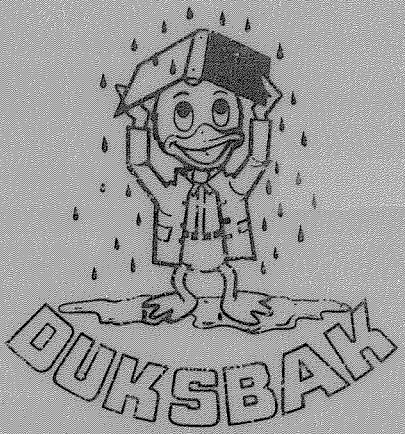

WATERPROOF

NO. 30

R. D. PENHALL LTD.

Field Handbook
Classification and Sampling
1992

Ministry of Forests
Inventory Branch
1450 Government Street
Victoria, B.C V8W 3E7

Field Handbook
(Classification and Sampling)

Preface

The British Columbia Forest Act (1978) states that the Chief Forester shall develop and maintain an inventory of the land and forests in the Province, and shall assess the land in the Province for its potential for growing trees continuously, providing forest oriented recreation, producing forage for livestock and wildlife, and for accommodating other forest uses. Also, the Ministry of Forests Act (1978) requires a periodic resource analysis report containing a description of the inventory of the forest resources in the Province, a description of the location and extent of areas of forest land in the Province that have been denuded of timber through harvesting or otherwise and have not become restocked with a commercially valuable species of timber, or are producing timber at the rate that is substantially lower than their potential. In addition, the Minister of Forests is required to submit to the Lieutenant-Governor in Council an annual report which must include a summary of forest land in the Province, showing areas denuded of forest during the year, areas restocked during the year and areas the productivity of which has been improved during the year.

In order to implement the requirements of the new forest legislation, the Branch of the Ministry of Forests has acquired new technology and has developed new approaches for conducting forest inventory. The Forest Inventory Manual, consisting of five volumes, the The Inventory Program Five-Year Strategic Plan, and the inventory handbooks, namely the Field Handbook, and the Colour and Black and White Stereogram Handbook, describe the procedures for planning, conducting and auditing provincial forest inventory.

The Field Handbook (Classification and Sampling) is a compact, pocket-sized summary of relevant chapters of the Forest Inventory Manual. In addition, it contains two appendices: the first is a summary of the pre-1978 forest classification system; and the second is Site Index Curves and Tables for British Columbia - Coastal and Interior Species (Land Management Handbook Field Guide Inserts 3 and 6). This handbook was prepared by J.F. McLellan, R.P.F., D.B. Carpenter, D.R. Brand, E.J. Beadle, L. Armstrong, R.P.F. and D. Campbell, R.P.F., and it was updated by Joe Nemeth, Chon Kim and Gerry Bourdon.

For further information, please contact Mr. I. Spandli, R.P.F., Manager, Resource Inventory.

D. Gilbert, R.P.F.
Director

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Emergency Procedures

1.0 Contacts in Case of Emergency

In the event of an injury, serious illness, or other emergency, KEEP CALM, and:

A. Administer first aid:
   1. Check breathing.
   2. Stop bleeding.
   3. Treat shock.
   4. Immobilize fractures.

B. Get medical assistance

C. Notify the:
   1. Immediate supervisor.
   2. Headquarters.

1.1 USEFUL PHONE NUMBERS (to be filled in by the holder of this manual)

Immediate supervisor: _____

Local R.C.M.P. or police: _____

Local ambulance: _____

Local helicopter base: _____

Local fixed wing base: _____

The next of kin is to be notified by the most senior person attached either to the Branch, to the Forest Region, or to the District who is available at the time of the emergency.

Because an emergency may be of news interest, withhold the names of personnel involved until you know that the next of kin has been notified. When reporting accidents by radio, use only the code number when referring to an injured person.

Fill in the code sheet at the end of this chapter.

2.0 Aircraft and Marine Emergency

Report to the most senior person:

A. Aircraft or boat identification

B. Names of the pilot and other personnel involved.

C. Date and time of last position report.

D. Location of the last position report.

E. Map reference, flight plan and relevant aerial photo numbers.

If you are unable to contact the senior person at the Branch, Forest Region, or District, call the Operator and say "Aircraft Distress" or "Marine Distress" as the case may be. Your information will be received by the Rescue Coordination Centre.

2.1 Flare Kit Instructions

A. If possible, fire from an opening or hilltop.

B. Fire the flare into the field of vision of the aircraft's occupants. It will likely be wasted on a retreating aircraft. Do not fire directly at the aircraft.

C. Fire flares at daybreak or at twilight for maximum visibility by ground parties. Search parties are unlikely to be out at night.

D. Fire flares almost vertically and downhill. Watch where the flare lands in case it starts a fire.

E. STAY PUT WHEN YOU HAVE BEEN SPOTTED unless directed otherwise by searchers. See air-to-ground signals in Section 4.3.

3.0 When Lost in the Bush

A. Remain calm.

B. Sit down, relax and try to figure out where you are.

C. Take stock of what you have with you.

D. Go to a high point to orient yourself and to improve your chances of being spotted.

E. Do not walk yourself into a state of exhaustion; conserve energy.

F. If you have not oriented yourself by twilight, decide to spend the night in the bush. Make this decision earlier if you are exhibiting signs of exhaustion or hypothermia.

G. Prepare to spend the night by:
   1. checking instructions in the flare kit,
   2. preparing a smoke-signal fire,
   3. laying out ground-to-air signals if necessary and possible,
   4. making shelter and building a night fire, and by
   5. conserving food.

Note: **Stay put when you have been spotted** unless otherwise directed by the searchers.

4.0 Emergency Signals

4.1 Radio Code For Air Assistance

Class A (Alpha) - Emergency. Require doctor to be flown in immediately.

Class B (Bravo) - Emergency, but no doctor required. Need air transport immediately.

Class C (Charlie) - No emergency, but require medical attention. Fly out as soon as possible.

Class D (Delta) - No medical attention required. Fly out as soon as possible.

4.2 Ground To Air Signals

Require assistance V

Require medical assistance X

Require food and water ..... F

Am proceeding in this direction ..... →

Require fuel and oil L

All is well LL

No ..... N

Yes ..... Y

Require repairs ..... W

4.3 Air To Ground Signals

Visual signals to be used in emergencies and in fire protection work:

Low pass over drop area, revving motors - Take cover: air drop coming

Pass over drop area, wobbling wings - Finished dropping or signals recognized.

5.7 Fractures (Broken Bones)

A. Splint the joints above and below the fracture with available stiff materials (for example, saplings, tally sack, and other parts of body).

B. Splint deformed joint fractures in the position found. A skilled first aid attendant may apply traction and straighten a mid-bone fracture or manipulate a deformed joint injury when necessary.

C. With open fractures, place a ring (donut) pad around the protruding bone and cover with clean dressing before splinting.

D. Check splint ties frequently to ensure that they do not interfere with circulation.

E. If circulation is adequate past the injury site, a cold compress can be applied in cycles of 10 minutes on 5 minutes off to decrease pain and swelling.

5.8 Heat Exhaustion

A. Have the patient lie down in a cool place.

B. Loosen tight clothing.

C. If conscious, give him a large quantity drink.

D. Put the patient in the 3/4-prone position if drowsy or unconscious.

5.9 Hypothermia

Immediate and positive treatment is required:

A. Get the victim out of the cold, wind and rain.

B. If possible, strip off all wet clothes and get him into dry clothes and into a warm sleeping bag; hot packs placed around the neck, armpit and groin will help.

C. If he is conscious, give him warm sweet drinks (non-alcoholic).

D. If he is semi-conscious or worse, try to keep him awake. When there are no other rewarming aids available, someone will have to provide body heat by skin-to-skin contact (bare chest to bare chest is most effective). Severe hypothermia victims are unconscious and unresponsive. They are best rewarmed at a hospital.

5.10 Shock

Prevention and treatment:

A. Loosen tight clothing.

B. Reassure the patient.

C. Keep him warm by insulating below as well as above him.

D. Place him in the most comfortable position.

E. Continue to reassure him.

F. Moisten his lips if he is thirsty (no food or drink).

G. If he is unconscious and there is a problem keeping the airway clear because of continuous bleeding or vomit in the mouth, place him in the 3/4-prone position.

5.11 Sprains

A. Simple:
   1. Wrap with elastoplast or bandage.
   2. Apply a cold compress (cooled by creek water) if possible
   3. Elevate and rest the sprain when possible (for example, during lunch break).

B. Serious:
   1. Apply cold compresses to the sprain to reduce swelling (use cycles of 10 minutes on, 5 minutes off for the next 24 hours).
   2. Secure medical aid.

5.12 Unconsciousness

Unconsciousness means that a person fails to react to voice or touch. Whatever the degree of unconsciousness, he is in extreme danger and has no way of protecting himself from choking on blood, on vomit or on his tongue. Before seeking help place him in the drainage position. Gently turn him on his side, injured side down, with his cheek on the ground. Make sure his mouth is open and the airway straight and clear.

6.0 Leaving An Injured Person In The Bush

If you must leave your partner in the bush:

A. Make sure he is comfortable and treat all injuries before you leave. If there is a danger of his becoming unconscious, prop him in the drainage position.

B. Leave him with:
   1. Shelter, when raining or cold
   2. Food and water
   3. Fire, wood, kindling, matches
   4. Knife, axe
   5. Flare kit
   6. Extra clothing, both over and under
   7. Tally bag
   8. Watch

C. Tell him your plans:
   1. Direction and route you are taking.
   2. Estimated time of return.
   3. What you will do when you reach camp or the vehicle.
   4. Reassure him before you leave.

D. Mark his location well with flagging tape; you may have to return in the dark.

E. Flag or blaze your way out, using you compass.

F. Take air photos with you, having marked your partner's location before leaving.

CODE SHEET

NAME _____ CODE

Field Handbook

Forest Classification

Forest Classification

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Forest Classification

Land is stratified into homogeneous strata, based on a set of well defined criteria which can be recognized on aerial photographs with minimum ground control.

1.0 Forest Land

Land is classified as forest land if it can be considered that it will provide the greatest contribution to the social and economic welfare of the province if it is predominantly maintained under forest management, in successive crops of trees, forage, or both.

1.1 Species Composition

Species composition is estimated to the nearest percent for all living trees over a specified diameter limit. Use the species symbols listed in Table 2.

Table 1

Letter symbols for the recognized commercial native tree species of British Columbia

Common Name of Genus/Species	Scientific Name of Genus/Species	Genus Symbol	Species Symbol
Alder	Alnus	D	
Red alder	A. rubra		Dr
Balsam	Abies	B	
Alpine fir	A. lasiocarpa		Bl
Amabilis fir	A. amabilis		Ba
Grand fir	A. grandis		Bg
Birch	Betula	E	
Common paper birch	B. papyrifera		Ep
Alaska paper birch	B. neoalaskana		Ea
Cedar	Thuja	C	
Western red cedar	T. plicata		Cw
Cypress	Chamaecyparis	Y	
Yellow cedar	C. nootkatensis		Yc
Douglas-fir	Pseudotsuga	F	
Douglas-fir	P. menziesii		Fd
Hemlock	Tsuga	H	
Mountain hemlock	T. mertensiana		Hm
Western hemlock	T. heterophylla		Hw
Larch	Larix	L	
Alpine larch	L. lyallii		La
Tamarack	L. laricina		Lt
Western larch	L. occidentalis		Lw
Maple	Acer	M	
Broadleaf maple	A. macrophyllum		Mb
Pine	Pinus	P	
Limber pine	P. flexilis		Pf
Lodgepole pine	P. contorta		Pl
Western white pine	P. monticola		Pw
Whitebark pine	P. albicaulis		Pa
Yellow pine	P. ponderosa		Py
Jack pine	P. banksiana		Pj
Poplar	Populus	A	
Aspen	P. tremuloides		At
Balsam poplar	P. balsamifera subsp. balsamifera		Ac
Black cottonwood	P. balsamifera subsp. trichocarpa		Ac
Spruce	Picea	S	
Black spruce	P. mariana		Sb
Engelmann spruce	P. engelmannii		Se
Sitka spruce	P. sitchensis		Ss
White spruce	P. glauca		Sw

Table 2

Letter symbols for non-commercial native tree and brush species of British Columbia

Common Name of Genus/Species	Scientific Name of Genus/Species	Genus Symbol	Species Symbol
Tree Species			
Alder	Alnus	D	
Mountain alder	A. incana		Dm
Green and Sitka alder	A. viridis		Dg
Arbutus	Arbutus	R	
	A. menziesii		Ra
Birch	Betula	E	
Water birch	B. occidentalis		Ew
Cascara	Rhamnus	K	
	R. purshianus		Kc
Cherry	Prunus	V	
Bitter cherry	P. emarginata		Vb
Dogwood	Cornus	G	
Pacific dogwood	C. nuttallii		Gp
Juniper	Juniperus	J	
Rocky mountain juniper	J. scopulorum		Jr
Maple	Acer	M	
Vine maple	A. circinatum		Mv
Rocky mountain maple	A. glabrum		Mr
Oak	Quercus	Q	
Garry oak	Q. garryana		Qg
Willow	Salix	W	
	Salix		
Yew	Taxus	T	
Western yew	T. brevifolia		Tw
Brush Species			
Alder	Alnus	D	
Mountain alder	A. incana		Dm
Green and Sitka alder	A. viridis		Dg
Birch	Betula	E	
Bog Birch	B. glandulosa		Eb
Swamp Birch	B. pumila		Es
Water birch	B. occidentalis		Ew
Dogwood	Cornus	G	
Red-osier dogwood	C sericea		Gr
Maple	Acer	M	
Vine maple	A. circinatum		Mv
Rocky mountain maple	A. glabrum		Mr
Willow	Salix	W	

1.2 Age

Age is determined to the nearest year and is based on the 100 largest diameter trees per hectare of the leading species.

1.3 Top Height

Top height is determined to the nearest 0.1 metre when practical, otherwise to the nearest 1.0 metre, and is based on the 100 largest diameter trees per hectare of the leading species.

1.4 Crown Closure

Crown closure is determined to the nearest percent where practical, and is based on the area occupied by the trees in the main canopy.

1.5 Stand Density and Stocking

Stand density is measured to the nearest stem per hectare and represents the number of the trees equal to or greater than the minimum size specified for the survey.

1.6 Site Index

Site index is the top height of the leading species, at 50 years Breast height age.

1.7 Environmentally Sensitive Areas (E.S.A.)

Forest land is assessed for environmental sensitivity and other resource values (see Volume 2. "Environmentally Sensitive Areas" of the Forest Inventory Manual).

Seven E.S.A. categories are recognized: soil (Es), forest regeneration (Ep), snow avalanche areas (Ea), recreation (Er), wildlife (Ew), water (Eh), and fisheries (fisheries symbols).

For each E.S.A. category except snow avalanche and Fisheries, high and moderate classes are recognized. These are denoted by the subscripts 1 and 2 respectively. For the Fisheries category, the four fisheries-values and stream-sensitivity ratings are nil, low, moderate and high.

The E.S.A. classes, E. S. A. categories and fisheries symbols are shown in Table 3.

Record E.S.A. designations at the end of the type label.

Example: $P1_{70}F_{30}$ 161-26.8 Epr_2

For the wildlife category, the specific wildlife species is further identified by the subscript symbols summarized in Table 4. Fisheries symbols are placed along streams on forest cover maps.

Table 3

E.S.A. classes and E.S.A. categories

E.S.A. Class	Timber Availability for Harvesting	E.S.A. Category	E.S.A. Category Description
High	Forest land not normally available for sustained harvesting because of environmental sensitivity and/or value for other resources	Es_1	Areas having severe soil and steepness problems
		Ep_1	Areas having severe regeneration problems
		Ea_1	Areas having severe snow chute and avalanche problems
		Er_1	Areas having exceptionally high recreational values
		Ew_1	Areas having critical importance to wildlife
		Eh_1	Areas having exceptionally high water values
Moderate	Forest land for other resources for harvesting due to other resource values	Es_2	Areas having significantly fragile and unstable soils but less than those of Es_1
		Ep_2	Areas having severe regeneration problems caused by biotic factors
		Er_2	Areas having high recreational values but less than those for Er_1
		Ew_2	Areas having high value for wildlife but less than that for Ew_1
		Eh_2	Areas having high water values but less than those for Eh_1

Note: Management practices on forest lands not having an E.S.A. designation are subject only to operational constraints consistent with the policies of the Forest Region

	Symbol	Fisheries-value and Stream-sensitivity Rating
Fisheries	▲	Nil
	■	Low
	●	Moderate
	◆	High

Note: Unclassified streams are not assigned a fisheries symbol.

Table 4

Symbols for wildlife species

Wildlife Species	Symbol
Bear * (grizzly only)	b
Caribou	c
Deer	d
Elk	e
Goat	g
Moose	m
Birds	o
Sheep	s

*To indicate grizzly bear habitat requiring protection see Figure 2

Examples: Ew_{2ed} (Elk and deer) Ew_{1m} (Moose)

Important grizzly bear habitats along salmon producing streams are identified with symbols as shown in Figure 2.

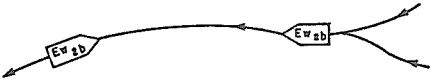

Figure 2 Grizzly bear symbols along salmon stream

1.8 Inoperable Areas (I)

Inoperable areas are strata which contain merchantable or potentially merchantable timber, but because of some physical barrier or other limitations, the area is considered inoperable in terms of current harvesting technology. Examples of inoperable areas include stands behind blocked access, such as hanging valleys, canyons, highways, railroads, and parks, as well as narrow strips and isolated patches of timber.

1.9 Unproductive Forest Land

Forest land is classified as unproductive forest land when it is incapable of producing a merchantable stand within a reasonable length of time. In British Columbia, unproductive forest land includes a range of sites from alpine forest to forests growing on swamp, on muskeg, and on steep, rocky, broken sites.

The two classes of unproductive forest are: alpine forest and non-productive forest.

1.10 History

Natural and man-caused disturbances and activites in the forest are mapped and described by symbols. The basic structure of the symbol is a circle with four radii, each representing either a disturbance or treatment. The history activities, symbols and codes are outlined in Table 5.

Table 5

History activity symbols

Activity	Disturbance Symbols	Code
Logging		L
Wildfire		B
Insect	⊖	I
Disease		D
Fume kill		K
Slide		S
Flooding		F
Windthrow		W
	Site Preparation Symbols	
Mechanical		M
Broadcast burn		B
Spot burn		S
Chemical	⊕	C
Grass seeded		G
Mechanical & spot burn		MS
	Stand Tending Symbols	
Juvenile spacing		J
Mistletoe control		M
Brushing & weeding		W
Conifer release		R
Sanitation spacing	⊖	S
Pruning		P
Commercial thinning		T
Fertilization		F
	Regeneration Symbols	
Planted	⊕	P

2.0 Non-Forest Land

Land is classified as non-forest land if it cannot be considered that it will provide the greatest contribution to the social and economic welfare of the province if it is predominantly maintained under forest or range management. The various classes of non-forest land, together with their descriptive symbols, are listed and described in Table 6.

Table 6

Classes and map symbols of non-forest land

Class	Symbol	Guidelines
Alpine		- Includes non-forest land above timberline, and continuous areas of glaciers, NP Brush and snow slides.
Claybank	Claybank	
Cultivated		- Land managed for agricultural purposes,
Gravel bar	Gravel bar	
Muskeg, swamp		
Non-productive brush	NPBr	- An ecologically stable community of brush species, usually willow or slide alder, with little or no potential for conversion to productive forest land.
Non-productive burn		- Forest land removed for the long term from the productive land base because of a combination of severe burning, erosion, and adverse micro-climatic conditions.
Miscellaneous non-productive	NP	- Miscellaneous
Open range	OR	- An ecologically stable, non-forested range land, best suited for range management. Open range may include tree cover up to 10 percent by crown closure, which may be described as a forest layer.
Rock	R	
Slide		- Includes all classes of slides. Place the arrow in the direction of the slide. If the slide is part of an alpine type, the slide symbol can stand on its own; if the slide is isolated, the slide symbol must be accompanied either by the symbol R for rock or by NP Br for non-productive brush.
Urban		- Industrial sites, gravel pits, power lines, pipelines, roads, railways, mines, municipalities, etc.
Wild hay meadow	M	- Unimproved moist, low lying and usually flat grassland.

