

Alberta Phase 3 Forest Inventory AN OVERVIEW



Alberta
FORESTRY, LANDS AND WILDLIFE

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Dept. 59	Temporary Sample Plot Procedures
Dept. 60a	Yield Tables for Unmanaged Stands (Main Body)
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Dept. 61a	Volumes and Stem Numbers for Forest Types: Steps to Volume Table Formulation
Dept. 61b	Volumes and Stem Numbers for Forest Types: Southern Region, Volume Sampling Regions 1, 2, 3 and 11
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Dept. 61d	Volumes and Stem Numbers for Forest Types: Northern Region, Volume Sampling Regions 7, 8 and 10
Dept. 86a	Single Tree Volume Tables: Method of Formulation
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Dept. 86k	Single Tree Volume Tables: Volume Sampling Region 10
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ABSTRACT:

Forest inventories are the basis for the management of Alberta's forest resources. Since 1950, three forest inventories have been completed. The latest of these is the Phase 3 Inventory, which is the subject of this report.

The report begins by comparing the purposes and standards of the three inventories. For the Phase 3 Inventory, the report then gives a general overview, describes the methods used for the inventory and concludes by summarizing the important results.

If you would like more information about the Phase 3 Inventory, please contact:

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Alberta Phase 3 Forest Inventory

AN OVERVIEW



1. Introduction

Three forest inventories have been conducted in Alberta in the past 40 years. The first, Phase 1, was a broad inventory encompassing most publicly owned forested lands. The second inventory, Phase 2, was more detailed, covering lands with commercial timber commitments not included in Phase 1. Phase 3 is the most recent and detailed inventory of forests on publicly owned lands in Alberta.

This report is a discussion of the purpose, procedures and results of the Phase 3 Forest Inventory.



Phase 1 Inventory Area



Fig. 1

Phase 2 Inventory Area



Fig. 2

1.1 Historical Background

During and shortly after the Second World War the demand for lumber and wood products increased dramatically. This resulted in concern over the lack of knowledge about the extent of the provincial forest resource, and led to fears that the timber supply could be easily depleted. The Broad Scale, or Phase 1 Inventory, was initiated in 1949 in response to these concerns. The inventory served as the information base to plan the management of Alberta's forest resource.

The Phase 1 Inventory (Figure 1) included all publicly owned forested lands in the province except Indian lands, national parks and an area known as the Rocky Mountain Forest Reserve. Through aerial photo interpretation, land was classed according to vegetation cover as productive, potentially productive or nonproductive.

On productive forest land, homogeneous groups of trees called stands were classified by "cover type", which describes tree species, height and crown density. The minimum recognized stand size was 65 hectares. Potentially productive land included burned or harvested areas and cultivated land. Nonproductive lands comprised organic soils, lakes and barren rock.

The inventory area was divided into zones, each with different growth conditions, species occurrence and elevation. Sample data was collected and used to evaluate the aerial photo interpretation, and to develop tables for each zone showing wood volumes by cover type. Inventory maps were produced at a scale of 1:40 000. Summary information included area and wood volume for each cover type and zone.

Phase 1 was used to define lands suitable for agriculture, to determine timber harvest levels and to plan forest protection and timber and industrial development. After the inventory was completed in 1956, no attempts were made to keep the information current.

The Detailed Forest Inventory, or Phase 2, started in 1956 and finished in 1966. The major objectives were to complete an inventory of areas not covered by Phase 1, particularly those areas with stands of timber suitable for lumber production (Figure 2). The data was also used for annual allowable cut calculations on Forest Management Units (FMUs) where timber quotas were to be issued. Timber quotas are a form of timber disposition which give private companies the long-term rights to harvest a percentage share of the timber in an FMU.

Detailed information collected through the Phase 2 Inventory included species composition, stand density, stand heights, site class and the maturity or year of stand establishment. Minimum stand size was 16 hectares. The inventory information and maps were updated for burned areas greater than 65 hectares and included all fires from

1950 to 1971. Cover type volume tables (CTVT) were developed, each applicable to different regions of the inventory area. Volume estimates were available by cover type, species and diameter class.

Between 1965 and 1967 the Detailed Forest Inventory was supplemented by a major project called the Quota Reconnaissance Survey. This project was designed to meet increasing demands for timber supplies by selecting areas suitable for the establishment of new quotas. The Quota Reconnaissance Survey concentrated on merchantable stands and logging possibilities and was used as the basis for quota planning. Maps were produced at scales of 1:31 680 and 1:40 000 and indicated species composition, stand density and height.

The Phase 2 Inventory was soon outdated due to technological changes in the forest industry and natural changes in the forest. Up-to-date and more detailed information was required to revise estimates of annual allowable cuts and for management planning, as all timber quotas were scheduled for renewal in 1986. A task force of federal and provincial government personnel and forest industry representatives was established in 1966 to review inventory standards. Its report recommended that a new inventory be completed by 1984.

The Phase 3 Inventory was initiated in 1970 and completed in 1984. It included areas containing active timber harvesting operations and areas of commercial timber identified during the Phase 1 and Phase 2 inventories (Figure 3).

The Phase 3 Inventory has a number of advantages over previous inventories. It provides greater detail, the cover types include more descriptive features, and the estimates of volume and stem frequencies are more accurate. Inventory data is stored in a computer system which allows the information to be easily accessed and updated; changes such as forest fires and timber harvesting can be incorporated quickly so the inventory remains accurate and current.

Phase 3 Inventory Area



2. Inventory Procedures

The major activities of the Phase 3 Inventory are the interpretation of cover types from aerial photographs; the production of maps; the collection of field data to determine stand volumes and to prepare growth estimates; and the storage and updating of inventory data.

A pilot study was done in 1970 in the Peace River Forest (Figure 4). The purpose was to assess whether the required information could be obtained from aerial photo interpretation and to define a sampling methodology. There was experimentation with a number of different film types, photo scales and interpretation techniques to find the combination that would produce the best results. The pilot study resulted in the choice of black-and-white modified infra-red film. This film produces excellent tonal contrasts between coniferous and deciduous species, so that identification of cover types is fast and accurate. The pilot study also allowed staff to become accustomed to the inventory specifications and field procedures.

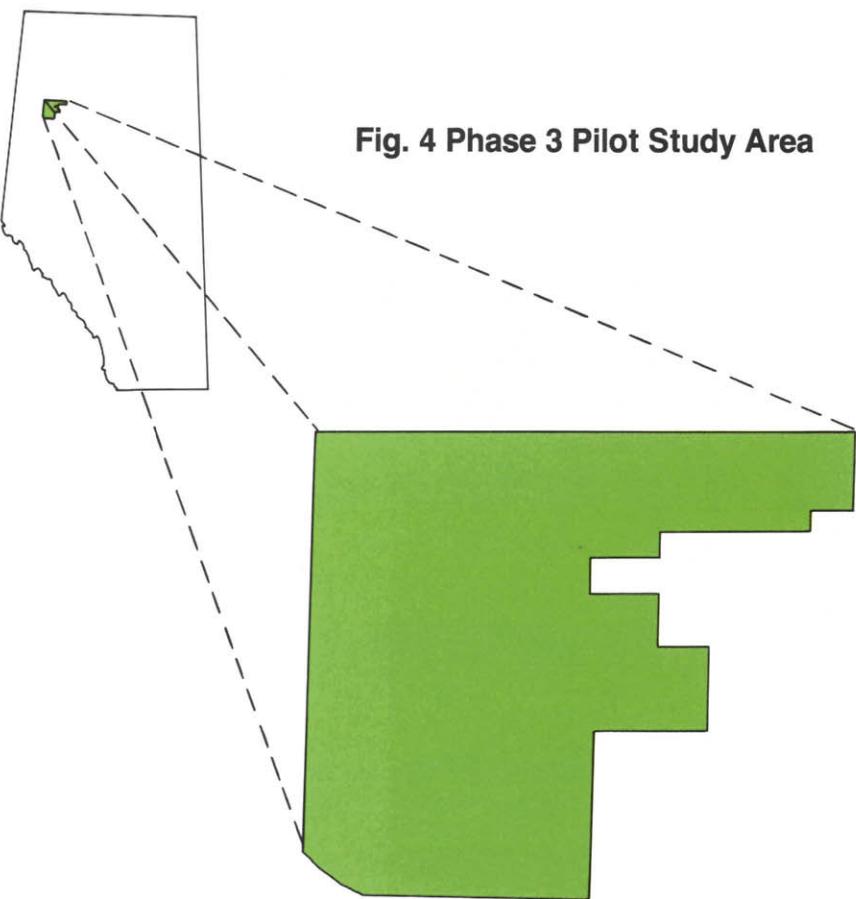


Fig. 4 Phase 3 Pilot Study Area

2.1 Aerial Photo Interpretation



The Phase 3 Inventory is a photo-based inventory. By examining aerial photographs, characteristics of the stands that make up the forest can be determined. Most of the inventory information, such as species, height and crown density, is obtained through photo interpretation.

Aerial photographs at a 1:15 000 scale were taken during the summers between 1970 and 1982. These were used as the interpretive base for the inventory.

To assist in aerial photo interpretation, all existing data about the forest resource was collected. Information on land ownership, fire incidence and forest capability, and information from previous inventories, was used to interpret the 1:15 000 photos.

The first step of photo interpretation was to separate forested from nonforested lands.

Forested land was then classified as productive, potentially productive or non productive.

Productive land was defined as forested land capable of producing 50 cubic metres (m^3) or more of wood volume per hectare within 120 years. Potentially productive forest land was land not growing timber at present but with the capability to do so. This included areas that were clearcut during logging operations or burnt over by forest fires. Nonproductive forest land included treed muskegs and coniferous and deciduous scrub.

On productive forest land, stands were identified from the aerial photos and given a map cover type. Map cover types were identified for a minimum stand size of 2 hectares and included species composition, crown density, height, date of stand origin, site index class and coniferous commercialism class. Where applicable, stand condition, type and severity of disturbance, slope category and understory descriptions were also included. These are detailed in the report **Alberta Phase 3 Forest Inventory: Forest Cover Type Specifications**. Potentially productive and nonproductive lands were indicated by symbols. Figure 5 illustrates the model used in the delineation of cover types.



2

Areas that were difficult to interpret or areas where incorrect typing could result in significant errors were defined as "grey zones". In these areas there were usually difficulties in distinguishing between cover type classes, for example, between two crown density classes. Grey zones were identified on the photos, and then iteks (photographed copies of the interpreted photos) were sent to field offices for ground truthing.

Ground truthing consists of both aerial and ground checks. This work was carried out to clarify grey zones and to enhance the photo interpretation. Field checks were

used to verify the species composition, understory descriptions, height class, stand origin and the coniferous commercialism class. Sample measurements were necessary only if visual estimates were not able to verify the typing. Errors uncovered during ground truthing were reported to the photo interpreters for correction. Detailed information about the ground truthing program can be obtained from the report **Alberta Phase 3 Forest Inventory: Ground Truthing Procedures**.

After the final photo interpretation was completed the Phase 3 maps were produced.

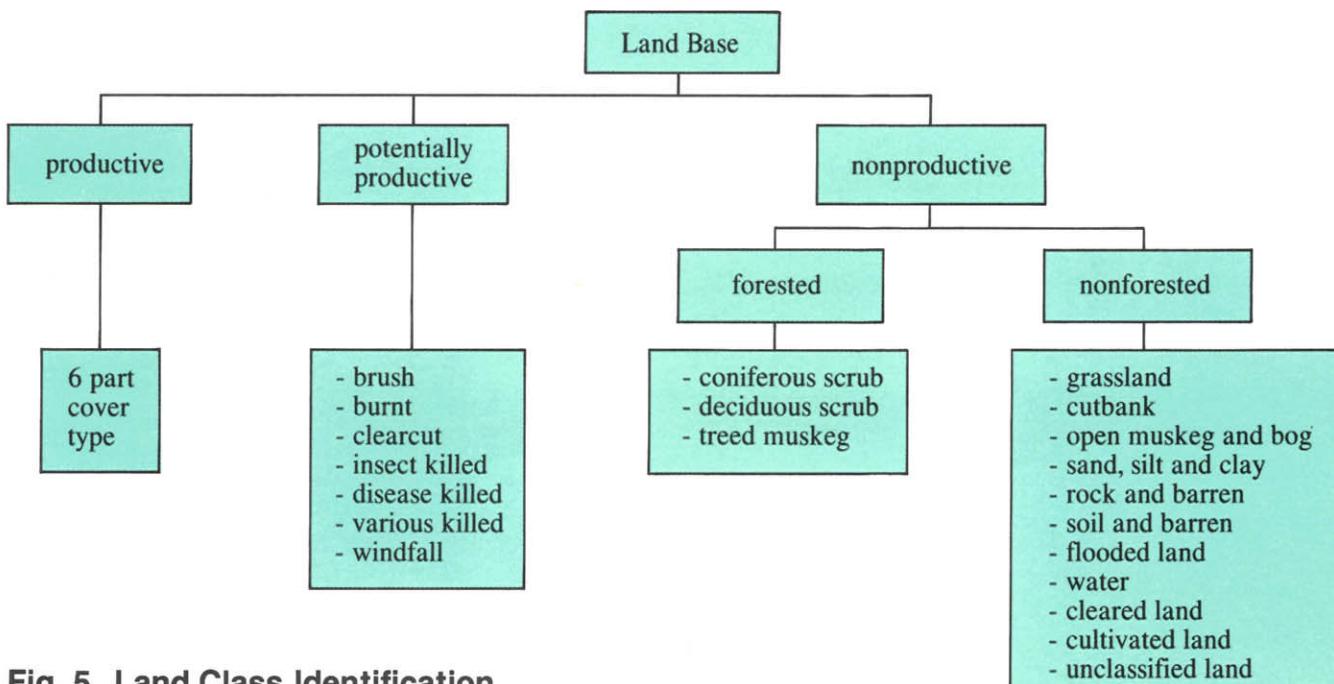


Fig. 5 Land Class Identification

2.2 Map Production

Map production was an important part of the inventory, as maps are used extensively for planning purposes and for field work. For the Phase 3 Inventory, 1:60 000 black-and-white panchromatic aerial photographs were used to generate 1:15 000 orthophotos for each township. Orthophotos are aerial photos corrected for image displacement caused by variations in flying height and tilt of the aircraft, and by variations in ground relief. These orthophotos were then used to produce base maps. Contour lines, stand boundaries and cover types were added to the base maps using a series of overlays. Final products were 1:15 000 forest cover maps and 1:50 000 planning maps.

