FINAL REPORT OF THE EVALUATION COMMITTEE FOR THE CANADA/NEWFOUNDLAND FORESTRY SUBSIDIARY AGREEMENT 1974 - 1979

LAØ1. 1181

August 10, 1981

Co-Chairmen
Forestry Subsidiary Agreement

Gentlemen:

The Evaluation Committee takes pleasure in submitting this final evaluation report. Should you wish to discuss any of its content, we would be pleased to do so at your convenience.

We wish to thank all officials included in the management and implementation of this program for their cooperation.

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MAJOR CONCLUSIONS

1. The Evaluation Committee concludes that, to date, the Agreement has not met its basic overriding objective of diversifying and expanding the industry, thereby increasing incomes and employment opportunities in Newfoundland. The Evaluation Committee qualifies this conclusion by pointing out that an Agreement whose program content reflected a deliberate thrust to provide the Province with the internal competence to manage and protect the forest resource could not have been expected to significantly impact in the short term on global industry indicators such as employment, incomes, and diversification of production.

2. Benefits from the Acquisition of Forest Lands Program appear to warrant this transaction.

3. The Forest Management Program provided an administrative and policy framework within which good forestry management principles can be employed to manage the forest resource of the Province. The Evaluation Committee notes, however, that the stumpage appraisal study has still not been undertaken.

4. The objective of the Harvesting and Utilization Program was not met to any significant extent. The Logging Equipment program element, which accounted for over 97% of all funds allocated to this program did not meet its objective as defined in Amendment #1 of the Agreement. The failure of this program element overshadowed significant accomplishments generated by the Cable Crane Logging, Integrated Logging, Small Sawmills, and Whole Tree Chipping program elements.

5. The Forest Access Roads program was the most effective of all the programs carried out under the Agreement in terms of its contribution to meeting the Agreement's overall objective. A good basic infrastructure network is in place, over 1,000 km of road were constructed and/or upgraded, and many year's supply of wood has been made accessible. Further benefits will accrue to the forest industry as wood is harvested utilizing this road network.

6. The Evaluation Committee concludes that the Forest Inventory program has been carried out at an acceptable level of cost efficiency with an adequate degree of statistical reliability. The Evaluation Committee does express some concern that the work which was

accomplished under the Agreement appears to be slipping behind schedule within the context of a revised 10-year rotating schedule for completion. See Page 9 of table

Program 6

7. The Evaluation Committee concludes that the Forest Protection Program has enabled the Province to substantially increase its fire surveillance and supression capability. The refurbishment of the water bomber fleet was efficiently and effectively managed. The VHF radio system is not yet operating at total efficiency. The Aerial Surveillance program element was not considered to be efficiently or effectively conducted in that only one aircraft was acquired. Also, considerable ambiguity in the accounting procedures associated with the Insect Protection program element was observed.

objectives states (To assist in acquiring equipment for locating subsurface fire

Program 7

8. The Forest Improvement Program as originally envisaged was beyond the capability at that time for the Department of Forest Resources and Lands to implement successfully. The organization was understaffed and thus did not have sufficient manpower resources to plan and manage the program. Accounting practices for this program were particularly poor, making it extremely difficult to apportion costs and benefits. The economic

feasibility of many of the program elements is extremely questionable at best. The Reforestation program element, particularly the production of quality seedlings holds promise. The Pre-commercial Thinning program element was judged to be the most effective of all the program elements funded under the Forest Improvement Program. Generally, this program has not yet met its objective.

9. The Evaluation Committee concludes that the Administration Program has been successful in meeting its major objective of upgrading staff capability. The absence of a management information system is a matter of utmost concern. Accounting weaknesses surface once again with respect to the Equipment and Facilities program element as does the issue of inadequate management controls as evidenced by the variances in costs under the Construction of Buildings program element.

RECOMMENDATIONS

1. It is recommended that the stumpage appraisal study be carried out as soon as possible.

2. Now that the concept of integrated logging has received a degree of acceptance, it should become a requirement under the respective management unit plans as long as pulpwood can be disposed of at a reasonable price.

3. The momentum generated by the work on whole tree chipping should continue in the Forestry II Subsidiary Agreement.

4. The sawmill industry in Newfoundland and Labrador is still in a state of uncertainty. The Department of Forest Resources and Lands should increase its efforts to bring about an improvement in industry efficiency thereby reducing the amount of lumber now imported to meet the Province's needs.

5. Accounting systems should be so structured under the Forestry II Subsidiary Agreement that expenditures can be separated out for the various classes of forest

access roads constructed, re-constructed and upgraded, thus facilitating a more meaningful evaluation than was possible under this Agreement.

6. It is recommended that future access road construction projects be subjected to rigorous pre-evaluation criteria taking into account the amount of wood which has already been made accessible under this Forestry Agreement and the demand for new wood supplies.

7. Under future forest improvement programs, it is recommended that annual operating goals and target dates be stated to aid in program efficiency and effectiveness. Treatments should be more site selective to minimize costs. The overall supervision of future forest improvement program operations must be improved from the field, on up to headquarters.

8. A proper accounting system must become a priority to aid in evaluation and, more importantly, to allow cost controls over individual program elements.

9. It is recommended that steps be taken to develop and maintain a management information system which will systematically track the benefits accruing to the Province as a result of past and future expenditures on forestry.

Chapter 1

INTRODUCTION

1.1 Background

On February 1, 1974, the Province of Newfoundland entered into a General Development Agreement (GDA) with the Government of Canada through the Department of Regional Economic Expansion (DREE). The purpose of the GDA is to facilitate joint socio-economic initiatives between the Province and the Government of Canada, primarily in the form of subsidiary agreements which are either sectoral or infrastructure oriented. The objective of the subsidiary agreements as stated in the GDA is to enable the implementation of programs aimed towards the realization of specific development opportunities. These subsidiary agreements are jointly financed by both levels of government.

The Canada/Newfoundland Forestry Subsidiary Agreement was signed on April 26, 1974, and was based to a large extent on the recommendations of the Federal/Provincial Task Force on Forestry submitted to the Provincial Government in March of 1973. The Agreement and the programs contained within were designed to "enable Canada and the Province to take advantage of opportunities for expanding and diversifying Newfoundland's forest industries and thereby increasing

income and employment opportunities in Newfoundland". In more detail, the objectives as outlined in the accompanying documentation of the agreement are as follows:

(1) to provide an adequate and economic wood supply for the existing forest based industries and for new developments;

(2) to provide a wood supply for domestic users and small commercial operators in rural areas;

(3) to encourage full utilization of the forest resources of the Province and progressively bring these resources under sound management practices;

(4) to provide for the multiple use of forest lands and integrated resource management;

(5) to improve the utilization of the resource by integrated harvesting when practical;

(6) to introduce a high standard of environmental quality and protection of recreation and aesthetic values for the people of Newfoundland;

(7) to stimulate research in increasing the yields of the forest resources and regularly introduce proven methods of increasing the productivity of forested land.

1.2 Evaluation

The evaluation of the Canada/Newfoundland Subsidiary Agreement on Forestry was initiated in accordance with Section 18 of the Agreement. An objective evaluation of the agreement should isolate those program elements[1] which have generated significant benefits for the Province as a whole, and the forestry sector in particular; and could merit further considerations in the future.

An Evaluation Committee for the Forestry Subsidiary Agreement was formed to carry out an evaluation of the Agreement in late October of 1976. The Committee membership includes representation from the Federal Departments of Environment (Canadian Forestry Service), Regional Economic Expansion (DREE), the Provincial Department of Forest Resources and Lands and the Cabinet Secretariat.

1.3 Report Outline

This report will devote most of its attention to the examination of each of the program elements in terms of

[1]Program element refers to the various activities carried out under each of the major program headings, e.g., Cable Logging represents a program element expenditure under the Harvesting and Utilization Program.

the efficiency with which they were conducted and effectiveness, i.e., the extent to which the stated objectives were attained (Chapter 3). A brief methodology chapter (Chapter 2) explains the approach used in conducting the final evaluation of the Canada/Newfoundland Subsidiary Agreement on Forestry. A concluding chapter (Chapter 4) summarizes the report and presents the overall findings and conclusions as determined by the Evaluation Committee.

Chapter 2

METHODOLOGY

2.1 Terms of Reference

The terms of reference submitted to the Management Committee in November of 1976 outlined a work schedule consisting of six distinct activities:

(1) data collection through program inventory forms;

(2) formulation of performance indicators and norms;

(3) field research;

(4) analysis of data;

(5) performance measurement;

(6) report writing.

2.2 Program Inventory Forms

To facilitate data collection in a standardized format the evaluation team employed the use of a program inventory form (See Appendix I). The purpose of the form was to collect basic information on the original objective(s) of the program element, the level of expenditure incurred, tangible output from the expenditures incurred, and evidence of long and short term benefits.

Considerable time was spent explaining the intent of these forms with the responsible program officers in the

Provincial Forestry Branch of the Department of Forest Resources and Lands and the importance of collecting the information requested on the form.

As a supplement to this report and under separate cover, completed Program Inventory forms are available for each of the program elements. These forms contain most of the detailed information on which the findings of this report are based (see Appendix II).

2.3 Performance Indicators

To facilitate the quantitative and qualitative analysis of the 40 program elements implemented under the Agreement, performance indicators were identified for each. The evaluation team adopted this approach primarily because it felt that before conclusions could be reached as to the performance of the Agreement as a whole, each of the respective program elements required analysis. The conclusion reached as to the performance of each of the program elements could then be "summed" to formulate a conclusion as to the performance of each major program carried out under the Agreement. Each program would in turn be "summed" to formulate the final conclusion as to the performance of the Agreement as a whole.

Appendix III contains a detailed breakdown of the performance indicators used for each program element. It will be noticed that two types of indicators were employed namely, efficiency and effectiveness indicators. Efficiency indicators, for the purpose of this report, essentially attempt to establish input-output ratios, the input being largely expenditures incurred and matched against the quantifiable output generated by the expenditure. As well, efficiency indicators centre on the internal management of the program elements, the overall procedures employed and the programs' general organization as it affected the impact of the program. Generally, in this context, the effectiveness indicators aid in determining whether or not the objectives of the programs or program elements have been attained and attempt to quantify where possible the socioeconomic benefits which have materialized or may materialize in the future (as a result of the program element expenditures). In many cases quantification was not possible, necessitating a subjective consensus by the evaluation team as to program element effectiveness.

The efficiency and effectiveness indicators chosen vary according to the following three categories of forestry development projects:

(a) Projects which produce a marketable good as a primary output along with some social goods. These include reforestation, thinnings, fertilization, stand tending, purchase of forest land, mechanization of harvesting, etc. In these cases the efficiency indicators place emphasis on determining whether the least cost per unit of output was achieved or not. This is done by determining the average cost and comparing with other available average costs for similar operations in this Province or elsewhere.

(b) Investments in projects which produce social goods only, such as demonstration areas and clearing lake shorelines. Although quantifiable effectiveness indicators should be used if readily available, a subjective approach was adopted here to avoid unnecessary delay and cost in generating the estimates of benefits. Often these benefits will accrue in the distant future and are, therefore, difficult to quantify at this time. From an efficiency indicator perspective, some input-output ratios are relevant.

(c) Projects on feasibility studies and research into new technologies. The procedure used here is, again, subjective with the exception of a few instances where some parameters could be estimated empirically.

In all three categories, success in program delivery was considered to be a quality product completed in time and within budget. In the absence of physical program output targets, which were not fixed beforehand, the utilization of funds allocated has been used as one measure of success.

2.4 Performance Standards or Norms

The evaluation team attempted, where possible, to obtain from previous experiences in the Province, and from forestry publications, information as to reasonable levels of efficiency (input-output ratios) and effectiveness which should be attained for the types of program expenditures carried out under the Agreement. It was obviously necessary to take into consideration unique local conditions and the standards were only used as a guideline in assisting the evaluation team in reaching conclusions as to the relative efficiency and effectiveness of the program elements.

Chapter 3

EVALUATION OF THE PERFORMANCE OF THE AGREEMENT

3.1 Introduction

The Forestry Subsidiary Agreement was divided into eight programs as follows:

	Amount[1] (000)	Percent %	Amount of P.A. Authority	Percent %
1. Acquisition of Lands	$ 4,229	8	$ 4,150	7.5
2. Forest Management	372	1	372	1.0
3. Harvesting & Utilization	10,264	18	10,187	18.5
4. Access Road Construction	17,495	32	17,197	31.3
5. Forest Inventory	3,191	6	3,191	5.8
6. Forest Protection	3,941	7	3,957	7.2
7. Forest Improvement	6,076	11	6,350	11.5
8. Forest Administration	9,483	17	9,483	17.2
TOTAL	$55,051	100%	$54,887	100%

[1]These amounts represent the final allocations as determined by the Management Committee.

Each of the programs outlined contains a number of program elements. For each program element a number of objectives were specified in Schedule "A" of the Agreement. The Management Committee for the Agreement had the authority to reallocate funds within a program from one program element to another whereas, the reallocation between programs could be done by Ministerial approval only. The allocation of funds and their utilization to March 31, 1980, according to the records of Intergovernmental Affairs Secretariat, are shown in Table 3.1

From Table 3.1 it can be seen that out of the budget of $54,966,599 allocated for all programs, $54,887,999 was spent as of March 31, 1980. Some program elements for varying reasons were never initiated, while others were enlarged in scope and size.

As stated earlier, before judgements were made on the performance of the eight programs in total, it was necessary to evaluate the performance of each program element. This chapter will address itself, in turn, to each of the programs and their respective program elements. In each instance the program elements will be evaluated in terms

TABLE 3.1
FORESTRY SUBSIDIARY AGREEMENT
UTILIZATION OF FUNDS

Program Element		Original Allocation $	Final Allocation $	Expenditure to March 31, 1980 $
1.	Acquisition of Lands	4,228,600	4,228,600	4,150,000
	Sub-Total (1)	4,228,600	4,228,600	4,150,000
2.	Forest Management			
2.1	Stumpage Appraisal	10,000	NIL	NIL
2.2	Management Units	189,300	81,334	81,334
2.3	Management Plans & Surveys	172,600	290,566	290,566
	Sub-Total (2)	371,900	371,900	371,900
3.	Harvesting & Utilization			
3.1	Cable Logging	122,900	338,521	338,521
3.2	Integrated Logging	62,000	56,146	56,146
3.3	Lower Churchill	32,100	28,781	28,781
3.4	Minor Species	35,000	NIL	NIL
3.5	Small Sawmills	10,700	82,812	82,812
3.6	New Sawmills	163,400	17,497	17,497
3.7	Wood Panel Plants	63,200	NIL	NIL
3.8	Transportation Study	NIL	6,333	6,333
3.9	Areas Immediate Control	NIL	NIL	NIL
3.10	Dams	NIL	33,523	33,523
3.11	Whole Tree Chipping	NIL	94,217	94,217
3.12	Industry Modernization	NIL	5,000	5,000
3.13	Logging Equipment	14,576,000	9,524,170	9,524,170
	Sub-Total (3)	15,065,300	10,187,000	10,187,000
4.	Access Roads	12,354,800	17,197,010	17,197,010
	Sub-Total (4)	12,354,800	17,197,010	17,197,010
5.	Forest Inventory			
5.1	Management Inventory	2,757,400	3,006,025	3,006,025
5.2	Hardwood Inventory	79,600	35,374	35,374
5.3	Bio-Physical Inventory	NIL	150,000	150,000
	Sub-Total (5)	2,837,000	3,191,399	3,191,399
6.	Forest Protection			
6.1	Cansos	805,000	2,052,571	2,052,571
6.2	UHF	850,000	1,550,391	1,550,391
6.3	Aerial Surveillance	684,600	229,282	229,282
6.4	Insect Protection	80,700	124,956	124,956
		2,420,400	3,957,200	3,957,200
7.	Forest Improvement			
7.1	Forest Fertilization	1,141,500	47,722	47,722
7.2	Pre-Commercial Thinning	1,052,400	2,358,171	2,358,171
7.3	Commercial Thinning	476,500	437,483	437,483
7.4	Clearing Flooded Areas	170,800	33,124	33,124
7.5	Demonstration Areas	105,200	1,195	1,195
7.6	Christmas Trees	178,900	22,702	22,702
7.7	Stand Tending	70,900	77,981	77,981
7.8	Hardwood Removal	89,400	20,648	20,648
7.9	Prescribed Burning	147,300	9,714	9,714
7.10	Reforestation	2,394,500	2,546,970	2,546,970
7.11	Stand Reclamation	NIL	794,779	794,779
	Sub-Total (7)	5,827,400	6,350,490	6,350,490
8.	Administration			
8.1	Additional Staff	2,634,600	7,427,376	7,427,376
8.2	Construction of Buildings	1,140,200	1,283,794	1,283,794
8.3	Data Processing	94,100	4,020	4,020
8.4	Equipment & Facilities	2,000,000	767,810	767,810
	Sub-Total (8)	5,868,900	9,483,000	9,483,000
TOTAL		54,083,300	54,966,599	54,887,999

SOURCE: INTERGOVERNMENTAL AFFAIRS SECRETARIAT CLAIMING RECORDS.

of its success in meeting the objective(s). In most instances the objectives are consistent with those stated in background material for the Agreement and on the Program Inventory forms compiled in support of this report. Where objectives differ it will be noted in this report, indicating whether the change represents a summarization of the objectives stated in the Program Inventory Forms, or as stated in the Agreement; or in fact represents a subsequent change in the objective(s) as the Agreement progressed.

