

**Summary of Harvesting, Planting and Regeneration Trends  
for Western Redcedar in Coastal TFLs and TSAs  
1991 – 2005**

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## Executive Summary

The main objective of this report is to use existing data to provide a summary of trends in past and current management of western redcedar (Cwc), in relation to all other species, on Crown land within Tree Farm Licence (TFL) and Timber Supply Area (TSA) management units. Harvest Billing System (HBS) and Reporting Silviculture Updates and Land Status Tracking System (RESULTS) data are used to summarize trends in the amount of volume and area of Cwc harvested; amount of area and number of Cwc trees planted; current stocking status of harvested areas; and changes in silviculture systems for the period of 1991-2005.

A secondary objective of this project is to develop business information (BI) tools for the RESULTS database that will assist District and Regional managers in assessing the status and impact of past and current forest practices.

The following trends are observed for 1991-2005:

- Overall, the harvest level of Cwc has remained constant for the coast. TFLs show a decrease and TSAs show an increase over time. TSA 21 shows the largest increase, but TFL 26, TFL 45, TFL 54 and TSA 33 also show increases.
- The percent of harvested volume that is Cwc is increasing for the coast. TFLs show a decrease and TSAs show an increase over time. For the period of 2001-2005, at between 50 and 60 percent, TFL 10, TFL 54, TFL 57, TSA 19 and TSA 33 have the highest proportion of the harvested volume being Cwc. For the same period, TFL 25, TFL44, TSA 21 TSA 25, TSA 38 and all TSAs combined have more than 30 percent of the harvested volume being Cwc.
- Although the amount of area planted to Cwc exceeds the area of Cwc harvested, the amount of area classified as free growing Cwc is less than what was planted. This indicates:
  - Cwc mortality, most likely from browsing by deer.
  - Ingress of other species, which may be out competing the planted Cwc.
- There has been a major shift in silviculture systems. For 1991-1995, the clearcut system accounted for 98 percent of the area harvested. For 2001-2005, the clearcut system accounted for 36 percent; the retention system accounted for 36 percent; and clearcut with reserves system accounted for 24 percent of the area harvested.
- The increase use of the retention system emphasizes the importance of developing tools to assess site productivity and predict growth for the resultant complex stand structures.

- Due to the increased use of the retention and clearcut with reserves systems, volume per opening area has decreased over time. Volume per opening area for all coastal TFLs and TSAs combined has decreased by 16 percent for the period of 2001-2005, as compared to the periods of 1991-1995 and 1996-2000.

A comparison of recent harvesting trends to the 1994 inventory data for TSA 21 shows that from 1996-2005 more than 20 percent of the area and volume of Cwc were harvested, while only 6 percent of the area and volume of all other species were harvested. Although the total allowable annual cut (AAC) appears to be sustainable, the harvest level for Cwc does not appear to be sustainable for this TSA. This result suggests that the AAC should be proportioned by species, based on the species profile in the inventory, to ensure sustainability.

Results of this project indicate that BI tools can be an effective tool for Regional and District managers to assess the impact of past and current forest practices, but in order for BI tools to be made available and updated in a timely manner, improvements in the completeness of data, validity of data and access to data are required.

It is recommended that Regional and District managers review the trends in Cwc management presented in this report to past and current inventory data to assess the sustainability of the Cwc harvest in all coastal TFLs and TSAs.

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## 1.0 INTRODUCTION

The primary objective of this project is to provide a summary of past and current harvesting, planting and regeneration trends for western redcedar (Cwc) in coastal Tree Farm Licence (TFL) and Timber Supply Area (TSA) management units to assess whether the trends are sustainable and to quantify changes in silviculture systems and reforestation.

A secondary objective of this project is to develop business information (BI) tools for the RESULTS database that will assist District and Regional managers in assessing the status and impact of past and current forest practices. In order for the BI tools to be effective, the following conditions must be met:

- Existing data must be summarized from various sources in a format that allows current conditions and trends to be easily identified and understood. This is accomplished by presenting the data graphically, in graphs that are simple and uncluttered.
- Once current conditions or trends of interest have been identified, the data must be summarized in a format that allows specific questions to be answered. This is accomplished by presenting the data in tabular format, in tables that are compact and informative.
- Existing data from various sources must be current, complete and compatible for it to be amalgamated without extensive data processing, data entry or data validation.

To attain the primary objective, data must be amalgamated from the following databases that are maintained by various Ministry of Forests and Range (MoFR) branches:

- Harvesting, silviculture activity and current forest cover data from the Reporting Silviculture Updates and Land Status Tracking System (RESULTS) database, maintained by Forest Practices Branch (FPB). These data are available from 1987 to the present and provide information on the number of seedlings planted, area planted, area harvested, silviculture system, previous forest cover and current status of regenerating and residual areas. These data are primarily area based.
- Harvest billing data from the Harvest Billing System (HBS), maintained by Revenue Branch (RB). These data are available from 1979 to the present and provide information on the volume harvested, by species and ownership, over time. These data are volume based.

- Inventory forest cover data, overlay data, timber supply review (TSR) data and TSR documentation for the timber harvesting land base (THLB), maintained by Forest Analysis and Inventory Branch (FAIB). Inventory forest cover data are both area and volume based and provide a link between the area based RESULTS data and volume based HBS data. These data should be available from the early 1990s, but due to problems with data archiving, are not available for this project. The exception was a 1994 forest inventory planning (FIP) file for the North Coast TSA (TSA 21) that FAIB was able to provide.

Section 2.0 of this report briefly describes the data used for this project and how these data were compiled and utilized. A more detailed description is given in Appendix VI.

**It should be noted that areas and volumes are not summarized by leading species for this project, but are summarized by individual species based on the species composition for area based data and volume or volume per hectare for volume based data. The methodology is briefly explained in Section 2.2.6 and explained in detail in Appendix VI.**

The data summaries for this project are classified into two categories:

- Summaries to assess periodic achievements, such as the number of seedlings planted. These types of summaries are useful for determining current conditions and trends. Data for these summaries tends to be one-dimensional and independent of other data.
- Summaries to monitor the effectiveness and results of past and current practices, such as silviculture systems. These types of summaries are useful for determining factors that contribute to the current conditions and trends. Data for these summaries tends to be multifaceted, as data from a variety of sources must be linked together.

For this project, data are summarized graphically, for the periods of 1991-1995, 1996-2000 and 2001-2005, for the following:

- Volume and area harvested. These are classified as summaries to assess periodic achievements.
- Area and number of seedlings planted. These are classified as summaries to assess periodic achievements.
- Current status of openings that have been harvested between 1991 and 2005. This is classified as a summary to monitor the effectiveness and results of past and current practices.

It should be noted that the data presented in the graphs to assess periodic achievements are different from the data presented in the graph to assess the current status of openings harvested between 1991 and 2005. Using Figure 8 as an example:

- The area planted for all coastal TFLs and TSAs combined is 358,428.6 hectares (ha).
- The area planted for openings harvested in all coastal TFLs and TSAs combined is 293,009.2 ha.
- The difference is that the 358,428.6 ha includes areas that were planted for openings harvested prior to 1991 and the 293,009.2 includes areas that were planted after 2005 in openings that were harvested prior to 2006.

Summary graphs are given in Figures 1 to 8, Appendix I contains graphs for each individual TFL and Appendix II contains graphs for each individual TSA.

Figures 1 and 2 give the volume harvested in each coastal TSA and TFL, subdivided by Cwc and all other species combined. These graphs assist in putting trends observed in individual TFLs and TSAs into perspective as to their overall impact on coastal forestry.

Figures 3 and 4 provide information for all coastal TFLs and TSAs combined, Figures 5 and 6 provide information for all coastal TFLs combined and Figures 7 and 8 provide information for all coastal TSAs combined.

Section 3.0 of this report provides a summary of the trends observed. Trends indicate:

- A decrease in the amount and proportion of Cwc harvested in coastal TFLs and an increase in the amount and proportion of Cwc harvested in coastal TSAs over time.
- The area planted to Cwc is replacing the area of Cwc harvested. Areas classified as free growing Cwc are less than the areas planted to Cwc, indicating mortality of Cwc and the ingress of other species over time.
- An increase in the use of clearcut with reserves and retention silviculture systems over time and the resultant increase in area occupied by residual mature trees.
- Due to the increased use of clearcut with reserves and retention and systems, more area is required to obtain the same volume of Cwc.

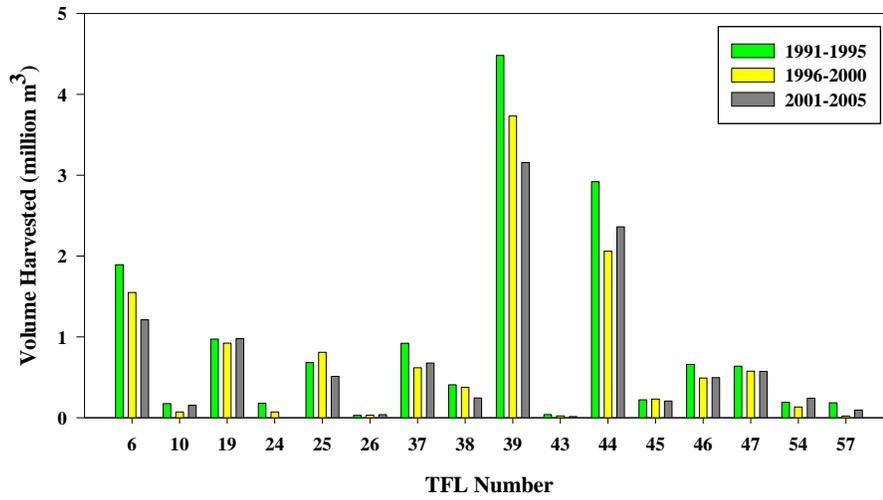
Section 3.0 also includes summary tables for all coastal TFLs combined, all coastal TSAs combined and all coastal TFLs and TSAs combined that were derived to provide more detail for the trends observed. Appendices III, IV and V contain the tables for each individual TFL and TSA.

Section 4.0 of this report uses the 1994 forest cover data for TSA 21 to illustrate how the addition of forest cover data allows the effects of harvesting and regeneration trends on the growing stock within the THLB to be assessed for sustainability. This comparison indicates that although the overall allowable annual cut (AAC) appears to be sustainable, the amount of Cwc harvested as part of the AAC, relative to the inventory profile, does not appear to be sustainable. It should be noted that an unknown portion of the volume harvested for TSA 21 was from outside of the THLB that is defined in the 1994 TSR document.

Section 5.0 of this report provides recommendations for further analysis. Although it was possible to amalgamate data from various sources to attain the primary objective of summarizing trends in Cwc management over time, the data required too much additional processing to attain the secondary objective of using summaries from various data sources to produce BI tools for the RESULTS database in a timely manner. Section 5.0 also provides recommendations:

- For further analysis.
- To improve the reporting capability of the RESULTS database.
- To improve the availability of forest cover and TSR data.
- To improve the linkage between the HBS and the RESULTS databases.

### Western Redcedar



### Other Species

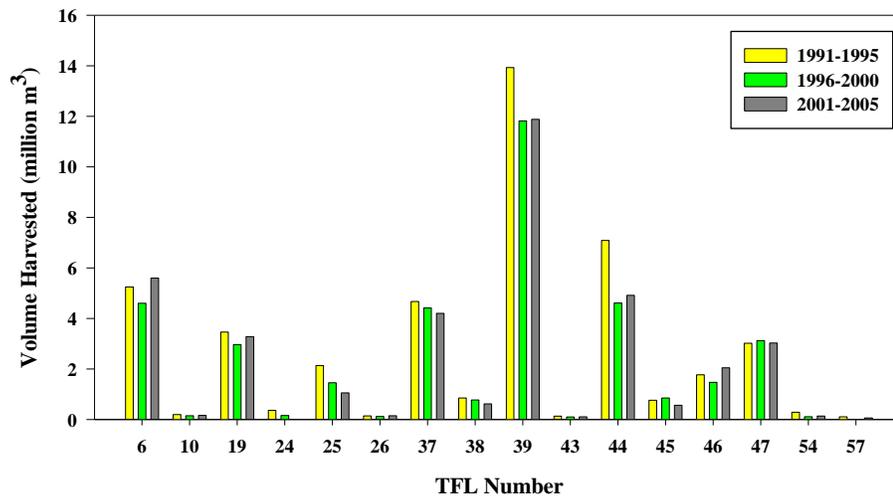
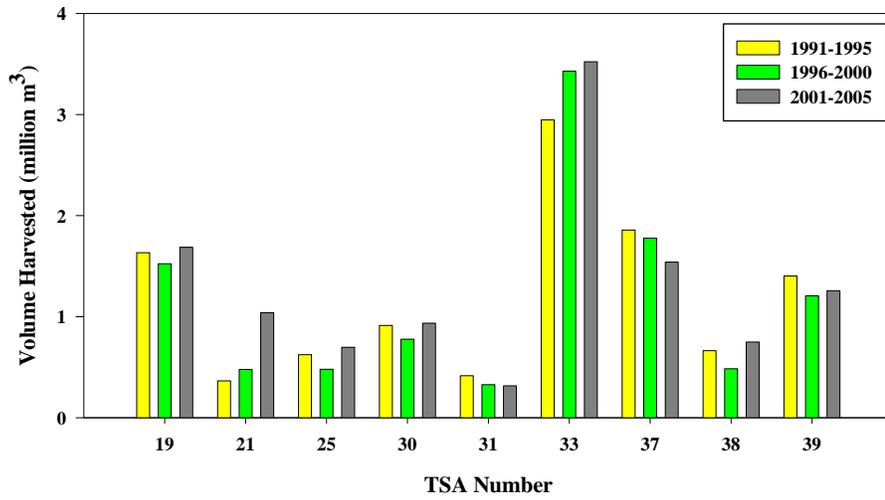


Figure 1. Volume Harvested – Individual Coastal TFLs

### Western Redcedar



### Other Species

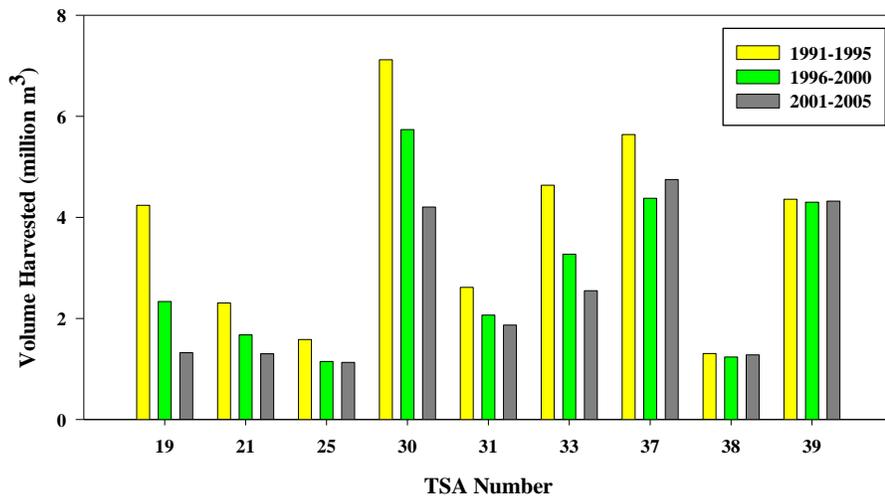


Figure 2. Volume Harvested – Individual Coastal TSAs

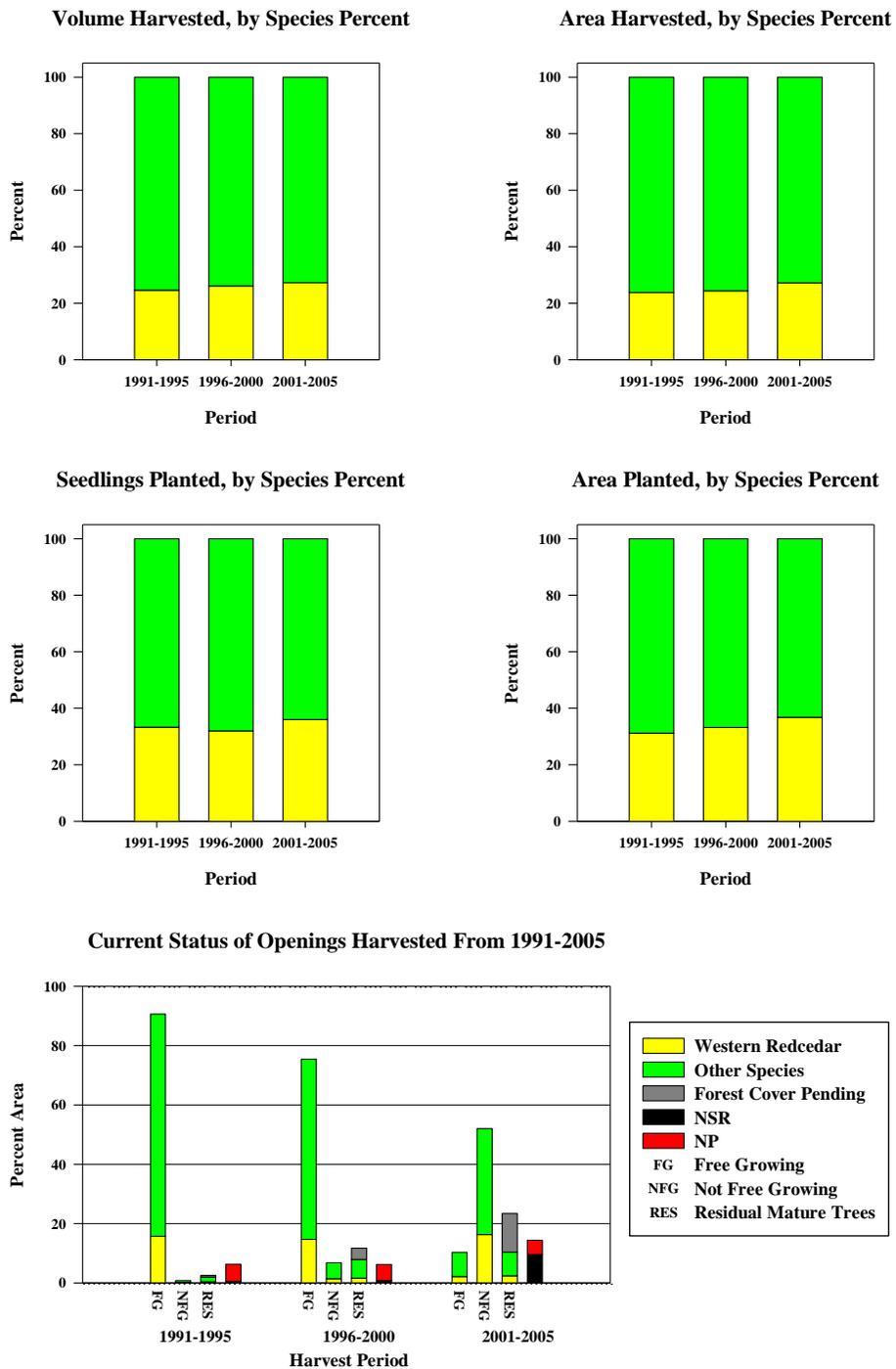


Figure 3. Combined Coastal TFLs and TSAs – Percent Volume and Area

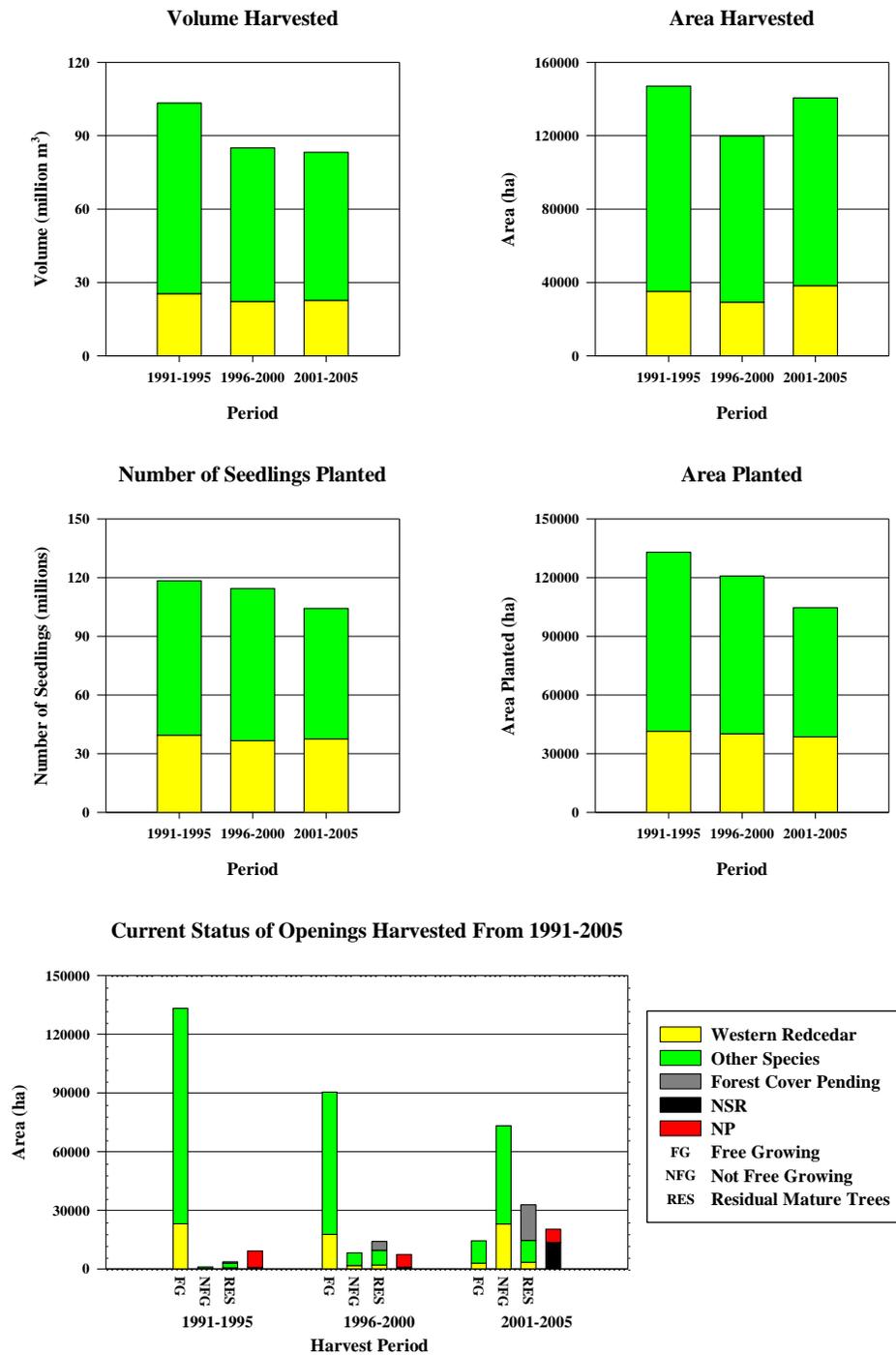
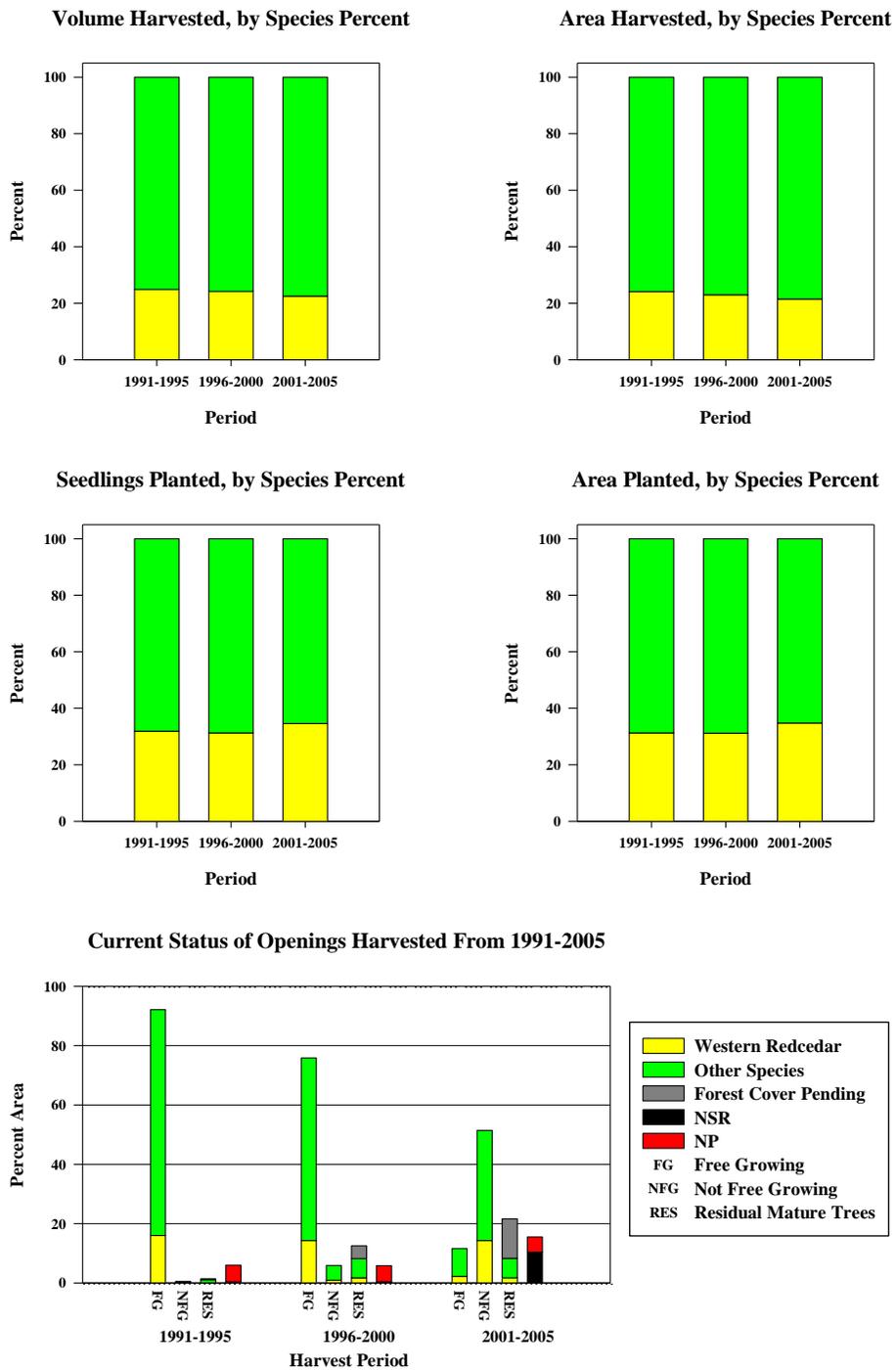
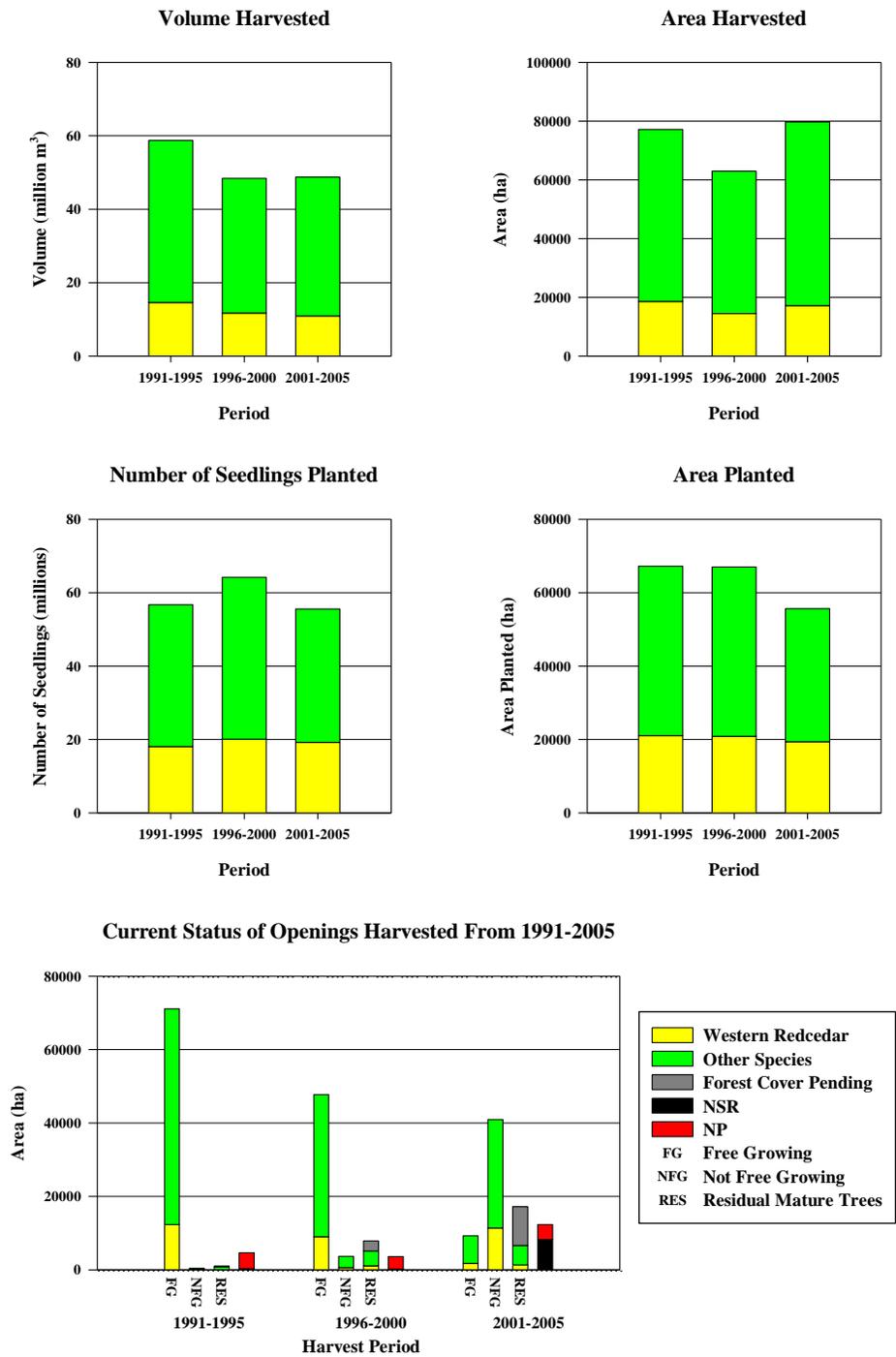


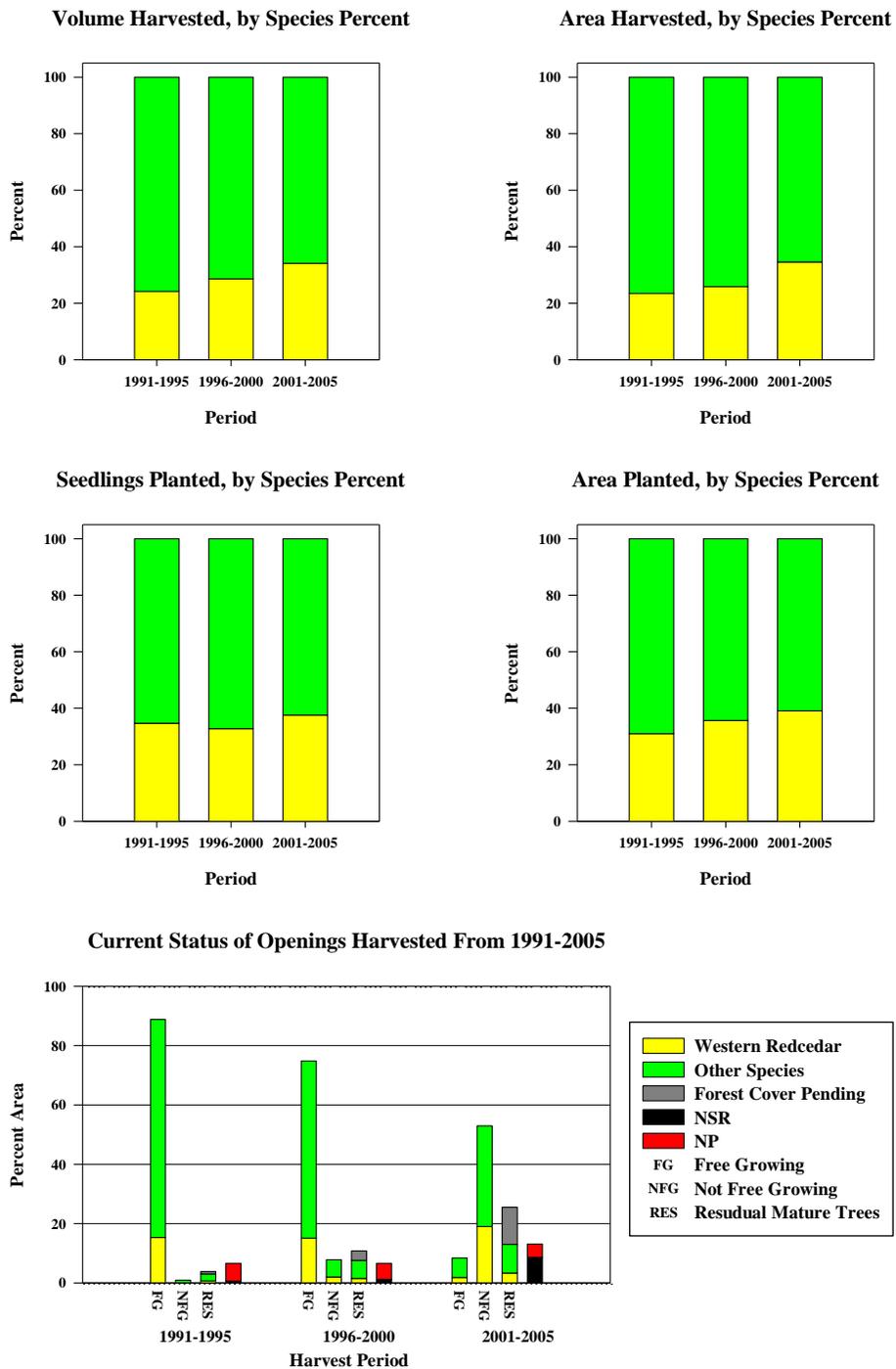
Figure 4. Combined Coastal TFLs and TSAs – Volume and Area



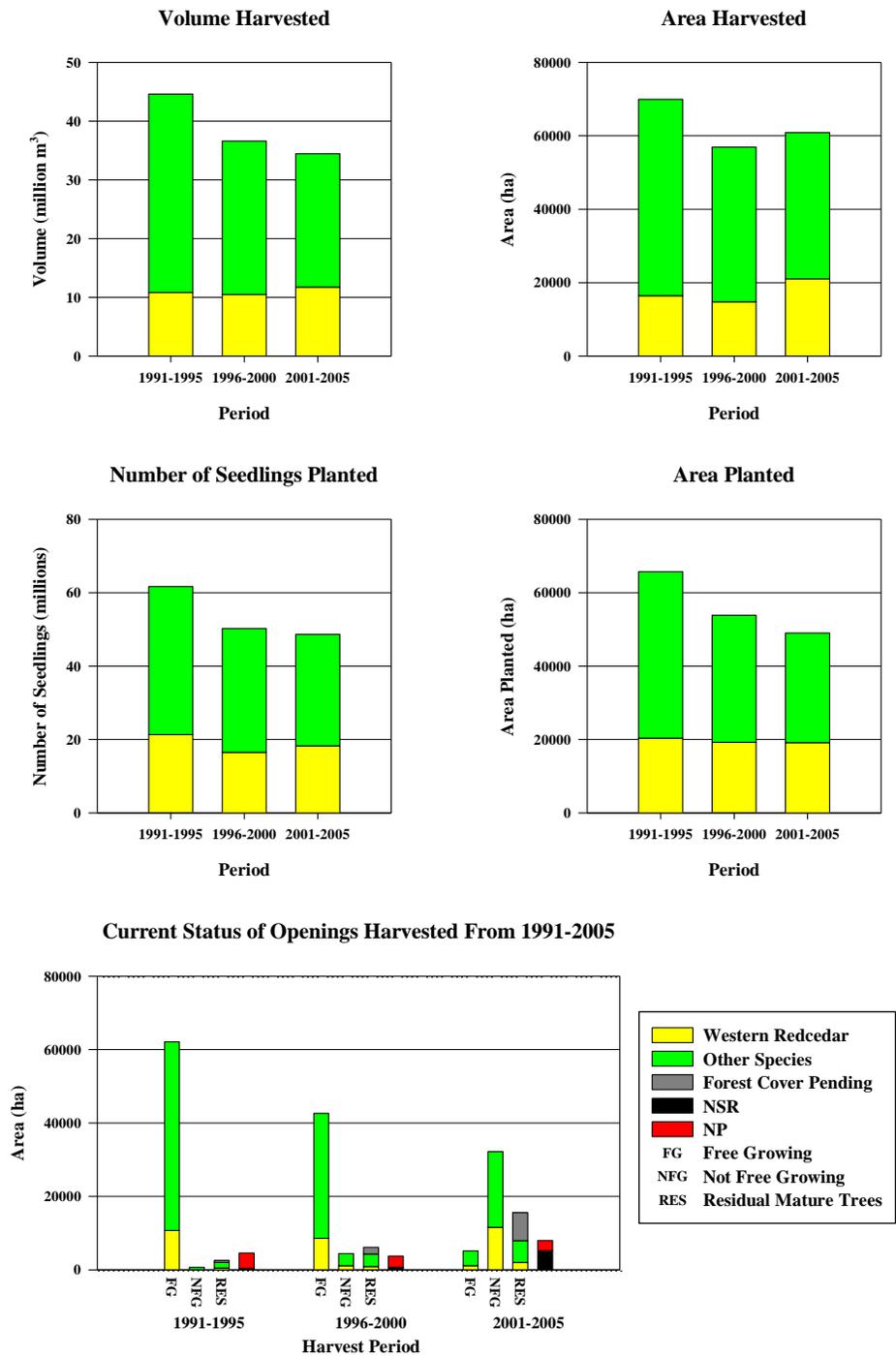
**Figure 5. Combined Coastal TFLs – Percent Volume and Area**



**Figure 6. Combined Coastal TFLs – Volume and Area**



**Figure 7. Combined Coastal TSAs – Percent Volume and Area**



**Figure 8. Combined Coastal TSAs – Volume and Area**

## **2.0 DATA DESCRIPTION AND DATA COMPILATION**

This section briefly describes the data used for this project and how these data were compiled and utilized. A more detailed description is given in Appendix VI, which also includes problems associated with the data and how the problems were addressed.

