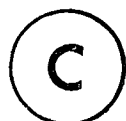


A MANAGEMENT PLAN FOR THE
UNIVERSITY OF BRITISH COLUMBIA RESEARCH FOREST

by



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B.S.F. (Brit. Columbia)

A THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF FORESTRY

in the Faculty of Forestry

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA

August 1981

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ABSTRACT

The Management Plan (1981) for U.B.C. Research Forest consists of four parts: a description of the Estate (PART I), a current management section (PART II), maps, figures and tables, and finally, the appendices and supporting material.

The Management Plan has a "rolling" format, Year 1 of the Plan is complete with detailed prescriptions and costs, Year 2 in relatively fine detail, Year 3-5 in more general terms, Year 6-10 broadly outlined, and Year 11+ used for "crystal ball" projections. PART II of the Plan is revised annually, the entire Plan at 5 year intervals.

Only one appendix (the index to the Central Filing System) is included in its entirety. Due to the bulk of the other appendices, only the header sheets are included with the Plan, the information being held in the Central Filing System at U.B.C. Research Forest.

Using the one complete appendix, any information pertaining to U.B.C. Research Forest can be found. A prime objective of planning is to ensure continuity of management intent. The Management Plan of the U.B.C. Research Forest has the format, and the information base required to fulfil the objective.

THE UNIVERSITY OF BRITISH COLUMBIA

RESEARCH FOREST

MANAGEMENT PLAN FOR PERIOD

COMMENCING 1 APRIL 1982

Plan approved by:

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This Management Plan (1981) was prepared under the direction of Dr. J.V. Thirgood who also researched and wrote sections of the Introduction and Part I during the summers of 1972 and 1973, and was consulted throughout the preparation of the Plan.

Mr. P.R.W. Sanders, worked on the Plan preparations intermittently between June 1974 to its completion in August 1981 and was responsible for the research compilation and writing of the remainder of Part I, Part II in its entirety, the collections of the extensive supplementary material, associated data collecting forms, recording documents, filing systems, figures, tables, maps and the overall format.

The numbering system was suggested by Mr. R.A. McLauchlin who undertook extensive proof reading and made numerous constructive suggestions.

Acknowledgement is also given to the many authors of past Forest publications, theses, research reports and general references consulted and made use of as appropriate.

AMENDMENTS

U.B.C. Research Forest Management Plan

Sheet # _____

Date	New Paragraph Number	Deletions (if any)	Signature
------	-------------------------	-----------------------	-----------

All additions to Part I of the Management Plan should be listed in the Amendments. New paragraphs should be numbered (and dated) to follow the paragraph behind which it is inserted. e.g. A paragraph replacing 1.1-9 would be 1.1-9 (year of revision), whole additional qualifying paragraphs to paragraph 1.1-9 would be 1.1-9.1 (year of revision) etc.

U.B.C. Research Forest

Management Plan

PART I

Description

PART I

1.0	INTRODUCTION	
1.1	Background	
1.1-1	The purpose of the U.B.C. Research Forest was set out in the restrictive covenant in 1943 as "For the purpose of instruction and demonstration in the practices of forestry and forest engineering." While many policy statements have been formulated since that time, the primary purpose of management of the Forest is still for education, research and demonstration.	PURPOSE OF MANAGEMENT FOR THE U.B.C. RESEARCH FOREST
1.1-2	In compiling this Management Plan, recognition has been given to the fact that some areas of ground are best suited for a particular purpose, (for example:- timber production, for wildlife, or recreation), with secondary uses accepted that are compatible with, but sub-ordinate to, the primary use.	DOMINANT USE
1.1-3	Thus, land allocation on the basis of use suitability, together with secondary uses ranked in hierarchial order and weighed as to relative importance, constitutes the overall land management strategy.	LAND SUITABILITY
1.1-4	However, the purpose of the U.B.C. Research Forest is for "instruction and demonstration" (para. 1.1-1) and all land use is constrained by activities related to the primary functions.	USE CONSTRAINTS
1.1-5	The satisfactory conduct of any enterprise requires a management plan, based on a study of all relevant facts to establish: first, the Objects of Management, to state the clear purpose of the controlling body, and, second, the means of achieving these objectives.	CONDUCT OF THE ENTERPRISE
1.1-6	Without some degree of planning and without control of the execution of an agreed plan, action becomes uncoordinated. Individual people, influenced by their separate objectives, abilities, knowledge and personalities react differently to immediate events and thereby often interfere with each other's acts, even if all participants in the enterprise agree continuously with its purpose. Generally, the bigger and more complex the enterprise, the more necessary is a plan of work written in the light of the stated objectives of management and available information. Such a management plan, after approval by higher authority and full consideration of all the circumstances, and sub-divided as necessary for operational purposes, defines the purpose of the undertaking and outlines the means for its accomplishment. No forest, and the U.B.C. Research Forest is no exception, can be managed efficiently in the absence of a carefully researched and prepared Management Plan designed to satisfy the declared Objectives of Management.	NEED FOR PLANNING

- | | | |
|--------|--|--|
| 1.1-7 | <p>A Management Plan is particularly necessary for the U.B.C. Research Forest where the functions of education, research and demonstration are combined, and where a changing community of researchers of varied disciplines and diverse objectives is operating, and which involves the participation of the U.B.C. Faculty of Forestry which encompasses a wide spectrum of interests. Moreover, because these activities depend for their financial support largely on the revenue produced from a self-sustaining operation it is essential that such a document be prepared correctly and in considerable detail.</p> | <p>EDUCATION
RESEARCH
DEMONSTRATION</p> |
| 1.1-8 | <p>Further, for continued efficiency, a forest enterprise must be dynamic. It is not enough that the operation be well founded, fully devised and controlled so that work has become a smooth routine. Conditions will change and concepts will evolve. New techniques will be developed and perfected. It is evident, therefore, that not only must there be a carefully conceived and maintained plan but that this plan must be periodically revised to take account of changes in management objectives. For such revisions to be possible there must be a continuous and intelligible record of results and collection of new information on which to base the revision. In every plan, and the U.B.C. Research Forest Management Plan is no exception, there must be incorporated means for recording results, for incorporating research findings into techniques, for collecting information from other sources and for storing, digesting and using such information.</p> | <p>DYNAMIC
MANAGEMENT
CONTROL</p> |
| 1.1-9 | <p>Since the U.B.C. Research Forest was established in 1943 and the initial non-prescriptive management plan was prepared in 1953, (Appendix 1.1-9-A) much information has been generated. This information has provided the basis for numerous theses, reports and research papers. These have contributed much to forest science in British Columbia. But most often the data have been developed, compiled, and recorded to meet the needs of specific studies. There have been major deficiencies in the systematic compilation and maintenance of forest records, in the generation of data in a form suitable for management purposes and, in general, in the compilation of information on the forest and forest environment considered as a unit. Where information has been collected, and reports prepared in a form suited to the needs of management, inadequacies in, and inattention to conservation of technical information has frequently resulted not only in the loss of information but also of significant management appraisals and evaluations.</p> | <p>REVIEW OF
PREVIOUS
MANAGEMENT
CONTROL</p> |
| 1.1-10 | <p>Further, there have been deficiencies in the formal long term planning for the achievement of the Objectives of Management.</p> | |
| 1.1-11 | <p>In summary, the wealth of information developed on the U.B.C. Research Forest has not been compiled, or adequately maintained, in a form suited to the broad, continuing research and education functions of the Forest as a managed forest.</p> | |

1.1-12	This Management Plan sets out to correct these deficiencies. Considerable emphasis is placed on the description of: the forest environment and growing stock, the past history of the Forest, a clear statement of Management Objectives, the provision of the necessary territorial management framework, the systematic conduct of operations to achieve the objectives, and the maintenance of essential records.	CLEAR STATEMENT OF FACTS
1.1-13	A written plan is an essential part of long term management. In forestry a management plan enables the governing body first to clarify and define the objects of management and to approve the subsequent policy of action and second, to organize the administration and treatment of the forest in harmony with the policy.	THE WRITTEN PLAN
1.1-14	Any plan soon is purposeless if it is not followed. It is not sufficient to prepare a Management Plan; it is also necessary to see that its provisions are carried out. It is essential, therefore, for a plan to provide for its own control and for the collection and record of results and new information as essential elements in the management of the forest.	PLAN EXECUTION AND CONTROL
1.1-15	But a Management Plan should not merely express and provide long and short term planning. It should also summarize the reasoning and justify the planning and proposed action. Without records of such reasoning, subsequent critical analysis of the plan will be handicapped.	SUMMARIZE REASONING
1.1-16	Effective reasoning, however, depends on a clear statement of Management Objectives, a digestion of past and current facts and their interaction and on the forecast of future events. It requires an assessment of growing stock and site, of the results of past treatment and assessment of current demands for raw material and services and an appreciation of future trends. It must include a stock-taking, a survey of resources and a study of limitations which together are analysed to enable decisions on policy and basic methods and detailed action to be made. That much of the necessary data for these are lacking for the U.B.C. Research Forest emphasizes the essential principle of data conservation in management planning. This Plan must provide for the maintenance of reliable records and reports of operations progress. Mechanisms must be provided for the collection of new data, the conservation of these data, and the inclusion of the data in subsequent revisions of this Plan so that decisions at any time are based on accurate information.	MANAGEMENT PLANNING
1.1-17	Therefore the content of the Plan proposed herein, is fourfold: 1. A survey and assessment of past results, present facts, resources and limitations upon which the management proposals are based. 2. An analysis of these facts with reference to prospects leading to conclusions on policy, Objectives of Management and basic methods - The Long Term Management Plan. 3. A plan for future action in a definite period - The Short Term Management Plan - in conformity with the Long Term Management Plan. 4. Provisions for control of the prescriptions and for maintenance of records for the collection of new data to further and refine future management.	SCOPE OF PRESENT PLAN

1.1-18

The Forest Management Plan should be evaluated and judged as a working document. Deficiencies in the Plan will become apparent in the working and these should be corrected in subsequent revisions of the Plan.

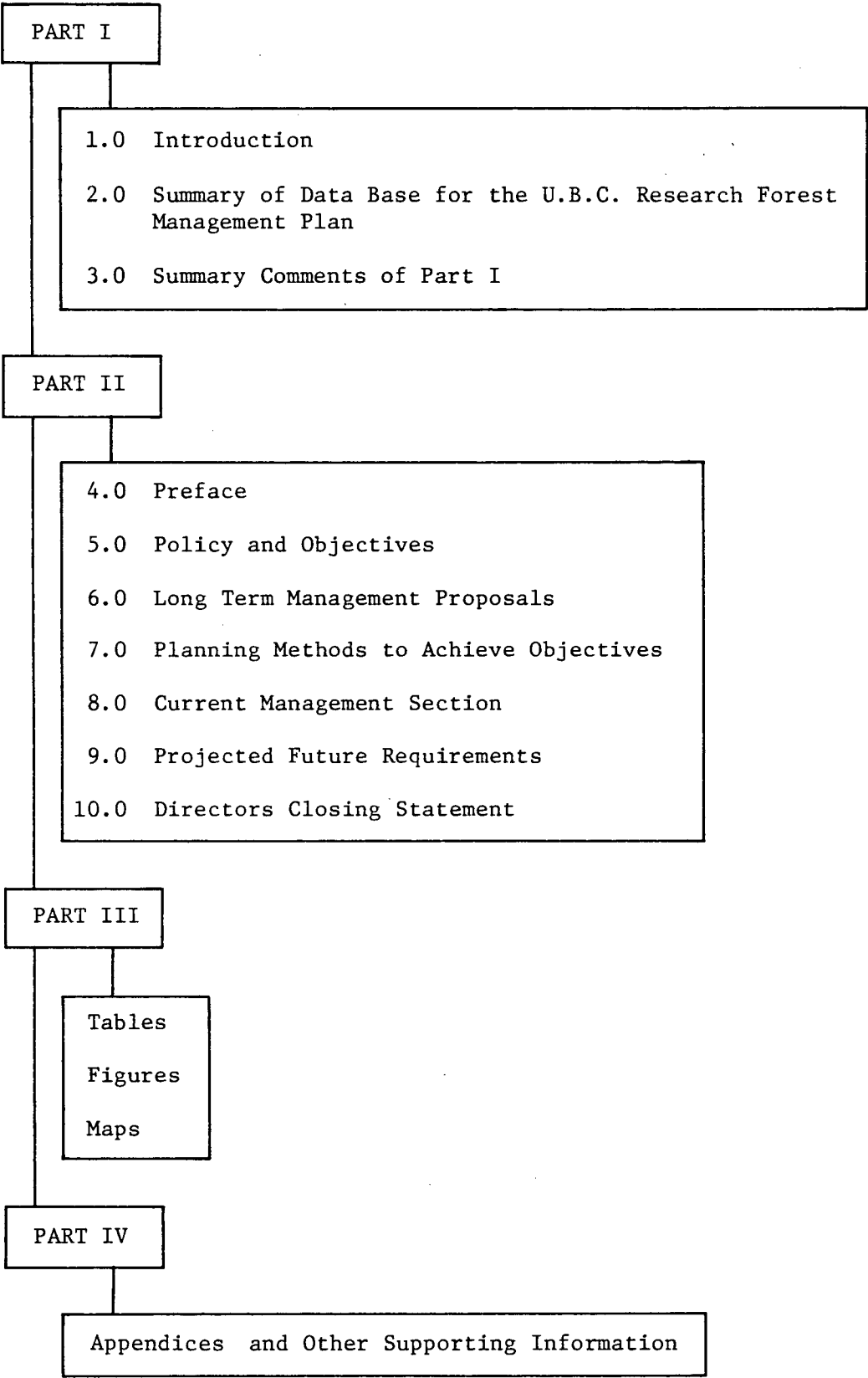
REVISION
OF THE PLAN

1.2 Objectives of the U.B.C. Research Forest Management Plan

1.2-1 The objectives of the Management Plan are as follows:

- a) To ensure that the declared forest policy for the U.B.C. Research Forest is made effective at all levels of forest management.
- b) To ensure the orderly and efficient development of the U.B.C. Research Forest within this framework of policy and to prevent uncoordinated management decisions being made without regard to their wider implications.
- c) To ensure that the aims of management, both long and short term, are clearly defined and that the methods of achieving these are realistic and are the result of a careful study of all relevant factors.
- d) To ensure that all concerned with the U.B.C. Research Forest are aware of its intended future development and thereby to achieve continuity of management.
- e) To bring together in readily accessible form such information as is necessary for the efficient management of the Forest and its operation and to provide a work of reference and a foundation upon which to base subsequent management.
- f) To ensure provision for the systematic compilation of information regarding the U.B.C. Research Forest.
- g) To provide a mechanism by which the working plan may be reviewed and changed as circumstances may from time to time require.

Figure 1.3.-1-A Overall Organization of the U.B.C. Research Forest Management Plan



1.3 Design of the Management Plan

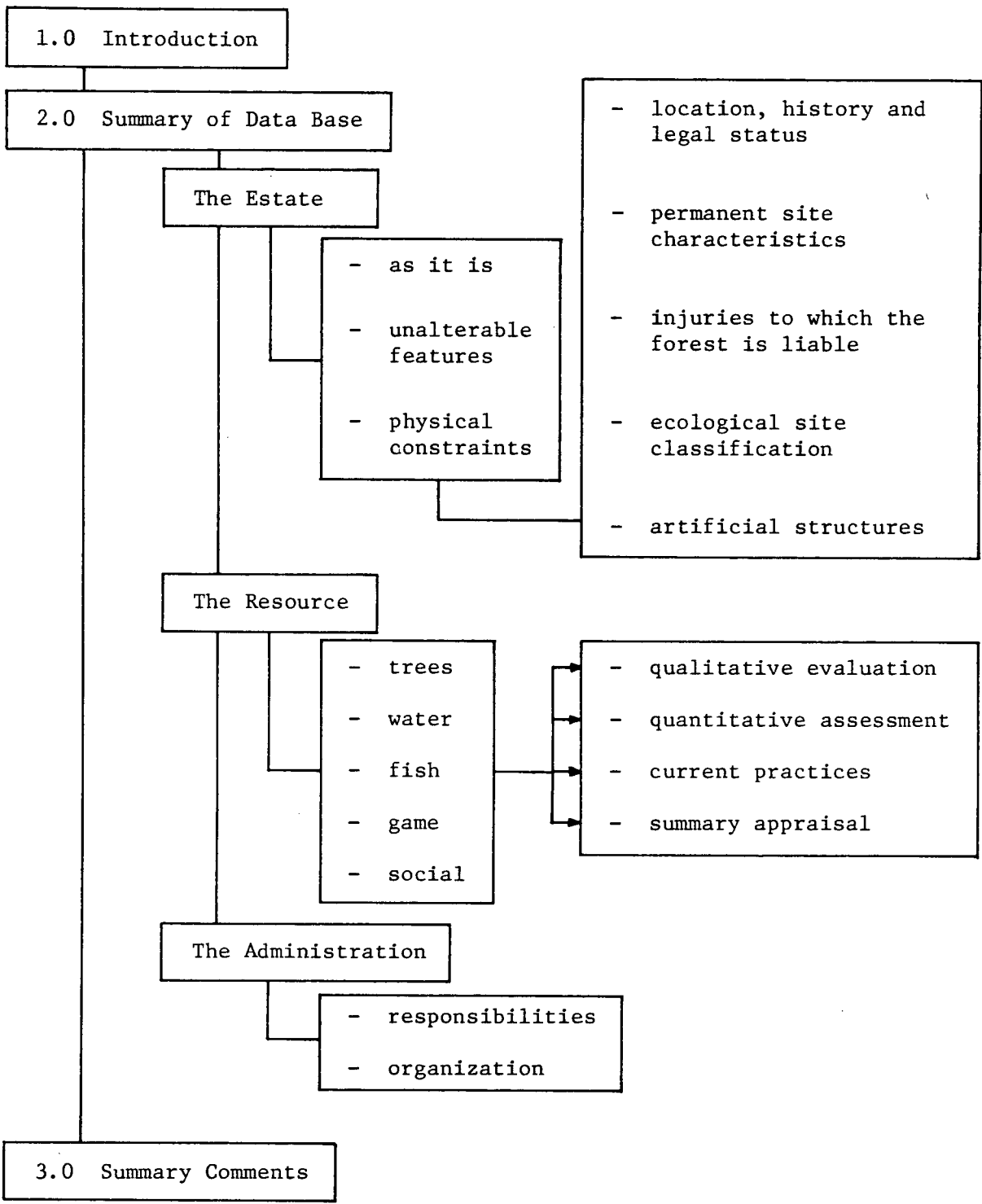
- 1.3-1 The U.B.C. Research Forest Management Plan follows, in part, as shown in Figure 1.3-1-A, the traditional pattern. GENERAL
PLAN
ORGANIZATION
- Description - Part I supported by Part III and IV.
Prescription - Part II based on the data base in Part I.
- 1.3-2 The Plan departs from the traditional framework in that it is not concerned with a fixed period, but is inovative in that it is a permanent, open-ended document, subject to regular amendment and review. Extensive use will be made in future of management aids (e.g. machine generated reports, computer based retrieval systems), as they become available, and provision will be made in the plan to incorporate projections and constant updating procedures. OPEN-ENDED
PLAN
- 1.3-3 As more information becomes available, the descriptive section, Part I, will be revised. All additions and amendments will be noted in the Record of Amendments, and when additional paragraphs are inserted, paragraph numbers will be decimalized to accomodate the additions (see "Amendments"). Every five years, the Part I will be revised to incorporate the amendments and update historical and resource information. REVISION
PART I
- 1.3-4 In Part II, programmes of a qualitative nature are written, followed by detailed quantitative prescriptions. Costs are estimated on a one year basis, constituting an annual programme, with longer term projections being made of treatment for the growing stock, and other forest assets, for a period of 5 or 10 years ahead. Procedures are included for complete re-appraisal at these or other suitable intervals.
- 1.3-5 At intervals of five years, in the light of the amendments noted in 1.3-3, the plan will be re-appraised as to its satisfaction of the Objectives of Management, and the continuing applicability of the objectives of management. After the revision, the plan will be submitted to Higher Authority for approval. PLAN
RE-APPRAISAL
- 1.3-6 Part I has three major sections as shown in Figure 1.3-6-A. PART I AND II
ORGANIZATION
- (a) The Estate
(b) The Resource
(c) The Administration

These sections are supported by the Part II Appendices which contain detailed information.

Part II has six major sections:-

1. Policy and objectives
2. Long term management proposals
3. Planning methods to achieve objectives
4. Current management proposals
5. Projected future requirements
6. Director's closing statement

Figure 1.3-6-A Organization of Part I of the U.B.C. Research Forest Management Plan



1.3-7

Because the plan will also have an educational function many descriptive materials and definitions are included in the Part IV Appendices which would not appear in a usual management plan.

PART III
ORGANIZATION

Three stages can be identified in the preparation of the Management Plan.

PREPARATION
OF THE PLAN

a) Long term planning

The first stage in the development of the U.B.C. Research Forest Management Plan was to conceive in broad outline the future evolution and development of the U.B.C. Research Forest. This involved an analysis and evaluation of the environmental factors, social trends, and the condition of the growing stock. Policy was defined and general consideration given as to how this might be implemented. Some measures, such as the establishment of compartments and their allotment to working circles had to be considered for several decades ahead. Similarly, in rather broader terms, attention had to be directed to the question of the yield. However, under the special circumstance of the U.B.C. Research Forest, very detailed planning for ten or twenty years ahead is almost certain to be a waste of effort; such advance planning has to be simple and flexible. Nevertheless, long term planning to determine the general policy and basic methods to be employed forms the essential foundation on which management rests and this has been fully recognized in the preparation of the Plan.

b) Forecasts

Due to the dynamic nature of forest management and swiftly changing circumstances, it is recognized that detailed quantitative prescriptions made more than one year ahead can rapidly become obsolete. A forecast of quantities and actions, therefore, is made for five years ahead, to be revised and extended by one year on an annual basis, specifying (in general terms only) the location of the operations and quantities per year for each of the five years. (Detailed prescriptions and estimated costs are made in the annual plan and relate to specific areas.) It was visualized that forecasts made under a five year open-ended plan will be made with the benefit of modern management aids (such as linear and dynamic programming techniques) as they become available, and thus in the future the yearly revision exercise will be somewhat simplified. The object of the forecasts is to ensure that work prescribed, the available labour and the finance are in balance, and that any changes in circumstances or requirements are foreseen and recognized well in advance.

c) Short term planning and annual programme

A detailed programme of work and one year cost estimates will be prepared annually. These will specify, for one year ahead, the extent and location of all operations to the end of the second year. No costs will be scheduled by area (e.g. working circle, compartment or sub-compartment). They are, in effect, the quantitative prescriptions that form the basis of the annual financial estimates, and after approval, serve as the Director's instruction for the year.

1.3-8

"Long term planning", "forecast" and "programme" are not to be confused. Long term planning involves the development of the overall management objectives along the lines of stated policy. It is expressed in general, rather than specific terms. The forecast shows the quantity of work which will be required for a number of years ahead to keep the U.B.C. Research Forest in good order and to carry out the Objects of Management. The annual programme specifies firm prescriptions for the actual work and its location for one year. In practice it is not possible to consider the requirements of the Forest without, at the same time, taking into account the resources likely to be available in any one year. Additionally, because of the special nature of the Forest, modification of the term forecast may be necessary to satisfy educational and research objectives.

2.0	SUMMARY OF THE DATA BASE FOR THE U.B.C. RESEARCH FOREST MANAGEMENT PLAN	
2.1	The Estate	
2.1-1	Location and Extent of the U.B.C. Research Forest	
2.1.1-1	<p>The 5151 hectare (12,728 acre) University of British Columbia Research Forest, owned by the University of British Columbia, is located approximately six kilometers (four miles) north of the town of Haney, B.C. and 58 km (36 miles) from the University Campus on Point Grey, Vancouver (see Map 2.1.1-1-A). The latitudes ($\pm 1'$) of the south and north boundaries are $49^{\circ} 15' 00''$ and $49^{\circ} 21' 43''$ respectively and the longitudes of the east and west boundaries are $122^{\circ} 31' 10''$ and $122^{\circ} 35' 56''$ respectively. The U.B.C. Research Forest comprises the entire area of Township 4, Range 5, West of the 7th Meridian together with fractional townships and part of Sections 33 and 34, Township 12, less some 147.7 ha (365 acres) of Crown Grants and pre-emption claims.</p>	NAME, LOCATION AND OWNER
2.1.1-2	<p>The Research Forest is bounded by Golden Ears Provincial Park to the north and east; Pitt Lake and the tidal flats and reclaimed land of Pitt Meadows and Pitt Polder to the west and the Municipality of Maple Ridge to the south. The complete boundary has been legally surveyed as Lots 6110 and 7074 Group I New Westminster District. A statement of the metes and bounds is given in Appendix 2.1.1-2-A. An index of all maps is contained in Appendix 2.1.1-2-B.</p>	BOUNDARIES
2.1.1-3	<p>The U.B.C. Research Forest comprises on compact block some 4 kilometers ($2\frac{1}{2}$ miles) wide east-west, and 12 kilometers ($7\frac{1}{2}$ miles) long north-south. The area is divided into 35 compartments varying in size from 83 hectares (206 acres) to 263 hectares (651 acres). A general land classification of the U.B.C. Research Forest is shown in Table 2.1.1-3-A. Compartments are detailed on Map 2.1.1-3-A, while land classification by compartments is shown on Table 2.1.1-3-B.</p>	DISTRIBUTION OF AREA AND COMPART- MENTATION
2.1.1-4	<p>There are 17 lakes on the U.B.C. Research Forest (Map 2.1.1-4-A). Eleven of these are under 8 ha (20 acres) in size while the largest body of water within the Forest is Loon Lake, which is approximately 1.6 km (1 mile) long and 0.4 km (0.25 mile) wide (Table 2.1.1-4-A).</p> <p>Jacob's (Marion), Gwendoline, and Eunice Lakes were named after Mr. McCormick's (see 2.1.2-9) wife and daughters respectively, Katherine after Professor Malcolm Knapp's wife, Shirley after Mr. Bruce Webster's wife and Betsy after Miss. Bilodeau, Secretary at U.B.C. Research Forest for many years. Confusion exists in regards to Jacob's Lake which is so identified on official topographic maps. However, the name Marion Lake is in common use and has been since this name was bestowed by Mr. McCormick early this century. Therefore, in the Plan the name Jacob's Lake will be used with the name Marion shown after in brackets.</p>	LAKES

- 2.1.1-5 A number of rivers and small creeks run through the U.B.C. Research Forest (Map 2.1.1-4-A). These are year around flows and are deeply cut, often with steep channels. Lengths, widths and areas of the main creeks and rivers on the U.B.C. Research Forest are shown in Table 2.1.1-5-A.
- 2.1.1-6 Lengths of rivers and creeks were determined from the 1:12,000 base map of the U.B.C. Research Forest. Widths of rivers and creeks were estimated from a series of field measurements.

- 2.1.2 The History of the U.B.C. Research Forest
- 2.1.2-1 The history of the U.B.C. Research Forest is typical of the coastal forests of British Columbia - it is one of fires and logging. The oldest trees are 750 years old and although some stands have been reserved, logging, fire and Typhoon Frieda in the fall of 1962 have taken their toll. The most common age of the presently existing old growth is 300 years. Map 2.1.2-1-A shows the location of the old timber berths and licences on the Forest. GENERAL HISTORY OF THE FOREST
- 2.1.2-2 The oldest substantial area of second growth is on the Pitt Lake Slope and probably originated following a fire started by lightning, early prospectors, or Indians about the year 1840. Second growth stands also originate from an earlier small fire that occurred in the south-west corner of the Forest about 1780. The fire history of the U.B.C. Research Forest is shown on Map 2.1.2-2-A.
- 2.1.2-3 With these exceptions, all the area that today supports older second growth was burned over by a large fire in 1868, one year after the Confederation of Canada. In this year many catastrophic fires burned all along the west coast of North America from California to Alaska as a consequence of the great drought that extended from April to November of that year. Fires occurred in the islands in the Gulf of Georgia and throughout much of the Fraser Valley. Men - prospectors, farmers clearing land and Indians - caused most of the fires. Contemporary accounts of the early fire history of Coastal British Columbia are given in Appendix 2.1.2-3-A. THE 1868 FIRE
- 2.1.2-4 In 1912 Mr. E.A. Marc, sometime French consul in Victoria, and his wife homesteaded on a 157 acre (63.5 ha) Crown Grant below Loon Lake within the south-western portion of the area now comprising the U.B.C. Research Forest and a short distance from the Southern boundary (Map 2.1.2-1-A). During the First World War Mr. Marc served as a Captain in the French Army. Shortly after the war the Marcs resettled on their property. Although they cleared about 5 acres (3 ha) of land their primary source of income was from Mr. Marc's work in the woods. He ran a small logging operation taking out shingle bolts, cedar poles, sawlogs and shakes from what is now the U.B.C. Research Forest and maintained a camp on his property for his Japanese work crew. From 1922 to 1932 Mr. Marc operated a shingle mill at the southeast corner of his property and over the years built many miles of skid roads, some requiring rock cuts, cribbing and bridges as long as 100 feet (30 metres). MR. E.A. MARC
- 2.1.2-5 Most of the merchantable timber on B.C. Forest Service Timber Sales X12935 and X14785 (X13636) was logged by Mr. Marc (Map 2.1.2-1-A). In the case of Timber Sale X16769, however, only the cedar poles and dead cedar were removed from the southern portion of the sale. Mr. Marc also removed quantities of cedar from Timber Berth "W", west of Alouette River which had been left uncut by Abernethy and Loughheed Logging Co.

- 2.1.2-6 The timber on Mr. Marc's own holding was similar to that on the forest lands adjoining. It comprised a mixture of four to thirty-six inch (ten to eighty-eight centimetres) diameter Douglas-fir, western hemlock and western red cedar about eighty years old. Over the years Mr. Marc took out a considerable quantity of logs from the lower half of his property so that by 1956 the stand was badly broken up with brush openings and patches of young hemlock. The upper half remained untouched except for the removal of salvage material. In 1957 Mr. Marc sold the remaining timber on his holding to Herman Sawmills of Mission, receiving \$52,400 for it. Trees ten inches (25 cm) and under in diameter were not to be cut. Subsequently a second operation removed most of the remaining small diameter material. In 1963, a third, small scale operation removed small poles and fence posts. No timber as such was left on the area but there was some scattered small material.
- 2.1.2-7 When the Faculty of Forestry first obtained the U.B.C. Research Forest the surrounding area was unsettled and the Marc family were the only permanent residents, and were of considerable help to the Faculty. The first students on the Forest stayed with the Marcs. For several years the only road on the Forest was the one through their property and the main public access gate was on their property.
- 2.1.2-8 In later years Mr. Marc rented boats to fishermen on Loon and Blaney Lakes. In 1959 Mr. Marc died. The boat rental business was continued by Mrs. Marc and her son Marcel until 1968 when their property was purchased by the University, with their boat concession. The Marcs were pioneers in working with the public in the public use of the area.
- 2.1.2-9 Much of what is now the U.B.C. Research Forest was staked in the timber boom at the turn of the century. Timber Berth "W" (Map 2.1.2-1-A) originally contained about 15 square miles (38.8 sq. km) of mature timber and was about equal in area to the present U.B.C. Research Forest. It was granted by the Dominion of Canada and held by Mr. McCormick of McCormick Deering Co. the manufacturers of farm equipment. As early as 1910-1911 a few men were employed to establish base lines, build trails, cruise and map, and to serve as a fire crew. Headquarters were established in Haney on 14th Avenue near 22nd Road with telephone communication to a camp on Loon Lake and to a lookout on the knoll north of Mr. Marc's homestead. On Jacob's (Marion) Lake Mr. McCormick built a log house which later was shipped to the Chicago World's Fair.
- 2.1.2-10 Relatively little timber was logged until the mid nineteen-twenties when the Abernethy and Lougheed Logging Company (the A and L) ran the biggest railway logging operation of its time in British Columbia, on what is now the eastern third of the U.B.C. Research Forest. At the peak of activity, one thousand men were employed in logging and the operation was a show-place for distinguished visitors to the Province. Visitors during this period included the Prince of Wales, Mr. Winston Churchill and the Crown Prince of Germany.

MR. MCCORMICK

THE
ABERNETHY
AND LOUGHEED
LOGGING
COMPANY

2.1.2-11

The following volumes of timber were logged between 1921 and 1923 on Timber Berth "W" by the Abernethy and Loughheed Logging Company.

Volumes (MM f.b.m) logged from Timber Berth "W"¹ 1921-1923

Year	Fir		Hemlock	Cedar	Others	Total
	Logs	Fuel				
1921	4.6	1.2	1.7	7.9	-	15.4
1922	6.0	1.4	3.1	12.5	0.1	23.1
1923	11.6	2.0	6.9	30.6	0.3	51.4
	22.2	4.6	11.7	51.0	0.4	89.9

¹See Map 2.1.2-1-A

Average volume logged per acre was 61.5 M board feet on the 1,460 acres (590 ha) cut during the period 1921-1923. In a later year the cut reached a maximum of 115-125 MM board feet.

2.1.2-12

In 1921 the Company began large-scale operations on areas adjacent to the southeast corner of the U.B.C. Research Forest. Headquarters were moved to Allco (on the South Alouette to the north-east of Haney), and logs were dumped in the Fraser River one mile east of Haney to be sold on the open market. Gradually operations extended into the area now known as U.B.C. Research Forest and camps were established at Alouette, Mike, and Jacob's (Marion) Lakes, and on Gold Creek flats, in addition to the headquarters at Allco. Most of the logging was done by cold decking and swinging, although an incline was used at Mike Lake. Six locomotives were employed and many miles of railway grade were constructed, all by hand labour. Gravel came from the foot of Alouette Lake. Company operations were reduced by the depression and the main operation closed in 1931 after the fire that burned over the A and L holdings (Map 2.1.2-2-A). Approximately 1,800 acres (730 ha) of the timber berth, mainly at higher elevations, remained to be logged. Logging continued for several years on a small scale along the shores of Alouette Lake.

2.1.2-13

In 1933, an unsuccessful attempt was made to exchange the Timber Berth for an equivalent value of Crown timber at Salmon River; at that time the British Columbia Forest Service cruised the Berth and estimated its volume at 41 million board feet. However, the Berth was reduced in size, most of it reverting to the Crown. With the extension of Garibaldi Park down to Maple Ridge, the remaining portions of the Berth reverted to the Crown and were placed in the Park.

2.1.2-14

The B and K Logging Co. operated on Raven Creek from 1921 to 1931 and logged Timber Berth 351 (Map 2.1.2-1-A), a part of which lay in the northern portion of the present Forest. Logs were transported to Pitt Lake by a sky line from the end of the company's railway.

B & K LOGGING
(BROWN AND
KIRKLAND)

- 2.1.2-15 In September 1925 a fire started near Alouette Lake, swept across an area of 1,560 acres (630 ha) of logging slash, and destroyed twenty million board feet of timber and two yarding machines (Map 2.1.2-2-A). On slopes the burn was very severe and left only a thin covering of soil. The first fires in the area adjacent to Spur 17, a main branch of the railway, occurred in February, March and August of 1926. THE 1925/26 FIRES
- 2.1.2-16 Sparks caused by a line striking some rocks on the B and K operation started a fire in July 1931. It was fought all night and thought to be under control the next morning, but it suddenly flared up, crowned and travelled northward to Pitt Lake and southward to the A and L operations, burning all the slash up to the main line at Mike Lake (Map 2.1.2-2-A). The fire was fought for 33 days before the main crew was laid off. Up to 2,500 men were employed on the fire at one time; one hundred men were camped at Blaney Lake for six weeks, and supplies were back-packed from Mr. Marc's farm. This fire destroyed all of the A and L operations. THE 1931 FIRE
- 2.1.2-17 The U.B.C. Research Forest is situated in the one time Railway Belt. This tract was administered by the Federal Government until 1930 when it was transferred back to the Province. Timber Berths "W", 351, and 609 were staked in 1900, 1909, and 1923 respectively (Map 2.1.2-1-A). Timber Berths "W" and 351 were in large part logged and then reverted to the Crown. Timber Berth 609 was held by the Webber Lumber Company for several years before it reverted, uncut, to the Crown. When the Garibaldi Park Boundary was extended toward what is now the Municipality of Maple Ridge in 1968, it included part of what is now the U.B.C. Research Forest. EARLY ADMINISTRATION
- 2.1.2-18 In 1927, a trial of about eight exotic species including Sequoria gigantea, Ponderosa pine, Scots pine, Siberian larch, elm, ash and red oak was established by the B.C. Forest Service one mile east of the present U.B.C. Research Forest and two nearby areas were broadcast seeded with western red cedar. In the period 1928-30, the logged-over portions of Timber Berth "W" (Map 2.1.2-1-A) were examined for the purpose of recording vegetational changes taking place after logging. A line of plots was established by the B.C. Forest Service to give a typical cross-section of each setting. EARLY RESEARCH
- 2.1.2-19 In about 1912, a party of forestry students from Michigan spent the summer on Mr. McCormick's property, engaging in fire protection, cruising and related exercises. EARLY EDUCATION

- 2.1.2-20 On March 1, 1943, the Provincial Government set aside from Garibaldi Park under lease to the University an area of 9,774 acres (3,957 ha) between Haney and Pitt Lake designated, at that time, as the University Forest Reserve. The lease was for 21 years, subject to renewal if the Reserve was being used for the purposes intended, which were defined as "for forestry demonstration purposes". During 1943-45 road surveys were made to establish the first road into the University Forest, to Loon Lake. A gift of \$25,000 by Dr. H.R. McMillan, together with a grant by the Board of Governors of the University of British Columbia, provided the funds for building the two and one-half miles of road (four kilometers) which was completed in October 1946. Prior to this time the only connection between Loon Lake and the end of the Municipal road from Haney at the Marc homestead, was a fisherman's trail.
- THE
ESTABLISHMENT
OF THE
UNIVERSITY
FOREST RESERVE
- 2.1.2-21 The preliminary work of clearing, stumping, and grading a campsite at Loon Lake to provide accomodation for students, instructors and research workers was started in the autumn of 1946. A portable sawmill was set up at the site to slab the logs required for the buildings, to saw shakes and boards from standing dead cedar, and to cut other lumber needed for floors, doors and window frames. The adjacent forest provided all of the wood for building.
- 2.1.2-22 In 1947, financial support was pledged by the Forest Industry for the construction of Loon Lake Camp, contingent upon the Crown-Granting of the area to the University by the Provincial Government. The Crown Grant was issued to the University on March 25, 1949, and the British Columbia Loggers' Association gave \$140,000 for the completion of Loon Lake Camp.
- THE 1949
CROWN GRANT
- 2.1.2-23 During the first decade (1949-1958) the initial steps were taken to change the U.B.C. Forest from an unorganized and inaccessible forest area to a managed forest estate. Logging operations provided revenue for the building of roads, buildings and other necessary facilities. The declared aim was to provide a well-managed, self sustaining forest area that would serve to best advantage the needs of research, education, demonstration, and recreation. Development followed a distinct pattern. Facilities for education were the first to be provided. A road (2.1.2-20) was built to connect Loon Lake in the west-central section of the Forest with the public road ending at Mr. Marc's Crown Grant in the southern part. Loon Lake Camp (2.1.2-21 and 22) was constructed and officially opened on September 15, 1950.
- THE FIRST
DECADE
1949-1958
- 2.1.2-24 In May 1954 at a ceremony at Loon Lake, attended by 200 guests prominent in government, industry, and education, the U.B.C. Research Forest was dedicated as the first certified Tree Farm in British Columbia by the Canadian Forestry Association (Figure 2.1.2-24-A).
- TREE FARM
NO. 1

- 2.1.2-25 Concurrent with Camp and road construction, steps were taken to prepare for more intensive management. From 1945 to 1948, one or two students had been employed each summer by the University with grants from the B.C. Research Council for two projects, one concerned with the ecology of the timber edges adjacent to cut over areas, and the other with the survey of regeneration on logged areas. A Resident Forester was appointed in July 1948 and in April 1956, a Research Forester was added to the staff. In December 1956 an Administration building was completed, located at the entrance to the Forest. Funds available at first, amounted to an annual grant of \$7,000 from the University, sufficient only for staff salaries and necessary supplies and expenses. Consequently, activities in the early years were restricted largely to reconnaissance and mapping of topography and forest cover and the establishment of a few sample plots.
- 2.1.2-26 1951 By 1951 the preliminary surveying and mapping of the U.B.C. Research Forest was completed with a five percent timber cruise and the establishment of baseline control. Excluding Pitt Lake Slope in the northwest the total estimated volume of merchantable timber twelve inches (30 cm) and larger in diameter was eighty-two million board feet. A twenty percent cruise was undertaken on 1600 acres (650 ha) of mature timber. One quarter of the surveyed area comprised non-productive sites and fully stocked 20 year old reproduction. Of the remaining 3,000 acres (1210 ha) a fringe along the timber edge was fully stocked while the rest was a complex mixture with varying degrees of stocking salmon-berry and bare ground.
- 2.1.2-27 1952 In the face of financial limitations, the relatively small scale logging of the earliest years-salvage logging of dead cedar over 450 acres (182 ha) and right-of-way timber along the Loon Lake road in 1951 - gave way to a large scale logging involving an estimated 6 million board feet. The initial undated, descriptive Management Plan (a copy of which is not available), was revised and a fire-control plan prepared.
- 2.1.2-28 1953 In 1953 operations and development increased greatly and timber sale activity in particular was much expanded. The sale of dead cedar continued in the area south of Blaney Lake. The sale of the Loon Lake road right-of-way timber was completed. A 10 acre (4 ha) clear cut was made in decadent, mistle-toe infected western hemlock and western red cedar immediately southeast of Loon Lake Camp. One hundred and fifty acres (66 ha) of patchy old growth consisting of decadent fir, cedar, and hemlock situated on both sides of the North Alouette River adjacent to the southern boundary of the Forest were sold. This timber was decadent but of high quality and unusually large quantities of windfalls were found to be merchantable. An estimated volume of 6 million board feet was included and three years allowed for logging.

STUDENT
EMPLOYMENTRESIDENT AND
RESEARCH
FORESTERS
APPOINTEDRECONNAISSANCE
MAPPINGPRELIMINARY
SURVEYSCRUISE
DETAILSTIMBER
SALE
ACTIVITIES
INCREASE

2.1.2-29	<p>Road construction was extended and where possible old railway logging grades were used as roads. The locations of the old railway logging grades on the Forest are shown in Map 2.1.2-29-A. The longest section of new road was 8,500 feet (2600 m) and was constructed in the Alouette River sale area and was located to provide the first stage of a proposed main north-south haul road. The Loon lake road was joined to the railroad spurs in the cut-over area by 6,200 feet (1890 m) of road north of Blaney Lake. The main railroad grade (Spur 17) was opened from Placid Lake in the northern part of the Forest, south and eastward for approximately five miles to connect with the road system in Garibaldi Park. Construction was begun on 1,500 feet (457 m) of road to connect 14th Avenue, below the Marc Homestead, with the Alouette River road in order to bypass excessive grades on the 14th Avenue hill. The Management Plan was again revised and approved. It remained descriptive rather than prescriptive. Both revenues and expenditures greatly increased over previous years.</p>	<p>ROAD CONSTRUCTION ACCELERATED</p> <p>USE OF OLD RAILWAY GRADES</p>
2.1.2-30	<p><u>1954</u> In 1954 two new sales were made for the salvage of dead cedar from about 700 acres (280 ha) of cut-over lands. Several thousand feet of new road were constructed on the west side of the North Alouette River and the east-west road joining Loon Lake road with Spur 17 (Map 2.1.2-29-A). One mile of railroad grade east of the Alouette River timber sale was opened and connected to the railroad spur at Mike Lake and the road network in the timber sale area. By the end of 1954 approximately ten miles of roads were in use, providing access to the Loon Lake Camp, the old logged areas as far north as Placid Lake, and the south-eastern part of the Forest, and seven miles of road were under construction. A fire control plan was completed. Four water holes were constructed in the drier areas of the old, cut-over lands.</p>	<p>MORE TIMBER SALES AND ROAD CONSTRUCTION</p> <p>FIRE CONTROL PLAN PREPARED</p>
2.1.2-31	<p>At the close of 1954 the U.B.C. Research Forest was in the favourable financial position of having substantial reserve funds. The timber-sale policy had become well established and an adequate annual income was reasonably assured. Up to this time, operation and development had concentrated on logging and road construction. Very little had been done to prepare sites, control brush, improve stands, or plant on a large scale.</p>	<p>FAVOURABLE FINANCIAL POSITION</p> <p>NO STAND TENDING OR LARGE SCALE PLANTING</p>
2.1.2-32	<p><u>1955</u> By the end of 1955, eight timber sales were in operation. Four sales encompassed dead cedar on the old logged and burned areas, while the balance comprised right-of-way timber, the large (continuing) timber sale adjacent to the southern boundary, an area one-half mile west of Loon Lake Camp, and a sale planned as a "commercial thinning" (to salvage dead and down cedar), although the thinning included a portion of the residual stand. The first cedar pole sale was designed as a pre-logged operation in an over-mature stand scheduled for clear cutting. By the end of 1955, approximately 2,200 acres (890 ha) were included in contracts for salvage and timber sales. A total of 4,993,000 board feet of scaled volume was logged during the year.</p>	<p>SALES OF DEAD CEDAR</p> <p>"THINNING" OPERATIONS</p>

Road construction and rehabilitation continued and by year end about 17 miles (27.2 km) of road were usable. Operations including pruning of open grown twenty year old Douglas-fir on fifty acres (20 ha) and snag falling over several hundred. A fire suppression and maintenance crew of Canadian Forestry Association Junior Forest Wardens was employed during the summer on a variety of miscellaneous operations; similar crews were to be employed in subsequent years.

HIGH
PRUNING

FIRE
SUPPRESSION
AND
MAINTENANCE
CREW

2.1.2-33

1956 The year 1956 saw changes in policy. Development to that time had emphasized road construction and the sale of timber. However, it was evident that construction and the sale of timber had outstripped maintenance and essential silvicultural operations and problems of brush and slash disposal had begun to accumulate. In this year site preparation and planting operations were started and 40,000 Douglas-fir seedlings were planted. However, the programme of road construction continued with completion of 4,500 feet (1370 m) of new road. Excessive damage to the Loon Lake road, due to exceptionally heavy fall rains, was made good. Culverts were reconstructed and other repairs were made on roads. West of Jacob's (Marion) Lake there were three new timber sales: one sale of right-of-way timber, one for shingle bolts and cedar logs left after shake operations and a sealed tender sale for cedar on 250 acres (101 ha) of logged road west of Spur 17, (Map 2.1.2-29-A). Three other timber sales were extended in time, and three sales completed, including the large sale started in 1954. Approximately 4.06 million board feet were logged plus a large volume of shakes, blanks and shingle bolts. Revenues were the highest on record.

PLANTING
COMMENCED

MORE
TIMBER SALES

2.1.2-34

1957 During 1957/58 timber sale activity continued at a high level. In progress were the following salvage operations for the removal of split cedar and other forest products:

HIGH LEVEL
OF
TIMBER SALES

- two cedar pole sales (one to pre-log an old growth stand and the other to cut selectively a younger stand).
- one salvage and low thinning sale in a 65 year old stand (to remove small logs, posts, poles, pilings and pulpwood).
- a salvage sale of fire damaged timber.
- a sale of right-of-way timber.
- two sales of overmature timber (one of 70 acres (24 ha) and the other of 8 acres (3.2 ha)).

Product details are summarized in Table 2.1.2-34-A.

A new product, hemlock pulpwood, previously unmerchantable, appeared in 1957 and made possible the salvage of formerly unmerchantable material and the commercial thinning in some second growth stands.

2.1.2-35

Road construction and maintenance continued with a total of seven miles (11 km) of road constructed or made usable from old railroad spur lines. Access was provided to a timber sale at Goose Lake, the road being built by the contractor as part of the terms of the timber sale. Access was provided to the southeastern parts of the Forest. The original Loon Lake road was again repaired. Planting was carried out on 145 acres (59 ha), as follows:

Old A and L cut over (15 ha - 37 acres).
Planted 2+0 Douglas-fir.

Old A and L cut over (24.7 ha - 61 acres)
Spot seeded redcedar.

Alouette River Sale (0.8 ha - 2 acres).
Planted poplar.

Alouette River Sale (18.2 ha - 45 acres).
Planted 2+0 Douglas-fir.

Snag falling continued. The Junior Forest Warden Crew was enlarged. Primary development was completed on the southern half of the Forest. Four north-south roads, less than half a mile apart, provided access to all areas. All overmature and decadent timber had been logged except for areas reserved for demonstration and research. A start had been made on rehabilitating old and new cut-over areas. Snags had largely been eliminated.

SNAG
FALLING

2.1.2-36

The Fire Control Plan and the Management Plan were revised. Road construction and timber sale activity continued at a high level. The bridge spanning Blaney Creek on Road M was replaced and a garage/workshop was constructed adjacent to the Administration offices. Planting and snag falling continued and a slash fire escaped during site preparation activities, burning approximately 50 acres (19 ha) of slash. All operations on the Forest were reported as "satisfactory" and timber sales produced a good income. A summary of activities for the years 1948-1957 is shown in Table 2.1.2-36-A.

FIRE CONTROL
AND
MANAGEMENT
PLAN REVISION

1948-1957
ACTIVITY
SUMMARY

2.1.2-37

The teaching programme. During the first decade (1948-1958) extensive use was made of the U.B.C. Research Forest for teaching purposes. An annual camp extending over three weeks, was held each year when third year forestry students were given an intensive course covering various types of practical forestry work. Especially in the early years, much of this programme contributed to the development of the Forest and many of the road surveys, cruises, and related activities were undertaken by students. The potential of the Forest as an educational centre was seen largely in terms of a managed unit along industrial lines. An industrial approach was emphasized with considerable emphasis on current industrial practice.

ANNUAL CAMPS
FOR U.B.C.
FORESTRY
STUDENTS

2.1.2-38

The research programme 1949-1958. Prior to 1949 there was only limited research activity. In 1949 the forest industries of British Columbia provided funds with which to begin a research programme. From then, research steadily expanded by means of funds from the University, and from the sale of timber, and during the subsequent decade, the research programme of the Faculty of Forestry was centered around the U.B.C. Research Forest. A major impetus came in 1956 with the appointment of a Research Forester to the Forest staff. Sixty-three projects were undertaken (Appendix 2.1.2-38-A), many publications, reports and theses were produced (Appendix 2.1.2-38-B) and the U.B.C. Research Forest became widely recognized for its research

EXPANDING
RESEARCH

contribution. This reputation was gained quickly, and largely at a time when funds and staff were limited, and, it appears that these limitations were responsible for the circumstances that all research projects, with the notable exception of a thinning project initiated in 1949, were short term and observational. The emphasis on large scale operation and the commercial pressures inevitably present in a business enterprise undoubtedly interfered with the establishment of long term silvicultural studies and served to reduce the area available for demonstration and experimentation (Appendix 2.1.2-38-C).

- 2.1.2-39 1959-1973 The following section continues in "diary" form with selected topics extracted from Annual Reports, minutes of meetings of various committees and records of the Forest. Note should be taken of the brief references to policy, the development of work programmes (e.g. timber harvesting) and the general trend of developments over the period. A short summary concludes the section. DIARY
- 2.1.2-40 1959 A pamphlet was produced by the U.B.C. Extension Department to inform the public of the story of the Research Forest. It stated that the four principal functions of the Forest were research, student training, demonstration and recreation. The publication went on to describe the Forest area, and related activities. Also, a booklet entitled "The First Decade of Management and Research - U.B.C. Forest 1949-1958", describing the history of the first 10 years was produced by the Faculty of Forestry. 1959
- 2.1.2-41 A report to the Forest Committee of the Faculty of Forestry at U.B.C. noted that the four principal functions (research, student training, demonstration and recreation) which had been set out in the Extension Department pamphlet in 1959 (paragraph 2.1.2-40) received equal emphasis. The Committee considered that the terms of reference of the U.B.C. Research Forest should be re-stated, with policy relating to each function clearly detailed. Recommendations were made to create a reserve area within the virgin timber (old growth), to maintain an area in a "natural state", and to use the Forest as a centre of silvicultural experimentation, free from the commercial pressures of timber exploitation. FUNCTIONS OF
RESEARCH FOREST

ATTEMPTS TO
CREATE RESERVES
- 2.1.2-42 The Forest Research Committee proposed that a 500-600 acre (200-250 ha) block in the north-east of the Forest should be set aside as a designated reserve. (The Forest consisted of only Block I at this time - see map, Appendix 2.1.2-2-A. Block II - see map, Appendix 2.1.2-79-A - was not acquired until 1968). The motion to create the reserve was later defeated and the reserve lifted. Proposals were made concerning an Arboretum and the Committee called for specific recommendations. RESERVE
PROPOSAL
DEFEATED

2.1.2-43	Six new timber sales were awarded during the year, ten were completed and eight extended for another year. Roads continued to be built by contractors for access to their respective Timber Sale Areas.	MORE TIMBER SALES
2.1.2-44	Improvements were made to the Camp at Loon Lake and a six week camp for handicapped children was held. Several field trips were organized and the Fire Protection Plan was updated.	CAMP USE EXTENDED
2.1.2-45	Agreement could not be reached between the Forest and the Western Horsemen's Association on the use of the Forest by riders and the problem of access in general was discussed. Gates were installed across the main entrance to the Forest.	GATE INSTALLED AT MAIN ENTRANCE
2.1.2-46	<u>1960</u> The number of timber sales contined to rise and extensions were granted to selected sales already in operation. The Forest produced a wide range of timber products. Sales included cedar blanks (for sawn shingles), shakes and grape shakes, alder and birch, and a wide range of sawlogs, peeler logs, poles and pilings. Extra payments were made to contractors for avoiding damage to standing "plus" trees and a donkey engine (working in conjunction with a wooden spar) was still in use in the logging operations. The Forest used rented equipment from Whonnock Lumber Company and employed labour from the Company to assist in comparing logging costs between different operators. The results of the study were published in 1961 (Faculty of Forestry Research Paper 41 - Cost analysis of mobile logging operations on the U.B.C. Research Forest"). Much of the sawlog and peeler material was boomed and sold on the Vancouver Log Market. Two and a half miles (4 km) of new road was constructed to facilitate timber harvesting. In addition, a transit survey of the existing road system was commenced with tally points (control points) established at 5 chain (100 metre) intervals along the roads.	1960 FURTHER TIMBER SALES FOREST RENTS HARVESTING EQUIPMENT
2.1.2-47	The University Forest Committee agreed that no operation should be carried out unless it was shown that the cost of the operation would be returned at a reasonable rate of interest and profit. Upper levels of expenditure for re-establishing the felled areas were set (using critierial related to site index). It was agreed, however, that there were many times when overly expensive operations were desireable for demonstration or research purposes.	EXPENDITURE LIMITS
2.1.2-48	The Junior Forest Wardens programme, instituted in 1959, continued. An additional staff member was taken on as an Assistant to the Resident Forester to assist in supervision of the timber sales. His duties also included taking over planting and site preparation programmes for the Research Forester.	STAFF ADDITIONS
2.1.2-49	Plans were formulated to build a sawmill on the Forest on one of the timber sale areas. In this way it was hoped to realise maximum returns from marginal products. A small sawmill was built in 1960 and ran with marginal success until 1962. Co-operation was sought with other agencies on various projects. The Forest co-operated with the B.C. Forest Service on fire control and fire weather calculation, as well as snag felling problems in the A & L Lands.	SAWMILL ESTABLISHED

2.1.2-50	<p>1961 The Management Policy of the Research Forest was re-defined by the Forest Research Committee as:</p> <p>"1. The University Forest is managed to provide a sustained and maximum income, consistent with effective use of the property for research, teaching, demonstration, and public recreation. Income from the Forest will be used to maintain the capital value of the Forest in such a manner that these primary uses will be maximized.</p> <p>2. The principle objective of the research programme will be to study the management, silvics, and silviculture of western hemlock, Douglas-fir, and western red cedar in the Research Forest as a sample of the Coastal Western Hemlock zone.</p> <p>3. In the continuance of existing projects and in the development of new programmes, somewhat more emphasis will be placed on studies of western hemlock than on Douglas-fir, and less on western red cedar." (Forest Research Committee Minutes, February 1961).</p>	1961	POLICY STATEMENT
2.1.2-51	<p>The reserve fund reached an adequate level and it appeared desirable to carry out an expanded programme of research and operations. It was noted that the research programme could be aided by the addition of a field laboratory. However, it was agreed that research would not ordinarily be undertaken by the Forest staff in the fundamental aspects of fire control, tree physiology, soils and synecology. Co-operation in these fields would be extended to interested agencies, subject to other commitments, and from time to time, members of the teaching staff of the Faculty of Forestry, or others, might be appointed through the Research Committee to undertake specific projects in co-operation with the Research Forester.</p>		RESERVE FUND ADEQUATE
2.1.2-52	<p>Timber harvesting operations continued in 1961 although a fire closure during the summer and severe winter conditions, kept the level of operations below that of the previous year. A further 1½ miles (2.4 km) of road was constructed and it was recognized that a grader would be required in future to assist with the increased road maintenance. Re-establishment operations included slashburning, planting and some pruning.</p>		FURTHER HARVESTING AND ROAD CONSTRUCTION
2.1.2-53	<p>The use of the Forest for recreation purposes increased and gates were constructed to restrict vehicular access. Relations with the public were recognized as generally good, and the Resident Forester gave several talks to groups during the year.</p>		RECREATIONAL USE INCREASES

- 2.1.2-54 1962 Major changes took place in the management, administration and operations on the Forest. T.G. Wright became Dean, Professor F.M. Knapp retired as Director (Appendix 2.1.10.3-6-A) and a new Director (Mr. R. Breadon) was appointed. The duties of the Resident Forester were directed more towards logging and fire control. A new steel spar was secured in time to assist in clearing up the ravages of Typhoon Frieda (Appendix 2.3.2-1-A). This October storm caused a major change in operation schedules and a programme to clear the devastated patches (amounting to over 270 acres (110 ha)) was formulated. A new committee called the Logging Committee was formed "to investigate various logging methods that might be feasible on the Forest".
- 2.1.2-55 Concurrently with these events, operational cruising was being done on all second growth and old growth stands to provide inventory data, and field survey work was in progress to provide information for a new series of maps. Aerial photographs were taken in conjunction with this programme.
- 2.1.2-56 Re-establishment of tree crops on logged over areas continued, and slashburning, planting and pruning were carried out as was alder control on roadsides and in plantations. Fire Index rating standards were established and revision of the Fire Control Plan commenced.
- 2.1.2-57 During the year, the Camp facilities at Loon Lake were well used and the upgrading of the Camp's facilities continued. Due to inclement weather, a number of conference groups cancelled. The Canadian Forestry Association Junior Wardens continued their involvement at the Forest and a further work programme was formulated for the group.
- 2.1.2-58 A radical step away from the policy of restricted access was taken by admitting hunters (with vehicles) from the local Rod and Gun Club. This club reported 142 visits and a harvest of 12 deer.
- 2.1.2-59 1963 The duties of the Director were reviewed and re-stated as:-
- "The University Forest exists to serve the Faculty, the students, the University and the Public. The Director of the Forest must recommend policy and supervise the Forest with the objective of attaining these ends in an efficient manner within the limitations of staff and budget." (T.G. Wright, April, 1963.)
- 2.1.2-60 About this time, a report was submitted to the newly formed Faculty of Forestry Forest Advisory Committee by the Logging Committee urging the development of logging techniques within second-growth areas. The finite nature of the old growth area was recognised and although the operations were regularly used to demonstrate methods to the students, the current logging practices in the old growth did not differ greatly from other logging areas on the Coast.

1962

DIRECTOR
RETIRES

TYPHOON
FRIEDA
STRIKES

OPERATIONAL
CRUISE

AIR
PHOTOGRAPHS

STAND TENDING
CONTINUES

CAMP WELL
UTILIZED

HUNTERS
ADMITTED TO
FOREST

LOGGING
TECHNIQUE
DEVELOPMENT
URGED IN
SECOND-GROWTH

The Logging Committee urged the study of handling of smaller second growth material and the introduction of smaller equipment for this purpose. Logging methods in 1963 included highlead yarding with a 70' (21 m) steel spar, and skidding with a caterpillar and other tractors. At one time during the year, a wooden spar was raised to open a second "side". In view of the favourable prices, salvage operations resulting from Typhoon Frieda were continued at a rapid pace, together with an extension of the road system.

2.1.2-61	The Forest inventory was partially completed, and a preliminary 5 year logging and road development plan was outlined (Table 2.1.2-61-A). Maps were prepared using the inventory data that was available.	INVENTORY PARTIALLY COMPLETED
2.1.2-62	About this time, the concept of a strict annual allowable cut was dropped and a periodic cut was introduced. In view of the high timber prices, approval was given by the Research Forest Advisory Committee to log somewhat more than previously intended (more than the estimated sustainable yield) and utilize the proceeds for development, management and research.	PERIODIC CUT INTRODUCED
2.1.2-63	The Forest was extensively used by students, recreation- alists, professional bodies and many visitors and the Haney Rod and Gun Club recorded 286 visits to the Forest and a harvest of 11 deer.	RECREATION USE
2.1.2-64	<u>1964</u> Early in the year, concern was expressed by members of the Logging Committee over proposals for the increase in the cut over previous years. However, it was noted that a cut-back would result in having to amend the cutting plans. The concept of the periodic cut was confirmed (2.1.2-62) to take advantage of the market conditions. Detailed inventory and mapping were completed.	1964 PERIODIC CUT INCREASED
2.1.2-65	The salvage cutting of timber blown down by Typhoon Frieda continued, and logging continued in the old-growth areas. A wide variety of products were sold and included poles, pilings and sawlogs. Heavy snowfall curtailed operations early in the season, but due to the large amount of equipment in use (four "high lead" settings and four caterpillarskidding operations), a large volume of timber was extracted and sold. Horses were used on some salvage (re-logging) areas and greased chutes were used to supplement the more conventional harvesting methods.	SALVAGE AND OLD-GROWTH LOGGING CONTINUES
2.1.2-66	The use of the Forest by fishermen at Loon Lake and hunters from the Rod and Gun Club continued, the latter reporting 173 visits and a harvest of 6 deer. To avoid conflict with other Forest users, hunting was confined to Sundays and holidays.	FISHING AND HUNTING CONTINUES
2.1.2-67	<u>1965</u> Opinions were expressed about this time that the size of the Forest compared favourable with other University Forests in North America. It was noted that only about one third of these were self-supporting, and that a good case could be made for the University assuming the long-term responsibility for financing teaching, demonstration and research programmes on the U.B.C. Research Forest. Such support would be required if the stand improvement programmes required to re-establish the areas devastated by Typhoon Frieda and through logging, were expanded.	1965

- 2.1.2-68 The main salvage operations resulting from Typhoon Frieda reached a peak and were drawing to a close during 1965. An area exceeding 200 acres (81 ha) was slashburned and an area where slash-burning was unsuccessful was scarified using a caterpillar tractor. The completion of the inventory produced information which permitted the calculation of an annual allowable cut of 900,000 cubic feet (31,800 cubic metres) based on an eighty year rotation. A table was compiled to show how the harvest on the Forest had fared historically and is reproduced in Table 2.1.2-68-A. INVENTORY COMPLETED
- 2.1.2-69 Many improvements were made to the Loon Lake Camp and, as in previous years, it was utilized by visiting groups and students from the Faculty of Forestry. Recreation visitors included the fishermen at Loon Lake, and the 229 hunters from the Rod and Gun clubs of Maple Ridge and Coquitlam for a harvest of 11 deer. IMPROVEMENTS TO LOON LAKE CAMP
RECREATION
- 2.1.2-70 1966 The Forest saw changes in administrative control in 1966 (Mr. J. Walters - the present Director (1981) - assuming the duties of Mr. B. Breadon), and decisions were taken related to policy and function of the Research Forest. It was recognized that education, demonstration and research were largely inseparable in the context of their academic application, and it was decided that the objectives as stated in 1958 (2.1.2-41) should be amended, and "recreation" dropped from the four principle objectives. Greater involvement of the University was sought and to this end, a statement was circulated to Deans and Heads of other University departments describing the Forest and encouraging inquiries about the area. Demonstration of advanced forest management techniques was proposed and it was recognized that the Forest should be looked upon as an outdoor laboratory for researchers and a classroom for students, as opposed to the Forest being a demonstration of purely sustained yield. 1966 CHANGE OF DIRECTOR
- 2.1.2-71 A further major change occurred in administrative control. The University Forest Advisory Committee no longer managed the Forest, but offered advice to the Dean and Director from time to time. The Director assumed control, with one professional assistant. The dependence on summer help was discontinued and a full-time technical staff employed. Separation of operational and research duties by the Forest staff ended. ADMINISTRATIVE CONTROL CHANGES
- 2.1.2-72 Harvesting continued, but due to a depressed log market, output was confined to old-growth timber. The pulpwood market was weak and losses were recorded on this category. With the extension of harvesting into the granitic-cored uplands the cost of road construction rose as considerable blasting was required. WEAK MARKETS
- 2.1.2-73 Nearly 90 acres (36.44 ha) were slash-burned and about 11 acres (4.45 ha) were scarified. Planting and weeding of plantations continued. Considerable improvements were made to Loon Lake Camp and a new 24 bed dormitory was built. The Camp was well used by students and the size and frequency of groups visiting the Camp reflected the growing popularity of the installation. The fishing concession continued at Loon Lake and hunters from the local Rod and Gun Club once again entered the Forest and in five days shot 14 deer. SLASHBURNING, WEEDING AND CAMP IMPROVEMENT

2.1.2-74	<u>1967</u> Several changes in administration and organization of the Forest took place in 1967. The appointment of J. Walters as Director (2.1.2-70) was confirmed and the distinction between research and operations as related to the duties of the staff was further emphasized. The sale of timber was rationalized and all timber was sold to one timber company, and a greater involvement by outside agencies than ever before took place with numerous non-Forest researchers initiating projects on either an individual basis, or on behalf of an outside agency (rather than projects being initiated by the Forest staff as previously).	1967 ADMINISTRATIVE CHANGES
2.1.2-75	An overall road development plan was proposed and developed (Appendix 2.1.2-75-A). Thus, for the first time, the annual road building plan for the area would be able to follow a progressive, pre-determined pattern, rather than cater for the short-term harvesting requirements.	MASTER ROAD PLAN
2.1.2-76	Forest re-establishment operations continued with slashburning, mechanical scarification, planting and plantation weeding. Reserves (2.1.2-42) on the Forest were increased with the addition of the Malcolm Knapp Reserve. The Arboretum (2.1.2-42), commenced in 1959, was named in memory of Professor J.E. Bier, pathologist in the Faculty of Forestry at U.B.C. for many years.	MALCOLM KNAPP RESERVE ESTABLISHED
2.1.2-77	The fishing concession on Loon Lake was continued by the Marc family, but due to the intensification of research, steps were taken to discontinue hunting by the Maple Ridge Rod and Gun Club.	HUNTING DISCONTINUED
2.1.2-78	International visitors to the Forest greatly increased as did the use of the Camp by groups from a wide range of back-grounds. Further improvements were made to the Camp, and a new 30 KW generator was installed. Plans were passed for an extension to the Administration Offices and construction commenced early in 1968.	INCREASED VISITORS ADMINISTRATION OFFICE EXTENSION
2.1.2-79	<u>1968</u> Additions were made to the land area of the Forest during the year. The Marc property, consisting of just over 150 acres (61 ha) in the south eastern part of the Forest was purchased for \$100,000 by the University and an area of 2807 acres (1136 ha) adjoining the north and east boundaries (known as "Block II" - see Appendix 2.1.2-79-A) of the U.B.C. Research Forest was granted by the Crown.	1968 ADDITIONS TO RESEARCH FOREST
2.1.2-80	The changes proposed for the internal administration (2.1.2-74) were implemented and Forest staff were used to service, rather than initiate, research. The sale of timber was now confined to one company (Whonnock Lumber Co.), and a higher proportion of the harvest was coming from the second-growth areas.	INTERNAL ADMINISTRATION CHANGES
2.1.2-81	The road construction associated with the timber harvesting was now following the new systematic road plan (Paragraph 2.1.2-75). By the end of the year, the Forest had the following lengths of roads: <div style="margin-left: 100px;"> 6.97 miles of main road (11.15 km) 17.35 miles of secondary roads (27.76 km) 12.68 miles of branch roads (20.23 km) 7.12 miles of spur roads (11.39 km) </div>	SYSTEMATIC ROAD PLAN FOLLOWED

- 2.1.2-82 The operations of 1968 continued with a programme of slashburning, scarification, planting and weeding. The Camp was well utilized by visitors, and although the fishing concession continued on Loon Lake, the hunting privileges extended to the local Road and Gun Clubs (2.1.2-77) were cancelled by mutual agreement to ensure the safety of the large numbers of researchers and visitors. The extension to the Administration building was completed. HUNTING
CEASES
- 2.1.2-83 1969 A Long Range Policy Committee was formed in December to submit proposals on long range policy for forest land management. The committee was to submit proposals on both policy and management objectives, bearing in mind the integrated nature of the forest resource, and that the overriding objective of management should be to create an optimal environment for education (teaching and research), and that management strategies should be judged in terms of their contribution to this primary objective. 1969
THE LONG
RANGE POLICY
FORMULATION
- 2.1.2-84 On the Forest, the "ring" road was completed with the construction of almost a mile (1.6 km) of secondary road around the north end of Katherine Lake. With other construction, the total road length on the Forest was now 45.41 miles (72.66 km). An extensive programme of road maintenance was carried out as was a major programme of roadside brush control. Logging was done in both old growth and second growth areas. FOREST RING
ROAD COMPLETED
- 2.1.2-85 Survey control points (established in 1964) were cleared and painted, and a system of "sub-compartments" based on areas felled in various years was established.
- 2.1.2-86 An Outdoor Education Programme was initiated for local school children and the Forest staff gave talks to a number of schools and clubs in the Maple Ridge District. The number of visitors continued to rise and a large number of tours of the Forest were arranged. Public fishing on Loon Lake was closed when the Marc family vacated their property. The closure of public fishing after 20 years was intended to pave way for increased research activities connected with fish populations on the Forest. OUTDOOR
EDUCATION
PROGRAMME
COMMENCED

FISHING
DISCONTINUED
- 2.1.2-87 1970 The Long Range Policy Committee submitted their reports on Management Objectives and Policy. The philosophy of "Best-Use" was summarized in a statement to the U.B.C. Research Forest Advisory Committee and the recommendations were as follows: 1970
POLICY
RECOMMENDATIONS
- "1. The purpose of the Research Forest is to provide an optimal environment for education in the applied and basic fields of forestry.
 2. The policy of the Faculty should be to manage the Research Forest to the highest possible technical standards as an integrated, multi-use forest resource based on the concept of "Best-Use" forestry."

[illegible]

2.1.2-92	The implementation of the "Best-Use" management concept was taken a step further with tentative proposals for inter-disciplinary studies and demonstrations of integrated resource management (Appendix 2.1.2-38-C, Year 1971). A description of what "Best-Use" constituted was prepared, together with a map showing the relationship to management at the Research Forest. Proposals were also made by the Research Forest Silvicultural Group (a group within the U.B.C. Research Forest Advisory Committee) for a Silvicultural Description of the Forest. The information considered necessary to compile such a description was detailed and a budget was drawn up for the operation.	MANAGEMENT CONCEPTS CHANGING "BEST-USE"
2.1.2-93	Visitors to the Forest increased and an Open House drew over 4,000 people. The Outdoor Education School Programme commenced 5 day "living in" sessions at the Loon Lake Camp.	OPEN HOUSE
2.1.2-94	Timber harvesting continued and now consisted almost entirely of second growth areas. A start was made on a main direct access road to Loon Lake Camp (Road C). Access to the Forest was restricted to the road through the Main Gate; other entrances to the Forest were closed. An extensive road maintenance programme was undertaken.	SECOND GROWTH TIMBER HARVESTING
2.1.2-95	Brush control continued on roadsides and in plantations. Areas were slashburned and a small section of land was cleared by bulldozer for a seed orchard.	BRUSH CONTROL PROBLEMS
2.1.2-96	<u>1972</u> Notice was received that, although the B.C. Forest Service supported "Best-Use" interdisciplinary studies (2.1.2-92), they would not aid financially. The implementation of the concept was, therefore, to be undertaken using the limited resources available to the Forest. A start was made on revising and extending the Research Forest Management Plan.	1972 FINANCIAL SUPPORT
2.1.2-97	Logging continued in both old-growth and second growth areas, and trials were carried out to test the use of helicopters on the more inaccessible areas of the Pitt Slope. The trials were only partially successful (see Research Project 72-6 - Appendix 2.1.2-38-A).	HELICOPTER TRIALS FOR HARVESTING
2.1.2-98	An area of about 34 acres (13.7 ha) was mechanically cleared and some slashburning was carried out. Planting was limited due to non-completion of the clearcutting programme and poor success of the previous year's slashburning.	GROUND CLEARANCE CONTINUED
2.1.2-99	Improvements continued to be made to the Loon Lake Camp and a secondary sewage treatment system was installed. Both Camp and Forest were extensively used by visitors.	CAMP FURTHER IMPROVED

- 2.1.2-100 1973 The alignment of the B.C. Hydro line (Mica Dam project) right-of-way across the southern edge of the Forest was discussed, and a management plan for the development of the land under the power line was proposed. Requests were made to B.C. Hydro to fence the entire line to permit more easily controlled access. The local Rod and Gun Club approached the Forest with a request to use part of the land cut off by the power line, but no action was taken. The Federal Penitentiary Service approached the Director for permission to build a small medium security installation on a portion of the Research Forest cut off by the Hydro line. While it was considered that such an installation might bring abundant free labour, no action was taken until the matter was considered in detail and agreement had been reached by the Federal Penitentiary Service with the local municipality. No agreement was ever reached. 1973
POWER LINE
RIGHT-OF-WAY
DISCUSSED
- 2.1.2-101 Extensive alterations were proposed at the Loon Lake Camp and the decision was made to construct a new mess-hall and convert the existing messhall to a bunkhouse. PROPOSED
CHANGES AT
LOON LAKE
CAMP
- 2.1.2-102 A full time Education Co-ordinator was employed by the Forest commencing January 1974, funded in part, by the Council of Forest Industries. The addition of this staff member was aimed at relieving the other staff members of work imposed by the school Outdoor Education Programme. EDUCATION
CO-ORDINATOR
COMMENCES
- 2.1.2-103 An area of about 87 acres (35.2 ha) was logged, all in second-growth areas. Road building was limited to access roads for logging and a further programme of road maintenance was carried out. Site preparation for planting included mechanical land clearance, although no slash-burning was undertaken due to adverse weather conditions.
- Summary 1959 - 1973
- 2.1.2-104 During the course of the period 1959 - 1973, the Forest underwent great changes. The changes were far reaching and reflect, in part, the evolution through which the forest industry of B.C. was passing. 1959 - 1973
GREAT CHANGES
DURING PERIOD
- 2.1.2-105 Although the function of the Forest as set out in the restrictive covenant (1.1-1) remained the same -- "instruction, and demonstration" -- the interpretation of how this function should be fulfilled changed radically. For many years, the Forest was used to demonstrate sustained yield and current logging practices, and almost the entire effort of both management and research was oriented around production of timber as a commercial crop. The Annual Reports and list of Research Projects (Appendices 2.1.2-38-A, B, and C) indicates the strong bias of the early administrative and research effort toward industrial forestry and the subsequent broadening trend, reflecting a shift in policy and increased use of the Forest by researchers from other agencies. CHANGING ROLE
OF FOREST

- 2.1.2-106 The use and management policies in the recent past, show the trend away from timber management alone towards an interdisciplinary approach to integrated forest management. These changes reflect current thought within the Faculty of Forestry, the B.C. Forest Service and the Provincial forest industry with respect to forest management. MANAGEMENT TRENDS
- 2.1.2-107 Thus, over the last 15 years, the shift has been away from a pre-occupation with timber values, to an interdisciplinary approach that attempts to optimize the whole forest resource. Indications of this evaluation can be seen in Table 2.1.2-107-A and Figures 2.1.2-107-A and B.
- 2.1.2-108 The Forest is fulfilling its role by evolving to meet the requirements of education, research and society as a whole. The rapid increase in researcher visits (Appendix 2.1.2-38-C, Years 1959 - 1973), school parties and casual visitors provides an indication of the interest and the success of the policies. This evolution is a continuous process, and the management framework, while providing stability for the day to day running of the Forest, to be successful must provide most of all a format that reflects the requirements of society, not merely at the present day, but in the future as best as this may be determined. FOREST EVOLVING
- 2.1.2-109 In hindsight, the Forest might have been better served by an early Management Plan directed to other than a purely timber production policy, but this is not necessarily an adverse feature of the early history, having regard to the Forest's role and the original Objectives of Management. HINDSIGHT
- 2.1.2-110 Many activities and techniques have been attempted at the U.B.C. Research Forest and although these have not always been successful, they have provided valuable examples of former practices and management methodology. It is not suggested that there has been a deliberate policy of "bad practice" but through implementing contemporary policies, examples are provided -- whether successful or not -- for all to see. For example, the pattern of increased utilization and expenditure set by operations to salvage timber in the wake of Typhoon Frieda (while continuing normal logging in the mature stands), which set a pattern of increased logging that continued after the salvage was completed, was in direct conflict with the sustained yield principles that policy declared to be pre-eminent. EXAMPLES AT FOREST
- 2.1.2-111 The forest is, in fact, an experiment in itself but also reflects, in microcosm, the historical development of the treatment of the Coastal Forest in British Columbia. A valuable function of the Forest is the provision of a wide variety of examples, both good and bad, of management and cultural operations, within a relatively small area. FOREST A MICROCOSM

- 2.1.3 The Topography of the U.B.C. Research Forest
- 2.1.3-1 The topography of the U.B.C. Research Forest is very broken (Map 2.1.3-1-A). The land form is one indication of massive disturbance during the last ice age about 10,000 years ago. In general the area is rolling to fairly steep foothill country. Elevations range from sea level at Pitt Lake in the north west and Pitt Meadows on the south west to 1020 metres (3,350 feet) near the north boundary. Two thirds of the Forest is located below the 500 metre (1640 foot) contour. The general slope of the country is towards the south, but several north-south ridges provide variation in aspect and sites which give a great variety of forest conditions. The flat agricultural land of Pitt Meadows is within half a mile of the west boundary. To the south is the rolling farm and woodlot land of the Maple Ridge countryside, now rapidly becoming urbanized. TOPOGRAPHY
- 2.1.3-2 The main drainages of the Research Forest are provided by the North Alouette River in the east, and Blaney Creek in the west (Map 2.1.3-2-A). The North Alouette River is 10 metres (30 feet) or more wide and cuts a deep channel across the southeast corner of the Forest. This river flows from the Golden Ears Park (16,900 ha. 43,000 acres) with its headwaters on the east slope of Golden Ears Mountain (1,078 m - 3800 ft). The North Alouette River enters the Forest just prior to its confluence with Jacob's Creek about 900 m (3,200 feet) south of Jacob's (Marion) Lake. DRAINAGE
- 2.1.3-3 Jacob's Creek drains Gwendoline, Eunice and Jacob's (Marion) Lakes, the latter lake being near the south end of a broad valley which extends northward to Pitt Lake. A wide pass 400 metres (1,300 feet) above sea level, about 3.2 km (2 miles) north of Jacob's (Marion) Lake, is the divide between the north and south drainages. From this divide the land slopes gently to the north down the valley to Raven Creek whence it drops very steeply to Pitt Lake. The north boundary of the Forest crosses the valley approximately 2.8 km (1 3/4 miles) north of the divide. The north east corner of the U.B.C. Forest is on the lower slopes of Golden Ears Mountain, where the highest point on the Forest is found at an elevation of 1020 metres (3,350 feet) above sea level. LAKES
- 2.1.3-4 To the west of Jacob's (Marion) Lake a long ridge, with maximum elevation of 610 m (2,000 feet) above sea level, extends to the north making an impassable barrier except for one high pass to the west of the divide to Raven Creek. CENTRAL RIDGE
- 2.1.3-5 The central portion of the Forest contains three parallel north-south valleys. The western valley contains Loon Lake which is the largest lake in the Forest being 49 ha (121 acres) in area and 1.6 km (about 1 mile) long, and the site of the Loon Lake Camp. The central valley is drained by Blaney Creek as it flows from Placid Lake to Blaney Lake. The eastern valley is formed by Jacob's (Marion) Lake, Jacob's Creek, and the North Alouette River. The ridges vary in steepness but all contain numerous rock outcrops or bluffs. North of Loon Lake a rolling area forms a high pass from the lake to the steep slope down to Pitt Lake. VALLEYS

- 2.1.3-6 The central ridge continues into the northern portion of the Forest, following the top of the Pitt Lake escarpment, to form a semi-circle running to the north east until it reaches 790 metres (2,600 feet) just west of Gwendoline Lake and 760 metres (2,500 feet) north of Katherine Lake. North of this it drops slightly but continues as a high ridge nearly to the north boundary. Beyond is a broad valley running north to Raven Creek. To the west the slope drops very abruptly from the ridge top down to Pitt Lake, an average slope of 100 percent. The Pitt Lake shore is rocky. South of the lake the bottom of the slope meets flat, wet, grassy tidal flats contained by dykes. East of the main ridge the ground drops moderately to Gwendoline, Eunice, and Katherine Lakes, which are separated from the broad Alouette-Raven Creek valley by several knolls, ridges and the rock outcroppings of the steep valley side. RIDGES
- 2.1.3-7 Gwendoline Lake flows into Eunice Lake the outflow of which cascades down the steep rocky slope to the North Alouette River. Two passes separate Eunice and Katherine Lakes. The latter lake is the only lake on the Forest that drains north to Pitt Lake. Katherine Lake has a wide shore line resulting from its being dammed many years ago to provide water for a now abandoned copper mine on the north boundary of the Forest.
- 2.1.3-8 The south portion of the Research Forest has a generally southerly aspect but varies greatly in steepness. There are numerous knolls of various sizes whose sides are quite steep and spotted with rock outcrops and bluffs. Several creeks flowing south drain most of this portion of the Research Forest.

2.1.4 The Bedrock Geology of the U.B.C. Research Forest

- 2.1.4-1 The underlying bedrock is mainly quartz diorite, granodiorite, diorite, and more or less metamorphosed volcanic formations (Map 2.1.4-1-A). Volcanic rocks and granite occur locally around Loon Lake, Gwendoline Lake and in the north east portion of the Research Forest. Principle formations have a parallel north-south orientation. West of Jacob's Lake (Marion) the Research Forest is underlain by quartz diorite with localized granitic formations, with granodiorite extending from the steep slopes east and north-east of Loon Lake, to, and on both sides of Blaney Lake, and down Blaney Creek almost to the southern boundary of the U.B.C. Research Forest. BEDROCK
- 2.1.4-2 To the east there is diorite in the lower portion of the North Alouette drainage and volcanic rock formations extending to the eastern boundary of the Forest on the edge and Golden Ears Mountains.
- 2.1.4-3 The area is traversed by a number of north-south faults, the largest of which extends from Loon Lake north-east past Gwendoline Lake, parallel to Pitt Lake. FAULTS
- 2.1.4-4 Six major geologic formations have been recognized.

Twin Island Group

Composition:- Hornblende-granulite, amphibolite, gneiss, schist, conglomerate, quartzite, meta-arkose, lime silicate, rock magmatite.

Period:- Pre-Jurassic (Mesozoic).

Quaternary

Composition:- Alluvial, marine and glacial deposits.

Period:- Cenozoic

Blaney-Jacobs

Composition:- Quartzdiorite, (Biotite more abundant than hornblende)

The rock has well developed sheet jointing with a north-easterly trend. Dioritized inclusions and some hornblende diorite are found in the vicinity of the gorge of the Allouette River near the southern boundary of the Research Forest.

Blaney Lake

Composition:- Medium grain granodiorite (hornblende). The content of K-feldspar is low.

This grades into quartzdiorite. The rock is unfoliated and has approximately 2% inclusions, although 5% inclusions are found between Loon and Blaney Lakes. The pink colour of the rock is given by the K-feldspar.

West Boundary

Composition:- Quartz diorite (medium grain), with hornblende more prominent than biotite.

Small amount of K-feldspar west of Loon Lake.

Diorite is also found where this section crosses the North Alouette river.

Structure:- The only foliation in this area is on the west shore of Loon Lake where it has an east-west trend.

Andesitic dykes were also found on the west shore of the lake. Faults are noticed in the North Alouette River valley where exposures are sheared.

North-east Section

Composition:- Predominantly a diorite area.

Hornblende is most dominant.

2.1.4-5

Within the U.B.C. Forest a small pocket of molybdenum was uncovered in 1969 in the area of Eunice Lake in the main geological fault line.

2.1.5 The Geomorphology of the U.B.C. Research Forest.

2.1.5-1 There are four major geomorphologic land associations on the Research Forest (Map 2.1.5-1-A).

<u>LAND ASSOCIATION</u>	<u>CHARACTERISTICS</u>	<u>AREA OF FOREST (%)</u>
A	Mountainous to strongly rolling, granitic-cored uplands.	42.5
B	Hilly to gently rolling. Granitic cored uplands and valleys.	43.9
C	Flat to gently rolling complex of glacio-fluvial and sub-stratified drift deposits.	7.8
D	Flat to gently rolling complex of glacio-marine deposits and sub-stratified drift deposits.	2.2
Water and Streams		<u>3.6</u>
		100.0

A generalized map of the surficial geology of the U.B.C. Research Forest is shown in Map 2.1.5-1-1-A. The drainages of the North Alouette River, Jacob's Creek and Raven Creek are overlain by unconsolidated glacial drift. Generally throughout the Forest the bedrock is overlain by glacial till, outwash, glacio-marine and lacustrine deposits of varying thickness.

SURFICIAL
GEOLOGY
MAP

2.1.5-2 Land Association A - Mountainous to Strongly Rolling Granitic-cored Uplands.

Land Association A is characterized by rugged, mountainous topography and extensive areas of shallow soils. The granitic bedrock is generally overlain by dense, compact glacial till which is nearly impervious despite relatively little clay and a high percentage of sand. This is partly a result of the weight of glacial ice beneath which the till was deposited and partly a result of mechanical composition: fine particles fill voids between coarse particles and bind them together to form a natural "concrete". Soils have been developed on a complex of ablation till and colluvial material which overlies the till. Colluvium is generally poorly soiled and of a gravelly loam texture. The forest and vegetation cover is extremely variable due to the range in land features, logging and fires.

LAND
ASSOCIATION
A

2.1.5-3 Land Association B - Hilly to Gently Rolling, Granitic-cored Uplands and Valleys.

Land Association B covers approximately the same total land area as Land Association A. This land association occurs throughout the Research Forest. In the north it is confined to the Jacob's (Marion) Lake-North Alouette River valley, the central depression running from Blaney Creek to Gwendoline and Eunice Lakes and a strip of Land around the north and east shores of Loon Lake. Land Association B is characterized by a higher proportion of a deeper soils than is found in Land Association A, and by less rugged terrain. Gravelly sandy loam colluvium overlying unweathered, compact, glacial till and/or bedrock is the most common structural pattern of the terrain. In draws and low-lying areas reworked till and poorly sorted sands and gravels mantle glacial till. A small area of rich, loam colluvium is situated near Loon Lake Camp. Patches of talus, and varied lacustrine clays and silts are minor inclusions.

LAND
ASSOCIATION
B

2.1.5-4 Land Association C - Flat to Gently Rolling, Complex of Glacio-fluvial and Sub-stratified Drift Deposits.

The Land Association on the Forest comprises the lower parts of the North Alouette River and Blaney Creek valleys, and a strip of land between these two water courses. Outwash sand and gravel terraces and deltas are the common landforms. The soil materials are quite deep. Although these sediments are generally permeable, tree rooting is restricted on some terraces by discontinuous iron pans and cemented layers. Temporary, perched water tables occur above these layers for short periods during the year. Except for terrace scarps and the occasional bedrock knolls, the topography is flat to gently sloping.

LAND
ASSOCIATION
C

2.1.5-5 Land Association D - Flat to Gently Rolling, Complex of Glacio-marine Deposits and Sub-stratified Drift.

Although limited to the southwest corner of the Research Forest and occupying only 2.2 percent of the total area, this Land Association contains some of the most productive land and is composed of glacio-marine deposits over a rolling to flat topography. Some inclusions of bedrock knolls and islands of till occur. These glacio-marine drift deposits have a silt loam to silty clay texture. Stones and sand lenses are scattered throughout.