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Forest Sampling

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1.0 Sample Specifications

Table 1

Summary of recommended sample specifications by stand structure

STAND STRUCTURE	SAMPLE SPECIFICATIONS					
	Main plot Trees ≥7.5 cm d.b.h.			Small-tree Plot Trees > 0.3 m ht. and < 7.5 cm d.b.h.		Veterans
	Type of Plot	Radius (m)	Optimum No.of Trees (6 plots)	Type of Plot	Radius (m)	
A. Single Layer						
1. Simple structure	⊙	3.99				
a) Average d.b.h. < 15 cm (no vets)		to 12.62	60-80	⊙	2.52	
b) Average d.b.h. < 15 cm (+ vets)	⊙	3.99 to 12.62	60–80	⊙	2.52	Tally as tree class 5
c) Average d.b.h. > 15 cm (no vets)	≺		40–60	⊙	2.52	
d) Average d.b.h. > 15 cm (+ vets)	≺		40–60	⊙	2.52	Tally as tree class 5
2. Complex structure	≺		40-60	⊙	2.52	
B. Multi-layer						
1. Combinations						
a) Two layers: average d.b.h. for both layers < 15cm	⊙	3.99 to 12.62	60–80 20/layer	⊙	2.52	
b) Two layers: average d.b.h. for both layers > 15 cm	≺		60–80 20/layer	⊙	2.52	
c) Two layers (see note):						
– Layer 1: average d.b.h. > 15 cm	≺		20-40	⊙	2.52	
– Layer 2: average d.b.h. < 15 cm	⊙	3.99 to 12.62	40–60			

Symbols: ⊙ – fixed radius plot, ≺ – variable radius plot (prism or relaskop)
Note: An alternative for sampling B.1.c) is to select only one type of sample for both layers.

2.0 Plot Measurements

This information is obtained on all sample points:

A. Trees tallied

1. Living trees equal to or greater than 0.3 m in height.
2. Dead potential trees (standing or down): equal to or greater than 10.0 cm d.b.h. and equal to or greater than 3 m in height or length.
3. Dead useless trees (standing only): equal to or greater than 10.0 cm d.b.h. and equal to or greater than 3 m in height.

B. Information recorded

1. For all living trees equal to or greater than 7.5 cm d.b.h., record:
   a) Tree identification number
   b) Tree species
   c) d.b.h.
   d) Total height
   e) Tree class
   f) Crown class
   g) Layer
   h) Pathological indicators
   i) quality remarks
2. For all trees classed as "dead potential", record:
   a) Tree identification number
   b) Tree species
   c) d.b.h.
   d) Total height
   e) Tree class
   f) Layer
   g) Quality remarks
3. For all trees classed as "dead useless", record:
   a) Tree identification number
   b) Tree species
   c) d.b.h.
   d) Present height
   e) Tree class
   f) Layer
4. For all living trees less than 7.5 cm d.b.h. but equal to or greater then 0.3 m in height, record:
   a) Tree species
   b) d.b.h. class
   c) Height

3.0 Tree Class

The tree class code is in parentheses after the tree class (Volume 2, Forest Sampling chapter)

Residual (1)
A live tree with no external indicators of decay.

Suspect (2)
A live tree having one or more of these eight external indicators of decay:

Conk	Fork or pronounced crook
Blind conk	Scar
Mistletoe trunk infection	Rotten branch (greater than 10 cm)
Frost crack	Dead or broken top (weathered, and always pathological code 3).

Dead Potential (3)
Dead standing or down trees with greater than or equal to 50 percent merchantable volume.

Dead Useless (4)
Dead standing trees greater than or equal to 10 cm d.b.h. and greater than or equal to 3 m in height that are not tree class 3.

Veteran (5)
Live trees, at least 40 years older than those of the main stand, for example, a remnant of a former stand. Drill at least one veteran to determine a representative age.

4.0 Crown Class

The crown class code is in parentheses after the crown class.

Dominant (1)
Trees with crowns extending above the general level of the layer. They are somewhat taller than the codominant tree, and have well developed crowns, which may be somewhat crowded on the sides.

Codominant (2)
Trees with crowns forming the general level of the crown canopy. The crown is generally smaller than those of the dominant trees and is usually more crowded on the sides.

Intermediate (3)
Trees with crowns below, but still extending into, the general level of the crown canopy. The crowns are usually small and quite crowded on the sides.

Overtopped (4)
Trees with crowns entirely below the general level of the crown canopy.

5.0 Quality Remarks

Quality information is assessed for all trees tallied as tree class 1, 2, 3 or 5 equal to or greater than 5.3 m in height.

Use a Christen's hypsometer to determine quality remarks where applicable.

Spiral Grain

0 absent

1 present

Sweep and Lean

0	< 5.0°	No sweep or lean
1	5.0° - 10.0°	Minor sweep or lean
2	> 10.0°	Major sweep or lean

Logs

Logs are 5 metres long and are numbered upwards from the top of a 30-centimetre stump.

Live Limb

Enter the log number containing the base of the crown.

Stub

Enter the log number on which the first stub or first dead branch (no green needles) occurs, irrespective of diameter or length.

Knots

Visually divide the surface of the first two 5-metre logs into four panels. Assign one of the following codes:

0 - No quarters with knots (four clear quarters)

1 - Knots in one quarter (three clear quarters)

2 - Knots in two quarters (two clear quarters)

3 - Knots in three quarters (one clear quarter)

4 - Knots in four quarters (no clear quarters)

5 - Any open knot (a branch broken flush with the log surface), branch or stub estimated to be greater than 10 cm d.i.b., irrespective of the number of clear quarters.

6.0 Sample Tree Requirements

Sample trees must be carefully selected and measured to establish the average height and age for each layer recognized and for each species comprising ≥ 16 percent by composition. A minimum of eight sample trees must be measured for the leading species for each layer recognized, consisting of eight heights (2 dominants, 4 codominants, 1 intermediate, and 1 overtopped) and three ages (1 dominant and 2 codominant). For all other species < 16 percent by composition, measure three ages and heights from dominants and codominants in a ratio of 1:2 respectively. If veterans are recognized, measure the age and height of at least one representative codominant from the leading species (see Table 2).

Table 2

Minimum sample tree requirements for different stand structures

Stand Structure	Sample Tree Requirements						
	Ages		Heights				Total
	Doms.	Codoms.	Doms.	Codoms.	Interm.	Overt.	Trees
A. SINGLE LAYER	1	2	2	4	1	1	8
1. Simple Structure							
a) Single species, i.e. no other species ≥ 16% by comp.							
b) Multi species Leading species	1	2	2	4	1	1	8
Second spcies ≥ 16% by comp.	1	2	1	2			3
Third species ≥ 16% by comp.	1	1	1	2			3
Fourth species ≥ 16% by comp.	1	1	1	2			3
Fifth species ≥ 16% by comp.	1	2	1	2			3
c) For veteran layer or equivalent. Leading species	1	1					
2. Complex structure (Take sample trees from the upper 1/3 of the layer) Leading species	2	4	2	4	1	1	8
Second species ≥ 16% by comp.	1	2	1	2			3
Third species etc.	1	2	1	2			3
B. MULTI LAYER	1	2	2	4	1	1	8
1. Layer 1							
a) Single species ie. no other species ≥ 16% by comp.							
b) Multi species Leading species	1	2	2	4	1	1	8
Second species ≥ 16% by comp.	1	2	1	2			3
Third species etc.	1	1	1	2			3
2. Layer 2 (as above for layer 1)							

7.0 Site Details

7.1 Macro Site Position

Enter the code that best describes site position macro:

1	Apex	The uppermost portion of a mountain. Surface shape is often convex.
2	Face	The vertical rock wall with steep exposed bedrock.
3	Upper Slope	The generally convex upper portion of the mountain slope immediately below the apex, and if present, the face.
4	Middle Slope	The area of a mountain between the upper slope and the lower slope where the general profile of the slope is not distinctly concave or convex.
5	Lower Slope	The area toward the base of the mountain slope where the broad slope profile is generally concave.
6	Valley Floor	Lower part of the valley system, bounded on both sides by mountain ranges, and more or less horizontal in cross section. Valley floors generally have level to moderate slopes.
7	Plain	The area in which gravitational forces and confinement of water bodies by mountainous topography (difference between mountain tops and valley floors greater than 300 m) are not major factors in the processes of landscape formation. Plateaus are considered as elevated plains (Holland, 1976). Plains may occur at any elevation.

7.2 Meso Site Position

Enter the code that best describes site position meso.

1	Crest	The generally convex uppermost portion of a hill (meso scale); it is usually convex in all directions; no distinct aspect.
2	Upper Slope	The generally convex upper portion of the slope of a hill (meso scale) immediately below the crest; it has a convex surface profile with a specific aspect.
3	Middle Slope	The area of the slope of a hill between the upper and lower slopes, where the slope profile is not generally concave or convex; it has a straight or somewhat sigmoid surface profile with a specific aspect.
4	Lower Slope	The area toward the base of the slope of the hill. It generally has a concave surface profile with a specific aspect.
5	Toe	Area defined by extent of homogeneous site of slight slope; clearly demarcated by an abrupt decrease in the slope (below and adjacent to the lower slope).
6	Depression	Any area that is concave in all direction; generally at the foot of a meso scale hill or in generally level area.
7	Level	Any level meso scale area not adjacent to a meso scale hill. The surface profile is generally horizontal with no significant aspect.

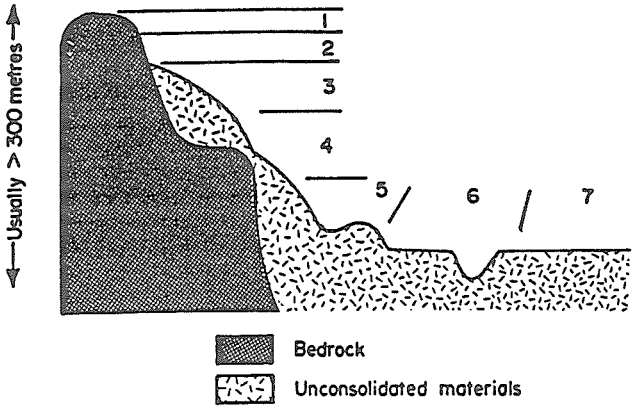


Figure 1 Description of site position macro

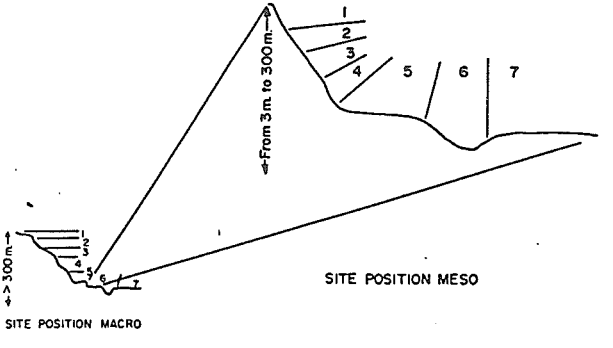


Figure 2 Description of site postion meso

7.3 Soil Texture

Soil texture is the relative proportion of various "size fractions" of a soil:

The coarse fraction consists of particles greater than 2 mm in diameter. They are estimated visually as a percentage of the whole soil (% stones + % cobbles + % gravels + fine fraction = 100 % of total soil).

The fine fraction consists of particles less than 2 mm in diameter (for non-spherical particles see Figure 3): % sand + % silt + % clay = 100 % (fine fraction).

Particles of the two size fractions are defined in Figure 3.

The relative proportion of fine fraction particles (sand, silt and clay) are estimated through the use of their unique properties of "feel". Sand can always be felt as individual grains, but silt and clay generally cannot. Dry silt feels floury and wet silt is slippery or soapy, but not sticky. Dry clay forms hard lumps, is very sticky when wet, and is plastic (like plasticene) when moist.

Most soils are a mixture of sand, silt and clay; so the graininess, slipperiness or stickiness varies depending upon how much of each particle size is present. As the amount of clay increases, soil particles bind together better, form stronger casts, and longer, stronger worms. As sand and silt increase the soil-binding strength decreases, and only weak to moderately strong casts and worms can be formed. The various classes of soil texture, defined on the textural triangle in Figure 3, are named by a combination of the dominant particle size; the term loam meaning a relatively even mix of the three.

The field determination of soil texture is subjective and can only be done consistently with training and experience. To determine texture in the field, use these field tests in sequence with the flow chart in Figure 3:

A. Graininess Test: Rub the soil between your fingers. If sand is present, it will feel "grainy". Determine whether sand comprises more or less than 50 percent of the sample.

B. Moist Cast Test: Compress some moist soil by clenching it in your hand. If the soil holds together (forms a "cast"), then test the durability of the cast by tossing it from hand to hand. The more durable it is, the more clay is present.

C. Stickiness Test: Wet the soil thoroughly and compress between thumb and forefinger. Degree of stickiness is determined by noting how strongly the soil adheres to the thumb and forefinger upon the release of pressure, and how much it stretches. Stickiness increases with clay content.

D. Worm Test: Roll some moist soil between the palms of your hands to form the longest, thinnest worm possible. The more clay there is in the soil, the longer, thinner and more durable the worm will be.

E. Taste Test: Work a small amount of soil between your front teeth. Silt particles are distinguished as fine "grittiness", unlike sand which is distinguished as individual grains (graininess). Clay has absolutely no grittiness at all.

Well decomposed organic matter (humus) imparts silt-like properties to the soil. It feels floury when dry and slippery when moist, but not sticky and not plastic. However, when subjected to the taste test, it feels non-gritty. It is generally very dark when moist or wet, and stains the hands brown or black. Humus-enriched soils often occur on wet sites in association with a heavy moss cover, and on grasslands. Humus is not used as a determinant of soil texture; an estimate of the silt content of any humus-enriched mineral soil should be reduced accordingly.

"Organic" soil samples are those that contain more than 30% organic matter. Soil texture is not determined on organic samples. Most organic soils and deep organic horizons are found on wet sites, often in depressions or on flood plains; also in association with a dense moss cover (frequently Sphagnum spp).

A description of surface soil texture usually consists of one or more of the components in Table 4.

Table 2

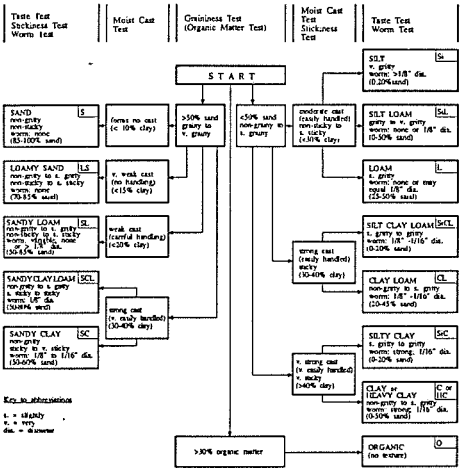
Soil texture by code, component and description

Code	Component	Description
10	Organic Material	Decomposed vegetative matter
20	Clay	< 0.005 mm
30	Silt	0.005 – 0.05 mm
40	Loam	Mixture of clay, silt, sand and organic material.
50	Sand	0.05 – 2.0 mm
60	Gravel	2.0 mm – 7.5 cm
70	Cobbles	7.5 – 25 cm
80	Stones	> 25 cm
90	Exposed bedrock	

Assess the relative volume of each component present and record the codes of the first two major components only in order of relative volume. For example, enter 63 for gravel-silt, 56 for sand-gravel, 32 for silt-clay.

Table 4

Soil texture flowchart



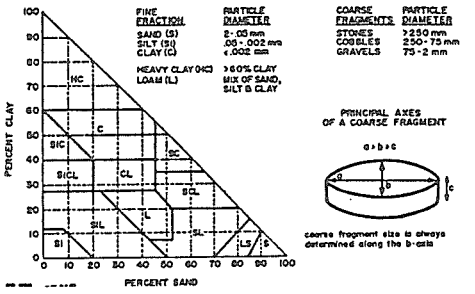


Figure 3 Soil texture key

8.0 Stem Mapping

A. Enter in degrees, Bearing of Strip_____°, and plot the strip direction through the plot centre:

B. Enter the map scale: 1 cm = _____m

C. Enter the plot size(s) used: Band width _____

Plot radius _____

D. Describe a partial disturbance (if present) that may account for an atypical crown width and stem diameter relationship (e.g., selective logging).

Record: Type _____ (record the disturbance symbol)

Year _____ (obtain from previous inventory or from date of release as indicated by age cores)

Degree _____% (enter the degree of disturbance to the nearest 10 percent)

E. Map the position of the flag (△) in relation to the plot centre. Measure the height of the flagged tree, and enter total height on the stem map record. This height will be used to check and calculate the E (error) factor for the adjustment of height measurements. The flagged tree may also be used as a sample tree if it meets sample tree standards. Refer to Appendix 9.0 for flagging procedures.

F. Describe the type of flag used, its position relative to the average crown canopy, and any other features useful for aerial identification.

G. Map the positions of ground markers.

H. Map the positions of all "in" trees in relation to the plot centre. Indicate each tree with an "X" and the tree tag number. For trees with a "major" lean indicate the direction of lean with an arrow. To aid plot orientation, plot the length and position of large dead and down trees relative to plot centre. For point samples only, record the positions of "out" trees greater than or equal to 7.5 cm d.b.h. that could be confused with an "in" tree on the photo sample. Identify their position with a solid dot, a species symbol, and a crown class code.

Example:

Pl(C) = Lodgepole pine (codominant)

9.0 Plot Flagging

Tree Flagging

A. Select a dominant or codominant tree close to plot centre and a shooting position as close to the target tree as its canopy permits. If the shooting distance from the tree is too far, the line will straddle more than the target tree (see Figure 4). This may result in flags being dislodged or damaged during high winds.

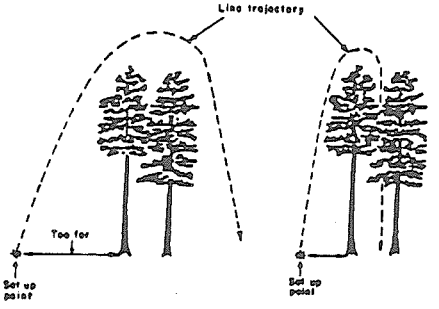


Figure 4 Setting up for tree flagging

B. If the catapult is to be used, locate, cut and trim a 1.5 to 2.5 metre sapling (outside the plot) and clamp it to the catapult angle iron. If the pocket rocket is used, unfold it and position it on the shooting forearm.

   Periodically inspect the sling and pouch assembly for wear or cuts. Replace all damaged or worn parts immediately.

C. Attach the weight to a line swivel clip which prevents line from tangling and allows quick detachment of the weight, and feed the line and the weight through the catapult or pocket rocket uprights so that the line leads away from the top of the pouch (see Figure 5).

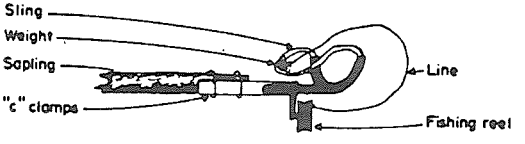


Figure 5 Slingshot assembly

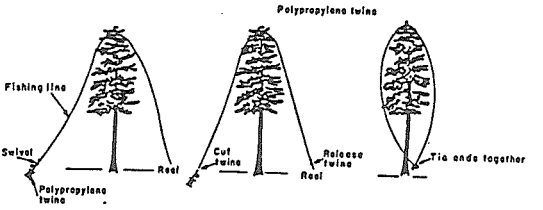
D. Place the reel in the line release position and ensure that the line will not tangle about the reel or on adjacent branches.