3.2 PROGRAM 1 - Acquisition of Forest Lands

Objective: To accelerate the growing of commercial timber crops for future use and to release for use timber crops withheld by private owners.

Original Allocation	$4,228,600
Revised Allocation	4,150,000
Utilization (1976)	3,150,000
Utilization March 31, 1980	4,150,000

Activity under this Program consisted of the acquisition of 212,905 ha of forest land from the Reid Newfoundland Company. The purchase price of $4,150,000 was shared under the Subsidiary Agreement on a 50:50 basis, with all interest (7%) costs borne by the Province. From an overall perspective, the method of payment (see Table 3.2) when discounted to 1974 dollars indicates that this was a financially more attractive alternative approach to a lump sum payment in the first year. (Compare Column 5 to Column 2).

TABLE 3.2
Analysis of Benefits and Costs

1 Year	2 Principal	3 Interest (7%)	4 Total Current Cost	5 Present Value 1974-75
1974-75	$1,150,000	0	$1,150,000	$1,150,000
1975-76	1,000,000	$200,000	1,210,000	1,100,000
1976-77	1,000,000	140,000	1,140,000	942,149
1977-78	1,000,000	70,000	1,070,000	803,907
Total	$4,150,000	$420,000	$4,570,000	$3,961,056

From a provincial perspective, however, because it was responsible for payment of interest, this method of deferred payments turned out to be a less attractive alternative. See Table below. (Compare Column 5 to Column 2).

TABLE 3.3
Provincial Costs

1 Year	2 Provincial Share of Principal	3 Interest (all) Provincial	4 Total Current Dollar Payment	5 Present Value
1974-75	$ 575,000	0	$ 575,000	$ 575,000
1975-76	500,000	$210,000	710,000	645,454
1976-77	500,000	140,000	640,000	528,925
1977-78	500,000	70,000	570,000	428,249
Total	$2,075,000	$420,000	$2,495,000	$2,177,628

Benefits from the transaction as estimated in the first evaluation report were as follows:

-	softwood timber on productive areas (371,901 cords at $2.50 stumpage each)	$ 929,755
-	hardwoods (50,174 cords at $1.50 stumpage each)	$76,071
-	cottage lots	$11,055
-	bareland value ranging from a minimum of $1,744,500 to a maximum of	$3,142,625

The minimum figure assumed $4 per acre for fee simple and $2 for other lands while the maximum assumed values were $7 and $4 respectively.

The total value of marketable benefits ranged from $2,761,381 to $4,159,506. This did not include other unquantifiable benefits such as recreation potential, wildlife and public control over the land and its resources. It appears that the benefits arising out of the transaction come close to matching the cost.

In conclusion, it would seem that the average cost per hectare of $19.49 is considered to be acceptable. The method of payment was marginally more expensive than payment in a lump sum, however, it is likely that the Reid interests may not have accepted lump sum payments in any event. The exclusion of mineral rights from the purchase price particularly with respect to gravel, sand and clay, may possibly create difficulties in the future. It is the conclusion of the Evaluation Committee that the program element objectives were attained within appropriations.

3.3 PROGRAM 2 - Forest Management

Objective: To provide the Forest Service with the administrative framework for forest management.

Allocation	$371,900
Utilization (1976)	197,610
Utilization (1978)	295,452
Utilization March 31, 1980	371,900

This program consists of three program elements, all designed to support implementation of the Forest Lands (Management and Taxation) Act, 1974. These program elements are to support an improvement in the level of forest management in the Province, as well as permitting the Department of Forest Resources and Lands to exercise more intensive control of timber resources.

3.3.1 Stumpage Appraisal

Original Allocation	$10,000
Revised Allocation March 31, (1976)	8,000
Utilization	NIL

The purpose of this program element was to design, with the assistance of a consultant, a stumpage appraisal system employing rates consistent with prevailing market prices for pulpwood and sawlogs. A well designed stumpage appraisal system can be used as an effective management tool either as a significant generator of revenue or as an instrument through differing stumpage charges to encourage development consistent with the Province's objectives.

The Stumpage Appraisal Study was postponed as a result of higher departmental priorities. The funds originally allocated to this program element were re-allocated to the Preparation of Management Plans program element as the Stumpage Appraisal Study was to have been undertaken internally. The Evaluation Committee understands that at the time of writing this report, the study had not been undertaken internally. The Committee feels that determining appraisal rates consistent with prevailing market prices is important to good forest management and suggests that the Department of Forest Resources and Lands give serious consideration to initiating action on conducting the Stumpage Appraisal Study.

3.3.2 Establishment of Management Units

Original Allocation	$189,300
Revised Allocation (1979)	81,334
Utilization (1976)	81,730
Utilization March 31, 1980	81,334

Management Units were chosen by the Province as the administrative mechanism through which the Forest Lands (Management and Taxation) Act, 1974, as amended, would be enforced. The objective of this program element entailed the identification of specific management unit boundaries.

The establishment of Management Units was carried out using departmental staff. With the benefit of knowledge gained from studying other provincial management systems, most notably Ontario, a team of seven departmental foresters set about the task of sub-dividing the Province into units. The initial breakdown of the Province into units was done using Rowe's forest regions which were further broken down into land districts. These land districts were further sub-divided to give areas of approximately 300,000 acres with consideration being given to geography and distance from wood using centres. Further boundary refinements were made giving consideration to administrative ~~case~~ care, topography, natural

boundaries, units of equal productivity and timber ownership. Using these criteria, 25 units were defined.

As a result of discussions held with industry, the original 25 units were reduced to the present 19. These units embody the multi-ownership concept and each unit is being managed in accordance with a single management plan. Industry is still not fully satisfied with the system of management units, contending that there are too many units. Industry also feels that the unit stucture does not allow efficient management of its timber limits. Despite these criticisms, the system of 19 management units were gazetted in 1979 and are now legally recognized entities.

The Evaluation Committee feels that the program element was carried out in an efficient manner at a reasonable level of expenditure. Because departmental staff were employed in expediting the definition of the management units, actual expenditures were lower than initially envisaged ($81,334 spent versus the $189,300 allocation). The units defined are constantly being tested and evaluated through interaction between the industries and the Department of Forest Resources and Lands. The Evaluation Committee contends that a system is now in place which enables the

Province to effectively and efficiently manage the forest resource consistent with the Province's forestry development objectives.

3.3.3 Preparation of Management Plans

Original Allocation	$172,600
Revised Allocation (1980)	290,566
Utilization (1976)	115,880
Utilization (1978)	214,117
Utilization March 31, 1980	290,566

The objective of this program element was to develop a set of management plans for the various management units, thereby introducing proper forest management and extending government control.

At the time of writing the first interim evaluation report covering the time up to December 31, 1976, management plans had been prepared for each of the units. Activity under this program element since, has largely been in the form of expenditures on equipment, supplies, and general expenses. These were apparently necessary to continue the refinement of the management plans which were essentially completed in 1976.

Tangible output from the expenditures incurred are the operational surveys i.e., damage assessment, regeneration, timber assessment surveys, etc. carried out in various parts of the Province where more detailed information was required to establish wood supply volumes. Table 3.4 indicates the nature of the work performed in the Eastern Region of the Province for the years 1978/79 and 1979/80.

Expenditures for the Central Region, including salaries, amounted to $20,015 for 1978/79. Work carried out included timber surveys in the following areas to determine wood volumes for commercial operations:

Bay d'Espoir	1,319 ha
Bishop's Falls	1,749 ha
Springdale	577 ha

Surveys of timber on right-of-ways in Springdale, Bay d'Espoir and Lewisporte were also conducted during 1978/79.

Activities for the Central Region during 1979/80 amounted to a timber survey in Bay d'Espoir (20,000 ha) to

TABLE 3.4
SURVEYS COMPLETED FOR EASTERN REGION
1978/79

LOCATION	AREA (Ha)	NATURE OF WORK
1. Argentia	449.0	Timber survey to determine volumes for commercial domestic requirements
2. Middle Gull Pond	725.0	Same as above
3. Nine Island Pond	47.1	Timber appraisal survey for a proposed cottage development area
4. Northern Pond	61.0	Timber survey of residual volumes after harvesting
5. Spread Eagle	862.0	Timber and damage assessment surveys
6. Long Harbour Valley	5,200.0	Determination of stand age and condition
7. Avalon Peninsula	112.0	Survey of alder
8. Bunyan's Cove	999.1	Survey of forest access road extension

1979/80

LOCATION	AREA (Ha)	NATURE OF WORK
1. Clam River	2100.0	Timber survey to determine commercial volumes
2. Axes Pond	372.0	Timber survey to determine volume for domestic operations
3. Bellevue	584.8	Damage assessment survey
4. Goulds	71.0	Timber survey to determine salvage volume on proposed agricultural area
5. St. John's	117.6	Damage assessment survey
6. Island Pond/Ocean Pond	152.25	Regeneration survey after selective cutting
7. Chance Harbour	348.01	Regeneration survey after clear cutting
8. Dark Hole Brook	2658.0	Timber survey along forest access roads

determine availability of sawlogs in the area. A budworm damage assessment survey was also carried out in the Lewisporte Management Unit (50,000 ha) and during 1979/80, $25,902 was spent.

During 1978/79, $26,515 was spent on surveying activity for the Western Region. The expenditure included salaries, equipment purchases, operating expenses and computer time. A survey to determine the volume of sawlogs and pulpwood available for commercial operations as well as a cull survey to obtain net merchantable volumes were conducted at Northeast Pond (1,955 ha) and Saltwater Pond (2,758 ha).

Expenditures for 1979/80 for the Western Region amounted to $41,986. This included salaries, operating expenses and computer time for the following surveys:

1. A survey to determine the volume of sawlogs and pulpwood available for commercial operations.
2. A cull survey to obtain net merchantable volumes.
3. Areas:

Horsechops, Roddickton Management Unit	4,311 ha
Main Brook, Roddickton Management Unit	3,995 ha
Batteau Barrens, Port Saunders Management Unit	179 ha
Cold Brook, St. George Management Unit	3,544 ha

During 1978/79 only $2,527 was expended for survey work in Labrador. No monies were expended for salaries and the balance of the expenditures went for general operating expenses. Despite the low dollar utilization for Labrador during 1978/79, the following work was performed:

1. Birch volume survey - 41 plots covering 4,100 ha
2. Regeneration studies - 342 regeneration plots covering 3,330 ha
3. 18 Jack Pine planting trials
4. Establishment of 20 permanent sample plots on cutovers

During 1979/80 expenditures increased to $13,311 for surveying activity in the Labrador Region. This expenditure included approximately $7,400 for salaries with the remaining balance going to general operating expenses, VHF and drafting equipment. Work performed in Labrador for 1979/80 included establishment of 238 permanent sample plots and operational cruising of Unit 19.

The Evaluation Committee feels that the management plans along with the constant updating has enabled unit staff to begin the task of properly managing the forests. These management plans will also ensure that the companies follow forest management practices which are beneficial to the Province as a whole.

The Evaluation Committee notes that constant updating and refinement of the plans will be necessary to facilitate retainment of reliable information to allow sound decisions to be made regarding the maximization of benefits from our forests. The Department of Forest Resources and Lands now has in place management plans which can be updated as the units change over time with cutting and regeneration. This will allow proper management of forests for the benefit of the Province.

CONCLUSION

The Evaluation Committee feels that two of the program elements, (Establishment of Management Units and Preparation of Management Plans) were carried out in an efficient manner at a reasonable level of expenditure. A system of management units is now in place and plans have been prepared for each of the units. With the constant refinement of the management plans and constant evaluation of the units, the Province will now be able to effectively and efficiently manage the forest resource to maximum benefit of the residents and industry.

The Evaluation Committee does point out that the Stumpage Appraisal Study has not been undertaken. The Committee feels that determining appraisal rates consistent with prevailing market prices is also important to good forest management and is consistent with the Province's development objectives. The Committee feels that action should be undertaken by the Department of Forest Resources and Lands to conduct a Stumpage Appraisal Study.

The Evaluation Committee feels that the objectives of the program were met to a large extent with the exception of the Stumpage Appraisal program element.

3.4 Program 3 - Harvesting and Utilization

Objective: To upgrade the technical capability of both the Newfoundland Forest Service and private enterprises in forest management and utilization by increasing efficiency in timber management, harvesting, hauling and processing operations.

Original Allocation	$15,065,300
Revised Allocation (1978)	11,890,300
Revised Allocation (1979)	10,187,000
Utilization (1976)	11,535,231
Utilization (1978)	11,650,075
Utilization March 31, 1980	10,176,066

This program consisted of thirteen program elements. However, $9,524,170 (93%) of this program's appropriation was specific to Labrador Linerboard Limited for the acquisition of logging equipment. The other program elements generally were aimed at adopting technology and the building up of expertise which would enable Newfoundland to fully exploit its forest resources. The need for such technology and knowledge arose out of the special problems associated with the terrain and forest conditions prevalent in Newfoundland.

3.4.1 Cable Logging

Original Allocation	$122,900
Revised Allocation (1978)	276,521
Revised Allocation (1979)	338,521
Utilization (1976)	103,439
Utilization (1978)	187,639
Utilization March 31, 1980	338,521

The objective of this program element was to introduce and operate cable logging equipment and techniques which would be acceptable technically and environmentally as well as being economically feasible in harvesting wood from steep slopes in Newfoundland.

The benefits to be derived from cable logging appear to be quite significant when one considers that about 12% of the Island's growing stock (36.25 million m^3 stacked or 10 million cords) are located on steep slopes. About 60% of this stock occurs in fairly close proximity to the two largest wood using industries in the Province. Cable crane logging could permit the annual allowable cut to be increased by 362,500 m^3 stacked (100,000 cords) per year because previously inaccessible wood would be made available to the major mills. Cable logging could significantly improve utilization of the forest resources and the problem that the major mills are experiencing in obtaining wood within economic transportation distances would be reduced.

