

**2000/02 PRINCE EDWARD ISLAND
Corporate Land Use Inventory
Forest Summary**



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**Resource Inventory and Modelling Section
Department of Agriculture, Fisheries, Aquaculture and Forestry**

Introduction

The 2000/02 Corporate Land Use Inventory was developed from the 1980/82 and 1990/92 Forest Biomass Inventories of Prince Edward Island. It followed the same general methodology as the previous projects but included a much more detailed study of non forest land than the earlier Forest Inventory projects. The report titled, *2000/02 Corporate Land Use Inventory Area Summary*, provided an overview of the Inventory findings and this report provides details on the forest component of the Corporate land Use Inventory. Comparison data from earlier studies are also provided. However, it should be noted that the early studies were less detailed than the 2000 study.

The project was carried out under the direction of the Resource Inventory and Modelling Section of the Department of Agriculture and Forestry (now the Department of Agriculture, Fisheries, Aquaculture and Forestry).

Procedures

Area information was generated from the interpretation of aerial photography taken in July and August of 2000. The 1:17,500 false colour infrared photography is the same type and scale used in the 1990/92 Forest Biomass Inventory.

The aerial photography was interpreted by a team of skilled interpreters and involved the identification and classification of 184,000+ areas across the Island. Field work was carried out in 2000 and 2001, and includes the establishment of 804 forest sample plots. The information contained herein is the result of the combination of the measurements made from the photographs and the field plots.

Detailed maps are available from the Department of Department of Agriculture, Fisheries, Aquaculture and Forestry Office, Upton Road, West Royalty. Maps for a given area can be viewed in the Forest District offices in Wellington Station, Beech Grove and Southampton.

Information from earlier inventories is provided where appropriate for comparison. In a number of cases the methodology or mapping base has changed over the twenty year period and earlier data was recalculated, where appropriate and possible, to provide comparable figures.

The following tables are based on both the interpretation of aerial photography and the field measurements. Area information have been determined from the photography and the volume information from the field plots, while the total volume information is a combination of both.

Note: Other data collected as part of the fieldwork included information on shrubs, ground vegetation, coarse woody debris, and soils. Analysis of this information data is ongoing.

Total Forest Area

The Island's forest area has been reported in a number of studies since 1900. Table I shows that the area of the forest continued to increase from 1900 to 1990. However, since 1990 more forest land has been converted to other uses and thus the forest area decreased during this period. Details of the 1990-2000 conversion are documented elsewhere in this report. The forest area was determined from aerial photography taken in the years 1935/36, 1974, 1980, 1990 and 2000. The basis for the 1961 number is not known but was probably the 1958 aerial photography.

Table I
Forest Area of Prince Edward Island 1900-2000

Year	Area (hectares)	Source
circa 1900	177,900	1935/36 Forest Covertypes mapping project
1935/36	186,283	1935/36 Forest Covertypes mapping project
1961	210,400	Canadian Forestry Statistics 1961, report 25-202, page 5
1974	256,000	Maritime Resource Management Services
1980	273,593	1980/82 Forest Biomass Inventory
1990	279,193	1990/92 Forest Biomass Inventory
2000	263,207	2000/02 Corporate Land Use inventory

- Notes:
- 1: The 1900 and 1935/36 numbers were published in Prince Edward Island 1935/36 Forest Cover Type Mapping, dated May 1997 by W. M. Glen, Department of Agriculture and Forestry. The area in circa 1900 was determined from the origin of stands as shown by the 1935/36 aerial photography
 - 2: There is no forest area figure for 1967 even though there was an inventory. The 1967 Acres Inventory did not report total forest area only merchantable forest area.
 - 3: The 1974 area numbers were generated by Maritime Resource Management Services (M.R.M.S.) in Amherst, Nova Scotia from the 1974 aerial photography.
 - 4: The 1980 area has been recalculated after the digitization of that inventory and the numbers vary slightly from those previously published.
 - 5: The 1990 numbers also vary slightly from previously published numbers due to the conversion of that inventory to the same datum and projection that is now used by the Province.
 - 6: Forest area includes; high forest, plantations, alders, clearcuts, forested wetlands

Forest Covertypes

Table II provides the forest covertypes breakdown from the various reports and sources. Covertypes are based on the percentage of the species in the tree canopy. Individual species are identified as to whether they are softwood or hardwood species, and then grouped as follows:

The **softwood covertypes** is composed of 75% or greater of softwood species.

The **softwood/hardwood covertypes** is composed of more than 50% softwood and with

more than 25 % hardwood species

The **mixed wood category** was used in the 1935 study for areas with an equal amount of hardwood and softwood species. The 1961 mixed wood area included the softwood/hardwood and the hardwood/softwood categories.

The **hardwood/softwood coverype** is composed of greater than 50% hardwood and with more than 25 % softwood

The **hardwood coverype** is composed of 75% or greater of hardwood species.

Table II
Prince Edward Island Forest Covertypes 1935/36, 1961, 1974, 1980, 1990 & 2000 in Hectares

Year	Softwood	Soft/hardwood	Mixedwood	Hard/softwood	Hardwood	Other
1935/36	53,200	48,950	3,458	33,558	12,140	34,970
1961	122,610	--	72,020	--	6,060	67,560
1974	98,830	83,630	--	45,620	27,880	--
1980	88,741	32,939	--	52,281	69,620	30,013
1990	58,828	58,364	--	62,076	73,394	26,531
2000	55,713	33,332	--	49,985	83,782	40,395

Notes 1: No coverype data were available for 1900

2: sources are as shown in notes for Table I

3: The 1961 data recorded the area of mixedwood and this area was not divided into soft/hardwood and hard/softwood

4: The 2000 areas include the forested wetlands as do the previous years.