While problems with the data do not detract from the primary objective of this project, the analysis of trends in past and present management of coastal Cwc, they do detract from the secondary objective of summarizing data from various sources without additional processing to develop BI tools for the RESULTS database. It should be noted that many of the problems encountered are for data collected in the past and the problems have already or are currently being rectified in current data collection and management procedures.

It should be noted that:

- TFL 47 has recently been changed to TFL 58. Only the HBS had data for TFL 58 and all HBS data associated with either TFL 47 or TFL 58 are assigned to and presented as TFL 47 for this project.
- In 1998, TFL 24 was consolidated with TFL 25. These data were not combined for this report and are presented as they are recorded in the HBS and RESULTS databases.

### **2.1 Data Description**

Data are described by the following data sources:

- Harvest billing system (HBS) data
- RESULTS data
- Inventory forest cover data

#### **2.1.1 Harvest Billing System (HBS) Data**

HBS data are available from 1979 to the present and are used to summarize the volume harvested, by species, over time. Characteristics of these data are:

- Volume harvested, by species, is summarized by timber mark and billing date. Timber marks are unique between management units, but volumes cannot be linked to individual RESULTS database openings due to:
  - Timber marks can represent more than one RESULTS database opening within a management unit.
  - RESULTS database openings can have more than one timber mark.

- Billing date lags behind the actual harvest date and RESULTS database openings can be harvested over a number of years, making it impossible to use dates in the HBS and RESULTS databases to match timber harvested to openings when timber marks represent more than one opening.

As a result, volume harvested can only be summarized by management unit or aggregations of RESULTS database openings.

- Timber marks are classified by file type code to differentiate between Crown, federal and private land.

### **2.1.2 RESULTS Data**

RESULTS data area available from 1987 to the present and are used to summarize the number of seedlings planted; area planted; area harvested; silviculture system; current and previous forest cover; and current land status of regenerating and residual areas. Problems with these data for the period of 1991-2005 are:

- Previous forest cover information is missing for 60 percent of the openings. This information could be obtained from past inventory files, but not within the scope or timeframe of this project. Current data submission requirements ensure that these data are obtained.
- Areas classified as not satisfactorily regenerated (NSR) are not updated to a new classification immediately after planting, but tend to be reclassified after a regeneration or survival survey. It is estimated that approximately 30,000 ha out of the 40,000 ha classified as NSR have actually been planted.
- Areas planted within an opening, as reported in the RESULTS database PLANTING table, do not directly link up with the areas of the polygons, as reported within the RESULTS database FOREST COVER table. This makes it difficult to determine if areas classified as NSR have been planted.
- The classification and coding for openings where a silviculture system or intermediate cut treatment results in a partial harvest requires more consistency. The collection and coding of these data are currently under review.
- Planting codes are incorrectly or inconsistently used. Replanted areas and fill planted areas are often coded as being part of the initial planting and there are no codes for under planting in partially harvested areas. This, combined with the inconsistent classification of partially harvested openings and the differences in treatment areas between the RESULTS PLANTING and FOREST COVER tables, makes it difficult to distinguish between planting technique, the actual areas planted and which polygons within an opening have been planted.

### **2.1.3 Inventory Forest Cover Data**

Inventory forest cover data were to be used to assess the effect of past and current management practices on the available growing stock in the THLB, but were not available within the time frame of this project. Problems obtaining these data are:

- Inventory forest cover data for TSAs are available from the land and data resource warehouse (LRDW), but only from 2002 and do not contain the overlays required to determine the THLB.
- Based on previous projects, such as the state of forest (SOF) reports, obtaining permission to use licensee data for TFLs is time consuming and not within the scope or time frame of this project. In past cases, TFL inventory could only be used if the TFL data were aggregated and not presented individually.
- Forest cover files netted down for previous timber supply reviews (TSR) are not available from FAIB. Summaries in the TSR documents are not adequate as they are summarized by categories, such as analysis unit, which are unique to timber supply analysis.
- Inventory forest cover data files netted down to the THLB for the Timber Reallocation Project (2003) and the Coastal Forestry Revitalization Strategy (2007) were not made available by FAIB for this project.
- Forest inventory planning (FIP) files have been archived since the early 1990's, but must be extracted, processed and converted to current systems to be used. Tentatively, FAIB plans to have the attribute files available by September, 2007 and spatial files available at a later date.

### **2.2 Data Compilation**

Data compilation is described by the categories the data were summarized by to produce the graphs for this project:

- Number of seedlings and area planted by species
- Volume harvested by species
- Area harvested by species
- Current status of areas harvested, from 1991-2005, by species
- Growing stock by species
- Miscellaneous data compilation procedures

### **2.2.1 Number of Seedlings and Area Planted**

Number of seedlings planted is calculated by merging data from the RESULTS database PLANTING SPECIES and PLANTING tables to obtain the total number of seedlings planted in an opening. No differentiation is made between different types of planting, such as initial, fill or replant, and all seedlings planted by all methods are summed.

Species composition is calculated by dividing the number of seedlings planted for each species by the total number of seedlings planted.

Treatment area is obtained from the RESULTS database PLANTING table.

Area planted by species is calculated from the planted species composition and treatment area. For each species planted, the area occupied by a species is calculated by dividing the species percent by the sum of all the species percents and then multiplying by the treatment area.

### **2.2.2 Volume Harvested**

Volume harvested is calculated from the HBS database by summarizing the volume billed for Crown land, as defined by the file type code, by:

- Species and billing year.
- Species and timber mark.

A check on compatibility and completeness of data between the RESULTS and HBS databases, for 1991-2005, indicates:

- 98.6 percent of the area represented by openings in the RESULTS database were linked to timber marks that have volume harvested data in the HBS.
- 96.7 percent of the harvested volume in the HBS associated with Crown land were linked by timber mark to an opening in the RESULTS database.

### **2.2.3 Area Harvested**

Area harvested is calculated by summing the net area for each polygon within an opening from the RESULTS database FOREST COVER table.

Area harvested by species is calculated from the pre-harvest species composition and opening area. For each species in the pre-harvest species composition, the area occupied by the species is calculated by dividing the species percent by the sum of all the species percents and then multiplying by the area of the opening.

Since the previous species label is missing from 60 percent of the records in the RESULTS database OPENING table, HBS data are used to determine pre-harvest species composition by grouping all openings with overlapping timber marks and basing the pre-harvest species composition on the species profile of volume harvested. Combined openings all have the same pre-harvest species composition.

This method of assigning a pre-harvest species composition to an opening has the following characteristics:

- Since it combines openings, it cannot be used for an analysis by opening, but it can be used for an analysis by management unit.
- Since it does not account for residual trees in a partially harvested opening, it does not assign a correct previous species composition to these openings. The magnitude of the error depends on the volume of residual mature trees.

#### **2.2.4 Current Status of Areas Harvested from 1991-2005**

The current status of areas harvested from 1991-2005 classifies the polygons within openings into the following categories:

- Free growing
- Not free growing
- Not satisfactorily stocked (NSR)
- Non-productive (NP)
- Residual mature trees

For this analysis, free growing is defined as:

- Polygons classified as free growing in the RESULTS database
- Polygons that are not classified as free growing in the RESULTS database, but have a stocking status set to immature, a stocking type set to artificial or natural and a current forest cover age greater than or equal to seven years.

Not free growing is defined as polygons classified as natural or artificial which are less than seven years old and not classified as free growing in the RESULTS database.

NSR and NP are areas classified as NSR and NP in the RESULTS database. NP also includes areas classified as rock, lake, swamps etc.

Residual mature trees are defined as polygons in the RESULTS database classified as mature.

Classification of polygons uses an amalgamation of data from the RESULTS database FOREST COVER LAYER SPECIES, FOREST COVER LAYER, FOREST COVER and OPENING tables. Data from the RESULTS database PLANTING SPECIES and PLANTING tables are also used to convert polygons currently classified as NSR, but have been recently planted and not had their status updated, to the not free growing classification.

Forest cover is determined from the current inventory label. Valid forest cover descriptions must have a species composition and age. If the inventory label has more than one species with an age, the oldest age is used. Ages are updated to 2007, based on the reference year for the forest cover label.

Area is determined from the net area of the polygon within an opening.

Area by species is calculated from the current inventory label and polygon area. For each species in the current inventory label, the area occupied by the species is calculated by dividing the species percent by the sum of all the species percents and then multiplying by the area of the polygon.

### **2.2.5 Growing Stock**

Inventory forest cover data for the THLB of the TFLs and TSAs were not available for this project, with the exception of the 1994 FIP file for TSA 21 (North Coast). Section 4.0 gives an example of how inventory forest cover data can be used to assess the effects of harvesting and regeneration trends on the initial growing stock for TSA 21.

Area by species is calculated by multiplying the species percent by the polygon area and dividing by the sum of the species percents.

Volume by species is calculated by multiplying the primary utilization level volume per hectare for a species by the area of the polygon.

### **2.2.6 Miscellaneous Data Compilation Procedures**

Miscellaneous data compilation procedures include:

- For openings that were disturbed over a number of years, the last year of disturbance is used to define the opening year.
- Data used are restricted to the years between 1991 and 2005 for the following:
  - RESULTS data prior to this period are incomplete.
  - HBS and RESULTS data beyond 2005 are not completely up to date.

- Data are grouped into the periods 1991-1995, 1996-2000 and 2001-2005 for the following:
  - RESULTS openings usually have disturbances that span a number of years.
  - HBS data related to an opening is reported after the last disturbance date for the opening.

Graphing these data on an annual basis results in what appears to be erratic relationships between the different sources of data and makes overall trends difficult to visualize, while graphing these data on a periodic basis provides a clearer picture of overall trends.

- Traditionally, inventory data are summarized by leading species or aggregated into analysis units by leading species. This analysis took a different approach of determining the area occupied by each species based on the species composition and area of a polygon. This approach was taken for the following reasons:
  - It provides a more accurate estimate of the abundance of an individual species.
  - It provides a more accurate estimate of the abundance of scattered species, such as Cwc, that are generally not the leading species of mixed stands.
  - It provides a more consistent basis for comparing areas planted, areas harvested and regenerating areas by individual species.

### 3.0 TRENDS OBSERVED IN THE DATA

Trends for the period of 1991-2005 observed in this analysis are:

- The volume of Cwc harvested in coastal TFLs and TSAs has remained fairly constant. On average, TFLs show the amount of Cwc volume harvested has decreased over time, whereas TSAs show the amount of Cwc harvested has increased over time. TFL 26, TFL 45, TFL 54, TSA 21 and TSA 33 show the greatest increase in the amount of Cwc volume harvested over this timeframe.
- The percent of harvested volume that is Cwc in coastal TFLs and TSAs has remained fairly constant. On average, TFLs show a decrease in the percent of harvested volume that is Cwc, whereas TSAs show an increase. TFL 44, TFL 54, TSA 19, TSA 21, TSA 25, TSA 30 and TSA 31 show the greatest increases in the percent of the harvested volume that is Cwc over time

On average, the harvested volume that is Cwc in coastal TFLs and TSAs is approximately 25 percent of the total harvested volume. TFLs show this average dropping to 20 percent for the period 2001-2005, whereas TSAs show this average increasing to over 30 percent for the period 2001-2005. For the period 2001-2005, TFL 10, TFL 54, TFL 57, TSA 19 and TSA 33 have the highest proportion of the harvest being composed of Cwc, at 49, 64, 62, 56 and 58 percent respectively. For the same period, TFL 25, TFL 44, TSA 21, TSA 25 and TSA 38 have more than 30 percent of the harvested volume being composed of Cwc.

- Table 1 summarizes the area of Cwc harvested, area of Cwc planted and the status of the Cwc that was planted for all coastal TFLs combined, all coastal TSAs combined and all coastal TFLs and TSAs combined. Appendix III summarizes the data for individual coastal TFLs and TSAs. Table 1 indicates the area of Cwc harvested is being replaced by planting Cwc. The current status of the planted Cwc indicates a substantial amount of Cwc mortality and ingress of other species over time. Based on the periods 1991-1995 and 1996-2000, it is expected that a portion of the area currently classified as not free growing Cwc for the period of 2001-2005 will not be classified as Cwc after free growing surveys have been conducted.
- There is an increase over time in the amount of residual mature trees left in harvested areas. Tables 2 to 4 provide summaries of the opening area, openings with residual mature trees and the area of residual mature trees by silviculture system and time period for all coastal TFLs combined, all coastal TSAs combined and all coastal TFLs and TSAs combined. Appendix IV summarizes the data for individual coastal TFLs and TSAs.
  - The area left as residual mature trees, compared to the area harvested, has increased from 2.5 percent in 1991-1995 to 11.7 percent in 1996-2000 to 23.3 percent in 2001-2005.

- The area of openings containing residual mature trees after harvesting has increased from 10.0 percent in 1991-1995 to 59.9 percent in 1996-2000 to 86.4 percent in 2001-2005.
- Due to the increase in areas of residual mature trees, the volume harvested per opening area is decreasing over time. Table 5 summarizes the area and volume harvested by period and all coastal TFLs combined, all coastal TSAs combined and all coastal TFLs and TSAs combined. Appendix V summarizes these data by individual coastal TFLs and TSAs. Table 5 shows that for the period of 2001-2005, in comparison to the periods of 1991-1995 and 1996-2000:
  - The volume harvested per opening area has decreased by 20 percent for all coastal TFLs combined. The opening area left as mature residual trees has increased from 1 percent in 1991-1995 to 13 percent in 1996-2000 to 22 percent in 2001-2005.
  - The volume harvested per opening area has decreased by 12 percent for all coastal TSAs combined. The opening area left as mature residual trees has increased from 4 percent in 1991-1995 to 11 percent in 1996-2000 to 26 percent in 2001-2005.
  - The volume harvested per opening area has decreased by 16 percent for all coastal TFLs and TSAs combined. The opening area left as mature residual trees has increased from 3 percent in 1991-1995 to 12 percent in 1996-2000 to 23 percent in 2001-2005.

Based on the changes in opening area left as mature residual trees and the decreases in volume harvested per opening area, it appears that more volume per opening area is being left as residual mature trees in TFLs, as compared to TSAs.

**Table 1. Status of Western Redcedar Planted in Openings Harvested from 1991-2005**

Management Unit	Harvest Period	Area of Cwc Harvested (ha)	Harvested Area Planted to Cwc (ha)	Current Status of Planted Cwc (ha)		
				Free Growing	Not Free Growing	Total
All Coastal TFLs Combined	1991-1995	18,609.9	22,177.4	12,321.1	138.1	12,459.2
	1996-2000	14,461.8	16,103.4	9,024.1	568.9	9,593.0
	2001-2005	17,172.7	16,826.3	1,775.0	11,403.6	13,178.6
All Coastal TSAs Combined	1991-1995	16,451.1	21,100.6	10,721.8	95.6	10,817.4
	1996-2000	14,767.5	16,268.0	8,603.6	1,136.5	9,740.1
	2001-2005	21,042.5	16,814.9	1,121.3	11,581.5	12,702.8
All Coastal TFLs and TSAs Combined	1991-1995	35,061.0	43,278.0	23,042.8	233.7	23,276.5
	1996-2000	29,229.0	32,371.4	17,627.7	1,705.4	19,333.1
	2001-2005	38,215.2	33,641.2	2,896.3	22,985.1	25,881.4

**Table 2. Area of Residual Mature Trees in Openings Harvested from 1991-2005 (All Coastal TFLs Combined)**

Silviculture System	Area Description	Harvest Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	76,451.7	50,845.9	27,694.8	154,992.4
	Area of openings with residual mature trees (ha)	7,400.3	30,029.5	22,838.5	60,268.3
	Area of residual mature trees in openings (ha)	512.2	4,802.7	4,447.2	9,762.1
Clearcut with Reserves	Total opening area (ha)	91.4	7,889.9	16,720.3	24,701.6
	Area of openings with residual mature trees (ha)	91.4	7,000.3	14,119.1	21,210.8
	Area of residual mature trees in openings (ha)	25.6	1,372.1	2,672.8	4,070.5
Retention	Total opening area (ha)		3,213.7	34,625.0	37,838.7
	Area of openings with residual mature trees (ha)		3,076.1	31,487.2	34,563.3
	Area of residual mature trees in openings (ha)		1,079.4	9,720.5	10,799.9
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	634.3	997.1	624.7	2,256.1
	Area of openings with residual mature trees (ha)	581.8	991.9	562.8	2,136.5
	Area of residual mature trees in openings (ha)	521.5	635.6	360.3	1,517.4
All Silviculture Systems	Total opening area (ha)	77,177.4	62,946.6	79,664.8	219,788.8
	Area of openings with residual mature trees (ha)	8,073.5	41,097.8	69,007.6	118,178.9
	Area of residual mature trees in openings (ha)	1,059.3	7,889.8	17,200.8	26,149.9

**Table 3. Area of Residual Mature Trees in Openings Harvested from 1991-2005 (All Coastal TSAs Combined)**

Silviculture System	Area Description	Harvest Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	67,258.8	47,334.4	23,008.0	137,601.2
	Area of openings with residual mature trees (ha)	4,305.3	23,563.4	18,526.6	46,395.3
	Area of residual mature trees in openings (ha)	533.8	3,479.9	3,504.5	7,518.2
Clearcut with Reserves	Total opening area (ha)	19.4	6,064.1	16,311.0	22,394.5
	Area of openings with residual mature trees (ha)	9.6	4,379.1	14,042.3	18,431.0
	Area of residual mature trees in openings (ha)	0.8	934.9	2,858.1	3,793.8
Retention	Total opening area (ha)		472.5	16,195.3	16,667.8
	Area of openings with residual mature trees (ha)		429.4	14,658.5	15,087.9
	Area of residual mature trees in openings (ha)		149.4	5,971.3	6,120.7
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	2,640.3	3,046.0	5,367.8	11,054.1
	Area of openings with residual mature trees (ha)	2,271.7	2,289.2	5,141.3	9,702.2
	Area of residual mature trees in openings (ha)	2,063.3	1,567.9	3,213.2	6,844.4
All Silviculture Systems	Total opening area (ha)	69,918.5	56,917.0	60,882.1	187,717.6
	Area of openings with residual mature trees (ha)	6,586.6	30,661.1	52,368.7	89,616.4
	Area of residual mature trees in openings (ha)	2,597.9	6,132.1	15,547.1	24,277.1

**Table 4. Area of Residual Mature Trees in Openings Harvested from 1991-2005 (All Coastal TFLs and TSAs Combined)**

Silviculture System	Area Description	Harvest Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	143,710.5	98,180.3	50,742.7	292,633.5
	Area of openings with residual mature trees (ha)	11,705.6	53,592.9	41,405.0	106,703.5
	Area of residual mature trees in openings (ha)	1,046.0	8,282.6	7,959.4	17,288.0
Clearcut with Reserves	Total opening area (ha)	110.8	13,954.0	33,040.4	47,105.2
	Area of openings with residual mature trees (ha)	101.0	11,379.4	28,161.4	39,641.8
	Area of residual mature trees in openings (ha)	26.4	2,307.0	5,530.9	7,864.3
Retention	Total opening area (ha)		3,686.2	50,820.3	54,506.5
	Area of openings with residual mature trees (ha)		3,505.5	46,145.7	49,651.2
	Area of residual mature trees in openings (ha)		1,228.8	15,691.8	16,920.6
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	3,274.6	4,043.1	5,992.5	13,310.2
	Area of openings with residual mature trees (ha)	2,853.5	3,281.1	5,704.1	11,838.7
	Area of residual mature trees in openings (ha)	2,584.8	2,203.5	3,573.5	8,361.8
All Silviculture Systems	Total opening area (ha)	147,095.9	119,863.6	140,595.9	407,555.4
	Area of openings with residual mature trees (ha)	14,660.1	71,758.9	121,416.2	207,835.2
	Area of residual mature trees in openings (ha)	3,657.2	14,021.9	32,755.6	50,434.7

**Table 5. Area and Volume Harvested for Openings Harvested from 1991-2005**

Management Unit	Period	Status of Opening Area (ha)			Volume Harvested (million m <sup>3</sup> )			Average Yield* (m <sup>3</sup> /ha)
		Residual Mature	Other	Total	Western Redcedar	Other Species	Total	
All Coastal TFLs Combined	1991-1995	1,059.3	76,118.1	77,177.4	14.590386	44.123332	58.713718	760.8
	1996-2000	7,889.8	55,056.8	62,946.6	11.710027	36.709812	48.419839	769.2
	2001-2005	17,208.5	62,496.2	79,704.7	10.950480	37.794588	48.745068	611.6
All Coastal TSAs Combined	1991-1995	2,597.9	67,320.6	69,981.5	10.816146	33.799915	44.616061	637.5
	1996-2000	6,132.1	50,784.9	56,917.0	10.481440	26.140173	36.621613	643.4
	2001-2005	15,547.1	45,344.1	60,891.2	11.737941	22.718602	34.456543	565.9
All Coastal TFLs and TSAs Combined	1991-1995	3,657.2	143,438.7	147,127.4	25.406532	77.923247	103.329779	702.3
	1996-2000	14,021.9	105,841.7	119,863.6	22.191467	62.849985	85.041452	709.5
	2001-2005	32,755.6	107,840.3	140,595.9	22.688421	60.513190	83.201611	591.8

\* Average yield is based on the total opening area, including reserves and areas with residual mature trees

## 4.0 ADDITION OF FOREST COVER DATA

The graphs and tables presented in this report provide information on trends in harvesting, planting and regeneration, but they do not provide any information on the effect of these trends on the growing stock. Inventory forest cover data representing the THLB over time are required to make this assessment. As described in Section 2.0, these data were not available for this project.

As an example of how inventory forest cover data could be used, FAIB provided a 1994 FIP file for TSA 21 (North Coast). This file was netted down to the THLB, based on the 1994 TSR data package. Table 6 provides a comparison of the 1994 TSR net down and the net down for this report.

Harvested area and volume graphs for TSA 21 (Appendix II) indicate:

- The proportion of area harvested that is Cwc has increased from 22 percent in 1991-1995 to 20 percent in 1996-2000 to 54 percent in 2001-2005.
- The proportion of volume harvested that is Cwc has increased from 14 percent in 1991-1995 to 22 percent in 1996-2000 to 44 percent in 2001-2005.

Figure 9 provides a comparison of these trends to the volume and area of growing stock as it was in 1994. This figure indicates that over a 10 year period from 1996 to 2005:

- 4,206.9 ha of Cwc have been harvested from the 18,932.9 ha of Cwc that was present in 1994. This represents a removal of 22 percent of the Cwc area.
- 5,788.1 ha of other species have been harvested from the 94,479.4 ha of other species that was present in 1994. This represents a removal of 6 percent of the other species area.
- 1,518,000 m<sup>3</sup> of Cwc have been harvested from the 7,750,000 m<sup>3</sup> of Cwc that was present in 1994. This represents a removal of 20 percent of the Cwc volume.
- 2,973,000 m<sup>3</sup> of other species have been harvested from the 49,800,000 m<sup>3</sup> of other species that was present in 1994. This represents a removal of 6 percent of the other species volume.

The addition of forest cover shows that although the overall harvest in TSA 21 appears to be sustainable, the increase in harvest of Cwc does not appear to be sustainable. The implication is that consideration should be paid to partitioning the AAC by species, based on the species profile indicated by the inventory forest cover data.

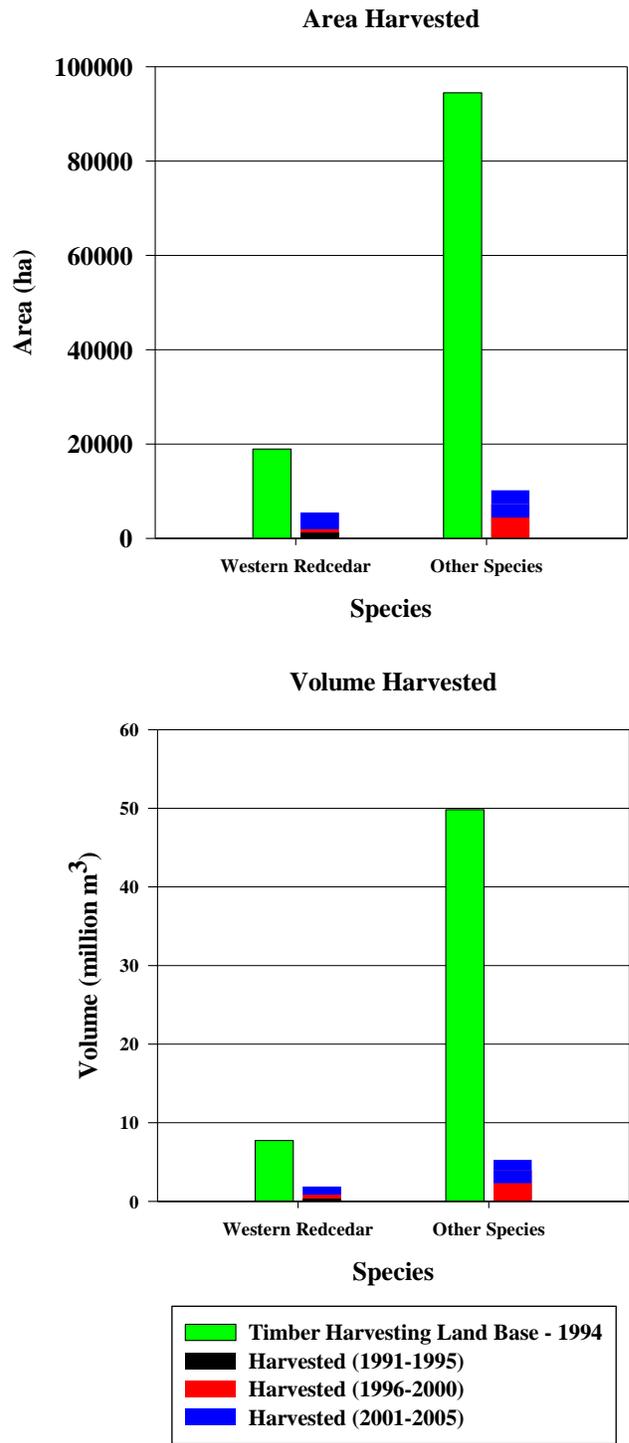
It should be noted that this analysis:

- Does not account for forest growth since 1994, but most of the Cwc in TSA 21 is overmature and not expected to change too much in volume.
- Does not account for changes in area of the THLB over time. The 1994 THLB was approximately the same size for the 1999 TSR, but has increased by approximately 25 percent for the 2006 TSR. The 1999 and 2006 TSR files for the THLB were not available from FAIB.
- Includes all RESULTS openings for TSA 21, including those that are outside of the THLB, as the RESULTS attribute files do not distinguish between areas in or out of the THLB.

**Table 6. TSA 21 Netdown of 1994 FIP File**

Description	TSR - 1994 Area (ha)		Report - 2008 Area (ha)	
<b>Total TSA</b>		<b>1,947,531</b>		<b>1,896,133</b>
Non-Crown	54,758		48,359	
<b>Total Crown land</b>		<b>1,892,773</b>		<b>1,847,774</b>
Non-productive	1,187,928		1,152,209	
<b>Total productive Crown land</b>		<b>704,845</b>		<b>695,565</b>
<b>Reductions to productive Crown land</b>				
Khutzeymateen Valley	15,906		15,899	
Environmentally sensitive areas	139,190		137,289	
Inoperable	418,234		415,799	
Riparian	6,508		6,277	
Non-merchantable forest types	5,627		5,220	
Low site	4,249		786	
Non-commercial cover	67		26	
Roads, skid trails and landings	1,011		1,011	
NSR	4,491		3,264	
<b>Total Reductions</b>	<b>595,283</b>		<b>585,571</b>	
<b>Additions to productive Crown land</b>				
NSR reclassified as stocked	1,397			
Backlog NSR	1,879		3,264	
Current NSR	1,215			
TL reversions	154		154	
<b>Total Additions</b>	<b>4,645</b>		<b>3,418</b>	
<b>1994 timber harvesting land base</b>		<b>114,207</b>		<b>113,412</b>

[Note]: The 1994 TSR file had map sheets in the FIP file that were from the Kalum TSA and are not in the 1994 FIP file obtained from FAIB in 2007.



**Figure 9. Area and Volume Harvested in Relation to the 1994 Growing Stock for TSA 21 (North Coast)**

## 5.0 RECOMMENDATIONS

Recommendations for further analysis are:

- The comparison of HBS and RESULTS data identified trends in the past and current management of Cwc, but a comparison of how these trends affect the original growing stock is required to assess whether the trends are sustainable or not. Regional and district managers should obtain inventory data for THLB within their management units to assess the trends presented in this report. FAIB has confirmed that the archived inventory data have been restored and converted to present systems and are currently available.
- Regional and district managers should monitor the TFLs and TSAs whose trends indicate an increase in the volume or proportion of Cwc harvested.
- Based on the comparison of trends identified in the HBS and RESULTS data to the forest cover in TSA 21 in Section 4.0 of this report, consideration should be given to partitioning the AAC by species, based on the species profile indicated by the inventory forest cover data.
- The substantial increase in the use of the retention silviculture system emphasizes the importance of developing tools to assess site productivity and predict future growth for the resultant complex stand structure.

Recommendations for improvements to the RESULTS database, many of which are currently being reviewed or are just being implemented, are:

- Areas that have been planted should immediately have the stocking status updated to IMM and the stocking type updated to ART to reflect the planting, instead of waiting until a regeneration or survival survey.
- The correct codes for planting activities, such as fill planting or re-planting, should be used. Codes for variations of understory planting should be added.
- Openings with residual trees, managed under a partial harvest silviculture system, should have forest cover described by layer, with the primary layer being identified. A code describing whether the residual trees are likely to be included in any future harvests should also be added.
- Consideration should be given to using different data collection standards and separate tables in the RESULTS database for forest cover descriptions for areas managed under a clearcut silviculture system and areas managed under a partial harvest silviculture system. The current FOREST COVER table is sufficient for clearcut areas, but partially harvested areas should store a pre-harvest and post-harvest stand table.

- The RESULTS database should store more information for the previous inventory label than the current practice of only storing the two leading species. Ideally, a separate table could be added that stores the complete previous inventory data. At the very least, age, height and species percent should be added. For openings that cover multiple or parts of previous inventory polygons, inventory data for and the area of each inventory polygon disturbed should be stored.
- Areas of silviculture treatment activities in the PLANTING table should agree with the areas of polygons treated in the FOREST COVER table or the silviculture activity treatment number should be referenced to the polygons within an opening, as opposed to only the opening.
- The classification, coding and data collection for partially harvested areas should be reviewed with technicians recording the data in the field.
- Logic checks between related fields should be applied to all data in the RESULTS database. Errors should be corrected or a list produced for technicians to check conflicting data in the field. FPB should consider the use of a standardized electronic data collection system to assist with data verification in the field.
- A field should be added to the attribute file to indicate whether an opening is in the THLB or not. Due to changes in the THLB over time, this field would have to be associated with the year of the relevant TSR.
- Only one silviculture system should be allowed to describe an opening. If more than one system is used, separate openings should be created for each system.
- The reclassification of data due to TSA or TFL changes should be reviewed.

Recommendations for improvements to the inventory forest cover database, TSR files and access to these data, many of which have previously been identified by Moss, Marshall and LeMay (2006), are:

- FAIB should implement a system to catalogue, archive and define the availability of data compiled for major projects, such as the Timber Reallocation Project, for future or other uses. The system should also track the status of data requests which could not be immediately met by FAIB.
- Forest cover and netted down files for TSR analysis should be archived for future use or reference.
- The inclusion of pre and post harvest stand tables in the inventory forest cover database for partially harvested stands should be considered.
- Linkages between the inventory and RESULTS databases should be reviewed and improved.

Recommendations for improvements to the HBS database, maintained by RB, are:

- Consideration should be given to assigning a unique timber mark to individual openings. This would allow a direct link between data on volumes harvested, estimated volumes from inventory forest cover data and silvicultural surveys. With the increase in partial harvesting, a direct link between these data sources would be extremely useful for many aspects of forest management, planning and verification. It would also provide a method of making the HBS spatial, at a relatively low cost by utilizing the spatial attribute of the RESULTS database. For the data analysed for this report, approximately 50 percent of the openings had one or more timber marks that were unique to an opening.
- Adopt the standard species codes used by other forestry branches.

## **6.0 LITERATURE CITED**

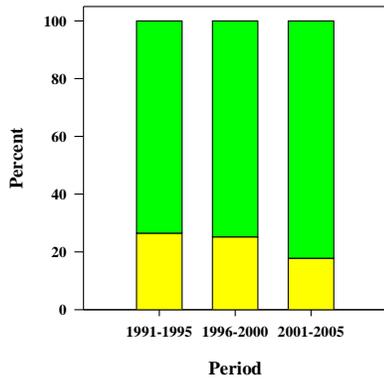
Moss, I, P.M. Marshall and V. LeMay. 2006. Assessment of the status of forest inventories in British Columbia – background report. Prepared for the Assoc. of BC Professional Foresters. Vancouver. 47 pp.

