2006
Island Wood Supply Analysis

Public Review

Mission Statement

To manage, conserve, enhance and use the forest ecosystems of Newfoundland and Labrador using adaptive management to ensure its sustainability and productivity with the appropriate balance of values desired by society.

INTRODUCTION

The process for establishing the Annual Allowable Cut (AAC) levels for the Island portion of the province for the period 2006-2010 is nearing completion. The following information about the process is being provided by the Department of Natural Resources to give the general public, forest stakeholders and all those with a vested interest in the management of our forest resource a chance to review and comment on the process.

Through providing a description of the various components of the wood supply analysis process, government wishes to provide the public with a clearer understanding of steps involved in calculating the AAC. In addition, the following information will highlight the multitude of considerations that government must address when undertaking this analysis.

Government encourages individuals and groups to review the information and provide comment so that any input can be assessed and incorporated into an approved analysis.

BACKGROUND

Beginning in 1984, the province developed its first 20 Year Forest Development Plan and initiated a planning cycle where new plans are generated every five years. In 1989, the first formalized wood supply analysis was undertaken and this analysis is now required by legislation and repeated every five years. A new analysis is completed every five years to allow government to account for changes in the forest land base, implement new management strategies and address differences detected in forest growth rates compared to previous wood supply forecasts.

The volume of timber that can be harvested each year on a sustainable level is determined by the wood supply analysis and is referred to as the Annual Allowable Cut (AAC). The AAC defines the maximum annual rate at which timber can be harvested in the province on a sustainable level into the future.

It is important to note that it is the policy of the Government of Newfoundland and Labrador to ensure that timber harvesting in this province is conducted in a sustainable manner (i.e. harvesting will not exceed established AACs).

The key underlying principles that guide the timber supply analysis are:

- The AAC must be sustainable during the planning period (160 years);
- The level of uncertainty associated with calculating the AACs must be minimized using the best empirical information available;
- There must be conformity with the information and assumptions used in the analysis and the actions and decisions made on the ground;
- The wood supply analysis incorporates other forest values; and
- The analysis must account for economic factors, as well as the physical supply of timber.

ESTABLISHING THE AACs

The process of establishing the AACs for 2006 is very challenging. A key component of the wood supply analysis requires seeking and obtaining input from the general public, forest stakeholders and the various sectors of the forest industry. Obtaining this input is achieved through forest management district planning team meetings and direct consultation with the forest industry.

The current review of the province's wood supply started in 2003 and was structured to incorporate several diverse values including social, economic and ecological factors that may impact the determination of a sustainable wood supply. Thus, the analysis requires detailed consideration of a broad range of both timber and non-timber values.

Calculation of the AACs involves the use of computer models that forecast various scenarios of forest sustainability. These models assess a variety of information including a description of the current state of the forest, the growth rates associated with the current forest and the management strategies, including other values, applied to the forest. More specifically, the following elements were considered in establishing the AACs.

Forest Description

The forests of the island have a variable age distribution which impacts the AAC. In a typical Forest Management District (FMD), there are more older forests (over 80 years) and younger regenerating forests than there are intermediate-aged forests (40-60 years). Due to large level wildfires and insect epidemics, wide ranging age class stands are a common characteristic of forest stands in Newfoundland and Labrador (Figure 1). As a result of this unbalanced forest age class distribution, most FMDs will experience a period when there will be a limited amount of harvestable forest available. This factor, more than any other, impacts AACs on the island.

Forest management strategies have been developed to address the intermediate forest age gap. This includes an aggressive forest protection program to keep mature and over-mature stands alive as long as possible; harvesting schedules that limit the harvest of intermediate age class timber and silviculture thinning programs that allow for younger regenerating forests to grow more quickly and become harvestable earlier.