LAND
ASSOCIATION
D

- 2.1.6 The Soils of the U.B.C. Research Forest.
- 2.1.6-1 A preliminary soil map of the U.B.C. Research Forest is shown on Map 2.1.6-1-A while the soil legend for this map is shown in Table 2.1.6-1-A. A detailed soil survey report on the 16 ha (40 acres) Arboretum located adjacent to the Administration buildings is shown in Appendix 2.1.6-1-A. AVAILABLE SOILS DATA
- 2.1.6-2 In the mountainous terrain that extends over much of the Forest geomorphological processes were very significant in soil development. Many upland soil profiles show evidence of soil creep, slides and slumping. Buried profiles, overlain by colluvial-alluvial caps varying in thickness from 12 - 75 cm (6" - 30") occur on many lower slopes. On some upper slopes (Land Associations A and B) the surface soil horizons have been removed or disturbed by gravitational transfer. Mini podzols occur on slopes and ridges where the soil is shallow to bedrock. With deeper soils, mini and orthic podzols, and acid brown wooded soils are most common. Concretionary brown soils occur on some moist, deep colluvium till materials while gleyed acid brown wooded soils are common in moist areas. In old growth stands, acid brown wooded or orthic podzol soils are common on the better drained conditions, orstein and gleyed podzols where drainage is imperfect, and eluviated gleysols and peatygleysols where drainage is poor. In Land Association C mini podzols and orthic podzols are associated with dry to well-drained soils, and acid brown wooded soils on well-drained to moist conditions. Acid brown wooded and orthic podzols predominate on somewhat moist and well drained sites within Land Association D. Gleyed acid brown wooded soils are associated with moist areas, and gleysols with poorly drained areas.
- 2.1.6-3 Further soils information has been developed through ecological classification on U.B.C. Research Forest. In 1976, a Ph.D thesis (Klinka) was published describing in detail the ecological classification of U.B.C. Research Forest (see 2.1.8 following). Klinka's description included soils and copies of the map based on Klinka's work are held at U.B.C. Research Forest Administration Headquarters. FURTHER SOILS DATA

- 2.1.7 The Climate of the U.B.C. Research Forest.
- 2.1.7-1 The first weather station to serve the Forest area was established in June 1945. This station, referred to as the A.E. Marc Weather Station, is located at an elevation of 165 metres (550 feet) in the south west portion of the Forest on the old Marc property. This station has been in operation since January 1946. WEATHER STATIONS
- 2.1.7-2 In 1958 a weather station was established at the Administration Office. This station is at the southern boundary of the Forest at an elevation of 145 metres (475 feet). In 1962 two other stations were established, one near Loon Lake at an elevation of 370 metres (1,215 feet) and the other, south of Spur 17, at an elevation of 375 metres (1,225 feet). Records of the Loon Lake Station have not been continuous and are not reported here. Locations of the four weather stations are shown on Map 2.1.7-2-A (Mean Annual Precipitation).
- 2.1.7-3 The general climate of the Research Forest area is influenced by the Pacific Ocean to the southeast and by the Coast Mountains to the north. Temperatures are not extreme; summer temperatures of 32° C (90° F) or over are not common and the lowest recorded winter temperature at any of the four stations was -20° C (-5° F.) Average annual precipitation is about 230 cm (90 inches) in the southern part of the Forest but increases in the higher areas to the north. Approximately 11 percent of the precipitation falls in the three summer months. Winter snowfall in the southern part of the Forest averages about 107 cm (42 inches) annually, but increases considerably in the higher elevations in the north. GENERAL CLIMATE
- 2.1.7-4 Summarized weather data for the 22 year period for the A.E. Marc Station are given in Appendix 2.1.7-4-A, together with similar data for the Administration Building and Spur 17 stations. WEATHER DATA
- 2.1.7-5 The prevailing summer winds are from the south west during June, July and August. Winds from the north east through to south east are more common during the late fall and winter months, but there is considerable variation year by year, for all months except June and July. Wind records for the period 1966-72 are presented in Appendix 2.1.7-4-A. The strongest wind experienced on the Forest was on the night of October 12, 1962 when "Typhoon Frieda" swept over the area, and winds were estimated to be 130 - 160 km (80 to 100 miles) per hour. At that time no records of winds were being made. In November 1966 a wind of 85 km (53 miles) per hour and in March 1967 a wind of 99 km (62 miles) per hour were recorded. Usually, however, the winds are steady and light to moderate during the summer and are moderate to strong but variable in fall, winter and spring. WINDS

- 2.1.7-6 No records of sunshine were made at the Forest until 1968 when readings were started at the Branch E20 Weather Station. However, sunshine records have been maintained at the Dominion Demonstration Farm at Agassiz, 56 km (35 miles) east of the Forest since 1946. These data are shown in Appendix 2.1.7-4-A. SUNSHINE
- 2.1.7-7 Periods of frost at the Forest are generally confined to the months of December, January, February and March. Due to the maritime influence of the Pacific Ocean, low temperatures are extremely variable in occurrence. Occasionally, however, freezing temperatures occur as early as September and as late as May. FROST

- 2.1.8 The Ecological Classification of the U.B.C. Research Forest.
- 2.1.8-1 The Forest is located in the Coastal Western Hemlock Biogeoclimatic zone. This zone is sub-divided into the wet and dry sub-zones, representing approximately the northern and southern halves of the Research Forest respectively. The division runs approximately through the lower end of Loon Lake and across the Forest in an easterly direction to the southern end of Jacob's (Marion) Lake (Map and Figure 2.1.8-2-A). A detailed description of the Coastal Western Hemlock Biogeoclimatic Zone is contained in Appendix 2.1.8-1-A. BIOGEOCLIMATIC ZONES
- 2.1.8-2 A major factor in the occurrence of the various plant associations appears to be the distribution of soil moisture. The summits of the hills are subject to drought since the shallow soils do not have much water storage capacity. This is indicated in Figure 2.1.8.2-A, where the Salal-Douglas-fir dominates the top of the ridge and ranges down the slope to the Devil's Club Western Red Cedar association in the areas near the creek. Water seeps down into the lower ecosystems and generally becomes increasingly available for plant growth. MOISTURE
- 2.1.8-3 Six ecosystem demonstration areas have been identified in Compartments 28 and 29 (Map 2.1.1-3-A) and descriptive notice boards installed (Figure 2.1.8-2-A). Their details and interpretation follow. The following details and interpretations have been extracted from U.B.C. Research Forest Research News #2 (April 1975). ECOSYSTEM DEMONSTRATION
- 2.1.8-4 "A. Ecosystem: Rocky Mountain Salal (Gaultheria shallon) - Douglas-fir.
Soil: Lithic Mini Humo-Ferric Podzols
Parent Material: Shallow ablation till and colluvium over quartz diorite bedrock.
Site Index: DF 70-90, WH 65-85, WRC 65-75 feet/100 years.
Interpretation: These ecosystems contribute substantially to bedrock weathering and to the release of minerals but give a low yield of wood. Heavy disturbances such as clear cutting and slash burning will accelerate soil erosion and cause retrogression to non-forested ecosystems on thin soils and rock. Reforestation is difficult and large loss of planting stock will normally occur. However, this ecosystem provides a good seed source for adjacent cutover areas. Road construction requires heavy blasting and expensive grading. This landform imposes severe limitations to intensive management. It should be managed to protect soils and slow runoff. It can provide useful shelter for wildlife and has good recreation potential."
- 2.1.8-5 "B. Ecosystem: Moss (Hylocomium splendens) - western hemlock
Soil: Mini Ferro-humic Podzols.
Parent Material: Moderately deep ablation till over basal till - bedrock controlled.
Site Index: DF 110-150, WH 100-130, WRC 85-115 feet/100 years.
Interpretation: Characterized by high stand density and good growing potential for Douglas-fir and western hemlock. It is suitable for intensive management as commercial forest with local limitations for mechanization.

Suggested rotation age 60 years (fertilized) to 90 years (without fertilization). Silvicultural systems suggested: 1. Clearcuts of moderate size with subsequent natural or artificial reforestation of Douglas-fir. 2. Two-cut shelterwood system with second cut occurring after 5 to 10 years. A permanent road system could favour western hemlock for pulpwood production. Slash burning is unnecessary and early reforestation should prevent invasion of site by bracken fern (Pteridium aquilinum). Recreation and wildlife land use are relatively subordinate on these good sites."

2.1.8-6

"C. Ecosystem: Moss (Furynchium oreganum) - Oregon grape (Mahonia nervosa) - Douglas-fir-western hemlock.

Soil: Mini Humo-Ferric Podzols.

Parent Material: Reworked ablation till over basal till-bedrock controlled.

Site Index: DF 130-150, WH 85-100, WRC 85-100 feet/100 years.

Interpretation: These ecosystems may be managed as protection or commercial forests though steep slopes will limit degree of mechanization. Soil surface erosion is a hazard, especially if skidding. Slash burning is permitted. Clear cuts of limited size will reduce evaporation on southerly slopes and assist regeneration. Suggested reforestation to Douglas-fir (rotation age 70-100 years). Shelterwood cutting might be successful if done to favour Douglas-fir. Stocking control will be essential for proper stand development."

2.1.8-7

"D. Ecosystem: Subhygric moss (Plagiothecium undulatum)-swordfern (Polystichum munitum) - western red cedar - western hemlock.

Soil: Weakly gleyed Mini Ferro-Humic Podzols.

Parent Material: Reworked ablation till over basal till. Bedrock controlled.

Site Index: DF 150-170, WH 110-140, WRC 90-115 feet/100 years.

Interpretation: Can be managed intensively as commercial forest with few limitations for mechanization. Compared to moss ecosystem greater intensity of management (including stocking control and fertilization) is more justified here particularly for Douglas-fir. Silviculture systems suggested: 1. Clear cuts-immediate, high density reforestation to Douglas-fir to avoid serious hardwood or brush competition. Light spot burning after logging. 2. Two cut shelterwood system cuts 3 to 7 years apart. Suitable if western hemlock is desired for pulpwood production. Choice of system will depend on local situation (transport, utilization, standards, markets and general forest policy objectives)."

2.1.8-8

"E. Ecosystem: Foamflower (Tiarella unifoliata) - swordfern (Polystichum munitum) - western red cedar.

Soil: Gleyed Mini Ferro-Humic Podzols.

Parent Material: Glacio-fluvial deposits over basal till.

Site Index: DF 170-200, WH 115-140, WRC 115-140 feet/100 years.

Interpretation: Highly productive ecosystems suitable for intensive management with few limitations for mechanization. Recommended species are Douglas-fir, western red cedar (grand fir at lower elevations): rotation 30 years and small clear cuts to ensure success in immediate reforestation.

Special quality nursery stock may be useful to avoid serious brush competition. Stocking control and crop tending measures required earlier and more frequently than in other ecosystems. Slash burning is acceptable except on fine textured soils. Waterways (buffer strip/ recreation corridors) and stream quality maintenance (for fish) are important. Species mixtures and quickly grown large trees can create aesthetic values."

- 2.1.8-9 "F. Ecosystem: Devil's club (Oplopanax horridus) - western red cedar.
 Soil: Gleyed Mini Humo-Ferric Podzols.
 Parent Material: Glacio-fluvial deposits over basal till.
 Site Index: DF 150-180, WH 110-130, WRC 115-140 feet/100 years.
 Interpretation: To be managed mainly as protection forest and excluded from harvesting. Main function will be streambank stabilization and maintenance of stream water quality for fish and other uses. Roads should not be located in close proximity to creeks (drainage and erosion problems). Very important for recreation - waterfalls and ravine scenery are most attractive in hot summers. Thoughtfully laid-out and carefully built trails could connect small picnic sites, rest benches and fishing pools. Limitations include the coolness of these sites at night, high humidity and mosquitoes.
- 2.1.8-10 Ecosystem units (according to Klinka, 1975), have been delineated and mapped for the Research Forest. Copies of the map, published by the U.B.C. Faculty of Forestry are available from the Administration Headquarters. A charge is made for the maps. Map 2.1.8-2- A gives a generalized picture of the Research Forest, indicating the boundary of the Wet and Dry Subzones of the Western Hemlock Biogeoclimatic Zone. Figures 2.1.8-10-A and B show the percentage of each ecosystem unit, and a Key for the numbering is contained in Figure 2.1.8-10-A.
- 2.1.8-11 A number of publications relative to ecological classifications have been produced and are referenced in Appendix 2.1.8-1-A.

SUPPORTING
INFORMATION

2.1.9	The Facilities of the U.B.C. Research Forest.	
2.1.9-1	The extensive railway system developed during the logging operations earlier this century is shown in Map 2.1.2-29-A. Many of these grades are still accessible, at least by foot, in spite of the invasion of alder and salmonberry, and a few of them have been incorporated into the road network. Some remains of the old trestles are still visible.	OLD RAILWAY SYSTEM
2.1.9-2	The first access roads were build with the inception of the Research Forest. Over the years, a number of road plans have been prepared, mainly as student projects. Until 1969, however, roads were located on a year to year basis, primarily as access roads to logging areas. A "crash" programme followed Typhoon Frieda to get the blown down timber out at least cost. Due to the constraints of topography, the random road network that resulted was more-or-less in line with the systematic network now being developed. Reflecting more intensive working, road development has been greatest in the southern portion of the Forest.	EARLY ROAD NETWORK
2.1.9-3	In 1968, a master road plan was prepared to co-ordinate planning (Appendix 2.1.2-75-A). The purpose of the master road plan was to produce a comprehensive road network for the Forest, to eliminate location errors and to ensure adequate construction standards. The completion of the road network is scheduled for 1984 with an overall road density of 1 km to 1.5 sq. km (4.45 miles per square mile) of Forest. Four different construction standards were proposed - main, secondary, branch and spur - with provisions for upgrading the standards as development proceeds. A system of road lettering and numbering was proposed and is in use at the present time. (Map 2.1.9-3-A.)	MASTER ROAD PLAN
2.1.9-4	A number of footpaths have been cut to give access to research areas and some trails have been developed for educational purposes (Map 2.1.9-4-A).	TRAILS
2.1.9-5	There are five major bridges in the Forest road system situated as follows:- (a) crossing the North Alouette River on Road A (b) crossing Jacobs Creek on Road K (c) crossing Blaney Creek on Road G (d) crossing Blaney Creek on Road M (e) crossing North Alouette on Road A/B	BRIDGES

A further bridge across Spring Creek (outside the U.B.C. Research Forest on an un-named road leading off Road G), has been maintained by the Forest for use during logging operations, but no liability is attached to, or accepted for, the maintenance of this bridge. All the bridges on the Forest, with the exception of the bridge across the North Alouette at the point where Roads A and B join, are in excess of 10 years old, are wooden and vary in length from 15-20 m (50-70 feet). The pier construction is cross latticed Douglas-fir stringers cut locally. The fourth bridge (across Blaney Creek on Road M) is built of treated material. Details of bridge construction are in Appendix 2.1.9-5-A.

Excerpt from Annual Report 1957-58.

"The old hewn-timber bridge over Blaney Creek was removed and replaced by a creosoted wooden trestle. The bridge is approximately 100 feet long, rests on concrete piers, and has an expected life of at least twenty-five years."

The decking of all five bridges is squared hemlock (2" x 10"). The life expectancy of such bridges is not more than 15 years from the time of construction. In 1975, the bridge across the North Alouette was almost completely rebuilt. The old decking was removed, the rotten wood was stripped from the original stringers, and a new set of stringers were placed on top of the old bridge structure. The new bridge section was thus almost one metre (about 3 feet) higher than before, and the road alignment on both sides was improved. A detailed series of photographs of the bridge reconstruction were taken and copies are held at the Administration Building and in the Faculty of Forestry.

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| 2.1.9-6 | All the original culverts were wooden. During the course of the road system expansion, the trend has been to use galvanized, self-cleaning culverts, varying in size from 30-365 cm (12" to 12 feet). A few of the wooden culverts remain on the little used sections of road. These are being replaced by metal culverts as necessary. Culverts occasionally block and wash out and while the use of correct culvert size and systematic inspection and maintenance lowers the washout rate, with storm events and the subsequent bedload and debris movement into the drainage system, washouts will still occasionally happen. | CULVERTS |
| 2.1.9-7 | <p>There are a number of permanent buildings and other structures on the Research Forest. These are divided into the following categories: (Appendix 2.1.9-7-A)</p> <ul style="list-style-type: none"> - Loon Lake Camp - Gatekeeper's House - Administration Buildings - Workshops and Garages - Old Marc Property - Research Structures and signs - Climate Stations - Airstrip - Public information signs, road signs, gates and power lines. | BUILDINGS |
| 2.1.9-8 | <p>Situated on a promontory towards the south end of the Loon Lake (Map 2.1.9-8-A/B). The Camp was commenced in 1948 and the first stage completed in 1953 at a cost of \$140,000 (2.1.2-24). Details of the Camp layout and other relevant details are contained in Appendix 2.1.9-7-A. The Camp has been used by large numbers of visitors, field camps, meetings and as a school for all grades of students since its completion. Various alterations and modifications have been carried out over the last 20 years. The Camp is further discussed in the description of the Social Resource (Section 2.2.5), and the powerline route to Camp shown on Map 2.1.9-8-C. The main gate area of the U.B.C. Research Forest is shown on Map 2.1.9-8-D.</p> | LOON LAKE
CAMP |

- 2.1.9-9 The Gatekeeper's house (Map 2.1.9-8-A) was built in 1956 as Administration Offices and accomodation for the Gatekeeper and continued this dual role until 1961, when the first section of the present Administration Building was constructed. However, in 1972, when there was a change in staff and a new Gatekeeper hired, the Gatekeeper's house ceased to be used for office space and was given over entirely to use as the Gatekeeper's residence. GATEKEEPER'S HOUSE
- 2.1.9-10 The present Administration Building (location - Map 2.1.9-8-A; details of construction - Appendix 2.1.9-7-A) was constructed in two parts: The first phase, consisting of the Main Office, the Director's and Forester (Engineering) offices, were constructed in 1961 while the second phase was added in 1968 when four laboratories were built onto the east side of the Main Office. ADMINISTRATION OFFICES
- 2.1.9-11 Adjacent to the Administration Building are two large workshops and a garage. Also in this area is a petrol storage tank with pump (location - Map 2.1.9-A; details of construction - Appendix 2.1.9-7-A). WORKSHOPS AND GARAGE
- Excerpt from Annual Report 1957-58:
- "A garage-workshop was constructed adjacent to the administration building. The building is 864 square feet in area and contains a storage and work room for research, a garage, and a workshop. It is wired and heated and houses various power tools and equipment."
- 2.1.9-12 Acquired in 1968 when the 63.5 ha (157 acres) were purchased from the Marc family, the Marc house was renovated in 1977 when services were installed and the house generally upgraded. (Map 2.1.9-8-A and Appendix 2.1.9-7-A). OLD MARC PROPERTY
- 2.1.9-13 Over the course of the years, researchers have built small huts, storage sheds, temporary shelters and other semi-permanent structures to facilitate their research efforts. The location and a list of these semi-permanent structures is included in Appendix 2.1.9-7-A. RESEARCH STRUCTURES
- 2.1.9-14 The Research Forest has a number of continuing experiments, many of which require accurate information relating to the climate. The Research Forest maintains a weather station. The location is given on Map 2.1.7-2-A, details of data and equipment are given in Appendix 2.1.7-4-A. CLIMATE STATIONS
- 2.1.9-15 As a demonstration of the use of "tilted" runways for forestry purposes, a runway was constructed on the Forest in April 1970 (Map 2.1.9-8-A). The site is on the south side of Spur F40 (Compartment 24) in a southerly direction from the Spur. The average grade on the airstrip was 23 percent with the steepest part being 27 percent. The airstrip was built in two days using a Cat D7F. The original airstrip was 183.5 m (600 feet long) and was oiled to reduce the danger of stones being blown up by the slip-stream of the aircraft. Details of construction and re-alignment are to be found in Appendix 2.1.9-7-A. AIRSTRIP

In 1973, the alignment of the airstrip was altered, and the specifications upgraded. The flight path approach to the original runway was across the Griffith Reserve (Project 57-20) and some of the trees had grown to the point that they constituted a hazard to aircraft using the strip. The airstrip is now aligned N6W (as opposed to the original N7E), is now 230 m (750 feet long), has an even drop of 20% throughout and conforms to the specifications included in the detailed description in Appendix 2.1.9-6-A.

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| 2.1.9-16 | <p>Many information signs relating to experiments and functions of various buildings and other structures have been erected since 1970. These signs are maintained by the Forest Administration and the research agencies to inform both visitors and casual observers of the purpose of certain research installations. Roads are numbered and lettered (Appendix 2.1.2-75-A) to facilitate ease of travelling through the Forest. Gates have been installed at strategic points on the forest road network (Map 2.1.9-6-A) to restrict access and use of unauthorized vehicles within the forest area. Power lines have been constructed on the Forest (Map 2.1.9-8-C). The Mica Hydro line, constructed in 1975, sterilizes an extensive area at the south end of the Forest with respect to timber production and places a severe constraint on the management possibilities in this area. However, local lines require only a small right-of-way (4.6 metres - 15 feet) and have in some cases been sited along existing roads and consequently remove little ground from production.</p> | <p>PUBLIC
INFORMATION
SIGNS, ROAD
SIGNS, GATES
AND POWER
LINE</p> |
| 2.1.9-17 | <p>A forest nursery was laid out alongside the Administration Building during 1957 and 1958. A cedar hedge was planted in January 1958 and a start made on landscaping the area surrounding the Main Gate. A total of 98 m (320 feet) of seed bed was available of which 39 m (128 feet) was in production. The remaining 59 m (192 feet) was available for production of 30,000 Douglas-fir seedlings and for special research requirements.</p> | <p>U.B.C.
RESEARCH
FOREST
NURSERY</p> |
| 2.1.9-18 | <p>Stock growing in a forest nursery (now terminated) at the University campus was lifted in October 1959, and transplanted in the nursery at the Research Forest. Four thousand Scots pine (<u>Pinus sylvestris</u>), forty European larch (<u>Larix eurolepis</u>), and three hundred Japanese larch (<u>Larix leptolepis</u>) were set out as 1 - 0 stock.</p> | |
| 2.1.9-19 | <p>Frost heaving as a result of a succession of severe frosts in November 1959, the latter part of February and the beginning of March 1960, caused the loss of all seedlings in the Forest nursery. This loss included approximately 20,000 1 - 0 Douglas-fir seedlings, and 35,000 western hemlock seedlings. Small sowings of sequoia (<u>Sequoia sempervirens</u>) and Sitka spruce (<u>Picea sitchensis</u>) were similarly affected.</p> | |
| 2.1.9-20 | <p>From 1960 to 1968, the Forest nursery was used mainly as storage for stock to be used for research purposes. In 1968, this nursery was no longer required and the area was landscaped and sown to grass.</p> | |

- 2.1.10 Hazards to the U.B.C. Research Forest
- 2.1.10.1 Hazards of direct human origin.
- 2.1.10.1-1 Theft There is no record of timber theft but Christmas trees have been stolen, especially from the Arboretum. MAN THEFT, TRESPASS INTERFERENCE AND FOREST PRACTICES
- 2.1.10.1-2 Trespass and Vandalism The Forest is closed to fishing, hunting, horse riding and vehicular access. Damage has been done to the Marc property. Logging trucks and other machinery have been damaged. Climatological stations and directional signs have been shot at. There has been occasional poaching of deer. Increasing urbanization is likely to intensify these problems.
- 2.1.10.1-3 The Forest stands on the edge of a large urban area and over one million people live within a 50 mile radius of the Main Gate. Apart from the organized parties of school children on Day Tours, Resident Pupils of the Outdoor Education Programme and meetings at the Loon Lake Camp and other visitors, there are an increasing number of casual visitors, who merely "happen along". The immediate area close to the southern boundary of the Forest is subject to increasing visitor pressure and educational trails sited in this area suffer from heavy and often uncontrolled use. While casual visitors are not actively discouraged, the increasing number of this type of un-restrained visitor could pose serious problems in the near future through over-use of existing educational trails, litter disposal problems and possible vandalism. HUMAN PRESSURE
- 2.1.10.1-4 Forest Practices Logging methods and management practices have resulted in erosion. Sheet erosion after logging is frequent even on moderate slopes. Poorly designed and sited logging and skid roads have had adverse hydrological effects with excessive erosion and stream sedimentation. Slash burning on shallow to bedrock soils has resulted in exposure of bedrock over extensive areas as fire consumes the organic material overlying the bedrock, while any material left on the bedrock following burning is loosened by the fire and is generally washed off by subsequent rain. Areas of exposed rock transmit water rapidly and present a strong erosion force to down-slope soil material. Rapid surface flows may lead to localized paludification in rock basins. Logging debris and sediment flushed down draws on clearcut and burned areas may accumulate at critical points and lead to extensive damage: culverts plug, roads wash out and site productivity is reduced. LOGGING AND EROSION SLASH BURNING
- 2.1.10.1-5 By Order-in-Council, dated 11 August, 1958, the University Forest is reserved from mining and placer development. A copper mine just beyond the north boundary was in production for several years but has not been worked since the Depression of 1930. A few mineral claims were staked in 1943 at the Alouette River forks, others have been staked, particularly in the north eastern portion of the Forest on the Pitt Lake slopes where gold, silver, and copper can be found in small quantities. Mineral claims on the Forest are shown on Map 2.1.10.1-5-A while details of claims are given in Appendix 2.1.10.1-5-A. MINING

2.1.10.2 Fire

- 2.1.10.2-1 Until recent logging operations, fire has been the major factor in shaping what is now the U.B.C. Research Forest. Details of fires prior to the establishment of the U.B.C. Research Forest in 1949 are given in Sections 2.1.2-15 and 16 and Map 2.1.2-2-A. Since the establishment of the U.B.C. Research Forest, improved access and protection measures have greatly reduced the incidence of fire although the hazard remains. Since 1949 the major cost and damage by fire to the Forest has resulted from intentionally set slash fires that have burned out of control. GENERAL FIRE INCIDENCE
- 2.1.10.2-2 In July 1949, lightning caused a fire in the south west corner of the Forest. This was extinguished before it had time to spread. In 1957 a small fire was started by a smoker, possibly a horseback rider. On October 8, 1957 a slash fire flared up out of control during a high north wind. This fire spread quickly and covered approximately 20.24 ha (50 acres) of slash-covered ground. A suppression crew of 16 men were employed during the night of October 8 and this number was increased to 49 men on October 9 when the fire was brought under control. This fire was mostly confined to the slash-covered area but about one hectare (two and a half acres) of second growth timber above Twin Falls on the North Alouette River in Compartment 33(d) were partially burned. During the summer of 1958 four roadside fires were detected and extinguished before causing any damage. In late July 1965, a small picnic fire along an abandoned railway (adjacent to Road A) was spotted, located with some difficulty, and extinguished while still of negligible size by the Canadian Forestry Association Junior Forestry Crew. In September 1967, slash burning operations east of Eunice and Gwendoline Lakes spread out of control. Though heavy rains had ended the summer drought and the logging slash was damped down, canopy interception on the margins of the cut-over areas significantly reduced the effect of the rains on the forest litter and fire entered the adjacent stands. Most of the timber in the burned area was recovered in the subsequent salvage operations, but as a result of the escape, burning costs rose to \$93/ha (\$37.69 per acre) for the year. Logged-over areas slash burned in previous areas were re-burned as fires spread from new slash to old slash and planted areas, and approximately 3.2 ha (8 acres) were burned. The extent of the fire is indicated on the map included in Appendix 2.1.10.2-2-A. On July 7, 1970 a small fire on the south part of the Forest along 14th Avenue was spotted and extinguished by Forest Staff before causing significant damage. In 1974, a fire escaped from land clearing operations at the south-west corner of the Forest (Hydro power line right-of-way, see Table 2.1.10.2-2-A), causing considerable damage on both the inside and outside the Forest boundary. The fire was fought from 13 September to 2 October before it was completely extinguished, and up to 75 men were employed cutting fire guards and manning pumps during this period. Aircraft were employed to spread retardant and extensive use was made of helicopters to lay water and supply the fire-fighters. Ten hectare (25 acres) were burned. The cost of the fire was difficult to determine but was placed in excess of \$280,000. A summary of fires, causes, costs and areas of damage is shown in Table 2.1.10.2-2-A, while details are given in Appendix 2.1.10.2-2-A. FIRES SINCE 1949

- 2.1.10.2-3 A Forest Fire Control Plan was prepared in January 1967 and revised and expanded in December 1968 to include the then newly acquired Block II. The revised (1969) Fire Control Plan and the current revision (1976), are shown in Appendix 2.2.10.2-2-A. DETECTION AND CONTROL
- 2.1.10.2-4 Ground access problems are greatest in the north half of the Forest along the east and west boundaries. These areas have steep, broken ground through which road construction is extremely costly and access on foot, slow and arduous. In the central zone of the northern portion there is fair accessibility by road except in the broad valley north of Jacob's (Marion) Lake. Ground access in this area is difficult due to dense cover and broken ground. The southern half of the Forest has a well developed road system and good accessibility. "Remote" fires in the least accessible regions are of low incidence due mainly to lack of access; in these areas lightning is the most likely cause factor. Consequently, all control planning for these areas is oriented toward other than ground access. The least accessible areas of the Forest contain the major volumes of old growth timber remaining on the Forest. Because of the steep terrain and shallow soils a fire of large proportions would have an extremely damaging effect. In view of these circumstances fire prevention and control in the remote areas assumes considerable importance. FIRE ACCESS

2.1.10.3	Physical Hazards	
2.1.10.3-1	Frost damage on the Forest takes two main forms. The first is the conventional "frost pocket" problem. This is local in distribution and gives little cause for concern. The second aspect of frost is the lifting action of the moist soils, in particular associated with areas of cleared ground where all surface vegetation has been cleared by machine. On areas of this nature where frost lift is a possibility, planting methods must be used that ensure deep planting with well formed planting stock. The cracking of standing timber due to frost is occasionally found in hemlock and <u>Abies</u> sp. but in general terms this form of frost damage is insignificant.	FROST
2.1.10.3-2	In coastal British Columbia, the combination of wet snow (or rain-on-snow) and dense stands of young conifers leads to the possibility of snow press and snow break. Correct spacing at an early age overcomes this problem.	SNOW BREAK
2.1.10.3-3	Sun scorch is prevalent on trees on forest edges exposed by clear cutting. Also affected in some instances are young trees in open stands after pruning, and after cleaning operations have removed the competitive top cover. The last problem can be overcome by ensuring that cleaning is undertaken at an early age so that the main crop trees are not exposed to sudden micro-climatic changes.	SUN SCORCH
2.1.10.3-4	Drought is often of critical significance in the survival of new plantations. If drought conditions occur after late spring planting, complete failure can result.	DROUGHT
2.1.10.3-5	Windfall occurs throughout the Forest in mature stands and on stand edges. Marginal trees may blow down up to ten years or more after clear felling have been completed. In winter winds from the north west and north east are especially significant and in summer, to a lesser extent, winds from the south east. Degree of exposure to the prevailing wind is important for windfall intensity. Lake shore lines and ridges are subject to continuing exposure and show a decrease in the extent of windfall intensity with slope variation. In old growth stands local aspect is reflected in susceptibility to windfall. Overall the most critical points are the forest edges of cuts where residual stands are on shallow soils.	WINDFALL
2.1.10.3-6	The most extensive wind damage occurred on October 12, 1962 when Typhoon Frieda caused the blow down of 110 ha (272 acres) of old growth and 32 ha (80 acres) of older second growth stands (Map 2.1.10.3-6-A). Much of the damage occurred in the north central valley where winds from the south-southeast were deflected to the north up the valleys. This topographic acceleration of the wind, in conjunction with extensive clear cuttings which had opened up mature and over-mature stands on generally shallow soils, resulted in the largest areas of windfall on the Forest. In general, severe damage was restricted to stands 30 metres (100 feet) tall and greater. No difference in susceptibility was apparent between older second growth and old growth stands. Greatest damage occurred on exposed south-east slopes with a gradient of less than 50 percent and especially where a cutting boundary had been located along them. In several instances, poor drainage situations, particularly in fine textured soils, resulted in serious reduction of root support and consequent up-rooting of trees. Details of Typhoon Frieda windfall areas and volumes are given in Appendix 2.1.10.3-6-A.	TYPHOON FRIEDA

2.1.10.4 Biological Hazards

- 2.1.10.4-1 There is no domestic grazing in the Forest. Occasionally cows have entered through the west boundary. Horse riding caused significant damage to planted areas until the Forest was closed to riding in 1959. Dogs chase deer and are known to have caused occasional deer mortality. Dogs killing deer is an increasing problem. DOMESTIC ANIMALS
- 2.1.10.4-2 There are no major problems with wild animals on the U.B.C. Research Forest. Bears have been known to upset research installations. Deer cause only slight damage to regeneration and have damaged pines, particularly exotics, through the fraying of velvet. At times hare and grouse have damaged young plantations but this has been only a periodic and limited occurrence. Sapsuckers sometimes damage young hemlock trees. On two occasions the Douglas squirrel has caused extensive damage to young Douglas-fir through cutting of leaders. In 1961 such damage occurred over 800 ha (2,000 acres) when 11.5 percent of 3,352 trees were damaged. Trees injured ranged in age from 7 to 30 years and in height from 1 - 12 meters (3 to 40 feet). A relationship was suggested with a poor seed year in 1960 and squirrel depredations (Walters and Soos, 1961). WILD ANIMALS
- 2.1.10.4-3 No systematic entomological survey has been undertaken although casual observations have been made over the years. Endemic insect populations cause minor defoliation at irregular intervals but the U.B.C. Research Forest does not have a serious history of insect problems. However, the possibility of a serious outbreak should not be overlooked. In the early 1930's an outbreak of hemlock looper, Lambdina fiscellaria lugubrosa, killed 26.32 ha (65 acres) of hemlock on the Forest. Another localized outbreak occurred in the Widgeon Creek drainage which lies to the southwest of Pitt Lake a few miles west of the Forest. There have been small outbreaks of other insects from time to time, and there are others present that could cause problems under favourable circumstances. Sitka spruce plantations have sustained moderate damage to leaders from the Sitka spruce weevil, Pissodes sitchensis. The "plantation weevil" Steremnius carinatus, could develop into a problem in new plantations. It occurs in fresh Douglas-fir stumps and can cause major damage through the girdling of seedlings if these are planted within one year of felling. Losses of up to 40 percent have been reported from areas on Vancouver Island. Both western hemlock and Douglas-fir fall-felled logs are susceptible to attacks in the following spring and summer by the ambrosia beetles Trypodendron lineatum and Gnathotrichus sulcatus. Other insects that may be present but which have caused little or no damage are the blackheaded bud worm, Accleris variana, and the Douglas-fir beetle, Dendroctonus pseudotsugae. The latter has been identified but does not present a serious problem at this time. However, it is a potential hazard to trees over 100 years of age. The cone midges, Contarinia Oregonensis and Washingtonensis and the cone moths Barbara colsaxiana and Diorcyctia spp. could become a problem. Adelges cooleyi, the Douglas-fir chermes has as alternative hosts Douglas-fir and Sitka spruce, INSECTS

when these two species are present major population increases may occur producing large pineapple galls on the spruce. The European pine shoot moth Rhyacionia buoliana could be a problem, if pines are planted. The most recent insect problem of some importance is damage to Pacific Silver fir (Abies amabilis), a minor species on the Forest, by the Balsam Woolly aphis (Adelges piceae). This insect is slowly infecting and killing most of the trees. The willow borer, Sternochetus lapathi, has been active for some years on the Forest and is widespread on willows. As a destroyer of willows it commanded little local attention until it was noted in the early 1960's attacking planted hybrid poplar in the Fraser Valley. It is now recognized as presenting a hazard to hybrid poplar plantations and damage has occurred to poplars in the southern portion of the Forest.

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| 2.1.10.4-4 | No systematic pathological survey has been made of the U.B.C. Research Forest. The normal fungal diseases endemic in the lower coast region of British Columbia occur but none are of major significance at this time. In the older stands the normal diseases characteristics of over-maturity are found and many trees in mature and overmature stands are infected with wood destroying fungi causing substantial cull losses. Injuries caused by felling and skidding during thinning and other partial cutting operations facilitate the entry of wood destroying fungi, causing substantial cull losses. As forestry practices become more intensive the significance as distinct from the incidence of fungal disease on the Forest may be expected to become greater. | DISEASE |
| 2.1.10.4-5 | There are no serious foliage diseases on the Forest. The only noteworthy disease of this type, and this only to a very limited extent, is the needle-cast disease of Douglas-fir (<u>Rhabdocline pseudotsugae</u>). | FOLIAGE
DISEASES |
| 2.1.10.4-6 | Lodgepole pine is almost always heavily infected with the western gall rust, <u>Peridermium harnessii</u> . It is quite destructive, particularly to seedlings and samplings, killing some trees and stunting and malforming many more. However, the small proportion of Lodgepole pine present on the Research Forest reduces the significance of this disease on the Forest. Practically all of the regeneration of <u>Pinus monticola</u> has been killed or is heavily infested by the introduced disease <u>Cronartium ribicola</u> white pine blister rust. The alternate host, <u>Ribes</u> spp. is very common on the Forest but eradication has been considered unfeasible because of the rough topography, the general low density of naturally occurring white pine and the ubiquitous nature of the <u>Ribes</u> , as well as weather conditions which in most years are favourable for infection of pine. An extensive white pine varietal trial for resistance to blister rust was established in 1964. The use of antibiotics to control or kill the fungus has been and still is being tested. Acti-Dione appears to offer most prospects in this regard. | RUSTS |

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|-------------|---|---|
| 2.1.10.4-7 | Of the heart rots, red ring rot <u>Fomes pini</u> and red belt fungus <u>Fomes pinicola</u> are by far the most common. With the harvesting of the overmature stands their incidence may be greatly reduced. <u>Polyporus abietinus</u> is also present and causes rapid decay of the sapwood particularly of western hemlock and blasam fir when these have been scarred. | HEART ROTS |
| 2.1.10.4-8 | Root rots attack trees of all ages. Losses may be direct causing mortality or cull, or indirect, affecting future yield. The incidence of these diseases is increased where tree species are planted on sites not optimum for their development. Susceptibility to infection is increased by exposure to prolonged periods of distress consequent on adverse site conditions and weather. Some of the most important root rots are honey or shoestring fungus, <u>Armillaria mellea</u> , white stringy root rot, <u>Fomes annosus</u> and Rhizina root rot, <u>Rhizina undulata</u> (<u>R. inflata</u>). <u>Phellinus weirii</u> , yellow laminated root rot, is also present. <u>Armillaria mellea</u> is found on many trees, and is primarily important in young stands, particularly in western hemlock although it has also killed dominant Douglas-fir and has been observed on white pine. It is presently considered the most destructive root rot on the Research Forest. | ROOT ROTS |
| 2.1.10.4-9 | <u>Rhizina undulata</u> , the so-called "coffee-break" disease; because of its observed association with small cooking fires, went unrecognized in B.C. until the late 1960's when it was identified in a newly planted area east of Stave Lake, some fifteen miles (24 km) east of the U.B.C. Research Forest. The disease results in extensive mortality in new plantations and group dying in pole stage stands. It has been reported on the U.B.C. Research Forest in plantations established on sites that have been broadcast burned. | |
| 2.1.10.4-10 | <u>Fomes annosus</u> , white stringy root rot, occurs as butt rot rather than as a pathogen. It may become of importance as Forest Management becomes more intensified. Currently it is checked by the parastic mould <u>Trichoderma</u> spp. which is present in abundance and favoured by the acid soil conditions that prevail. To the present this has provided an effective biological control. With the increase in planted areas and the possibility of initiating thinnings, the disease could spread quickly. Thus the change from an old growth exploitive forest economy to the more intensive management of a young, vigorous forest, <u>Fomes</u> , as with other fungal diseases endemic in the over-mature forests, could become of serious concern. | |
| 2.1.10.4-11 | A thinning study (Project 56-2) in a 25-year-old western red cedar-western hemlock stand raised questions regarding possible pathological constraints on stand treatment. This stand, established on a site burnt in 1931, was released and thinned during 1956, 1957, 1958 and 1960. The hemlock had been damaged by sap suckers and, after thinning, the stand was almost pure cedar. Root and butt rot was so high that extension of the study was abandoned and no further thinnings undertaken. Infection is entirely confined to the thinned plots. | PATHOLOGICAL
CONSTRAINTS
CASE STUDY |

A 0.04 ha (0.1 acre) plot was subjected to detailed pathological examination. In this plot Phellinus subacida as the most frequently isolated pathogen, and sporophores of the fungus were found on 95% of the cankered trees and 85.7% of the stumps. This was followed in frequency by:-

Armillaria mellea

Phellinus weirii

Fomes annonus

Odontia bicolor

Hishioporus abietinus (Polyporus abietinus)

These fungi were not confined merely to the roots but include also basal cankers and considerable root rot.

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| 2.1.10.4-12 | <p>Few western hemlock stands on the Research Forest are free from infection by Dwarf Mistletoe (<u>Arceuthobium campylopodum tsugensis</u>). Appreciable losses occur in all age classes and it is a major concern in young stands. Mistletoe infection is observed in the form of large club-like brooms of living (or dead) branches. In the absence of thinning, control of this major destructive parasite is impossible. In one major area of infection south of Loon Lake (Compartment 28) approximately 4 ha (10 acres) of merchantable western hemlock and amabilis fir were clear felled in 1953. The stand was uneven aged with merchantable trees ranging from 80-240 years. Sixty-six percent of the cruise volume of hemlock was visibly infected by dwarf mistletoe. There were large openings where the hemlock had been killed after an extremely dry year in 1951, significantly increasing the size of already existing openings.</p> | <p>NOXIOUS
PLANTS AND
FOREST WEEDS</p> |
| 2.1.10.4-13 | <p>The sites of the lower elevation areas of the Research Forest are rated as of moderate to good productivity. The non-commercial tree species and the underbrush pose an ever present problem to the re-establishment of the forest following clear cutting or fire. Lack of funds in the past years has placed a constraint on the tending of newly regenerated areas, and this practice has unfortunately left a legacy of partially stocked areas at the present time (1980). Alder has invaded many of the young plantations, and the extremely rapid early growth rates of this species makes it difficult to combat. In the past, treatment has been limited to cutting back the weed species and little chemical control has been exercised. Currently methods of mechanical weed control are showing promise.</p> | <p>WEEDS AND
BRUSH</p> |

Figure 2.2-1-A Organization of the "Resource Section" of the
U.B.C. Research Forest Management Plan

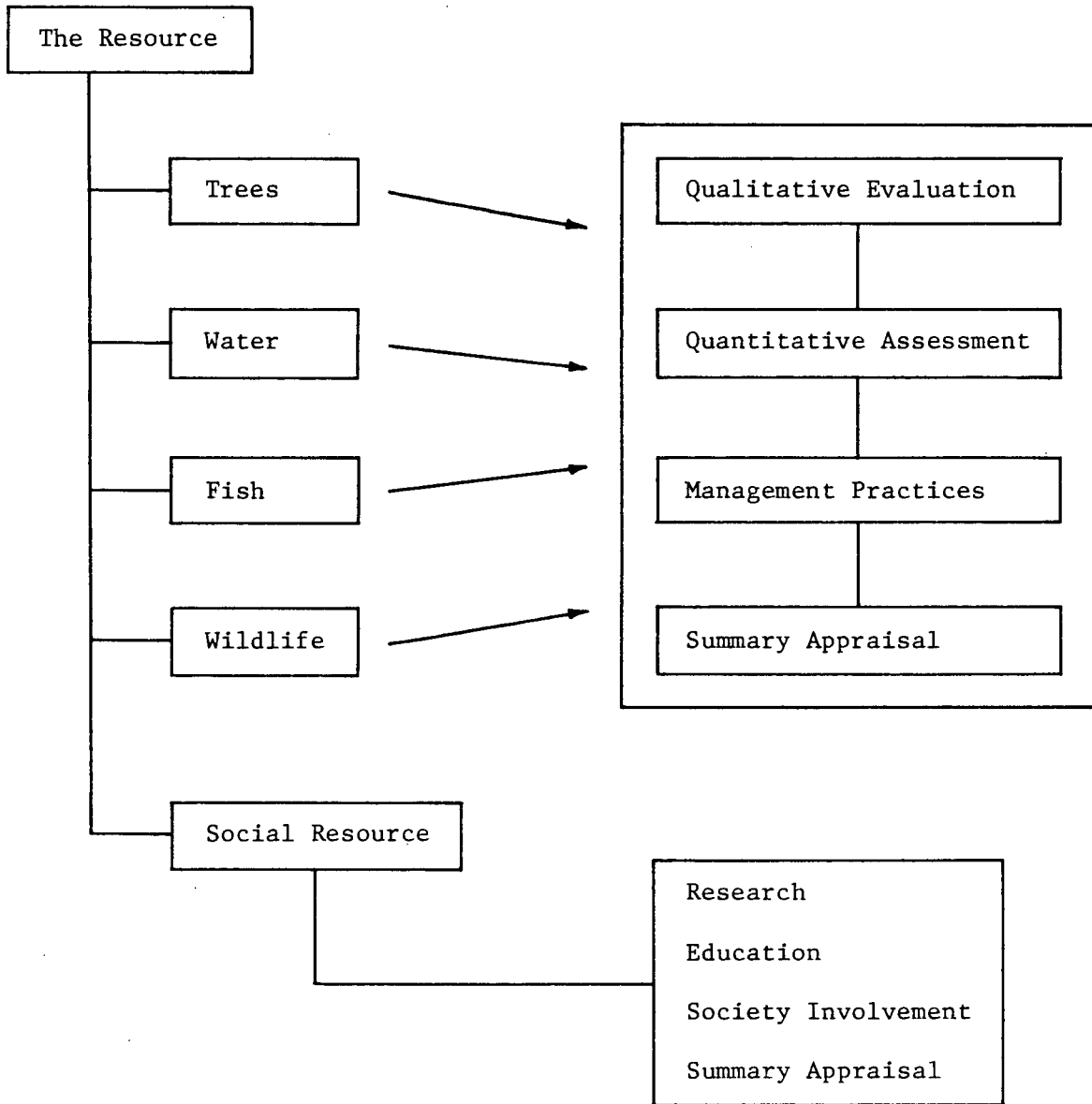
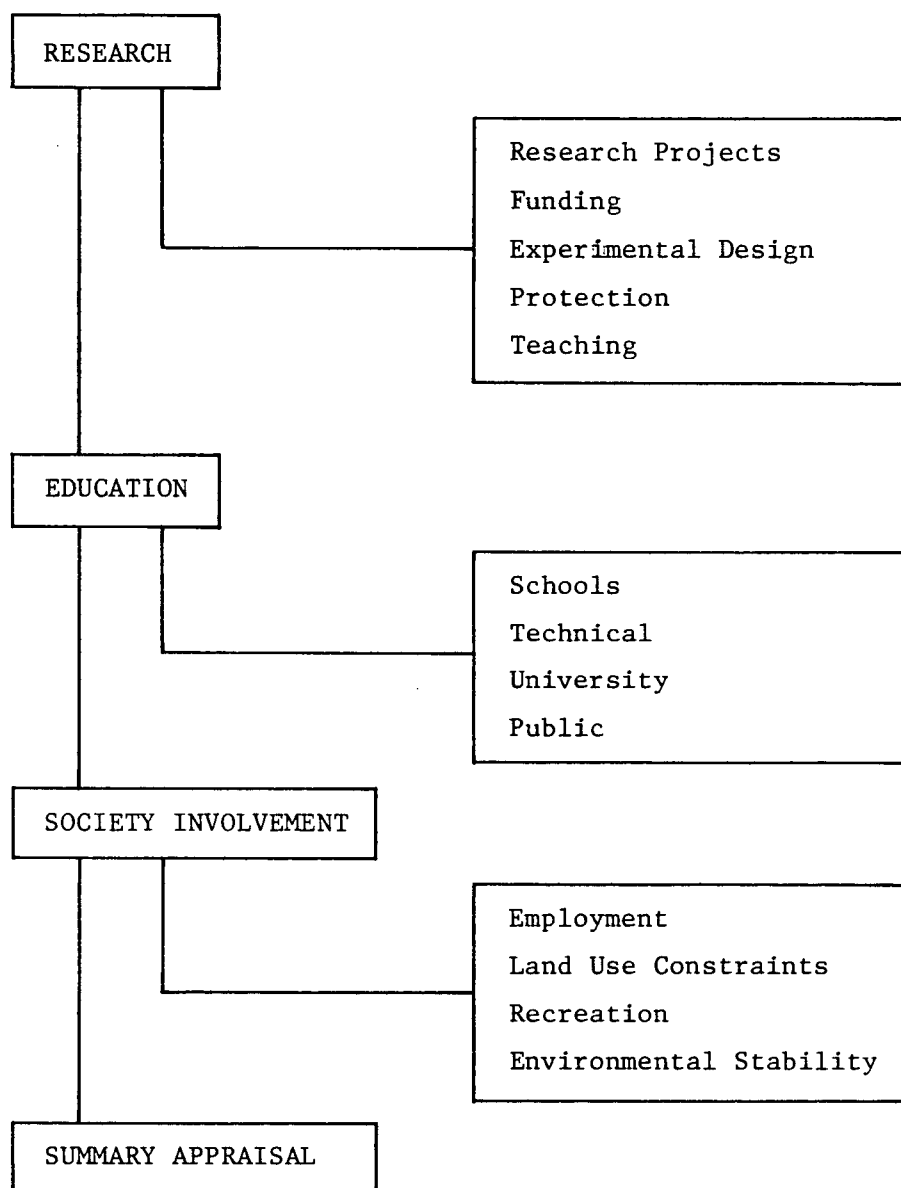


Figure 2.2.1-B The Organization of the "Social Resource"
of the U.B.C. Research Forest Management Plan



2.2 The Resource

2.2-1 The "Resource Section" will be broken into five parts as follows:

GENERAL
ORGANIZATION

2.2.1 The Tree Resource

2.2.2 The Water Resource

2.2.3 The Fish Resource

2.2.4 The Wildlife Resource

2.2.5 The Social Resource

Each section will be analyzed under four headings (Figure 2.2-1-A) as follows:

Qualitative evaluation

Quantitative assessment

Management practices

Summary appraisal of resource

The exception to this is the Social Resource (Figure 2.2-1-B) which does not lend itself to this treatment and will be analyzed as follows:

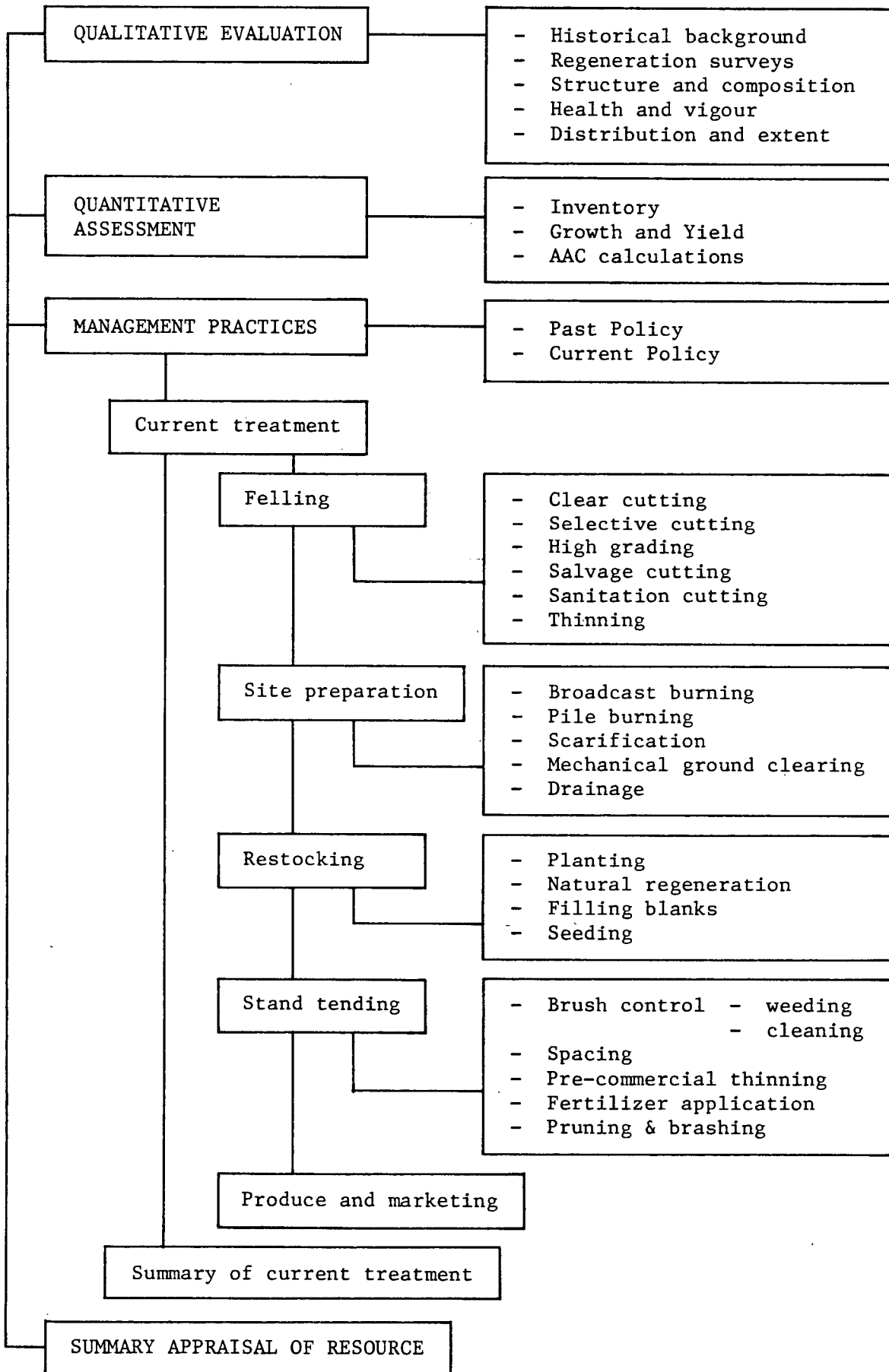
Research

Education

Society Involvement

Summary Appraisal

Figure 2.2.1.1-A The Organization of the "Tree Resource Section"
of the U.B.C. Research Forest Management Plan



2.2.1	The Tree Resource on the U.B.C. Research Forest	
2.2.1-1	The general organization of the analyses of the Tree Resource at the U.B.C. Research Forest is shown in Figure 2.2.1-1-A.	ORGANIZATION
2.2.1.1	Qualitative Evaluation	
2.2.1.1-1	Two major factors determine the present silvicultural character of the forest area: the first is the fire history (Sections 2.1.2-15 and 16 and Map 2.1.2-2-A) while the second is the logging activities. The importance of fire and logging are of such overwhelming significance that they almost totally dominate other influences: e.g. the 1868 fire destroyed some 1214 ha (3,000 acres) of the western portion of the forest while since 1920, two thirds of the forest has been cut over. Logging operations between 1920 and 1931 and the fires related to these operations, cleared nearly 2834 ha (7000 acres). Since 1953, more than 607 ha (1500 acres) of the forest have been logged.	HISTORICAL BACKGROUND
2.2.1.1-2	Regeneration surveys of timber Berth "W" (Map 2.1.2-1-A) were undertaken by the B.C. Forest Service in 1929 (by the Research Division) and in 1940 (aerial survey). Both surveys indicated a relatively satisfactory level of stocking on the logged and burned areas, as opposed to logged areas where there had been no burning. The species with which the area was stocked was predominantly western hemlock and western red cedar, with a small number of Douglas-fir scattered through the area.	REGENERATION SURVEYS
2.2.1.1-3	The composition of the Forest varies. For instance, in the dry sub-zone, as one proceeds from the drier to wetter communities, the proportion of Douglas-fir decreases and the proportion of western hemlock and western red cedar correspondingly increases (See Appendix 2.2.1.1-3-A). Fire and logging have played their part in influencing composition and where there has been little logging since the last major fire, e.g. on the eastern side of the forest, hemlock and cedar mixtures dominate (See Appendix 2.2.1.1-3-A). The extent of this section of the forest indicates the large area covered by the fire (Map 2.1.2-2-A) and the subsequent regeneration patterns are reflected in the present species composition. The earlier 1868 fire sites on the western side of the Forest have been extensively logged. With better control of logging in more recent times, combined with rapid replanting with Douglas-fir and natural seeding of hemlock from adjacent stands, species composition varies from almost pure Douglas-fir, through Douglas-fir hemlock mixtures to almost pure western red cedar and western hemlock on sites where planting was unsuccessful. At the southern end of the forest, red alder is a prominent part of the species composition and is abundant as a competitive weed species on all the better quality sites. The uneven age distribution, size classes, stocking and variation in sites, together with the diverse nature of the management policy, renders any approach towards normality in management difficult and in many instances, unrealistic. Details of site classes and crop types are summarized in forest inventory in Appendix 2.2.1.1-3-A and B.	STRUCTURE AND COMPOSITION

- 2.2.1.1-4 The health of the tree crops at the U.B.C. Research Forest is generally good, although the areas of forest sited on the shallow soils do not have the vigour popularly associated with the forests of the Pacific North-West. This is especially so of parts of the central north/south ridge towards the northern end of the forest where growth is poor. Many of the shallow soils in the less vigourously growing areas are probably at least partly a result of the fire and logging history. However, elevation becomes a constraining factor in some instances where the land rises over 365 m (1200 feet) above sea level (Map 2.1.3-1-A). Disease and insect populations in most areas are minimal although, as previously noted in 2.1.10.4-3, care is required in certain management practices, particularly thinning. HEALTH AND VIGOUR
- 2.2.1.1-5 The generalized distribution and extent of the forest types is shown in Map 2.2.1.1-5-A. Where the primary forest use is non-timber oriented, precise forest type boundary definition is less important than on timber production areas, and in some instances, a definition which acknowledges gradual transition from one type to another rather than a fixed boundary may be advantageous. DISTRIBUTION AND EXTENT

2.2.1.2 Quantitative Assessment

- 2.2.1.2-1 Much information related to the forest cover has been accumulated over the years (Appendix 2.2.1.1-3-A), and it would be impractical to include more than a small proportion of this within the body of the U.B.C. Research Forest Management Plan. However, as much of this information is required to place the current situation in perspective, the following paragraphs are referenced to Appendices 2.2.1.1-3-A (Inventory) and 2.2.1.1-3-B (Calculation of Annual Allowable Cut (AAC)).
- 2.2.1.2-2 The Quantitative Assessment of the Tree Resource is treated under the following headings:
- Inventories past and present
 - Annual Allowable Cut (AAC) Calculation
- 2.2.1.2-3 As previously noted in Sections 2.1.2-26 to 2.1.2-68, several inventories have been carried out over the years. The intensity of cruising generally, together with the emphasis in the inventories on timber values, closely reflects the intensity and type of management practised. The early inventories were extensive and, by current (1980) standards, of a superficial nature. However, they were adequate at the time, and more intensive surveys would have wasted valuable staff effort at a time of financial stringency.
- 2.2.1.2-4 The first reference in the Forest records to inventory is in the Mapping Plan of 1950 (Appendix 2.2.1.1-3-A). In this Plan, procedures were set out for cruise and mapping operations. Specifications relative to the intensity, types of measurements and survey methods were contained in the Mapping Plan, and, together with excerpts from the Annual Reports of the Research Forest of 1951/52, are discussed in Appendix 2.2.1.1-3-A part (ii).
- 2.2.1.2-5 The field work for the second inventory was carried out during 1964-1966. The data obtained from this inventory still provides the quantitative basis for the management of the Forest (1980). Details of this inventory are contained in Appendix 2.2.1.1-3-A, as follows:
- Part (i) Old Mapping Plan (1950)
 - Part (ii) Preliminary Report on the University Forest (Spring 1950).
 - Part (iii) Description of methods used in collection and analysis of point sampling in the 1964/1966 inventory.
 - Part (iv) Summary of inventory statistics as of April 1966 and the calculation of the Annual Allowable Cut (1966).
 - Part (v) Area and volume summary of the U.B.C. Research Forest in November 1971 plus key map for identification of Forest types.
 - Part (vi) Details of Inventory undertaken in 1973 as part of Variable Density Yield Table Assessment (Productivity Committee contract P.C. 006, B.C. Forest Service).
 - Part (vii) Site Classification map. (Site index map, (Baizak 1960), updated to 1971).
 - Part (viii) Computer print out of 1970 reworked inventory.

GENERAL
APPROACHINVENTORY
WORKTHE 1950
INVENTORYTHE 1966
INVENTORY

- 2.2.1.2-6 A copy of the complete inventory consisting of three volumes, together with the key map to the forest types, is held at the Forest Administration Office, as are the field books containing the notes, cruise cards, and other plot information. COPY OF INVENTORY
- 2.2.1.2-7 The useable net volume on the U.B.C. Research Forest in cubic feet, trees 7.1" and over, including dead useable material, with deduction for close utilization, defect, waste and breakage was: NET VOLUME 1966
- "Old Growth" 9,188 Mcf (26020 m³)
- "Thrifty" 14,021 Mcf (39707 m³)
- 2.2.1.2-8 The 1966 inventory (in the 1970 reworked edition), forms the basis for all timber management work on the Forest. The current AAC is based on the data contained in this inventory, as are the calculations related to contractor activities in timber harvesting. INVENTORY 1970 EDITION
- 2.2.1.2-9 A further inventory was undertaken in 1973. Details of this inventory and the purpose of the project are discussed in Appendix 2.2.1.1-3-A. This information has been used in various forms, one of which has been to check parts of the 1966 inventory and another as reference material for student exercises. It does not form the basis of any management decisions due to lack of detail, minor inaccuracies in type boundaries and type grouping which did not co-incide with management requirements. In this project, several methods were used to calculate the volume of timber per acre, and large differences occur between the various methods. Estimates of crown cover, previously omitted in earlier inventories, was included in the 1973 inventory. THE 1973 INVENTORY
- 2.2.1.2-10 The Annual Allowable Cut (AAC) calculation on the U.B.C. Research Forest is based on a modified form of the Hanzlik formula. THE ROTATION AND ANNUAL ALLOWABLE CUT

$$AAC = \frac{V_m}{R} + I \text{ (thrifty)} + I \text{ (immature)}$$

where AAC = Annual Allowable Cut

V_m = the merchantable volume above rotation age (R)

I = the MAI (Mean Annual Increment) for the first rotation

Thrifty = 41 year plus

Immature = up to 40 years of age

Annual Allowable Cut calculations are shown in Appendix 2.2.1.1-3-B.

2.2.1.3 Management Practices

- 2.2.1.3-1 Trees on the Research Forest have been regarded primarily as a source of revenue, and until about 1968, there was little attempt to relate the Forest to other uses. Since the first establishment of the U.B.C. Research Forest, the area has been exploited for timber values and felling has been based on a calculated Annual Allowable Cut (AAC) - (Appendix 2.2.1.1-3-B). The same basic method of yield calculation has been employed throughout, using increasingly detailed information. Due initially to Typhoon Frieda, and later to management policies based on assumptions that (in hindsight) were not accurate, the Forest was extensively overcut during 1953 - 1967. As a result of both the cutting programme and the previous logging and fire history, the age structure of the stands is abnormal (Tables 2.2.1.1-3-A, B and C). PAST MANAGEMENT POLICY
- 2.2.1.3-2 Management policy is still oriented towards timber production, albeit at a lower level than previously. In the main, trees are cut for their timber value to provide essential revenues, in disregard of other management objectives, although the tendency is to concentrate timber production in the southern part of the Forest wherever possible. The current policy (1980) has been to reduce the AAC, and attempt to bring the age class distribution more into balance and approach the theoretical normal forest. Felling in the few remaining old growth areas has been drastically reduced, and has increased in the lower and intermediate age classes (areas naturally regenerated between 1840 and 1890). During 1970-72 the first steps were taken towards zoning on the basis of Best-Use (Appendix 2.1.2-38-C), and the current policy aims at the eventual withdrawal of timber production from the mountainous areas. Additional to the areas within the zone designated primarily for timber production are areas classified for "subsidiary timber production". A large proportion of the annual cut is, in fact drawn from these areas. See current Management Sections 7.0 and 8.0. CURRENT MANAGEMENT POLICY

Harvesting

- 2.2.1.3-3 The radical change in policy in recent times from one of rapid depletion of the older timber stands, towards a more restrained multiple-use management, coupled with the virtual elimination of the virgin old-growth forest, is changing the emphasis from clear-cutting and planting to a stand-tending, caretaker management approach to meet the requirements of education, demonstration and research. However, the pressing need to generate revenue to finance essential management activities still necessitates logging at a higher than desirable rate. Timber growing is now concentrated on the higher quality, more productive and easily accessible sites in the southern end of the Forest.
- 2.2.1.3-4 The Research Forest evolved its own system of guidelines (in 1970) prior to the introduction of the B.C. Forest Service Coast Logging Guidelines of 1972. In general, the self-imposed constraints of the Research Forest are well within the suggested B.C. Forest Service guidelines. Since 1970, streams have been protected by leave strips on each bank, and buffer zones have protected lakes from clear-felled areas (30-120 m - 100-400 feet), depending on the significance of the lake in fishing, research and aesthetic terms. Feeding grounds and wildlife corridors have been left for game. The adoption of patch-logging has kept the size of the clear-cut operations to areas of generally less than 20 ha (50 acres), although in some instances larger areas have been harvested: the largest cut during the period 1973-1980 was just over 44 ha (110 acres). LOGGING GUIDELINES

Felling

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|-----------|---|----------------------|
| 2.2.1.3-5 | Two methods of clear-cutting are in use. The conventional high-lead system is used on the steep ground and accounts for about 80% of the clear-felling operations. Rubber-tired skidders are employed on more easily traversed areas where slopes rarely exceed 30%. | CLEAR
CUTTING |
| 2.2.1.3-6 | Selective cutting has been confined to the recovery of cedar bolts for shingles and shakes. In the past, this was very profitable and the Forest was worked over extensively to salvage this type of product, but suitable material is now scarce and little, if any, of this type of work is now undertaken. Virtually no selective cutting is carried out for poles and piles, although where clear-cutting operations are in progress, poles and piles are selected as separate categories and on occasion, areas are pre-logged to remove poles and pilings prior to harvesting for sawlogs and pulpwood. | SELECTIVE
CUTTING |
| 2.2.1.3-7 | Salvage cutting has been done on sites of escaped slashfires and areas of windfall (paragraph 2.1.2-54). At times, where the area involved has been sufficiently large, a special sale has been offered. On other occasions, parcels of windfallen timber have been sold with adjacent clear-cuts. There are small parcels of this type of timber from time to time, but the last major operation was in 1962/63 after Typhoon Frieda (Paragraphs 2.1.2-65 and 68). | SALVAGE
CUTTING |
| 2.2.1.3-8 | Thinning has been confined to small research projects and student exercises, and has not been attempted on an operational scale. The results of the limited thinning research on the Forest have raised questions of disease susceptibility, although there is strong indication that the adverse results obtained were due largely to the presence of pathogens prior to the thinning being carried out (Paragraph 2.1.10.4-11). A small area that was thinned in 1971 (now part of a clear-felled area in Compartment 28) apparently did not suffer in the same way. | THINNING |

Site Preparation

- | | | |
|------------|---|---------------|
| 2.2.1.3-9 | Until early 1972, slash-burning was practiced on all clear-felled areas. Burning of slash and logging debris is now undertaken on a selective basis (using guidelines developed on the Forest based on ecological constraints). The clear-cutting of large areas, which once was a feature of logging operations on the Forest, is no longer carried out, and thus burning of logging slash to reduce fire hazard or insect infestation, is no longer a necessity. | BURNING |
| 2.2.1.3-10 | Cultivation of the soil by scarification is not done operationally. Any scarification that has been done in the past has been confined to skid roads and chance disturbance during logging. On the skid roads the operation was undertaken using a log pulled behind a rubber-tired skidder. References to scarification in the Annual Reports (Paragraph 2.1.2-68 and Annual Reports 1965 onwards) refer to mechanical ground clearing as detailed in the following section. | SCARIFICATION |

- | | | |
|-------------------|--|-----------------------------------|
| 2.2.1.3-11 | Mechanical ground clearing involves complete clearance in preparation for fully mechanized cultural operations. Old stumps are pushed out of the ground into piles and burned, together with the slash debris from the clear-felling operations. Large boulders are removed. Once the bulk of the debris is burned, the remaining material is buried. Any boggy areas are ditched using land clearing equipment. Rocky outcrops are left untouched and surface irregularities considered a hinderance to the operation of machinery, are leveled out as well as possible. In many instances, the surface topography is completely remodelled. | MECHANICAL
GROUND
CLEARANCE |
| 2.2.1.3-12 | On only a few of the highly productive sites at the southern end of the Forest have been drained. Swamps have been drained in areas to the south-east of Loon Lake in Compartment 28 (Map 2.1.1-3-A), but the areas involved are very small. Draining is not a frequent operation and where undertaken, dynamite, rather than mechanical means such as a backhoe, is favoured. However, there are many instances where the ground is not suitable for dynamite (e.g. stoney ground), and a backhoe has to be used. | DRAINAGE |
| <u>Restocking</u> | | |
| 2.2.1.3-13 | Until about 1955, there was almost complete dependence on natural regeneration for restocking logged or burned areas. After the slash was disposed of by burning, the site was left and over a period of time, possibly up to 20 years, would partially or fully restock with hemlock and cedar, with often less than 10% of other species such as Douglas-fir. As a consequence of this policy, alder occupies extensive areas on the more productive, lower elevation sites. In many instances, an understorey of conifers is becoming established under the alder invaded areas, but the stocking is generally sparse, and poorly distributed. In the past, the shape of the felled area was planned with consideration being given to distance from the possible seed source. Shading, aspect, condition of the soil and type of regeneration required was used to decide whether natural regeneration would be attempted. | NATURAL
REGENERATION |
| 2.2.1.3-14 | Since 1955, most of the clear-felled areas have been planted. The planting stock has been supplied by the B.C. Forest Service, using, in some cases, seed collected on the Forest, and has consisted mainly of 2 + 0 bare root Douglas-fir. Container stock, of hard-walled containers or planting bullets have been successfully used in field scale trials. | PLANTING |
| 2.2.1.3-15 | Replanting of partially failed areas has been confined to highly productive sites or to areas where the original planting has completely failed. Rarely, if at all, has beating-up of natural regeneration been done thus some of the areas on the central ridge are still under-stocked after 45 years, and in some instances, the stocking level is as low as 30% of the minimum desired level (120 trees per acre as opposed to about 450 trees per acre). | BEATING-UP
(FILLING
BLANKS) |

- 2.2.1.3-16 Some areas were spot seeded in 1957, using locally collected seed, but the operation was only partially successful. The areas were relatively small and were subsequently re-planted in 1959. Due to the inefficiencies of seed use, and the marginal success achieved, no artificial seeding has been done since 1957. SEEDING

Stand Tending

- 2.2.1.3-17 Little weeding of newly planted areas was practiced until 1970. This operation is now confined to highly productive sites and then only when it is apparent that the crop will be completely lost if weeding is not done. Weed growth consists of a wide variety of weed species such as alder, salmonberry, vine maple, wild rose, bracken etc., and on the high sites is extremely lush and vigorous. Herbicidal sprays have been used in the past but because of environmental considerations, spraying is no longer practiced unless for research purposes. WEEDING
- 2.2.1.3-18 Cleaning of plantations, to rid them of undesirable tree species and reduce competition has been done on the best sites. The operation has only been carried out as a last resort when it has been considered that the crop would have been completely lost if the cleaning was not done. Many areas at the southern end of the Forest require cleaning as a routine part of the crop maintenance programme. CLEANING
- 2.2.1.3-19 No spacing has been done except in research plots as part of the experimental treatments, or as part of the cleaning operation. Small areas have been spaced (juvenile thinned) as part of student exercises but these areas are extremely small and have had little impact on the overall problem. The stocking on some of the naturally regenerated areas is such that spacing might be undertaken to advantage, but up to the present time (1980), this has not been done (Appendix 2.1.2-38-C). No criteria have been established for space requirements relative to species or site. SPACING (JUVENILE THINNING)
- 2.2.1.3-20 Small areas of the Forest have been treated with fertilizer, but the operation has been confined to research (Appendix 2.1.2-38-B) and demonstration purposes. The aircraft used in the demonstration projects, flew from the sloping airstrip sited on the Forest in Compartment 24 (Paragraph 2.1.9-15 and Map 2.1.1-3-A). FERTILIZER APPLICATION
- 2.2.1.3-21 Some high pruning was carried out on an operational scale in 1961 and 1962 (Compartments 26 and 34 - see Map 2.1.1-3-A). Approximately 48.6 ha (120 acres) were treated and between 85 - 90 trees per ha (35 - 38 trees per acre) were pruned to a height of about 6 m (20 feet). No further operational high pruning has been carried out, although some research areas have been low pruned for access. Little brashing (pruning to about 2 m in height - 6-7 feet) for access and fire hazard reduction has been done. The small areas brashed are situated in Compartments 25 and 33 in spacing and provenance trials. A further area was brashed in Compartment 25 to permit a thinning trial. All of the brashing operations have been done by non-forest labour (student exercises) and the forest technical staff have not been involved in this activity to date (1980). PRUNING AND BRASHING

Summary of Current Treatment

2.2.1.3-22	Current methods of treating the forest cover have altered considerably over the last few years. The old "traditional" method of logging and slashburning with reliance on uncontrolled natural regeneration has given way to controlled temperature slash fires, mechanical ground clearing and replanting with preferred tree species. Land clearance prior to restocking has led to considerable saving in weeding operations, permitting mechanized operation, where formerly it was not possible to utilize tractor mounted cutting equipment, and the work had to be undertaken by hand. The initial capital investment in land clearing has already been reflected in ease of planting and weed control, and will doubtless facilitate later stocking control.	ESTABLISHMENT AND TENDING
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2.2.1.3-23	Little thinning has been done and the only harvesting has been by clear-cutting. Economic considerations have overridden the research and demonstration aspect of harvesting and although the logging operations are visited by large numbers of people, the methods have not been innovative, nor developmental. It is notable that there has been little research into harvesting and logging operations on the Forest. The size of the felling coupes (openings or settings), has generally decreased although this has been more a result of lowering the Annual Allowable Cut (AAC) and current lack of extensive loggable stands, than on commitment to reducing the size of clear-cuts. Rather, there is a tendency to extend existing openings, and thus the appearance presented by the harvesting is that of a progressive clear-cut.	HARVESTING
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Produce and marketing

2.2.1.3-24	Timber harvested from the Research Forest falls into the following categories:	PRODUCTS- GENERAL
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- (a) Millwood
- (b) Poles and pilings
- (c) Cedar for shakes
- (d) Minor produce such as firewood

2.2.1.3-25	All timber produced on the Forest classifiable as sawlogs is currently sold to:	SAWLOGS AND PULPWOOD
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Whonnock Lumber Co. Ltd.
Lougheed Highway,
Whonnock, B.C. Telephone: 462-4711

2.2.1.3-26	Prior to 1967, all timber was boomed in the Pitt River and sold on the Vancouver Log Market. At the present time (1980), the price for the timber is based on the Vancouver Log Market, but all timber is sold to Whonnock Lumber. The price is adjusted monthly to take into account market fluctuations.
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2.2.1.3-27	Poles and pilings are purchased by:	POLES AND PILINGS
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Bell Pole Co. Ltd.,
2362 River Road,
Maple Ridge, B.C. Telephone: 463-8611

Poles and pilings are sometimes produced as special orders and often are felled prior to timber operations in the areas designated to be felled during the coming year. This market is lucrative and the Research Forest is suited to growing these categories.

- | | | |
|------------|--|---------------------|
| 2.2.1.3-28 | The quantity of cedar suitable for shakes and shingles has declined rapidly during the past few years. Material harvested that can be sold for the production of shakes is purchased by Whonnock Lumber (Paragraph 2.2.1.3-25). | SHAKES AND SHINGLES |
| 2.2.1.3-29 | The amount of minor produce harvested is extremely small and is normally produced only to order. Minor produce takes the form of small round fencing material, foliage for market gardeners and split cedar fence posts. The quantity involved is insignificant compared to the regular harvesting operations and is not considered part of the regular income for the Forest. | MINOR PRODUCTS |
| 2.2.1.3-30 | Other produce consists of specimens cut for use as demonstration, or experimental material for education or research purposes. No charge is levied for this type of produce although records are kept of the type and quantity of material produced. | OTHER PRODUCTS |
| 2.2.1.3-31 | The main contractors involved in timber harvesting (1980) are: | CONTRACTORS |

Logging

C & L Logging,
11790 - 246th Street,
Maple Ridge, B.C.
V2X 6X6 Telephone: 463-9616

Haulage (Sub-contracting to C & L Logging)

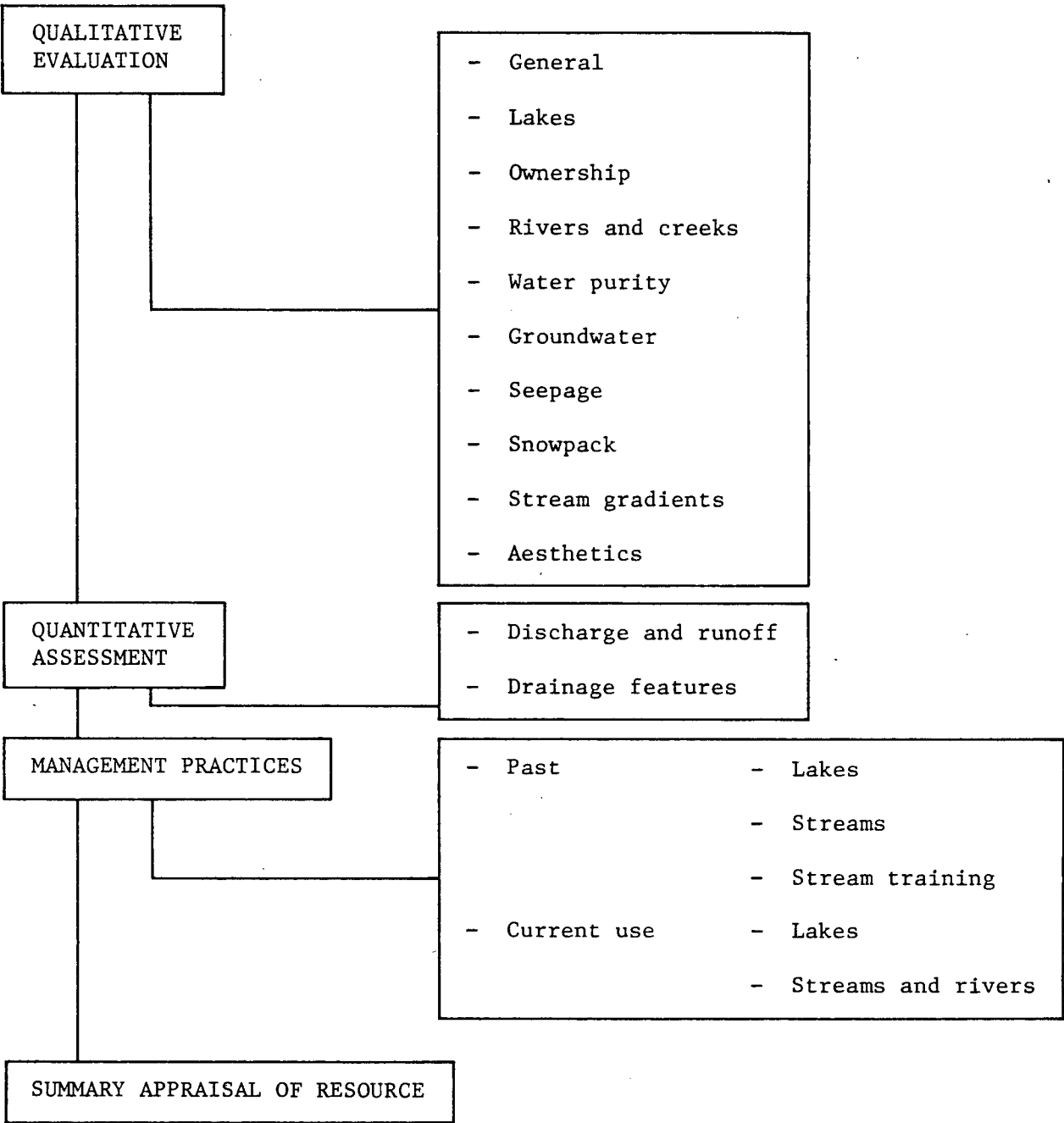
R. Ruddick,
25884 Dewdney Trunk Road,
Whonnock, B.C. Telephone: 462-7051

- | | | |
|------------|---|-------------------|
| 2.2.1.3-32 | There is currently (1980) no market for small thinnings. A market for small cedar poles exists but at present it is not possible to cut sufficient quantities to serve this market. | THINNINGS |
| 2.2.1.3-33 | In spite of the proximity of the Research Forest to large urban centres, the markets for smaller sized produce is poor. The volume of thinnings that could be produced is in excess of 100,000 cubic feet (3500 m ³) per annum, but none of this material is harvested due to lack of markets and as a consequence much is lost to mortality. The market for the larger, higher quality logs and peeler categories, as well as cedar for shakes and shingles, is attractive, but the quantity of this material remaining on the Forest is now minimal and revenue from this type of produce is declining. | MARKETS - GENERAL |

2.2.1.4 Summary Appraisal of Tree Resource

- 2.2.1.4-1 In general, it can be seen that the treatment of the Forest has differed little from other coastal forest units. There are areas of the Forest that show signs of severe neglect, but this is typical of many forest areas in Coastal B.C. The combination of logging method and absence of markets for small material, have worked together to maintain the unevenness of the age class distribution (Tables 2.2.1.1-3-A, B and C). The Research Forest has large area of immature forest cover, which is developing in an unmanaged condition. The stands resulting from the 1925 - 1931 fires have been left very much to their own devices and although some minor research projects have been undertaken, and minor spot planting operations have been carried out, there has been little development work in these stands. The extensive post - 1950 clearcutting has left the Forest with a further large age class, much of which is in the juvenile stage, requiring extensive maintenance. Much of the weeding being done at the present time is an attempt to salvage the young plantations and save further damage from smothering by weed growth. Few plantations resulting from recent logging are free of brush problems, and much time and effort has been given in recent years to attempt to stem the intense competition by weeds.
- 2.2.1.4-2 Little spacing (juvenile thinning), stock control or species selection has been carried out. Natural regeneration after the early logging is dense and requires much work to guide the crop towards a desirable stand condition. There is an urgent need to come to grips with the gross overstocking of hemlock, both in the young (1 - 20 years) and many of the intermediate aged stands (40 - 50 years). The backlog of routine maintenance work reflects the extensive nature of crop cultivation in the past and poses a challenge to the present administration. The Forest is not unique in this respect, but the development of mechanized silvicultural techniques is an urgent and critical requirement.
- 2.2.1.4-3 The general quality of the Forest is average, although the young Douglas-fir plantations now entering the thicket stage are beginning to show the potential of the Forest as a timber growing unit. It is possible that information at present used to determine site index is not accurate, and that in some areas, the site index will require recalculation as more accurate management information becomes available. The tree stands are the basic building blocks of the Forest Resource and the present trend toward intensifying stand establishment operations is an investment in the Resource as a whole.

Figure 2.2.2-1-A The Organization of the "Water Resource Section"
of the U.B.C. Research Forest Management Plan



- 2.2.2 The Water Resource on the U.B.C. Research Forest.
- 2.2.2-1 The organization of the Analyses of the Water Resource on the U.B.C. Research Forest is shown in Figure 2.2.2-1-A.
- 2.2.2.1 Qualitative Evaluation
- 2.2.2.1-1 The water resource comprises several parts: the major components are lakes and streams while other components such as ground water (moving and stored), and snow, make up the balance. The major part of the information available on the Research Forest is confined to lakes and streams, and as these are the visible, management components of the water resource, the main part of the description and discussion will be concerned with these aspects. Information on water entering the system via precipitation is contained in Appendix 2.1.7-4-A (Climate). GENERAL
- 2.2.2.1-2 The 17 lakes (Paragraph 2.1.1-4 and Table 2.1.1-4-A) on the Research Forest cover a total of 126 ha (312 acres) and range in size from 48.5 ha (Loon Lake - 120 acres) down to 0.17 ha (Peaceful Lake - 0.42 acres). The lakes contain approximately 13,000 acre feet of water and the combined catchment area of the lakes on the Forest is 2150 ha (5,310 acres) (Map 2.1.3-2-A). An area of about 240 ha (600 acres) drains into the Forest lake system from outside the Forest, mainly from the slopes of the Golden Ears. Pitt Lake on the west boundary is not included in the details of the lake system although it receives the drainage from the western edge of the Forest. The balance of the Forest not covered by lake catchments, drains into streams carrying water directly to the Forest boundary or to areas outside the Forest as shown by the generalized marco-drainage patterns on Map 2.1.3-2-A. LAKES
- 2.2.2.1-3 The shorelines of only two of the 17 lakes are not wholly owned by the Forest. On the west boundary, ownership of Goose Lake shoreline is divided between the U.B.C. Research Forest, Pitt Meadows Municipality and one other (private) owner (Appendix 2.2.2.1-3-A). Peaceful Lake, in Block II on the central east boundary, is partially abounded by the Golden Ears Provincial Park and the shoreline ownership is divided between the U.B.C. Research Forest and the B.C. Parks Branch. OWNERSHIP
- 2.2.2.1-4 No processing plants are sited in the lake catchment system and no industrial waste is discharged into the area. Waste disposal from Loon Lake Camp is passed through a sewage disposal treatment plant built in 1973 (Appendix 2.1.9-7-A) and a small proportion of the waste is pumped onto an area adjacent to Loon Lake as part of a Research Project (Appendix 2.1.2-38-A). Prior to the installation of the sewage system at Loon Lake Camp, the wastes from the Camp were piped into septic tanks with the outflows from the tanks being disposed of by seepage into Loon Lake. Total dissolved solids vary between 15 parts per million (p.p.m.) to 30 p.p.m., although local variation is found seasonally. No serious pollutants are found in the lakes, or creeks and although some of the smaller lakes in the headwaters of the system, shrink in size and become warmer during periods of summer drought, water purity is relatively high. The buffer strips (Paragraph 2.2.1.3-4) now maintained around the lakes are part of current management efforts to maintain the level of water quality in the lakes. PURITY

- 2.2.2.1-5 The main drainage system of the Forest is oriented essentially in a north-south direction (Maps 2.1.1-4-A and 2.1.3-2-A). Most of the rivers and creeks are fed by the lakes and with the many lakes in the Forest providing a "buffering" effect, there is always a certain quantity of water draining from the area, although the generalized Forest hydrograph (Figure 2.2.2.1-5-A) exhibits the typical configuration of a coastal headwater system. About 85% of the water drains towards the south. RIVERS AND CREEKS
- 2.2.2.1-6 Little information is available on groundwater or aquifers within the Forest area, either as storage (underground lakes) or channels (underground rivers). Some householders on Silver Valley Road (lower end), draw water from wells sited on an underground stream. The source of this stream is thought to be in the south-eastern section of the Forest, but no concrete evidence has been presented in support of the hypothesis. Researchers have suggested that springs feed some of the lakes (e.g. Jacob's (Marion) Lake) but none have so far been mapped, although the presence of springs is suggested by the temperature profiles in the lakes recorded during the process of other investigations. Many of the lakes have associated bog and peat masses as well as considerable areas of sphagnum moss around the edges. Large quantities of water are stored in these masses, but no information is available on either quantity or quality. GROUNDWATER
- 2.2.2.1-7 There are areas of seepage at various points within the Research Forest. Some are indicated by Ecological Mapping units (Paragraph 2.1.8-2). Many of the better growing sites are situated in these areas, although apart from the ecological mapping, no specific information is available. SEEPAGE
- 2.2.2.1-8 Stream profiles for the drainage systems on the Forest are shown in Figure 2.2.2.1-8-A (North Alouette River upstream to Gwendoline Lake), Figure 2.2.2.1-8-B (Blaney Creek upstream to Placid and Loon Lakes), Figure 2.2.2.1-8-C (Stephenson Creek upstream to Katherine Lake) and Figure 2.2.2.1-8-D (Raven Creek). These profiles are for description purposes only, and more detailed graphs are held in the Administration Office. The profiles of minor streams draining into Jacob's (Marion) Lake, Goose Lake and other small catchment systems have not yet been done. Stream profiles are drawn to show the presence of waterfalls, centres of energy distribution and sediment precipitation and areas of sensitivity, where care must be exercised when constraints such as erosion of the stream banks and culvert blockage are considered. If the detailed stream profile includes the lake profile, as well as the entry points of the streams into the lakes, impressions can quickly be drawn as to the general movement of the water in the lake, possible areas of water stagnation and sediment collection. STREAM GRADIENTS
- 2.2.2.1-9 Many of the Forest streams provide interesting and aesthetically pleasing scenes. These vary from the confined view of a 6 - 9 m (20 - 30 foot) waterfall at the lower end of the North Alouette River, to the extensive views of the Trestle Creek waterfalls on the slopes of the Golden Ears at the north of the Forest. AETHETICS

2.2.2.1-10 There is little information on the influence of snow in the Forest, although the generalized hydrograph (Figure 2.2.2.1-5-A) clearly shows the accumulation and melt periods. The influence on water storage and runoff is thought to be considerable, and minor investigations in the form of student projects have been carried out. There are no management practices directed at influencing snowpack accumulation or snowmelt rates, and although records of a general nature are collected at the weather stations sited on the Forest (Map 2.1.7-2-A and Appendix 2.1.7-4-A), little detailed data has been recorded. SNOWPACK

2.2.2.2 Quantitative Assessment

- 2.2.2.2-1 A large amount of streamflow data is available for rivers adjacent to the Research Forest, and the Department of Energy, Mines and Resources - Water Resources Branch maintains a meter station on upper Jacob's Creek. The meter station is situated to the north of Jacob's (Marion) Lake - Compartment 23 (Map 2.1.1-3-A). Details of the location and equipment, together with Daily Height and Daily Discharge records for the ten year period 1964-1973 are given in Appendix 2.2.2.2-1-A. The hydrograph for Jacob's Creek is shown in Figure 2.2.2.1-5-A. The value of the hydrograph lies in the indication of times of expected peak flow, and this in turn indicates the risk associated with culverts and roadside drains during these periods. While runoff is variable in space and time, and differs from river to river, it is influenced by such factors as the size of the catchment, the location of the watershed, the potential of the area to store water (in the form of snow, or in bogs or lakes), landform, micro-topography, past and present land use, land cover etc. The hydrograph indicates the general pattern of the area, and facilitates understanding of the total basin behaviour. Figure 2.2.2.1-5-A shows a typical Pacific Drainage (Mainland) hydrograph with a winter maximum (as opposed to a Pacific Drainage (Vancouver Island) with two maximums, one in June and another in November).
- 2.2.2.2-2 Maps 2.1.1-4-A and 2.1.3-2-A show the drainage patterns and watershed areas on the Forest. The Forest is broken down into 15 watershed areas, the largest of which is the Jacob's (Marion) Lake system (Table 2.2.2.2-2-A). Precise measures of water quantities flowing out from each system are not available.