Table III provides a breakdown of the “other” category of coverype shown in Table II. In 1935, clearcuts represented 17.7% of the forest area as compared to 6.6% in 2000. No breakdown of the “other” category was available from the 1961 and 1974 studies.

Table III
Breakdown of the ‘Other’ Forest Coverype 1935/36, 1980, 1990 & 2000 in Hectares

Year	Alders	Clearcuts	Plantations	Remainder
1935/36	1,724	33,015	2	0
1980	16,662	11,580	526	1,245
1990	15,184	9,913	1,429	5
2000	7,079	17,474	15,731	111

Notes 1: Clear cuts are areas from which tree cover has been recently removed and have not been converted to other uses or regrown to a size where tree species were identifiable.

2: Remainder included dead trees. The high number in 1980 was due to the inclusion of barrens which

were beginning to revert to forest in this category.

3: Minor discrepancies may exist between grand totals and the sum of individual values due to rounding.

4: Much of the area of alders in the 2000 inventory was included in the high forest numbers as there were a number of other species mixed in with the alder. In previous inventories these trees were not identified if they represented less than 40% of the stand.

Table IV provides a breakdown at the county level for the forests of the Province.

Table IV
1980-2000 Breakdown of Covertypes in Hectares by County

Land Use	1980			1990			2000		
	Prince	Queens	Kings	Prince	Queens	Kings	Prince	Queens	Kings
Softwood	25,067	25,703	37,971	14,825	16,807	27,196	15,548	15,036	25,129
Soft-hardwood	8,984	10,733	13,222	19,321	15,051	23,992	10,090	8,928	14,314
Hard-softwood	17,532	15,239	19,511	23,855	14,585	23,636	18,252	12,707	19,026
Hardwood	22,132	23,254	24,234	19,201	28,525	25,668	27,266	28,981	27,535
Alders	8,794	3,179	4,689	8,887	2,129	4,168	4,292	774	2,013
Clearcuts	3,847	2,670	5,063	3,188	3,154	3,571	5,263	4,329	7,882
Plantations	240	72	215	324	681	424	4,171	5,759	5,801
Other forest	87	753	405	0	1	4	84	23	4

See notes for table III:

Tree species

Photo interpretation identifies the percentage of a given tree species by the area of the tree crowns. Trees which normally form the tree canopy, such as white birch, poplar, white spruce, etc., can be detected from aerial photography. However, trees which form understories cannot be seen on the photographs and are therefore, under reported by photo interpretation. Understory species are usually shade tolerant species such as hemlock, beech, sugar maple. (Table XXVI, based on the field plot measurements, gives a complete picture.) Table V and Table VI break down the 'High Forest' cover types into the percentage of the forest canopy occupied by each species.

Table VII has the breakdown of the plantation cover as of the Year 2000.

Note: The term "High Forest" is defined as the area that had trees of sufficient size to enable the photo interpreters to identify the species.

Table V
Area in hectares of the Crowns of Hardwood Tree Species
in Prince Edward Island 1980, 1990 & 2000

Species	1980	1990	2000
Alders	--	4,371	8,663
Intolerant hardwood	32,431	--	--
Pin cherry	--	567	1,244
Poplar	8,076	29,562	24,379
White birch	12,220	24,967	22,707
Red oak	trace	28	19
Grey birch	299	67	25
Tolerant hardwood	41,882	--	--
Sugar maple	464	12,475	8,045
Beech	71	1,048	1,283
Red maple	22,848	46,531	52,732
Ash	22	120	107
Yellow birch	111	4,528	4,794
Elm	505	312	173

Notes 1: Table V only includes the covertypes, softwood, soft/hardwood, hard/softwood and hardwood. It does not include the area in the 'other' category as shown in table III except for plantations with a height \geq 5 metres.

2: In the 1980 inventory the species groupings of intolerant and tolerant hardwood were used. The intolerant hardwood group included white birch, poplar, and pin cherry. The tolerant hardwood group included red and sugar maple, beech, and yellow birch.

3: The 1980, 1990 and 2000 areas include the forested wetlands

4: The 1980 inventory had a less detailed breakdown on species in the canopy so that minor species of the forest may be under estimated.

5: Alder shown in this table were in stands dominated by tree species, most alder was classified in the 'other' category (see Table II).

Table VI
Area in Hectares of the Crowns of Softwood Tree Species
in Prince Edward Island 1980, 1990, & 2000

species	1980	1990	2000
Balsam fir	17,540* ²	18,027	18,325
Black spruce	29,310	34,410	22,790
Cedar	950	551	538
Douglas fir	10	4	12
Eastern larch	12,416	16,807	12,588
European larch	40	8	7
Japanese larch	–	–	29
Hemlock	298	82	147
Jack pine	132	99	210
Norway spruce	2	2	33
Red pine	166	142	720
Red spruce	14,544	7,258	3,664
Scots pine	14	24	61
White pine	523	303	693
White spruce	48,714	50,367	40,646
Other species	–	–	29

- Notes 1: Table VI only includes the covertypes, softwood, soft/hardwood, hard/softwood and hardwood. It does not include the area in the 'other' category except plantations with a height \geq 5 metres.
- 2: In the 1980 inventory the species grouping of spruce/fir was used. This group included primarily balsam fir with less amounts of red, black or white spruce. In this table the category (14,888 ha) was added to the balsam fir number.
- 3: The 1980, 1990 and 2000 areas include the forested wetlands.
- 4: The 1980 inventory had a less detailed breakdown on species in the canopy so that minor species of the forest may be under estimated.