E. Ensure that all crew members are wearing hard hats and they are out of danger.

F. Draw back and fire the wight over the tree top and allow it to fall through the canopy to the ground. If the weight should hang up in the canopy a light tug-and-release routine will usually coax it down. However, if the weight fouls in a tree and will not fall, DO NOT try to retrieve it by heaving on the line because it may return at bullet speed. The line must be cut and a new weight and swivel attached. If a second attempt is necessary, remove the wight from the swivel and reel in the line.

G. After retrieving the wight successfully, remove it from the fishing line and attach the leading end of the polypropylene twine to the swivel clip.

H. Raise the polypropylene twine over the tree crown by reeling in the fishing line until the swivel clip reaches the reel, remove the swivel, then tie the two ends together to form a large loop (see Figure 6).



a. Finshing line over canopy

b. Polypropylene twine over canopy

c. Tieing ends to form loop

Figure 6 Stringing the line

I. Attach half the Taymore blanket to the polypropylene twine by folding the blanket into a triangle and tying the longest ends to the twine. Allow sufficient slack in the flag so any tension is taken by the twine and not by the flag (see Figure 7).

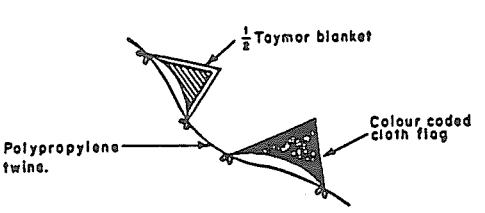


Figure 7 Attachment of flags

Raise the Taymore flag slightly and attach either the remaining half of the Taymore blanket or a colour coded cloth flag using the preceding method (see Figure 7).

J. Hoist the two flags as on a flag pole, until the first flag penetrates the tree crown and one flag is left hanging on either side of the canopy. Then bring the two polypropylene lines tightly into the tree base and secure them to a branch or the trunk (a branch is preferred as girdling will occur if tied around the trunk (see Figure 8).

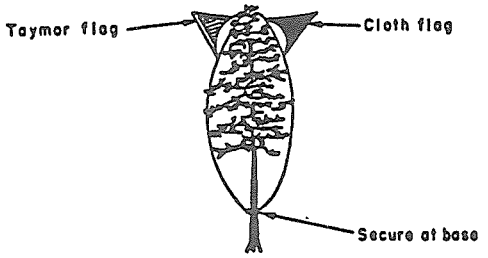


Figure 8. Positioning and securing the flags

Ground Marking

A ground flag is placed on each plot to aid the navigator in the helicopter and the stereocord operator in the identification of both plot centre and ground height. The ground flag is made from half a Taymore blanket and shaped like an arrowhead by folding under two adjacent corners of the blanket. Next, place the flag in an opening at or near plot centre with the point of the arrow aimed at the plot centre.

Weight down the blanket on all sides. Spray a 10 to 12 centimetre orange, fluorescent dot at the point of the arrowhead (if raining, a large rock or other object will suffice). Take a bearing and measure the distance from the reference dot to plot centre and record them on the compass sheet (F.S. 807(2), see Figure 9).

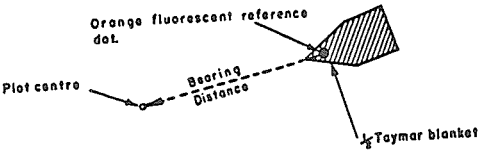


Figure 9 Ground flag

Field Handbook

Calculations and Tables

Calculations and Tables

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1.0 Calculations

List of Tables

1.0 Calculations

1.1 To determine if a tree is "in" or "out" at a Relascop or Prism Point

Data required:

- d.b.h. of tree
- Slope angle from the plot centre to the tree
- Slope distance from the plot centre to the projected centre of the tree at d.b.h.
- Basal area factor (or number of bands)

Method:

A. Determine the horizontal limiting distance (H.L.D.)

H.L.D. = D.B.H. (cm) * Plot radius factor (P.R.F.)

$$\text{P.R.F.} = \frac{0.5}{\sqrt{\text{B.A.F.}}}$$

B: Determine the horizontal distance to the tree

1. Look up the slope distance factor for the slope
2. H.D. = S.D. * Slope distance factor

Result:
The tree is "in" if the horizontal distance (H.D.) to the tree is less than the horizontal limiting distance (H.L.D.).

Example:

Tree D.B.H.	= 20.2 cm
Slope	= 55%
Slope distance	= 6.02 m
B.A.F.	= 4
H.L.D.	= D.B.H. * P.R.F. (Table 2)
	= 20.2 * .250
	= 5.05 m
H.D. to tree	= 6.02 * .876 (Table 1)
	= 5.27 m

The tree is "out" because the H.D. is greater than the H.L.D.

1.2 To determine whether a tree is "in" or "out" of a circular plot

Data required:

- Slope distance from the plot centre to the point of germination of the tree
- Plot radius
- Slope angle from the plot centre to the tree

Method:
Determine the limiting slope distance (L.S.D.)

$$\text{L.S.D.} = \frac{\text{Plot radius}}{\text{Slope distance factor *}}$$

Example:

Slope	= 53%
Plot Radius	= 5.64 m
S.D. to tree	= 5.87 m

$$\text{L.S.D.} = \frac{5.64}{.883} = 6.387$$

The tree is "in" because the S.D. is less than the L.S.D.

* Slope distance factor obtained from Table 1.

1.3 Slope distance factors

To convert slope distance (S.D.) to horizontal distance (H.D.):

$$\text{H.D.} = \text{S.D.} * \text{Slope distance factor}$$

To convert horizontal distance (H.D.) to slope distance (S.D.):

$$\text{S.D.} = \frac{\text{H.D.}}{\text{Slope distance factor}}$$

Table 1
Slope Distance Factors

% SLOPE	DISTANCE
10	0.995
11	0.994
12	0.993
13	0.992
14	0.990
15	0.989
16	0.987
17	0.986
18	0.984
19	0.982
20	0.981
21	0.979
22	0.977
23	0.975
24	0.972
25	0.970
26	0.968
27	0.965
28	0.963
29	0.960
30	0.958
31	0.955
32	0.952
33	0.950
34	0.947
35	0.944
36	0.941
37	0.938
38	0.935
39	0.932
40	0.928
41	0.925
42	0.922
43	0.919
44	0.915
45	0.912
46	0.908
47	0.905
48	0.902
49	0.898
50	0.894
51	0.891
52	0.887
53	0.884
54	0.880
55	0.876
56	0.873

% SLOPE	DISTANCE
57	0.869
58	0.865
59	0.861
60	0.857
61	0.854
62	0.850
63	0.846
64	0.842
65	0.838
66	0.835
67	0.831
68	0.827
69	0.823
70	0.819
71	0.815
72	0.812
73	0.808
74	0.804
75	0.800
76	0.796
77	0.792
78	0.789
79	0.785
80	0.781
81	0.777
82	0.773
83	0.769
84	0.766
85	0.762
86	0.758
87	0.754
88	0.751
89	0.747
90	0.743
91	0.740
92	0.736
93	0.732
94	0.729
95	0.725
96	0.721
97	0.718
98	0.714
99	0.711
100	0.707
101	0.704
102	0.700
103	0.697

% SLOPE	DISTANCE
104	0.693
105	0.690
106	0.686
107	0.683
108	0.679
109	0.676
110	0.673
111	0.669
112	0.666
113	0.663
114	0.659
115	0.656
116	0.653
117	0.650
118	0.647
119	0.643
120	0.640
121	0.637
122	0.634
123	0.631
124	0.628
125	0.625
126	0.622
127	0.619
128	0.616
129	0.613
130	0.610
131	0.607
132	0.604
133	0.601
134	0.598
135	0.595
136	0.592
137	0.590
138	0.587
139	0.584
140	0.581
141	0.578
142	0.576
143	0.573
144	0.570
145	0.568
146	0.565
147	0.562
148	0.560
149	0.557
150	0.555

$B = \cos [\arctan (A/100)]$

where A = slope in %
B = slope distance factor

Table 2

Plot radius factors (P.R.F.) for a wide-scale Relascop and for a prism

Wide-Scale Relaskop			Prism	
Number of bands	B.A.F. (m^2/ha)	Plot Radius Factor	Basal Area Factor	Plot Radius Factor
0.50	0.2500	1.000	1	0.500
0.75	0.5625	0.667	2	0.354
1.00	1.0000	0.500	3	0.289
1.25	1.5625	0.400	4	0.250
1.50	2.2500	0.333	5	0.224
1.75	3.0625	0.286	6	0.204
2.00	4.0000	0.250	7	0.189
2.50	6.2500	0.200	8	0.177
3.00	9.0000	0.167	9	0.167
3.50	12.2500	0.143	10	0.158
4.00	16.0000	0.125		
4.50	20.2500	0.111		
5.00	25.0000	0.100		

The formulae used to derive the plot radius factors in Table 4-6 are:

$$\text{Relaskop P.R.F.} = \frac{0.5}{\text{Number of bands}}$$

$$\text{Number of bands} = \sqrt{\text{B.A.F.}}$$

$$\text{Prism P.R.F.} = \frac{0.5}{\sqrt{\text{Basal area factor}}}$$

Note: Do not use less than 1.5 bands or the equivalent B.A.F. for standard inventory samples.

Table 3

Fixed-radius plot sizes

Plot Area (ha)	Plot Area (m^2)	Plot Per Hectare Factor	Plot Radius of Circular Plot (m)	
0.2000	2000	5.00	25.23	
0.1000	1000	10.00	17.84	
0.0800	800	12.50	15.96	
0.0600	600	16.67	13.82	
0.0500	500	20.00	12.62	*
0.0400	400	25.00	11.28	*
0.0300	300	33.33	9.77	*
0.0200	200	50.00	7.98	*
0.0100	100	100.00	5.64	*
0.0080	80	125.00	5.05	*
0.0050	50	200.00	3.99	*
0.0037	37	270.30	3.43	
0.0030	30	333.33	3.09	
0.0020	20	500.00	2.52	*
0.0010	10	1000.00	1.78	

* Recommended plot sizes

$$\text{Plot per hectare factor} = \frac{1}{\text{Plot (ha)}} = \frac{10{,}000}{\text{Plot area } (m^2)}$$

$$\text{Plot radius (m)} = \sqrt{\frac{\text{Plot area } (m^2)}{\pi}}$$

Table 4A

Plot Radii Limiting Slope Distances (1.78 to 7.98 m)

PLOT SIZES (HECTARES)/PLOT RADII (METRES)

% SLOPE	.001 1.78	.002 2.52	.003 3.09	.005 3.99	.008 5.05	.010 5.64	.020 7.98
10	1.79	2.53	3.11	4.01	5.08	5.67	8.02
12	1.79	2.54	3.11	4.02	5.09	5.68	8.04
14	1.80	2.54	3.12	4.03	5.10	5.70	8.06
16	1.80	2.55	3.13	4.04	5.11	5.71	8.08
18	1.81	2.56	3.14	4.05	5.13	5.73	8.11
20	1.82	2.57	3.15	4.07	5.15	5.75	8.14
22	1.82	2.58	3.16	4.09	5.17	5.77	8.17
24	1.83	2.59	3.18	4.10	5.19	5.80	8.21
26	1.84	2.60	3.19	4.12	5.22	5.83	8.25
28	1.85	2.62	3.21	4.14	5.24	5.86	8.29
30	1.86	2.63	3.23	4.17	5.27	5.89	8.33
32	1.87	2.65	3.24	4.19	5.30	5.92	8.38
34	1.88	2.66	3.26	4.21	5.33	5.96	8.43
36	1.89	2.68	3.28	4.24	5.37	5.99	8.48
38	1.90	2.70	3.31	4.27	5.40	6.03	8.54
40	1.92	2.71	3.33	4.30	5.44	6.07	8.59
42	1.93	2.73	3.35	4.33	5.48	6.12	8.66
44	1.94	2.75	3.38	4.36	5.52	6.16	8.72
46	1.96	2.77	3.40	4.39	5.56	6.21	8.78
48	1.97	2.80	3.43	4.43	5.60	6.26	8.85
50	1.99	2.82	3.45	4.46	5.65	6.31	8.92
52	2.01	2.84	3.48	4.50	5.69	6.36	8.99
54	2.02	2.86	3.51	4.53	5.74	6.41	9.07
56	2.04	2.89	3.54	4.57	5.79	6.46	9.15
58	2.06	2.91	3.57	4.61	5.84	6.52	9.23
60	2.08	2.94	3.60	4.65	5.89	6.58	9.31
62	2.09	2.97	3.64	4.69	5.94	6.64	9.39
64	2.11	2.99	3.67	4.74	6.00	6.70	9.47
66	2.13	3.02	3.70	4.78	6.05	6.76	9.56
68	2.15	3.05	3.74	4.83	6.11	6.82	9.65
70	2.17	3.08	3.77	4.87	6.16	6.88	9.74
72	2.19	3.11	3.81	4.92	6.22	6.95	9.83
74	2.21	3.13	3.84	4.96	6.28	7.02	9.93
76	2.24	3.17	3.88	5.01	6.34	7.08	10.02
78	2.26	3.20	3.92	5.06	6.40	7.15	10.12
80	2.28	3.23	3.96	5.11	6.47	7.22	10.22
82	2.30	3.26	4.00	5.16	6.53	7.29	10.32
84	2.32	3.29	4.04	5.21	6.60	7.37	10.42
86	2.35	3.32	4.08	5.26	6.66	7.44	10.53
88	2.37	3.36	4.12	5.31	6.73	7.51	10.63
90	2.39	3.39	4.16	5.37	6.79	7.59	10.74
92	2.42	3.42	4.20	5.42	6.86	7.66	10.84
94	2.44	3.46	4.24	5.48	6.93	7.74	10.95
96	2.47	3.49	4.28	5.53	7.00	7.82	11.06
98	2.49	3.53	4.33	5.59	7.07	7.90	11.17
100	2.52	3.56	4.37	5.64	7.14	7.98	11.29
102	2.54	3.60	4.41	5.70	7.21	8.06	11.40
104	2.57	3.64	4.46	5.76	7.29	8.14	11.51
106	2.59	3.67	4.50	5.81	7.36	8.22	11.63
108	2.62	3.71	4.55	5.87	7.43	8.30	11.75
110	2.65	3.75	4.59	5.93	7.51	8.38	11.86
112	2.67	3.78	4.64	5.99	7.58	8.47	11.98
114	2.70	3.82	4.69	6.05	7.66	8.55	12.10
116	2.73	3.86	4.73	6.11	7.73	8.64	12.22
118	2.75	3.90	4.78	6.17	7.81	8.72	12.34
120	2.78	3.94	4.83	6.23	7.89	8.81	12.47
122	2.81	3.98	4.87	6.29	7.97	8.90	12.59
124	2.84	4.01	4.92	6.36	8.04	8.98	12.71
126	2.86	4.05	4.97	6.42	8.12	9.07	12.84
128	2.89	4.09	5.02	6.48	8.20	9.16	12.96
130	2.92	4.13	5.07	6.54	8.28	9.25	13.09
132	2.95	4.17	5.12	6.61	8.36	9.34	13.22
134	2.98	4.21	5.17	6.67	8.44	9.43	13.34
136	3.00	4.25	5.22	6.74	8.52	9.52	13.47
138	3.03	4.29	5.27	6.80	8.61	9.61	13.60
140	3.06	4.34	5.32	6.86	8.69	9.70	13.73

Table 4B

Plot Radii Limiting Slope Distances (9.77 to 25.23 m)

PLOT SIZES (HECTARES)/PLOT RADII (METRES)

% SLOPE	0.03 9.77	0.04 11.28	0.05 12.62	0.06 13.82	0.08 15.96	0.10 17.84	0.20 25.23
10	9.82	11.34	12.68	13.89	16.04	17.93	25.36
12	9.84	11.36	12.71	13.92	16.07	17.97	25.41
14	9.87	11.39	12.74	13.95	16.12	18.01	25.48
16	9.89	11.42	12.78	14.00	16.16	18.07	25.55
18	9.93	11.46	12.82	14.04	16.22	18.13	25.64
20	9.96	11.50	12.87	14.09	16.28	18.19	25.73
22	10.00	11.55	12.92	14.15	16.34	18.27	25.83
24	10.05	11.60	12.98	14.21	16.41	18.35	25.95
26	10.09	11.66	13.04	14.28	16.49	18.43	26.07
28	10.15	11.71	13.11	14.35	16.57	18.53	26.20
30	10.20	11.78	13.18	14.43	16.66	18.63	26.34
32	10.26	11.84	13.25	14.51	16.76	18.73	26.49
34	10.32	11.91	13.33	14.60	16.86	18.84	26.65
36	10.38	11.99	13.41	14.69	16.96	18.96	26.82
38	10.45	12.07	13.50	14.78	17.07	19.08	26.99
40	10.52	12.15	13.59	14.88	17.19	19.21	27.17
42	10.60	12.23	13.69	14.99	17.31	19.35	27.36
44	10.67	12.32	13.79	15.10	17.44	19.49	27.56
46	10.75	12.42	13.89	15.21	17.57	19.64	27.77
48	10.84	12.51	14.00	15.33	17.70	19.79	27.99
50	10.92	12.61	14.11	15.45	17.84	19.95	28.21
52	11.01	12.71	14.22	15.58	17.99	20.11	28.44
54	11.10	12.82	14.34	15.71	18.14	20.27	28.67
56	11.20	12.93	14.46	15.84	18.29	20.45	28.92
58	11.29	13.04	14.59	15.98	18.45	20.62	29.17
60	11.39	13.15	14.72	16.12	18.61	20.80	29.42
62	11.50	13.27	14.85	16.26	18.78	20.99	29.69
64	11.60	13.39	14.98	16.41	18.95	21.18	29.95
66	11.71	13.52	15.12	16.56	19.12	21.38	30.23
68	11.81	13.64	15.26	16.71	19.30	21.57	30.51
70	11.93	13.77	15.40	16.87	19.48	21.78	30.80
72	12.04	13.90	15.55	17.03	19.67	21.98	31.09
74	12.15	14.03	15.70	17.19	19.85	22.19	31.39
76	12.27	14.17	15.85	17.36	20.05	22.41	31.69
78	12.39	14.31	16.01	17.53	20.24	22.63	32.00
80	12.51	14.45	16.16	17.70	20.44	22.85	32.31
82	12.63	14.59	16.32	17.87	20.64	23.07	32.63
84	12.76	14.73	16.48	18.05	20.84	23.30	32.95
86	12.89	14.88	16.65	18.23	21.05	23.53	33.28
88	13.01	15.03	16.81	18.41	21.26	23.76	33.61
90	13.14	15.18	16.98	18.59	21.47	24.00	33.94
92	13.28	15.33	17.15	18.78	21.69	24.24	34.28
94	13.41	15.48	17.32	18.97	21.90	24.48	34.63
96	13.54	15.64	17.49	19.16	22.12	24.73	34.97
98	13.68	15.79	17.67	19.35	22.35	24.98	35.33
100	13.82	15.95	17.85	19.54	22.57	25.23	35.68
102	13.96	16.11	18.03	19.74	22.80	25.48	36.04
104	14.10	16.27	18.21	19.94	23.03	25.74	36.40
106	14.24	16.44	18.39	20.14	23.26	26.00	36.77
108	14.38	16.60	18.57	20.34	23.49	26.26	37.14
110	14.52	16.77	18.76	20.54	23.73	26.52	37.51
112	14.67	16.94	18.95	20.75	23.96	26.79	37.88
114	14.82	17.11	19.14	20.96	24.20	27.05	38.26
116	14.96	17.28	19.33	21.17	24.44	27.32	38.64
118	15.11	17.45	19.52	21.38	24.69	27.59	39.02
120	15.26	17.62	19.71	21.59	24.93	27.87	39.41
122	15.41	17.79	19.91	21.80	25.18	28.14	39.80
124	15.56	17.97	20.10	22.02	25.42	28.42	40.19
126	15.72	18.15	20.30	22.23	25.67	28.70	40.59
128	15.87	18.32	20.50	22.45	25.92	28.98	40.98
130	16.02	18.50	20.70	22.67	26.18	29.26	41.38
132	16.18	18.68	20.90	22.89	26.43	29.54	41.78
134	16.34	18.86	21.10	23.11	26.69	29.83	42.18
136	16.49	19.04	21.30	23.33	26.94	30.12	42.59
138	16.65	19.22	21.51	23.55	27.20	30.40	43.00
140	16.81	19.41	21.71	23.78	27.46	30.69	43.41

