

Forestry Division - Nova Scotia Department of Natural Resources

Photo Interpretation Specifications



Introduction

This document describes the specifications for the stereoscopic interpretation of true colour aerial photography used by the Forestry Division of the Nova Scotia Department of Natural Resources(DNR). The interpretation of photographs provides the information used to create the Spatially Referenced Forest Resources(SRFR) data base residing on a Geographic Information System (GIS).

Every hectare of land and water in the province is viewed on aerial photography and classified into one or more of 21 forest types or 18 non-forest types. For each forest stand or polygon tree species, average co-dominant tree height of the stand, tree crown closure and site capability to grow forests are recorded. These four attributes are used to derive additional individual stand attributes described in this document. Non-forested areas are also classified into a series of categories described in this document.

From 1987 to 1996 the entire province was interpreted and the first version of the digital resources data base was created. The current photo interpretation process is a review and update of the original data base. The update process is designed to cover the province on a continuous repeat cycle of ten years.

Photo Interpretation Specifications

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1.0 **Original and New Interpretation**

- 1.1 Forested areas are delineated into homogenous polygons(forest stands) based on crown closure, species and height. Obvious differences in site, determined from land position, slope, and soil drainage will also form the basis for the delineation of a stand. A maximum of four tree species in 10% classes are recorded, crown closure is assigned in 5 % increments from 0 to 95%. Height is recorded to the nearest metre. Site or land capability is assigned as described in section 10.0 below.
- 1.2 The following features will also constitute polygon boundary lines in the geographic data base.
 - 1.2.1 Roads, which in the opinion of the interpreter are hard surfaced (any gravel road or trail will not be used as a polygon boundary). If a gravel road or trail actually forms a stand type boundary then the type boundary must be marked on the map on that portion of the gravel road or trail involved.
 - 1.2.2 Streams wide enough to be shown as a double line on a map of 1:10,000 scale.
 - 1.2.3 Lakes or ponds at least 0.5 ha in size at the mean high water mark.
 - 1.2.4 Coastline down to the mean high tide mark.
 - 1.2.5 Powerlines wide enough to be shown as a double line feature on a map of 1:10 000 scale.
- 1.3 Non-forest features(see Section 11.3 and 16.2) less than 0.5 ha will not be delineated as a separate polygons. House lots that are surrounded on three sides by forest and adjoin a road edge, will be delineated. House lots less than one hectare in area and are surrounded by forest, will not be delineated as a separate polygons.
- 1.4 Forest types less than one hectare will not be delineated.
- 1.5 Off shore or lake islands, will be interpreted the same as any other land area. Only islands at least one hectare in size on the base map at a scale of 1:10,000 will be interpreted. An island is any piece of land completely surrounded by water and not being attached to mainland by any natural or man made structure which provides full time access.
- 1.6 Wetlands will be interpreted and classified as distinct "non forest " types. (see definitions Section 16.2)
- 1.7 Generally any wetland that appears to cover a variety of adjacent forest types will be delineated on the air photo as one polygon. All classes of wetlands that are continuous will be encompassed in one polygon and will include such areas as alders on wet sites and those areas adjacent to marshes, shallow vegetated ponds, meadows and swamps, etc. Open bogs and treed bogs will be delineated and identified separately. Beaver flowage will be delineated and coded accordingly, regardless

whether or not they are active or inactive. Alders that are on dry land such as old fields will not be considered as wetlands and must be coded under the appropriate alder classification as forest areas.

- 1.8 Once the forest stand boundaries are delineated, stand attributes of co-dominant height in metres, crown closure, species in 10% classes to a maximum of four and land capability are recorded as described in Sections 7 through 10 below.
- 1.9 For non-forest stands all other features listed in Table 1 Forested/Non Forested codes will be delineated in accordance with the definitions.

2.0 **Update Interpretation**

- 2.1 Existing stand boundaries in the GIS data base are to be maintained wherever possible. Forested and Non-forest stands will be reviewed for changes in attributes and will be reclassified where necessary. The attributes of an existing stand will be changed only if they differ from the original interpretation as described below. Beginning in March, 2004 for Digby county, and to apply to the rest of the Province from this date on, only forest stands less than or equal to 13 metres in height will be reviewed for changes.

Species difference:	> 20%
Height difference :	> 2 metres
Crown Closure difference:	> 15%
Site difference of:	> 1 cubic metre per ha per year

- 2.2 Stand boundaries in the GIS will be altered only where treatments have occurred causing a change in the original stand boundaries or in the opinion of the interpreter, there was an obvious and gross error in the original delineation.