Table VII shows the species found in all plantations with a height of five metres based on their percentage occupancy of the canopy.

Table VII
Area in Hectares of the Crowns of Trees in Plantations
with a Height greater than 5 Metres

planted species	hectares	in growth species	hectares
Austrian pine	8	Alder	84
Jack pine	61	Grey birch	10
Lodgepole pine	3	White birch	175
Red pine	667	Pin cherry	19
Scots pine	61	Poplar	154
White pine	129	Red maple	174
Balsam fir	71	Sugar maple	3
Douglas fir	12		
Black spruce	628		
Norway spruce	33		
Red spruce	12		
White spruce	402		
Other spruces	3		
Eastern larch	532		
European larch	7		
Japanese larch	29		
Cedar	8		
White ash	3		
Red oak	5		
Yellow birch	1		
Hybrid poplar	8		

- Notes
- 1: black pines include Austrian, Corsican and Yugoslavian pine
 - 2: other spruces include hybrids planted as part of experiments carried out in cooperation with the Canadian Forest Service
 - 3: some area of black spruce, white spruce, eastern larch as well as balsam fir are ingrowth into the plantations

Forest Conversion

From 1900 to 1990 agricultural lands were abandoned and allowed to revert to forest. This was primarily a natural process but since 1951, Forestry Division planting programs also contributed towards this increase in forest. Prior to 1980, these planting programs were small as shown by the 1980 inventory which only identified 526 hectares of forest plantation.

By 1990, the inventory identified 1429 ha of plantation but many plantations established after 1985 were not identified from the aerial photography due to the small size of the planted trees. The 2000 inventory identified 15,731 hectares of plantation but in spite of this increase, the total forest area of the Island decreased by 16,791 ha during the 1990-2000 period. Table VII shows the forest types which were converted to other land uses. The majority of the remaining area not shown on this table is forest that was classified as treed wetland in 2000.

**Table VII
Forest land Converted to other Land Uses 1990-2000**

forest type 1990	to Agriculture	to Blueberries	to Residential	to Industrial	to Recreation
Softwood	1,496	420	335	135	148
Soft/hardwood	1,668	438	308	120	101
Hard/softwood	1,504	233	269	114	115
Hardwood	1,871	857	300	173	96
Plantations	85	36	20	9	2
Clearcut	833	732	32	54	9
Alders	842	182	113	21	21
Total	8,319	2,898	1,377	626	492

Forest Regeneration

The 2000 inventory allowed researchers to examine the regeneration that has occurred on areas noted as clearcut in 1980 and 1990. Table VIII and Table X show the 2000 land use classification of these clearcuts. Most of the area is still in forest cover but development and conversion to agriculture have removed over a thousand hectares. Tables IX and XI show the land cover of the cuts in 2000 as well as the area occupied by plantations. The majority of the cuts that were not planted, regenerated to intolerant hardwoods.

**Table VIII
Area in Hectares in 2000 of Areas Recorded as Clearcuts in 1980**

Land Use in 2000	Area in Hectares	Comment
Agriculture	909	converted from forest
Forest	10,078	retained in forest
Developed land	175	converted from forest
Other	727	includes wetland and no evident land use

Table IX
Area in Hectares in 2000 of areas Recorded as Clearcuts in 1980
and that have been Retained as Forest (based on photo interpretation of tree crowns)

species	natural regeneration area	planted area
Alder	490	0
Beech	22	0
Elm	6	0
Grey birch/pin cherry	70	0
Poplar	1,240	0
Red maple	2,080	0
Sugar maple	136	0
White birch	1,136	0
Yellow birch	67	0
Ash	4	0
Black spruce	1,103	249
Red spruce	151	4
White spruce	1,349	113
Norway spruce	15	15
Balsam fir	879	33
Eastern larch	562	45
Japanese larch	7	7
Cedar	29	1
Red pine	100	100
White pine	61	49
Jack pine	16	13
Dead trees	30	0
Clearcut	513	0

Note: The greatest area of the 1980 clearcuts regenerated to white birch, poplar, and red maple. These are considered to be pioneer species that grow well in open (clearcut) conditions. Even 20 years after the harvest, 513 hectares did not have tree species which could be identified from photo interpretation.

Based on the harvest figures reported by Statistics Canada, the type of wood that was harvested between 1975 and 1980 was 45.3% hardwood and 54.7% softwood (Anonymous, 1974-1980). This would suggest that the clearcutting identified by the 1980 inventory was probably an equal (more or less) mix of hardwood and softwood dominated stands .