Since 1974 and the signing of the Forestry/DREE Agreement, the Province has tackled the problem of logging from steep slopes with the successful introduction of several logging machines and systems.

In 1975, one Ecologger was leased by the Forest Service at $10,800 a month and was tested with Labrador Linerboard Limited at Southwest Brook. This operation achieved some success producing 800 cords (2,900 m^3 stacked) of wood at a total cost between $30.00 - $40.00/ cord or $8.25 - $11.00/$m^3$ stacked.

In 1976 the Department of Forestry purchased its own Ecologger and tested the machine in the Costigan River Valley with the cooperation of Price Newfoundland Ltd. The Forest Service hired a logging engineer to work full time on developing this program. During this trial 400 cords (1,450 m^3 stacked) of wood were produced at an actual cost of $39.00/cord or $10.76/$m^3$ stacked.

In 1977, another agreement was signed between Price Newfoundland and the Provincial Government to again operate the two Ecologgers on their limits. This operation produced 923.25 cords (3,346 m^3 stacked) at a total cost of $28,448 or $7.17 m^3 ($26.00/cord). This cost was $3 to

$4 per cord higher than skidder operations which appears to be quite reasonable. Later in 1977, a tour of Scotland by three representatives from Newfoundland resulted in the purchase of a Smith Timbermaster cable logging machine.

In 1978, the Smith Timbermaster was operated on Price Limits with the cooperation of Price Newfoundland Limited. Final results of this trial produced 804 cords (2,915 m^3 stacked), at a total cost of $20,100 or 6.89 m^3 ($25/cord). This indicated that the Smith Timbermaster could log economically on the Island's steep slopes. The Ecologger was also operated in 1978 on Bowater limits. The results of both machines and past trials indicated that the Smith Timbermaster was the better of the two machines.

In 1978, a cable logging training course was organized at the Bay St. George Community College in Stephenville and a Smith Timbermaster was purchased for the school at a cost of $45,000. Since that time, the College has successfully trained four crews of cable logging operators.

In 1979, Price Newfoundland Limited continued trials with the Timbermaster belonging to the Provincial Government. Bowater Newfoundland Limited purchased their

own Smith Timbermaster from Scotland and operated it very successfully on their limits. Also in 1979, cable logging operations with the Ecologger and Timbermaster were conducted in Bay d'Espoir under the Forest Economic Stimulation Program, with technical assistance provided by the Provincial Government.

Under this program element a number of crews throughout the Province have been successfully trained. Table 3.5 lists the numbers of people trained and employed in cable logging between 1975 and 1980. Approximately 13 man years of employment were generated by this program element.

TABLE 3.5

Direct Employment Generated From Cable Logging

Year	Number of Staff Involved
1975-76	5 crew members and 1 supervisor for 3½ months (paid by Labrador Linerboard Ltd) 1 forester and 1 technician for 3 months (paid under the Agreement)
1976-77	1 forester (paid under the Agreement) 5 crew members and 1 supervisor for 3 months (paid by Price Newfoundland Ltd)
1977-78	1 forester (paid under the Agreement) 5 crew members and 1 supervisor for 3 months (paid by Price Newfoundland Ltd)
1978-79	1 forester (paid under the Agreement) 5 crew members for 4½ months (paid by Bowater Newfoundland Ltd) 4 crew members and 1 supervisor for 4 months (paid by Price Newfoundland Ltd)

TABLE 3.5 (con't)

Year	Number of Staff Involved
1979-80	1 forester (paid under the Agreement) 4 crew members and 1 part-time supervisor for 4 months (paid by Bowater Newfoundland Ltd) 4 crew members for 3 months (paid by Price Newfoundland Ltd) 5 crew members and 1 supervisor for 5 months (paid by FESP)

The Evaluation Committee notes that cable logging is a new concept to the forest industry in Newfoundland and commends the Department of Forest Resources and Lands in the successful introduction and operation of cable logging to the Province. Cable logging has been proven to be economically, technically and environmentally sound to the point where Bowaters purchased and presently operates its own Smith Timbermaster.

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Another indication of its success is that officials of the Department of Forest Resources and Lands have been asked to attend seminars throughout Canada and the United States concerning cable logging by institutes such as the International Union of Forest Research Organization (IUFRO) and the Forest Engineering Research Institute of Canada (FERIC).

The Evaluation Committee concludes that much progesss has been made by the Department of Forest Resources and Lands in successfully introducing and operating cable

logging machinery to the forest industries in Newfoundland. They can also be credited for the establishment of a complete cable logging training program at the Bay St. George Community College where four qualified cable logging crews have now been trained.

Cable crane logging is a new concept to the forest industry in Newfoundland. One of the greatest achievements in the introduction of such a new idea has been the encouragement of a locally-manufactured cable logging machine, the Atmus Timberjet, by Atmus Equipment Ltd. of Pasadena, Newfoundland. Although there are still a number of mechancial problems with this machine, knowledge gained over time may serve to improve this logging machine to a stage where successful manufacture, maintenance and servicing of a locally produced machine is made available to the Newfoundland forest industry as well as new markets.

3.4.2 Integrated Logging

Original Allocation	$62,000
Revised Allocation (1980)	56,147
Utilization (1976)	44,576
Utilization (1978)	45,014
Utilization - March 31, 1980	47,584

The objective of this program element was to improve utilization of harvested wood by integrating the production of raw materials for different end uses. Essentially, the concept involves separating sawlogs from pulpwood in the conduct of logging operations. The sawlogs are utilized by sawmills in the production of lumber while the pulpwood is used by the pulp and paper mills. In addition to improving utilization of raw materials, the concept permits sawmill operators (provided pulpwood markets are available) working mostly on Crown land, to lower harvesting costs since they no longer have to concentrate on logging only scattered sawlog sized wood. This program element was, therefore, designed to promote the integration of pulpwood and sawlog production in the hope that the sawmill industry would flourish with resulting reductions in imported lumber.

Work carried out under this program element consisted of the hiring of a logging specialist in 1974 for the purpose of educating the sawmill operators and convincing them about the benefits of integrated logging. During 1977 and 1978, both pulp and paper companies were approached concerning operational trials. As a result, several sawmill operations were set up on company controlled limits during this period and in 1979/80 a trial was conducted between

Price (Nfld.) Ltd. and Bay d'Espoir Forest Products Ltd. This short trial showed that operational aspects of an integrated operation can be overcome but problems still remain in the economics of wood fibre exchange. In addition to the progress made in 1979/80, previous efforts have resulted in an estimated 100 tons of chips a day being delivered to the Price Mill in Grand Falls from integrated operations, thereby making the sawmills involved more profitable. Four mills using the integrated system are presently employing about 100 people on a year round basis.

The Evaluation Committee notes that the objective of this program element has been achieved to a large extent as nearly all large sawmill operators on Crown lands carry out integrated logging techniques. The Committee, however, feels that the Department of Forest Resources and Lands should continue with its efforts to promote integrated logging techniques on company limits. It is worthy of note that the expenditures incurred under this program element represent only a fraction of the time and effort committed by regional forestry officials towards this goal.

The concept of integrated logging has received a wide degree of acceptance by virtually all involved in the forest industry. The Evaluation Committee feels that this

program element was very worthwhile and conducted in an efficient and effective manner. The Committee also feels that integrated logging should be made a requirement under the respective management unit plans provided pulpwood can be disposed of at reasonable prices. The Department of Forest Resources and Lands should continue its efforts to maintain the concept of integrated logging in Newfoundland by looking into the possibility of initiating a program between the pulp and paper mills and the sawmill operators to facilitate a mutually beneficial exchange of pulpwood and sawlogs.

3.4.3 Lower Churchill Salvage

Original Allocation	$33,100
Revised Allocation (1979)	28,781
Utilization March 31, 1980	28,781

The objective of this program element was to conduct a feasibility study of salvaging timber to be flooded by the proposed hydro development on the Lower Churchill River in Labrador.

In 1973, the Newfoundland Forestry Service conducted a timber survey of the proposed areas of the Lower Churchill River. Maps of the area of anticipated flooding were prepared and it was estimated that 380,000 cords of merchantable timber could be harvested before flooding took place.

In 1974, a feasibility study was conducted by Darveau, Grenier, Dussies et Assoui's on salvaging the merchantable timber of the area to be flooded by the proposed power development. Methods were described for harvesting the merchantable wood and costs of these methods were determined. Methods and costs of disposing of non- merchantable trees and slash were also worked out. A schedule of operations was laid down and estimates were given for road construction, transportation, personnel and capital required for salvage.

In 1977, a further study was carried out by McGunk, Matthews, Greggain & Associates which resulted in updated estimates for salvage of the merchantable timber on the Lower Churchill.

The Evaluation Committee notes that the studies were sufficiently valid at the time they were conducted to be of valuable use to Government in deciding upon a course of action to take with respect to clearing the reservoir.

The use of these studies will depend on the eventual development of the hydro project. Development of Lower Churchill power has been continuously delayed but studies are still being conducted on the environmental

effects of leaving the timber to be flooded. The present demand for wood and wood fibre is very high and will without doubt be a consideration when assessing the benefits to be derived from a possible salvage operation. The increasingly high cost of other forms of energy dictates the eventual development of this hydro power project. When this occurs, the information gathered in previous studies can be revised and used to decide if any, or to what extent, salvage operations will take place.

3.4.4 Minor Species

Original Allocation	$35,000
Revised Allocation	NIL
Utilization	NIL

The objective of this program element was to conduct a feasibility study of utilizing minor species in the development of wood product based secondary forest industries.

This study was not carried out as much of the subject matter proposed to be studied was subsequently covered off in another study. This was carried out under a separate program element, namely, Wood Panel Plants (to be discussed later in this report). The Evaluation Committee concurs with this decision.

3.4.5 Small Sawmills

Original Allocation	$10,700
Revised Allocation (1980)	82,812
Utilization (1976)	18,363
Utilization (1978)	30,704
Utilization March 31, 1980	78,965

The objective of this program element was to formulate a realistic policy on the development of the sawmill industry in Newfoundland and Labrador and to provide a program of technical assistance to local mills for the purpose of improving the efficiency and profitability of their operations.

Government had expressed concern over the future of the sawmill industry, as although there were close to 1,400 licensed mills in the Province during 1975, they produced only 28.5 million f.b.m. of lumber. An additional 70.5 million f.b.m. of lumber was imported to meet the Province's demand. The low domestic production of lumber was attributed to problems such as improper mill layout, equipment design and maintenance and less than full time production because of adverse market conditions. It was also discovered that one of the main problems was the lack of sawmill design expertise in this Province.

In 1975, a design engineer who had extensive experience in the sawmill industry elsewhere in Canada was hired to do a preliminary assessment of the technical problems facing sawmills. Under the supervision of a Sawmill and Wood Products Committee, Dr. Jim Church of Memorial University coordinated activities to assess mill efficiency in four larger mills, developing a sawmill information centre and improving the mechanical design of mill equipment in a number of mills throughout the Province.

Dr. Church produced a report which was completed in 1977 and contained a number of sound recommendations to help the sawmill industry.

The Evaluation Committee notes that this program element has been reasonably effective in assisting a number of mills throughout the Province, particularly in the area of equipment design. This program element was also responsible for the establishment of a sawmill information centre which serves as a data bank for the university and is available to interested sawmill operators of regional centres around the Province. The sawmill operators are now beginning to seek technical help so the eventual success depends to a great extent on cooperation of sawmills in streamlining their operations as advised.

An indication of an increase in participation in redesigning and upgrading sawmills is the fact that in 1979 there were 1,600 mills with a production of 50 million f.b.m. an average of 30,000 board feet per mill as compared to 20,000 board feet in 1975. However, this really isn't very significant when one considers the fact that this 50 million feet could be produced by only 25 of these mills.

The sawmill industry in Newfoundland and Labrador still has a long way to go if it is to get away from its present state of uncertainty and deterioration. The Evaluation Committee expresses concern that limited sawmill expertise to assist sawmillers still exists in the Province. In conclusion, the Committee feels that this program element appears to have been efficiently handled and reasonably effective. The Department of Forest Resources and Lands should continue with its efforts to make the sawmilling industry more efficient and viable so that the amount of lumber imported into the Province can be reduced.

3.4.6 New Sawmills

Original Allocation	$163,000
Revised Allocation (1979)	17,497
Utilization March 31, 1980	17,497

The objective of this program element was to study the feasibility of establishing new sawmills in the Province, including mill locations, kinds of mills and size.

In 1974, Newfoundland sawmills produced only 33% of the annual requirements of lumber in the Province. As a result of the high level of imports of lumber, government felt a need to increase local production capacity towards achieving self-sufficiency. A Federal/Provincial Task Force had identified seven (7) tentative locations for establishing new sawmills. A detailed feasibility study for each proposed site was recommended before establishing these sawmills.

Only one (1) study was carried out under this program element by Darveaux, Grenier, Lussier and Associates of Quebec and was specifically concerned with the feasibility of establishing a sawmill at Goose Bay, Labrador. It was estimated that this sawmill would have an annual capacity of 38 million board feet of finished lumber.

The consultant produced a report which was not acceptable due to several incorrect assumptions. These assumptions invalidated the report's conclusions. In the Evaluation Committee's view, this reflects poor administration with respect to the terms of reference

outlined for the study as well as poor liaison between the Forestry Department and the consultants while the study was in progress. No further studies on new sawmills were carried out because of the difficulty in using the recommendations of the study and because of private initiatives.

Although the feasibility studies for the other six (6) locations selected were not carried out, new sawmills were established.

The original sawmill established at Gambo has long since been inoperative. However, a mill operating in the same area and at a smaller capacity appears to be doing very well at present. Mills established at Glenwood and Roddickton are at present operating in a viable state. The mill at Bay d'Espoir shut down recently due to the inavailability of adequate sawlogs and the sawmill located at Hawke's Bay which was producing much below its capacity also closed operations recently.

A sawmill was established at Goose Bay with a capability of approximately 10 million board feet annually. This mill was to be supplied with sawlog material from the stockpile of timber left from the Labrador Linerboard

operations. After the stockpile of wood had been exhausted, it was anticipated that a harvesting program would be inaugurated as part of the sawmill operation or contracted to an independent operation. It appears that the amount of usable wood contained in the stockpile was overestimated. Also the machines at the sawmill were not able to handle the size of wood available from the stockpile. As a result of these factors, the Goose Bay sawmill has recently closed down its operations.

In 1979, a new mill was brought into operation on limits controlled by Price (Nfld.) Ltd. This mill is located just east of Jonatons Pond and is capable of producing 2.5 million board feet per year. A drawback with this mill is the fact that it does not have a debarker or chipper. Recent information supplied to the Evaluation Committee indicates that the mill has shut down, at least temporarily.

Although Newfoundland's sawmills have increased production to 50% of the annual requirement of lumber in the Province, much still has to be done to sustain this level and to further increase production. The Department of Forest Resources and Lands should actively continue its efforts to have the sawmilling industry operating at peak efficiency and economic viability so as to facilitate a reduction in the amount of imported lumber required to meet domestic demands.

3.4.7 Wood Panel Plant - Feasibility Study

Original Allocation	$63,000
Revised Allocation (1978)	40,000
Utilization	NIL

The objective of this program element was to study the feasibility of establishing a wood panel plant and other hardwood based secondary forest industries.