3.0 **Edge Matching and New Stand Numbers**

- 3.1 New and updated stands are to be edge matched and joined to existing stand boundaries where appropriate. Any new stands created are assigned a new stand number which will commence from the last highest number on the map sheet. Stand numbers must be unique within any map sheet. Attributes are transferred across map sheet boundaries as required.

4.0 **Photo Interpreters Field Checks**

- 4.1 The field checking process is intended to help the interpreter become familiar with the local forest conditions and stand types. It is not intended as a statistical assessment of the interpretation process.
- 4.2 Photo interpreters are required to spend a minimum of 10% of their time, including travel, field checking their own work. While field checking, tally sheets are to be completed for stands selected by the interpreter. Stand average height, site(Land Capability), and species by basal area are recorded for the variable radius plots(prism point sampling). Sampling intensity is set at one sample point per hectare with a maximum of 10 points and a minimum of four points for any stand.

4.2.1 Stands that are field checked by the interpreter will be flagged in the GIS data base. Field check codes are assigned as follows.

The field check code has four fields:

In order to be consistent, if a code below is used then all data listed for that code must have been field checked. For example, if the first field is filled in with a group number then species **and** height must have been measured or estimated.

First Field - Group identification code of section/person checking and have checked for species **and** average stand height of co-dominant trees.

Second Field - Group identification code and have checked for basal area.

Third Field - Group identification code and have checked for age **and** site.

Fourth Field - Field verification method: 0 for ocular estimate, Group identification code for measured values. For this field to be filled in at least one of the first three fields must also have data.

Group Identification Codes

- 1 = Photo Interpretation Staff
- 2 = Forest Inventory Field Staff
- 3 = Mensuration Field Staff
- 4 = Reforestation & Silviculture Division Field Staff
- 5 = Operations Field Staff
- 6 = Company Field Staff
- 7 = Consultant
- 8 = Formal Field Check according to Photo Interpretation Manual
- 9 = Others

If the Photo Interpretation section ocularly estimated only the site and age of the stand, the field checked code would read: 0010.

If site and age were actually measured then the code would be 0011.

In order to transfer the field checked data to the GIS data base the interpreter must fill out a file amendment form with appropriate data and forward to the GIS section.

5.0 **Photo Interpretation Coding form**

5.1 A sample of the current Photo Interpretation Coding form used by Forestry Division interpreters is shown below.

SAMPLE PHOTO INTERPRETATION CODING FORM

MAPSHEET: S4615614		DATE	INTERPRETER		PAGE		1							
STAND	SPECIES	FOR/ NON	CR CL	HT.	ALL HTS	SECOND SP	STORY CC	ST HT	ST SW	ST HW	FIELD CHECK			
0001	WS08BF02	9900	55	9			0	0	5		0	0	0	0
0002	WS06BF02OH02	9908	25	12	-	-	0	0	5	-	0	0	0	0
0004		9907	0	0	-	SH	5	2	5	-	0	0	0	0
0005	WS08BF02	9900	65	8	-	-	0	0	5	-	0	0	0	0
0006	WS06BF02OH02	9900	65	11	-	-	0	0	5	-	0	0	0	0
0007	IH06WS02OS01TH01	9900	60	13	-	-	0	0	5	-	0	0	0	0
0008	WS04IH03BF02TH01	9900	55	11	-	-	0	0	5	-	0	0	0	0
0009	WS06BF02OH02	9900	60	13	-	-	0	0	5	-	0	0	0	0
0010	WS05BF02IH02TH01	9908	25	11	-	SH	5	2	5	-	0	0	0	0
0011	IH04WS03OS02TH01	9900	60	13	-	-	0	0	5	-	0	0	0	0
0012	IH04WS03OS02TH01	9900	40	6	-	-	0	0	5	-	0	0	0	0
0013		9907	0	0	-	SH	5	11	5	-	0	0	0	0
0014	WS06IH03OS01	9900	65	11	-	-	0	0	5	-	0	0	0	0
0016	WS08OH01OS01	9900	55	11	-	-	0	0	5	-	0	0	0	0
0018		9907	0	0	-	SH	5	11	5	-	0	0	0	0
0019	IH05WS02 F02TH01	9900	30	8	-	-	0	0	4	-	0	0	0	0
0021	WS08OS01OH01	9900	65	12	-	-	0	0	5	-	0	0	0	0
0022	IH04TH02WS02 F02	9900	65	14	-	-	0	0	5	-	0	0	0	0
0023	WS03BF03IH03TH01	9900	50	10	-	-	0	0	5	-	0	0	0	0
0024	WS05BF03OH02	9900	65	12	-	-	0	0	5	-	0	0	0	0
0025	TH05IH04OS01	9900	65	14	-	-	0	0	5	-	0	0	0	0
0026	IH04WS03BF02TH01	9908	35	12	-	-	0	0	5	-	0	0	0	0
0027	WS06BF02IH01TH01	9900	65	13	-	-	0	0	5	-	0	0	0	0
0028	WS04IH03BF02TH01	9900	65	13	-	-	0	0	5	-	0	0	0	0
0029	IH04TH03WS02BF01	9900	60	11	-	-	0	0	5	-	0	0	0	0