Table X
The Land Use in 2000 of areas Recorded as Clearcuts in 1990

Land Use in 2000	Hectares	Comment
Agriculture	1,272	converted from forest
Developed land	102	converted from forest
Forest	8,230	retained in forest
Other	307	includes wetland and no evident land use

Table XI
The species in 2000 of Areas Recorded as Clearcuts in 1990
and that have been retained as forest (based on photo interpretation of tree crowns)

Species	Natural Regeneration area (ha)	Planted Area (ha)
Alder	409	0
Beech	20	0
Elm	1	0
Grey birch/pin cherry	123	0
Poplar	718	0
Red maple	1,530	0
Sugar maple	86	0
White birch	948	0
Yellow birch	39	3
Ash	1	1
Black spruce	1,110	957
Red spruce	31	4
White spruce	786	459
Norway spruce	13	13
Balsam fir	447	124
Eastern larch	482	363
Japanese/European larch	29	29
Cedar	12	1
Red pine	582	581
White pine	297	292
Jack pine	2	2
Other species	10	9
clearcut	548	0

As in Table IX, Table XI shows that the majority of areas classified as clearcuts in 1980 and 1990, if not replanted, regenerated to poplar, white birch, and red maple. Interestingly, some 500+ ha of land was still classified as clearcut because it had not yet regenerated to trees which could be identified by the photo interpreters.

Table XII shows the amount of area harvested verses the size of the cuts. There has been a continued increase in the proportion of the cuts over five hectares.

Table XII
Percentages of the Area Harvested by Clearcut sizes 1980, 1990, 1994, 1997 & 2000

Size (hectares)	1980	1990	1994	1997	2000
1-5	64.4	41.3	44.1	45.0	39.4
5-10	20.2	21.6	26.0	22.9	24.7
10-15	4.7	12.3	13.1	12.9	13.6
15-20	2.8	8.1	4.5	6.0	6.7
21-25	1.8	5.7	4.2	5.0	4.7
25+	6.1	10.9	8.1	8.3	10.9

Notes 1: does not include clearcut areas less than one hectare in size.

Table XIII shows the type of forest harvested between 1990 and 2000. The amount of softwood and softwood/hardwood types clearly shows that the harvest was concentrated on softwood species.

Table XIII
1990 Covertypes of areas identified as clearcuts in 2000 and not converted to other uses

Covertypes	Area in Hectares	Percent of the harvested area
Softwood	6,431	36.7
Soft-hardwood	4,968	28.4
Hard-softwood	2,690	15.3
Hardwood	2,110	12.1
Clearcuts	546	3.1
Plantations	14	0.1
Alders	307	1.8
Cleared land	448	1.0

Note: the cleared land category is a mix of land which had plantations established between circa 1985 and 1990 and other land which had trees and shrubs growing up which appeared to have been harvested probably in preparation for conversion to other uses.

Table XIV provides a summary of the “High Forest ”areas in 1980, 1990 and 2000. Tables XV and XVI provide a breakdown of the “High Forest ” in 2000 by height and crown closure.

Note: The crown closure of the vast majority of the forest is over 50%.

Table XIV
Area of High Forest by County in 1980, 1990 and 2000

Year	Prince	Queens	Kings	Province
1980	73,715	74,929	94,938	243,581
1990	77,202	74,968	100,492	252,662
2000	71,156	65,652	86,004	222,812

Note: ‘High’ forest is the forest area which the photo interpreters could identify tree species

Table XV
Area of High Forest by Height Class in 2000

Covertypes	<5 m	5-10 m	11-15 m	16-20 m	21-25 m	26+ m
Softwood	926	12,432	36,730	5,559	66	0
Soft-hardwood	859	4,561	22,785	5,078	49	0
Hard-softwood	3,656	5,518	28,492	12,183	129	7
Hardwood	10,771	10,355	25,979	36,075	603	0

Table XVI
2000 Area in Hectares of High Forest by Percent Crown Closure

Covertypes	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Softwood	66	376	494	1,670	2,673	7,837	11,450	16,542	13,522	1,085
Soft-hardwood	31	142	274	820	1,480	4,460	7,663	10,666	7,582	212
Hard-softwood	35	172	274	871	1,521	4,589	9,099	17,391	15,676	358
Hardwood	60	325	552	1,379	1,711	4,710	8,538	23,454	39,661	3,393

The 1990/92 Forest Biomass Inventory stand typing was classified by Sobey & Glen (1999) into a number of plant communities. The distribution of these plant communities in 1990 and 2000 based on this classifications is shown in Table XVII. Table XVIII shows a more detailed breakdown of the Upland Hardwood Forest Community area in 2000.

Table XVII
The 1990 and 2000 Area in Hectares of the Forest Plant Communities
(after Sobey & Glen 99)

Forest Plant Communities	1990	2000
Upland hardwood	55,043	47,665
Wet rich hardwood	42,192	40,926
Black spruce	33,106	20,743
Old field white spruce	57,982	41,691
Disturbed forest	62,259	65,695
Misc (alder, plantations, clearcuts)	28,611	46,531
Total	279,193	263,205

Table XVIII
Area in Hectares of the Upland Hardwood Forest Community in 2000
broken down by heights in metres and crown closure percentage

Crown closure %	<5m	6-10m	11-15m	16-20m	21-25m	26+m
0-10	18	0	0	2	0	0
11-20	9	1	3	3	0	0
21-30	5	0	8	8	0	0
31-40	2	5	29	93	0	0
41-50	13	14	107	125	0	0
51-60	107	57	431	609	0	0
61-70	150	158	1,157	2,071	16	7
71-80	380	674	4,168	8,308	39	0
81-90	175	1,156	8,228	17,102	125	0
91-100	10	69	863	1,177	16	0
Total	869	2,131	14,993	29,498	196	7

Volume Information

The following tables are based on field plots established across the Island. In 1980 and 1990, temporary plots were used but they were not remeasured because they were not established to be relocatable. The 2000 inventory plots were established so that they can be relocated and in subsequent inventories, plot to plot comparisons will be possible. Because the inventories reports did not remeasure the same plots, the only valid comparisons are averages of a number of plots. The following tables are based on averages of the plot measurements.