## **APPENDIX I**

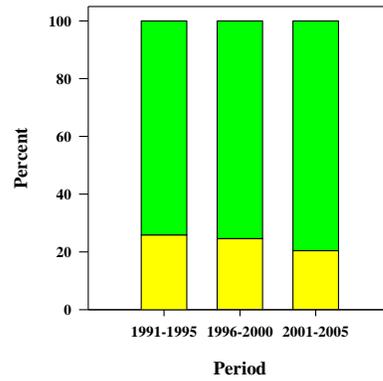
### **Individual Coastal TFL Graphs**

# TFL 06 - Western Forest Products Inc. Percent Volume and Area

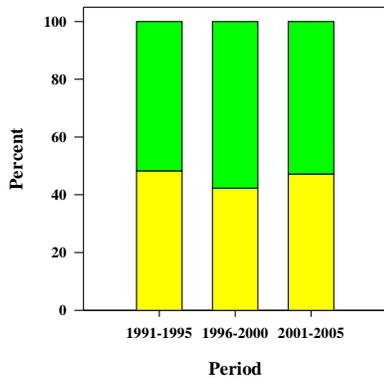
**Volume Harvested, by Species Percent**



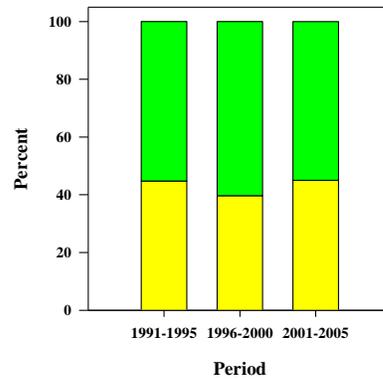
**Area Harvested, by Species Percent**



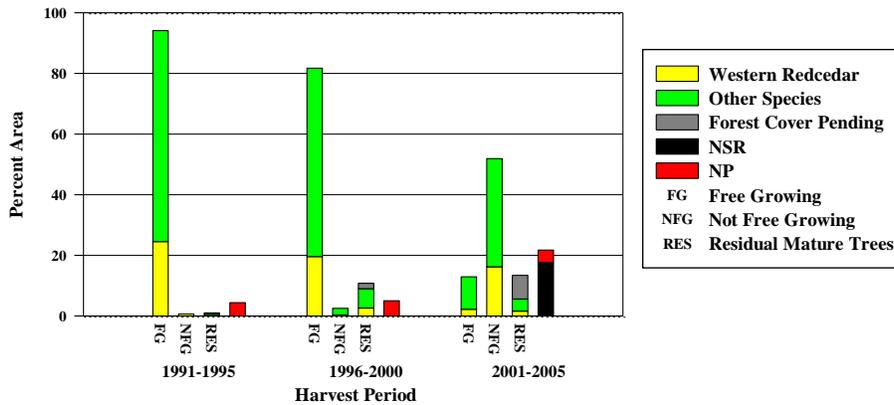
**Seedlings Planted, by Species Percent**



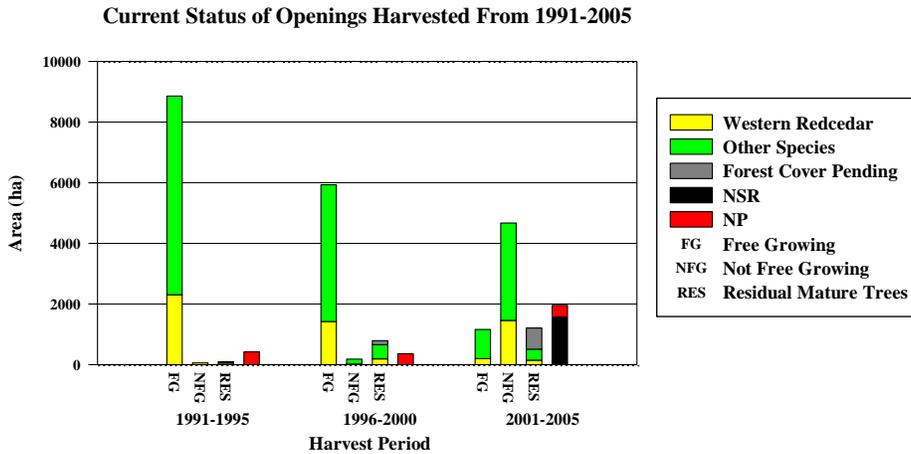
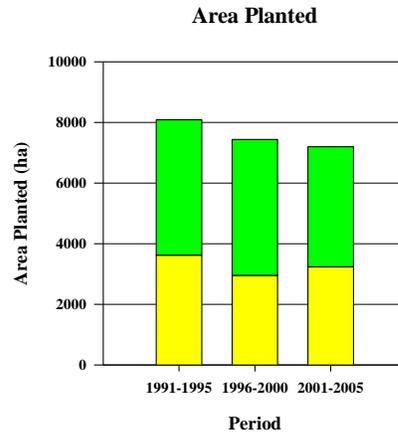
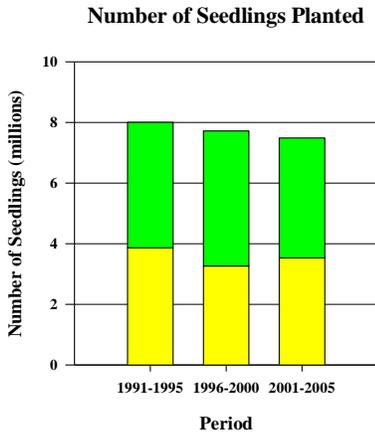
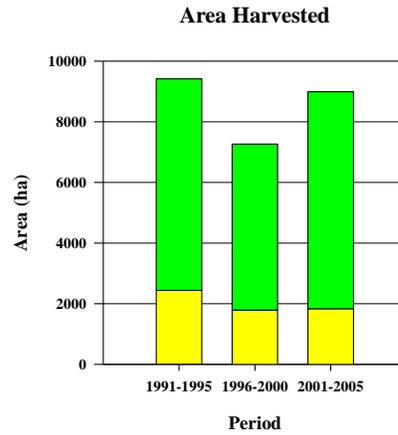
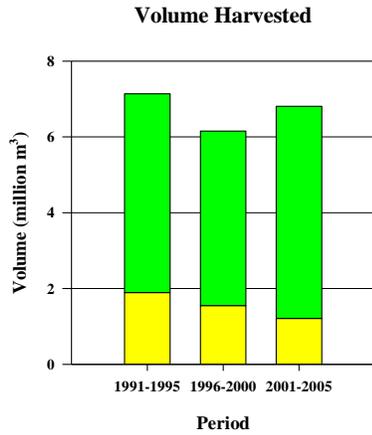
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

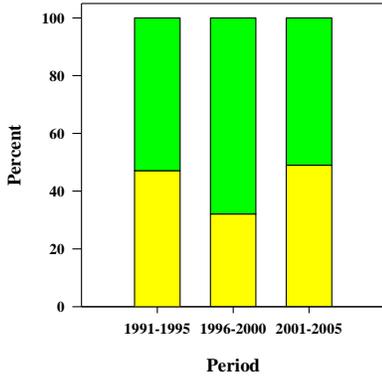


# TFL 06 - Western Forest Products Inc. Volume and Area

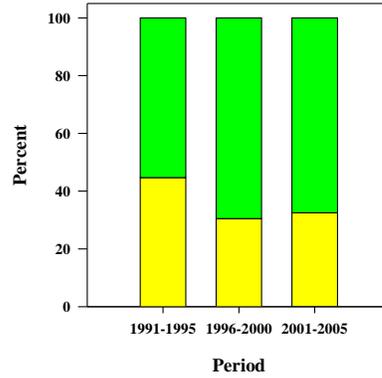


# TFL 10 - International Forest Products Ltd. Percent Volume and Area

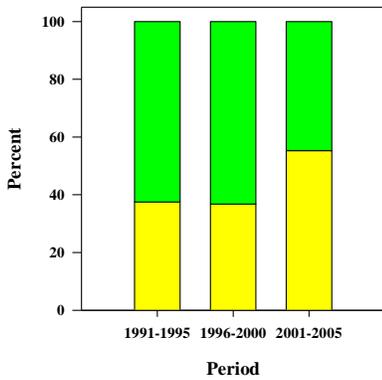
**Volume Harvested, by Species Percent**



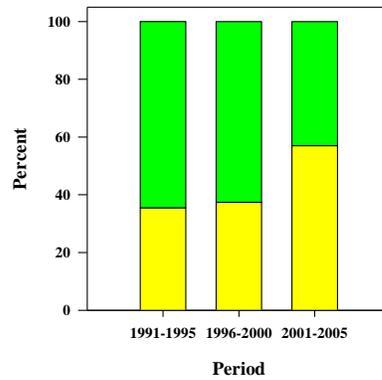
**Area Harvested, by Species Percent**



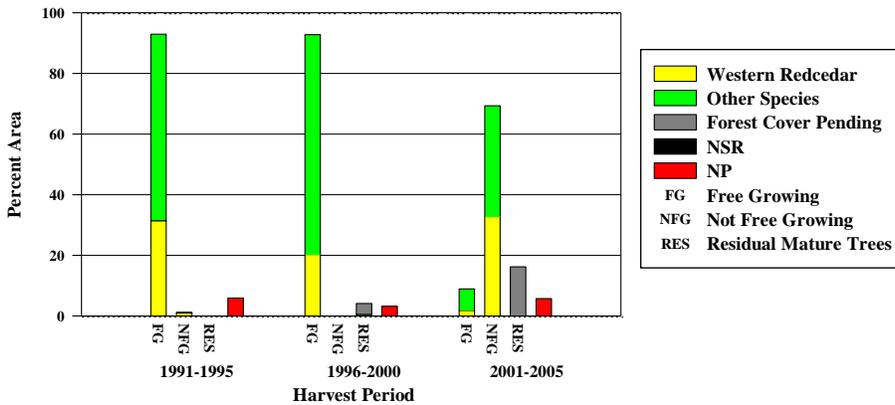
**Seedlings Planted, by Species Percent**



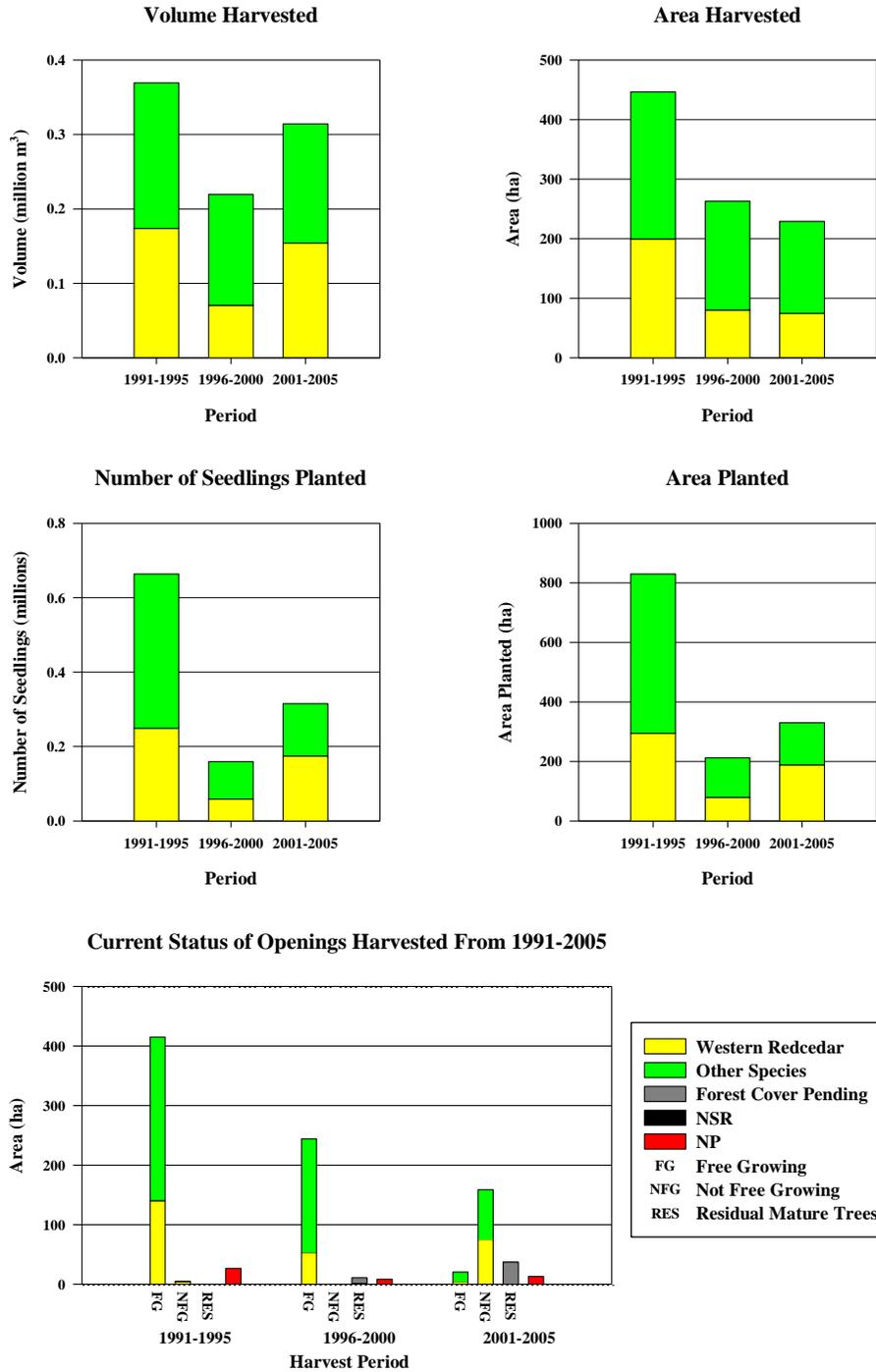
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



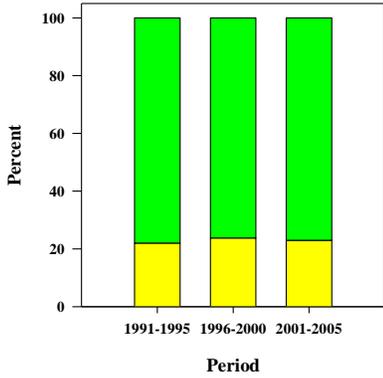
# TFL 10 - International Forest Products Ltd. Volume and Area



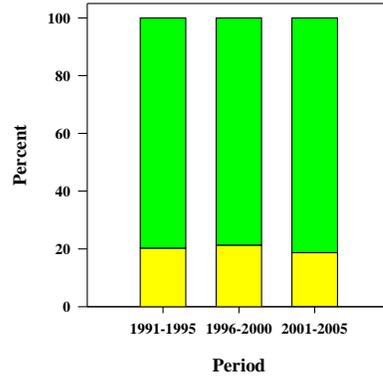
# TFL 19 - WFP Western Lumber Ltd.

## Percent Volume and Area

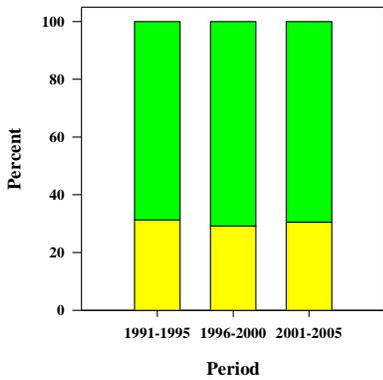
**Volume Harvested, by Species Percent**



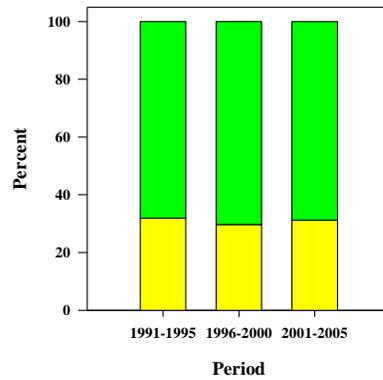
**Area Harvested, by Species Percent**



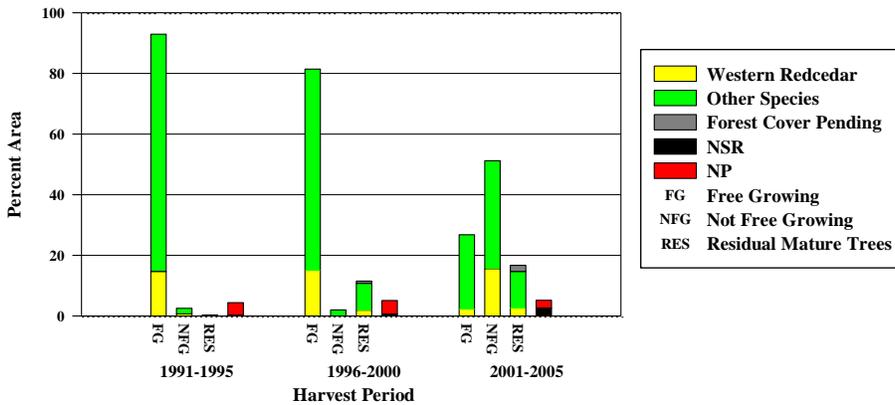
**Seedlings Planted, by Species Percent**



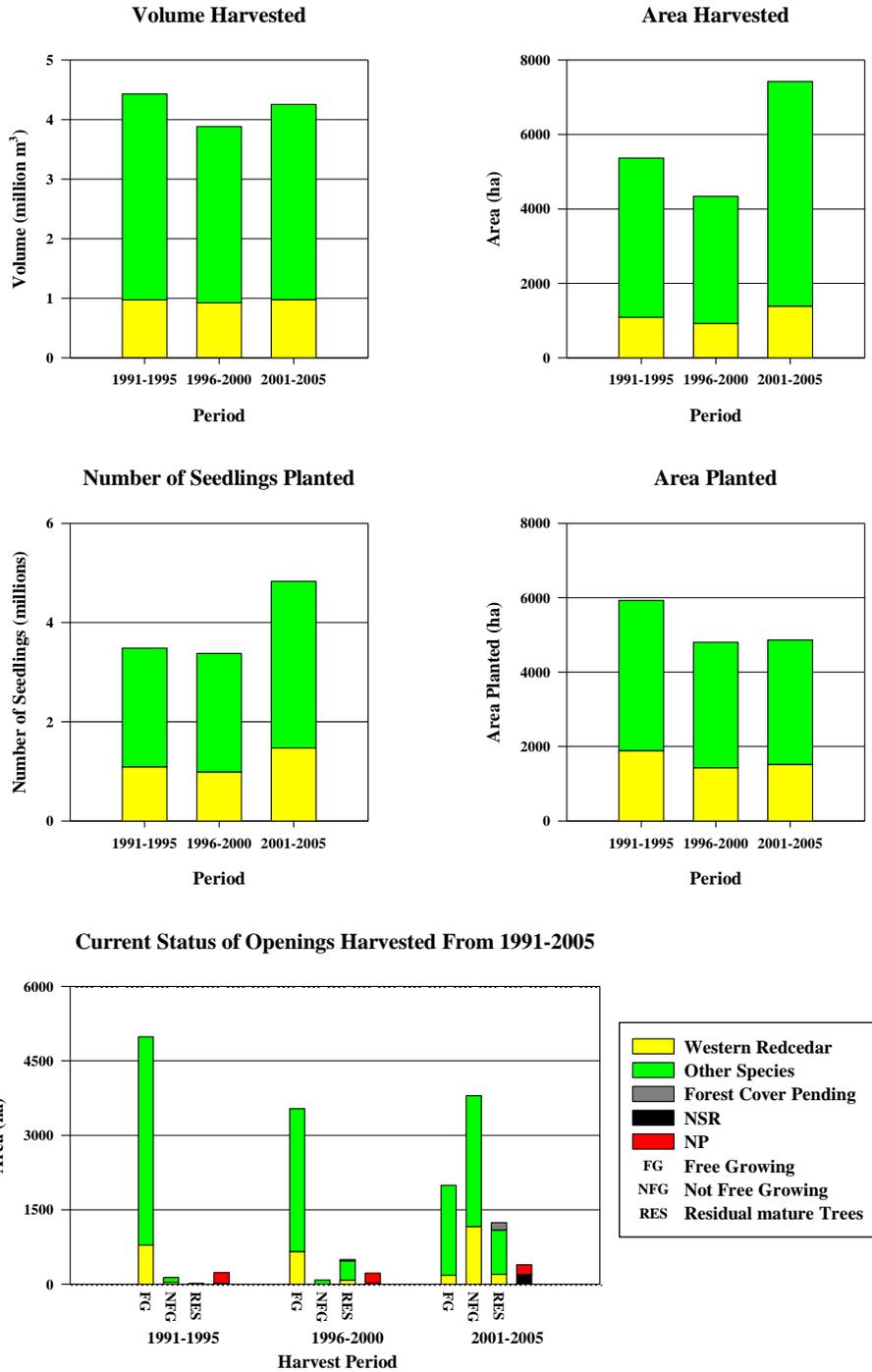
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



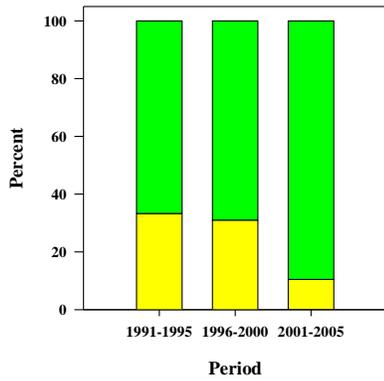
# TFL 19 - WFP Western Lumber Ltd. Volume and Area



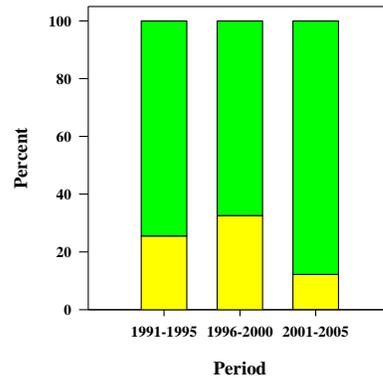
# TFL 24

## Percent Volume and Area

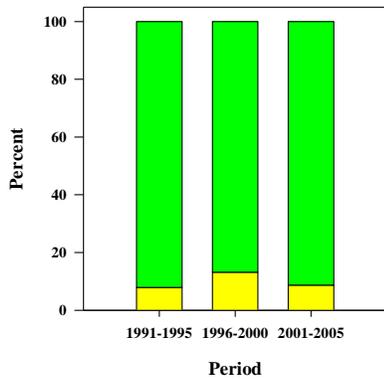
**Volume Harvested, by Species Percent**



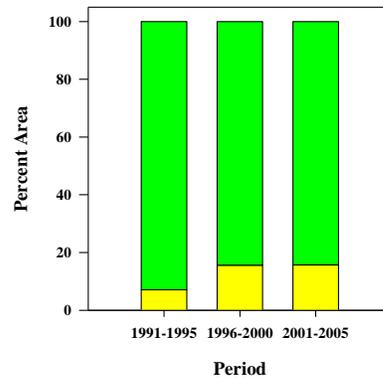
**Area Harvested, by Species Percent**



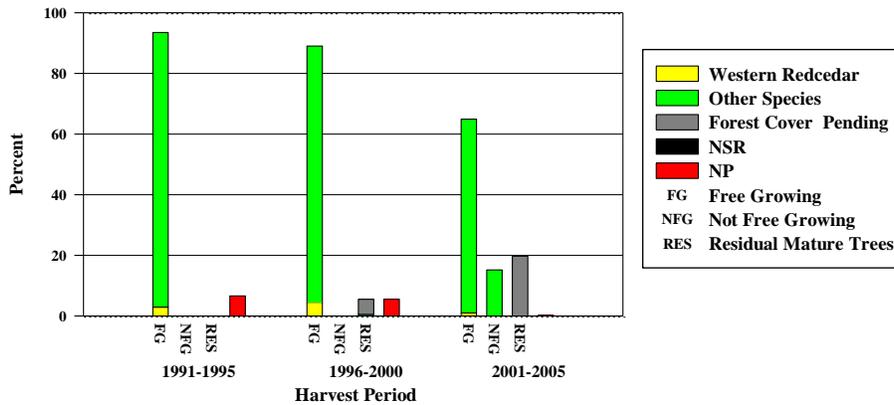
**Seedlings Planted, by Species Percent**



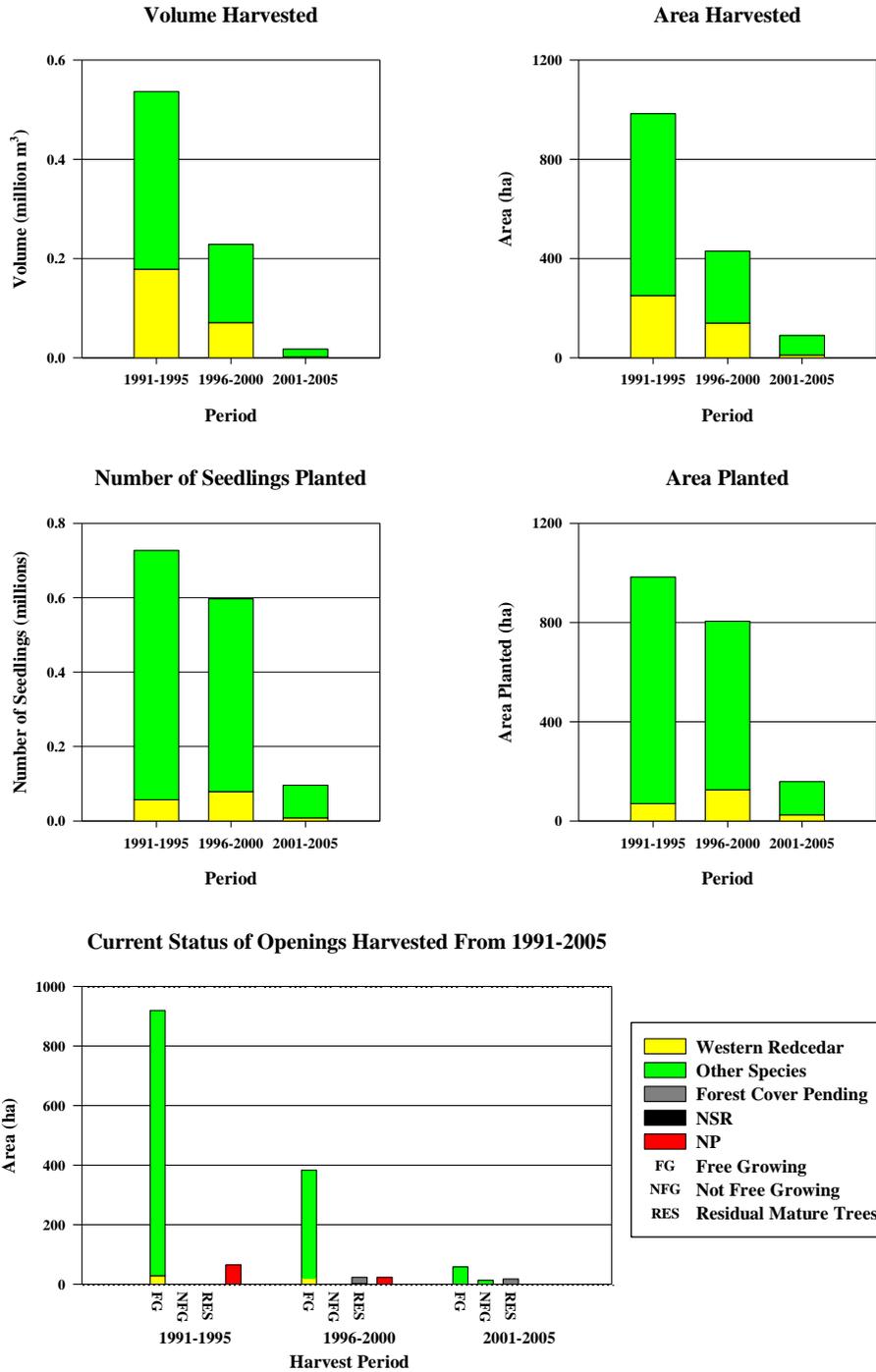
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

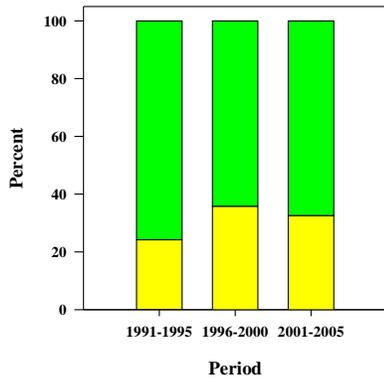


# TFL 24 Volume and Area

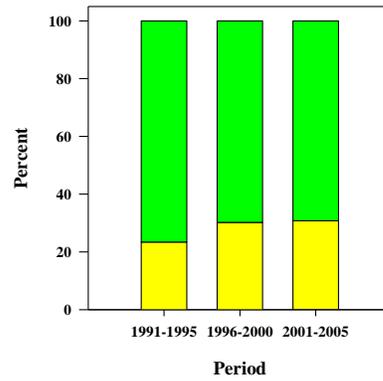


# TFL 25 - Western Forest Products Inc. Percent Volume and Area

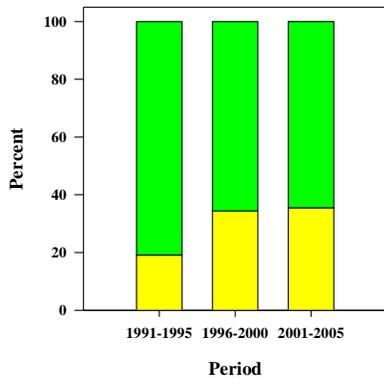
**Volume Harvested, by Species Percent**



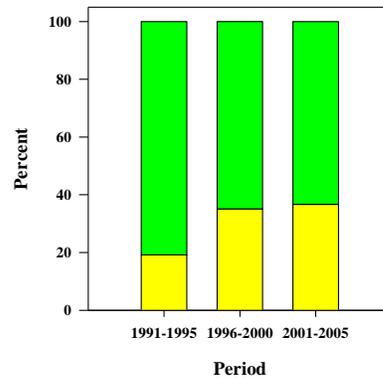
**Area Harvested, by Species Percent**



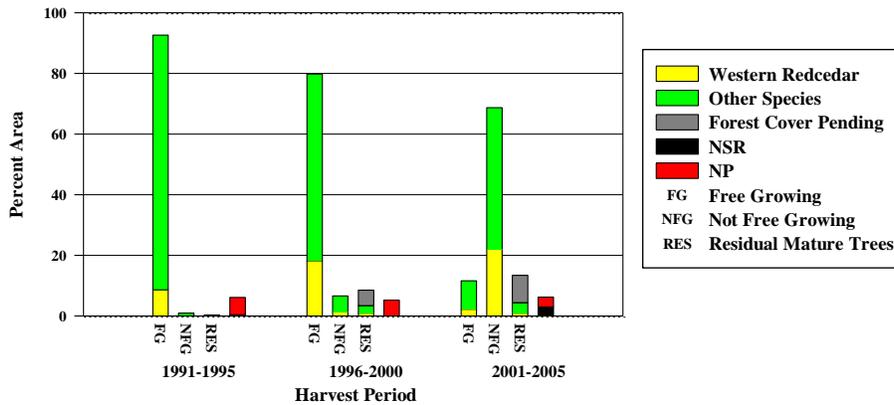
**Seedlings Planted, by Species Percent**



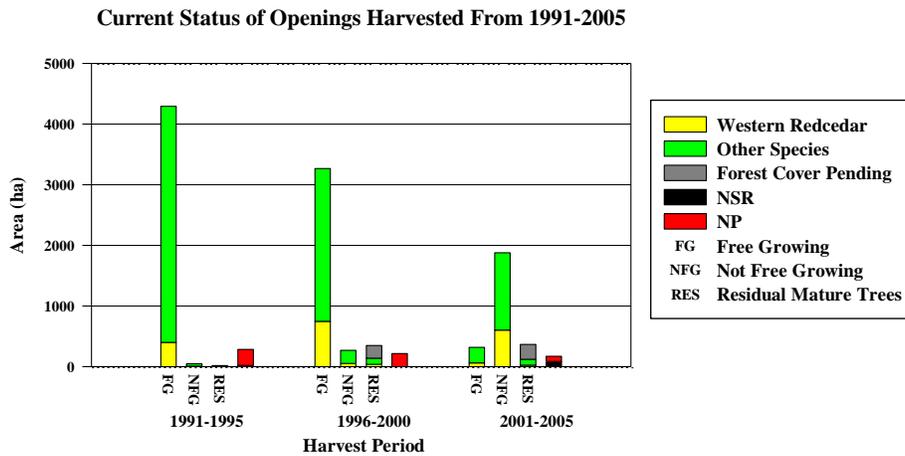
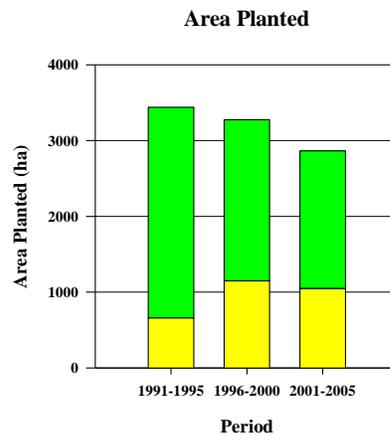
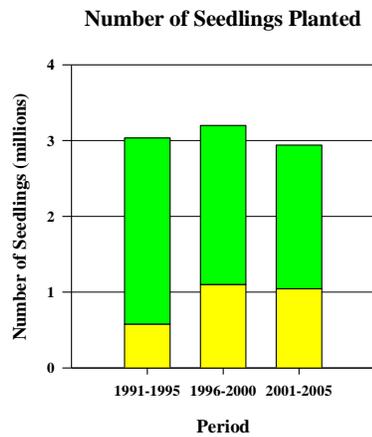
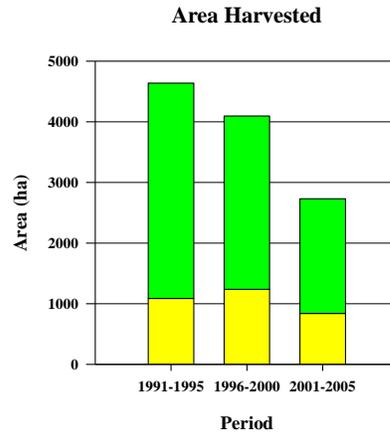
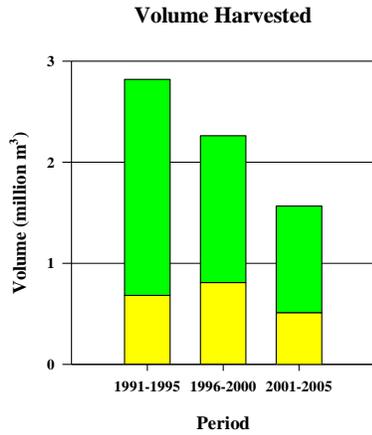
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

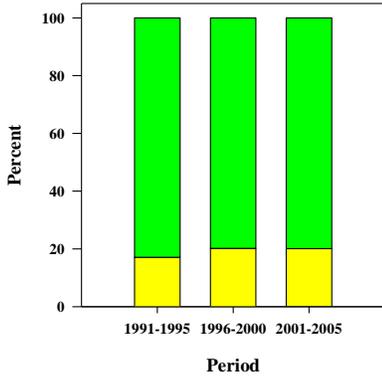


# TFL 25 - Western Forest Products Inc. Volume and Area

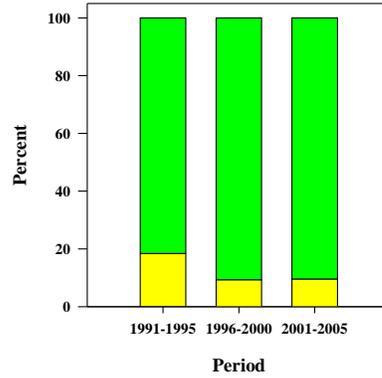


# TFL 26 - The Corporation of the District of Mission Percent Volume and Area

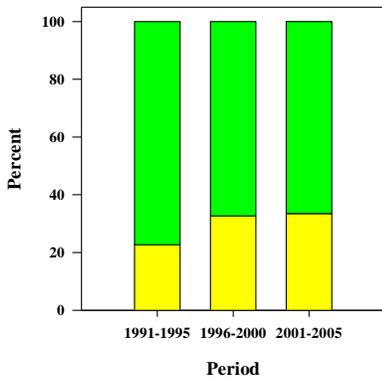
Volume Harvested, by Species Percent



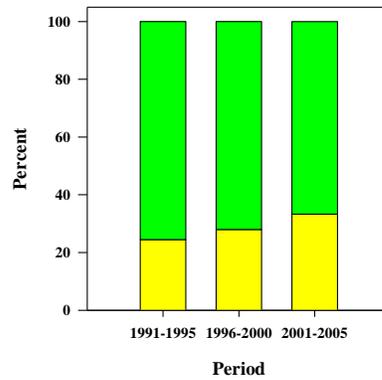
Area Harvested, by Species Percent



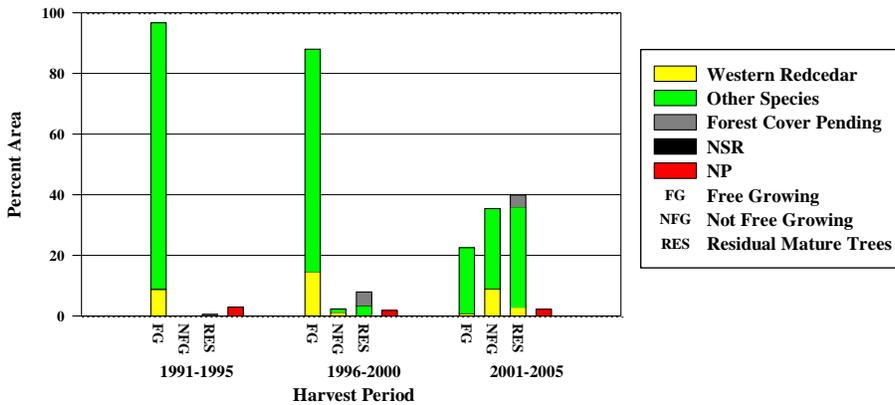
Seedlings Planted, by Species Percent



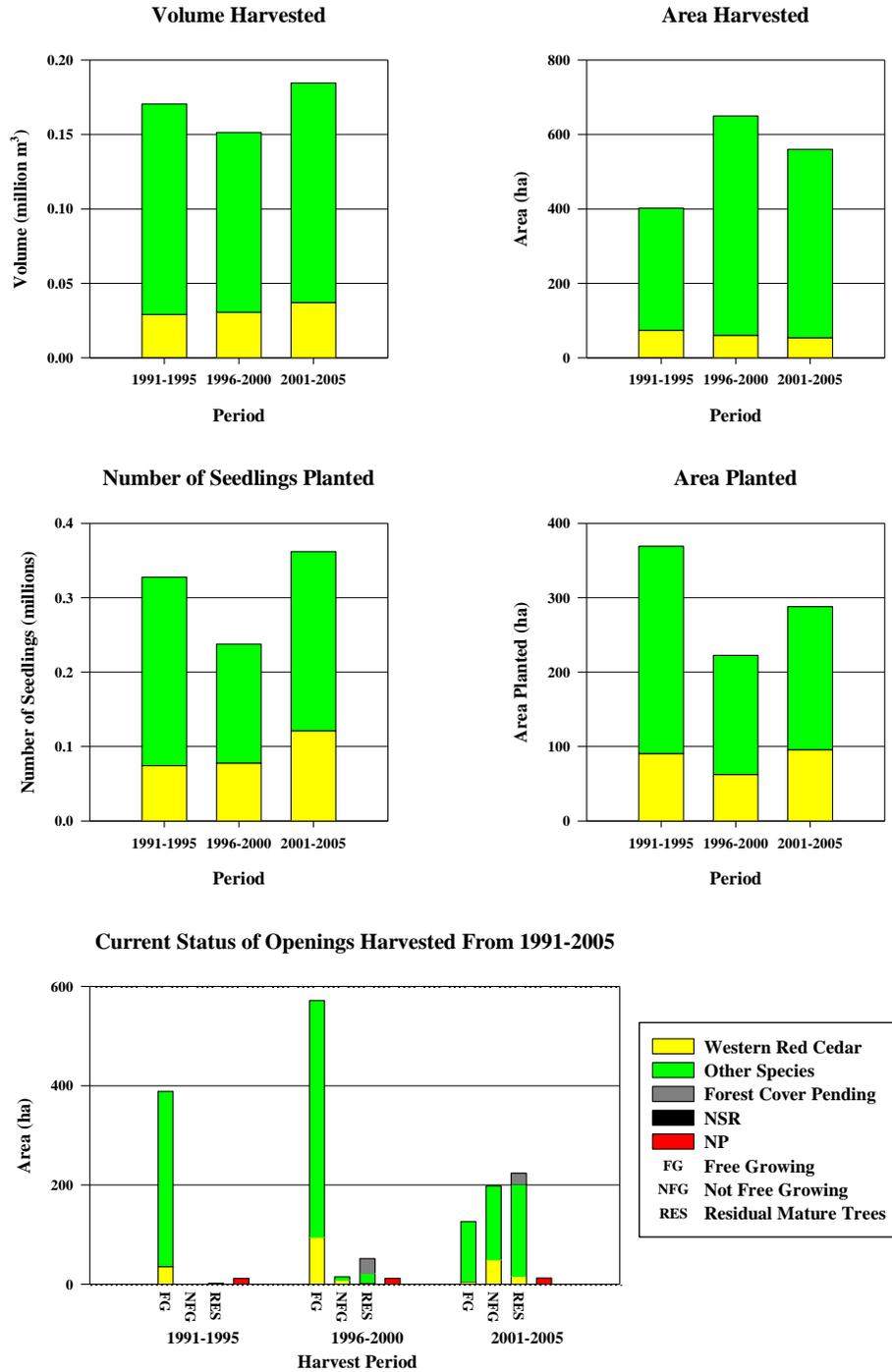
Area Planted, by Species Percent



Current Status of Openings Harvested From 1991-2005

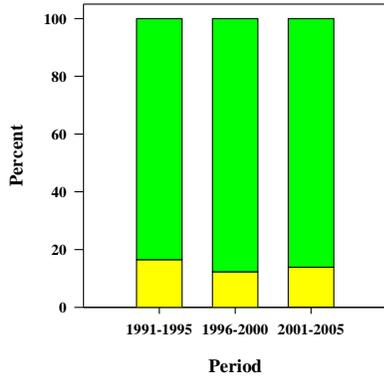


# TFL 26 - The Corporation of the District of Mission Volume and Area

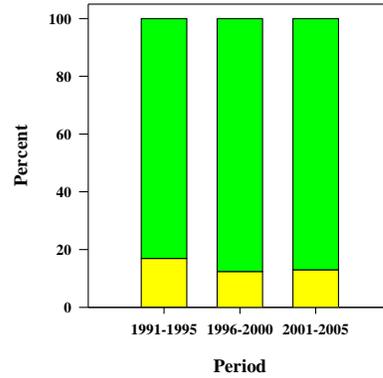


# TFL 37 - Western Forest Products Ltd. Percent Volume and Area

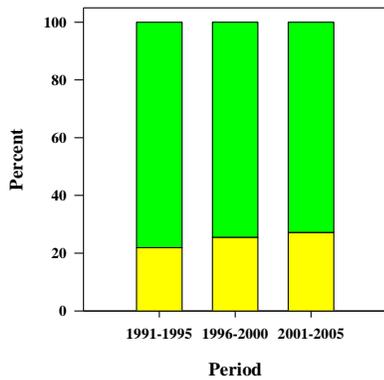
**Volume Harvested, by Species Percent**