DISCHARGE
AND RUNOFF

DRAINAGE
FEATURES

2.2.2.3 Management Practices

2.2.2.3-1

Little use has been made of the creeks and rivers in the Forest. The lower part of the North Alouette River below the falls in Compartment 25 (Map 2.1.1-3-A) has been used for sport fishing. Water has been drawn from the creeks for domestic use, mainly from the North Alouette; some local householders along Silver Valley Road draw water from Anderson Creek, a small surface stream that rises in the area of the Arboretum adjacent to the Main Gate. Water from Blaney Creek was used by the YMCA Camp (now abandoned) that was situated on an un-named road leading off 232nd Street by the south-east corner of the Forest. Details of water licences currently valid on, or adjacent to the southern end of the Forest are given in Appendix 2.2.2.3-1-A.

PAST USES -
STREAMS

2.2.2.3-2

The lakes have been used for a variety of purposes in the past. Prior to 1939, Katherine Lake was used as a source of water for mining operations (Appendix 2.1.10.1-5-A - Viking Group) on Pitt Lake slopes. The outlet from Katherine Lake was dammed and the water diverted from the Jacob's (Marion) Lake drainage system, through Shirley and Rose Lakes, into Stephenson Creek from which water was drawn for the copper mining operations. Camps sited within the Forest during the railway logging shows (in particular in the Jacob's (Marion) Lake area) drew water from the lakes and they undoubtedly served a recreational purpose for the labour force during this time. It is unlikely that the lakes were ever used to store timber and there are no records or physical signs to indicate that this was ever done, probably due to their comparatively small size, their location relative to the operations, and the type of railway logging operation which required that large volumes of timber be moved quickly to the booming grounds on Pitt Lake and the Fraser River. The main use of the lakes in the recent past has been for recreation and sport. There are indications, inferred by species distribution, that fish were introduced into some of them, although there is no concrete evidence of this. When the concession on Loon Lake was given up in 1967, fishing was banned in all Forest lakes. Since 1967, recreation on Loon Lake has been confined primarily to swimming and canoeing by Camp occupants. No power boats are permitted on Loon Lake or any other lakes within the Forest, except as required for research purposes.

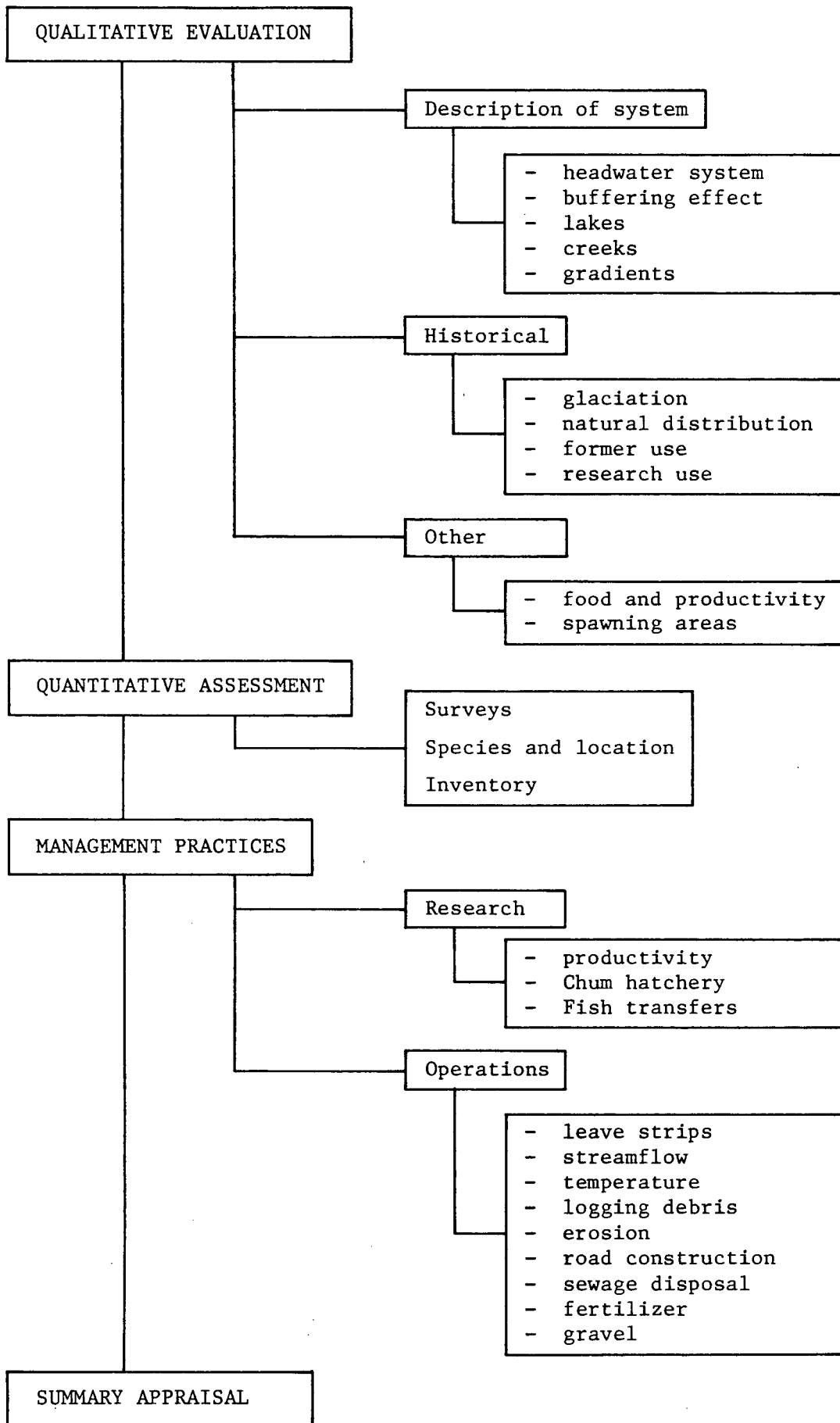
PAST USES -
LAKES

2.2.2.4 Summary Appraisal of Water Resource

2.2.2.4-1 The Forest is the source of considerable quantities of water, much of which runs directly out of the system in a relatively short time. The reference section will provide further detailed information. Proposals on the construction of a reservoir to enlarge Jacob's (Marion) Lake by damming the North Alouette River are shown in Appendix 2.2.2.4-1-A.

2.2.2.4-2 The water is generally of good quality and low in sediment yield. At the present time, the water resource is used for research and as a source of water for fighting fires if required, with a minor role in recreation. There are currently (1980) no definite objectives under which the water resource is managed apart from the general objective not to lower the overall quality and to maintain the system in a comparatively pristine state.

Figure 2.2.3-1-A The Organization of the "Fish Resource Section"
of the U.B.C. Research Forest Management Plan



- 2.2.3 The Fish Resource on the U.B.C. Research Forest
- 2.2.3-1 The organization of the analyses of the Fish Resource on the U.B.C. Research Forest is shown in Figure 2.2.3-1-A.
- 2.2.3.1 Qualitative Evaluation
- 2.2.3.1-1 Much of the information contained in the Water Resource Section (Section 2.2.2) is relevant to the Fish Resource. The whole Forest is typical of the Pacific North-west insomuch as it is a "headwater system". Almost every creek has a lake or series of lakes at the head (Map 2.1.1-4-A), and as indicated previously the resulting buffering effect irons out peakflows and periods of low flow to a considerable degree (Paragraph 2.2.2.1-5). A list of species is contained in Table 2.2.3.2-2-A. HEADWATER: SYSTEM
- 2.2.3.1-2 The lakes are generally cold throughout the year and due to both the low productivity and the short length of the growing season, the fish do not grow to any significant size. The edges of many of the lakes have accumulations of peat and floating bog, the presence of which decreases the quantity of oxygen available for fish and plant growth. LAKES
- 2.2.3.1-3 The streams have small resident populations of fish. The gradients of many streams (Figures 2.2.2.1-8-A to D) are such that few fish migrate. Two waterfalls just outside the southern boundary of the Forest are major blocks to migration on the North Alouette: although there is a good run of Steelhead below the falls, none have ever been seen or caught above this point. The shallow stream gradient between Blaney and Loon Lakes probably facilitates a continuous natural transfer of fish between the two bodies of water. STREAMS AND STREAM GRADIENTS
- 2.2.3.1-4 An indigenous fish population came in following glaciation (Paragraph 2.1.3-1). Some lakes probably were never naturally stocked (e.g. Katherine, Eunice, Gwendoline) though it is possible that there may originally have been natural stocking and that the fish may have died out due to adverse habitat conditions. Investigations however, have shown that humid coastal conditions have prevailed in the area for about 10,500 years with virtually no evidence of a classical hypothermal interval in the intervening years (see Research Project 69-5). HISTORICAL
- 2.2.3.1-5 There is a possibility that fish have been introduced in some of the lakes on the Forest by man, and although not substantiated, it is thought that Indians may have transferred some fish into the area many years ago. Apparently attempts were made to stock the lakes in the late 1800's or early 1900's although this also is unsubstantiated. The presence of kokanee in the system (a fish species that is uncommon in the small lakes of the area) provides some evidence. Fish may have been transferred into Jacob's (Marion) Lake following the building of the McCormick cabin (Paragraph 2.1.2-9) and later during the operation of the logging camp (Paragraph 2.1.2-12). ARTIFICIAL INTRODUCTION

- | | | |
|------------|--|--|
| 2.2.3.1-6 | The Fish Resource has been used in two ways since the inception of the Research Forest. For 20 years, the Marc family ran a fishing concession on Loon Lake until 1968 (Paragraph 2.1.2-8). Access to the lake for many years was by way of a trail originally cut by shake cutters, until a road was built to the Camp on Loon Lake. The concession was successful and there was very heavy use, although the fish were generally small in size. | PAST USE |
| 2.2.3.1-7 | The second major use has been for research purposes. In 1963, a project entitled "Productivity in a small lake" (Project 64-4) was undertaken by the U.B.C. Institute of Fisheries under the direction of Dr. I.E. Efford. The project, which ran continually for 10 years, has made Jacob's (Marion) Lake one the the best studied lakes in Canada. A list of papers to July 1973 dealing with the biology of Jacob's (Marion) Lake is included in Appendix 2.2.2.4-1-A. A small laboratory and camp was constructed on the west side of the lake in 1967 and dismantled in 1980. | RESEARCH |
| 2.2.3.1-8 | Many other projects concerning the fish populations have been carried out and investigations have been made into many aspects of population dynamics, food source and production and habitat requirements. | |
| 2.2.3.1-9 | Fish do not grow to an appreciable size in the creeks due mainly to the poor food supply, although low flow levels and temperature regimes in some creeks assert a influence on fish size. Cutthroat trout may live for many years (eight to ten) in one relatively short stretch of stream and grow no larger than 15 cm (six inches). The lakes provide a somewhat better food supply although the fish are still fairly small. The largest recorded fish caught within the Forest boundaries was netted in Jacob's (Marion) Lake by researchers in about 1964. This weighed approximately 0.7 kilograms (approximately 1½ lbs.), and measured about 35 cm (14 inches). | FOOD AND
PRODUCTIVITY |
| 2.2.3.1-10 | Broadleaved trees grow adjacent to streams over most of the Forest areas and a moderate quantity of alder and willow detritus falls into, or adjacent to, the creeks. Where creeks flow through relatively dense coniferous stands, broadleaved streamside trees are sparse and stream productivity is low. There has been little active encouragement of deciduous broadleaved trees along creek banks in the past, but some planting of deciduous broadleaved species has been done (Paragraph 2.2.3.3-8). The creeks and lakes provide breeding areas for many types of insects and the larvae provide a staple part of the fish food supply. Extensive research has been carried out with respect to productivity and much of data are available (see Appendix 2.1.2-38-A - under Ecology, Lake, Management - Fish, Zoology - Fish and Insects). | INFLUENCE OF
STREAMSIDE
VEGETATION OR
RIPARIAN FOREST |
| 2.2.3.1-11 | Fish spawn in many streams throughout the Forest. Few of the spawning beds are precisely known although there are indications from research observations that kokanee spawn both in Jacob's (Marion) Lake and in parts of the stream above the lake. There are spawning grounds mid-way between Loon and Blaney Lakes and the fish population from both lakes use the area. Hybridization does occur between the respective populations but not apparently in abnormal or unusual proportions. Many of the minor fish populations in the streams are self-sustaining thus there must be small spawning grounds along most of the creeks, although the location of these areas are not known. | SPAWNING
AREAS |

2.2.3.2 Quantitative Assessment

- | | | |
|-----------|---|-------------------------|
| 2.2.3.2-1 | The Fish and Wildlife Branch carried out a survey in 1951. The survey covered a number of lakes on the Forest. Details are in the Forest "Lake Files". Copies of the survey sheets are held at the Institute of Animal Resource Ecology, University of British Columbia. Minor surveys have been undertaken since 1951, generally as part of research projects; these have tended to be highly specific. Little detailed management information is available and only crude estimates of population size can be made. | SURVEYS |
| 2.2.3.2-2 | The species of fish that have been recorded in the Forest lakes and streams are shown in Table 2.2.3.2-2-A. The number of recorded species is low. There is no information on some of the smaller lakes. There are no fish in Gwendoline, Eunice or Katherine Lakes. The passage of fish along upper Jacob's Creek is prevented by a steep rise which prevents fish from entering the upper lake systems. Other barriers (e.g. Twin Falls on the North Alouette - Figure 2.2.2.1-8-A) prevent the migration and natural movement of fish from one location to another. The other streams and major lakes were accessible to fish at the time the ice receded and thus were colonized. | SPECIES AND
LOCATION |
| 2.2.3.2-3 | Although crude estimates of the fish population are available, these are of little value in attempting to estimate the production of fish. Counts have been made of small stretches of creeks, mainly by researchers to estimate differences due to forest cover manipulation and influence of ground treatment (e.g. East Creek of Spring Creek investigating mechanical land clearing operations in Compartment 32, clear-cut and burn operations Compartment 27, and uncut areas, also in Compartment 27). Surveys have been used to indicate presence of fish and the data used to indicate results of management strategies and effects on water quality of forest cover manipulation. | INVENTORY |

2.2.3.3 Management Practices

- 2.2.3.3-1 Research has figured prominently in the small amount of management that has been done relative to the Fish Resource. The project "Productivity of a small lake" (Project 63-4) involved many researchers and drew heavily on the resources of the Forest for a considerable time. Many other research projects have been undertaken and involve fish transfers (Paragraph 2.2.3.3-4) the influence of fish on the available food supply, the effect of species integration, and a number of fish monitoring studies. In 1970, an attempt was made to increase the number of cutthroat trout eggs available for hatching and stocking of lakes. Fish were caught in Upper Blaney Creek and transferred to the Fraser Valley Hatchery at Abbotsford where they were held until mature for spawning. The results were poor and the project was discontinued in 1972. RESEARCH PRODUCTIVITY
- 2.2.3.3-2 In 1972, U.B.C. and Environment Canada entered an agreement to lease 1.17 ha (2.9 acres) of ground to site a hatchery. The objectives were as follows: CHUM HATCHERY
1. To produce in two generations, a twenty-five-fold increase in Chum salmon stock (i.e. from approximately 800 to 2,000 fish to 20,000 to 50,000 fish.
 2. To understand the problems and requirements for co-existence as related to a drainage area subjected to an active sustained yield logging operation.
 3. To do such incidental studies as are required to enhance knowledge of the incubation programme operating techniques and to better understand the ecological associations peculiar to this type of drainage system.
 4. To determine procedures required to effectively manage the anticipated increased stock.
- 2.2.3.3-3 About 265,000 eggs were collected during the first season. The operation has functioned well from the Fisheries viewpoint and has proved a major attraction for visiting students and researchers. Due to poor streamflow conditions in the fall of 1974 and 1975, the number of eggs collected was well short of the number required and thus the hatchery was by no means fully utilized. In September 1974, the hatchery area and some of the unused holding tanks were used (with no apparent adverse effect) to mix fire retardant for the fires that spread north-west from the power line operations (Paragraph 2.1.10.2-2). HATCHERY OPERATION
- 2.2.3.3-4 In 1976, transfer of fish from Loon Lake to two of the three unstocked lakes at the north end of the Forest was begun. The fish species involved were Dolly Varden and cutthroat trout. (See Annual Reports of the Research Forest 1974-1975.) FISH TRANSFERS
- 2.2.3.3-5 The guidelines instituted by the Forest in 1970 ensure that creeks and lake shores are rarely denuded of forest cover. Exceptions to this rule are seen in Compartment 27 (Map 2.1.1-3-A). Prior to drainage operations, the area was almost total marshland with no clearly defined stream channel. Subsequent stream training in this area and in Compartment 28 left the newly formed stream banks totally devoid of vegetation. Surveys carried out in 1974 however, indicated a resident fish population. LEAVE STRIPS

- | | | |
|------------|---|--|
| 2.2.3.3-6 | <p>The clear-cutting practices on the Forest appear to have little effect on the streamflow regimes. Although little firm data is available for the time prior to logging operations commenced in the early 1950's, studies carried out during the recent past indicate that the effects of logging on streamflow within the Forest area are small, and that the system rapidly returns to the post-logging situation. The seasonal variation and natural peakflows due to snowmelt, storm, and rain-on-snow events, have a far greater impact than does the removal of forest cover. Some differences in the release of nutrients into the creeks have been observed but serious adverse effects of logging and slashburning on the fish are not apparent at the present time (1980).</p> | EFFECTS OF LOGGING ON STREAMFLOWS AND NUTRIENT RELEASE |
| 2.2.3.3-7 | <p>Measureable temperature differences have been recorded on areas where the forest cover along stream banks has been completely removed. In particular, the stream in the mechanically cleared area in Compartment 32 (Map 2.1.1-3-A) shows differences in temperature of up to 6° C (10° F.) from the forested sections of the same stream. The apparent result of this is the relocation of fish from the areas of high temperature to shaded banks and seepage sites where water temperatures are slightly lower, and when temperatures return to "normal", the fish return to their original location (Paragraph 2.2.3.1-9). This pattern has been observed in Jacob's (Marion) Lake where the fish will move to a point over a spring sited in the centre of the lake during periods of high water temperature.</p> | TEMPERATURE DIFFERENCES |
| 2.2.3.3-8 | <p>All the creek banks denuded by logging and site treatment are rapidly growing in, and the planting of willow has been carried out to speed up this process in Compartment 32 (Map 2.1.1-3-A).</p> | REVEGETATION OF DENUDED CREEK BANKS |
| 2.2.3.3-9 | <p>There is little evidence to suggest that in the small creeks on the Forest, logging debris adversely effects the fish population. A survey in Compartment 27 (Map 2.1.1-3-A) in 1974 along East Creek, showed a relatively large population of cutthroat trout in an area where the creek was almost totally covered by logging debris, providing shelter for fish. There are few migratory fish (Paragraph 2.2.3.2-2) in the Forest waters and thus any major debris jams have little effect on the fish.</p> | LOGGING DEBRIS |
| 2.2.3.3-10 | <p>The Forest soils are relatively stable, with little natural sediment (Paragraphs 2.1.6-1 and 2). Erosion from road building and maintenance operations has been small, although there are many examples of poor road construction and poor culvert siting. As the sediment is low (see Water Quality, Paragraph 2.2.2.1-4), and bedload movement normally minimal, the effects on fish are negligible. The implementation of the Forest operation guidelines ensures that such a state will continue.</p> | EROSION AND SEDIMENT |
| 2.2.3.3-11 | <p>As indicated in Paragraph 2.2.3.3-10, past road construction has not always been of a high standard. Cut banks and fill slopes have been poorly constructed and ground drainage has, in many instances, been completely destroyed. Culverts have been poorly sited and in some cases, not been put in at all. However, all this appears to have had little effect on the fish populations. The culvert on Upper Blaney Creek immediately below Loon Lake was replaced in 1974. It is not known yet whether fish will pass through this culvert although the gradient of the culvert was kept between 3 and 4 percent and the size increased to 120 cm (48 inches).</p> | ROAD CONSTRUCTION AND CULVERT SITING |

- | | | |
|------------|---|--|
| 2.2.3.3-12 | Even prior to the installation of the sewage treatment plant at Loon Lake Camp (Paragraph 2.2.2.1-4) there was little apparent effect of sewage on the fish. The outflow of the Camp system seeped into the lagoon to the east of the Camp (and thus almost directly into Upper Blaney Creek), but this never appeared to be a threat to the resident fish population, or to the spawning area immediately below the lake exit. The effluent may, indeed, have added desirable nutrients to the lake. | SEWAGE DISPOSAL -
LOON LAKE CAMP |
| 2.2.3.3-13 | Fertilizer has been applied to the Forest in small quantities (Paragraph 2.2.1.3-20), but on such a small scale that the effects on water (and thus on the fish population) have not been discernible. Herbicides have been used for control of brush, both in plantations and along roadsides. Results of herbicide application have been published as research papers (Appendix 2.1.2-38-B). | FERTILIZER AND
CHEMICAL APPLICATION |
| 2.2.3.3-14 | Gravel has been excavated from several of the creeks on the Forest for road construction. The creek along Road E10 (Compartments 20, 21 - Map 2.1.1-3-A) and the creek between Eunice and Gwendoline Lakes, were extensively used as a source of gravel for road surfacing. The effects of the gravel removal on the fish are not known and the practice has been discontinued. | GRAVEL EXCAVATION |

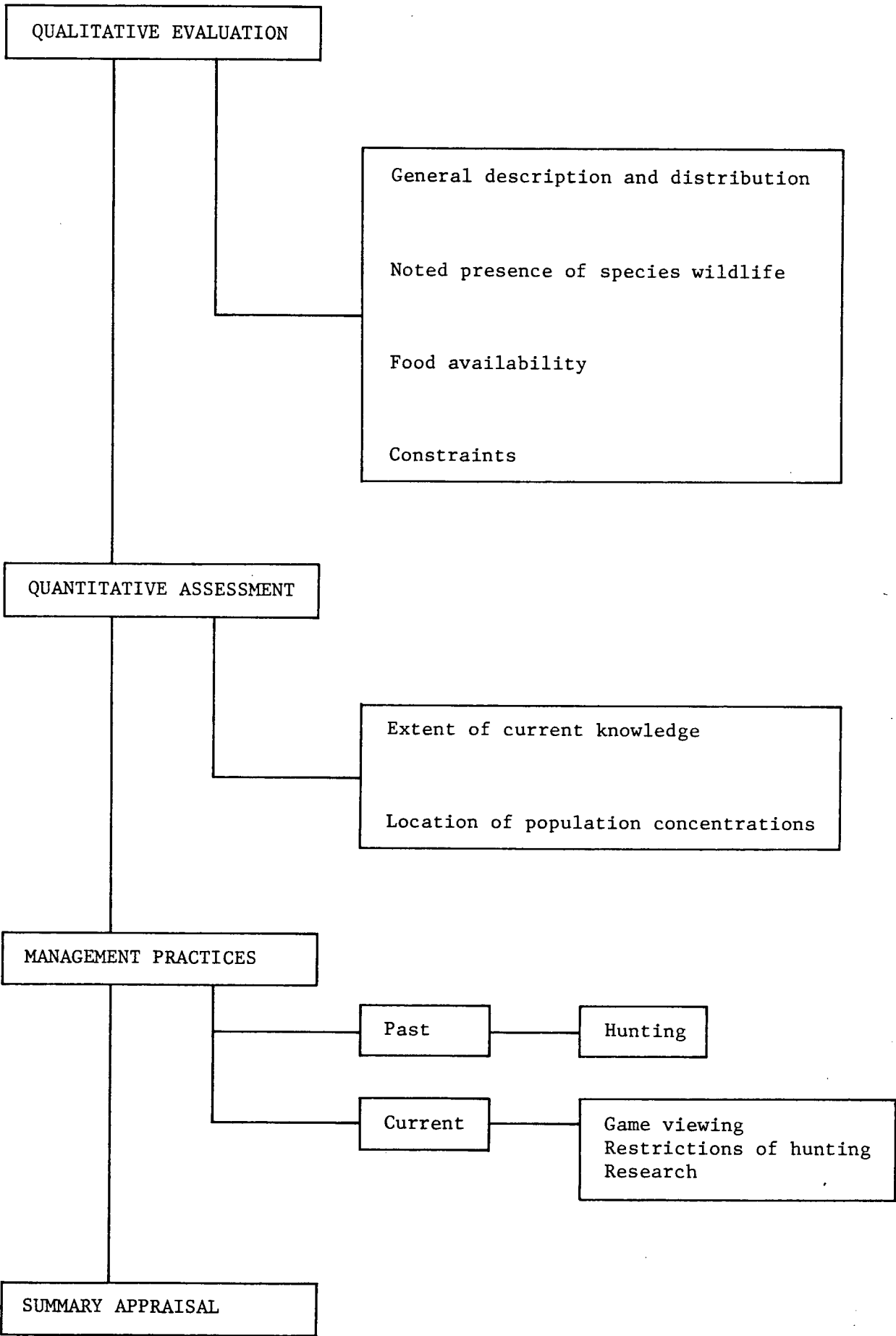
2.2.3.4 Summary Appraisal of the Fish Resource

2.2.3.4-1

The foregoing paragraphs have presented a general picture of the fish resource. A considerable amount of information is available concerning various highly specific factors. But although there is probably adequate information to protect the resource, little quantitative information is available as to what the resource consists of, and to what extent it can be managed. Productivity is low, and fish do not grow to any appreciable size. Apart from the Marc fishing concession, there has been no attempt to exploit the resource commercially and the change in emphasis from sport fishing to fisheries research and demonstration has ruled out, in the short term at least, the only economic return from the fish resource.

CURRENT
KNOWLEDGE OF
SYSTEM

Figure 2.2.4-1-A The Organization of the "Wildlife Section"
of the U.B.C. Research Forest Management Plan



2.2.4	The Wildlife Resource on the U.B.C. Research Forest	
2.2.4-1	The organization of the analyses of the Wildlife Resource on the U.B.C. Research Forest is shown in Figure 2.2.4-1-A.	
2.2.4.1	Qualitative Evaluation	
2.2.4.1-1	The Forest has an abundance of wildlife, and with the low levels of snowpack and the availability of winter range, the southern end of the Forest, in particular, lends itself to the presence of a wide variety of fauna. The Game generally referred to in this section is primarily the the <u>Columbian Black-Tailed Deer</u> (<u>Odocoileus hemionus columbianus</u>). The emphasis in this section is on Game species, although the presence of other wildlife is recognized and brief notes are included. Studies have been undertaken on varying aspects of game and other wildlife species by researchers working on the Forest, but little detailed inventory information is available.	GENERAL
2.2.4.1-2	Mammalian wildlife species observed by staff, researchers and visitors are listed in Table 2.2.4.1-2-A. A further more comprehensive list (1975) and report on sightings (1969) of both animals and birds is contained in Appendix 2.2.4.1-2-A. The order in Table 2.2.4.1-2-A is arbitrary and is not intended as an order of sighting frequency, and while the list is relatively comprehensive, it is recognized that there are gaps which will be filled as further information is gathered and recorded. The presence of the large mammal species is decided by a combination of factors. Three factors that have particular weight are: <ol style="list-style-type: none"> 1. The availability of food. 2. Shelter adjacent to the food supply. 3. The presence of travel corridors between habitat zones. 	SPECIES PRESENT
2.2.4.1-3	Although in summer, the rain forests of the Pacific North-west are prolific primary producers, the winter situation is markedly different. Food must be available on a year round basis to sustain high wildlife population levels, and one of the major constraints on population size and distribution on the Forest, is the limitation imposed by the effects of snow depth in impeding the passage of deer between feeding areas. The age and structure of the forest also affects the quantity of food produced and the rapid depletion stage through which the Forest passed during the last twenty years has enhanced the diversity of primary production and directly influenced wildlife populations. Details of the C.L.I. capability ratings for ungulate production on the Forest are shown in Appendix 2.2.4.1-2-A.	FOOD AVAILABILITY
2.2.4.1-4	The cutting patterns employed during the recent past and the provision of extensive edge zones, whether deliberate or accidental, has assisted diversification of habitat in the southern section of the Forest, promoting increased number of deer. Similar practices in the northern section have not had the same effect on the levels of wildlife, due primarily to the elevation of the cut-over areas, the progressive nature of the clear-cutting and the higher snowpack levels.	CUTTING PATTERNS

2.2.4.1-5	Wildlife utilize existing roads and pathways, supplemented by their own system of trails. There are nearly 96 km (60 miles) of man-made roads on the Research Forest (Paragraph 2.1.9-3), which provide easy and direct travel corridors for game. Deer are frequently sighted using roads, and the infrequent sightings of bear and cougar are generally along roadways. The major constraint on travel is the winter snowpack (Paragraph 2.2.4.1-3). Accumulation of slash and other debris from logging operations apparently have little effect on the movement of deer, although in the past, most of this material was burned, thus removing the bulk of debris that may have hindered movement. However, since the curtailment of slashburning, deer still appear to move quite freely through the unburned clear-cuts, although the areas felled have been substantially smaller than that in the past, inferring that deer could easily avoid such areas if necessary.	EASE OF TRAVEL
2.2.4.1-6	A further constraint on the deer is the effect of predators (e.g. cougars). Cougars apparently do not kill large numbers of deer, (probably not more than 50 per year, although no definite figures are available).	OTHER POPULATION CONSTRAINTS
2.2.4.1-7	The presence of human beings by itself does not adversely affect the deer population. Visitors have been prohibited from bringing dogs onto the Forest, but dogs running loose have done considerable damage by harassing and sometimes killing deer.	HUMANS AND DOGS

2.2.4.2 Quantitative Assessment

- | | | |
|-----------|---|-----------------------------------|
| 2.2.4.2-1 | As previously noted in Paragraph 2.2.4.1-1, there is little detailed inventory information on either game or other wildlife species. Information is available from casual observations of population centres, especially during the winter months. The extent of information reflects the current state of knowledge and the level of management of the Wildlife Resource on the Forest. | EXTENT OF
CURRENT
KNOWLEDGE |
| 2.2.4.2-2 | The movement of game in winter on the Forest has been observed by staff and visitors, and although no formal record has been kept of the areas of activity, a picture can be drawn of areas of winter range and activity. The areas of deer concentration are shown on Map 2.2.4.2-2-A. Superimposed on the figure is the extent of the 60 cm (24 inches) snowpack level. This snowpack "critical perimeter" is highly variable from year to year, and should be taken as a approximation only. The areas of deer concentration vary from year to year and until further information relating to game is collected, few details of a concrete nature can be stated. | POPULATION
CENTRES |

2.2.4.3 Management Practices

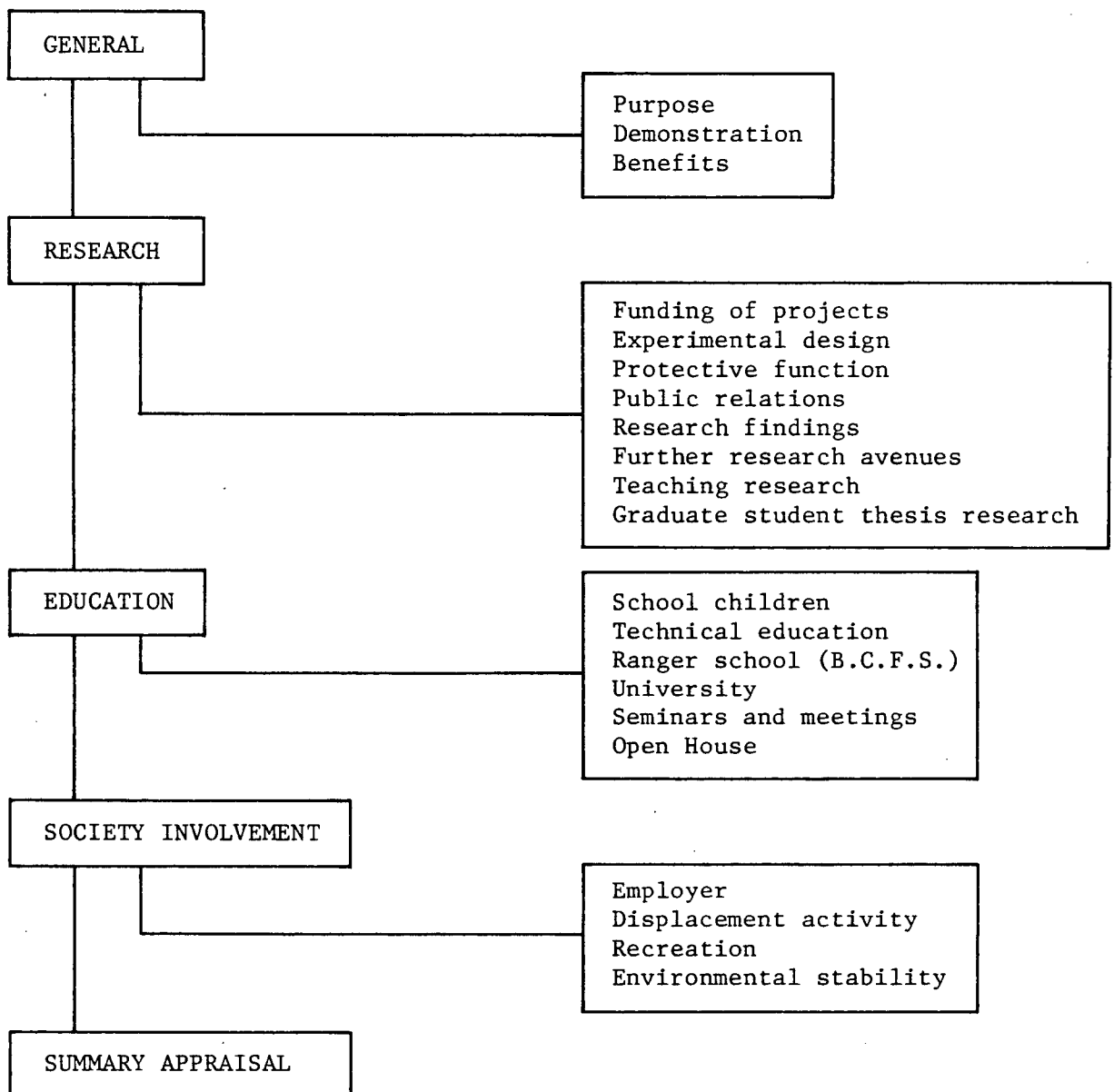
- | | | |
|-----------|---|---------------------------------------|
| 2.2.4.3-1 | Game hunting provides both recreation and food. Hunting was permitted (with restrictions) between 1962 and 1969 (Paragraphs 2.1.2-58 to 2.1.2-77), but in 1969, due to resource management conflicts and for safety reasons, hunting was prohibited. | PAST-
HUNTING |
| 2.2.4.3-2 | Since 1969, research has played a prominent role in the management of game on the Forest. The research has centered upon nutrition (Project 72-16) and behavioural studies (Project 80-14) and no work has been done on inventory or assessment of population levels. The prohibition of hunting has led to an increased frequency of sighting, and an apparent rise in the deer population. It is possible that the increased frequency of sighting is due more to the absence of a hostile environment than a large increase in numbers. One of the objectives of the nutrition study has been to make the deer more visible to the general public, and to this end, a trail was constructed in 1975, and feeding stations erected at selected points along the trail. Game viewing has been considered a desirable feature of the Resource and although the Forest Administration had no active role in the construction of the trail, the trail was sited with Game viewing in mind, in consultation with the U.B.C. Research Forest staff. | PRESENT -
RESEARCH
GAME VIEWING |
| 2.2.4.3-3 | A deer breeding enclosure is maintained adjacent to the Main Gate. The installation, originally constructed for purely research purposes, provides a focal point for research, education and public viewing. Approximately 20 deer are raised in the enclosure each year, and released in the spring at about 10 months of age, the residential animals being retained for further breeding. A programme of improving the quality of the deer has been in operation since 1979, with selected bucks being captured and bred with the residential does. | DEER BREEDING
PROGRAMME |
| 2.2.4.3-4 | Almost all information relative to the bird population has been collected as a result of research projects (Appendix 2.1.2-38-A). A list of birds sighted within 2 km (1.25 miles) is contained in Table 2.2.4.3-4-A. Other information directly related to the Forest is in the form of visitors observations or student projects, none of which have been sufficiently comprehensive of details to give more than a superficial picture. A series of sighting reports on the Research Forest, together with a list of birds observed on the Pitt Polder, are contained in Appendix 2.2.4.1-2-A. Details of the C.L.I. Capability ratings for Waterfowl are also contained in Appendix 2.2.4.1-2-A. | BIRDS AND
BIRD WATCHING |

2.2.4.4 Summary Appraisal of the Wildlife Resource

2.2.4.4-1 Research and Game viewing are currently the main use of the Wildlife Resource. The extent to which wildlife other than deer (such as bear, cougar and mountain goat) and other living organisms contribute to game viewing activities is not known, but is thought to be significant. It is difficult to place a value on the Wildlife Resource due to both lack of definite population numbers and a yardstick by which the resource might be measured. The Forest is extensively used by hikers and much of the attraction of the area is the presence of wildlife species that can be viewed in their natural surroundings without undue difficulty. While birds have received little attention in this section, bird watching is known to be a feature of the Forest and numerous visitors take part in this activity. A list of the flora and fauna of the Pitt Polder and details of the C.L.I. Capability Ratings for ungulates is contained in Appendix 2.2.4.1-2-A.

INTANGIBLE
VALUES

Figure 2.2.5-1-A The Organization of the "Social Resource Section"
of the U.B.C. Research Forest Management Plan



2.2.5 The Social Resource for the U.B.C. Research Forest.

2.2.5-1 The U.B.C. Research Forest plays a unique role in forestry in British Columbia, and it is this role that sets it apart from similar forest areas on the Coast. The description of the role and the interaction of the Research Forest with society is termed the Social Resource, and requires different treatment than given of the other four resources previously described. The organization of the analyses of the Social Resource for the U.B.C. Research Forest is shown in Figure 2.2.5-1-A. The Resource will be described under the following headings

GENERAL
TREATMENT
OF RESOURCE

- (a) Research
- (b) Education
- (c) Society involvement
- (d) Summary appraisal

2.2.5-2 Although the term "demonstration" appears in the Restrictive Covenant (Paragraph 1.1-1), demonstration as such is not treated as a separate entity. Many of the research and management projects undertaken demonstrate techniques, and the application of current knowledge to both operations and research. The purpose of the Research Forest is such that a reservoir of demonstration areas has been formed pertaining to research, education and public related activities, all of which are directly related to the Social Resource.

2.2.5.1	Research	
2.2.5.1-1	Although included in the title of the management unit, research is by no means the only activity, but it is an important part of the programme, and enters every facet of management. The list of research projects (Appendix 2.1.2-38-A and B), indicates the extent of the work undertaken and the diversity of interests. The number of research projects initiated to December 31, 1980 amounted to 429.	RESEARCH PROJECTS
2.2.5.1-2	Funding of research on the Forest is now normally independent of the Research Forest budget, although this was not always so in the past. Allocation of funds often reflects social interest and political pressures of the present, and as such, is rarely of a long-term nature. Although there is no lack of long-term project availability, due to the methods of funding, emphasis is on the short-term, and investigations of a long-term nature tend to suffer neglect due to financial constraints. No charges are levied by the Forest Administration for the use of the area for research purposes, and although much time and effort is often expended to assist in maintaining experimental areas, the Forest derives no direct revenue from this service.	FUNDING OF RESEARCH
2.2.5.1-3	The various research projects that have been undertaken on the Forest provide a variety of examples of experimental design and approaches to problem solving. Although many projects have been terminated, either by the conclusion of the experiment or due to lack of funds, they remain on the ground (in various stages of neglect or development) for visitors to see.	EXPERIMENTAL DESIGN
2.2.5.1-4	The Research Forest provides sites on which research projects can be undertaken under relatively secure conditions. Although not always successful (e.g. killing of deer by dogs in 1975 and 1976 - Project 72-16 and in 1981 Project 80-14), the area is protected to a large extent against vandalism. Much effort is directed to the security of the Forest and a large part of the Forest resources are used in protection, not merely against vandalism and the natural elements, but in controlling access and regulating the amount of use in any one area. In the past, there have been minor conflicts between research projects, but this problem has been minimal and few conflicts have resulted in permanent damage to installations or work in progress.	PROTECTIVE FUNCTION
2.2.5.1-5	With the exception of closures due to high fire hazard conditions, the public are permitted to walk almost anywhere on the Forest although certain small areas are permanently closed to public access, e.g. Loon Lake Camp. The freedom of foot access in any area virtually free of vehicles draws a large number of people (up to 500 per day -- figure from the summer of 1980). Information boards are provided at various research sites and these are useful in informing the visitors as to the purpose and objectives of particular projects. The boards, and information dispensed by the Forest staff during the course of their duties, provide a valuable public relations service.	PUBLIC RELATIONS

- | | | |
|-----------|--|--------------------------------|
| 2.2.5.1-6 | The Forest publishes an annotated bibliography of all publications, theses and reports generated by users of the area (Appendix 2.1.2-38-B). Other information pertaining to research projects is contained in the files held at the Administration office. Research findings are an important product of the Forest, although the Forest receives no financial benefits from published material. | RESEARCH
FINDINGS |
| 2.2.5.1-7 | Although research projects are often short-term, few researchers complete their work without recommending further avenues of investigation. Within the Forest, records are maintained and project areas continue to develop and are protected in the event that a project may be reinstated or may be of use to another researcher. At the present time (1980), there is no definite procedure to determine whether or not projects have been definitely terminated. However, consideration is given to reinstatement, where requested, and further research where applications are submitted. | FURTHER
RESEARCH
AVENUES |
| 2.2.5.1-8 | A further function of research on the Forest concerns the training of students and future researchers. Examples of experimental design (Paragraph 2.2.5.1-3) can be seen, providing both good and poor examples. | TEACHING
RESEARCH |
| 2.2.5.1-9 | The Forest is a useful resource facility and many graduate students have undertaken research work on the area for thesis purposes (Appendix 2.1.2-38-B). The quantity of basic data of a highly specific nature available on different areas, provides initial calibration information, saving time and effort that might otherwise be spent by students on initial information gathering. | GRADUATE
THESIS
RESEARCH |

2.2.5.2 Education

- | | | |
|-----------|--|---|
| 2.2.5.2-1 | Many school children visit the Forest, either as day visitors or as residents at Loon Lake Camp. The children consist mainly of grades 6 and 7, although children from other grades attend as well, the older students in grades 11 and 12 acting as counsellors. The residential programme was initiated in 1971 (Paragraph 2.1.2-93), although the Junior Forest Warden Programme of an earlier date (Paragraph 2.1.2-48) was an informal forerunner of the present programme. | SCHOOL
CHILDREN |
| 2.2.5.2-2 | The school children stay at Loon Lake Camp for up to 5 days, accompanied by their own teachers who organize and supervise activities. The Forest staff member employed as Education Co-ordinator has, in the past, assisted if required. The activities have consisted of visits to trails, water safety programmes, building plant collections, and many aspects of ecology and forestry education. In many instances, the visit to the Camp is the first exposure to outdoor education. The numbers of school children staying at Loon Lake Camp have been reported in the Outdoor Education Annual Reports of the Research Forest (8,580 student days in 1978). | RESIDENT
CAMP |
| 2.2.5.2-3 | A large number of school children (4,587 in 1977, 2,043 in 1978) have visited the Forest on day tours. Teachers familiar with the Forest require little assistance, but groups arriving for the first time draw heavily on Forest staff as guides. | DAY VISITS |
| 2.2.5.2-4 | Forestry students from British Columbia Institute of Technology have made extensive use of the Forest for exercises in surveying, timber cruising and other forest management activities. The technical school students have been accompanied by their own instructors. | TECHNICAL
SCHOOL
STUDENTS |
| 2.2.5.2-5 | In the past, the British Columbia Forest Service Ranger School at Green Timbers in Surrey have held management exercises on the Forest preparing fire plans etc. There is currently (1980) no active programme. | B.C.F.S.
RANGER
SCHOOL |
| 2.2.5.2-6 | The U.B.C. Faculty of Forestry students attend a three week camp at the end of the third year. In the past, a two week survey camp was held at the Loon Lake Camp for second year students, but this was discontinued in 1973. Professors and staff from the Faculty of Forestry bring student groups to the Forest for both field instruction and to engage in research work. The groups vary in size from small (3-4) to large (40-60) and the interests range over the entire forest resource. The Forest staff play only a minor role in the day excursions and there is often no liaison between Faculty and the Forest staff on these visits. | UNIVERSITY
STUDENTS -
U.B.C. FORESTRY |
| 2.2.5.2-7 | Students from other faculties at U.B.C. as well as other Universities such as Simon Fraser University (S.F.U.), have also been frequent visitors to the Forest. Although information has been provided for such visitors by the Forest Administration, the Professors in charge have generally led the field trips. | UNIVERSITY
STUDENTS -
OTHER |
| 2.2.5.2-8 | The Camp is used to host professional seminars related to forestry and other areas of professional interest. These meetings are noted in the Annual Reports of the Research Forest. Also noted are lists of non-forestry agencies using the Forest for seminars and meetings. | SEMINARS
AND MEETINGS |

2.2.5.2-9

From time to time, the Forest invites the general public to an Open House, although since the Demonstration Forest was opened in 1978, no Open House has been held. Considerable effort was devoted to informing the public of current forest practices and a large temporary staff was mobilized (in excess of 100), to assist the permanent staff. The Demonstration Forest provides a permanent, year round facility for both formal education and public relations activities. Tours are conducted (2.2.5.2-3) by the Forest Staff as work loads permit, and the Ministry of Forests has funded guides during the summer months on a programme sponsored by the Canadian Institute of Forestry.

OPEN HOUSE
AND
DEMONSTRATION
FOREST

2.2.5.3 Society Involvement

2.2.5.3-1 Areas in which people living in the local community are employed are as follows: EMPLOYMENT

1. Staff positions and office staff.
2. Technical staff for forest operations and maintenance work.
3. Loon Lake Camp and kitchen staff.
4. Gatekeeping and for security purposes.
5. Contractors for logging, road building and road maintenance, building contractors and other engineering operations.
6. Some research project maintenance staff.
7. Summer Youth Employment programmes
8. Employment Development programmes

A considerable number of people are employed at the Forest and live locally (about 30 full-time and many other part-time). This is a significant economic input onto the local community. The level of this input varies from year to year, but has steadily increased since the establishment of the Forest.

2.2.5.3-2 Since 1977, a series of employment development and youth employment programmes have been organized by the Education Department of the Forest. Up to 25 persons have been employed during the summer months (mainly on contracts awarded by the Federal Department of Immigration and Employment) on Forest maintenance operations. Youth employment programmes have greatly assisted in plantation maintenance, preparation of areas for student exercises, maintenance of the Arboretum and Loon Lake Camp, and a variety of other work that would normally have been undertaken by the Forest technical staff. Programmes specifically for the disabled and handicapped (deaf, blind and mentally handicapped) have been developed in conjunction with the Western Institute for the Deaf (W.I.D.), Canadian Institute for the Blind (C.N.I.B.) and Arthur Peake School in Maple Ridge. EMPLOYMENT DEVELOPMENT

2.2.5.3-3 The Forest occupies a considerable land area adjacent to the local community. While there are certain minor constraints imposed, the land is available for recreation and leisure purposes. The Forest has displaced other activities, (notably hunting and fishing), but generally speaking, has presented an acceptable and aesthetically pleasing alternative for the local community. LAND USE CONSTRAINTS

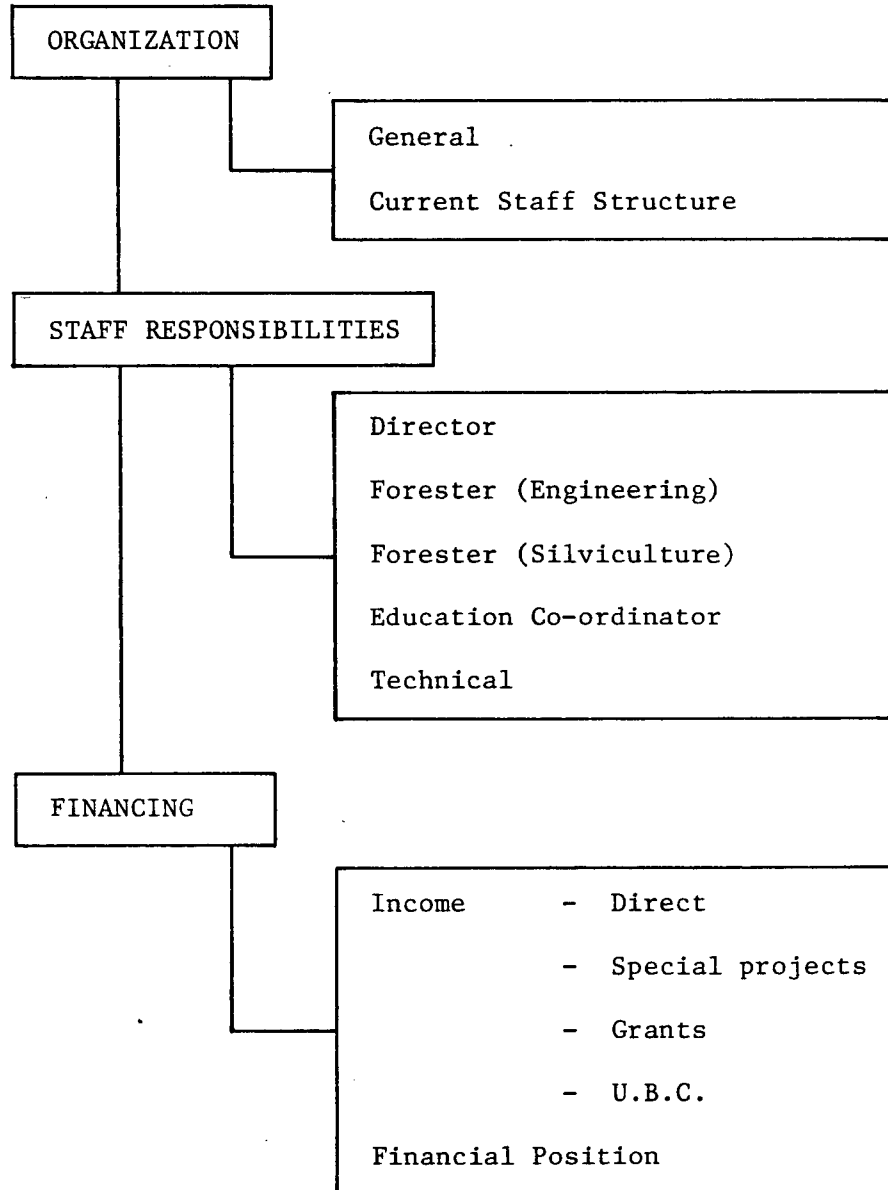
2.2.5.3-4 The Forest is open for hiking, game viewing, snow shoeing, cross country skiing and general nature rambling by individuals or family groups. Constraints are placed on the entry of motor vehicles, horses, and cross country recreation machines, and thus the Forest presents a peaceful, relaxing recreation setting. The local community directly benefits from the availability of the area for these purposes, as do visitors from many places outside the district. RECREATION

2.2.5.3-5 Water licences (Appendix 2.2.2.3-1-A Part (iii)) have been issued on almost all of the creeks and rivers leaving the Forest. The stability and purity of the water supply is affected by the environmental stability of the upstream areas. The Forest Administration actively protects the environmental values of the area by sound forest management. The Research Forest displaces other forms of land use and thus stabilizes the land use pattern. This is an important feature of the area and directly benefits the local residents. ENVIRONMENTAL STABILITY

2.2.5.4 Summary Appraisal of the Social Resource

2.2.5.4-1 The methods by which the University of British Columbia utilizes the Research Forest have been briefly described in the Social Resource. The relationship between the University, Society and the four physical resources of the Forest (timber, water, fish and game) is complex and highly interactive. The Social Resource includes intangibles that are difficult to describe and quantify (e.g. values of ideas generated during research and education activities). During the first 20 years that the University owned the Forest, use was restricted almost entirely to the Faculty of Forestry, and although activities such as recreation received some attention, it was not until about 1970 that activities on the area became more community and society directed. The development of the Forest Social Resource in the recent past closely reflects changing social attitudes, and as such, is highly relevant to the society of today.

Figure 2.3-1-A The Organization of the "Administration Section"
of the U.B.C. Research Forest Management Plan



2.3 The Administration

2.3-1 The organization of the analyses of the administration of the U.B.C. Research Forest is shown in Figure 2.3-1-A and will be broken into three main parts as follows:

Organization
Staff Responsibilities
Financing

2.3.1 The Organization of the U.B.C. Research Forest

2.3.1-1 The Administration has passed through varying stages since the inception of the Forest. The area has been administered by a series of Committees and Directors, all with varying degrees of authority and responsibility, to the present time when the Director is in sole charge of the day-to-day administration, responsible to the Dean of the Faculty of Forestry, who is in turn responsible to the Board of Governors of the University of British Columbia. There is a U.B.C. Faculty of Forestry Research Forest Advisory Committee that provides for liaison with the staff of the Faculty of Forestry. Much of the evolution of the administration and the events leading to the present situation can be traced through the year-by-year diary (Paragraphs 2.1.2-26 to 108) and information on a historical nature recorded in the previous sections. Formulation of policy is normally done at Director level and above, while planning and direction is done at Director and Staff levels: execution of operations is done at Staff level. GENERAL

2.3.1-2 Current administrative (1980) and staff structure of U.B.C. Research Forest are shown in Figure 2.3.1-2-A. ADMINISTRATIVE
STRUCTURE

All sections overlap and while the main areas of interest are clearly defined, many functions are of a joint nature. Thus, for example, during student camps or Open House preparations, the staff responsibilities are inter-changeable and there is no strict division or boundaries within which the staff operate.

2.3.2 Staff Responsibilities on the U.B.C. Research Forest

2.3.2-1 In general terms, the staff responsibilities are shown in Figure 2.3.2-1-A and are summarized as follows:

- (a) Director - In charge of planning and co-ordination, has overall responsibility for the organization and conduct of all activities on the Research Forest.
- (b) Forester - (Engineering) - Responsible for all engineering operations, contractor conduct relative to harvesting, vehicles, equipment and buildings in the Administration and Workshop areas. Responsible also for fire protection and fire plan revision.
- (c) *Forester - (Silviculture and Education) - Responsible for all silvicultural operations, co-ordination of both residential and day education programmes, compilation of the Management Plan, youth employment and employment development projects.
- (d) Secretarial - In charge of all bookkeeping, filing, camp reservations and general secretarial work.
- (e) Technical - Provides technical support for all operations.

A list of all professional staff since the inception of U.B.C. Research Forest is contained in Appendix 2.3.2-1-A.

* The position of Forester (Silviculture and Education) involves two major activities, Silviculture and Education. Where responsibilities (or duties) are stated in the Management Plan, the position (depending on subject matter) is noted as either Forester (Silviculture) or Forester (Education) for the sake of brevity. It is anticipated that the present position will evolve into two positions at some future (unspecified) date.

2.3.3	The Financing of the U.B.C. Research Forest	
2.3.3-1	The source financing of the U.B.C. Research Forest is broken into four main parts:	GENERAL
	(i) Direct revenue from operations on the Forest.	SOURCES OF INCOME
	(ii) Direct grants for specific projects from sources other than U.B.C.	
	(iii) Other sources apart from U.B.C. and specially funded projects.	
	(iv) U.B.C. (Operating expenses)	
2.3.3.1	Direct Income from Forest Operations	
2.3.3.1-1	The direct income source from Forest operations is as follows:	DIRECT INCOME
	(i) Income from timber operations and other forest products.	
	(ii) Income from the Loon Lake Camp operations.	
	(iii) Income from rent of other forest facilities.	
	(iv) Income from students fees for Spring Camp.	
2.3.3.1-2	The income from timber has been highly variable over the years, reflecting both administration policies and market trends. The income from this source has shown a decrease during the recent past as the more valuable old growth timber areas have been logged and harvesting has been increasingly concentrated in the second growth areas.	DIRECT INCOME VARIABLE
2.3.3.1-3	Camp operations have provided an increasing amount of income, although this has been largely offset by the increased maintenance necessary due to higher use, and the constant capital improvements to the Camp facilities.	CAMP INCOME
2.3.3.1-4	Other sources of income include compensation for rights-of-way (e.g. Mica Power Line) which are normally one payment transactions, and the lease of ground (e.g. Chum Salmon Hatchery) which provides a small, but steady income.	OTHER SOURCES
2.3.3.1-5	Income from student fees for Spring Camp do not cover the cost, and the Camp is heavily subsidized by the Faculty of Forestry at U.B.C.	STUDENT FEES

2.3.3.2 Direct Grants for Specific Projects from Sources other than the University of British Columbia.

2.3.3.2-1 Projects are sometimes financed by agencies or companies for particular projects or projects related to research work on the Forest. For instance, the Outdoor Education Department has been assisted by a grant from the Council of Forest Industries and many items related to Outdoor Education are supplied from this fund, including guides for the day tour programme. The preparation of this Management Plan for the Forest has been, in part, financed by a rebate from the logging tax. Income of this nature is small but an important component of the overall financing, although it is also liable to variation as the economic climate of the Province fluctuates.

DIRECT GRANTS
FROM OUTSIDE
U.B.C.

2.3.3.2-2 Further examples include a National Research Council (NRC) grant for the development of direct seeding techniques, British Columbia Forest Service grants for the development of tree planting containers and machines, Canadian Forestry Service grants for the development of tree planting containers and machines, Canadian Forestry Service grants for development of an aerial cone harvester, and a Careers '75 grant to assist in the metrication of the Forest records. While such grants appear to financially assist the Research Forest, grants of this nature are tied to specific projects, are often short term investigations, non-repeatable and do not necessarily assist the Forest in defraying operating expenses and the continuing charges of management and overhead costs that may indeed, be increased by their receipt. Moreover, these grants involve the Forest staff in extra duties, not directly related to the administration and maintenance of the Forest and may put a strain on the adequate performance of the essential tasks.

COSTS OF
ACCEPTING
GRANTS AND
OTHER OUTSIDE
FUNDS

2.3.3.3 Other Sources apart from U.B.C. and specially
Funded Projects.

2.3.3.3-1 These sources have included Canada Manpower projects
(Canada Works, Young Canada Work Programmes), funds
allocated by local School Districts for such projects
as a new dock at Loon Lake, and donations to the
Research Forest Education Development Fund.

2.3.3.4 U.B.C. (Operating Expenses)

2.3.3.4-1 The Research Forest operates a deficit budget and the University takes up the balance of the expenditure over income. Severe constraints are placed on the amount contained in the annual budget. A small proportion of most Research grants are deducted by the University for administration purposes, but this goes into the general University administration fund and does not reach the Forest directly. No Forestry fund has ever been established and there have been no endowments to the Forest for management purposes that reflect the special nature of the area. U.B.C.

2.3.3.5 Financial Position (1980) of the U.B.C. Research Forest.

2.3.3.4-1 The financial situation of the Forest is generally poor and imposes severe constraints on the operation of the Forest Unit. Projects of a long term nature can rarely be attempted due to the uncertainty of the income, and, due to the depleted old growth timber inventory, there are no reserves for contingencies.

PRESENT
FINANCIAL
POSITION
POOR

- 3.0 SUMMARY STATEMENT AND OBSERVATIONS ON PART I OF THE
U.B.C. RESEARCH FOREST MANAGEMENT PLAN
- 3.1 The Research Forest is a highly diverse forest area,
given to the University of British Columbia "for
the purpose of instruction and demonstration in the
practice of forestry and forest engineering",
(Paragraph 1.1-1) and this one quotation from the
restrictive covenant guides the management strategy
of the Forest. However, no matter how the restrictive
covenant is interpreted, or for that matter, no matter
what type of forest is under consideration, area
management must be based on a sound knowledge of the
Forest Resource.
- 3.1-1 PART I is the basis of the resource information -- an
accumulation and repository of the management data.
The U.B.C. Research Forest is unique in many respects,
in particular in regard to the immense quantity of
highly specific information related to the many
research projects undertaken on the area. Much of
the information is not directly included in this plan,
for the inclusion of all such material would render
the descriptive section of the working plan unwieldy
and unmanageable. The appendices of the Management
Plan contain a vast quantity of information, and
direction to further references in the Central Filing
System and elsewhere. It is believed that a balance has
been struck. Criticisms can be made that the information
selected for inclusion is biased, with either too much
or insufficient detail and the reaction in this respect
will depend on the special interest area of the reader.
- 3.1-2 PART I is, in large part, a key to a box of information
and should be treated as such, and not a compendium
of the total knowledge available. The yearly reviews
and the five year updating procedures will ensure
that the contents are kept abreast of current information
requirements and if the format proves incorrect, it
can be altered to fulfill the objectives prevailing
at that time. Time alone will show whether or not
the present (1980) format is realistic. It is certainly
not intended to be sacrosanct or carved in pillars of
stone. Land management forms must change as the need arises.

2.2.1.3-11	Mechanical ground clearing involves complete clearance in preparation for fully mechanized cultural operations. Old stumps are pushed out of the ground into piles and burned, together with the slash debris from the clear-felling operations. Large boulders are removed. Once the bulk of the debris is burned, the remaining material is buried. Any boggy areas are ditched using land clearing equipment. Rocky outcrops are left untouched and surface irregularities considered a hinderance to the operation of machinery, are leveled out as well as possible. In many instances, the surface topography is completely remodelled.	MECHANICAL GROUND CLEARANCE
2.2.1.3-12	On only a few of the highly productive sites at the southern end of the Forest have been drained. Swamps have been drained in areas to the south-east of Loon Lake in Compartment 28 (Map 2.1.1-3-A), but the areas involved are very small. Draining is not a frequent operation and where undertaken, dynamite, rather than mechanical means such as a backhoe, is favoured. However, there are many instances where the ground is not suitable for dynamite (e.g. stoney ground), and a backhoe has to be used.	DRAINAGE
	<u>Restocking</u>	
2.2.1.3-13	Until about 1955, there was almost complete dependence on natural regeneration for restocking logged or burned areas. After the slash was disposed of by burning, the site was left and over a period of time, possibly up to 20 years, would partially or fully restock with hemlock and cedar, with often less than 10% of other species such as Douglas-fir. As a consequence of this policy, alder occupies extensive areas on the more productive, lower elevation sites. In many instances, an understorey of conifers is becoming established under the alder invaded areas, but the stocking is generally sparse, and poorly distributed. In the past, the shape of the felled area was planned with consideration being given to distance from the possible seed source. Shading, aspect, condition of the soil and type of regeneration required was used to decide whether natural regeneration would be attempted.	NATURAL REGENERATION
2.2.1.3-14	Since 1955, most of the clear-felled areas have been planted. The planting stock has been supplied by the B.C. Forest Service, using, in some cases, seed collected on the Forest, and has consisted mainly of 2 + 0 bare root Douglas-fir. Container stock, of hard-walled containers or planting bullets have been successfully used in field scale trials.	PLANTING
2.2.1.3-15	Replanting of partially failed areas has been confined to highly productive sites or to areas where the original planting has completely failed. Rarely, if at all, has beating-up of natural regeneration been done thus some of the areas on the central ridge are still under-stocked after 45 years, and in some instances, the stocking level is as low as 30% of the minimum desired level (120 trees per acre as opposed to about 450 trees per acres).	BEATING-UP (FILLING BLANKS)

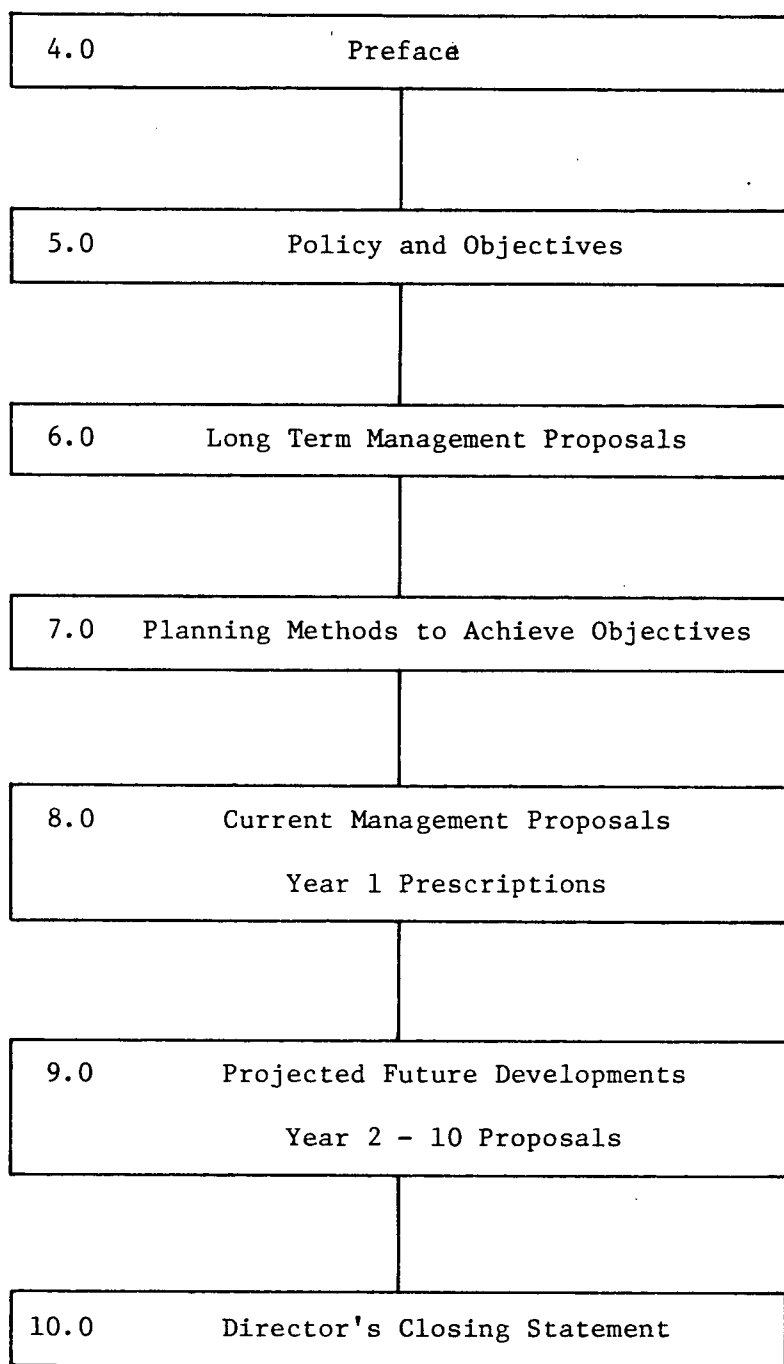
U.B.C. Research Forest

Management Plan

PART II

Current Management Section

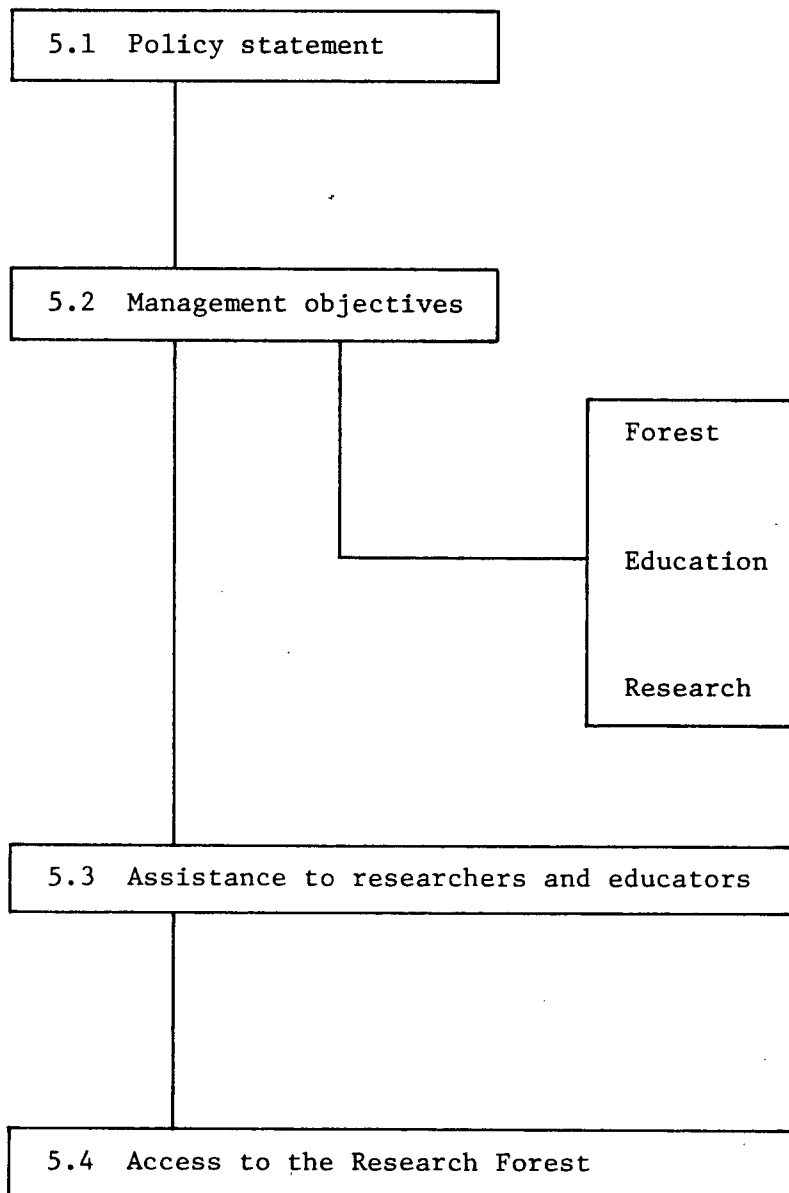
Figure 4.0-A Contents of PART II - U.B.C. Research Forest Management Plan



PART II

4.0	PREFACE	
4.1	Explanation of contents	
4.1-1	Part II contains; <ul style="list-style-type: none"> - Policy and Objectives - Long Term Management Proposals - Planning Methods to Achieve Objectives - Current Management - Projected Future Proposals - Director's Closing Statement 	CONTENTS
4.1-2	<u>Policy, Objectives and Long Term Management proposals</u> explain overall management philosophy. <u>Planning Methods</u> detail the mechanism. <u>Current Management</u> contains the Programme for Year 1 of the Plan. <u>Projected future Proposals</u> details the Short term (Year 2), Intermediate (Years 3-5 inclusive) and Long term (Years 6-10 inclusive) management proposals. Director's Closing Statement is a short prognosis for the outcome of the 1st year.	OUTLINE
4.1-3	Part II is based on a rolling format and will be amended each year. Thus, in turn Year 2 will be written as Year 1 and enlarged to include sufficient detail for all budgetary and planning control. Other sections will be progressively brought forward and the long term planning pushed on one year ahead, ensuring a constant 10 year horizon. Amended and out of date Management Plants will be filed as indicated in Appendix 0.0.	ROLLING PLAN CONCEPT
4.1-4	Due to uncertainty of funding, only one year's programme is set out in detail and a number of long term proposals (e.g. Harvesting Section 8.5.3 following) are given in only general terms. Uncertainty does not detract from the urgency of many proposals, particularly proposals associated with forest cover operations and building replacement.	FUNDING AND PROGRAMME
4.1-5	The format of Part II has been designed to provide a flexible management tool. Many headings used in the Prescription Check List (Section 6.2 following) will not be used each year, but their inclusion ensures consideration. The List itself will be amended and/or enlarged each year as experience indicates necessary. Part II, therefore, contains provision for its own revision and this attribute will be used to ensure the intent of, and maintain the integrity of long term management proposals.	REVISION

Figure 5.0 - A Policies and Objectives



5.0 POLICIES AND OBJECTIVES

5.1 Policy

5.1-1 The policy of the Forest will be to implement the terms as set out in the Restrictive Covenant of 1943 - namely, the Forest was granted "for the purpose of instruction and demonstration in the practices of forestry and forest engineering." POLICY

5.2 Management Objectives

MANAGEMENT OBJECTIVES

5.2-1 The management objectives to attain the stated policy as detailed above cannot be given in one concise statement. The major activities within the Forest must be specified for each area of interest.

5.2-2 (i) The Forest - Objectives related to the Forest as a management unit:-

- (a) The Forest unit will be managed to demonstrate the techniques of Best-Use. This implies intensive management of all areas of the Forest under the Best-Use designated for any stated area. Other uses are integrated with, but subservient to, the "Best-Use".
- (b) The Forest Administration will be managed, and its structure refined, to optimize staff effort and available resources.
- (c) The Forest facilities such as Loon Lake Camp, the climatological stations, and the road system will be utilized to the fullest extent, to provide logistical support for the management of the Forest, education, research and related activities.

5.2-3 (ii) Education - Objectives related to education are divided into the following:-

- (a) To provide an open-air classroom for technical vocational, and university students.
- (b) To expose research assistants and graduate students to field research techniques and methods.
- (c) To develop and promote forest-oriented outdoor education for school children in the context of the Forest objectives of research, education and demonstration.
- (d) To promote public interest in Forestry, forest recreation and associated activities.

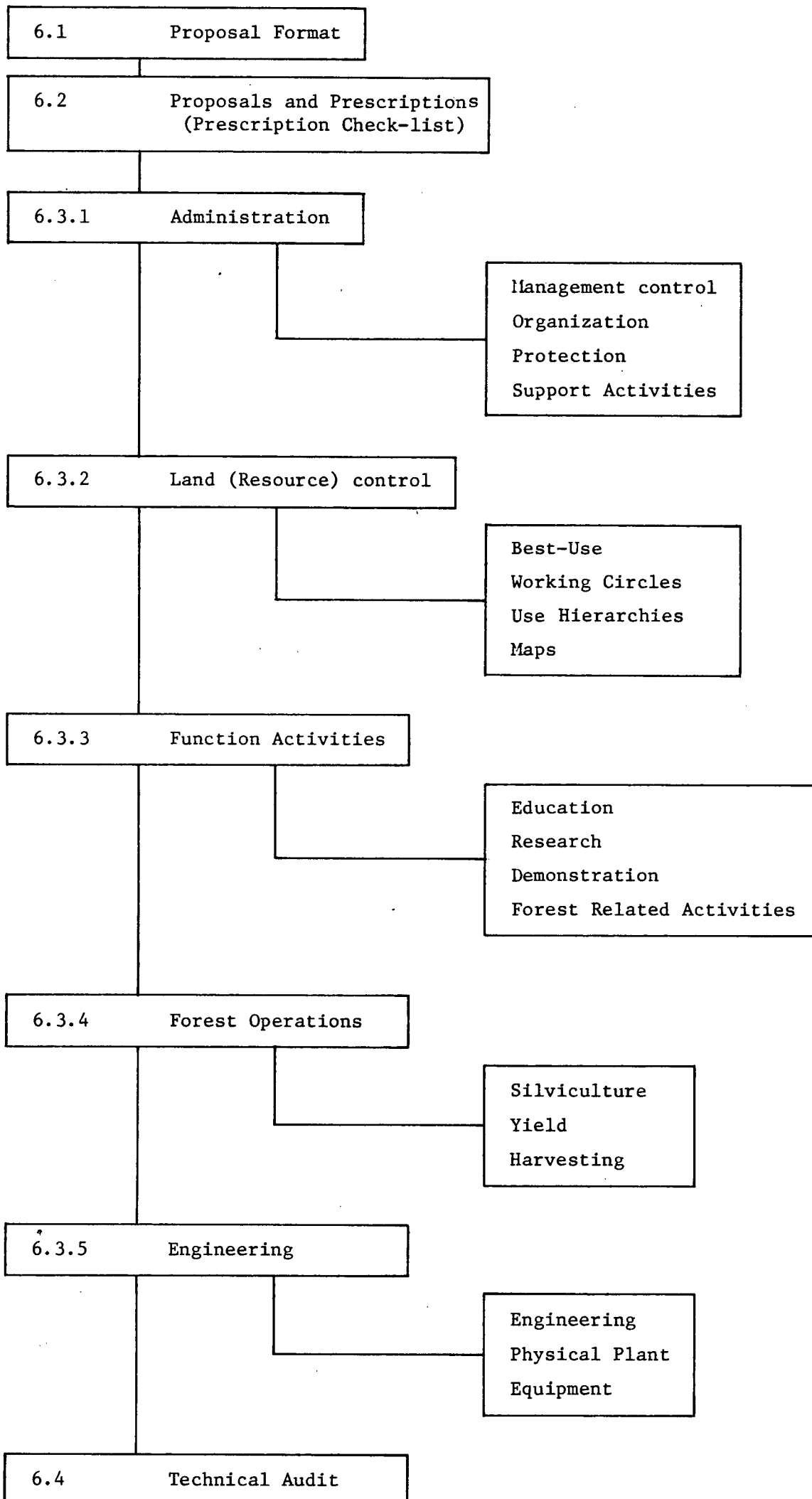
5.2-4 (iii) Research - Objectives related to research are:-

- (a) To provide a medium in which research can be actively pursued.
- (b) To protect research installations.
- (c) To demonstrate research techniques and (combined with the educational objectives) provide demonstrations for students and visitors to the Forest.

5.2-5 No forest management operation will be undertaken that will interfere with, or adversely affect, a research project. All projects, whether for research, education or demonstration purposes, must be approved by the Forest Director or his deputy prior to commencement of field work. The Forest administration reserves the right to deny access or assistance where, in its opinion, conflicts might arise.

- 5.3 Assistance to Researchers, Educators and visitors.
- 5.3-1 Researchers and Educators will be assisted where possible. While the Director and staff will do their utmost to satisfy demands in the form of information, material, labour and equipment, resources (where committed) will not be diverted from existing projects.
- 5.3-2 Groups, individuals or professional visitors will continue to be given assistance in the form of either information or tours (where time and resources permit).

- | | | |
|-------|--|---------------------|
| 5.4 | Access to U.B.C. Research Forest | |
| 5.4-1 | The general public will not be denied access except during periods of fire closure. Access will continue to be restricted to hiking, or snowshoeing and cross country skiing in winter. Hunting, fishing, horse riding, camping or lighting of camp fires will not be permitted. Non-business vehicular traffic will not be permitted. | GENERAL
PUBLIC |
| 5.4-2 | Sections of the Forest will be designated "Restricted Areas" and the general public will be excluded from these areas for security reasons. | RESTRICTED
AREAS |
| 5.4-3 | Due to the programme to make deer more visible to visitors, and research projects under way (2.2.4), pet dogs will not be permitted on U.B.C. Research Forest. | DOMESTIC
ANIMALS |

Figure 6.0 - A Methods to Achieve Objectives

6.0	METHODS TO ACHIEVE OBJECTIVES											
6.1	Format											
6.1-1	Proposals are set out in Sections 7, 8 and 9 in the following manner:											
	<p>Section 7.0 Long Range Management Proposals</p> <p>- containing proposals in general form for the 10 year period. The Proposals are written in general terms only, indicating management emphasis as described in headings listed in 6.1-2 following.</p> <p>Section 8.0 Current Management</p> <p>- current proposals for Year 1 of the planning period, including budget, cost flow, summaries and operation timetable for year.</p> <p>Section 9.0 Projected future developments.</p> <p>- contains proposals for Year 2, Years 3-5 and Years 6-10 of the planning period. Projections beyond Year 10 as foreseen by planners at the time of Management Plan review, are also included.</p>	PROPOSAL FORMAT										
6.1-2	Proposals are made in each section under the following headings:											
	<p>Administration</p> <p>Land (Resource) Control</p> <p>Function Activites (Research, Education etc.)</p> <p>Forest Operations (Silviculture, Yield and Harvesting)</p> <p>Engineering, Physical Plant and Equipment</p>	PROPOSAL HEADINGS										
6.1-3	To ensure continuity, the Proposed Central Filing System will follow a similar format as indicated in 6.1-2 and as expanded in 6.3 following.	RECORDS										
6.1-4	To show continuity of Current Short term and Long term planning, Figure 6.1-4-A is included. Four areas are carried through the entire planning process;	PLANNING CONTINUITY										
	<p>Administrative Intent</p> <p>Land Control</p> <p>Function Activities</p> <p>Forest Operations.</p> <p>To ensure success, all of these areas of forest management requires long term planning, and deficiencies in any one will result in major problems at some future date.</p>											
6.1-5	The Planning periods are as follows:	PLANNING PERIODS										
	<table><tr><td>Year 1</td><td>1982-83</td></tr><tr><td>Year 2</td><td>1983-84</td></tr><tr><td>Years 3-5</td><td>1984-85 - 1986-87</td></tr><tr><td>Years 6-10</td><td>1987-88 - 1991-92</td></tr><tr><td>Years 11 +</td><td>1992-93 - onwards</td></tr></table>	Year 1	1982-83	Year 2	1983-84	Years 3-5	1984-85 - 1986-87	Years 6-10	1987-88 - 1991-92	Years 11 +	1992-93 - onwards	
Year 1	1982-83											
Year 2	1983-84											
Years 3-5	1984-85 - 1986-87											
Years 6-10	1987-88 - 1991-92											
Years 11 +	1992-93 - onwards											

Figure 6.1-4-A Method Used to Ensure Continuity of Proposals Between Current, Short and Long Term¹

Year 1	Year 2	Year 3-5	Year 6-10	Year 11+
Current →	Short Term →	Long Term →		
8.2 Administration	<div> <div>→ 9.2.1 Administration</div> <div>→ 9.2.2</div> </div>	→ 9.3.1 Administration	→ 9.4.1 Administration	→ 9.5.1 Policy Objective Administration
8.3 Land Use	→ 9.2.3 Land	→ 9.3.2 Land	→ 9.4.2 Land	→ 9.5.4 Land
8.4 Function	→ 9.2.4 Function	→ 9.3.3 Function	→ 9.4.3 Function	→ 9.5.5 Function
8.5 Forest Operation	→ 9.2.5 Forest Operation	→ 9.3.4 Forest Operation	→ 9.4.4 Forest Operation	→ 9.5.6 Forest Operation
8.6 Engineering	→ 9.2.6 Engineering	→ 9.3.5 Engineering	→ 9.4.5 Engineering	
8.7 Cost/Quantity				
8.8 Time Tables	→ 9.2.7 Cost	→ 9.3.6 Summary	→ 9.4.6 Summary	→ 9.5.7 Income and Expenditure Predictions
8.9 Other Income				
8.10 Summary	→ 9.2.8 Other			

¹See 6.1-4 of Plan text.

6.2 Proposals and Prescriptions

- | | | |
|-------|---|-----------------------|
| 6.2-1 | To ensure that all areas of concern are considered, planned and prescribed, a check-list is used. The check-list (not covering Policy and Objectives - Section 5.0) is detailed in Section 6.3 following. All headings listed do not necessarily have to be commented on, nor used, but their inclusion ensures consideration. Many headings included require further subdivision and merely indicate interest areas. | CHECK-LIST |
| 6.2-2 | Changes in Policy and Objectives are not within the terms of reference of the individual charged with revising the Management Plan. Changes in Policy and Objectives, therefore, will be incorporated into the Management Plan as required by the Director in consultation with the Dean of the Faculty of Forestry. | POLICY AND OBJECTIVES |

- 6.3 Proposal and Prescription check-list
- 6.3.1 Administration
- 6.3.1-1 Management control
 - budgeting
 - finance
 - development
 - technical audit (see also 6.4 following)
 - marketing
 - inventory (biological and physical)
 - valuation
 - leases
 - physical plant, equipment and plant additions and renewals (see also 6.3.5-3 following)
- 6.3.1-2 Organization
 - staffing
 - employment policy
 - labour relations
 - management plan review
 - staff training
 - technical training
 - community involvement
 - accounting procedures
 - reports
 - minor accounts
- 6.3.1-3 Protection
 - fire (for equipment see 6.3.5-3 following)
 - security
 - pest control
 - environmental
- 6.3.1-4 Support activities
 - maps (see also 6.3.2-4 following)
 - photos
 - files and records
 - promotion
 - other

6.3.2 Land (Resource) Control

6.3.2-1 Best-Use

- Application
- Review
- Amendments

6.3.2-2 Working Circles

- Nature and Education
- Water Production
- Wood Production
- Recreation
- Wildlife
- Utility Corridor
- Research

6.3.2-3 Use Hierarchies

- Assessment
- Application
- Review
- Amendments

6.3.2-4 Maps

- List and Scales
- Renewals and amendments
- Storage
- Display
- Access
- Inventory

6.3.3 Function Activities

6.3.3-1 Education

- Education Co-ordinators Function
- Universities (including Spring Camp)
- Technical Schools
- Vocational Institutes
- Secondary
- Primary
- Seminars
- Workshops
- Work Experience
- Special Education Projects
- Public Education
- Signs
- Other visitors
- Other Day Tours and visits
- Other Residential groups
- Summer student projects
- Professional papers
- Other

6.3.3-2 Research

- Working Plan and Project Outline
- Researcher's Package
- Long term Project maintenance
- Forest Supported research
- Research News, other publications
- Researcher Aid
- Other

6.3.3-3 Demonstration

- Open House
- Demonstration Forest
- Special Projects
- Signs
- Other

6.3.3-4 Forest Related Activities

- Landscaping
- Hatchery
- Arboretum
- Deer Project
- Nursery
- Weather Station
- Other

6.3.4 Forest Operations

6.3.4-1 Silviculture

- Review of priorities
- Methods of labour
- Surveys and assessments
- Site preparation
- Planting (includes restocking)
- Weed control (includes cleaning)
- Juvenile thinning (includes species control)
- Pruning
- Pre-commercial thinning
- Commercial thinning
- Rehabilitation
- Other plantation maintenance operations
- Equipment (see 6.3.5-3 following)
- Compartment Treatment records
- Treatment summaries

6.3.4-2 Yield

- Review of priorities
- Methods of labour
- Inventory
- Yield calculation
- Regulation
- Equipment and instruments (see 6.3.5-3 following)

6.3.4-3 Harvesting

- Methods of labour
- Programme Year 1
- Programme Year 2
- Programme Years 3 - 5
- Provisional Programme Years 6 - 10
- Constraints and precautions
- Forest equipment (see 6.3.5-3 following)

6.3.5 Engineering, Plant and Equipment

6.3.5-1 Engineering

- Priorities
- Method and labour
- Roads, New (all aspects)
- Roads, Maintenance (general provisions)
- Drainage
- Snow removal
- Bridges (new, replacement and maintenance)
- Culverts (new, replacement and maintenance)
- Guard rails, road markers, signs
- Roads Equipment (see 6.3.5-3 following)
- Vegetation control
- Other

6.3.5-2 Physical Plant

- Priorities
- Methods and labour
- Buildings, New
- Buildings, Replacement
- Buildings, Maintenance
- Camp structures and services
- Administration Buildings
- Workshop complex
- Marc House & Greenhouse
- Equipment (see 6.3.5-3 following)
- Other

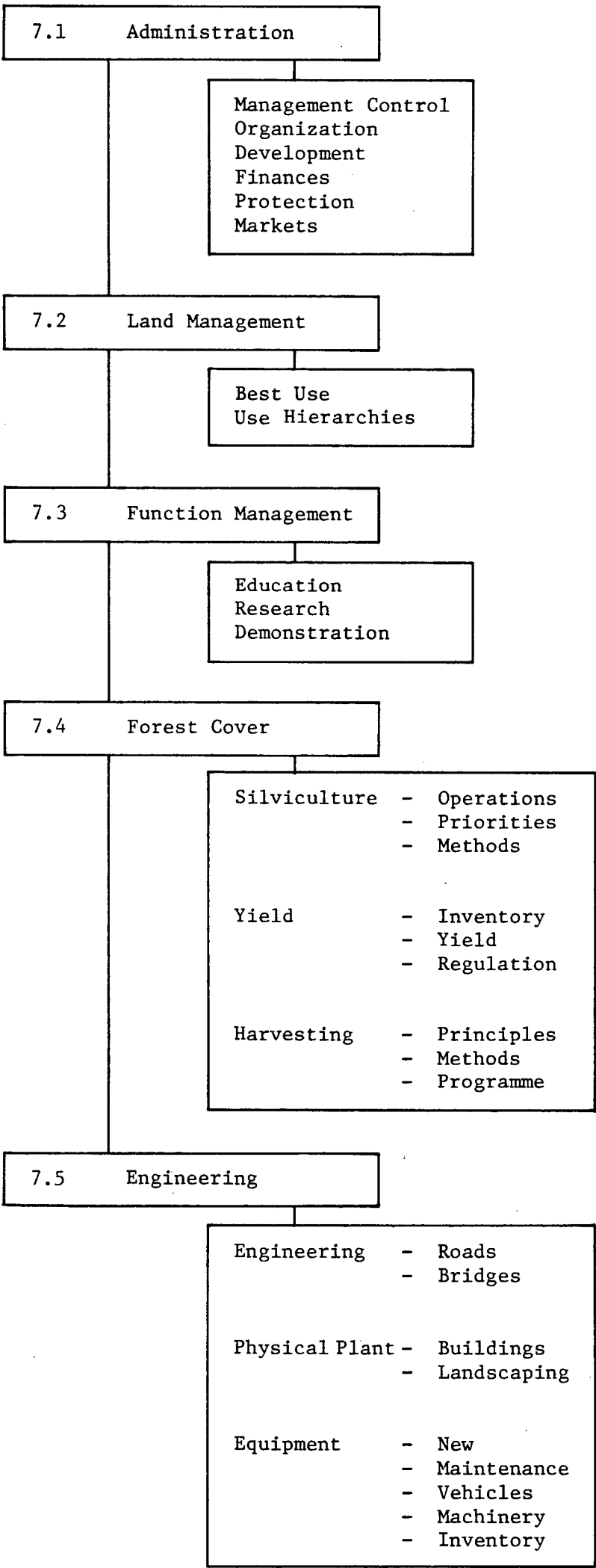
6.3.5-3 Equipment

- Silviculture
- Engineering
- Office
- Survey
- Workshop
- Fire suppression (field)
- Fire suppression (buildings)
- Vehicles, tractors, accessories and saws
- Purchase and Replacement priorities
- Inventory procedures
- Other

6.4 Technical Audit

- | | | |
|-------|--|---|
| 6.4-1 | To ensure constant review, evaluation and effectiveness of management processes, each year prior to Management Plan review, a brief analysis of the previous year's operations will be undertaken. The Technical Audit will be done concurrently with compilation of the Forest Annual Report. | AUDIT OF
MANAGEMENT
EFFECTIVENESS |
| 6.4-2 | Due to the trial nature of the audit, only silvicultural operations will receive scrutiny initially. As audit methods develop in future years, all other forest operations will be covered. Audit procedures will be handled internally by the staff member responsible for the operation. | TRIAL OF
PROCEDURES |
| 6.4-3 | The result of the Technical Audit will be presented to the Director annually or as required for staff meetings. | RESULTS |

Figure 7.0 - A Long Range Management Proposals



7.0 LONG RANGE MANAGEMENT PROPOSAL

7.1 Administration

- | | | |
|-------|--|---------------------------------|
| 7.1-1 | The Forest will continue to be managed by the Director and Professional Staff. Greater use of management aids (in the form of computer based management and accounting systems) will be made. The Management Plan will be the integrating document and will provide the key for management control. Policies relative to the Forest access and security will be reviewed annually. | MANAGEMENT
CONTROL |
| 7.1-2 | The Forest Administration will continue to diversify its role relative to Best-Use. As funds become available, individual resource managers will be employed to develop and co-ordinate a fully integrated Best-Use management framework. | ORGANIZATION |
| 7.1-3 | The Forest will continue to develop within the framework of Best-Use. Flexibility will be maintained in both management and education, and due to their developmental nature, both will be expected to change over the course of time to reflect developing social and other influences. An integrated management/ research information retrieval system will be developed, to contain all basic data, reports and publications generated on the Forest since its inception in 1943. | DEVELOPMENT |
| 7.1-4 | Methods of financing operations on the Forest will continue to be explored. A greater shift in revenue sources away from timber harvesting will place further constraints on all activities, particularly plantation maintenance. Loon Lake Camp will become financially self-sustaining by 1990, as will other educational activities. Funding will continue to be sought for summer student employment. | FINANCES |
| 7.1-5 | <p>All aspects of Protection will continue to receive a high priority. Protection review will be undertaken using the following headings.</p> <ul style="list-style-type: none"> Fire Protection (Forest) Fire Protection (buildings and plant) Insect Disease Protection Forest Wildlife Water quality Research Environmental quality | PROTECTION |
| 7.1-6 | The fire plan and other emergency procedures will be reviewed annually and plans redrafted every four years (see 8.2.3-1 following) or as required to meet intermediate planning dead-lines. Periodic surveys will be undertaken to review potential insect and disease problems. Security against trespass and vandalism will also be reviewed annually. The fence along the southern boundary will be maintained and extended. Areas delineated as "Protection Forest" will be reviewed annually as part of the Working Circle review (see 8.3.2 following), and amended as and when required. | GENERAL LONG
TERM PROVISIONS |

Hunting and fishing will continue to be prohibited and provision of adequate winter range will be planned for the local deer population. Deer breeding will continue to maintain population levels. Water quality will be maintained at a high level and a systematic sampling of water quality will be planned and instituted. All research installations will receive protection within the resources available. Environmental quality will be considered in all operational decisions. Areas accessible to the general public will continue to receive a high priority relative to maintenance and landscaping.