Table 5A

Horizontal limiting distance table for the wide-scale relascope

1.00 Band (B.A.F. = 1.0000)

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	.80
7	3.50	3.60	3.70	3.80	3.90
8	4.00	4.10	4.20	4.30	4.40
9	4.50	4.60	4.70	4.80	4.90
10	5.00	5.10	5.20	5.30	5.40
11	5.50	5.60	5.70	5.80	5.90
12	6.00	6.10	6.20	6.30	6.40
13	6.50	6.60	6.70	6.80	6.90
14	7.00	7.10	7.20	7.30	7.40
15	7.50	7.60	7.70	7.80	7.90
16	8.00	8.10	8.20	8.30	8.40
17	8.50	8.60	8.70	8.80	8.90
18	9.00	9.10	9.20	9.30	9.40
19	9.50	9.60	9.70	9.80	9.90
20	10.00	10.10	10.20	10.30	10.40
21	10.50	10.60	10.70	10.80	10.90
22	11.00	11.10	11.20	11.30	11.40
23	11.50	11.60	11.70	11.80	11.90
24	12.00	12.10	12.20	12.30	12.40
25	12.50	12.60	12.70	12.80	12.90
26	13.00	13.10	13.20	13.30	13.40
27	13.50	13.60	13.70	13.80	13.90
28	14.00	14.10	14.20	14.30	14.40
29	14.50	14.60	14.70	14.80	14.90
30	15.00	15.10	15.20	15.30	15.40
31	15.50	15.60	15.70	15.80	15.90
32	16.00	16.10	16.20	16.30	16.40
33	16.50	16.60	16.70	16.80	16.90
34	17.00	17.10	17.20	17.30	17.40
35	17.50	17.60	17.70	17.80	17.90
36	18.00	18.10	18.20	18.30	18.40
37	18.50	18.60	18.70	18.80	18.90
38	19.00	19.10	19.20	19.30	19.40
39	19.50	19.60	19.70	19.80	19.90
40	20.00	20.10	20.20	20.30	20.40
41	20.50	20.60	20.70	20.80	20.90
42	21.00	21.10	21.20	21.30	21.40
43	21.50	21.60	21.70	21.80	21.90
44	22.00	22.10	22.20	22.30	22.40
45	22.50	22.60	22.70	22.80	22.90
46	23.00	23.10	23.20	23.30	23.40
47	23.50	23.60	23.70	23.80	23.90
48	24.00	24.10	24.20	24.30	24.40
49	24.50	24.60	24.70	24.80	24.90
50	25.00	25.10	25.20	25.30	25.40
51	25.50	25.60	25.70	25.80	25.90
52	26.00	26.10	26.20	26.30	26.40
53	26.50	26.60	26.70	26.80	26.90
54	27.00	27.10	27.20	27.30	27.40
55	27.50	27.60	27.70	27.80	27.90
56	28.00	28.10	28.20	28.30	28.40
57	28.50	28.60	28.70	28.80	28.90
58	29.00	29.10	29.20	29.30	29.40
59	29.50	29.60	29.70	29.80	29.90
60	30.00	30.10	30.20	30.30	30.40
61	30.50	30.60	30.70	30.80	30.90
62	31.00	31.10	31.20	31.30	31.40
63	31.50	31.60	31.70	31.80	31.90

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	.80
64	32.00	32.10	32.20	32.30	32.40
65	32.50	32.60	32.70	32.80	32.90
66	33.00	33.10	33.20	33.30	33.40
67	33.50	33.60	33.70	33.80	33.90
68	34.00	34.10	34.20	34.30	34.40
69	34.50	34.60	34.70	34.80	34.90
70	35.00	35.10	35.20	35.30	35.40
71	35.50	35.60	35.70	35.80	35.90
72	36.00	36.10	36.20	36.30	36.40
73	36.50	36.60	36.70	36.80	36.90
74	37.00	37.10	37.20	37.30	37.40
75	37.50	37.60	37.70	37.80	37.90
76	38.00	38.10	38.20	38.30	38.40
77	38.50	38.60	38.70	38.80	38.90
78	39.00	39.10	39.20	39.30	39.40
79	39.50	39.60	39.70	39.80	39.90
80	40.00	40.10	40.20	40.30	40.40
81	40.50	40.60	40.70	40.80	40.90
82	41.00	41.10	41.20	41.30	41.40
83	41.50	41.60	41.70	41.80	41.90
84	42.00	42.10	42.20	42.30	42.40
85	42.50	42.60	42.70	42.80	42.90
86	43.00	43.10	43.20	43.30	43.40
87	43.50	43.60	43.70	43.80	43.90
88	44.00	44.10	44.20	44.30	44.40
89	44.50	44.60	44.70	44.80	44.90
90	45.00	45.10	45.20	45.30	45.40
91	45.50	45.60	45.70	45.80	45.90
92	46.00	46.10	46.20	46.30	46.40
93	46.50	46.60	46.70	46.80	46.90
94	47.00	47.10	47.20	47.30	47.40
95	47.50	47.60	47.70	47.80	47.90
96	48.00	48.10	48.20	48.30	48.40
97	48.50	48.60	48.70	48.80	48.90
98	49.00	49.10	49.20	49.30	49.40
99	49.50	49.60	49.70	49.80	49.90
100	50.00	50.10	50.20	50.30	50.40
101	50.50	50.60	50.70	50.80	50.90
102	51.00	51.10	51.20	51.30	51.40
103	51.50	51.60	51.70	51.80	51.90
104	52.00	52.10	52.20	52.30	52.40
105	52.50	52.60	52.70	52.80	52.90
106	53.00	53.10	53.20	53.30	53.40
107	53.50	53.60	53.70	53.80	53.90
108	54.00	54.10	54.20	54.30	54.40
109	54.50	54.60	54.70	54.80	54.90
110	55.00	55.10	55.20	55.30	55.40
111	55.50	55.60	55.70	55.80	55.90
112	56.00	56.10	56.20	56.30	56.40
113	56.50	56.60	56.70	56.80	56.90
114	57.00	57.10	57.20	57.30	57.40
115	57.50	57.60	57.70	57.80	57.90
116	58.00	58.10	58.20	58.30	58.40
117	58.50	58.60	58.70	58.80	58.90
118	59.00	59.10	59.20	59.30	59.40
119	59.50	59.60	59.70	59.80	59.90
120	60.00	60.10	60.20	60.30	60.40

Table 5B

Horizontal limiting distance table for the wide-scale relascope

1.25 Band (B.A.F. = 1.5625)

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	.80
7	2.80	2.88	2.96	3.04	3.12
8	3.20	3.28	3.36	3.44	3.52
9	3.60	3.68	3.76	3.84	3.92
10	4.00	4.08	4.16	4.24	4.32
11	4.40	4.48	4.56	4.64	4.72
12	4.80	4.88	4.96	5.04	5.12
13	5.20	5.28	5.36	5.44	5.52
14	5.60	5.68	5.76	5.84	5.92
15	6.00	6.08	6.16	6.24	6.32
16	6.40	6.48	6.56	6.64	6.72
17	6.80	6.88	6.96	7.04	7.12
18	7.20	7.28	7.36	7.44	7.52
19	7.60	7.68	7.76	7.84	7.92
20	8.00	8.08	8.16	8.24	8.32
21	8.40	8.48	8.56	8.64	8.72
22	8.80	8.88	8.96	9.04	9.12
23	9.20	9.28	9.36	9.44	9.52
24	9.60	9.68	9.76	9.84	9.92
25	10.00	10.08	10.16	10.24	10.32
26	10.40	10.48	10.56	10.64	10.72
27	10.80	10.88	10.96	11.04	11.12
28	11.20	11.28	11.36	11.44	11.52
29	11.60	11.68	11.76	11.84	11.92
30	12.00	12.08	12.16	12.24	12.32
31	12.40	12.48	12.56	12.64	12.72
32	12.80	12.88	12.96	13.04	13.12
33	13.20	13.28	13.36	13.44	13.52
34	13.60	13.68	13.76	13.84	13.92
35	14.00	14.08	14.16	14.24	14.32
36	14.40	14.48	14.56	14.64	14.72
37	14.80	14.88	14.96	15.04	15.12
38	15.20	15.28	15.36	15.44	15.52
39	15.60	15.68	15.76	15.84	15.92
40	16.00	16.08	16.16	16.24	16.32
41	16.40	16.48	16.56	16.64	16.72
42	16.80	16.88	16.96	17.04	17.12
43	17.20	17.28	17.36	17.44	17.52
44	17.60	17.68	17.76	17.84	17.92
45	18.00	18.08	18.16	18.24	18.32
46	18.40	18.48	18.56	18.64	18.72
47	18.80	18.88	18.96	19.04	19.12
48	19.20	19.28	19.36	19.44	19.52
49	19.60	19.68	19.76	19.84	19.92
50	20.00	20.08	20.16	20.24	20.32
51	20.40	20.48	20.56	20.64	20.72
52	20.80	20.88	20.96	21.04	21.12
53	21.20	21.28	21.36	21.44	21.52
54	21.60	21.68	21.76	21.84	21.92
55	22.00	22.08	22.16	22.24	22.32
56	22.40	22.48	22.56	22.64	22.72
57	22.80	22.88	22.96	23.04	23.12
58	23.20	23.28	23.36	23.44	23.52
59	23.60	23.68	23.76	23.84	23.92
60	24.00	24.08	24.16	24.24	24.32
61	24.40	24.48	24.56	24.64	24.72
62	24.80	24.88	24.96	25.04	25.12
63	25.20	25.28	25.36	25.44	25.52

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	80
64	25.60	25.68	25.76	25.84	25.92
65	26.00	26.08	26.16	26.24	26.32
66	26.40	26.48	26.56	26.64	26.72
67	26.80	26.88	26.96	27.04	27.12
68	27.20	27.28	27.36	27.44	27.52
69	27.60	27.68	27.76	27.84	27.92
70	28.00	28.08	28.16	28.24	28.32
71	28.40	28.48	28.56	28.64	28.72
72	28.80	28.88	28.96	29.04	29.12
73	29.20	29.28	29.36	29.44	29.52
74	29.60	29.68	29.76	29.84	29.92
75	30.00	30.08	30.16	30.24	30.32
76	30.40	30.48	30.56	30.64	30.72
77	30.80	30.88	30.96	31.04	31.12
78	31.20	31.28	31.36	31.44	31.52
79	31.60	31.68	31.76	31.84	31.92
80	32.00	32.08	32.16	32.24	32.32
81	32.40	32.48	32.56	32.64	32.72
82	32.80	32.88	32.96	33.04	33.12
83	33.20	33.28	33.36	33.44	33.52
84	33.60	33.68	33.76	33.84	33.92
85	34.00	34.08	34.16	34.24	34.32
86	34.40	34.48	34.56	34.64	34.72
87	34.80	34.88	34.96	35.04	35.12
88	35.20	35.28	35.36	35.44	35.52
89	35.60	35.68	35.76	35.84	35.92
90	36.00	36.08	36.16	36.24	36.32
91	36.40	36.48	36.56	36.64	36.72
92	36.80	36.88	36.96	37.04	37.12
93	37.20	37.28	37.36	37.44	37.52
94	37.60	37.68	37.76	37.84	37.92
95	38.00	38.08	38.16	38.24	38.32
96	38.40	38.48	38.56	38.64	38.72
97	38.80	38.88	38.96	39.04	39.12
98	39.20	39.28	39.36	39.44	39.52
99	39.60	39.68	39.76	39.84	39.92
100	40.00	40.08	40.16	40.24	40.32
101	40.40	40.48	40.56	40.64	40.72
102	40.80	40.88	40.96	41.04	41.12
103	41.20	41.28	41.36	41.44	41.52
104	41.60	41.68	41.76	41.84	41.92
105	42.00	42.08	42.16	42.24	42.32
106	42.40	42.48	42.56	42.64	42.72
107	42.80	42.88	42.96	43.04	43.12
108	43.20	43.28	43.36	43.44	43.52
109	43.60	43.68	43.76	43.84	43.92
110	44.00	44.08	44.16	44.24	44.32
111	44.40	44.48	44.56	44.64	44.72
112	44.80	44.88	44.96	45.04	45.12
113	45.20	45.28	45.36	45.44	45.52
114	45.60	45.68	45.76	45.84	45 92
115	46.00	46.08	46.16	46.24	46.32
116	46.40	46.48	46.56	46.64	46.72
117	46.80	46.88	46.96	47.04	47.12
118	47.20	47.28	47.36	47.44	47.52
119	47.60	47.68	47.76	47.84	47.92
120	48.00	48.08	48.16	48.24	48.32

Table 5C

Horizontal limiting distance table for the wide-scale relascope

1.50 Band (B.A.F. = 2.2500)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	2.33	2.40	2.47	2.53	2.60
8	2.67	2.73	2.80	2.87	2.93
9	3.00	3.07	3.13	3.20	3.27
10	3.33	3.40	3.47	3.53	3.60
11	3.67	3.73	3.80	3.87	3.93
12	4.00	4.07	4.13	4.20	4.27
13	4.33	4.40	4.47	4.53	4.60
14	4.67	4.73	4.80	4.87	4.93
15	5.00	5.07	5.13	5.20	5.27
16	5.33	5.40	5.47	5.53	5.60
17	5.67	5.73	5.80	5.87	5.93
18	6.00	6.07	6.13	6.20	6.27
19	6.33	6.40	6.47	6.53	6.60
20	6.67	6.73	6.80	6.87	6.93
21	7.00	7.07	7.13	7.20	7.27
22	7.33	7.40	7.47	7.53	7.60
23	7.67	7.73	7.80	7.87	7.93
24	8.00	8.07	8.13	8.20	8.27
25	8.33	8.40	8.47	8.53	8.60
26	8.67	8.73	8.80	8.87	8.93
27	9.00	9.07	9.13	9.20	9.27
28	9.33	9.40	9.47	9.53	9.60
29	9.67	9.73	9.80	9.87	9.93
30	10.00	10.07	10.13	10.20	10.27
31	10.33	10.40	10.47	10.53	10.60
32	10.67	10.73	10.80	10.87	10.93
33	11.00	11.07	11.13	11.20	11.27
34	11.33	11.40	11.47	11.53	11.60
35	11.67	11.73	11.80	11.87	11.93
36	12.00	12.07	12.13	12.20	12.27
37	12.33	12.40	12.47	12.53	12.60
38	12.67	12.73	12.80	12.87	12.93
39	13.00	13.07	13.13	13.20	13.27
40	13.33	13.40	13.47	13.53	13.60
41	13.67	13.73	13.80	13.87	13.93
42	14.00	14.07	14.13	14.20	14.27
43	14.33	14.40	14.47	14.53	14.60
44	14.67	14.73	14.80	14.87	14.93
45	15.00	15.07	15.13	15.20	15.27
46	15.33	15.40	15.47	15.53	15.60
47	15.67	15.73	15.80	15.87	15.93
48	16.00	16.07	16.13	16.20	16.27
49	16.33	16.40	16.47	16.53	16.60
50	16.67	16.73	16.80	16.87	16.93
51	17.00	17.07	17.13	17.20	17.27
52	17.33	17.40	17.47	17.53	17.60
53	17.67	17.73	17.80	17.87	17.93
54	18.00	18.07	18.13	18.20	18.27
55	18.33	18.40	18.47	18.53	18.60
56	18.67	18.73	18.80	18.87	18.93
57	19.00	19.07	19.13	19.20	19.27
58	19.33	19.40	19.47	19.53	19.60
59	19.67	19.73	19.80	19.87	19.93
60	20.00	20.07	20.13	20.20	20.27
61	20.33	20.40	20.47	20.53	20.60
62	20.67	20.73	20.80	20.87	20.93
63	21.00	21.07	21.13	21.20	21.27

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	21.33	21.40	21.47	21.53	21.60
65	21.67	21.73	21.80	21.87	21.93
66	22.00	22.07	22.13	22.20	22.27
67	22.33	22.40	22.47	22.53	22.60
68	22.67	22.73	22.80	22.87	22.93
69	23.00	23.07	23.13	23.20	23.27
70	23.33	23.40	23.47	23.53	23.60
71	23.67	23.73	23.80	23.87	23.93
72	24.00	24.07	24.13	24.20	24.27
73	24.33	24.40	24.47	24.53	24.60
74	24.67	24.73	24.80	24.87	24.93
75	25.00	25.07	25.13	25.20	25.27
76	25.33	25.40	25.47	25.53	25.60
77	25.67	25.73	25.80	25.87	25.93
78	26.00	26.07	26.13	26.20	26.27
79	26.33	26.40	26.47	26.53	26.60
80	26.67	26.73	26.80	26.87	26.93
81	27.00	27.07	27.13	27.20	27.27
82	27.33	27.40	27.47	27.53	27.60
83	27.67	27.73	27.80	27.87	27.93
84	28.00	28.07	28.13	28.20	28.27
85	28.33	28.40	28.47	28.53	28.60
86	28.67	28.73	28.80	28.87	28.93
87	29.00	29.07	29.13	29.20	29.27
88	29.33	29.40	29.47	29.53	29.60
89	29.67	29.73	29.80	29.87	29.93
90	30.00	30.07	30.13	30.20	30.27
91	30.33	30.40	30.47	30.53	30.60
92	30.67	30.73	30.80	30.87	30.93
93	31.00	31.07	31.13	31.20	31.27
94	31.33	31.40	31.47	31.53	31.60
95	31.67	31.73	31.80	31.87	31.93
96	32.00	32.07	32.13	32.20	32.27
97	32.33	32.40	32.47	32.53	32.60
98	32.67	32.73	32.80	32.87	32.93
99	33.00	33.07	33.13	33.20	33.27
100	33.33	33.40	33.47	33.53	33.60
101	33.67	33.73	33.80	33.87	33.93
102	34.00	34.07	34.13	34.20	34.27
103	34.33	34.40	34.47	34.53	34.60
104	34.67	34.73	34.80	34.87	34.93
105	35.00	35.07	35.13	35.20	35.27
106	35.33	35.40	35.47	35.53	35.60
107	35.67	35.73	35.80	35.87	35.93
108	36.00	36.07	36.13	36.20	36.27
109	36.33	36.40	36.47	36.53	36.60
110	36.67	36.73	36.80	36.87	36.93
111	37.00	37.07	37.13	37.20	37.27
112	37.33	37.40	37.47	37.53	37.60
113	37.67	37.73	37.80	37.87	37.93
114	38.00	38.07	38.13	38.20	38.27
115	38.33	38.40	38.47	38.53	38.60
116	38.67	38.73	38.80	38.87	38.93
117	39.00	39.07	39.13	39.20	39.27
118	39.33	39.40	39.47	39.53	39.60
119	39.67	39.73	39.80	39.87	39.93
120	40.00	40.07	40.13	40.20	40.27