Table XIX shows the total volume and biomass statistics for the past three inventories. These numbers are generated by multiplying the average volume/biomass per hectare by the number of hectares of high forest. "High Forest" is the forest area in which the photo interpreters could identify tree species on the aerial photography. Only plots which fell in the "High forest" were used to generate the following tables. For example, none of the plots reported on in the following tables were established in clearcuts or areas of alders. This is the same procedure as used in the 1980 and 1990 inventories. The "High Forest" figures were 243,581 ha in 1980, 252,662 ha in 1990 and 222,812 ha in 2000 (see table XIV).

Table XIX
Total Forest Statistics

	1980	1990	2000
Volume			
Total Merchantable (Cubic metres)	28,336,000	31,785,000	24,161,600
Biomass			
Softwood species (oven dry tonnes)	14,447,000	15,137,000	9,572,000
Biomass			
Hardwood species (oven dry tonnes)	14,410,000	17,032,000	11,918,200
Total Biomass (oven dry tonnes)	28,857,000	32,169,000	21,490,200

The 1980 total merchantable volume estimate is accurate within +/- .14% at the 95% probability level.
The 1990 total merchantable volume estimate is accurate within +/- .09% at the 95% probability level.
The 2000 total merchantable volume estimate is accurate within +/- .21% at the 95% probability level.

Notes: 1-The 1980 and 1990 Inventories used the same field plot design of variable radius plots based on a Basal Area Factor 2 prism for trees and a fixed area plot of 1/625 ha for the saplings. Both were compiled using the same methodology.
2-The 2000 Inventory was based on fixed area plots (1/25 ha for the merchantable trees and 1/100th for the saplings). The compilation methodology used the same volume equations as in 1980 and 1990 numbers presented in this report above but the tree heights were determined using measured trees of each crown class in each plot not the Provincial height diameter equation used for the 1980 and 1990 numbers.

The following pages present an extract of some of the more important statistics obtained during the 2000 inventory and, where appropriate, comparison numbers are provided from the 1967, 1980 and 1990 inventories.

Table XX
Average Merchantable Volume per hectare
of high forest
(Cubic metres)

Cover Type	Prince 1980	Prince 1990	Prince 2000	Queens 1980	Queens 1990	Queens 2000	Kings 1980	Kings 1990	Kings 2000	Province 1980	Province 1990	Province 2000
Softwood	117.93	108.72	101.74	123.93	132.59	103.99	95.56	96.98	94.62	113.84	111.94	99.19
Softwood Hardwood	113.33	131.59	111.97	128.39	124.99	120.79	141.42	117.48	113.75	126.96	124.45	114.76
Hardwood Softwood	90.90	151.51	124.47	119.00	131.34	115.12	112.09	112.17	119.86	107.17	125.05	120.12
Hardwood	105.64	134.71	80.55	124.34	145.09	111.66	121.97	119.40	115.08	116.19	136.67	104.65
Total	109.41	128.46	102.89	124.25	136.38	111.88	113.55	110.49	110.19	116.33	125.80	108.44

Notes: 1- high forest excludes, alders, clearcuts, plantations < 5 metres in height

2- covertypes are defined as follows:

softwood = >75% softwood

softwood/hardwood = >50% softwood, >25% hardwood

hardwood/softwood = >50% hardwood, >25% softwood

hardwood = >75% hardwood

3: minor discrepancies exist between grand totals and the sum of individual values due to rounding.

4: for area of "High forest" by County see Table XIV

Table XXI
Average Merchantable Volume by Product Class
(Cubic metres per hectare)

Products	Prince 1980	Prince 1990	Prince 2000	Queens 1980	Queens 1990	Queens 2000	Kings 1980	Kings 1990	Kings 2000	Province 1980	Province 1990	Province 2000
Softwood pulpwood/firewood	41.53	34.34	10.90	43.11	30.84	12.14	40.29	37.57	14.25	41.82	34.03	12.61
Softwood undersized Sawlogs	n/a	n/a	5.89	n/a	n/a	5.59	n/a	n/a	6.99	n/a	n/a	6.25
Softwood studwood	11.16	15.16	12.30	16.99	17.72	10.17	16.83	19.31	12.03	14.90	17.38	11.58
Softwood Sawlogs	7.04	9.32	25.00	7.24	10.92	27.00	6.28	5.91	22.00	6.93	8.85	24.37
Total Softwood	59.73	58.82	54.09	67.34	59.48	54.90	63.40	62.79	55.26	63.65	60.26	54.80
Hardwood pulpwood/firewood	48.51	62.65	40.06	55.38	69.21	46.02	47.84	45.15	36.57	51.08	59.65	40.37
Hardwood Studwood	0.69	3.11	n/c	0.94	3.33	n/c	1.02	1.31	n/c	0.87	2.64	n/c
Hardwood Sawlogs good 2 sides	n/a	n/a	6.31	n/a	n/a	6.24	n/a	n/a	10.60	n/a	n/a	8.03
Hardwood Sawlogs good 3 sides	n/a	n/a	1.58	n/a	n/a	3.44	n/a	n/a	4.73	n/a	n/a	3.39
Hardwood Sawlogs veneer	n/a	n/a	0.84	n/a	n/a	1.28	n/a	n/a	3.02	n/a	n/a	1.85
Hardwood Sawlogs (not classified)	0.49	3.87	0.0	0.60	4.36	0.0	1.28	1.24	0.0	0.73	3.24	0.0
Total Hardwood	49.69	69.63	48.40	56.92	76.90	56.98	50.14	47.70	54.92	52.68	65.53	53.64
Total merchantable Volume	109.41	128.48	102.89	124.25	136.38	111.88	113.55	110.49	110.19	116.33	125.80	108.44

Note: Product definitions are as follows:

Pulpwood/Firewood (1980, 1990, 2000) all trees not suitable for sawlogs or studwood due to quality that had a minimum diameter (BH) of 9 cm and a minimum top diameter of 8 cm at a minimum log length of 240 cm.