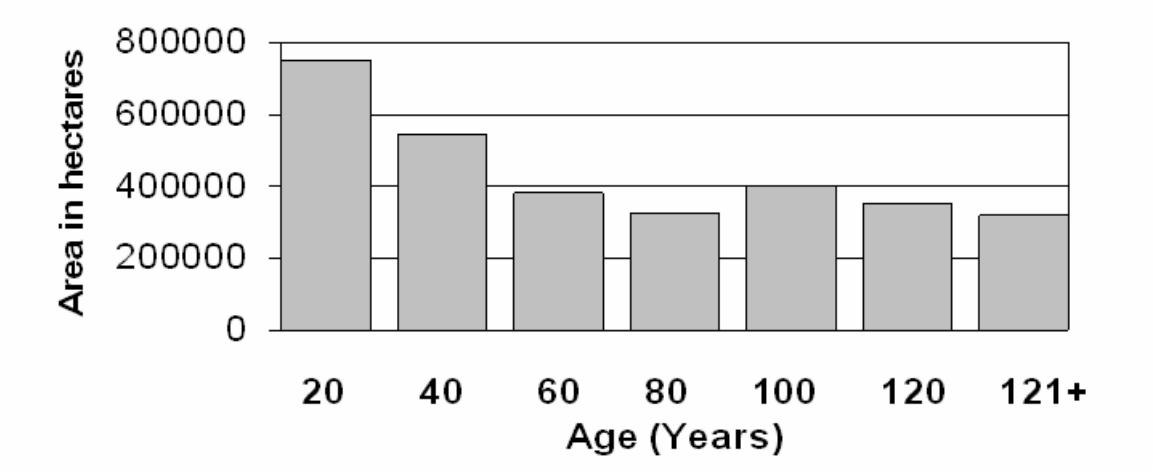
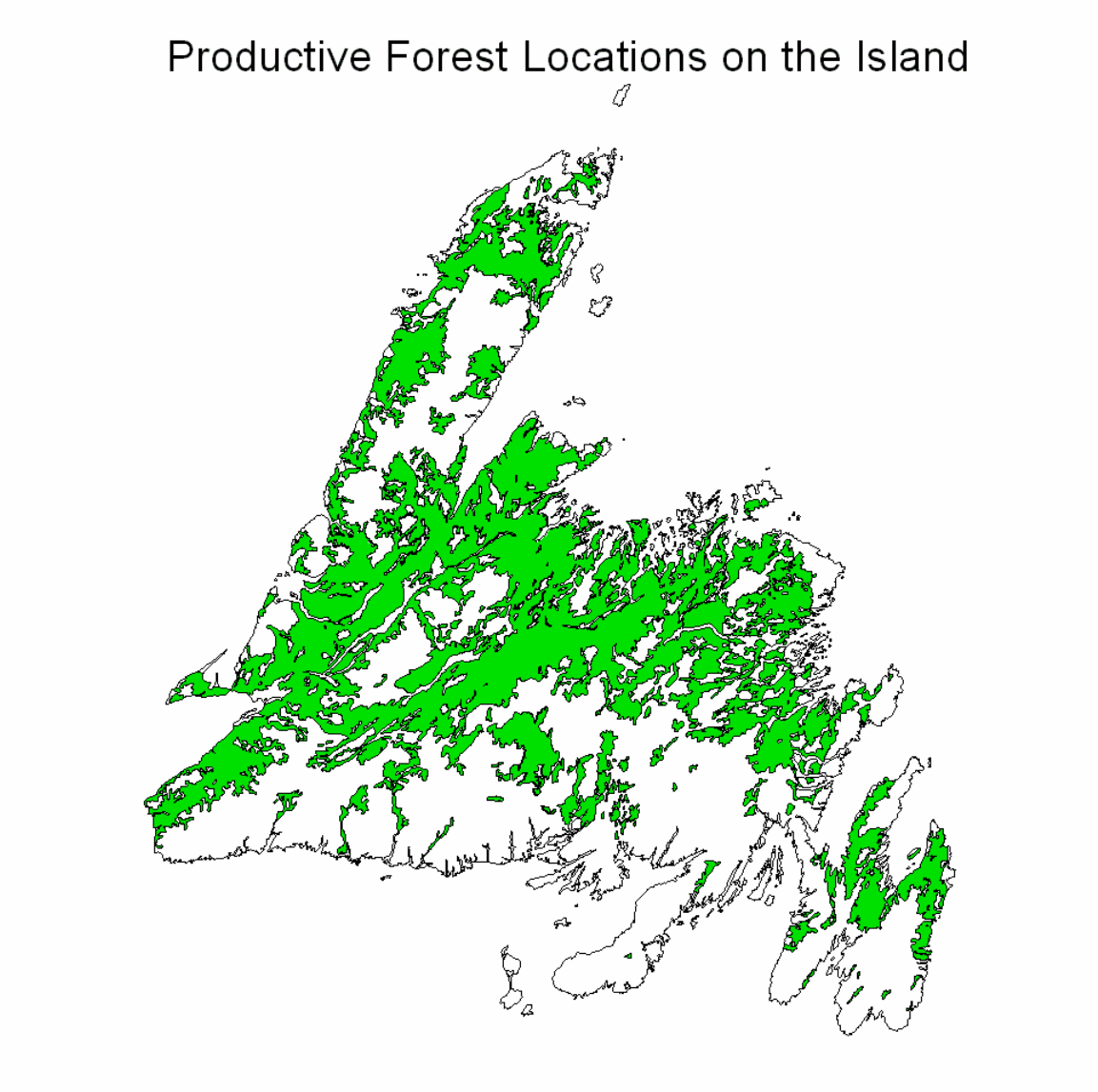