The Island of Newfoundland in 1974 had 69.89 million cunits of hardwood which was not being utilized to any significant extent. This program element was designed to investigate the possibilities of efficiently utilizing the hardwoods. As a result of increased knowledge of the resource and changed market demands for hardwood products, the objective was enlarged to investigate all possibilities of hardwood utilization in the Province, especially for the areas where better inventory information is available.

The Evaluation Committee understands that this study was never carried out under the Forestry Subsidiary Agreement. This was apparently due to the lack of information on the hardwood stands located in the Province. Consultants were invited to submit proposals but no contract was awarded. The Committee also understands that the funds

allocated for this program element were later transferred into the Forest Inventory Program where they were utilized for completion of the Biophysical Inventory and site assessment program element.

The Evaluation Committee feels that in light of the changed market demand for hardwood based wood products, consideration should be given to conducting such a study as was originally envisaged to determine if greater utilization of this resource is possible.

3.4.8 Transportation Study

Original Allocation	NIL
Revised Allocation (1979)	$6,335
Utilization March 31, 1980	6,335

The objective of this program element was to determine the most economic distribution of timber limits for existing wood based manufacturing plants from a transportation cost viewpoint.

This program element was designed to provide an analysis of wood transportation destination alternatives to solve wood demand and supply problems for the existing mills. Various timber-limit arrangements were to be examined to determine the most efficient arrangement in relation to wood costs.

Work carried out under this program element consisted of engaging a consultant to do a preliminary evaluation of the feasibility of undertaking a detailed timber transportation study for Newfoundland. A conceptual plan was prepared by the consultant and cost estimates for the plan were devised. The methodology proposed by the consultant required refined inventory data. The cost estimates supplied by the consultant were high and it was discovered after an exercise to determine data needs, that the reliable inventory base was not available. For these reasons, no attempt was made to proceed with the main study.

The Evaluation Committee understands that this study was later undertaken by the Provincial Government and was totally funded with provincial dollars. The Committee does point out the fact that the companies at the present time must travel greater distances to obtain an adequate supply of timber and therefore suggests that the Department of Forest Resources and Lands undertake with the pulp and paper companies to devise an efficient and economic delivery system. Such a system will eventually benefit the provincial economy by ensuring steady employment both in the woods and at the mills.

3.4.9 Areas for Immediate Control

Allocation	NIL
Utilization	NIL

The objective of this program element was to fund the acquisition and control of leased land held by the pulp and paper companies.

No activity was carried out under this program element. The Evaluation Committee agrees with such an approach and feels no further activity should be contemplated. The Forest Lands (Management and Taxation) Act, 1974 provides adequate incentives for leased forest lands to revert to the Crown should the companies not wish to manage the limits in accordance with the provision of the Act.

3.4.10 Construction of Dams

Original Allocation	NIL
Revised Allocation (1979)	$33,523
Utilization (1978)	NIL
Utilization March 31, 1980	33,523

The objective of this program element was to improve facilities for water transportation of timber through the construction of dams.

There are three means of transporting timber in the Province. These are by road, rail and water. The access road construction and upgrading program aided sawmill operators using road transport. Under the Forestry I Subsidiary Agreement, no provision was made for assistance to sawmill operators who used water transportation. As a consequence, this program element was devised to aid sawmillers by constructing small dams thereby facilitating water transport of timber where other means of transport were not feasible.

Under this program element, two small dams were constructed, one at Traverse Brook at an approximate cost of $17,867 and another at Horwood at a cost of $15,657. Stumpage on the wood (6,000 cords) made accessible by the dam at Traverse Brook would recover for the Province all construction costs. In comparison, an expenditure of $150,000 would have been necessary to make the same amount of wood available through the construction of an access road. Furthermore, in 1976, the cost of harvesting and transporting wood to the sawmills by water would have been around $35 per cord, much lower than wood transported by road to the same mills.

The Evaluation Committee notes the project appears to have been worthwhile and considers this program element to be a good investment of Agreement funds.

3.4.11 Whole Tree Chipping

Original Allocation	$100,000
Revised Allocation (1979)	94,217
Utilization (1976)	NIL
Utilization March 31, 1980	87,355

The objective of this program element was to investigate the feasibility of total tree chipping thereby utilizing previously wasted tree portions.

Since 1970, the concept of total tree chipping (which involves the conversion of whole trees into chips) has been introduced into the pulp and paper industry. Chips can be used for a wide variety of products such as pulping material, particle and pressed board, roofing paper and shingles. Chips can also be used for erosion control, ground cover and landscaping mulch. Since 1976, there has been a growing demand for wood chips as a fuel source in the pulp and paper industry. This has been due to the steadily increasing costs of heating with fossil fuels.

Work carried out under this program element consisted of an experiment undertaken between the Department of Forest Resources and Lands and Price (Nfld.) Ltd. whereby the total tree chipping concept would be used to produce chips for fuel.

In 1978, a three month operational field trial was conducted which resulted in 6,844 green tons of white birch whole tree chips being harvested from a stand of overstocked small diameter white birch. These whole tree chips were used as a fuel supplement in firing a refuse boiler in the Price (Nfld.) mill. This trial was successful but showed the need for further development in order for this activity to be successfully introduced into other mills in the Province.

In 1979, a second field trial was conducted for a three month period again in conjunction with the Department of Forest Resources and Lands, Price (Nfld.) Ltd. and the Canadian Forestry Service. This trial produced approximately 6,300 green tons of chips from three different stand types; an over stocked white birch stand, an over mature birch stand and an immature fire-killed black spruce stand. Results indicated that whole tree chipping for fuel was economical in certain stand types with high volumes per hectare.

Also in 1979, the Department of Forest Resources and Lands undertook to look into the feasibility of a facility using wood fuel other than the pulp and paper industry. As a result of the feasibility study conducted, a pilot project has been initiated in cooperation with the Departments of Health, Mines and Energy, and Forest Resources and Lands, whereby a hospital in Gander will convert to burning sawmill residue as fuel for heating purposes.

The Whole Tree Chipping program element appears to have been a worthwhile project in that valuable experience was gained and two reports were produced containing information on the best types of harvesting techniques available. It appears, however, that further work is needed in the areas of chip collection and efficient transportation of chips to the various mills. The hospital project, if successful, will serve as a good example in showing that wood residue can be successfully used for fuel in non-forestry enterprises.

The Evaluation Committee commends the Department of Forest Resources and Lands for its initiatives in this area of whole tree chipping. A full scale operation is scheduled for 1981. The Committee also notes that additional work in

the area of whole tree chipping will go a long way to increasing the maximum and efficient utilization of the wood supply in the Province.

3.4.12 Industry Modernization

Allocation (1979)	$5,000
Utilization	
March 31, 1980	5,000

The objective of this program element was to determine and evaluate the modernization and pollution abatement requirements of the Province's pulp and paper mills. This program element was created in response to an announcement by the Federal Government that funds would be made available to the Canadian pulp and paper industry as grants for mill modernization and pollution abatement capital improvements. Approximately $60 million was expected to be made available to Atlantic Canada for improvements to pulp and paper operations. The funds were to be expended through DREE in federal/provincial cost-sharing incentive grants whereby the mills would be reimbursed approximately 25% of the capital cost of approved capital construction programs.

In light of the above developments, the Province in 1979 set up a task force to study the pollution abatement and modernization requirements of the pulp and paper mills

located at Grand Falls and Corner Brook. The Bowater mill at Corner Brook was specifically known to need investment in modernization and pollution abatement. The task force had as its mandate:

1. to study and report on the existing mill facilities of the pulp and paper industry in Newfoundland with a view to identifying the causes of high cost and pollution in the existing operations and comparing the Newfoundland manufacturing costs with the major competitors.

2. to identify the new investment needed for reducing the production costs and to reduce pollution. This will be for maintaining the existing level of total production in the mills; and

3. to identify the expansion requirements which will be over and above the cost reduction and pollution abatement requirements.

In October 1979, the task force submitted its report on Pollution Abatement and Modernization of the Newfoundland pulp and paper industry. This report outlined the existing mill facilities in the Province and identified

in detail the expansion requirements needed by industry and the amount of new investment required for reducing production costs and pollution.

The Evaluation Committee notes that a proposal based on the task force report was submitted to the Federal Government to provide assistance to the Province's pulp and paper industry. A formal cost sharing agreement between the Province and the Federal Government totalling $33 million was signed on June 1, 1981. The Committee feels that the report produced by the task force certainly justified the funds expended under this program element.

3.4.13 Logging Equipment

Original Allocation	$14,756,000
Revised Allocation (1979)	9,524,170
Utilization (1977)	11,316,239
Utilization March 31, 1980	9,524,170

The objective of this program element, while not explicitly stated in supporting documentation for the Agreement, was to provide financial assistance to Labrador Linerboard Limited (LLL) in organizing woodland operations. The program element originated from deliberations between (in

which the Management Committee was not directly involved) the Provincial Government and DREE Newfoundland, which began in June of 1973. It was eventually agreed that federal assistance would be made available to Labrador Linerboard, a provincially-owned company. The mechanism selected for the assistance was the existing Forestry Subsidiary Agreement. Accordingly, on January 27, 1975, an amendment to the Agreement was signed, increasing the funding of the Agreement by almost $20 million.

The Evaluation Committee's search of background documentation associated with the Agreement revealed information gaps and apparent misunderstandings of the intent of the Amendment. For example, it appears that the Management Committee's perception of the Amendment's objective was solely to purchase $14.76 million of equipment for Labrador Linerboard Ltd. There is no evidence to indicate that the Management Committee was aware of any other terms and conditions surrounding the purchase of the equipment.

The Evaluation Committee's search, however, revealed the existence of appendicies which were referred to in the Amendment itself. These appendicies contained a detailed breakdown of the proposed locations on the Island

for forest access road construction and logging camps. The search also revealed the existence of a federal Treasury Board requirement that the funds for equipment acquisition be conditional upon the Labrador Linerboard Mill becoming profitable.

A further condition concerning the establishment of a provincial Crown corporation to harvest wood at competitive on-Island prices was contained in a letter from the Honourable Don Jamieson, Minister for DREE at the time, to the then Minister of Forestry and Agriculture, the Honourable Harold Collins. This letter, dated January 24, 1975, imposes this condition upon the Province, and the Provincial Minister's countersignature on the letter indicates acknowledgement of the receipt and acceptance of the conditions.

Based on several studies, particularly an Intergovernmental Task Force's report, it was concluded that LLL appeared to have the potential for becoming economically viable within 3-5 years. A condition, however, of realizing the economic viability was the provision of a maximum amount of wood to the mill at "island costs". To this end, the Provincial Government was willing to form a Crown corporation

to guarantee the provision of wood, primarily from Labrador to the mill in Stephenville at "island costs".

The intent of the program was to provide funds for the purchase of mechanized logging equipment and the establishment of operational logging systems. The main benefit accruing through the use of fully mechanized equipment in woodlands operations was supposed to be increased production at lower per unit production costs. The basis of the Amendment was to make Labrador Linerboard economically viable and simultaneously, to maintain or provide jobs for those employed primarily in the woods operations. The viability of LLL, of course, implied its continued operation and the societal benefits to the Bay St. George and Happy Valley/Goose Bay areas.

In addition to the above, it is considered relevant to the evaluation of this program element initiative to stress the following conditions associated with the Amendment under which it was initiated:

a) DREE's participation was based on the explicit understanding that LLL would become economically viable within 3-5 years;

b) The Provincial Government would establish a Crown Corporation, prior to the end of 1975, to provide wood to LLL at Island cost; and

c) Two administrative conditions particular to DREE, one concerning evaluation, the other, financial procedures.

According to the Amendment, logging equipment was to be purchased but it was not explicitly stated where the equipment was to be used. Supporting documentation to the federal Treasury Board outlined proposed locations which were not followed by LLL in utilizing the equipment. It should be noted, however, that these proposed locations were not outlined in the Amendment signed by both governments nor is there any evidence to suggest that these proposed locations were communicated to the Management Committee. A list of proposed equipment from the documentation is shown on the following page in Table 3.6.

Research has indicated that the equipment already in the possession of LLL was purchased from the following companies as the first activity under this program element:

Citicorp of Delaware	$6,266,789
Canpac of Quebec	1,606,829
Linerboard Limited	2,616,784
Total	$10,490,402

TABLE 3.6
EQUIPMENT & BUILDINGS

	FOX ISLAND RIVER	S.W. BROOK CAMP 1	S.W. BROOK CAMP 2	N.F.P. CAMP	HAWKES BAY CAMP 1	HAWKES BAY CAMP 2	CAMP 7	TOTAL NUMBER	UNIT COST	TOTAL
Feller-Buncher-Drott	-	-	2	-	-	-	2	4	$ 75,000	$ 300,000
Feller-Buncher-BJ20	-	-	2	-	-	-	2	4	80,000	320,000
Forwarders-Lokomo	3	2	3	1	3	3	3	18	80,000	1,440,000
Harvesters-RW30	-	1	5	1	2	3	3	15	78,000	1,170,000
Processors-Hahn	4	2	4	-	2	2	1	15	51,000	765,000
Slashers-Forano	1	1	-	-	1	1	-	4	170,000	680,000
Skidders	15	20	4	6	20	20	5	90	28,000	2,520,000
Loader-Grapple Drott 40	1	1	1	1	1	1	1	7	75,000	525,000
Loader-P.E. Cat.745	1	1	1	1	1	1	1	7	70,000	490,000
Tractor-Med. Size D7	3	3	3	2	3	3	3	20	85,000	1,700,000
Trucks-Tractor Units	4	4	4	4	5	5	4	30	39,000	1,170,000
Trailers-Pulpwood	7	7	7	7	8	8	7	51	18,000	918,000
Buses	3	3	3	2	3	3	3	20	15,000	300,000
Trucks-Pick-up 1/2 ton	5	5	5	4	5	5	5	34	4,500	153,000
Load Aligner	1	1	-	-	1	1	1	5	21,000	105,000
Graders	1	1	1	-	1	-	1	5	38,000	190,000
Power Saws	30	40	25	40	40	40	25	240	200	48,000
TOTAL LOGGING EQUIPMENT								SUB-TOTAL		$12,794,000
Camp Buildings	1	1	1	-	1	1	-	5	250,000	1,250,000
Garage & Tooling	1	1	1	-	1	1	-	5	50,000	250,000
Power Plant	1	1	1	-	1	1	-	5	20,000	100,000
Plumbing & Site Prep.	1	1	1	-	1	1	-	5	20,000	100,000
Fire Protection Equip.	1	1	1	1	1	1	1	7	6,000	42,000
Cookhouse Equipment	1	1	1	-	1	1	-	5	8,000	40,000
TOOL UTILITIES								SUB-TOTAL		$ 1,782,000
GRAND TOTAL								GRAND TOTAL		$14,576,000
								TOTAL FEDERAL SHARE		$13,118,000

The equipment consisted of six 80-man logging camps and back up harvesting and wood transportation equipment. The detailed list can be found in the Program Inventory Form. Subsequent to the initial expenditure of $10.5 million, $669,000 was spent for the purchase of additional equipment. One and one-half camps were erected at Southwest Brook. Two camps were constructed in Goose Bay, Labrador, but these were not included in the original proposal. Two camps were loaned to Gull Island Power Company. Half a camp is in storage. In summary, the equipment was purchased but not allocated to the locations originally proposed in the supporting documentation to the federal Treasury Board, nor were the camps erected as intended.