Refer to the report **Alberta Phase 3 Forest Inventory: Mapping Specifications** for more information.



3

2.3 Volume Sampling

Accurate estimates of the wood volume in a stand are important for forest management and planning. During the volume sampling program of the Phase 3 Inventory,

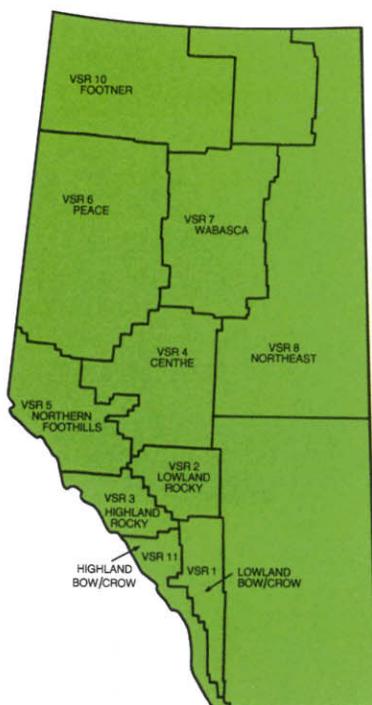
individual tree and sample plot measurements were collected. This information was used to develop tables of single tree volumes, cover type volumes and future yields.

The total inventory area was separated into 10 volume sampling regions (VSRs) (Figure 6). VSR boundaries were established using existing administrative boundaries and areas of similar ecological characteristics. Volume and yield tables were developed for each VSR, thus reflecting regional ecological conditions.

Single tree volume tables were constructed using stem analysis data. Trees were felled and sectioned into predetermined lengths, and measurements taken of stem diameter, internal defects and age. Equations were then developed to determine single tree volumes and estimates of internal defects by species, height class, diameter class and VSR. For more information refer to the reports **Alberta Phase 3 Forest Inventory: Tree Sectioning Manual** and **Single Tree Volume Tables**.

Cover type volume tables were also prepared. Over 120 000 temporary sample plots were established throughout the province. In each plot information was

Fig. 6 Volume Sampling Regions



collected on the age of dominant or co-dominant trees, tree species, tree diameters, heights and any visible defects.

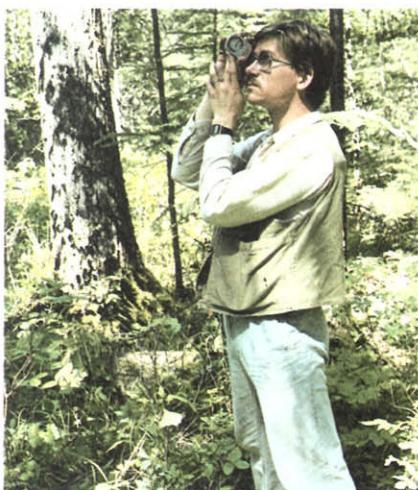
Refer to the reports **Alberta Phase 3 Forest Inventory: Temporary Sample Plot Procedures and Volumes and Stem Numbers for Forest Types** for details.

A new technique in volume sampling using large-scale photography (LSP) was attempted, and was successful in reducing the need for expensive ground sampling measurements. The initial step of the LSP program was the acquisition of 1:1 200 and 1:4 000 black-and-white aerial photographs. The 1:4 000 photographs were used to accurately locate the aircraft flight lines. LSP plots were then located and measured on the 1:1 200 photography. As aerial photographs for LSP are taken at altitudes of less than 650 metres (m), individual

trees can be accurately identified and measured. The species and height of each tree in a fixed area plot was determined directly from the photo. The diameter of individual trees was estimated using the height measurement and crown area; thus tree volumes could be calculated.

Refer to the report **Alberta Phase 3 Forest Inventory: Large Scale Photography Procedures** for greater detail about the LSP program.

The information from LSP plots was combined with existing temporary sample plot and stem analysis data. All volume data was then loaded, edited and stored on the Cruise Compilation System (CRUZCOMP), a computer system for sample plot compilation. Finally, this data was compiled to give volume, basal area and number of stems per hectare.



6

4. Sectioning a tree during stem analysis work.
5. Counting growth rings to determine the age of a tree.
6. Measuring tree heights at a temporary sample plot.
7. Tree diameters is part of the information collected at each sample plot.
8. Tree age is determined with the aid of an increment borer.



4



7



5



8

2.4 Growth and Yield

In order to predict future wood volumes, some measure of the growth rate of trees and forests was required. To serve this purpose yield tables were developed using stem analysis and permanent sample plot (PSP) data. These tables are used to predict future stand volumes.

The PSP program is a continuous project, independent of the Phase 3 Inventory. The Alberta Forest Service has over 400 PSPs in the province, most of which were established in the early 1960s. PSPs are remeasured at periodic intervals and the information used to estimate growth rates of various cover types on different site conditions. From these growth estimates future volumes can be predicted.

The PSP program is described in detail in the **Alberta Forest Service Permanent Sample Plot Manual** and in the report **Alberta Phase 3 Forest Inventory: Yield Tables for Unmanaged Stands**.

2.5 Updating

Forests are dynamic ecosystems in which changes can occur very rapidly, for example, as a result of forest fires. To provide users with the most current information for planning and management, the forest inventory must be updated to reflect these changes.

As a part of the update process, all FMUs are updated annually for fire losses and major administrative changes. Forest management units with commercial timber commitments are updated prior to timber management plan revisions or timber supply analysis. Remaining FMUs are updated as time and funding allows.

For most disturbances the minimum area to be updated is 15 hectares, though harvested areas are updated regardless of size. As a part of the update program, the entire inventory is "grown" every year. Growth factors are applied to the stored data so that the inventory data reflects natural stand growth.

Through the update process, the accuracy of the inventory is continually being improved through the discovery and correction of gross errors.

Phase 3 data is stored in the Alberta Forest Service Inventory Storage and Maintenance System (AFORISM), a computer system developed specifically for the Phase 3 Inventory. AFORISM was designed so that inventory information could be easily retrieved and updated. With this update feature the inventory remains current and accurate; changes that occur in the forest, such as fires or commercial timber harvesting, can be easily incorporated. Phase 3 maps are then updated manually to ensure compatibility with information in AFORISM.

2.6 Accuracy of Estimates

Standards of accuracy were established for both photo interpretation and the volume estimates. Photo interpretation quality standards established limits for acceptable interpretation errors. These standards were applied during ground truthing. Significant errors, such as incorrect species composition, density or age class, were reported to the photo interpreters so corrections could be made. The accuracy of volume estimates were obtained through a statistical analysis of cover type volumes. Details of these photo interpretation and volume estimate accuracy standards are in the report **Alberta Phase 3 Forest Inventory: Volume and Stem Numbers for Forest Types: Steps to Volume Table Formulation**.

2.7 Uses of the Phase 3 Inventory

The Phase 3 Inventory provides the basis for management of Alberta's forests. The aerial photography from the inventory is frequently used by the Alberta Forest Service and the forest industry for detailed timber cruising, road layout, logging plan development and other types of field work. Other industries active within the forested area, such as oil and gas companies, often require aerial photography for project planning. The photography used in the Phase 3 Inventory may be viewed or purchased through the Alberta Energy and Natural Resources Photo Library at the following address:

Photo Library
Resource Evaluation and Planning
2nd Floor, Petroleum Plaza,
North Tower
9945 - 108 Street
Edmonton, Alberta
T5K 2G6
Telephone (403) 427-3520



Forest cover maps produced for the Phase 3 Inventory are generally used with the aerial photos for planning purposes and field work. As well, recreational users of the forest often find a need for forest cover maps. Figure 7 gives an example of a Phase 3 forest cover map. Maps are also available from the above address.

Cover type volume tables, single tree volume tables and yield tables are of interest to persons involved in forest management activities. Cover type volume tables indicate wood volume per hectare by species and utilization standard and are available for each cover type in a volume sampling region. Single tree volume tables are available for each tree species. These tables indicate

the gross merchantable volume of individual trees and are used with sample plot data to estimate wood volume per hectare. A yield table is a tabular presentation of volume and selected stand characteristics by species and site. Yield tables provide the information necessary to "grow" the inventory. They are used in the analysis of timber supplies because they predict future stand volumes.

Tables 1, 2 and 3 are examples of a cover type volume table, a yield table, and a single tree volume table.

From AFORISM, numerous reports can be produced summarizing the information collected by the inventory. Government agencies, consultants and forest industry companies often

require this information for their forest management needs.

Forest inventory statistics generated through AFORISM are available from:

Director,
Timber Management Branch
Alberta Forest Service
9th Floor, Bramalea Building
9920 - 108 Street
Edmonton, Alberta
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Telephone: (403) 427-8441

Fig. 7 Phase 3 Forest Cover Map

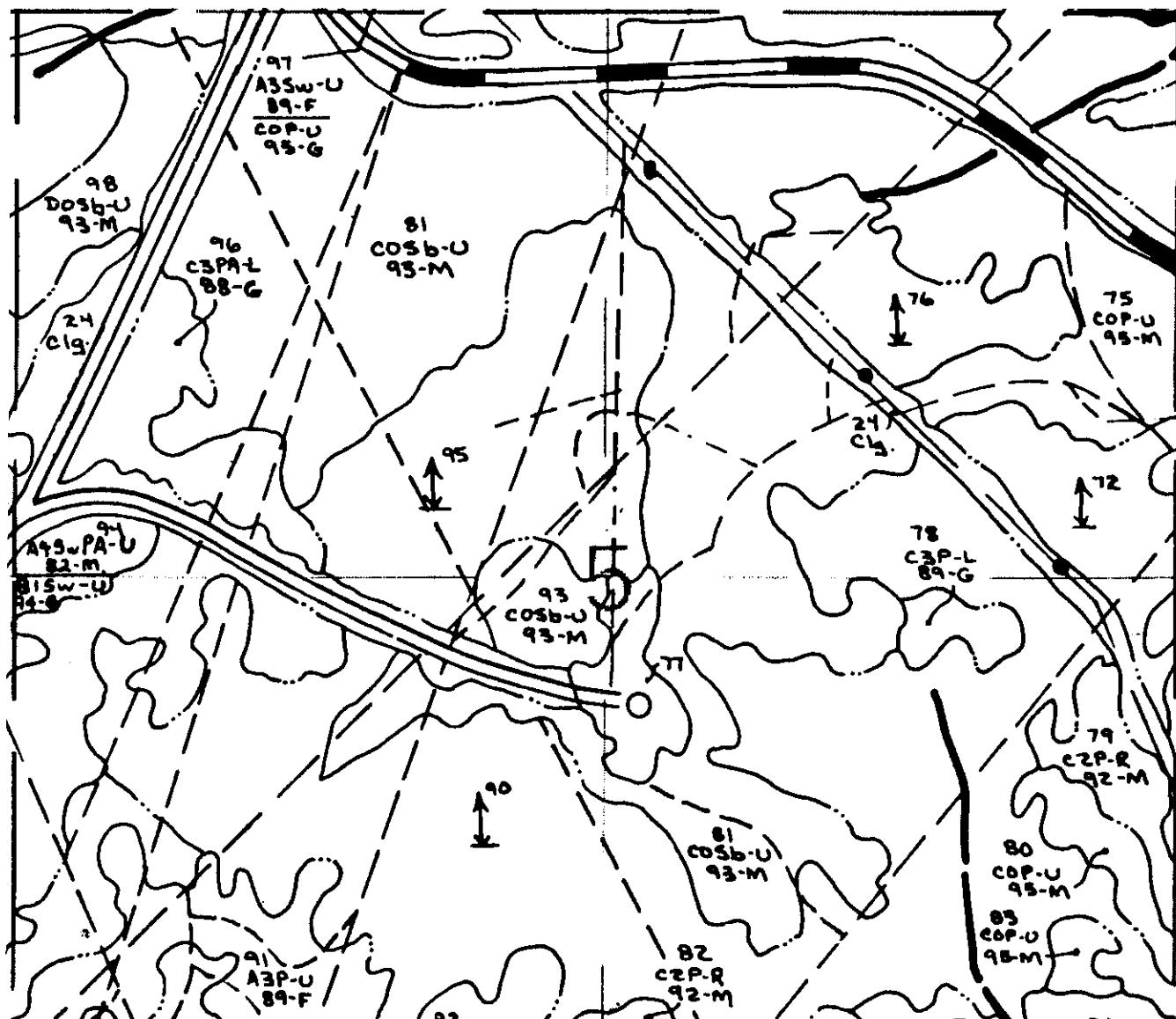


TABLE 1
COVER TYPE VOLUME TABLE

E.N.R. — ALBERTA FOREST INVENTORY - PHASE 3

COVER TYPE VOLUME TABLE 1984

FINAL VOL. TABLE

SAMPLING REGION 06

FMU = P3

GROSS VOLUME IN CUBIC METRES/HA

NO CULL FACTORS APPLIED

D	H	CG	S	S	13+/07				15+/10				20+/13			
E	E	OR	P	P	LIVE	LIVE	ALL	LIVE	LIVE	ALL	LIVE	LIVE	ALL	LIVE	LIVE	ALL
N	I	VO	E	E	CONIF	DECID	SPEC	CONIF	DECID	SPEC	CONIF	DECID	SPEC	CONIF	DECID	SPEC
S	G	EU	C	C												
I	H	RP	I	I												
T	T		E	E												
Y			S	S	1	2										