Figure 1. Island's forest age class structure

The natural fragmentation of the province's forested landscape also poses a challenge when setting the AAC. The province is dotted by many ponds, bogs, rivers, streams and rock outcrops, resulting in relatively small, scattered pockets of timber. The resulting landscape is a mosaic of timber stands of varying economic viability.

Defining the AAC Land Base

When setting the AAC for the province, government must consider a multitude of values which make the task particularly challenging. In addition, a significant amount of Newfoundland and Labrador's forest land base is protected from harvesting through regulation or is rendered unavailable for harvesting due to economic reasons. Incorporating these values as part of the wood supply analysis ultimately leads to a reduction in the AAC; yet from a forest sustainability perspective, it is important that both timber and non-timber values be adequately considered. Doing so is a pre-requisite of today's approach toward sustainable forest management.



All known timber and non-timber issues were considered in defining the forested area available for timber harvesting. This approach was applied directly to the 2006 AAC calculation to ensure that harvest levels do not exceed the sustainable level of the forest ecosystem.

Forest values considered when determining the 2006 AAC include:

Land Availability

For the analysis, productive forest land on the Island was categorized as either Class I (available for harvest) or Class III (partially available for harvest) (Figure 2). Class I contains 1,891,000 hectares or 62% of the productive forest land base, while Class III contains 1,182,500 hectares or 38%.