6.0 Map Sheet Identification

6.1 Map sheets are identified using the standard 1:10 000 scale, Nova Scotia Topographic base map numbering system. The number represents the Latitude and Longitude in degrees and decimal degrees of the south east, or bottom right corner of the map sheet. The Map Sheet number is preceded by the Department's internal single character county code.

Map Sheet No. 1:10 000 Resource series
Eg 10 45 4500 630 200 is shown as E45456320

6.2 County and Municipality codes

A = Pictou
B = Antigonish
C = Guysborough East
W = St. Mary's
D = Cumberland
E = Colchester
F = Hants
G = Halifax East
H = Halifax West
J = Annapolis
K = Kings
L = Queens
M = Lunenburg
N = Digby
P = Yarmouth
R = Shelburne
S = Inverness
T = Victoria
U = Richmond
V = Cape Breton

6.3 True colour photographs are identified by roll number, photo number, Line number and year of photography.

Photo ID. Roll No(incorporates year), & Photo No. line number
Eg 94001 - 146 L22

6.4 Stand numbers, unique within a map sheet, are assigned during interpretation as shown.

Stand No. - 00001 - 99999

7.0 **Species Designation**

7.1 Forest stand species are delineated into 10 percent classes of crown composition with a maximum of four species per stand. The sum of all percentages must be 100%. Species are to be listed, right justified, in descending order of percent crown composition. Where species are equal in percent the interpreter uses adjacent stands and/or site conditions to determine what species dominates the site and should be listed first. Normally softwood species would have a higher priority in mixed stands.

NOTE: Species are not assigned to the following forested types:

- clear cut
- burns
- “ treatment not classified “stands with height and crown
closure of 00

7.2 **Wind throw, Old fields returning to forest, Brush, and Dead stands** -Beginning in 2002 species delineations will be added to these stand classifications as described in the definitions.

7.3 Table 1. Species Codes

Species Symbol	10%, max. 4 species per stand
WS =	White Spruce
RS =	Red Spruce
BS =	Black Spruce
XS =	Red & Black Spruce-- Discontinued 2002
BF =	Fir
EH =	Hemlock
WP =	White Pine
RP =	Red Pine
JP =	Jack Pine
TL =	Larch
EC =	Eastern Cedar
OS =	Other Softwood---Discontinued 2002
SP =	Scots Pine
AP =	Austrian Pine
WL =	Western Larch
EL =	European Larch
JL =	Japanese Larch
SS =	Sitka Spruce
NS =	Norway Spruce
DF =	Douglas Fir
US =	Unclassified Softwood
SM =	Sugar Maple
RM =	Red Maple
YB =	Yellow Birch
WB =	White Birch
GB =	Grey Birch
TA =	Aspen (Large Tooth and Trembling)
RO =	Oak
AS =	Ash (black & white)
BE =	Beech
WE =	Elm
TH =	Tolerant Hardwood--Discontinued 2002*
IH =	Intolerant Hardwood--Discontinued 2002*
OH =	Other Hardwood---Discontinued 2002*
UH =	Unclassified Hardwood
UC =	Unclassified Species

* Species classification will remain in the Forestry Data base for those original stands which have not been re-interpreted nor field checked. In time these species codes should disappear as they change and are re-interpreted.