C	2	CD	P	A	176	66	246	170	65	239	151	59	210			
C	2	DC	A	SW	57	55	113	52	53	106	42	42	84			
C	2	DC	A	SB	57	55	113	52	53	106	42	42	84			
C	2	DC	A	P	138	64	203	133	61	195	116	53	170			
C	2	D	A		32	97	129	31	90	121	25	69	95			
C	2	D	AW		32	128	160	31	120	151	25	95	121			
D	4	C	SW		267	30	302	265	30	299	251	29	284			
D	3	C	SW		255	44	306	249	43	299	234	38	277			
D	3	C	SW	SB	208	38	254	203	38	249	176	37	219			
D	3	CD	SW	A	251	52	307	246	51	302	229	49	281			
D	3	DC	A	P	167	121	289	166	120	287	155	116	271			
D	3	DC	AW	SW	146	137	291	142	136	286	130	129	262			
D	3	D	A		47	172	220	46	166	213	43	143	186			
D	2	C	SW		116	21	137	109	20	130	95	17	112			
D	2	C	SW	SB	188	23	214	177	23	203	137	22	161			

TABLE 2
EMPIRICAL YIELD TABLE

ALBERTA PHASE 3 FOREST INVENTORY
PROVINCIAL EMPIRICAL YIELD TABLES

WHITE SPRUCE GOOD SITE (S.I. = 18.0 METERS) (reference age 50 yrs)
MINIMUM 0.0 CM STUMP AT 0.30 M. 0.0 CM MINIMUM TOP DIB

TOTAL STUMP AGE	BREAST HEIGHT AGE	SITE HEIGHT (M.)	TOP HEIGHT (M.)	VOLUME (CU.M./HA.)	MAI (CU.M./HA./HR.)	BASEL AREA (SQ.M./HA.)	QUADRATIC MEAN DBH (CM.)	NUMBER OF TREES (PER HA.)
10	4	0	0.0	0.0	0.0	0.0	0.0	0
20	14	6	2.50	15.31	0.76545	5.27	2.87	8143
30	24	16	5.91	7.52	55.08	1.83602	12.34	6.83
40	34	26	9.74	11.78	103.71	2.59274	18.55	10.31
50	44	36	13.43	15.65	155.97	3.11942	24.04	13.41
60	54	46	16.77	19.01	207.91	3.46518	28.82	16.19
70	64	56	19.72	21.89	256.90	3.67002	32.93	18.68
80	74	66	22.27	24.34	301.55	3.76931	36.41	1201
90	84	76	24.48	26.42	341.35	3.79281	39.35	22.95
100	94	86	26.39	28.20	376.40	3.76397	41.83	951
110	104	96	28.04	29.72	407.04	3.70039	43.92	24.79
120	114	106	29.47	31.03	433.77	3.61478	45.70	28.01
130	124	116	30.72	32.16	457.09	3.51609	47.22	29.41
140	134	126	31.81	33.15	477.47	3.41049	48.52	30.71

TABLE 3
SINGLE TREE VOLUME TABLE
ALBERTA FOREST SERVICE - PHASE 3 INVENTORY
SINGLE TREE VOLUME TABLE 1984
VSR 2 GROSS MERCHANTABLE CUBIC METRE VOLUME WHITE SPRUCE
7.0 CM TOP DIB 0.30 M STUMP HT
HEIGHT IN METRES

SHADED AREA INDICATES EXTENT OF ORIGINAL DATA

DBHOB CM	8	10	12	14	16	18	20	22	24	26	28	30
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
10	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.07	0.08
12	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
14	0.04	0.05	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.16	0.17	0.19
16	0.06	0.07	0.09	0.10	0.12	0.14	0.16	0.17	0.19	0.21	0.23	0.25
18	0.07	0.09	0.1	0.13	0.15	0.18	0.20	0.22	0.24	0.26	0.29	0.31
20	0.09	0.11	0.14	0.16	0.19	0.22	0.24	0.27	0.30	0.32	0.35	0.38
22	0.10	0.13	0.16	0.19	0.23	0.26	0.29	0.32	0.35	0.39	0.42	0.45
24	0.12	0.16	0.19	0.23	0.27	0.30	0.34	0.38	0.42	0.46	0.49	0.53
26	0.14	0.18	0.22	0.26	0.31	0.35	0.39	0.44	0.48	0.53	0.57	0.62
28	0.16	0.21	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.61	0.66	0.71
30	0.18	0.23	0.29	0.34	0.40	0.46	0.51	0.57	0.63	0.69	0.75	0.80
32	0.20	0.26	0.33	0.39	0.45	0.51	0.58	0.64	0.71	0.77	0.84	0.90
34	0.23	0.29	0.36	0.43	0.50	0.57	0.65	0.72	0.79	0.86	0.94	1.01
36	0.25	0.33	0.40	0.48	0.56	0.64	0.72	0.80	0.88	0.96	1.04	1.12
38	0.28	0.36	0.44	0.53	0.62	0.70	0.79	0.88	0.97	1.06	1.15	1.24
40	0.31	0.40	0.49	0.58	0.68	0.77	0.87	0.97	1.06	1.16	1.26	1.36
42	0.33	0.43	0.53	0.64	0.74	0.84	0.95	1.05	1.16	1.27	1.38	1.49
44	0.36	0.47	0.58	0.69	0.80	0.92	1.03	1.15	1.26	1.38	1.50	1.62
46	0.39	0.51	0.63	0.75	0.87	1.00	1.12	1.24	1.37	1.50	1.63	1.75
48	0.43	0.55	0.68	0.81	0.94	1.08	1.21	1.34	1.48	1.62	1.76	1.89
50	0.46	0.59	0.73	0.87	1.01	1.16	1.30	1.45	1.60	1.74	1.89	2.04
52	0.49	0.64	0.79	0.94	1.09	1.24	1.40	1.56	1.71	1.87	2.03	2.19
54	0.53	0.68	0.84	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.18	2.35
56	0.56	0.73	0.90	1.07	1.25	1.42	1.60	1.78	1.96	2.14	2.32	2.51
58	0.60	0.78	0.96	1.14	1.33	1.52	1.71	1.90	2.09	2.28	2.48	2.67
60	0.64	0.83	1.02	1.22	1.41	1.61	1.81	2.02	2.22	2.43	2.63	2.84
62	0.68	0.88	1.08	1.29	1.50	1.71	1.93	2.14	2.36	2.58	2.80	3.02
64	0.72	0.93	1.15	1.37	1.59	1.81	2.04	2.27	2.50	2.73	2.96	3.20

3. Inventory Results

3.1 Provincial Summary

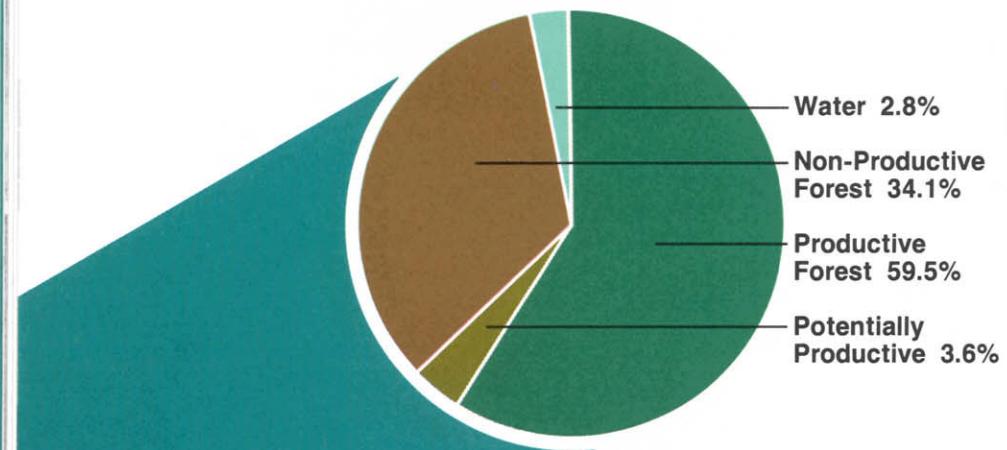
The Phase 3 Inventory covers 322 307 km² of Alberta and includes most of the publicly owned forested lands in the province (Figure 9). Of the area covered by the inventory, 60 per cent is classed as productive forest land, 3.5 per cent as potentially productive and 34 per cent as nonproductive; water covers 2.5 per cent of the inventory area (Table 4). Provincial and national parks, wilderness areas, Indian and Metis lands, townsites and privately owned lands were excluded from the inventory.

Total gross merchantable wood volume on productive forest land is 2.8 billion m³. In the south of the province, forests are dominated by coniferous species, primarily lodgepole pine. Further north and east, trembling aspen becomes more common, forming mixedwood stands with white spruce. Pure stands of trembling aspen make up the forests on the eastern edge of the province.

The following sections summarize inventory results for each of the forests in the province. Note that totals between tables may not agree due to rounding.



Fig. 8 The Forests of Alberta



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Fig. 9 Total Inventory Area By Land Class

Table 4 INVENTORY AREA BY FOREST AND FOREST LAND CLASS (km²)

Forest	Productive Forest			Potentially productive forest	Non productive forest	Water	Total Area
	coniferous	mixedwood	deciduous				
Athabasca	13 252	3 882	4 767	4 398	20 249	1 667	48 215
Bow/Crow	7 088	1 037	842	269	7 868	94	17 198
Edson	12 840	1 663	1 493	484	3 999	198	20 677
Footner Lake	10 647	6 375	13 203	889	14 755	857	46 726
Grande Prairie	6 973	3 044	8 576	728	5 202	320	24 843
Lac La Biche	6 730	3 090	4 970	734	11 429	1 403	28 356
Peace River	7 020	5 417	12 472	1 403	14 893	660	41 865
Rocky/Clearwater	8 702	1 407	1 727	268	6 402	298	18 804
Slave Lake	7 413	6 461	15 244	1 895	19 856	3 247	54 116
Whitecourt	8 095	2 917	4 445	636	5 119	295	21 507
Total	88 760	35 293	67 739	11 704	109 772	9 039	322 307

Table 5 VOLUME DISTRIBUTION BY FOREST AND SPECIES (thousands of m³)

Forest	White Spruce	Black Spruce	Pine	Total ^a		Total
				Coniferous	Deciduous	
Athabasca	42 391	12 782	46 570	106 468	68 854	175 322
Bow/Crow	32 869	3 519	73 589	119 091	12 241	131 332
Edson	54 391	18 977	146 594	233 303	40 259	273 562
Footner	146 187	13 538	16 326	182 571	135 521	318 092
Grande Prairie	84 124	12 364	78 503	185 382	166 625	352 007
Lac La Biche	44 503	13 061	24 203	86 017	83 336	169 353
Peace River	113 938	16 317	49 348	187 596	234 611	422 207
Rocky/Clearwater	43 645	9 996	100 977	161 303	34 485	195 788
Slave Lake	147 832	24 305	50 142	233 867	224 180	458 047
Whitecourt	62 509	26 813	86 574	185 342	87 072	272 414
Total	772 389	151 672	672 826	1 680 940	1 087 184	2 768 124

^a Includes other coniferous species: balsam fir, Douglas fir and larch.

Table 6 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP - PROVINCIAL SUMMARY (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	10 563	5 967	12 460	28 990
Mature	25 105	13 094	23 310	61 509
Immature	27 818	11 066	28 308	67 192
Young	21 042	4 280	3 508	28 830
Reproduction	4 232	887	155	5 274
Total	88 760	35 294	67 741	191 795

Table 7 SPECIES VOLUME BY AGE CLASS — PROVINCIAL SUMMARY (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	10 108	5 804	19 318	832	20 150
181 - 200	4 663	2 271	8 328	498	8 826
161 - 180	14 468	7 804	26 423	2 633	29 056
141 - 160	35 944	13 961	58 206	13 262	71 468
121 - 140	93 593	38 581	156 442	47 658	204 100
101 - 120	172 492	83 032	296 232	120 942	417 174
81 - 100	201 303	239 310	506 689	243 510	750 199
61 - 80	104 929	151 820	301 128	191 563	492 691
41 - 60	80 634	94 026	204 104	245 574	449 678
21 - 40	53 847	34 646	101 845	219 933	321 778
1 - 20	408	1 571	2 225	784	3 009
Total	772 389	672 826	1 680 940	1 087 184	2 768 129

3.2 Athabasca Forest

Phase 3 covers 48 215 km² or over 83 per cent of the area of the Athabasca Forest (Figure 10). The remaining area, approximately 10 000 km², was not considered worthwhile to include in the Phase 3 Inventory because the severe climate and frequent forest fires have left open stands of dwarf trees.

Productive forest land makes up 45 per cent of the Phase 3 area. A relatively large proportion, over 9 per cent, is classed as potentially productive forest land and consists of brush-covered and burned-over lands. Nonproductive lands, mostly muskegs, cover 46 per cent of the area (Figure 11). Tables 8 through 10 summarize figures for the Phase 3 Inventory forest area.

Total wood volume is 175 million m³ (Table 11); 61 per cent is coniferous, mostly white spruce, black spruce, and jack pine, and 39 per cent is deciduous, primarily trembling aspen. Much of this timber is found along the major river valleys where climate and growth conditions are more favorable than on the uplands.