Undersized softwood Sawlogs (2000) all trees of sawlog quality with a minimum diameter (BH) of 9 and a maximum diameter (BH) of 15 cm

Studwood softwood (1980, 1990, 2000) and hardwood (1980, 1990) all trees of suitable quality and with a minimum diameter (BH) of 16 cm and a maximum diameter (BH) of 21 cm, and a minimum top diameter of 14 cm at a minimum log length of 240 cm.

Sawlogs both hardwood and softwood (1980, 1990) all trees of suitable quality and with a minimum diameter (BH) of 22 cm and a minimum top diameter of 16 cm at a minimum log length of 240 cm.

Softwood Sawlogs (2000) the lower two 2.4 metre sections of all softwood trees of suitable quality with a minimum diameter (BH) of 22 cm

Hardwood Sawlogs (2000) the lower two 2.4 metre sections of all hardwood trees were classified as to the number of good sides each section had. The minimum diameter (BH) of this category was 9cm. The category can be subdivided by diameter (BH) upon request.

n/a not available

n/c not calculated

Table XXII
Average Biomass per Hectare by diameter class and County
(Oven Dry Tonnes/ha)

Diameter Class cm	Prince 1980	Prince 1990	Prince 2000	Queens 1980	Queens 1990	Queens 2000	Kings 1980	Kings 1990	Kings 2000	Province 1980	Province 1990	Province 2000
2	1.93	0.93	0.80	1.04	0.76	0.85	1.08	0.87	0.67	1.37	0.85	0.76
4	5.97	2.85	2.09	4.00	2.22	1.87	3.57	2.68	1.75	4.60	2.58	1.89
6	8.38	5.04	2.77	6.37	4.52	2.23	5.91	5.01	2.80	6.97	4.84	2.62
8	9.27	8.26	3.08	8.93	7.62	2.05	8.31	8.33	2.53	8.90	8.06	2.56
10	9.63	10.33	5.94	10.08	9.05	5.47	11.46	9.08	6.24	10.26	9.50	5.92
12	11.27	11.99	7.66	12.44	12.83	6.93	13.32	11.40	7.83	12.24	12.11	7.51
14	11.90	12.72	8.69	13.17	12.92	7.41	13.44	12.26	8.51	12.78	12.65	8.24
16	11.02	12.81	9.05	11.92	12.45	8.67	12.02	12.92	8.85	11.62	12.72	8.86
18	9.70	11.90	8.69	11.17	12.60	8.06	10.60	11.42	8.30	10.51	12.00	8.35
20	7.26	10.31	8.09	10.58	11.56	8.18	8.77	9.73	7.81	8.95	10.58	8.00
22	6.46	8.60	7.26	7.59	10.55	7.36	7.28	7.64	8.16	7.11	9.00	7.65
24	5.54	7.21	5.42	6.45	8.02	6.85	5.37	6.94	5.97	5.86	7.42	6.05
26	3.39	5.73	4.92	4.18	7.26	6.40	3.60	4.24	6.09	3.76	5.82	5.82
28	2.97	5.16	4.61	3.76	5.23	4.10	2.81	3.17	4.38	3.25	4.58	4.37
30	2.48	3.43	2.97	2.83	4.39	4.57	1.92	2.86	4.15	2.48	3.60	3.91
32	1.63	2.83	3.13	2.15	3.16	3.79	1.57	2.24	3.64	1.82	2.77	3.53
34+	5.84	8.58	10.04	6.87	10.13	10.83	5.13	5.74	10.34	6.07	8.27	10.39
Total	114.63	128.69	95.21	123.53	135.27	95.60	116.14	116.53	98.00	118.54	127.32	96.45

Table XXIII
Hardwood species
Age Class Distribution
(Percent of sample trees by age class)

Age Class Yrs.	Prince 1980	Prince 1990	Prince 2000	Queens 1980	Queens 1990	Queens 2000	Kings 1980	Kings 1990	Kings 2000	Province 1980	Province 1990	Province 2000
0-10	0.7	2.9	0.6	0.0	2.7	3.3	0.0	3.9	0.9	0.2	3.1	1.6
11-20	0.0	5.1	6.8	0.0	2.2	9.4	0.0	3.5	10.1	0.0	3.6	8.9
21-30	5.8	10.0	14.3	6.8	4.7	11.1	3.3	10.7	11.1	5.6	8.3	12.0
31-40	19.7	18.6	28.7	22.9	12.4	13.3	24.8	22.1	13.5	22.2	17.3	17.9
41-50	26.2	27.9	28.1	33.7	22.6	18.3	28.7	20.5	18.4	30.0	23.9	21.2
51-60	23.7	17.8	11.8	20.8	25.6	17.2	19.3	14.0	15.5	21.5	19.6	15.0
61-70	12.0	10.5	3.7	8.3	16.1	11.6	12.1	12.7	13.5	10.5	13.1	10.0
71-80	5.4	3.9	3.1	4.7	7.2	7.7	6.0	6.1	9.7	5.3	5.7	7.1
81-90	2.1	1.2	1.8	1.7	3.4	1.6	3.8	4.2	3.3	2.4	2.8	2.3
91-100	1.8	0.7	0.6	0.5	1.7	4.4	1.1	1.9	2.9	1.1	1.4	2.7
101+	2.1	0.9	0.0	0.0	0.9	1.6	0.5	0.0	0.4	0.8	0.7	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: ages were measured 1.3 metres above ground (BH)