- 7.4 **US, UC, UH Species Codes** -When a treated stand is detected on the photography but a treatment type cannot be detected it is classed as "**treatment not classified**". If the vegetation is of such a height that the determination of species is impossible then the species codes US meaning unclassified softwood; or UH unclassified hardwood; or UC unclassified vegetation are assigned. If a plantation has both hardwood and softwood it would be a combination of both and UC is assigned. If it is impossible to even determine whether softwood or hardwood dominate (maximum height of 3 metres) then the code UC, unclassified species is applied. The appropriate per cent of crown cover would also be included.
- 7.5 For those stands in a natural regeneration stage and where the regeneration is so low in height as to make identification of species impossible, the species codes US, UH and UC may be used.
- 7.6 **Other softwoods OS** -Discontinued
- 7.7 **Other hardwoods OH** -Discontinued
- 7.8 **IH, TH and XS Codes - Beginning in the year 2002 the codes IH, TH, and XS are not being used.** In order to determine what species is dominant in IH and TH stands the interpreter will use ecological information, adjacent stands and site data to assign the dominant species. **The specific species codes are to be applied. eg. SM for sugar maple, BE for American Beech, RM for red maple, WB for white birch, YB for yellow birch, BS for Black Spruce, and RS for red Spruce.** This is a major change from the original interpretation.

8.0 Crown Closure

Crown closure is an estimate of the stocking of forest stands and is represented by the percent of the stand area that is covered by tree crowns.

- 8.1 When estimating Crown Closure in a stand the interpreter will include in the estimate the Crown Closure of both the merchantable and the non merchantable portion of the stand in the uniform canopy layer. For All-age/All-height stands the crown closure is based on only the merchantable trees(trees greater than 10 cm in diameter). If the stand is to be categorized as a two story stand then the crown closure of each story would be estimated separately.
- 8.2 The actual estimate of percent crown closure in two digits 00-95 is assigned in 5 percent increments.

Example:

3%	=05
27%	=25
100%	=95

9.0 **Height**

- 9.1 Height is assigned to tree vegetation. For merchantable stands the actual average co-dominate height to the nearest metre is assigned. The co-dominate height is assumed to be equivalent to the height of trees of average total basal area. Total Basal Area is defined as the sum of basal area for all trees above 2 cm at breast height.
- 9.2 Uniform stands with an average tree height < 1 m are assigned a minimum height of 1 metre.
- 9.3 All age/All heights stands, having more than two distinct canopy layers or no distinct canopy layers and a full range of heights, are indicated on coding sheets. When classifying all height/all aged stands that cover the full range of heights then the following will be followed:
1. Height assigned will be the average height of merchantable stems
 2. Crown Closure assigned is for merchantable stems. This will permit the most accurate calculation of volume.

10.0 **Site Designation**

- 10.1 Land capability(LC) is assigned to all forested categories. LC designation is based on the original Canada Land Inventory (CLI) designations with additional interpretation for the complexes. The original CLI designations have been converted to the Nova Scotia Land capability class for forest growth. The processes of updating interpretation have adjusted the capability classes as appropriate. All original site values are based on the capability for softwood growth. Beginning in 2001 hardwood capability values are assigned as described in 10.2 below.
- 10.2 Hardwood site values will be applied only to sugar maple, beech, yellow birch , and red oak stands, where the tolerant hardwood species comprise 70% or more of the stand by basal area. All other stands will be assigned softwood site values.
- 10.3 Capability classes

Softwood Capability Class	Hardwood Capability Class
0-less than 0.5 m ³ /ha•a	0 - less than 0.5 m ³ /ha•a
1 - 0.5 to 1.5 m ³ /ha•a	1 - 0.5 to 1.4 m ³ /ha•a
2 - 1.6 to 2.5 m ³ /ha•a	2 - 1.5 to 2.4 m ³ /ha•a
3 - 2.6 to 3.5 m ³ /ha•a	3 - 2.5 to 3.4 m ³ /ha•a
4 - 3.6 to 4.5 m ³ /ha•a	4 - 3.5 to 4.4 m ³ /ha•a
5 - 4.6 to 5.5 m ³ /ha•a	5 - 4.5 to 5.5 m ³ /ha•a
6 - 5.6 to 6.5 m ³ /ha•a	
7 - 6.6 to 7.5 m ³ /ha•a	
8 - 7.6 to 8.5 m ³ /ha•a	
9 - 8.6 to 9.5 m ³ /ha•a	
10 - 9.6 to 10.5 m ³ /ha•a	
11 - 10.6 to 11.5 m ³ /ha•a	
12 - 11.6 to 12.5 m ³ /ha•a	
13 - 12.6 to 13.5 m ³ /ha•a	

11.0 **Forest/Non-Forest Codes**

11.1 Every hectare of land has to be classified as either forest or non forest using a four digit code in the following format:

First two digits:

- 95 - Coastal Offshore non-land
- 96 - Lake Islands
- 97 - Off Shore Islands
- 98 - Main Land Non Forested
- 99 - Main Land Forested

For the Last two digits the following additional codes indicate the type of stand.