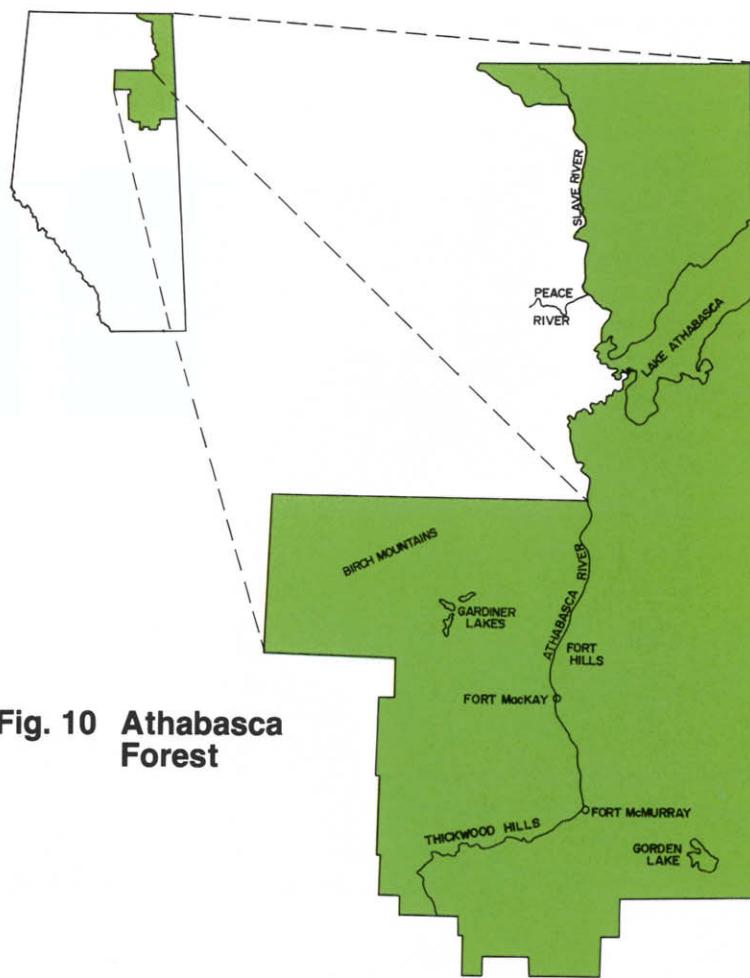
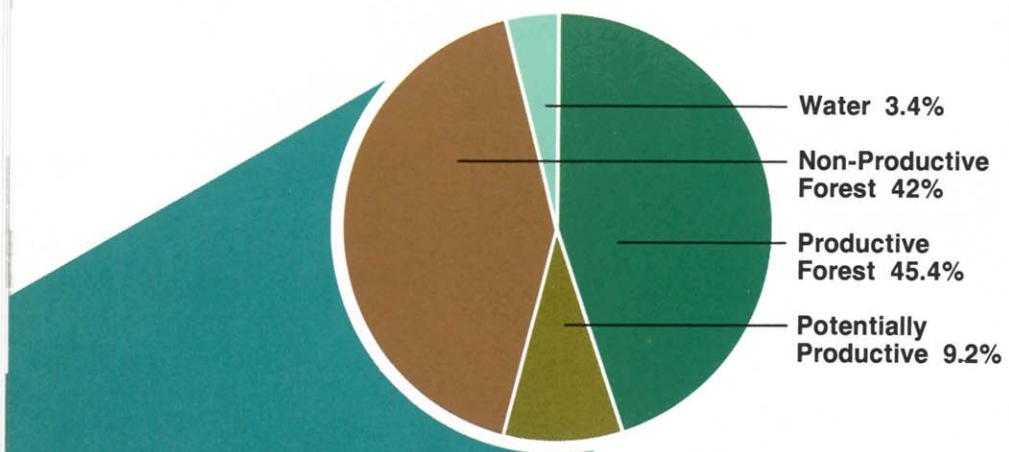


Fig. 10 Athabasca Forest



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Fig. 11 Athabasca Forest Land Class Distribution

Table 8 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	854	882	5	1 741
Roundwood	1 669	409	3	2 081
High Uncommercial	2	345	1 561	1 908
Uncommercial	10 728	2 247	3 197	16 172
Total	13 253	3 883	4 766	21 902

Table 9 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	446	188	346	980
Medium	6 370	2 988	3 890	13 248
Good	6 436	707	531	7 674
Total	13 252	3 883	4 767	21 902

Table 10 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	615	449	363	1 427
Mature	1 678	1 100	1 524	4 302
Immature	4 196	1 391	2 334	7 921
Young	5 184	824	544	6 552
Reproduction	1 579	119	2	1 700
Total	13 252	3 882	4 767	21 902

Table 11 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	12	0	12	3	15
181 - 200	117	2	137	22	159
161 - 180	496	58	621	336	957
141 - 160	2 986	482	3 855	1 661	5 516
121 - 140	9 555	2 004	13 215	6 099	19 314
101 - 120	8 880	2 502	14 086	5 505	19 591
81 - 100	5 739	7 792	16 381	7 549	23 930
61 - 80	5 865	11 717	22 314	12 439	34 753
41 - 60	5 863	15 795	25 408	23 912	49 320
21 - 40	2 851	6 180	10 343	11 291	21 634
1 - 20	27	38	96	37	133
Total	42 391	46 570	106 468	68 854	175 322

3.3 Bow/Crow Forest

The Phase 3 Inventory includes 17 198 km² of the Bow/Crow Forest, an area of foothills and mountains in southwest Alberta. Except for the Ghost River Wilderness area, the entire Bow/Crow Forest is included in the inventory (Figure 12). Half of the inventoried area is productive land (Figure 13).

Coniferous species, mainly lodgepole pine, constitute 90 per cent of the total wood volume of 131 million m³ (Table 15). The age class distribution of the Bow/Crow Forest is very uneven. Mature and overmature timber occupies over 80 per cent of the productive area, due in part to successful fire suppression activities. Tables 12, 13 and 14 detail area distribution by site class, coniferous commercialism class, maturity class and cover group.

An outbreak of mountain pine beetle (*Dendroctonus ponderosae*) in the southern portion of the Bow/Crow Forest in the late 1970s lasted for six years and affected an area of 15 000 ha. A major control program in the Crowsnest Pass area was successful in limiting the northward spread of the pest. Salvage logging has taken place on approximately 10 000 ha of the beetle infested area.

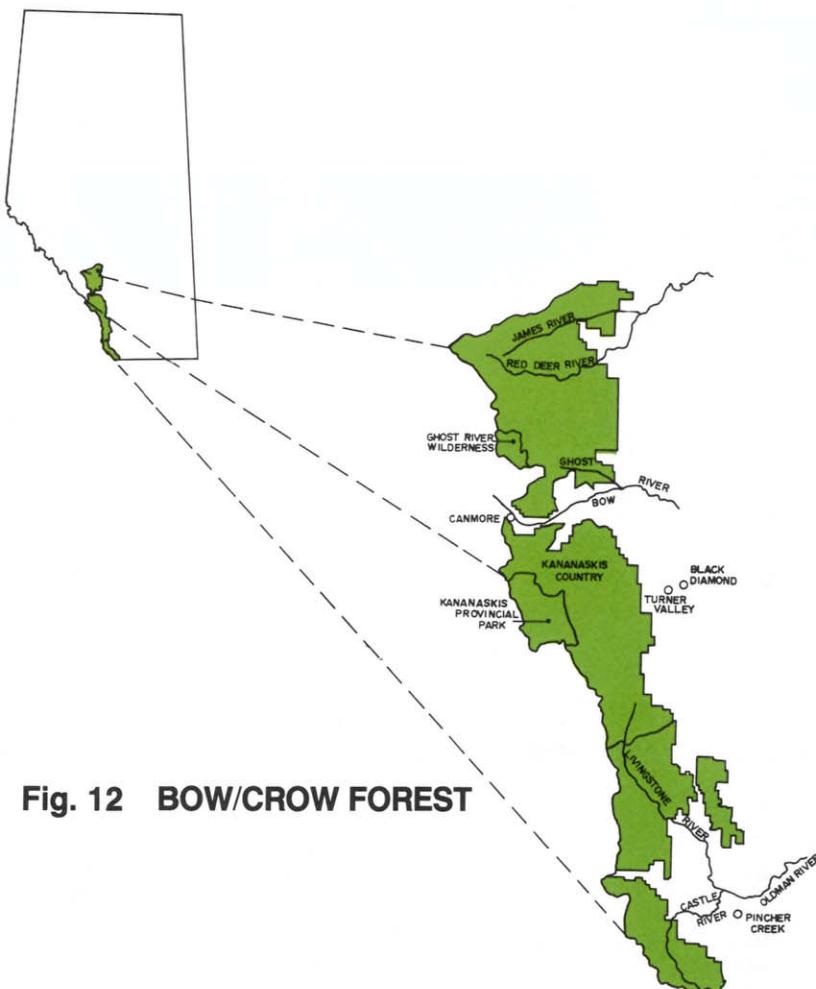
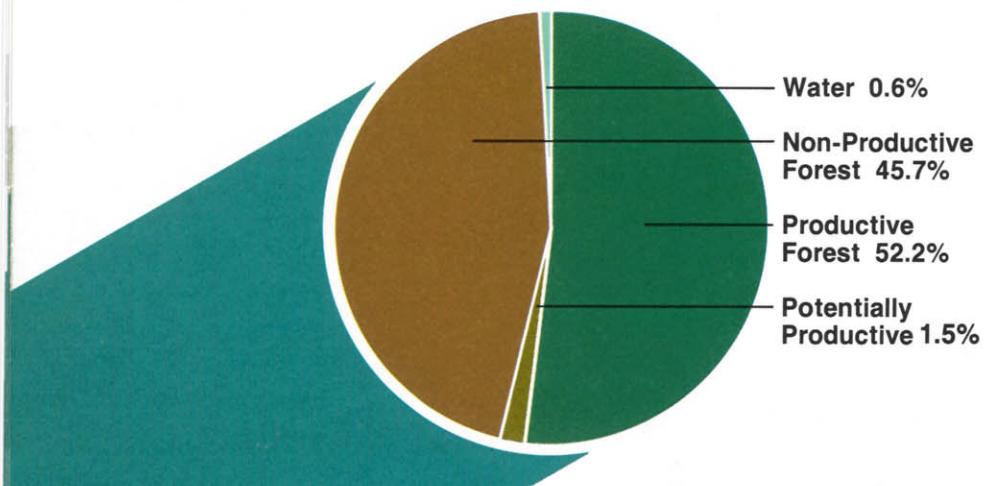


Fig. 12 BOW/CROW FOREST



Red foliage indicates mortality due to recent mountain pine beetle infestation.

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Fig. 13 Bow/Crow Forest Land Class Distribution

Table 12 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	1 535	219	0	1 754
Roundwood	2 601	223	0	2 824
High Uncommercial	0	213	202	415
Uncommercial	2 953	383	641	3 977
Total	7 089	1 038	843	8 970

Table 13 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	2 258	151	372	2 781
Medium	1 894	376	223	2 493
Good	2 937	510	248	3 695
Total	7 089	1 037	843	8 969

Table 14 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 722	98	79	1 899
Mature	3 139	628	289	4 056
Immature	1 735	254	471	2 460
Young	306	50	1	357
Reproduction	187	6	2	195
Total	7 089	1 036	842	8 967

Table 15 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	4 169	1 903	7 322	307	7 629
181 - 200	1 909	1 076	3 586	110	3 696
161 - 180	1 779	2 273	4 706	221	4 927
141 - 160	2 252	1 996	5 032	204	5 236
121 - 140	3 878	4 389	9 638	399	10 037
101 - 120	3 128	6 247	10 862	1 406	12 268
81 - 100	5 973	14 932	23 011	2 929	25 940
61 - 80	5 591	29 702	38 173	2 424	40 597
41 - 60	3 699	9 138	14 158	3 399	17 557
21 - 40	379	1 034	1 522	811	2 333
1 - 20	112	899	1 081	31	1 112
Total	32 869	73 589	119 091	12 241	131 332

3.4 Edson Forest

Except for the Willmore Wilderness Park, the entire Edson forest is included in the Phase 3 Inventory (Figure 14). In this area of 20 677 km², over 77 per cent is productive forest land (Figure 15). The Edson Forest has the largest productive land base in proportion to its area of any of the forests in the province. Tables 16, 17 and 18 summarize the area statistics by coniferous commercialism, site and maturity class.

Coniferous species, mostly lodgepole pine, make up 85 per cent of the total wood volume of 273 million m³ (Table 19). A large share of this coniferous volume is in the roundwood class which is well suited for pulp production. Champion Forest Products (Alberta) Ltd. and Canadian Forest Products Ltd. harvest coniferous timber in the forest. Both of these companies have Forest Management Agreements. Pelican Mills has recently opened an oriented strandboard plant which uses trembling aspen as the raw material and produces panel products, similar to plywood, for building construction.