The Amendment was intended to reduce the cost of wood to LLL and increase the quantity supplied. In 1974-75, the company produced 75,000 cords of wood on the Island. Subsequent to the Amendment, Island production fell to 49,000 cords in 1975-76 and none in 1976-77. At the same time, the company's Island purchase was 225,000 cords in 1974-75, 106,000 in 1975-76 and 97,000 cords in 1976-77. Hence, in spite of the Island logging operations the company consistently purchased more wood than it produced on the Island.

TABLE 3.7
COMPARISON OF PURCHASES AND COMPANY PRODUCTION (CORDS)

Year	Island		Labrador	
	Produced	Purchased	Produced	Purchased
1972-73	--	50,135	--	--
1973-74	8,911	98,002	136,500	253,413
1974-75	74,632	224,913	144,000	443,545
1975-76	48,864	106,166	148,000	303,030
1976-77	--	96,431	119,000	215,431

The company was also producing more wood in Labrador than on the Island. It must be noted that the cost of Labrador wood was always greater than Island wood. The objective, therefore, of making more inexpensive wood available at the mill was clearly not achieved. From the analysis it is conclusive that the company could have obtained more wood at a lower price by purchasing Island wood rather than attempting to produce their own at economically unsound costs, particularly in Labrador.

The Labrador Linerboard mill was closed in 1977. Subsequent to its closing, equipment which was considered as being surplus or non-essential to the possible sale of the mill was sold through public tender for an amount of approximately $1,861,043. The funds received from the sale reverted back to program element 3C - Logging Equipment, of the Harvesting and Utilization Program. Schedule 1 of the Program Inventory form for this program element contains a

list of the equipment sold through public tender (see Appendix II). From a rough analysis, the Evaluation Committee estimates that equipment originally valued in excess of $6 million was disposed of through this route.

Under a similar arrangement some of the remaining surplus equipment was retained to supply the needs of the Department of Forest Resources and Lands. Schedule II of the Program Inventory form for this program element contains a list of the equipment retained. This equipment had an original value of approximately $1.2 million. The remaining equipment, with an original value in excess of $7 million, was retained by the Stephenville mill and was involved in the sale of the facility to Abitibi-Price Ltd. in 1978, or cannot be accounted for. A large number of skidders, pick-up trucks and power saws fall into the latter category.

In the judgement of the Evaluation Committee, the program element did not meet its objective. Further, and perhaps outside the immediate terms of reference, it appears that the mechanism of purchasing logging equipment to enhance LLL's capability to produce their own wood, might very well have been the wrong choice under the prevailing conditions at that time. This is in part substantiated by the conspicuous underutilization of most pieces of equipment. There is a detailed inventory showing utilization in the PI forms.

In conclusion, the Committee wishes to observe the following:

The Amendment was explicit that a Provincial Crown Corporation would be established by 1975 to purchase wood from Labrador. This was not done although preparatory work to set up the corporation was essentially complete when the decision was made to close the Labrador Linerboard Mill.

By March of 1974, LLL had lost $15 million, (not including any debt financing). Subsequently, there was little evidence to suggest that the company was moving towards economic viability. It is, therefore, not clear that the probability of economic viability was considered in managing funds allocated for this program element. Out of the total expenditure of $11.1 million, $10.5 million was for retroactive purchase of equipment already in the possession of LLL. This was in effect an expenditure made in the hope that the mill would become viable, although the indications of viability were less than promising.

The Evaluation Committee does note that the funds expended under this program element were eventually decreased to $9,524,170. This was made possible through the sale of surplus equipment. The Committee concurs with the decision to sell the surplus equipment before deterioration set in.

It is the Evaluation Committee's judgement that lack of compliance with the aspect of mill viability outlined in the Amendment represented a serious departure from conditions imposed by the Federal Treasury Board upon DREE. At the same time, the Evaluation Committee notes that the Management Committee could not have been expected to make decisions that would have substantially affected mill viability.

Conclusion

The Evaluation Committee concludes that the objective of this program was met to a certain extent. As noted previously, 93% of the funds allocated to this program were specific to Labrador Linerboard Limited for the acquisition of logging equipment. The poor performance of this particular program element overshadows to a large extent the success of other program elements.

Several of the program elements proposed under this program were not activated for sound reasons. Other program elements such as New Sawmills and Wood Panel Plant - Feasibility Study were not operative or did not meet their objectives. In the case of New Sawmills, the study on the new sawmill at Goose Bay was administered poorly and resulted

in the findings being invalid. Of the seven new sawmills established during the time frame of the Agreement, four were closed down. Only the sawmills at Glenwood and Roddickton appear to be viable operations. The Wood Panel Plant - Feasibility Study was not carried out and the Committee feels that a study should have been conducted to determine possible utilization of hardwoods which are now left to die after harvesting of other species has taken place.

Some progress was made towards improving mill efficiency on a small scale under the Small Sawmills program element. A report on small sawmills was produced in 1977 which contained a number of sound recommendations to help the sawmill industry and a sawmill information center was established. The Evaluation Committee feels that this program element was reasonably effective in assisting a number of small sawmills throughout the Province. However, the Committee feels that given the present state of uncertainity and deterioration of the sawmilling industry more effort must be concentrated on making small sawmills viable and efficient operations which will in the long term reduce imports of lumber and ensure jobs.

Under this program, progress was made in the successful use and acceptance of certain logging practices.

The Evaluation Committee feels that much progress has been made by the Department of Forest Resources and Lands in successfully introducing and operating cable logging machinery to the forest industries in Newfoundland. As well a complete cable logging training program was established at the Bay St. George Community College. The concept of integrated logging has also received a wide degree of acceptance by virtually all involved in the forest industry. The Evaluation Committee feels that this program element was very worthwhile and conducted in an efficient and effective manner. However, the Committeee feels that a program should be devised between the pulp and paper mills and the sawmill operators to facilitate a mutually beneficial exchange of pulpwood and sawlogs.

The Evaluation Committee notes that the Lower Churchill Salvage Studies were sufficiently valid at the time they were conducted to be of valuable use to Government in deciding upon a course of action to take with respect to clearing the reservoir.

The expenditure of funds on constructing small dams to facilitate water transportation of wood appears to have been a good investment, indicating that this practice might

be favourably pursued in other locations throughout the Province.

With regard to Whole Tree Chipping, this program element appears to have been a worthwhile project in that valuable experience was gained on the best types of harvesting techniques to be used. However, further work is needed in the areas of chip collection and efficient transportation of chips to the various mills.

The Evaluation Committee feels that the report produced by the Task Force on Pollution Abatement and Modernization and the subsequent Federal/Provincial agreement, well justified the funds expended under the Industry Modernization program element.

The Evaluation Committee concludes that a number of the program elements under the Harvesting and Utilization Program were handled efficiently and produced very meaningful results. Unfortunately, the poor performance of the Logging Equipment (Labrador Linerboard Limited) program element overshadowed the results of the more successful program elements. However, the Committee feels that the Program did meet its objective to a certain degree.

3.5 Program 4 - Access Roads

Objectives: To provide access to mature and overmature stands;

To provide access for forest improvement; and

To provide access for intensified forest protection.

Original Allocation	$17,463,800
Revised Allocation (1978)	17,532,500
Revised Allocation (1979)	17,197,010
Utilization (1976)	10,322,545
Utilization (1978)	14,516,650
Utilization March 31, 1980	17,197,010

There were three main categories or types of access roads built under the Forestry Subsidiary Agreement. These were:

(i) roads constructed on non-alienated Crown lands for use by various sawmill operators and other wood harvesting operations;

(ii) special salvage road projects on the limits of Price and Bowater;

(iii) construction of roads designated specifically for harvesting operation of Labrador Linerboard (primary and secondary roads and some associated bridge work).

Under this program, a total of $17,197,010 was spent to construct or reconstruct 1,079.31 kilometres of access roads throughout Newfoundland and Labrador. A measure of the emphasis placed on this program is that the total expended for access road work represented approximately 31.3% of all funds expended under the Forestry Subsidiary Agreement.

Table 3.8 indicates that 935.63 kilometres of all class roads were constructed or re-constructed, while 143.68 kilometres of budworm salvage roads were constructed throughout the Province. The Table also shows wide variations in construction costs per kilometre for all regions of the Province. The average cost of construction for all access roads was $15,933/km. The average construction cost of $5,511/km for the Eastern Region appears substantially lower than the costs/km for all other regions. This figure, however, is quite misleading as a higher proportion of unpgrading/reconstruction, at considerably reduced costs took place within the Eastern Region. The Central and Western Regions had a higher proportion of new construction of "B" class roads which produced higher costs.

TABLE 3.8
KILOMETRES CONSTRUCTED & CONSTRUCTION COST BY REGION

Region	KM*	Total Cost	Cost/km
Eastern	154.37	$ 850,795.40	$ 5,511.40
Central	374.24	4,931,606.89	13,177.66
Western	347.58	6,248,609.97	17,977.47
Labrador	59.45	1,280,524.08	21,539.41
Sub-Total	935.63	13,311,536.34	14,227.35
	BUDWORM SALVAGE ROADS		
Central & Western	143.68	$ 2,320,436.34	$16,150.03
Administration & Engineering Allowance(10%)		1,565,037.32	
Total	1,079.31	$17,197,010.00	$15,933.34

*Also includes upgrading and construction.

It should be noted that the Evaluation Committee recommended in the first Interim Evaluation Report that costs of reconstruction versus new construction be kept separately for all regions. The Committee notes the difficulty in assessing the overall efficiency of the access road construction program as these figures were not available. For future access roads programs, the Evaluation Committee recommends that reconstruction/upgrading and new construction costs be recorded separately, thereby, ensuring that a true picture of the costs involved with each type of road and the efficiency of construction can be shown.

With respect to the quantity of wood made accessible per kilometre, Table 3.9 shows that roads constructed in Labrador made the most wood accessible per kilometre.

TABLE 3.9
WOOD MADE ACCESSIBLE BY CONSTRUCTION OF ACCESS ROADS

Region	KM	Wood (Cords)	Cords/km
Eastern	154.37	279,221.50	1,808.78
Central	374.24	1,284,607.13	3,432.58
Western	347.58	1,153,934.75	3,319.91
Labrador	59.45	839,140.00	14,115.05
Sub-Total	935.63	3,556,903.38	3,801.61
Budworm Salvage Roads	143.68	1,388,900.00	9,666.62
TOTAL	1,079.31	4,945,803.40	4,582.38

The average amount of wood made accessible per kilometre for both forest access and budworm salvage roads was approximately 4,582 cords. The Labrador Region and the budworm salvage roads appear to be much more efficient in making wood accessible, and tend to distort the overall picture. If, for example, these two groups of roads were removed, the average would drop significantly to 2,854 cords per kilometre. It should also be noted that in Labrador

higher efficiency in terms of the quantity of wood made accessible per kilometre is to be expected. The timber is virgin, up to 150 years old and would, therefore, yield higher cords per hectare than roads constructed on the Island portion of the Province.

In absolute terms, the Access Roads Program was successful in making large amounts of wood available. Placed in perspective, the program has barely scratched the surface. It must be recognized that, in total, the Province has a standing inventory of roughly 156 million cords of wood available on productive forest lands. The amount of wood made available through the Forestry Subsidiary Agreement was 4,945,803 cords or approximately 3% of the total supply.

From another perspective, namely the demand on the forest resource opened up by the access roads, 1980 figures show that the Bowater mill in Corner Brook and the Price mill at Grand Falls use in total roughly 2,863,750 m^3 stacked (790,000 cords) of wood per year. It is anticipated that the new Abitibi-Price mill scheduled to open in 1981 at Stephenville will use roughly 580,000 m^3 (160,000 cords) per year, while the sawmill industry harvests approximately 362,500 m^3 (100,000 cords) per annum. Using these figures as a basis for future wood consumption, it appears

that the program has made accessible approximately a five year supply of wood (this assumes that wood made accessible is ready for harvesting). This is, however, a misrepresentation of the case as at the present time only four of the access roads constructed under the Agreement (less than 14%) are being used by the companies. It is, therefore, not unreasonable to assume that the supply of wood created through this program is much longer than five years. In fact, if the basic objective of the program was to make wood accessible to the sawmill industry, then almost a 50 year supply of wood has been made available.

An additional indicator of efficiency employed in the evaluation of the Access Roads Program is the cost per cord of wood made accessible. Table 3.10 shows the cost per cord by region.

TABLE 3.10
SUMMARY OF CORDS MADE ACCESSIBLE AND COST PER CORD

Region	Wood (Cords)	Cost of Roads	Cost/Cord
Eastern	279,221.50	$ 850,795.40	$3.05
Central	1,284,607.13	4,931,606.89	3.84
Western	1,153,934.75	6,248,609.97	5.42
Labrador	839,140.00	1,280,524.08	1.53
Sub-Total	3,556,903.38	$13,311,536.34	$3.74
Budworm Salvage Roads	1,388,900.00	2,320,436.15	1.67
TOTAL	4,945,803.40	$15,631,937.49	$3.16

This table shows considerable variation in the cost per cord across the Province. It ranged from a high of $5.42 in the Western Region to a low of $1.53 in Labrador. The budworm salvage roads, as a group, were understandably more efficient. Of the total amount of wood made accessible under the Agreement, the budworm salvage roads accounted for 28% but they required only 15% of the total expenditure.

As stated in the first interim evaluation, the cost per cord indicator is an important planning consideration. It must, however, be used with caution in reaching conclusions on the relative efficiency of specific projects. Cost per kilometre varies considerably with the terrain, distance to the timber stand, the class of road constructed, timber volumes as well as other conditions. It can also be misleading when applied equally to new construction expenditures as compared to reconstruction/upgrading projects.

There is a general rule that a stumpage fee of $3.00 per cord should cover the cost of access road construction. However, such an expectation is only reasonable when measured against the construction of branch class "C" access roads designed to link in with established road infrastructure (Class "A" and "B" roads). Where no infrastructure exists considerable initial capital outlay is

required in establishing the class "A" and "B" network from which cheaper class "C" roads are built. This initial infrastructure has much longer periods of use, up to 20 years as main access roads, thereby justifying a much higher cost per kilometre.

Prior to the Forestry Subsidiary Agreement, little or no infrastructure in the form of Class "A" and "B" roads existed in the Western and Central Regions. For these reasons, heavy investments were required to establish the initial infrastructure of Class "A" and "B" roads. Thus, the costs per cord of wood made accessible for the Western and Central Regions of $5.42 and $3.84, respectively, were the highest recorded for any of the regions.

According to the Department of Forest Resources and Lands, there were 568 "industrial operations" served by the forest access roads. This was broken down into three pulp and paper mills, 239 sawmills, 106 logging operations and 220 industrial units classified only as "other". It should be noted that 152.9 km of road (roughly 14%) were used by the major companies for their wood cutting purposes and therefore 86% of the roads constructed served the smaller industrial operations. As the intent of the program was to assist the smaller industries who could not afford the capital outlay to finance access roads, it appears to have met its objective.

Table 3.11 indicates that the Western and Central Regions were the major beneficiaries of the Forest Access Roads Program, with 84% of the funds expended for construction going to these two regions, as well as 84% of the direct employment generated in construction. Although little or no information was available on the specific activity by region for budworm salvage roads, it was apparent that these roads were entirely constructed within the Central and Western Regions. The Evaluation Committee agrees with the decision to expend the bulk of the funds in these two regions as the majority of the Province's wood users are located in Central and Western Newfoundland.

TABLE 3.11
TOTAL ACTIVITY BY REGION

Region	% of Total km Built	% Cost By Region	% of Wood Made Accessible	Man Months* of Direct Employment	Direct Employment % of Total
Eastern	16.4	6.4	7.9	368.6	7.4
Central	40.0	37.1	36.1	2,022.7	40.8
Western	37.2	46.9	32.4	2,163.3	43.6
Labrador	6.5	9.6	23.6	404.5	8.2
	100%	100%	100%	4,959.1	100%

*NOTE: Man Months of Direct Employment resulting from construction of Budworm Salvage roads amounted to 761.73. This brings the total man months of direct employment to 5,720.83 or approximately 475 man years.