7.1-7

The main market for timber will continue to be Whonnock Lumber and other local wood processors as determined by the Forest Administration. Markets for small dimension logs and thinnings will continue to be sought, and the feasibility of a small sawmill, using small diameter material will be investigated. Markets for special products (such as foliage from juvenile thinnings) will be used when available.

MARKETS AND
MARKETING

- 7.2 Land Management
- 7.2-1 The Forest will continue to develop the principles and demonstrate the application of Best-Use management to the total forest resource. Working Circles (see 8.3.2 following) will be reviewed each year and modified as necessary to fulfil the overall management objectives. BEST-USE
- 7.2-2 Use hierarchies within Working Circles (see 8.3.3 following) will be established, reviewed annually and amended as and when considered necessary. USE HIERARCHIES

7.3 Function Management

- 7.3-1 The Education Department of U.B.C. Research Forest will continue to explore and develop use of the Forest for educational purposes. The Forest will continue to host and administer the course Forestry 451 (Spring Camp). When not required by the Faculty of Forestry, the Camp at Loon Lake will be used by School District #42 (or other school districts as determined by the Forest Administration). Active participation in day tours by secondary schools, technical, vocational and university groups will continue with guides provided when, and as, resources permit. Activity of the Forest Education Department will be reported annually. EDUCATION
- 7.3-2 The Forest will continue to encourage research undertaken by researchers, students and agencies, and research installations will be protected within the limits of Forest resources. The Forest Administration will continue to play an active role in initiating their own research projects. A Researchers Information Package will be developed as will a more comprehensive filing system. RESEARCH
- 7.3-3 The Forest will continue to demonstrate forestry practices. A further series of demonstration sites will be developed relative to forest cover manipulation, forestry practices, outdoor education and research. The public demonstration area will be maintained and enhanced as considered necessary to fulfill educational objectives. DEMONSTRATION

7.4 Forest Cover

7.4.1 Silviculture

- 7.4.1-1 The Forest has a backlog of reforestation and plantation maintenance. Operations will be planned and budgeted to reduce the backlog, the objective being that by 1990, all outstanding operations will have been completed and routine silvicultural operations will be planned on an even-flow basis. Silvicultural demonstration areas will be established, and selected areas will be landscaped to enhance the appearance of the Forest. OPERATIONS
- 7.4.1-2 Priorities in silvicultural operations will be given to establishing plantations and rehabilitation of high-site areas lost to Non-Commercial Cover in the Wood Production Working Circle (see 8.1.4 following). Areas suitable for totally mechanized silvicultural operations will be cleared as funds permit. A list of priorities will be established and amended periodically as determined by the Forest Administration. PRIORITIES
- 7.4.1-3 Although traditional methods will be used to establish and maintain plantations, the Forest will continue to be actively involved in developing new and innovative techniques. Priorities will be given to addressing problems currently facing the forestry sector of British Columbia at the present time. METHODS
- 7.4.1-4 An area will be developed to demonstrate Mountain Silviculture. An area in the Water Protection and Storage Working Circle (see 8.3.2.3 following) in the Marion Lake watershed (Map 2.1.3-2-A) has been proposed for the demonstration site.

7.4.2 Yield

- 7.4.2-1 The Forest Inventory (Appendix 2.2.1.1-3-A) was completed in 1966 and updated in 1970. A continuous Forest Inventory (CIF) will be established on a Compartment basis and the inventory continuously updated. Inventory information will be included in a computer based management model. INVENTORY
- 7.4.2-2 Calculation of yield (Appendix 2.2.1.1-3-B) will continue to be undertaken periodically. Future calculations will be based on yield relative to ecosystem units and increases due to more intensive silvicultural techniques. The highly variable nature of the Forest will be taken into consideration as will the use of thinnings available to market. YIELD CALCULATION
- 7.4.2-3 Theoretically, the Annual Allowable Cut (AAC) (Appendix 2.2.1.1-3-B) is $19,300 \text{ m}^3$ ($680,000 \text{ ft}^3$). However, due to age class imbalance, areas reserved for research, education and "protection", the AAC is currently $8,500 \text{ m}^3$ ($300,000 \text{ ft}^3$). The AAC is based on a productive area of $3,200 \text{ ha}$ ($7,900 \text{ ac}$) - approximately 63% of the total Forest area. The estimated time required to achieve an even-flow production of $14,200 \text{ m}^3$ ($500,000 \text{ ft}^3$) is 50 years (Figures 7.4.2-3-A, B, C, D, E). It is proposed that 10% of the actual growth is reserved for contingencies such as fire, disease etc. Future regulation policy will be based on a periodic rather than annual cut to allow for market fluctuations, the periodic cut being balanced with permissible cut in any ten year period. It is proposed that the AAC is recalculated in 1985, the calculation being based on variable rotations relative to differing plantation and ecosystem productivity. It is anticipated that plantations currently being established on high site land in the Wood Production Working Circle will, by intensive management have a reduced rotation, possibly 50 years instead of the present 80 years. Techniques for confirming the possible rotation are not yet available. REGULATION

7.4.3 Harvesting

- 7.4.3-1 Due to factors noted in Section 6.3.2, Appendix 2.2.1-3-B and PART I, Section 2.2.1.3, harvesting will be severely constrained for the next two decades. Production could be maintained by entering areas such as the Knapp Reserve, but such measures would only temporarily alleviate the problems. The programme as detailed in Section 8.5.3 (following) is provisional. In principle, in each of the next ten years, when the budgeted income has been achieved, harvesting will cease, any area not harvested being delayed until the following year. Further, a series of spot harvesting operations will be undertaken in selected old growth stands on the western slopes of the Golden Ears. Selected harvesting of this nature is a "mining" operation as none of these stands are regarded (due to age) as replaceable and areas thus cut will not be artificially reforested. Windblow and diseased stands will be cleared as required if considered necessary and commercially feasible. PRINCIPLES AND PHILOSOPHY
- 7.4.3-2 Harvesting methods will, in general terms, be based on conventional methods using high lead on the steeper slopes, and skidders where accessibility permits. Helicopters will be used for selected operations where high value, otherwise inaccessible material is harvested. Systems will be clearcutting using cutting patches of approximately 20 hectares (50 acs) per setting. It is anticipated that commercial thinnings will be available towards 1990. METHODS AND SYSTEMS
- 7.4.3-3 Areas selected for harvesting are detailed over three periods: LONG RANGE PROGRAMME
- | | |
|------------------------|--|
| Year 1 (Current) | The area covered by the current planning year commencing April 1. Specifics detailed in Section 8.5.3 (following). Areas detailed by sub-compartments. |
| Years 2-5 (Short Term) | Years immediately following current years harvesting and specified in general terms only. Areas given by compartments (where known). |
| Years 6-10 (Long Term) | Areas and quantities will be detailed by Working Circles indicating the general area, rather than specific compartments. At the present time, there are no long term harvesting proposals. |

7.5 Physical Estate

7.5.1 Engineering

- 7.5.1-1 The road system will be maintained. A long term maintenance programme will be prepared. Only sufficient new roads will be constructed as will service new logging areas or other sites as required to fulfill the policy of "Best Use" (7.2-1). The single road access to Loon Lake Camp (Road C) will be extended as funding permits. Roads servicing mid-age class (40 - 60 years old) forest stands on the east side of the Forest will be progressively upgraded, commencing in 1985, to permit harvesting to proceed. Vegetation suppression on all accessible roads will be continued to permit fire or emergency access. ROADS
- 7.5.1-2 A programme of bridge maintenance and replacement will be prepared. New bridges will be constructed on Road G, Road M, and Road K by 1990. Bridges currently on these locations are under weight restrictions because of deterioration due to age. BRIDGES
- 7.5.1-3 The programme of replacing wooden box culverts (when required) will continue, as will the siting of additional self-cleaning culverts in sections of road where considered necessary. All culverts will be numbered and a register maintained as to site, size, age and other pertinent information. CULVERTS

7.5.2 Physical Plant

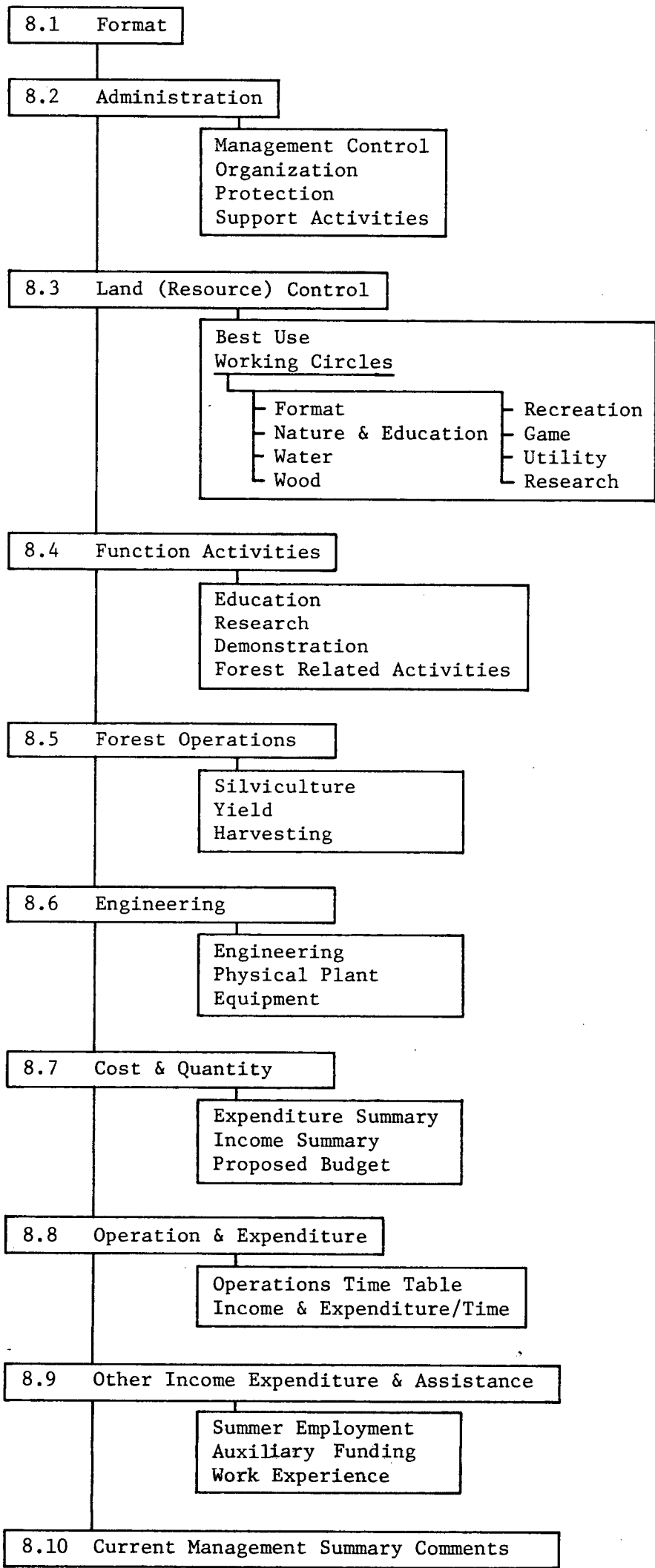
- | | | |
|---------|---|-------------|
| 7.5.2-1 | A review system will be developed to determine priority of use, space requirements and efficient use of buildings. A replacement policy will be developed and the older buildings progressively upgraded or replaced as considered necessary by the Forest Administration. A small trailer area will be established for the use of visiting researchers as will a storage area for inactive research equipment. | BUILDINGS |
| 7.5.2-2 | Selected points throughout the Forest will be landscaped as funds permit. Areas selected for treatment will be at strategic, well frequented road intersections, key buildings and research sites. Summer programmes will provide the labour, and plants will be grown in the Forest nursery. It is proposed that a landscaping programme is developed and one site treated each year. | LANDSCAPING |

7.5.3 Equipment

- | | | |
|---------|--|-------------|
| 7.5.3-1 | As the function of the Forest expands, new equipment will be required, particularly for silviculture, Education and Research. Equipment is also required for trail construction and maintenance of Research installations. A replacement programme for existing equipment, together with a list of priorities for acquisition will be prepared and equipment purchased as funding permits. | NEW |
| 7.5.3-2 | A technician will maintain equipment servicing facilities and undertake repairs. A comprehensive workshop and store will be constructed for equipment maintenance operations. The technician will prepare service schedules and a system of preventative maintenance will be instituted. | MAINTENANCE |
| 7.5.3-3 | Replacement of vehicles will continue as required. Vehicle (and equipment) logs will be introduced with a system of regular inspections and maintenance. | VEHICLES |
| 7.5.3-4 | The Forest maintains a number of special purpose machines (saws, brushcutters, sprayers, tractors), as well as machines developed on the Forest for demonstration purposes. A programme of housing and maintenance of special purpose machinery will be planned and instituted as funding permits. Repairs to instruments will continue to be contracted out. | MACHINERY |
| 7.5.3-5 | A comprehensive inventory and equipment handling system will be developed. The technician responsible for maintenance will be in charge and will receive training in inventory and stock control. | INVENTORY |

- 8.0 CURRENT MANAGEMENT SECTION (PLAN YEAR 1) (1982-83)
- 8.1 Format
 - 8.1-1 Section 8.0 contains all proposals necessary to guide the principle management activities on the U.B.C. Research Forest for Year 1 of the Management Period.
 - 8.1-2 Proposals follow the format set out in Section 6.3 and the main headings follow the outline as set out in Figure 6.0-A.
 - 8.1-3 Amendments to the methods of presenting proposals will be reviewed and amended as described in Section 8.2.1 following.

Figure 8.0 - A. Current Management



8.2	Administration	
8.2.1	Management control	
8.2.1-1	The U.B.C. Research Forest will be administered and controlled by the Forest Director, assisted by his professional staff. The Director and staff will continue to be responsible for the day-to-day administration, allocation of resources, budget allocation and all matters pertaining to Forest use.	GENERAL
8.2.1-2	Budgeting will be coordinated by the Director in consultation with his staff. A deficit budget of \$205,000.00 has been proposed for the year, to cover operating expenses.	BUDGETING
	<ul style="list-style-type: none"> - Estimated expenditure = \$603,500.00 - Estimated income = \$398,500.00 - Budgeted operation cost = \$205,000.00 	
	The Budget for 1982/83 will be presented to the Dean of the Faculty of Forestry, U.B.C. for consideration of the Board of Governors in September 1981 for finalization in February 1982.	
8.2.1-3	In view of the current financial constraints, little work of a developmental nature will be undertaken during the year. Any developmental work will be the result of funding from outside the University.	DEVELOPMENT
8.2.1-4	A method of assessing the success and efficiency of silvicultural operations will be devised and initiated, based on the outcome of the silvicultural technical audit.	TECHNICAL AUDIT
8.2.1-5	Marketing arrangements will continue as in previous years. Timber will be offered and sold to Whonnock Lumber and specialist products to other traditional outlets. In view of the increasing quantity of small roundwood available from thinnings, markets will be sought for this material and revenue generated to develop techniques and offset operating costs.	MARKETING
8.2.1-6	In view of the time that has elapsed since the last forest inventory, preparations will be made to initiate the field work necessary to complete a new inventory. The inventory will include a number of factors previously omitted such as wildlife and recreation (see 9.2.2.2.1-6 following)	FOREST INVENTORY
8.2.1-7	As a step to assist allocation of resources, a method of valuing assets within the Forest will commence. Information will assist with decisions of building replacement, depreciation, valuation of growing stock, research, education and recreation facilities.	VALUATION

- | | | |
|---------|--|------------------------|
| 8.2.1-8 | All leases and rentals will be reviewed during the year to determine their purpose, performance and profitability. The information will determine whether the service provided is reasonable in light of current financial hardships. | LEASES AND
RENTALS |
| 8.2.1-9 | The U.B.C. Research Forest operates a number of pieces of mechanical equipment, and maintains an extensive inventory of tools. A complete inventory will be compiled during the year for each section and a stock-taking procedure initiated. A technician will be employed to service equipment, maintain stock books, and control and account for movement of tools and equipment. | PLANT AND
EQUIPMENT |

8.2.2	Organization	
8.2.2-1	The staff structure for the Forest devised during 1979/80 will be implemented and amendments made where required. (Figure 8.2.2-1-A).	STAFFING
8.2.2-2	In view of the diverse nature of the operations undertaken on the Forest, a register of job and operation descriptions will be compiled and will include education levels and specialist skills required. In future, employment criteria will be established to maintain a pool of diverse specialist skills, particularly technical. Where skills are not immediately available, suitability for training within the specified specialist area will be included in employment criteria for both professional and technical positions.	EMPLOYMENT CRITERIA
8.2.2-3	A series of periodic field meetings will be held for all staff. While the focus of the meetings will be technical, with the technician in charge of the work explaining the operation, staff will be encouraged to exchange views on any factors affecting interstaff relations.	LABOUR RELATIONS
8.2.2-4	The U.B.C. Research Forest Management Plan will be reviewed annually. The review will be undertaken at the same time as the Forest Annual Report is written. The joint exercise will permit the Technical Audit to be assessed, records summarized and additions to be made to Part I of the Management Plan. A review of the Plan format will be undertaken at the same time. Plans will be made to include the Management Plan review as part of Forestry 451 (Spring Field Camp for 4th Year Forestry students).	MANAGEMENT PLAN REVIEW
8.2.2-5	Professional staff will organize and schedule their personal continuing education. Annually, each professional staff member will submit to the Director his plans for the year, including coursework and workshops.	STAFF TRAINING
8.2.2-6	Each technical and secretarial staff member will be encouraged to continue their education to re-inforce old skills and acquire new skills, with particular reference to the criteria established within their job description (see 8.2.2-2). Although the overall responsibility will rest with the individual involved, a member of the professional staff will be responsible for co-ordinating and advising staff members of opportunities.	TECHNICAL TRAINING
8.2.2-7	The Forest will continue to play an important role in the local community. The open door access policy will be maintained, grants applied to employ local students, and information made available to local press and interested individuals. Organized groups will be encouraged to participate in creative work programmes, conducted tours and educational projects.	COMMUNITY INVOLVEMENT

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|----------|--|--|
| 8.2.2-8 | Although the Forest operates under the University Finance Department, internal accounting procedures will be reviewed during the year to ensure a more rapid recall of accounting information, including quantities and costs, particularly in regard to operational procedures. This will be part of the research function of the Forest. | ACCOUNTING
PROCEDURES |
| 8.2.2-9 | Safety and safe work practices will continue to have a high profile. Staff meetings (8.2.2-3) will provide a medium for re-inforcement and staff will be encouraged to participate in safety courses outside the Forest (8.2.2-6). Emergency procedures will be reviewed and injured party evacuation practices held. Close liaison will be maintained with the local Search and Rescue Department (contact telephone number 463-6251). | SAFETY AND
EMERGENCIES |
| 8.2.2-10 | The Forest Annual Report will continue to be written by the Director (see 8.2.2-4), and a standard format suitable for machine processing will be investigated. A brief summary of the years' activities will be written for inclusion in a continuing history, and eventual inclusion in PART I of this Plan, and other reports will be produced as required. The Forest information leaflet will be reviewed, amended where necessary and reprinted. The leaflet will continue to be available to the general public free of charge. | REPORTS,
HISTORY AND
INFORMATION |

8.2.3 Protection

8.2.3-1 The Fire Plan will continue to be reviewed annually. FIRE
Major revisions will be carried out every four years
(7.1-6), the next revision being due in 1982. Six
copies of the Fire Plan will be held at the U.B.C.
Research Forest, the distribution being as follows:

- Director
- Forester (Engineering)
- Forester (Silviculture & Education)
- Office Copy
- Senior Technician
- Management Plan (Appendix 2.1.10-2-A)

The Forester (Engineering) will be responsible for
Fire Plan revision and ensuring that the provisions
of the Fire Plan are carried out.

8.2.3-2 Security of the Forest will be constantly under SECURITY
review. The Forester (Engineering) will be responsible
for all activities related to security, trespass and
vandalism, and will ensure that the Director is
informed at all times as to security status. Outside
of normal working hours, the Gatekeeper will be in
charge of the gate and all administration buildings,
ensuring that all buildings and gates are secured
when not in use. The fence patrol trail running
immediately inside the southern fence line will be
completed. The Caretaker, while in residence, at
Loon Lake will be in charge of Camp security. When
the Caretaker is not in residence, it is the responsi-
bility of the Forester (Silviculture), to ensure
adequate security measures are taken.

8.2.3-3 The Forester (Silviculture) will be responsible for PEST CONTROL
accurate information relative to forest pests and
diseases. Problem areas will be observed and the
Director kept informed. Where outbreaks of either
insects or diseases occur that are outwith the knowledge
of Forest Staff, samples will be collected and sent for
analysis by specialists. Decisions as to treatment
will be made by the Forest professional staff as required.

8.2.4 Support Activities

- 8.2.4-1 A comprehensive stock of maps will be maintained. MAPS
The Forester (Silviculture) will be responsible for ensuring that the maps are available for educational, research and operational use. A system for continually amending maps will be investigated and initiated if feasible. Scales currently in use are as follows:

General Descriptive 1:50,000

This scale does not permit fine detail, but is useful for descriptive purposes. Figures in the Management Plan are drawn to 1:50,000 as are the maps handed out to visitors (see 8.2.2-10).

Management Detail 1:10,000

The most commonly used scale in management control. Sufficient detail is available from the scale to isolate areas as small as 1 ha (2.47 ac) with a reasonable degree of accuracy, and provide relatively precise detail of project areas, roads, creeks and so on. The entire Forest can be displayed on one map sheet, and thus the map provides a detailed overall picture of the Forest. Many of the "specialized" maps are drawn to this scale (e.g. Ecosystem Units Map, compartments etc.).

Operation Detail 1:5,000

The largest scale in common use and used extensively for measuring areas, precise plotting of boundaries. All harvesting, planting, land clearing, cultural operations, sub-compartment details, reserves and features of special management interest are recorded on 1:5,000.

A list of the maps held at the Administration Office is contained in Appendix 2.1.1-2-B of the Management Plan. For proposals relative to maps, see Section 8.3.4 following.

- 8.2.4-2 The Forester (Engineering) will be responsible for ensuring that air photographs will be taken every two years to provide full Forest coverage. The next series will be due in 1983. Other air photographs will be taken as required for education or research purposes. All photographs will be catalogued and a current list available (together with information as to the whereabouts of the negatives) will be held in the Forest Central Filing System at all times. The Senior Technician will be responsible for storage of all still photographs, slides and movie films related to the Forest. A method of cataloguing, storage and access will be devised during the current year. PHOTOGRAPHS
- 8.2.4-3 The Central Filing System currently under development will be implemented during the year and amendments made as required. Filing will be the responsibility of the Office Secretary (Office Administrator) and a system of file security will be developed and implemented (Appendix 0.0). FILES AND RECORDS

- | | | |
|---------|--|--|
| 8.2.4-4 | Public relations will continue to be the responsibility of the Director who will allocate tasks related to public relations and promotion of Forest interests, to staff as required. | PROMOTION OF
FOREST
INTERESTS |
| 8.2.4-5 | A review will be undertaken of the efficiency and use of the Administration Building. Proposals formulated in 1975 will be reviewed, (see Section 8.6.2-7 following), and recommendations made for inclusion in the 1983/84 budget and implementation in 1985. | OTHER
ADMINISTRATION
SUPPORT
ACTIVITIES |

8.3 Land (Resource) Use

8.3.1 Best-Use

- 8.3.1-1 Best-Use will continue to be actively applied to U.B.C. Research Forest. Sections 8.3.2 and 8.3.3 (following) detail the areas best utilized for specific purpose and how use integration will be applied. APPLICATION
- 8.3.1-2 A review procedure will be devised to test the validity of the Working Circles (8.3.2) covering any suspected failures to achieve objectives detailed for each Working Circle. REVIEW
- 8.3.1-3 Where amendments become necessary through review, the Director will instruct the professional staff member responsible for that particular resource (see Figure 8.2.2-1-A) to amend the use hierarchy (see 8.3.3-1 following) as required. Any major revisions will be formalized and carried out at the Management Plan revision. AMENDMENTS

8.3.2 Working Circles

8.3.2.1 General provisions

8.3.2.1-1 The term "Working Circle" is used to delineate areas of common purpose and treatment as determined by the Forest Management Objectives. Working Circles will overlap and a series of secondary (complimentary) uses prescribed. Boundaries will be fixed only for the period of the short term (one year) and adjusted as required to accomodate changing policies and objectives. However, although the boundaries are fixed in the short term, by following Best Use management, it is unlikely that sudden changes will result, particularly in view of the Long Term Management Proposals (7.1-2). Adjustments will be carried out at the time of Management Plan revision. Selected areas of the Forest have, in the past, been broadly classified as "Protection" areas. As "Protection" is inherent in sound forest management, the term is not used as a separate working circle title.

FORMAT

8.3.2.1-2 There will be seven Working Circles:

DIVISIONS

- Nature and Educational Reserves
- Water Production and Storage
- Wood Production
- Recreation
- Game Management
- Utility Corridor
- Research

8.3.2.1-3 For the period of this plan, the Forester (Silviculture) will be responsible for administering all Working Circles, reporting directly to the Director. The Director will allocate management responsibility for specific areas to the professional staff during the year and these provisions will be included in the Management Plan revision for 1983/84.

RESPONSIBILITY

8.3.2.2	Nature and Education Reserves Working Circle	
8.3.2.2-1	The Nature and Educational Reserves Working Circles will include all existing Ecological, Nature, Mensurational and Education Reserves (Map 8.3.2.2-1-A). The area extends to 1,463 ha (3,517 acres). Areas reserved for Research Projects are discussed under the title of Research Working Circle (Section 8.3.2.8 following).	EXTENT
8.3.2.2-2	Although areas within the Working Circle have special protection status (i.e. limited or zero commercial use), due to financial stress, logging perforce has been, and will continue to be carried on in selected Reserves in so far as this is not incompatible with Reserve status. Individual Reserve records will continue to be maintained in the Forest Central Filing System and will contain all pertinent details including purpose, description, extent and treatment philosophy.	PROTECTED AREAS
8.3.2.2-3	Few boundaries of the Nature Reserves are accurately marked on the ground, nor accurately mapped. A programme to survey and mark boundaries will commence during the coming year.	TREATMENT - NATURE RESERVES
8.3.2.2-4	All logged over areas within Educational Reserves will be assessed and provisions made to rehabilitate and raise stocking to acceptable levels. One selected area in the Loon Lake Educational Reserve will be retained for planting workshops. The Loon Lake Education Reserve Five Year Plan (1976) will be revised and provisions made to complete outstanding work. Volunteer labour will be encouraged and a grant applied for to complete a number of the proposed facilities (Section 8.9 following).	TREATMENT - EDUCATIONAL RESERVES
8.3.2.2-5	All access trails within Reserves will be accurately mapped, plotted onto maps of each reserve, at a scale 1:5,000, and summarized onto one master copy of the entire Forest at a scale of 1:10,000. A system of regular trail inspections will be devised to permit scheduling of maintenance, assessment of use and permit regular inspections of the reserves themselves.	ACCESS
8.3.2.2-6	Although no other treatment is prescribed, periodic inspections may reveal work necessary to maintain the integrity of an area. Contingencies will be discussed at staff meetings and treatment scheduled as considered necessary.	OTHER TREATMENT

8.3.2.3 Water Production and Storage Working Circle

- 8.3.2.3-1 The Water Production and Storage Working Circle comprises three watersheds, Jacob's (Marion) Lake, Gwendoline Lake and Eunice Lake, extending to 1,723 ha (4,142 acres), (Map 8.3.2.3-1-A). This tract has be envisioned as a future Water Production Area, and the Working Circle has been established to preserve the integrity of the watershed. GENERAL
- 8.3.2.3-2 No treatment for Water Production is prescribed. At an unscheduled future date, the Working Circle will be managed under a range of silvicultural systems to demonstrate and research their operation on a field scale (Paragraph 7.4.1-1). These systems will be compatible with the watershed values. A survey to implement these treatments will be made in 1982. No Silvicultural work will be done below the contour of proposed flooding level 340 m (1,125 ft.), unless to maintain the integrity of the water storage objective. TREATMENT
- 8.3.2.3-3 Existing access will be maintained and selected railroad grades on the slopes to the east of Jacob's (Marion) Lake will be cleared to provide access for fire control and for future silvicultural operations. ACCESS
- 8.3.2.3-4 The Water Production Working Circle could be enlarged to include Katherine Lake watershed, and the inclusion of this area within the Working Circle will be investigated during the 1983 revision. KATHERINE LAKE

8.3.2.4	Wood Production Working Circle	
8.3.2.4-1	The Wood Production Working Circle will cover 780 ha (1,875 acres) at the southern end of the Forest as indicated on Map 8.3.2.4-1-A. Topography (ground under 30°) and site type (areas in excess of S.I. 30 D-f at 50 years), will be constraining factors in determining the extent of the Working Circle. In order that the area comprises one contiguous block, small areas will be included that do not meet the topography and site requirements, notably rock outcrops and thin soil areas. Recreation corridors will include winter grazing for game. Permanent research areas will remain undisturbed.	EXTENT
8.3.2.4-2	Areas of the Forest not included in the Wood Production Working Circle will also produce timber. The areas where timber production will not be the primary use, but timber will be produced in stand treatment, will be designated "Subsidiary Wood Producing Zones". In such areas, the constraints imposed by the Primary Use will be paramount.	SUBSIDIARY WOOD PRODUCING ZONES
8.3.2.4-3	Treatment within the Wood Production Working Circle will be undertaken using mechanized equipment as far as practical (see 8.5.1-4 following).	TREATMENT
8.3.2.4-4	A further 10 ha (24 acres) will be cleared in Compartment 32 (using contractor equipment and labour) in 1982/83. Where draining is required, backhoe or bulldozer will be used.	GROUND PREPARATION
	Approximately 20,000 Douglas-fir will be planted by the Forest Technicians. The seedlings will consist of both bare root and bullet stock, and will be planted at between 1,000 and 1,400 trees per ha (400 - 500 trees per acre). The bullet stock will be planted by the injection planting machine developed at the Forest at 3 m x 3 m (10 feet x 10 feet). In areas where the use of the planting machine is not possible due to topographical constraints, containers will be planted using the Walters' planting gun. Bare root stock will be planted by mattock. Small areas in Compartments 16 and 20 will be filled in (beaten up).	PLANTING
8.3.2.4-6	Weeding (70 ha - 173 acres) and Cleaning (60 ha - 148 acres) will be carried out by the Forest Technicians. Approximately 40 ha (99 acres) will be undertaken on areas previously cleared, using tractor mounted mowers. The balance will be weeded by hand using brush cutters (Husqvarna power scythes) and hand tools (Sandvik brush knives).	CROP WEEDING AND CLEANING
8.3.2.4-7	A small area of plantation (6 ha - 15 acres) will be brashed; (pruned to 2 m (6.2 feet) in height) for access, fire hazard reduction and to permit measurement of sample plots. Volunteer labour and students will be used to assist in this activity.	PLANTATION BRASHING

8.4.4	Forest Related Activities	
8.4.4-1	Selected areas will be landscaped during the year as funds and assistance permit (8.3.2.5-3 and 8.9 following). Landscaping will be designed to improve areas frequented by the public and will create a more orderly, well cared appearance. The Forester (Silviculture) will be responsible for all landscaping projects and will, during 1981/82, formulate a 5-year programme to improve the appearance of strategic points throughout the Forest.	LANDSCAPING
8.4.4-2	The responsibility for maintaining the Chum Hatchery in Compartment 30 will remain with the Federal Authorities. A programme to improve the immediate environs of the area will be formulated by the Forester (Silviculture) and submitted to the Federal Authorities as a jointly funded project.	HATCHERY
8.4.4-3	Few additions will be made to the Arboretum during the year. Requests for seeds from Eastern Provinces will be made and, if successful, sowings will take place in Spring 1982. Maintenance will continue and the grass and hedges cut to present an orderly appearance. Trees susceptible to browse damage by deer will be protected. The Forester (Silviculture & Education) will be responsible for the Arboretum. Name plates will be checked and replaced as necessary.	ARBORETUM
8.4.4-4	Funds secured during 1979 will be used to maintain the Deer Breeding project (formerly Research Project 72-16). Deer bred will be released to the surrounding area to improve the visibility of the herd outside the enclosure. No destructive research will be permitted on the herd, although any approaches by researchers to use the deer for research purposes will be considered. The Forester (Silviculture) and staff will be responsible for the project and will submit a report to the sponsors (Provincial Lottery Fund) in January 1982.	
8.4.4-5	The Weather/Climate Station (Research Project 56-4) will be maintained and operated by the Forest. Researchers setting up temporary climate stations will be requested to submit data for inclusion in the Data Bank in the Forest Central Filing System. Responsibility for operation of the Weather/Climate Station will rest with the Forest Senior Technician.	WEATHER STATION
8.4.4-6	The areas set aside for a transplant nursery will be maintained, and specimen trees will be grown for landscaping purposes and for the Arboretum. A seedling shelter will be planned and if funding permits, constructed. The Forester (Silviculture & Education) will be responsible for the nursery.	NURSERY
8.4.4-7	Other Forest Related activities that may arise (e.g. sawmill or other management activities not defined at this time), will be the responsibility of the Director.	OTHER

- | | | |
|------------|--|----------------------|
| 8.3.2.4-8 | Approximately 2 ha (5 acres) will be juvenile thinned by students during the Spring Field Camp (Forestry 451) and students from the Pacific Vocational Institute (P.V.I.) during practical field work on U.B.C. Research Forest. | JUVENILE
THINNING |
| 8.3.2.4-9 | A further 2 ha (4.8 acres) will be thinned by students, but no Forest staff will be engaged in this activity due to lack of funds and markets for the produce. | THINNING |
| 8.3.2.4-10 | No harvesting will be carried out in the Wood Production Working Circle during the coming year. All timber will come from the Subsidiary Wood Production Zones. | HARVESTING |

8.3.2.5	Recreation Working Circle	
8.3.2.5-1	<p>The Recreation Working Circle comprises two parts, Primary and Secondary Use Areas (Map 8.3.2.5-1-A).</p> <ul style="list-style-type: none"> - Primary A. Golden Ears Slope B. Irony Placid Area <p style="padding-left: 40px;">Total area = 668 ha (2816 acres)</p> <ul style="list-style-type: none"> - Secondary C. Wood Production Zone D. Water Storage and Pitt Lake Reserve <p style="padding-left: 40px;">Total area = 2237 ha (5412 acres)</p>	EXTENT
8.3.2.5-2	Included in the Secondary Use Areas are corridors (e.g. North Alouette River) where all operations will be carried out with aesthetics and public safety in mind.	CORRIDORS
8.3.2.5-3	Apart from minor landscaping projects (8.4.4-1 following) no new field operations will be undertaken to enhance recreation values due to lack of funds. The Trail Master Plan (Research Project 76-5) will be completed and a long term construction and maintenance programme prescribed to commence in 1984.	TREATMENT
8.3.2.5-4	While it is recognized that almost the entire Forest is used by the general public for recreation purposes, no provisions are made for areas not included in Section 8.3.2.5-1. A review will be made of Forest recreational use in 1983. Working Circle extent, use and treatment will be amended at this time as required to fulfill objectives.	OTHER

8.3.2.6	Game Management Working Circle (Wildlife)	
8.3.2.6-1	Game Management will not be the primary use on any one part of the Forest. The purpose of the Game Management Working Circle is to indicate areas of high use, winter grazing, movement corridors and breeding areas. All Working Circles on the Forest will be managed with game in mind to permit free movement and adequate food supplies both summer and winter (Map 2.2.4.2-2-A).	GENERAL
8.3.2.6-2	Apart from the Deer Breeding Project which will continue (see Section 8.4.4-4 following) no treatment will be prescribed during the year related directly to Game Management. Plans will be formulated with the view to making deer more visible to the general public in both the timber production zone and the recreation areas, and this will be done in conjunction with the Trail Master Plan (8.3.2.5-3).	PLANNING AND TREATMENT
8.3.2.6-3	No hunting will be permitted during the current planning period. A programme of culling will be introduced at some future date but at the present time, no stock improvement programme is underway. If, for any reason, animals have to be destroyed, the local Fish and Wildlife Branch of the B.C. Forest Service will be contacted.	HUNTING
8.3.2.6-4	Conflicts could arise between the production of wood and winter grazing (Map 8.3.2.6-4-A). Areas of prime winter grazing are often the same areas that are highly productive wood production areas, and local cropping damage may occur in young plantations during excessively hard winters.	WINTER GRAZING

- 8.3.2.7 Utility Corridor Working Circle (B.C. Hydro Right-of-way)
- 8.3.2.7-1 This Working Circle comprises the B.C. Hydro Mica Right-of-way at the southern end of the Forest (see Map 8.3.2.7-1-A), extending to almost 44 ha (110 acres) in Compartments 30, 31, 32 and 35. GENERAL
- 8.3.2.7-2 A Management Plan was proposed for the area in 1972 prior to commencement right-of-way clearing operations. but was not implemented. (A copy of this Plan is held at the Administration Headquarters of the Forest). During the course of 1982/83, the Plan, which proposed and prescribed six separate management areas, will be reviewed. MANAGEMENT PLAN
- 8.3.2.7-3 The six management areas proposed were:- MANAGEMENT AREAS
- (i) Upland Game Management area
 - (ii) Christmas Tree Farm
 - (iii) S.F.U. Experimental station
 - (iv) Public Recreation Park
 - (v) Forest Information Centre
 - (vi) Deer Park
- 8.3.2.7-4 Indicated on Map 8.3.2.7-1-A are areas 5, 6 which are not within the boundaries of the Forest, but were included in the original management proposals. AREAS NOT INSIDE RESEARCH FOREST
- 8.3.2.7-5 No treatment will be prescribed for the Utility Corridor Working Circle. When the Right-of-way Management Plan has been reviewed, prescriptions will be drawn up, and treatment scheduled. TREATMENT

8.3.2.8 Research Working Circle

- | | | |
|-----------|--|-------------------------|
| 8.3.2.8-1 | The Research Working Circle has no fixed territorial limits. The purpose of the Research delineation is to ensure the use by researchers of a definite project plan that is co-ordinated with the routine operations of the Forest. Project outlines will be prepared by the individual researcher and, after agreement by the Forest Administration, filed at the Forest Headquarters. A Research Project Outline will be prepared for each study and no research project may be undertaken without the preparation, and lodging of such an outline. The Forester (Engineering) will be responsible for research co-ordination and resolution of use-conflicts. | GENERAL |
| 8.3.2.8-2 | The format for the Research Project Working Plan will be prepared. The Plan will state clearly the Forest maintenance requirements for implementation, details of financing and responsibility, treatment and control. | PROJECT
PLANS |
| 8.3.2.8-3 | A map was prepared as part of a census in 1979, showing location of research projects on the Forest. Funds will be sought to complete the census and draft the map. The Forester (Engineering) will be responsible for ensuring the map is up-to-date at all times and that accurate location details are included in Research Project files in the Forest Central Filing System. | LOCATION OF
PROJECTS |

8.3.3 Use Hierarchies

8.3.3-1 All areas, with the exception of selected Reserves, will be managed for a series of uses. The primary use will be satisfied before other complementary uses are considered. To ensure a definite sequence of use priorities and avoid conflicts, a hierarchy system will be used. While all uses are considered, in the management of a Working Circle, each hierarchial level has precedence over the next. Thus, for example, the primary use of Working Circle 4 will be Recreation, with wood production permitted in selected areas as a secondary use. Wood production will be permitted only after the stated Recreational Objectives have been satisfied. All areas (excluding the Wood Production Working Circle), where wood producing is included as a secondary use, are classified as "Subsidiary Wood Production Zones" (see 8.3.2.4-9). At the present time (1980), all logging is in Subsidiary Wood Production Zones.

GENERAL

8.3.3-2 Hierarchy within the Working Circles is detailed below and the area details are shown on Map 8.3.3-2-A.

APPLICATION

Working Circles

Working Circle 1. (Nature and Education)

- 1.(a) (i) Nature and Education
(ii) Recreation
(iii) Community Resource Use
(iv) Wood Production
(v) Wildlife
- 1.(b) (i) Nature and Education
(ii) Recreation
(iii) Wildlife
(iv) Wood Production
- 1.(c) (i) Nature and Education
(ii) Recreation
(iii) Wood Production
(iv) Wildlife
- 1.(d) (i) Nature and Education (Eunice Lake Reserve)
(ii) Wildlife
- 1.(e) (i) Nature and Education (Knapp Reserve)
(ii) Wildlife
- 1.(f) (i) Nature and Education (Arboretum and Ecology Reserve)
(ii) Recreation
(iii) Wildlife
- 1.(g) (i) Nature and Education (Griffith Reserve)
(ii) Wildlife
- 1.(h) (i) Nature and Education (Otto Reserve)
(ii) Wildlife

Working Circle 2. (Water Production and Storage)

- (i) Water Production and Storage
- (ii) Wood Production and demonstration of silvicultural systems
- (iii) Recreation
- (iv) Wildlife

Working Circle 3. (Wood Production)

- 3.(a)
 - (i) Wood Production
 - (ii) Recreation
 - (iii) Wildlife
- 3.(b)
 - (i) Wood Production
 - (ii) Community Resource Use
 - (iii) Recreation
 - (iv) Wildlife

Working Circle 4. (Recreation)

- 4.(a)
 - (i) Recreation
 - (ii) Wood Production
 - (iii) Wildlife
- 4.(b)
 - (i) Recreation
 - (ii) Wildlife

Working Circle 5. (Wildlife - Game Management)

The Wildlife Working Circle is not shown as in no one area is wildlife the Primary Use.

Working Circle 6. (Utility Corridor)

For details of the Utility Corridor see Map 8.3.2.7-1-A. All stated uses at the present time are single uses only.

Working Circle 7. (Research)

All research areas will be single use areas and no other activity will be permitted unless specified in the relevant Research Project Working Plan.

Note:-

- (A) The number and letter refer to the Working Circle division.
 e.g. 3.(a) = the first division within the Working Circle.
- (B) The Roman numeral refers to the use hierarchy.
 e.g. (i) = Best use
 (ii) = Use in second position of priority
 (iii) = Use in third position of priority etc.
- (C) Travel corridors have been designated along Roads F, H, K, and M. Although the areas through which the corridors pass have a pre-designated Best-Use, the management of the land adjacent to the corridors will be constrained by the preservation of aesthetics associated with recreation.

8.4	Function Activities	
8.4.1	Education	
8.4.1-1	The duties of Forester (Silviculture & Education) will be reviewed and amended as required. The position currently assisting the Education Co-ordinator (Forester (Silviculturist & Education)) will assume greater control of education activities (other than for universities).	EDUCATION CO-ORDINATOR
8.4.1-2	The Director of the Forest will continue to run Spring Camp (Forestry 451) assisted by his professional staff. Details of all activities pertaining to Forestry 451 will be maintained in the Forest Central Filing System under the heading "Spring Camp". The register containing ideas for student theses will continue to be maintained and will be included in the Central Filing System. All other educational activities pertaining to universities will be co-ordinated by the Forester in charge of Education.	UNIVERSITY
8.4.1-3	Technical Schools will continue to use the Forest for a variety of activities. In view of the diverse requirements of Technical Schools, all professional staff at the Forest will be engaged in tuition at some time throughout the year.	TECHNICAL SCHOOLS
8.4.1-4	The Forest will continue to provide a site for the numerous activities for Vocational Schools throughout the year. Classes arrive with their own instructors and will require only occasional assistance from Forest staff. Visits requiring assistance will continue to be arranged on a personal basis by staff members involved in the different programmes.	VOCATIONAL SCHOOLS
8.4.1-5	Secondary schools will be involved in both day tours and residential programmes. The Education Co-ordinator will continue to be responsible for liaison with the various parties concerned and will continue to be responsible for their programmes and conduct.	SECONDARY SCHOOLS
8.4.1-6	The visits by primary school groups will be the responsibility of the assistant to the Education Co-ordinator.	PRIMARY
8.4.1-7	Numerous workshops for teachers and student leaders will be held throughout the year. School District #42 will be responsible for In-service Workshops arranged specifically for the Residential Programme although the Forest Education Co-ordinator will assist where required. Other workshops will be conducted as required through the Education Co-ordinator and his staff. The Education Co-ordinator will continue to support workshops outside the Forest given by other schools and school districts on the Lower Mainland. Workshops will be held for Forest employees as decided by the Professional Staff.	WORKSHOPS

8.4.1-8	Seminar groups using the facilities at Loon Lake Camp will continue to be the responsibility of the departments involved and, unless specific requests are made, Forest staff will not be directly involved.	SEMINARS
8.4.1-9	The Education Co-ordinator and staff will be responsible for all work experience programmes held on the Forest. Programmes will be arranged directly with the schools concerned and will continue to be of a developmental nature. Where possible, work experience programmes of a service type (i.e. non-developmental), will involve participants working directly with the Forest technical staff.	WORK EXPERIENCE
8.4.1-10	Projects involving mentally retarded, deaf and disadvantaged students will continue to be the responsibility of the Education Co-ordinator and staff. Participating groups will supply teachers and specialists in their respective fields, the Forest involvement regarded as developmental and of a demonstration nature.	SPECIAL EDUCATION PROJECTS
8.4.1-11	Members of the general public will continue to be encouraged to use the Forest both on a formal and informal basis. (See also 8.4.3 following.) Forest professional staff will continue to be involved in public education courses, either through the University (Continuing Education Department) or through local community programmes. Information will continue to be available through staff at the Administration Buildings of the Forest.	PUBLIC EDUCATION
8.4.1-12	Information signs throughout the Forest will continue to be maintained, amended and additions made as funding permits. The Education Co-ordinator will be responsible for sign maintenance and renewal. Signs will continue to play an important role in dispensing information, creating order and soliciting public support in maintaining the Forest in an orderly, vandal-free condition.	SIGNS
8.4.1-13	The Forest will continue to receive visitors from many parts of the world. Visitors will be guided around the Forest by members of the professional or technical staff as considered pertinent to the visiting group. Responsibility for co-ordinating foreign visitors will continue to rest with the Director.	OTHER VISITORS
8.4.1-14	Day tours and visitors not covered under any of the foregoing will be the responsibility of the Education Co-ordinator. All groups wishing to use the Demonstration Forest Trail System will continue to book (8.4.3 following).	DAY TOURS - OTHER
8.4.1-15	Residential programmes not covered under any of the foregoing will be the responsibility of the Education Co-ordinator and staff. Camp bookings, conduct and access will be the responsibility of the Education Co-ordinator's staff and the Camp Caretaker.	RESIDENTIAL PROGRAMMES - OTHER
8.4.1-16	The Education Co-ordinator will continue to be responsible for summer students and other grant funded personnel throughout the summer months (see also 8.9 following).	SUMMER STUDENT PROJECTS

8.4.2 Research

- | | | |
|---------|---|--|
| 8.4.2-1 | The Forester (Engineering) will be responsible for co-ordinating research on the Forest (8.3.2.8-1), and will request assistance from other Professional staff as required. Research will continue to be actively encouraged and all other activities (with the exception of selected education projects such as Forestry 451), will have a low priority relative to research unless otherwise decided by the Director. | GENERAL |
| 8.4.2-2 | Project outline sheets currently in use will be revised. Researchers will lodge a definite working plan (which will be kept in the relevant file in the Forest Central Filing System), and project outline. The Format for the Research Working Plan will be developed during 1982 and will be ready for use by December 31, 1982. | WORKING PLAN
AND PROJECT
OUTLINE |
| 8.4.2-3 | A package of information for the use of researchers will be developed during the year and be ready for use December 31, 1983. The package will include a list of other projects and researchers (including location of project areas), details of basic information relative to the Forest (climate, biogeoclimatic information etc.), and access to a publications list. The package will be prepared in a manner suitable for storage in a computer or word processor machine. | RESEARCHER'S
PACKAGE |
| 8.4.2-4 | The Forest will continue to maintain a number of long term research projects where researchers have completed their research or moved away, and in the opinion of the Forest professional staff, the project should be maintained in an active state. A maintenance policy (stating priorities) will be developed and funding sought to supplement Forest funds for continuing maintenance. The Forester (Silviculture) will be responsible for maintenance of long term research projects. | LONG TERM
PROJECT
MAINTENANCE |
| 8.4.2-5 | The Forest staff will continue to be directly involved in a number of research projects. An annual review will be conducted to maintain the active status or terminate (as required) staff research projects. The review will be constructed at the time of the Annual Report compilation and Management Plan revision (8.2.2-4). | FOREST SUPPORTED
RESEARCH |
| 8.4.2-6 | Compilation of "Research News" will continue only as time permits. Researchers will be requested to write an interim report on their own projects, and the report edited for Forest use in the "Research News". Due to financial constraints, a stock of publications will not be maintained at the Forest. One copy of each publication will be maintained in the Forest Central Filing System, and one copy in the relevant project file. | RESEARCH NEWS
AND PUBLICATIONS |

- 8.4.2-7 The Forest will continue to assist researchers where funds and time permit. Requests for aid will be dealt with by the Forester (Engineering) who will assess the priorities in consultation with other Forest professional staff. The Forester (Engineering) will ensure that the Researcher's Working Plan (8.4.2-2) has provisions for contingencies and that limits of Forest aid are clearly stated in the relevant plan. RESEARCHER
AID
- 8.4.2-8 Conflicts and matters arising relative to research and researcher use of the Forest will be the responsibility of the Forester (Engineering), who will ensure that all professional staff are kept informed as to problems, requests for aid, commitments and matters arising. OTHER
RESEARCH
MATTERS

8.4.3	Demonstration	
8.4.3-1	No provisions will be made for an "Open House" during the year. Due to constraints on availability of staff, and the presence of existing demonstration areas, an "Open House" is not envisaged for sometime.	OPEN HOUSE
8.4.3-2	The Demonstration Forest Trail system will continue to be the centre of day tours (8.4). The Forester (Silviculture and Education) will be responsible for all activities and maintenance of the area. The booking system for all guided and non-guided groups will continue. Funds and personnel will be sought by the Canadian Institute of Forestry (C.I.F.) to staff the Demonstration Forest during the period May - September, 1982. A review will be conducted as to the success of the area for public and secondary school education, and amendments and changes made where funds and time permit. The brochure, first produced in 1978, will be reviewed and funds sought for rewriting and printing a second edition.	DEMONSTRATION FOREST
8.4.3-3	The Forest will continue to play host to demonstrations of a special nature (e.g. harvesting equipment, cone collection devices, aerial spraying etc.). The Director will be responsible for special events assisted, as required, by his staff.	SPECIAL PROJECTS
8.4.3-4	Information and signs relative to demonstration areas have been dealt with in Section 8.4.1-12. Directional and other signs for individual demonstration projects will be the responsibility of the relevant organizer.	SIGNS

8.4.4	Forest Related Activities	
8.4.4-1	Selected areas will be landscaped during the year as funds and assistance permit (8.3.2.5-3 and 8.9 following). Landscaping will be designed to improve areas frequented by the public and will create a more orderly, well cared for appearance. The Forester (Silviculture) will be responsible for all landscaping projects and will, during 1981/82, formulate a 5-year programme to improve the appearance of strategic points throughout the Forest.	LANDSCAPING
8.4.4-2	The responsibility for maintaining the Chum Hatchery in Compartment 30 will remain with the Federal Authorities. A programme to improve the immediate environs of the area will be formulated by the Forester (Silviculture) and submitted to the Federal Authorities as a jointly funded project.	HATCHERY
8.4.4-3	Few additions will be made to the Arboretum during the year. Requests for seeds from Eastern Provinces will be made and, if successful, sowings will take place in Spring 1982. Maintenance will continue and the grass and hedges cut to present an orderly appearance. Trees susceptible to browse damage by deer will be protected. The Forester (Silviculture & Education) will be responsible for the Arboretum.	ARBORETUM
8.4.4-4	Funds secured during 1979 will be used to maintain the Deer Breeding project (formerly Research Project 72-16). Deer bred will be released to the surrounding area to improve the visibility of the herd outside the enclosure. No destructive research will be permitted on the herd, although any approaches by researchers to use the deer for research purposes will be considered. The Forester (Silviculture) and staff will be responsible for the project and will submit a report to the sponsors (Provincial Lottery Fund) in January 1982.	DEER PROJECT
8.4.4-5	The Weather/Climate Station (Research Project 56-4) will be maintained and operated by the Forest. Researchers setting up temporary climate stations will be requested to submit data for inclusion in the Data Bank in the Forest Central Filing System. Responsibility for operation of the Weather/Climate Station will rest with the Forest Senior Technician.	WEATHER STATION
8.4.4-6	The area set aside for a transplant nursery will be maintained, and specimen trees will be grown for landscaping purposes and for the Arboretum. A seedling shelter will be planned and if funding permits, constructed. The Forester (Silviculture & Education) will be responsible for the nursery.	NURSERY
8.4.4-7	Other Forest Related activities that may arise (e.g. sawmill or other management activities not defined at this time), will be the responsibility of the Director.	OTHER

8.5 Forest Operations

8.5.1 Silviculture

- 8.5.1-1 The Forest has a large backlog of plantation maintenance and rehabilitation. Resources, where available, will be placed to maintain existing research areas and healthy plantations in the Wood Production Working Circle (8.3.2.4), and bring back into production high site land that has been lost to brush. The Forester (Silviculture) Figure 8.2.2-1-A), will submit a list of priorities to the Director for approval and will be responsible for the year's schedule, operations and performance (6.4). REVIEW OF PRIORITIES
- 8.5.1-2 Where possible, all operations will be undertaken using full mechanization. Land will be cleared, drainage channels dug, planting undertaken and plantations weeded using machinery. Hand operations will be used to supplement machinery, the labour being drawn from the Forest technical staff assisted by casual labour as required. METHODS AND LABOUR
- 8.5.1-3 A system of continuing systematic surveys will be introduced to keep maps (8.3.4-2) and records up to date. A complete list of planting and plantation maintenance requirements will be compiled. Although much of the work will not be undertaken due to lack of funds, the completed statement will indicate the backlog of work required to render the Forest a comprehensive demonstration of sound, intensive forest management. SURVEYS AND ASSESSMENTS
- 8.5.1-4 A further 10 ha (24.8 acres) will be cleared in the Wood Production Working Circle. Areas will be cleared as follows: SITE PREPARATION

Table 8.5.1-4-A LAND CLEARING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
27	6.0 (14.8)	D7 Cat	1800	10,800
31	2.6 (6.5)	D7 Cat	1500	3,900
33	1.4 (3.5)	D7 Cat	1300	1,800
Totals	10.0 (24.8)	-----	-----	16,500

An area of 6 ha (14.8 ac) will be broadcast burned as weather conditions permit in the Loon Lake Education Reserve as follows:

Table 8.5.1-4-B BROADCAST BURNING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
17	3.0 (7.4)	Hand	120	360
18	3.0 (7.4)	Hand	120	360
Totals	6.0 (14.8)	---	---	720

Drainage will be undertaken in the Wood Production Working Circle as follows:

Table 8.5.1-4-C DRAINAGE

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
21	2.1 (5.2)	Backhoe	100	200
27	1.1 (2.7)	JD 450	360	400
33	0.8 (2.0)	Backhoe	120	100
Totals	4.0 (9.9)	-----	---	700

Scarification will take place on 18 ha (45 ac) in the Wood Production Working Circle as follows:

Table 8.5.1-4-D SCARIFICATION

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
31	18.0 (45.0)	Disc (D-7)	61	1,100

8.5.1-5

Planting will be carried out on 40 ha (99 ac) as follows:

PLANTING

Table 8.5.1-5-A PLANTING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
16	15 (37)	Hand (bare root and bullets)	494 (1000 trees/ha)	7,400
31	25 (62)	Machine (bullets)	150 (1500 trees/ha)	3,700
Totals	40 (99)	-----	-----	11,100

Planting in Compartment 16 will be carried out by Forest Technicians supplemented by casual labour. The ReForester injection planting machine will be used to plant Compartment 31 using bullets grown on the Forest. Species will include Douglas-fir (Pseudotsuga menziesii) and White Pine (Pinus monticola). The White Pine seedlings will be grown from seed collected on the Forest under Research Project 65-5.

8.5.1-6

A total of 150 ha (370 ac) will be weeded in the Wood WEEDING
Production Working Circle. The programme includes:

Table 8.5.1-6-A WEEDING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
25	5 (12)	Hand	180	900
27	11 (28)	Hand	150	1,600
30	28 (69)	Hand	230	6,400
31	48 (118)	Mowing/ Chemicals	160	7,700
32	46 (113)	Mowing/ Chemicals	100	4,600
35	12 (28)	Hand	300	3,600
Totals	150 (370)	-----	---	24,800

Hand weeding will be carried out by Forest Technical staff supplemented by casual labour as required to complete the programme, using hand power tools (brushcutters). Mowing will be undertaken using an agricultural rotary flail-type mower and chemicals. Strict precautions will be observed where chemicals are to be used, and they will only be applied by fully licenced applicators. The Forester (Engineering) will be responsible for safety of all staff involved in applying chemicals and for securing relevant licences.

8.5.1-7

Little juvenile thinning (spacing/stock control) will be undertaken although it is estimated that over 200 ha (500 ac) requires attention at the present time. The only juvenile thinning will be carried out by students during Forestry 451 (8.4.1-2) and will amount to less than 2 ha (5 ac) in the Wood Production Working Circle. JUVENILE THINNING

Table 8.5.1-7-A JUVENILE THINNING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
28	2.0 (5.0)	Hand	(Student Labour)	

Juvenile thinning will be used to demonstrate methods of assessment, and operational techniques. Hand carried power tools (chain saws and brushcutters) will be used under strict technical supervision.

8.5.1-8

A quantity of pruning (brashing) will be undertaken in the Wood Production Working Circle using volunteer and student labour. Pruning to 2 m (6.2 feet) will permit access for future operations and reduce fire hazard at a later date.

PRUNING

Table 8.5.1-8-A PRUNING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
25	0.5 (1.2)	Hand	} Volunteer Labour	
28	0.6 (1.5)	Hand		
30	0.4 (1.0)	Hand		
35	0.3 (0.7)	Hand		
Totals	1.8 (4.4)	----	-----	

Hand saws will be used in all pruning operations. A very small quantity of high pruning to 3 m (10 feet) will be done by students in Forestry 451, but as it will be less than 0.1 ha (0.25 ac), it will not be detailed here.

8.5.1-9

Approximately 0.8 ha (2 ac) of precommercial thinning will be undertaken by Forestry 451 students in the Wood Production Working Circle as follows:

PRE-COMMERCIAL
THINNING

Table 8.5.1-9-A PRE-COMMERCIAL THINNING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
25	0.4 (1.0)	Hand	Student Labour	
*30	0.5 (1.2)	Chemical	Research Project 79-8	
33	0.4 (1.0)	Hand	Student Labour	
Totals	1.3 (3.2)	----	-----	

All stands treated will be 20 year old Douglas-fir (*Pseudotsuga menziesii*), and operations will be used for instruction in intensive forest management.

*Note: This item covers an area allocated to a researcher for experimental purposes. The Forester (Engineering) will ensure that all safety and licencing requirements are fulfilled.

- 8.5.1-10 Commercial thinning will be carried out in Compartment 35 (in the Wood Production Working Circle) by students engaged in Forestry 451. While referred to as "Commercial Thinning", no market has yet been found for material harvested under this category. Markets will be investigated (8.2.1-6). The operation will be carried out in the following location: COMMERCIAL THINNING

Table 8.5.1-10-A COMMERCIAL THINNING

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
35	2.0 (4.9)	Various methods for student instruction		

- 8.5.1-11 A number of areas have been lost to brush (estimated at over 100 ha (250 ac)), and a summary will be prepared by the Forester (Silviculture) to assess the high site areas at present under a non-commercial cover. No rehabilitation work will be undertaken during the year due to financial constraints. REHABILITATION
- 8.5.1-12 No areas will be fertilized, drained or beaten-up (stocking raised by additional planting), and no other plantation maintenance work is scheduled. OTHER PLANTATION MAINTENANCE
- 8.5.1-13 All heavy land clearing, scarification and drainage equipment will be supplied and operated by a local contractor. The Forest maintains an adequate supply of hand and hand held power tools (8.2.1-10). The Forester (Silviculture) will be responsible for ensuring that tools, and spares and fuel are ordered through the equipment technician (Figure 8.2.2-1-A). EQUIPMENT

8.5.2	Yield	
8.5.2-1	Two major issues will be reviewed during 1981/82, the Forest inventory and Regulation required to achieve a "normal" forest situation by the year 2050 (Figures 7.4.3-3-A - E inclusive).	REVIEW OF PRIORITIES
8.5.2-2	Yield calculation will be divided into three sections <ul style="list-style-type: none"> - Wood production areas - Subsidiary Wood production areas - Reserves. A further breakdown will be carried out to allocate yield figures to Compartments. The Forester (Engineering) will be responsible for planning and implementing the programme.	METHODS AND LABOUR
8.5.2-3	The Forest Inventory review will include consideration of previous work on "Sequential Sampling with Partial Replacement" carried out in 1975 (Appendix 2.1.2-38-A). Assistance will be requested from the Faculty of Forestry on available systems and expertise (see also 8.9).	INVENTORY
8.5.2-4	Investigation will be made to see whether it is feasible to work yield calculations into a management model for use by Forestry 451 students. Assistance will also be sought in this matter.	YIELD CALCULATIONS
8.5.2-5	Regulation (Appendix 2.2.1.1-3-B) is directly related to financial problems currently facing the Forest. The Director and professional staff will carry out a further investigation into methods of regulation (8.5.2-1).	REGULATION
8.5.2-6	Funding will be sought for a computer terminal through which to access yield and inventory information. No other purchases of equipment or instruments will be carried out until the Forester (Engineering) presents the Inventory Revision Plan (8.5.2-2).	EQUIPMENT AND INSTRUMENTS

8.5.3 Harvesting

8.5.3-1	Clearcutting harvesting systems will be used on all mature forest stands. Only very small areas will be commercially thinned (8.5.1-10). Settings will vary in size from 2 ha (5 ac) patches where helicopters are used, to 20 ha (50 ac) blocks harvested by conventional methods. Reforestation proposals are detailed in Section 8.5.1. Contract labour will be used in all harvesting operations with the exception of commercial thinning (8.5.1-10).	METHODS AND LABOUR
8.5.3-2	The harvesting programme for 1982/83*is currently (1981) in preparation, and is not available at this time.	PROGRAMME YEAR 1
8.5.3-3	The harvesting proposals for 1983/84 are not available at this time (8.5.3-2).	PROGRAMME YEAR 2
8.5.3-4	General locations for future harvesting operations have not been established at this time.	FUTURE PROPOSALS
8.5.3-5	Until harvesting programmes have been established, no environmental constraints can be noted and no precautions can be prescribed.	CONSTRAINTS AND PRECAUTIONS
8.5.3-6	Traditional equipment will be used to harvest the bulk of the timber. High lead systems will be used on all accessible hillsides with topographical slopes of over 30%, using a 18 m (60 ft) Rosedale Mobile Spar. Slopes of less than 30% will be harvested by a skidder. A small quantity of timber will be extracted by helicopter (7.4.3-2). Helicopters will be used in areas inaccessible by road where the value of the product permits their use.	EQUIPMENT

*Note: It will be noted that in 8.7.1-3, an item is included for "Harvesting" and "New Roads". These figures are included to cover the possibility that additional operation funds will not be available, and harvesting will have to proceed in the current management period.

8.6 Engineering, Physical Plant and Equipment

8.6.1 Engineering

8.6.1-1 The only new roads to be constructed during the year will be associated with the harvesting programme. As the harvesting programme is not available, at this time, (8.5.3), no programme for new roads has been formulated. ROADS, NEW

8.6.1-2 Only sufficient maintenance to keep the roads useable will be undertaken (Table 8.6.1-2-A). Plans will be formulated during the year to upgrade the main road system. Proposals set out in Figure 9.2.6.1-1-A (following) are of a tentative nature and are subject to radical change at the time when more precise plans have been formulated. ROADS, MAINTENANCE

Table 8.6.1-2-A Details of Road Maintenance for Year 1

Operation	Location	Quantity	Cost (\$)	Remarks
Grading	F, E, M	20 km	1800	Forest grader (labour only)
Ditching	K	2 km	1500	Contract backhoe
Culvert cleaning	All roads	200	1500	Handwork during storm events
Vegetation Control	L, G	3 km	600	Summer Crews
Snow removal	F, E, M (Camp)	20 km	2000	Contingency
Surfacing	F, E	0.2 km	2000	Includes gravel
TOTAL			9400	

8.6.2 Physical Plant

- | | | |
|---------|---|----------------|
| 8.6.2-1 | No new buildings will be constructed during the year. Renovation to the Administrative Buildings will commence and follow plans as detailed in Appendix 2.1.9-7-A. Workshop and garage buildings in the compound (Map 2.1.9-8-C) will be painted. A series of storage areas in the Workshop will be constructed to assist with organization of tools, equipment and spare parts. The surrounds of the compound will be graded and surfaced. | BUILDINGS |
| 8.6.2-2 | A plan to reconstruct buildings in Camp will be formulated and material will be assembled to reconstruct Cabin 6 (Map 2.1.9-8-B) in Year 2. Buildings will be painted as finances permit. Efforts will be made to generate funding for major upgrading work and the funding proposal, complete with costs and details of improvements such as materials and operations timetable, will be prepared by the Forester (Education). | LOON LAKE CAMP |
| 8.6.2-3 | The Marc House (Map 2.1.9-8-A) will be repainted and repairs carried out on the roof. | MARC HOUSE |
| 8.6.2-4 | Routine maintenance will be carried out on other structures and installations on the Forest as required. | OTHER WORK |

8.6.3 Equipment

- | | | |
|---------|--|------------------|
| 8.6.3-1 | A review of equipment required for plantation establishment and maintenance will be prepared by the Forester (Silviculture). Provisions for new equipment noted in 9.2.6.3-1 (following) are provisional and may be amended once the overall review has been undertaken. | SILVICULTURE |
| 8.6.3-2 | No new equipment will be purchased for engineering operations. Plans will be formulated for a small screening and crushing plant to be sited in the gravel pit adjacent to Blaney Creek on Road G (Maps 2.1.1-4-A and 2.1.9-3-A). Existing engineering equipment will be maintained in working condition. | ENGINEERING |
| 8.6.3-3 | A review of the adequacy of existing fire suppression equipment will be undertaken by the Forester (Engineering) who will project equipment requirements for Years 1-5. Plans will be drawn up for a mobile tank trailer to carry initial attack equipment (Appendix 2.1.10.2-2-A) for purchase in Year 2. All fire equipment in buildings will be inspected twice during the year and repaired and/or replaced if found to be faulty or inadequate. | FIRE SUPPRESSION |
| 8.6.3-4 | Equipment inventory procedures will be instituted throughout the Forest by department heads (Figure 2.3.2-1-A). | INVENTORY |
| 8.6.3-5 | One pick-up truck will be purchased and one older model traded in to offset the cost. Maintenance of vehicles will be the responsibility of the workshop technician who will report to the Forester (Engineering). | VEHICLES |

8.7. Cost and Quantity Summary

8.7.1 Expenditure Summary

8.7.1-1 The U.B.C. Research Forest Budget (Table 8.7.3-1-A) is broken down into "Salaried" and "Non-Salaried" items. While the budget will continue to be submitted in its present form, a detailed technical breakdown will be presented in the current section of the Management Plan following, as far as practical, the "Prescription Check List" (6.3). It is anticipated that as time progresses, more detail will be included in the breakdown as shown in Figures 8.5.1-4-A to 8.5.1-10-A.

TECHNICAL
EXPENDITURE

8.7.1-2 Inter-departmental forms (Appendix 8.7.1-2-A) circulated in 1979 will be reviewed as to effectiveness and re-circulated each year prior to budget compilation. Estimate summaries (Table 8.7.1-1-A) will be compiled and submitted to the Director for approval.

DATA FOR
BUDGET
COMPILATION

8.7.1-3 Breakdown of budgeted expenditure is as follows:

Administration	-	Unallocated salaried	
Land Control	-	and non-salaried	
Function Activities	-	<u>items</u>	\$ 336,480
Forest Operations			
- Silviculture	-	\$ 30,120*	
- Harvesting	-	\$ <u>174,900</u>	\$ 205,020
Engineering			
- Sundry Maintenance	-	\$ 41,000	
- New Roads	-	\$ <u>21,000</u>	\$ <u>62,000</u>
Total budget (Table 8.7.3-1-A)			\$ <u>603,500</u>

* Table 8.7.1-1-A.

8.7.2 Income Summary

8.7.2-1 Details of budgeted revenue are included in
Table 8.7.3-1-A (page 3).

8.7.3 Proposed Budget

8.7.3-1 The entire budgetary details of the U.B.C. Research
Forest Operating Budget are included in Table 8.7.3.-1-
A on Pages 1 and 2.

8.8 Operations and Expenditure Timetables

8.8.1 Operations Timetable

8.8.1-1 Operations are scheduled month by month, for 13 months, commencing at the beginning of March 1982, ending at the end of March 1983. Tables 8.8.1-1-A to M (inclusive). The purpose for inclusion of the last month of the previous year is to permit "visual continuity" when the new amendment is introduced each year, and to ensure continuity of technical operations from one year to another.

8.8.1-2 The operations labour summary Table 8.8.1-1-N has been summarized for the year to balance with the budget.

8.8.1-3 The Director's budget proposal to the Dean will be submitted based on inter-staff communications in October 1981. Records of inter-departmental budget estimates will be recorded in Appendix 8.8.1-1-A for one year and then transferred to the Central Filing System at the time of the Management Plan review.

8.8.2 Income and Expenditure Over Time

- 8.8.2-1 The University of B.C. operates a "Public Sector Accounting" system and draws from a budgeted allotment for the year for operating expenses.
- 8.8.2-3 Revenue from logging normally occurs within three months of cessation of logging activities, and all receipts will be complete by August 1, 1982.
- 8.8.2-4 In view of discussions currently underway relative to funding and harvesting, methods of funding are liable to radical alteration. Thus, in spite of budget predictions, income cannot be accurately be predicted for the year 1982/83.
- 8.8.2-5 Auxiliary funding will be applied for on a continuing basis (8.9 following). The success of funding is unpredictable and estimates of possible income from these sources will not be included.

8.9	Other income, expenditure and assistance	
8.9.1	Summer employment programmes	
8.9.1-1	Application will be made for assistance to complete the location map of Research Projects, and physically mark selected areas in the field. As funding for Youth Employment Programmes for Universities is uncertain, no detailed planning (other than project outlines) will be done until funding is confirmed.	YOUTH EMPLOYMENT PROGRAMME FOR UNIVERSITIES
8.9.1-2	A further application will be made for the Job Creation Branch of the Federal government for funds to employ students during the summer. Students would maintain the Demonstration Forest Trail system, do pruning and weeding in plantations and assist in landscaping projects. A detailed outline will be prepared by the Forester (Education) and submitted at the appropriate time.	YOUNG CANADA WORKS PROGRAMME
8.9.1-3	Other funding opportunities will be followed up as they arise.	OTHER FUNDING

8.9.2 Auxiliary Funding

8.9.2-1 A file containing funding ideas and outlines will be maintained in the Central Filing System. The Register, compiled on similar lines to the Thesis Ideas File (8.4.1-2) will be maintained by the Education Co-ordinator. Unsolicited proposals will be submitted as circumstances dictate.

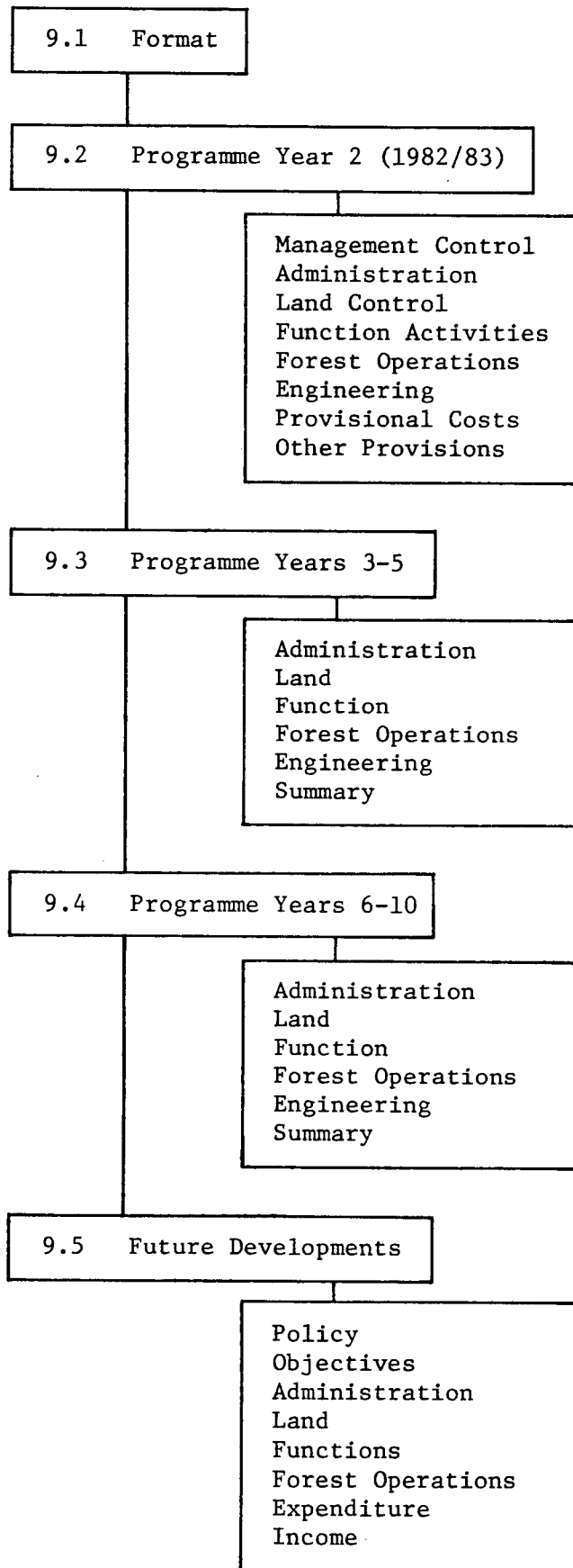
GENERAL

8.9.3 Work Experience and Community Projects

- | | | |
|---------|--|--|
| 8.9.3-1 | The Forest will continue to run Work Experience programmes for schools and interested community groups. The Forester (Education) will be responsible for outlining and carrying through work experience programmes and will continue to encourage student interest in forest oriented employment. All students will be covered by Workmens Compensation, coverage being the responsibility of the leaders of the participating groups. | GENERAL |
| 8.9.3-2 | The number of programmes run for Secondary Schools will not be increased at the present time due to constraints on staffing, although existing contacts will be encouraged to return. The present programme will maintain continuity with interested schools and provide a format for programme development. | SECONDARY |
| 8.9.3-3 | The Forest will continue to work closely with the Special Education Programme sponsored by School District #42 (Maple Ridge). Programmes will continue to be tailored to the individual student (as opposed to group work experience projects - 8.9.3-2) and continue to cater for students experiencing difficulty in classroom situations. | SPECIAL
EDUCATION
PROGRAMMES |
| 8.9.3-4 | Programmes designed and initiated for mentally retarded students will continue. The Forester (Education) will act as advisor and work co-ordinator, the school authorities being responsible for all other aspects of the programme. A programme designed specifically for deaf students will be formulated by the Forester (Education) in conjunction with a specialist school in Vancouver. | SPECIAL
INTEREST GROUPS |
| 8.9.3-5 | All work experience programmes will continue to have a strong education emphasis. Although work experience, <u>per se</u> , will continue to be the focal point of any programme, students will be instructed in forest related subjects including biology and wildlife. Work experience will continue to provide a medium for outdoor (environmental) education. | EDUCATION
ELEMENT IN
WORK EXPERIENCE |
| 8.9.3-6 | The Forester (Education) will continue to accept workers involved in community service (Probationary) programmes, reserving the right to terminate at any time should the subject not participate in the spirit of the programme. | COMMUNITY
SERVICE |
| 8.9.3-7 | The Corrections Branch of the Provincial Government will not be approached for assistance by the Forest during the coming year. | CORRECTIONS
SERVICE |
| 8.9.3-8 | Local community groups volunteering for minor work projects (e.g. Trail Maintenance) will be encouraged. The Forester (Education) will be responsible for co-ordinating work of a community nature, directing work effort to maintaining public education areas. | OTHER |

8.10 Current Management summary comments

8.10-1 The foregoing paragraphs contain details of activities which are required to maintain the viability of the Forest as an Education, Demonstration and Research facility. Due to contingencies, selected activities may not be undertaken. These will be rescheduled the following year. Prescriptions (Section 8) have been formulated to maintain the Forest at a minimum operating level, the following section (9.0 Projected Future Requirements) indicating activities required to promote growth and alleviate past neglect. Funding constraints will continue to be of prime concern to the managers of the Forest who will spend considerable time attempting to generate revenue.

Figure 9.0 -A Projected Future Developments

9.0 PROJECTED FUTURE DEVELOPMENTS

9.1 Format

9.1-1 Section 9 contains four parts

- (9.2) Programme Plan Year 2 (1983/84)
- (9.3) Programme Plan Years 3-5 (1984/85 - 1986/87 inclusive)
- (9.4) Programme Plan Years 6-10 (1987/88 - 1991/92 inclusive)
- (9.5) Long Term Developments (Plan Year 11 +)

Only brief outlines are presented for each section. As questions relative to funding and harvesting are resolved, more details will be included in the future Plan revisions.

- | | | |
|-------|---|----------------------|
| 9.1-2 | Plan Year 2 (1983/84) Programme will, where relevant, pick up incomplete segments of the programme for Year 1 (1982/83). Thus, although definite proposals will be made and will follow in logical sequence from the previous year, incomplete prescriptions will (unless specifically excluded by current planning) automatically take precedence and will be included implicitly as part of Current Management in the Yearly Revision (8.2.2-4). | PLAN YEAR 2 |
| 9.1-3 | Programme for Plan Years 3-5 (1984/85 - 1986/87) will contain proposals under general headings as detailed in Section 7. Quantities will be detailed as summaries (rather than individually allocated quantities to specific areas) to indicate projected requirements based on current information. Although costs will be indicated in general terms and an overall budget figure suggested, the programme will contain no detailed breakdown. | PLAN YEARS
3 - 4 |
| 9.1-4 | Plan Years 6-10 (1987/88 - 1991/92) will be detailed sufficiently to indicate trends and projected long term requirements. The section will contain sufficient detail to show the quantity of work necessary not merely to maintain the Forest at a minimum operating level, but upgrade the quality of Forest stands, expanding the present scope of cultural operations, to fulfil the projected role of the Forest as a demonstration of sound advanced management and cultural practices. | PLAN YEARS
6 - 10 |
| | Long Term Development (Plan Years 11 +) will contain a prognosis of management trends for the Forest to follow in the future. The section will provide "crystal ball" opportunity and project policies and objectives past the tenure of current management personnel, providing a basic premise of any sound, long term management plan - continuity of intent. | PLAN YEARS
11 + |

- 9.2 Programme - Year 2 (1983/84)
- 9.2.1 Format and contents
- 9.2.1-1 A year end review of incomplete operations prescribed for Year 1 will be undertaken by the Forest Staff. Incomplete work will automatically be transferred to current year's prescriptions and reasons sought for non-completion. INCOMPLETE
YEAR 1
OPERATIONS
- 9.2.1-2 Certain prescriptions, particularly in stand treatment, can be delayed without undue problems, for periods of up to 10 years, (although delay would result in lower treatment effectiveness), depending on the type of treatment and stand to be treated. Silvicultural prescriptions for Year 1 contain a number of such operations, which, if time and resources permit, will be carried out, but may be temporarily delayed. All silvicultural treatment reports made by the Forester (Silviculture) will have the "buffer-dates" (dates between which the prescribed treatment should be undertaken), and these figures will be included as part of the tables for Year 1, commencing the first Plan revision. This will ensure that the option of treatment is not lost, nor damage result to a stand due to neglect.

9.2.2	Administration (Year 2)	
9.2.2.1	Management Control (Year 2)	
9.2.2.1-1	Budgeting will be undertaken by the Director in consultation with his staff. Operating costs for the Forest are calculated at \$220,000 (205,000 in Year 1), and will be presented to the Dean of the Faculty of Forestry at U.B.C. for the consideration of the Board of Govenors in September 1982.	BUDGETING
9.2.2.1-2	Discussions currently underway relative to harvesting continue to make short term plans nebulous due to income uncertainties. Employment development grants will continue to be applied for by the Forester (Silviculture) although the outcome (and possible success) of these applications cannot be predicted, and estimates of income from grant sources are not included.	FINANCE
9.2.2.1-3	No major new developments are predicted for Year 2 and no prescriptions are included of a developmental nature.	DEVELOPMENTS
9.2.2.1-4	The results of the Technical Audit from Year 1 will be assessed and procedures amended as necessary. Factors noted in 9.2.1-1 will be considered and the Audit assessed in conjunction with stand treatment objectives.	TECHNICAL AUDIT
9.2.2.1-5	Marketing of minor forest products will continue to be investigated by the Forester (Silviculture). Should sufficient revenue be generated from products not currently produced, consideration will be given to employment of a further full time technician (paid out of minor produce revenue) to fill orders. Marketing will also be undertaken relative to rental of Loon Lake Camp, and greater use of the Camp facility will be investigated.	MARKETING
9.2.2.1-6	Tenders from consultants will be invited for an inventory of the Tree Resource (8.5.2-1). The inventory format will be compiled by the Forester (Engineering) in consultation with Mensurationists at U.B.C. Faculty of Forestry and Ministry of Forests inventory specialists. Inventory of equipment and fittings will be carried out by the Senior Technician, as will inventories of chemicals and dangerous substances. Inventories at Loon Lake Camp will be undertaken by the staff responsible for each section. Thus, the Head Cook will undertake food and equipment in the Mess Hall. the Caretaker equipment and fittings in the Cabins and other Camp buildings.	INVENTORY
9.2.2.1-7	Little work will be carried out on valuation unless time permits. Valuation work will be limited to discussion of suitable format within which to undertake the work.	VALUATION
9.2.2.1-8	Leases will remain the responsibility of the Director. No additional leases are anticipated for Year 2, and any matters arising relative to leases will be dealt with by the Director as required.	LEASES
9.2.2.1-9	No major additions to either physical plant or equipment are scheduled. Preventative maintenance will be undertaken on a continuing basis in a similar manner as noted in 8.2.1-9.	PLANT AND EQUIPMENT

9.2.2.2	Organization (Year 2)	
9.2.2.2-1	No additions to staff will be made. Staff structure will be reviewed by the Director and action taken as considered necessary to achieve optimum efficiency.	STAFFING
9.2.2.2-2	The number of technical staff currently employed will not be increased (unless as noted in 9.2.2-5), although sufficient work is available (particularly in silvicultural operations) to employ a further four technicians. Employment grants will be applied for (9.2.2-2).	
9.2.2.2-3	Informal meetings between technical and professional staff will continue.	LABOUR RELATIONS
9.2.2.2-4	The third revision of the Management Plan will be undertaken. Descriptive sections currently included in PART II (for purposes of explanation) will be removed and placed in an appendix for reference purposes, and PART II will become more condensed and precise.	MANAGEMENT PLAN REVIEW
9.2.2.2-5	Workshops for technical staff will be oriented towards safety and safe work practices. Technicians holding Industrial First Aid Certificates will return for further training, pesticide applicator courses will be attended by all technical staff, and a continuing programme of instruction on preventative maintenance of equipment will be undertaken.	TRAINING
9.2.2.2-6	Further cooperation with community groups (such as the Woman's Institute) will continue, and professional staff will give talks to local organizations as invited and as time permits. The open door policy (8.2.2-7) will continue as will conducted tours (staff availability permitting).	COMMUNITY
9.2.2.2-7	A mini computer will be installed to provide a more efficient system of maintaining accounts and retrieving accounting information.	ACCOUNTS
9.2.2.2-8	Review of safety procedures will be a continuing process. One member of the professional staff will head the Safety committee and be responsible for all matters related to safety, assisted by one technician holding an Industrial First Aid Certificate.	SAFETY
9.2.2.2-9	Compilation of the Forest Annual Report will be undertaken by the Director, with the professional staff contributing major sections. Other reports will be written by the staff as required. A composite paper comprising summaries of all reports will be produced for the year.	REPORTS

9.2.2.3 Protection (Year 2)

- 9.2.2.3-1 The Forester (Engineering) will review the Fire Plan (8.2.3-1) and ensure that equipment is serviced and ready for use. Training of Forest staff in fire control will be undertaken, as will training of temporary personnel in the use of fire equipment. The Fire Weather Index will be calculated and posted daily throughout the summer months. Patrols will be mounted as required and decisions to close the Forest during period of high fire hazard will be made by the Director. The access trails in Compartment 24 (Map 2.2.1-3-A) will be cleared in Spring to provide access onto the Central ridge for emergency purposes. FIRE
- 9.2.2.3-2 Security will remain the responsibility of the Forester (Engineering) who will ensure that the Director is informed at all times on security status of the Forest. The fence on the southern end of the Forest will be patrolled weekly. SECURITY
- 9.2.2.3-3 The Forester (Silviculture) will continue to be responsible for monitoring forest pests and diseases. A map will be compiled from compartment records, showing the location of problem areas, and a series of short trails cut through selected stands for education and demonstration purposes relative to disease. PEST CONTROL

- 9.2.2.4 Support activities (Year 2)
- 9.2.2.4-1 The Forester (Silviculture) will continue to be responsible for ensuring an adequate supply of maps for operational and education purposes. Estimates (redrafting services) will be made for bringing the 1975 series of 1:5,000 maps up to date. Further, one map will be drafted to show the location of all research projects, both active and terminated. MAPS
- 9.2.2.4-2 The Forester (Engineering) will remain in charge of air photographs and ensure that a new set covering the entire Forest is taken during the year. PHOTOGRAPHS
- 9.2.2.4-3 A reference system for the Central Filing System will be developed and programmed into the mini-computer to be purchased for accounting purposes (9.2.2.2-7). CENTRAL
FILING SYSTEM

- 9.2.3 Land control (Year 2)
- 9.2.3-1 Best Use land management will continue to be actively pursued and no major revisions in land use patterns are scheduled. BEST USE CONTINUING
- 9.2.3-2 No amendments to boundaries or treatments in any working circle are scheduled. Plans will continue to be implemented and the Forester (Silviculture) will ensure the provisions of the Management Plan are carried out. WORKING CIRCLES
- 9.2.3-3 A review of use priorities will be undertaken by the Forester (Silviculture), particularly with reference to Wildlife and use patterns in the Utility Corridor (Hydro Right-of-way). USE HIERARCHIES
- 9.2.3-4 A series of treatment maps relative to each Compartment will be commenced. Each compartment will have a complete series of maps relative to a standard format similar to the prescription check list 6.3.4-1 items "Site preparation" through to "Other plantation maintenance operations". MAPS

9.2.4 Function activities (Year 2)

9.2.4.1 Education

9.2.4.1-1 The Forester (Silviculture and Education)

EDUCATION
COORDINATOR

- referred to in this section as Forester (Education)
- will continue to fill the role of Education Co-ordinator.