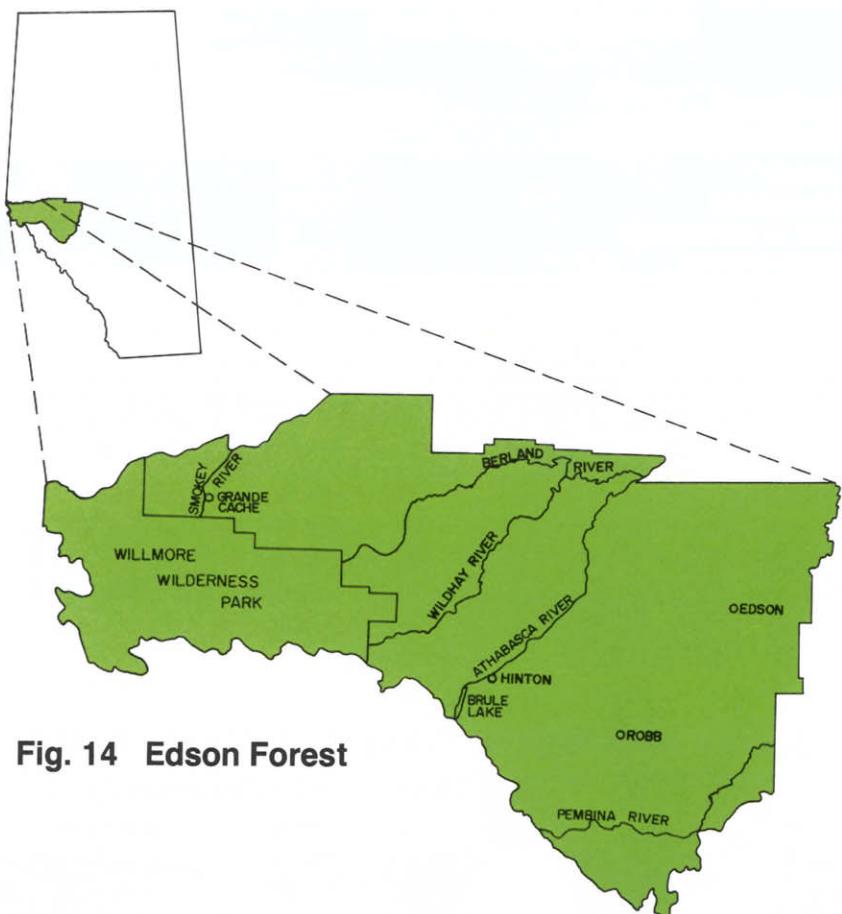


Fig. 14 Edson Forest

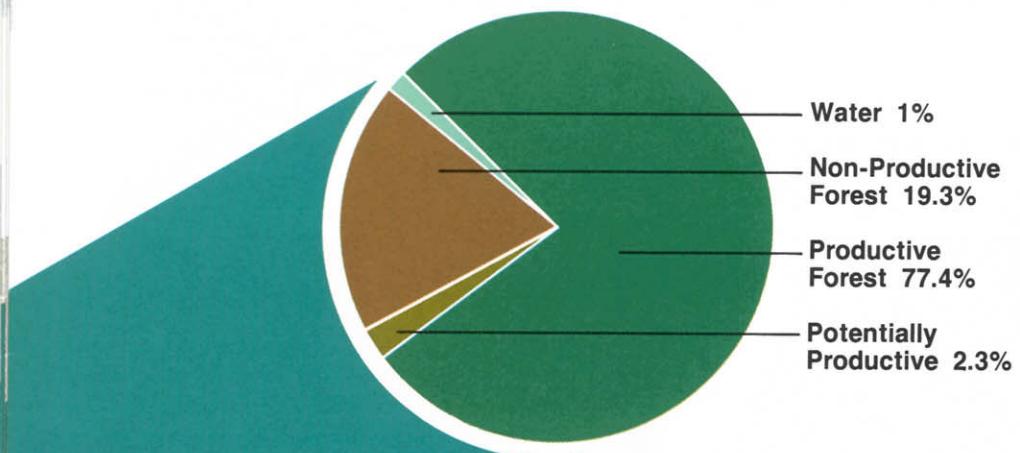


Fig. 15 Edson Forest Land Class Distribution

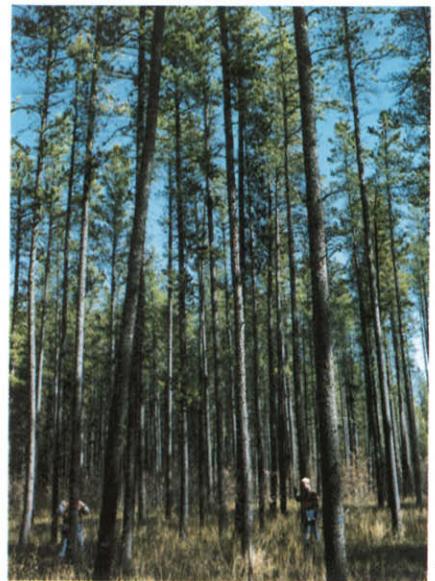


Table 16 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	2 753	526	7	3 286
Roundwood	5 790	249	3	6 042
High Uncommercial	3	356	1 139	1 498
Uncommercial	4 295	531	344	5 170
Total	12 841	1 662	1 493	15 996

Table 17 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	5 822	156	167	6 145
Medium	6 381	1 285	1 142	8 808
Good	637	223	184	1 044
Total	12 840	1 664	1 493	15 997

Table 18 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 052	125	335	1 512
Mature	5 431	685	897	7 013
Immature	3 586	459	218	4 263
Young	2 461	218	43	2 722
Reproduction	309	176	0	485
Total	12 839	1 663	1 493	15 995

Table 19 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	1 039	933	2 680	103	2 783
181 - 200	295	284	711	25	736
161 - 180	3 009	2 138	6 292	308	6 600
141 - 160	2 988	2 392	6 458	362	6 820
121 - 140	3 529	4 170	9 447	624	10 071
101 - 120	8 777	12 469	25 005	2 333	27 338
81 - 100	20 029	64 736	96 819	19 922	116 741
61 - 80	10 010	42 309	60 415	10 381	70 796
41 - 60	3 937	14 929	21 820	4 308	26 128
21 - 40	680	1 731	2 977	855	3 832
1 - 20	98	503	679	38	717
Total	54 391	146 594	233 303	39 259	272 562

3.5 Footner Lake Forest

Located in the northwest of the province, the Footner Lake Forest (Figure 16) has growth conditions and fire history similar to the Athabasca Forest. The cold, dry climate and frequent fires have resulted in extensive poor quality forest. Black spruce and muskegs cover large areas of the forest (Figure 17). For these reasons the Phase 3 Inventory encompasses only about 46 726 km² or 62 per cent of the forest area.

The total wood volume for the Phase 3 area within the Footner Lake Forest is 318 million m³; 43 per cent is deciduous, mainly trembling aspen, and 57 per cent is coniferous (Table 23). While there is considerable wood volume in the forest, development of the timber resource has been hampered by relative inaccessibility.

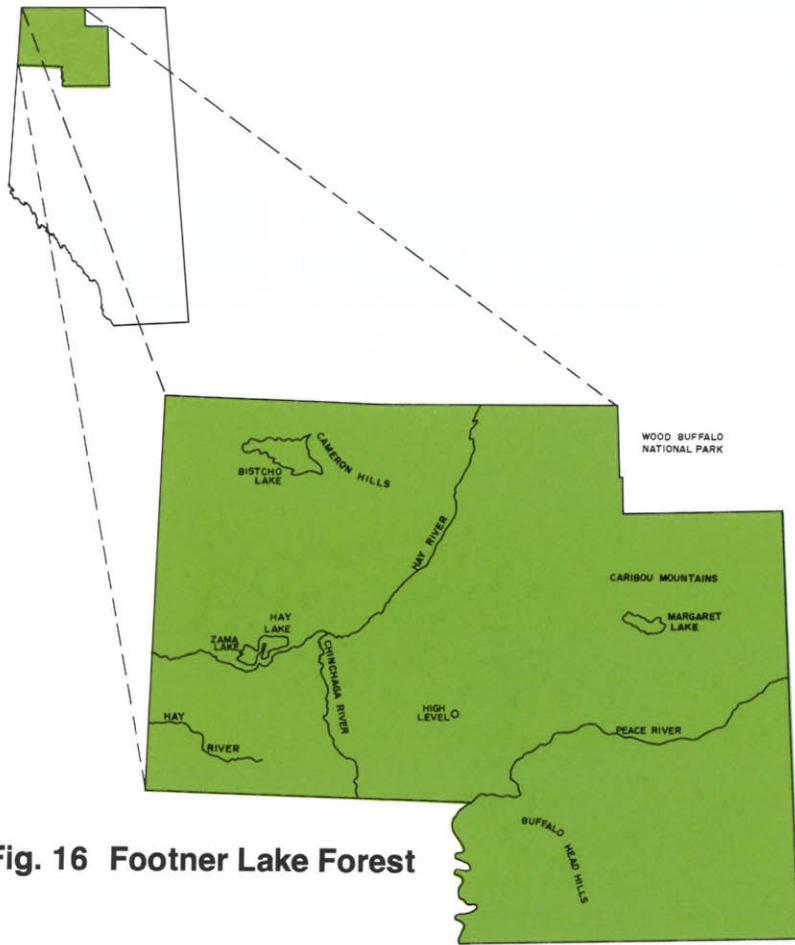


Fig. 16 Footner Lake Forest

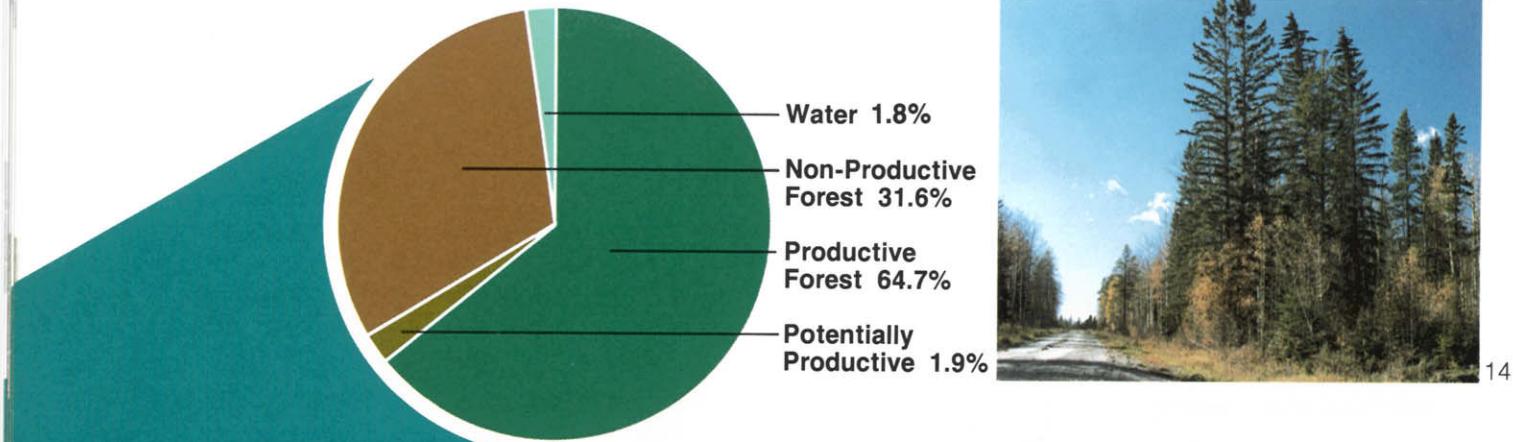


Fig. 17 Footner Lake Forest Land Class Distribution

Table 20 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	2 452	1 383	8	3 843
Roundwood	1 495	802	12	2 309
High Uncommercial	7	1 309	5 848	7 164
Uncommercial	6 693	2 881	7 336	16 910
Total	10 647	6 375	13 204	30 226

Table 21 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	4 817	1 526	1 869	8 212
Medium	5 122	4 208	9 715	19 045
Good	709	641	1 620	2 970
Total	10 648	6 375	13 204	30 227

Table 22 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 257	696	1 663	3 616
Mature	2 293	2 306	5 985	10 584
Immature	3 165	2 472	5 166	10 803
Young	3 452	757	386	4 595
Reproduction	480	143	3	626
Total	10 647	6 374	13 203	30 224

Table 23 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	200	2	228	26	254
181 - 200	751	7	810	89	899
161 - 180	3 419	90	3 885	570	4 455
141 - 160	8 565	220	9 700	1 964	11 664
121 - 140	24 040	867	27 631	6 037	33 668
101 - 120	30 407	1 839	35 466	8 001	43 467
81 - 100	30 191	4 169	39 048	23 018	62 066
61 - 80	23 959	4 157	32 580	33 435	66 015
41 - 60	18 612	3 766	25 115	44 384	69 499
21 - 40	6 027	1 206	8 085	17 981	26 066
1 - 20	16	3	23	16	39
Total	146 187	16 326	182 571	135 521	318 092

3.6 Grande Prairie Forest

The Grande Prairie Forest is an area of gently rolling hills, low foothills and agricultural land in west-central Alberta (Figure 18.). The Phase 3 Inventory includes 69 per cent of the forest's area. The remaining area is privately owned agricultural lands and the Kakwa Wildlife Recreation Area.

The total Phase 3 area is 24 843 km²; 75 per cent of this is productive forest land (Figure 19). Trembling aspen is the dominant species in the forest, making up almost half the total 352 million m³ of wood volume (Table 27). The Grande Prairie Forest has the highest deciduous volume in proportion to its area of any of the forests. Proctor and Gamble Ltd. and Canadian Forest Products Ltd. hold Forest Management Agreements for the harvest of coniferous timber, but very little of the deciduous timber volume is being harvested at present.



Fig. 18 Grande Prairie Forest

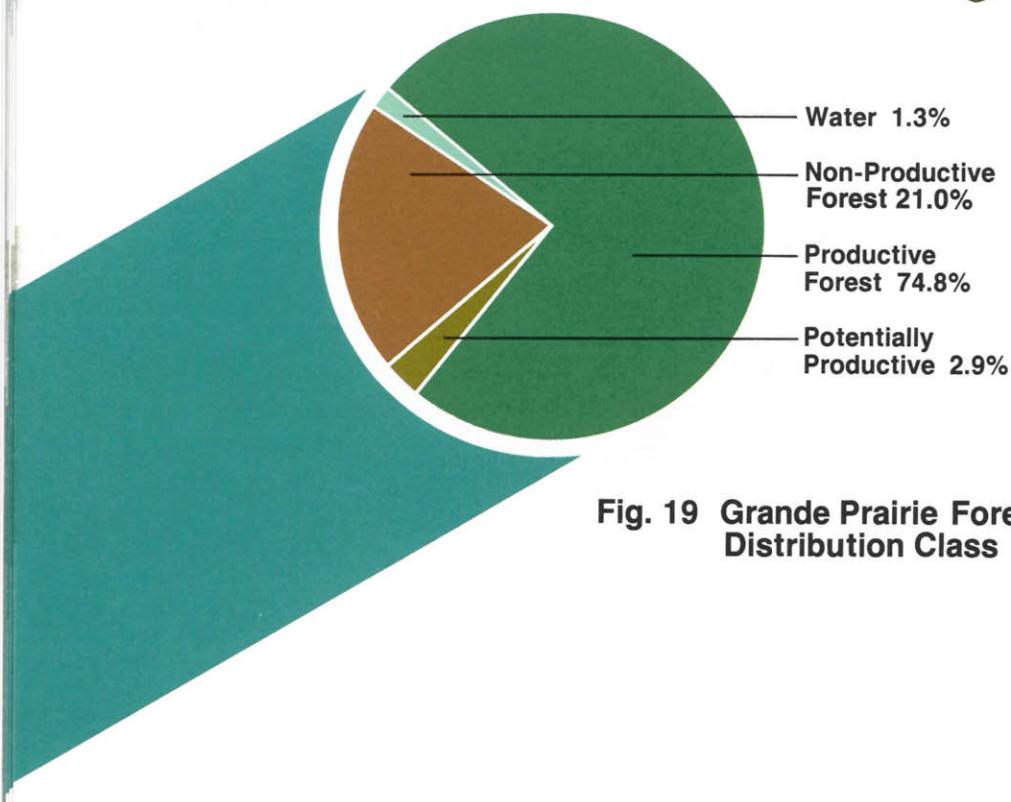


Fig. 19 Grande Prairie Forest Land Distribution Class

Table 24 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group				Total
	Coniferous	Mixedwood	Deciduous		
Lumber	2 899	1 504	14	4 417	
Roundwood	2 180	221	3	2 404	
High Uncommercial	1	275	5 339	5 615	
Uncommercial	1 894	1 044	3 220	6 158	
Total	6 974	3 044	8 576	18 594	