11.2 Table 2. Forested Stands

- 00 - Natural Stand
- 01 - Treated - treatment not classified, Not Xmas trees
- 02 - Burn - Wildfire
- 03 - Xmas Trees
- 04 - Sugar Bush
- 05 - Old field returning to forest
- 06 - Wind Throw
- 07 - Dead
- 08 - Dead - 1
- 09 - Dead - 2
- 10 - Research Stand
- 11 - Seed orchard & seed production area
- 12 - Treated stand - treatment classified
- 13 - Dead - 3
- 14 - Dead - 4
- 15 - Dead - 5
- 20 - Plantation
- 33 - Brush
- 38 - Alders less than 75%
- 39 - Alders greater than 75%
- 60 - Clear Cut
- 61 - Partial cut
- 62 - Partial cut Satellite derived not verified

11.3 Table 3. Non Forested Stands

- 70 - Wetlands General
- 71 - Beaver Flowage
- 72 - Open Bogs
- 73 - Treed Bogs
- 74 - Coast Wetlands Habitat
- 75 - Wetland in Lake
- 76- Cliffs, Dunes, Coastal Rocks
- 77 - Inland water
- 78 - Ocean
- 83 - Brush being replaced by forest category 33
- 84 - Rock Barren
- 85 - Barren
- 86 - Agriculture
- 87 - Urban
- 88 - Alders less than 75% Beginning in 2001 will be Forest category 38
- 89 - Alders greater than 75% Beginning in 2001 will be Forest category 39
- 91 - Blueberries
- 92 - Miscellaneous
- 93 - Sanitary Land Fill
- 94 - Beach
- 95 - Gravel Pit
- 96 - Pipeline Corridor
- 97 - Powerline
- 98 - Road corridor
- 99 - Rail lines

12.0 **Two Story Stands**

- 12.1 A two story stand must have two distinct canopy layers in which a second layer is a distinct layer either above or below the main stand with at least 2 m difference in height and each layer has at least 10% crown closure.
- 12.2 For stand types of 60-clear cuts, 02-burns, or 07,08,09, 13, 14, 15-dead, these classes are to be considered as the main stand and if there is a remnant component to the stand then this remnant component may be classed as a second story.
- 12.3 Only in the case of a plantation can the second story have the same height (natural regeneration) as the main stand.
- 12.4 For Second Story Stands the species groups, height, and crown closure are assigned. Species groups may be assigned if not done so for the primary canopy.

12.5 Second Story Species Groups

S =	80% + Softwood by Volume
SH =	70 - 50% Softwood by Volume
HS =	40 - 20% Softwood by Volume
H =	less than 20% Softwood by Volume

12.6 Second Story Crown Closure.

Same criteria as main stand

12.7 Second Story Height

Same criteria as main stand.

13.0 **Calculated Stand Attributes**

In the GIS data base the complete attribute set for each stand is composed of data from interpretation as described above and data calculated from mathematical regressions.

13.1 Calculated Attributes

Cover Type - see Section 15.5

Area (hectares)

Basal Area: The area of a plane passed through the stem of a tree at right angles to its longitudinal axis is called its cross sectional area. If the cross section is taken at breast height, 1.3 metres from ground level, for a standing tree it is called its Basal Area.

Total Basal Area (m²/ha) Softwood main story
Total Basal Area (m²/ha) Hardwood main story
Total Basal Area (m²/ha) Total main story

Merchantable Volume (m³/ha) Softwood main story
Merchantable Volume (m³/ha) Hardwood main story
Merchantable Volume (m³/ha) Total main story

Total Basal Area (m²/ha) Softwood second story
Total Basal Area (m²/ha) Hardwood second story
Total Basal Area (m²/ha) Total Second story
Total Basal Area (m²/ha) Total Both Stories

Merchantable Volume (m³/ha) Softwood second story
Merchantable Volume (m³/ha) Hardwood second story
Merchantable Volume (m³/ha) Total second story
Merchantable Volume (m³/ha) Total Both Stories

Age - Defined as stump age to a maximum of 110 years unless field measured.

Total Average Diameter (Diameter of tree of average total basal area)

Maturity - see section 14.4

14.0 **Calculation methods**

14.1 Stand Age

Age is a calculation which uses average stand height and land capability (site) to estimate stand age. The softwood matrix uses the full thirteen land capability classes whereas the hardwood calculation is based on land capability classes from 1 to 5.