Table 5D

Horizontal limiting distance table for the wide-scale relascope

1.75 Band (B.A.F. = 3.0625)

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	.80
7	2.00	2.06	2.11	2.17	2.23
8	2.29	2.34	2.40	2.46	2.51
9	2.57	2.63	2.69	2.74	2.80
10	2.86	2.91	2.97	3.03	3.09
11	3.14	3.20	3.26	3.31	3.37
12	3.43	3.49	3.54	3.60	3.66
13	3.71	3.77	3.83	3.89	3.94
14	4.00	4.06	4.11	4.17	4.23
15	4.29	4.34	4.40	4.46	4.51
16	4.57	4.63	4.69	4.74	4.80
17	4.86	4.91	4.97	5.03	5.09
18	5.14	5.20	5.26	5.31	5.37
19	5.43	5.49	5.54	5.60	5.66
20	5.71	5.77	5.83	5.89	5.94
21	6.00	6.06	6.11	6.17	6.23
22	6.29	6.34	6.40	6.46	6.51
23	6.57	6.63	6.69	6.74	6.80
24	6.86	6.91	6.97	7.03	7.09
25	7.14	7.20	7.26	7.31	7.37
26	7.43	7.49	7.54	7.60	7.66
27	7.71	7.77	7.83	7.89	7.94
28	8.00	8.06	8.11	8.17	8.23
29	8.29	8.34	8.40	8.46	8.51
30	8.57	8.63	8.69	8.74	8.80
31	8.86	8.91	8.97	9.03	9.09
32	9.14	9.20	9.26	9.31	9.37
33	9.43	9.49	9.54	9.60	9.66
34	9.71	9.77	9.83	9.89	9.94
35	10.00	10.06	10.11	10.17	10.23
36	10.29	10.34	10.40	10.46	10.51
37	10.57	10.63	10.69	10.74	10.80
38	10.86	10.91	10.97	11.03	11.09
39	11.14	11.20	11.26	11.31	11.37
40	11.43	11.49	11.54	11.60	11.66
41	11.71	11.77	11.83	11.89	11.94
42	12.00	12.06	12.11	12.17	12.23
43	12.29	12.34	12.40	12.46	12.51
44	12.57	12.63	12.69	12.74	12.80
45	12.86	12.91	12.97	13.03	13.09
46	13.14	13.20	13.26	13.31	13.37
47	13.43	13.49	13.54	13.60	13.66
48	13.71	13.77	13.83	13.89	13.94
49	14.00	14.06	14.11	14.17	14.23
50	14.29	14.34	14.40	14.46	14.51
51	14.57	14.63	14.69	14.74	14.80
52	14.86	14.91	14.97	15.03	15.09
53	15.14	15.20	15.26	15.31	15.37
54	15.43	15.49	15.54	15.60	15.66
55	15.71	15.77	15.83	15.89	15.94
56	16.00	16.06	16.11	16.17	16.23
57	16.29	16.34	16.40	16.46	16.51
58	16.57	16.63	16.69	16.74	16.80
59	16.86	16.91	16.97	17.03	17.09
60	17.14	17.20	17.26	17.31	17.37
61	17.43	17.49	17.54	17.60	17.66
62	17.71	17.77	17.83	17.89	17.94
63	18.00	18.06	18.11	18.17	18.23

d.b.h.	Diameter (cm)				
(cm)	.00	.20	.40	.60	.80
64	18.29	18.34	18.40	18.46	18.51
65	18.57	18.63	18.69	18.74	18.80
66	18.86	18.91	18.97	19.03	19.09
67	19.14	19.20	19.26	19.31	19.37
68	19.43	19.49	19.54	19.60	19.66
69	19.71	19.77	19.83	19.89	19.94
70	20.00	20.06	20.11	20.17	20.23
71	20.29	20.34	20.40	20.46	20.51
72	20.57	20.63	20.69	20.74	20.80
73	20.86	20.91	20.97	21.03	21.09
74	21.14	21.20	21.26	21.31	21.37
75	21.43	21.49	21.54	21.60	21.66
76	21.71	21.77	21.83	21.89	21.94
77	22.00	22.06	22.11	22.17	22.23
78	22.29	22.34	22.40	22.46	22.51
79	22.57	22.63	22.69	22.74	22.80
80	22.86	22.91	22.97	23.03	23.09
81	23.14	23.20	23.26	23.31	23.37
82	23.43	23.49	23.54	23.60	23.66
83	23.71	23.77	23.83	23.89	23.94
84	24.00	24.06	24.11	24.17	24.23
85	24.29	24.34	24.40	24.46	24.51
86	24.57	24.63	24.69	24.74	24.80
87	24.86	24.91	24.97	25.03	25.09
88	25.14	25.20	25.26	25.31	25.37
89	25.43	25.49	25.54	25.60	25.66
90	25.71	25.77	25.83	25.89	25.94
91	26.00	26.06	26.11	26.17	26.23
92	26.29	26.34	26.40	26.46	26.51
93	26.57	26.63	26.69	26.74	26.80
94	26.86	26.91	26.97	27.03	27.09
95	27.14	27.20	27.26	27.31	27.37
96	27.43	27.49	27.54	27.60	27.66
97	27.71	27.77	27.83	27.89	27.94
98	28.00	28.06	28.11	28.17	28.23
99	28.29	28.34	28.40	28.46	28.51
100	28.57	28.63	28.69	28.74	28.80
101	28.86	28.91	28.97	29.03	29.09
102	29.14	29.20	29.26	29.31	29.37
103	29.43	29.49	29.54	29.60	29.66
104	29.71	29.77	29.83	29.89	29.94
105	30.00	30.06	30.11	30.17	30.23
106	30.29	30.34	30.40	30.46	30.51
107	30.57	30.63	30.69	30.74	30.80
108	30.86	30.91	30.97	31.03	31.09
109	31.14	31.20	31.26	31.31	31.37
110	31.43	31.49	31.54	31.60	31.66
111	31.71	31.77	31.83	31.89	31.94
112	32.00	32.06	32.11	32.17	32.23
113	32.29	32.34	32.40	32.46	32.51
114	32.57	32.63	32.69	32.74	32.80
115	32.86	32.91	32.97	33.03	33.09
116	33.14	33.20	33.26	33.31	33.37
117	33.43	33.49	33.54	33.60	33.66
118	33.71	33.77	33.83	33.89	33.94
119	34.00	34.06	34.11	34.17	34.23
120	34.29	34.34	34.40	34.46	34.51

Table 5E

Horizontal limiting distance table for the wide–scale relascope

2.00 Band (B.A.F. = 4.0000)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	1.75	1.80	1.85	1.90	1.95
8	2.00	2.05	2.10	2.15	2.20
9	2.25	2.30	2.35	2.40	2.45
10	2.50	2.55	2.60	2.65	2.70
11	2.75	2.80	2.85	2.90	2.95
12	3.00	3.05	3.10	3.15	3.20
13	3.25	3.30	3.35	3.40	3.45
14	3.50	3.55	3.60	3.65	3.70
15	3.75	3.80	3.85	3.90	3.95
16	4.00	4.05	4.10	4.15	4.20
17	4.25	4.30	4.35	4.40	4.45
18	4.50	4.55	4.60	4.65	4.70
19	4.75	4.80	4.85	4.90	4.95
20	5.00	5.05	5.10	5.15	5.20
21	5.25	5.30	5.35	5.40	5.45
22	5.50	5.55	5.60	5.65	5.70
23	5.75	5.80	5.85	5.90	5.95
24	6.00	6.05	6.10	6.15	6.20
25	6.25	6.30	6.35	6.40	6.45
26	6.50	6.55	6.60	6.65	6.70
27	6.75	6.80	6.85	6.90	6.95
28	7.00	7.05	7.10	7.15	7.20
29	7.25	7.30	7.35	7.40	7.45
30	7.50	7.55	7.60	7.65	7.70
31	7.75	7.80	7.85	7.90	7.95
32	8.00	8.05	8.10	8.15	8.20
33	8.25	8.30	8.35	8.40	8.45
34	8.50	8.55	8.60	8.65	8.70
35	8.75	8.80	8.85	8.90	8.95
36	9.00	9.05	9.10	9.15	9.20
37	9.25	9.30	9.35	9.40	9.45
38	9.50	9.55	9.60	9.65	9.70
39	9.75	9.80	9.85	9.90	9.95
40	10.00	10.05	10.10	10.15	10.20
41	10.25	10.30	10.35	10.40	10.45
42	10.50	10.55	10.60	10.65	10.70
43	10.75	10.80	10.85	10.90	10.95
44	11.00	11.05	11.10	11.15	11.20
45	11.25	11.30	11.35	11.40	11.45
46	11.50	11.55	11.60	11.65	11.70
47	11.75	11.80	11.85	11.90	11.95
48	12.00	12.05	12.10	12.15	12.20
49	12.25	12.30	12.35	12.40	12.45
50	12.50	12.55	12.60	12.65	12.70
51	12.75	12.80	12.85	12.90	12.95
52	13.00	13.05	13.10	13.15	13.20
53	13.25	13.30	13.35	13.40	13.45
54	13.50	13.55	13.60	13.65	13.70
55	13.75	13.80	13.85	13.90	13.95
56	14.00	14.05	14.10	14.15	14.20
57	14.25	14.30	14.35	14.40	14.45
58	14.50	14.55	14.60	14.65	14.70
59	14.75	14.80	14.85	14.90	14.95
60	15.00	15.05	15.10	15.15	15.20
61	15.25	15.30	15.35	15.40	15.45
62	15.50	15.55	15.60	15.65	15.70
63	15.75	15.80	15.85	15.90	15.95

d.b.h (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	16.00	16.05	16.10	16.15	16.20
65	16.25	16.30	16.35	16.40	16.45
66	16.50	16.55	16.60	16.65	16.70
67	16.75	16.80	16.85	16.90	16.95
68	17.00	17.05	17.10	17.15	17.20
69	17.25	17.30	17.35	17.40	17.45
70	17.50	17.55	17.60	17.65	17.70
71	17.75	17.80	17.85	17.90	17.95
72	18.00	18.05	18.10	18.15	18.20
73	18.25	18.30	18.35	18.40	18.45
74	18.50	18.55	18.60	18.65	18.70
75	18.75	18.80	18.85	18.90	18.95
76	19.00	19.05	19.10	19.15	19.20
77	19.25	19.30	19.35	19.40	19.45
78	19.50	19.55	19.60	19.65	19.70
79	19.75	19.80	19.85	19.90	19.95
80	20.00	20.05	20.10	20.15	20.20
81	20.25	20.30	20.35	20.40	20.45
82	20.50	20.55	20.60	20.65	20.70
83	20.75	20.80	20.85	20.90	20.95
84	21.00	21.05	21.10	21.15	21.20
85	21.25	21.30	21.35	21.40	21.45
86	21.50	21.55	21.60	21.65	21.70
87	21.75	21.80	21.85	21.90	21.95
88	22.00	22.05	22.10	22.15	22.20
89	22.25	22.30	22.35	22.40	22.45
90	22.50	22.55	22.60	22.65	22.70
91	22.75	22.80	22.85	22.90	22.95
92	23.00	23.05	23.10	23.15	23.20
93	23.25	23.30	23.35	23.40	23.45
94	23.50	23.55	23.60	23.65	23.70
95	23.75	23.80	23.85	23.90	23.95
96	24.00	24.05	24.10	24.15	24.20
97	24.25	24.30	24.35	24.40	24.45
98	24.50	24.55	24.60	24.65	24.70
99	24.75	24.80	24.85	24.90	24.95
100	25.00	25.05	25.10	25.15	25.20
101	25.25	25.30	25.35	25.40	25.45
102	25.50	25.55	25.60	25.65	25.70
103	25.75	25.80	25.85	25.90	25.95
104	26.00	26.05	26.10	26.15	26.20
105	26.25	26.30	26.35	26.40	26.45
106	26.50	26.55	26.60	26.65	26.70
107	26.75	26.80	26.85	26.90	26.95
108	27.00	27.05	27.10	27.15	27.20
109	27.25	27.30	27.35	27.40	27.45
110	27.50	27.55	27.60	27.65	27.70
111	27.75	27.80	27.85	27.90	27.95
112	28.00	28.05	28.10	28.15	28.20
113	28.25	28.30	28.35	28.40	28.45
114	28.50	28.55	28.60	28.65	28.70
115	28.75	28.80	28.85	28.90	28.95
116	29.00	29.05	29.10	29.15	29.20
117	29.25	29.30	29.35	29.40	29.45
118	29.50	29.55	29.60	29.65	29.70
119	29.75	29.80	29.85	29.90	29.95
120	30.00	30.05	30.10	30.15	30.20

Table 5F

Horizontal limiting distance table for the wide-scale relascope

2.50 Band (B.A.F. = 6.2500)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	1.40	1.44	1.48	1.52	1.56
8	1.60	1.64	1.68	1.72	1.76
9	1.80	1.84	1.88	1.92	1.96
10	2.00	2.04	2.08	2.12	2.16
11	2.20	2.24	2.28	2.32	2.36
12	2.40	2.44	2.48	2.52	2.56
13	2.60	2.64	2.68	2.72	2.76
14	2.80	2.84	2.88	2.92	2.96
15	3.00	3.04	3.08	3.12	3.16
16	3.20	3.24	3.28	3.32	3.36
17	3.40	3.44	3.48	3.52	3.56
18	3.60	3.64	3.68	3.72	3.76
19	3.80	3.84	3.88	3.92	3.96
20	4.00	4.04	4.08	4.12	4.16
21	4.20	4.24	4.28	4.32	4.36
22	4.40	4.44	4.48	4.52	4.56
23	4.60	4.64	4.68	4.72	4.76
24	4.80	4.84	4.88	4.92	4.96
25	5.00	5.04	5.08	5.12	5.16
26	5.20	5.24	5.28	5.32	5.36
27	5.40	5.44	5.48	5.52	5.56
28	5.60	5.64	5.68	5.72	5.76
29	5.80	5.84	5.88	5.92	5.96
30	6.00	6.04	6.08	6.12	6.16
31	6.20	6.24	6.28	6.32	6.36
32	6.40	6.44	6.48	6.52	6.56
33	6.60	6.64	6.68	6.72	6.76
34	6.80	6.84	6.88	6.92	6.96
35	7.00	7.04	7.08	7.12	7.16
36	7.20	7.24	7.28	7.32	7.36
37	7.40	7.44	7.48	7.52	7.56
38	7.60	7.64	7.68	7.72	7.76
39	7.80	7.84	7.88	7.92	7.96
40	8.00	8.04	8.08	8.12	8.16
41	8.20	8.24	8.28	8.32	8.36
42	8.40	8.44	8.48	8.52	8.56
43	8.60	8.64	8.68	8.72	8.76
44	8.80	8.84	8.88	8.92	8.96
45	9.00	9.04	9.08	9.12	9.16
46	9.20	9.24	9.28	9.32	9.36
47	9.40	9.44	9.48	9.52	9.56
48	9.60	9.64	9.68	9.72	9.76
49	9.80	9.84	9.88	9.92	9.96
50	10.00	10.04	10.08	10.12	10.16
51	10.20	10.24	10.28	10.32	10.36
52	10.40	10.44	10.48	10.52	10.56
53	10.60	10.64	10.68	10.72	10.76
54	10.80	10.84	10.88	10.92	10.96
55	11.00	11.04	11.08	11.12	11.16
56	11.20	11.24	11.28	11.32	11.36
57	11.40	11.44	11.48	11.52	11.56
58	11.60	11.64	11.68	11.72	11.76
59	11.80	11.84	11.88	11.92	11.96
60	12.00	12.04	12.08	12.12	12.16
61	12.20	12.24	12.28	12.32	12.36
62	12.40	12.44	12.48	12.52	12.56
63	12.60	12.64	12.68	12.72	12.76

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	12.80	12.84	12.88	12.92	12.96
65	13.00	13.04	13.08	13.12	13.16
66	13.20	13.24	13.28	13.32	13.36
67	13.40	13.44	13.48	13.52	13.56
68	13.60	13.64	13.68	13.72	13.76
69	13.80	13.84	13.88	13.92	13.96
70	14.00	14.04	14.08	14.12	14.16
71	14.20	14.24	14.28	14.32	14.36
72	14.40	14.44	14.48	14.52	14.56
73	14.60	14.64	14.68	14.72	14.76
74	14.80	14.84	14.88	14.92	14.96
75	15.00	15.04	15.08	15.12	15.16
76	15.20	15.24	15.28	15.32	15.36
77	15.40	15.44	15.48	15.52	15.56
78	15.60	15.64	15.68	15.72	15.76
79	15.80	15.84	15.88	15.92	15.96
80	16.00	16.04	16.08	16.12	16.16
81	16.20	16.24	16.28	16.32	16.36
82	16.40	16.44	16.48	16.52	16.56
83	16.60	16.64	16.68	16.72	16.76
84	16.80	16.84	16.88	16.92	16.96
85	17.00	17.04	17.08	17.12	17.16
86	17.20	17.24	17.28	17.32	17.36
87	17.40	17.44	17.48	17.52	17.56
88	17.60	17.64	17.68	17.72	17.76
89	17.80	17.84	17.88	17.92	17.96
90	18.00	18.04	18.08	18.12	18.16
91	18.20	18.24	18.28	18.32	18.36
92	18.40	18.44	18.48	18.52	18.56
93	18.60	18.64	18.68	18.72	18.76
94	18.80	18.84	18.88	18.92	18.96
95	19.00	19.04	19.08	19.12	19.16
96	19.20	19.24	19.28	19.32	19.36
97	19.40	19.44	19.48	19.52	19.56
98	19.60	19.64	19.68	19.72	19.76
99	19.80	19.84	19.88	19.92	19.96
100	20.00	20.04	20.08	20.12	20.16
101	20.20	20.24	20.28	20.32	20.36
102	20.40	20.44	20.48	20.52	20.56
103	20.60	20.64	20.68	20.72	20.76
104	20.80	20.84	20.88	20.92	20.96
105	21.00	21.04	21.08	21.12	21.16
106	21.20	21.24	21.28	21.32	21.36
107	21.40	21.44	21.48	21.52	21.56
108	21.60	21.64	21.68	21.72	21.76
109	21.80	21.84	21.88	21.92	21.96
110	22.00	22.04	22.08	22.12	22.16
111	22.20	22.24	22.28	22.32	22.36
112	22.40	22.44	22.48	22.52	22.56
113	22.60	22.64	22.68	22.72	22.76
114	22.80	22.84	22.88	22.92	22.96
115	23.00	23.04	23.08	23.12	23.16
116	23.20	23.24	23.28	23.32	23.36
117	23.40	23.44	23.48	23.52	23.56
118	23.60	23.64	23.68	23.72	23.76
119	23.80	23.84	23.88	23.92	23.96
120	24.00	24.04	24.08	24.12	24.16

Table 5G

Horizontal limiting distance table for the wide-scale relascope

3.00 Band (B.A.F. = 9.0000)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	1.17	1.20	1.23	1.27	1.30
8	1.33	1.37	1.40	1.43	1.47
9	1.50	1.53	1.57	1.60	1.63
10	1.67	1.70	1.73	1.77	1.80
11	1.83	1.87	1.90	1.93	1.97
12	2.00	2.03	2.07	2.10	2.13
13	2.17	2.20	2.23	2.27	2.30
14	2.33	2.37	2.40	2.43	2.47
15	2.50	2.53	2.57	2.60	2.63
16	2.67	2.70	2.73	2.77	2.80
17	2.83	2.87	2.90	2.93	2.97
18	3.00	3.03	3.07	3.10	3.13
19	3.17	3.20	3.23	3.27	3.30
20	3.33	3.37	3.40	3.43	3.47
21	3.50	3.53	3.57	3.60	3.63
22	3.67	3.70	3.73	3.77	3.80
23	3.83	3.87	3.90	3.93	3.97
24	4.00	4.03	4.07	4.10	4.13
25	4.17	4.20	4.23	4.27	4.30
26	4.33	4.37	4.40	4.43	4.47
27	4.50	4.53	4.57	4.60	4.63
28	4.67	4.70	4.73	4.77	4.80
29	4.83	4.87	4.90	4.93	4.97
30	5.00	5.03	5.07	5.10	5.13
31	5.17	5.20	5.23	5.27	5.30
32	5.33	5.37	5.40	5.43	5.47
33	5.50	5.53	5.57	5.60	5.63
34	5.67	5.70	5.73	5.77	5.80
35	5.83	5.87	5.90	5.93	5.97
36	6.00	6.03	6.07	6.10	6.13
37	6.17	6.20	6.23	6.27	6.30
38	6.33	6.37	6.40	6.43	6.47
39	6.50	6.53	6.57	6.60	6.63
40	6.67	6.70	6.73	6.77	6.80
41	6.83	6.87	6.90	6.93	6.97
42	7.00	7.03	7.07	7.10	7.13
43	7.17	7.20	7.23	7.27	7.30
44	7.33	7.37	7.40	7.43	7.47
45	7.50	7.53	7.57	7.60	7.63
46	7.67	7.70	7.73	7.77	7.80
47	7.83	7.87	7.90	7.93	7.97
48	8.00	8.03	8.07	8.10	8.13
49	8.17	8.20	8.23	8.27	8.30
50	8.33	8.37	8.40	8.43	8.47
51	8.50	8.53	8.57	8.60	8.63
52	8.67	8.70	8.73	8.77	8.80
53	8.83	8.87	8.90	8.93	8.97
54	9.00	9.03	9.07	9.10	9.13
55	9.17	9.20	9.23	9.27	9.30
56	9.33	9.37	9.40	9.43	9.47
57	9.50	9.53	9.57	9.60	9.63
58	9.67	9.70	9.73	9.77	9.80
59	9.83	9.87	9.90	9.93	9.97
60	10.00	10.03	10.07	10.10	10.13
61	10.17	10.20	10.23	10.27	10.30
62	10.33	10.37	10.40	10.43	10.47
63	10.50	10.53	10.57	10.60	10.63

