COOPERATION

FOREST RESEARCH REPORT

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NOVA SCOTIA SOFTWOOD GROWTH AND YIELD MODEL - VERSION 1.0 USER MANUAL

INTRODUCTION

To develop sound forest management strategies, managers must be able to predict the effects of silvicultural interventions on growth and yield. For example, how do these interventions affect future pulpwood and sawlog production, rotation ages, and volume increments? What is the effect of site and the timing and intensity of treatments? Due to the length of crop-rotations in forestry, these predictions must be made decades into the future, and are difficult to accurately formulate. For example, a typical pre-commercially thinned stand will not be ready for harvest for at least 20 years after treatment. Plantations require 40 years to mature.

Growth and yield models provide forest managers a way to "view" and gain a better understanding of the long-term outcome of their activities. More importantly, they provide a tool to project future growth and compare silvicultural alternatives. They are not intended to describe past growth. Inevitably any individual stand will vary in one way or another from the "average" conditions simulated by a growth and yield model. Therefore direct comparisons may not always be appropriate. The value of a growth and yield model lies in its ability to provide the best possible prediction of the relative outcomes of various management alternatives (Edwards and Christie, 1981).

Many growth and yield models have been developed in other regions (USDA, 1988), but forest growth is strongly affected by local climatic, soil, physiographic and biotic factors (Hocker, 1979). The Nova Scotia Softwood Growth and Yield Model (GNY) was developed to provide a tool relevant to the conditions prevalent in Nova Scotia.

MODEL DESCRIPTION

GNY is based on data collected from hundreds of permanent and temporary sample plots measured throughout Nova Scotia over the last quarter century. These plots are located in plantations, pre-commercial thinnings, commer-

Canada

cial thinnings, and shelterwoods of various ages and spacings, as well as in unmanaged stands. They are maintained by the Forest Research Section of the Nova Scotia Department of Natural Resources (DNR).

The growth of unmanaged and managed (plantations, pre-commercial and commercial thinnings) softwood stands can be simulated with GNY. Initial inputs to the model include (i) simulation duration, (ii) Site Index or Land Capability, (iii) main species, (iv) spacing or density for plantations, (v) treatment timing and (vi) treatment intensity (treatment spacing for pre-commercial thinnings: percent basal area removal for commercial thinnings). Based on these inputs; total, merchantable, and sawlog stand averages for (i) diameter, (ii) height, (iii) basal area, (iv) number of trees, and (v) volume (Appendix I) are predicted every 5 years over the simulation period.

MODEL ASSUMPTIONS AND LIMITATIONS

Model limitations, controlled through GNY's input screen and listed in the on-line "HELP MENU" are as follows:

- Species:
  Red Spruce (*Picea rubens* Sarg.),
  White Spruce (*Picea glauca* (Moench) Voss),
  Black Spruce (*Picea mariana*(Mill.) B.S.P.),
  Norway Spruce (*Picea abies* (L.) Karst.),
  Balsam Fir (*Abies balsamea* (L.) Mill.),
  White Pine (*Pinus strobus* L.),
  Red Pine (*Pinus resinosa*Ait.), or
  Eastern Hemlock (*Tsuga canadensis* (L.) Carr.)

	Minimum	Maximum
• Site Index (50):	6m (19.7ft)	30m (98.5ft)
or Land Capability:	$1m^3 \cdot ha^{-1} \cdot a^{-1}$	$13m^3 \cdot ha^{-1} \cdot a^{-1}$
	(no imperial equivalent)	
• Number of trees:	1077/ha	6729/ha
	(436/ac)	(2723/ac)
	(plantations only)	
• Spacing:	1.2m (4ft)	3.0m (10ft)
	(plantations only)	
• Simulation duration:	20 yrs	120 yrs
or by diameter:	10cm (4in)	50cm (20in)
• Management time:	5 yrs	80 yrs
or by diameter:	1cm (0.5in)	38cm (15in)
• Basal Area Removal:	10%	75%
	(commercial thinnings only)	
• Spacing:	1.5m (5ft)	3.0m (10ft)
	(pre-commercial thinnings only)	

This model simulates the growth of even-aged softwood stands except for Eastern larch (*Larix laricina* (DuRoi) K. Koch) and jack pine (*Pinus banksiana* Lamb.) stands. The main factors controlling growth, in the model, are Site Index, spacing, stand age and the treatment applied. All growth equations are independent of species. The predominant softwood species is specified for volume calculations only.