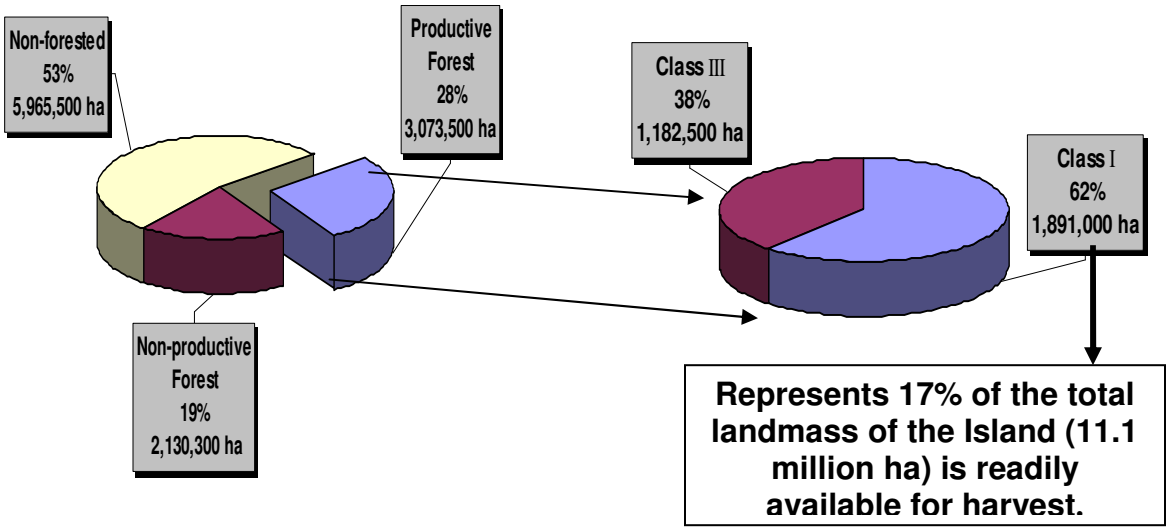


Figure 2. Forested land base classification for Island portion of province

No-Cut Buffers

Under provincial guidelines, all water bodies greater than one meter in width must be given a 20-meter, uncut treed buffer. In addition, in many areas, the buffers have been established greater than 20 m to protect values such as salmon spawning areas, cabin development areas, wildlife habitat and outfitting camps. These buffers account for 193,500 hectares or 6% of productive forest as being withdrawn from timber harvesting.

Wildlife Corridors

As part of the evaluation process for timber harvesting plans, consultation with wildlife biologists resulted in recommendations that wildlife corridors be established to ensure animals have sufficient cover to move between forested areas. As part of the analysis, every effort is being made to avoid harvesting activity within these corridors. If harvesting is to take place, government is committed to designating substitute corridors.

Protected Areas

All established and proposed protected areas have been removed from the 2006 AAC land base. This removal equates to 164,500 hectares of productive forest or 5% of the total productive forest land base on the Island.

Insect/Fire Losses

Using a mixture of aerial photography, remote sensing, and ground surveys (with global positioning systems), the forestry digital inventory was updated to reflect forest changes resulting from forest fires and insect outbreaks.

Logging/Silviculture Changes

All stands silviculturally treated and harvested since the 2001 analysis have been incorporated into the forest data base.

Watersheds

Major watershed areas were incorporated into the wood supply land base and were given unique designation. This was done in response to forest stakeholders concerned about the potential impacts of forest management activity within the watersheds. This approach will enable government to assess impacts of forest management activities within watersheds.

Growth Forecasting

A key requirement for forecasting future wood supply is obtaining an understanding of how forests renew themselves after disturbance and how these new forests grow and develop over time.

It is important for government to determine how much merchantable or harvestable timber the forest contains at any given point in time. This is done through the use of 'yield curves' and 'regeneration assumptions'. A yield curve shows the pattern of timber volume accumulation and volume loss over time for a particular stand type. Regeneration assumptions describe how stands regenerate and how stands recover after a disturbance such as forest fire or insect infestations.

Yield Curves

Yield curves are a key element in the wood supply analysis. The validity of the analysis is largely determined by the accuracy of the yield curve forecasts. Government has committed a significant amount of resources into developing accurate yield curves for the 2006 AAC calculations.

Twenty years of tree and forest stand development data were used to develop stand growth predictions. Forecasts were then checked against actual data from thousands of sample plots located throughout the province. If forecasts varied from the actual temporary sample plots (TSPs), the yield curves were adjusted to make them more accurate. Thirteen distinct yield curve sets were developed on an ecoregion or sub-ecoregion basis for the Island. In total, 975 unique yield curves were developed for the 2006 analysis.

Regeneration Assumptions

Uncertainty in how forest areas regenerate over time has led to the establishment of a network of regeneration survey plots across the Island. The data from these plots, along with expert field opinion of the Newfoundland and Labrador Forest Service (NLFS) and industry foresters are used to develop regeneration assumptions. Sites which do not regenerate naturally will be designated for planting.