14.2 Stand Basal Area

Algorithms, based on the Nova Scotia revised normal yield tables (Forest Research Report No. 22) are used to calculate maximum total basal area for every stand with a height of 1.5 metres (5 feet) or greater. The Imperial foot unit is used because the original algorithms were derived in the Imperial system of measurement. Separate algorithms for softwood and hardwood are used with the exception that the softwood algorithm is applied to the aspen ("populus tremuloides" michx.) species because it was determined that aspen species grow more like softwood species, than other hardwood species. Stand basal area values are reduced by the per cent crown closure and by the species portion (per cent) for each stand. The algorithms are listed below:

Softwood maximum BA = $148.418 + 2.58554 \times ht - .033254 \times ht^2 + .000296 \times ht^3 - .000001256 \times ht^4$

Hardwood maximum BA = $8.35106 + 2.77608 \times ht - .000066369 \times ht^3$ actual softwood BA = maximum BA x percent crown closure x species per cent

Where: ht = the interpreted stand height (which is an estimate of Loreys' height, the height of the tree of average Basal Area)

BA = total basal area

14.3 Stand volume

To find merchantable volume, the calculated stand basal areas are multiplied using the following factor:

$$Mrvol = -14.1774 + .77012 \times ht - .0007559 \times ht^2 - .000026698 \times ht^3 + .00000000125277 \times ht^5$$

Where:

mrvol = merchantable volume conversion factor

ht = the interpreted stand height

Volume is calculated only for those stands with a height of 6 metres(20 feet) or more.

14.4 Stand Maturity Classification

FOR ALL FOREST STANDS

REGENERATION:	Equal to or less than 1 m in height and less than 20 years of age. This stage of stand development is termed the establishment of new stocking phase.
YOUNG:	Less than 40 years of age and greater than 1 m and less than or equal to 6 m in height. This stage of stand development is characterised by growth on new stocking with the beginning of Crown Competition.
IMMATURE:	Less than 40 years of age and less than or equal to 60 m ³ /ha and greater than 6 metres in height. This stage of development is the stem exclusion stage.

FOR INTOLERANT SPECIES

WS, JP, BF, IH, RM, TA, WB, GB, TL

POLE:	40 - 60 years of age or less than 40 years of age with a volume greater than 60 m ³ /ha
MATURE:	60 - 70 years of age
OVER MATURE:	Greater than 70 years of age
ALL HEIGHT /ALL AGE:	Stands with three or more distinct layers or no distinct layers with a full range of heights.

FOR TOLERANT SPECIES

The following species or combinations thereof will make up 50% or more of the forest stand crown cover as interpreted. Otherwise the stand will be categorised using the intolerant species list above.

RS, BS, EH, WP, RP, YB, TH, AS, SM, RO, BE NS, SP, WE

POLE:	40 - 79 years of age or less than 40 years of age with a volume greater than 60 m ³ /ha
MATURE:	80 - 150 years of age(Only Field checked stands will have ages greater then 110)

OVER MATURE: Greater than 150 years of age(Only Field checked stands will have ages greater then 110)

ALL HEIGHT/ALL AGE: Stands with three or more distinct layers or no distinct layers with a full range of heights.

15.0 **Stand Cover Type Designation**

The stand forest cover type is calculated using the stand basal area for softwood and hardwood species and classes are assigned using the following criteria. Stands are assigned as :