Table 25 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group				Total
	Coniferous	Mixedwood	Deciduous		
Fair	2 005	207	281	2 493	
Medium	4 414	2 396	6 596	13 406	
Good	554	441	1 699	2 694	
Total	6 973	3 044	8 576	18 593	

Table 26 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group				Total
	Coniferous	Mixedwood	Deciduous		
Overmature	1 167	392	1 684	3 243	
Mature	2 995	1 226	3 217	7 438	
Immature	1 871	959	3 301	6 131	
Young	769	391	359	1 519	
Reproduction	171	77	15	263	
Total	6 973	3 045	8 576	18 594	

Table 27 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	235	88	404	29	433
181 - 200	561	360	1 149	63	1 212
161 - 180	1 615	1 392	3 754	303	4 057
141 - 160	3 804	3 002	8 257	1 051	9 308
121 - 140	4 939	3 016	9 174	1 918	11 092
101 - 120	15 738	13 032	33 018	8 294	41 312
81 - 100	27 658	34 211	69 958	34 716	104 674
61 - 80	14 483	13 349	31 557	47 413	78 970
41 - 60	8 746	6 583	17 180	35 917	53 097
21 - 40	6 325	3 434	10 864	36 902	47 766
1 - 20	20	36	67	19	86
Total	84 124	78 503	185 382	166 625	352 007

3.7 Lac La Biche Forest

Approximately 28 356 km² of the Lac La Biche Forest are included in the Phase 3 Inventory (Figure 20). This is about 67 per cent of the total forest area. The remainder is privately owned lands and the Cold Lake Air Weapons Range. Productive forest land occupies 52 per cent of the inventory area (Figure 21). Compared with other forests in the province the Lac La Biche Forest has a high proportion of non productive lands, mostly muskegs, covering almost 40 per cent of the inventory area. These have developed from extinct lakes which were formed during the last deglaciation period. Numerous small lakes occupy five per cent of the forest area and are popular with cottagers in the summer.

Total wood volume is 170 million m³, split evenly between coniferous and deciduous species (Table 31). Coniferous commercialism, site, and maturity data are summarized in Tables 28, 29 and 30.

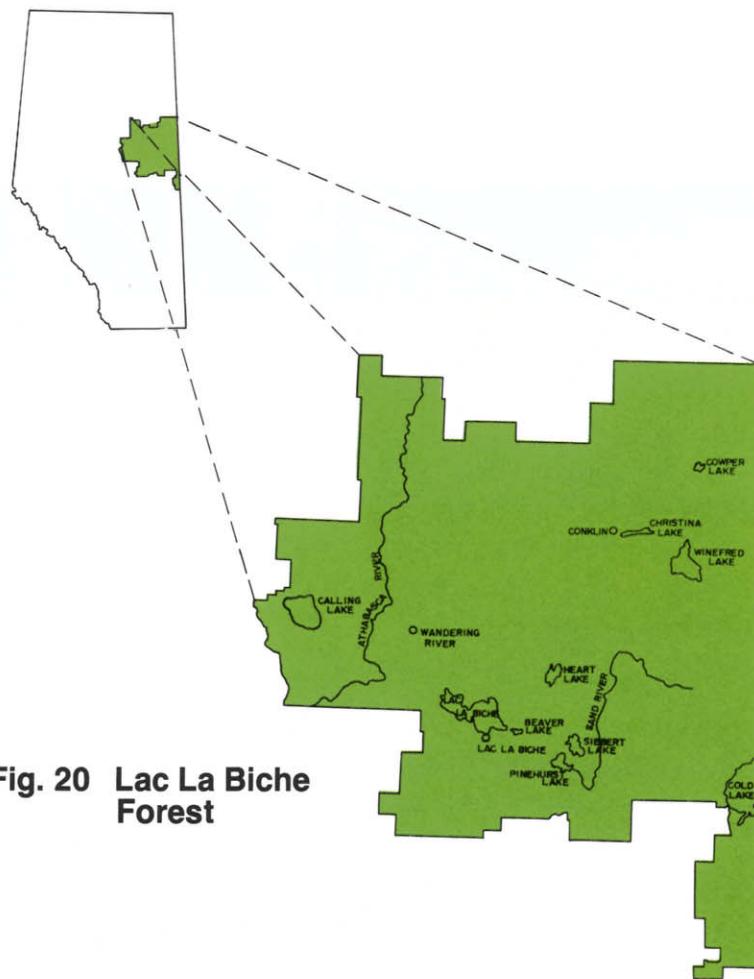


Fig. 20 Lac La Biche Forest

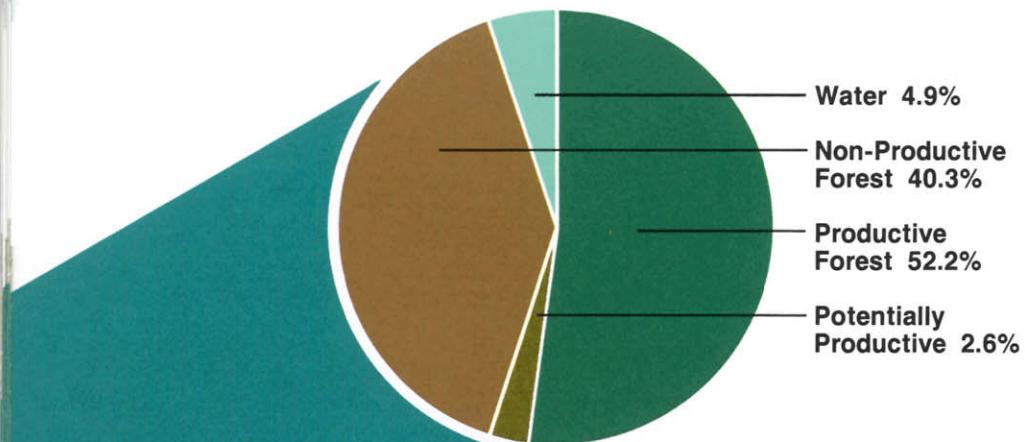


Fig. 21 Lac La Biche Forest Land Class Distribution

Table 28 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	671	1 521	10	2 202
Roundwood	775	170	1	946
High Uncommercial	0	370	2 810	3 180
Uncommercial	5 283	1 029	2 149	8 461
Total	6 729	3 090	4 970	14 789

Table 29 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	2 259	266	570	3 095
Medium	4 108	1 967	3 508	9 583
Good	363	857	892	2 112
Total	6 730	3 090	4 970	14 790

Table 30 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	361	849	1 170	2 380
Mature	877	1 024	1 391	3 292
Immature	2 613	807	2 100	5 520
Young	2 490	374	282	3 146
Reproduction	390	36	27	453
Total	6 731	3 090	4 970	14 791

Table 31 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	0	0	0	0	0
181 - 200	0	0	0	0	0
161 - 180	20	16	46	43	89
141 - 160	346	73	466	199	665
121 - 140	2 219	757	3 546	1 585	5 131
101 - 120	15 089	2 396	20 592	11 669	32 261
81 - 100	14 177	5 443	25 884	21 299	47 183
61 - 80	4 825	5 366	14 150	10 852	25 002
41 - 60	6 075	6 981	15 758	25 246	41 004
21 - 40	1 744	3 160	5 553	13 336	18 889
1 - 20	8	11	22	107	129
Total	44 503	24 203	86 017	84 336	170 353

3.8 Peace River Forest

The Peace River Forest covers an area of agricultural and forested lands in the northwest of the province (Figure 22). Extensive agricultural development has occurred in the southern part of the forest and there is great demand for additional agricultural lands. The provincial government has recently conducted public hearings regarding the expansion of the agricultural land base onto forested land. Policies are being developed concerning future land uses in the forest.

The Phase 3 Inventory included 41 865 km², or 79 per cent of the forest area. Sixty per cent of this area is high quality productive land (Figure 23). Forest cover is dominated by deciduous species, particularly trembling aspen.

Total wood volume is 422 million m³ (Table 35); 56 per cent of this volume is deciduous and 44 per cent is coniferous species. The Peace River Forest has over 21 per cent of the total deciduous volume in the province. Numerous quota holders and Canadian Forest Products Ltd. are actively harvesting coniferous timber in the forest. No deciduous timber is being harvested at present.

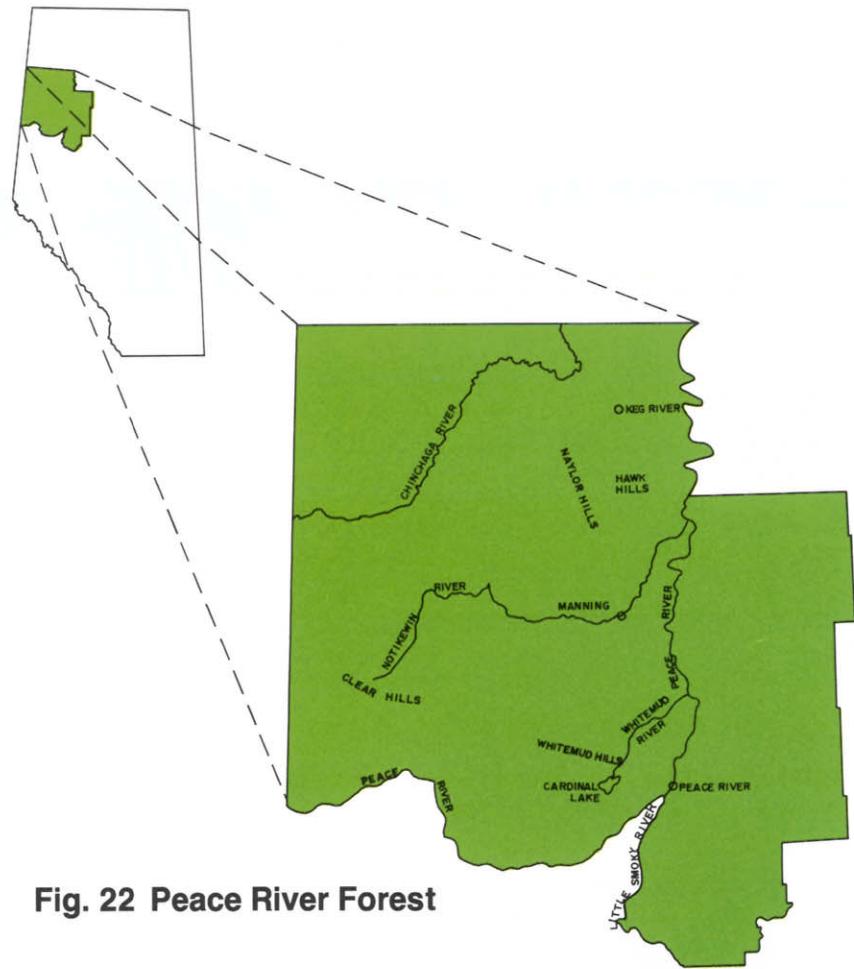


Fig. 22 Peace River Forest

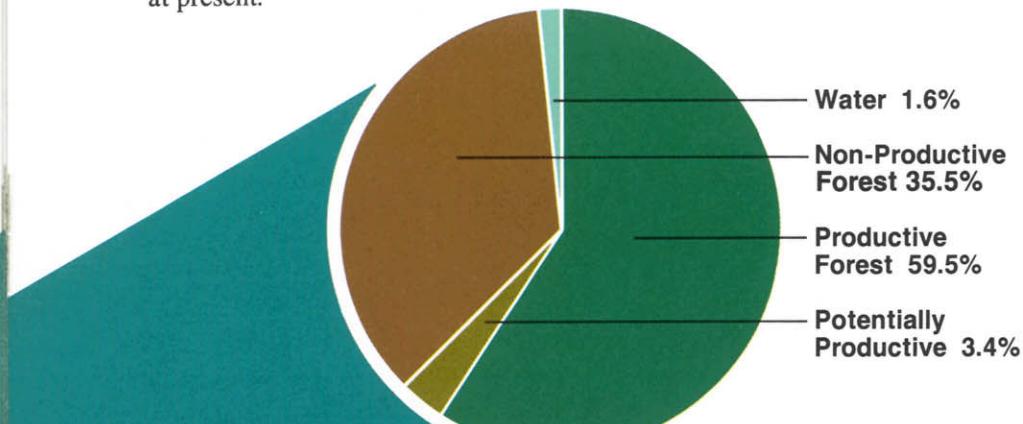


Fig. 23 Peace River Forest and Class Distribution

Table 32 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	1 314	1 522	8	2 844
Roundwood	1 425	867	50	2 342
High Uncommercial	3	903	5 717	6 623
Uncommercial	4 278	2 125	6 698	13 101
Total	7 020	5 417	12 473	24 910

Table 33 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	1 843	550	1 238	3 631
Medium	4 771	4 434	10 824	20 029
Good	406	434	410	1 250
Total	7 020	5 418	12 472	24 910

Table 34 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	504	605	1 505	2 614
Mature	1 818	1 925	4 953	8 696
Immature	2 164	2 098	5 508	9 770
Young	2 265	677	500	3 442
Reproduction	268	112	6	386
Total	7 019	5 417	12 472	24 908