Management Strategies

Once the current state of the forest was determined and growth patterns defined, the next step in the wood supply model consisted of designing a strategy to effectively manage the

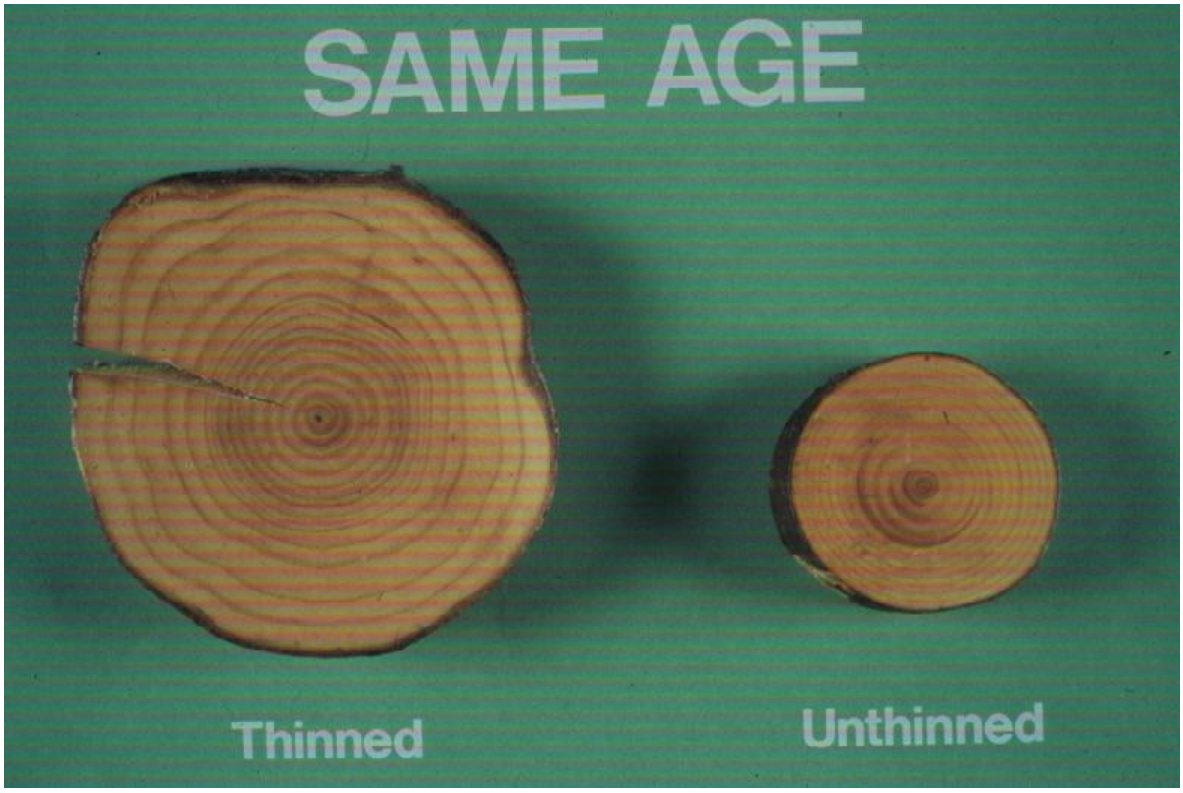
forest. The key objective is to maximize AACs over the long term, while ensuring that other forest values are taken into consideration. This requires developing management strategies that reduce timber losses and enhance sustainability. Factors considered when developing the management strategy include:

Operability Limits

These are time frames in which harvesting can be undertaken. In the analysis, both stand volume and tree size were used to determine the earliest age when a stand is eligible for harvest (Example: Age 45 for silviculture treated stands).

Silviculture

Silviculture is a key tool which enables government to enhance the forest of the future. In the analysis, several silviculture treatments were considered, including pre-commercial thinning of juvenile, naturally-regenerated forests, planting of non-regenerating areas with a variety of spruce species and gap planting of stands that have only partially regenerated naturally.