GNY is a stand level model. Individual tree growth is not simulated. At present, one thinning is allowed per simulation. GNY estimates are most accurate up to age 60. As sample plots, particularly in managed stands, grow older, are remeasured, and used to derive new growth equations; the model accuracy beyond this age will improve.

Pre-commercial thinnings are limited to stands with an average stand height less than or equal to 9m (30ft). Spacings in taller stands are considered commercial thinnings. All thinnings are assumed to be from below (low thinnings, Robertson and Young, 1990). Whenever a plantation or commercial thinning in a plantation is simulated; the model assumes that the spacing in one direction is not less than 50% of that in the other direction. If this criterion is not satisfied, growth projections will not be accurate. For example, in a 1.8m x 1.8m plantation, a row thinning of 2 consecutive rows will not be correctly simulated. Likewise an initial plantation spacing cannot be specified at say, 2.4m (7.9ft) by 1.1m (3.6ft).

Yields projected by GNY are for fully stocked stands only. To project yields from

stands that are partially stocked, the estimated % stocking must be multiplied by the simulated basal areas and volumes. This estimation method assumes that the stocked portions of the stand are growing "normally" and that the understocking is due to "holes" in the stand.

LOADING THE MODEL

GNY is a program that runs on an IBM PC or compatible micro-computer operating under DOS 3.2+ or OS/2 2.0®+. To install GNY, copy the contents of the GNY disk onto the desired directory on the hard drive. For example, to copy GNY from your A floppy drive into a directory called **GROWTH** on your C drive, type the following at the DOS prompt, when C is your active drive (press the **ENTER** key after every line)

**CD **
MD GROWTH
CD GROWTH
(put GNY disk into your A floppy drive)
COPY A:*.*

GNY can also be run directly off the floppy drive. In this case, GNY does not have to be copied onto the hard drive.

In order for GNY to operate successfully, an ANSI.SYS device driver must be set up in the CONFIG.SYS file. GNY will not run without an active ANSI.SYS driver. Appendix II describes a method to install and activate the ANSI.SYS driver.

Once the ANSI driver is installed and active, GNY can be run from the drive where it is located by typing GNY after the DOS prompt. For example, if you have copied GNY.EXE to the C:\GROWTH\ directory, move to this directory and type GNY

RUNNING THE MODEL

In general, the user must press the "enter" key after every input to proceed to the next input prompt or to proceed to the next screen. If at any time the user wishes to exit the program without completing a run; the "CTRL" and "C" keys should be pressed at the same time. The run will be aborted and the program exited.

To start GNY, type "GNY" and the "enter" key. GNY then displays the following introduction screen.

```
       Growth and Yield Model
          Version 1.0 1993
         (C) Forest Research
       Nova Scotia Department
       of Natural Resources
```

Press ENTER to Start

After pressing the "enter" key, the Input screen is shown.

```
INPUT/OUTPUT UNITS
Imperial(Y/N)= ▓ Metric(Y/N)= ▓

STAND CHARACTERISTICS
Natural(Y/N)= ▓ Plantation(Y/N)= ▓
Species: ▓ =   [ Major Component ]
Site Index(50)[Breast Height] ▓▓▓▓
Number of Trees  / Unit Area ▓▓▓▓▓
                or
        Spacing: ▓▓▓▓ by ▓▓▓▓

GROW UNTIL
AGE= ▓▓▓▓ (or) DIAMETER= ▓▓▓▓
```

```
H E L P   M E N U
(INPUT UNITS) Enter (Y) for Imperial
or (Y) for Metric units - not both
Press ENTER to advance to METRIC

ERROR

MANAGEMENT TIME OPTION
Age  ▓▓▓▓  (or) Diameter ▓▓▓▓

MANAGEMENT INTENSITY OPTION
% B.A. Removal   (or)    Spacing
  ▓▓▓▓                    ▓▓▓▓
```