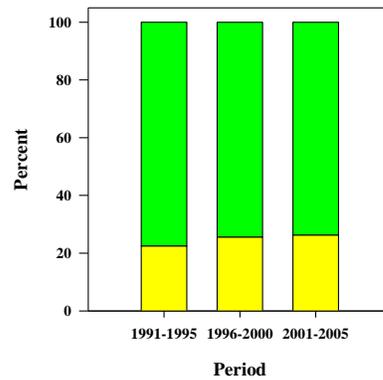
**Area Harvested, by Species Percent**



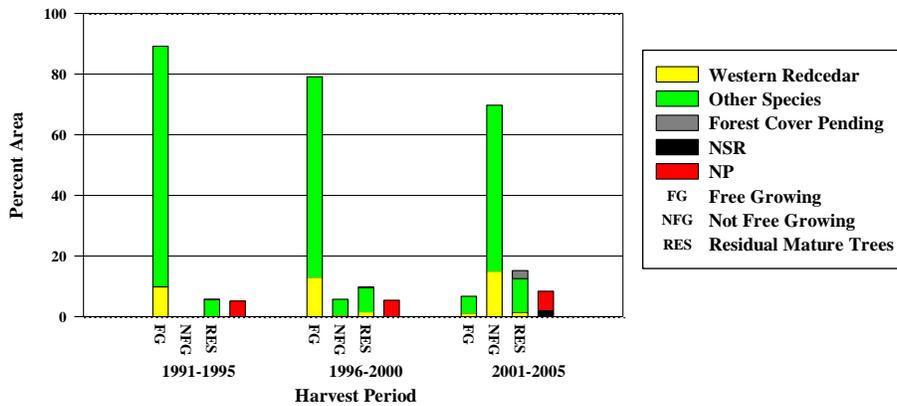
**Seedlings Planted, by Species Percent**



**Area Planted, by Species Percent**

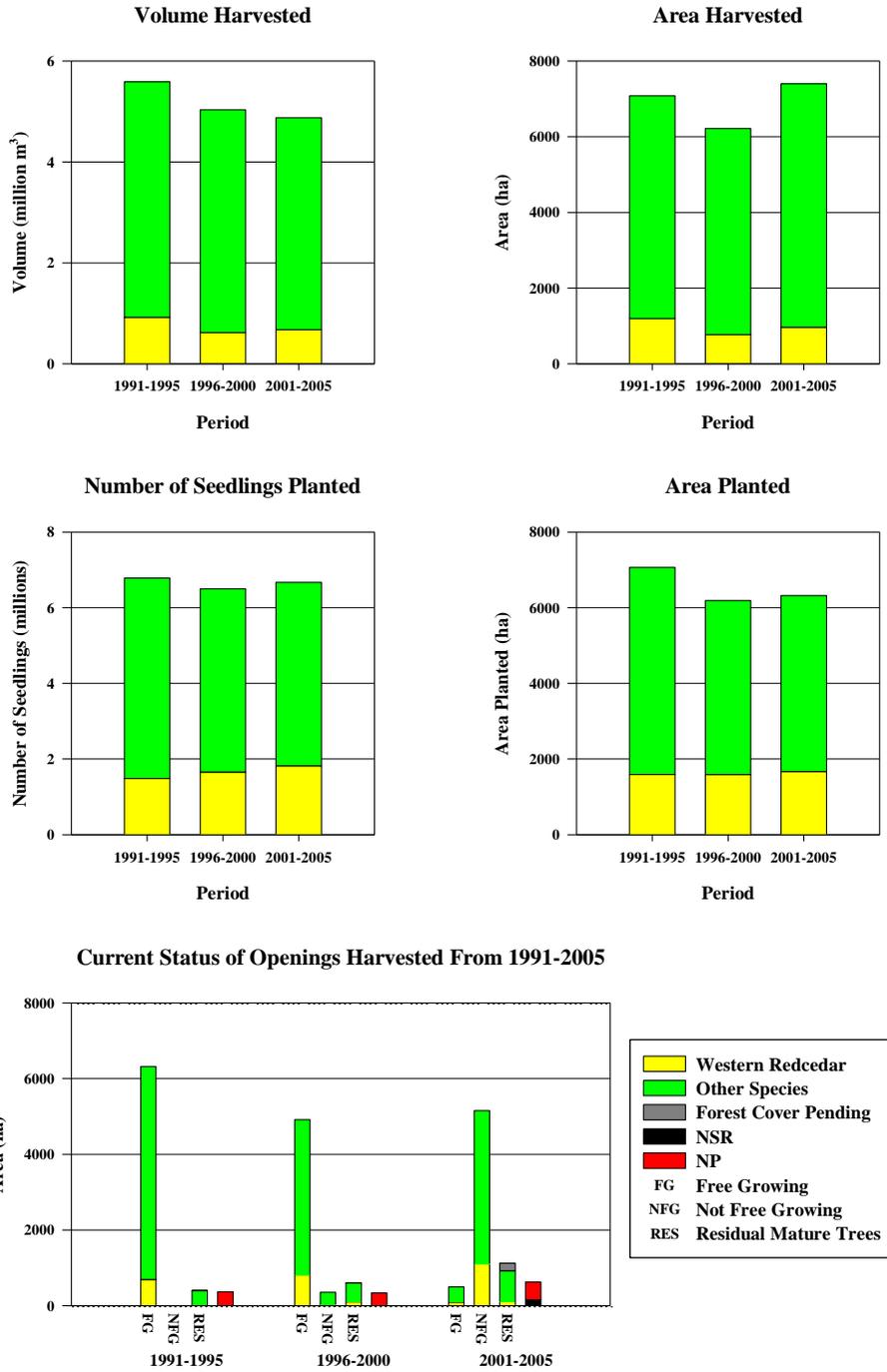


**Current Status of Openings Harvested From 1991-2005**



# TFL 37 - Western Forest Products Ltd. Volume and Area

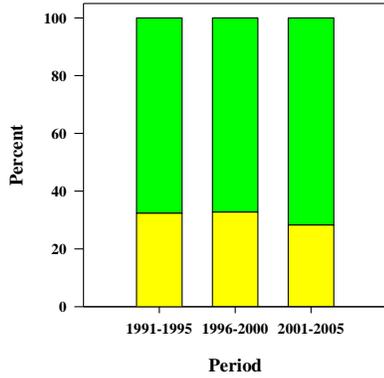
Harvest Period



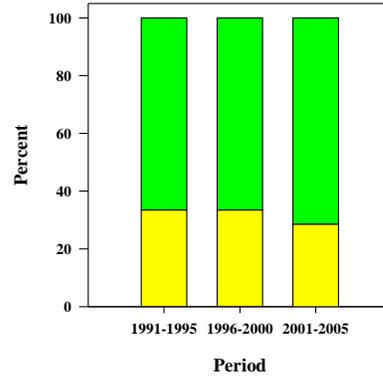
# TFL 38 - Northwest Squamish Forestry Limited Partnership

## Percent Volume and Area

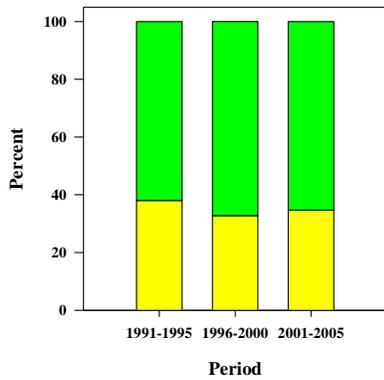
**Volume Harvested, by Species Percent**



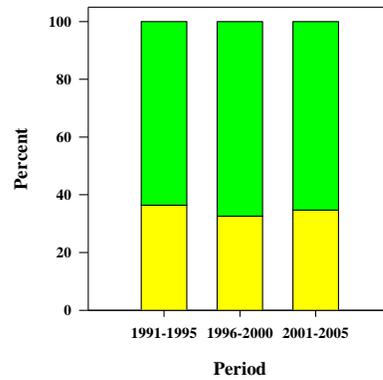
**Area Harvested, by Species Percent**



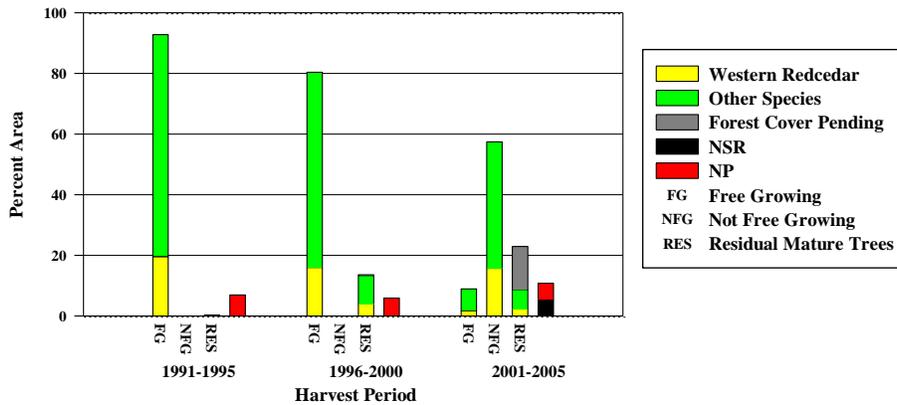
**Seedlings Planted, by Species Percent**



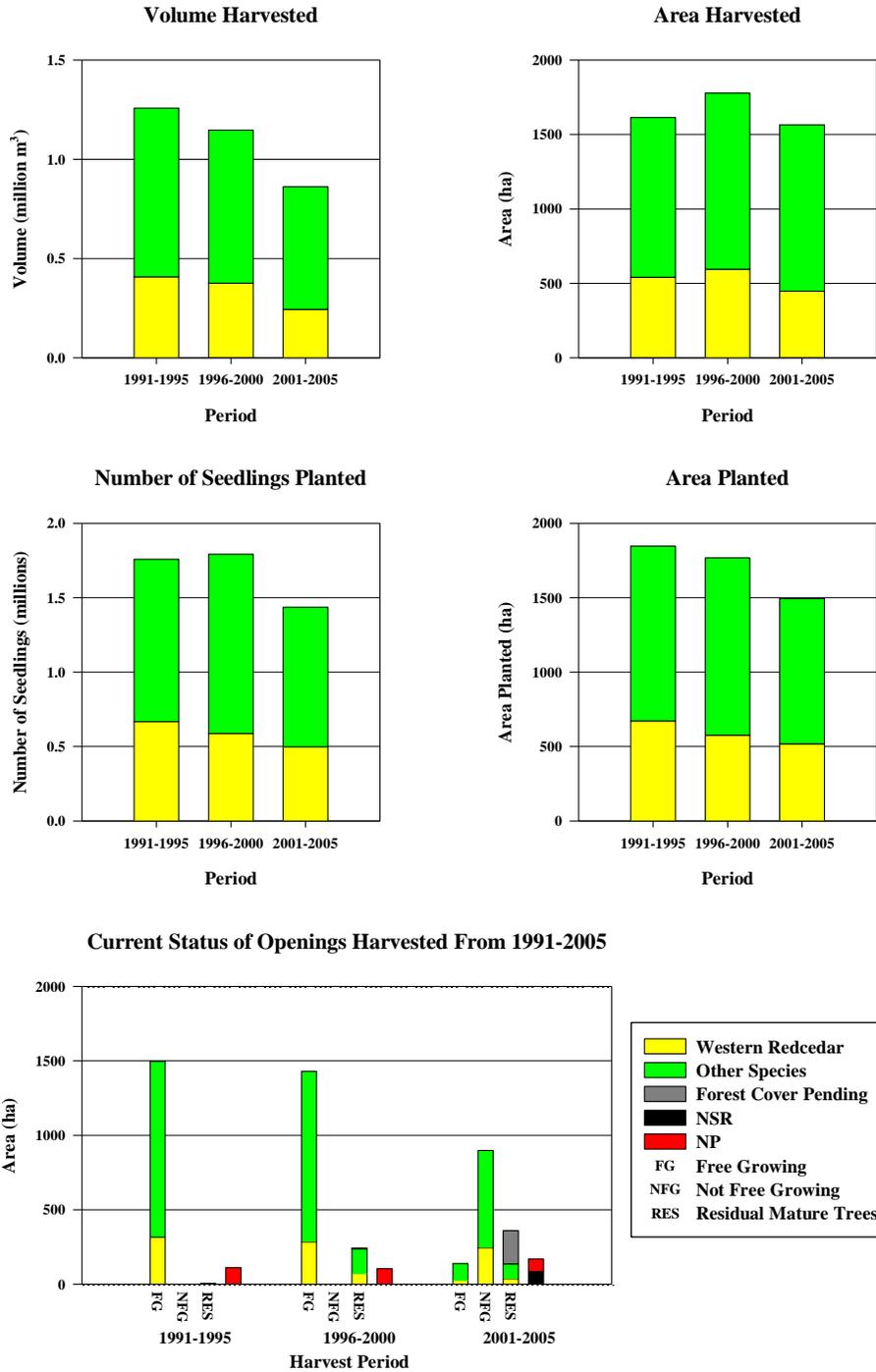
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



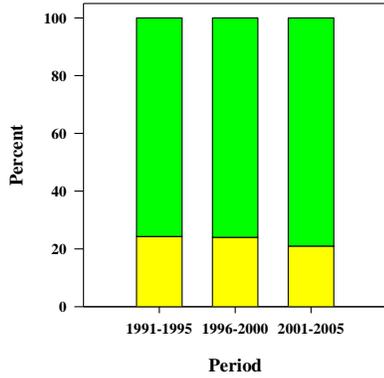
# TFL 38 - Northwest Squamish Forestry Limited Partnership Volume and Area



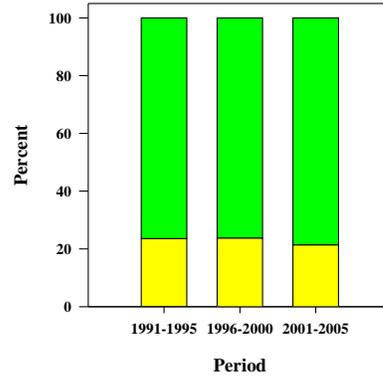
# TFL 39 - Western Forest Products Inc.

## Percent Volume and Area

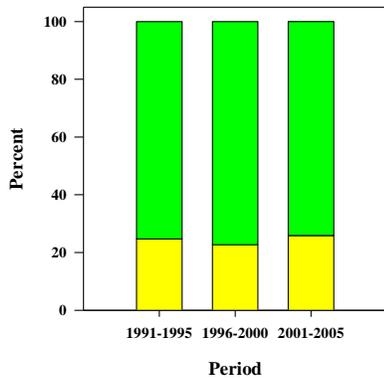
**Volume Harvested, by Species Percent**



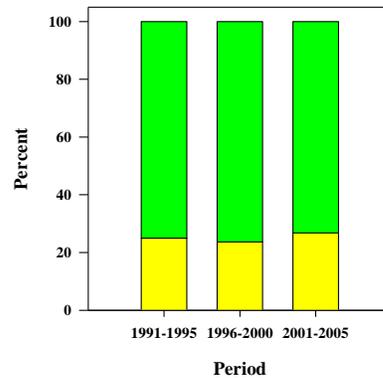
**Area Harvested, by Species Percent**



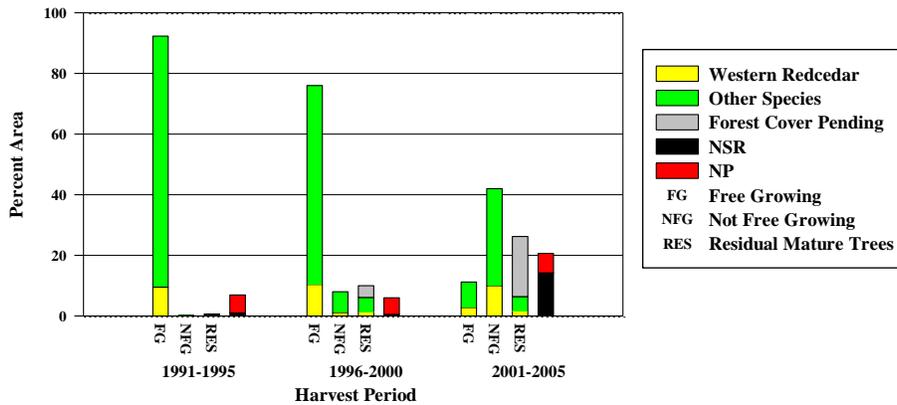
**Seedlings Planted, by Species Percent**



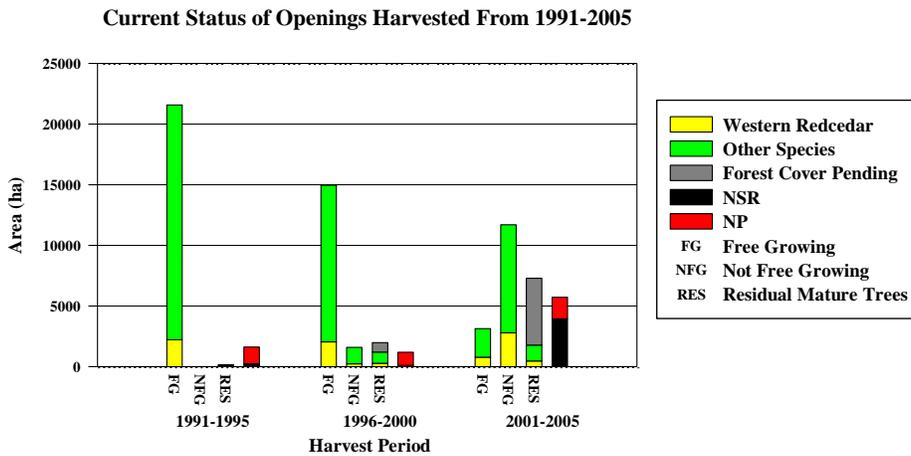
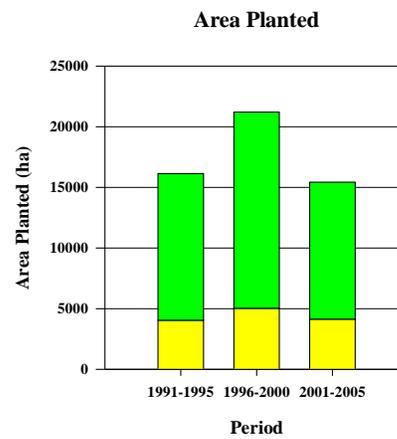
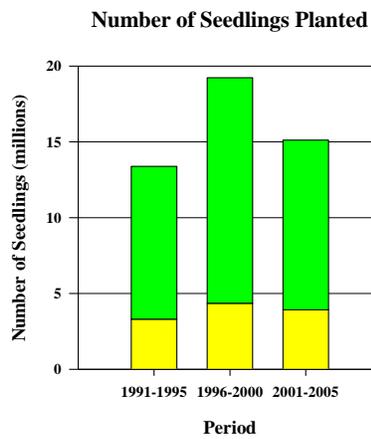
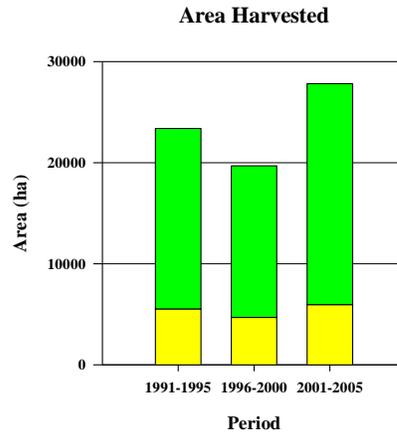
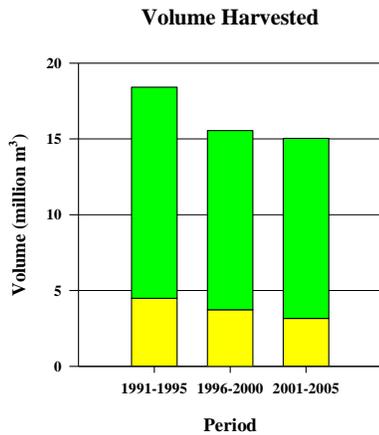
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



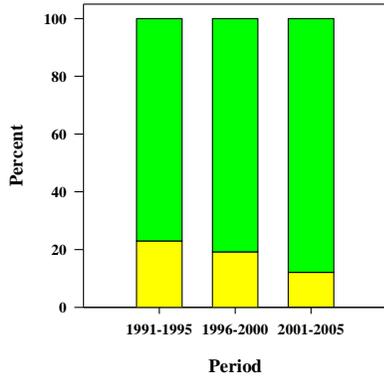
# TFL 39 - Western Forest Products Inc. Volume and Area



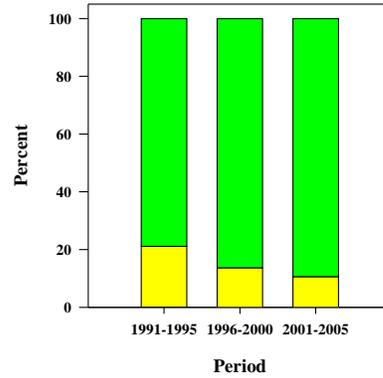
# TFL 43 - Scott Paper Limited

## Percent Volume and Area

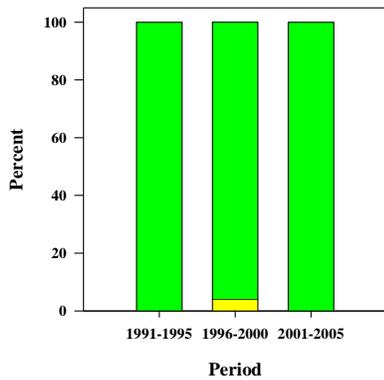
**Volume Harvested, by Species Percent**



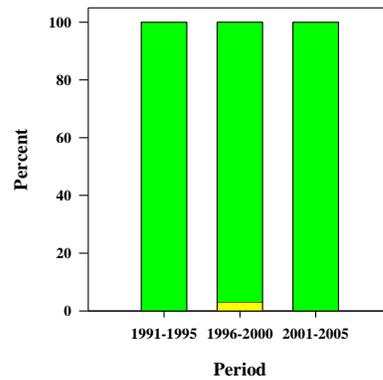
**Area Harvested, by Species Percent**



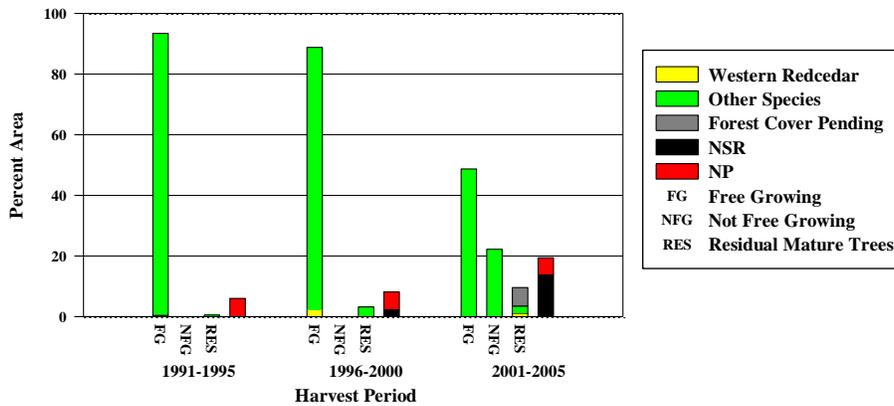
**Seedlings Planted, by Species Percent**



**Area Planted, by Species Percent**

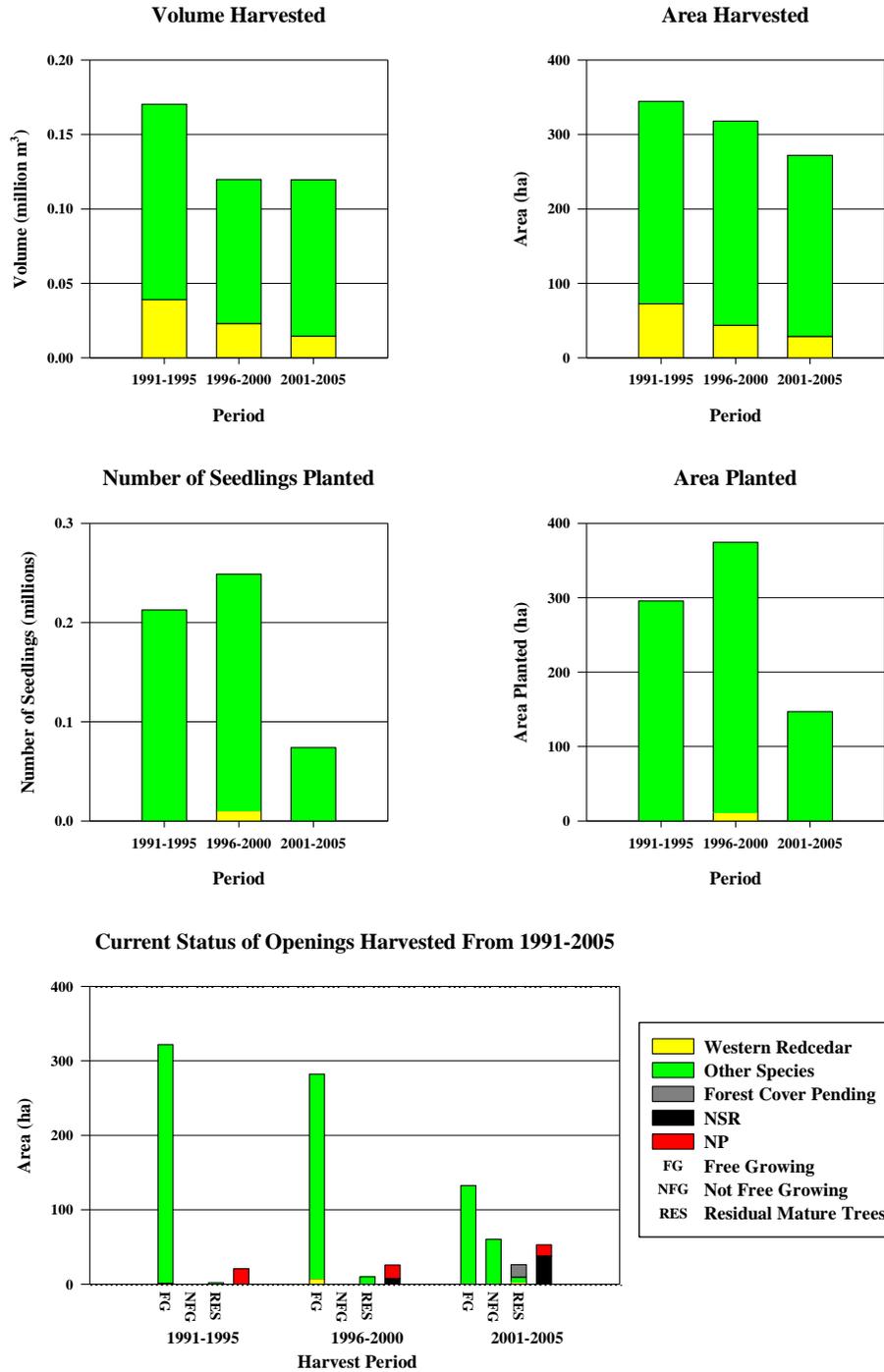


**Current Status of Openings Harvested From 1991-2005**



# TFL 43 - Scott Paper Limited

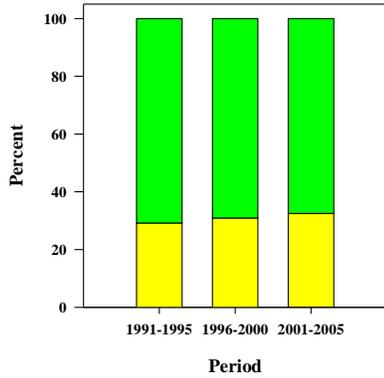
## Volume and Area



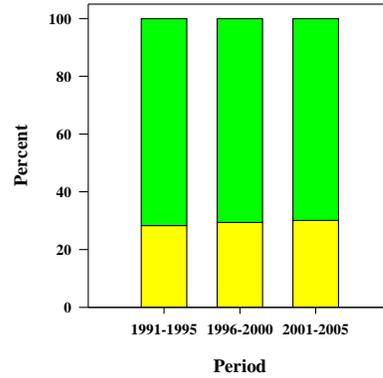
# TFL 44 - Western Forest Products Inc.

## Percent Volume and Area

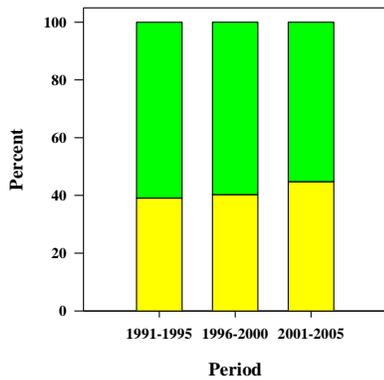
**Volume Harvested, by Species Percent**



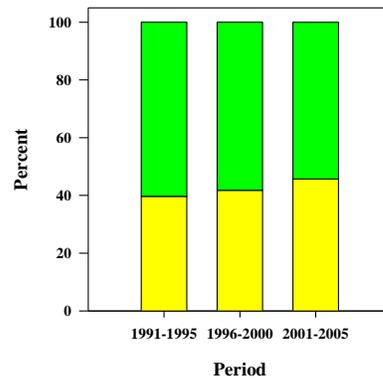
**Area Harvested, by Species Percent**



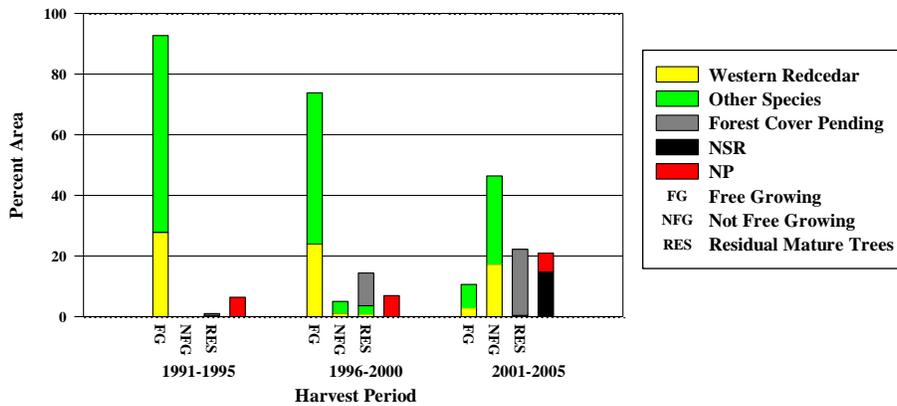
**Seedlings Planted, by Species Percent**



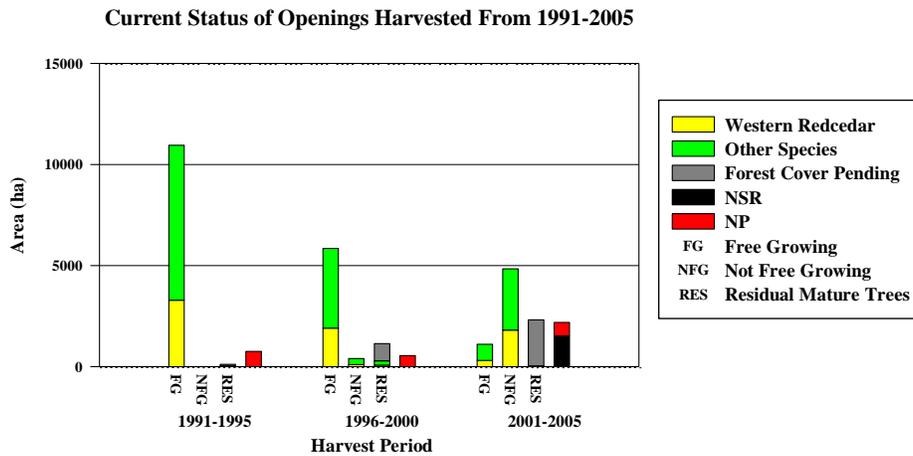
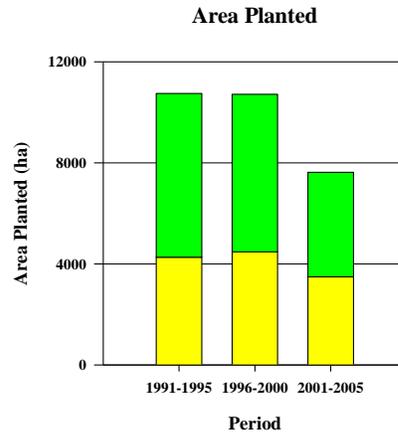
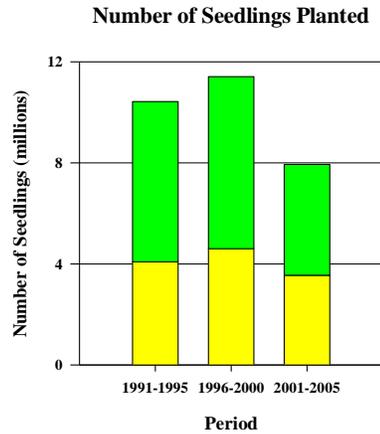
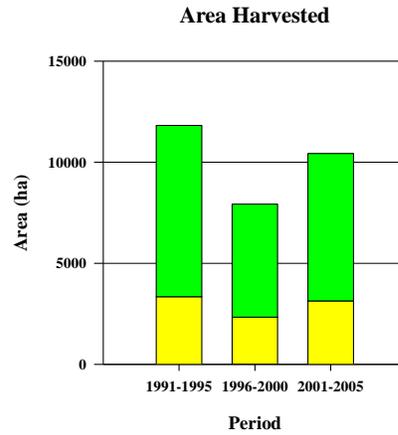
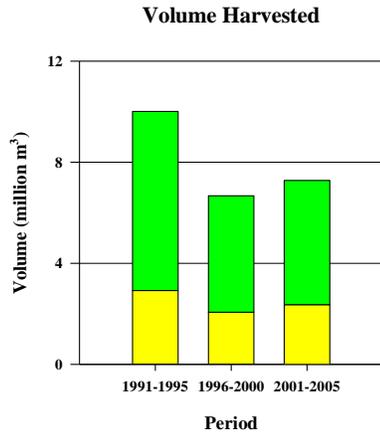
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

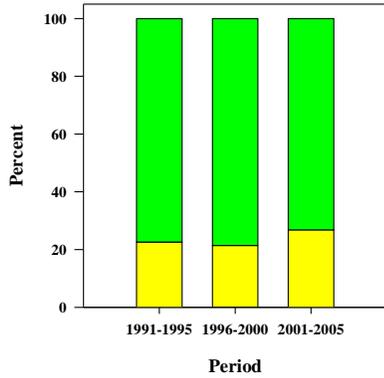


# TFL 44 - Western Forest Products Inc. Volume and Area

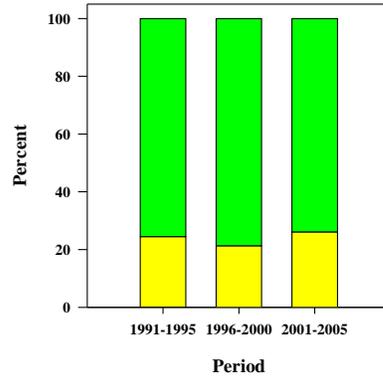


# TFL 45 - International Forest Products Ltd. Percent Volume and Area

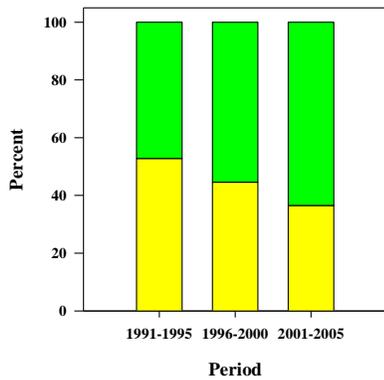
**Volume Harvested, by Species Percent**



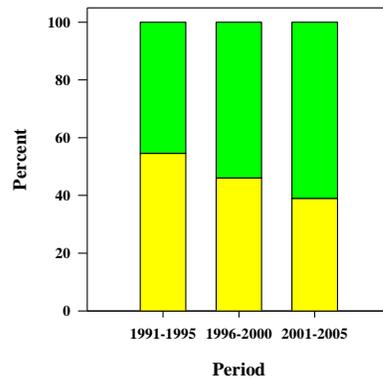
**Area Harvested, by Species Percent**



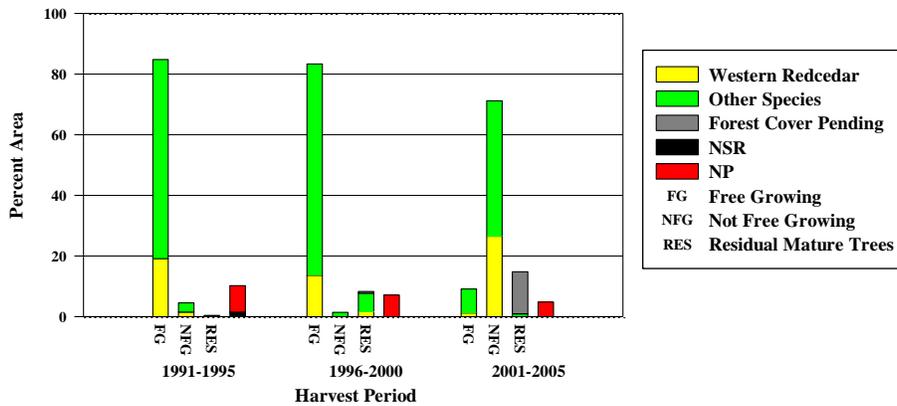
**Seedlings Planted, by Species Percent**



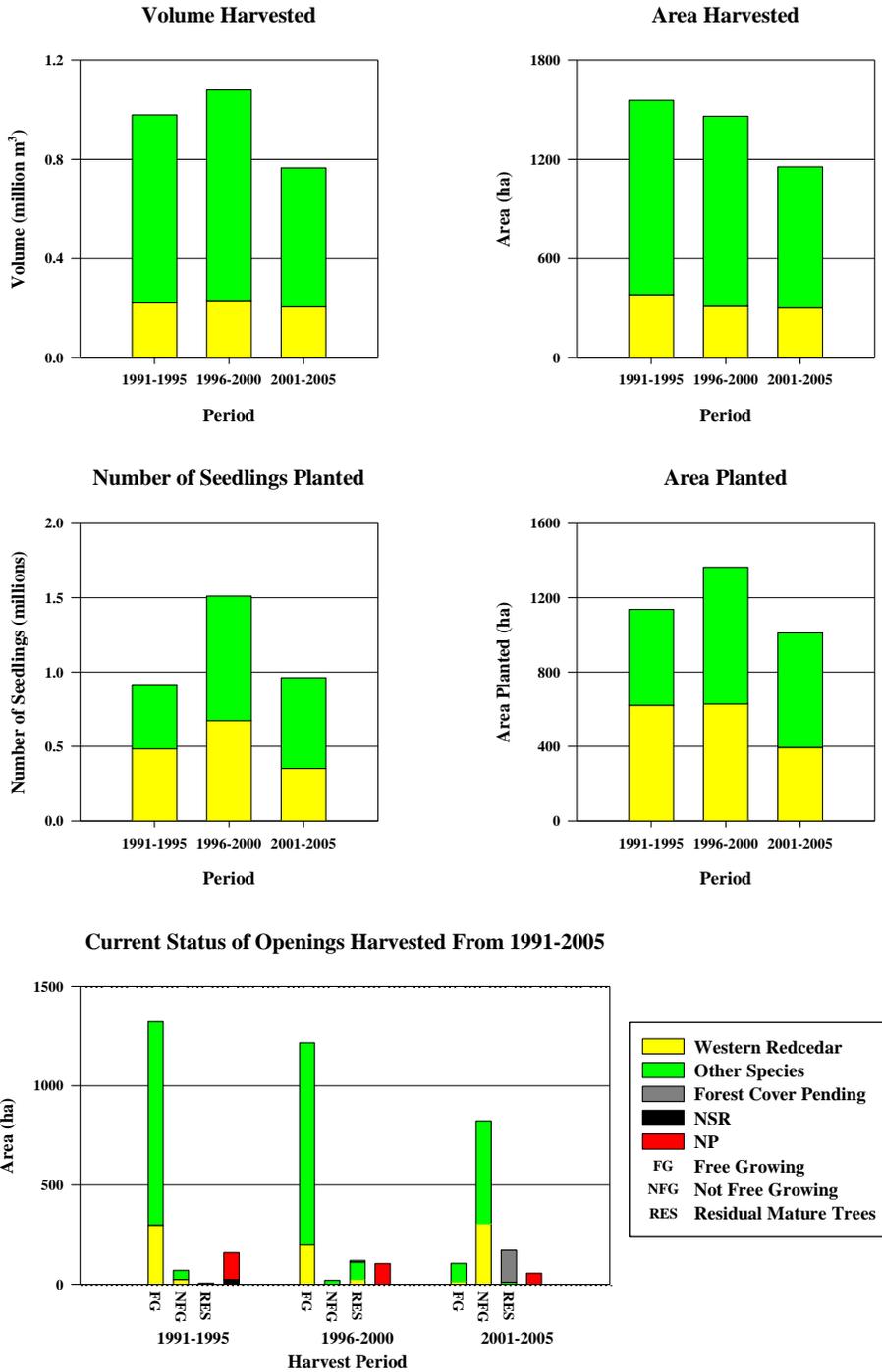
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



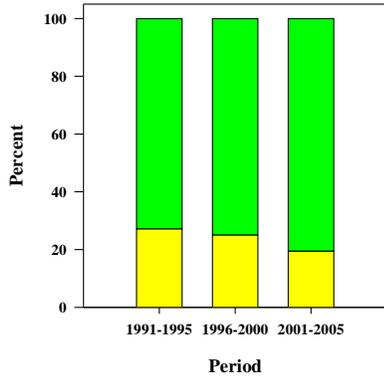
# TFL 45 - International Forest Products Ltd. Volume and Area



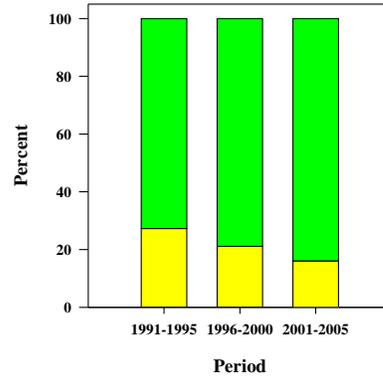
# TFL 46 - Teal Cedar Products Ltd.