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	10.67	10.70	10.73	10.77	10.80
65	10.83	10.87	10.90	10.93	10.97
66	11.00	11.03	11.07	11.10	11.13
67	11.17	11.20	11.23	11.27	11.30
68	11.33	11.37	11.40	11.43	11.47
69	11.50	11.53	11.57	11.60	11.63
70	11.67	11.70	11.73	11.77	11.80
71	11.83	11.87	11.90	11.93	11.97
72	12.00	12.03	12.07	12.10	12.13
73	12.17	12.20	12.23	12.27	12.30
74	12.33	12.37	12.40	12.43	12.47
75	12.50	12.53	12.57	12.60	12.63
76	12.67	12.70	12.73	12.77	12.80
77	12.83	12.87	12.90	12.93	12.97
78	13.00	13.03	13.07	13.10	13.13
79	13.17	13.20	13.23	13.27	13.30
80	13.33	13.37	13.40	13.43	13.47
81	13.50	13.53	13.57	13.60	13.63
82	13.67	13.70	13.73	13.77	13.80
83	13.83	13.87	13.90	13.93	13.97
84	14.00	14.03	14.07	14.10	14.13
85	14.17	14.20	14.23	14.27	14.30
86	14.33	14.37	14.40	14.43	14.47
87	14.50	14.53	14.57	14.60	14.63
88	14.67	14.70	14.73	14.77	14.80
89	14.83	14.87	14.90	14.93	14.97
90	15.00	15.03	15.07	15.10	15.13
91	15.17	15.20	15.23	15.27	15.30
92	15.33	15.37	15.40	15.43	15.47
93	15.50	15.53	15.57	15.60	15.63
94	15.67	15.70	15.73	15.77	15.80
95	15.83	15.87	15.90	15.93	15.97
96	16.00	16.03	16.07	16.10	16.13
97	16.17	16.20	16.23	16.27	16.30
98	16.33	16.37	16.40	16.43	16.47
99	16.50	16.53	16.57	16.60	16.63
100	16.67	16.70	16.73	16.77	16.80
101	16.83	16.87	16.90	16.93	16.97
102	17.00	17.03	17.07	17.10	17.13
103	17.17	17.20	17.23	17.27	17.30
104	17.33	17.37	17.40	17.43	17.47
105	17.50	17.53	17.57	17.60	17.63
106	17.67	17.70	17.73	17.77	17.80
107	17.83	17.87	17.90	17.93	17.97
108	18.00	18.03	18.07	18.10	18.13
109	18.17	18.20	18.23	18.27	18.30
110	18.33	18.37	18.40	18.43	18.47
111	18.50	18.53	18.57	18.60	18.63
112	18.67	18.70	18.73	18.77	18.80
113	18.83	18.87	18.90	18.93	18.97
114	19.00	19.03	19.07	19.10	19.13
115	19.17	19.20	19.23	19.27	19.30
116	19.33	19.37	19.40	19.43	19.47
117	19.50	19.53	19.57	19.60	19.63
118	19.67	19.70	19.73	19.77	19.80
119	19.83	19.87	19.90	19.93	19.97
120	20.00	20.03	20.07	20.10	20.13

Table 5H

Horizontal limiting distance table for the wide-scale relascope

3.50 Band (B.A.F. = 12.2500)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	1.00	1.03	1.06	1.09	1.11
8	1.14	1.17	1.20	1.23	1.26
9	1.29	1.31	1.34	1.37	1.40
10	1.43	1.46	1.49	1.51	1.54
11	1.57	1.60	1.63	1.66	1.69
12	1.71	1.74	1.77	1.80	1.83
13	1.86	1.89	1.91	1.94	1.97
14	2.00	2.03	2.06	2.09	2.11
15	2.14	2.17	2.20	2.23	2.26
16	2.29	2.31	2.34	2.37	2.40
17	2.43	2.46	2.49	2.51	2.54
18	2.57	2.60	2.63	2.66	2.69
19	2.71	2.74	2.77	2.80	2.83
20	2.86	2.89	2.91	2.94	2.97
21	3.00	3.03	3.06	3.09	3.11
22	3.14	3.17	3.20	3.23	3.26
23	3.29	3.31	3.34	3.37	3.40
24	3.43	3.46	3.49	3.51	3.54
25	3.57	3.60	3.63	3.66	3.69
26	3.71	3.74	3.77	3.80	3.83
27	3.86	3.89	3.91	3.94	3.97
28	4.00	4.03	4.06	4.09	4.11
29	4.14	4.17	4.20	4.23	4.26
30	4.29	4.31	4.34	4.37	4.40
31	4.43	4.46	4.49	4.51	4.54
32	4.57	4.60	4.63	4.66	4.69
33	4.71	4.74	4.77	4.80	4.83
34	4.86	4.89	4.91	4.94	4.97
35	5.00	5.03	5.06	5.09	5.11
36	5.14	5.17	5.20	5.23	5.26
37	5.29	5.31	5.34	5.37	5.40
38	5.43	5.46	5.49	5.51	5.54
39	5.57	5.60	5.63	5.66	5.69
40	5.71	5.74	5.77	5.80	5.83
41	5.86	5.89	5.91	5.94	5.97
42	6.00	6.03	6.06	6.09	6.11
43	6.14	6.17	6.20	6.23	6.26
44	6.29	6.31	6.34	6.37	6.40
45	6.43	6.46	6.49	6.51	6.54
46	6.57	6.60	6.63	6.66	6.69
47	6.71	6.74	6.77	6.80	6.83
48	6.86	6.89	6.91	6.94	6.97
49	7.00	7.03	7.06	7.09	7.11
50	7.14	7.17	7.20	7.23	7.26
51	7.29	7.31	7.34	7.37	7.40
52	7.43	7.46	7.49	7.51	7.54
53	7.57	7.60	7.63	7.66	7.69
54	7.71	7.74	7.77	7.80	7.83
55	7.86	7.89	7.91	7.94	7.97
56	8.00	8.03	8.06	8.09	8.11
57	8.14	8.17	8.20	8.23	8.26
58	8.29	8.31	8.34	8.37	8.40
59	8.43	8.46	8.49	8.51	8.54
60	8.57	8.60	8.63	8.66	8.69
61	8.71	8.74	8.77	8.80	8.83
62	8.86	8.89	8.91	8.94	8.97
63	9.00	9.03	9.06	9.09	9.11

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	9.14	9.17	9.20	9.23	9.26
65	9.29	9.31	9.34	9.37	9.40
66	9.43	9.46	9.49	9.51	9.54
67	9.57	9.60	9.63	9.66	9.69
68	9.71	9.74	9.77	9.80	9.83
69	9.86	9.89	9.91	9.94	9.97
70	10.00	10.03	10.06	10.09	10.11
71	10.14	10.17	10.20	10.23	10.26
72	10.29	10.31	10.34	10.37	10.40
73	10.43	10.46	10.49	10.51	10.54
74	10.57	10.60	10.63	10.66	10.69
75	10.71	10.74	10.77	10.80	10.83
76	10.86	10.89	10.91	10.94	10.97
77	11.00	11.03	11.06	11.09	11.11
78	11.14	11.17	11.20	11.23	11.26
79	11.29	11.31	11.34	11.37	11.40
80	11.43	11.46	11.49	11.51	11.54
81	11.57	11.60	11.63	11.66	11.69
82	11.71	11.74	11.77	11.80	11.83
83	11.86	11.89	11.91	11.94	11.97
84	12.00	12.03	12.06	12.09	12.11
85	12.14	12.17	12.20	12.23	12.26
86	12.29	12.31	12.34	12.37	12.40
87	12.43	12.46	12.49	12.51	12.54
88	12.57	12.60	12.63	12.66	12.69
89	12.71	12.74	12.77	12.80	12.83
90	12.86	12.89	12.91	12.94	12.97
91	13.00	13.03	13.06	13.09	13.11
92	13.14	13.17	13.20	13.23	13.26
93	13.29	13.31	13.34	13.37	13.40
94	13.43	13.46	13.49	13.51	13.54
95	13.57	13.60	13.63	13.66	13.69
96	13.71	13.74	13.77	13.80	13.83
97	13.86	13.89	13.91	13.94	13.97
98	14.00	14.03	14.06	14.09	14.11
99	14.14	14.17	14.20	14.23	14.26
100	14.29	14.31	14.34	14.37	14.40
101	14.43	14.46	14.49	14.51	14.54
102	14.57	14.60	14.63	14.66	14.69
103	14.71	14.74	14.77	14.80	14.83
104	14.86	14.89	14.91	14.94	14.97
105	15.00	15.03	15.06	15.09	15.11
106	15.14	15.17	15.20	15.23	15.26
107	15.29	15.31	15.34	15.37	15.40
108	15.43	15.46	15.49	15.51	15.54
109	15.57	15.60	15.63	15.66	15.69
110	15.71	15.74	15.77	15.80	15.83
111	15.86	15.89	15.91	15.94	15.97
112	16.00	16.03	16.06	16.09	16.11
113	16.14	16.17	16.20	16.23	16.26
114	16.29	16.31	16.34	16.37	16.40
115	16.43	16.46	16.49	16.51	16.54
116	16.57	16.60	16.63	16.66	16.69
117	16.71	16.74	16.77	16.80	16.83
118	16.86	16.89	16.91	16.94	16.97
119	17.00	17.03	17.06	17.09	17.11
120	17.14	17.17	17.20	17.23	17.26

Table 5I

Horizontal limiting distance table for the wide-scale relascope

4.00 Band (B.A.F. = 16.0000)

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
7	0.88	0.90	0.93	0.95	0.98
8	1.00	1.03	1.05	1.08	1.10
9	1.13	1.15	1.18	1.20	1.23
10	1.25	1.28	1.30	1.33	1.35
11	1.38	1.40	1.43	1.45	1.48
12	1.50	1.53	1.55	1.58	1.60
13	1.63	1.65	1.68	1.70	1.73
14	1.75	1.78	1.80	1.83	1.85
15	1.88	1.90	1.93	1.95	1.98
16	2.00	2.03	2.05	2.08	2.10
17	2.13	2.15	2.18	2.20	2.23
18	2.25	2.28	2.30	2.33	2.35
19	2.38	2.40	2.43	2.45	2.48
20	2.50	2.53	2.55	2.58	2.60
21	2.63	2.65	2.68	2.70	2.73
22	2.75	2.78	2.80	2.83	2.85
23	2.88	2.90	2.93	2.95	2.98
24	3.00	3.03	3.05	3.08	3.10
25	3.13	3.15	3.18	3.20	3.23
26	3.25	3.28	3.30	3.33	3.35
27	3.38	3.40	3.43	3.45	3.48
28	3.50	3.53	3.55	3.58	3.60
29	3.63	3.65	3.68	3.70	3.73
30	3.75	3.78	3.80	3.83	3.85
31	3.88	3.90	3.93	3.95	3.98
32	4.00	4.03	4.05	4.08	4.10
33	4.13	4.15	4.18	4.20	4.23
34	4.25	4.28	4.30	4.33	4.35
35	4.38	4.40	4.43	4.45	4.48
36	4.50	4.53	4.55	4.58	4.60
37	4.63	4.65	4.68	4.70	4.73
38	4.75	4.78	4.80	4.83	4.85
39	4.88	4.90	4.93	4.95	4.98
40	5.00	5.03	5.05	5.08	5.10
41	5.13	5.15	5.18	5.20	5.23
42	5.25	5.28	5.30	5.33	5.35
43	5.38	5.40	5.43	5.45	5.48
44	5.50	5.53	5.55	5.58	5.60
45	5.63	5.65	5.68	5.70	5.73
46	5.75	5.78	5.80	5.83	5.85
47	5.88	5.90	5.93	5.95	5.98
48	6.00	6.03	6.05	6.08	6.10
49	6.13	6.15	6.18	6.20	6.23
50	6.25	6.28	6.30	6.33	6.35
51	6.38	6.40	6.43	6.45	6.48
52	6.50	6.53	6.55	6.58	6.60
53	6.63	6.65	6.68	6.70	6.73
54	6.75	6.78	6.80	6.83	6.85
55	6.88	6.90	6.93	6.95	6.98
56	7.00	7.03	7.05	7.08	7.10
57	7.13	7.15	7.18	7.20	7.23
58	7.25	7.28	7.30	7.33	7.35
59	7.38	7.40	7.43	7.45	7.48
60	7.50	7.53	7.55	7.58	7.60
61	7.63	7.65	7.68	7.70	7.73
62	7.75	7.78	7.80	7.83	7.85
63	7.88	7.90	7.93	7.95	7.98

d.b.h. (cm)	Diameter (cm) .00	.20	.40	.60	.80
64	8.00	8.03	8.05	8.08	8.10
65	8.13	8.15	8.18	8.20	8.23
66	8.25	8.28	8.30	8.33	8.35
67	8.38	8.40	8.43	8.45	8.48
68	8.50	8.53	8.55	8.58	8.60
69	8.63	8.65	8.68	8.70	8.73
70	8.75	8.78	8.80	8.83	8.85
71	8.88	8.90	8.93	8.95	8.98
72	9.00	9.03	9.05	9.08	9.10
73	9.13	9.15	9.18	9.20	9.23
74	9.25	9.28	9.30	9.33	9.35
75	9.38	9.40	9.43	9.45	9.48
76	9.50	9.53	9.55	9.58	9.60
77	9.63	9.65	9.68	9.70	9.73
78	9.75	9.78	9.80	9.83	9.85
79	9.88	9.90	9.93	9.95	9.98
80	10.00	10.03	10.05	10.08	10.10
81	10.13	10.15	10.18	10.20	10.23
82	10.25	10.28	10.30	10.33	10.35
83	10.38	10.40	10.43	10.45	10.48
84	10.50	10.53	10.55	10.58	10.60
85	10.63	10.65	10.68	10.70	10.73
86	10.75	10.78	10.80	10.83	10.85
87	10.88	10.90	10.93	10.95	10.98
88	11.00	11.03	11.05	11.08	11.10
89	11.13	11.15	11.18	11.20	11.23
90	11.25	11.28	11.30	11.33	11.35
91	11.38	11.40	11.43	11.45	11.48
92	11.50	11.53	11.55	11.58	11.60
93	11.63	11.65	11.68	11.70	11.73
94	11.75	11.78	11.80	11.83	11.85
95	11.88	11.90	11.93	11.95	11.98
96	12.00	12.03	12.05	12.08	12.10
97	12.13	12.15	12.18	12.20	12.23
98	12.25	12.28	12.30	12.33	12.35
99	12.38	12.40	12.43	12.45	12.48
100	12.50	12.53	12.55	12.58	12.60
101	12.63	12.65	12.68	12.70	12.73
102	12.75	12.78	12.80	12.83	12.85
103	12.88	12.90	12.93	12.95	12.98
104	13.00	13.03	13.05	13.08	13.10
105	13.13	13.15	13.18	13.20	13.23
106	13.25	13.28	13.30	13.33	13.35
107	13.38	13.40	13.43	13.45	13.48
108	13.50	13.53	13.55	13.58	13.60
109	13.63	13.65	13.68	13.70	13.73
110	13.75	13.78	13.80	13.83	13.85
111	13.88	13.90	13.93	13.95	13.98
112	14.00	14.03	14.05	14.08	14.10
113	14.13	14.15	14.18	14.20	14.23
114	14.25	14.28	14.30	14.33	14.35
115	14.38	14.40	14.43	14.45	14.48
116	14.50	14.53	14.55	14.58	14.60
117	14.63	14.65	14.68	14.70	14.73
118	14.75	14.78	14.80	14.83	14.85
119	14.88	14.90	14.93	14.95	14.98
120	15.00	15.03	15.05	15.08	15.10

Table 6

Slope distances for chaining short horizontal distances

SLOPE	HORIZONTAL DISTANCE (METRES)									
%	5	10	15	20	25	30	35	40	45	50
10	5.02	10.1	15.1	20.1	25.1	30.2	35.2	40.2	45.2	50.3
12	5.04	10.1	15.1	20.1	25.2	30.2	35.3	40.3	45.3	50.4
14	5.05	10.1	15.2	20.2	25.2	30.3	35.3	40.4	45.4	50.5
16	5.06	10.1	15.2	20.3	25.3	30.4	35.5	40.5	45.6	50.6
18	5.08	10.2	15.2	20.3	25.4	30.5	35.6	40.6	45.7	50.8
20	5.10	10.2	15.3	20.4	25.5	30.6	35.7	40.8	45.9	51.0
22	5.12	10.2	15.4	20.5	25.6	30.7	35.8	41.0	46.1	51.2
24	5.14	10.3	15.4	20.6	25.7	30.9	36.0	41.1	46.3	51.4
26	5.17	10.3	15.5	20.7	25.8	31.0	36.2	41.3	46.5	51.7
28	5.19	10.4	15.6	20.8	26.0	31.2	36.4	41.5	46.7	51.9
30	5.22	10.4	15.7	20.9	26.1	31.3	36.5	41.8	47.0	52.2
32	5.25	10.5	15.8	21.0	26.3	31.5	36.8	42.0	47.3	52.5
34	5.28	10.6	15.8	21.1	26.4	31.7	37.0	42.3	47.5	52.8
36	5.31	10.6	15.9	21.3	26.6	31.9	37.2	42.5	47.8	53.1
38	5.35	10.7	16.1	21.4	26.7	32.1	37.4	42.8	48.1	53.5
40	5.39	10.8	16.2	21.5	26.9	32.3	37.7	43.1	48.5	53.9
42	5.42	10.9	16.3	21.7	27.1	32.5	38.0	43.4	48.8	54.2
44	5.46	10.9	16.4	21.9	27.3	32.8	38.2	43.7	49.2	54.6
46	5.50	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	55.0
48	5.55	11.1	16.6	22.2	27.7	33.3	38.8	44.4	49.9	55.5
50	5.59	11.2	16.8	22.4	28.0	33.5	39.1	44.7	50.3	55.9
52	5.64	11.3	16.9	22.5	28.2	33.8	39.5	45.1	50.7	56.4
54	5.68	11.4	17.1	22.7	28.4	34.1	39.8	45.5	51.1	56.8
56	5.73	11.5	17.2	22.9	28.7	34.4	40.1	45.8	51.6	57.3
58	5.78	11.6	17.3	23.1	28.9	34.7	40.5	46.2	52.0	57.8
60	5.83	11.7	17.5	23.3	29.2	35.0	40.8	46.7	52.5	58.3
62	5.88	11.8	17.7	23.5	29.4	35.3	41.2	47.1	53.0	58.8
64	5.94	11.9	17.8	23.8	29.7	35.6	41.6	47.5	53.4	59.4
66	5.99	12.0	18.0	24.0	30.0	35.9	41.9	47.9	53.9	59.9
68	6.05	12.1	18.1	24.2	30.2	36.3	42.3	48.4	54.4	60.5
70	6.10	12.2	18.3	24.4	30.5	36.6	42.7	48.8	54.9	61.0
72	6.16	12.3	18.5	24.6	30.8	37.0	43.1	49.3	55.5	61.6
74	6.22	12.4	18.7	24.9	31.1	37.3	43.5	49.8	56.0	62.2
76	6.28	12.6	18.8	25.1	31.4	37.7	44.0	50.2	56.5	62.8
78	6.34	12.7	19.0	25.4	31.7	38.1	44.4	50.7	57.1	63.4
80	6.40	12.8	19.2	25.6	32.0	38.4	44.8	51.2	57.6	64.0
82	6.47	12.9	19.4	25.9	32.3	38.8	45.3	51.7	58.2	64.7
84	6.53	13.1	19.6	26.1	32.7	39.2	45.7	52.2	58.8	65.3
86	6.59	13.2	19.8	26.4	33.0	39.6	46.2	52.8	59.4	66.0
88	6.66	13.3	20.0	26.6	33.3	40.0	46.6	53.3	59.9	66.6
90	6.73	13.5	20.2	26.9	33.6	40.4	47.1	53.8	60.5	67.3
92	6.79	13.6	20.4	27.2	34.0	40.8	47.6	54.4	61.2	67.9
94	6.86	13.7	20.6	27.5	34.3	41.2	48.0	54.9	61.8	68.6
96	6.93	13.9	20.8	27.7	34.7	41.6	48.5	55.5	62.4	69.3
98	7.00	14.0	21.0	28.0	35.0	42.0	49.0	56.0	63.0	70.0
100	7.07	14.1	21.2	28.3	35.4	42.4	49.5	56.6	63.6	70.7
102	7.14	14.3	21.4	28.6	35.7	42.9	50.0	57.1	64.3	71.4
104	7.21	14.4	21.6	28.9	36.1	43.3	50.5	57.7	64.9	72.1
106	7.29	14.6	21.9	29.2	36.4	43.7	51.0	58.3	65.6	72.9
108	7.36	14.7	22.1	29.4	36.8	44.2	51.5	58.9	66.2	73.6
110	7.43	14.9	22.3	29.7	37.2	44.6	52.0	59.5	66.9	74.3