Softwood - $\geq 75\%$ Softwood Species by Basal Area- GIS code 2

or

Mixedwood - 74 - 26% Softwood Species by Basal Area- GIS code 5

or

Hardwood - $\leq 25\%$ Softwood Species by Basal Area- GIS code 8

16.0 **Definitions**

16.1 Forested Categories and Code designations

Codes

- 00 **Natural Stand** - any area of land greater than one hectare in size capable of growing trees to at least 3 metres in height at maturity which has not been treated silviculturally and does not qualify under clear cut, partial cut, burn, old field , wind throw, alders, brush or dead categories. The stand must have a tree cover greater then 25%, expressed by Crown Closure
- 01 **Treated- treatment not classified, not xmas trees-** an area where silviculture activity has occurred but the actual treatment can not be determined on the photograph.
- 02 **Burn** - any stand that has been completely destroyed by fire leaving less than 25% crown closure. In cases of partial burn the remaining live stand is to be categorized and not classed as burn.
- 03 **Christmas Trees** - any stand being used for Christmas tree cultivation.
- 04 **Sugar Bush** - any stand being used to produce maple sugar products. It may or may not have been silviculturally treated.
- 05 **Old Field** - any field that has an indication of merchantable tree species growing on site with less than 25% crown closure. All normal attributes are assigned to existing commercial tree material as the main story. There can be no second story.
- 06 **Wind Throw** - any stand where more than 25% of the merchantable trees have been pushed over to more than 45 degrees from the vertical by wind action. All normal attributes are assigned to live commercial tree material as the main story. There can be no second story.
- 07 **Dead** - any stand that contains dead trees due to any cause which contains less than 25% crown closure of live residual material (or 75% or more of dead material) and which contains evidence of dead material either standing or laying on the ground with little or no evidence of regeneration. If a portion of the stand with dead material is contiguous then a new stand can be created as long as the area is a hectare or more in size. Beginning in 2002 species, crown closure and height will be assigned to the live residual material.
- 08 **Dead - 1** - Any stand that contains dead trees due to any cause which contains 25-50% crown closure of live residual material (or 50 to 74% of dead material) and which contains evidence of dead material either standing or laying on the ground with little or no evidence of regeneration. Usually the dead material is spread throughout the stand. If a portion of the stand with dead material is contiguous then a new stand can be created as long as the area is a hectare or more in size. All normal attributes are assigned to the live residual material.
- 09 **Dead - 2** - Any stand that contains dead trees due to any cause and which contains 51-75% crown closure of live residual material (or 25 to 49 % of dead material) and which contains evidence of dead material either standing or laying on the ground with little or no evidence of

regeneration. If a portion of the stand with dead material is contiguous then a new stand can be created as long as the area is a hectare or more in size. All normal attributes are assigned to the live residual material. Stands with less than 15% of dead material are to be classed as a natural forest stand.

- 10 **Research** - stands treated in some manner primarily to provide data on growth, etc. which contain sample plots for evaluation of response rather than intended as operational treatment.
- 11 **Seed Orchard, Seed Production Areas** - any stands designated by the Department as an area reserved for seed production.
- 12 **Treated- treatment classified**-an area where silviculture activity has occurred and the actual treatment has been identified primarily by field data.
- 13 **Dead - 3** - Any stand that contains 25-50% of equivalent crown closure of dead material and which contains regeneration which will be categorized in the main stand first story classification section. Equivalent crown closure being an estimate of what the crown closure would be if the dead material was alive, exclusive of regeneration. Residual live material is classified in the second story and the crown closure is for the live material only and must be less than 75%.
- 14 **Dead - 4** -Any stand that contains 51-75% of equivalent crown closure of dead material and which contains regeneration which will be categorized in stand classification section. Equivalent crown closure being an estimate of what the crown closure would be if the dead material was alive, exclusive of regeneration. Residual live material is classified in the second story and the crown closure is for the live material only.
- 15 **Dead - 5** - Any stand that contains 75+% of equivalent crown closure of dead material and which contains regeneration which will be categorized in stand classification section. Equivalent crown closure being an estimate of what the crown closure would be if the dead material was alive, exclusive of regeneration. Residual live material is classified in the second story and the crown closure is for the live material only.
- 20 **Plantation** - a group of trees artificially established by direct seeding or setting out seedlings, transplants or cuttings.
- 33 **Brush** - any area containing less than 25% commercial tree cover and contains non-merchantable woody plants consisting of at least 25% cover. All normal attributes are assigned to existing commercial tree material as the main story. There can be no second story.
- 38 **Alders less than 75% cover** - any forested area containing alders that compose less than 75% crown closure of alders. Commercial tree cover must be less than 25 % crown closure. All normal attributes are assigned to existing commercial tree material as the main story. There can be no second story.
- 39 **Alders 75% or greater cover** - any forested area containing alders that compose 75% or more crown closure of alders. Commercial tree cover must be less than 25 % crown closure. All normal

attributes are assigned to existing commercial tree material as the main story. There can be no second story.

- 60 **Clear Cut** - any stand that has been completely cut and any residuals make up less than 25% crown closure and with little or no indication of regeneration. Site values are retained. Residual live commercial material is described as the second story.
- 61 **Partial Cut**- any stand that has been cut and residuals make up 25% or more of the crown closure on the site, of hardwood species. Site values are retained.
- 62 **Partial Cut**- any stand that has been cut and has been identified by satellite imagery and not yet verified by photo interpretation. Site values are retained.

16.2 Non Forest Categories and Code designations

Non forest - any area not classed as forest and will be taken to high water line for inland water and to high tide mark along coast.