## Percent Volume and Area

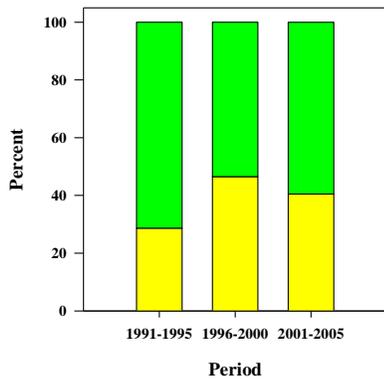
**Volume Harvested, by Species Percent**



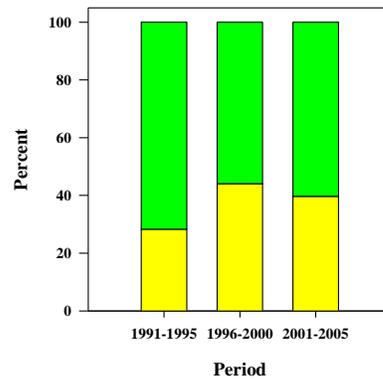
**Area Harvested, by Species Percent**



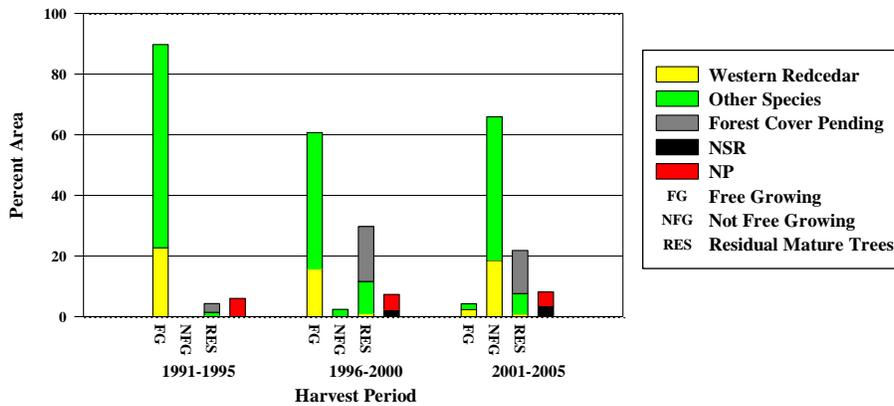
**Seedlings Planted, by Species Percent**



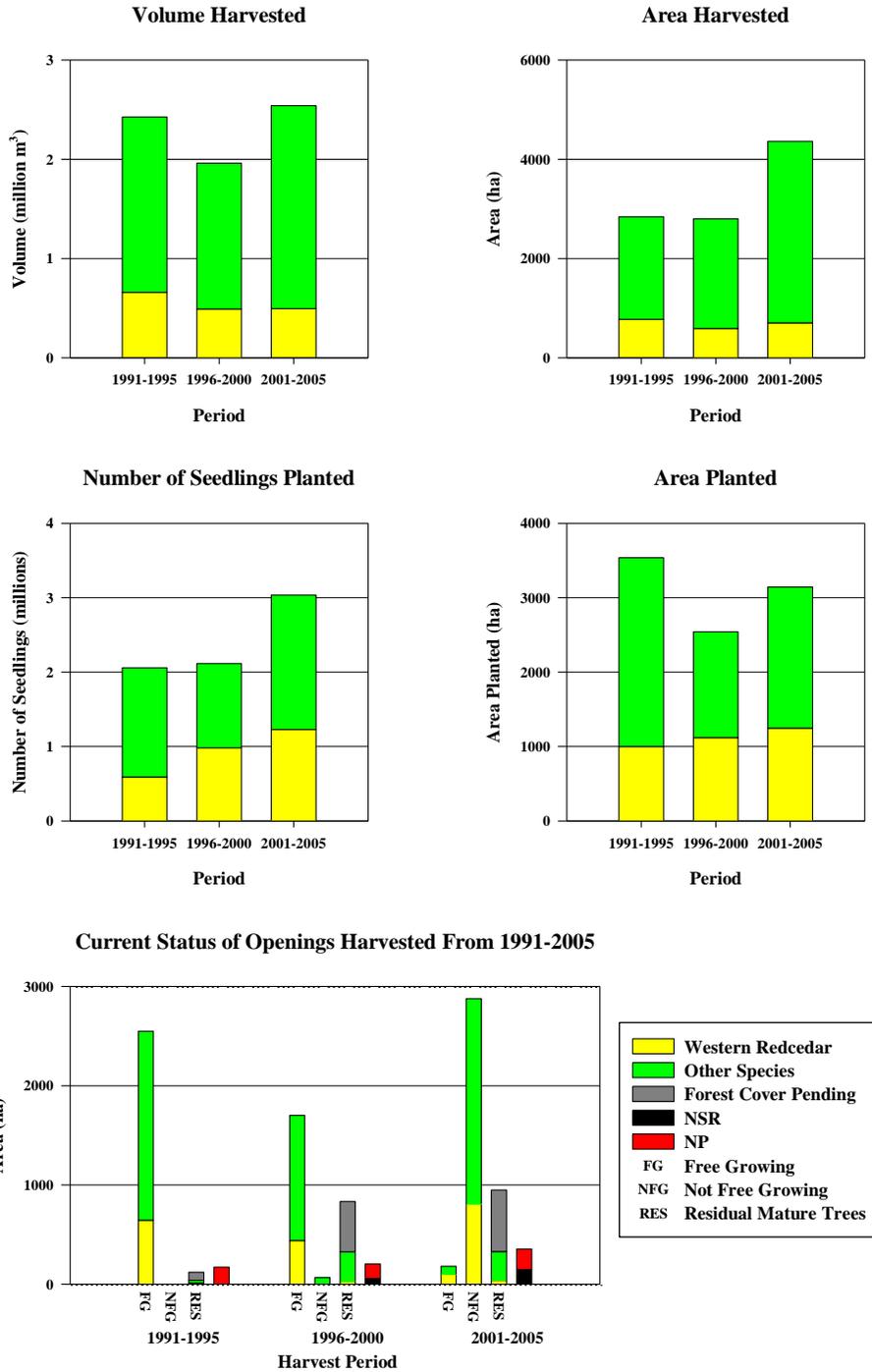
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

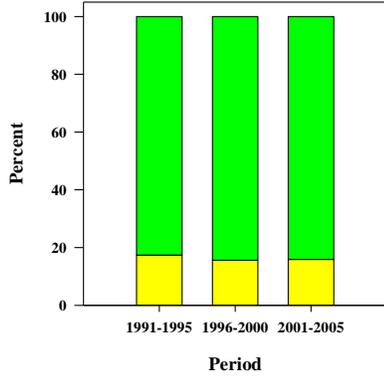


# TFL 46 - Teal Cedar Products Ltd. Volume and Area

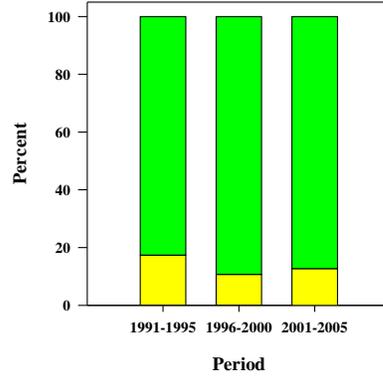


# TFL 47 - TimberWest Forest Corp. Percent Volume and Area

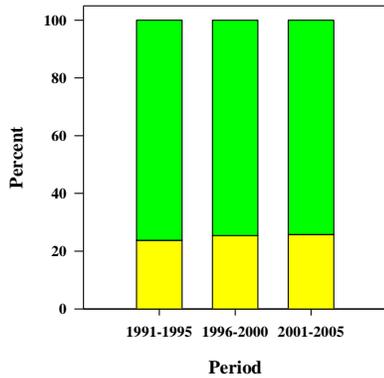
**Volume Harvested, by Species Percent**



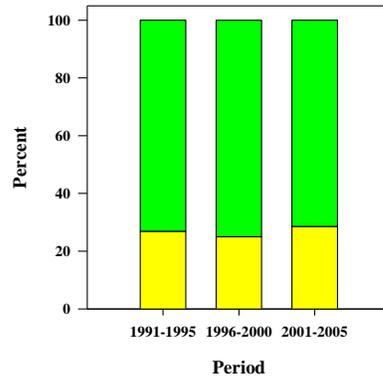
**Area Harvested, by Species Percent**



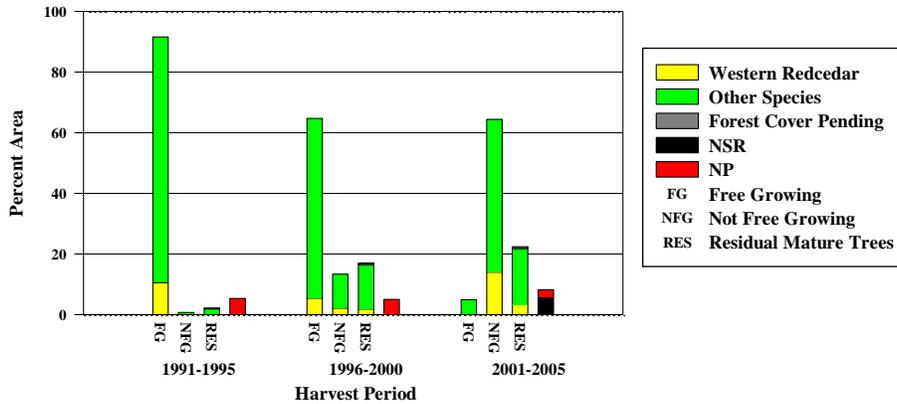
**Seedlings Planted, by Species Percent**



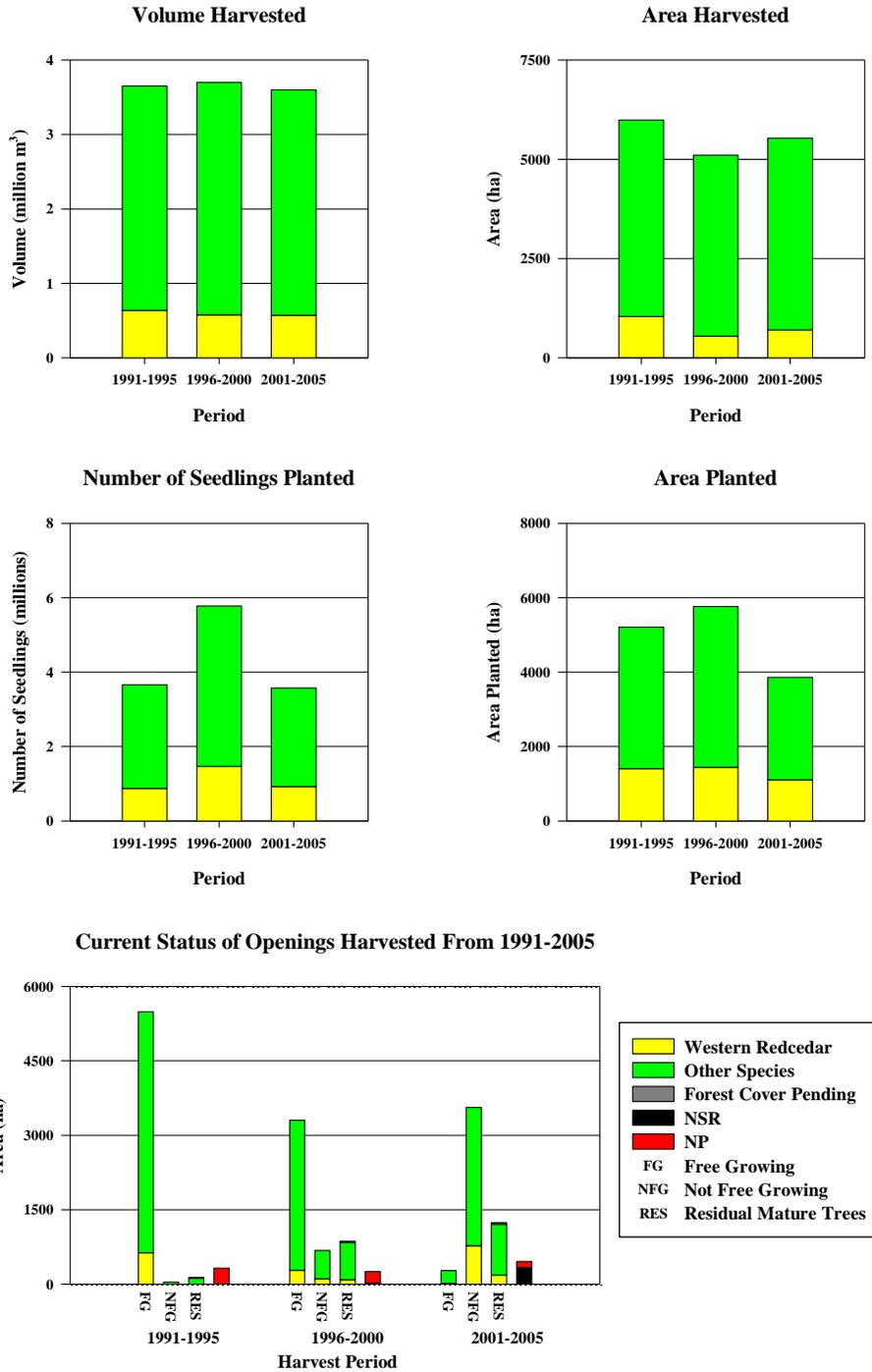
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

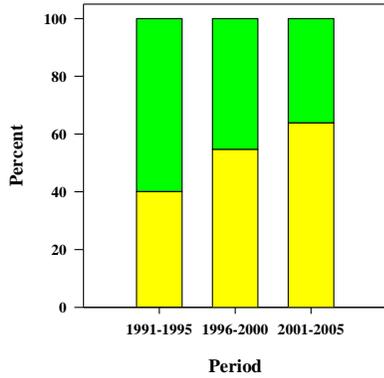


# TFL 47 - TimberWest Forest Corp. Volume and Area

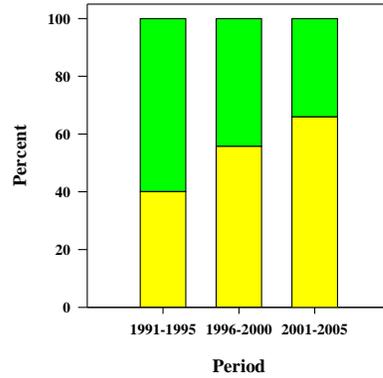


# TFL 54 - International Forest Products Ltd. Percent Volume and Area

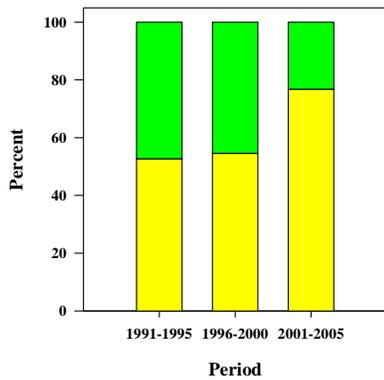
**Volume Harvested, by Species Percent**



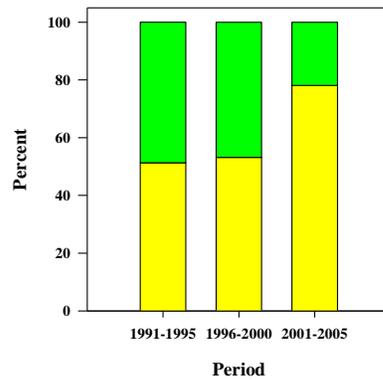
**Area Harvested, by Species Percent**



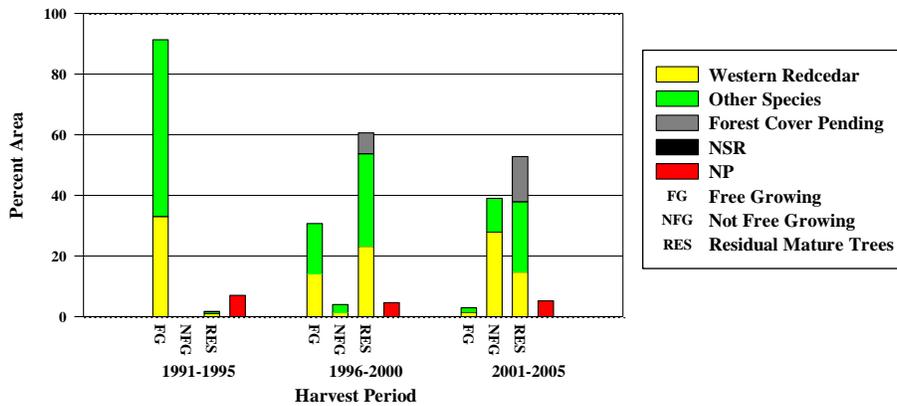
**Seedlings Planted, by Species Percent**



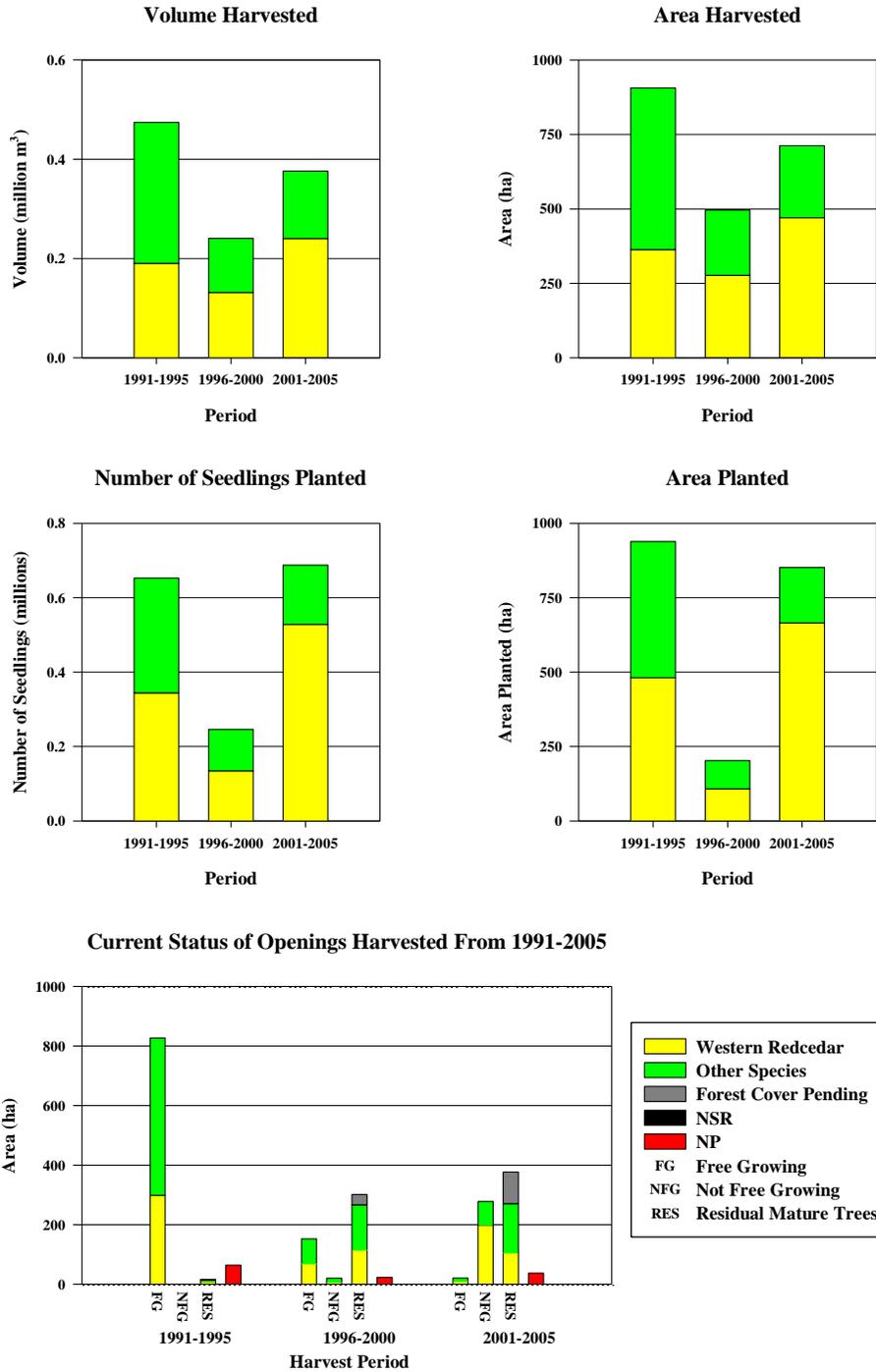
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



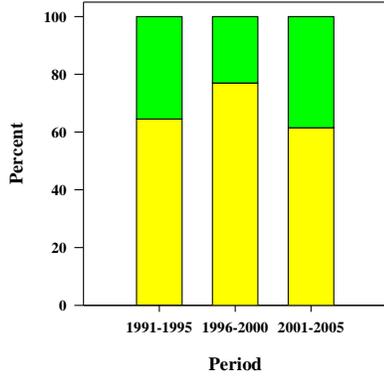
# TFL 54 - International Forest Products Ltd. Volume and Area



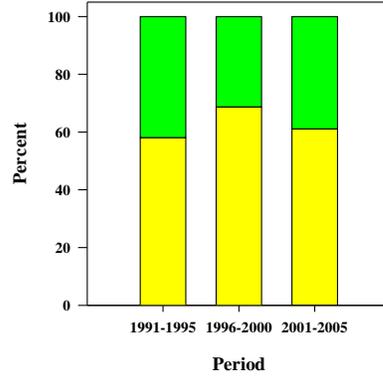
# TFL 57 - Iisaak Forest Resources Ltd.

## Percent Volume and Area

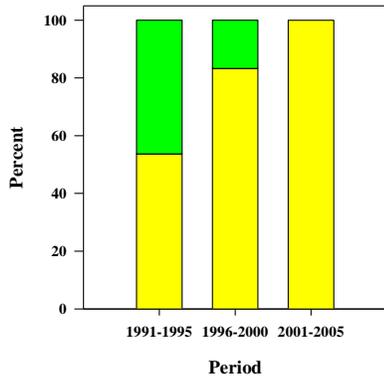
**Volume Harvested, by Species Percent**



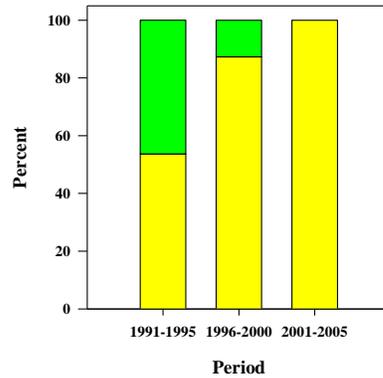
**Area Harvested, by Species Percent**



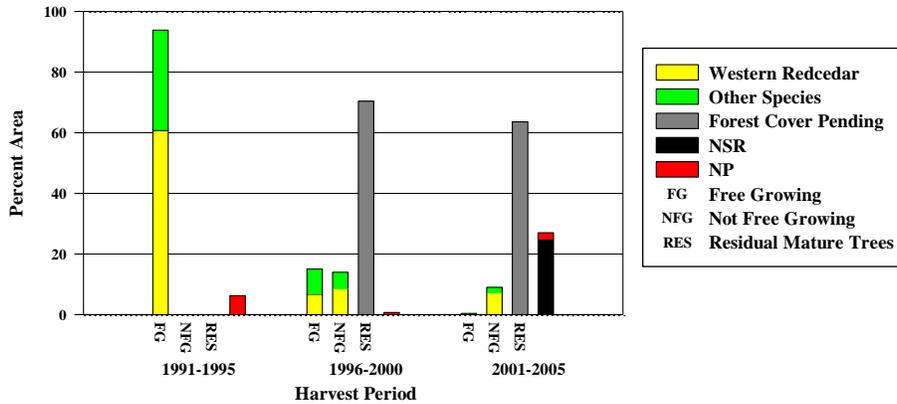
**Seedlings Planted, by Species Percent**



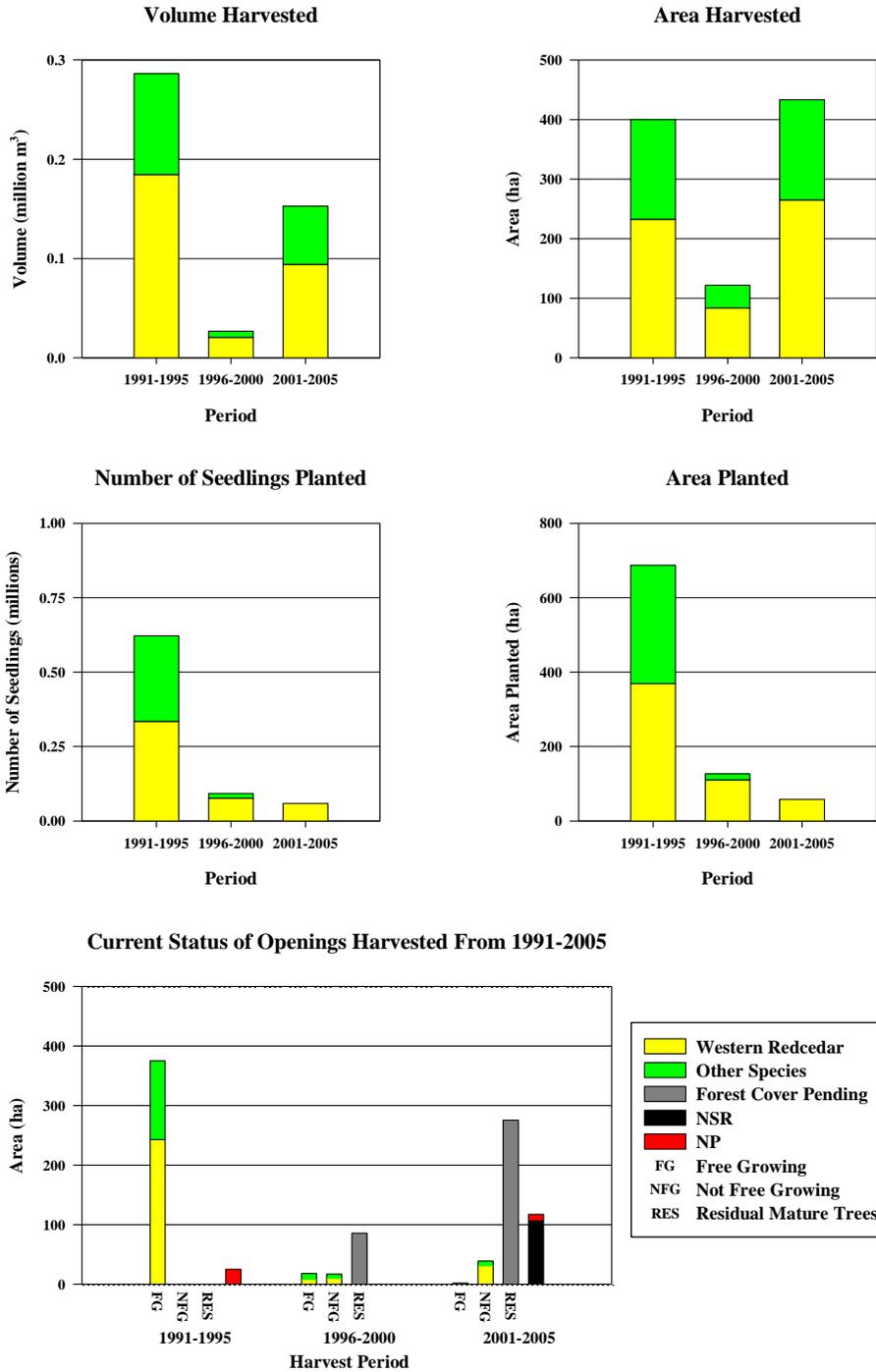
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



# TFL 57 - Isaak Forest Resources Ltd. Volume and Area



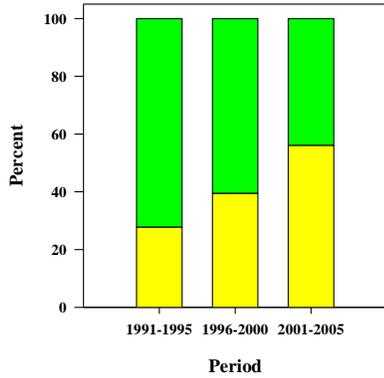


## **APPENDIX II**

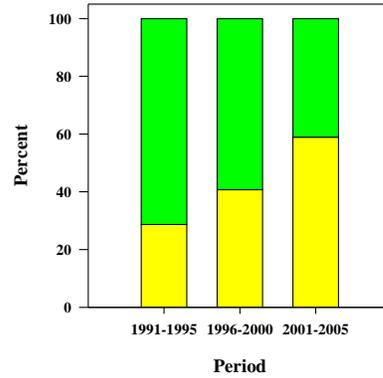
### **Individual Coastal TSA Graphs**

# TSA 19 – Mid Coast Percent Volume and Area

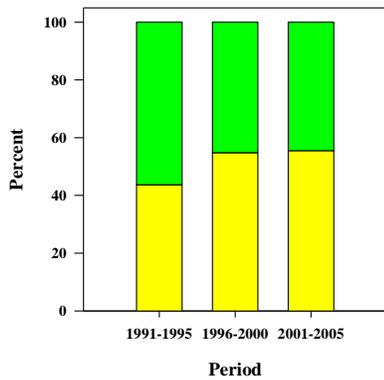
**Volume Harvested, by Species Percent**



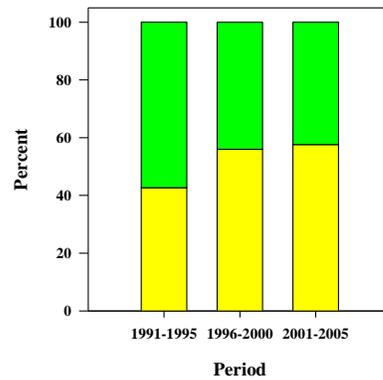
**Area Harvested, by Species Percent**



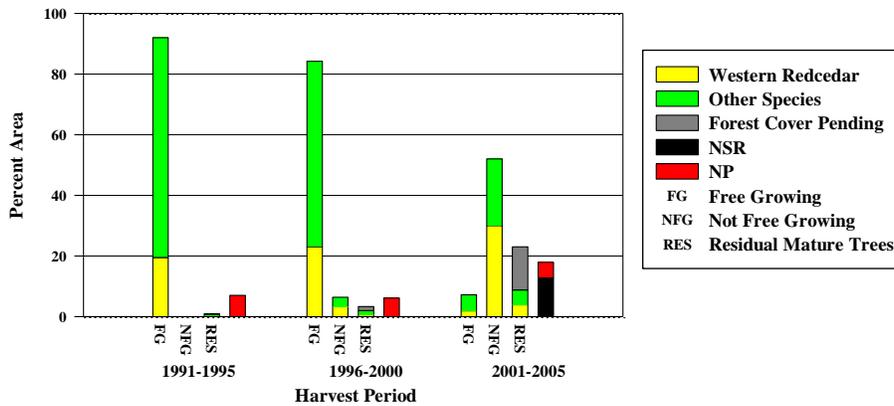
**Seedlings Planted, by Species Percent**



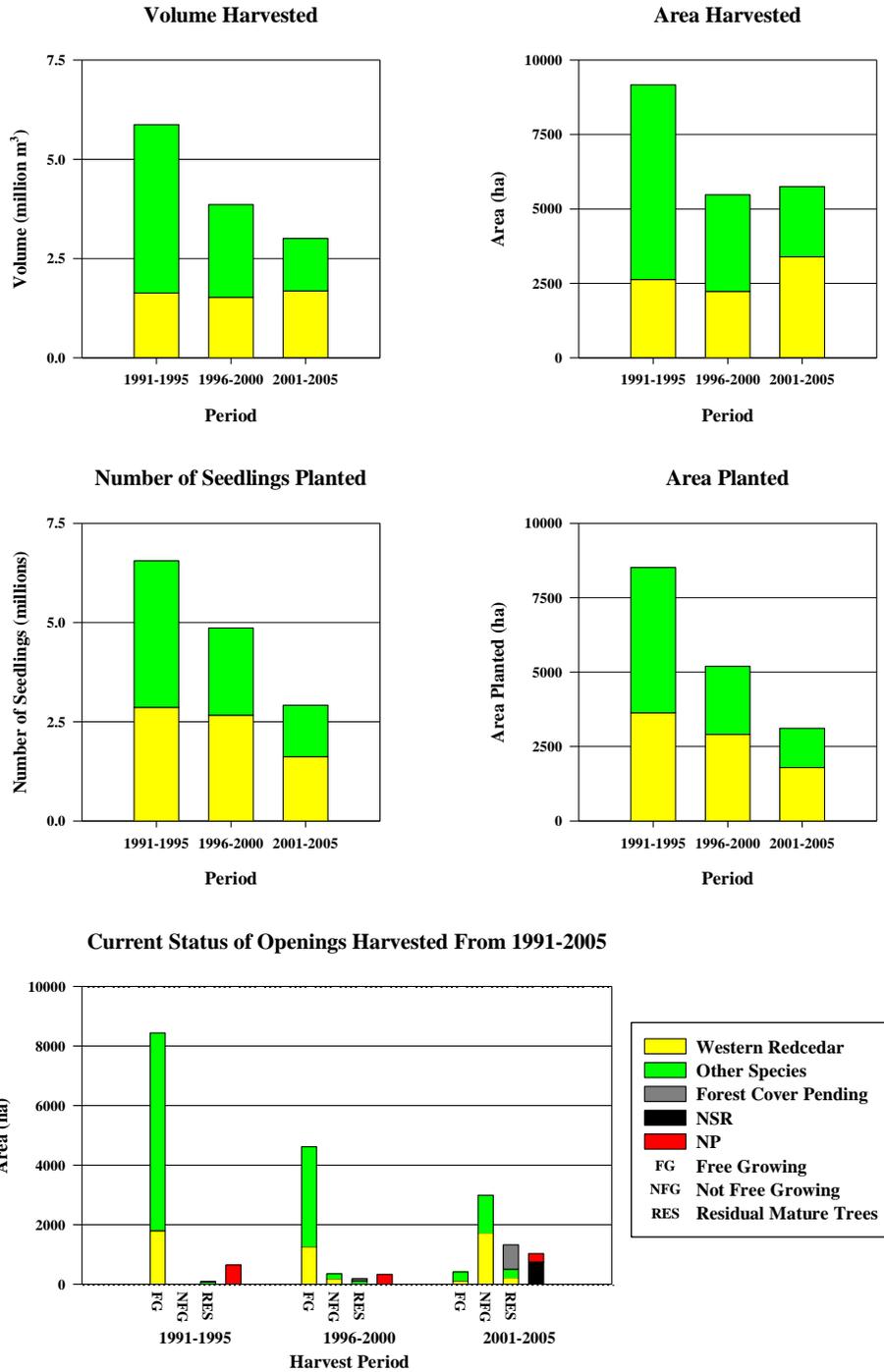
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