Table 7A

Stand Table Factors (S.T.F.) for B.A.F. = 1

(5 – cm D.B.H. Classes)

(Used for calculating the number of stems/ha from point samples)

5–cm D.B.H. CLASSES	[1]LIMITS (cm)	[2]S.T.F.
10	7.5– 12.4	127.32
15	12.5– 17.4	56.59
20	17.5– 22.4	31.83
25	22.5– 27.4	20.37
30	27.5– 32.4	14.15
35	32.5– 37.4	10.39
40	37.5– 42.4	7.96
45	42.5– 47.4	6.29
50	47.5– 52.4	5.09
55	52.5– 57.4	4.21
60	57.5– 62.4	3.54
65	62.5– 67.4	3.01
70	67.5– 72.4	2.60
75	72.5– 77.4	2.26
80	77.5– 82.4	1.99
85	82.5– 87.4	1.76
90	87.5– 92.4	1.57
95	92.5– 97.4	1.41
100	97.5– 102.4	1.27
105	102.5– 107.4	1.15
110	107.5– 112.4	1.05
115	112.5– 117.4	0.96
120	117.5– 122.4	0.88
125	122.5– 127.4	0.81
130	127.5– 132.4	0.75
135	132.5– 137.4	0.70
140	137.5– 142.4	0.65
145	142.5– 147.4	0.61
150	147.5– 152.4	0.57
155	152.5– 157.4	0.53
160	157.5– 162.4	0.50
165	162.5– 167.4	0.47
170	167.5– 172.4	0.44
175	172.5– 177.4	0.42
180	177.5– 182.4	0.39
185	182.5– 187.4	0.37
190	187.5– 192.4	0.35
195	192.5– 197.4	0.33
200	197.5– 202.4	0.32

Note 1: Measurements are rounded to the closest 0.1 cm.

Note 2: See Table 7B

Table 7B
Stand Table Factors (S.T.F.) for B.A.F. = 1
(2 – cm D.B.H. Classes)

(Used for calculating the number of stems/ha from point samples)

Two cm Classes	[1]Limits (cm)	[2]S.T.F.
1	0.0– 1.9	12,732.4
3	2.0– 3.9	14,14.71
5	4.0– 5.9	509.30
7	6.0– 7.9	259.85
9	8.0– 9.9	157.19
11	10.0– 11.9	105.23
13	12.0– 13.9	75.34
15	14.0– 15.9	56.59
17	16.0– 17.9	44.06
19	18.0– 19.9	35.27
21	20.0– 21.9	28.87
23	22.0– 23.9	24.07
25	24.0– 25.9	20.37
27	26.0– 27.9	17.47
29	28.0– 29.9	15.14
31	30.0– 31.9	13.25
33	32.0– 33.9	11.69
35	34.0– 35.9	10.39
37	36.0– 37.9	9.30
39	38.0– 39.9	8.37
41	40.0– 41.9	7.57
43	42.0– 43.9	6.89
45	44.0– 45.9	6.29
47	46.0– 47.9	5.76
49	48.0– 49.9	5.30
51	50.0– 51.9	4.90
53	52.0– 53.9	4.53
55	54.0– 55.9	4.21
57	56.0– 57.9	3.92
59	58.0– 59.9	3.66
61	60.0– 61.9	3.42
63	62.0– 63.9	3.21
65	64.0– 65.9	3.01
67	66.0– 67.9	2.84
69	68.0– 69.9	2.67
71	70.0– 71.9	2.53
73	72.0– 73.9	2.39
75	74.0– 75.9	2.26
77	76.0– 77.9	2.15
79	78.0– 79.9	2.04
81	80.0– 81.9	1.94
83	82.0– 83.9	1.85
85	84.0– 85.9	1.76
87	86.0– 87.9	1.68
89	88.0– 89.9	1.61
91	90.0– 91.9	1.54
93	92.0– 93.9	1.47
95	94.0– 95.9	1.41
97	96.0– 97.9	1.35
99	98.0– 99.9	1.30

Note 1: Measurements are rounded to the closest 0.1 cm.

Note 2: S.T.F. is the number of stems per hectare for a given diameter class and basal factor.

$$\text{S.T.F.} = \frac{\text{B.A.F.}}{\left[\frac{\text{d.b.h.}}{200}\right]^2 \pi} \quad \text{where d.b.h. is in centimetres}$$

Example: d.b.h. = 9, no. of trees = 2, and B.A.F. = 4
No. of stems per ha = no. of trees in d.b.h. class × S.T.F. (from table) × B.A.F.
= 2 × 157.2 × 4
= 1257.6 stems per ha

Field Handbook

Appendices

Appendix 1

Summary of Forest Classification Guidelines Before 1978

For Reference Only

Field Pocket Handbook

Appendix 1

Summary of Forest Inventory Forest Classification Guidelines Used Before 1978

Table of Contents

List of Tables

A1–1.0 Forest Description

A1–1.1 Species Composition

For species composition, each species comprising 20% or more of the gross volume was recorded, in descending order as a major species. Each species comprising 10–19% of the gross volume was recorded, in descending order, as a minor species, in brackets.

A1–1.11 Type Group Designation (Classification)

The designation of type groups was based on the first two major species.

		Example	Forest Type	Type Group
A.	Pure Forest Types Leading major species 81% by volume of live trees in stand	F 81% S 19%	F(S)	1
B.	Mixed Forest Types Two major species each ≥ 20% by volume of live trees in stand	1. S 50% Pl 40% B 10%	SP1(B)	25
		2. D 55% S 25% Cot 10% Mb 10%	DS(CotMb)	37

Table A1–1

Commercial tree species and symbols

Common Name of Species/Genus	Scientific Name of Species/Genus	Symbol
Alder	Alnus	
Red alder	A. rubra	D
Balsam Abies		
Alpine fir	A. lasiocarpa	B
Ambilis fir	A. amabilis	B
Balsam fir	A. balsamea	B
Grand fir	A. grandis	B
Birch	Betula	
White birch	B. papyrifera	Bi
Cedar	Thuja	
Western red cedar	T. plicata	C
Cypress	Chamaecyparis	
Yellow cedar	C. nootkatensis	Cy
Douglas–fir	Pseudotsuga	
Douglas–fir	P. menziesii	F
Hemlock	Tsuga	
Mountain hemlock	T. mertensiana	H
Western hemlock	T. heterophylla	H
Larch	Larix	
Alpine larch	L. lyallii	L
Tamarack	L. laricina	L
Western larch	L. occidentalis	L
Maple	Acer	
Broadleaf maple	A. macrophyllum	Mb
Pine	Pinus	
Lodgepole pine	P. contorta	Pl
Western white pine	P. monticola	Pw
Whitebark pine*	P. albicaulis	Pa
Yellow pine	P. ponderosa	Py
Poplar	Populus	
Aspen	P. tremuloides	A
Balsam poplar	P. balsamifera	Cot
Black cottonwood	P. trichocarpa	Cot
Spruce	Picea	
Black spruce*	P. mariana	Sb
Engelmann spruce	P. engelmannii	S
Sitka spruce	P. sitchensis	S
White spruce	P. glauca	S

*First recognized on forest cover maps in 1964.

Table A1–2

Inventory type groups

SECOND MEASURE		LEADING SPECIES															SECOND MEASURE
		F	C	H	B	S	Cy	Pw,Pa	Pl	Py	L	Cot	D	Mb	Bi	A	
		Type Group Code Numbers															
	Decid.	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	Decid.
0	F	1	10	13	18	22	10	27	29	32	33	35	37	39	40	41	F
N	C	2	9	14	19	23	9	27	30	32	34	35	37	39	40	41	C
D	H	3	11	12	19	23	11	27	30	32	34	35	37	39	40	41	H
	B	3	11	15	18	24	11	27	30	32	34	35	37	39	40	41	B
M	S	4	11	16	20	21	11	27	30	32	34	35	37	39	40	41	S
A	Cy	2	9	14	19	21	9	27	30	32	34	35	37	39	40	41	Cy
J	Pw,Pa	1	9	12	18	21	9	27	30	32	34	35	37	39	40	41	Pw,Pa
0	Pl	5	9	12	18	25	9	27	28	32	34	35	37	39	40	41	Pl
R	Py	6	10	13	18	22	10	27	29	32	34	35	37	39	40	41	Py
	L	7	10	13	18	22	10	27	29	32	34	35	37	39	40	41	L
S	Cot	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	Cot
P	D	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	D
E	Mb	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	Mb
C	Bi	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	Bi
I	A	8	9	17	18	26	9	27	31	32	34	36	38	39	40	42	A
E																	
S		F	C	H	B	S	Cy	Pw,Pa	Pl	Py	L	Cot	D	Mb	Bi	A	
		LEADING SPECIES															

Table A1–3

Growth type groups

(17 combinations of the 42 inventory type groups)

Growth Type Group		Inventory Type Groups	
Number Code	Letter Code	Code	Name
1	A	1	F
		5	FPI }
		8	FDecid.) } Coastal zones only
		27	Pw }
2	B	2	FC and FCy
		3	FH
		4	FS
3	C	5	FPI – Interior zones only
		6	FPy
		8	FDecid. – Interior zones only
		32	Py Pa
4	D	7	FL
		27	Pw – Interior only
		33	LF
		34	L
5	E	9	C
		10	CF
		11	CH
6	F	12	H (and HPI)
		17	HDecid.
7	G	13	HF
		14	HC
		15	HB
		16	HS
8	H	18	B
		19	BH
		20	BS
9	I	21	S
10	J	22	SF
		23	SH (and SC)
		24	SB
11	K	25	SPI
		26	SDecid.
12	L	28	Pl
13	M	29	PIF
		30	PIS (and PIB)
14	N	31	PlDecid.
15	O	37	DConif.
		41	AConif.
16	P	38	DDecid.
		39	Mb
		40	Bi
		42	ADecid.
17	Q	35	Cot.Conif.
		36	Cot.Decid.

A1–1.2 Age

The age of each major species in a type was recorded to the nearest ten years. For descriptive purposes on photos and maps, the following age codes were used:

Table A1–4
Age codes

Age Code	Age Class Limits	Age Class Limits for Age-in-Tens		Age-in-Tens
1	1– 20	1– 10,	11– 20	01, 02
2	21– 40	21– 30,	31– 40	03, 04
3	41– 60	41– 50,	51– 60	05, 06
4	61– 80	61– 70,	71– 80	07, 08
5	81–100	81– 90,	91–100	09, 10
6	101–120	101–110,	111–120	11, 12
7	121–140	121–130,	131–140	13, 14
8	141–250	141–250.		15, 25 (20)
9	251+	251+		26, 27, etc. (26)

A1–1.21 Maturity Rules

Species	Immature	Mature
Pl, Pa, Decid.	1–80 yrs.	81+ yrs.
All other Conifers	1–120 yrs.	121+ yrs.

A1–1.22 Change-in-age-class Intervals

In 1964, age class intervals were lowered five years.

Example: In 1963 age class intervals for a 30-year old stand were 26 and 35; in 1964 intervals were lowered to 21 and 30.

A1–1.3 Height

Heights were estimated to the nearest 3 metres based on the average height of the leading species, using dominants and codominants. For example, if the average height of a species was estimated to fall within the range 29–31 metres, it was recorded as 30 metres. For descriptive purposes on maps and photos the following height codes were used.

Table A1–5
Height codes

Height Code	Height (metres)	Class Limits	Height Class Limits for Height in 3's		
1	3, 6, 9	0–10.4	0– 4.4,	4.5– 7.4,	7.5–10.4
2	12, 15, 18	10.5–19.4	10.5–13.4,	13.5–16.4,	16.5–19.4
3	21, 24, 27	19.5–28.4	19.5–22.4,	22.5–25.4,	25.5–28.4
4	30, 33, 36	28.5–37.4	28.5–31.4,	31.5–34.4,	34.5–37.4
5	39, 42, 45	37.5–46.4	37.5–40.4,	40.5–43.4,	43.5–46.4
6	48, 51, 54	46.5–55.4	46.5–49.4,	49.5–52.4,	52.5–55.4
7	57, 60, 63	55.5–64.4	55.5–58.4,	58.5–61.4,	61.5–64.4
8	66+	64.5+		64.5+	

A1–1.4 Species Preference

Before 1969, stand age and height were determined from sample trees measured for the most important for the first two major commercial species. In descending order of importance, coniferous species were recorded first, lodgepole pine second, and deciduous species third.

Example: In a PIS stand, age and height came from the S.

A1–1.5 Stocking Class

A. Immature Stands: Stocking Class 0

B. Mature Stands:

1. 76 or more trees per hectare ≥ 27.5 cm d.b.h. Stocking Class 1
2. Fewer than 76 trees per hectare ≥ 27.5 cm d.b.h.
   a) Leading species not lodgepole pine Stocking Class 2
   b) Leading species lodgepole pine
      (1) 311 or more stems per hectare ≥ 17.5 cm d.b.h.
         (a) 50% or more of stems ≥ 7.5 cm d.b.h. are ≥ 12.5 cm d.b.h. Stocking Class 3
         (b) Fewer than 50% of the stems ≥ 7.5 cm d.b.h. are ≥ 12.5 cm d.b.h. Stocking Class 4
      (2) 0 to 310 stems per hectare ≥ 17.5 cm d.b.h. Stocking Class 4

A1–1.6 Site

Site was determined for all productive forest types from site tables. The site classes were good (G), medium (M), poor (P) and low (L) and the determination of site was always based on the first species in order of predominance regardless of the percentage composition of the stand or of the number of species in the label.

A1–1.7 Secondary Elements

A. Main stand immature plus an older element.

1. Immature plus "Vets" –where an older element was 40 years older than the main stand and had a volume of < 70 m^3/ha, 27.5 cm d.b.h., e.g., P1F320-P + F vets
2. Immature plus "Vol" –where an older component was 40 years older than the main stand and had a volume of ≥ 70 m^3/ha, 27.5 cm d.b.h., e.g., FP1420-P + F vol

Note: Trees classed as vets or vol could be less than 27.5 cm d.b.h.; the 27.5 cm d.b.h. limit was simply a basis for classifying by merchantable volume.

B. Main stand mature plus a younger element.

Recognized only for thrifty young conifers that are developing under a main stand nurse crop of older lodgepole pine or deciduous. e.g. A531-M + S imm

A1–1.8 Inventory Constraints

A. 1973 to 1975: environmental protection forests (E.P.F.'s):

Soil problems ..... Es
Management problems ..... Ec
Recreation values ..... Er
Wildlife values ..... Ew
Fish values ..... Ef

B. 1976 to 1982: environmental protection areas (E.P.A.'s):

Soil problems ..... Es
Regeneration problems ..... Ep
Operability problems ..... Ei
Snow avalanche problems ..... Ea
Recreation values ..... Ew
Wildlife values ..... Ew
Water value ..... Eh
Fish values ..... Ef

A1–1.9 Disturbed Stands

A1–1.91 Degree of Disturbance

A. Minor disturbance–less than 26% by area or volume.

B. Partial disturbance–from 26% to 75% by area or volume.

C. Total disturbance–greater than 75% by area or volume.

A1–1.92 Disturbance Symbols

A. Logging

1. Clear Logging

Single date	⊖66
Multiple date	⊖64–66
Two separate dates	61⊖65

B. Fires

1. Single date	66 ⓘ
2. Multiple dates (show latest)	59 ⓘ
3. Separate burns (show latest)	66 ⓘ
4. Ground fire (causing damage less than 26%)	68G ⓘ

C. Logging and Burning

1. Single dates	65 ⊕64
2. Multiple dates	67 ⊕64–66
3. Log, burn, re-burn (latest burn shown)	68 ⊕65–66

D. Other

1. Windfall	68
2. Insects and Disease (name causative agent) Looper Kill 66–68	
3. Slides	S 68

A1–1.10 Plantations

Plantations were recorded by the species planted and the year of planting.

Example: F Ⓟ 72

Table A1–6

Summary of most common history labels

Disturbance	Degree of Disturbance		
	0-25%	26–75%	76%+
Logging	FP1 841–M  	(1) FP1 84 Resid–M or (2) P1F 42 Resid–M 	(1) NSR–P  or (2) DSD–P 
Fires	FP1 841–M 69G 	(1) NSR–P 69 or (2) FP1 84–Resid–M 69 	(1) NSR–P 69 or (2) DSD–P 71
Logged and burned			(1) NSR–P 69 or (2) DSD–P 73
Windfall	FP1 841–M 	(1) NSR–P + Vets or (2) FP1 84–Resid–M  	(1) NSR–P  or (2) DSD–P
Insects	FP1 841–M Bark beetle kill 1968	(1) FP1 831–P or FP1 832–P Bark Beetle kill 1968 or (2) FP1 83 Resid–P Bark beetle kill 1968 or (3) NSR–P Bark beetle kill 1968	(1) NSR–P Bark beetle kill 1968

A1–2.0 Non–Productive Forest Description

Non–productive forest was forest land of very low productivity presenting no commercial possibilities in the foreseeable future.

A. NP Swamp Forest–common to central and northern interior areas.

Example: Black spruce forest types bordering swamps
NP Sb722

B. NP Lowland Forest–short, stunted, limby, poorly formed trees. Common on central and northern coastal lowlands.

Example: NP CCyP1921

C. Miscellaneous forest areas–characterized by rocky, broken–up terrain, often excessively steep, and invariably of poor access.

Example: NP F932

A1–3.0 Non–Forest Description

Name	Map Symbol
Barren	
Alpine	A
Rock	R
Non–productive burn	NP
Claybank	Claybank
Other	NP
Non–productive deciduous brush	NP Br
Water	Lake, River
Swamp, muskeg	
Cleared, cultivated, urban, improved grassland	C or Urban
Isolated industrial plant	C or Plant Name
Wild hay meadow	M
Range land	OR
Rock, NPBu, claybank, NP Br, swamps, etc.	Not usually separated from alpine and alpine forest areas

Appendix 2

Illustrated Guide to Gymnosperms

of British Columbia

(Adapted from An Illustrated Key to Gymnosperms of British Columbia, courtesy of the B.C. Provincial Museum in cooperation with the Resource Analysis Branch).