Average age of hardwood sample trees in 1980 was 50.1; in 1990 was 48.4; in 2000 was 46.8

TABLE XXIV
Softwood species
Age Class Distribution
(Percent of sample trees by age class)

Age Class Yrs.	Prince 1980	Prince 1990	Prince 2000	Queens 1980	Queens 1990	Queens 2000	Kings 1980	Kings 1990	Kings 2000	Province 1980	Province 1990	Province 2000
0-10	0.6	0.9	0.0	0.5	3.1	8.0	0.0	1.6	1.5	0.4	1.9	3.0
11-20	0.0	3.1	9.3	0.0	6.5	10.9	0.0	3.5	10.1	0.0	4.1	10.1
21-30	5.9	8.2	13.8	7.0	12.0	15.6	4.5	12.9	10.5	5.9	11.1	13.0
31-40	19.0	18.0	20.5	22.3	22.0	16.8	24.6	23.0	25.4	21.8	21.1	21.4
41-50	20.3	20.0	23.2	32.0	22.7	21.5	21.8	17.1	22.6	25.3	20.1	22.4
51-60	17.3	19.5	12.5	19.2	18.0	10.1	25.1	13.6	10.8	20.1	17.0	11.0
61-70	16.3	13.1	11.1	10.4	9.1	8.0	13.9	11.2	7.6	13.4	11.1	8.7
71-80	11.4	8.0	4.4	3.1	4.0	4.2	4.9	8.9	6.0	6.4	6.9	5.0
81-90	4.2	3.9	3.1	3.3	1.7	2.5	2.4	4.4	1.9	3.4	3.3	2.4
91-100	1.9	2.9	0.8	0.5	1.1	2.1	1.6	2.1	1.2	1.3	2.0	1.4
101+	2.6	1.9	0.8	1.1	0.2	0.0	0.8	1.1	1.9	1.5	1.0	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: ages were measured 1.3 metres above ground (BH)

Average age of softwood sample trees in 1980 was 51.7; in 1990 was 48.1; in 2000 was 43.2

Table XXV
Average Number of Live Stems per Hectare (all species)
(By diameter class and cover type, all Counties combined)

Diameter Class cm	Softwood 1980	Softwood 1990	Softwood 2000	Softwood/ Hardwood 1980	Softwood/ Hardwood 1990	Softwood/ Hardwood 2000	Hardwood/ Softwood 1980	Hardwood/ Softwood 1990	Hardwood/ Softwood 2000	Hardwood 1980	Hardwood 1990	Hardwood 2000
2	2,123.00	2,966.00	1,554.00	2,100.00	2681.00	1,741.00	1,926.00	2,676.00	2,371.00	2,024.00	2505.00	3,532.00
4	1,176.00	975.20	516.90	1,490.00	958.40	621.40	1,374.00	1,046.00	790.00	1,464.00	1096.00	948.10
6	796.60	637.60	318.10	976.00	714.90	312.50	868.40	780.00	419.50	704.40	702.20	435.60
8	522.00	476.10	156.60	666.10	612.70	150.00	526.20	660.40	244.20	513.20	556.10	200.40
10	376.30	257.30	204.25	342.20	295.20	196.48	308.90	330.10	198.08	333.80	264.50	175.58
12	324.60	233.10	178.60	315.30	245.10	178.50	255.10	246.50	166.30	226.60	259.10	137.70
14	234.60	209.10	136.50	201.40	195.30	131.20	185.30	198.20	131.30	187.20	170.50	106.00
16	155.40	134.90	113.20	154.20	153.40	112.00	120.70	150.70	104.4	121.40	132.80	83.35
18	114.40	108.40	86.78	108.60	102.00	82.33	68.58	100.50	68.93	84.58	98.13	61.33
20	71.97	79.44	59.08	73.47	74.95	63.70	60.01	70.96	61.84	55.64	70.63	45.43
22	45.77	60.79	49.62	47.60	53.09	48.05	33.64	41.83	39.00	34.29	48.67	37.96
24	26.14	30.85	26.08	34.89	32.62	32.52	29.71	31.18	33.04	25.67	35.14	23.98
26	15.40	23.66	18.70	17.34	25.44	24.97	10.81	21.01	25.11	14.26	21.55	19.77
28	10.92	12.72	12.80	10.83	15.68	16.60	10.67	16.34	14.32	10.79	14.26	13.74
30	6.90	8.61	9.18	8.98	9.91	12.95	6.49	8.78	10.73	6.79	11.00	10.16
32	4.69	6.56	4.74	4.87	6.14	8.04	3.67	6.39	9.49	5.02	7.21	8.62
34+	8.00	6.08	8.08	11.64	12.92	15.00	8.05	11.56	21.01	9.93	16.83	15.28
Total	6,012.51	6,216.38	3453.30	6,564.35	6189.09	3,747.39	5,797.12	6397.08	4,708.28	5,821.50	6009.23	5,854.71

Notes 1: covertypes are defined as follows:

softwood = >75% softwood; softwood/hardwood = >50% softwood, >25% hardwood; hardwood/softwood = >50% hardwood, >25% softwood; hardwood = >75% hardwood

2: minor discrepancies exist between grand totals and the sum of individual values due to rounding.