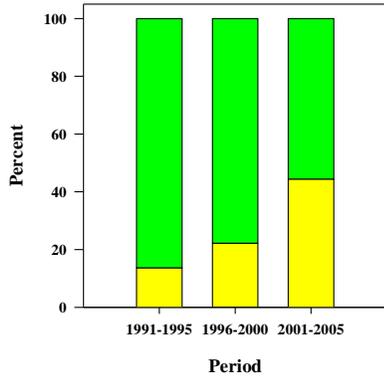


# TSA 19 – Mid Coast Volume and Area

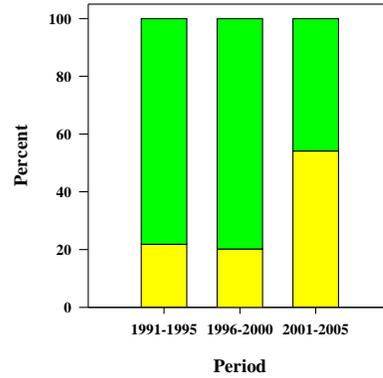


# TSA 21 – North Coast Percent Volume and Area

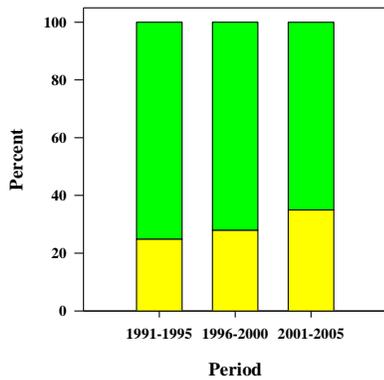
**Volume Harvested, by Species Percent**



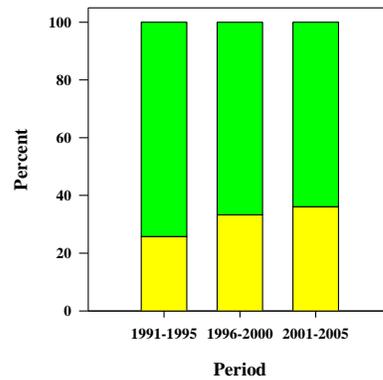
**Area Harvested, by Species Percent**



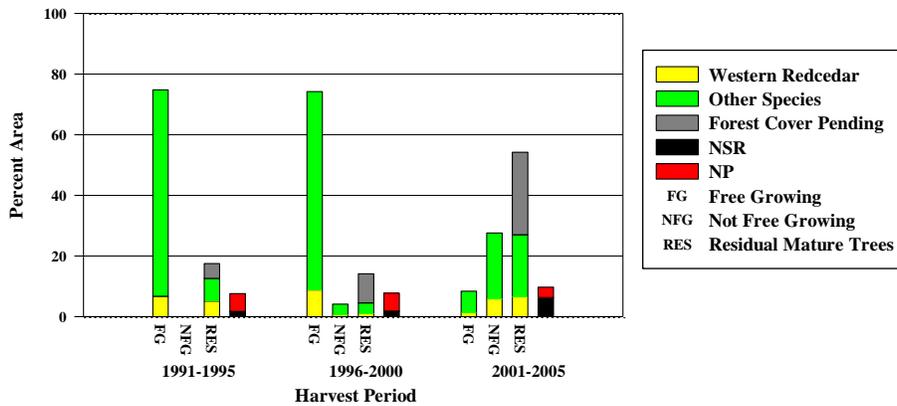
**Seedlings Planted, by Species Percent**



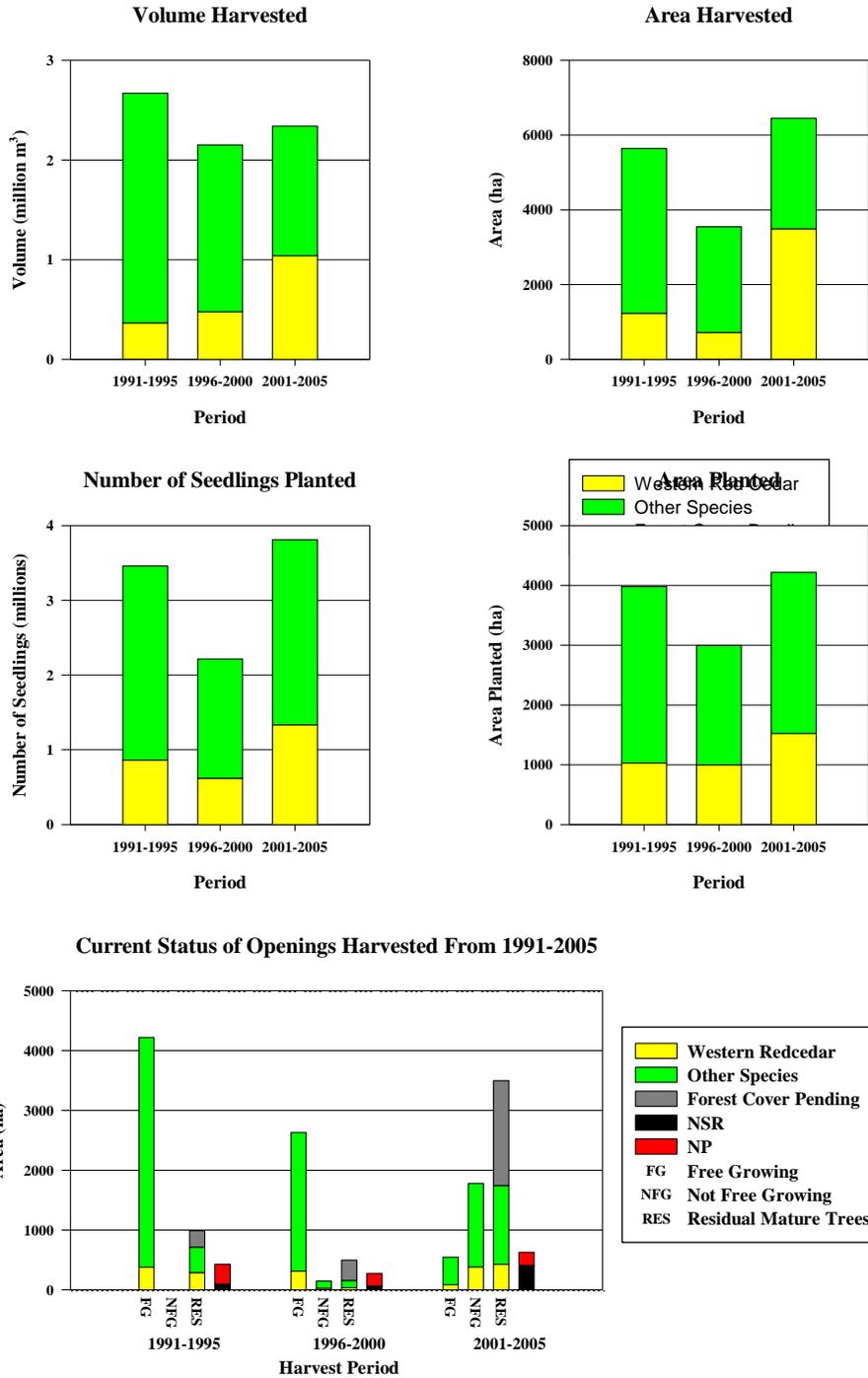
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

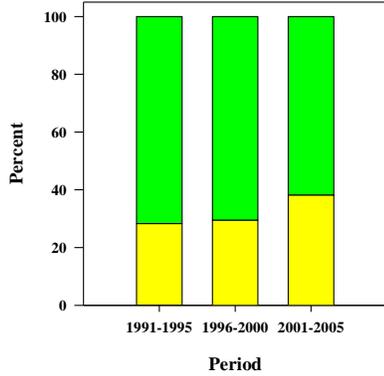


# TSA 21 – North Coast Volume and Area

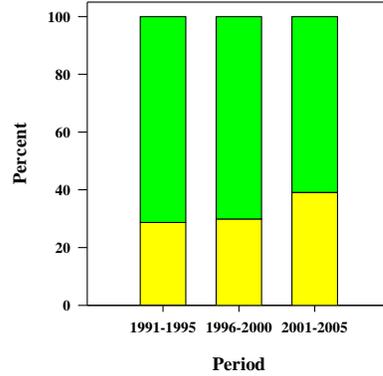


# TSA 25 – Queen Charlotte Percent Volume and Area

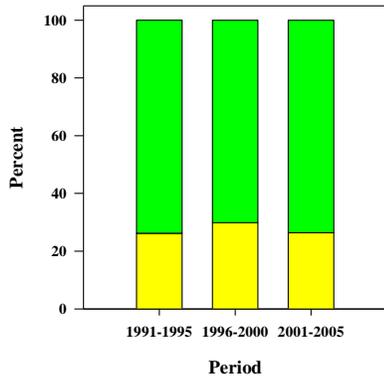
**Volume Harvested, by Species Percent**



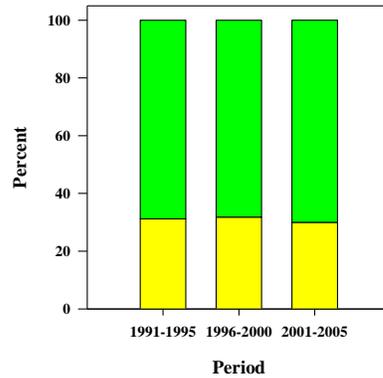
**Area Harvested, by Species Percent**



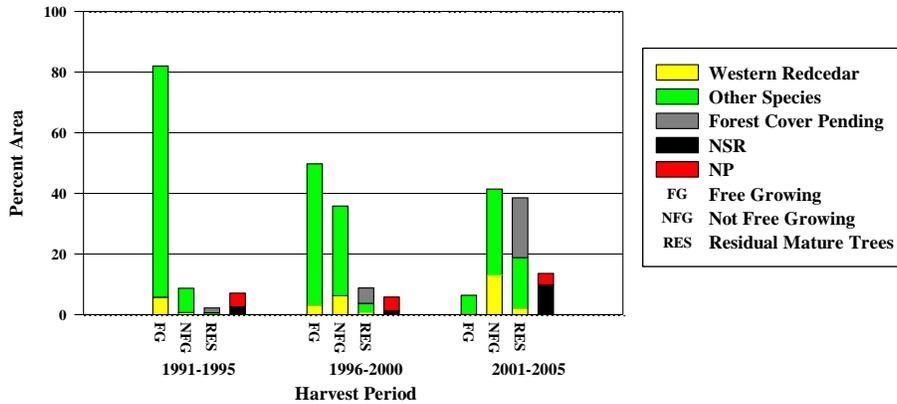
**Seedlings Planted, by Species Percent**



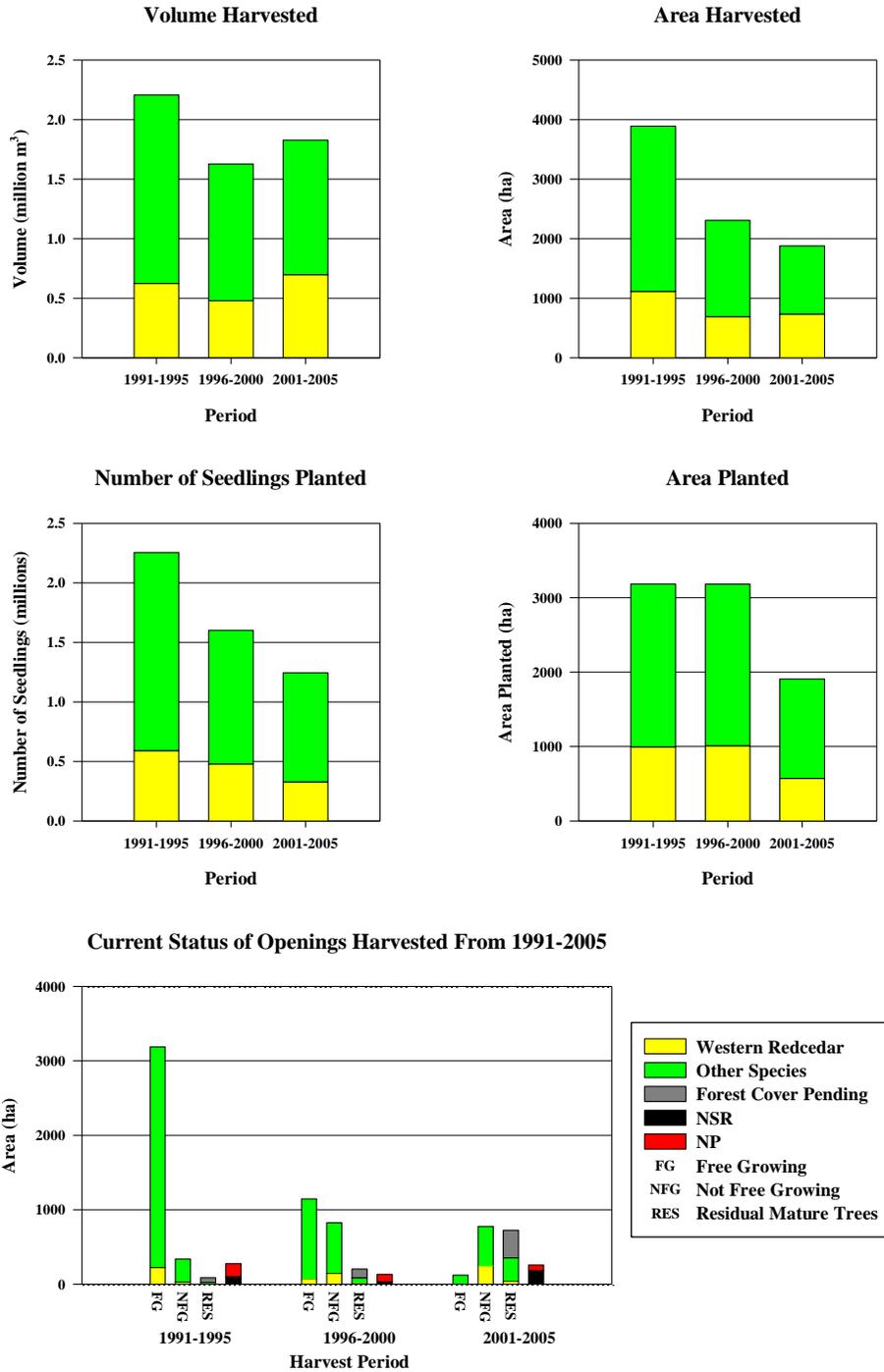
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



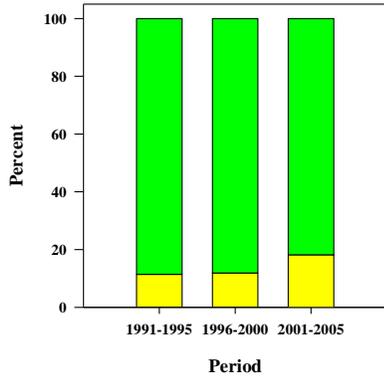
# TSA 25 – Queen Charlotte Volume and Area



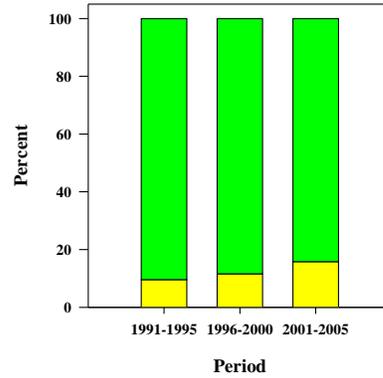
# TSA 30 – Fraser

## Percent Volume and Area

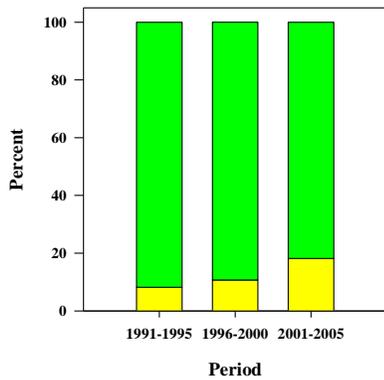
**Volume Harvested, by Species Percent**



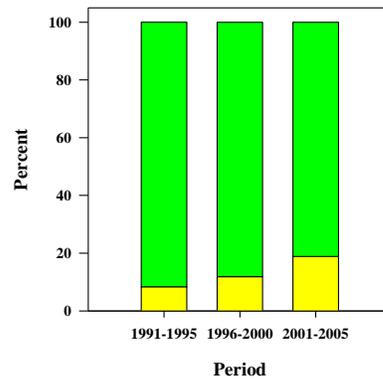
**Area Harvested, by Species Percent**



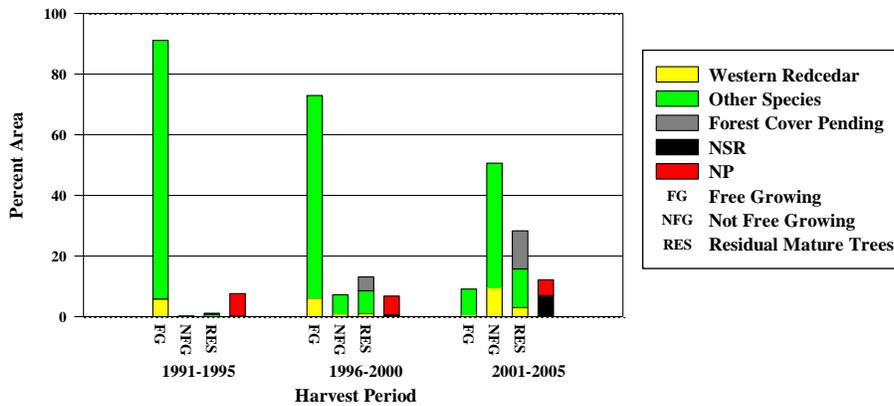
**Seedlings Planted, by Species Percent**



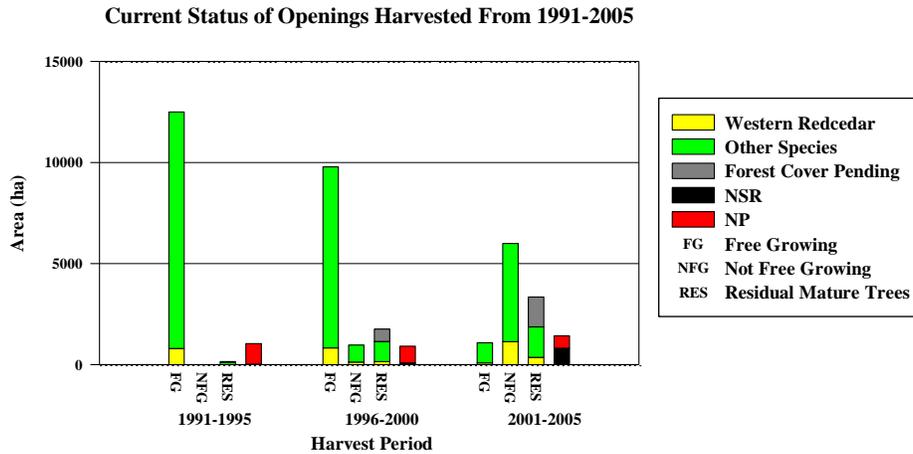
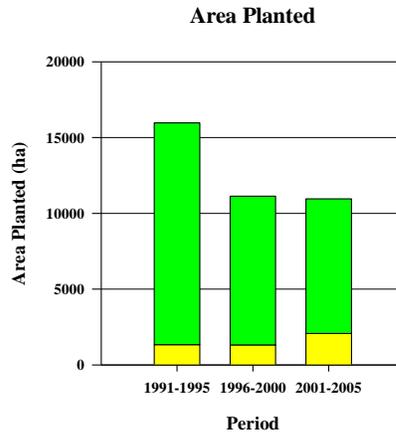
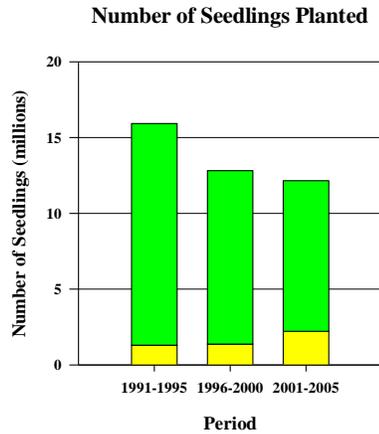
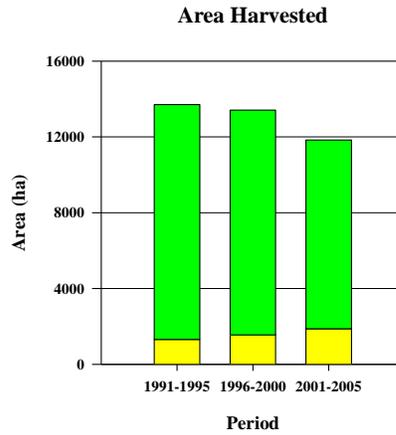
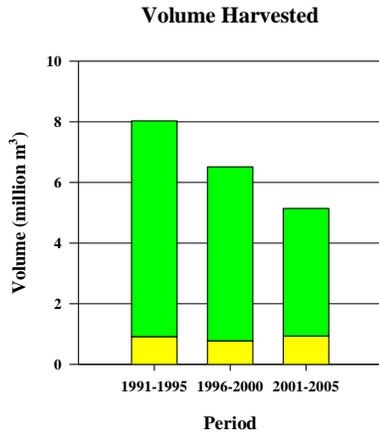
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



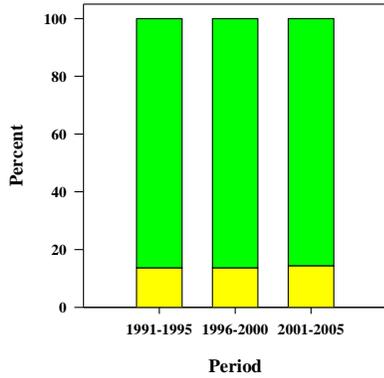
# TSA 30 – Fraser Volume and Area



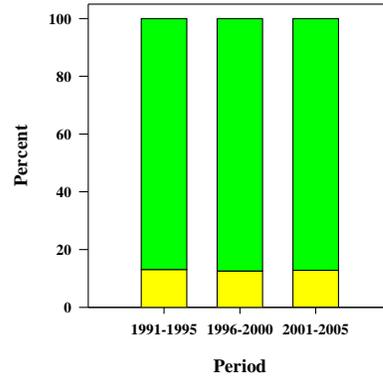
# TSA 31 – Soo

## Percent Volume and Area

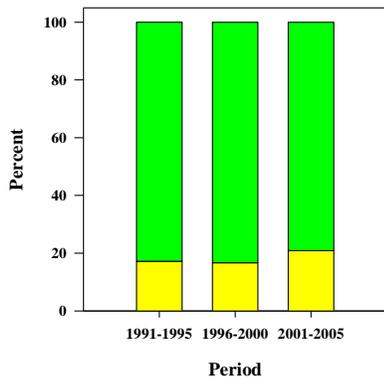
**Volume Harvested, by Species Percent**



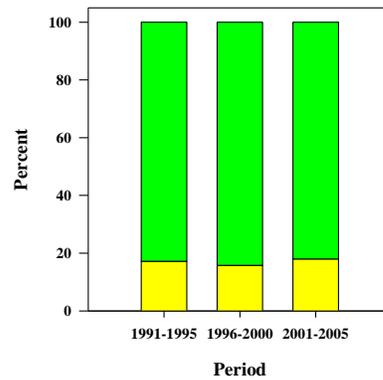
**Area Harvested, by Species Percent**



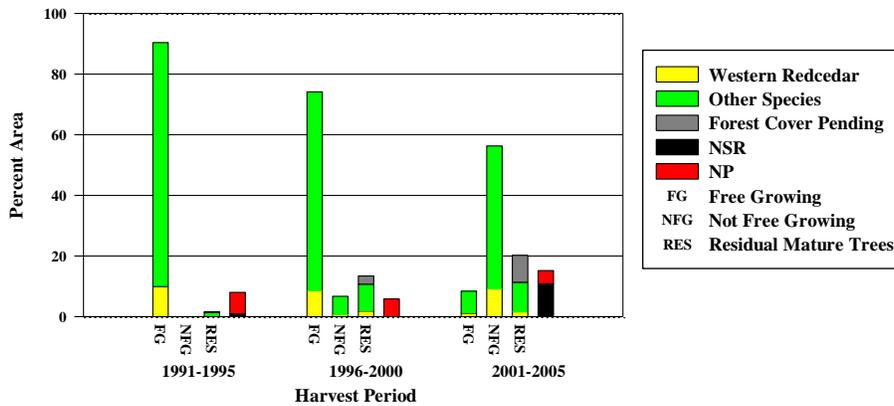
**Seedlings Planted, by Species Percent**



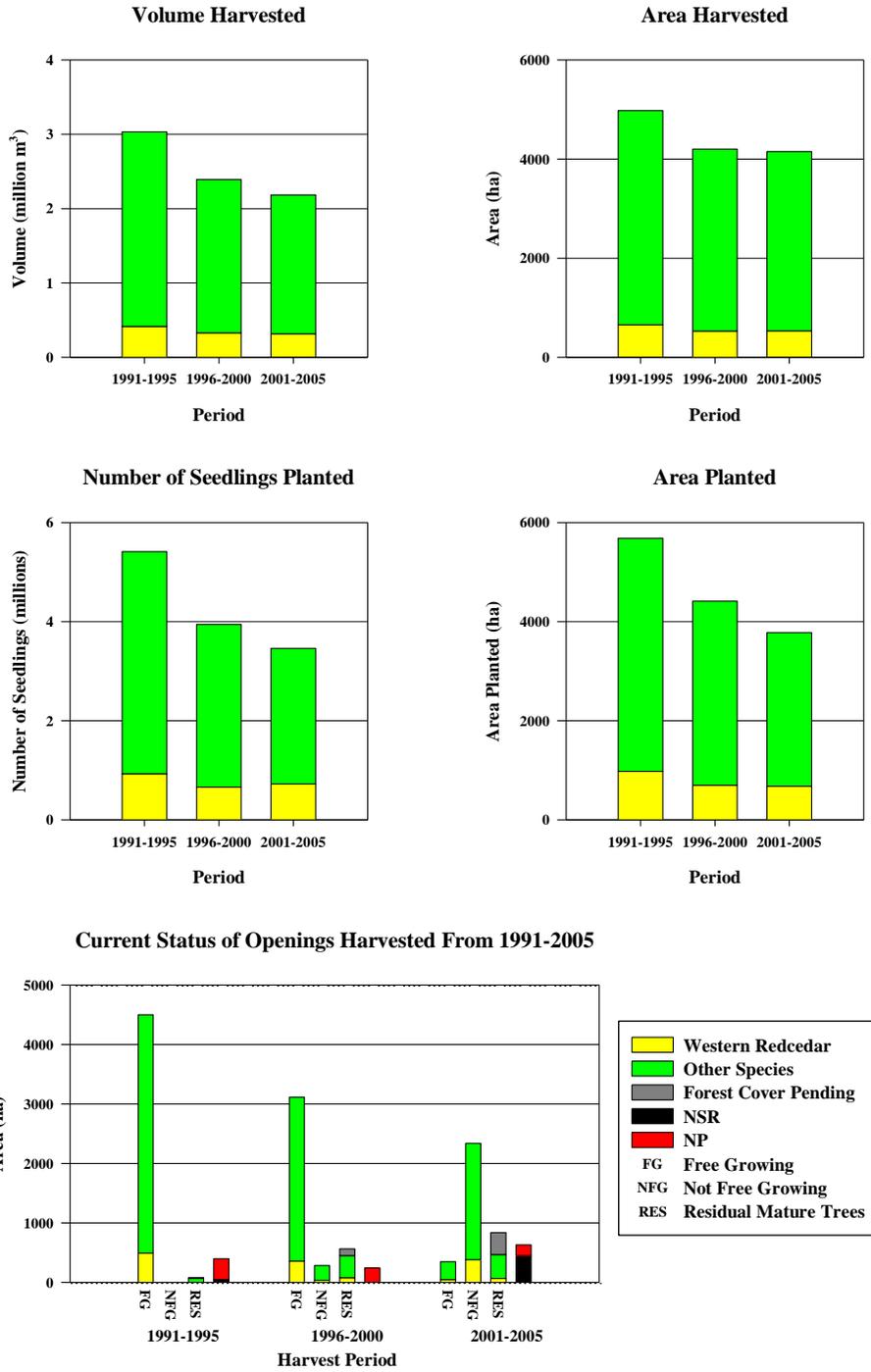
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



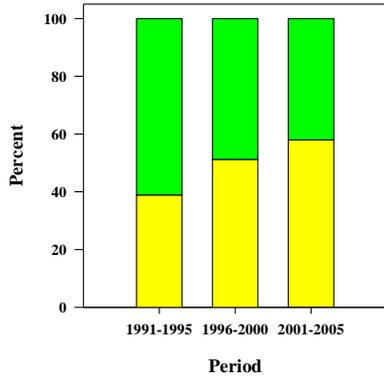
# TSA 31 – Soo Volume and Area



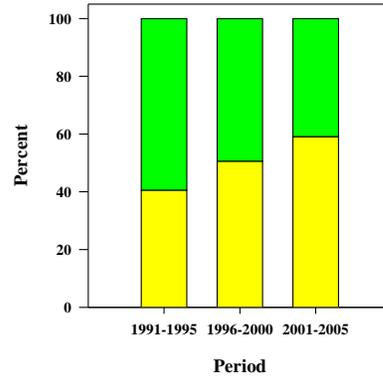
# TSA 33 – Kingcome

## Percent Volume and Area

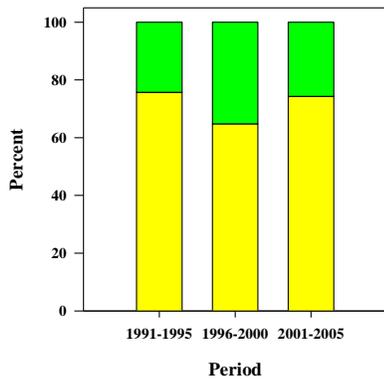
**Volume Harvested, by Species Percent**



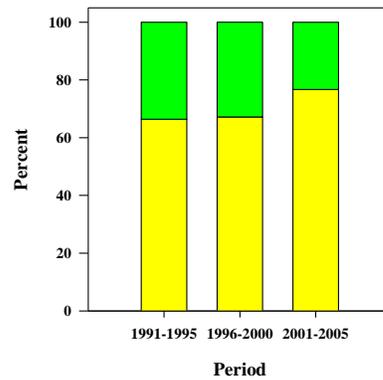
**Area Harvested, by Species Percent**



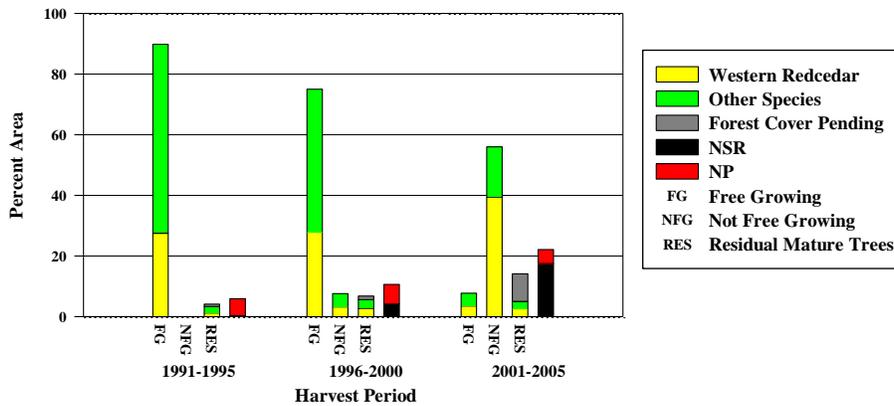
**Seedlings Planted, by Species Percent**



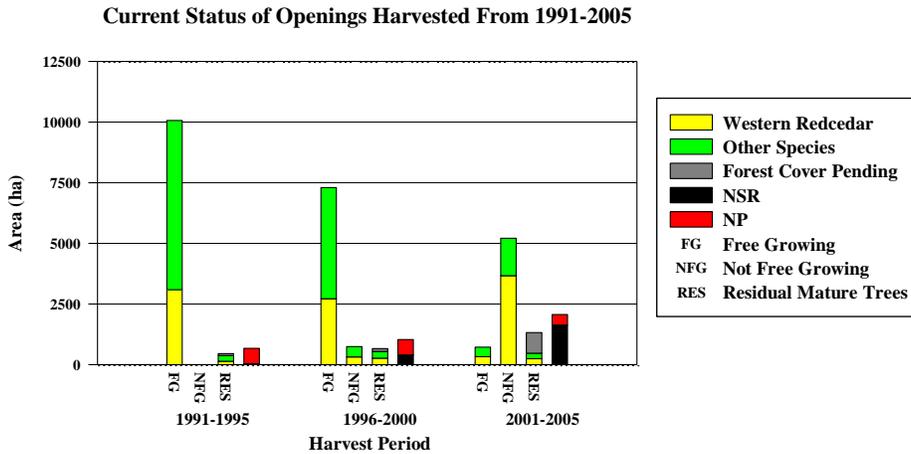
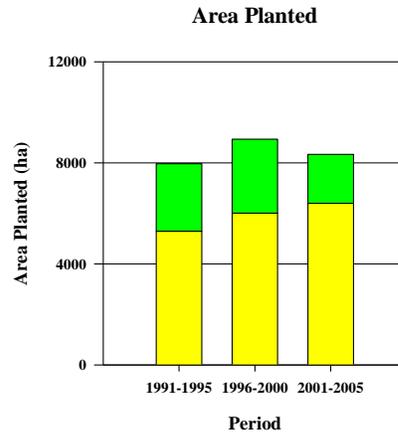
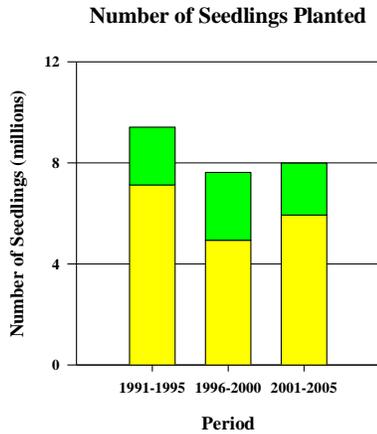
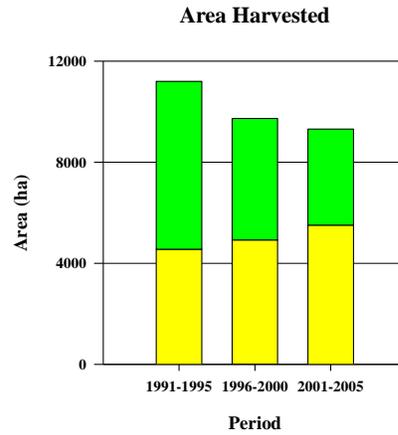
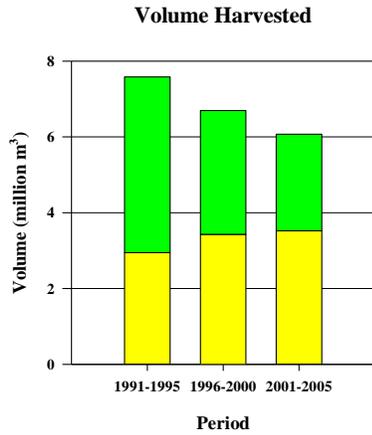
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



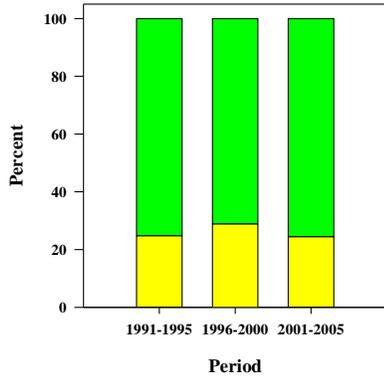
# TSA 33 – Kingcome Volume and Area



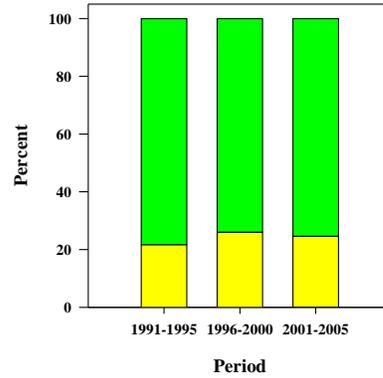
# TSA 37 – Strathcona

## Percent Volume and Area

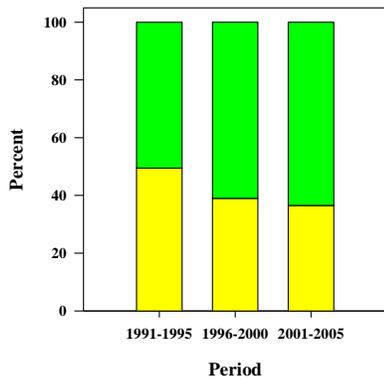
**Volume Harvested, by Species Percent**