- 70 **Wetland General** - any wet area, not identified as a lake, river or stream, excluding open and treed bogs, and beaver flowage. (In GIS wetland complexes may include open and treed bogs)
- 71 **Beaver flowage** - an area that is or has been occupied by beavers. No Forest information is provided for these areas (ie site, height, species, crown closure) as this designation refers only to the water flowage area or may be for grassy areas created by the beaver dam.
- 72 **Open Bog** - any area consisting primarily of ericaceous plants, sphagnum or other mosses with less than 25% live tree cover and poorly drained and wet all year. Indicator plants: Bog Rosemary, Leather Leaf, Labrador Tea, Cranberry and Lambkill. Ericaceous plants being plants in or related to the heather family (ericaceae). They are typically plants of acid soils, bogs and woodlands.
- 73 **Treed Bog** - any area consisting primarily of ericaceous plants, sphagnum or other mosses with stunted softwood or hardwood species 25% or more live tree cover.
- 74. **Ocean Wetland** Ocean water portion of a wetland
- 75. **Wetland In Lake** Lake water portion of a wetland
- 76 **Cliffs, Dunes, Coastal Rocks** that area of land between high tide mark and the forest or non forest stand and consists of cliffs (a high steep face of a rocky or soil mass), dunes (a ridge or hill created by wind blown sand), or coastal rock (a toque shaped or lobate area of bedrock, may or may not extend into the water).
- 77 **Inland water** May include lakes, rivers, reservoirs, canals and ponds.
- 78. **Ocean**- Any area of salt water beyond harbour mouths as indicated by virtual boundaries assigned as part of original interpretation.

- 84 **Rock Barren** - any area covered by at least 50% exposed rock outcrop and/or boulders with less than 25% live tree cover.

Boulders being rock fragment over 60cm in diameter.

- 85 **Barren** - any area of less than 25% live tree cover containing "ericaceous" vegetation with less than 50% rock out crops and/or boulder cover and less than 50% other woody plant cover. Area dry and firm in summer. Indicator plants: Bearberry, Rhodora, Blueberry, Huckleberry and Lambkill.

- 86 **Agriculture** - any area in hay field, pasture, tilled crops, orchards which contains no merchantable tree species.

- 87 **Urban** - any area used primarily as residential, industrial and related structures such as streets, sidewalks, parking lots, etc. Also include house lots in wooded areas outside of towns and villages which are not adjacent to agriculture land and those lots surrounded by forest will have to be delineated according to these specifications.

In cases of ribbon development along some roads then a strip may be delineated along the road and classed as urban. Obvious urban area within agriculture land will be delineated and coded accordingly. Ribbon development pertains to the unplanned rural housing that occurs along roads.

Categories that will be classified as urban are bunkers, golf courses, picnic parks, campgrounds, drive in theatres, auto salvage yards, power stations, water treatment areas, lagoons sewer/water, cemeteries, light houses, ball parks, etc.

- 91 **Blueberry** - areas that appear to have been or are being used for commercial blueberry production.

- 92 **Miscellaneous**- any non-forested land not covered by any of the above categories: old mill site, rifle range, tower site, observation site, lake shore bottom (where unable to give forest/non-forest code), quarry, mining activity, wharf, pier, causeway, dam, unidentified objects, airstrip, etc. any miscellaneous category must be named in the coding form.

Tower Site - an area which contains a building or structure high in proportions to its lateral dimensions ie. Fire tower

Receiver Site - an area which has a device or apparatus that receives electrical signals, waves or the like.

Observation Site - a position usually on high ground which activities can be observed.

Quarry - an excavation or pit usually open to the air from which building stone, slate or the like is obtained by cutting, blasting, etc.

Mining Activity - an excavation or pit made in the earth for the purpose of extracting ores, precious stones, coal, etc.

Rifle Range - an area equipped with targets for practice in shooting weapons

- 93 **Sanitary Land Fill** - areas used by municipalities for disposal of garbage by burying of the material not usually included in an Urban area.
- 94 **Beach** - that area of land between normal water line and the forest stand or non forest category (i.e. bog, etc.) . Area showing due to abnormally low water is not considered to be part of a beach.
- 95 **Gravel Pit** - any area either active or non active used for the purpose of extracting gravel.
- 96 **Pipeline Corridor** - a defined lineal feature of a gas or oil pipeline route.
- Water (lakes & streams), roads, railway, transmission lines will be taken from topographic Data Base.
- 97 **Powerline** A powerline corridor identifiable on a 10 000 scale aerial photograph.
- 98 **Road Corridor** Generated polygons of varying widths for paved Roads based on road class.
- 99 **Railway corridor** Generated 20 metre polygons around active and abandoned rail lines.