9.2.4.1-2

No departure from items in 8.4.1-2 to 8.4.1-16, is anticipated. The Forester (Education) will continue to be involved in all aspects of education work, including the organization of residential programme for Resource Technicians (involving six schools scattered throughout British Columbia). A residential programme for adults (associated with the Outdoor Education programme at Loon Lake Camp) will be planned in co-operation with personnel of School District #42.

9.2.4.2 Research (Year 2)

- | | | |
|-----------|--|-------------------------------------|
| 9.2.4.2-1 | The Forester (Engineering) will continue to be responsible for liaison with researchers using the Forest. The Working Plan format for research projects will be tested and amendments made as necessary. The map showing the location of all projects (9.2.2.4-1) will be completed. | WORKING PLAN |
| 9.2.4.2-2 | A map will be prepared showing research projects adjacent to the Main Gate that would be of interest to visiting foresters. The map will show long term silvicultural projects and selected demonstration areas (such as the area selected for fully mechanized silviculture and the thinning demonstration area). The objective of such a map is to permit visiting foresters and forestry students to guide themselves around projects of interest, saving Research Forest staff time. It is anticipated that a write-up of the selected areas will be prepared at a later date. | VISITORS
PROJECT MAP |
| 9.2.4.2-3 | Work will continue on the "Researcher's Package" which should be ready for use by December 31, 1983. The Forester (Engineering) will be responsible for the package. | RESEARCHER'S
PACKAGE |
| 9.2.4.2-4 | A programme of selecting one long term silvicultural project each year and undertaking a major clean up, assessment and interim write up will commence. A number of long term research projects have become neglected due to lack of researcher interest or lack of resources necessary to undertake the work. A number of these projects have been underway for many years and could provide useful operational information if cleaned up and assessed. The Forester (Silviculture) will be responsible for this programme. | LONG TERM
PROJECT
MAINTENANCE |

9.2.4.3 Demonstration (Year 2)

- 9.2.4.3-1 The Demonstration Forest will continue to be maintained and enriched with the addition of further areas of interest. The Thinning Demonstration area (sited between Roads F and A10 - Map 2.1.9-3-A) will continue to develop, and a series of signs will be prepared for siting throughout the area. DEMONSTRATION FOREST
- 9.2.4.3-2 Tours will be given to visiting groups where staff and time permit. A grant will be applied for (in association with the C.I.F.) to fund two summer students to assist with guiding tours during the peak school visits (late May and June) and with public tours at the weekends during the summer.
- 9.2.4.3-3 Other demonstrations will be arranged as considered necessary. It is not known at this time what requests will be made to the Forest for demonstration sites, but requests will be considered by the Director as they arise. OTHER DEMONSTRATIONS
- 9.2.4.3-4 Signs will continue to play an important role in providing information to visitors. A programme of sign maintenance will be prepared and instituted by the Forester (Education).

9.2.5	Forest Operations (Year 2)	
9.2.5.1	Silviculture (Year 2)	
9.2.5.1-1	Operations incomplete from Year 1 will be completed. Methods and labour will be as for Year 1 (8.5.1-2).	GENERAL
9.2.5.1-2	The results of the survey (8.5.1-3) conducted in Year 1 (8.5.1-3) will be reviewed and treatment priorities established.	TREATMENT PRIORITIES OF BACKLOG
9.2.5.1-3	No land clearing will be undertaken except as necessary to complete Year 1 programme (Table 8.5.1-4-A), or clearing required for research or demonstration purposes. Broadcast burning will be undertaken on areas in Compartment 28 for research purposes. The precise location of the area has not yet been determined.	SITE PREPARATION
9.2.5.1-4	No drainage or scarification will be undertaken during Year 2 unless for demonstraion purposes.	DRAINAGE AND SCARIFICATION
9.2.5.1-5	Planting will be carried out to reforest harvested areas. As areas to be harvested have not been determined, (8.5.3-2) specific programme details are not available. No filling in (beating up) is anticipated or scheduled.	PLANTING
9.2.5.1-6	Weeding will amount to 190 ha (470 acres) as set out in Table 9.2.5.1-6-A.	WEEDING

Table 9.2.5.1-6-A Weeding Details for Year 2

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost (\$)
25	5 (12)	Hand	180	900
27	11 (28)	Hand	150	1,600
30	28 (69)	Hand	230	6,400
31	48 (118)	Mowing/ Chemicals	160	7,700
32	46 (113)	Mowing/ Chemicals	100	4,600
35	12 (28)	Hand	300	3,600
16	15 (37)	Hand	25	375
31	25 (62)	Hand/ Machine	200	5,000
				30,175

9.2.5.1-7

Approximately 10 ha (25 ac) will receive juvenile thinning (Table 9.2.5.1-7-A). The labour will be provided by students, (mainly from the Pacific Vocational Institute Forestry Crewperson programme), although 1 ha (2.5 ac) will be carried out by students attending Forestry 451 as part of their field activities.

JUVENILE
THINNING

Table 9.2.5.1-7-A Juvenile Thinning Details for Year 2

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
20	8 (20 ac)	Hand	Student Labour	
28	2 (5 ac)	Hand	Student Labour	

9.2.5.1-8

The programme for pruning plantations for access and reduction of fire hazard will continue as shown in Table 9.2.5.1-8 (Total = 5 ha (12 acres)).

PRUNING

Table 9.2.5.1-8-A Pruning Programme for Year 2

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
19	0.5 (1 ac)	Hand	Student and Volunteer Labour	
24	2.0 (5 ac)	Hand		
28	1.0 (2.5 ac)	Hand		
29	1.0 (2.5 ac)	Hand		
31	0.5 (1 ac)	Hand		

9.2.5.1-9

Precommercial thinning amounting to 2 ha (5 acres) will be undertaken in Compartments 27 and 31 as part of student exercises associated with Forest 451 (Table 9.2.5.1-9-A).

PRECOMMERCIAL
THINNING

Table 9.2.5.1-9-A Details of Precommercial Thinning (Year 2)

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
27	1 (2.5 ac)	Hand	Student labour	
31	1 (2.5 ac)	Hand		

9.2.5.1-10

Compartment 35 will again be the site for student exercises and a further 2 ha (5.0 acres) will be commercially thinned using small skidders for extracting the material to roadside. No market is available for the quantity of thinnings to be produced although this aspect of the operation will be investigated prior to the activity.

COMMERCIAL
THINNING

Table 9.2.5.1-10-A Details of Commercial Thinning (Year 2)

Compartment	Area ha (ac)	Method	Unit Cost \$/ha	Total Cost
35	2 (5 ac)	Various methods for student instruction		

9.2.5.1-11

No other silvicultural operations are prescribed for Year 2. If labour becomes available through either financial assistance or student labour, cleaning plantations in Compartments 25, 30, 31 and 35 will receive priority, followed by juvenile thinning in Compartments 17, 19, 20, 21, 28 and 29. Other silvicultural activities could be pursued and a list of such operations is contained in Appendix 9.2.5.1-11-A.

OTHER
SILVICULTURAL
OPERATIONS

9.2.6 Engineering, Plant and Equipment (Year 2)

9.2.6.1 Engineering (Year 2)

9.2.6.1-1 No new roads will be constructed unless associated with harvesting (9.2.5.3-1). Any new roads will be built to "Spur" road specifications (Appendix 2.1.2-75-A), with no provision for future maintenance. ROADS, NEW

9.2.6.1-2 An extensive programme of road maintenance will commence. Table 9.2.6.1-2-A details proposals for the programme. ROADS, MAINTENANCE

Table 9.2.6.1-2-A Details of road maintenance proposals (Year 2 onward)

OPERATION	ROAD NUMBER(S)	QUANTITY	METHOD	UNIT COST	TOTAL COST
<u>GRADING</u>	All main roads (and side roads as required) on a continuing basis. Cost (1981 \$) approximately \$6,000 per year				
<u>ROADSIDE DITCHES</u>	F,G,K,H,L	48 km (30 miles)	Backhoe	\$1/m	\$4,000 annually
<u>CULVERT CLEANING</u>	F,G,K,H,L (Plus contingencies)	300	Hand and Backhoe	\$10/ea.	\$3,000 annually
<u>CULVERT REPLACEMENT</u>	G,K,H,L	60	Backhoe and cat	\$500/ea.	\$5,000 annually
<u>VEGETATION CONTROL</u>	F,G,K,H,L,E	20 km (12 miles)	Hand and Machine	\$200/km	\$1,000 annually
<u>REALIGNMENT</u>	K,H,F	3 km (2 miles)	Contract	\$20,000/km	\$5,000 annually
					\$20,000 annually

9.2.6.1-3 The bridge over Blaney Creek on Road G (Maps 2.1.1-4-A and 2.1.9-3-A), will be replaced at a cost of approximately \$60,000, and plans will be made to realign and reconstruct the trestle bridge over Blaney Creek on Road M at a date yet to be fixed. No financial provisions have been made for either project and, although both projects require urgent attention, both may be delayed. BRIDGES

9.2.6.1-4 Vegetation will be cut back along Roads L, E10 and K (Map 2.1.9-3-A), using labour employed under summer youth employment and development programmes (9.2.2.1-2). A gravel screening plant costing approximately \$5,000 will be constructed and the material processed used to surface Roads F, M and E. Depending on the quantity of material developed in proposed screening operations, a stockpile of road surfacing material will be assembled to surface other roads (notably Roads F, H and K), in future years. Contingency work will be undertaken to protect roads as required. OTHER ROAD WORK

- 9.2.6.2 Physical Plant (Year 2)
- 9.2.6.2-1 No new buildings will be constructed in Year 2, although plans will be made to enlarge sleeping accommodation at Loon Lake Camp (9.2.6.2-2 following). BUILDINGS,
NEW
- 9.2.6.2-2 The log cabins at Loon Lake require major repairs and one cabin (#6 - Map 2.1.9-8-B) will be dismantled, and reconstructed on a new foundation, with a more efficient heating system and new roof. A number of overhead power lines will be replaced and the Mess Hall connected to the emergency power supply. A further effort will be made to raise funds to undertake major renovations in Camp. Funds would be used to renew all services, reconstruct selected buildings, resurface roads, create a new beach area and generally upgrade the facilities and Camp surrounds. LOON LAKE
CAMP
- 9.2.6.2-3 Routine maintenance will be carried out on other structures as required, and the Administration Buildings will be renovated if funds become available. OTHER
WORK

9.2.6.3	Equipment (Year 2)	
9.2.6.3-1	Additions to equipment required for plantation maintenance will be made. Four chainsaws, two brushcutters, two tractor mounted mowers and sundry items of hand equipment will be purchased.	SILVICULTURE
9.2.6.3-2	The screen noted in 9.2.6.1-4 will be constructed and a new tractor towed rock rake will be purchased. The grader will continue to be maintained.	ENGINEERING
9.2.6.3-3	Survey equipment will continue to be borrowed from the Faculty of Forestry at U.B.C., and sufficient office equipment will be maintained as will adequately support the services required by the Forest Administration.	SURVEY AND OFFICE EQUIPMENT
9.2.6.3-4	A trailer will be purchased specifically for fire suppression equipment. The trailer will be equipped with a 680 litre (150 gallon) tank, fire pump and 45 m (150 feet) of hose. The trailer will also carry sufficient hand tools for a four man suppression crew. The fire equipment will be kept in readiness throughout the year, and a small cache of fire equipment will be maintained at Loon Lake Camp in the garage adjacent to the Caretaker's house (Map 2.1.9-8-B). Fire equipment in all buildings will be checked twice yearly by the Royal City Fire Equipment Company. Responsibility for ensuring that fire equipment is fully serviced and ready for emergency use will continue to be held by the Forester (Engineering).	FIRE SUPPRESSION EQUIPMENT
9.2.6.3-5	Safety equipment and first aid supplies, as well as first aid facilities will continue to be the responsibility of the Chairman of the Safety Committee (normally the Forester (Engineering)).	SAFETY EQUIPMENT
9.2.6.3-6	Inventories of equipment will be carried out at the direction of the staff member responsible for each area. Inventories will be undertaken twice yearly and deficiencies made up before the beginning of the next financial year.	INVENTORY

9.3 Programme Years 3-5 (1984/5 - 1986/87)

9.3.1 Format and content

9.3.1-1 The programme for Years 3 - 5 is in preparation. Proposals and data in process of collection are found in Appendix 9.2.5.1-11-A. The Forester (Silviculture) will be responsible for formulation of long term programmes based on proposals made by the Professional Staff in consultation with the Director. General estimates of silvicultural maintenance requirements are set out below in Table 9.3.1-1-A.

OVERALL
PROGRAMME IN
PREPARATION

Table 9.3.1-1-A General Estimates of Silvicultural Maintenance Operations
Years 3-5.

OPERATION	LOCATION (COMPARTMENTS)	QUANTITY	REMARKS
Site preparation	28,29,30,31,34,35	100 ha (250 ac)	Rehabilitation
Planting	28,29,30,31,34,35	100 ha (250 ac)	Hand & Machine
Weed control	28,29,30,31,32,34,35	420 ha (1050 ac)	Hand & Machine
Juvenile thinning	3,4,8,7,15,16,17,18, 20,21,28	200 ha (490 ac)	Hand
Precommercial thinning	24,28,29,31,35	30 ha (75 ac)	Hand

9.4 Programme Year 6 - 10

9.4.1 Format and content

9.4.1-1 No provisions have been made thus far for long term programmes, although, in effect, long term management proposals as detailed in Section 7.0 will be implemented. It is anticipated that Section 9.0 of the UBC Research Management Plan will be more comprehensive as revisions are made, and that by 1985/86, projections will be available for the 10 year period.

9.5 Future developments

9.5.1 Policy and Objectives

- 9.5.1-1 Although the policy of the Forest will remain as noted in 5.1-1, the interpretation of the restrictive covenant will reflect demands placed upon the establishment. It is anticipated that the Forest will become more heavily involved in education relative to the schools system and technical educational establishments. The Forest will become involved in numerous extension projects, centered on Loon Lake Camp. The wealth of silvicultural demonstration areas, long term research projects and extensive data bank, will make the Forest the foremost field forestry laboratory in Western Canada. Management Objectives will aim to satisfy the demands placed upon the Forest.
- 9.5.1-2 The Forest Administration will expand to include a number of specialists (Figure 9.5.1-2-A) in management, education, individual resources (such as wildlife) and support staff. The professional staff will be faced with greater problems associated with land use conflicts, and considerable time and resources will be devoted to protection. Finances will pose severe problems until a major component of funding is assumed by the Provincial Government.
- 9.5.1-3 Best Use will continue to dominate management strategy and use patterns and use hierarchies will reflect political and social pressures.
- 9.5.1-4 The Function Activities will expand to include a major recreation component, and demonstrations of sound recreation management. Education will continue to expand and dominate all other activities. Loon Lake Camp will become a fully (year round) utilized facility, run as a separate accounting unit under the control of a full time camp manager reporting to the Director.
- 9.5.1-5 Forest operations will continue to be poorly funded until funding strategies have been developed and a sound financial base established. While silvicultural operations will assume a greater proportion of the budget than hitherto, with a full time silvicultural technical crew of 10 trained technicians, supported by a seasonal staff of some 40 persons, many field operations will be done by persons participating in educational and training programmes (similar to the Forestry Crewperson programme currently in operation at the Pacific Vocational Institute). There is a possibility of the Forest running service courses of this nature under the auspices of the Ministry of Education at some future date. Roads will be heavily used and will require extensive and continuing maintenance. A full time engineering crew of six, complete with mechanized support equipment, will be required to maintain roads, bridges and security installations (such as perimeter fences around the Forest). A separate physical plant section will be required to assist with building maintenance, reconstruction of Camp facilities, assistance to researcher's and educational buildings. An extensive equipment inventory will be required, and a fully equipped service depot will be constructed, staffed by four technicians.

9.5.1-6

The Forest will develop into a dynamic, field oriented forestry institution, offering service courses in all aspects of forest management, forest use and cultivation, at all education levels. As part of the educational programme, the Forest will develop and use a highly complex and sophisticated management model for use of both the Administration and students as part of their exercise work. Research will be more integrated with education, and researchers will address themselves more to pressing operational problems, reflecting funding sources and social pressures. The forest will expand into a large operational unit, playing a leading role in forestry, with other agencies associated with forestry using the Forest as a base of operations. Care will have to be exercised that orderly development is followed in the expansion process, and to this end, the Future Development Section of the Management Plan should have a minimum 50 year horizon. In future years, the Management Plan will contain greater detail in projection, and long term proposals will provide an orderly format for development.

- 10.0 DIRECTOR'S CLOSING STATEMENT
- 10.1 The Plan
- 10.1-1 The U.B.C. Research Forest Management Plan has been designed and written to assist the Director and his staff manage a diverse, dynamic forest enterprise.
- 10.1-2 The U.B.C. Research Forest, although physically similar, in many respects, to other areas in Coastal British Columbia, is unique in the terms of the Crown Grant, interpretations of the Restrictive Covenant, information available for management purposes, and use pattern.
- 10.1-3 The Forest plays host to a highly diverse group of researchers, students and educators, all having specialized interests, forceful and often single minded in their objectives. Any Management Plan format would lack the total flexibility necessary to accommodate (in full) such a group, and still maintain the continuity of intent necessary to manage a forest unity subject to coherent, long term objectives. Thus, not all users of the Forest will be totally satisfied.
- 10.1-4 An attempt has been made to integrate the constraints imposed by finances in the short term, the overall objectives of the long term, and changing social preferences which alter rapidly and are reflected in political pressures.
- 10.1-5 The format of the Management Plan will undoubtedly change over time, but any foreseen change can be accommodated in the preceeding pages. At the present time, uncertainty exists relative to financing, and thus the Management Plan cannot be presented as a complete document (see Section 9.0). However, this in itself illustrates the flexibility inherent in the Plan format.
- 10.1-6 U.B.C. Research Forest is passing through a period of re-adjustment relative to financing, land use and resource control. It is foreseen that the Management Plan will provide not only an administrative guide, but an effective management and recording instrument that will benefit the University, the users of the Forest and society as a whole.

ADDRESS OF RESEARCH FOREST:

THE DIRECTOR,
UBC RESEARCH FOREST,
R.R.2, MAPLE RIDGE, B.C.
CANADA, V2X 7E7

TELEPHONES:

LOCAL 463-8148
 463-8149

FACULTY OF
FORESTRY
AT UBC 228-2727

FROM VANCOUVER
10 MILES
16 KILOMETERS

NEW
WESTMINSTER

PORT MANN
BRIDGE

401 FREEWAY TO HOPE

PORT
COQUITLAM

C.P.R.
LOUGHEED HIGHWAY

PITT
POLDER

PITT RIVER

NORTH ALOUETTE RIVER

SOUTH ALOUETTE RIVER

FRASER RIVER

HANEY

UBC
RESEARCH
FOREST

△
5596 FT./1696 M
MT. BLANCHARD

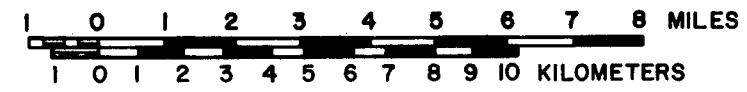
MAIN GATE &
ADMINISTRATION BUILDING

SILVER VALLEY ROAD

232 STREET

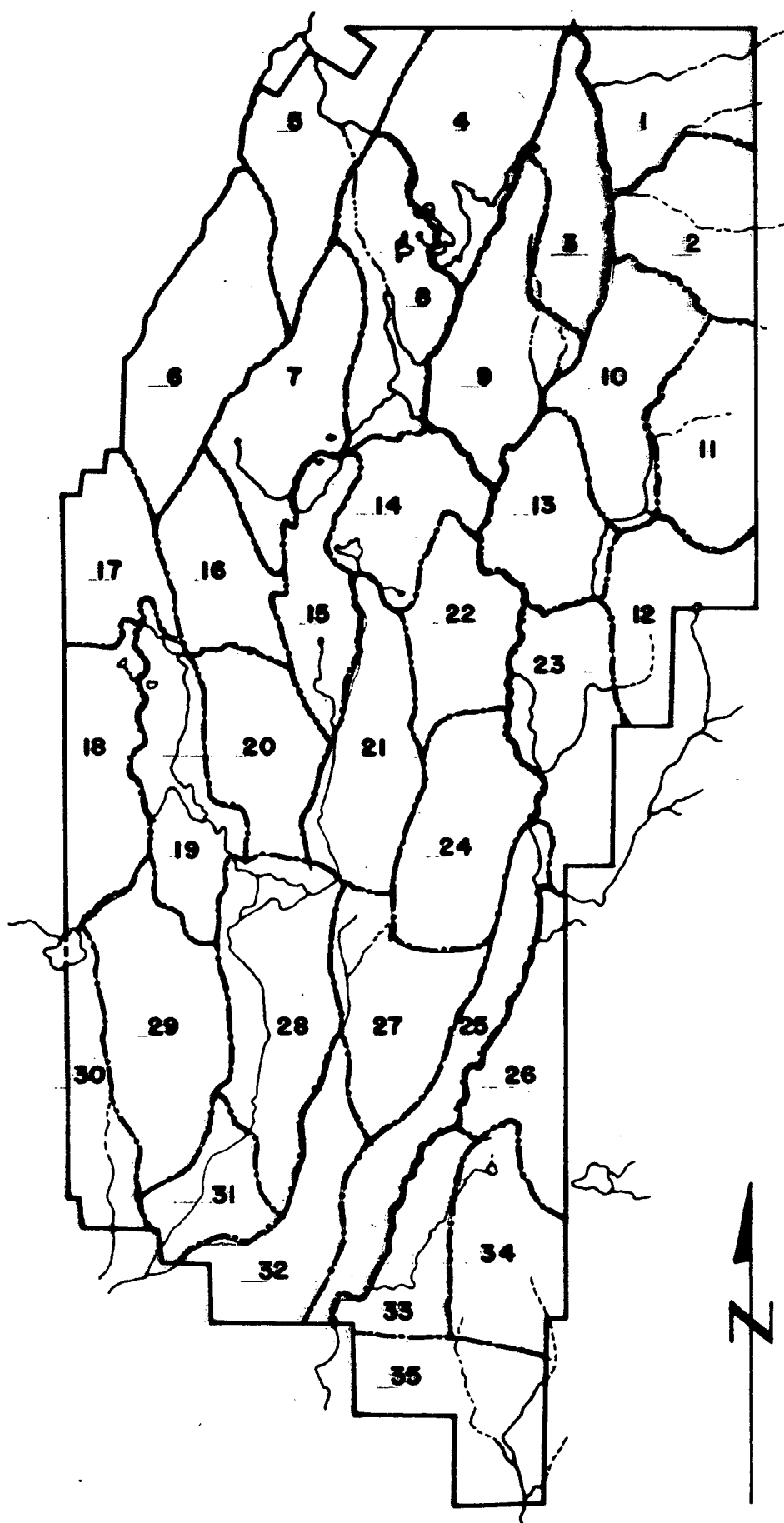
120 AVENUE (DEWDNEY TRUNK ROAD)

224 STREET (HANEY BOULEVARD)



LOCATION OF UBC RESEARCH FOREST





UBC RESEARCH FOREST

MAP 2.1.1-3-A

COMPARTMENTS ON THE UBC
RESEARCH FOREST

date SEPT. 1980

scale 1:50,000

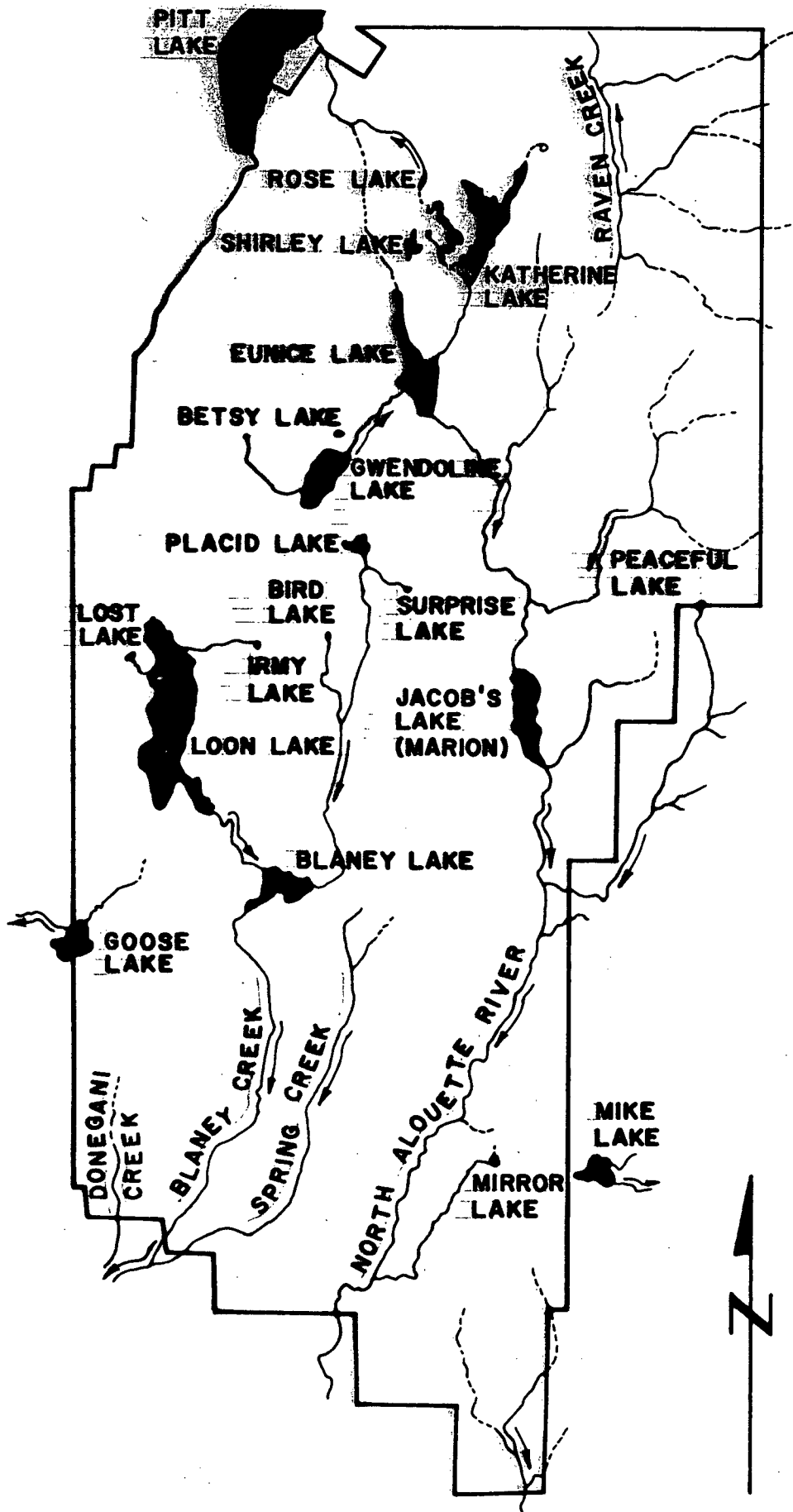
dr. ALM

chk.

legend:

compartment
boundaries

compartment
numbers - 18



UBC RESEARCH FOREST

MAP 2.1.1-4-A

LAKES AND MAIN CREEKS AND RIVERS ON THE UBC RESEARCH FOREST

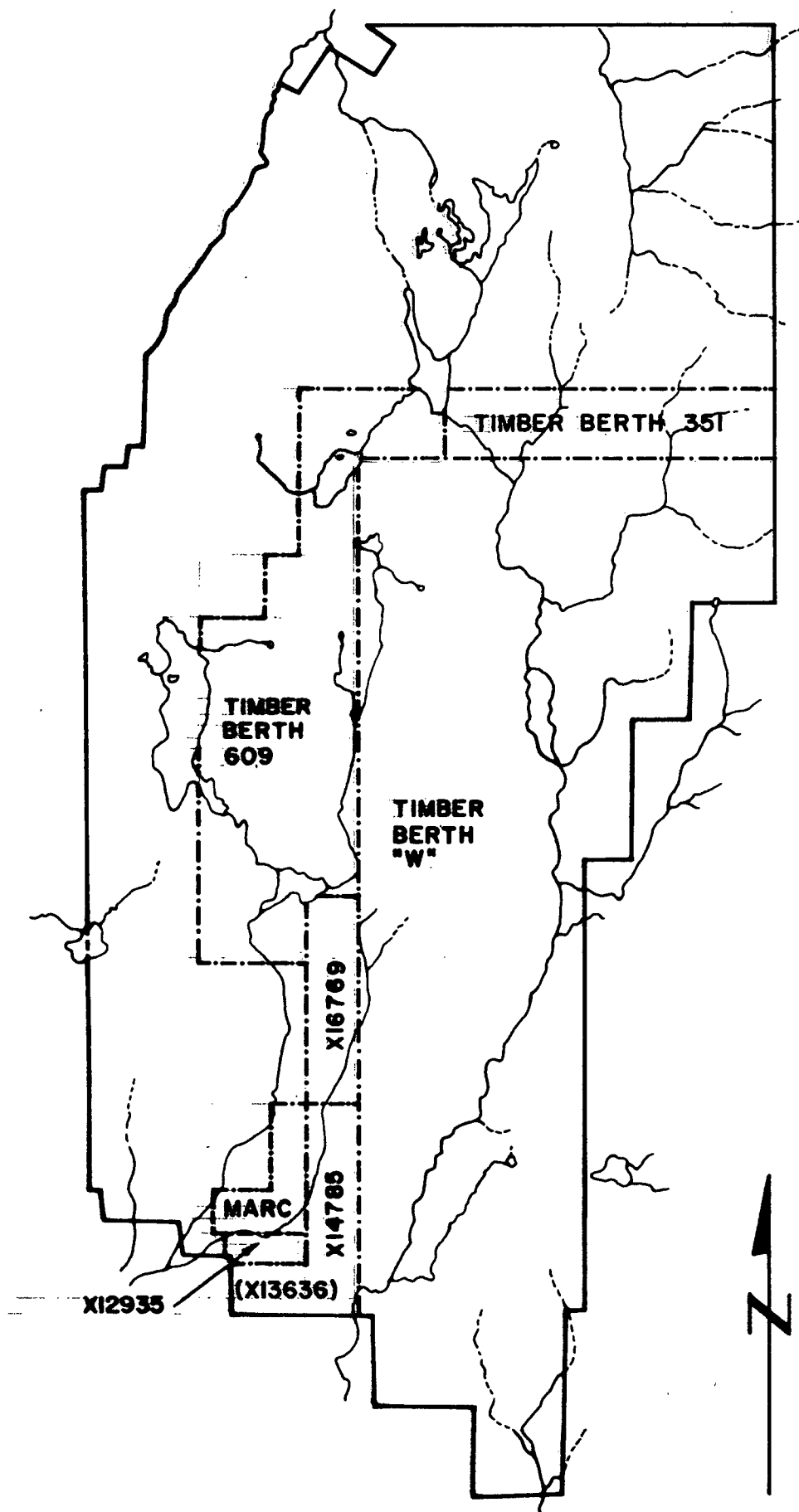
date SEPT. 1980

scale 1:50,000

legend

dr. ALM

chk.



¹Source: BC Forest Service History Maps

UBC RESEARCH FOREST

MAP 2.1.2-1-A

OLD TIMBER BERTHS AND LICENCES¹
ON THE UBC RESEARCH FOREST

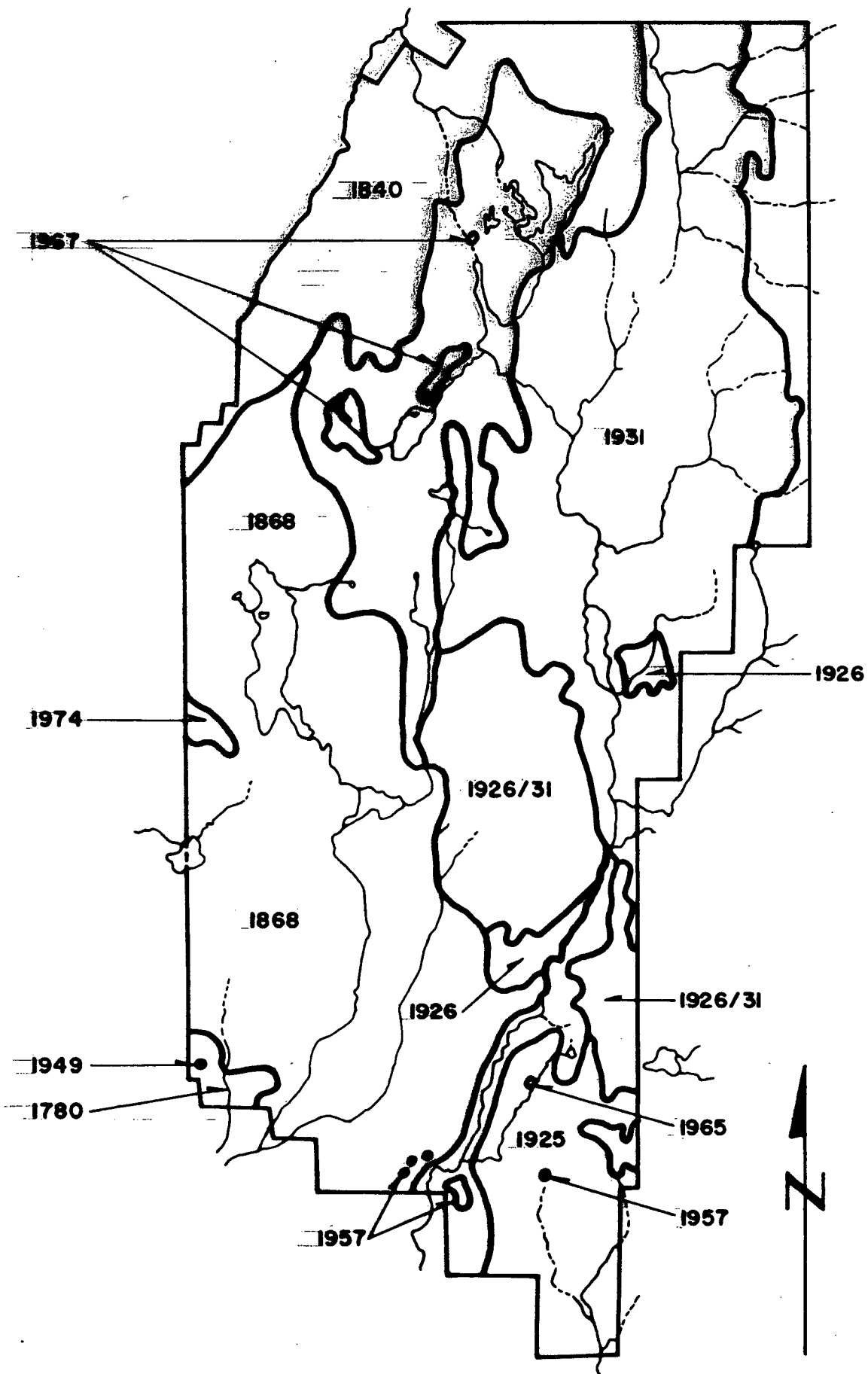
date SEPT. 1980

scale 1:50,000

legend

dr. ALA

chk.



¹Source: Research Forest and B.C. Forest Service records

UBC RESEARCH FOREST

MAP 2.1.2-2-A

FIRE HISTORY¹ OF THE UBC RESEARCH FOREST

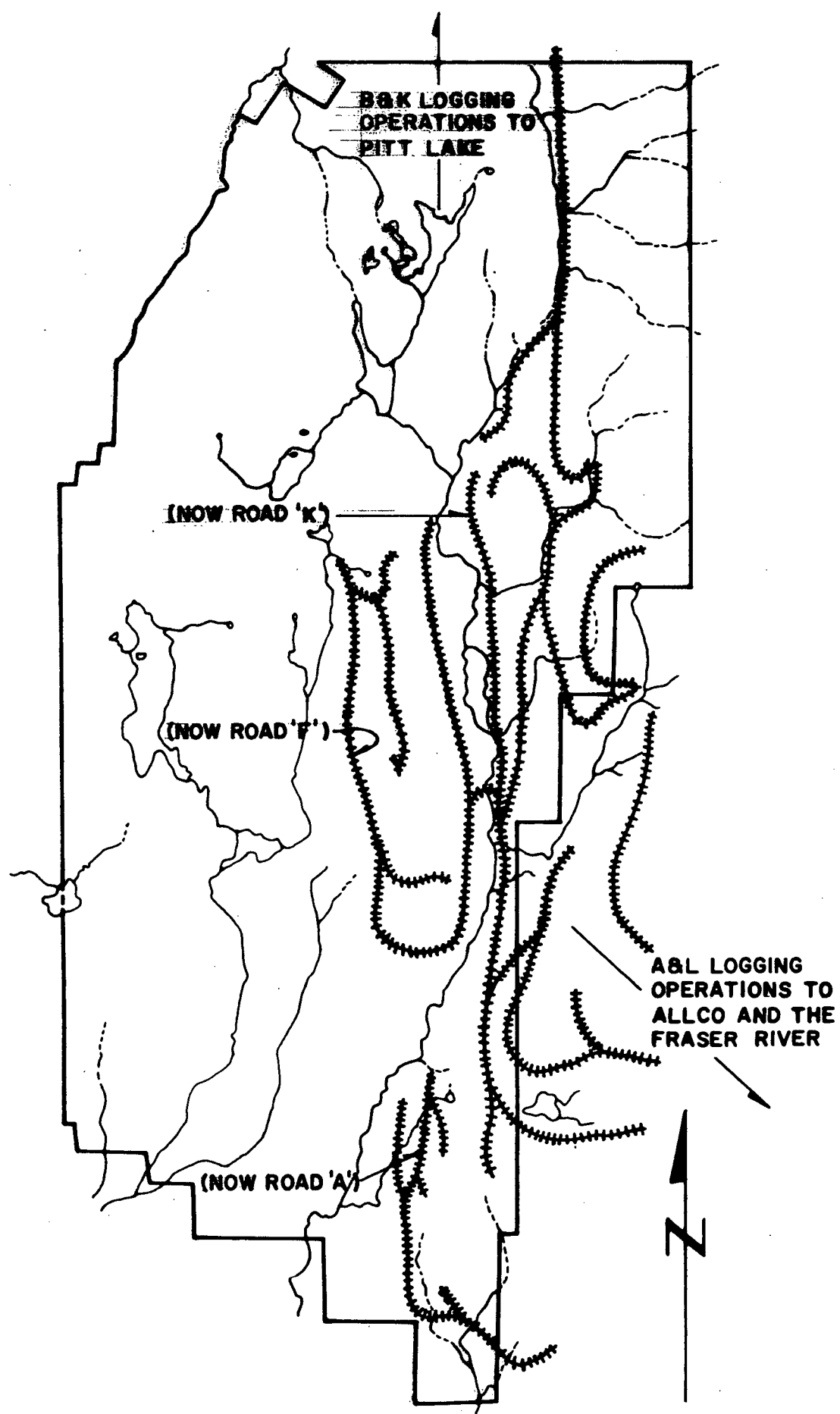
date SEPT. 1980

scale 1:50,000

legend

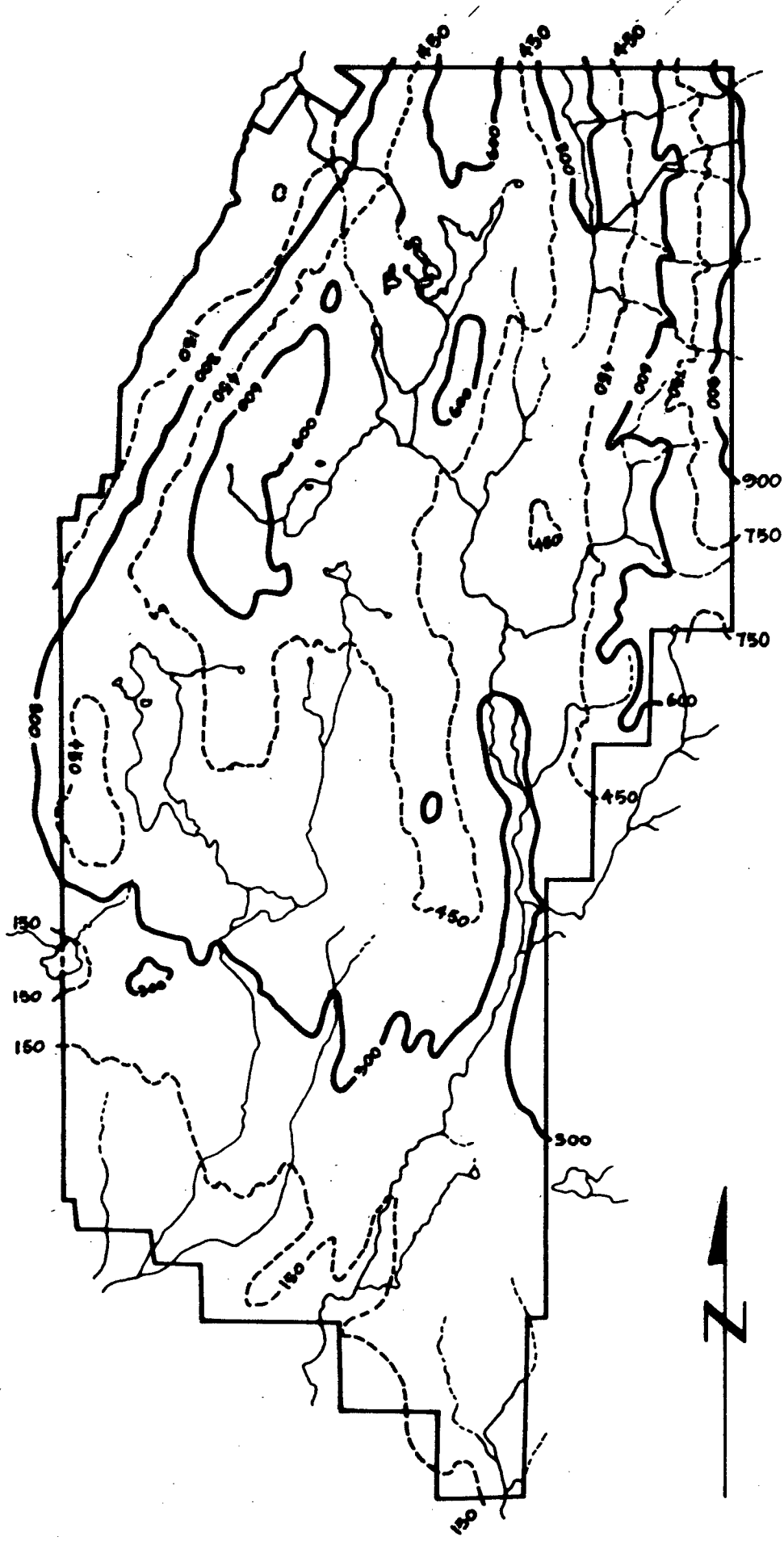
dr. ALM

chk.



Source: B.C. Forest Service, History Map Series, Alouette River 1930. History Map, Alouette River (Timber Berth 'W') Abernethy Loughheed Coy. March 1935.

UBC RESEARCH FOREST		MAP 2.1.2-29-A	
		LOCATION OF OLD RAILWAY LOGGING GRADES ON THE UBC RESEARCH FOREST	
date SEPT.1980	scale 1:50,000	legend: old railroad grades	
dr. ALM	chk.		



UBC RESEARCH FOREST

MAP 2.1.3-1-A

TOPOGRAPHY OF THE UBC RESEARCH FOREST

date SEPT. 1980

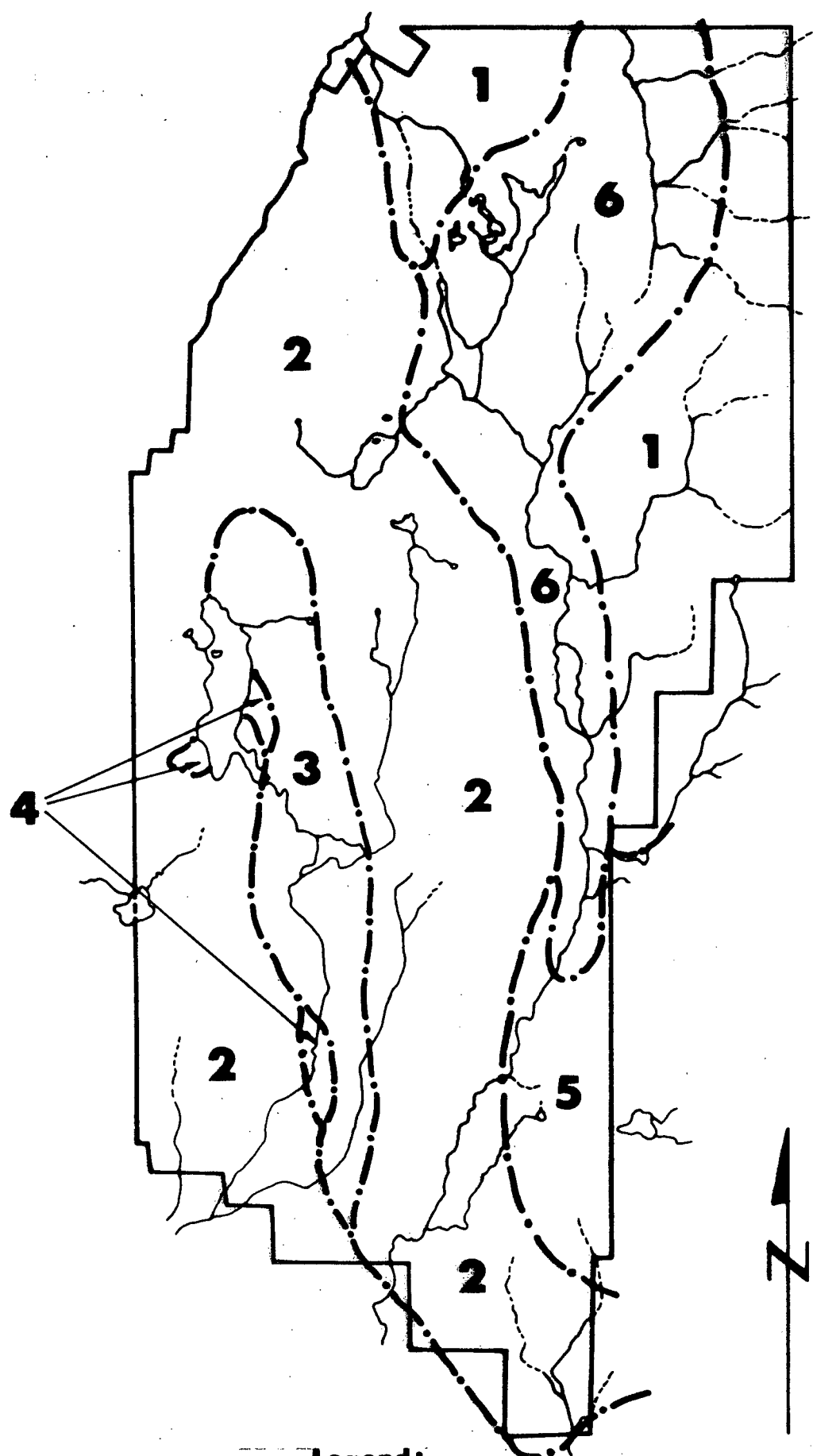
scale 1 : 50,000

legend:

dr. ALM

chk.

All elevations in meters A.S.L.



Legend:

- | | |
|-------------------|------------------------------------|
| 1. Volcanic | 4. Granite |
| 2. Quartz Diorite | 5. Diorite |
| 3. Grano Diorite | 6. Unconsolidated
Glacial Drift |

UBC RESEARCH FOREST

MAP 2.1.4-1-A

BEDROCK GEOLOGY OF THE UBC
RESEARCH FOREST

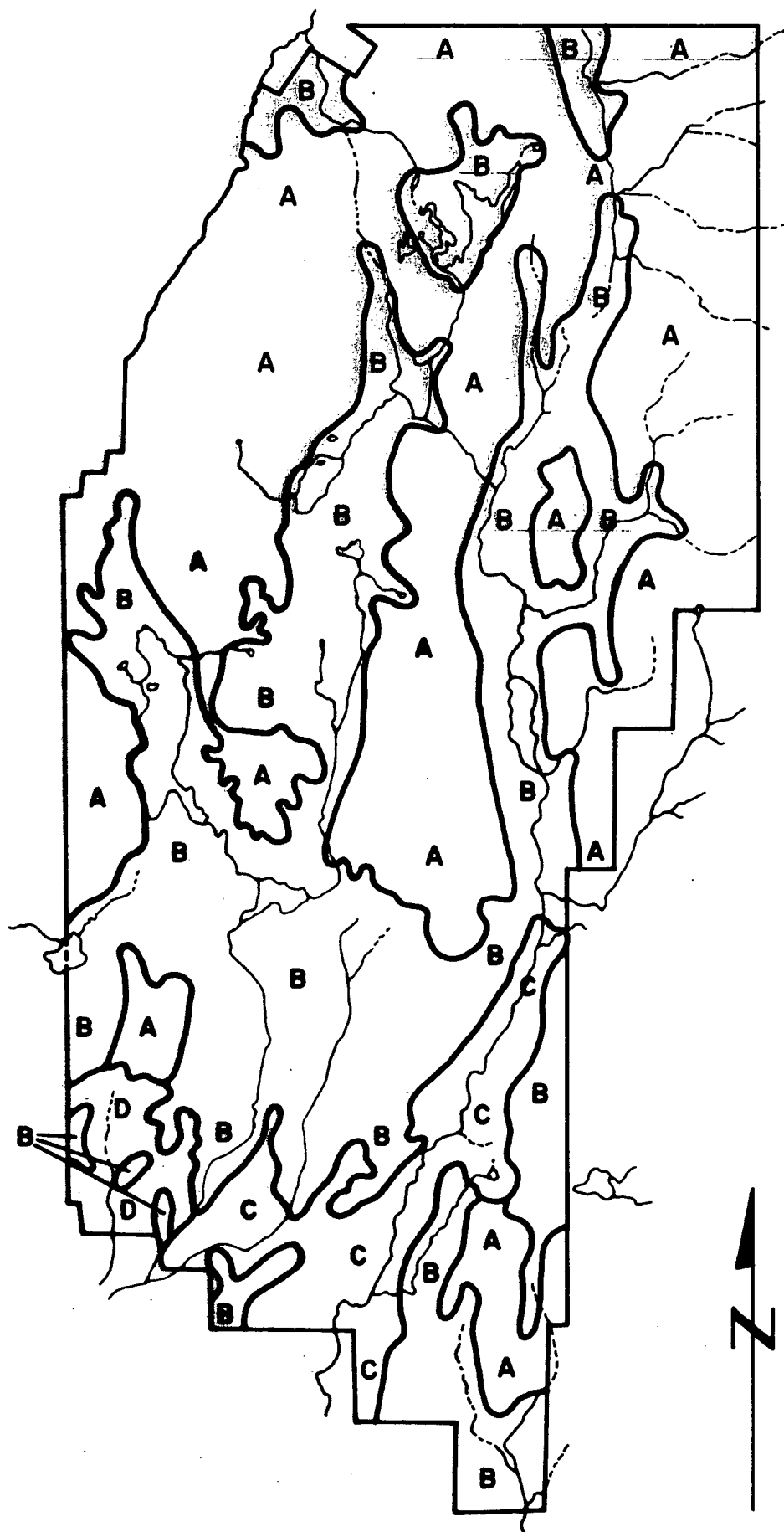
date SEPT. 1980

scale 1:50,000

legend

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UBC RESEARCH FOREST

MAP 2.1.5-1-A

**LAND ASSOCIATION (LACATE, 1965)
ON THE UBC RESEARCH FOREST**

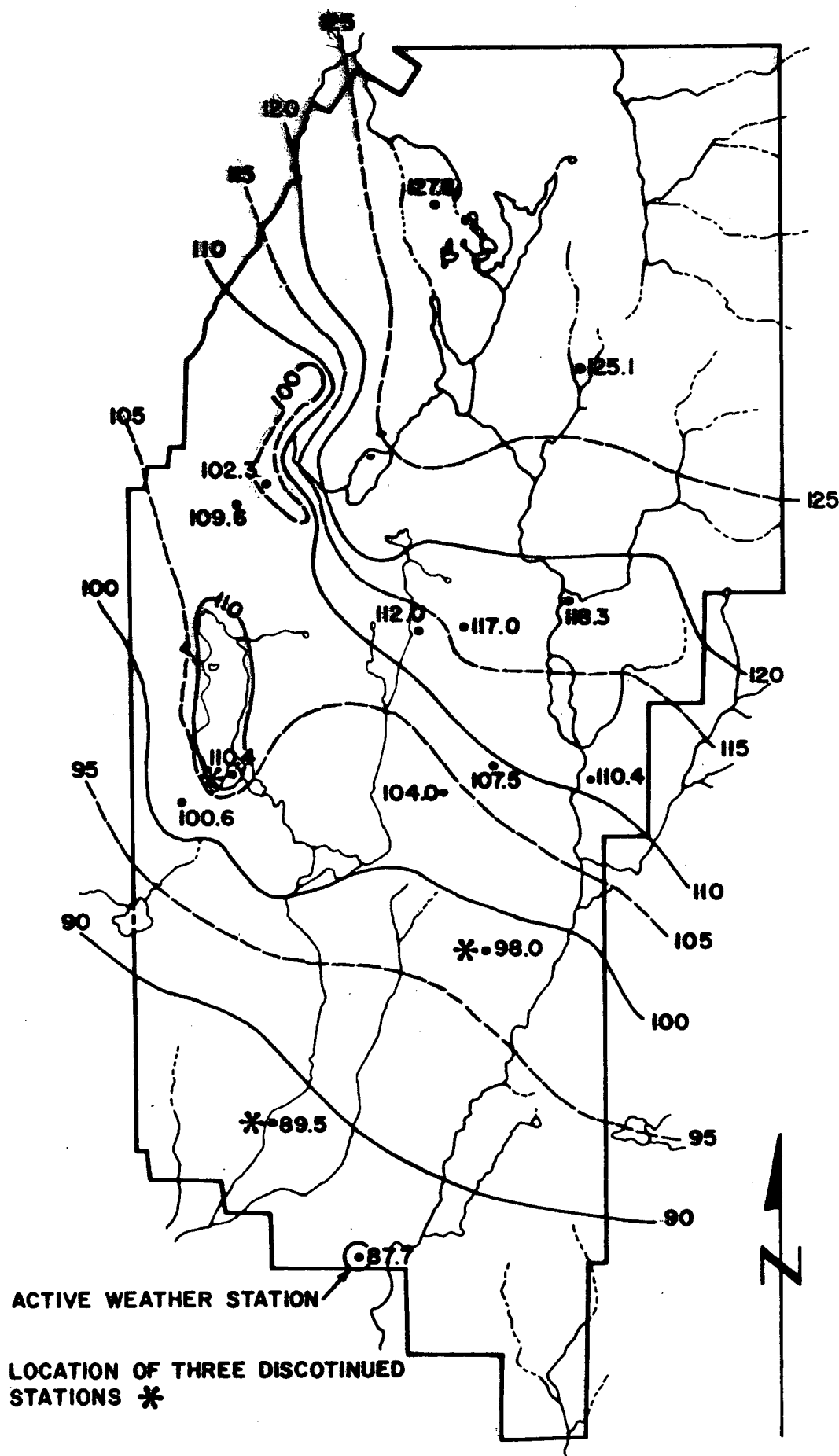
date SEPT. 1980

scale 1 : 50,000

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legend:
For explanation of symbols see
paragraph 2.1.5-1



UBC RESEARCH FOREST

MAP 2.1.7-2-A

ESTIMATED MEAN ANNUAL PRECIPITATION ON THE UBC RESEARCH FOREST (E. HETHERINGTON, JAN. 25, 1972)

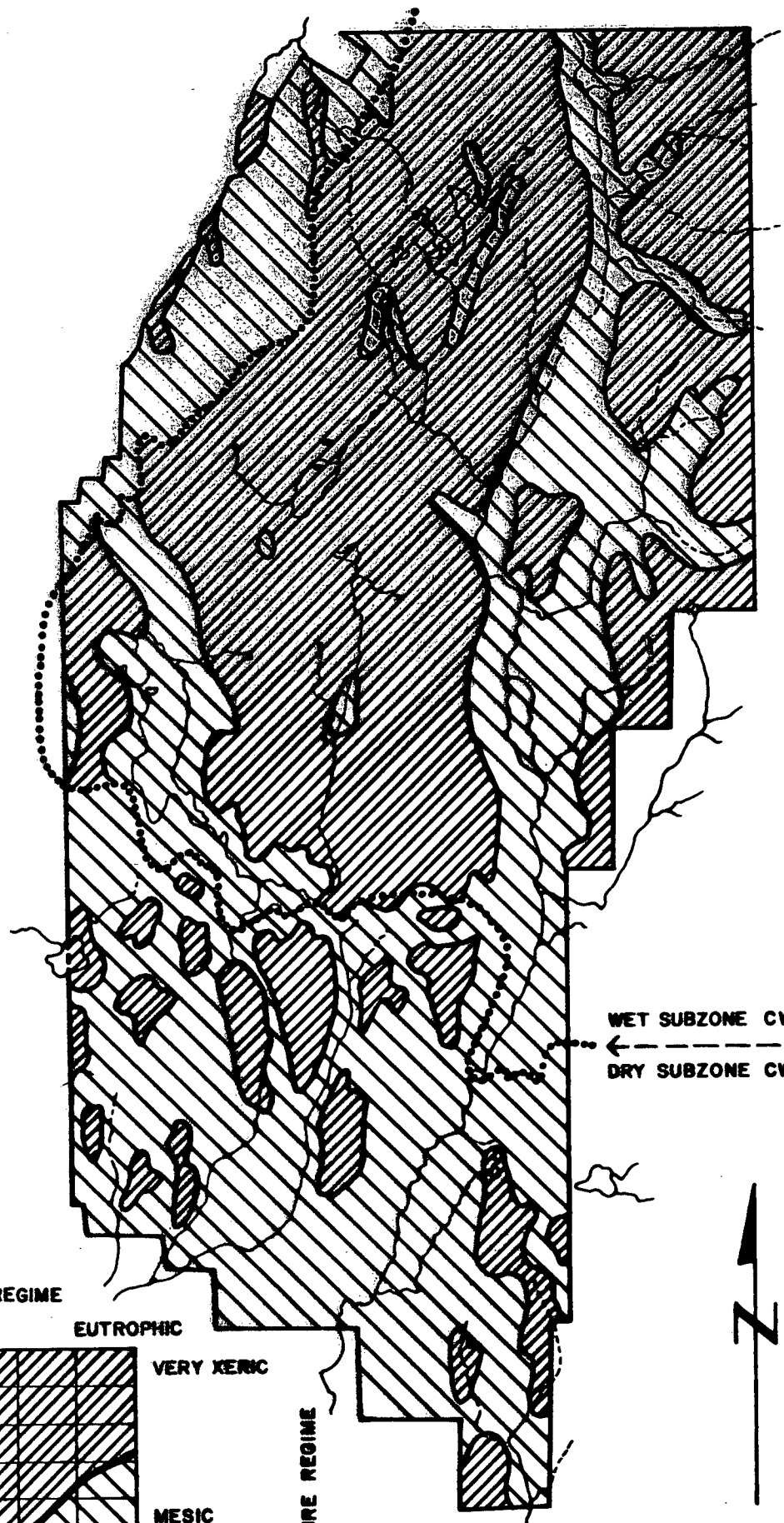
date SEPT. 1980

scale 1: 50,000

legend

dr. ALM

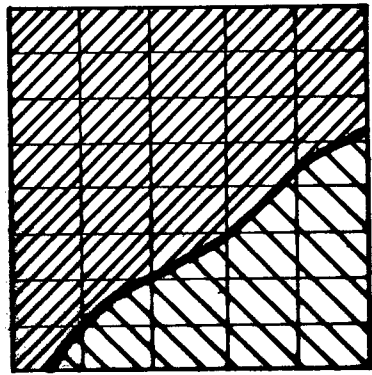
chk.



SOIL NUTRIENT REGIME

OLIGOTROPHIC

EUTROPHIC



VERY XERIC

MESIC

SUBHYDRIC

SOIL MOISTURE REGIME

WET SUBZONE CWH b

DRY SUBZONE CWH a



UBC RESEARCH FOREST

MAP 2.1.8-2-A

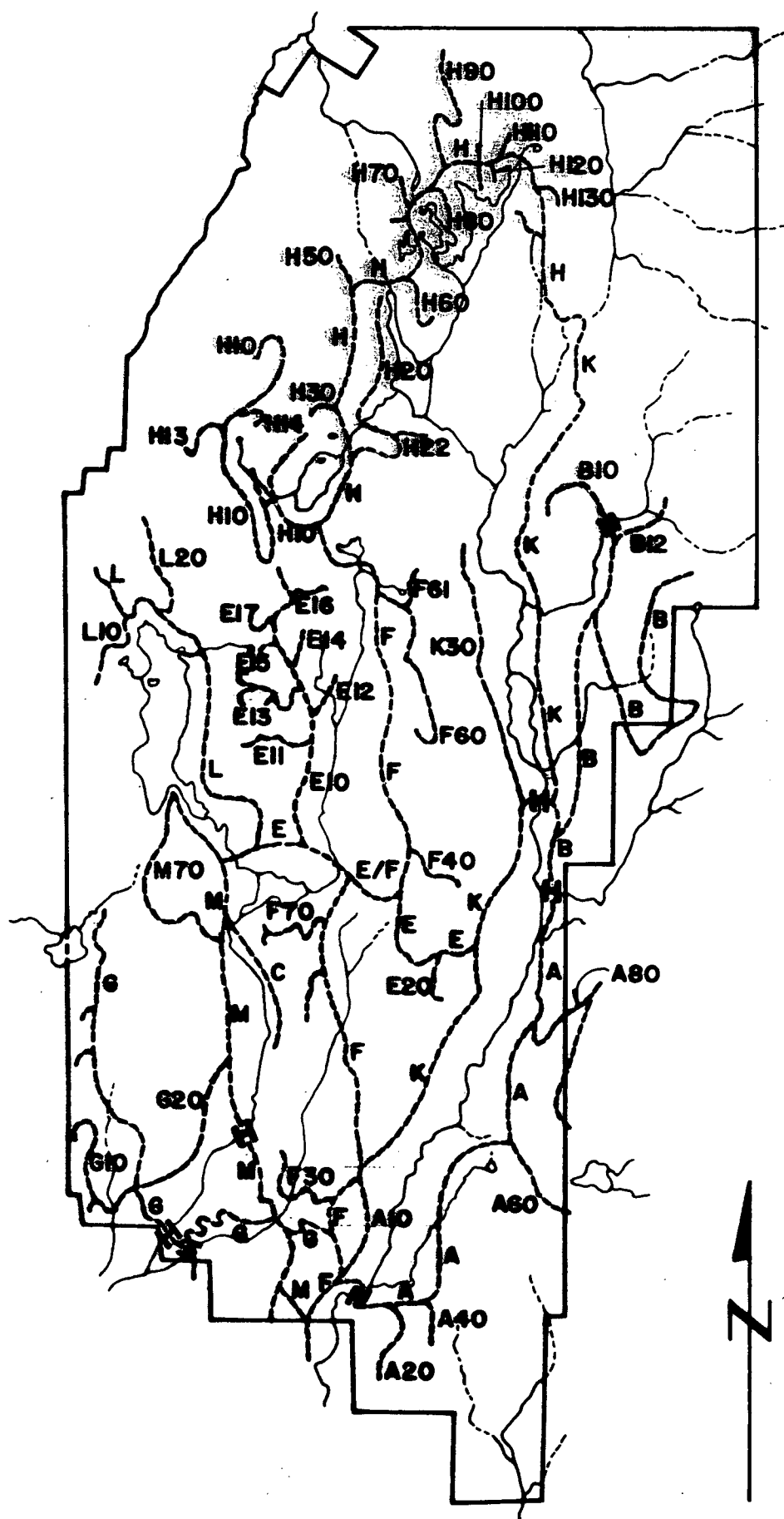
WESTERN HEMLOCK BIOGEOCLIMATIC (CWH) SUBZONES AND GENERALISED ECOSYSTEM UNITS ON THE UBC RESEARCH FOREST

date SEPT. 1980

scale 1:50,000

dr. ALM

chk.



**For details of road specifications
see appendix 2.1.2 - 75 - A**

UBC RESEARCH FOREST

MAP 2.1.9-3-A

ROADS AND BRIDGES IN THE UBC RESEARCH FOREST

date SEPT. 1980

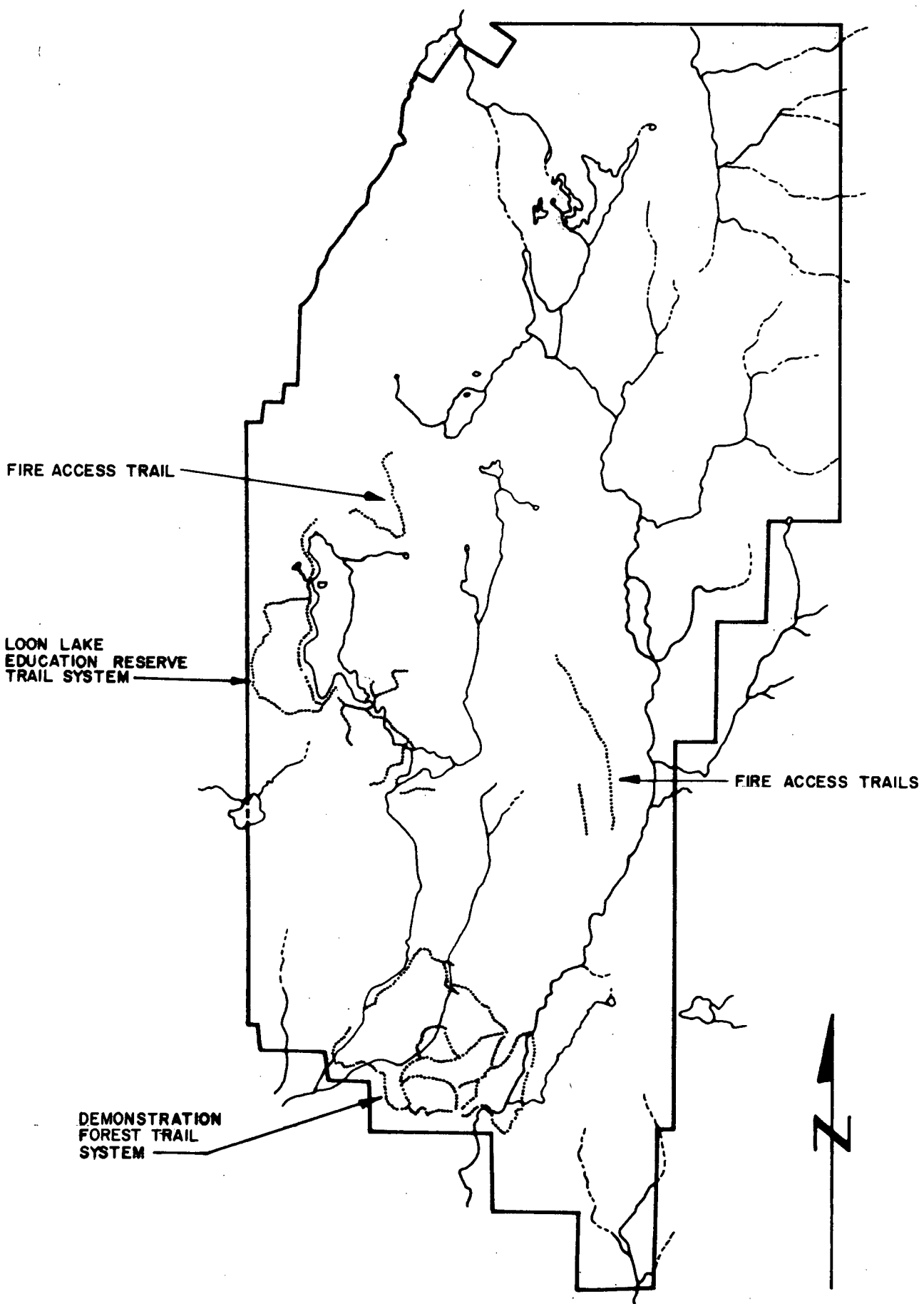
scale 1:50,000

legend: _____ road

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chk.

road number - F40 bridge -----I-----



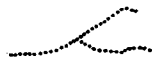
UBC RESEARCH FOREST

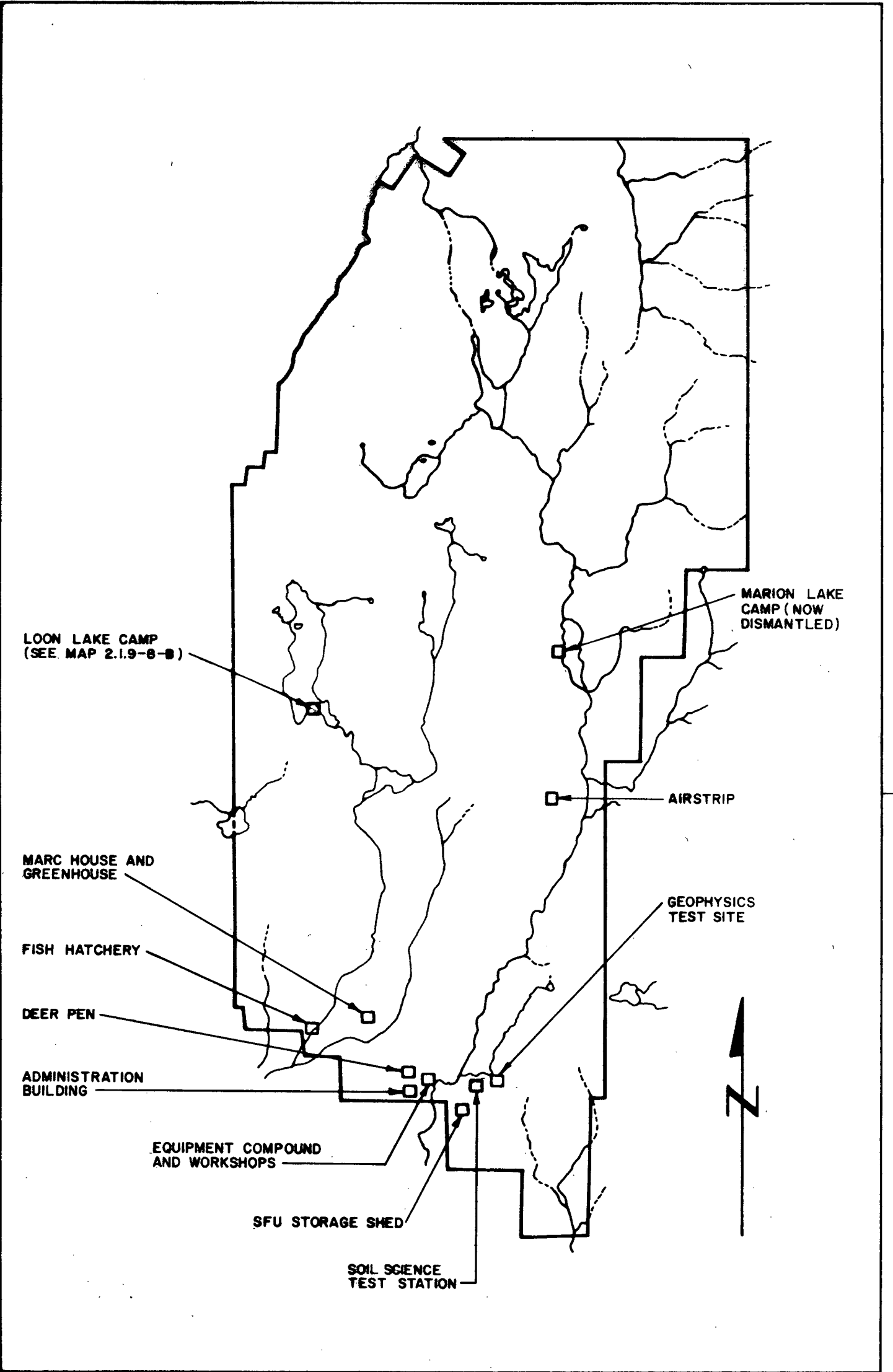
MAP 2.1.9-4-A

LOCATION OF TRAILS ON THE
UBC RESEARCH FOREST

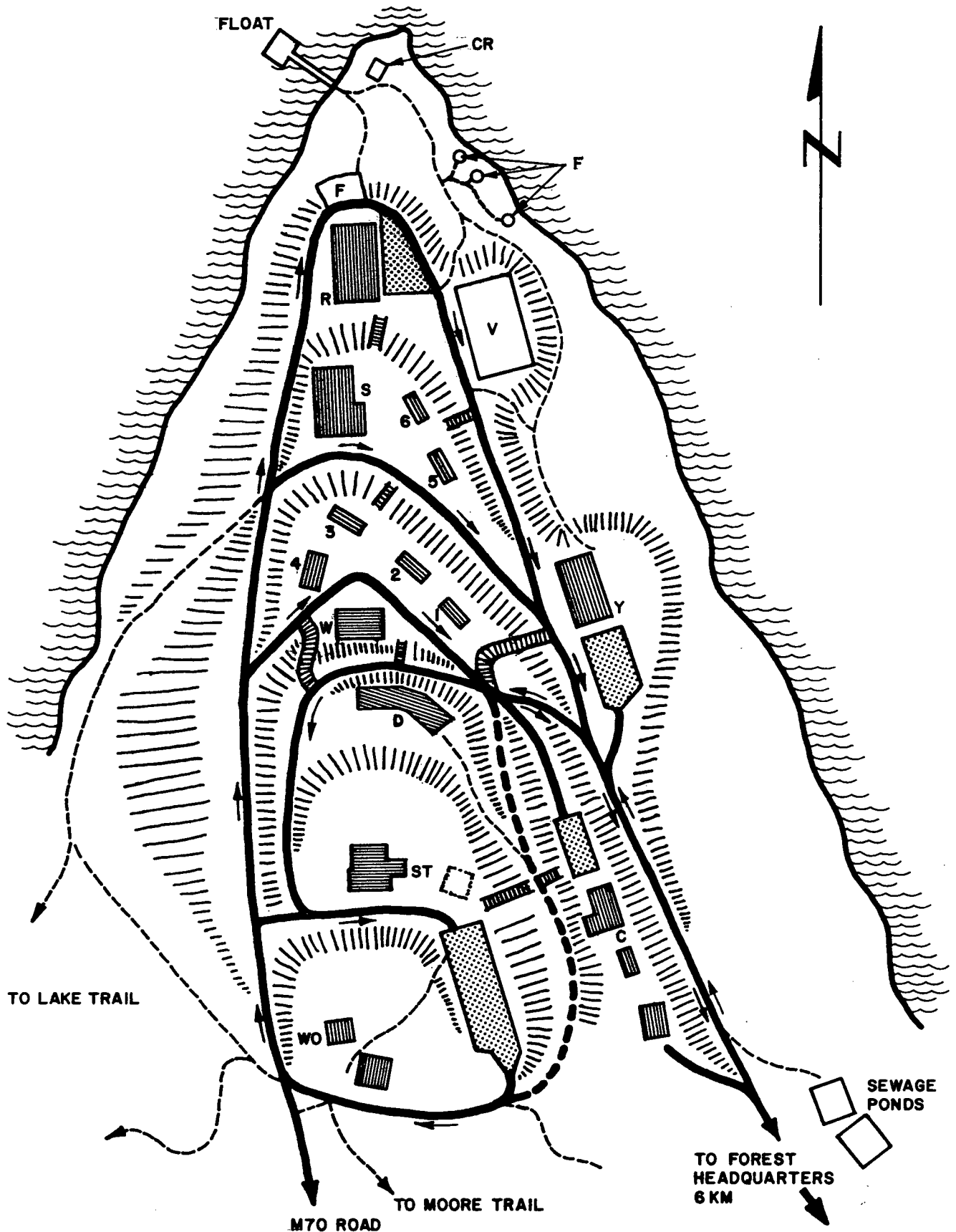
date SEPT. 1980
dr. ALM

scale 1:50,000
chk.

legend:
trails 



UBC RESEARCH FOREST		MAP 2.1.9-8-A	
		LOCATION OF STRUCTURES ON THE UBC RESEARCH FOREST	
date SEPT.1980	scale 1:50,000	legend: building structures □	
dr. ALM	chk.		



LEGEND

- | | | | |
|-------------------|---------------------|--------------------|--------------|
| BUILDINGS: | C CARETAKER'S HOUSE | Y FIREPITS | PARKING AREA |
| | R RECREATION HALL | V VOLLEYBALL COURT | |
| | S SADIE HALL | CR CANOE RACK | |
| | W WASH HOUSE | → TRAFFIC FLOW | |
| | D DINING HALL | — ROAD | |
| | ST STAFF HOUSE | - - - DISUSED ROAD | |
| | WO WOODSHED | - - - TRAIL | |
| | Y YACHT CLUB | STEEP BANK | |
| | 1-6 CABINS | STEPS | |

UBC RESEARCH FOREST

MAP 2.1.9 - 8 - B

LOON LAKE CAMP ON THE UBC RESEARCH FOREST

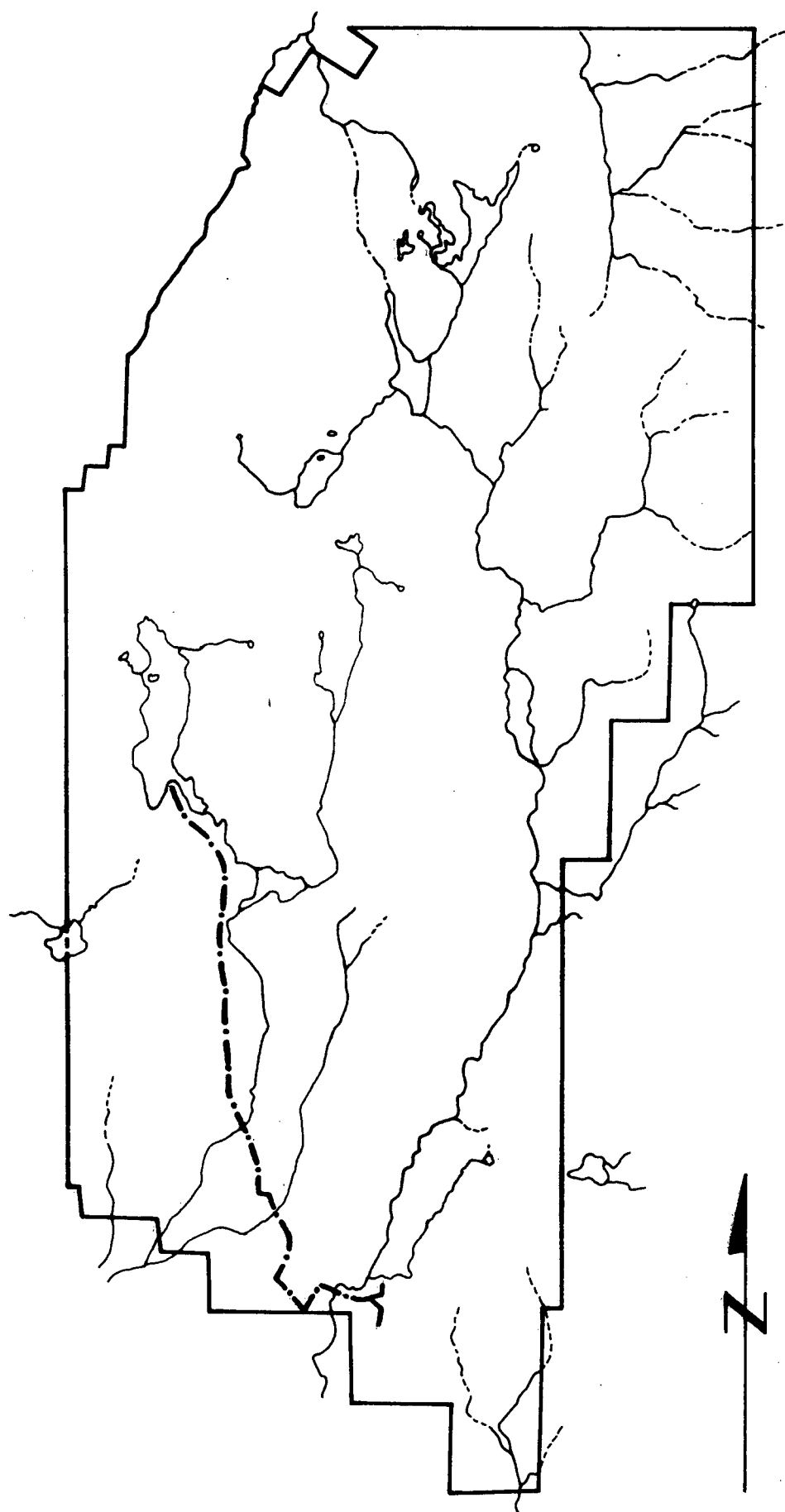
date SEPT. 1980

scale 1:1250

See map 2.1.9-8-A for location on the UBC Research Forest

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chk.



UBC RESEARCH FOREST

MAP 2.1.9-8-C

LOCATION OF POWER LINES ON
THE UBC RESEARCH FOREST

date SEPT. 1980

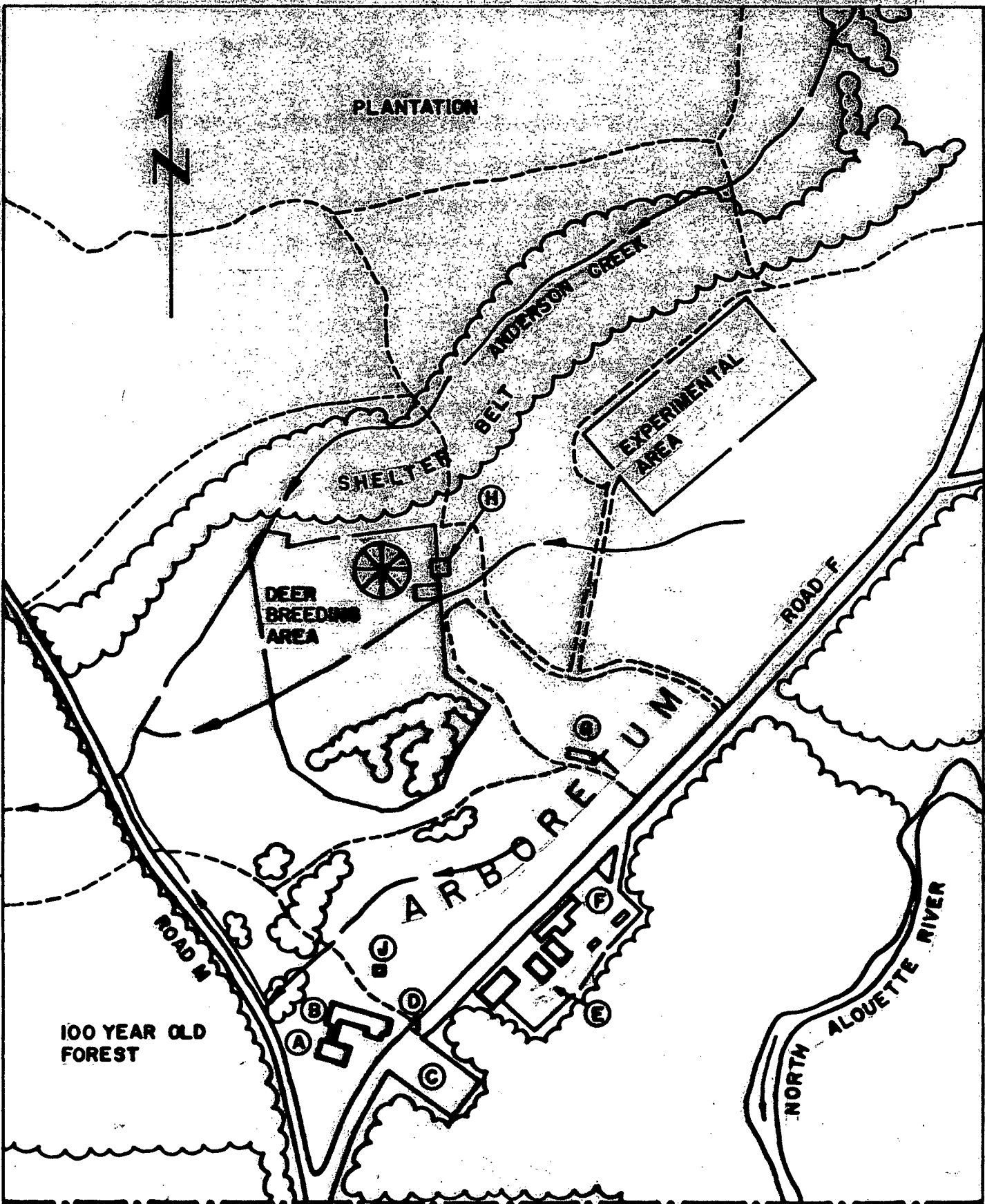
scale 1:50,000

legend:

dr. ALM

chk.

power line — · — · —



Legend:

- | | |
|---------------------------|-----------------------------|
| Ⓐ GATEKEEPER'S HOUSE | Ⓕ FIRE EQUIPMENT |
| Ⓑ ADMINISTRATION BUILDING | Ⓖ OLD DONKEY ENGINE |
| Ⓒ CAR PARK | Ⓗ DEER SHELTER & FEED STORE |
| Ⓓ MAIN GATE | Ⓙ WEATHER STATION |
| Ⓔ WORKSHOP COMPOUND | |
- TRAILS

UBC RESEARCH FOREST

MAP 2.1.9-8-D

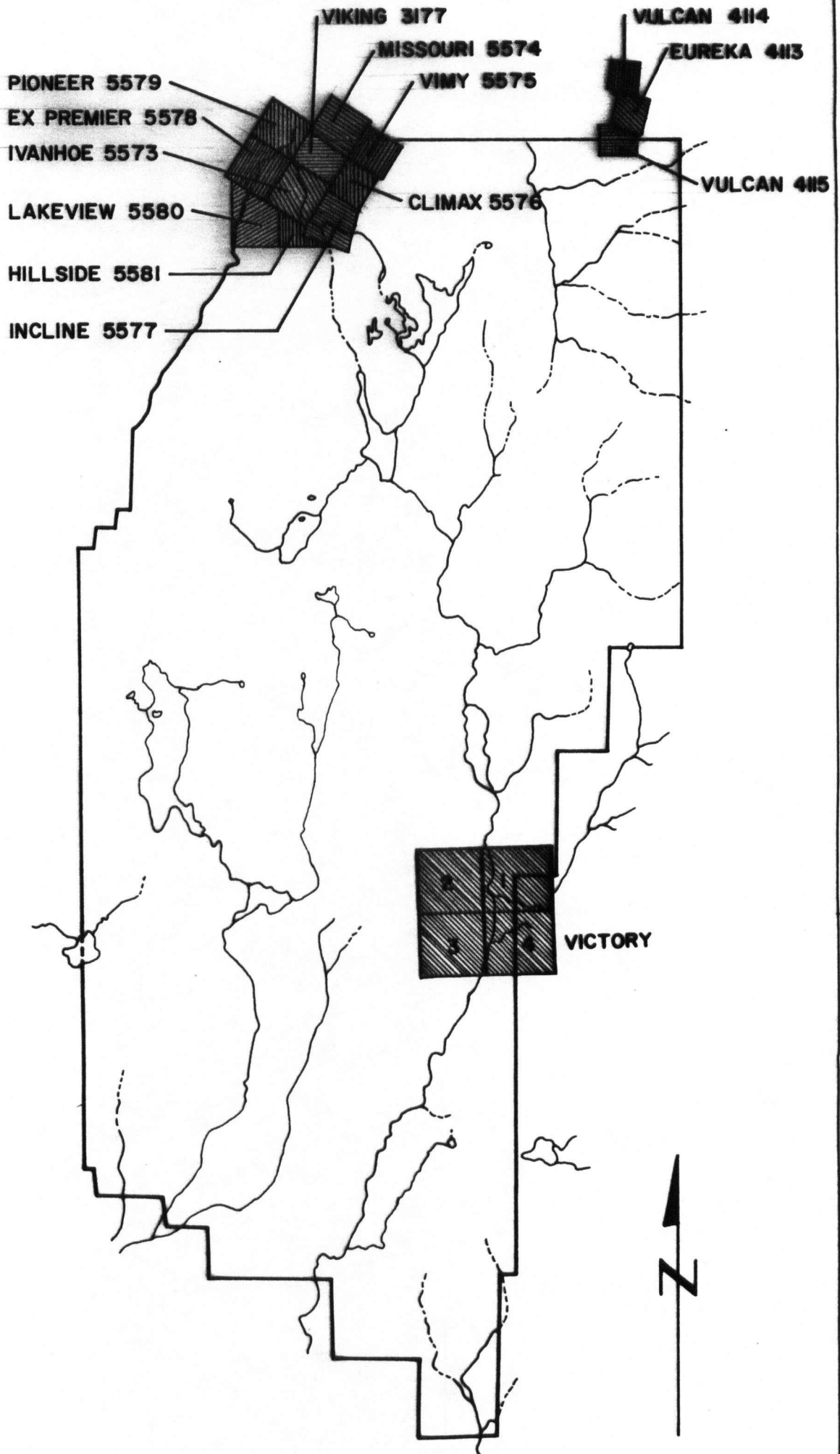
ADMINISTRATION BUILDINGS,
WORKSHOP COMPOUND AND
ARBORETUM AREA ON THE
UBC RESEARCH FOREST

date SEPT. 1980

scale 1cm = 25m

dr. ALM

chk.