Harvest Flow Constraints

Government requires harvesting to take place on a consistent level from year to year. This requirement ensures there will be no significant fluctuations in harvest levels from year to year between 2006 and 2010. Failure to do so may result in significant changes in the AAC from year to year creating instability for the forest industry.

Planning Horizons

Government is committed to long-term forest sustainability. Accordingly, the analysis is forecasted ahead for 160 years to ensure actions and strategies applied today will not negatively impact the long-term sustainability of future forests.

Operable Growing Stock Buffer

As part of the analysis, government imposed an "operable growing stock objective" to further ensure the sustainability of AACs. In any harvest period, no more than half of the accessible timber volume available may be harvested.

Old Forest Targets

An old forest objective was set over the planning period, where 15% of the total productive forest within a FMD must be older than 80 years. This objective was designed to ensure the presence of ecologically important old forest into the future. Achieving this target resulted in AAC reductions.

Manual Harvest Scheduling

A major improvement in the 2006 analysis compared to the 2001 analysis is the introduction of 25-year manual harvest scheduling. This method of planning fosters the long-term sustainability of the AACs by mimicking current harvest practices and accounts for actual on the ground conditions that may delay or restrict the harvesting of stands.

This manual harvest scheduling approach will allow forest planners to identify where timber will be harvested in the future, thereby, providing confidence within the forest community that the province's forest resource is being managed in a consistent and responsible manner.

THE ANALYSIS OF THE DATA

After all the necessary data has been collected and all necessary assumptions have been formulated, the actual analysis begins. The analysis has two major components, the design and validation of the wood supply model and the design of the analysis procedures.

Forest Modeling Software

The computer software used in both the 2001 and 2006 analyses is referred to as 'Woodstock'. The main benefit of Woodstock is its ability to address local forest management problems. Woodstock is the commercial wood supply software package of choice in Canada.

Model Construction and Validation

As part of the analysis, the Woodstock software was used to create unique models for each FMD. All data and assumptions used within the models were verified against the original data input files and software generated files.

Scenario Generation

Once all the data was compiled and the assumptions formulated, the Woodstock model was used to generate "pictures" of how today's forest will develop under different management scenarios. In some cases, 20 to 30 scenarios were generated for each FMD before all management objectives were satisfied.

This process allows forest managers to better understand and accommodate unexpected events such as insect outbreaks that alter forest development. In addition, the levels of silviculture and harvesting highlighted in the selected scenario form the framework for management for the following five years.

INTERMEDIATE RESULTS

In the 2006 analysis, harvest allocation figures will be established for each of the two major timber types (softwoods and hardwoods). First, is the Class I AAC which is calculated using assumptions that reflect current harvesting practices. Second, is the Class III AACs that represent stands that are much more difficult and costly to harvest. The numbers outlined in Table 1 represent the gross timber volumes generated by Woodstock.

Table 1. Summary of the gross volumes from the 2006 Wood Supply Analysis.