A help menu is located in the upper right hand of this screen. The information in this menu will change according to the item to be entered. For example, the first message in the help menu indicates you should enter a "Y", followed by "enter", next to the desired unit type. This menu will also indicate keying errors. For example, if "N" is entered for both metric and imperial units; the program produces a beep, and an ERROR message is displayed in the bottom portion of the help menu "BAD ENTRY - SEE MENU ABOVE".

```
INPUT/OUTPUT UNITS
Imperial (Y/N)= ▓  Metric (Y/N)= ▓

STAND CHARACTERISTICS
Natural(Y/N)= ▓ Plantation(Y/N)= ▓
Species: ▓ =   [Major Component]
Site Index(50)[Breast Height] ▓▓▓▓
Number of Trees / Unit Area ▓▓▓▓▓
                or
        Spacing: ▓▓▓▓ by ▓▓▓▓

GROW UNTIL
AGE= ▓▓▓▓ (or) DIAMETER= ▓▓▓▓
```

```
H E L P   M E N U
{INPUT UNITS} Enter (Y) for Imperial
or (Y) for Metric units - not both
Press ENTER to advance to METRIC

ERROR:  BAD ENTRY - SEE MENU ABOVE

MANAGEMENT TIME OPTION
Age ▓▓▓▓  (or) Diameter ▓▓▓▓

MANAGEMENT INTENSITY OPTION
% B.A. Removal   (or)    Spacing
  ▓▓▓▓                    ▓▓▓▓
```

The next data entry section is entitled "STAND CHARACTERISTICS". The first item entered in this section is the regeneration method. If the stand is naturally regenerated, press "Y" and "enter" next to the "Natural (Y/N)" prompt. If the stand is planted answer "Y" next to "Plantation (Y/N)".

```
         INPUT/OUTPUT UNITS                         H E L P    M E N U

 Imperial (Y/N)=█  Metric (Y/N)=Y          {STAND TYPE} Enter (Y) for NATURAL
                                           or (Y) for PLANTATION - not both
       STAND CHARACTERISTICS               Press ENTER to advance to PLANTATION

 Natural(Y/N)=█   Plantation(Y/N)=Y        ERROR:

  Species: █ =    [Major Component]           MANAGEMENT TIME OPTION

 Site Index(50)[Breast Height] █████
                                            Age  ████  (or) Diameter ████
 Number of Trees / Unit Area   █████
                 or
          Spacing: ████ by ████               MANAGEMENT INTENSITY OPTION

            GROW UNTIL                     % B.A. Removal   (or)   Spacing
                                                 ████                ████
 AGE= ████  (or) DIAMETER= █████
```

Next you are asked to type a two letter code representing the main species in the stand.

```
         INPUT/OUTPUT UNITS                         H E L P    M E N U

 Imperial (Y/N)=█  Metric (Y/N)=Y          {species} RS=Red Sp., WS=White Sp.,
                                           BS=Black Sp., NS=Norway Sp., BF=B.Fir
       STAND CHARACTERISTICS               WP=White Pine, RP=Red Pine, EH=E.Hemlock

 Natural (Y/N)=█ Plantation(Y/N)=Y         ERROR:

 Species: RS =   [Major Component]            MANAGEMENT TIME OPTION

 Site Index(50)[Breast Height] ████
                                            Age ████  (or) Diameter ████
 Number of Trees / Unit Area   ████
                 or
          Spacing: ████ by ████               MANAGEMENT INTENSITY OPTION

            GROW UNTIL                     % B.A. Removal   (or)   Spacing
                                                ████               ████
 AGE= ████  (or) DIAMETER= ████
```