Table 3.12 gives a breakdown of the total potential for indirect employment as a result of construction of approximately 1,080 kilometres of access roads under the

Agreement. The assumptions employed can be found in Appendix II (Program Inventory Form) of this report. It must be emphasized that these are potential benefits only, and will not be realized unless harvesting and processing take place.

Table 3.12

Potential Estimate of Indirect Employment
Man Months

Region	Harvesting	Transportation	Processing	Total Indirect Man Months
Eastern	3,603.1	3,490.2	6,898.0	13,991.3
Central	15,871.6	11,201.9	12,932.3	40,005.8
Western	14,422.2	3,017.3	12,118.0	29,557.5
Labrador	8,391.4	839.1	322.5	9,553.0
Sub-Total	42,228.3	18,548.5	32,270.8	93,107.6
Budworm Salvage Roads	16,534.5	7,233.8	12,626.4	36,394.7
Total	58,822.8	25,782.3	44,897.2	129,502.3

The Evaluation Committee has observed throughout the life of the Agreement, the absence of an information system to track the benefits which have materialized, and will materialize in the future as harvesting takes place in the timber stands made accessible by this Program. The Evaluation Committee observes that this is still the case.

During the life of the Forestry Subsidiary Agreement all of the forest access roads constructed were capable of being used for recreational purposes (cabins, fishing, hunting, camping, etc.). Also, four of the roads constructed were converted into provincial roads by the Department of Transportation.

CONCLUSION

In summary, it is difficult to definitively state to what degree the Access Road Program was a success. This is because no quantitative goals such as employment, kilometres of road constructed, etc. were originally specified in the Agreement.

In general terms, the main objective was to provide access to the Newfoundland forest resource. Upon termination of the Agreement, over 1,000 kilometres of access roads had either been constructed or upgraded/reconstructed, providing factual evidence of access opportunity to the forest resource. At the same time, approximately 5 million cords of wood were made accessible and almost 6,000 man months of direct employment created. Additionally, as the wood is harvested and processed numerous other job opportunities will materialize. Also, prior to the Forestry Subsidiary

Agreement, little or no infrastructure (Class "A" or "B" roads) existed in Newfoundland and Labrador. The Province now has the capability of building branch roads (Class "C") to additional timber stands at reasonable levels of expenditure. Measured against this evidence the Evaluation Committee feels that the Forest Access Roads Program was certainly successful.

However, the Evaluation Committee would like to mention the following points to assist in future decisions with respect to allocation of funds towards further access road development. A significant share of the provincial lumber comsumption is supplied by imports from mainland Canada. As a measure of support to the sawmill industry, it is recommended that commercial sawmills be given at least equal consideration with the pulp and paper companies when decisions are made concerning the location of future access roads. This will contribute to the objective of decreasing our reliance on imported lumber, and will aid local sawmillers in their struggle to become viable.

It is the Evaluation Committee's recommendation that future access road construction projects be subjected to rigorous pre-evaluation criteria taking into account the

amount of wood which has already been made accessible under this Forestry Agreement. The Committee recognizes, however, that access to the resource to conduct silviculture treatments, to facilitate expedient harvesting of budworm damaged timber, and to permit adequate forest protection are other equally important considerations in allocating funds for further access road construction in the future.

Finally, the Evaluation Committee once again recommends that steps be taken to develop and maintain an information system which will systematically track the benefits accruing to the Province as a result of past and future forest access road expenditures.

3.6 Program 5 - Intensive Forest Inventory

Objective: To provide the necessary information (concerning forest inventories) to conduct and plan forest operations within the management units.

Original Allocation	$2,837,000
Revised Allocation (1979)	3,191,400
Utilization (1976)	1,308,539
Utilization (1978)	2,213,314
Utilization March 31, 1980	3,191,400

This program consists of three program elements designed to compile an inventory of the forest resources of the Province. The information generated is a critical component in the development of good forest management in this Province.

3.6.1 Management Inventory

Original Allocation	$2,757,400
Revised Allocation (1979)	3,006,025
Utilization (1976)	1,273,165
Utilization (1978)	2,123,953
Utilization March 31, 1980	3,006,025

The objective of this program element was to compile information on the forest resources of the Province which would represent the basis upon which comprehensive forest management plans would be prepared for each of the respective management units.

The inventory (including information on timber volumes by species, location, density, size, suitability for processing, fibre, age and growth rates) was conducted in three phases: photography, field work, and computer printouts by management units. The table below indicates the progress which has been made over the life of the Agreement.

TABLE 3.13

Progress Report - Intensive Forest Inventory
No. of Units and Type of Work
Completed for Each

	1976	1978	1980
Photo-Interpretation Units Complete	9	13	18
Field Work Commenced	6	10	12
Data Processing Finalized	2	5	6
Units Completed	2	5	6

In the context of a revolving 10-year cycle of conducting forest inventory work, the progress acheived to date has been slower than anticipated. It is questionable

whether all units can be completed within a 10-year period thus diminishing the accuracy of the information being used as a basis for a management plan in those units completed earlier in the Agreement. Given continuing losses to the inventory of forest resources from insect attack, fire and harvesting, it is critical that the inventory be updated at least within a 10-year period. This is a matter of serious concern to the Evaluation Committee.

On a more positive note, the Evaluation Committee notes that 1,398 temporary plots were established as were 106 cut plots. Additionally, 740 permanent plots are now in place. Cost information data has improved to the extent that management is able to judge the relative efficiency of field operations in the various units and from one year to the next. Similarly, the Evaluation Committee has been informed that 408 forest type maps were produced under the Agreement and progress is being made in maintaining cost data on a per map basis. The Evaluation Committee is encouraged by the fact that greater attention is being paid by forestry personnel to the relative efficiency in which programs are carried out, particularly in the case of the Forest Inventory program element.

3.6.2 Hardwood Forest Inventory

Original Allocation	$79,600
Revised Allocation (1976)	35,374
Utilization 1976	35,374
Utilization March 31, 1980	35,374

The objective of this program element was to compile information on the nature and extent of the birch resource in Central Newfoundland as a basis for establishing the feasibility of hardwood based processing industries.

An inventory was carried out in a 651 square mile area (1,686 square kilometres) of Central Newfoundland, utilizing staff resources assigned to the Management Inventory program element. Costs were approximately $85 per square mile which is considered normal for this type of inventory. The quality of information generated is acceptable for intended uses. In fact, the data has been used in assessing the feasibility of a hardwood-based wood industry.

The Evaluation Committee feels that this was a worthwhile expenditure and that the objective of the program element was met. Unfortunately, no industrial activity

materialized. It should be noted that further field research will still be necessary to refine the data to satisfy the particular requirements of proposals as they materialize. Additionally, the Evaluation Committee has been unable to find any justification for not extending the hardwood inventory to additional areas of the Province.

3.6.3 Site Assessment and Biophysical Surveys

Original Allocation	$180,000
Revised Allocation (1979)	150,000
Utilization (1976)	NIL
Utilization (1978)	53,987
Utilization March 31, 1980	150,000

The objective of this program element was to evaluate forest sites for their potential for different forestry operations. Site Assessment and Biophysical Surveys identify the potential of the forest site and describe the factors which would limit its productivity, or factors which would make the site uneconomic for forest investments in silviculture. During the life of the Agreement, 112 site appraisal reports were carried out, a "Manual for Forest Site Descriptions" was distributed throughout the Department, and a pilot project involving Forest Site Mapping in Management

Unit 10 was completed. The pilot project was instrumental in demonstrating that this program element could be used as an effective pre-planning tool in determining broadly those areas where the various types of silvicultural treatments could most productively be implemented. Co-ordination of the site assessment and biophysical surveys with forest management and silviculture planning has improved over the life of the Agreement. In the earlier stages this program element was used predominately as a reactive site appraisal technique after a site had been identified by Management unit personnel and silvicultural specialists as having potential for silviculture investments. Site assessment and biophysical surveys are now an integral component of the planning process. Through forest site mapping over a geographically compact area, the program element has become more efficiently utilized and has had greater effectiveness in forest management and silviculture planning.

CONCLUSION

The Evaluation Committee expresses satisfaction with the improvements which have been made towards developing and maintaining a management information system for the Intensive Forest Inventory Program which is sensitive

to efficiency in program delivery. The Evaluation Committee also commends Forestry personnel on their success in integrating Site Assessment and Biophysical Surveys into Forest Management and Silviculture Planning. Efficiency in program delivery and the effectiveness of the technique have improved considerably.

The Evaluation Committee notes with concern that the Management Inventory program element is falling behind schedule. Increased effort to ensure that the inventory is complete for all 19 management units within the next five years is essential if the data generated under this program element can continue to be used with any great degree of confidence in future preparation and updating of management unit plans. The Evaluation Committee notes that the original target was to complete the Forest Inventory for all 19 management units under this Agreement, but for technical reasons it was extended to a 10-year period. Even this extended deadline is now in doubt.

3.7 - Program 6 - Forest Protection

Objective: To increase ability to protect the forest from fire, insect and disease.

Original Allocation	$2,420,000
Revised Allocation (1978)	3,761,400
Final Allocation (1980)	3,957,200
Utilization (1976)	1,497,287
Utilization (1978)	3,208,389
Utilization March 31, 1980	3,957,200

This program consists of four program elements designed to provide the Department of Forest Resources and Lands with the capability to carry out its responsibilities with respect to forest protection against fire, insect and disease.

3.7.1 Assessment and Refurbishment of Water Bomber Fleet

Original Allocation	$ 805,000
Revised Allocation (1980)	2,095,420
Utilization (1976)	557,631
Utilization (1978)	1,719,590
Utilization March 31, 1980	2,095,420

The original objective of this program element was to assess the mechanical condition and life expectancy of each aircraft in the Province's fleet (at that time) of five water bombers and to determine the costs of refurbishment or acquisition of other aircraft. This assessment was carried

out and the recommendation made to refurbish the fleet thus increasing the operational life of each of the aircraft by ten years. Funds were subsequently transferred from another program to underwrite the costs of refurbishment.

Refurbishment of the five water bombers was mostly completed by 1976 at a total cost of $855,390. Some additional refurbishment took place in January 1979 at a cost of $35,800. The Evaluation Committee agrees with the decision to refurbish the five aircraft at an approximate cost of $160,000 each. The acquisition of new aircraft of the same type would have incurred substantially higher costs, in the range of $2,000,000 per replacement aircraft. These aircraft have performed well since undergoing refurbishment with very little downtime due to mechanical failure over the past five fire seasons. The operational capability of the fleet has obviously improved as a result.

Two additional used Canso Aircraft were also purchased under this program element, thus bringing the fleet to seven aircraft in total.[1] These aircraft were

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[1] One aircraft recently crashed in Quebec, thus the fleet complement is now at six.

purchased from Field Aviation Co. Ltd. of Ontario, who were the only bidders on tender, at a cost of $1,204,230. This cost covered the purchase price of the aircraft as well as their conversion to water bomber status.

The Evaluation Committee concludes that this program element was implemented in an efficient and effective manner. The Department of Forest Resources and Lands now has the capability to provide an improved fire protection service.

3.7.2 Replacement of Radio System (VHF)

Original Allocation (1976)	$ 850,100
Final Allocation (1979)	1,550,390
Utilization (1976)	790,000
Utilization (1978)	1,233,413
Utilization March 31, 1980	1,550,390

The objective of this program element was to install a modern radio-telephone communication system basically for forest fire detection and suppression. The old AM high frequency system in place prior to the signing of the Agreement, was inadequate for these purposes and improvements to it were not permitted under federal communications regulations.

The system has been installed with the exception of three sites which are not yet operational. While parts of the system are functioning adequately, the Evaluation Committee understands that major problems are being experienced in maintaining the trunk portion of the system. The nature of the system is such that continuous maintenance is required, and the Department of Forest Resources and Lands has been unable to provide sufficient technician manpower to keep the system operating. This fact, coupled with the problems of access to remote sites in poor flying conditions, have rendered the system often inoperable.

The Evaluation Committee observes that the total cost of installation of the new system exceeded the original cost estimate by almost 100%. The Evaluation Committee also questions the site selection process, noting that if more emphasis were placed upon accessibility in choosing the base stations, and the repeater stations, maintenance would not present the same degree of difficulty as is now being experienced. Finally, it appears obvious that maintenance personnel must be made available if the major investment in the system is to be justified.

3.7.3 Aerial Surveillance

Original Allocation (1976)	$684,000
Final Allocation (1979)	229,282
Utilization (1976)	127,950
Utilization (1978)	197,172
Utilization March 31, 1980	229,282

The objective of this program element was to provide aerial surveillance of fires throughout the Province. Early detection of fires reduces timber losses and fire suppression costs.

Aerial Surveillance was provided under this program element through a combination of chartered aircraft in Labrador and the purchase of an aircraft for this purpose for the Island. The aircraft was purchased at a cost of $95,000, charters cost another $95,000 and $40,000 was spent on the acquisition of an infra-red scanner for the aircraft to facilitate the spotting of sub-surface fires.

Throughout the life of the Agreement, the Evaluation Committee has questioned the efficiency in which this program element has been administered. In previous reports, the Evaluation Committee observed that the original allocation was sufficient to enable the purchase of

additional surveillance aircraft, but this action was not taken. At the termination of the Agreement, the Department of Forest Resources and Lands does not have the surveillance capability to cope with an average or above average fire season, without engaging in additional costly charters. The Evaluation Committee questions the decision to utilize funds originally allocated for this program element on cost overruns on the VHF system, and the purchase of additional water bombers. The Committee, therefore, concludes that the objective of this program element has not been met.

3.7.4 Insect Protection (Forest Insect Surveys)

Original Allocation	$ 80,700
Final Allocation (1979)	124,956
Utilization (1976)	910
Utilization (1978)	58,213
Utilization March 31, 1980	124,956

The original objective of this program element was to acquire expertise for the Department in insect protection and disease problems. The objective was subsequently changed to information gathering on the extent of disease and insect infestation throughout the Province.

Expenditures under this program element were used to cover aircraft charter costs and temporary manpower

required to carry out annual defoliation, egg mass, hibernacula and damage assessment surveys designed to monitor the spread of the spruce budworm epidemic. The approach used in conducting the survey is consistent with that used elsewhere in Canada. The results of the survey have been used as a data source upon which policy decisions have been made with respect to the spruce budworm, at least to some extent. The Evaluation Committee concludes that the objectives of this program element have been met in an efficient and effective manner.

CONCLUSION

The Evaluation Committee's overall conclusion is that this program has met its objective in an efficient and effective manner. The Province has been able to substantially upgrade its fire suppression capability as a result of the refurbishment and acquisition expenditures on the water bomber fleet. A vastly improved communications system has been installed which, if maintained properly, further strengthens the Province's fire detection and suppression capability. There were significant cost overruns on the VHF System but it must be remembered that installation took place during a period of rapidly increasing construction costs and the initial estimates were significantly

understated. The Evaluation Committee is disappointed that no action was taken throughout the life of the Agreement to correct, in the Committee's opinion, a lack of emphasis on the Aerial Surveillance program element. There is no doubt that this will create problems in fire detection in future bad fire seasons.

3.8 - Program 7 - Forest Improvement

Objective: To increase future yields of the forests of Newfoundland.