UBC RESEARCH FOREST

MAP 2.1.10.1-5-A

**APPROXIMATE POSITIONS OF
MINERAL CLAIMS**

date SEPT. 1980

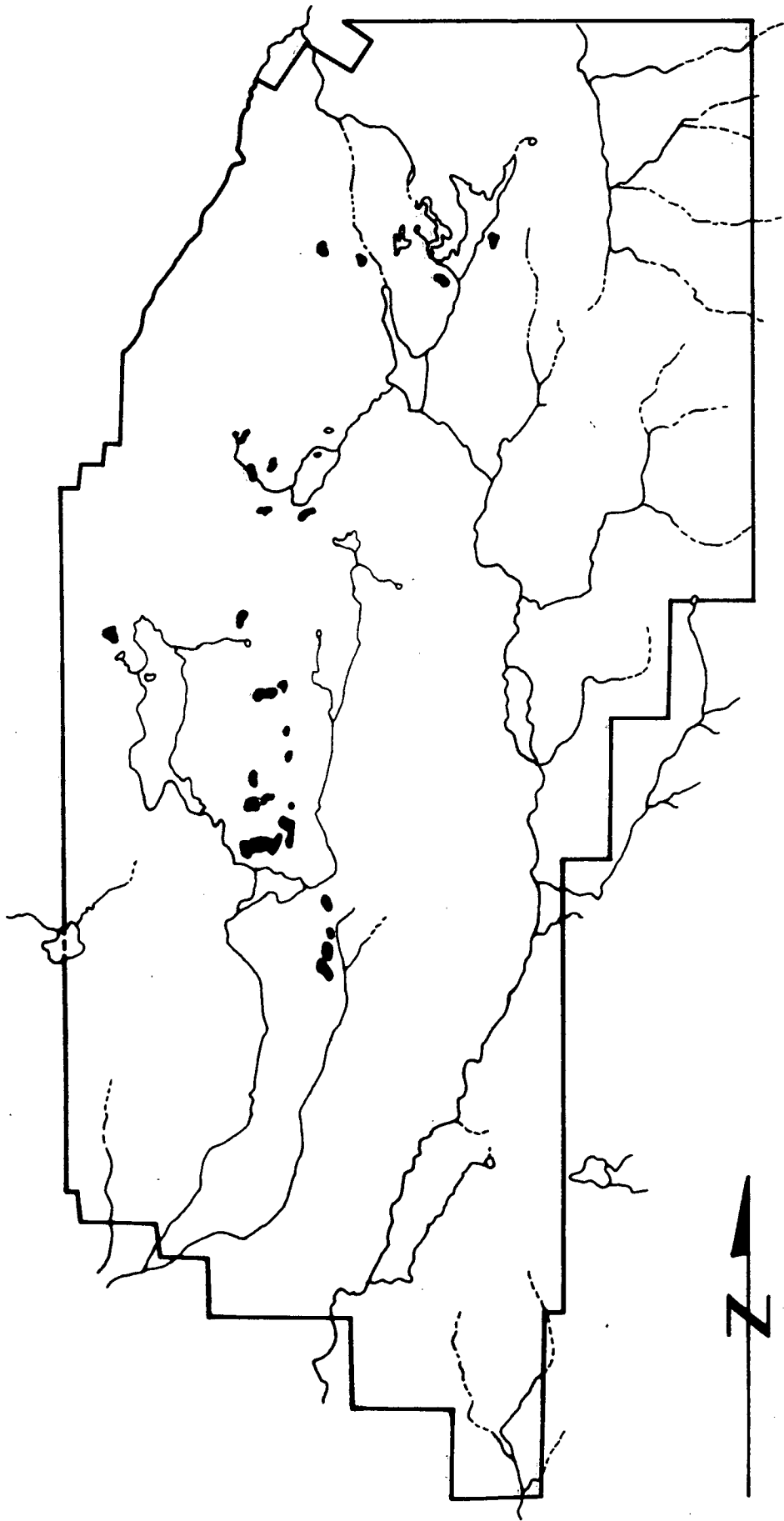
scale 1:50,000

dr. ALM

chk.

legend:

**For further information see
appendix 2.1.10.1-5-A**



UBC RESEARCH FOREST

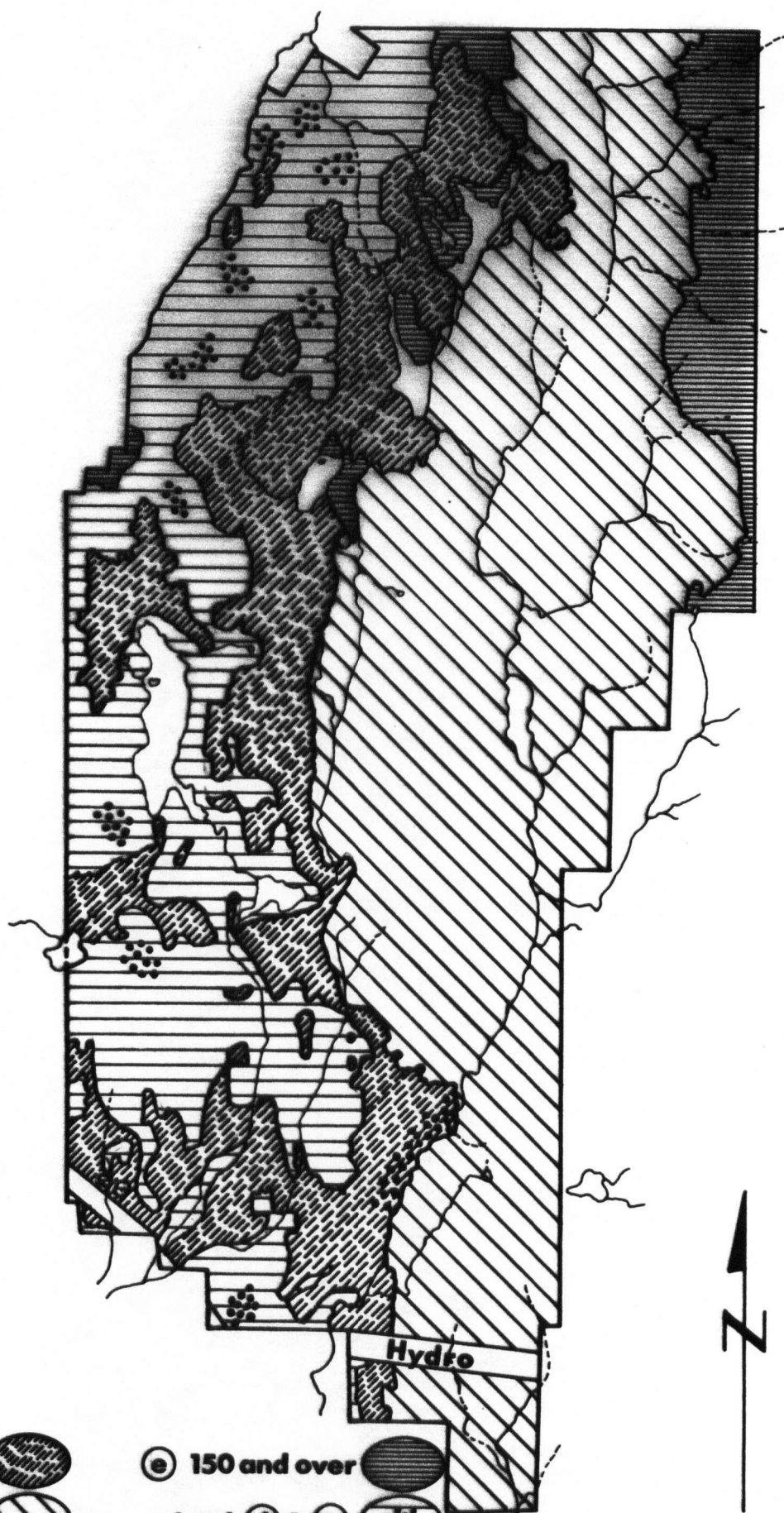
MAP 2.1.10.3-6-A
AREAS OF BLOWDOWN FROM
TYPHOON FREIDA (1962) ON THE
UBC RESEARCH FOREST

date SEPT. 1980 scale 1:50,000

dr. ALM chk.

legend:
areas of blowdown





Legend:

- | | | | |
|------------|------|------------------|--|
| (a) 1-25 | | (e) 150 and over | |
| (b) 26-50 | | mixed (d) & (e) | |
| (c) 51-75 | none | mixed (a) & (b) | |
| (d) 76-150 | | | |

UBC RESEARCH FOREST

MAP 2.2.1.1-3-A

GENERALIZED AGE CLASS DISTRIBUTION ON THE UBC RESEARCH FOREST

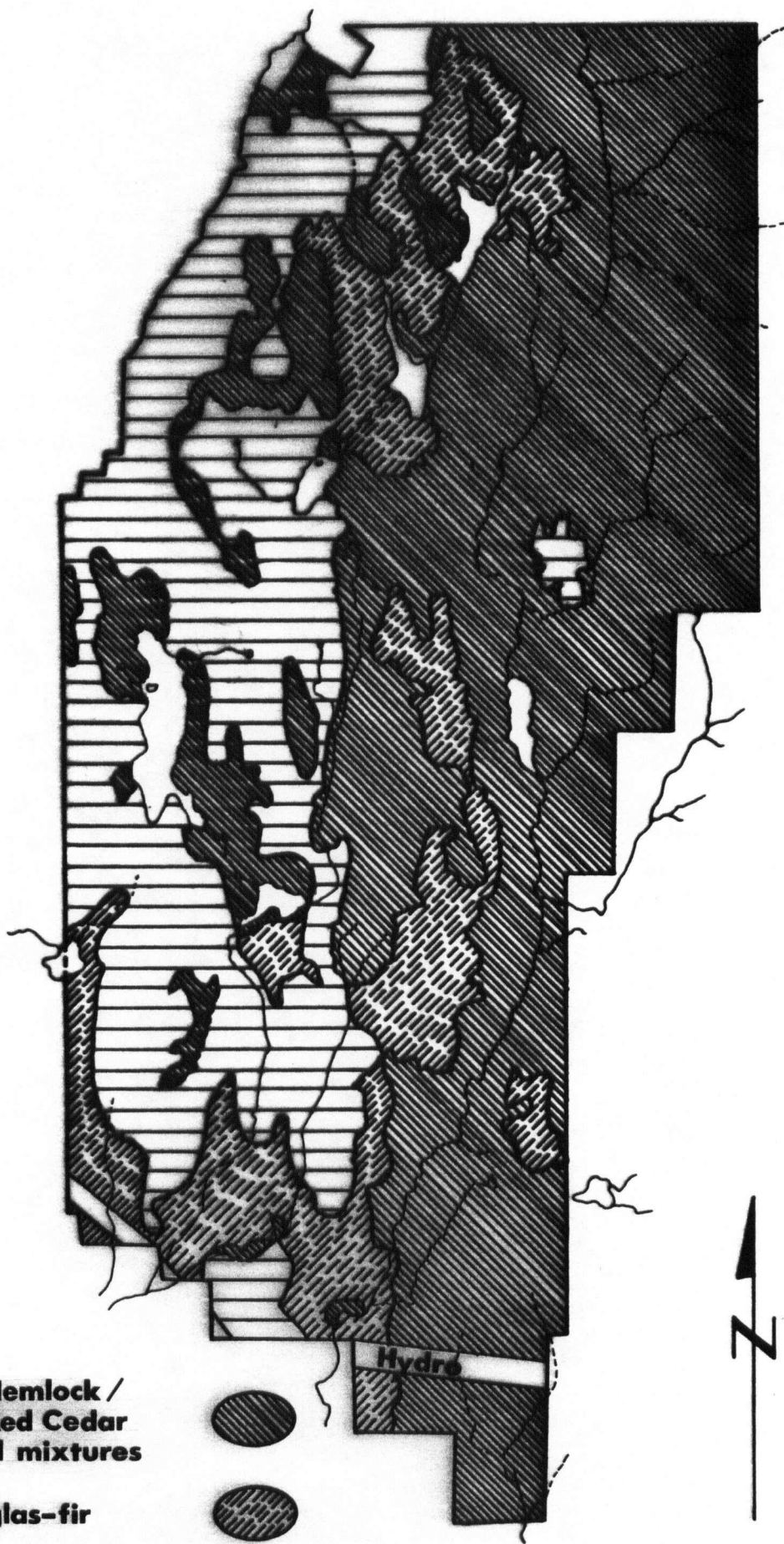
date SEPT. 1980

scale 1:50,000

legend

dr. ALM

chk.

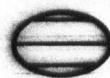
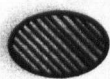


Legend:

**Western Hemlock /
Western Red Cedar
dominated mixtures**

Pure Douglas-fir

**Douglas-fir dominated
mixtures**



UBC RESEARCH FOREST

MAP 2.2.1.1-5-A

**GENERALIZED DISTRIBUTION OF FOREST
TYPES ON THE UBC RESEARCH FOREST**

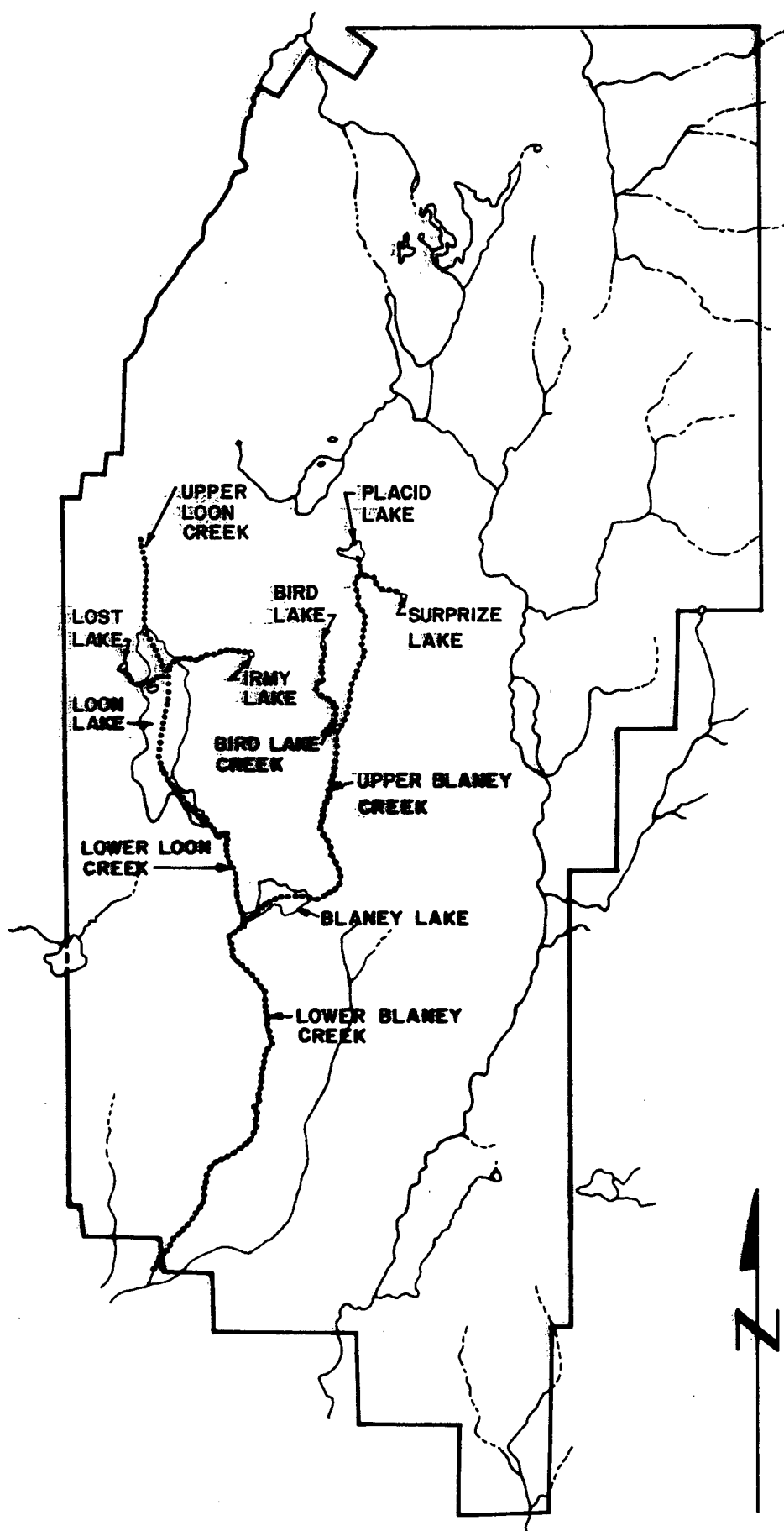
date SEPT. 1980

scale 1:50,000

legend

dr. ALM

chk.



UBC RESEARCH FOREST

MAP 2.2.2.1-8-B

**LOCATION OF STREAM PROFILE,
DESCRIBED IN FIGURES 2.2.2.1-8-B₁ & B₂
ON THE UBC RESEARCH FOREST**

date SEPT. 1980

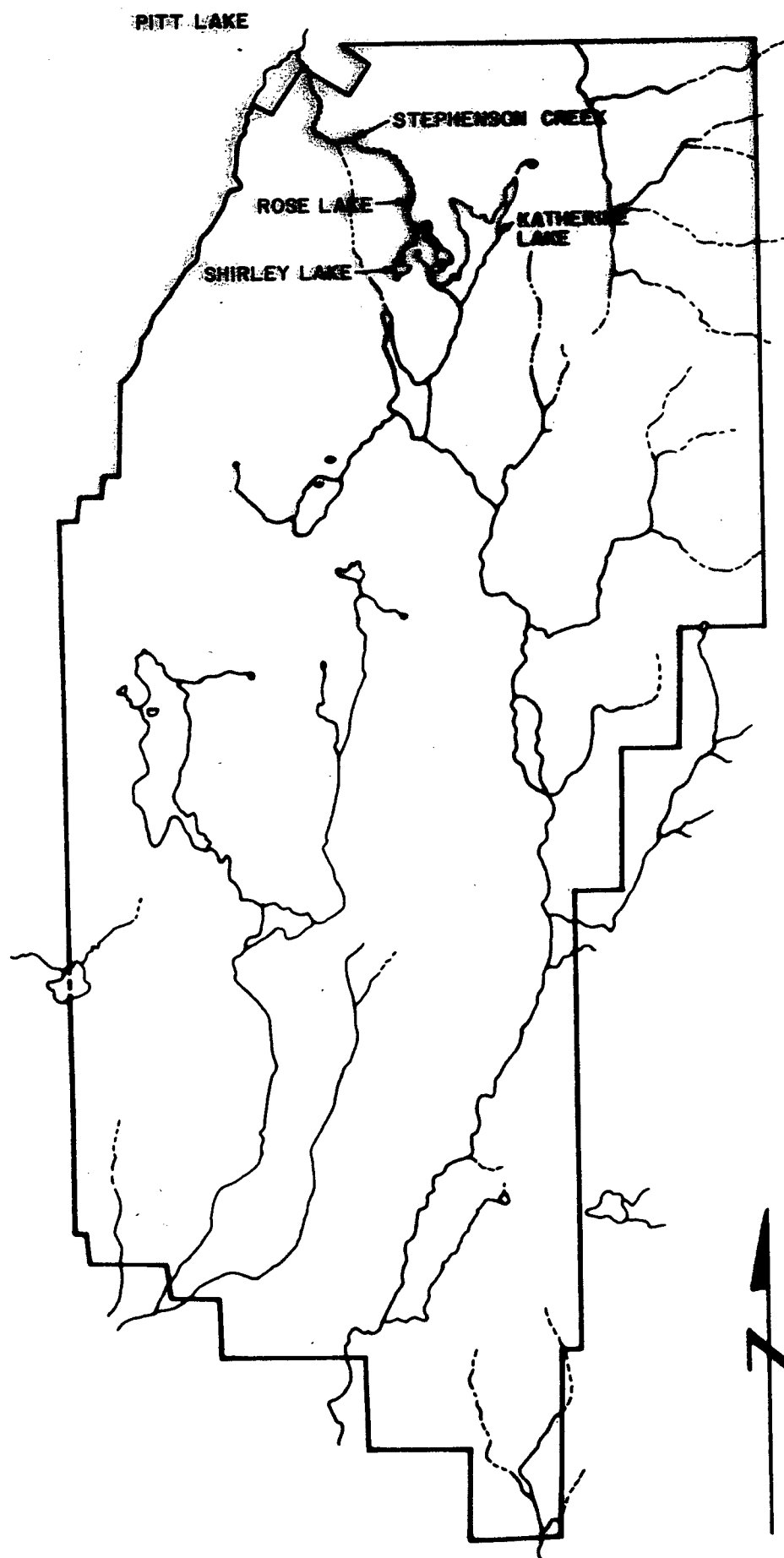
scale 1:50,000

legend:

dr. ALM

chk.

location of stream profile



UBC RESEARCH FOREST

MAP 2.2.2.1-8-C

LOCATION OF STREAM PROFILE,
DESCRIBED IN FIGURE 2.2.2.1-8-C
ON THE UBC RESEARCH FOREST

date SEPT. 1980

scale 1:50,000

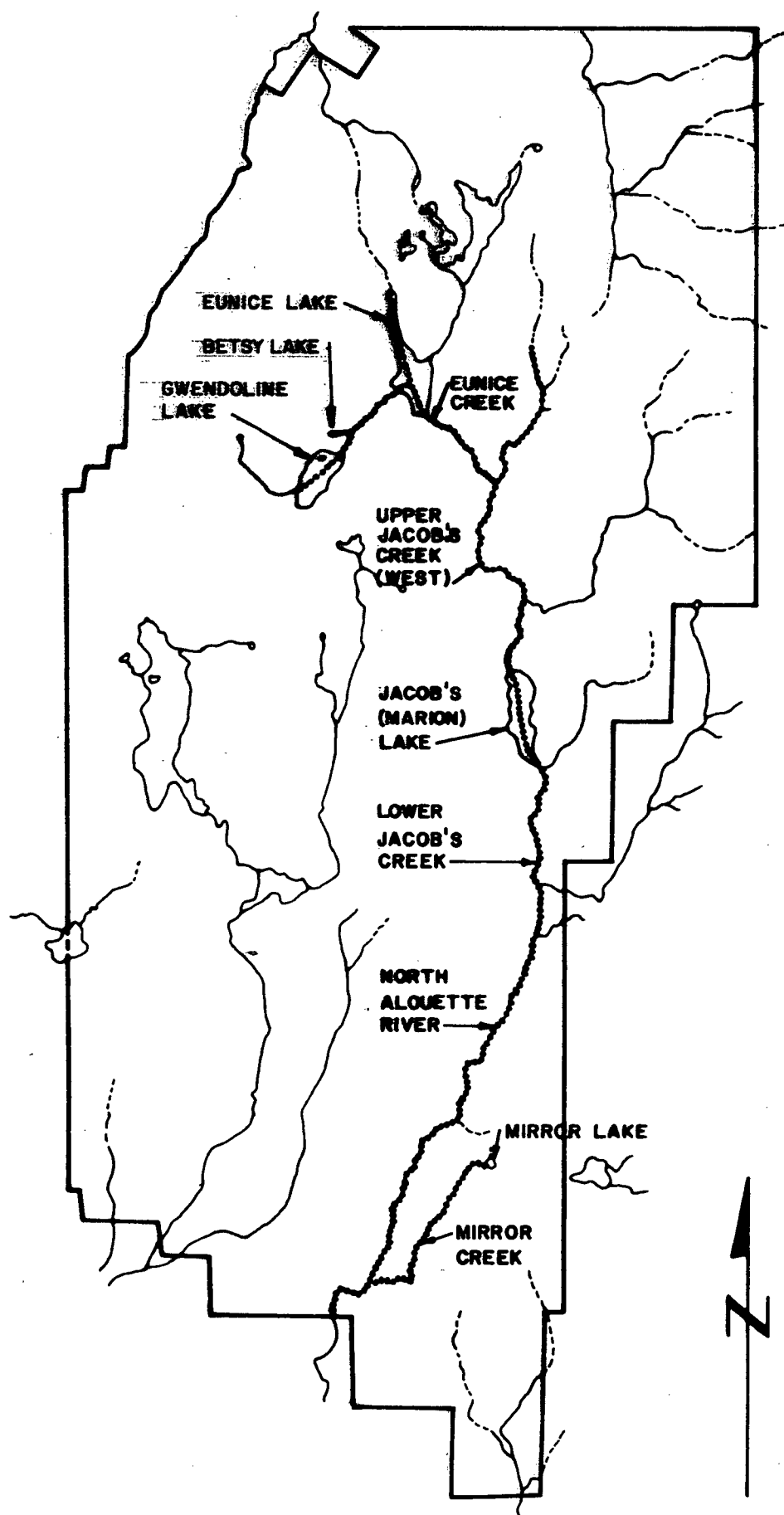
legend:

dr. ALM

chk.

location of stream profile





UBC RESEARCH FOREST

MAP 2.2.2.1-8-A

**LOCATION OF STREAM PROFILE,
DESCRIBED IN FIGURE 2.2.2.1-8-A
ON THE UBC RESEARCH FOREST**

date SEPT. 1980

scale 1:50,000

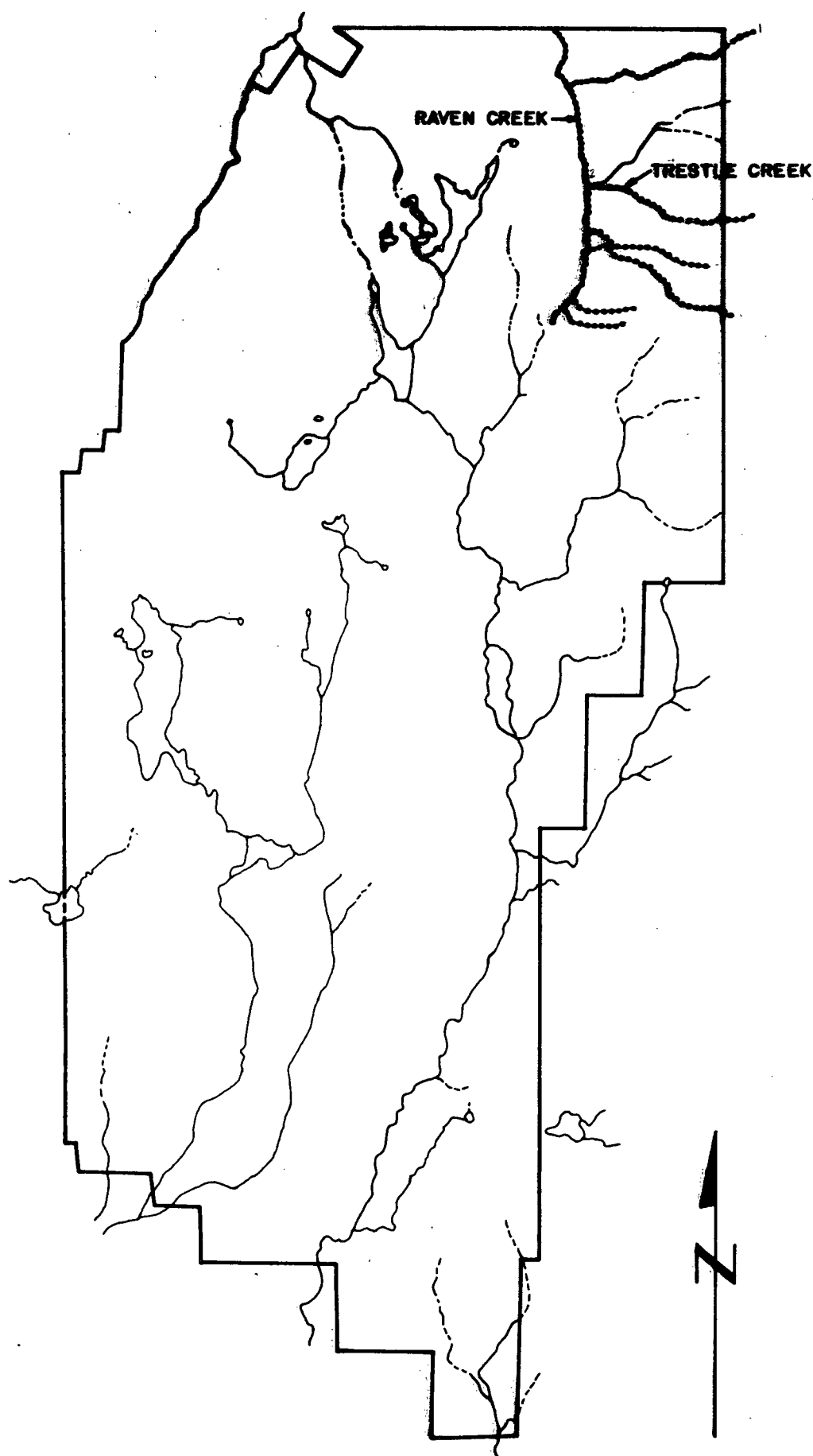
legend:

dr. ALM

chk.

location of stream profile





UBC RESEARCH FOREST

MAP 2.2.1-8-D

**LOCATION OF STREAM PROFILE,
DESCRIBED IN FIGURE 2.2.2.1-8-D
ON THE UBC RESEARCH FOREST**

date SEPT.1980

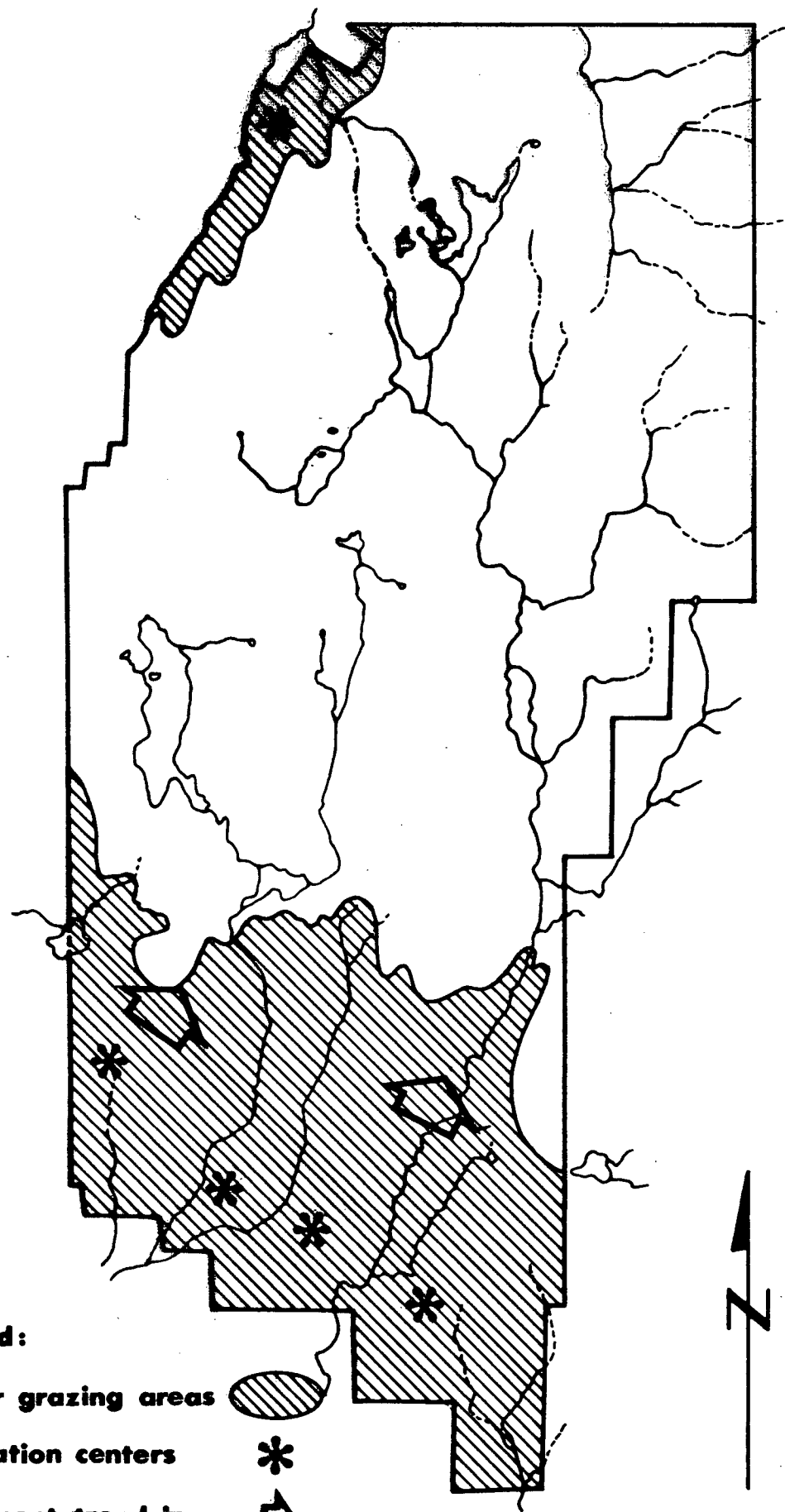
scale 1:50,000

legend:




dr. ALM

chk.

location of stream profile 



Legend:

- winter grazing areas 
- population centers 
- movement trend in summer 

see also map 8.3.2.6-4-A
for further details

UBC RESEARCH FOREST

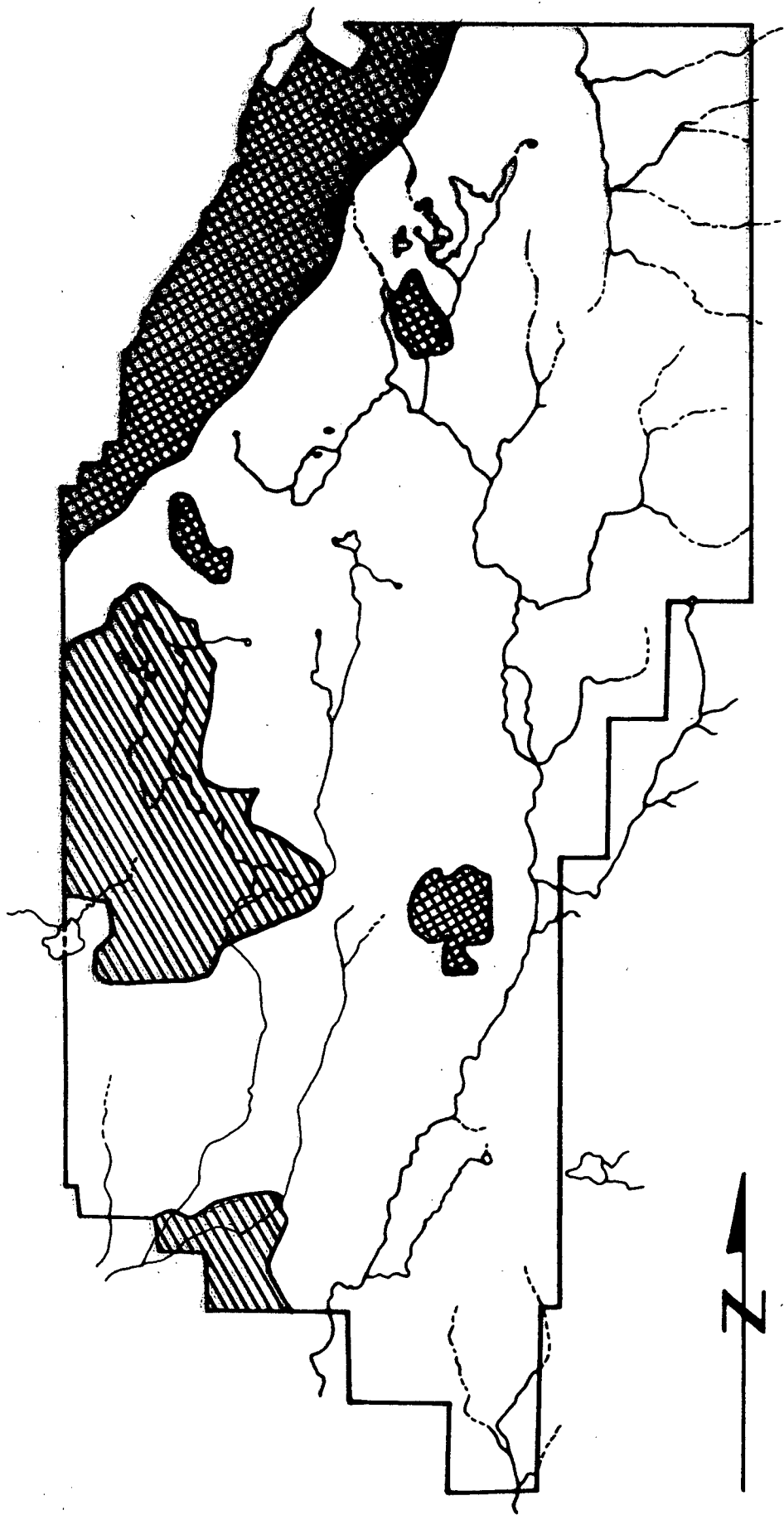
MAP 2.2.4.2-2-A

**AREAS OF DEER CONCENTRATION ON
THE UBC RESEARCH FOREST**

date **SEPT. 1980** scale **1:50,000**

dr. **ALM** chk.

legend



UBC RESEARCH FOREST

MAP 8.3.2.2 - I - A

WORKING CIRCLE NO.1
NATURE & EDUCATIONAL RESERVES ON
THE UBC RESEARCH FOREST

date SEPT. 1980

scale 1:50,000

dr. ALM

chk.

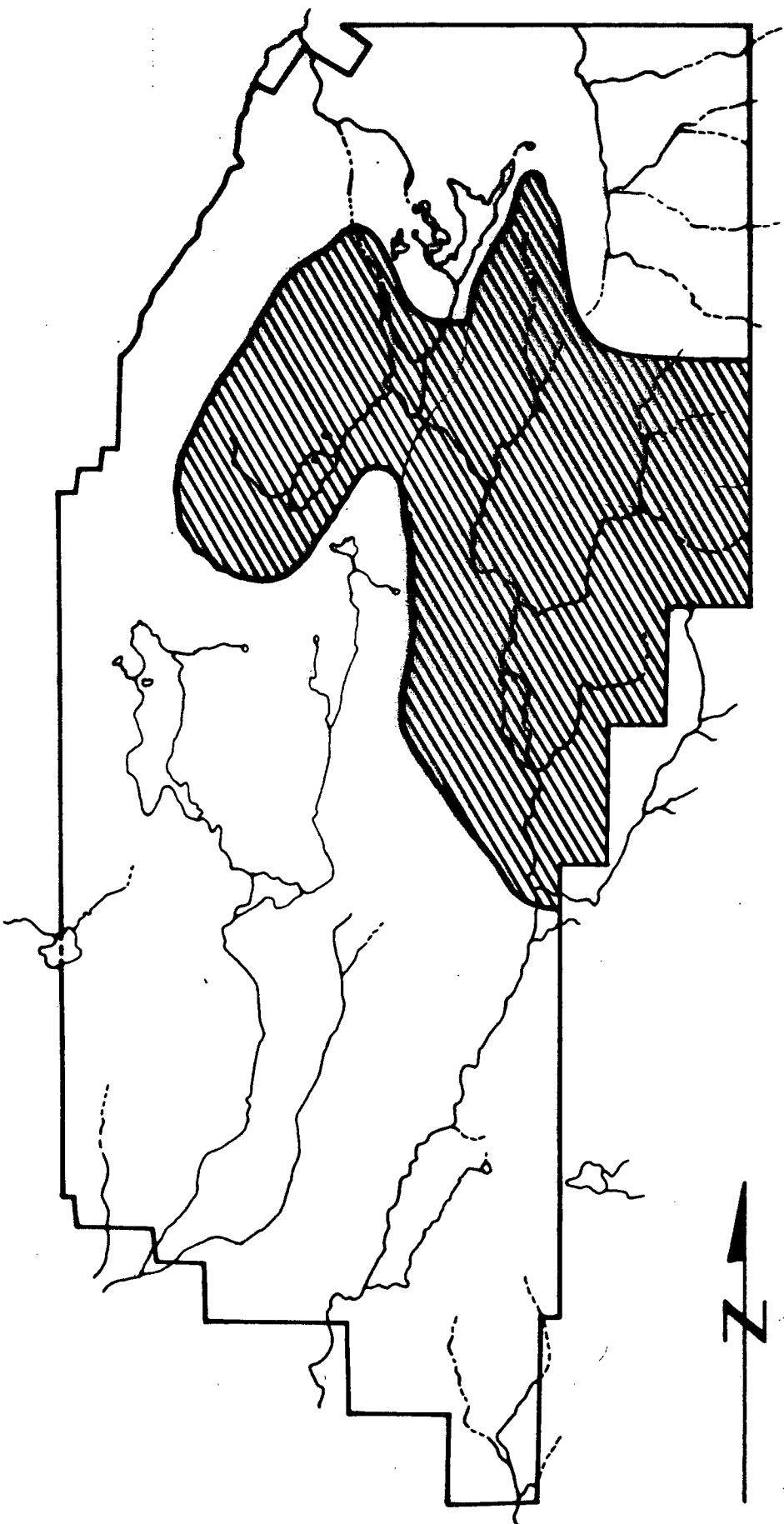
legend:

nature
reserve



educational
reserve





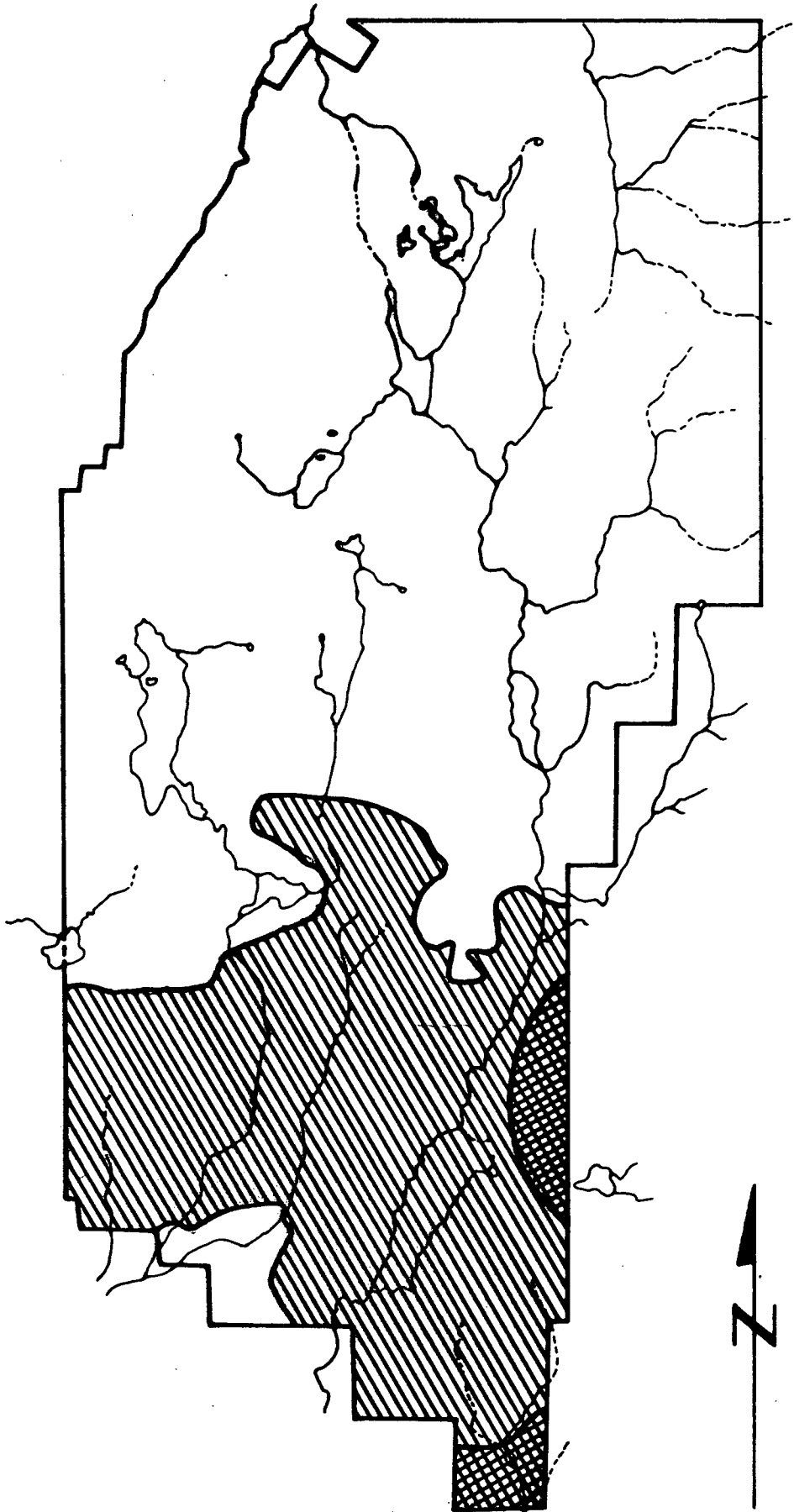
**UBC RESEARCH
FOREST**


MAP 8.3.2.3-1-A
WORKING CIRCLE NO.2
WATER PRODUCTION AND STORAGE
ON THE UBC RESEARCH FOREST

date SEPT. 1980 **scale** 1:50,000

dr. ALM **chk.**

legend



Note: Areas hatched thus  are included within the Wood Production Working Circle at the present time but may be rezoned at a later date for Community Development purposes.

UBC RESEARCH FOREST

MAP 8.3.2.4-1-A

WORKING CIRCLE NO.3
WOOD PRODUCTION ON THE UBC
RESEARCH FOREST

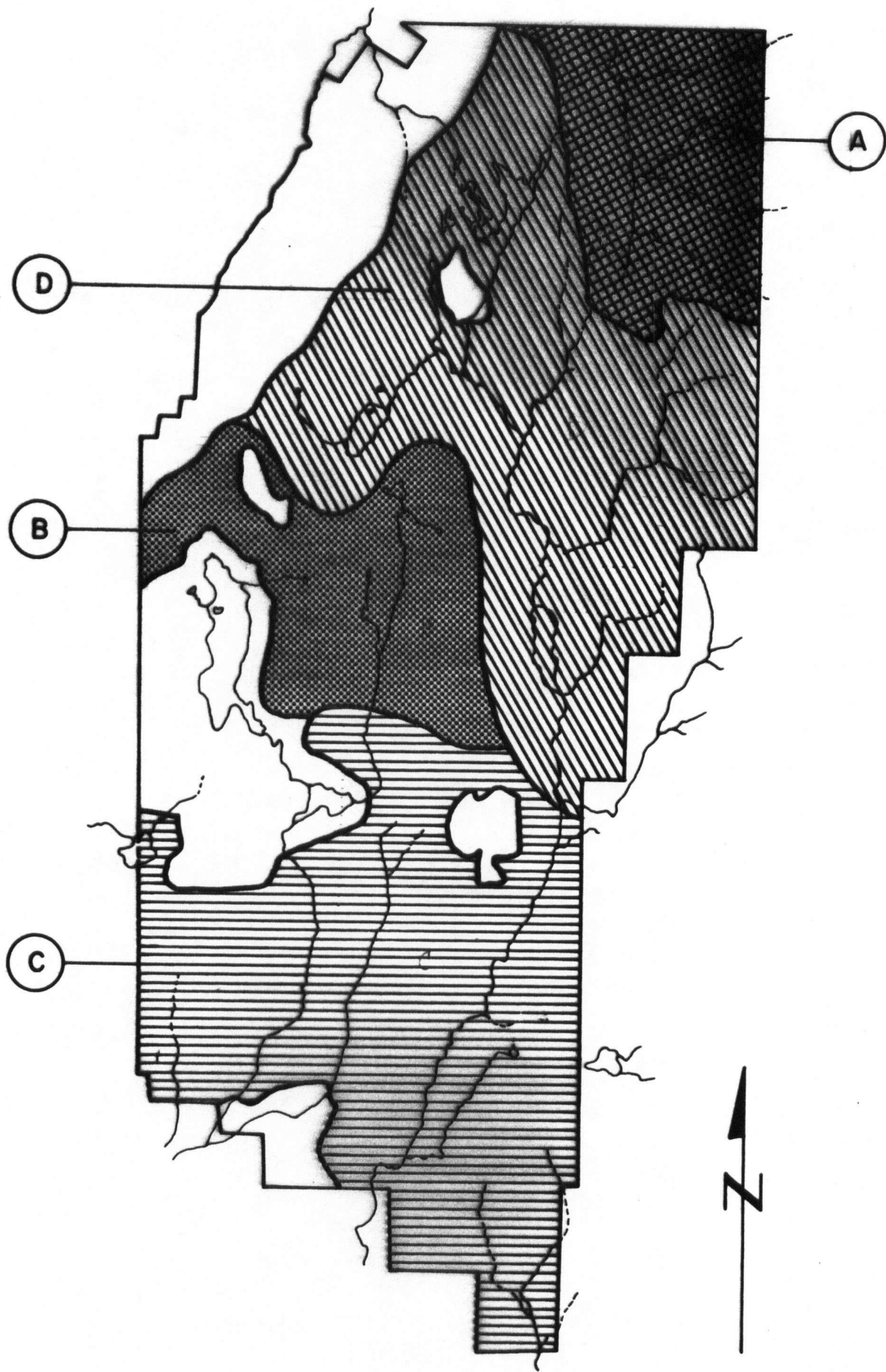
date SEPT. 1980

scale 1:50,000

legend

dr. ALM

chk.



UBC RESEARCH FOREST

MAP 8.3.2.5-1-A

**WORKING CIRCLE NO.4
RECREATION ON THE UBC
RESEARCH FOREST**

date SEPT. 1980

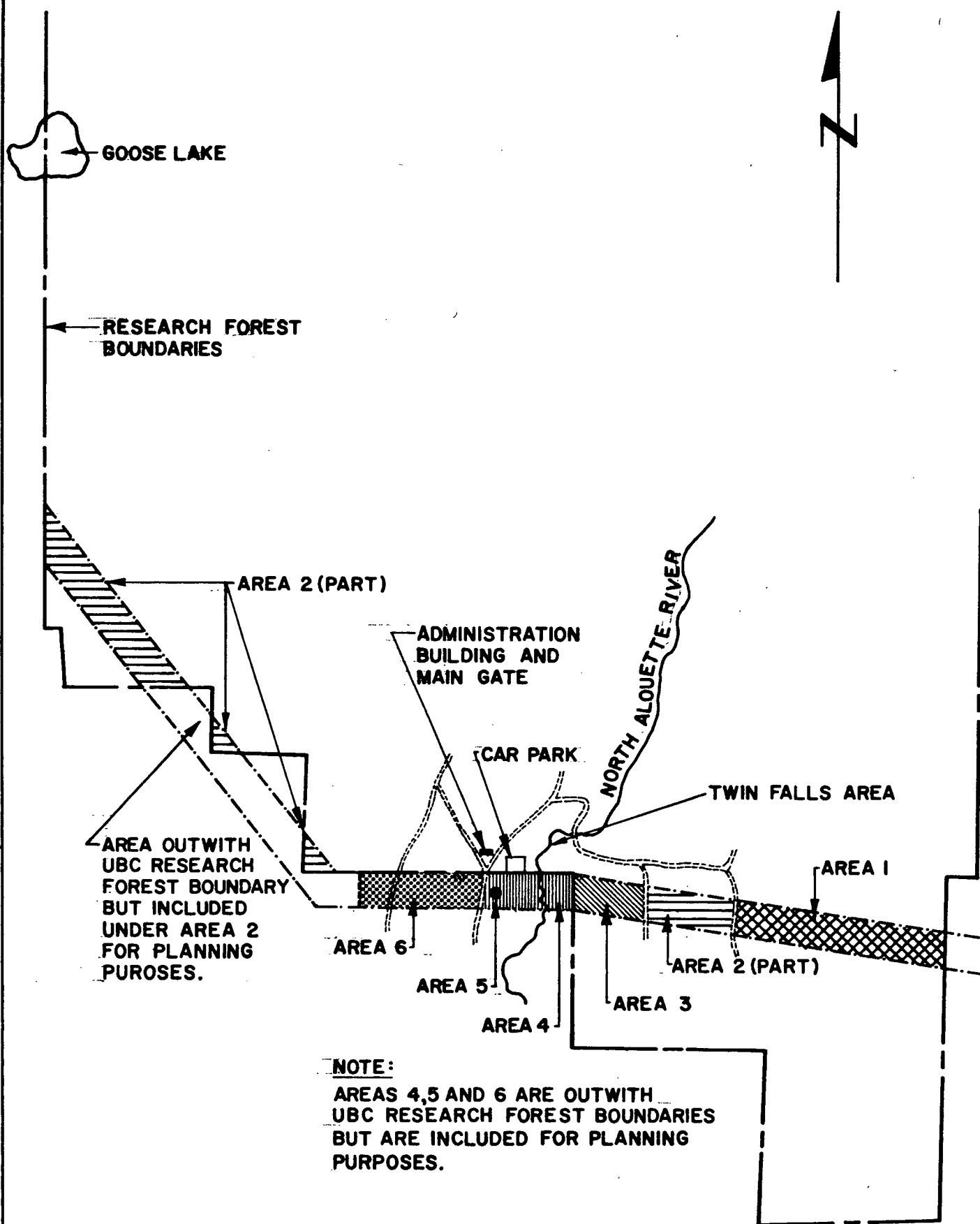
scale 1:50,000

dr. ALM

chk.

legend:

For key, see paragraph 8.3.2.5-1



UBC RESEARCH FOREST

MAP 8.3.2.7-1-A

WORKING CIRCLE NO.6
UTILITY CORRIDOR ON THE
UBC RESEARCH FOREST

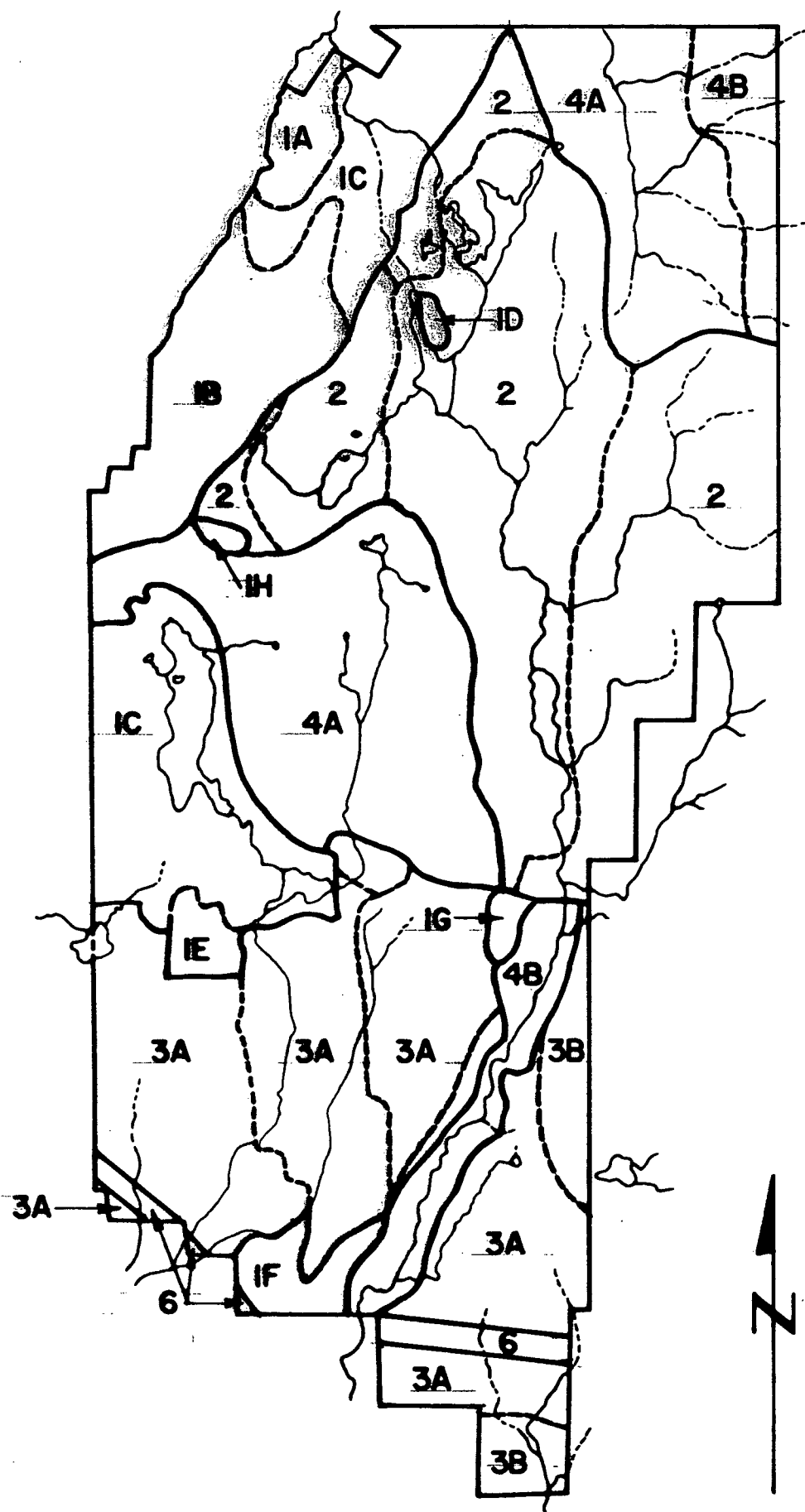
date SEPT. 1980

scale 1:2000

legend

dr. ALM

chk.



UBC RESEARCH FOREST

MAP 8.3.3-2-A

WORKING CIRCLES - HIERARCHY OF USE
ON THE UBC RESEARCH FOREST

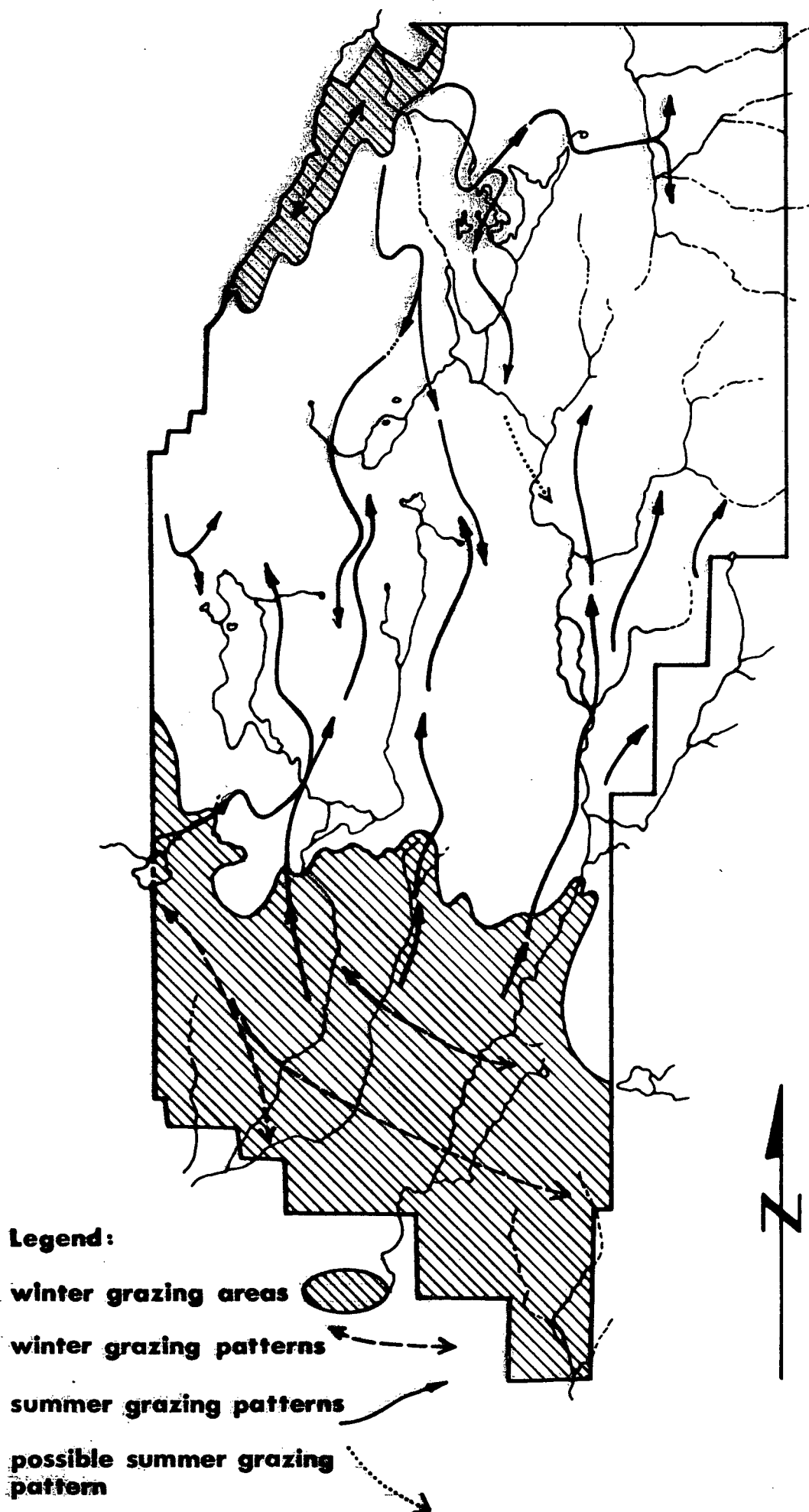
date SEPT. 1980

scale 1:50,000

dr. ALM

chk.

legend: Working Travel corridors with
Circle Divisions - 4A constraints due to
(for key see 8.3.3-2) recreation -----



UBC RESEARCH FOREST

MAP 8.3.2.6-4-A

POPULATION CENTERS, AND
MOVEMENT OF DEER ON THE
UBC RESEARCH FOREST

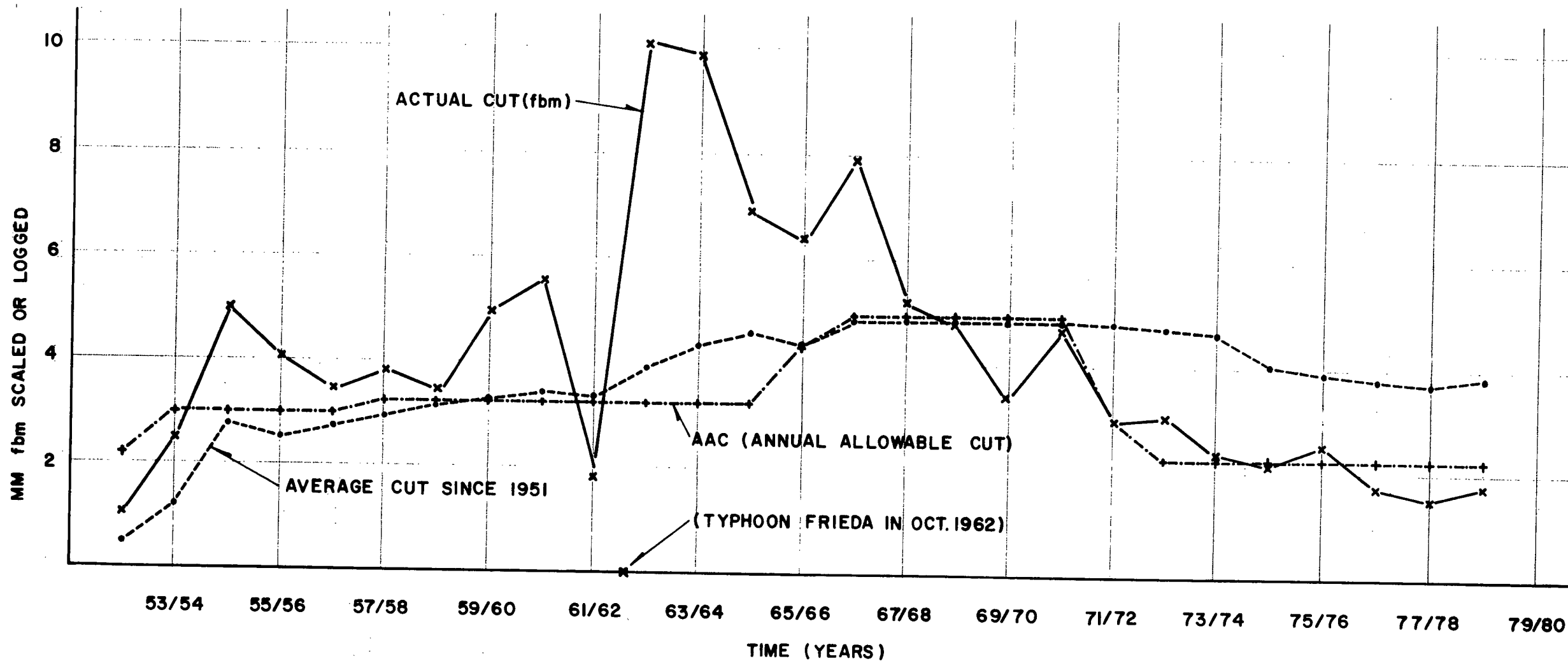
date SEPT. 1980

scale 1:50,000

legend

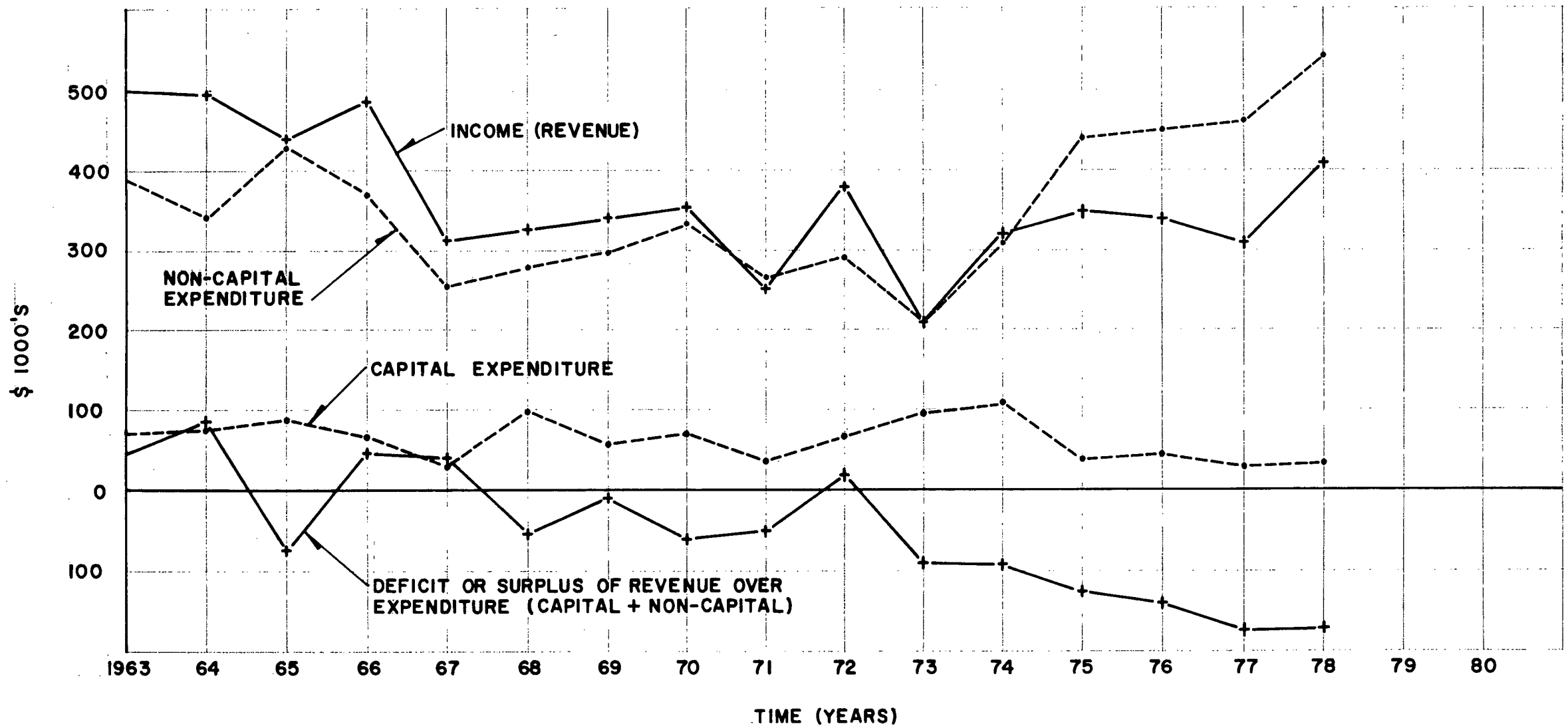
dr. ALM

chk.

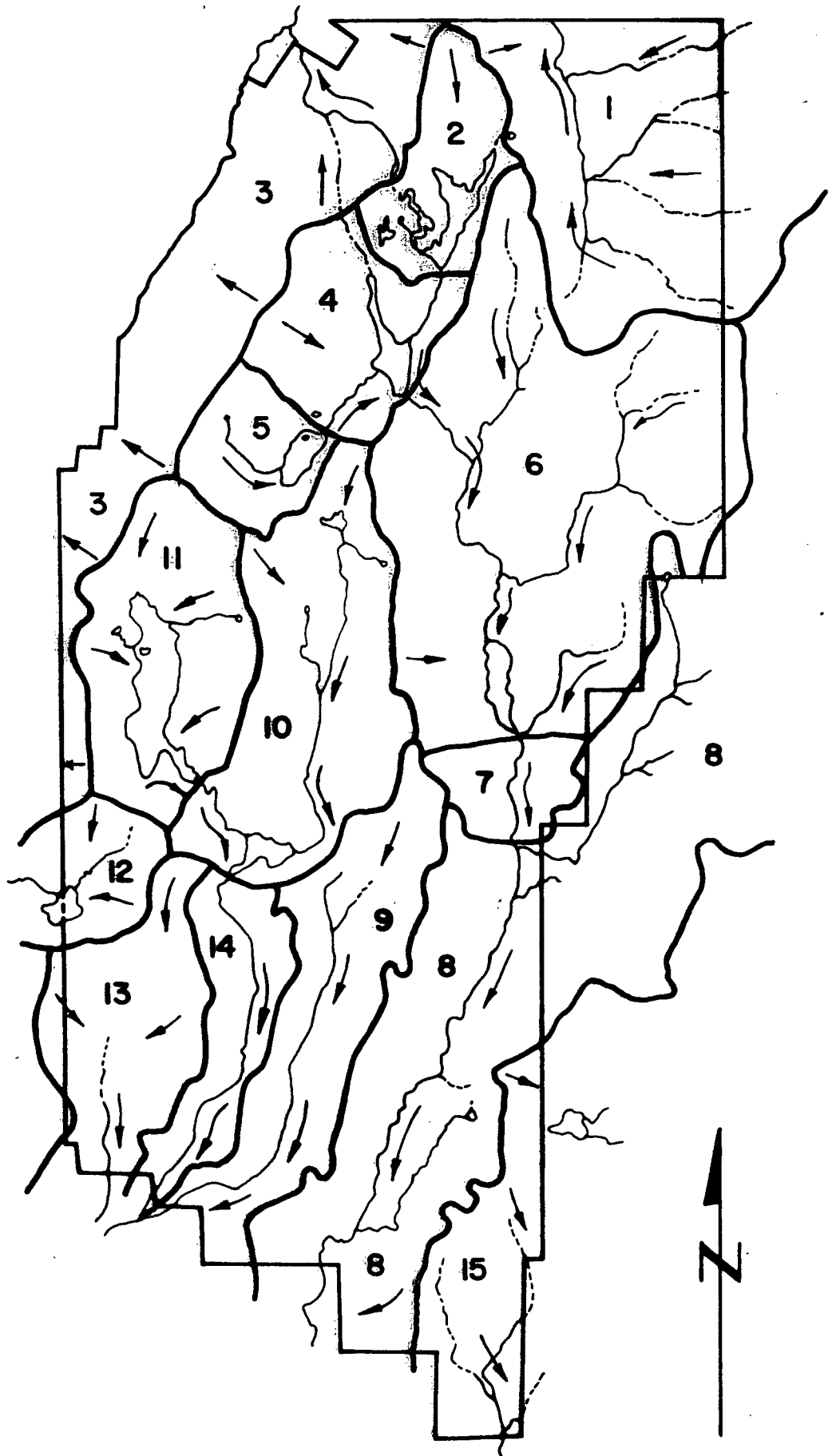


GRAPH SHOWING VOLUMES (IN fbm) OF TIMBER SCALED OR LOGGED
1953-1980

FIGURE 2.1.2 - 107 - A



GRAPH SHOWING SUMMARY OF INCOME, CAPITAL AND NON-CAPITAL EXPENDITURE
AND SURPLUS OR DEFICIT FOR THE PERIOD 1963-19
(Figures extracted from Research Forest Annual Reports)



For key to watershed numbers
see Table 2.2.2.2-2-A

UBC RESEARCH FOREST

MAP 2.1.3-2-A

DRAINAGE PATTERN AND WATERSHED
NUMBERS ON THE UBC RESEARCH FOREST

date SEPT. 1980

scale 1:50,000

dr. A-L-M

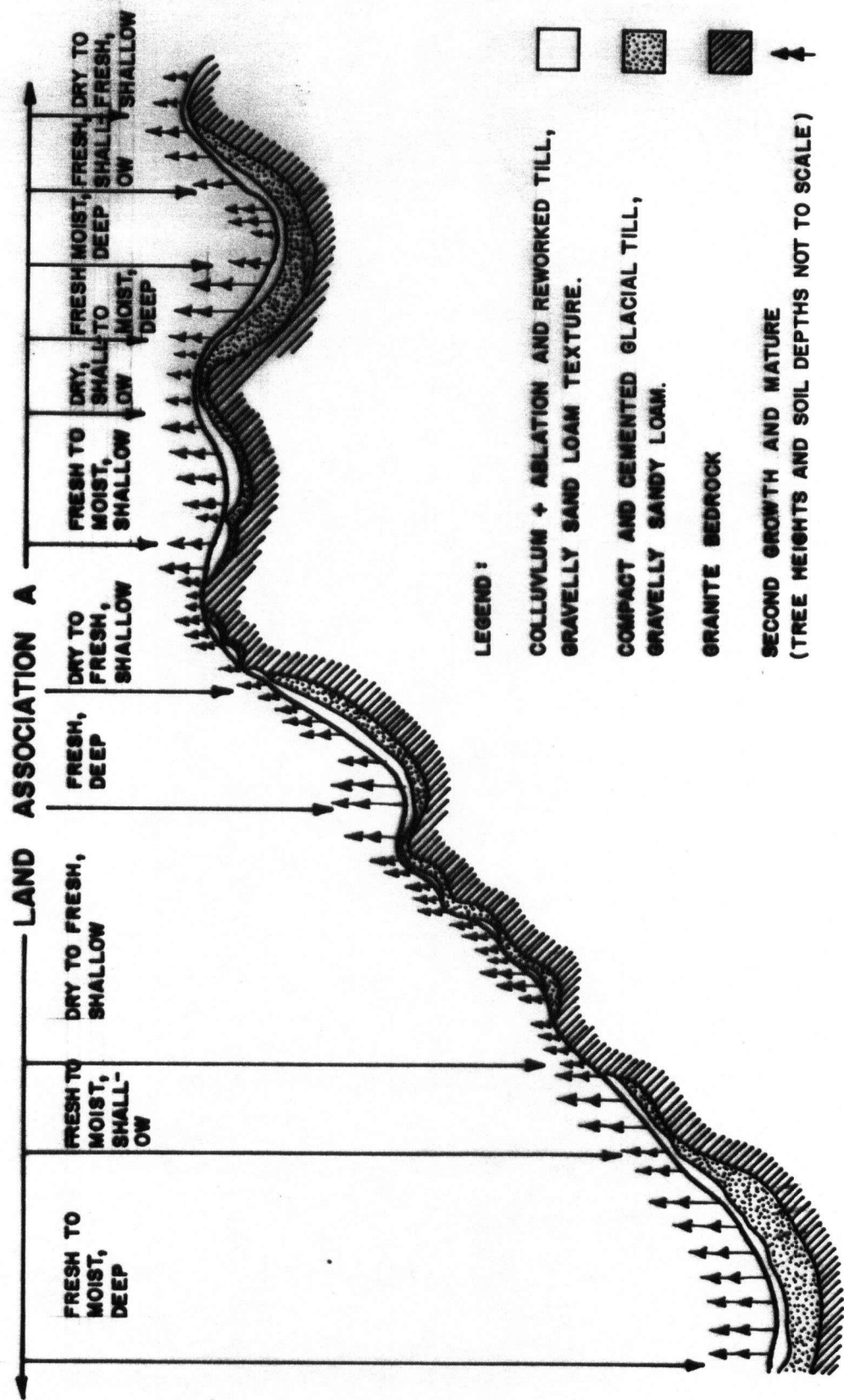
chk.

legend:

watershed area
boundaries

drainage direction

watershed area
number - 13



UBC RESEARCH FOREST

FIGURE 2.1.5-1-A

PROFILE OF LAND ASSOCIATION A ON THE UBC RESEARCH FOREST (LACATE, 1965)

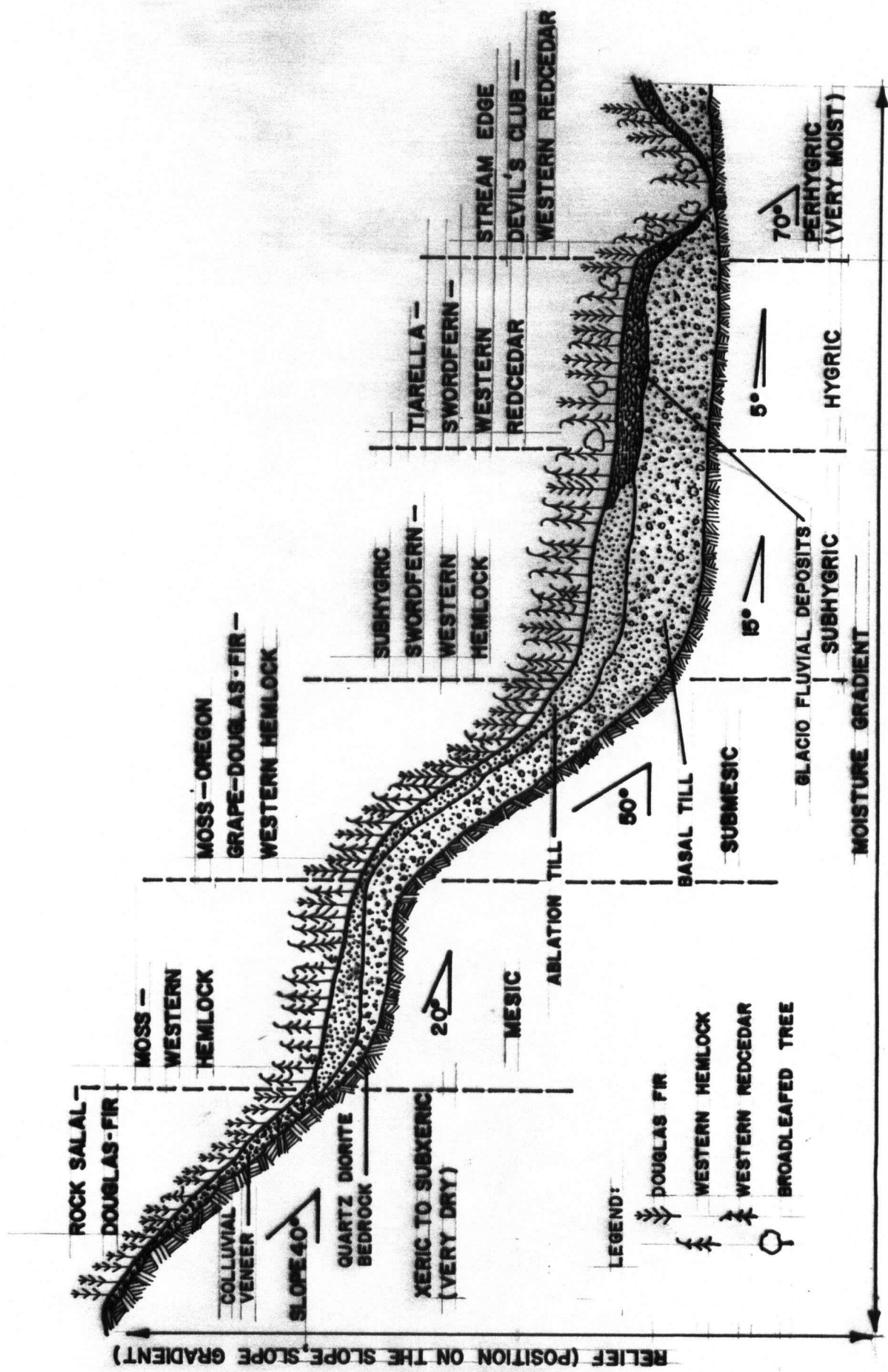
date SEPT. 1980

dr. ALM

scale

chk.

legend



UBC RESEARCH FOREST

FIGURE 2.1.8-2-A

GENERAL DESCRIPTION OF ECOSYSTEM ON THE UBC RESEARCH FOREST

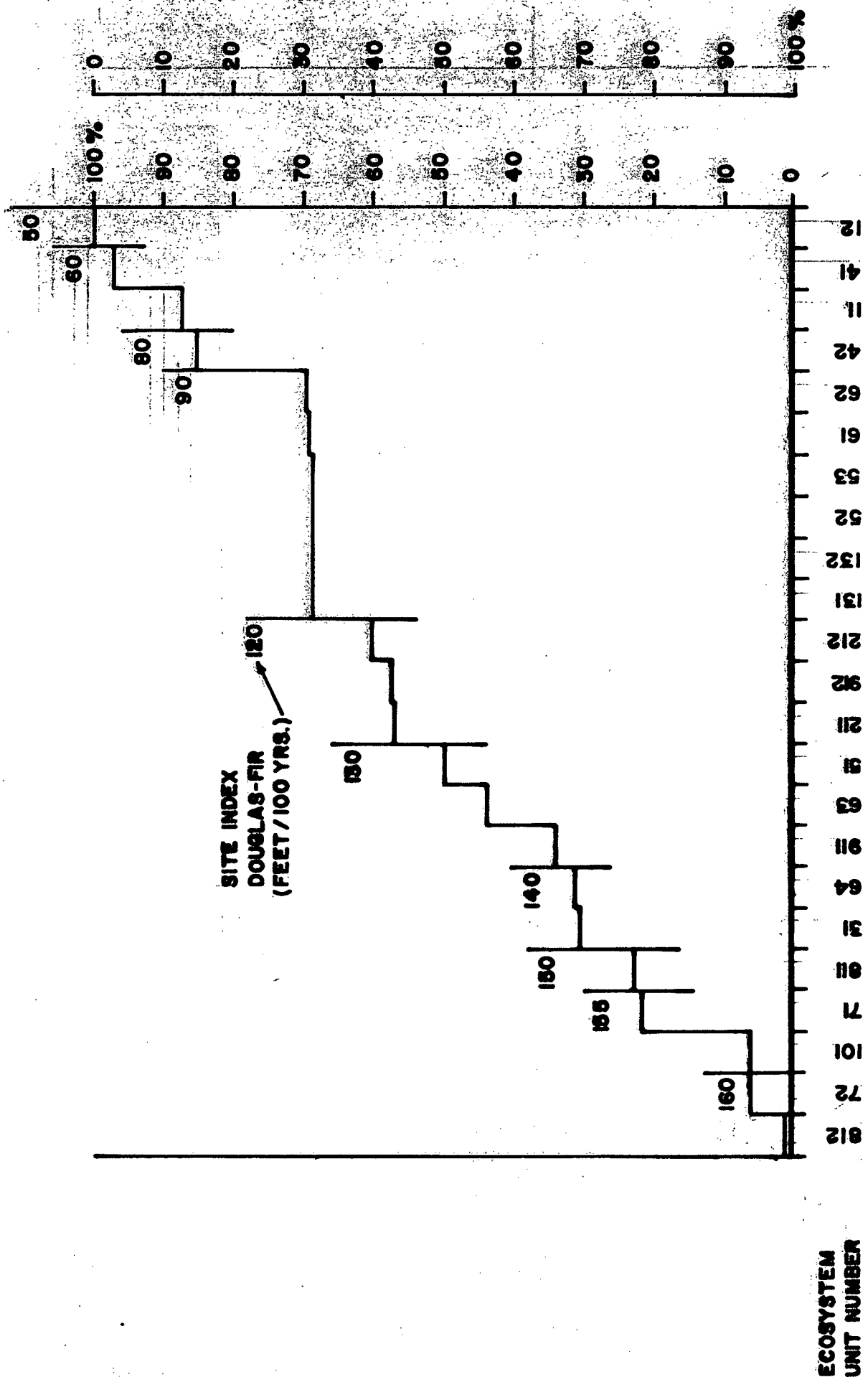
date SEPT. 1980

scale

dr. ALM

chk.