You are also asked to enter the Site Index or the Land Capability (Appendix I). If Land Capability is entered, it must be preceded by a minus sign. For example if you wish to simu-late a stand with an LC of 6, it must be entered as "-6" followed by "enter". Enter Land Capability in whole numbers only.

```
┌─────────────────────────────────────┐
│        INPUT/OUTPUT UNITS            │
├─────────────────────────────────────┤
│  Imperial (Y/N)=▓  Metric (Y/N)=Y   │
├─────────────────────────────────────┤
│        STAND CHARACTERISTICS         │
├─────────────────────────────────────┤
│  Natural (Y/N)=▓  Plantation(Y/N)=Y │
│                                      │
│  Species: RS =    [Major Component]  │
│                                      │
│ Site Index (50)[Breast Height]-6 ▓▓ │
│                                      │
│ Number of Trees / Unit Area  ▓▓▓▓▓  │
│              or                      │
│      Spacing: ▓▓▓▓ by  ▓▓▓▓          │
├─────────────────────────────────────┤
│            GROW UNTIL                │
├─────────────────────────────────────┤
│   AGE=▓▓▓▓ (or) DIAMETER=▓▓▓▓        │
└─────────────────────────────────────┘
```

```
┌─────────────────────────────────────┐
│        H E L P   M E N U             │
├─────────────────────────────────────┤
│ {SITE INDEX} Min = 6 m / 19.7 ft    │
│   @ age 50    Max = 30 m /98.5 ft   │
│ Breast Height or LC (1-13)          │
├─────────────────────────────────────┤
│ ERROR:                               │
├─────────────────────────────────────┤
│     MANAGEMENT TIME OPTION           │
├─────────────────────────────────────┤
│                                      │
│   Age ▓▓▓▓  (or) Diameter ▓▓▓▓       │
├─────────────────────────────────────┤
│   MANAGEMENT INTENSITY OPTION        │
├─────────────────────────────────────┤
│  % B.A. Removal   (or)   Spacing     │
│      ▓▓▓▓                 ▓▓▓▓        │
└─────────────────────────────────────┘
```
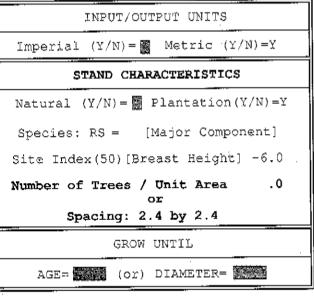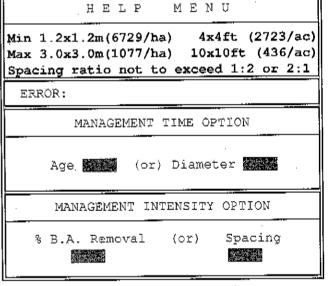
If you have chosen a plantation, enter either the "Number of Trees / Unit area" or the "Spacing:". If a "Natural" stand was chosen, it is assumed to grow as a fully stocked stand. In this case, the density is calculated by the model and cannot be entered.

```
┌─────────────────────────────────────┐
│        INPUT/OUTPUT UNITS            │
├─────────────────────────────────────┤
│  Imperial (Y/N)=▓  Metric (Y/N)=Y   │
├─────────────────────────────────────┤
│        STAND CHARACTERISTICS         │
├─────────────────────────────────────┤
│  Natural (Y/N)=▓  Plantation(Y/N)=Y │
│                                      │
│  Species: RS =    [Major Component]  │
│                                      │
│ Site Index(50)[Breast Height] -6.0  │
│                                      │
│ Number of Trees / Unit Area     .0  │
│              or                      │
│      Spacing: 2.4 by 2.4             │
├─────────────────────────────────────┤
│            GROW UNTIL                │
├─────────────────────────────────────┤
│   AGE=▓▓▓▓ (or) DIAMETER=▓▓▓▓        │
└─────────────────────────────────────┘
```

```
┌─────────────────────────────────────┐
│        H E L P   M E N U             │
├─────────────────────────────────────┤
│ Min 1.2x1.2m(6729/ha)  4x4ft (2723/ac)│
│ Max 3.0x3.0m(1077/ha) 10x10ft (436/ac)│
│ Spacing ratio not to exceed 1:2 or 2:1│
├─────────────────────────────────────┤
│ ERROR:                               │
├─────────────────────────────────────┤
│     MANAGEMENT TIME OPTION           │
├─────────────────────────────────────┤
│                                      │
│   Age ▓▓▓▓  (or) Diameter ▓▓▓▓       │
├─────────────────────────────────────┤
│   MANAGEMENT INTENSITY OPTION        │
├─────────────────────────────────────┤
│  % B.A. Removal   (or)   Spacing     │
│      ▓▓▓▓                 ▓▓▓▓        │
└─────────────────────────────────────┘
```

The next section defines the simulation length options. You can specify the length of the simulation by keying in the ending stump age or average diameter at breast height (DBH).

```
┌─────────────────────────────────────┐   ┌─────────────────────────────────────┐
│         INPUT/OUTPUT UNITS           │   │      H E L P      M E N U            │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ Imperial (Y/N)=▓  Metric (Y/N)=Y     │   │ {ROTATION AGE} minimum =  20 years  │
├─────────────────────────────────────┤   │  Dom. Stump    maximum = 120 years  │
│        STAND CHARACTERISTICS         │   │ Press ENTER to select diameter option│
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ Natural (Y/N)=▓ Plantation(Y/N)=Y    │   │ ERROR:                              │
│                                      │   ├─────────────────────────────────────┤
│ Species: RS =    [Major Component]   │   │      MANAGEMENT TIME OPTION          │
│                                      │   │                                      │
│ Site Index(50) [Breast Height] -6.0  │   │                                      │
│                                      │   │    Age ▓▓▓▓  (or) Diameter ▓▓▓▓     │
│ Number of Trees / Unit Area   1735.  │   │                                      │
│                  or                  │   ├─────────────────────────────────────┤
│         Spacing: 2.4  by 2.4         │   │    MANAGEMENT INTENSITY OPTION       │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ ↳           GROW UNTIL               │   │ % B.A. Removal   (or)    Spacing     │
├─────────────────────────────────────┤   │      ▓▓▓▓▓               ▓▓▓▓▓       │
│  AGE= 80▓  (or) DIAMETER= ▓▓▓▓       │   │                                      │
└─────────────────────────────────────┘   └─────────────────────────────────────┘
```