Table XXVI
Total Merchantable Volume by Species 1967, 1980, 1990, 2000
in cubic metres

Species	1967	1980	1990	2000
Red maple	n/a	5,778,600	8,080,100	5,914,100
Sugar maple	n/a	1,489,200	1,452,800	882,400
All maple	870,300	7,267,800	9,532,900	6,796,500
Beech	47,700	558,100	573,500	409,100
White birch	477,300	2,188,800	2,289,100	1,322,200
Yellow birch	n/a	629,000	952,500	626,900
Grey birch	n/a	50,700	65,700	67,000
Elm	n/a	108,000	151,600	3,100
Ash	n/a	86,800	101,100	103,800
Poplar	86,300	1,812,400	2,690,900	2,477,900
Red oak	n/a	0	5,100	1,600
Other hardwood	n/a	12,600	5,100	16,500
Red spruce	n/a	1,723,800	1,008,100	352,400
White spruce	n/a	5,183,300	6,821,900	5,134,000
Black spruce	n/a	2,242,900	1,591,800	2,126,300
All spruce	1,506,900	9,150,000	9,421,800	7,612,700
Balsam fir	623,000	4,838,300	4,136,100	3,487,600
Eastern larch	102,300	761,800	945,000	674,300
Hemlock	4,500	251,400	169,300	111,600
White pine	43,200	32,000	83,400	135,300
Red pine	n/a	8,600	2,500	20,300
Jack pine	n/a	14,900	n/a	1,100
Cedar	n/a	445,700	464,900	130,400
Other species	102,300	131,000	194,600	163,700
Total	3,863,900	29,202,900	31,782,400	24,161,600

- Notes
- 1- 1967 Acres inventory was based on 1964 photography and 1965 field work, conversions used were 1 cord pulp = 2.2 m³ and 1 Mfbm sawlogs = 6.0 m³
 - 2- differences between inventories of uncommon species such as red oak and jack pine are probably a reflection of where the field plots were and not necessarily a change in volume.

Table XXVI provides a comparison of the merchantable volumes obtained from the last four forest inventories. There was a minor difference between the minimum sized tree measured by the inventories. The 1967 inventory included trees with a diameter (BH) of 3.6 inches (9.1 cm) and greater, the 1980-2000 inventories included trees with a diameter(BH) 9 centimeters or greater. The minimum top diameter used by the 1967 inventory was not stated but the standard at the time was 3.5 inches (9 cm). The 1980-2000 inventories used a minimum top diameter of 8 cm. These differences in merchantability limits have a minor effect on total volume. The difference between the 1967 and 1980 volumes are a reflection of the fact that the 1967 forest was only just becoming merchantable due to harvesting pressures over the past century. The 1967 reports noted that 107,850 acres (43,700 ha) of forest was not merchantable as the trees were under 3.6 inches in diameter but were expected to become merchantable within the next 20 years.

Summary

The Island's forest area decreased over the past 10 years from 48.6% of the provincial area to 45.7%. Also, during the same period, the standing volume has decreased by 24.0% and the average age decreased by 3.3 years for hardwood species and 4.9 years for softwoods. Therefore, the 2000 forest is younger, smaller in area, and lower in volume. This change resulted from decisions made by the owners of the Island's 24,040 parcels of forest land (Glen; 2002).

References

- Acres Research & Planning Ltd, January 1967, *Development Planning for Prince Edward Island, Woodlot Inventory*, Acres Research & Planning Ltd, Toronto, Ontario.
- Anonymous, January 1992, *1990/92 Prince Edward Island Forest Inventory, Summary*, Silviculture Development Section, Forestry Branch, Department of Energy and Forestry.
- Anonymous, June 1995, *1994 Prince Edward Island Forest Inventory Update, Summary*, Silviculture Development Section, Forestry Branch, Department of Agriculture, Fisheries and Forestry.
- Anonymous, April 1998, *1997 Prince Edward Island Forest Inventory Update, Summary*, Silviculture Development Section, Forestry Branch, Department of Agriculture and Forestry.
- Glen, W. M., 1997, *Prince Edward Island 1935/36 Forest Cover Type Mapping*, Silviculture Development Section, Forestry Division, Department of Agriculture and Forestry
- Glen, W. M., 2002, *An Examination of the Forest Ownership in Prince Edward Island*, Forest Management Note number 28, Resource Inventory and Modelling Section, P.E.I. Department of Agriculture and Forestry.
- Sobey D. & Glen W., August 1999, *Analysis of the Ground Flora and other data collected during the 1990-1992 Prince Edward Island Forest Biomass Inventory, IV The Distribution of Forest-Types on Prince Edward Island*, Forestry Division, Department of Agriculture and Forestry, Charlottetown, P.E.I.
- Anonymous, 1974-1980, *Canadian Forestry Statistics*, Statistics Canada report number 25-202, Ottawa, Canada

2000/02 Corporate Land Use Inventory

Staff involved

Overall

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Jon Hutchinson	project manager	2002, 2003

Field plots

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Peter Sharkey	technician	1999

Plot establishment

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