Original Allocation	$5,827,400
Revised Allocation (1978)	6,076,000
Revised Allocation (1979)	6,350,490
Utilization (1976)	1,843,052
Utilization (1978)	3,695,390
Utilization March 31, 1980	6,061,319[1]

A wide range of reforestation, afforestation and improvement techniques were allocated funding over the life of the Forestry Subsidiary Agreement. This program originally consisted of ten separate program elements, grouped into three classes. In 1977/78, however, an eleventh program element was added to Class C of the Forest Improvement Program.

3.8.1 Fertilization

Original Allocation	$1,141,500
Revised Allocation (1978)	47,722
Utilization (1976)	43,522
Utilization March 31, 1980	53,195[1]

[1] These utilization figures differ from amounts indicated in Table 3.1. This reflects a weakness in the accounting systems used under the Agreement.

The objective of this program element was to increase fibre yields of commercial stands nearing maturity by fertilization treatments.

Most of the province's soils are deficient in nutrients, most notably nitrogen. These soils can be fertilized with urea to improve the growing capability, thereby increasing fibre volumes of trees on the site. This program element was designed to fertilize soils supporting timber stands approximately 10 years from maturity. By concentrating treatments on sites near processing centres, harvesting as well as transportation costs per unit of fibre would be reduced. Originally, over 2,000 hectares were to be fertilized under this program element.

In 1974/75, 45 tonnes of urea were purchased at an average price of $270 per tonne for use at Port Blandford. No fertilization treatments were undertaken that year. Some work was done on road grading at Cochrane Pond relative to obtaining fertilizer from a swine operator. In 1975/76, this fertilizer was used in three areas as follows:

Site	Area (hectares)
Port Blandford	53.4
Salmonier Area	1.8
Jonathons Pond	4.0
Total	59.2 @ 493 kg/ha urea

Sample plots were established to monitor progress of growth response. In 1976/77, nine tonnes of urea were purchased at $171 per tonne. In 1977/78, 16.2 ha of a pre-commercially thinned stand were fertilized in the Eastern Region.

Activity during 1979/80 consisted of 41 ha being fertilized at Scammels Pond in the Western Region. The total cost of this fertilization project was $5,416. During the entire period of operation, 116.4 hectares were treated with urea, generating a total of 35.2 man-months of employment. Total program element costs were $53,195.

TABLE 3.14
FERTILIZATION
SUMMARY OF EXPENDITURES AND EMPLOYMENT

Region	Item	1974/75	1975/76	1976/77	1977/78	1979/80[2]	Total
Western	Salary	---	---	---	---	$4,786	$4,786
	Capital	---	---	---	---	---	---
	Other Exp.	---	---	---	---	630	630
	Sub-Total	---	---	---	---	$5,416	$6,416
Eastern	Salary	$20,995	$2,934	$ ---	$1,837	---	$25,766
	Capital	12,280	---	1,556	---	---	13,836
	Other Exp.	4,949	808	---	2,420	---	8,177
	Sub-Total	$38,224	$3,742	$1,556	$4,257	---	$47,779
	TOTAL	$38,224	$3,742[1]	$1,556	$4,257	$5,416	$53,195
Employment (Man Months)		22.0	4.0	-	2.7	6.5	35.2

[1] 4.0 hectares were treated at Jonatons Pond in the Central Region in 75/76 but cost figures were not available.

[2] No activity took place in 78/79.

The evaluation committee notes that $16,596 in unrelated work (mainly thinning operations) was charged to this program element. Deducting this amount from the fertilization program costs results in an actual program element cost of $36,599.

Due to rapidly escalating fertilizer costs, this program element was temporarily suspended after the 1975/76 season. The original allocation of funding was reduced, with the majority of funds transferred to other forest improvement program elements. The cost of fertilizer has dropped since 1975/76, however, ~~only~~ two additional trials did occur ~~occurred~~, in 1977/78 and 1979/80. The Evaluation Committee agrees with the decision to scale down and change the thrust of this project from one of operational treatments to trial studies. The actual cost of approximately $314/ha (not including unrelated charges) exceeds the benefits which could be expected from fertilization treatments.[1] Therefore, while trials in the future are warranted to study growth response, full-scale operational fertilization cannot be justified unless fibre values increase dramatically or costs can be significantly reduced.

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[1] For example, assume average gains in wood volume after ten years approximate 20 m^3 per ha, and this "extra" fibre has a value of $1.25/$m^3$. Also, assuming a real discount rate of 3% and an actual cost of $314/ha, the net present value of the treatment would be minus $295/ha.

The stands fertilized will benefit from the treatment in terms of biological response. The goal of treating 2,000 hectares had to be revised in view of high fertilizer costs and low economic returns. Hopefully, all sites treated under this program element will be protected and monitored for growth response. These results will prove to be useful in the future.

3.8.2 Pre-commercial Thinning

Original Allocation	$1,052,400
Revised Allocation (1978)	2,021,101
Revised Allocation (1979)	2,358,171
Utilization (1976)	437,482
Utilization (1978)	1,229,861
Utilization March 31, 1980	2,145,487

The objective of this program element was to increase future yields in young stands by manual thinning treatments.

An estimated 1.8 million hectares of productive forest land on the Island are occupied by overstocked stands of commercial species. Because of this overcrowding, merchantable volume production of these stands is greatly reduced over normal growth rates. Benefits from pre-commercial thinning include increased growth, and reduction of the rotation age and harvesting costs of the stand in the future.

During the period of operation, a total of 5,217 ha of overstocked stands were thinned. Total employment generated was 2,104 man months and total program element costs are estimated at $2,145,487. Area treated and employment are presented below, broken down by region (Table 3.15):

TABLE 3.15
PRE-COMMERCIAL THINNING
SUMMARY OF ACTIVITY AND EMPLOYMENT

Item	Region	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	Total
Area Treated (ha)	Eastern	8.9	52.2	68.6	136.8	99.0	--	365.9
	Central	165.9	70.8	77.4	1,193.1	507.0	--	2,014.2
	Western	19.4	32.3	51.4	551.6	1,065.0	1,117.0	2,836.7
	Total	194.2	155.7	197.4	1,181.4	1,671.0	1,117.0	5,216.8
Employment (man-months)	Eastern	12	53	47	77	53	--	242
	Central	92	65	62	347	171	--	737
	Western	17	29	55	216	359	449	1,125
	Total	121	147	164.	640	583	449	2,104

The efficiency of this program element is difficult to assess due to the poor quality of accounting data available. Recent data submitted by the Department of Forest Resources and Lands, conflicted with earlier figures presented to the Evaluation Committee. As well, there were repeated examples of work charged to this program element which were totally unrelated to pre-commercial thinning. Examples include clearing flooded areas in Bay d'Espoir,

stand tending at Colliers Ridge and patrolling fires. There are other examples as well, but the main point is these non-related costs distort the estimation of actual pre-commercial thinning costs. With the inclusion of these costs, plus the fact that different accounting figures conflict with one another, the Evaluation Committee cannot accurately determine the total cost of this program element, total area treated, or total employment generated. The figures presented in Tables 3.15 and 3.16 are best estimates using available data.

In terms of utilization of allocated funding, no firm conclusions are possible. The Evaluation Committee has estimated total utilization of $2,145,487, or 91% of allocated funding. Other figures supplied by the Department of Forest Resources and Lands indicate an additional expenditure of $113,712. The Evaluation Committee cannot account for this additional expenditure.

Over the period of operation, costs per ha were estimated as follows:

Year	Cost/ha ($)
1974/75	899.09
1975/76	730.20
1976/77	555.14
1977/78	381.75
1978/79	370.67
1979/80	366.99

Table 3.16
Pre-Commercial Thinning
Summary of Expenditure by Region

Region	Expenditure type	Year of Operation 1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	Total
Head-quarters	Salaries	$48,285	$	$	$	$	$	$ 48,285
	Capital Expend.	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-
	Total	48,285	-	-	-	-	-	48,285
Eastern	Salaries	10,068	22,819	9,685	70,192	36,344	-	149,109
	Capital Expend.	963	2,034	25	-	-	-	3,024
	Other	2,198	13,138	1,551	14,222	6,346	-	37,457
	Total	13,229	37,992	11,263	84,414	42,690	-	189,590
Central	Salaries	73,014	25,030	59,442	324,934	164,854	-	647,276
	Capital Expend.	6,962	2,229	157	-	-	-	9,350
	Other	15,888	14,397	9,491	60,113	59,686	-	159,578
	Total	95,865	41,657	69,092	85,048	224,540	-	816,204
Western	Salaries	13,130	20,412	25,139	195,938	285,597	337,396	877,603
	Capital Expend.	1,247	1,827	66	-	-	-	3,142
	Other	2,846	11,801	4,022	52,878	66,576	72,538	210,664
	Total	17,224	34,041	29,228	248,806	352,173	4,099	1,091,409
Total	Salaries	144,497	68,261	94,267	591,054	486,795	337,396	1,722,272
	Capital Expend.	9,173	6,091	250	-	-	-	15,516
	Other	20,933	39,338	15,066	127,215	132,608	72,538	407,699
	TOTAL	$174,604	$113,692	$109,584	$718,270	$619,403	$409,934	$2,145,487

As the figures indicate, average costs per ha decreased annually, reflecting increased operating efficiency on site as crews became more experienced. In fact, the cost per ha shown for 1979/80 is competitive with industry costs for similar work.

While operating efficiency showed improvement each year, the same cannot be said about the accounting system. Therefore, from an overall view, the efficiency of this program element was felt to be low.

The Evaluation Committee is unable to determine the operational goals set for this program element. A thorough evaluation of goal achievement is, therefore, difficult.

The committee notes that 5,217 ha of overstocked stands were thinned with employment generation of 2,104 man-months. These achievements can be viewed as benefits, both to the forests of Newfoundland, and to those persons employed on the project. In future programs, however, the Evaluation Committee recommends that annual target goals be explicitly stated to allow tracking of program element effectiveness.

3.8.3 Commercial Thinning

Original Allocation	$476,000
Revised Allocation (1978)	437,482
Utilization (1976)	437,482
Utilization March 31, 1980	439,395

The objective of this program element was to increase future fibre yields by thinning overstocked softwood stands nearing biological maturity.

Commercial thinning is a silvicultural technique designed to reduce stocking levels in overstocked stands nearing biological maturity. This spacing results in improved stand growth until harvesting occurs in the near future. The fibre removed during thinning has a commercial value as pulpwood.

Originally, 1,417 ha of near mature softwood stands were to be thinned under this program element. Stocking levels would be reduced from 4,940 stems/ha to 1,000 stems/ha. Benefits of commercial thinning include the following:

a) a reduction in future harvesting costs of the thinned stands due to reduction in stems/ha and increased volume per stem as the stand matures;

b) thinned stands will produce more sawlog sized timber than unthinned stands; sawlogs are a higher value fibre than pulpwood; and

c) during thinning, production of 8-to-14 m^3/ha of pulpwood will offset thinning costs to a moderate degree.

Commercial thinning operations were conducted for two years and then halted following the 1975-76 fiscal year for three reasons. First, difficulties were encountered in marketing the pulpwood thinned from the stands. Secondly, thinned stands suffered heavy blowdown losses. Thirdly, higher than expected treatment costs were encountered.

During 1974/75 and 1975/76, approximately 156 and 215 hectares respectively were thinned in the Eastern, Central and Western Regions of the Province. A total of 371 ha were treated during the period of operation with 32,612 m^3 of pulpwood being removed from the stands thinned. Approximately 561 man-months of employment were generated. Total program element costs were $439,395 with 62% spent in Central Newfoundland, 16% in the Eastern Region and 17% in

the Western Region. The remaining 5% was spent as follows: 2% in headquarters salaries in 1974-75 and 3% in 1976-77 on expenditures carried over from the previous fiscal year.

TABLE 3.17
COMMERCIAL THINNING
SUMMARY OF EXPENDITURES

Item	1974-75	1975-76	1976-77	Total
Salary	$131,038	$189,552		$320,591
Capital Equipment	11,298	21,779		33,077
Others	25,511	47,685	$12,530	85,726
Total	$167,847	$259,017	$12,530	$439,394

During the period of operation, some work not related to commercial thinning was charged to the program element. Examples of non-related work included shoreline cleanup, fire suppression, site clearing and stand tending. These expenditures must, therefore, be deducted from the above table in order to properly evaluate only the thinning operations.

For the commercial thinning only, 331 ha were treated at a total cost of $315,584. From the data available, direct employment can only be estimated. Table 3.18 on the following page represents selected figures for only the commercial thinning operations.

TABLE 3.18
COMMERCIAL THINNING
SUMMARY OF ACTIVITY AND EMPLOYMENT

Year	Number of Man-Months*	Area Thinned (Ha)	Total Costs ($)
1974-75	227	137	146,213
1975-76	267	194	169,371
Total	494	331	315,584

*A total of 561 man months were generated for all activities under this program element but 494 man months were directly attributable to commercial thinning operations.

The 331 ha of overstocked softwood stands will certainly benefit from the commercial thinning operations. However, this program element did not achieve the original objective of 1,416 ha's of stands thinned. With limited markets for pulpwood at the time, little if any of the thinned pulpwood was sold.

The overall efficiency of this program element was felt to be low. The average cost of the thinning operation was approximately $953/ha. It should be noted that over 100% utilization of funds occured, yet only 23% of the area to be thinned was actually treated. Accounting practices and information flows for this program element were somewhat weak and caused considerable difficulty in writing a thorough

evaluation. The Evaluation Committee agrees with the decision to terminate this program element after two years of operation. In terms of potential economic benefits as compared to high treatment costs, commercial thinning in this Province does not appear to be a viable silvicultural prescription. Even if the thinned pulpwood could have been sold to offset costs, the level of costs were so high that this reduction would be insignificant. Thus, high costs, low product values and lack of markets for thinned pulpwood were prohibitive constraints for commercial thinning.

3.8.4 Clearing Flooded Areas

Original Allocation	$170,800
Revised Allocation (1978)	33,124
Utilization (1976)	33,124
Utilization March 31, 1980	33,124

The objective of this program element was to improve the aesthetic value and recreational potential of shorelines of flooded areas.

The reservoir created during the Bay d'Espoir power development was flooded without first clearing the timber from future shorelines. The Province not only loses the potential economic benefits from any merchantable timber

flooded, but also incurs reduced aesthetic and recreational values. The new lakes produced by the flooding have unsightly and often dangerous dead trees along the shorelines. This program element was designed to harvest the timber along these future shorelines. Water levels would first be lowered, with clearing of shorelines to follow. The water level would then be allowed to rise to planned levels and full development of the area's recreation potential would be possible.

During the operating period, 25 kilometres of shoreline were cleared. Of this total, 24 kilometres were cleared in 1974-75 and 1 kilometre in 1975-76. There is some confusion as to exactly how much of the work was actually charged to the program element. It seems that some clearing work was charged to other program elements such as commercial thinning. A total of $33,124 was charged to shoreline clearing over the operational period. However, taking into account work charged to other program elements, the total estimated cost of shoreline clearing is likely $45,273. A total of 77 man months of employment were generated. This program element was terminated after 1975-76 with the funds remaining from the original allocation being utilized in other program elements.

TABLE 3.19
CLEARING FLOODED AREAS
SUMMARY OF EXPENDITURES

Item	1974-75	1975-76	Total
Salary	$32,172		$32,172
Capital Equipment		$250	250
Other	144	558	702
Total	$32,316	$808	$33,124

There is great difficulty in assessing the achievement of objectives. First, there were no operational objectives such as clearing a specific distance of shoreline per year. Second, no records exist pertaining to the volume of merchantable timber salvaged, if any, or the width of cleared shorelines. A definite set of operational goals should have been outlined, before any work began.