Management timing options are keyed in next. The treatment can be specified to occur at a given stand age (from stump height), or at a given total average diameter (DBH). Since the model updates only once every 5 years, the treatment may be performed at a slightly different age or diameter than specified. If treatment timing accuracy is critical to your simulation, vary the simulation-duration age entered in the previous step until the time of treatment more closely matches the desired timing.

```
┌─────────────────────────────────────┐   ┌─────────────────────────────────────┐
│         INPUT/OUTPUT UNITS           │   │      H E L P      M E N U            │
├─────────────────────────────────────┤   ├─────────────────────────────────────┤
│ Imperial (Y/N)=▓  Metric (Y/N)=Y     │   │ {MANAGE. TIME - DBH} min.= 1cm = 0.5in│
├─────────────────────────────────────┤   │                      max.= 38cm = 15in│
│        STAND CHARACTERISTICS         │   ├─────────────────────────────────────┤
├─────────────────────────────────────┤   │ ERROR:                              │
│ Natural (Y/N)=▓ Plantation(Y/N)=Y    │   ├─────────────────────────────────────┤
│                                      │   │      MANAGEMENT TIME OPTION          │
│ Species: RS =    [Major Component]   │   │                                      │
│                                      │   │                                      │
│ Site Index(50)[Breast Height] -6.0   │   │   Age: 0.   (or) Diameter:19 ▓      │
│                                      │   │                                      │
│ Number of Trees / Unit Area   1735.  │   ├─────────────────────────────────────┤
│                  or                  │   │    MANAGEMENT INTENSITY OPTION       │
│         Spacing: 2.4  by 2.4         │   ├─────────────────────────────────────┤
├─────────────────────────────────────┤   │ % B.A. Removal   (or)    Spacing     │
│            GROW UNTIL                │   │     ▓▓▓▓▓               ▓▓▓▓▓        │
├─────────────────────────────────────┤   │                                      │
│  AGE= 80.= (or) DIAMETER= ▓▓▓▓       │   │                                      │
└─────────────────────────────────────┘   └─────────────────────────────────────┘
```

Lastly, the "intensity of management" is specified. For commercial thinnings, the total basal area removal in % is entered (in the leave strips excluding trails). For pre-commercial thinnings, the spacing is entered. Pre-commercial spacing is entered as one dimension (2.4 not 2.4x2.4).

```
┌─────────────────────────────────────┐  ┌─────────────────────────────────────┐
│         INPUT/OUTPUT UNITS           │  │       H E L P     M E N U           │
├─────────────────────────────────────┤  ├─────────────────────────────────────┤
│  Imperial (Y/N)=▓   Metric (Y/N)=Y  │  │ {MANAGE.INTENSITY} minimum 10% removal│
├─────────────────────────────────────┤  │   {BASAL AREA}     maximum 75% removal│
│        STAND CHARACTERISTICS         │  │ Press ENTER for SPACING option      │
├─────────────────────────────────────┤  ├─────────────────────────────────────┤
│  Natural (Y/N)=▓ Plantation(Y/N)=Y  │  │  ERROR:                             │
│                                      │  ├─────────────────────────────────────┤
│  Species: RS =   [Major Component]  │  │     MANAGEMENT  TIME  OPTION        │
│                                      │  ├─────────────────────────────────────┤
│  Site Index(50)[Breast Height] -6.0 │  │                                     │
│                                      │  │   Age: 0.    (or) Diameter:19.0     │
│  Number of Trees / Unit Area  1735. │  │                                     │
│                or                    │  ├─────────────────────────────────────┤
│       Spacing: 2.4  by 2.4          │  │    MANAGEMENT  INTENSITY  OPTION    │
├─────────────────────────────────────┤  ├─────────────────────────────────────┤
│            GROW UNTIL                │  │  % B.A. Removal    (or)    Spacing  │
├─────────────────────────────────────┤  │     40▓                     ▓▓▓▓▓   │
│  AGE= 80.= (or) DIAMETER= ▓▓▓▓▓     │  │                                     │
└─────────────────────────────────────┘  └─────────────────────────────────────┘
```