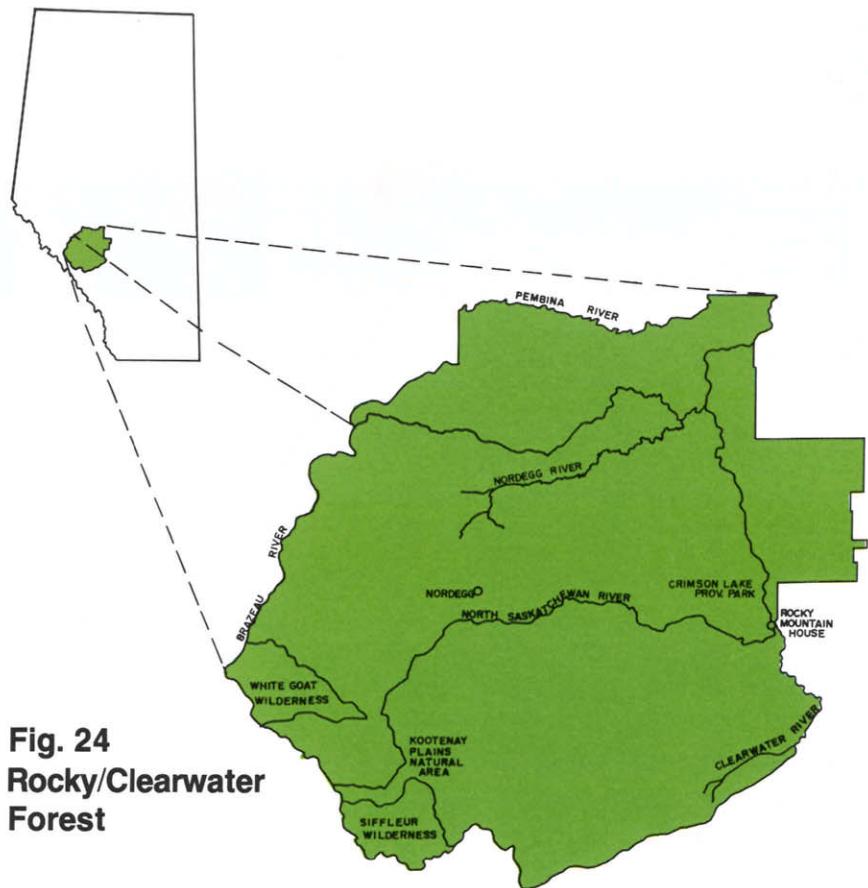
Table 35 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	19	0	20	3	23
181 - 200	302	36	382	103	485
161 - 180	936	123	1 160	321	1 481
141 - 160	5 094	747	6 378	2 808	9 186
121 - 140	7 946	1 416	10 442	4 444	14 886
101 - 120	17 655	3 180	23 002	13 862	36 864
81 - 100	39 366	17 038	63 611	61 799	125 410
61 - 80	18 085	11 826	36 035	36 769	72 804
41 - 60	13 853	7 646	25 359	49 485	74 844
21 - 40	10 673	7 330	21 191	64 970	86 161
1 - 20	9	6	16	52	68
Total	113 938	49 348	187 596	234 616	422 212

3.9 Rocky/Clearwater Forest

The Rocky/Clearwater Forest covers the forested lands adjacent to the Rocky Mountains in the southwest of the province (Figure 24). Phase 3 included 18 804 km² of the forest. Most of this area is productive forest land (Figure 25). Only the White Goat and Siffleur Wilderness Areas and the high-elevation areas in the R3 and R6 Forest Management Units were not included in the inventory.

Coniferous species, dominated by pine, make up 82 per cent of the total wood volume of 196 million m³ (Table 39). With over 65 per cent of the coniferous volume classed as mature and overmature and 70 per cent of the volume as coniferous lumber and roundwood commercialism, the timber resource in the Rocky/Clearwater Forest is one of the best remaining timber supplies in North America. Pelican Mills has recently been awarded a Forest Management Agreement to harvest deciduous and coniferous timber in the eastern part of the forest.



**Fig. 24
Rocky/Clearwater
Forest**

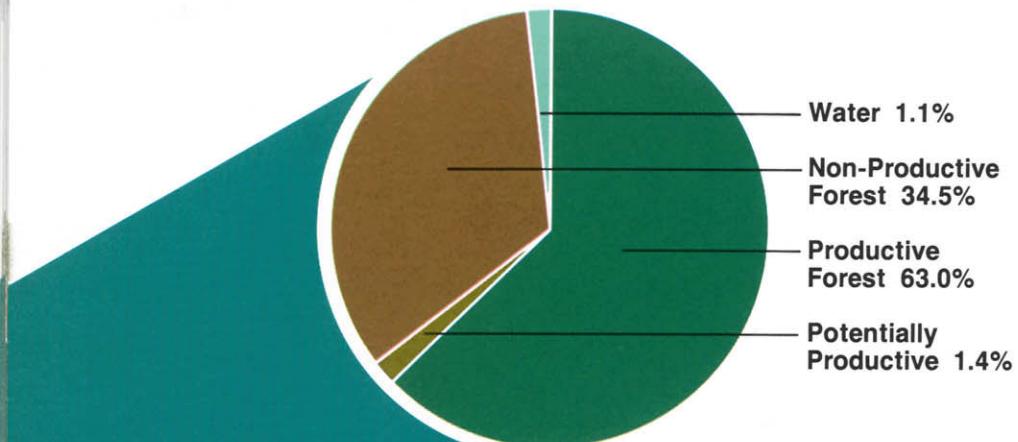


Fig. 25 Rocky/Clearwater Forest Land Class Distribution

Table 36 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	2 138	709	4	2 851
Roundwood	3 756	195	3	3 954
High Uncommercial	0	185	1 302	1 487
Uncommercial	2 807	318	419	3 544
Total	8 701	1 407	1 728	11 836

Table 37 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	4 627	134	84	4 845
Medium	3 791	1 069	1 241	6 101
Good	283	205	402	890
Total	8 701	1 408	1 727	11 836

Table 38 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 564	290	738	2 592
Mature	2 892	645	706	4 243
Immature	3 371	367	245	3 983
Young	759	85	38	882
Reproduction	116	19	0	135
Total	8 702	1 406	1 727	11 835

Table 39 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	4 102	2 737	7 903	279	8 182
181 - 200	596	428	1 236	43	1 279
161 - 180	2 202	1 254	4 029	177	4 206
141 - 160	1 814	1 098	3 315	365	3 680
121 - 140	4 934	3 994	10 421	1 765	12 186
101 - 120	8 008	13 049	23 613	7 162	30 775
81 - 100	15 872	53 175	75 964	17 407	93 371
61 - 80	3 463	15 171	20 557	4 031	24 588
41 - 60	1 830	8 628	11 564	1 817	13 381
21 - 40	823	1 443	2 700	1 439	4 139
1 - 20	1	0	1	0	1
Total	43 645	100 977	161 303	34 485	195 788

3.10 Slave Lake Forest

The Slave Lake Forest is an area of rolling lands in the centre of the province. The Phase 3 Inventory covers 92 per cent or 54 116 km² of the forest (Figure 26). Fifty-four per cent of this area is productive land, supporting a forest cover dominated by stands of trembling aspen and mixedwood stands of trembling aspen, balsam poplar and white spruce (Figure 27).

Nonproductive lands cover 37 per cent of the forest. Total coniferous volume is 234 million m³; deciduous volume is 224 million m³ (Table 43). At present quota holders harvest much of the coniferous volume. A Forest Management Agreement for the harvest of deciduous timber is being negotiated with Weldwood of Canada Ltd.

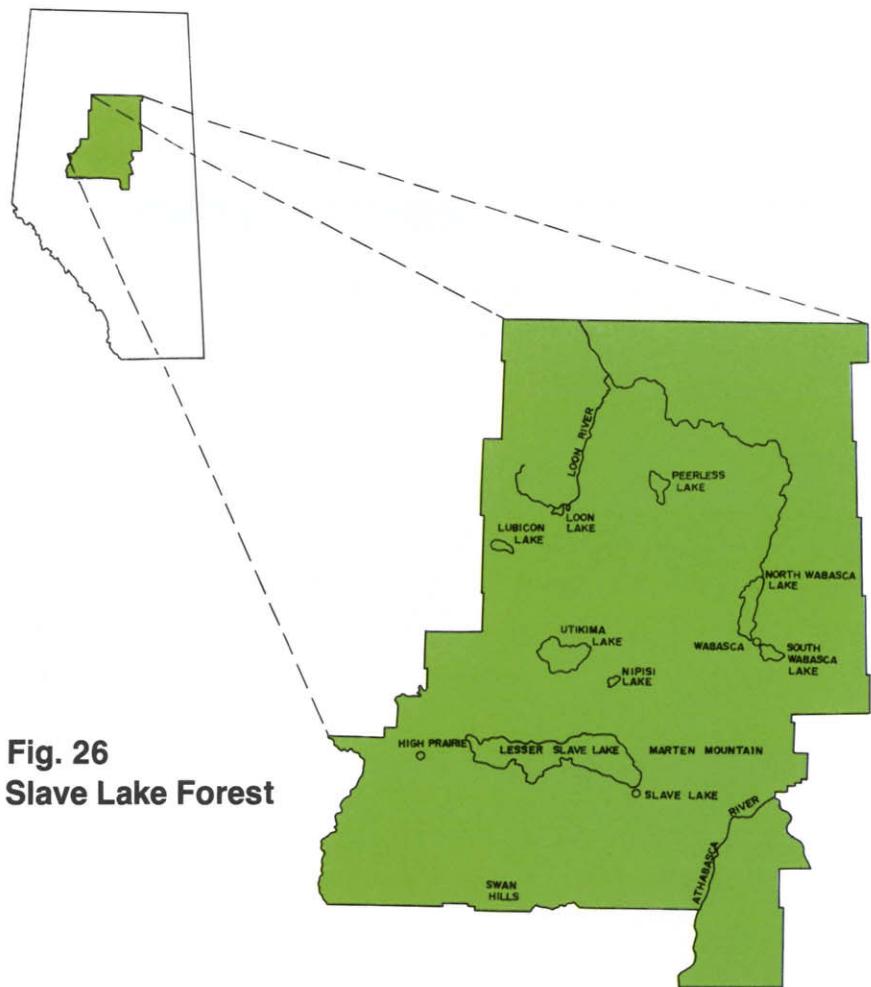
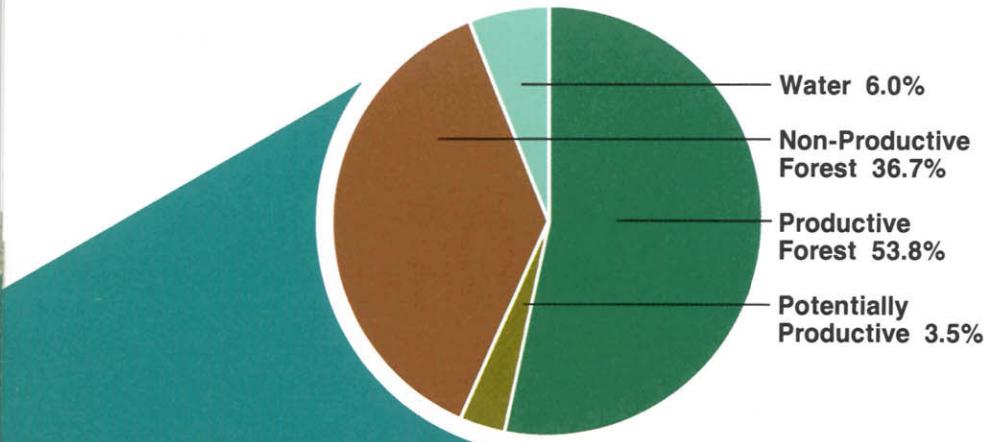


Fig. 26
Slave Lake Forest



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Fig. 27 Slave Lake Forest Land Class Distribution

Table 40 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	2 164	3 163	46	5 373
Roundwood	1 921	582	11	2 514
High Uncommercial	3	517	6 134	6 654
Uncommercial	3 325	2 200	9 052	14 577
Total	7 413	6 462	15 243	29 118

Table 41 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	1 908	794	1 109	3 811
Medium	5 128	5 175	12 329	22 632
Good	377	493	1 806	2 676
Total	7 413	6 462	15 244	29 119

Table 42 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 314	1 633	3 646	6 593
Mature	1 753	2 307	2 700	6 760
Immature	2 539	1 732	8 100	12 371
Young	1 522	649	728	2 899
Reproduction	285	142	71	498
Total	7 413	6 463	15 245	29 121

Table 43 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	161	29	312	32	344
181 - 200	51	5	71	13	84
161 - 180	498	198	954	176	1 130
141 - 160	6 621	2 141	10 304	4 042	14 346
121 - 140	28 456	13 688	51 682	22 949	74 631
101 - 120	44 967	10 274	63 839	43 846	107 685
81 - 100	19 705	8 267	33 589	22 770	56 359
61 - 80	11 829	4 214	19 850	20 531	40 381
41 - 60	13 659	6 600	24 156	46 815	70 971
21 - 40	21 850	4 717	29 060	62 855	91 915
1 - 20	35	9	50	151	201
Total	147 832	50 142	233 867	224 180	458 047

3.11 Whitecourt Forest

The entire 21 507 km² of the Whitecourt Forest is included in Phase 3 (Figure 28). Of the inventory area, 72 per cent is productive forest land, supporting a wood volume of 272 million m³ (Figure 29). Coniferous species, mostly white spruce and lodgepole pine, comprise 68 per cent of this volume, and 32 per cent is deciduous species (Table 47). Three per cent of the land is classed as potentially productive and 24 per cent as nonproductive.

Alberta Energy Company has a Forest Management Agreement for the harvest of coniferous timber. In 1982 Pelican Mills of Edson began operations on two deciduous timber allocations in the forest. There is a large area of unallocated timber in the Berland River region of the forest which is available for development.