legend



UBC RESEARCH FOREST

FIGURE 2.1.8-10-A

PERCENTAGE AREA OF ECOSYSTEM UNITS (ILES 1977) ON THE UBC RESEARCH FOREST

date **SEPT. 1980**

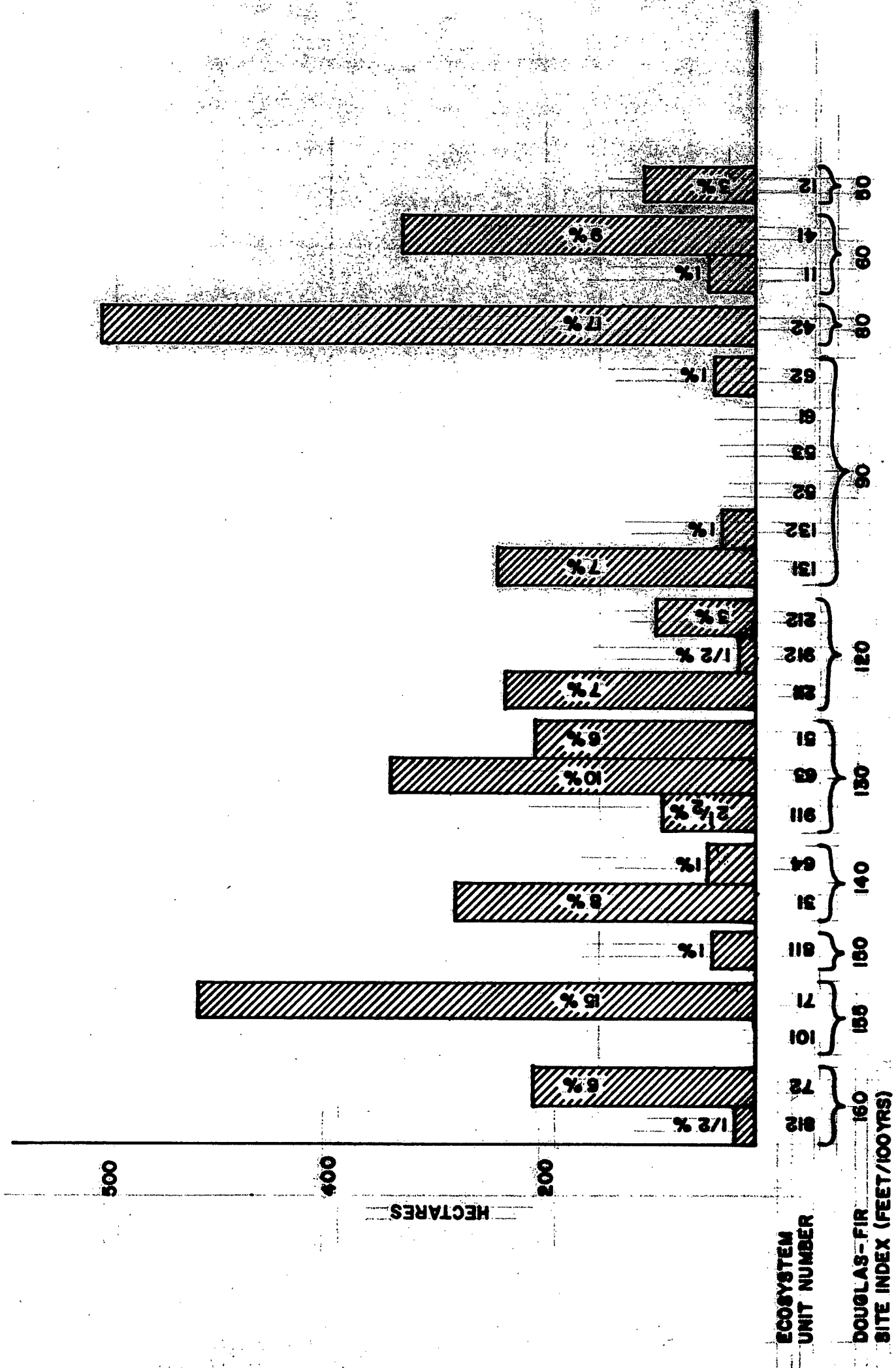
scale

dr. **ALN**

chk.

legend:

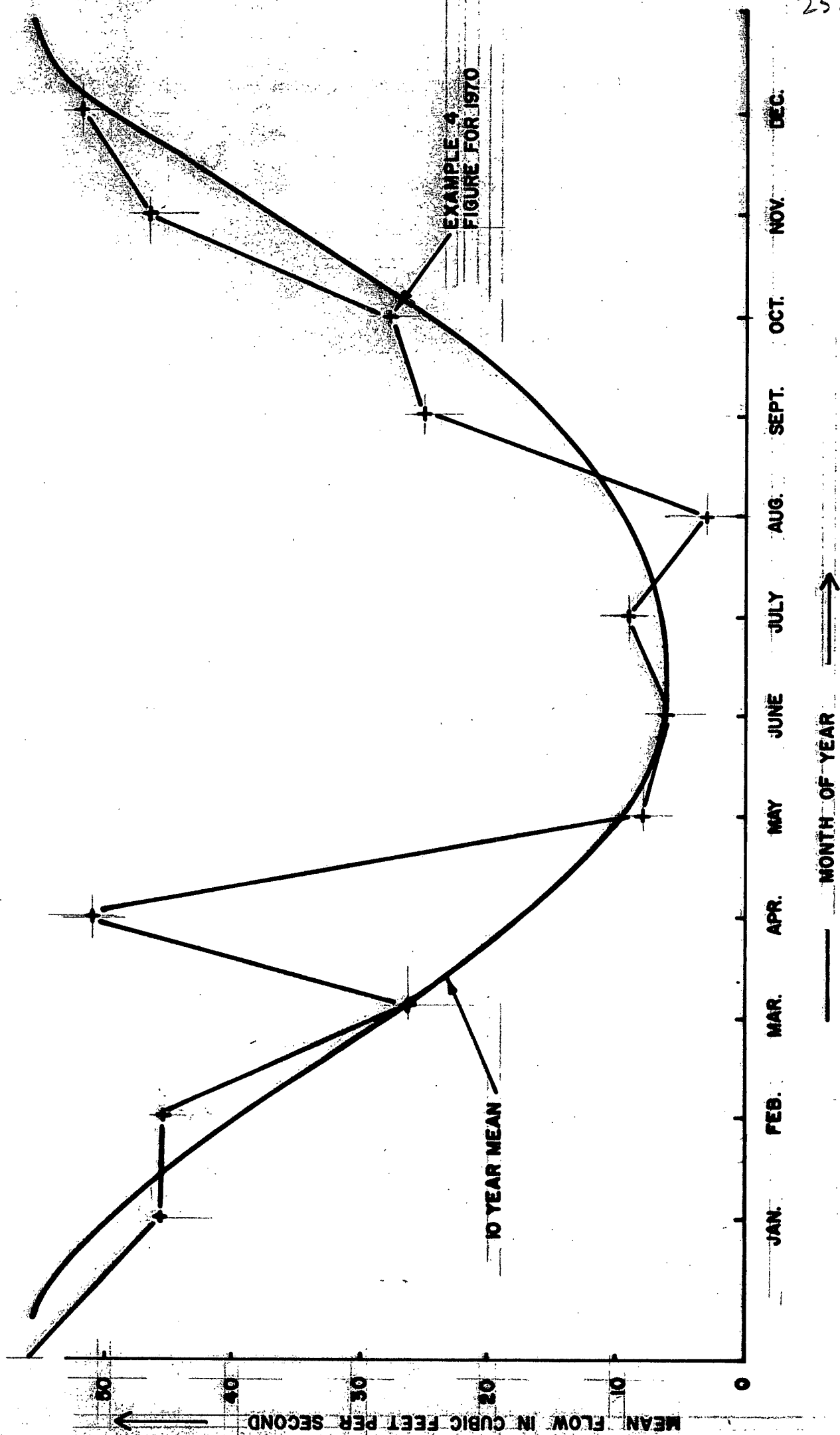
For key to ecosystem unit numbers see table 2.1.8-10(A)



UBC RESEARCH FOREST

FIGURE 2.1.8-10-B
AREA BY ECOSYSTEM UNITS (ILES 1977)
ON THE UBC RESEARCH FOREST

date SEPT. 1980	scale	legend:
dr. ALM	chk.	For key to ecosystem unit numbers see table 2.1.8-10(A)



UBC RESEARCH FOREST

FIGURE 2.2.2.1-5-A

HYDROGRAPH FOR UPPER JACOB'S CREEK ON THE UBC RESEARCH FOREST

date SEPT. 1980

scale

dr. ALH

chk.

legend

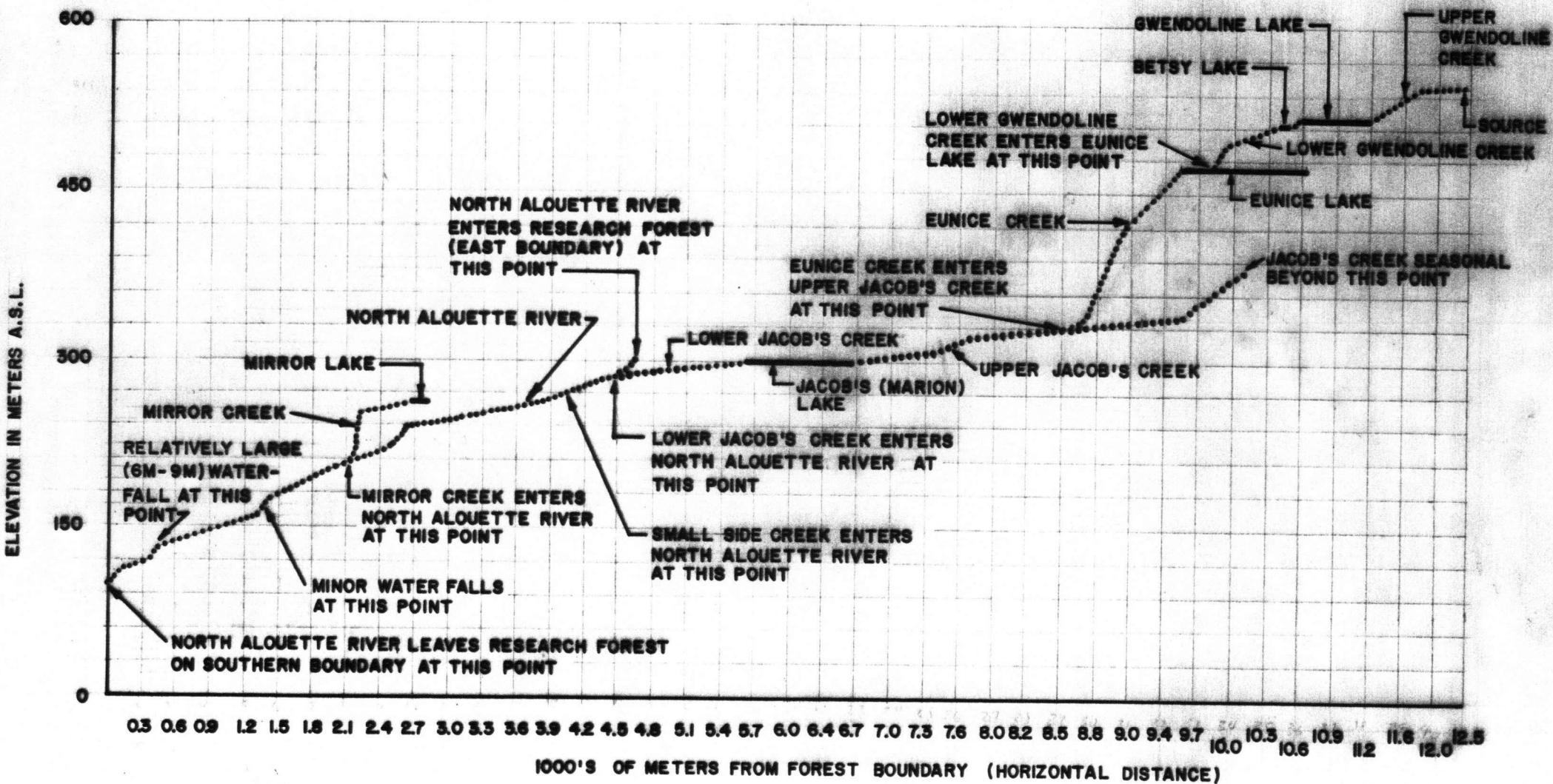


FIGURE 2.2.2.1-8-A

STREAM PROFILE OF NORTH ALOUETTE RIVER TO GWENDOLINE LAKE ON THE UBC RESEARCH FOREST

UBC RESEARCH FOREST

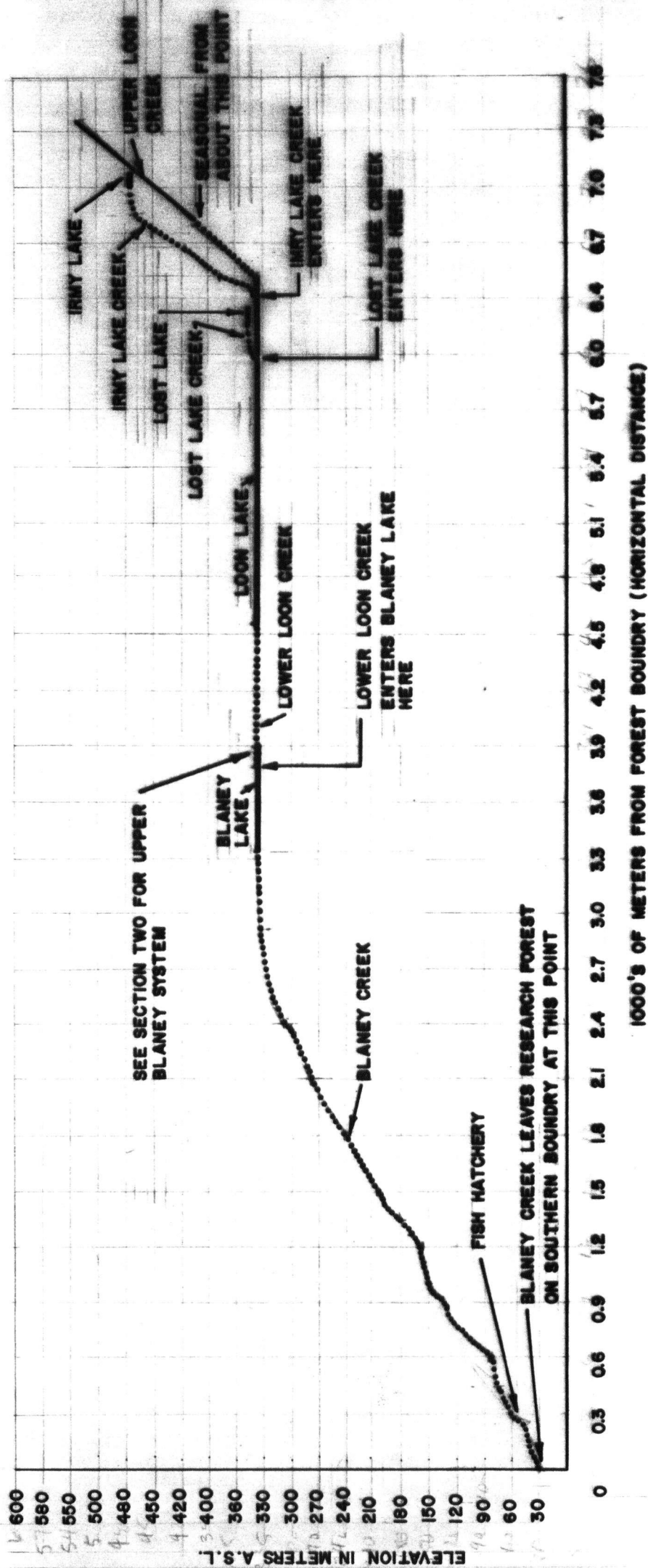
date SEPT. 1980

scale

dr. ALM

chk.

legend



UBC RESEARCH FOREST

FIGURE 2.2.2.1-8-B₁

STREAM PROFILE OF BLANEY CREEK TO PLACID LAKE ON THE UBC RESEARCH FOREST (SECTION I)

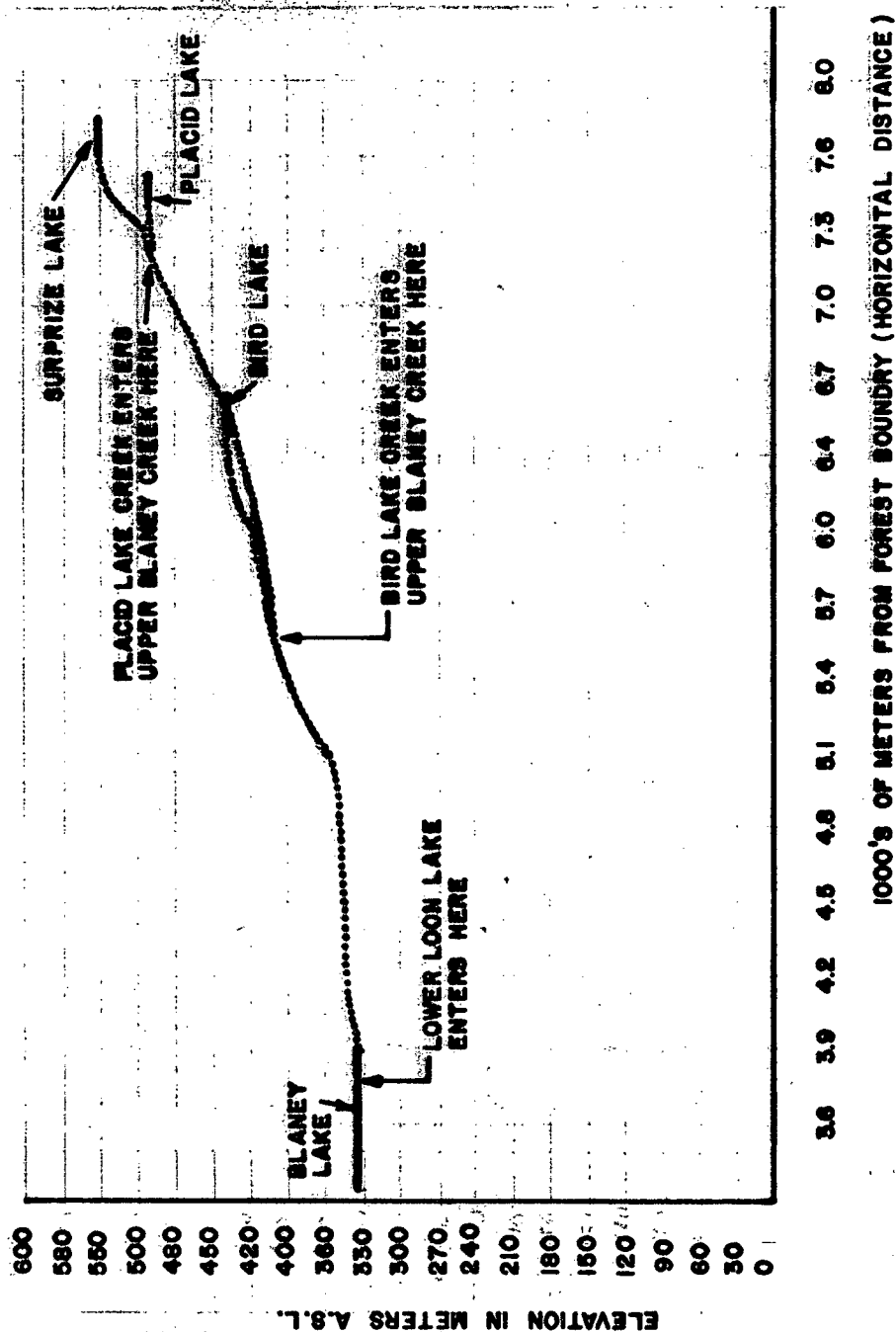
date SEPT. 1980

scale

dr. ALM

chk.

legend



UBC RESEARCH FOREST

FIGURE 2.2.2.1-8-B₂

STREAM PROFILE OF BLANEY CREEK TO PLACID LAKE ON THE UBC RESEARCH FOREST (SECTION 2)

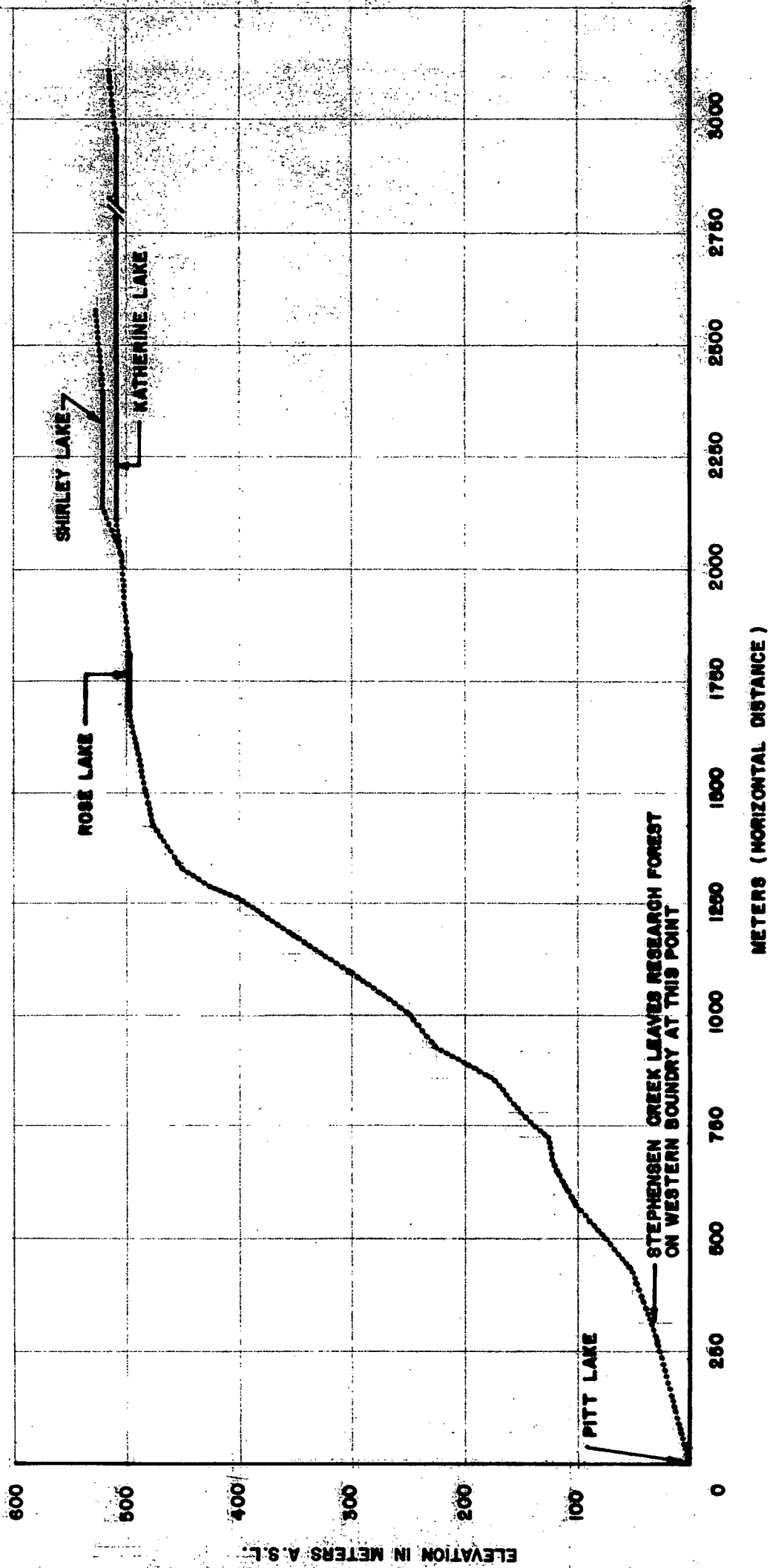
date SEPT. 1980

scale

dr. ALM

chk.

legend



UBC RESEARCH FOREST

FIGURE 2.2.2.1-8-C
STREAM PROFILE OF STEPHENSEN CREEK ON THE UBC RESEARCH FOREST

date	SEPT. 1980	scale	legend
dr.	ALM	chk.	

UBC RESEARCH FOREST			FIGURE 2.2.2.1-8-D	
date SEPT. 1980		scale	STREAM PROFILE OF RAVEN CREEK ON THE UBC RESEARCH FOREST	
dr. AVN	chk.	legend		

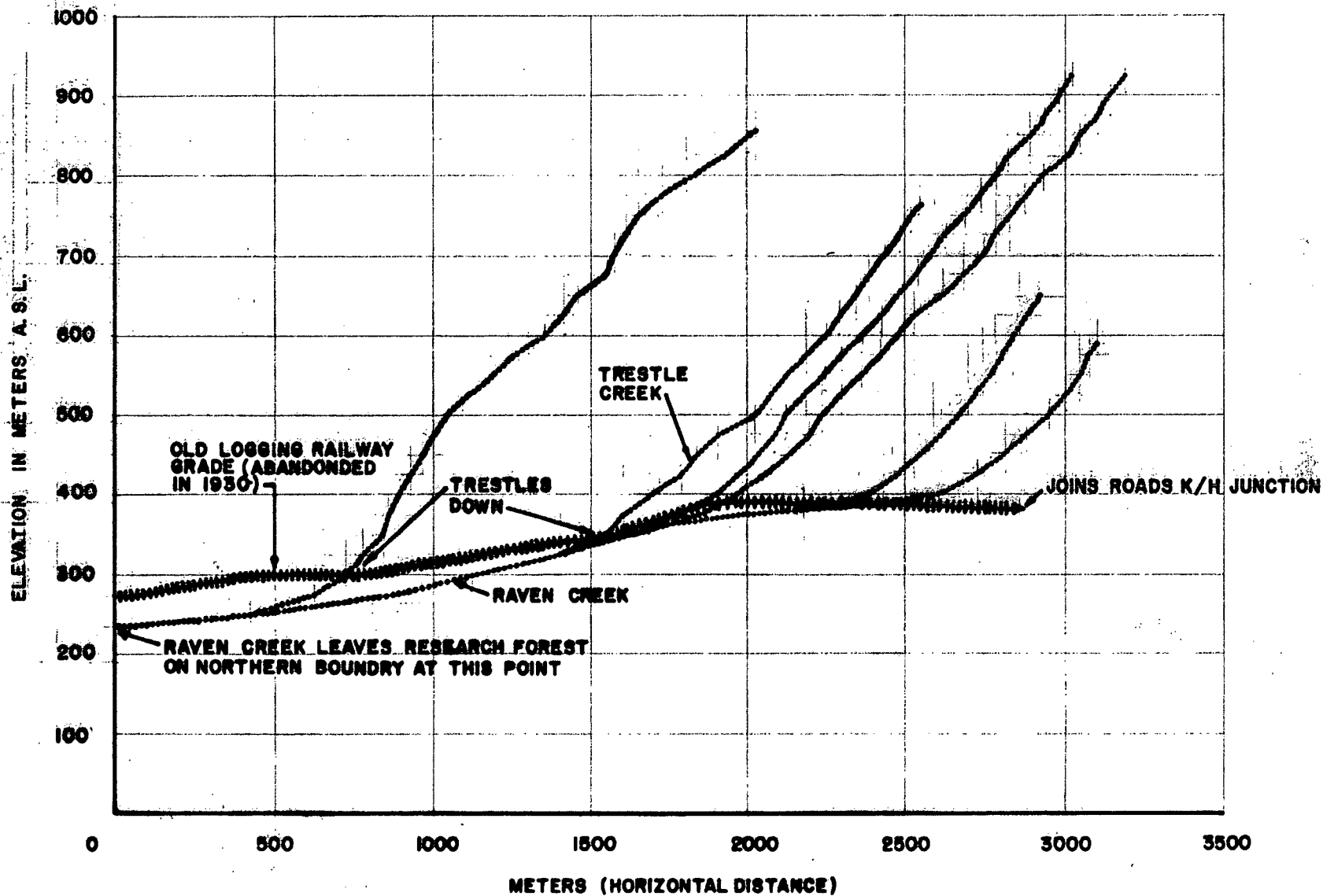


Figure 2.3.1-2-A Generalized Staff Structure of U.B.C. Research Forest
(See also Figures 2.3.2-1-A and 8.2.2-1-A following)

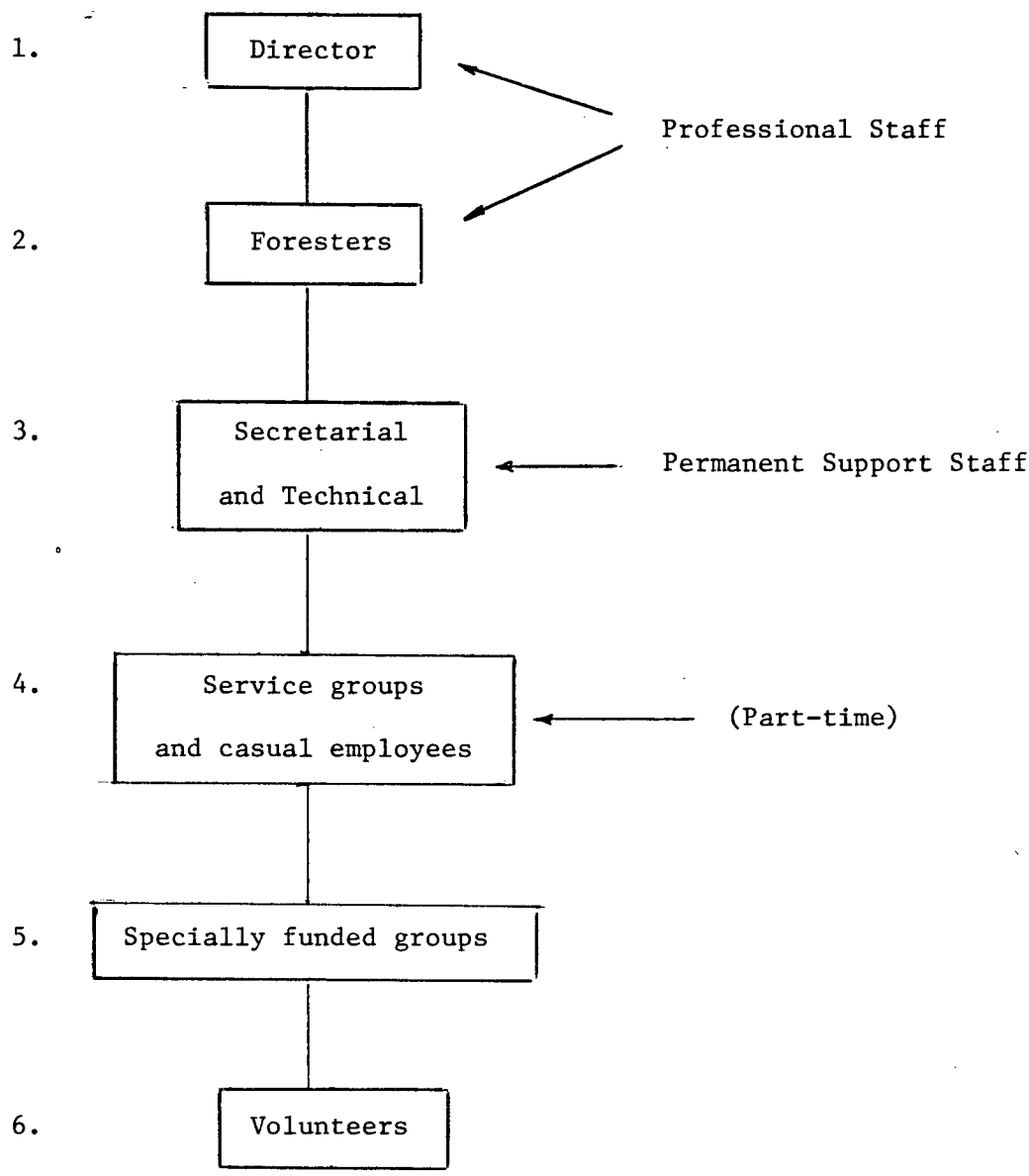
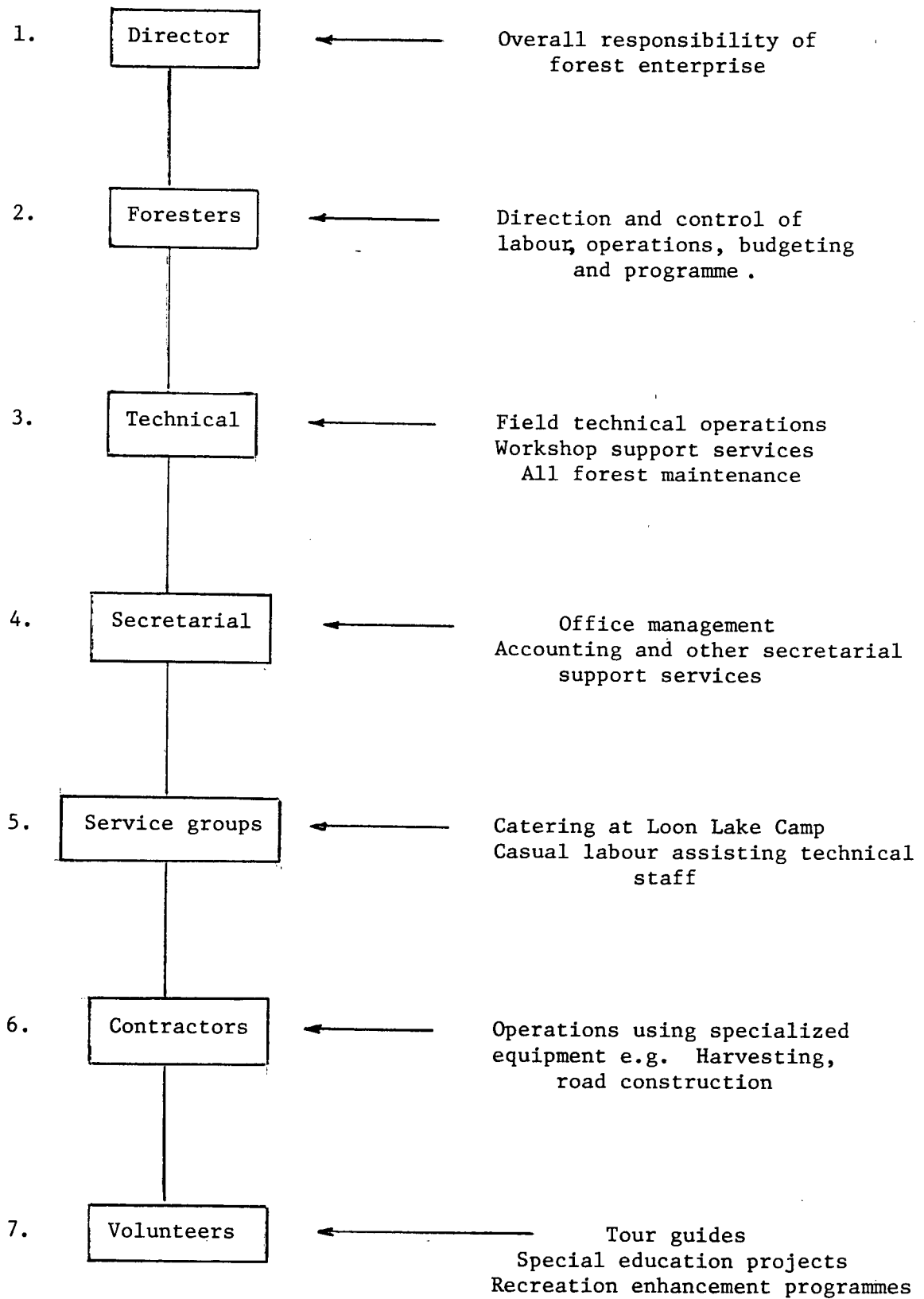
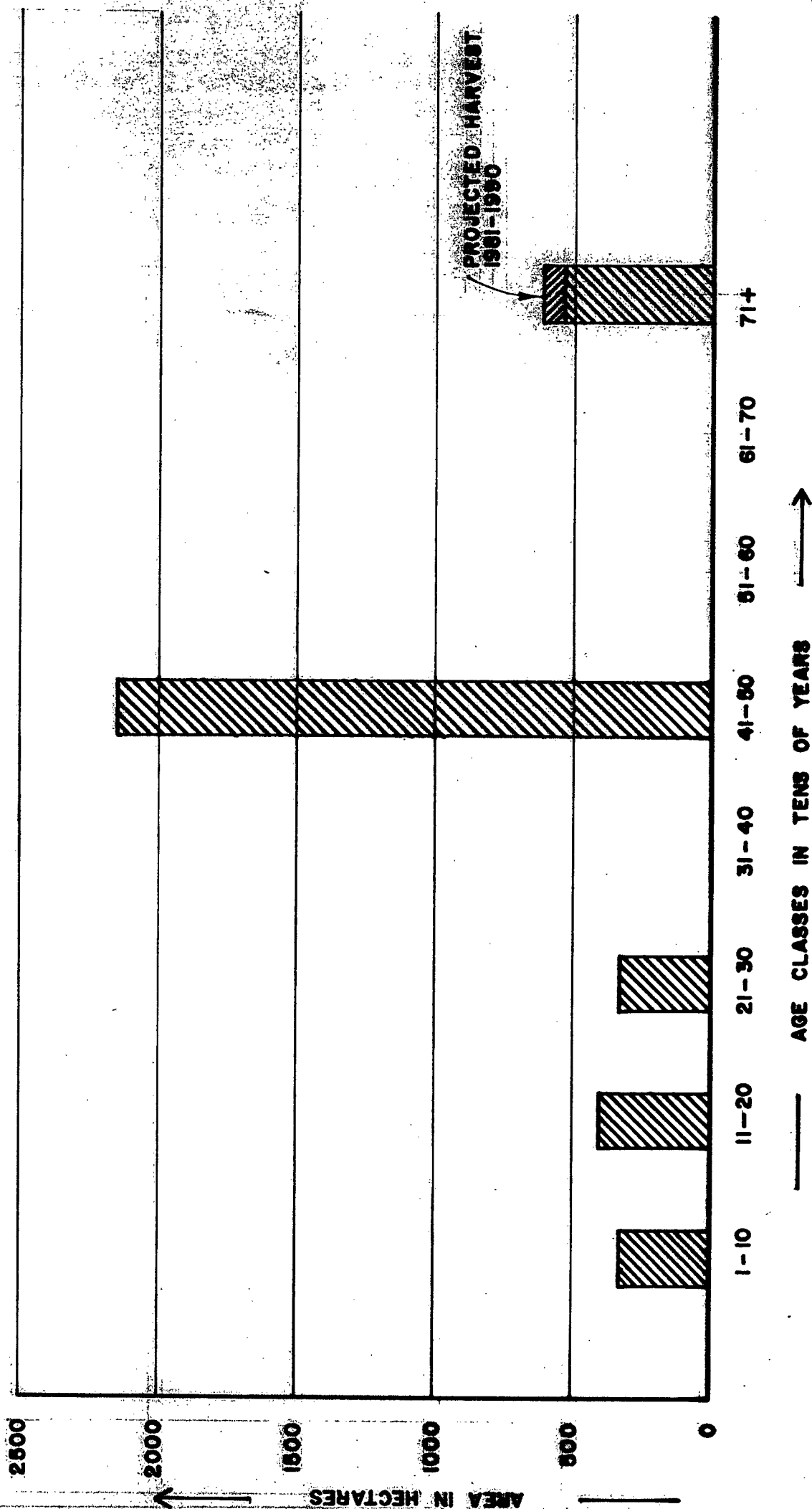


Figure 2.3.2-1-A Staff Responsibilities on the U.B.C. Research Forest

(See also 8.2.2-1-A following)





**UBC RESEARCH
FOREST**

date SEPT. 1980

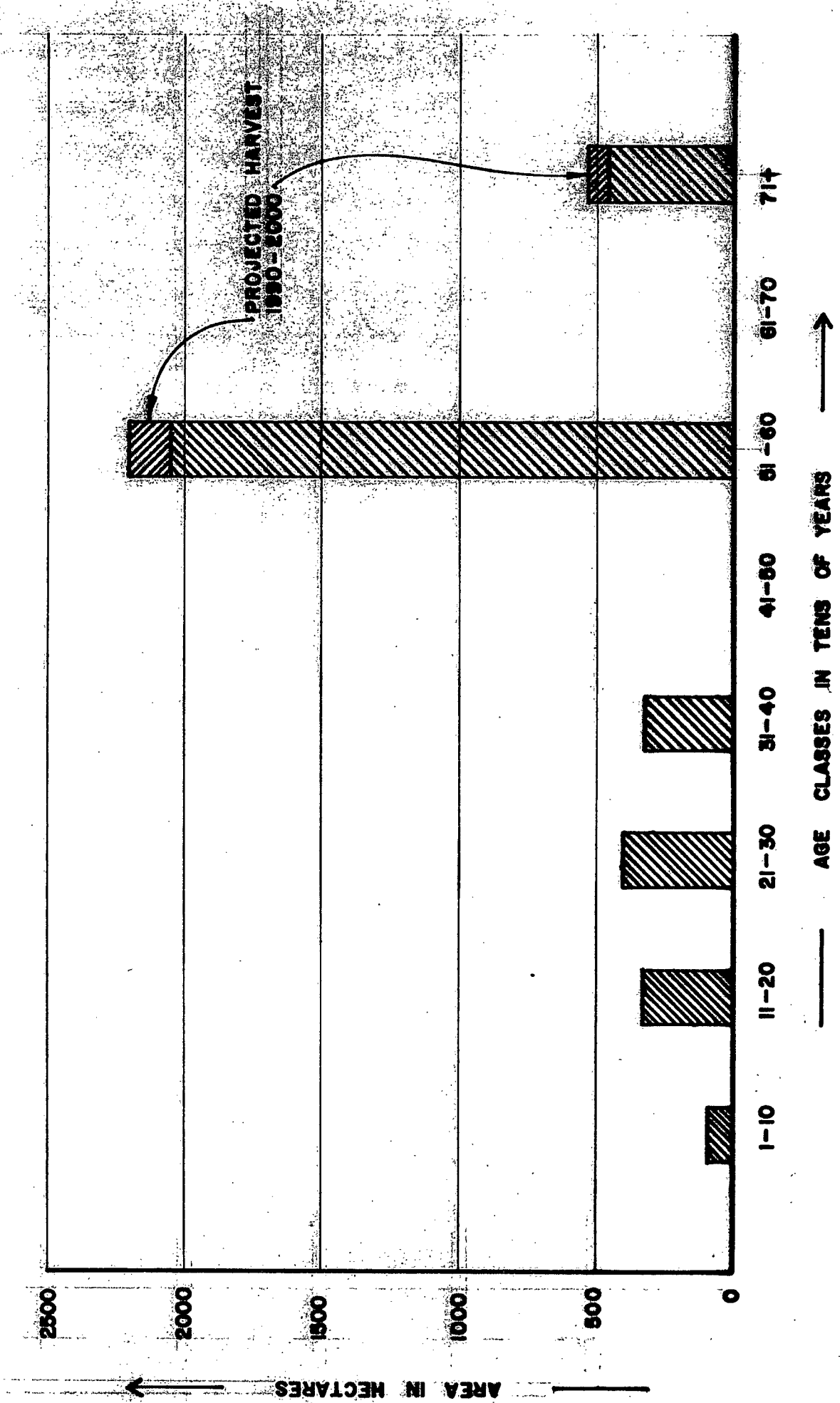
scale

dr. ALM

chk.

FIGURE 7.4.2-3-A

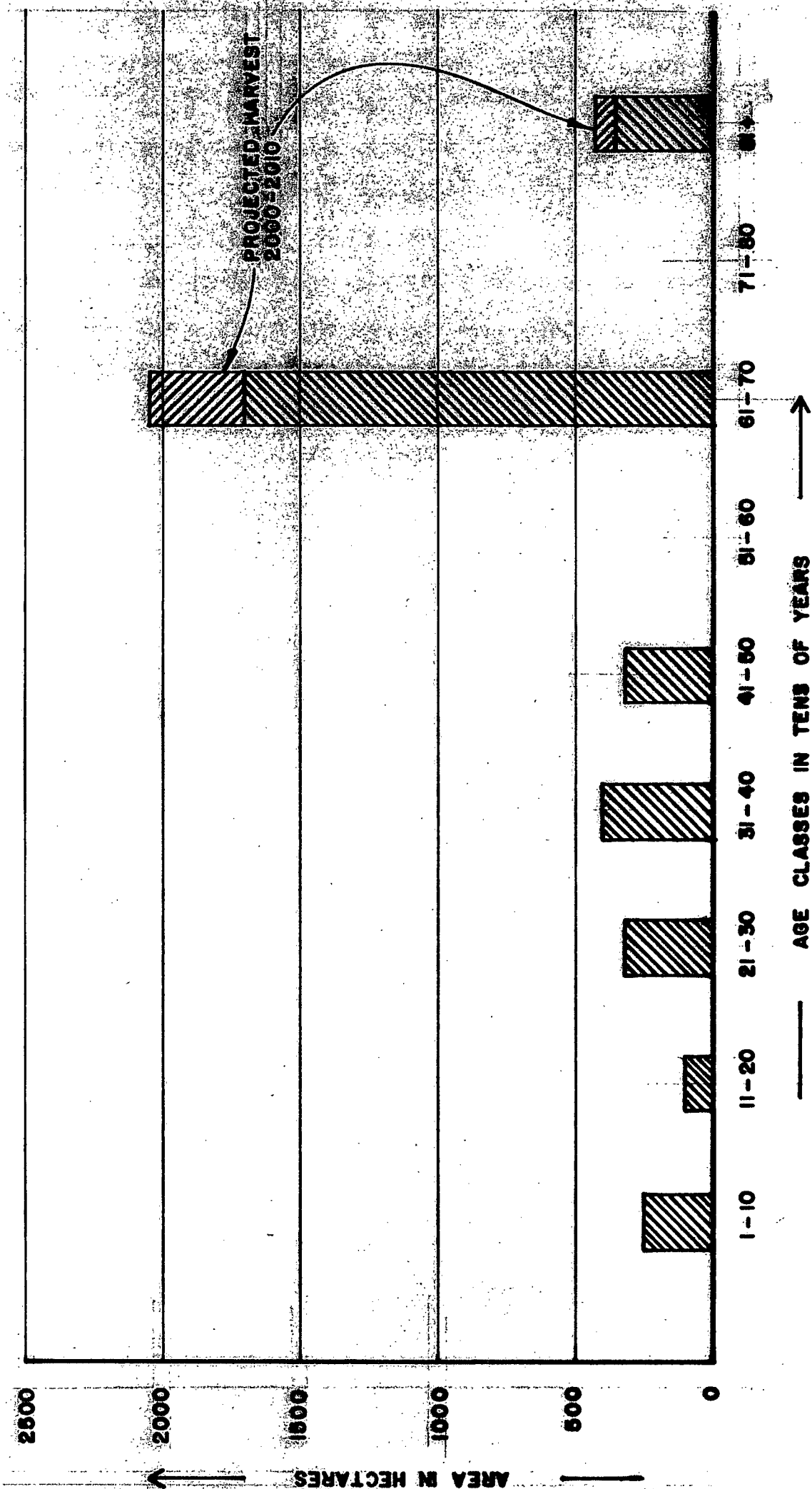
**SCHEMATIC REPRESENTATION OF
ADJUSTMENT TO NORMALITY
(BY AREA) 1980
BASE LINE YEAR 1980**



UBC RESEARCH FOREST

date SEPT. 1980	scale
dr. ALM	chk.

FIGURE 7.4.2-3-B
SCHEMATIC REPRESENTATION OF
ADJUSTMENT TO NORMALITY
(BY AREA) - 1990
BASE LINE YEAR 1980



UBC RESEARCH FOREST

date SEPT.1980

scale

dr. ALN

chk.

FIGURE 7.4.2-3-C

SCHEMATIC REPRESENTATION OF
ADJUSTMENT TO NOMALITY
(BY AREA) -2000
BASE LINE YEAR 1980

UBC RESEARCH FOREST

Dr. ALM

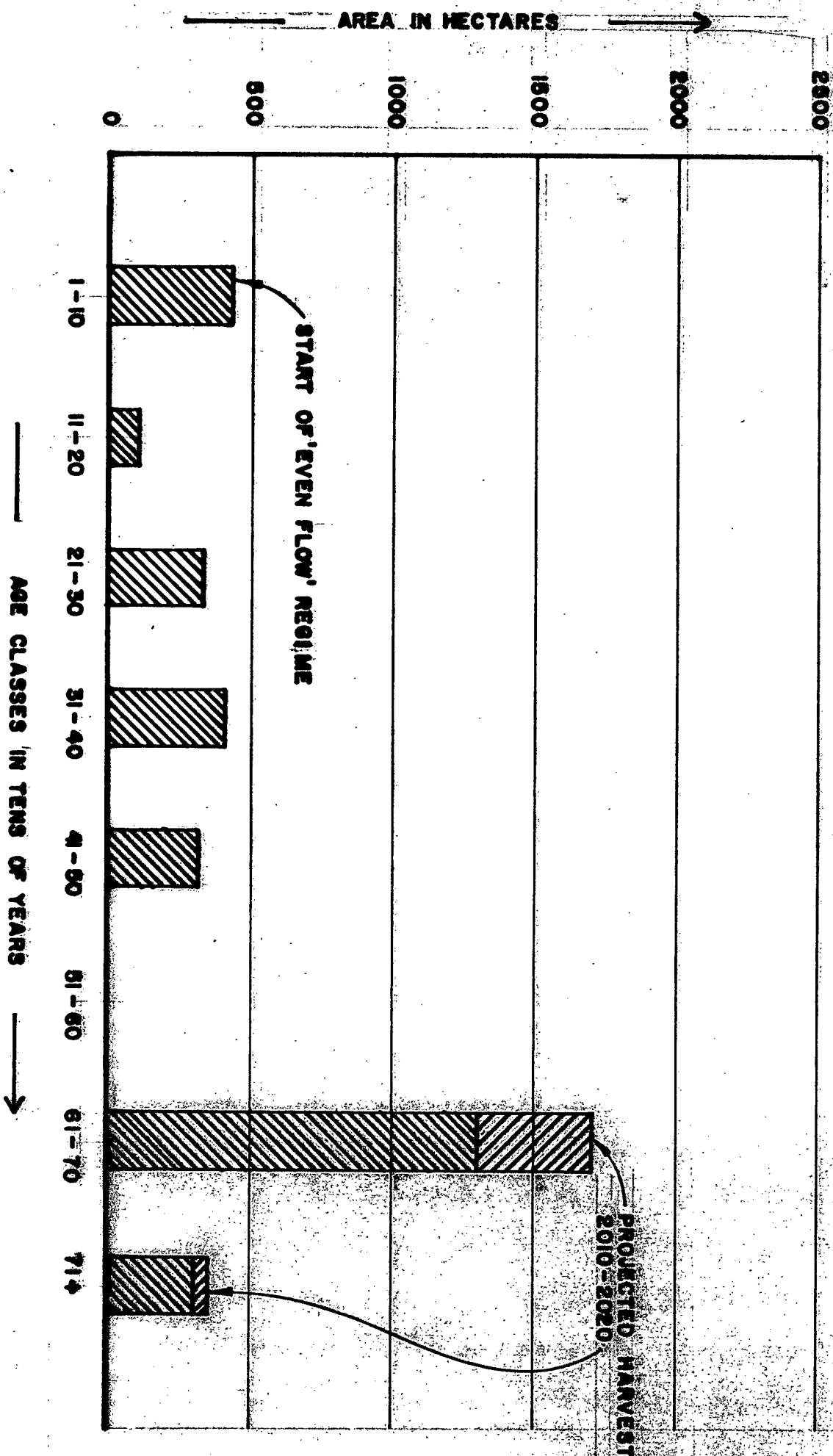
chk.

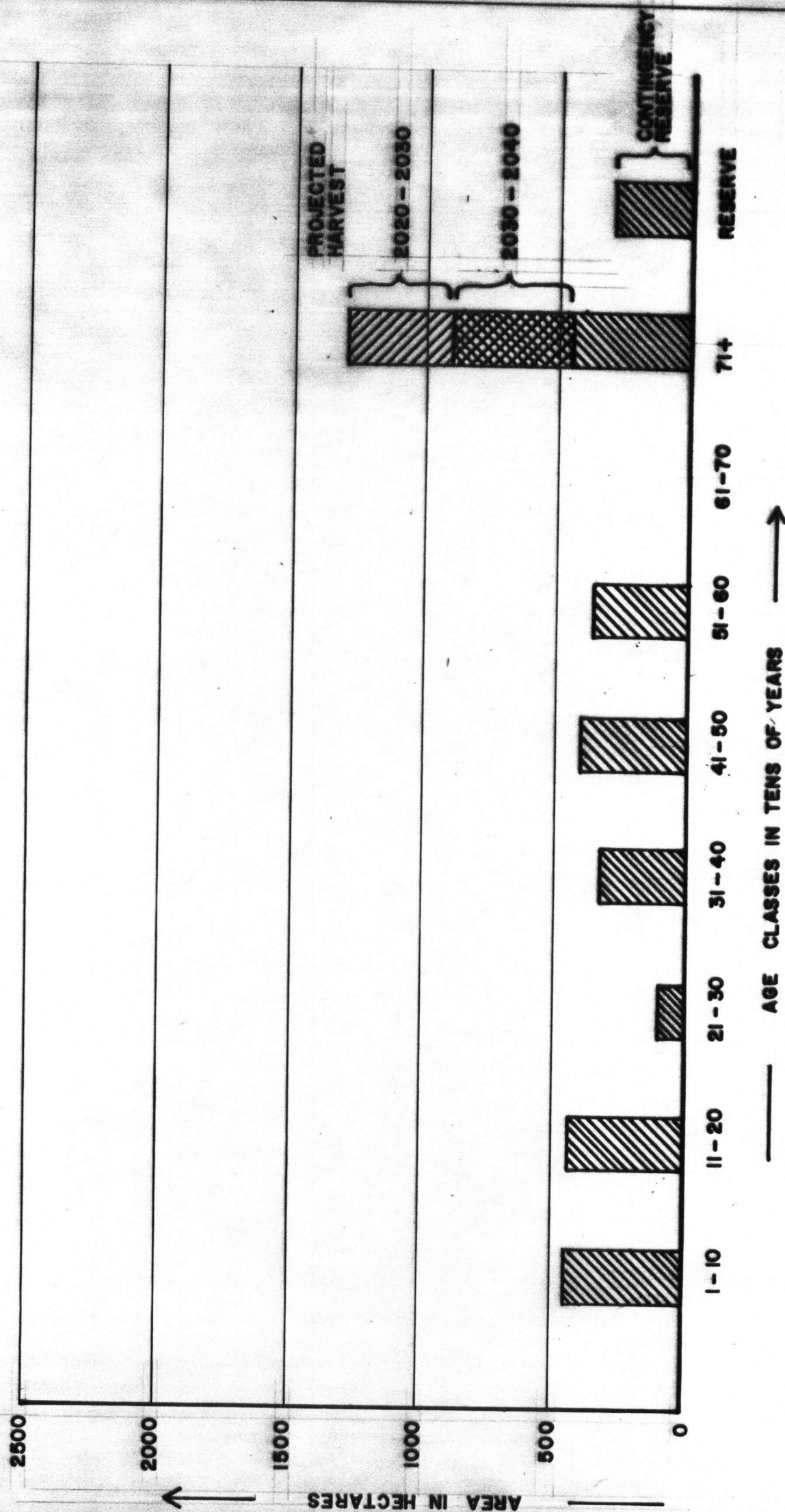
date SEPT. 1980

scale

SCHEMATIC REPRESENTATION OF
ADJUSTMENT TO NORMALITY
(BY AREA) - 2010
BASE LINE YEAR 1980

FIGURE 7.4.2-3-D





UBC RESEARCH FOREST

date SEPT. 1980

scale

dr. ALM

chk.

FIGURE 7.4.2-3-E

SCHMATIC REPRESENTATION OF
ADJUSTMENT TO NORMALITY
(BY AREA) - 2020
BASE LINE YEAR 1980

Figure 8.2.2 - 1-A U.B.C. Research Forest Staff Structure 1982/83

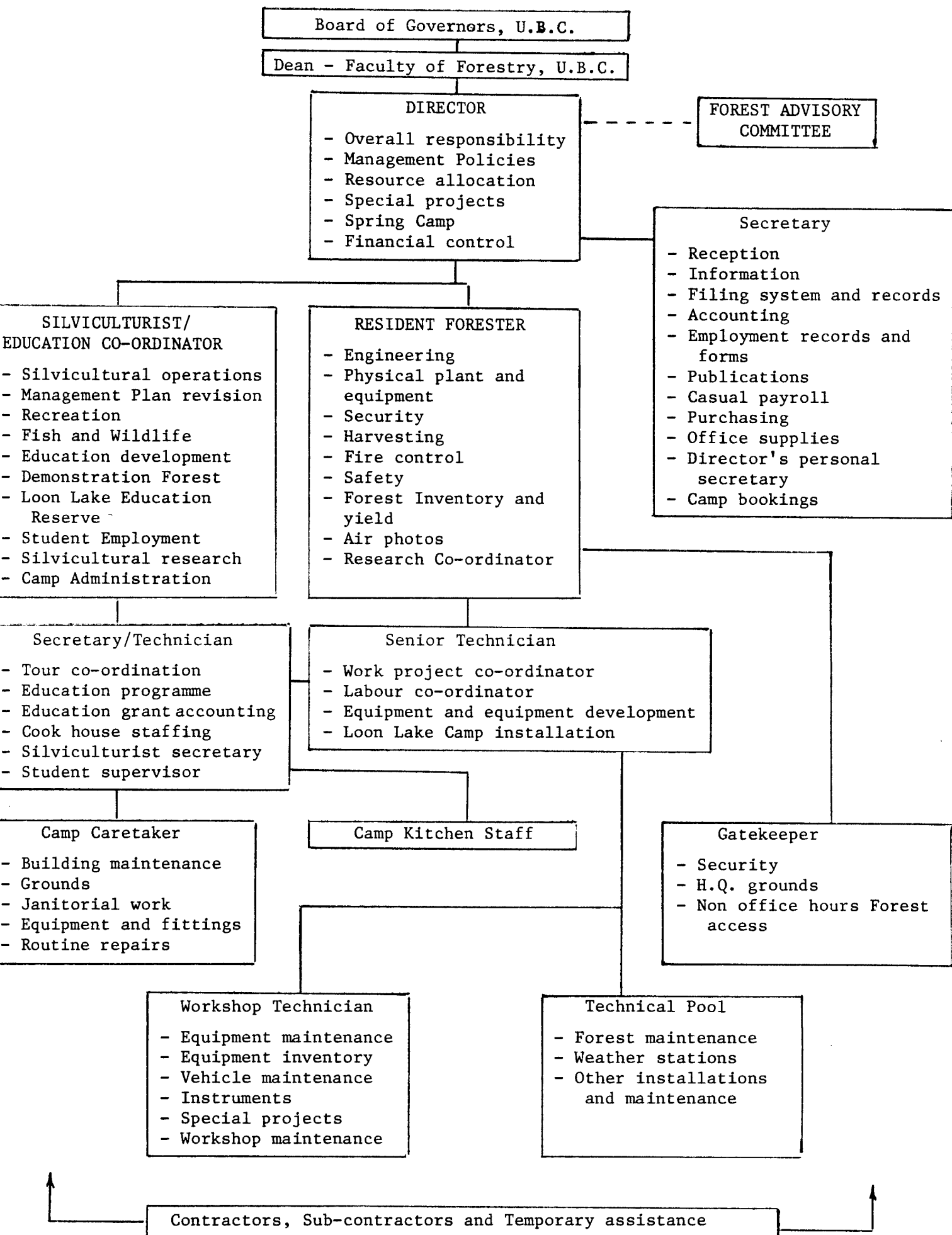


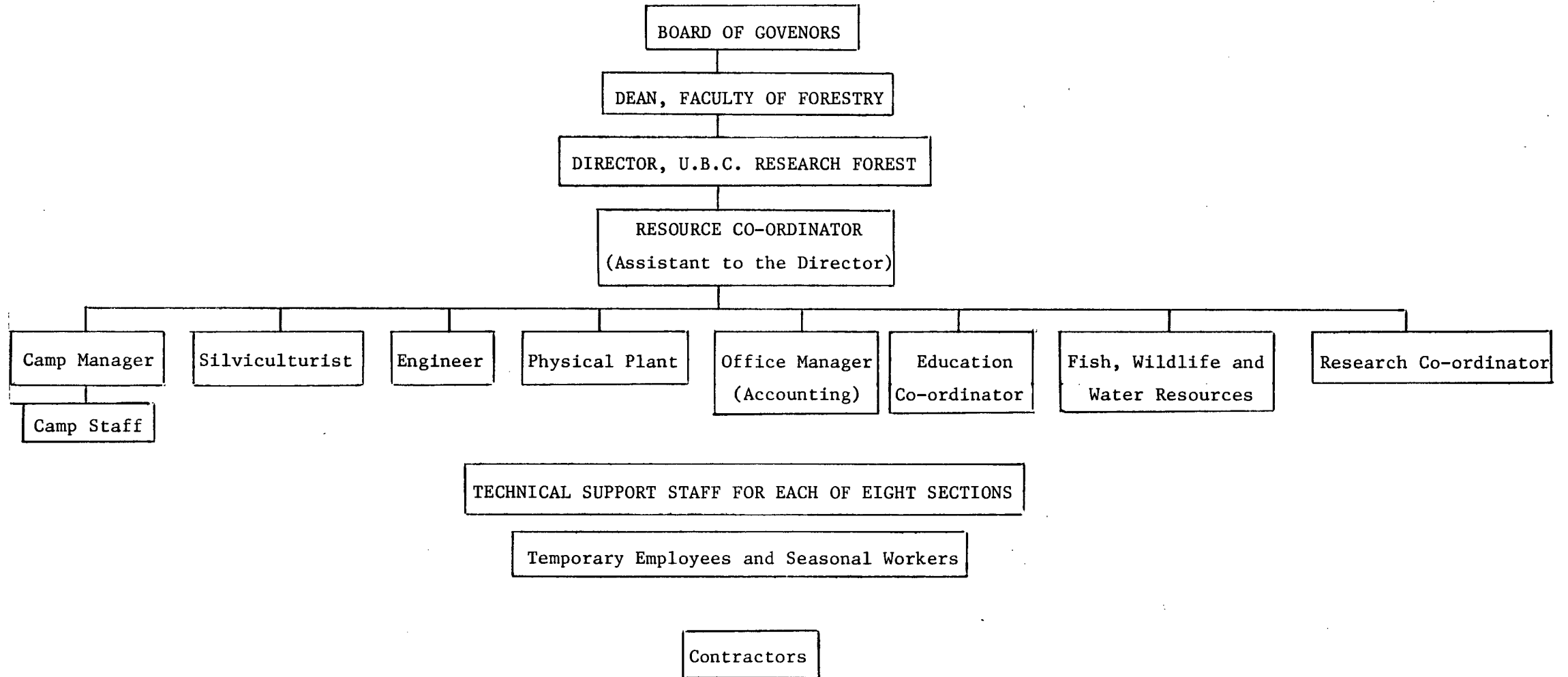
Figure 9.5.1-2-A Projected Future Staff Structure

Table 2.1.1-3-A General Land Classification of the U.B.C. Research Forest

Land classification	Hectares	Area details	
		Acres	Per cent
Productive and potentially productive forest land (including areas within Reserves)	4,620.3	11,417	89.7
Creeks	36.4	90	0.7
Lakes	126.2	312	2.5
Swamp	16.1	40	0.3
Rock slides	21.8	54	0.4
Rock	137.1	339	2.7
Scrub	53.8	133	1.0
Gravel pits	2.0	5	0.0
Buildings	4.0	10	0.1
Arboretum	8.0	20	0.2
Roads	107.6	266	2.1
Research plots	16.9	42	0.3
Total non productive area	(529.9)	(1,311)	(10.3)
	5,150.2	12,728	100.0

Table 2.1.1-3-B U.B.C. Research Forest -- Details of Compartment Areas

Compartment No.	Lakes	Roads	Quarries	Swamp	Creeks	Slides	Rock	Forest	Other	Total
1.				1.2	1.2	3.6	9.7	131.1		146.8
2.				0.4	0.4	2.4	7.6	122.2		133.0
3.		6.4	0.4		0.4	1.2	12.9	99.5		120.8
14.	21.5	5.2		0.8		1.2	6.4	136.3		171.4
5.				1.2		2.0	11.3	191.3		205.9
6.					0.4	1.2	9.3	161.0		171.9
7.		6.0		0.8	0.8	0.8	10.5	153.7		172.6
8.	14.9	8.9	0.8	0.4		0.4	4.4	119.3		149.1
9.					0.4	1.6	5.6	159.4		167.0
10.				1.2		0.4	2.0	143.2		146.8
11.				0.4	0.8	1.2	4.4	150.5		157.5
12.	0.4			0.8	0.4	0.8	8.4	130.3		140.7
13.		0.8		0.8		0.8	2.0	123.4		127.8
14.	2.0	3.2		0.8	0.8	0.8	3.6	123.0		134.2
15.	10.9	5.2		0.8		0.4	3.2	79.7		100.2
16.					0.4	1.6	6.0	125.0		133.0
17.		4.0					6.0	95.5		105.5
18.	0.4			0.4			4.0	151.7		156.5
19.	48.9	2.0		0.4	1.6		2.4	95.5	2.8	154.0
20.	0.8	6.8		0.4			2.4	144.8		155.2
21.		2.4					1.6	142.0		146.0
22.		1.2		1.2	1.6	0.4	2.4	112.0		118.8
23.	13.3	4.4	0.4	1.2		0.4	0.8	133.1		153.6
24.		3.2			0.4	0.4	4.0	179.2	1.2	188.4
25.	0.4	6.0	0.4	0.4	10.1		1.2	112.0	0.4	130.9
26.		4.0		0.8				119.7		124.5
27.		4.8			0.4		2.4	127.8		135.4
28.	8.5	8.9			7.2			238.7		263.3
29.		3.2			0.4		1.6	173.6		178.8
30.	3.6	4.8		1.2	2.4			84.9	15.3	112.2
31.		4.0						100.3	1.6	105.9
32.		4.8			5.2			105.2	12.1	127.3
33.		2.0			0.4			80.9		83.3
34.	0.8	2.0		0.8	0.4			164.7		168.7
35.		2.0						129.0	27.9	158.9
Total	126.4	106.6	2.0	16.4	36.1	21.6	137.3	4,639.6	61.3	5,147.4

Table 2.1.1.4-A Areas of the Lakes on U.B.C. Research Forest

Name	Area ¹	
	Hectares	(Acres)
Jacobs (Marion)	13.31	(32.95)
Placid	1.83	(4.54)
Gwendoline	11.13	(27.55)
Eunice	14.12	(34.94)
Katherine	20.00	(49.43)
Shirley	1.03	(2.55)
Betsy	0.23	(0.57)
Rose	0.92	(2.27)
Surprise	0.23	(0.57)
Irmy	0.34	(0.85)
Lost	0.34	(0.85)
Blaney	8.71	(21.59)
Goose	3.44	(8.52)
Loon	49.35	(122.15)
Mirror	0.69	(1.70)
Peaceful	0.17	(0.42)
Bird	0.23	(0.56)
Total Lake Area	134.07	(312.01)

- 1 Areas were determined by planimeter from the 1:12,000 base map (1964) of the U.B.C. Research Forest.
- 2 Discrepancy between the figure of 134.17 hectares and 126.4 hectares shown on Table 2.1.2-3-B arises due to sub-compartment areas are not recorded under 0.4 hectare.
- 3 The boundary of the U.B.C. Research Forest passes through both Goose and Peaceful Lakes, thus, the total surface area of the lakes is not recorded on the table.

Table 2.1.1-5-A Lengths, Widths and Areas of the Main Creeks and Rivers on the U.B.C. Research Forest

Name	length		width		area	
	meters	(feet)	meters	(feet)	hectares	(acres)
Alouette River	6,000	19,000	15	50	9.15	22.61
Spring Creek	3,690	12,100	9	30	3.37	8.33
Blaney Creek	6,650	21,800	10	35	7.08	17.50
Donegani Creek	2,680	8,800	6	20	1.62	6.00
Loon Creek	820	2,700	9	30	0.73	1.85
Trestle Creek	2,100	6,900	6.0	20	1.22	3.01
Other small creeks	22,000	72,000	4.5	15	13.28	32.82
	44,000	144,100			36.45	90.12

Lengths of rivers and creeks were determined from 1:12,000 base map of the U.B.C. Research Forest. Widths of the rivers and creeks estimated from measurements.

Table 2.1.2-34-A Product Sale Summary for 1957 - 1958

<u>Product Sold</u>	<u>Revenue</u>	<u>Percent of total</u>
Split products	\$ 3,946.68	7.2
Cedar poles	2,846.37	5.2
Pulpwood and small logs	969.72	1.8
Large sawlogs and veneer logs	47,132.70	85.8

The following were produced by contractors operating on the U.B.C. Forest:-

Tapered shakes	217,675 square feet
Blank shakes	78,152 pieces
Cedar poles	35,918 lineal feet
Shingle bolts	65.5 cords
Pulpwood	30 cords
Piling	640 lineal feet
Saw logs	2,875,287 board feet
Veneer logs	840,348 board feet

¹Source:- Sales slips and Research Forest records.

Table 2.1.2-36-A Summary of U.B.C. Research Forest Activities for the
Years 1948 - 1957¹

Year	No. of Sales Operating	Products	Stumpage Income	Expend- itures	Existing length of road	
					Kilo- meters	(Miles)
1948	1	Cedar shakes	\$ 250	\$ 6,000	4.0	(2½)
1949	1	Cedar shakes	400	6,000	4.0	(2½)
1950	3	Cedar shakes Salvaged logs	1,000	7,000	4.0	(2½)
1951	3	Cedar shakes Saw logs	3,000	8,000	4.0	(2½)
1952	3	Cedar shakes Saw logs	7,000	8,000	4.0	(2½)
1953	3	Cedar shakes Saw logs Wood logs	22,000	18,000	12.0	(7½)
1954	4	Cedar shakes Saw, veneer, wood logs	28,500	25,000	16.0	(10)
1955	8	Cedar shakes Shingle bolts Box lumber Cedar poles Saw, wood Veneer logs	29,000	56,000	28.9	(18)
1957	13	All split products, cedar poles fir pilings, Saw, veneer, logs, hemlock pulpwood	54,800	76,000	40.2	(25)

¹Fiscal Year - April 1 to March 31.

Table 2.1.2-61-A Details of the 1963 U.B.C. Research Forest Five Year Logging and Development Plan

Year	Old-growth logging volume (MM fbm)	Area		Road Construction	
		Hectares	(acres)	Meters	(feet)
1964/65	6.4	80.5	(199)	2980	(9,800)
1965/66	5.8	59.0	(146)	3100	(10,200)
1966/67	7.5	83.5	(207)	3650	(12,000)
1967/68	6.6	65.9	(163)	4950	(16,220)
1968/69	5.7	67.0	(166)	3750	(12,300)
Total 1964/69	32.0	356	(881)	18500	(60,500)

Table 2.1.2-68-A Annual Cutting on the U.B.C. Research Forest 1948 - 1966
in Relation to Allowable Cut

Year	Years under Regulation	MBM scaled	Actual Cut		
			Cumulative MBM scaled	Average Vol. scaled Since 1951	Allowable Cut in Force (MBM) ¹
1947-48	-	-	-		
1948-49	-	-	-		
1949-50	-	-	-		
1950-51	0	-	-		
1951-52	1	-	-	0	2200
1952-53	2	1106	1106	553	3000
1953-54	3	2506	3612	1200	3000
1954-55	4	4993	8605	2780	3000
1955-56	5	4060	12665	2530	3000
1956-57	6	3715	16380	2730	3000
1957-58	7	3843	20223	2900	3250
1958-59	8	3726	23949	2990	3250
1959-60	9	5003	28952	3220	3250
1960-61	10	5639	34591	3459	3250
1961-62	11	1934	36525	3320	3250
1962-63	12	10241	46766	3900	3250
1963-64	13	9904	56670	4360	3250
1964-65	14	7925	64595	4600	3250
1965-66	15	<u>6439</u>	71034	4735	4300
Total 1948-66		71034			

¹In determining the allowable cut during these years, no account was taken of the skewed nature of the age class distribution, nor was there a detailed breakdown of the yield from the different major age classes. Areas of reserves, low productivity and poor accessibility were not shown, and no account was taken of the lack of normality of the age classes.

²Figures are shown, as recorded, in board feet measure. Approximate conversion: 5.66 cubic meter to 1,000 board feet.

³For figures to 1980, see Appendix 2.2.1.1-3- A and B.

Table 2.1.2-107-A Summary of Income, Expenditure, Surplus or Deficit and Volume Logged from 1963 - 1973 for the U.B.C. Research Forest¹

	Income	Expenditure	Capital expenditure	Surplus or deficit	Volume logged (M fbm)	Cumulative from 1952 - 1953
1963/64	499,824	390,272	67,029	+42,465	9,904	56,670
1964/65	491,902	337,029	73,381	+81,491	7,925	64,595
1965/66	433,199	426,388	82,356	-75,548	6,439	71,034
1966/67	481,194	369,214	64,804	+47,176	7,919	78,953
1967/68	309,665	248,393	26,170	+35,101	5,281	34,234
1968/69	322,613	280,214	96,410	-54,011	4,777	89,011
1969/70	336,430	292,238	54,908	-10,715	3,750	92,761
1970/71	351,688	341,284	69,640	-59,239	4,733	97,494
1971/72	244,905	262,838	33,808	-51,741	2,968	100,461
1972/73	372,294	290,956	63,678	+17,659	3,110	103,572
1973/74	211,591	306,333	93,554	-88,301	2,411	105,984
Totals for 11 year period	4,055,305	3,545,164	725,795	-115,661	59,209 M fbm ²	

¹Figures reproduced from U.B.C. Research Forest Annual Reports 1963 - 1973

²Approximate metric conversion 1,000 fbm=5.66 m³

Table 2.1.6-1-A. Soil Legend for the Preliminary Soils Map of the U.B.C. Research Forest (Map 2.1.6-1-A)

Material	Symbol	Series			Slopes (%)
Glacial Till	CI	Cardinal	Mini Ferro-humic Podzol	moderately well	15-35
	ST	Steelhead	Cleved Mini Ferro-humic Podzol	imperfect	2-20
	BE	Blaney	Mini Ferro-humic Podzol	moderately well	20-50
	MN	Marion	Cleved Mini Ferro-humic Podzol	imperfect	10-40
	SN	Strachan	Orthic Ferro-humic Podzol	moderately well	20-50
	BW	Burwell	Gleyed Orthic Ferro-humic Podzol	imperfect	10-40
	GE	Golden Ears	Orthic Ferro-humic Podzol	moderately well	15-50
Glacial Till	WH	Whonnock	Gleyed Orthic Ferro-humic Podzol	imperfect	5-30
2 feet over rock	CE	Cannel	Lithic Mini Humo-ferric Podzol	well rapid	20-60
	S	Sayres	Lithic Orthic Ferro-humic Podzol	well-moderately well	20-60
	HB	Hollyburn	Lithic Orthic Humo-ferric Podzol	well-moderately well	20-60
Glaciofluvial (out-wash and ice contact)	CP	Capilano	Orthic Humo-ferric Podzol	well	5-20
	HY	Haney	Orthic Humo-ferric Podzol	well-rapid	20-60
	SH	Salish	Orthic Humo-ferric Podzol	well-moderately well	10-40
Glaciofluvial 5 feet over glacio-marine	BO	Bose	Mini Humo-ferric Podzol	well	5-20
	BY	Boosey	Gleyed Mini Humo-ferric Podzol	imperfect	0-20
	DR	Defehr	Gleyed Mini Ferro-humic Podzol	imperfect	0-20
	JM	Jackman	Rego Humic Gleysol	poor	0-5
Colluvium	PN	Paton	Mini humo-ferric Podzol	well-rapid	50-90
	PA	Palisade	Mini-Ferro-humic Podzol	well-moderately well	50-90
	LS	Lions	Mini-Humo-ferric Podzol	well-rapid	50-90
Colluvium 2 feet over rock	HV	Hoover	Lithic Mini Humo-ferric Podzol	well-rapid	50-90
Alluvium	SG	Sturgeon	Rego Gleysol	poor	0-5
	HA	Hallert	Rego Gleysol: peaty phase	very poor	0-5
Glaciomarine	W	Whatcom	Bisequa Mini Humo-ferric Podzol	moderately well	5-30
	SC	Scat	Orthic Humic Gleysol	poor	0-5
Organic	JW	Judson	Terric Meisisol	very poor	0-2
	GV	Glen Valley	Fenno Fibrisol	very poor	0-2
	WG	Widgeon	Terric Humisol	very poor	0-2
Miscellaneous Land Types	R.O.	Rock Outcrop			
	TA	Talus and avalanche tracks			

Table 2.1.8-1-A Vascular Plants of the U.B.C. Research Forest
(Source: Klinka Ph.D Thesis 1976)

Commercial Tree Species

Abies amabilis (Dougl.) Forbes
Abies grandis (Dougl.) Lindl.
Chamaecyparis noothkatensis (D. Don) Spach.
Picea sitchensis (Bong.) Carr.
Pinus contorta Dougl. ex Loud.
Pinus monticola Dougl. ex D. Don in Lamb.
Pseudotsuga menziesii (Mirb.) Franco
Tsuga heterophylla (Raf.) Sarg.
Tsuga mertensiana (Bong.) Carr.

Non-commercial Tree Species

Acer circinatum Pursh
Acer macrophyllum Pursh
Alnus rubra Bong.
Alnus sinuata (Regel) Rydb.
Arbutus menziesii Pursh
Betula papyrifera Marsh.
Cornus nuttallii Aud.
Malus fusca (Raf.) Schneider
Populus tremuloides Michx.
Populus trichocarpa T. & G. ex Hook
Prunus emarginata (Dougl.) ex Eaton
Prunus virginiana L.
Rhamnus purshiana DC.
Salix hookeriana Barratt
Salix lasiandra Benth.
Salix scouleriana Barratt in Hook.
Salix sitchensis Sanson in Bong.
Taxus brevifolia Nutt.

Herbs and Shrubs

Achillea millefolium L.
Achlys triphylla (Smith) DC.
Actaea rubra (Ait.) Willd.
Adenocaulon bicolor Hook.
Adiantum pedatum L.
Agrostis diegoensis Vasey
Agrostis scabra Willd.
Amelanchier alnifolia Nutt.
Anaphalis margaritacea (L.) B. & H.
Anemone lyallii Britt.
Angelica genuflexa Nutt.
Aquilegia formosa Fisch.
Arctium minus (Hill) Bernh.
Arctostaphylos uva-ursi (L.) Spreng.
Aruncus sylvestris Kostel.
Asarum caudatum Lindl.
Asplenium trichomanes L.
Athyrium filix-femina (L.) Roth.

Blechnum spicant (L.) Roth.
Boschniakia hookeri Walpers
Boykinia elata (Hook.) Shear
Bromus vulgaris (Nutt.) Greene

Table 2.1.8-1-A Vascular Plants of the U.B.C. Research Forest (continued)Herbs and Shrubs (continued)

Calamagrostis canadensis (Michx.) Beauv.
Cardamine breweri Wats.
Carex aquatilis Wahl.
Carex canescens L.
Carex deweyana Schw.
Carex hendersonii L.H. Bailey
Carex interior L.H. Bailey
Carex laeviculmis Meinsh.
Carex lasiocarpa Ehrh.
Carex leptalea Wahl.
Carex loptopoda Mack.
Carex mertensii Prescott ex Bong.
Carex pauciflora Lightf.
Carex retrorsa Schw.
Carex rossii Boott in Hook.
Carex sitchensis Prescott in Bong.
Carex spectabilis Dewey
Cassiope mertensiana (Bong.) G. Don
Chimaphila menziesii (R. Br.) Spreng.
Chimaphila umbellata (L.) Bart.
Cinna latifolia (Trev.) Griseb.
Circaea alpina L.
Circaea pacifica Asch. & Mag.
Cirsium edule Nutt.
Cladothamnus pyrolaeiflorus Bong.
Clintonia uniflora (Schult.) Kunth.
Coptis asplenifolia Salisb.
Coptis trifolia (L.) Salisb.
Corallorhiza maculata Raf.
Corallorhiza mertensiana Bong.
Cornus canadensis L.
Corylus cornuata Marsh.
Cryptogramma crispa (L.) R. Br.
Cystopteris fragilis (L.) Bernh.

Dactylis glomerata L.
Danthonia spicata (L.) Beauv.
Dicentra formosa (Andr.) Walpers
Disporum hookeri (Torr.) Nicholson
Drosera longifolia L.
Drosera rotundifolia L.
Dryopteris austriaca (Jacq.) Woyнар ex Schinz & Thell.
Dryopteris arguta (Kaulf.) Watt.

Elymus glaucus Buckl.
Epilobium alpinum L.
Epilobium angustifolium L.
Equisetum arvense L.
Equisetum fluviatile L.
Equisetum hiemale L.
Equisetum telmateia Ehrh.
Equisetum variegatum Schleich.
Eriophorum chamissonis C.A. Mey.
Eriophorum gracile Koch in Roth
Erigeron speciosus (Lindl.) DC.

Table 2.1.8-1-A Vascular Plants of the U.B.C. Research Forest (continued)Herbs and Shrubs (continued)

- Festuca occidentalis* Hook.
Festuca subuliflora Scribn.

Galium triflorum Michx.
Gaultheria ovatifolia Gray
Gaultheria shallon Pursh
Gentiana sceptrum Griseb.
Geum macrophyllum Willd.
Glyceria elata (Nash) M.E. Jones
Glyceria striata (Lam.) A.S. Hitchc.
Goodyera oblongifolia Raf.
Gymnocarpium dryopteris (L.) Newm.
Habenaria orbiculata (Pursh) Torr.
Habenaria saccata Greene
Hemitomes congestum Gray
Heuchera glabra Willd. ex R. & S.
Heuchera micrantha Dougl. ex Lindl.
Hieracium albiflorum Hook.
Holcus lanatus L.
Holodiscus discolor (Pursh) Maxim.
Hypericum anagalloides C. & S.
Hypopitys monotropa Crantz

Ilex aquifolium L.
Impatiens noli-tangere L.

Juncus ensifolius Wikst.

Kalmia polifolia Wang.

Lactuca muralis (L.) Fresen.
Ledum groenlandicum Oeder
Lilium columbianum Hanson
Linnaea borealis L.
Listera caurina Piper
Listera cordata (L.) R. Br.
Lonicera ciliosa (Pursh.) DC.
Lonicera involucrata (Rich.) Banks ex Spreng.
Luzula glabrata (Hoppe) Desv.
Luzula multiflora (Retz.) Lej.
Luzula parviflora (Ehrh.) Desv.
Lycopodium clavatum L.
Lycopodium complanatum L.
Lycopodium obscurum L.
Lycopodium selago L. var. *myoshianum* Makino
Lycopus uniflorus Michx.
Lysichitum americanum Hulten & St. John

Mahonia nervosa (Pursh) Nutt.
Maianthemum dilatatum (Wood) Nels. & MacBr.
Menyanthes trifoliata L.
Menziesia ferruginea Smith
Mimulus moschatus Dougl. in Lindl.
Mitella ovalis Greene
Mitella pentandra Hook.
Moneses uniflora (L.) Gray
Montia parvifolia (Moc.) Greene
Montia sibirica (L.) Howell
Myrica gale L.

Nuphar polysepalum Engelman.

Table 2.1.8-1-A Vascular Plants of the U.B.C. Research Forest (continued)Herbs and Shrubs (continued)

Oenanthe sarmentosa Presl
Oplopanax horridus (J.E. Smith) Miq.
Osmaronia cerasiformis (T. & G.) Greene
Osmorhiza chilensis H. & A.

Pachystima myrsinites (Pursh) Raf.
Penstemon davidsonii Greene
Penstemon serrulatus Menzies ex Smith in Rees
Phyllodoce empetriiformis (Smith) D. Don
Physocarpus capitatus (Pursh) Kuntze
Poa palustris L.
Poa pratensis L.
Poa trivialis L.
Polypodium glycyrrhiza D.C. Eaton
Polypodium montense F.A. Lang
Polystichum andersonii Hopkins
Polystichum munitum (Kaulf.) Presl
Prenanthes alata (Hook.) D. Dietr.
Prunella vulgaris L.
Pteridium aquilinum (L.) Kuhn
Pyrola asarifolia Michx.
Pyrola secunda L.

Ranunculus repens L.
Ribes bracteosum Dougl.
Ribes divaricatum Dougl.
Ribes lacustre (Pers.) Poir.
Ribes sanguineum Pursh
Rosa gymnocarpa Nutt.
Rosa nutkana Presl
Rubus chamaemorus L.
Rubus leucodermis Dougl. ex T. & G.
Rubus parviflorus Nutt.
Rubus pedatus J.E. Smith.
Rubus spectabilis Pursh
Rubus ursinus Cham. & Schlecht.
Rumex obtusifolius L.

Sambucus pubens Michx.
Sanguisorba menziesii Rydb.
Sanguisorba microcephala Presl
Saxifraga ferruginea Grah.
Scirpus microcarpus Presl
Selaginella wallacei Hieron.
Smilacina racemosa (L.) Desf.
Smilacina stellata (L.) Desf.
Sorbus sitchensis Roemer
Spiraea douglasii Hook.
Stachys ciliata Dougl. ex Benth.
Stellaria calycantha (Ledeb.) Bong.
Stellaria crispa Cham. & Schlecht.
Streptopus amplexifolius (L.) DC. in Lam. & DC.
Streptopus roseus Michx.
Streptopus streptopoides (Ledeb.) Frye & Rigg.
Symphoricarpos albus (L.) Blake

Table 2.1.8-1-A Vascular Plants of the U.B.C. Research Forest (continued)Herbs and Shrubs (continued)

Taraxacum officinale Weber in Wiggers
Tellima grandiflora (Pursh) Dougl.
Thalictrum occidentale Gray
Thelypteris phegopteris (L.) Slosson
Tiarella laciniata Hook.
Tiarella trifoliata L.
Tiarella unifoliata Hook.
Tofieldia glutinosa (Michx.) Pers.
Tolmiea menziesii (Pursh) T. & G.
Trautvetteria carolinienses (Walt.) Vail
Trientalis arctica Fisch. ex Hook.
Trientalis latifolia Hook.
Trillium ovatum Pursh
Trisetum cernuum Trin.

Urtica dioica L.

Vaccinium alaskaense Howell
Vaccinium membraneceum Douglas ex Hook.
Vaccinium ovalifolium Smith in Rees
Vaccinium oxycoccus L.
Vaccinium parvifolium Smith in Rees
Vaccinium uliginosum L.
Veratrum viride Ait.
Veronica americana Schwein. ex Benth. in DC.
Viburnum edule (Michx.) Raf.
Vicia americana Muhl.
Viola glabella Nutt. in T. & G.
Viola orbiculata Geyer ex Hook.
Viola palustris L.
Viola sempervirens Greene

Table 2.1.8-10-A

KEY TO ECOSYSTEM UNIT NUMBERS

Ecosystem Unit Number	Ecosystem Unit Name
11	(LICHEN) - <u>GAULTHERIA</u> - DF
12	LICHEN - <u>GAULTHERIA</u> - LP - DF
131	<u>Gaultheria</u> - WH - DF
132	<u>Mahonia</u> - <u>Gaultheria</u> - WH - DF
211	Moss - WH
212	<u>Mahonia</u> - Moss - WRC - WH
31	MOSS - (<u>POLYSTICHUM</u>) - WRC - WH
41	<u>VACCINIUM</u> - <u>GAULTHERIA</u> - DF - WH
42	<u>VACCINIUM</u> - <u>MOSS</u> - WH
51	<u>BLECHNUM</u> - AF - WH
52	<u>STREPTOPUS</u> - <u>BLECHNUM</u> - AF - WH
53	<u>BLECHNUM</u> - WH - WRC
61	<u>RIBES</u> - VM
62	<u>POLYPODIUM</u> - <u>GAULTHERIA</u> - DF - WRC
63	<u>POLYPODIUM</u> - <u>POLYSTICHUM</u> - DF - WRC
64	<u>MAHONIA</u> - <u>POLYSTICHUM</u> - DF - WRC
71	<u>TIARELLA</u> - <u>POLYSTICHUM</u> - WRC
72	<u>RUBUS</u> - <u>POLYSTICHUM</u> - WRC
73	<u>ADIANTUM</u> - <u>POLYSTICHUM</u> - WRC
811	<u>Polystichum</u> - <u>Oplopanax</u> - WRC
812	<u>Ribes</u> - <u>Oplopanax</u> - WRC
911	<u>Vaccinium</u> - <u>Lysichitum</u> - WRC
912	<u>Vaccinium</u> - <u>Lysichitum</u> - YC - WRC
101	<u>ANTHYRIUM</u> - <u>ARUNCUS</u> - RA - SA
R	Non-forested ecosystems on rocks
A	Non-forested ecosystem in aquatic environment

Source: Ecosystem mapping by: K. Klinka, B.C. Forest Service, Research Division, 1975.