Following this last data entry, "enter" is keyed and the following screen is shown. It contains a header section displaying user-specified inputs for species, Site Index, and input units. Also shown in the header, is the estimated number of years for free growing dominants to reach breast height. The remainder of this screen shows the simulated values at 5 year intervals, starting in the first period the average tree reaches breast height, for (i) average diameter, (ii) basal area per unit area, (iii) height, (iv) number of trees per unit area, and (v) volume per unit area for total (T), merchantable (M) and sawlog (S) trees in the stand (Appendix I).

P L A N T A T I O N			Species RS			Site Index 17.1			Units METRIC		
S I M U L A T I O N			4 Years from Stump to Breast Height						(Dominant)		

AGE	DIAMETER			BASAL AREA			HEIGHT			NUMBER TREES			VOLUME		
S.H.	T.	M.	S.	T.	M.	S.	T.	M.	S.	T.	M.	S.	T.	M.	S.
10	4.8	.0	.0	3	0	0	2	0	0	1735	0	0	4	0	0
15	9.0	12.4	16.1	11	7	2	4	4	5	1735	615	100	24	13	2
20	12.3	14.5	17.4	20	18	11	6	6	6	1735	1115	443	62	50	12
25	14.9	16.5	19.0	30	29	21	7	7	7	1735	1359	757	115	98	31
30	17.0	18.2	20.4	39	39	32	9	9	9	1735	1488	986	181	161	58
35	18.8	19.8	21.7	48	48	42	10	10	10	1735	1562	1147	255	232	90

*** MANAGEMENT INPUT = 40% BASAL AREA REMOVAL ***

AGE	DIAMETER			BASAL AREA			HEIGHT			NUMBER TREES			VOLUME		
35	22.7	23.3	24.7	29	29	28	11	11	11	713	680	575	160	149	62
40	24.2	24.6	25.9	33	33	32	12	12	12	713	688	602	203	190	81
45	25.8	26.1	27.2	37	37	36	14	14	14	713	695	626	252	237	104
50	27.2	27.5	28.4	42	41	41	15	15	15	713	699	643	304	287	127
55	28.5	28.7	29.6	46	46	45	16	16	16	713	703	656	357	337	150
60	29.7	29.9	30.6	50	50	49	17	17	17	713	705	666	410	388	172

PRESS THE ENTER KEY TO CONTINUE

By pressing the enter key again, the remainder of the simulated values are shown.

P L A N T A T I O N			Species RS			Site Index 17.1			Units METRIC		
S I M U L A T I O N			4 Years from Stump to Breast Height						(Dominant)		

AGE	DIAMETER			BASAL AREA			HEIGHT			NUMBER TREES			VOLUME		
S.H.	T.	M.	S.	T.	M.	S.	T.	M.	S.	T.	M.	S.	T.	M.	S.
65	30.8	31.0	31.6	53	53	53	18	18	18	713	706	674	462	438	195
70	31.9	32.0	32.5	57	57	57	19	19	19	713	708	679	514	488	218
75	32.8	32.9	33.4	60	60	60	20	20	20	713	708	684	565	537	241
80	33.7	33.8	34.2	63	63	63	21	21	21	713	709	688	615	584	263

PRINTED COPY REQUESTED (Y/N)   N

At the bottom of this screen you are asked if a printed copy of this run is desired. The default is no "N". After entering "Y" or "N" and "enter", the model asks whether you wish to exit the program. If a "Y" response is given, the program is exited. A "N" response returns the user to the input screen to complete another run.

To obtain a copy of GNY, send a DOS formatted disk and your return address to:

N.S. Department of Natural Resources
Forest Research Section,
P.O. Box 68,
Truro, N.S.
B2N 5B8
Attn: "GNY"

WAIVER

The GNY model is based on current information available at the time of publication. As more information is collected and analyzed, GNY will be revised and improved. The Nova Scotia Department of Natural Resources makes no warranties, expressed or implied, and shall not be liable for direct or indirect damages arising from the use of the software program. OS/2 is a registered trademark of International Business Machines Corp. Mention of any product, in this report, should not be construed as an endorsement of that product.