Management Responsibility	Gross Potential Wood Supply (m^3 per year)				
	Softwoods		Hardwoods		
	Class 1	Class3	Class 1	Class 3	Residual
Crown					
District 1	91,100	440	740	0	6,600
District 2	109,100	8,900	1,100	340	7,900
District 5	32,300	40,400	3,800	1,300	4,600
District 7	53,200	10,300	610	80	5,700
District 8	66,000	31,000	8,100	320	5,300
District 9	40,300	45,400	1,400	1,100	6,100
District 14	81,000	26,000	80	20	8,900
District 15	28,000	5,200	20	0	3,600
District 16	31,400	32,300	340	300	4,300
District 17	73,200	11,500	400	280	7,000
District 18	150,600	21,300	180	10	9,700
Total	**756,200**	**232,740**	**16,770**	**3,750**	**69,700**
Abitibi					
District 4	55,300	13,600	830	210	4,000
District 5	22,000	6,000	590	180	1,500
District 6	12,100	690	310	30	820
District 8	2,600	840	0	0	190
District 9	34,500	3,600	1,200	50	1,500
District 10	118,800	5,000	0	0	5,600
District 11	223,300	6,100	680	40	8,700
District 12	242,100	13,300	900	30	12,100
District 13	60,700	18,400	260	30	4,700
Total	**771,400**	**67,530**	**4,770**	**570**	**39,110**
CBPP					
District 5	60,800	8,400	2,600	310	3,900
District 6	145,700	14,800	2,100	80	9,800
District 8	19,700	2,600	1,300	120	1,200
District 9	214,200	24,400	3,500	500	13,700
District 14	127,600	27,100	290	200	11,900
District 15	385,000	40,800	2,000	410	32,400
District 16	160,300	46,100	1,500	620	14,800
District 17	101,700	8,100	1,200	50	7,100
Total	**1,215,000**	**172,300**	**14,490**	**2290**	**94,800**
Island Total	**2,742,600**	**472,570**	**36,030**	**6,610**	**203,610**

NOTE: The figures outlined in Table 1 represent an intermediate step in the analysis and do not represent the final AAC figures to be released for the 2006 analysis. Historically, these gross volumes have been adjusted downward by 30 to 40 per cent to obtain the final (net) AAC for the Island.

Please refer to Appendix I to view map outlining FMD boundaries for the Island.

GROSS HARVEST LEVEL ADJUSTMENTS

Three steps below have yet to be completed and will result in downward adjustments of the gross wood supplies numbers listed in Table 1.

Public Review
This step involves completion of the 30-day public review.

Manual Harvest Scheduling
This step involves adjusting the gross numbers to account for restrictions associated with spatial harvest scheduling. The expected adjustment is approximately 15%.

Inventory Adjustments
This step involves adjustments which have to be applied to account for volume reductions that are likely to occur due to natural disturbances and timber harvesting, including fire, insects and disease, timber utilization and stand remnants.

Fire
Historical wildfire statistics are used to estimate the loss of productive timber. The expected adjustment is approximately 1%.

Insects

An aerial mortality survey of areas with historically high insect infestations was completed. This information, along with GIS mapping analysis of areas salvaged or harvested, was used to estimate the amount of productive timber lost to insect mortality each year. The expected adjustment is approximately 3%.

Timber Utilization

Timber utilization information was derived from a series of intensive on-the-ground surveys which measured the amount of wood left on cutovers following harvesting. The expected adjustment is approximately 7%.

Timber harvesters have become much more efficient with respect to timber utilization since the 2001 wood supply analysis. At that time the impact on the AAC was much more significant at approximately 12 %.

Stand Remnants

Following harvesting operations, small fragments of stands are often left for a variety of reasons, including operational constraints, low volume and terrain conditions. These fragments often result in the forest operator being unable to harvest volumes predicted by the computer models. For the 2006 analysis, a series of surveys were conducted across the province and analyzed to determine the amount of productive area loss attributed to remnants. The expected adjustment is approximately 12%.

SUMMARY

The 2006 analysis was undertaken by government utilizing the best available data while using the most advanced modeling and analytical techniques. As a result of the new technologies and an enhanced data base, the 2006 analysis is an improvement over the 2001 analysis.

While the Department of Natural Resources is confident the 2006-2010 AAC will be accurate and sustainable, it is important to remember that the strength of the analysis is not necessarily in the numbers themselves. The strength lies in the continued commitment to constantly gather better data and to refine the assumptions and techniques employed in each analysis.

Public consultation is a key element in the effective management of our forest resources. Accordingly, the Department of Natural Resources encourages you to provide comment on the information presented regarding the 2006 Island Wood Supply Analysis. The deadline for individuals or groups to submit comment is February 17, 2006.

Anyone wishing to provide comment on the wood supply analysis process can do so by email at idownton@gov.nl.ca or in writing at the following address:

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Appendix I

Forest Management Regional and District Boundaries