Table 2.1.10.2-2-A Summary of Fires on the U.B.C. Research Forest¹

Date	Cause	Cost to extinguish	Area of Damage
1949	Lightning	No record	Nil
1957	Lightning	No record	Nil
1957	Smoker	No record	Nil
1957	Escaped Slashburn	\$620.00	2.5 acres (1 ha)
1958	Smoker	No record	Nil
1965	Abandoned campfire	\$41.00	Nil
1967	Escaped Slashburn	\$1,042.00	8 acres (3.2 ha)
1970	Smoker	\$25.00	Nil
1974	Escaped Right-of-way fire	\$280,000	24.7 acres (10 ha)

¹See Map 2.1.2-2-A

Table 2.2.2.2-2-A Area of Major Watersheds at U.B.C. Research Forest

<u>CATCHMENT AREAS</u>		Approx. area in acres	(ha)
1.	Raven Creek	1480	599
2.	Katherine Lake	390	157
3.	Pitt Slope	1410	570
4.	Eunice Lake	470	190
5.	Gwendoline Lake	310	125
6.	Marion (Jacob's) Lake	2250	910
7.	Marion (Jacob's) Creek	210	85
8.	North Alouette River	1130	457
9.	Spring Creek	1160	469
10.	Blaney Lake	1030	417
11.	Loon Lake	860	348
12.	Goose Lake	300	121
13.	Donegani Creek	740	300
14.	Blaney Creek	360	146
15.	South Alouette River	600	243
Approx. Total :		12700	5137

Table 2.2.3.2-2-A Fish Species Recorded in the Lakes of the U.B.C.
Research Forest

Lake Name	ha	Lake size Acres	Species present
Betsy	0.23	0.57	None
Bird	0.23	0.56	None
Blaney	8.71	21.59	Cutthroat trout Dolly Varden
Eunice	14.12	34.94	None
Goose	3.44	8.52	Three spine stickleback Possibly cutthroat trout
Gwendoline	11.13	27.55	None
Irmay	0.34	0.85	None recorded
Katherine	20.00	49.43	None
Loon	49.35	122.15	Cutthroat trout Dolly Varden
Lost	0.34	0.85	As for Loon Lake
Jacob's (Marion)	13.31	32.95	Kokanee Rainbow trout Cutthroat trout Dolly Varden (plus rainbow/cutthroat trout hybrid)
Mirror	0.69	1.70	Cutthroat trout
Peaceful	0.17	0.42	None recorded
Placid	1.83	4.54	Cutthroat trout
Rose	0.92	2.27	Not known
Shirley	1.03	2.55	Not known
Surprise	0.23	0.57	Not known

In addition long-nosed dace, sculpen species and steelhead trout have been recorded in the North Alouette River. Most other creeks have cutthroat trout and there are the occasional Dolly Varden in the creek connecting Loon and Blaney Lakes. Pitt Lake is not included in the above list. Information pertaining to this lake may be obtained from the Federal Fisheries Branch in New Westminster.

Table 2.2.4.1-2-A Mammal Species Recorded on the U.B.C. Research Forest

Species	Scientific name	Sighting frequency
Weasel	(<u>Mustela</u> spp.)	Infrequent
Muskrat	(<u>Ondatra zibethica</u>)	Infrequent
Columbian Black tailed deer	(<u>Odocoileus hernionus</u> <u>columbinanus</u>)	Daily sightings
Fisher	(<u>Martes pennanti</u>)	Rare
Black bear	(<u>Ursus americanus</u>)	Infrequent
Coyote	(<u>Canis latrans</u>)	Infrequent
Wolf	(<u>Canis lupus</u>)	Rare
Fox	(<u>Vulpes fulva</u>)	Rare
Cougar	(<u>Felis concolor</u>)	Frequent
Bobcat	(<u>Lynx rufus</u>)	Infrequent
Rabbit	(<u>Lepus americanus</u>)	Occasional
Deer Mouse	(<u>Peromyscus maniculatus</u>)	Daily
Voies	(<u>Microtus</u> spp.)	Daily
Skunk (spotted)	(<u>Spilogale gracilis</u>)	Frequent
Skunk	(<u>Mephitis mephitis</u>)	Frequent
Marmots	(<u>Marmota</u> spp.)	Rare
Beaver	(<u>Castor canadensis</u>)	Infrequent
Douglas Squirrel	(<u>Tamiasciurus douglasi</u>)	Frequent
Mountain goat	(<u>Oreamnos americanus</u>)	Rare
Chipmunks	(<u>Eutamias</u> spp.)	Common
Bats	(<u>Myotis</u> spp., etc)	Frequent
Mink	(<u>Mustela vison</u>)	Occasional

A list of flora and fauna of the Pitt Polder is found in Appendix 2.2.4.1-2-A.

Source of scientific names:-

McTaggart Cown, I and C.J. Guiguet. (1973) The Mammals of British Columbia. Handbook No. 11, B.C. Provincial Museum, Dept. of Recreation and Conservation, Victoria, B.C. 414 p

Table 2.2.4.3-4-A List of Birds on U.B.C. Research Forest

(From census undertaken in Compartment 22
by R. McLachlin 1979-1981)

Seasonal Status:

R - resident, present all year long
W - winter
S - summer
T - transient, present only during migration

American goldfinch	S	<u>Carduelis tristis</u> (Linnaeus)
American kestrel	S	<u>Falco sparverius</u> Linnaeus
American robin	R	<u>Turdus migratorius</u> Linnaeus
Bald eagle	R	<u>Haliaeetus leucocephalus</u> (Linnaeus)
Band-tailed pigeon	S	<u>Columba jasciata</u> Say
Barn swallow	S	<u>Hirundo rustica</u> Linnaeus
Belted kingfisher	R	<u>Megaceryle alcyon</u> (Linnaeus)
Bewick's wren	R	<u>Thryomanes bewickii</u> (Audubon)
Black-capped chickadee	R	<u>Parus atricapillus</u> Linnaeus
Black-headed grosbeak	S	<u>Pheucticus melanocepholus</u> (Swainson)
Black swift	S	<u>Cyseloides niger</u> (Gmelin)
Black-throated gray warbler	S	<u>Dendroica nigrescens</u> Townsend
Blue grouse	S	<u>Dendrogopus obscurus</u> (Say)
Brewer's blackbird	S	<u>Euphagus cyanocephalus</u> (Wagler)
Brown creeper	R	<u>Certhia fomiliaris</u> Linnaeus
Brown-headed cowbird	S	<u>Molothrus ater</u> (Boddaert)
Bushtit	R	<u>Psaltiriparus minimus</u> (Townsend)
Canada goose	R	<u>Branta canadensis</u> (Linnaeus)
Cedar waxwing	S	<u>Bombycilla cedrorum</u> Vieillot
Chestnut-backed chickadee	R	<u>Parus rufescens</u> Townsend
Cliff swallow	S	<u>Petrochelidon pyrrhonota</u> (Vieillot)
Cooper's hawk	S	<u>Accipiter cooperii</u> (Bonaparte)
Common flicker	S	<u>Colaptes auratus</u> (Linnaeus)
Common loon	S	<u>Gavia immer</u> (Brunnich)
Common merganser	R	<u>Mergus merganser</u> Linnaeus
Common nighthawk	S	<u>Chordeiles minor</u> (Forster)
Common raven	R	<u>Corvus corax</u> Linnaeus
Dark-eyed junco	S	<u>Junco hyemalis</u> (Linnaeus)
Dipper	R	<u>Cinclus mexicanus</u> Swainson
Evening grosbeak	S	<u>Hesperiphona vespertina</u> (Cooper)
Gloucous-winged gull	R	<u>Larus glaucescens</u> Naumann
Golden-crowned kinglet	R	<u>Regulus satrapa</u> Lichtenstein
Goshawk	R	<u>Accipiter gentilis</u> (Linnaeus)
Great blue heron	S	<u>Ardea herodias</u> Linnaeus
Great horned owl	R	<u>Bubo virginianus</u> (Gmelin)
Hairy woodpecker	R	<u>Pecoides villosus</u> (Linnaeus)
Hammond's flycatcher	S	<u>Empidonax pramondii</u> (Xantus)
Hermit thrush	T	<u>Catharus guttatus</u> (Pallas)
House finch	S	<u>Carposacus mexicanus</u> (Muller)

Hutton's vireo	R	<u>Vireo huttoni</u> Cassin
Mac Gillivray's warbler	S	<u>Oporornis tolmiei</u> (Townsend)
Mallard	R	<u>Anas platyrhynchos</u> Linnaeus
Marsh hawk	R	<u>Circus syaneus</u> (Linnaeus)
Mew gull	W	<u>Larus canus</u> Linnaeus
Mourning dove	S	<u>Zenaida macrowia</u> (Linnaeus)
Northwestern crow	R	<u>Corvus caurinus</u> Baird
Olive-sided flycatcher	S	<u>Nuttallornis borealis</u> (Swainson)
Orange-crowned warbler	S	<u>Vermivora celata</u> (Say)
Pigmy owl	R	<u>Glaucidium gnoma</u> Wagler
Pileated woodpecker	R	<u>Dryocopus pileatus</u> (Linnaeus)
Pine siskin	R	<u>Carduelis pinus</u> (Wilson)
Purple finch	R	<u>Carpodacus purpureus</u> (Gmelin)
Red-breasted nuthatch	S	<u>Sitta canadensis</u> Linnaeus
Red crossbill	S	<u>Loxia curvirostra</u> Linnaeus
Red-eyed vireo	S	<u>Vireo olivaceus</u> (Linnaeus)
Red-tailed hawk	R	<u>Butes jamaicensis</u> (Gmelin)
Ring-necked pheasant	R	<u>Phasianus colchicus</u> Linnaeus
Rock dove	R	<u>Columba livia</u> Gmelin
Rough-winged swallow	S	<u>Stelgidopteryx ruficollis</u> (Vieillot)
Ruby-crowned kinglet	T	<u>Regulus calendula</u> (Linnaeus)
Ruffed grouse	R	<u>Bonasa umbellus</u> (Linnaeus)
Rufous hummingbird	S	<u>Selasphorus rufus</u> (Gmelin)
Rufous-sided towhee	R	<u>Pipilo erythrophthalmus</u> (Linnaeus)
Sharp-shinned hawk	S	<u>Accipiter striatus</u> Vieillot
Solitary vireo	S	<u>Vireo solitarius</u> (Wilson)
Song sparrow	R	<u>Melospiza melodia</u> (Wilson)
Spotted sandpiper	S	<u>Actitis macularia</u> (Linnaeus)
Starling	R	<u>Sturnus vulgaris</u> Linnaeus
Steller's jay	R	<u>Cyanocitta stelleri</u> (Gmelin)
Swainson's thrush	S	<u>Catharus ustulatus</u> (Nuttall)
Townsend's solitaire	S	<u>Myadestes townsendii</u> (Audubon)
Townsend's warbler	S	<u>Dendroica townsendi</u> (Townsend)
Tree swallow	S	<u>Iridoprocne bicolor</u> (Vieillot)
Varied thrush	R	<u>Ixoreus naevius</u> (Gmelin)
Vaux's swift	S	<u>Chaetura vauxi</u> (Townsend)
Violet-green swallow	S	<u>Tochycineta thalassina</u> (Swainson)
Warbling vireo	S	<u>Vireo gilvus</u> (Vieillot)
Western flycatcher	S	<u>Empidonax difficilis</u> Baird
Western tanager	S	<u>Piranga ludoviciana</u> (Wilson)
Western wood pewee	S	<u>Contopus sordidulus</u> Sclater
White-crowned sparrow	R	<u>Zonotrichia leucophrys</u> (Forster)
Willow flycatcher	S	<u>Empidonax traillii</u> (Audubon)
Wilson's warbler	S	<u>Wilsonia pusilla</u> (Wilson)
Winter wren	R	<u>Troglodytes troglodytes</u> (Linnaeus)
Wood duck	S	<u>Aix sponsa</u> (Linnaeus)
Yellow-bellied sapsucker	R	<u>Sphyrapicus varius</u> (Linnaeus)
Yellow-rumped warbler	S	<u>Dendroica coronata</u> (Linnaeus)
Yellow warbler	S	<u>Dendroica petechia</u> (Linnaeus)

Table 8.7.1-1-A Summary of Projected Expenditure on
Silvicultural Operations for Year 1 (1982/83)

Operation	Land Area	Total Cost
Land Clearing	10 ha (24.8)	\$ 16,500.00
Broadcast Burning	6 ha (14.8)	720.00
Drainage	4 ha (9.9)	700.00
Scarification	18 ha (45.0)	1,100.00
Planting	40 ha (99.0)	11,100.00
Juvenile Thinning	2.0 ha (5.0)	-
Pruning	1.8 ha (4.4)	-
Precommercial Thinning	1.3 ha (3.2)	-
Commercial Thinning	2.0 ha (4.9)	-
Total Expenditure on Silviculture		\$ 30,120.00

290
Table 8.7.3 - 1 - A U.B.C. Detail Operating Budget
Faculty of Forestry - Research Forest

Page 1

Budget (\$) (Past)	Detail	Budget (\$) (Year 1)	Account Code
	Academic/Board Salaries		
37,986			29-8990-161
37,986			
23,929			29-8990-162
19,596			
19,800			
12,360			
13,824			
12,360			
12,360			
12,360			
12,360			
14,904			
11,484			
12,000	UUU3 10 Staff Increments	16,013	
25,500	0001 10 Kitchen Staff	31,875	29-8990-165
11,000	0002 10 Casual and Emergency Labour	11,000	
213,837		239,260	
	Non Salary Items		
26,500	M002 10 Food Purchases	33,000	29-8990-091
3,500	M001 10 Employer Share of Benefits	3,500	-205
7,100	M003 10 Electricity	8,000	-234
100	M004 10 Memberships	100	-237
7,700	M022 10 Gasoline and Oil	7,700	-244
2,100	M005 10 Insurance and Licences	2,100	-250
450	M006 10 Printing and Publications	450	-257
6,000	M007 10 Repairs and Maintenance - Bldgs.	10000.00	-262
	20 (Less: Recovery from Faculty	3000.00	
	30 of Forestry-Maintenance, Loon		
	40 Lake Camp)		
50	M008 10 Publication Purchase	80	-263
13,200	M009 10 Supplies and Expenses	16,000	-270
3,300	M010 10 Telephone	3,300	-272

Table 8.7.3 - 1 - A U.B.C. Detail Operating Budget
Faculty of Forestry - Research Forest

Budget (\$) (Past)	Detail	Budget (\$) (Year 1)	Account Code
	Non Salary Items		
291 500	M011 10 Travel - Learned Societies	900	-273
550	M012 10 Travel - General	700	-274
375	M013 10 Postage	375	-278
15,500	M014 10 Equipment	15,000	-281
135	M015 10 Freight Expenses	135	-284
7,500	M016 10 Equipment Rental	9,000	-412
1,000	M023 10 Photocopying	1,000	-414
5,000	M017 10 Repairs and 20 Maintenance - Vehicles	5,500	-416
14,250	M018 10 Repairs and Maintenance - Roads	14,000	-417
165,900	M020 10 Contract Logging	174,900	-422
21,000	M021 10 Major Additions Roads	21,000	-491
301,710		323,740	

U.B.C. Detail Operating Budget
Faculty of Forestry
Univ. Research Forest

Budget (\$) (Past)	Detail	Budget (\$) (Year 1)	Account Code
	Included in Budgeted Revenue - For Reference		
	R001 10 Camp Rentals 75000.00		79-8990-520
	R002 10 Log Sales 3000 cunits 276000.00		-534
	@\$92/CCF		
	R003 10 Poles and Piling 200 CCF 24000.00		-625
	@\$120		
	R004 10 Gov't Canada Fisheries 1000.00		-520
	Lease		
	R005 10 Council of Forest Industries 15000.00		-508
	R006 10 Spring Camp Fees 7500.00		
553,533		398,500	
	Reserve	30,000	
	Total	603,500	

Estimated Labour Availability

1 Store Technician x 21 days = 21 days

5 Field Technicians x 21 days = 105 days

1 Secretary/Tech. x 6 days = 6 daysTOTAL TECHNICAL LABOUR AVAILABLE = 132 daysCasual labour as required - see remarks
column in "Total Labour Budgeted" - below

Table 8.8.1-1-A Monthly Operations Schedule - March 82

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin area	Resident Forester (Senior Technician)	Weather Workshop maintenance	21 Store/Tech days	---	
b. Spring Camp	Director (Education Co-ordinator)	Preparations - poles - trails - notices	14 Tech/Days	1	
c. Physical Plant	Resident Forester (Senior Technician)	General maintenance	4 Tech/Days	4	
d. Compound	Resident Forester (Senior Technician)	Building construction	4 Tech/Days	4	
e. Roads	Resident Forester (Senior Technician)	Culverts Roadside ditches Grading Cleanup	8 Tech/Days	3	

f. Planting	Silviculturist (Senior Technican)	Compartments 18/19/20	20 Tech/days	2	
g. Weeding	Silviculturist (Senior Technician)	Compartments 29/30	20 Tech/days	2	
h. School Programme	Education Co-ordinator (Secretary/Technician)	Day Tours	6 Sec/Days/Tech	4	
i. Deer Project	Education Co-ordinator (Secretary/Technician)	Fence Check Feeding	2 Tech/days	4	
j. Camp Power line	Resident Forester (Senior Technician)	Clear overhanging trees	10 Tech/days	4	
k. Other	Education Co-ordinator (Secretary/Technician)	Greenhouse Education Facilities Contingencies	4 Tech/days 4 Tech/days 5 Tech/days	4	
TOTAL LABOUR BUDGETED FOR MONTH OF MARCH = <u>132 days</u>				No casual labour required	

Note:

No holidays, sick leave or other lost time causes are taken into consideration

CONTRACTOR OPERATIONS

a. Harvesting	Resident Forester (Silviculturist)	Compartments	Estimated to continue all month	
b. Spring Camp	Director (Education Co-ordinator)	Preparations as required to fulfil Spring Camp Schedule		

Estimated Labour Availability

1 Store Technician x 20 days = 20 days
 5 Field Technicians x 20 days = 100 days
 1 Secretary/Tech. x 6 days = 6 days
 TOTAL TECHNICAL LABOUR AVAILABLE = 126 days

Casual labour as required - see remarks
 column in "Total Labour Budgeted" - below

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin area	Resident Forester (Senior Technician)	Weather Workshop Test Fire Equipment	20 Store/Tech days	-	
b. Spring Camp	Director (Education Co-ordinator & Senior Technician)	Preparations - Camp - Exercise set up - Involvement	20 Field/Tech days 20 Field/Tech days 20 Field/Tech days	1 1 1	
c. Planting	Silviculturist (Senior Technician)	Compartment 17/18 19/20	15 Field/Tech days	2	
d. Weeding	Silviculturist (Senior Technician)	Compartments 29/30	15 Field/Tech days	4	
e. Roads	Resident Forester (Senior Technician)	Grading clean-up Ditches Brush	10 Field/Tech days 10 Field/Tech days 10 Field/Tech days	3	

Table 8.8.1-1-B

Monthly Operations Schedule - April 82

f. Deer project	Education Co-ordinator (Secretary/Technician)	Pipeline Feeding	8 Field/Tech days	4	See "Contractor" section
g. School programme	Education Co-ordinator (Secretary/Technician)	Day Tours	6 Sec/Tech Days	4	
h. Other	Education Co-ordinator (Secretary/Technician)	Greenhouse Education Facilities	4 Field/Tech days 4 Field/Tech days	4	

TOTAL LABOUR BUDGETED FOR MONTH OF APRIL = 162 days

Available from Forest = 126

Supplementary casual labour = 36

162

Note:

No allowances for contingencies or lost time due to leave, sick etc.

CONTRACTOR OPERATIONS

a. Harvesting	Resident Forester (Silviculturist)	Compartments	Continues all month		
b. Spring Camp	Director (Education Co-ordinator)	As required to prepare & support exercises			
c. Deer Pen	Education Co-ordinator (Secretary/Technician)	Pipe line	3 days back hoe		
d. Education	Education Co-ordinator (Secretary/Technician)	Outside toilets	2 days back hoe		

Estimated Labour Available

1 Store Technician x 21 days = 21 days
 5 Field Technicians x 21 days = 105 days
 1 Secretary/Tech. x 6 days = 6 days
 TOTAL TECHNICAL LABOUR AVAILABLE = 132 days

Casual labour as required
 (See "remarks" column in
 "Total Labour Budgeted" - below)

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin area	Resident Forester (Senior Technician)	Weather Workshop Compound	21 Store/Tech days	-	
b. Spring Camp	Director (Education Co-ordinator & Senior Technician)	Involvement Clean up	80 Field/Tech days 8 Field/Tech days	1	
c. School Programme	Education Co-ordinator (Secretary/Technician)	Day Tours	6 Sec/Tech days	4	
d. Planting	Silviculturist (Senior Technician)	Complete all scheduled areas	10 Field/Tech days	2	
e. Deer Project	Education Co-ordinator (Secretary/Technician)	Round up Confinement tending	2 Field/Tech days 20 Tech aid days (see "Notes")	1 1	

Table 8.8.1-1-C Monthly Operations Schedule - May 82

f. Other	Education Co-ordinator	Greenhouse	4 Field/Tech days	4	
	(Secretary Technician)	Education Facilities	2 Field/Tech days	4	

TOTAL LABOUR BUDGETED FOR MONTH OF MAY = 155 days

Available from Forest = 132

Supplementary casual labour = 23

Total = 155 days

Notes:

- a. No contingencies or lost time included
- b. Additional casual labour may be required for Spring Camp exercises.
- c. Technical Aid employed for deer confinement May-Aug. 1980.
- d. 1 public holiday during month (Victoria Day).

CONTRACTOR OPERATIONS

a. Harvesting	Resident Forester (Silviculturist)	Compartment	Continue all month	(May cease for a period during Spring Camp.)
b. Spring Camp	Director (Education Co-ordinator)	As required to fulfil Spring Camp Schedule		
c. Roads	Resident Forester (Senior Technician)	Grading as required to repair roads after Spring Camp		

Estimated Labour Availability

1 Store Technician x 21 days = 21 days

5 Field Technicians x 21 days = 21 days

1 Secretary/Tech. x 6 days = 6 daysTOTAL TECHNICAL LABOUR AVAILABLE = 132 days

Casual labour as required (see
"Remarks" column in "Total labour
Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin. area	Resident Forester (Senior Technician)	Workshop maintenance Weather Fire equipment check	21 Store/Tech days	-	
b. Brush Control	Silviculturist (Senior Technician)	Compartments 30/31/35	28 Field/Tech days	2	
c. Spring Camp	Education Co-ordinator (Senior Technician)	Thinning clean-up	4 Field/Tech days	4	
d. Summer students	Education Co-ordinator (Secretary/Technician)	As per daily schedule and project outline	* 10 Field/Tech days	1	
e. School Programme	Education Co-ordinator (Secretary/Technician)	Day Tours	6 Secretary/Tech. days	4	

Table 8.8.1-1-D Monthly Operations Schedule - June 82

f. Fire Equipment	Resident Forester (Senior Technician)	Fire practise Construct hose drying facilities Test Fire Equipment	10 Field/Tech days	3	
g. Deer Project	Education Co-ordinator (Secretary/Technician)	Deer confinement	20 Tech/Aid days	4	
h. Nursery	Silviculturist (Senior Technician)	Rotovate area and general clean-up	4 Field/Tech days	4	*See contractors operations
i. Physical Plant	Resident Forester (Senior Technician)	General maintenance	10 Field/Tech days	4	
j. Other	Education Co-ordinator (Senior Technician)	Greenhouse Arboretum	4 Field/Tech days 4 Field/Tech days	4	

Surplus = 31

TOTAL LABOUR BUDGETED FOR MONTH OF JUNE = 152 days

Available from Forest = 132

Technical Aid = 20
152

Notes: a. No lost time included although 31 days surplus technical time for month alloted for leave, public holidays, fire patrol etc.

b. *If no summer student projects, transfer to Brush control (item 6).

CONTRACTOR OPERATIONS

a. Harvesting	Resident Forester (Silviculturist)	Compartments	Clean-up operations	1	
b. Hydro Fence	Resident Forester (Silviculturist)	Fence from Road to North Alouette River		2	
c. Nursery	Silviculturist (Senior Technician)	Rotovate area	1 tractor day	3	

Estimated Labour Availability

1 Store Technician x 21 days = 21 days
 5 Field Technicians x 21 days = 105 days
 1 Secretary/Tech. x 10 days = 10 days
 TOTAL TECHNICAL LABOUR AVAILABLE = 136 days

Casual labour as required (see
 "Remarks" column in "Total labour
 Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin. area	Resident Forester (Senior Technician)	Workshop Maintenance Weather Fire equipment check	21 Store/Tech days	--	
b. Brush control (Mechanical)	Silviculturist (Senior Technican)	Compartments 30/31/32/35	42 Field/Tech days*	2	Interchangeable with d.
c. Brush control (Chemical)	Resident Forester (Senior Technician)	Compartments 25/31/32	42 Field/Tech days	1	
d. Summer students	Education Co-ordinator (Secretary/Technician)	As per daily schedule and project outline	42 Field/Tech days*		Interchangeable with b.
e. Deer Project	Education Co-ordinator (Secretary/Technician)	Deer confinement	21 Tech/Aid days**	4	
f. Loon Lake Camp	Director (Senior Technician)	New construction and routine maintenance	24 Field/Tech days	4	***

Table 8.8.1-1-E Monthly Operations Schedule - July 82

g. Marc House (Fire precautions)	Resident Forester (Senior Technician)	Water system and Emergency Water sump	15 Field/Tech days	4	***
h. Other	Silviculturist (Secretary/Technician)	Arboretum maintenance Green house clean-up	2 Field/Tech days 4 Field/Tech days	4	

TOTAL LABOUR BUDGETED MONTH JULY = 171 days

Available from Forest = 136

Deer Project Technical Aid = 21**(see item e.)

Casual labour required = 14

171 days

Note: a. *Items b, and d are interchangeable if no summer students are available.

b. No allowance has been made for sick leave, fire patrol, holidays or other lost time.

c. ***See contractor operations.

CONTRACTOR OPERATIONS

a. Loon Lake Camp	Director (Camp Caretaker)	Capital projects as detailed in budget estimates		
b. Marc House	Resident Forester (Senior Technician)	Emergency fire sump, dismantling tower, realigning electrical and waterlines		

Estimated Labour Availability

1 Store Technician x 21 days = 21 days
 5 Field Technicians x 21 days = 105 days
 1 Secretary/Tech. x 10 days = 10 days
 TOTAL TECHNICAL LABOUR AVAILABLE = 136 days

Casual labour as required (see
 "Remarks" column in "Total labour
 Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATIONS	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin. area	Resident Forester (Senior Technician)	Workshop Building maintenance Weather Fire Equipment Check	21 Store/Tech days	-	
b. Brush control	Silviculturist (Senior Technician)	Compartments 30/31/35	*42 Field/Tech days	1	Interchangeable ↑
c. Summer Students	Education Co-ordinator (Secretary/Technician)	As per daily schedule and project outline	*42 Field/Tech days 10 Sec/Tech days	1	↓ Interchangeable
d. Deer Project	Education Co-ordinator (Secretary/Technician)	Deer Confinement	**21 Tech/Aid days	2	
e. Physical Plant	Resident Forester (Senior Technician)	Routine building maint.	24 Field/Tech days	4	

Table 8.8.1-1-F Monthly Operations Schedule - August 82

f. Loon Lake Camp	Director (Camp Caretaker)	Complete capital project Prepare for School programme	30 Field/Tech days	3	
g. Landscaping	Silviculturist (Secretary/Technician)	Road junction E/F, F/G	10 Field/Tech days	4	
h. Cone Collection	Silviculturist (Senior Technician)	White Pine	10 Field/Tech days	1	

TOTAL LABOUR BUDGETED MONTH AUGUST = 168 days

Available from Forest = 136

Deer Project Technical Aid = 21

Casual Labour = 11

168

Note: a. No allowance for contingencies, sick leave, holidays, fire patrol or other lost time.

b. Fire closure may curtail operations.

c. Summer student projects (if operational) terminate 29 August

CONTRACTOR OPERATIONS

- None scheduled

Estimated Labour Available

1 Store Technician x 21 days = 21 days

5 Field Technicians x 21 days = 105 days

1 Secretary/Tech x 8 days = 8 days

TOTAL TECHNICAL LABOUR AVAILABLE = 134 days

Casual labour as required (see

"Remarks" column in "Total labour

Budgeted" and "notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMRANCE)
a. Admin. area	Resident Forester (Senior Technician)	Workshop maint. Weather Compound Maint.	21 Store/Tech days	-	
b. Brush Control	Silviculturist (Senior Technician)	Compartments; 27/28/30/31	42 Field/Tech days	1	
c. Loon Lake Camp	Director (Camp Caretaker)	School Programmes	4 Field/Tech days	3	
d. Education	Education Co-ordinator (Secretary/Technician)	Work experience Tours & Inservice Facilities	10 Field/Tech days 8 Sec/Tech days 4 Field/Tech days	2	
e. Roads	Resident Forester (Senior Technician)	Routine maint. Grading, etc.	10 Field/Tech days	4	
f. Deer Project	Education Co-ordinator (Secretary/Technician)	Feeding and fence check Veterinarian	6 Field/Tech days	4	

Table 8.8.1-1-G Monthly Operations Schedule - September 82

CONTRACTOR OPERATIONS

a. Land clearing	Resident Forester (Silviculturist)	As required to complete site preparation Road G	
b. Pile burning	Resident Forester (Senior Technician)	As weather permits (may be delayed to Oct./Nov.)	
c. Pipe line clean-up	Resident Forester (Senior Technician)	As schedule and finances permit	
d. Grading Roads	Resident Forester (Senior Technician)	As required.	

Estimated Labour Available

1 Store Technician x 21 day = 21 days

5 Field Technician x 21 day = 105 days

1 Secretary/Tech x 8 day = 8TOTAL TECHNICAL LABOUR AVAILABLE = 134 days

Casual labour as required (see
"Remarks" column in "Total labour
Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin. area	Resident Forester (Senior Technician)	Fire equipment test Workshop maint. Weather	21 Store/Tech days	-	
b. Brush control	Silviculturist (Senior Technician)	Compartment 35	42 Field/Tech days	2	
c. Roads & bridges	Resident Forester (Senior Technician)	Reconstruction bridges Culvert cleaning	42 Field/Tech days	1	
d. Deer project	Education Co-ordinator (Secretary/Technician)	Feeding Fence check Food Store construction	24 Field/Tech days	3	
e. Education	Education Co-ordinator	Day Tours Work experience Facility maintenance	8 Secretary/Tech days 8 Field/Tech days	4	

Table 8.8.1-1-H Monthly Operations Schedule - October 82

f. Loon Lake Camp	Director (Senior Technician)	School Programme	4 Field/Tech days	4	
g. Cones	Silviculturist (Senior Technician)	Harvesting	10 Field/Tech days	4	
h. Other	Silviculturist (Secretary/Technician)	Greenhouse	4 Field/Tech day	4	

TOTAL LABOUR BUDGETED MONTH OF OCTOBER = 163 days

Available from Forest = 134

Casual labour = 29

163 days

Note; No allowances for contingencies and lost time, holidays etc.

CONTRACTOR OPERATIONS

a. Bridge reconstruction	Resident Forester (Senior Technician)	Bridges Road K	
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Note: Road construction for harvesting may commence (details November schedule).

Estimated Labour Available

1 Store Technician x 19 days = 19 days

5 Field Technician x 19 days = 95 days

1 Secretary/Tech. x 6 days = 6 days

TOTAL TECHNICAL LABOUR AVAILABLE = 120 days

Casual labour as required (see
"Remarks" column in "Total labour
Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMRANCE)
a. Admin. area	Resident Forester (Senior Technician)	Workshop maint. Winterizing vehicles Building fire equip- ment check	19 Store/Tech days	-	
b. Roads & Bridges	Resident Forester (Senior Technician)	Reconstruction Bridges After grading work	38 Field/Tech days	1	
c. Deer Project	Education Co-ordinator (Secretary/Technician)	Complete food store Feeding	10 Field/Tech days	3	
d. Education	Education Co-ordinator (Secretary/Technician)	Day Tours Work Experience	4 Sec/Tech days 2 Sec/Tech days	4	
e. Brush/stock control	Silviculturist (Senior Technician)	Compartments 28/35	38 Field/Tech days	2	

Table 8.8.1-1-1 Monthly Operations Schedule - November 82

f. Other	Silviculturist (Secretary/Technician)	Greenhouse Work Experience	4 Field/Tech day	4	
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TOTAL LABOUR BUDGETED MONTH OF NOVEMBER = 120 days

Available from Forest = 120

No casual labour required.

Note: No allowances for contingencies, leave etc.

CONTRACTOR OPERATIONS

a. Bridge reconstruction	Resident Forester (Senior Technician)	Bridges Road K	
b. Roads	Resident Forester (Senior Technician)	Harvesting access Roads as scheduled in Management Plan	

Note: Felling for harvesting may commence (dependent on prevailing circumstances and contractor availability).

f. Cones	Silviculturist (Senior Technician)	Extraction of seed	10 Field/Tech days	4	
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TOTAL LABOUR BUDGETED FOR MONTH DECEMBER = 79 day

Available from Forest = 100

Surplus = 21 days

- Note: a. December is traditionally a time for leave and it is anticipated that this surplus will be taken up with holidays.
b. Any surplus will be used on Roads.

NO CONTRACTOR OPERATIONS

Estimated Labour Available

1 Store Technician x 21 = 21 days

5 Field Technician x 21 = 105 days

1 Secretary/Tech x 8 = 8 days

TOTAL TECHNICAL LABOUR AVAILABLE JANUARY = 134 days

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin area	Resident Forester (Senior Technician)	Workshop maint. Equipment maint.	21 Store/Tech days	-	
b. Physical Plant	Resident Forester (Senior Technician)	Building repairs & routine maint. (snow removal)	42 Field/Tech day	1	
c. Greenhouse	Silviculturist (Senior Technician)	Filling & sowing bullets	21 Field/Tech days	4	
d. Education	Education Co-ordinator (Secretary/Technician)	Tour Work Experience	8 Sec/Tech days 10 Field/Tech days		
e. Deer Project	Education Co-ordinator (Secretary/Technician)	Feeding, fence check Vet. check	4 Field/Tech days		

TOTAL BUDGETED LABOUR MONTH OF JANUARY = 106 days

Available from Forest = 134

Surplus = 28

Estimated Labour Available 1 Store Technician x 20 = 20 days
 5 Field Technician x 20 = 100 days
 1 Secretary/Tech x 6 = 6 days
 TOTAL TECHNICAL LABOUR AVAILABLE = 126 days

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS (PERFORMANCE)
a. Admin Area	Resident Forester (Senior Technician)	Workshop maint. Equipment maint.	20 Store/Tech days	-	
b. Education	Education Co-ordinator (Secretary/Technician)	Snag felling Trail clearing Work Experience Day Tours	15 Field/Tech days 6 Field/Tech days 6 Sec/Tech days	1 4	
c. Brush Control	Silviculturist (Senior Technician)	Compartments 30/31	60 Field/Tech days	2	
d. Physical Plant	Resident Forester (Senior Technician)	Inside building maint. (Snow removal)	15 Field/Tech days	3	
e. Loon Lake Camp	Director (Camp Caretaker)	Pre-school clean-up Test all systems	15 Field/Tech days	4	

f. Deer Project	Education Co-ordinator (Secretary/Technician)	Feeding Vet. check	4 Field/Tech days	4	
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TOTAL BUDGETED LABOUR MONTH OF FEBRUARY = 141 days

Available from Forest = 126

Casual labour required = 15

141 day

Note: No allowance for contingencies, sick leave and other lost time.

CONTRACTOR OPERATIONS

a. Road	Resident Forester (Senior Technician)	Construction for harvesting operations	As per Management Plan schedule	
b. Harvesting	Resident Forester (Silviculturist)	Falling commences if circumstances permit		

Estimated Labour Available

1 Store Technician x 21 = 21 days

5 Field Technician x 21 = 105 days

1 Secretary/Tech x 6 = 6 days

TOTAL TECHNICAL LABOUR AVAILABLE = 132 days

Casual labour as required - see
"Remarks" column in "Total Labour
Budgeted" and "Notes" - below).

TASK	RESPONSIBLE OFFICER (SECONDARY RESPONSIBILITY)	OPERATION	ESTIMATED LABOUR REQUIREMENTS	PRIORITY RATING	REMARKS
a. Admin area	Resident Forester (Senior Technician)	Fire equipment check Weather Workshop maint.	21 Store/Tech days	-	
b. Spring Camp	Director (Education Co-ordinator & Senior Technician)	Pre-camp preparation	14 Field/Tech day	1	
c. Roads	Resident Forester (Senior Technician)	Spring clean-up Culvers, ditches, grading	10 Field/Tech days	2	
d. Education	Education Co-ordinator (Secretary/Technician)	Day Tours Facility maint.	6 Sec/Tech days 10 Field Tech days	4	
e. Planting	Silviculturist (Senior Technician)	Compartments as determined by 198 harvesting.	42 Field/Tech days	3	

Table 8.8.1-1-M Monthly Operations Schedule - March 83

f. Deer Project	Education Co-ordinator (Secretary/Technician)	Feeding Vet check	4 Field/Tech days	4	
g. Brush Control	Silviculturist (Senior Technician)	Compartment 35	20 Field/Tech days	4	
h. Other	Education Co-ordinator (Secretary/Technician)	Work Experience Greenhouse	3 Field/Tech days 2 Field/Tech days	4	

TOTAL LABOUR BUDGETED FOR MARCH = 132 days

Total available from Forest = 132 No casual labour required.

Note: No allowances for sick leave or other lost time causes.

CONTRACTOR OPERATIONS

a. Harvesting	Resident Forester (Silviculturist)	As scheduled in Management Plan
b. Spring Camp	Director (Education Co-ordinator)	Preparations as requested to fulfil Spring Camp schedule

Table 8.8.1-1-N Summary of Time (in man/days*) per month for
Year 1982/83

Operations	A	M	J	J	A	S	O	N	D	J	F	M	Total
Fire Equipment	-	-	10	-	-	-	-	-	-	-	-	-	10
Spring Camp	60	88	4	-	-	-	-	-	-	-	-	14	166
Summer Students	-	-	10	42	52	-	-	-	-	-	-	-	104
Schools Programme	6	6	6	-	-	8	8	4	-	8	6	6	58
Deer Project	8	22	20	21	21	6	24	10	8	4	4	4	152
Nursery	-	-	4	-	-	2	-	-	-	-	-	-	6
Arboretum	-	-	4	2	-	-	-	-	-	-	-	-	6
Landscaping	-	-	-	-	10	-	-	-	-	-	-	-	10
Ed. Facilities	4	2	-	-	-	4	8	-	-	-	15	10	43
Work Experience	-	-	-	-	-	10	-	7	-	10	6	3	36
Greenhouse	4	4	4	4	-	4	4	4	-	21	-	2	51
Brush Control (M)	15	-	28	-	-	42	42	38	-	-	60	20	245
(C)	-	-	-	42	-	-	-	-	-	-	-	-	42
Cone Collection	-	-	-	-	10	-	10	-	10	-	-	-	30
Site Preparation	-	-	-	-	-	20	-	-	-	-	-	-	20
Planting	15	10	-	-	-	-	-	-	-	-	-	42	67
Roads	30	-	-	-	-	10	-	-	15	-	-	10	65
Bridges	-	-	-	-	-	-	42	38	-	-	-	-	80
Burning	-	-	-	-	-	20	-	-	-	-	-	-	20
Workshop	20	21	21	21	21	21	21	19	16	21	20	21	243
Marc House	-	-	-	15	-	4	-	-	-	-	-	-	19
Physical Plant	-	-	10	-	24	10	-	-	20	42	15	-	121
Loon Lake Camp	-	-	-	24	30	4	4	-	10	-	15	-	87
Sub-Total													1681
Surplus	-	-	31	-	-	-	-	-	21	28	-	-	80
Totals	162	153	152	171	168	165	163	120	100	134	141	132	1761
Tech. Labour	126	132	132	136	136	134	134	120	100	134	126	132	1542
Casual Labour	36	1	-	14	11	31	29	-	-	-	15	-	137
Technical Aid	-	20	20	21	21	-	-	-	-	-	-	-	82

*No Contract Labour Included.

APPENDICES

The Appendices of the U.B.C. Research Forest Management Plan are detailed and bulky, amounting to several thousands of pages.

The following are title pages of the Appendices, the complete documents being stored in the Central Filing System of the Research Forest in Maple Ridge, British Columbia.

Appendix 0.0 is the only complete Appendix herein, containing the key to the Central Filing System, complete with a list of all active Forest files, location of filing cabinets in the Administration Headquarters of the Forest, the cabinet holding the Appendices, research information and publications.

With Appendix 0.0, any information pertaining to the management and operation of the Forest is physically available.

APPENDIX 0.0

CENTRAL FILING SYSTEM
of the
U.B.C. RESEARCH FOREST

Contents

1. Breakdown of Reference areas.
2. Sub-file Headings.
3. Individual file headings (July 1981).
4. Cabinet numbers and location.
5. Copy of Card index for specific files (August 1981).
- only partial examples included

1. Breakdown of Reference areas.

CENTRAL FILING SYSTEM

1.0 ADMINISTRATION

- 1.1 Management Control
- 1.2 Organization
- 1.3 Personnel
- 1.4 Accounts
- 1.5 Public Relations

2.0 FUNCTION ACTIVITIES

- 2.1 Education
- 2.2 Research
- 2.3 Demonstration
- 2.4 Forest Related Activites

3.0 LAND (RESOURCE) CONTROL

- 3.1 Best-Use
- 3.2 Working Circles
- 3.3 Use Hierarchy
- 3.4 Maps
- 3.5 Protection

4.0 FOREST OPERATIONS

- 4.1 Silviculture
- 4.2 Yield
- 4.3 Harvesting

5.0 ENGINEERING

- 5.1 Engineering
- 5.2 Physical Plant
- 5.3 Equipment

2. Sub-file Headings.

CENTRAL FILING SYSTEM

1.0 ADMINISTRATION

1.1 Management Control

- 1.1.1 Budgeting
- 1.1.2 Grants & Research
- 1.1.3 Forest Development
- 1.1.4 Annual Report
- 1.1.5 Technical Audit
- 1.1.6 Valuation
- 1.1.7 Leases, Licences & Insurances
- 1.1.8 Marketing
- 1.1.9 Files & Records

1.2 Organization

- 1.2.1 Correspondence "SINK"
- 1.2.2 General Correspondence (un-allocated)
- 1.2.3 Memorandums
- 1.2.4 Meetings (Staff)
- 1.2.5 Business Cards
- 1.2.6 Computer

1.3 Personnel

- 1.3.1 Permanent Staff
- 1.3.2 Temporary Staff
- 1.3.3 Training
- 1.3.4 Employee Relations

1.4 Accounts

- 1.4.1 Day Journal
- 1.4.2 UBCRF - 29-8990
- 1.4.3 Grants

1.5 Public Relations

- 1.5.1 Correspondence - General
- 1.5.2 Associations & Agencies
- 1.5.3 Committees
- 1.5.4 Adjacent Land Owners
- 1.5.5 Local By-laws
- 1.5.6 Open House
- 1.5.7 Promotion

2.0 FUNCTION ACTIVITIES

2.1 Education

- 2.1.1 Correspondence
- 2.1.2 Universities
- 2.1.3 Technical Schools & Colleges
- 2.1.4 Vocational Schools
- 2.1.5 Resource Tech Programmes
- 2.1.6 Work Experience Programmes
- 2.1.7 Special Education Programmes
- 2.1.8 Workshops
- 2.1.9 Seminars, Lectures & Papers

Central Filing System continued - 2

- 2.1.10 Continuing Education
- 2.1.11 Day Tours and Visits
- 2.1.12 Other Residential Groups
- 2.1.13 Residential - Loon Lake Camp
- 2.1.14 Summer Student Work Programmes
- 2.1.15 Work Programmes General (not school)
- 2.1.16 Insurance - Outdoor Education
- 2.1.17 Information Centre
- 2.1.18 Ethno Botany
- 2.1.19 Orienteering

2.2 Research

- 2.2.1 Project Reference
- 2.2.2 General Correspondence & Notes
- 2.2.3 Plan format & Spare forms
- 2.2.4 Publication Reference
- 2.2.5 Long Term Project Maintenance
- 2.2.6 Forest Supported Research
- 2.2.7 Research News
- 2.2.8 Weather

2.3 Demonstration

- 2.3.1 Demonstration Forest
- 2.3.2 Other Demonstration Forests
- 2.3.3 Special Projects
- 2.3.4 Trail Systems

2.4 Forest Related Activities

- 2.4.1 Hatchery
- 2.4.2 Arboretum
- 2.4.3 Deer Project
- 2.4.4 Nursery
- 2.4.5 Landscaping and Grounds

3.0 LAND (RESOURCE) CONTROL

3.1 Best-Use

- 3.1.1 Application
- 3.1.2 Reviews
- 3.1.3 Amendments

3.2 Working Circles

- 3.2.1 Nature and Education
- 3.2.2 Water Production
- 3.2.3 Wood Production
- 3.2.4 Recreation
- 3.2.5 Wildlife
- 3.2.6 Utility Corridor
- 3.2.7 Research

3.3 Use Hierarchy

- 3.3.1 Assessment
- 3.3.2 Application
- 3.3.3 Reviews
- 3.3.4 Amendments

Central Filing System continued - 3

3.4 Maps and Plans

- 3.4.1 Key and Location
- 3.4.2 Inventory, storage and display area
- 3.4.3 Amendments and "roughs"
- 3.4.4 Negatives

3.5 Protection

- 3.5.1 Fire
- 3.5.2 Security
- 3.5.3 Pest Control
- 3.5.4 Environmental
- 3.5.5 Water Quality
- 3.5.6 Wildlife

3.6 Soils

- 3.6.1 Map (geology)
- 3.6.2 Profiles
- 3.6.3 Gravel Deposits
- 3.6.4 Rock Quarries

4.0 FOREST OPERATIONS

4.1 Silviculture

- 4.1.1 Surveys & Assessments, Programmes, control sheets
- 4.1.2 Site Preparation
- 4.1.3 Planting (including restocking)
- 4.1.4 Weed control (including cleaning)
- 4.1.5 Juvenile Thinning
- 4.1.6 Pruning
- 4.1.7 Precommercial Thinning
- 4.1.8 Commercial Thinning
- 4.1.9 Rehabilitation
- 4.1.10 Other Plantation and Maintenance Operations
- 4.1.11 Compartment Records
- 4.1.12 Treatment Summaries
- 4.1.13 Crop Tender
- 4.1.14 Seed Stock

4.2 Yield

- 4.2.1 Inventory
- 4.2.2 Yield Calculation
- 4.2.3 Regulation
- 4.2.4 Sample Plot Data

4.3 Harvesting

- 4.3.1 Programme 19xx
- 4.3.2 Programme 19xx plus 1
- 4.3.3 Programme 19xx plus 3-5
- 4.3.4 Programme 19xx plus 6-10
- 4.3.5 Constraints and precautions
- 4.3.6 Agreements and Contracts
- 4.3.7 S and R, Weighlines and Receipts
- 4.3.8 Summaries and Reports

Central Filing System continued - 4

5.0 ENGINEERING

5.1 Engineering

- 5.1.1 Roads
- 5.1.2 Drainage
- 5.1.3 Snow Removal
- 5.1.4 Bridges, new, replacement and maintenance
- 5.1.5 Culverts, " " " "
- 5.1.6 Guard Rails, Road markers and Signs
- 5.1.7 Vegetation Control
- 5.1.8 Records

5.2 Physical Plant

- 5.2.1 Buildings (new and replacement)
- 5.2.2 Building Maintenance
- 5.2.3 Administration
- 5.2.4 Workshop and Compound
- 5.2.5 Marc House and Trailers
- 5.2.6 Toilets
- 5.2.7 Research Forest Power-lines
- 5.2.8 S.F.U. Sheds

5.3 Equipment

- 5.3.1 Inventory, Equipment and Vehicles
- 5.3.2 Inventory, Fire (Field)
- 5.3.3 Inventory, Fire (Buildings)
- 5.3.4 Inventory, Workshop
- 5.3.5 Inventory, Office
- 5.3.6 Inventory, Instruments
- 5.3.7 Inventory, Safety
- 5.3.8 Maintenance Schedules
- 5.3.9 Catalogues, Equipment Brochures
- 5.3.10 Manuals, Parts List
- 5.3.11 Radio

3. Individual file headings (July 1981)

1.0 ADMINISTRATION

1.1 Management Control

- 1.1.1 Budgeting
 - 1.1.1-1 - Year 1981/82
 - 1.1.1-2 - Year 1982/83
- 1.1.2 Grants & Research
 - 1.1.2-1 - Applications
 - 1.1.2-2 - Contracts
 - 1.1.2-3 - Project Outlines & Ideas
- 1.1.3 Forest Development
 - 1.1.3-1 Current Management Plan
 - 1.1.3-2 Old Plan material
- 1.1.4 Annual Report
 - 1.1.4-1 Current Annual Report
 - 1.1.4-2 Previous Copies
- 1.1.5 Technical Audit
- 1.1.6 Valuation
- 1.1.7 Leases, Licences & Insurances
 - 1.1.7-1 Vehicles
 - 1.1.7-2 Water
 - 1.1.7-3 Buildings
 - 1.1.7-4 Personnel Licences (Copies)
 - 1.1.7-5 Other
- 1.1.8 Marketing
- 1.1.9 Files & Records
 - 1.1.9-1 Files & Information
 - 1.1.9-2 Photographs
 - 1.1.9-3 Director's
 - 1.1.9-4 Individual Forester's Files
 - 1.1.9-4-A
 - 1.1.9-5-B

1.2 Organization

- 1.2.1 Correspondence "SINK"
 - 1.2.1-1 Postal Book
- 1.2.2 General Correspondence (un-allocated)
- 1.2.3 Memorandums
 - 1.2.3-1 Forest Memo
 - 1.2.3-2 Dean's
 - 1.2.3-3 Inter-staff General
 - 1.2.3-3-A - J.W.
 - 1.2.3-3-B - D.D.
 - 1.2.3-3-C - P.S.
 - 1.2.3-3-D - R. St.
 - 1.2.3-4 Received Inter-staff - General
 - 1.2.3-4-A - J.W.
 - 1.2.3-4-B - D.D.
 - 1.2.3-4-C - P.S.
 - 1.2.3-4-D - R.St.
- 1.2.4 Meetings (Staff)
 - 1.2.4-1 Weekly
 - 1.2.4-2 Safety
 - 1.2.4-3 Spring Camp

1.2.5 Business Cards

1.2.6 Computer

- 1.2.6-1 General
- 1.2.6-2 Computer Work Information
- 1.2.6-3 Inventory
 - 1.2.6-3-A - Inventory Programme
 - 1.2.6-3-B - Sampling with Partial Replacement
- 1.2.6-4 I.D.'s Use & Costing
- 1.2.6-5 Current Newsletters
- 1.2.6-6 Formats of Programmes in Use
- 1.2.6-7 C.A.R.P.
- 1.2.6-8 A.S.A.P.

1.3 Personnel

1.3.1 Permanent Staff

- 1.3.1-1 Professional
 - 1.3.1-1-A - J.W.
 - 1.3.1-1-B - D.D.
 - 1.3.1-1-C - P.S.
- 1.3.1-2 Technical
 - 1.3.1-2-A - C. Blom
 - 1.3.1-2-B - J. Easterbrook
 - 1.3.1-2-C - B. Madill
 - 1.3.1-2-D - R. St. Jean
 - 1.3.1-2-E - B. Tuokko
 - 1.3.1-2-F - D. Tuokko
- 1.3.1-3 Secretarial
 - 1.3.1-3-A - B. Bilodeau
 - 1.3.1-3-B - J. Jensen
- 1.3.1-4 Gatekeeper
 - 1.3.1-4-A - T. Smith
- 1.3.1-5 Caretaker (cross ref. Camp)
 - 1.3.1-5-A - A. Smith
- 1.3.1-6 Applications

1.3.2 Temporary Staff

- 1.3.2-1 Hourly
 - 1.3.2-1-A - Casual Labour
 - 1.3.2-2-B - Students
 - 1.3.2-2-C - Kitchen (cross ref Camp)
- 1.3.2-2 Applications

1.3.3 Training

- 1.3.3-1 Permanent Staff
- 1.3.3-2 Temporary Staff

1.3.4 Employee Relations

- 1.3.4-1 Leave (sick, holidays etc.)
- 1.3.4-2 W.C.B. Reports
 - 1.3.4-2-A - First Aid Reports
- 1.3.4-3 Forms
 - 1.3.4-3-A - Income Tax
 - 1.3.4-3-B - Hourly Time Sheets
 - 1.3.4-3-C - Employment
 - 1.3.4-3-C-i - Permanent
 - 1.3.4-3-C-ii - Temporary
 - 1.3.4-3-D - Banking Instructions
 - 1.3.4-3-E - Medical
 - 1.3.4-3-F - Dental
 - 1.3.4-3-G - Extended Benefits

1.4 Accounts

1.4.1 Day Journal

1.4.2 UBCRF - 29-8990

1.4.2.1 Accounts Payable (list of all acct's)

- 1.4.2.1-1 A to Z Rentals
 - 1.4.2.1-1-A - U.B.C. paid Statements
- 1.4.2.1-2 Acklands
 - 1.4.2.1-2-A - U.B.C. paid statements
- 1.4.2.1-3 B.C. Welding Supplies
 - 1.4.2.1-3-A - U.B.C. paid statements
- 1.4.2.1-4 Bartle & Gibson
 - 1.4.2.1-4-A - " " "
- 1.4.2.1-5 Black Bros
 - 1.4.2.1-5-A - " " "
- 1.4.2.1-6 Boileau Electric
 - 1.4.2.1-6-A - " " "
- 1.4.2.1-7 Buckerfields
 - 1.4.2.1-7-A - UBC etc
- 1.4.2.1-8 C & L Logging - 416 Repairs & Maintenance
 - 1.4.2.1-8-A - U.B.C.
- 1.4.2.1-9 C & L Logging - 417 Repairs & Maint. Roads
 - 1.4.2.1-9-A - UBC
- 1.4.2.1-10 C & L Logging - 422 Contract Logging
 - 1.4.2.1-10-A - UBC
- 1.4.2.1-11 C & L Logging - 491 Roads Building
 - 1.4.2.1-11-A
- 1.4.2.1-12 Logging Tax
 - 1.4.2.1-12-A
- 1.4.2.1-13 Canadian Propane
 - 1.4.2.1-13-A
- 1.4.2.1-14 Cloverdale Paint
- 1.4.2.1-15 Diversey Can.
- 1.4.2.1-16 Express Photo
- 1.4.2.1-17 Finning Tractor
- 1.4.2.1-18 Fuller & Watson
- 1.4.2.1-19 Goertz, Fred
- 1.4.2.1-20 Griffin Bros.
- 1.4.2.1-21 Haney Blacksmith
- 1.4.2.1-22 Haney Builders
- 1.4.2.1-23 Accent Glass
- 1.4.2.1-24 Haney Iron Works
- 1.4.2.1-25 Johnson Pole Line
- 1.4.2.1-26 Kirkpatrick Sand
- 1.4.2.1-27 Lordco
- 1.4.2.1-28 Loughheed Tire
- 1.4.2.1-29 M.R. Rental
- 1.4.2.1-30 Middleton Trucking

- 1.4.2.1-31 - Modale Heating
- 1.4.2.1-32 - Morrow Fuels
- 1.4.2.1-33 - Mussallem Motors
- 1.4.2.1-34 - Muth and Sons
- 1.4.2.1-35 - Nuborn Plumbing
- 1.4.2.1-36 - Pacific Equipment
- 1.4.2.1-37 - Pacific Survey
- 1.4.2.1-38 - RDM Trucking
- 1.4.2.1-39 - Radio Shack
- 1.4.2.1-40 - Royal City Fire
- 1.4.2.1-41 - Saari, Sam
- 1.4.2.1-42 - Savage, John
- 1.4.2.1-43 - Sayers, George
- 1.4.2.1-44 - Shell Canada
- 1.4.2.1-45 - Tri-Way Disposal
- 1.4.2.1-46 - VanCal
- 1.4.2.1-47 - Vanderwal
- 1.4.2.1-48 - Wainbee

1.4.2.1-48-A - U.B.C. Paid Statements

1.4.2.2 Accounts Receivable (Deposits)

- 1.4.2.2-1 Whonnock Lumber
- 1.4.2.2-2 Bell Pole
- 1.4.2.2-3 Ecosystem Units Map

1.4.2.3 Transfers "Sink"

1.4.2.4 U.B.C. Ledger Sheets

1.4.2.5 Monthly reconciliation statements

1.4.2.6 Payroll

- 1.4.2.6-1 Time Sheets
- 1.4.2.6-2 Salaries Paid

1.4.2.2 Loon Lake Camp

1.4.2.2-1 Accounts Payable

- 1.4.2.2-1-A Henderson, James
- 1.4.2.2-1-B Henderson, R.G.
- 1.4.2.2-1-C Overwaitea
- 1.4.2.2-1-D Russell Food Equipment

1.4.2.2-2 Accounts Receivable

- 1.4.2.2-2-A Camp Rental

1.4.2.2-3 Transfers "Sink"

1.4.2.2-4 Payroll

- 1.4.2.2-4-A Time Sheets
- 1.4.2.2-4-B Salaries Paid

1.4.2.3 Spring Camp

1.4.2.3-1 Accounts Payable

- 1.4.2.3-1-A Fleck Bros.

1.4.2.3-2 Accounts Receivable

1.4.2.3-3 Transfers "Sink"

1.4.2.3-4 Payroll

- 1.4.2.3-4-A Professional & Honorium

1.4.3 Grants

1.4.3.1 - 63-5555 - Ed. Development Fund

- 1.4.3.1-1 - Accounts Payable (List of all acct's)
 - 1.4.3.1-1-A - Buckerfields
 - 1.4.3.1-1-B - Behnsen's Graphics
 - 1.4.3.1-1-C - Fuller & Watson
 - 1.4.3.1-1-D - Haney Builders
 - 1.4.3.1-1-E - Lordco Parts
 - 1.4.3.1-1-F - Middleton Trucking
 - 1.4.3.1-1-G - N.E.A. Research Ltd.- Dr. T. Sullivan
 - 1.4.3.1-1-H - Penhall Ltd.
 - 1.4.3.1-1-I - Safety Supply Ltd.
 - 1.4.3.1-1-J - Savege Backhoe
- 1.4.3.1-2 - Accounts Receivable
 - 1.4.3.1-2-A - Day Tours
 - 1.4.3.1-2-B - Stu Jones
- 1.4.3.1-3 - Transfers "SINK"
- 1.4.3.1-4 - U.B.C. Ledger Sheets
- 1.4.3.1-5 - Payroll
 - 1.4.3.1-5-A - Time Sheets
 - 1.4.3.1-5-B - Salaries Paid
- 1.4.3.1-6 - Monthly Reconciliation Statement

1.4.3.2 - 65-6575 - Deer Project

- 1.4.3.2-1 - Accounts Payable
- 1.4.3.2-2 - Accounts Receivable
- 1.4.3.2-3 - Transfers "SINK"
- 1.4.3.2-4 - U.B.C. Ledger Sheets
- 1.4.3.2-5 - Payroll
- 1.4.3.2-6 - Monthly reconciliation Statement

1.4.3.3 - 62-2852 - Deaf Programme

- 1.4.3.3-1 - Accounts Payable
- 1.4.3.3-2 - Accounts Receivable
- etc. etc.

1.4.3.4 - 65-0220 - Dev. Walter's Planting Gun

- 1.4.3.4-1 - Accounts Payable
- 1.4.3.4-2 - Accounts Receivable
- etc. etc.

1.4.3.5 - 65-7332 - Design & Dev. of Automatic tree planting system to operational standards

- 1.4.3.5-1 - Accounts Payable
- 1.4.3.5-2 - Accounts Receivable
- etc. etc.

1.4.3.6 - 65-0274 - Computer analysis of design & Composition of tree Planting Bullet

- 1.4.3.6-1 - Accounts Payable
- 1.4.3.6-2 - Accounts Receivable

1.5 Public Relations

1.5.1 Correspondence - General

1.5.2 Associations & Agencies

- 1.5.2-1 ABCRPF
- 1.5.2-2 ASAE
- 1.5.2-3 CIF
- 1.5.2-4 CFA
- 1.5.2-5 COFI
- 1.5.2-6 APA (American Pulpwood)
- 1.5.2-7 UBC Alumni
- 1.5.2-8 B.C. Museum Educators
- 1.5.2-9 Provincial Intermediate Teachers' Assoc.
- 1.5.2-10 Canadian Institute for the Blind
- 1.5.2-11 B.C. Forest Service
- 1.5.2-12 B.C.F.P.
- 1.5.2-13 C.F.S.

1.5.3 Committees

- 1.5.3-1 Forest Advisory Committee
- 1.5.3-1 Thesis (correspondence)
 - 1.5.3-1-A Topic Ideas
 - 1.5.3-1-B Student Thesis Committee
 - 1.5.3-1-C Thesis Advisory Committee
- 1.5.3-2 Safety Committee U.B.C. (cross ref with 1.2.4-2)
- 1.5.3-3 Committee on Mechanization
- 1.5.3-4 Reforestation Board
- 1.5.3-5 Articulation Alberta
 - 1.5.3-5-A Articulation B.C.
- 1.5.3-6 Coquitlam Area Mountain Study
- 1.5.3-7 Can. U.S.S.R Working Group

1.5.4 Adjacent Land Owners

1.5.5 Local By-laws

1.5.6 Open House

1.5.7 Promotion

- 1.5.7-1 Brochures, booklets
 - 1.5.7-1-A Research Forest Booklet

2.0 FUNCTION ACTIVITIES

2.1 Education

2.1.1 Correspondence

2.1.2 Universities

- 2.1.2-1 U.B.C.
 - 2.1.2-1-A 1st Yr. Orientation & Grad Tour
 - 2.1.2-1-B Spring Camp (cross ref.)
 - 2.1.2-1-C For 362
 - 2.1.2-1-D For. 125
 - 2.1.2-1-E Notice Board
 - 2.1.2-1-F New Forestry Building
- 2.1.2-2 S.F.U.
- 2.1.2-3 Other Universities
- 2.1.2-4 Other University Research Forests
- 2.1.2-5 Provincial Ecological Reserves
 - 2.1.2-5-A Redonda Island

2.1.3 Technical Schools & Colleges

- 2.1.3-1 B.C.I.T.
 - 2.1.3-1-A URF Campus
 - 2.1.3-1-B Field Exercises
- 2.1.3-2 Malaspina College
- 2.1.3-3 Selkirk College

2.1.4 Vocational Schools

- 2.1.4-1 P.V.I.

2.1.5 Resource Tech Programmes

- 2.1.4-1 Chilliwack
- 2.1.4-2 Keremeous
- 2.1.4-3 Canim Lake
- 2.1.4-4 Kamloops

2.1.6 - Work Experience Programmes

- 2.1.6-1 - M.R.S.S.
- 2.1.6-2 - Garibaldi
- 2.1.6-3 - Pitt Meadows

2.1.7 - Special Education Programmes

- 2.1.7-1 - Arthur Peake
- 2.1.7-2 - M.R.S.S.
- 2.1.7-3 - Jericho Hill

2.1.8 - Workshops

- 2.1.8-1 - Principles of Supervision
- 2.1.8-2 - Outdoor Education In-Service (cross ref Camp)

2.1.9 - Seminars, Lectures & Papers

- 2.1.9-1 - Third Annual Science Seminar 1979
- 2.1.9-2 - Automotive Engineers
- 2.1.9-3 - Fertilizer Symposium
- 2.1.9-4 - Greentimbers
 - 2.1.9-4-A - Introductory Lecture
 - 2.1.9-4-B - Lecture 1
 - 2.1.9-4-C - Lecture 2
 - 2.1.9-4-D - Lecture 3
 - 2.1.9-4-E - Lecture 4
 - 2.1.9-4-F - Lecture 5
 - 2.1.9-4-G - Lecture 6
 - 2.1.9-4-H - General Notes
- 2.1.9-5 - Forestry Symposium Khabarovsk
- 2.1.9-6 - Forest Magazine

2.1.10 - Continuing Education

2.1.11 - Day Tours and Visits

- 2.1.11-1 - Correspondence
- 2.1.11-2 - Booking Sheets

2.1.12 - Other Residential Groups (cross ref Camp)

2.1.13 - Residential - Loon Lake (cross ref Camp)

2.1.14 - Summer Student Work Programmes

- 2.1.14-1 - Ideas & Outline
- 2.1.14-2 - Applications
- 2.1.14-3 - Project Grants
 - 2.1.14-3-A - Careers 75' - Successive Sampling with Partial Replacement
 - 2.1.14-3-B - Careers 76' - Planning, construction etc. of access trails at Research Forest
 - 2.1.14-3-C - Careers 77' - S.F.U. - Dr. Sadlier
 - 2.1.14-3-D - YCW 1369-RX-4 - Student Community Guide
 - 2.1.14-3-E - Canada Works - Demonstration Forest for Schools
 - 2.1.14-3-F - YCW 1096 SX0 - Forest employment opportunities for students with learning disabilities
 - 2.1.14-3-G - Careers 78' - Assess condition and growth of Arboretum specimen trees
 - 2.1.14-3-H - YCW 1056 TX3 - Environmental protection. Employment for Classified Students
 - 2.1.14-3-I - U.B.C. Youth Employment - Status Listings of all Research Projects
 - 2.1.14-3-J - YCW 3062 UX8 - Special Student Integration and Work Orientation
 - 2.1.14-3-K - BCFS 1980 - Demonstration Forest Tour Co-ordinators
 - 2.1.14-3-L - BCFS 1981 - Demonstration Forest Tour Co-ordinators

- 2.1.15 Work Programmes General (not school)
 - 2.1.15-1 Ideas & Outline
 - 2.1.15-2 Applications
 - 2.1.15-3 Work Programmes
 - 2.1.15-3-A B.C. Labour YEP Project
 - 2.1.15-3-B Canada Employ. & Immigration 1256 MX8
 - 2.1.15-3-C Forestry Work Experience for the Deaf
 - 2.1.15-3-C Community Service Programme
- 2.1.16 Insurance - Outdoor Education
- 2.1.17 Information Centre
- 2.1.18 Ethno Botany

2.2 Research

- 2.2.1 Project Reference
 - 2.2.1.78/1 - Example
 - 2.2.1.78/2 - Next Example
 - 2.2.1.79/1 - etc.
- 2.2.2 General correspondence and notes
- 2.2.3 Plan format & Spare forms
- 2.2.4 Publication reference
- 2.2.5 Long Term Project Maintenance
- 2.2.6 Forest Supported Research
- 2.2.7 Research News
- 2.2.8 Weather
 - 2.2.8-1 Loon Lake
 - 2.2.8-2 Marc Station
 - 2.2.8-3 Spur 17
 - 2.2.8-4 Administration
 - 2.2.8-4-A Sun Charts
 - 2.2.8-4-B Percipitation
 - 2.2.8-4-C Fire Index
 - 2.2.8-5 Manuals

2.3 Demonstration

- 2.3.1 Demonstration Forest
 - 2.3.1-1 Green Trail Bridge
- 2.3.2 Other Demonstration Forests
- 2.3.3 Special Projects
 - 2.3.3-2 Husqvarna Brushcutter Demo 78'
 - 2.3.3-3 Signs
 - 2.3.3-3-A List, locations & example
 - 2.3.3-3-B Ideas
- 2.3.4 Trail systems

2.4 Forest Related Activities

- 2.4.1 Hatchery
- 2.4.2 Arboretum
- 2.4.3 Deer Project
 - 2.4.3-1 Bunnell
- 2.4.4 Nursery
 - 2.4.4-1 Lathe House
 - 2.4.4-1-A Records
 - 2.4.4-2 Proposed Forest Nursery on URF
- 2.4.5 Landscaping and Grounds

3.0 LAND (RESOURCE) CONTROL

3.1 Best-Use

- 3.1.1 Application
- 3.1.2 Reviews
- 3.1.3 Amendments

3.2 Working Circles

3.2.1 Nature & Education

- 3.2.1-1 Knapp Reserve
- 3.2.1-2 Griffith
- 3.2.1-3 Otto
- 3.2.1-4 Eunice
- 3.2.1-5 Loon Lake
- 3.2.1-6 Golden Ears
- 3.2.1-7 Pitt Lake Slopes

3.2.2 Water Production

3.2.2-1 Water Licence

3.2.2-2 Fish

3.2.2-3 Lakes

- 3.2.2-3-A - Betsy
- 3.2.2-3-B - Bird
- 3.2.2-3-C - Blaney
- 3.2.2-3-D - Eunice
- 3.2.2-3-E - Goose
- 3.2.2-3-F - Gwendoline
- 3.2.2-3-G - Irony
- 3.2.2-3-H - Katherine
- 3.2.2-3-I - Loon
- 3.2.2-3-J - Lost
- 3.2.2-3-K - Mirror
- 3.2.2-3-L - Peaceful
- 3.2.2-3-M - Placid
- 3.2.2-3-O - Rose
- 3.2.2-3-P - Shirley
- 3.2.2-3-Q - Surprise

3.2.3 Wood Production

3.2.4 Recreation

3.2.5 Wildlife

3.2.6 ~~Utility~~ Corridor

3.2.6-1 B.C. Hydro

3.2.6-2 Archery Club

3.2.7 Research

3.3 Use Hierarchy

- 3.3.1 Assessment
- 3.3.2 Application
- 3.3.3 Reviews
- 3.3.4 Amendments

3.4 Maps & Plans

3.4.1 Key and Location

- 3.4.1-1 Current use management maps
- 3.4.1-2 Spring Camp maps
- 3.4.1-3 Special use maps and charts
- 3.4.1-4 Building & site plans
- 3.4.1-5 History

3.4.2 Inventory, storage and display area

3.4.3 Amendments and "roughs"

3.4.4 Negatives

- 3.4.4-1 Micro negatives
- 3.4.4-2 Mylar positives

3.5 Protection

- 3.5.1 Fire (cross ref. 5.3.2)
 - 3.5.1-1 Current Plan
 - 3.5.1-2 Old plan material
- 3.5.2 Security
 - 3.5.2-1 "Key" System
- 3.5.3 Pest Control
- 3.5.4 Environmental
- 3.5.5 Water Quality (cross ref. Camp)
- 3.5.6 Wildlife

3.6 Soils

- 3.6.1 Map (geology)
- 3.6.2 Profiles
- 3.6.3 Gravel Deposits
- 3.6.4 Rock Quarries

4.0 SILVICULTURE

4.1 Silviculture

- 4.1.1 Surveys and Assessments, programmes, control sheets
- 4.1.2 Site Preparation
- 4.1.3 Planting (including restocking)
- 4.1.4 Weed control (including cleaning)
- 4.1.5 Juvenile thinning
- 4.1.6 Pruning
- 4.1.7 Pre-commercial thinning
- 4.1.8 Commercial thinning
- 4.1.9 Rehabilitation
- 4.1.10 Other Plantation and Maintenance Operations
- 4.1.11 Compartment Records
 - 4.1.11-1 - CO. 1
 - 4.1.11-2 - Sub-Compartments
 - 4.1.11-2-A Treatment
 - 4.1.11-2-B History
 - 4.1.11-2-C Reports
- 4.1.12 Treatment Summaries
- 4.1.13 Crop Tender
- 4.1.14 Seed Stock

4.2 Yield

- 4.2.1 Inventory
- 4.2.2 Yield Calculation
- 4.2.3 Regulation
- 4.2.4 Sample Plot Data (cross ref Rick's & P.S. files)

4.3 Harvesting

- 4.3.1 Programme 19xx
- 4.3.2 Programme 19xx plus 1
- 4.3.3 Programme 19xx plus 3-5
- 4.3.4 Programme 19xx plus 6-10
- 4.3.5 Constraints and precautions
- 4.3.6 Agreements and Contracts
 - 4.3.6-1 - C & L Logging
- 4.3.7 S and R, Weighlines and Receipts
- 4.3.8 Summaries and Reports
- 4.3.9

5.0 ENGINEERING

5.1 Engineering

5.1.1 Roads

5.1.1-1 List

- 5.1.1-1-1 Road A
- 5.1.1-1-2 Road A10
- 5.1.1-1-3 Road A20
- etc.

5.1.1-2 New

5.1.1-3 Maintenance (general provisions)

5.1.2 Drainage

5.1.3 Snow Removal

5.1.4 Bridges, new, replacement and maintenance

5.1.5 Culverts, " " " "

5.1.6 Guard Rails, road markers and signs

5.1.7 Vegetation Control

5.1.8 Records

5.1.8-1 Lists & source of material

5.2 Physical Plant

5.2.1 Buildings (new and replacement)

5.2.2 Building Maintenance

5.2.3 Administration

5.2.4 Workshop and Compound

5.2.5 Marc House & Trailers

5.2.6 Toilets

5.2.7 Research Forest Power-lines

5.2.8 S.F.U. Sheds

5.3 Equipment

5.3.1 Inventory, Equipment and vehicles

5.3.2 Inventory, Fire (Field)

5.3.3 Inventory, Fire (Buildings)

5.3.4 Inventory, Workshop

5.3.5 Inventory, Office

5.3.6 Inventory, Instruments

5.3.7 Inventory, Safety

5.3.8 Maintenance Schedules

5.3.9 Catalogues, equipment brochures

5.3.9-1 Rick's

5.3.9-2 Barry's

5.3.10 Manuals, parts list

5.3.10-1 Rick's

5.3.10-2 Barry's

5.3.11 Radio

4. Cabinet numbers and location.

CENTRAL FILING SYSTEM

Section 4. Filing Cabinet Numbers and Location

(i) ALLOCATED NUMBERS

Silviculture & Education	11 - 19
Technical	20 - 29
Administrative/Secretarial/Research	30 - 39
Engineering	40 - 49
Director	50 - 59
Workshop	60 - 69

(ii) NUMBERS IN USE

Silviculture & Education	11,12,13,14,15
Technical	21,22
Administrative/Secretarial/Research	31,32,33,34,35
Engineering	41,42
Director	51,52
Workshop	60

5. Copy of Card index for specific files (August 1981).

- only partial examples included

CENTRAL FILING SYSTEM

- 1.0 ADMINISTRATION
- 2.0 FUNCTION ACTIVITIES
- 3.0 LAND CONTROL
- 4.0 FOREST OPERATIONS
- 5.0 ENGINEERING

ADMINISTRATION

1.0 MAIN TITLE

— MAIN SUB-TITLES ARE ON THIS —

They are;

- 1.1 MANAGEMENT CONTROL - 11/1
- 1.2 ORGANIZATION - 11/1
- 1.3 PERSONNEL - 11/1
- 1.4 ACCOUNTS - 11/1
- 1.5 PUBLIC RELATIONS - 11/2

MANAGEMENT CONTROL

1.1 -11/1

Sub-titles are;

- 1.1.1 BUDGETING
 - 1.1.2 GRANTS & RESEARCH
 - 1.1.3 FOREST DEVELOPMENT
 - 1.1.4 ANNUAL REPORT
 - 1.1.5 TECHNICAL AUDIT
 - 1.1.6 VALUATION
 - 1.1.7 LEASES, LICENCES & INSURANCE
 - 1.1.8 MARKETING
 - 1.1.9 FILES & RECORDS
-

FOREST DEVELOPMENT

1.1.3 - 11/1

- 1.1.3-1 Current Management Plan - 11/1
- 1.1.3-2 Old Plan Material - 11/1
- 1.1.3-3 Forest History - 11/1

GRANTS & RESEARCH

1.1.2 100

- 1.1.2-1 Applications
- 1.1.2-2 Contracts
- 1.1.2-3 Project Outlines & Ideas

BUDGETING

1.1.1 100

- 1.1.1-1 - Year 1981/82
 - 1.1.1-2 - Year 1982/83
-

FILES & RECORDS

1.1.9

- 1.1.9-1 Files & Information
- 1.1.9-2 Photographs
- 1.1.9-3 Director's
- 1.1.9-4 Individual Forester's Files
 - 1.1.9-4-A - J.W.
 - 1.1.9-4-B - D.D.
 - 1.1.9-4-C - P.S. - 11/1

LEASES, LICENCES & INSURANCE1.1.7 *PAB*

- 1.1.7-1 Vehicles
- 1.1.7-2 Water
- 1.1.7-3 Buildings
- 1.1.7-4 Personnel Licences (copies)
- 1.1.7-5 Other

ANNUAL REPORT1.1.4 *PAB*

- 1.1.4-1 Current Annual Report
- 1.1.4-2 Previous Copies

ORGANIZATION

1.2 - 11/1

Sub-titles are:

- 1.2.1 CORRESPONDENCE "SINK"
- 1.2.2 GENERAL CORRESPONDENCE (un-allocated)
- 1.2.3 MEMORANDUMS
- 1.2.4 MEETINGS (STAFF)
- 1.2.5 BUSINESS CARDS
- 1.2.6 COMPUTER

CORRESPONDENCE "SINK"

1.2.1 - 11/1

1.2.1-1 Postal Book - 11/1

MEMORANDUMS

1.2.3 - 11/1

- 1.2.3-1 Forest Memo
 - 1.2.3-2 Dean's
 - 1.2.3-3 Inter-staff General - 11/1
 - 1.2.3-3-A - J.W.
 - 1.2.3-3-B - D.D.
 - 1.2.3-3-C - P.S.
 - 1.2.3-3-D - R. St.
 - 1.2.3-4 Received Inter-staff General - 11/1
 - 1.2.3-4-A - J.W.
 - 1.2.3-4-B - D.D.
 - 1.2.3-4-C - P.S.
 - 1.2.3-4-D - R. St.
-

COMPUTER

1.2.6 - 11/1

- 1.2.6-1 General
- 1.2.6-2 Computer Work Information
- 1.2.6-3 Inventory
 - 1.2.6-3-A - Inventory Programme
- 1.2.6-4 I.D.'s Use & Costing
- 1.2.6-5 Current Newsletters
- 1.2.6-6 Formats of Programmes in Use
- 1.2.6-7 C.A.R.P.
- 1.2.6-8 A.S.A.P
- 1.2.6-9 Vehicle Costing

MEETINGS (STAFF)

1.2.4 - 11/1

- 1.2.4-1 Weekly
 - 1.2.4-2 Safety
 - 1.2.4-3 Spring Camp
-

PERSONNEL

1.3 - 11/1

Sub-titles are;

- 1.3.1 PERMANENT STAFF
- 1.3.2 TEMPORARY STAFF
- 1.3.3 TRAINING
- 1.3.4 EMPLOYEE RELATIONS

PERMANENT STAFF

1.3.1 EAB

- 1.3.1-1 Professional
 - 1.3.1-1-A - J.W.
 - 1.3.1-1-B - D.D.
 - 1.3.1-1-C - P.S.
- 1.3.1-2 Technical
 - 1.3.1-2-A - C. Blom
 - 1.3.1-2-B - J. Easterbrook
 - 1.3.1-2-C - B. Madill
 - 1.3.1-2-D - R. St. Jean
 - 1.3.1-2-E - B. Tuokko
 - 1.3.1-2-F - D. Tuokko
- 1.3.1-3 Secretarial
 - 1.3.1-3-A - B. Bilodeau
 - 1.3.1-3-B - J. Jensen
- 1.3.1-4 Gatekeeper
 - 1.3.1-4-A - T. Smith
- 1.3.1-5 Caretaker
 - 1.3.1-5-A - A. Smith
- 1.3.1-6 Applications

TEMPORARY STAFF

1.3.2 - 11/1

- 1.3.2-1 Hourly
 - 1.3.2-1-A Casual Labour (not Loon Lake) EAB
 - 1.3.2-1-B Students - 11/1
 - 1.3.2-1-C Kitchen EAB
- 1.3.2-2 Applications - 11/1

EMPLOYEE RELATIONS

1.3.4 - 11/1

- 1.3.4-1 Leave (sick, holidays, etc.)
- 1.3.4-2 W.C.B. Reports - 11/1
 - 1.3.4-2-A - First-aid Reports - 11/1
- 1.3.4-3 Forms
 - 1.3.4-3-A - Income Tax
 - 1.3.4-3-B - Hourly Time Sheets
 - 1.3.4-3-C - Employment
 - 1.3.4-3-C-i - Permanent
 - 1.3.4-3-C-ii - Temporary
 - 1.3.4-3-D - Banking Instructions
 - 1.3.4-3-E - Medical
 - 1.3.4-3-F - Dental
 - 1.3.4-3-G - Extended Benefits

TRAINING

1.3.3 BFB

- 1.3.3-1 Permanent Staff
 - 1.3.3-2 Temporary Staff
-

ACCOUNTS

1.4 - 11/1

Sub-titles are:

- 1.4.1 DAY JOURNAL
- 1.4.2 UBCRF -29-8990
 - 1.4.2.2.1 LOON LAKE CAMP
 - 1.4.2.2.2 SPRING CAMP
- 1.4.3 GRANTS
 - 1.4.3.1 63-5555 Education Develop. Fund
 - 1.4.3.2 65-6575 Deer Project
 - 1.4.3.3 62-2852 Deaf Programme
 - 1.4.3.4 65-0220 Dev. Walters' Planting Gun
 - 1.4.3.5 65-7332 Design & Dev. of Auto tree planting system etc.
 - 1.4.3.6 65-0274 Computer analysis of design & component of tree Pl. Bullet
 - 1.4.3.7 62-2800 Summer Canada 81' Resource Dev. for Community Purposes
 - 1.4.3.8 65-0207 Wheelchair Circuit

PUBLIC RELATIONS

1.5 -11/2

Sub-titles are:

- 1.5.1 CORRESPONDENCE - GENERAL
- 1.5.2 ASSOCIATIONS & AGENCIES
- 1.5.3 COMMITTEES
- 1.5.4 ADJACENT LAND OWNERS
- 1.5.5 LOCAL BY-LAWS
- 1.5.6 OPEN HOUSE
- 1.5.7 PROMOTION
- 1.5.8 FOREST INFO CENTRE

ASSOCIATIONS & AGENCIES

1.5.2 - 11/2

- 1.5.2-1 ABC Registered Professional Forester
- 1.5.2-2 ASAE
- 1.5.2-3 CIF
- 1.5.2-4 CFA
- 1.5.2-5 COFI
- 1.5.2-6 APA (American Pulpwood)
- 1.5.2-7 UBC Alumni
- 1.5.2-8 B.C. Museum Educators
- 1.5.2-9 Provincial Intermediate Teachers Assoc.
- 1.5.2-10 Canadian Institute for the Blind
- 1.5.2-11 B.C. Forest Service
- 1.5.2-12 B.C.F.P.
- 1.5.2-13 C.F.S.
- 1.5.2-14 Ecological Reserves (Dept. of Lands)
- 1.5.2-15 ELUC
- 1.5.2-16 W.F.D.G
- 1.5.2-17 M & B
- 1.5.2-18 British F.C.
- 1.5.2-19 AAPS

[illegible]

APPENDIX 1.1-9-A

UNIVERSITY FOREST MANAGEMENT PLAN (1953)

APPENDIX 2.1.1-2-A

METES AND BOUNDS
of the
U.B.C. RESEARCH FOREST

Contents

1. Survey directions for location of boundary (1975)
2. Location map of starting point of survey.
3. Copy of original survey of Lot 7074 (Block I)
and Lot 6110 (Block II).

APPENDIX 2.1.1-2-B

LIST OF ALL MAP TYPES
of the
U.B.C. RESEARCH FOREST
(Maps held at the Administration Headquarters of the Forest.)

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- (i) Maps held in Mapping Room
- (ii) Maps stored in Tube Rack
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APPENDIX 2.1.2-3-A

ACCOUNTS OF FIRES
on the
U.B.C. RESEARCH FOREST

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1. Contemporary accounts of early fires as excerpts from local newspapers 1868.
2. Details of fires on U.B.C. Research Forest since 1947.

APPENDIX 2.1.2-38-A

LIST OF ALL RESEARCH PROJECTS INITIATED
on the
U.B.C. RESEARCH FOREST

APPENDIX 2.1.2-38-B

LIST OF ALL PAPERS, REPORTS, THESES AND OTHER PUBLICATIONS
written on the
U.B.C. RESEARCH FOREST

APPENDIX 2.1.2-38-C

ANNUAL REPORTS
of the
U.B.C. RESEARCH FOREST

APPENDIX 2.1.2-75-A

A MASTER ROAD PLAN
for the
U.B.C. RESEARCH FOREST

(Copy of the Road Development Plan (1968))

APPENDIX 2.1.2-79-A

METES AND BOUNDS OF BLOCK II
on the
U.B.C. RESEARCH FOREST

APPENDIX 2.1.2-90-A

CALCUALTION OF THE ANNUAL ALLOWABLE CUT
on the
U.B.C. RESEARCH FOREST
(1970)

APPENDIX 2.1.6-1-A

SOIL SURVEY REPORTS ON THE
ARBORETUM AT U.B.C. RESEARCH FOREST

APPENDIX 2.1.7-4-A

SUMMARY OF CLIMATE DATA
on the
U.B.C. RESEARCH FOREST

Contents

1. Climate and Records on U.B.C. Research Forest.
2. Notes on Spur 17 Station (now discontinued).
3. Station Catalogue Reference.

APPENDIX 2.1.8-1-A

ECOLOGICAL INFORMATION
on the
U.B.C. RESEARCH FOREST

Contents

1. Description of the Coastal Western Hemlock Biogeoclimatic Zone (Krajina, 1965). (Excerpt from the Forestry Handbook, U.B.C. Forest Club, Faculty of Forestry, U.B.C. 1971 pp 212-219)
2. Abstract of Klinka's (1976) Ph.D. Thesis.
3. Map - Ecosystem Units of U.B.C. Research Forest.

APPENDIX 2.1.9-5-A

DETAILS OF BRIDGE CONSTRUCTION
on the
U.B.C. RESEARCH FOREST

Note: This Appendix is incomplete at the present time (1981).

APPENDIX 2.1.9-7-A

DETAILS OF STRUCTURES
on the
U.B.C. RESEARCH FOREST

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References to the following Structures;

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2. Administration Headquarters
3. Workshops and garage
4. Marc House
5. Research signs and semi-permanent structures
6. Airstrip

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DETAILS OF ALL MINIERAL CLAIMS
on the
U.B.C. RESEARCH FOREST

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1. Letter from Mineral Resources Branch detailing claims on the U.B.C. Research Forest.
2. Copy of Section 12 of the Mineral Act.
3. Details of previous claims now forfeited.
4. Map showing location of Mineral claims on the U.B.C. Research Forest.

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PAST AND PRESENT FIRE PLANS
of the
U.B.C. RESEARCH FOREST

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1. Current Fire Plan.
2. Fire Plan written in 1967 (reduced copy)

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to

U.B.C. RESEARCH FOREST

APPENDIX 2.2.1.1-3-A

U.B.C. RESEARCH FOREST - FOREST INVENTORY

Contents

1. Old Mapping Plan (1950) and Preliminary Report on the University Forest (Spring 1950).
2. Description of methods used in collection analysis of Point samples - 1964/66 inventory.
3. Summary of statistics as of April, 1966 and Calculation of the Annual Allowable Cut.
4. Area and volume of the U.B.C. Research Forest (including Basal Area and Second Growth volume assessment). - plus key map.
5. Details of Inventory undertaken in 1973 as part of Variable Density Yield Table Assessment. (Productivity Committee contract P.C. 006, B.C. Forest Service.
6. Site Classification Map (Site index map) (Bajak, 1960 updated to 1971).
7. Computer printout of 1970 reworked inventory.

APPENDIX 2.2.1.1-3-B

DETAILS OF ALLOWABLE ANNUAL CUT CALCULATIONS
on
U.B.C. RESEARCH FOREST

Contents

1. Notes on AAC Calculations.
2. Memo (and AAC Calculations) 1970
3. Memo and AAC Calculations (1971)
4. Memo and AAC Calculations (1976).

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OWNERS OF ADJACENT PROPERTIES

to

U.B.C. RESEARCH FOREST

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DETAILS OF WATER RECORDING STATION
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on Jacob's Creek (now disused) and North Alouette.
2. Details of Daily Height and Daily Discharge from
stations described in 1 above.

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REGISTER OF WATER LICENCES ON CREEKS
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2. General information on Water Law in British Columbia.
3. Addresses for further information.

APPENDIX 2.2.2.4-1-A

DAMMING PROPOSALS FOR THE NORTH ALOUETTE

on

U.B.C. RESEARCH FOREST

PAPERS RELATIVE TO JACOB'S (MARION) LAKE

APPENDIX 2.2.4.1-2-A

WILDLIFE SIGHTINGS, AND C.L.I. CAPABILITY
of the
U.B.C. RESEARCH FOREST

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1. Explanation of ratings and description of ratings.
2. Figures **(Maps of Research Forest showing delineation of capabilities).
 - (i) Recreation
 - (ii) Waterfowl
 - (iii) Ungulates
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Contents Section II

1. Avian Populations of Pitt Polder.
2. Check list of Birds (Loon Lake) 1975.
3. Reports of distribution of Birds and Mammals 1969 and 1975.

APPENDIX 2.3.2-1-A

LIST OF PROFESSIONAL STAFF SINCE THE INCEPTION
of
U.B.C. RESEARCH FOREST

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EXAMPLES OF FORMS PROPOSED

for use on

U.B.C. RESEARCH FOREST

APPENDIX 8.8.1-1-A

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for
U.B.C. RESEARCH FOREST MANAGEMENT PLAN

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LIST OF REQUIRED SILVICULTURAL OPERATIONS