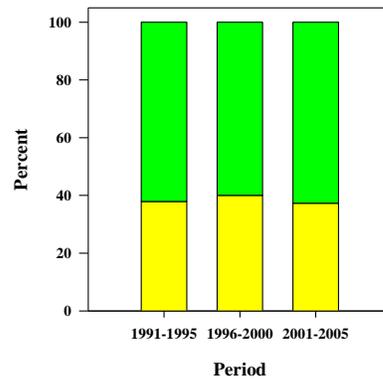
**Area Harvested, by Species Percent**



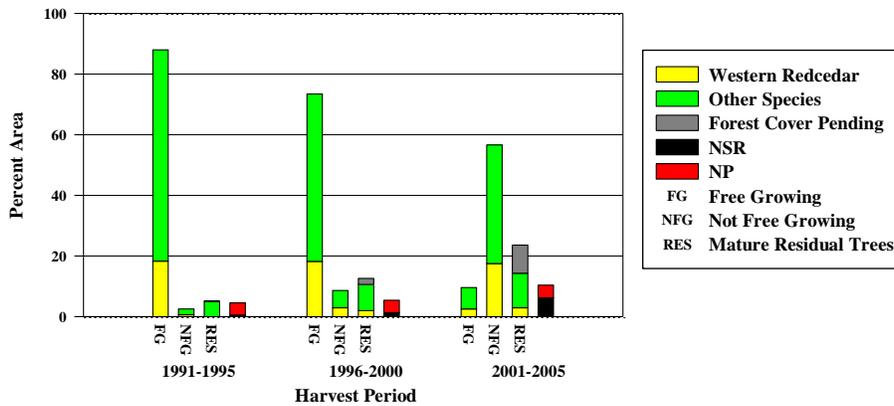
**Seedlings Planted, by Species Percent**



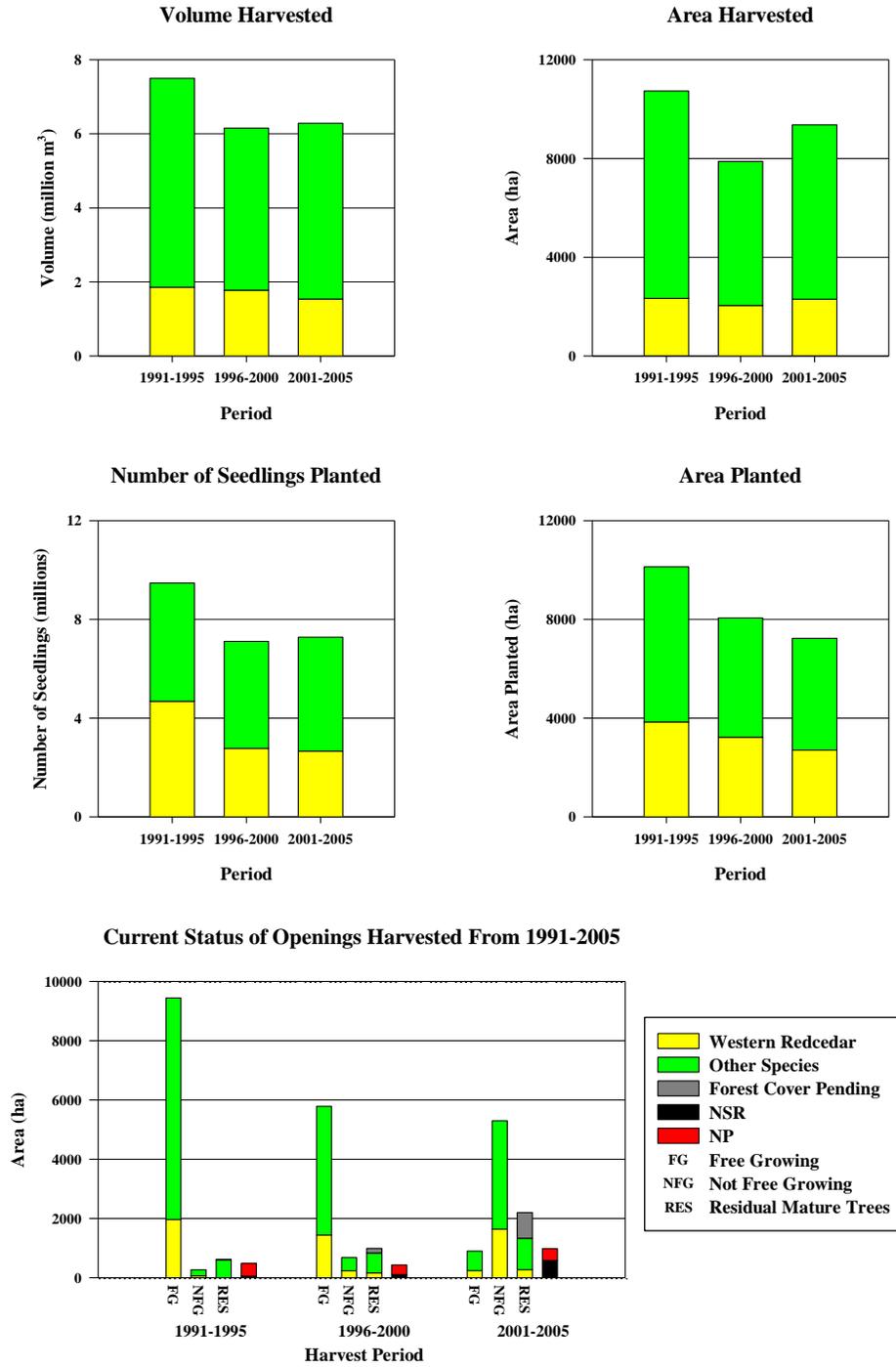
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



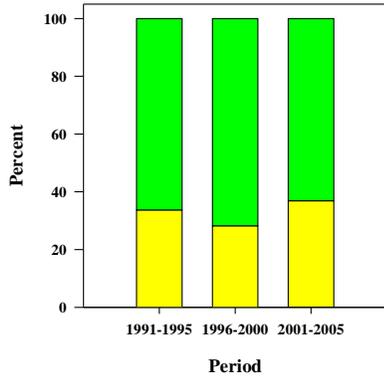
# TSA 37 – Strathcona Volume and Area



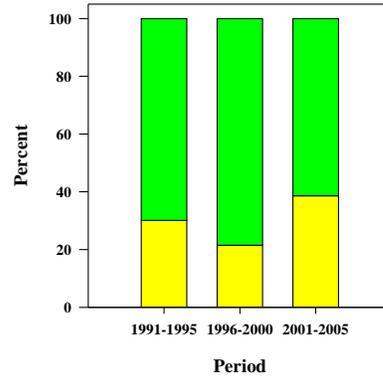
# TSA 38 – Arrowsmith

## Percent Volume and Area

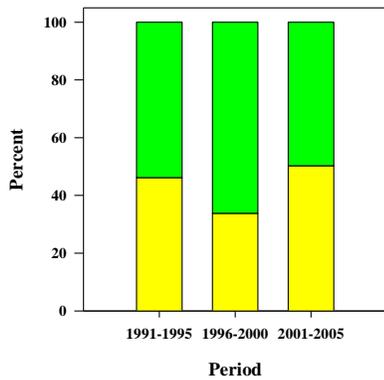
**Volume Harvested, by Species Percent**



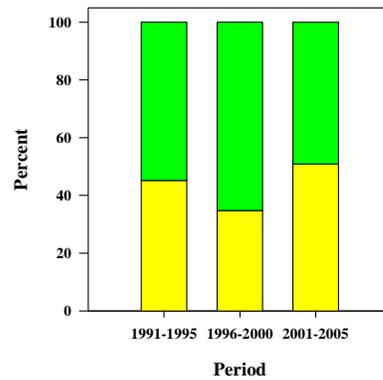
**Area Harvested, by Species Percent**



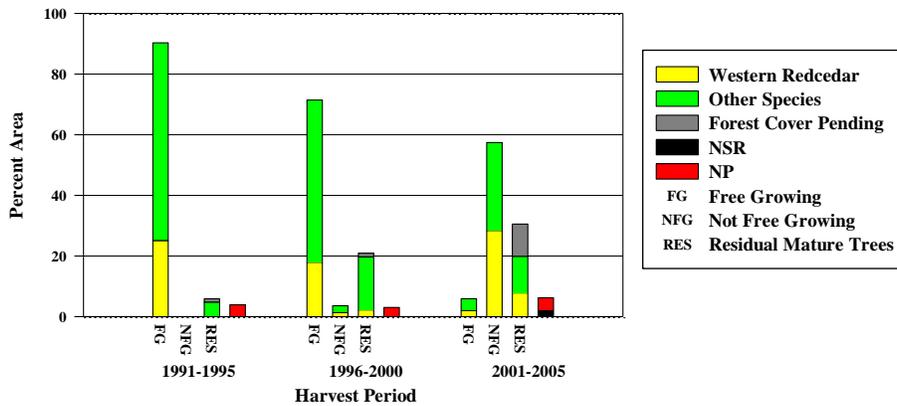
**Seedlings Planted, by Species Percent**



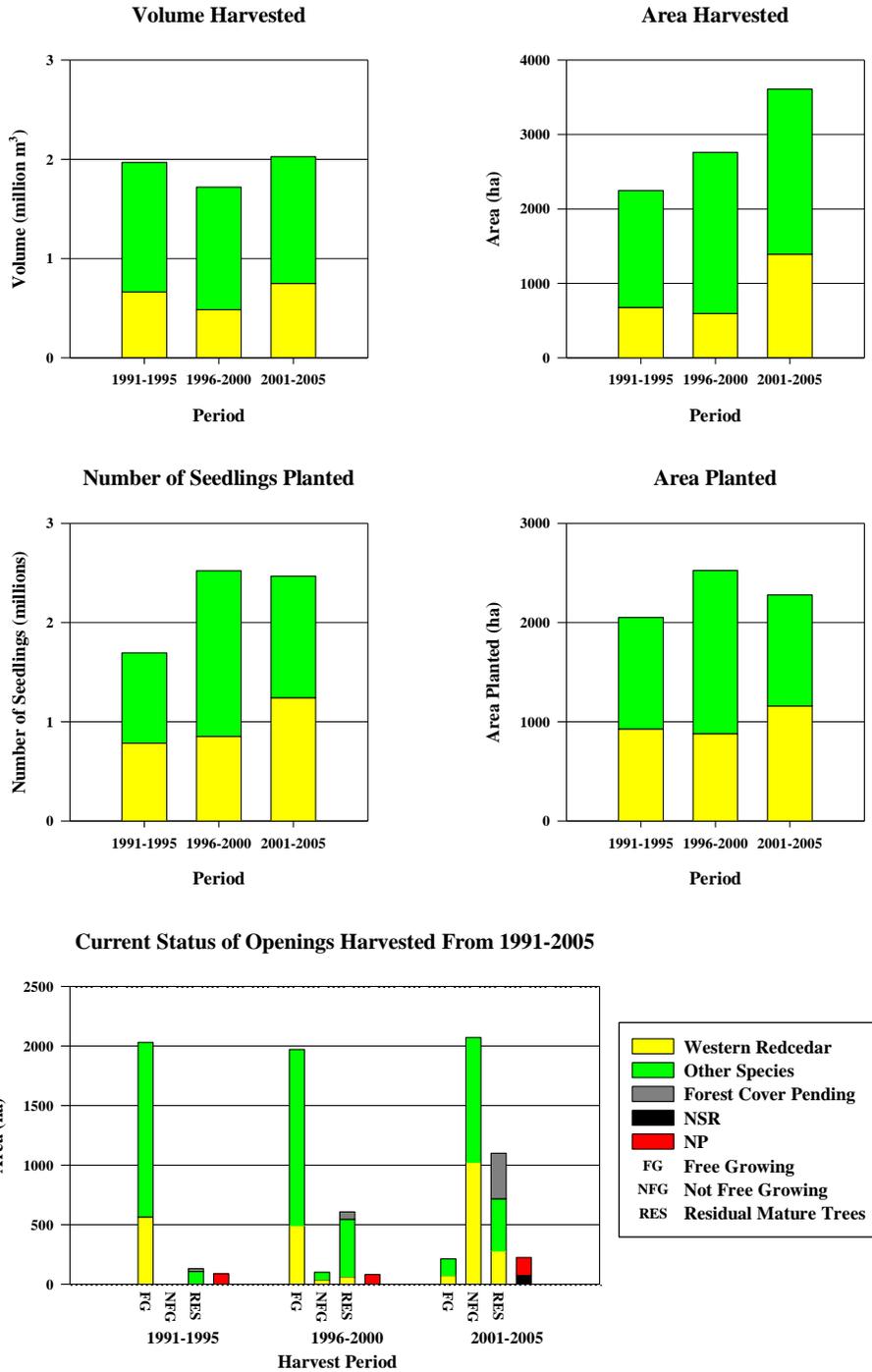
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**

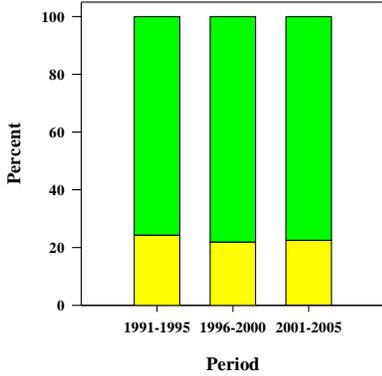


# TSA 38 – Arrowsmith Volume and Area

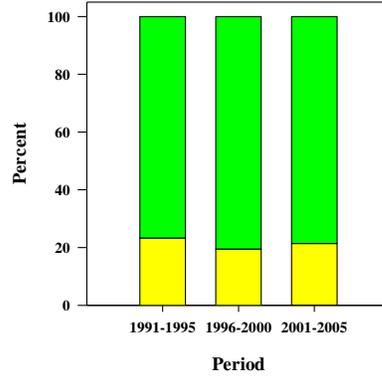


# TSA 39 – Sunshine Coast Percent Volume and Area

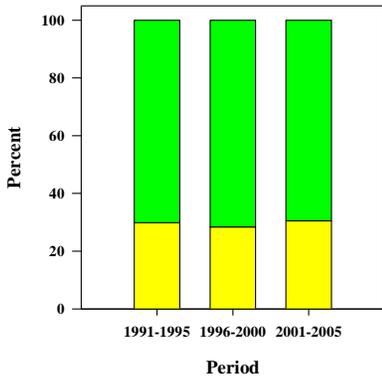
**Volume Harvested, by Species Percent**



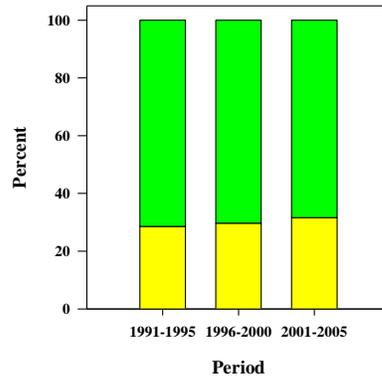
**Area Harvested, by Species Percent**



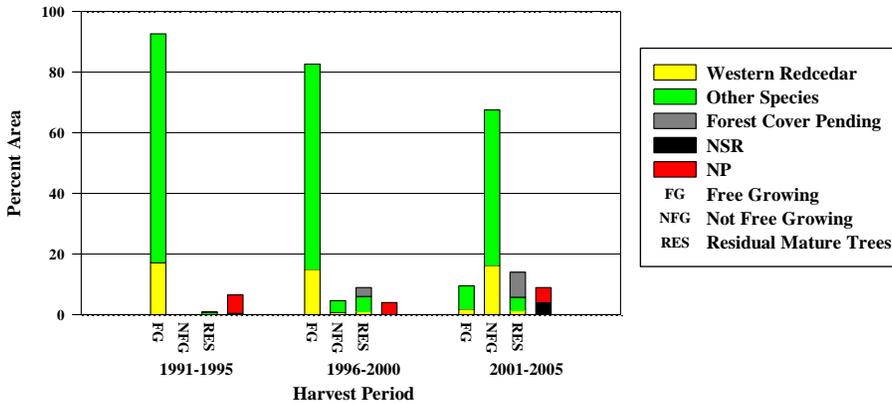
**Seedlings Planted, by Species Percent**



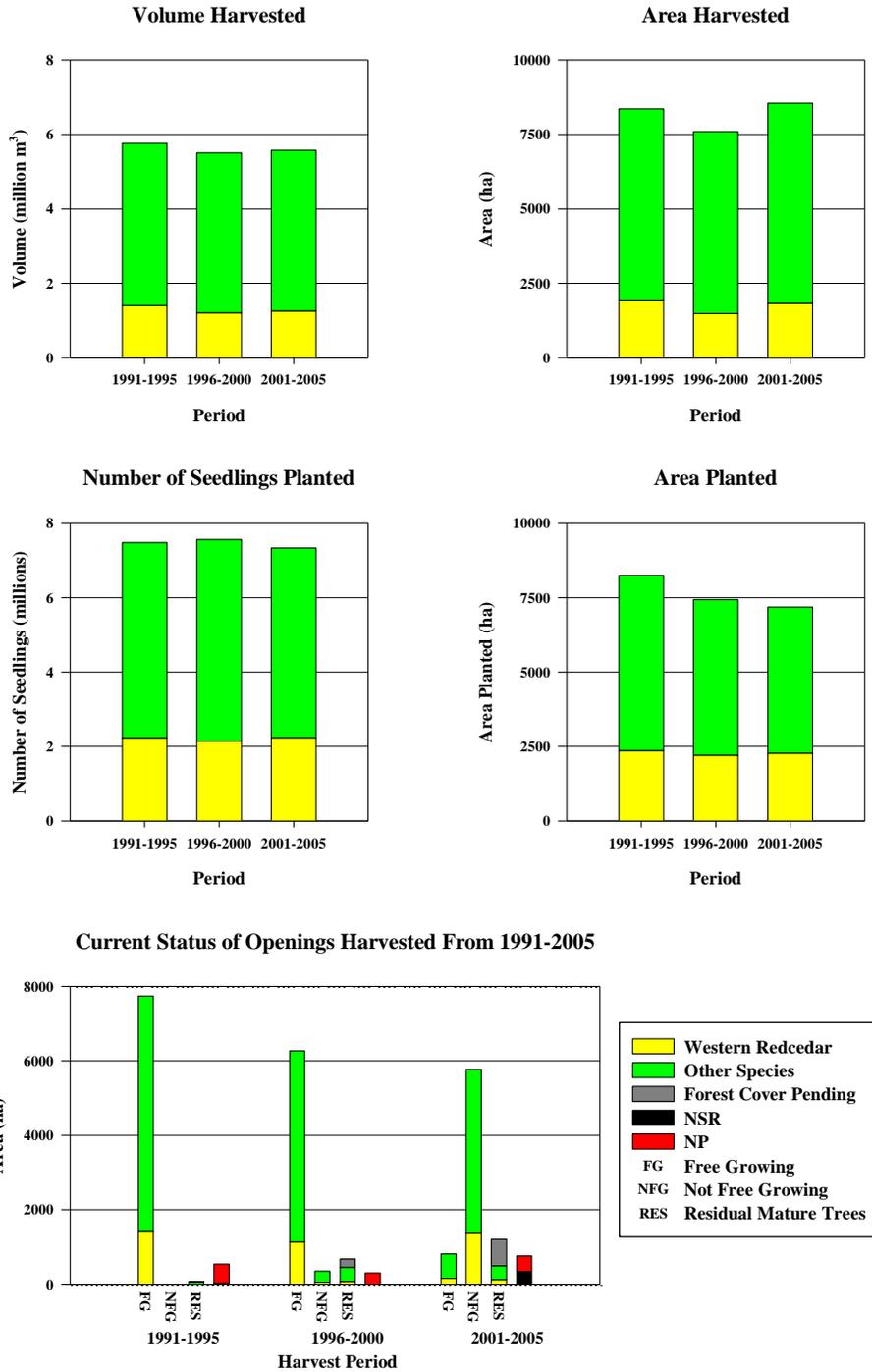
**Area Planted, by Species Percent**



**Current Status of Openings Harvested From 1991-2005**



# TSA 39 – Sunshine Coast Volume and Area



## **APPENDIX III**

### **Area of Western Redcedar Harvested and Planted – Individual Coastal TFL or TSA**

**Table III-1. Area of Western Redcedar Harvested and Planted**

Management Unit	Harvest Period	Area of Cwc Harvested (ha)	Harvested Area Planted to Cwc (ha)	Current Status of Planted Cwc (ha)		
				Free Growing	Not Free Growing	Total
TFL06	1991-1995	2,439.2	3,646.6	2,304.2	56.5	2,360.7
	1996-2000	1,788.1	2,341.2	1,421.3	19.9	1,441.2
	2001-2005	1,834.4	2,758.4	196.5	1,457.3	1,653.8
TFL10	1991-1995	199.5	238.9	140.2	4.3	144.5
	1996-2000	80.2	89.9	53.3		53.3
	2001-2005	74.5	105.5	4.1	75.0	79.1
TFL19	1991-1995	1,089.0	2,029.4	786.8	36.1	822.9
	1996-2000	922.6	1,035.6	656.9	7.9	664.8
	2001-2005	1,390.0	1,644.1	179.4	1,157.6	1,337.0
TFL24	1991-1995	250.7	140.5	28.4		28.4
	1996-2000	140.2	69.9	19.4		19.4
	2001-2005	10.9	8.2	0.9		0.9
TFL25	1991-1995	1,085.2	842.3	399.1	6.7	405.8
	1996-2000	1,237.1	1,220.7	744.6	52.3	796.9
	2001-2005	840.0	842.1	60.5	601.9	662.4
TFL26	1991-1995	73.9	76.2	35.2		35.2
	1996-2000	60.4	72.7	94.7	7.9	102.6
	2001-2005	54.0	73.8	4.6	49.6	54.2
TFL37	1991-1995	1,197.1	1,673.4	691.6	0.0	691.6
	1996-2000	771.3	1,412.3	808.3	33.2	841.5
	2001-2005	964.3	1,622.5	87.6	1,109.3	1,196.9

**Table III-1. Area of Western Redcedar Harvested and Planted**

Management Unit	Period	Area of Cwc Harvested (ha)	Harvested Area Planted to Cwc (ha)	Current Status of Planted Cwc (ha)		
				Free Growing	Not Free Growing	Total
TFL38	1991-1995	540.5	557.8	315.8		315.8
	1996-2000	595.3	514.8	284.4		284.4
	2001-2005	447.5	420.1	26.8	245.0	271.8
TFL39	1991-1995	5,528.0	4,172.0	2,220.7	5.2	2,225.9
	1996-2000	4,687.0	4,016.3	2,038.9	224.1	2,263.0
	2001-2005	5,949.1	3,724.4	772.2	2,788.4	3,560.6
TFL43	1991-1995	72.5		1.4		1.4
	1996-2000	43.6	10.3	7.3		7.3
	2001-2005	28.8	1.2	0.5		0.5
TFL44	1991-1995	3,340.1	4,704.6	3,281.9	0.2	3,282.1
	1996-2000	2,328.3	2,795.0	1,900.9	98.2	1,999.1
	2001-2005	3,137.7	2,574.1	301.4	1,802.0	2,103.4
TFL45	1991-1995	382.0	709.3	297.7	23.8	321.5
	1996-2000	311.3	468.9	198.0		198.0
	2001-2005	301.0	411.5	13.8	306.4	320.2
TFL46	1991-1995	774.6	1,007.9	644.9	0.4	645.3
	1996-2000	590.5	815.1	440.0		440.0
	2001-2005	702.7	1,090.3	99.0	808.2	907.2
TFL47	1991-1995	1,041.8	1,681.6	631.7	5.0	636.7
	1996-2000	545.4	953.7	278.0	108.3	386.3
	2001-2005	702.7	1,115.7	17.6	773.5	791.1

**Table III-1. Area of Western Redcedar Harvested and Planted**

Management Unit	Harvest Period	Area of Cwc Harvested (ha)	Harvested Area Planted to Cwc (ha)	Current Status of Planted Cwc (ha)		
				Free Growing	Not Free Growing	Total
TFL54	1991-1995	363.3	428.3	298.6		298.6
	1996-2000	277.1	254.5	69.8	6.7	76.5
	2001-2005	470.2	400.5	9.7	198.5	208.2
TFL57	1991-1995	232.5	268.6	242.8		242.8
	1996-2000	83.7	32.5	8.1	10.4	18.5
	2001-2005	264.9	33.9	0.5	31.0	31.5
TSA19	1991-1995	2,630.7	3,742.3	1,791.6		1,791.6
	1996-2000	2,230.1	2,180.5	1,260.4	178.2	1,438.6
	2001-2005	3,386.9	1,990.5	107.2	1,724.9	1,832.1
TSA21	1991-1995	1,231.9	1,155.0	378.3	1.0	379.3
	1996-2000	716.6	892.9	311.6	24.6	336.2
	2001-2005	3,490.3	1,136.5	85.8	381.2	467.0
TSA25	1991-1995	1,115.3	996.9	222.6	28.3	250.9
	1996-2000	689.1	584.3	73.5	146.1	219.6
	2001-2005	734.6	435.1	10.2	247.4	257.6
TSA30	1991-1995	1,314.2	1,236.2	797.1	0.5	797.6
	1996-2000	1,556.0	1,639.3	823.3	121.9	945.2
	2001-2005	1,871.0	1,763.3	85.9	1,135.5	1,221.4
TSA31	1991-1995	654.2	958.5	490.8	0.5	491.3
	1996-2000	528.5	692.7	357.5	34.9	392.4
	2001-2005	531.7	576.5	45.7	380.1	425.8

**Table III-1. Area of Western Redcedar Harvested and Planted**

Management Unit	Harvest Period	Area of Cwc Harvested (ha)	Harvested Area Planted to Cwc (ha)	Current Status of Planted Cwc (ha)		
				Free Growing	Not Free Growing	Total
TSA33	1991-1995	4,551.3	6,108.2	3,083.4	0.9	3,084.3
	1996-2000	4,921.9	4,820.4	2,714.1	312.3	3,026.4
	2001-2005	5,505.9	5,315.1	324.7	3,664.9	3,989.6
TSA37	1991-1995	2,330.7	3,613.6	1,960.7	60.8	2,021.5
	1996-2000	2,047.9	2,685.7	1,437.0	231.2	1,668.2
	2001-2005	2,300.7	2,330.8	236.0	1,636.0	1,872.0
TSA38	1991-1995	676.4	960.9	564.4		564.4
	1996-2000	593.9	809.5	493.9	35.8	529.7
	2001-2005	1,391.4	1,184.2	71.5	1,024.1	1,095.6
TSA39	1991-1995	1,946.4	2,329.0	1,432.9	3.6	1,436.5
	1996-2000	1,483.6	1,962.7	1,132.3	51.5	1,183.8
	2001-2005	1,830.4	2,082.9	154.3	1,387.4	1,541.7

## **APPENDIX IV**

**Area of Residual Mature Trees, by Silviculture System and Period –  
Individual Coastal TFL or TSA**

**Table IV-1. TFL 06 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	9,387.2	5,690.3	7,283.4	22,360.9
	Area of openings with residual mature trees (ha)	1,607.8	3,453.0	6,689.5	11,750.3
	Area of residual mature trees in openings (ha)	63.0	482.7	960.7	1,506.4
Clearcut with Reserves	Total opening area (ha)		1,490.8	1,450.6	2,941.4
	Area of openings with residual mature trees (ha)		1,446.3	1,445.6	2,891.9
	Area of residual mature trees in openings (ha)		227.7	201.3	429.0
Retention	Total opening area (ha)			206.7	206.7
	Area of openings with residual mature trees (ha)			206.7	206.7
	Area of residual mature trees in openings (ha)			41.8	41.8
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	27.2	81.2	30.9	139.3
	Area of openings with residual mature trees (ha)	27.2	81.2		108.4
	Area of residual mature trees in openings (ha)	26.9	78.5		105.4
All Silviculture Systems	Total opening area (ha)	9,414.4	7,262.3	8,971.6	25,648.3
	Area of openings with residual mature trees (ha)	1,635.0	4,980.5	8,341.8	14,957.3
	Area of residual mature trees in openings (ha)	89.9	788.9	1,203.8	2,082.6

**Table IV-2. TFL 10 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	446.4	199.8	72.9	719.1
	Area of openings with residual mature trees (ha)			55.8	55.8
	Area of residual mature trees in openings (ha)			17.7	17.7
Clearcut with Reserves	Total opening area (ha)		11.0		11.0
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Retention	Total opening area (ha)		52.2	156.1	208.3
	Area of openings with residual mature trees (ha)		52.2	156.1	208.3
	Area of residual mature trees in openings (ha)		10.8	19.4	30.2
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	446.4	263.0	229.0	938.4
	Area of openings with residual mature trees (ha)		52.2	211.9	264.1
	Area of residual mature trees in openings (ha)		10.8	37.1	47.9

**Table IV-3. TFL 19 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	5,367.7	4,250.2	5,795.4	15,413.3
	Area of openings with residual mature trees (ha)	421.0	2,694.5	4,464.3	7,579.8
	Area of residual mature trees in openings (ha)	14.6	482.4	988.2	1,485.2
Clearcut with Reserves	Total opening area (ha)		89.5	1,578.4	1,667.9
	Area of openings with residual mature trees (ha)		89.5	1,525.8	1,615.3
	Area of residual mature trees in openings (ha)		15.4	239.9	255.3
Retention	Total opening area (ha)			27.3	27.3
	Area of openings with residual mature trees (ha)			27.3	27.3
	Area of residual mature trees in openings (ha)			9.0	9.0
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	5,367.7	4,339.7	7,401.1	17,108.5
	Area of openings with residual mature trees (ha)	421.0	2,784.0	6,017.4	9,222.4
	Area of residual mature trees in openings (ha)	14.6	497.8	1,237.1	1,749.5

**Table IV-4. TFL 24 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	983.9	410.2	89.7	1,483.8
	Area of openings with residual mature trees (ha)		113.5	89.7	203.2
	Area of residual mature trees in openings (ha)		21.6	17.7	39.3
Clearcut with Reserves	Total opening area (ha)		19.5		19.5
	Area of openings with residual mature trees (ha)		19.5		19.5
	Area of residual mature trees in openings (ha)		1.9		1.9
Retention	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	983.9	429.7	89.7	1,503.3
	Area of openings with residual mature trees (ha)	0.0	133.0	89.7	222.7
	Area of residual mature trees in openings (ha)	0.0	23.5	17.7	41.2

**Table IV-5. TFL 25 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	4,637.4	3,279.2	1,135.2	9,051.8
	Area of openings with residual mature trees (ha)	677.1	1,397.0	743.2	2,817.3
	Area of residual mature trees in openings (ha)	16.4	229.0	148.3	393.7
Clearcut with Reserves	Total opening area (ha)		742.8	1,408.6	2,151.4
	Area of openings with residual mature trees (ha)		290.6	999.9	1,290.5
	Area of residual mature trees in openings (ha)		50.6	158.7	209.3
Retention	Total opening area (ha)			145.4	145.4
	Area of openings with residual mature trees (ha)			145.4	145.4
	Area of residual mature trees in openings (ha)			51.0	51.0
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		71.5	40.8	112.3
	Area of openings with residual mature trees (ha)		71.5	17.2	88.7
	Area of residual mature trees in openings (ha)		67.2	8.6	75.8
All Silviculture Systems	Total opening area (ha)	4,637.4	4,093.5	2,730.0	11,460.9
	Area of openings with residual mature trees (ha)	677.1	1,759.1	1,905.7	4,341.9
	Area of residual mature trees in openings (ha)	16.4	346.8	366.6	729.8

**Table IV-6. TFL 26 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	402.1	552.7	297.6	1,252.4
	Area of openings with residual mature trees (ha)	30.1	141.2	200.2	371.5
	Area of residual mature trees in openings (ha)	2.1	18.9	179.4	200.4
Clearcut with Reserves	Total opening area (ha)		77.4	238.3	315.7
	Area of openings with residual mature trees (ha)		77.4	123.9	201.3
	Area of residual mature trees in openings (ha)		14.1	21.1	35.2
Retention	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		19.8	24.4	44.2
	Area of openings with residual mature trees (ha)		19.8	24.4	44.2
	Area of residual mature trees in openings (ha)		18.5	23.0	41.5
All Silviculture Systems	Total opening area (ha)	402.1	649.9	560.3	1,612.3
	Area of openings with residual mature trees (ha)	30.1	238.4	348.5	617.0
	Area of residual mature trees in openings (ha)	2.1	51.5	223.5	277.1

**Table IV-7. TFL 37 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	6,697.9	6,091.5	1,729.1	14,518.5
	Area of openings with residual mature trees (ha)	596.9	3,823.8	1,426.9	5,847.6
	Area of residual mature trees in openings (ha)	31.4	535.1	243.8	810.3
Clearcut with Reserves	Total opening area (ha)		54.1	4,737.8	4,791.9
	Area of openings with residual mature trees (ha)		24.9	4,335.0	4,359.9
	Area of residual mature trees in openings (ha)		5.0	647.2	652.2
Retention	Total opening area (ha)			809.0	809.0
	Area of openings with residual mature trees (ha)			718.9	718.9
	Area of residual mature trees in openings (ha)			132.9	132.9
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	383.0	70.8	122.7	576.5
	Area of openings with residual mature trees (ha)	383.0	70.8	122.7	576.5
	Area of residual mature trees in openings (ha)	371.9	67.4	98.0	537.3
All Silviculture Systems	Total opening area (ha)	7,080.9	6,216.4	7,398.6	20,695.9
	Area of openings with residual mature trees (ha)	979.9	3,919.5	6,603.5	11,502.9
	Area of residual mature trees in openings (ha)	403.3	607.5	1,121.9	2,132.7

**Table IV-8. TFL 38 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	1,614.1	1,276.7	540.3	3,431.1
	Area of openings with residual mature trees (ha)	101.1	831.6	510.0	1,442.7
	Area of residual mature trees in openings (ha)	4.7	147.2	86.5	238.4
Clearcut with Reserves	Total opening area (ha)		341.5	69.3	410.8
	Area of openings with residual mature trees (ha)		341.5	69.3	410.8
	Area of residual mature trees in openings (ha)		52.3	13.8	66.1
Retention	Total opening area (ha)		159.0	955.3	1,114.3
	Area of openings with residual mature trees (ha)		159.0	955.3	1,114.3
	Area of residual mature trees in openings (ha)		43.7	258.9	302.6
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	1,614.1	1,777.2	1,564.9	4,956.2
	Area of openings with residual mature trees (ha)	101.1	1,332.1	1,534.6	2,967.8
	Area of residual mature trees in openings (ha)	4.7	243.2	359.2	607.1

**Table IV-9. TFL 39 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	23,378.5	15,878.2	3,613.8	42,870.5
	Area of openings with residual mature trees (ha)	1,315.9	7,765.3	2,197.9	11,279.1
	Area of residual mature trees in openings (ha)	137.0	1,152.7	417.6	1,707.3
Clearcut with Reserves	Total opening area (ha)		1,967.3	2,134.5	4,101.8
	Area of openings with residual mature trees (ha)		1,768.1	1,689.7	3,457.8
	Area of residual mature trees in openings (ha)		244.1	384.9	629.0
Retention	Total opening area (ha)		1,661.0	21,861.4	23,522.4
	Area of openings with residual mature trees (ha)		1,591.7	20,527.7	22,119.4
	Area of residual mature trees in openings (ha)		502.5	6,359.3	6,861.8
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		180.1	211.3	391.4
	Area of openings with residual mature trees (ha)		176.5	203.9	380.4
	Area of residual mature trees in openings (ha)		67.7	123.2	190.9
All Silviculture Systems	Total opening area (ha)	23,378.5	19,686.6	27,821.0	70,886.1
	Area of openings with residual mature trees (ha)	1,315.9	11,301.6	24,619.2	37,236.7
	Area of residual mature trees in openings (ha)	137.0	1,967.0	7,285.0	9,389.0

**Table IV-10. TFL 43 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	344.4	317.9	258.9	921.2
	Area of openings with residual mature trees (ha)	56.3	102.7	166.7	325.7
	Area of residual mature trees in openings (ha)	1.8	9.9	26.2	37.9
Clearcut with Reserves	Total opening area (ha)			13.1	13.1
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Retention	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	344.4	317.9	272.0	934.3
	Area of openings with residual mature trees (ha)	56.3	102.7	166.7	325.7
	Area of residual mature trees in openings (ha)	1.8	9.9	26.2	37.9

**Table IV-11. TFL 44 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	11,705.1	5,739.1	965.7	18,409.9
	Area of openings with residual mature trees (ha)	1,208.4	3,965.7	897.4	6,071.5
	Area of residual mature trees in openings (ha)	71.1	614.8	129.2	815.1
Clearcut with Reserves	Total opening area (ha)	35.5	1,061.5	934.0	2,031.0
	Area of openings with residual mature trees (ha)	35.5	908.0	898.4	1,841.9
	Area of residual mature trees in openings (ha)	11.3	166.5	186.8	364.6
Retention	Total opening area (ha)		853.8	8,464.0	9,317.8
	Area of openings with residual mature trees (ha)		787.6	6,914.8	7,702.4
	Area of residual mature trees in openings (ha)		227.8	1,968.7	2,196.5
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	76.2	269.1	67.9	413.2
	Area of openings with residual mature trees (ha)	52.8	269.1	67.9	389.8
	Area of residual mature trees in openings (ha)	29.1	126.4	24.7	180.2
All Silviculture Systems	Total opening area (ha)	11,816.8	7,923.5	10,431.6	30,171.9
	Area of openings with residual mature trees (ha)	1,296.7	5,930.4	8,778.5	16,005.6
	Area of residual mature trees in openings (ha)	111.5	1,135.5	2,309.4	3,556.4

**Table IV-12. TFL 45 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	1,556.3	1,182.7	454.2	3,193.2
	Area of openings with residual mature trees (ha)	105.5	738.7	437.8	1,282.0
	Area of residual mature trees in openings (ha)	6.0	72.9	65.5	144.4
Clearcut with Reserves	Total opening area (ha)		138.5	367.9	506.4
	Area of openings with residual mature trees (ha)		138.5	367.9	506.4
	Area of residual mature trees in openings (ha)		15.2	58.3	73.5
Retention	Total opening area (ha)		135.2	333.1	468.3
	Area of openings with residual mature trees (ha)		135.2	333.1	468.3
	Area of residual mature trees in openings (ha)		31.6	47.3	78.9
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		4.4		4.4
	Area of openings with residual mature trees (ha)		4.4		4.4
	Area of residual mature trees in openings (ha)		0.4		0.4
All Silviculture Systems	Total opening area (ha)	1,556.3	1,460.8	1,155.2	4,172.3
	Area of openings with residual mature trees (ha)	105.5	1,016.8	1,138.8	2,261.1
	Area of residual mature trees in openings (ha)	6.0	120.1	171.1	297.2