Gymnosperms of British Columbia

Needle or scale leaved evergreen (if deciduous then needles in groups of more than 10) trees or shrubs. Fruit a woody cone or berry.

Pines

Larch

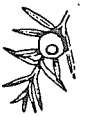
Hemlocks

True Firs

Spruces

Douglas Fir

Western Yew



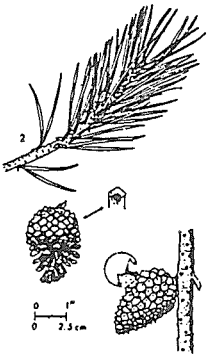
Cedars

Junipers

Lodgepole Pine

Jack Pine

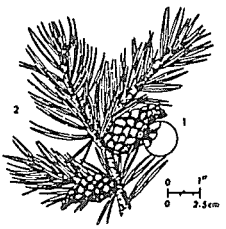
Needles in groups of two



Pinus contorta var. latifolia — lodgepole pine

A. Pinus contorta Dougl.
var latifolia Engelm.
(lodgepole pine)

1– Cones short (approximately 2" with distinct sharp prickles at hardened scale tips.
2– Needles about 3".
3– Trees of relatively open foliage, greyish green.
4– Bark light-brown to dark-brown, finely cracked at the base of stem and somewhat more flaky over the remainder.
5– Throughout the Province at all but alpine elevations and the dry valleys of Southern Interior.

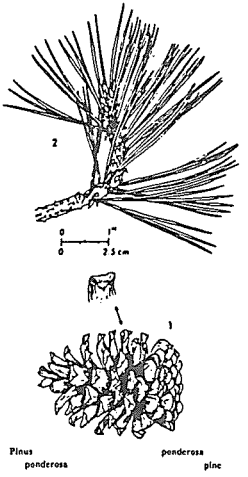


Pinus banksiana — jack pine

B. Pinus banksiana Lamb.
(Jack Pine)

1– Cones 1" to 2" long often curved assymetrical, without prickles at scale tips.
2– Needles approximately 1.5" long.
3– Trees somewhat contorted
4– In B.C. restricted to north-east (Peace River area).

Ponderosa Pine



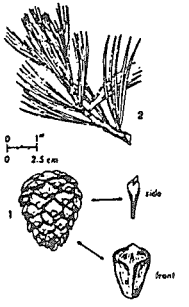
A. Pinus ponderosa Laws (ponderosa pine)

1- Cones more than 3" long and approximately 2/3 of length wide.
2- Needles usually more than 3" long.
3- Trees of somewhat open greyish-green foliage.
4- Bark thick withdeep cracks. Orange-brown in cracks and exposed surfaces, darker in colour when young.
5- Restricted to lower elevations of dry southern 1/4 of B.C.

Whitebark Pine

Limber Pine

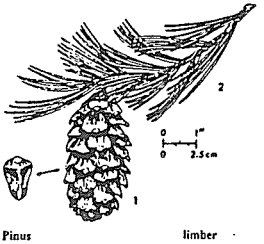
Needles in groups of 5



Pinus albicaulis — white bark pine

B. Pinus albicaulis Engelm. (white bark pine)

1- Cones 1.5" to 4" long, purple, ovoid, consisting of more or less fleshy scales (thickened).
2- Bark on young stems, thin greyish or old trees broken into narrow, plate-like scales.
3- Needles 1.5" to 3" long, slightly curved.
4- Often somewhat stunted tree, open, firm shiny dark-green foliage.
5- Usually on exposed slopes near timber line in interior.



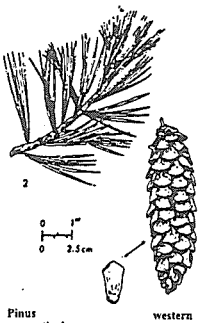
Pinus flexilis — limber pine

C. Pinus flexilus James (limber pine)

1- Cones elongate 3" to 8" long.
2- Needles 1.5" to 3" long, slightly curved yellow-green.
3- Bark on young trees, smooth, grey or silvery-white, becoming rough dark brown to almost black, deeply fissured into wide scaly plates.
4- Contorted subalpine to alpine tree of rocky mountains.

Western White Pine

Needles in groups of 5



Pinus monticola — western white pine

A. Pinus monticola Dougl. (western white pine)

1– Cones elongate uaually more than 4.5" long, more than twice as long as broad, slightly curved.

2– Needles usually more than 4" long, silver-green and relatively slender.

3– Slender tree often with distinct whorled branches particularly in the upper parts where the leader and the tips of branches often point upwards like candles.

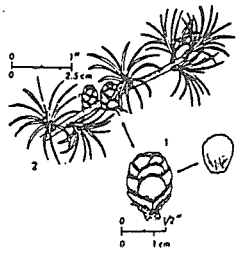
4– Bark silvery-grey on young trees becoming dark and deeply fissured on older trees to form a regular pattern of small thick plates.

5– In interior wet belt and coastal forest.

Larch

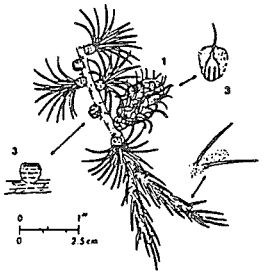
Tamarack
Alpine Larch
Western Larch

Needles in groups of more than 10



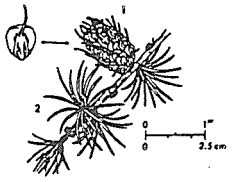
Larix laricina — tamarack

A. Larix laricina (Du Roi) K. Koch (tamarack)
1- Cones almost spherical 0.5" to 1" long.
2- Needles 3/4" to 1 1/4" long, light green turning yellow in autumn. In clusters or 10-20 on older twigs.
3- In B.C. restricted to northern half. Restricted to bogs in boreal and sub-boreal forests.
4- Tree usually small and stunted.
5- Bark thin smooth bluish grey on young trees. On old trees consisting of many curved-out hard scales.



Larix lyallii — alpine larch

B. Larix lyallii Parl. (alpine larch)
1- Cones elongate approximately 1" long, 1.5 to 2 times longer than wide.
2- In B.C. at high elevation of alpine tundra cirques, and snow chutes of interior wet belt and adjacent areas.
3- Small often stunted tree of conical shape. Foliage light to greyish-yellow-green. Dwarf shoots 1/8" to 3/8" long with distinct soft hairs on young twigs and cone scales.
4- Needles 1" to 1.5" long, pale blue-green, in brush like clusters of 30-40 on older twigs.
5- Bark thin dark-greyish-brown in the longitudinal cracks and on exposed surfaces.



Larix occidentalis — western larch

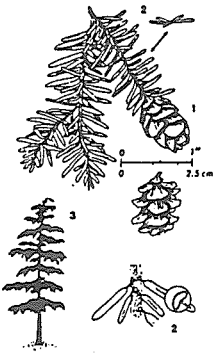
C. Larix occidentalis Nutt. (western larch)
1- Cones less than 1.5" long, yellowish-brown when mature. Scales usually covered on lower half with dense coating of white hairs when young.
2- Needles less than 1", in clusters of 14-30 on older twigs.
3- Tree of open yellowish-green foliage, usually somewhat cylindrical in form when mature
4- Lower to medium elevations of the interior wet belt and the adjacent Columbia forests.

Hemlock

Western Hemlock

Mountain Hemlock

Needles rounded at tip



Tsuga heterophylla — western hemlock

A. Tsuga heterophylla (Raf.) Sarg. (western hemlock)

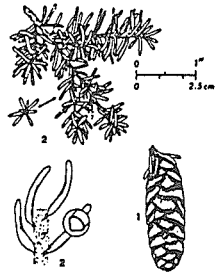
1– Cone ovoid, less than 1" long, scales thin with more or less wavy edges.

2– Leaves flattened, round-apexed appearing 2-ranked rather variable in length up to 1 1/4". Each leaf with a twist at the abruptly narrowed base, lighter lines or under surface.

3– Large trees (120'-160' high) with narrow pyramidal crown having drooping leader.

4– Young trees with rusty-brown bark covered with fine scales. Older trees with darker bark having flat, scaly ridges with deep furrows.

5– Coastal forests and interior wet belt.



Tsuga mertensiana — mountain hemlock

B. Tsuga mertensiana (Bong) Carr. (mountain hemlock)

1– Cone cylindrical more than 1" long, purple, brownish-purple, scales slightly thickened.

2– Leaves semi-circular in cross section, projecting out all around the twig.

3– Small tree (25' -50' high).

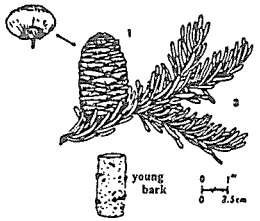
4– Bark dark reddish brown rough, hard, narrow, rounded ridges.

5– Coast forests and interior wet belt.

Balsam

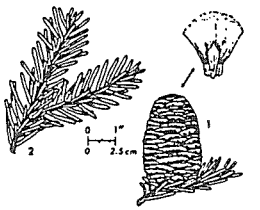
Alpine Fir
Amabilis Fir
Grand Fir

Needles notched at tip



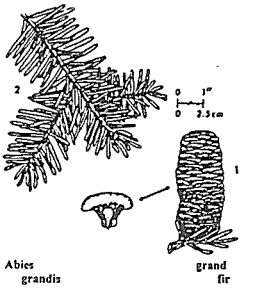
Abies lasiocarpa — alpine fir

A. Abies lasiocarpa (Hook) Nutt. (alpine fir)
1– Cone dark-purple, 2"-4" long, somewhat wider near the base, scales fan shaped.
2– Bark smooth, grey with resin blisters, old trees with shallow longitudinal furrows.
3– Needles about 1.5" long, dark-green with 2 silvery strips underneathe, usually curved upward near branch tips.
4– Symmetrical narrow spire-like form.
5– Throughout Province in sub-alpine boreal and sub-boreal forests.



Abies amabilis — amabilis fir

B. Abies amabilis (Dougl.) Forb. (amabilis fir)
1– Cones erect, dark-purple, cylindrical 4"-5" long. Scales fan shaped.
2– Needles dark-shiny-green, upper side, pointing forward, about 1" long.
3– Bark thin, smooth, unbroken except on old trees pale or ash-grey with conspicuous chalky white patches.
4– Sub-alpine slopes of coast range and Vancouver Island.



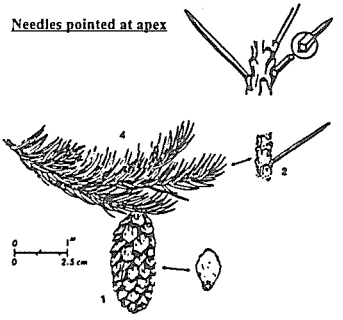
Abies grandis — grand fir

C. Abies grandis (Dougl.) Lindl. (grand fir)
1– Cone cylindrical yellow-green with broader than long scales about 3" long, 1.5"-2" broad.
2– Needles distinctly 2-ranked (oriented in flat plain), green above, whitish below, 1.5" long.
3– Young bark thin, grey-brown with resin blisters and chalky white patches. Old bark 2"-3" thick, usually furrowed into hard redish-brown ridges.
4– Southern coast, Vancouver Island, lower valleys of Kootenay and Arrow Lakes

Engelmann Spruce

White Spruce

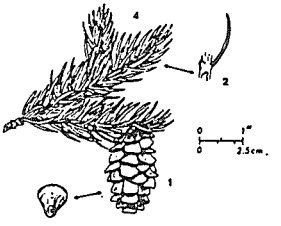
Twigs rough due to left-over peg-like leaf bases, leaves more or less 4-sided, stiff and prickly.



Picea engelmannii — engelmann spruce

A. Picea engelmannii Perry
(engelmann spruce)

1– Cones about 2" long, edges of scales distinctly ragged, cones attached at tips of branches, never forming a dense cluster.
2– Young twigs have dense, very fine hairs.
3– Bark thin, brownish to cinnamon-red, outer layers broken into small, thin loosely attached scales.
4– Needles 1/2"-1" long, usually curved upward.
5– Mature trees usually narrowly spike-like often interrupted. Branches often distorted, rarely ever forming distinct layers of foliage or regular whorles around the stem. Mature foliage dark green.
6– Sub-alpine forests of interior.



Picea glauca — white spruce

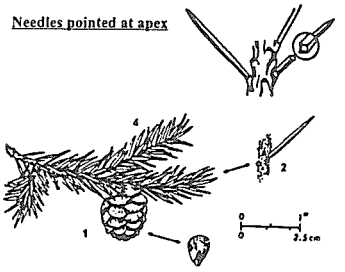
B. Picea glauca (Moench) Voss.
(white spruce)

1– Cone about 2" long, scale edges truncate and smooth (hybrids, between A and B abundant in contact zones, many show intermediate features).
2– Young twigs smooth or only sparcely hairy.
3– Ashy-brown bark with long and rough scales.
4– 1/2"-3/4" long, blue-green sharp pointed needles.
5– Tree cone shaped.
6– Northern and central and south-east B.C., east of Cascades.

Black Spruce

Sitka Spruce

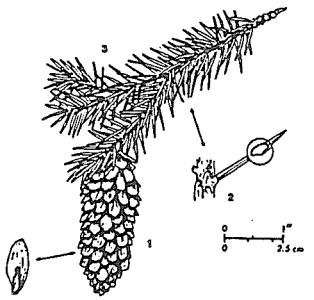
Twigs rough due to left-over peg-like leaf bases, leaves more or less 4-sided, stiff and prickly.



Picea mariana — black spruce

C. Picea mariana (Mill) B.S.P.
(black spruce)

1- Cones ovoid, purplish green .5" to 1.5" long often forming dense clusters, scales stiff rounded, with irregularly toothed margins.
2- young twigs with dark-reddish hairs.
3- Inner living part of bark olive-green. Outer surface scaly, greyish to reddish.
4- Needles .5" to .75" long. sharp pointed, blue-green.
5- Often a low, stunted tree.
6- In northern and central B.C., east of Cascades. In bogs, wet sites and rapidly drained coarse-textured sites.



Picea sitchensis — sitka spruce

D. Picea sitchensis (Bong) Carr.
(sitka spruce)

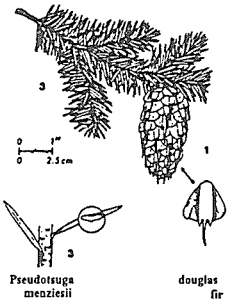
1- Cone cylindrical, pale-yellow to reddish-brown, 2" to 4" long, scales thin, stiff with wavy edges.
2- Twigs smooth.
3- Needles somewhat flattened, stiff, sharp pointed.
4- Bark dark-brown, scaly, scales thin, loose, crisp.
5- Restricted to coastal forests.

Douglas Fir

Douglas Fir

Twigs smooth (not leaving peg-like leaf bases)

Trees with woody cones, leaves not 2-ranked, twigs with oval leaf scars.



Pseudotsuga menziesii — douglas fir

A. Psuedotsuga menziesii (Mirbel) Franco. (douglas fir)

1– Cones 2"-4" long, oval, pendent bracts 3 toothed, longer than the scales.

2– Young bark smooth, grey-brown with resin blisters, older bark thick (up to 10"-12") corky and cracked, deeply fissured into reddish brown ridges.

3– Needles more or less flattened, leave oval scars on smooth twigs, bright-green and grooved above, paler below.

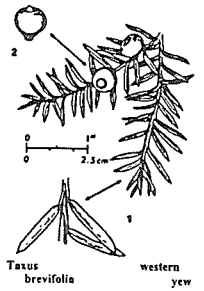
4– Throughout the interior at low to medium elevations in well drained positions and drier parts of coastal area.

Yew

Western Yew

Twigs smooth (not leaving peg-like leaf bases)

Shrubs or low trees usually less than 20' high, leaves 2-ranked, fruit a fleshy berry.



Taxus brevifolia — western yew

A. Taxus brevifolia Nutt. (western yew)

1– Needles 1/2" to 1" long flattened, appearing 2-ranked, oriented in a flat plane.

2– Fruit: about 1/3" long, single berries, green turning reddish at maturity, with an opening at its tip through which the "stone" is exposed.

3– Bark very thin, dark reddish-purple with papery scales.

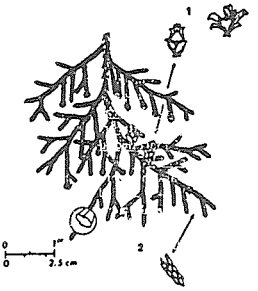
4– Low altitudes at coast and Vancouver Island, and in interior wet belt.

Cedar

Western Red Cedar

Having short (about ¼") scale-like leaves which are more or less pressed.

Fruit a green or more or less woody cone, with distinctly visible scales even when when immature.

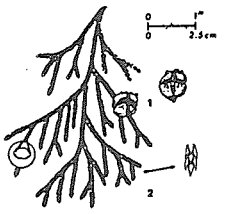


Thuja plicata — western red cedar

A. Thuja plicata Donn. (western red cedar)
1– Cone oval, small (1/2" long), fan shaped scales not more than a few (7) arising from a central axis.
2– Leaves overlapping scale-like, blunt, in pairs, dark yellow-green. Crushed foliage pungent smelling.
3– Reddish brown bark forming long fibrous shreds with a network of narrow intersecting ridges.
4– Throughout wet belt, coast and in wet spots of dry interior.

Cypress

Yellow Cedar



Chamaecyparis nootkatensis — yellow cedar

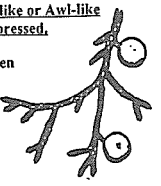
B. Chamaecyparus nootkatensis Spach. (yellow cedar)
1– Cones small (approximately 1/2") spherical, with conical scales radiating from a central point.
2– Leaves on seedlings awl-shaped, sharp pointed, arranged in groups of 3 or 4, leaves on older trees scale-like, bluish-green, sharp pointed, prickly to touch, in pairs, overlapping. Crushed foliage non-aromatic.
3– Bark greyish-brown with longitudinal intersecting cracks. Not fibrous.
4– At coast and near Beatrice Lake in interior wet belt.

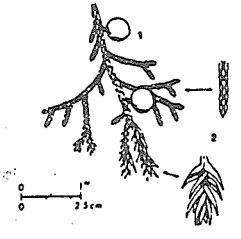
Rocky Mountain Juniper

Common Juniper

Having short (about ¼") scale-like or Awl-like leaves which are more or less pressed.

Fruit a berry, bluish-black when mature, without a pore at top.





Juniperus scopularum — rocky mountain juniper

A. Juniperus scopulorum Sarg. (rocky mountain juniper)

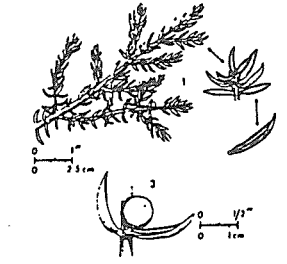
1– Fruit a fleshy green to dark-blue (when mature) berry usually with a distinct silvery bloom which rubs off, lacking an opening at the end.

2– Young branches with short prickly scaly leaves, attached upward. Older foliage of appressed scale-like leaves, not prickly.

3– Bark thin fibrous, red-brown to grey-brown, divided by shallow furrows.

4– Generally a bushy shrub or small tree less than 20' high, with one to several stems giving a conical form.

5– In dry central and south interior.



Juniperus communis — common juniper

B. Juniperus communis L. (common juniper)

1– Prickly awl shaped leaves arranged in three's.

2– Never a tree, often spreading over ground with the branches turned upward. Young and mature foliage similar.

3– Fruit, a fleshy green to dark-blue berry (when mature) usually with a distinct silvery bloom which rubs off.

4– Thin reddish-grey bark with scales.

5– Throughout B.C. at low to medium elevations.