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Dominant Height:
Average total height of the 5 tallest free growing trees in a stand.

Land Capability:
The estimated productivity of a site in terms of Peak Mean Annual Increment (PMAI) specified in solid cubic metres per hectare per year. Determined from Dominant Height and Breast Height Age curves found in the Forestry Field Handbook (NSDNR, 1993).

Site Index (50) Breast Height Age:
The projected average total height of the 5 tallest free growing trees at 50 years of age at Breast Height (1.3m above ground level). Used as an indicator of site productivity and determined from the Forestry Field Handbook (NSDNR, 1993).

Age (S.H.):
Stump Height Age: The average stand age in years at stump height (15cm above ground level)

Diameter (T.):
Total Diameter: The quadratic mean diameter (Husch et al, 1982). The diameter at breast height (DBHob) of the tree of average basal area based on trees greater than 1cm DBHob.

Diameter (M.):
Merchantable Diameter: The DBHob of the tree of average basal area based on trees greater than 9cm DBHob.

Diameter (S.):
Sawlog Diameter: The DBHob of the tree of average basal area based on trees greater than 14cm Dbhob.

Basal Area (T.):
Total Basal Area: The cross-sectional area, at breast height, of trees greater than 1cm DBHob, per unit area.

Basal Area (M.):
Merchantable Basal Area:: The cross sectional area, at breast height, of trees greater than 9cm DBHob, per unit area.

Basal Area (S.):
Sawlog Basal Area: The cross-sectional area, at breast height, of trees greater than 14cm DBHob, per unit area.

Number of Trees (T.):
Total Number of Trees: The number of trees, per unit area, greater than 1cm DBHob.

Number of Trees (M.):
Merchantable Number of Trees: The number of trees, per unit area, greater than 9cm DBHob.

Number of Trees (S.):
Sawlog number of Trees: The number of trees, per unit area, greater than 14cm DBHob.

Volume (T.):
Total Volume: The inside-bark bole-volume, per unit area, of trees 1cm DBHob and greater, as determined from Honer's (1967) volume equations (including the stump and top). This does not include volume harvested in commercial thinnings.

Volume (M):
Merchantable Volume: The inside-bark bole-volume, per unit area, of trees greater than 9cm DBHob, as determined from Honer's volume equations. The merchantable bole excludes the stump (15cm height) and top (portion of the bole less than 7.6cm diameter inside bark [Dib]). This does not include volume harvested in commercial thinnings.

Volume (S.):
Sawlog Volume: If imperial units are used: The number of board feet (fbm) per acre, for trees greater than 14cm DBHob, as determined from Honer's volume equations. These values are

based on the New Brunswick Log Rule. Stumps (15cm height) and tops (portion of the bole less than 10cm Dib) are excluded. If metric units are used: fbm is converted to solid cubic metres per hectare.

Height (T.):

Total Height: Total Lorey's height (Husch et al, 1982). The height of the tree of average basal area based on trees exceeding 1cm DBHob.

Height (M.):

Merchantable Height: The height of the tree of average basal area based on trees exceeding 9cm DBHob.

Height (S.):

Sawlog Height: The height of the tree of average basal area based on trees exceeding 14cm DBhob.

<div align="center">

APPENDIX II
Installation of ANSI.SYS

</div>

To determine whether an ANSI.SYS driver is present in CONFIG.SYS, enter the following at the DOS PROMPT: **TYPE C: \ CONFIG.SYS** If the line **DEVICE=drive: \ directory\ ANSI.SYS** is not present, it must be inserted. ANSI.SYS is usually in the DOS directory and can be added with EDLIN. For example, if EDLIN is used to edit CONFIG.SYS; and EDLIN.COM and ANSI.SYS are located in the DOS directory of your C drive; proceed as follows (only type the bold text and press enter after each line):

CD \DOS
EDLIN C:\CONFIG.SYS
End of input file
*I
    1:***DEVICE=C:\DOS\ANSI.SYS**
    2:***(press the) CTL** (key, and) **Z**
      (at the same time)
*E
You must now re-boot your machine to activate this change.
    (press the) **CTL** (key) and **ALT** (key) and **DEL** (key at the same time).

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