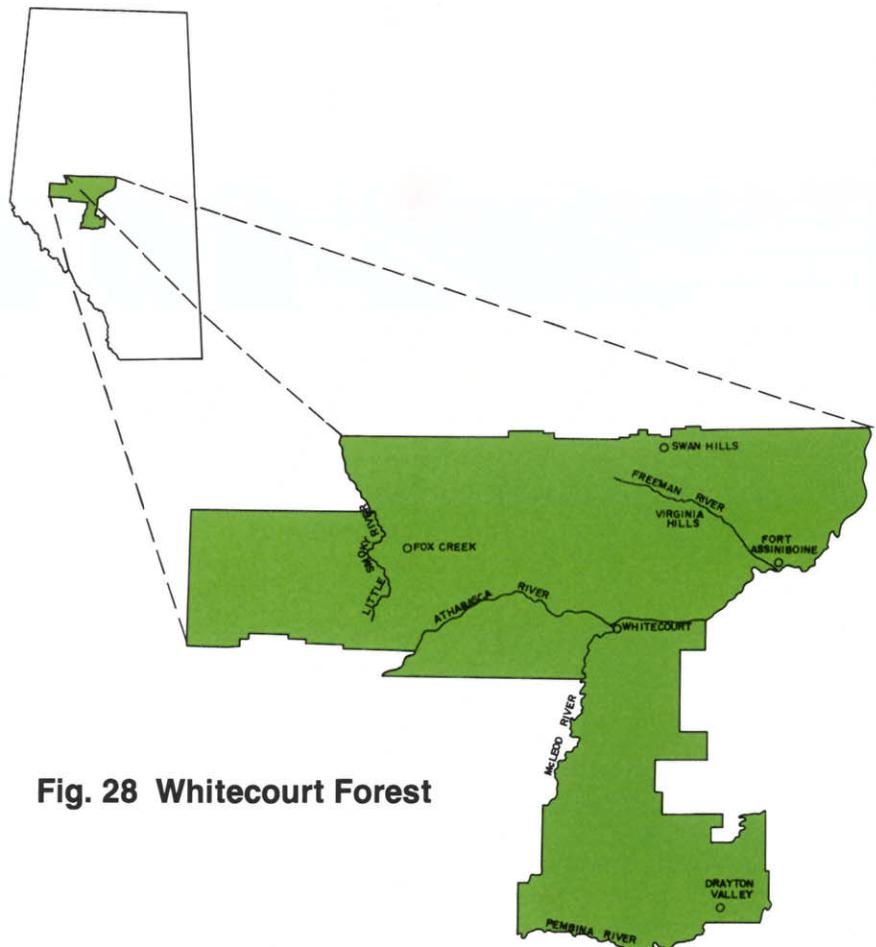


Fig. 28 Whitecourt Forest

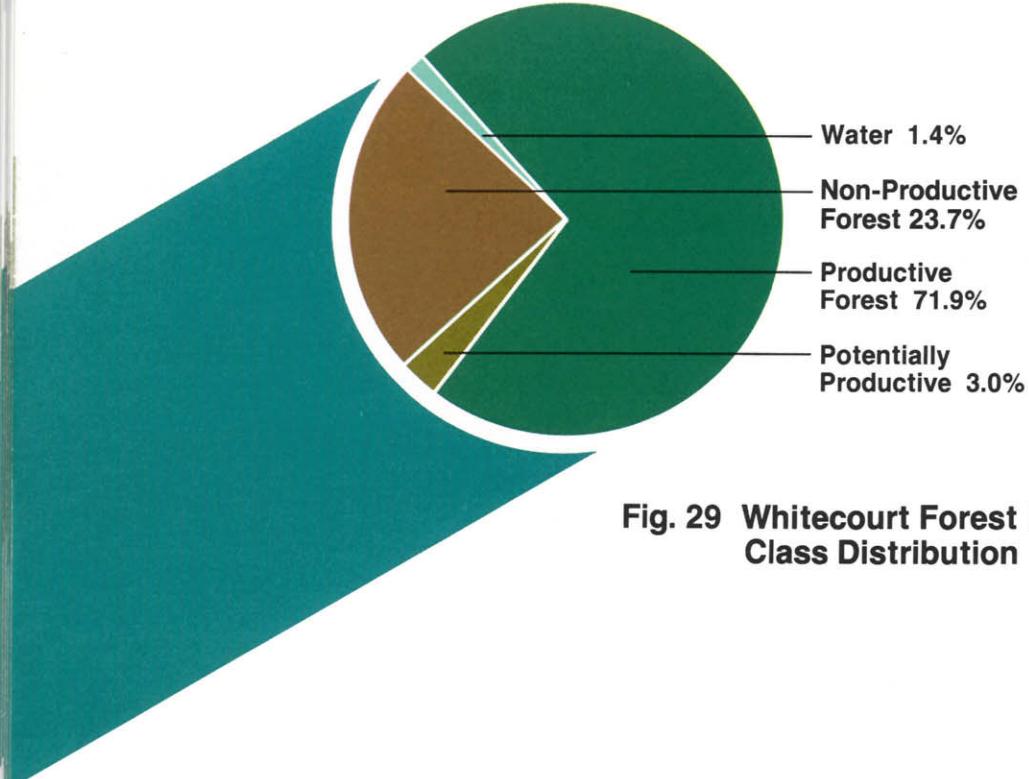


Fig. 29 Whitecourt Forest Land Class Distribution

Table 44 AREA DISTRIBUTION BY CONIFEROUS COMMERCIALISM CLASS AND COVER GROUP (km²)

Coniferous Commercialism Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Lumber	1 675	1 654	102	3 431
Roundwood	2 486	289	8	2 783
High Uncommercial	3	278	2 611	2 892
Uncommercial	3 931	696	1 725	6 352
Total	8 095	2 917	4 446	15 458

Table 45 AREA DISTRIBUTION BY SITE CLASS AND COVER GROUP (km²)

Site Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Fair	2 335	183	241	2 759
Medium	4 490	1 824	3 427	9 741
Good	1 271	909	777	2 957
Total	8 096	2 916	4 445	15 457

Table 46 AREA DISTRIBUTION BY MATURITY CLASS AND COVER GROUP (km²)

Maturity Class	Cover Group			Total
	Coniferous	Mixedwood	Deciduous	
Overmature	1 007	830	1 277	3 114
Mature	2 229	1 248	1 648	5 125
Immature	2 578	527	865	3 970
Young	1 834	255	627	2 716
Reproduction	447	57	29	533
Total	8 095	2 917	4 446	15 458

Table 47 SPECIES VOLUME BY AGE CLASS (thousands of m³)

Age Class	White Spruce	Pine	Total Coniferous	Total Deciduous	Total
201+	171	112	437	50	487
181 - 200	81	73	246	30	276
161 - 180	494	262	976	178	1 154
141 - 160	1 474	1 810	4 441	606	5 047
121 - 140	4 097	4 280	11 246	1 838	13 084
101 - 120	19 843	18 044	46 749	18 864	65 613
81 - 100	22 593	29 547	62 242	32 101	94 525
61 - 80	6 819	14 009	25 497	13 288	38 785
41 - 60	4 360	13 960	23 586	10 291	33 877
21 - 40	2 495	4 411	9 550	9 493	19 043
1 - 20	82	66	190	333	523
Total	62 509	86 574	185 342	87 072	272 414

GLOSSARY

allowable cut	the volume of wood which may be harvested for a given period	coniferous	cone-bearing trees with needle - or scale - like leaves belonging to the botanical group Gymnospermae. Examples of coniferous trees are spruce, pine, fir and larch.	flight line	a line drawn on a map or chart to represent the actual or proposed track of an aircraft during a remote sensing program
basal area	<i>of a tree:</i> the area in square metres of the cross section at breast height of the stem <i>of a stand:</i> the area in square metres per hectare of the cross-section at breast height of all trees	cover type	a group of trees of similar composition that can be differentiated from other such groups. Forest cover types are usually separated and identified by species composition and often by height and crown closure classes. In detailed typing, the age and site may also be recognized. Typing is usually done using aerial photographs supplemented by field data.	Forest Management Agreement (FMA)	a renewable agreement between the Alberta government and a company. This agreement grants the company the rights and obligations to manage, grow and harvest timber on a sustained yield basis in the area under agreement.
base map	a map that displays basic planimetric information (drainage and cultural features) and which is used as a base for the forest map	crown density	the percentage of ground area covered by the vertically projected tree crown area. The Phase 3 Inventory recognizes four crown density classes.	Forest Management Unit (FMU)	an area of forest land managed as a unit for wood fibre production and other renewable resources.
breast height	the standard height, 1.3 m above ground level, at which the diameter of a standing tree is measured	Code	Crown Density (%)	gross merchantable volume	volume of the main stem, excluding stump and top but including defective and decayed wood, of trees or stands.
breast height age	the number of annual growth rings between the bark and the pith, as counted at breast height	A	6 - 30	ground truthing	the collection of reference data used to verify information gathered from remote sensing devices such as aerial photography
co-dominant	trees with crowns forming the general level of the canopy and receiving full light from above but comparatively little from the sides; usually with medium-sized crowns more-or-less crowded on the sides	B	31 - 50	infrared film	film sensitive to infra-red and visible light radiation
commercialism	a classification of wood volume applied to a stocked forest stand according to the amount and size of coniferous timber volume. The Phase 3 Inventory recognized four commercialism classes:	C	51 - 70	inventory	<i>forest:</i> a survey of a forest area to gather such data as area, condition, volume and species, for specific purposes such as planning, purchase, evaluation, management or harvesting
Lumber - L	stand having 50 m ³ /ha or greater of coniferous volume, at 20/13 utilization standard	D	71 - 100	<i>management:</i> a detailed, intensive forest inventory for management purposes, of an area managed as one unit. The forest cover types are usually mapped in detail with estimates given for each type. Precision estimates are given for the total inventory volume.	
Roundwood - R	stand having 50 m ³ /ha or greater of coniferous volume, at 13/7 utilization standard	Deciduous Timber Allocation	see Timber Quota	<i>operational:</i> an intensive forest inventory of a small area for harvesting purposes. Individual stands are mapped with estimates given for each stand.	
High Uncommercial - H	stand having 50 m ³ /ha or greater of all species, at 13/7 utilization standard	diameter at breast height (dbh)	the stem diameter of a tree measured at breast height (1.3 m above ground level)	itek	photographs of interpreted aerial photographs
Uncommercial - U	stand with less than 50 m ³ /ha volume of all species, at 13/7 utilization standard	dominant	trees with crowns extending above the general level of forest canopy		
		economically inaccessible	a forest or stand that cannot be harvested profitably		
		even-aged	a stand in which relatively small age differences (usually less than 20 years) exist between individual trees		

large-scale photography	permanent sample plot	site index
aerial photos that have a scale larger than 1:12 000	see "sample plot"	an expression of forest quality based on the height, at a specific age (reference age), of dominant and co-dominant trees in a stand
management inventory	photo interpretation	soil horizons
see "inventory"	the extraction of information from photos	the more-or-less distinct layers of soil that are developed as a result of the various soil forming factors
maturity	photo typing	stagnant
the stage of forest cover development determined by its age relative to some selected rotation age. The Phase 3 Inventory recognizes five maturity classes:	the delineation and labelling of natural or cultural features on aerial photos	a stand whose growth and development have all but ceased due to poor site and/or excessive stocking
O - overmature		
M - mature		
I - immature		
Y - young		
R - reproduction		
mean annual increment (MAI)	remote sensing	stand
the average increase of a tree or stand dimension per year. The dimension measured may be diameter, height, volume, etc. The MAI is determined by dividing the cumulative size by the age. MAIs are most commonly applied to the volume growth of stands.	the use of sensors established on a suitable sensor platform to record, from a distance, electromagnetic energy reflected and/or emitted by matter	a community of trees possessing sufficient uniformity in composition, age, arrangement or condition to be distinguishable from the forest or other growth on adjoining area, thus forming a management entity
merchantability	rotation	stereoscope
tree or stand that has attained sufficient size, quality or volume to make it suitable for harvesting	the period of years required to establish and grow even-aged timber crops to a specified condition of maturity	a binocular instrument used to view overlapping aerial photos as a three-dimensional model
multiple use	sample plot	stocking
land area is managed in order to support integrated use with timber and nontimber interests, such as petroleum development, mining, recreation, wildlife and others	a fixed or variable area plot established for sampling and measurement purposes. In temporary plots measurements are made on only one occasion, while permanent plots are designed for remeasurement.	a qualitative expression of the adequacy of tree cover on an area, in terms of crown closure, number of trees, basal area or volume, in relation to a pre-established norm
net merchantable volume	site	sustained yield
the volume of the main stem, excluding stump, top, and defective or decayed wood, of trees or stands	the complex of physical and biological factors for an area which determines what forest or other vegetation it can support	management of forest land for continuous production with the aim of achieving, at the earliest practicable time, a balance between net growth and harvest
operational inventory	site class	timber disposition
see "inventory"	an interval into which the site index range is divided for purposes of classification and use. The Phase 3 Inventory recognizes three site classes based upon the site index (height in metres at stump age 70 years) of dominants and co-dominants of the predominant species.	an agreement between a forest products company and the provincial government, giving the company the rights to harvest timber on public forest land. There are two different types of dispositions: the Forest Management Agreement (FMA) and Timber Quota.
orthophoto		timber quota
an aerial photo in which photo scale variation and image displacement due to relief and tilt of the aircraft have been removed. On orthophotos, features are in their true planimetric positions.		a long-term right to harvest a percentage share of the allowable harvest in an FMU. Most quotas are for the harvesting of coniferous timber. However, deciduous quotas have also been established.
panchromatic film	Code	
film sensitive to visible light of all wavelengths	G Good M Medium F Fair	
	White Spruce >20 15 - 20 <15	
	Pine >20 15 - 20 <15	
	Aspen >20 15 - 20 <15	
	Black Spruce >12 9 - 12 < 9	
site height		
	pertaining to yield tables; the average height of dominant and co-dominant trees	

top height

pertaining to yield tables
(average height of the largest
100 trees per hectare)

utilization standard

the stump height and the top
diameter, usually measured in
centimetres, within which the
volume of the stem is used

volume

amount of wood in a tree, stand
or other specified area,
according to some unit of
measurement

Volume Sampling Region (VSR)

an area defined by broad
ecological and administrative
characteristics. there are ten
VSRs in the province.

volume table

a tabulated statement of tree
volumes in cubic metres or
some other units. Volume tables
may be for various sizes of a
particular species (single tree
volume table) or may be for a
grouping of trees, such as a
cover group (cover type volume
table).

yield table

gives the volume of forest
products that can be expected
per unit of area for a given age,
site, stocking and method of
management

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