**Table IV-13. TFL 46 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	2,840.3	1,078.5	44.1	3,962.9
	Area of openings with residual mature trees (ha)	747.4	1,035.7	44.1	1,827.2
	Area of residual mature trees in openings (ha)	121.0	259.4	8.3	388.7
Clearcut with Reserves	Total opening area (ha)		1,669.4	3,743.4	5,412.8
	Area of openings with residual mature trees (ha)		1,669.4	2,628.6	4,298.0
	Area of residual mature trees in openings (ha)		524.2	753.2	1,277.4
Retention	Total opening area (ha)			573.7	573.7
	Area of openings with residual mature trees (ha)			573.7	573.7
	Area of residual mature trees in openings (ha)			187.7	187.7
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		53.7		53.7
	Area of openings with residual mature trees (ha)		52.1		52.1
	Area of residual mature trees in openings (ha)		48.5		48.5
All Silviculture Systems	Total opening area (ha)	2,840.3	2,801.6	4,361.2	10,003.1
	Area of openings with residual mature trees (ha)	747.4	2,757.2	3,246.4	6,751.0
	Area of residual mature trees in openings (ha)	121.0	832.1	949.2	1,902.3

**Table IV-14. TFL 47 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	5,840.3	4,832.1	5,406.4	16,078.8
	Area of openings with residual mature trees (ha)	512.2	3,921.7	4,915.0	9,348.9
	Area of residual mature trees in openings (ha)	42.0	758.6	1,158.1	1,958.7
Clearcut with Reserves	Total opening area (ha)		106.9		106.9
	Area of openings with residual mature trees (ha)		106.9		106.9
	Area of residual mature trees in openings (ha)		6.1		6.1
Retention	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	147.9	167.4	126.7	442.0
	Area of openings with residual mature trees (ha)	118.8	167.4	126.7	412.9
	Area of residual mature trees in openings (ha)	93.6	103.9	82.8	280.3
All Silviculture Systems	Total opening area (ha)	5,988.2	5,106.4	5,533.1	16,627.7
	Area of openings with residual mature trees (ha)	631.0	4,196.0	5,041.7	9,868.7
	Area of residual mature trees in openings (ha)	135.6	868.6	1,240.9	2,245.1

**Table IV-15. TFL 54 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	850.1	48.0	6.3	904.4
	Area of openings with residual mature trees (ha)	20.6	45.1		65.7
	Area of residual mature trees in openings (ha)	1.1	17.5		18.6
Clearcut with Reserves	Total opening area (ha)	55.9	119.7	18.6	194.2
	Area of openings with residual mature trees (ha)	55.9	119.7	9.2	184.8
	Area of residual mature trees in openings (ha)	14.3	49.0	2.7	66.0
Retention	Total opening area (ha)		249.5	687.3	936.8
	Area of openings with residual mature trees (ha)		249.5	522.5	772.0
	Area of residual mature trees in openings (ha)		177.3	373.9	551.2
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)		79.1		79.1
	Area of openings with residual mature trees (ha)		79.1		79.1
	Area of residual mature trees in openings (ha)		57.1		57.1
All Silviculture Systems	Total opening area (ha)	906.0	496.3	712.2	2,114.5
	Area of openings with residual mature trees (ha)	76.5	493.4	531.7	1,101.6
	Area of residual mature trees in openings (ha)	15.4	300.9	376.6	692.9

**Table IV-16. TFL 57 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	400.0	18.8	1.8	420.6
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
Clearcut with Reserves	Total opening area (ha)			25.8	25.8
	Area of openings with residual mature trees (ha)			25.8	25.8
	Area of residual mature trees in openings (ha)			4.9	4.9
Retention	Total opening area (ha)		103.0	405.7	508.7
	Area of openings with residual mature trees (ha)		100.9	405.7	506.6
	Area of residual mature trees in openings (ha)		85.7	270.6	356.3
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)				
	Area of openings with residual mature trees (ha)				
	Area of residual mature trees in openings (ha)				
All Silviculture Systems	Total opening area (ha)	400.0	121.8	433.3	955.1
	Area of openings with residual mature trees (ha)		100.9	431.5	532.4
	Area of residual mature trees in openings (ha)		85.7	275.5	361.2

**Table IV-17. TSA 19 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	9,146.3	5,422.3	3,670.0	18,238.6
	Area of openings with residual mature trees (ha)	606.2	1,493.8	2,262.4	4,362.4
	Area of residual mature trees in openings (ha)	73.5	169.2	739.0	981.7
Clearcut with Reserves	Total opening area (ha)		22.8	557.2	580.0
	Area of openings with residual mature trees (ha)		18.3	557.2	575.5
	Area of residual mature trees in openings (ha)		4.5	172.6	177.1
Retention	Total opening area (ha)			622.1	622.1
	Area of openings with residual mature trees (ha)			620.7	620.7
	Area of residual mature trees in openings (ha)			98.7	98.7
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	18.7	30.4	900.0	949.1
	Area of openings with residual mature trees (ha)	11.0	11.5	872.6	895.1
	Area of residual mature trees in openings (ha)	11.0	8.2	311.5	330.7
All Silviculture Systems	Total opening area (ha)	9,165.0	5,475.5	5,749.3	20,389.8
	Area of openings with residual mature trees (ha)	617.2	1,523.6	4,312.9	6,453.7
	Area of residual mature trees in openings (ha)	84.5	181.9	1,321.8	1,588.2

**Table IV-18. TSA 21 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	4,649.9	3,154.6	1,969.6	9,774.1
	Area of openings with residual mature trees (ha)	291.9	1,376.5	1,511.9	3,180.3
	Area of residual mature trees in openings (ha)	106.6	266.6	249.0	622.2
Clearcut with Reserves	Total opening area (ha)		167.0	946.5	1,113.5
	Area of openings with residual mature trees (ha)		167.0	946.5	1,113.5
	Area of residual mature trees in openings (ha)		97.1	317.2	414.3
Retention	Total opening area (ha)		130.1	2,541.6	2,671.7
	Area of openings with residual mature trees (ha)		124.0	2,502.5	2,626.5
	Area of residual mature trees in openings (ha)		46.1	2,097.2	2,143.3
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	992.1	94.6	991.1	2,077.8
	Area of openings with residual mature trees (ha)	930.7	94.6	991.1	2,016.4
	Area of residual mature trees in openings (ha)	882.2	87.7	833.6	1,803.5
All Silviculture Systems	Total opening area (ha)	5,642.0	3,546.3	6,448.8	15,637.1
	Area of openings with residual mature trees (ha)	1,222.6	1,762.1	5,952.0	8,936.7
	Area of residual mature trees in openings (ha)	988.8	497.5	3,497.0	4,983.3

**Table IV-19. TSA 25 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	3,730.7	2,167.9	928.7	6,827.3
	Area of openings with residual mature trees (ha)	244.7	1,576.9	801.5	2,623.1
	Area of residual mature trees in openings (ha)	29.1	167.9	135.9	332.9
Clearcut with Reserves	Total opening area (ha)		110.0	318.9	428.9
	Area of openings with residual mature trees (ha)		86.8	277.4	364.2
	Area of residual mature trees in openings (ha)		15.3	111.2	126.5
Retention	Total opening area (ha)			154.5	154.5
	Area of openings with residual mature trees (ha)			153.1	153.1
	Area of residual mature trees in openings (ha)			80.2	80.2
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	158.6	29.5	476.1	664.2
	Area of openings with residual mature trees (ha)	137.3	29.5	470.3	637.1
	Area of residual mature trees in openings (ha)	57.3	19.6	396.4	473.3
All Silviculture Systems	Total opening area (ha)	3,889.3	2,307.4	1,878.2	8,074.9
	Area of openings with residual mature trees (ha)	382.0	1,693.2	1,702.3	3,777.5
	Area of residual mature trees in openings (ha)	86.4	202.8	723.7	1,012.9

**Table IV-20. TSA 30 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	13,587.5	11,389.7	4,063.4	29,040.6
	Area of openings with residual mature trees (ha)	572.4	6,805.5	3,408.0	10,785.9
	Area of residual mature trees in openings (ha)	92.3	1,212.9	914.6	2,219.8
Clearcut with Reserves	Total opening area (ha)		1,578.5	3,268.7	4,847.2
	Area of openings with residual mature trees (ha)		1,449.2	2,589.7	4,038.9
	Area of residual mature trees in openings (ha)		280.8	523.5	804.3
Retention	Total opening area (ha)		97.0	3,707.3	3,804.3
	Area of openings with residual mature trees (ha)		94.5	3,289.1	3,383.6
	Area of residual mature trees in openings (ha)		20.6	1,367.2	1,387.8
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	119.2	352.5	794.8	1,266.5
	Area of openings with residual mature trees (ha)	77.8	319.7	747.0	1,144.5
	Area of residual mature trees in openings (ha)	57.9	243.5	540.8	842.2
All Silviculture Systems	Total opening area (ha)	13,706.7	13,417.7	11,834.2	38,958.6
	Area of openings with residual mature trees (ha)	650.2	8,668.9	10,033.8	19,352.9
	Area of residual mature trees in openings (ha)	150.2	1,757.8	3,346.1	5,254.1

**Table IV-21. TSA 31 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	4,743.6	3,009.4	1,664.3	9,417.3
	Area of openings with residual mature trees (ha)	155.3	1,817.4	1,392.5	3,365.2
	Area of residual mature trees in openings (ha)	21.7	247.1	220.5	489.3
Clearcut with Reserves	Total opening area (ha)		393.0	1,269.5	1,662.5
	Area of openings with residual mature trees (ha)		311.6	1,150.1	1,461.7
	Area of residual mature trees in openings (ha)		62.9	278.3	341.2
Retention	Total opening area (ha)		80.7	508.3	589.0
	Area of openings with residual mature trees (ha)		48.6	495.7	544.3
	Area of residual mature trees in openings (ha)		20.5	99.5	120.0
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	233.3	717.5	708.5	1,659.3
	Area of openings with residual mature trees (ha)	91.1	523.8	693.2	1,308.1
	Area of residual mature trees in openings (ha)	57.2	233.3	238.2	528.7
All Silviculture Systems	Total opening area (ha)	4,976.9	4,200.6	4,150.6	13,328.1
	Area of openings with residual mature trees (ha)	246.4	2,701.4	3,731.5	6,679.3
	Area of residual mature trees in openings (ha)	78.9	563.8	836.5	1,479.2

**Table IV-22. TSA 33 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	10,821.5	8,478.1	4,257.9	23,557.5
	Area of openings with residual mature trees (ha)	1,222.5	4,304.6	3,866.1	9,393.2
	Area of residual mature trees in openings (ha)	80.0	537.5	372.6	990.1
Clearcut with Reserves	Total opening area (ha)		837.1	2,522.5	3,359.6
	Area of openings with residual mature trees (ha)		565.2	2,413.2	2,978.4
	Area of residual mature trees in openings (ha)		73.7	373.9	447.6
Retention	Total opening area (ha)			2,262.0	2,262.0
	Area of openings with residual mature trees (ha)			2,260.3	2,260.3
	Area of residual mature trees in openings (ha)			524.2	524.2
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	378.4	416.8	267.8	1,063.0
	Area of openings with residual mature trees (ha)	378.4	205.5	260.6	844.5
	Area of residual mature trees in openings (ha)	374.6	48.7	48.0	471.3
All Silviculture Systems	Total opening area (ha)	11,199.9	9,732.0	9,310.2	30,242.1
	Area of openings with residual mature trees (ha)	1,600.9	5,075.3	8,800.2	15,476.4
	Area of residual mature trees in openings (ha)	454.6	659.9	1,318.7	2,433.2

**Table IV-23. TSA 37 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	10,203.9	6,277.1	3,851.2	20,332.2
	Area of openings with residual mature trees (ha)	376.1	3,146.1	3,321.4	6,843.6
	Area of residual mature trees in openings (ha)	20.6	422.2	588.1	1,030.9
Clearcut with Reserves	Total opening area (ha)		1,055.7	2,964.3	4,020.0
	Area of openings with residual mature trees (ha)		694.1	2,549.3	3,243.4
	Area of residual mature trees in openings (ha)		133.7	421.3	555.0
Retention	Total opening area (ha)		134.6	1,908.7	2,043.3
	Area of openings with residual mature trees (ha)		134.6	1,694.1	1,828.7
	Area of residual mature trees in openings (ha)		39.7	669.0	708.7
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	531.7	414.9	631.7	1,578.3
	Area of openings with residual mature trees (ha)	531.7	403.4	536.3	1,471.4
	Area of residual mature trees in openings (ha)	531.6	393.6	520.1	1,445.3
All Silviculture Systems	Total opening area (ha)	10,735.6	7,882.3	9,355.9	27,973.8
	Area of openings with residual mature trees (ha)	907.8	4,378.2	8,101.1	13,387.1
	Area of residual mature trees in openings (ha)	552.2	989.2	2,198.5	3,739.9

**Table IV-24. TSA 38 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	2,071.0	1,178.7	296.0	3,545.7
	Area of openings with residual mature trees (ha)	169.5	445.9	217.6	833.0
	Area of residual mature trees in openings (ha)	37.8	52.5	29.3	119.6
Clearcut with Reserves	Total opening area (ha)	19.4	795.1	918.8	1,733.3
	Area of openings with residual mature trees (ha)	9.6	369.0	636.6	1,015.2
	Area of residual mature trees in openings (ha)	0.8	98.4	139.1	238.3
Retention	Total opening area (ha)		30.1	2,042.8	2,072.9
	Area of openings with residual mature trees (ha)		27.7	1,818.9	1,846.6
	Area of residual mature trees in openings (ha)		22.5	757.6	780.1
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	156.3	755.5	349.8	1,261.6
	Area of openings with residual mature trees (ha)	113.7	550.7	324.4	988.8
	Area of residual mature trees in openings (ha)	91.5	433.4	173.8	698.7
All Silviculture Systems	Total opening area (ha)	2,246.7	2,759.4	3,607.4	8,613.5
	Area of openings with residual mature trees (ha)	292.8	1,393.3	2,997.5	4,683.6
	Area of residual mature trees in openings (ha)	130.1	606.8	1,099.8	1,836.7

**Table IV-25. TSA 39 – Area of Residual Mature Trees, by Silviculture System and Period**

Silviculture System	Area Description	Period			All Periods
		1991-1995	1996-2000	2001-2005	
Clearcut	Total opening area (ha)	8,304.4	6,256.6	2,306.9	16,867.9
	Area of openings with residual mature trees (ha)	666.7	2,596.7	1,745.2	5,008.6
	Area of residual mature trees in openings (ha)	72.2	404.0	255.5	731.7
Clearcut with Reserves	Total opening area (ha)		1,104.9	3,544.6	4,649.5
	Area of openings with residual mature trees (ha)		717.9	2,922.3	3,640.2
	Area of residual mature trees in openings (ha)		168.5	521.0	689.5
Retention	Total opening area (ha)			2,448.0	2,448.0
	Area of openings with residual mature trees (ha)			1,824.1	1,824.1
	Area of residual mature trees in openings (ha)			277.7	277.7
Immature Cut, Patch Cut, Seed Tree, Selection or Shelterwood	Total opening area (ha)	52.0	234.3	248.0	534.3
	Area of openings with residual mature trees (ha)	0.0	150.5	245.8	396.3
	Area of residual mature trees in openings (ha)	0.0	99.9	150.8	250.7
All Silviculture Systems	Total opening area (ha)	8,356.4	7,595.8	8,547.5	24,499.7
	Area of openings with residual mature trees (ha)	666.7	3,465.1	6,737.4	10,869.2
	Area of residual mature trees in openings (ha)	72.2	672.4	1,205.0	1,949.6

## **APPENDIX V**

**Opening Area and Volume Harvested,  
by Management Unit and Period –  
Individual Coastal TFL or TSA**

**Table V-1. Opening Area and Volume Harvested by Management Unit and Period**

Management Unit	Period	Status of Opening Area (ha)			Volume Harvested (million m <sup>3</sup> )			Average Yield* (m <sup>3</sup> /ha)
		Residual Mature	Other	Total	Western Redcedar	Other Species	Total	
TFL06	1991-1995	89.9	9324.5	9414.4	1.893075	5.243437	7.136512	758.0
	1996-2000	788.9	6473.4	7262.3	1.549244	4.602099	6.151343	847.0
	2001-2005	1208.3	7780.7	8989.0	1.211128	5.596112	6.807240	757.3
TFL10	1991-1995		446.4	446.4	0.173787	0.195526	0.369313	827.3
	1996-2000	10.8	252.2	263.0	0.070480	0.149049	0.219529	834.7
	2001-2005	37.1	191.9	229.0	0.154013	0.160177	0.314190	1372.0
TFL19	1991-1995	14.6	5353.1	5367.7	0.972884	3.456712	4.429596	825.2
	1996-2000	497.8	3841.9	4339.7	0.922690	2.960520	3.883210	894.8
	2001-2005	1240.3	6183.3	7423.6	0.977079	3.277713	4.254792	573.1
TFL24	1991-1995		983.9	983.9	0.178490	0.357953	0.536443	545.2
	1996-2000	23.5	406.2	429.7	0.070881	0.157531	0.228412	531.6
	2001-2005	17.7	72.0	89.7	0.001834	0.015689	0.017523	195.4
TFL25	1991-1995	16.4	4621.0	4637.4	0.681573	2.138099	2.819672	608.0
	1996-2000	346.8	3746.7	4093.5	0.808901	1.453214	2.262115	552.6
	2001-2005	366.6	2363.4	2730.0	0.511131	1.054770	1.565901	573.6
TFL26	1991-1995	2.1	400.0	402.1	0.029138	0.141312	0.170450	423.9
	1996-2000	51.5	598.4	649.9	0.030626	0.120707	0.151333	232.9
	2001-2005	223.5	336.8	560.3	0.037096	0.147442	0.184538	329.4
TFL37	1991-1995	403.3	6677.6	7080.9	0.920836	4.668082	5.588918	789.3
	1996-2000	607.5	5608.9	6216.4	0.616923	4.415533	5.032456	809.5
	2001-2005	1121.9	6276.7	7398.6	0.676636	4.199197	4.875833	659.0

\* Average yield is based on the total opening area, including reserves and areas with residual mature trees

**Table V-1. Opening Area and Volume Harvested by Management Unit and Period**

Management Unit	Period	Status of Opening Area (ha)			Volume Harvested (million m <sup>3</sup> )			Average Yield* (m <sup>3</sup> /ha)
		Residual Mature	Other	Total	Western Redcedar	Other Species	Total	
TFL38	1991-1995	4.7	1609.4	1614.1	0.407736	0.849730	1.257466	779.1
	1996-2000	243.2	1534.0	1777.2	0.375843	0.770955	1.146798	645.3
	2001-2005	359.2	1205.7	1564.9	0.243520	0.618276	0.861796	550.7
TFL39	1991-1995	137.0	23241.5	23378.5	4.481643	13.930611	18.412254	787.6
	1996-2000	1967.0	17719.6	19686.6	3.730952	11.816402	15.547354	789.7
	2001-2005	7285.0	20536.0	27821.0	3.156006	11.880626	15.036632	540.5
TFL43	1991-1995	1.8	342.6	344.4	0.039076	0.131177	0.170253	494.3
	1996-2000	9.9	308.0	317.9	0.022993	0.096770	0.119763	376.7
	2001-2005	26.2	245.8	272.0	0.014495	0.105084	0.119579	439.6
TFL44	1991-1995	111.5	11705.3	11816.8	2.919486	7.086431	10.005917	846.8
	1996-2000	1135.5	6788.0	7923.5	2.059199	4.612559	6.671758	842.0
	2001-2005	2309.4	8122.2	10431.6	2.361104	4.913649	7.274753	697.4
TFL45	1991-1995	6.0	1550.3	1556.3	0.221020	0.757965	0.978985	629.0
	1996-2000	120.1	1340.7	1460.8	0.231016	0.848090	1.079106	738.7
	2001-2005	171.1	984.1	1155.2	0.205087	0.560292	0.765379	662.6
TFL46	1991-1995	121.0	2719.3	2840.3	0.659668	1.766461	2.426129	854.2
	1996-2000	832.1	1969.5	2801.6	0.491435	1.468615	1.960050	699.6
	2001-2005	949.2	3412.0	4361.2	0.495341	2.044338	2.539679	582.3
TFL47	1991-1995	135.6	5852.6	5988.2	0.637097	3.014250	3.651347	609.8
	1996-2000	868.6	4237.8	5106.4	0.576510	3.122648	3.699158	724.4
	2001-2005	1240.9	4292.2	5533.1	0.571872	3.026462	3.598334	650.3

\* Average yield is based on the total opening area, including reserves and areas with residual mature trees

**Table V-1. Opening Area and Volume Harvested by Management Unit and Period**

Management Unit	Period	Status of Opening Area (ha)			Volume Harvested (million m <sup>3</sup> )			Average Yield* (m <sup>3</sup> /ha)
		Residual Mature	Other	Total	Western Redcedar	Other Species	Total	
TFL54	1991-1995	15.4	890.6	906.0	0.190268	0.283980	0.474248	523.5
	1996-2000	300.9	195.4	496.3	0.131729	0.108961	0.240690	485.0
	2001-2005	376.6	335.6	712.2	0.240119	0.135904	0.376023	528.0
TFL57	1991-1995		400.0	400.0	0.184609	0.101606	0.286215	715.5
	1996-2000	85.7	36.1	121.8	0.020605	0.006159	0.026764	219.7
	2001-2005	275.5	157.8	433.3	0.094019	0.058857	0.152876	352.8
TSA19	1991-1995	84.5	9080.5	9165.0	1.632520	4.239805	5.872325	640.7
	1996-2000	181.9	5293.6	5475.5	1.523887	2.334657	3.858544	704.7
	2001-2005	1321.8	4427.5	5749.3	1.686142	1.320294	3.006436	522.9
TSA21	1991-1995	988.8	4653.2	5642.0	0.364698	2.304867	2.669565	473.2
	1996-2000	497.5	3048.8	3546.3	0.478628	1.672983	2.151611	606.7
	2001-2005	3497.0	2951.8	6448.8	1.039170	1.299979	2.339149	362.7
TSA25	1991-1995	86.4	3802.9	3889.3	0.623525	1.582954	2.206479	567.3
	1996-2000	202.8	2104.6	2307.4	0.479828	1.147911	1.627739	705.4
	2001-2005	723.7	1154.5	1878.2	0.697285	1.129633	1.826918	972.7
TSA30	1991-1995	150.2	13556.5	13706.7	0.912491	7.117376	8.029867	585.8
	1996-2000	1757.8	11659.9	13417.7	0.776581	5.738601	6.515182	485.6
	2001-2005	3346.1	8488.1	11834.2	0.934707	4.204611	5.139318	434.3
TSA31	1991-1995	78.9	4898.0	4976.9	0.415792	2.615627	3.031419	609.1
	1996-2000	563.8	3636.8	4200.6	0.327622	2.064876	2.392498	569.6
	2001-2005	836.5	3314.1	4150.6	0.314768	1.868483	2.183251	526.0

\* Average yield is based on the total opening area, including reserves and areas with residual mature trees

**Table V-1. Opening Area and Volume Harvested by Management Unit and Period**

Management Unit	Period	Status of Opening Area (ha)			Volume Harvested (million m <sup>3</sup> )			Average Yield* (m <sup>3</sup> /ha)
		Residual Mature	Other	Total	Western Redcedar	Other Species	Total	
TSA33	1991-1995	454.6	10745.3	11199.9	2.945486	4.635186	7.580672	676.9
	1996-2000	659.9	9072.1	9732.0	3.428951	3.269428	6.698379	688.3
	2001-2005	1318.7	7991.5	9310.2	3.522115	2.548840	6.070955	652.1
TSA37	1991-1995	552.2	10183.4	10735.6	1.857072	5.639905	7.496977	698.3
	1996-2000	989.2	6893.1	7882.3	1.776095	4.376213	6.152308	780.5
	2001-2005	2198.5	7166.5	9365.0	1.539148	4.747064	6.286212	671.2
TSA38	1991-1995	130.1	2116.6	2246.7	0.662764	1.305062	1.967826	875.9
	1996-2000	606.8	2152.6	2759.4	0.484499	1.234771	1.719270	623.1
	2001-2005	1099.8	2507.6	3607.4	0.748047	1.278318	2.026365	561.7
TSA39	1991-1995	72.2	8284.2	8356.4	1.401798	4.359133	5.760931	689.4
	1996-2000	672.4	6923.4	7595.8	1.205349	4.300733	5.506082	724.9
	2001-2005	1205.0	7342.5	8547.5	1.256559	4.321380	5.577939	652.6

\* Average yield is based on the total opening area, including reserves and areas with residual mature trees

## **APPENDIX VI**

### **Detailed Data Description and Compilation**

The following is a more detailed description of the compilation and summarization of RESULTS and HBS data, divided into the following three sections:

- **PLANTED**

Section AVI-1 describes the compilation and summarization of RESULTS data for the number and area of seedlings planted, by species group, graphs.

- **HARVESTED**

Section AVI-2 describes:

- The summarization of HBS data for the volume harvested, by species group, graphs.
- The summarization of RESULTS data and the merging of these data with the HBS data for the area harvested, by species group, graphs.

- **CURRENT STATUS OF HARVESTED AREAS**

Section AVI-3 describes the compilation and summarization of RESULTS data for the current status of harvested area, by species group, graphs.

## **AVI-1. PLANTED**

Planted data are obtained from the following RESULTS database tables:

- **PLANTING SPECIES** contains the number of trees planted for each species that are referenced by a management unit, opening number and activity treatment numbers.
- **PLANTING** contains the silviculture methods used, date of treatment and area treated that are referenced by a management unit, opening number and activity treatment numbers.

Data compilation and summarization are:

- Species composition is calculated, based on the number of trees planted, for each unique management unit, opening and activity treatment combination.
- Species are then combined into the following species groups:
  - Western redcedar (Cwc).
  - All other species.
- The **PLANTING SPECIES** compilation is merged with the **PLANTING** table.

- Combine the activity treatments within each opening and then calculate the species composition of planted trees, based on all activity treatments, for each management unit and opening. In many cases, re-planting and fill planting were not correctly coded in the RESULTS database. As a result, this analysis did not differentiate between different types of planting.

For the number of seedlings planted graphs, the numbers of seedlings are summarized by species group and planting year for the periods 1991-1995, 1996-2000 and 2001-2005.

For the area planted graphs, the numbers of seedlings planted for each species group is divided by the total number of seedlings planted and then multiplied by the treatment area to obtain the area planted to each species group. This is summarized by species group and planting year for the periods 1991-1995, 1996-2000 and 2001-2005.

## **AVI-2. HARVESTED**

### **Volume Harvested**

Volume harvested data are obtained from the HBS database.

Data compilation and summarization are:

- Data are categorized by the following HBS database management unit types:
  - T is TFL.
  - U and V are TSA
- Data within management unit types are further categorized by the following HBS database file type codes:
  - B13 and B14 are federal land.
  - B08, B09, B15 and B16 are private land.
  - All others are Crown land.

Data from federal and private land are deleted and only data from Crown land within a TSA or TFL is used for this analysis.

- Sum the volume, by species, for each timber mark by management unit and billing year.
- Combine the volumes into the following species groups:
  - Cwc
  - All other species.

For the volume harvested graph, data are summarized by species group and billing year for the periods of 1991-1995, 1996-2000 and 2001-2005.

### Area Harvested

Originally, area harvested was to be obtained from the OPENING table in the RESULTS database using the net area for an opening and the previous inventory label. Since previous inventory label is missing from approximately 60 percent of the openings in the OPENING table, the following alternate method is used.

Area harvested, by species, is obtained from the following sources:

- HBS data
- The RESULTS FOREST COVER table, which contains the net area for each opening.
- The RESULTS OPENING table, which contains the net area for each opening and the timber marks associated with each opening. Timber marks are unique between management units, but are not unique between openings within a management unit. Openings can have more than one timber mark and timber marks can apply to numerous openings.

Area harvested, by species, is determined as follows:

- Openings that shared timber marks are joined together to form larger areas where the HBS data can be used to determine previous species composition. As an example, the openings in Table APPVI – 1 are combined to form the aggregate openings in Table APPVI – 2.

**Table APPVI – 1. Original RESULTS Database Openings**

Opening	Area (ha)	Timber Mark 1	Timber Mark 2
-368620000	11.1	F57189	
-368640000	29.7	F57189	
-368610000	36.0	F57189	
93654	19.2	62520	62486
118657	17.9	62520	
118669	14.6	62520	
113629	35.2	63036	

**Table APPVI – 2. Combined RESULTS Database Openings**

<b>Aggregate Openings</b>	<b>Area (ha)</b>	<b>Combined Timber Marks</b>
-368620000, -368640000 and -368610000	76.8	F57189
93654, 118657 and 118669	51.7	62520 and 62486
113629	35.2	63036

- The pre-harvest species composition, based on the volume for each species from the HBS data, is determined for each aggregate opening. While this method cannot be used for an analysis by opening, it can be used for an analysis by management unit.

For the harvested area graph by species group, previous species composition is based on:

- HBS data are used to determine the previous species composition, as described above, for 16,541 of the RESULTS openings. Species composition is determined by the volume of each species divided by the total volume.
- Previous inventory label is used if it was present and no HBS data were available. This accounted for 48 openings. Previous inventory labels in the RESULTS data do not have the species composition and the following are assumed for Cwc:
  - 80 if there is only one species in the label and it is Cwc.
  - 60 if there are two species in the label and the first is Cwc.
  - 30 if there are two species in the label and the second is Cwc
- There is no HBS data or previous inventory labels for 126 openings. For these, Cwc percent composition is assumed to be 0.
- Combine the areas for each species into the following species groups:
  - Cwc.
  - All other species.

For the area harvested graphs, the area for each species group is determined by dividing each species group percent composition by the sum of the species group compositions and then multiplying this by the net area.

The year of disturbance for each opening is based on the last year of disturbance for the opening. The area harvested, by species group is then summarized for the periods 1991-1995, 1996-2000 and 2001-2005.

### **AVI-3. CURRENT STATUS OF HARVESTED AREAS**

The current status of harvested areas classifies the polygons within openings in the RESULTS database into the following categories:

- Free growing. This is defined as immature stands (natural or artificial) that are:
  - Classified as free growing in the RESULTS data.
  - Not classified as free growing in the RESULTS data, but are greater or equal to seven years old.
- Not free growing. This is defined as stands (natural or artificial) less than seven years old and not classified as free growing in the RESULTS database.
- Residual mature trees. This is defined as mature stands in the RESULTS database.
- Not satisfactorily restocked (NSR). This is defined as areas classified as NSR in the RESULTS database.
- Non-productive (NP). This is defined as areas classified as NP in the RESULTS database.

Current forest cover from the following RESULTS database tables is used to further classify each polygon by species composition:

- FOREST COVER LAYER SPECIES contains the species, species percent, age and height for each polygon within an opening and is referenced by management unit, opening, forest cover and forest layer numbers. Forest cover can be described by an inventory label, a silviculture label or both. Inventory labels describe all of the species present, while silviculture labels describe the free growing and well spaced trees. For polygons with residual trees, both inventory and silviculture labels describe the forest cover by layer (mature, pole, sapling, regeneration and veteran, if present).
- FOREST COVER LAYER contains the number of well spaced and free growing stems, crown closure and basal area and is referenced by management unit, opening, forest cover and forest layer numbers.
- FOREST COVER contains the opening net area, stocking status, stocking type and reference year and are referenced by management unit, opening and forest cover numbers.

- OPENING contains the current status of each opening.

Data compilation procedures for forest cover and opening status are:

- Merge FOREST COVER LAYER SPECIES data with the FOREST COVER LAYER table. The inventory forest cover description is selected, if present, otherwise the silviculture forest cover description is selected. If the label is divided into layers for residual trees, only one layer is selected, based on the following order of preference:
  - Mature.
  - Pole, if no mature layer is present.
  - Sapling, if no mature or poly layers are present.
  - Regeneration, if no mature, pole or sapling layers are present.
  - Veteran, if no other layers are present.

If more than one species in the forest cover label has an age, the oldest age is used. Ages are then adjusted to 2007, based on the reference year for the forest cover label.

- Merge the selected FOREST COVER LAYER data with the FOREST COVER data. FOREST COVER data
- Merge the opening status code from the OPENING table with the FOREST COVER data.

The process of classifying a RESULTS database polygon by the categories defined above (free growing, not free growing, residual mature trees, NSR and NP) and forest cover is complicated by:

- Many of the areas classified as NSR or non-productive in the FOREST COVER table have actually been planted, but the current forest cover label, stocking status code and stocking type code have not been updated to reflect the planting.
- Although you can determine that NSR, and in some cases NP, areas have been planted, you cannot determine how much because the treatment areas in the PLANTING file are different from the polygon areas in the FOREST COVER table.
- There are discrepancies between the classification in the FOREST COVER table and the information in the PLANTING table. Some FOREST COVER fields indicate natural regeneration, but the PLANTING table indicates artificial regeneration, and vice versa.
- Many openings in the FOREST COVER table do not have forest cover labels as they have not been assessed since harvesting or recent silviculture treatments.

- Ages in the forest cover labels do not agree with the difference between the reference year for the forest cover label and the planting date or opening disturbance date.
- In many cases, forest cover labels for residual mature components do not seem to be classified by layer, but appear to be classified by the merging of layers into one forest cover label. This tends to distort the forest cover label, particularly age and height relationships and the species composition of the primary future crop trees.

It is not within the scope of this project to correct the RESULTS data, but the problems identified above will be used to adjust and improve RESULTS data collection, data submissions and database administration.

RESULTS data from the PLANTING and PLANTING SPECIES tables are merged into the database created from the FOREST COVER LAYER SPECIES, FOREST COVER LAYER, FOREST COVER AND OPENING tables and the following procedures, in the order listed, are used to classify the data (classification codes are given in brackets):

- Polygons with stocking status set to NSR are classified as NSR (classification code 1A).
- Unclassified polygons with stocking status set to NP are classified as NP (classification code 2A).
- Unclassified polygons with no age in the inventory forest cover label, stocking status set to mature and no record of planting in the opening are classified as residual mature trees (classification code 3A).
- Unclassified polygons with a forest cover age greater than or equal to 40 years are classified as residual mature trees. Since only data from 1991 to 2005 are used for this analysis, it is assumed that any polygons that were clearcut and either planted or left to regenerate naturally should not have forest cover greater than 40 (classification code 3B).
- Unclassified polygons with no age or heights in the inventory forest cover label and stocking status set to mature are classified as residual mature trees (classification code 3C).
- Unclassified polygons with a forest cover age less than 40 years, stocking status set to mature and forest cover heights greater than 10.0 m are classified as residual mature trees (classification code 3D).
- Unclassified polygons with stocking status set to residual are classified as residual mature trees (classification code 3E).

- Unclassified polygons with stocking status not set to either mature, immature, residual, NP or NSR are classified as NP. This accounts for polygons classified as noncommercial cover, rock, swamp etc (classification code 2B).
- Unclassified polygons with a forest cover age between one and seven and opening status code set to free growing are classified as free growing (classification code 4A).
- Unclassified polygons with opening status code set to free growing are classified as free growing (classification code 4B).
- Unclassified polygons with a forest cover age greater than or equal to seven are classified as free growing (classification code 4C).
- Any unclassified polygon is classified as not free growing (classification code 5A).

To account for polygons currently classified as NSR in the RESULTS FOREST COVER table, but have evidence of being planted in the RESULTS PLANTING and PLANTING SPECIES tables, the following is used to reclassify polygons from NSR to the not free growing category:

- Polygons with stocking status set to NSR and stocking type set to plantable in openings where the total area planted is greater than all polygons in the opening that are currently classified as stocking status immature and stocking type artificial and the unaccounted for planted area is at least 50 percent of the area classified as NSR (classification code 5B).

Table APVI-3 gives the area of Crown land for all coastal TFLs and TSAs in the RESULTS database, by the classification categories, from 1991-2005.

The current forest cover label is used to assign species composition to the polygons classified as residual mature trees, free growing and not free growing (classification code 5A). The planted species composition for the opening is used to assign species composition to the polygons classified as not free growing (classification code 5B).

Polygons areas are then combined into the following species groups:

- Cwc
- All other species
- Forest cover pending, which is areas of polygons where a regeneration or free growing survey will be done in the near future to provide updated forest cover information.

Polygon areas that have no known species composition are:

- 23,542.0 ha of the 50,435.2 ha (46.68 %) classified as mature residual trees. These areas have yet to be classified and are coded as forest cover pending.
- 23.1 ha of the 237,938.3 ha (0.01 %) classified as free growing. These areas are assumed to have no Cwc and are classified as all other species.
- 1,888.7 ha of the 82,337.2 ha (2.29 %) classified as not free growing. These areas are assumed to have no Cwc and are classified as all other species.

The year for each polygon within an opening is based on the last year of disturbance for the opening. Polygons are then summarized by classification category and species group for the periods 1991-1995, 1996-2000 and 2001-2005.

**Table APPVI-3. Classification of RESULTS Database Polygons**

<b>Category Description</b>	<b>Classification Code</b>	<b>Area (ha)</b>	<b>Area (ha)</b>
NSR	1A	15,089.1	
<b>Subtotal</b>	<b>1</b>		<b>15,089.1</b>
NP	2A	20,806.8	
NP	2B	948.8	
<b>Subtotal</b>	<b>2</b>		<b>21,755.6</b>
Residual Mature Trees	3A	3758.0	
Residual Mature Trees	3B	25,057.7	
Residual Mature Trees	3C	19,227.7	
Residual Mature Trees	3D	27.0	
Residual Mature Trees	3E	2364.8	
<b>Subtotal</b>	<b>3</b>		<b>50,435.2</b>
Free growing	4A	155.8	
Free growing	4B	105,629.2	
Free growing	4C	132,153.3	
<b>Subtotal</b>	<b>4</b>		<b>237,938.3</b>
Not Free growing	5A	55,070.6	
Not Free growing	5B	27,266.6	
<b>Subtotal</b>	<b>5</b>		<b>82,337.2</b>
<b>Total</b>	<b>1-5</b>	<b>407,555.5</b>	<b>407,555.4</b>