Using the total estimated cost figure of $45,273 and the distance cleared of 25km, the average cost for this program element was $1,811 per kilometre. Without knowing the width of the cleared shoreline or the volume of timber removed, one cannot properly evaluate this cost per kilometre figure. The decision to terminate this project after 1975-76 was felt to be wise. The shoreline clearing program element did not contribute greatly to an overall improvement in the forest resources of Newfoundland. Unless a strong case can

be made in regards to the economic benefits of improved recreation potential, this type of program has limited use in the immediate future.

3.8.5 Demonstration Areas

Original Allocation	$105,200
Revised Allocation (1978)	1,195
Utilization (1976)	1,195
Utilization March 31, 1980	1,195

The objective of this program element was to demonstrate various forest management activities to the general public.

As part of the overall development of the Salmonier Provincial Park, the Department of Forest Resources and Lands began construction of a series of hiking trails within the park. This program element was designed to supplement initial progress on the hiking trails as well as provide a variety of interpretive sites and forest demonstration areas. The completed project would provide visitors the opportunity for intimate contact with the forest. As well, the program element would promote a better understanding of and greater desire to protect the forest environment among park visitors.

In 1974-75, 1.6km of hiking trails were completed. Only a minimal expenditure occured in 1975-76 following which the program element was terminated. Funds remaining from the initial allocation were diverted to other program elements. No labour costs were charged to this program element although 30 man-days of employment were generated and 10 labourers hired for the project. Total costs were $1,195.

TABLE 3.20
DEMONSTRATION AREAS
SUMMARY OF EXPENDITURES

Item	1974-75	1975-76	Total
Salary	NIL	NIL	NIL
Capital			
Equipment	NIL	NIL	NIL
Other	$1,177*	$18**	$1,195
Total	$1,177	$18	$1,195

*$612 for chainsaw hire, remainder travel costs
**Travel costs

The original program element goals were not achieved despite the initial allocation of $105,200. The $1,195 actually spent was for completion of ongoing trail construction rather than the new demonstration areas and interpretive sites. This program element was terminated after the 1975-76 fiscal year due mainly to the transfer of the forester in charge.

The efficiency of this program element is difficult to comment on. The Evaluation Committee agrees with the decision made to terminate this project after two seasons. Although the idea of promoting a public awareness of forestry is important, the funding originally allocated was rightfully used in other, more critical forest improvement programs. In future, this type of project may be justified. Investigations should be made into the potential for increasing public awareness of forestry through alternate measures such as pamphlets, films and media, advertisements or articles. At present, however, the benefits of public awareness must be measured against the benefits of using the funding in more vital areas of forest management.

3.8.6 Christmas Tree Production

Original Allocation	$178,900
Revised Allocation (1978)	23,098
Revised Allocation (1979)	22,702
Utilization (1976)	14,910
Utilization March 31, 1980	22,517

The objective of this program element was to improve the structure of the Newfoundland Christmas tree industry and to encourage a more organized and profitable industry.

Prior to the initiation of this program element, no organized production of Christmas trees existed in Newfoundland. Individuals or commercial operators cut their trees from any convenient area, provided the location was 100 metres from a public road. By selecting immature trees or tops from mature trees in a random process, the overall quality of the forest resource was being reduced. To encourage a more responsible and orderly Christmas tree industry, this program element was designed to establish demonstration areas managed for Christmas tree production. Commercial operators could then set up similar production areas.

During 1974-75, 2 hectares of balsam fir were thinned and fertilized. A similar area was treated during the 1975/76 fiscal year. Both sites were in the Eastern Region of the Province. During August and September of 1977, approximately 6.9 ha were treated in a demonstration project at Frenchman's Pond on the West Coast. In 1978-79, 7 hectares were treated at McIvers in the Western Region. All sites were thinned to a 1.8 m x 1.8 m spacing, resulting in approximately 4,302 Christmas trees per hectare.

TABLE 3.21
CHRISTMAS TREE PRODUCTION
SUMMARY OF EXPENDITURES

Region	Item	1974-75	1975-76	1976-77	1977-78	1978-79	Total
Eastern	Salary	$ --	$12,397	--	$ --	$ --	$12,397
	Other	1,765	692	--	56	--	2,513
	Sub-Total	1,765	13,089	--	56	--	14,910
Western	Salary	--	--	--	5,362	1,512	6,874
	Other	--	--	--	510	223	733
	Sub-Total	--	--	--	5,872	1,735	7,607
	TOTAL	$1,765	$13,089	--	$5,928	$1,735	$22,517

Some unrelated work was charged to this program element, however, the exact amount and type cannot be determined.

The following gives a breakdown of employment for the operating period of the program element:

1974/75 and 1975/76 - 9 man months

1977/78 - 62.8 man months

1978/79 - 2.25 man months

TOTAL - 74.05 man months

The efficiency of this program element is difficult to assess. A total of 17.9 hectares are under management for Christmas tree production resulting in an average cost of $1259 per hectare, or $0.29 per tree. The first crop of trees will not be mature until 1982. Only then,

can the efficiency of investing in Christams trees be determined. However, assuming a nominal interest rate of 12%, each tree in the eastern region site must be valued at $1.97 on the stump in 1982, if costs are to be recovered. The accounting of costs in this program element could have been improved. Cost data supplied at different intervals all reported different totals. While the discrepancies were small in value, they still emphasized the need for tighter control over accounting practices.

The Evaluation Committee agrees with the decision taken to scale down this program element. Until policy initiatives are undertaken to limit individual cutting of Christmas trees at no charge, large-scale commercial operations are unlikely to succeed.

3.8.7 Stand Tending

Original Allocation	$70,900
Revised Allocation (1978)	77,981
Utilization (1976)	61,490
Utilization (1978)	78,124
Utilization March 31, 1980	77,981

The objective of this program element was to carry out stand improvements such as clearing, thinning, and pruning in pine plantations established in the 1940's. This objective was later extended to include improvement measures to aid stand establishment.

During the 1940's, many areas in Newfoundland were planted with exotic pine species as an unemployment relief measure. This program element was designed to improve the quality of these stands by various treatments. A portion of the allocated funding was also to be directed onto sites requiring complete clearing to aid in establishing stands containing more commercially desired species.

From the information available, the Evaluation Committee cannot accurately determine the area treated. Work not related to this program element was included, most notably, pre-commercial thinning at Swift Current. As well, it would be extremely difficult to separate expenditures on stand tending which might more appropriately be charged to site reclamation. Table 3.22 indicates estimated area treated and employment.

TABLE 3.22
STAND TENDING
SUMMARY OF ACTIVITY AND EMPLOYMENT

Item	Region	1976/77	1977/78	Total
Area Treated (ha)	Eastern	34.6	34.0*	68.6
	Central	53.8	-	53.8
	Total	88.4	34.0	122.4
Employment (man-months)	Eastern	100	100*	200
	Central	159	-	159
	Total	259	100	359

*Estimated

A total of 122.4 ha of stands were treated in the two years of operation, although this figure likely contains some unrelated work. Due to the fact that no accurate data were available for 1977/78, figures for area treated and employment can only be estimated from the conflicting information provided to the Evaluation Committee.

TABLE 3.23
STAND TENDING
SUMMARY OF EXPENDITURES

Region	Item	1974/75	1975/76	1976/77	1977/78*	Total
Eastern	Salaries	$ -	$ -	$12,814	$14,000	$26,814
	Other	-	-	2,281	2,491	4,772
	Sub-Total	N.A.	N.A.	$15,096	$16,491	$31,587
Central	Salaries	-	-	37,529	-	37,529
	Other	-	-	6,666	-	6,66
	Sub-Total	N.A.	N.A.	$44,196	-	$441,96
Total	Salaries	-	-	50,344	14,000	64,344
	Other	-	-	8,948	2,491	11,439
	TOTAL	$641	$1555	$59,292	$16,491	$77,981

*Expenditure figures for 1977/78 are estimates, derived from available data.

Weak accounting practices with this program element again hinder a thorough evaluation. The Evaluation Committee was unable to determine exact expenditures, area treated or employment from available data, therefore, only rough

estimates past 1976/77 are possible. As well, the funds spent in 1974/75 and 1975/76 cannot be classified into expenditure categories. Without accurate expenditure data, especially for 1977/78, actual utilization of funding cannot be determined. The Committee, therefore, assumes 100% utilization of the funds allocated even though it is unable to account for the $16,491 expenditure in 1977/78. Assuming a total expenditure of $77,,981, costs per hectare averaged $637.09 during the period of operation. In 1976/77, costs per hectare averaged $436/ha in the Eastern Region and $821/ha in the Central Region. In 1977/78, average costs per hectare were $485.03. The higher costs in the Central Region in 1976/77 cannot be explained. Overall, these treatments incur high costs and low levels of benefits. Unless costs can be reduced significantly or fibre values increase, this type of treatment cannot be justified in future operations.

Since no operational objectives were set, little can be said about achievement of goals. This program element should have had operational objectives stated prior to initiation of work in 1975/76. Even if these goals had to be revised during program operation, a more thorough evaluation of this program element's effectiveness could have been possible.

3.8.8 Hardwood Removal

Original Allocation	$89,400
Revised Allocation (1978)	20,647
Utilization (1976)	20,647
Utilization March 31, 1980	20,647

The objective of this program element was to remove the hardwood overstory in mixed stands, thus allowing the release of the softwood understory. This treatment will reduce the time required by the remaining softwoods to reach merchantable pulpwood volumes.

In young stands of mixed hardwood and softwood species, the hardwoods usually suppress the softwoods because of their more rapid early growth rates. This suppression causes the softwoods to reach maturity over a longer time period than is desired. Therefore, removing the hardwood overstory allows the softwoods to more rapidly reach maturity. However, a small proportion of hardwoods appears to be desirable in most stands because of their ability to maintain site fertility. This program element was to be carried out on a trial basis with varying proportions of hardwoods being left on the treated areas.

In 1974-75, several sample plots were delineated in Central Newfoundland. One labourer was hired for one to two

days to carry out the work. The actual cutting of hardwoods on these plots was conducted in 1976-77. Approximately 22 ha were cleared of hardwoods in varying proportions on two plots. Seven men were employed and they generated 25 man months of employment. Following the 1976-77 operations, the hardwood removal project was terminated. Of the funds remaining from the original allocation, $68,753 was diverted to other program elements within the Forest Improvement Program.

TABLE 3.24
HARDWOOD REMOVAL
SUMMARY OF EXPENDITURES

Item	1974-75	1975-76	Total
Salaries	$ 59	$16,430	$16,489
Capital Equipment	---	---	---
Other	116	4,044	4,160
Total	$175	$20,474	$20,648

No definite operational objectives, such as clearing a certain area per year, were defined. Rather, this program element appeared to be an experimental project designed to study the effects of removing varying amounts of hardwoods from the sample plots. Only two sample plots were actually marked and treated. The use of only two trials may be insufficient in terms of a research experiment. However, whether the trials were a silvicultural success will be seen in time as the softwoods mature.

Weak accounting of expenditures was evident. A large amount of work performed under this program element was charged to other program elements. As well, no accurate records of employment were available. The average cost for these trials was approximately $927/ha. The marginal increase in benefits arising from the removal of hardwoods is unlikely to justify the high costs. Therefore, the Evaluation Committee feels the decision to terminate this program element after 1975-76 was wise. Future trials may be warranted if costs can be significantly reduced.

3.8.9 Prescribed Burning

Original Allocation	$147,300
Revised Allocation (1977)	12,214
Revised Allocation (1979)	9,713
Utilization (1976)	9,713
Utilization March 31, 1980	9,713

The objective of this program element was to burn selected areas, under controlled conditions for the purpose of site preparation, stand conversion and fire hazard reduction.

Prescribed burning is an accepted silvicultural technique used elsewhere in Canada for a variety of reasons. Burning slash on cutovers under controlled conditions will

reduce the danger from wildfire as well as aid in site preparation. Balsam fir regeneration tends to be suppressed and the site can then be seeded or planted with other commercial softwoods such as pine or spruce. In Newfoundland, balsam fir stands are highly susceptible to severe damage from a host of insect pests. Prescribed burning could be an important, low cost silvicultural tool in this Province. This program element was designed to implement the technique of prescribed burning into operational use.

In 1974-75, 7 ha of forest area were cleared of residual trees with the debris windrowed in preparation for burning. This work was conducted in Central Newfoundland. In 1975-76, 20 ha of forest area were cleared and prepared for burning in the Western Region of the Province. Approximately 480 m^3 of residual wood was tendered for sale. In both cases, no burning actually occurred primarily due to the non-availability of planting stock. Weather conditions often acted as a constraint. No further work occurred after 1975-76.

TABLE 3.25
PRESCRIBED BURNING
SUMMARY OF EXPENDITURES

Item	1974-75	1975-76	Total
Salary	$ 847	$7,178	$8,025
Capital Equipment	---	---	---
Other	1,126	562	1,689
Total	$1,973	$7,740	$9,714

The objectives of this program element were not attained. Approximately 27 ha of forest area were prepared for burning at a cost of $9,713, but no actual burning took place. Eleven man months of employment were generated through preparation of the forest area.

Because the burning was not carried out (for justified reasons) the efficiency of this program element is difficult to comment on. The Evaluation Committee agrees with the decision made to curtail operations after 1975-76. It is questionable, however, why this program element continued for two seasons especially in the light of an absence of planting stock. The inability to complete the silvicultural process of clearing, burning and reforestation, could possibly have been foreseen. While burning may promote regeneration of black spruce, unavailability of planting stock would suggest that the program element could have been terminated earlier or perhaps not initiated at all. The funding which was utilized could have been spent on other

program elements. The Evaluation Committee feels prescribed burning to be a silvicultural technique with great potential in this Province. Usually, prescribed burning is an effective, low cost tool for site preparation. When adequate levels of planting stock become available in Newfoundland, prescribed burning should be re-examined as a silvicultural prescription.

3.8.10 Reforestation

Original Allocation	$2,394,500
Revised Allocation (1978)	2,643,955
Revised Allocation (1979)	2,546,970
Utilization (1976)	819,223
Utilization (1978)	1,433,654
Utilization March 31, 1980	2,523,152

The objective of this program element was to increase provincial capability in seed procurement, seedling production and artificial stand regeneration through four separate sub-elements:

1) seed production areas
2) cone collection
3) site preparation
4) nurseries

There are an estimated 770,000 hectares of productive forest land which are inadequately stocked. Of this area, 150,000 hectares do not support any forest cover. A large proportion of this area is suitable for artificial regeneration with commercially desired species. This program element uses the four previously mentioned sub-elements as the major forces to ameliorate the areas of inadequately stocked forests. The most critical sub-element is the nurseries, required to produce the necessary planting stock. Both bare-root and container stock will be produced. The remaining three sub-elements are designed to complement the nursery program by providing a seed supply and planting sites for the seedlings grown. As well, actual planting operations are incorporated under this program element. This program element requires considerable funding, but is crucial for the success of intensive management programs in this Province.

Seed Production Areas

In 1977/78, 3.4 hectares of white spruce stands were thinned to create a seed production area. The total cost was $7,646. No employment data is available.

Cone Collection

In 1977/78, 11,986 kg of black spruce cones were collected for seed procurement from the Central Region of the province. Total costs in 1977/78 were $36,915. During 1978/79, approximately 905 kg of cones were collected, consisting of 361 kg of black spruce cones from Labrador, and 544 kg of red pine cones from Central Newfoundland. Total costs of cone collection for 1978/79 were $6,946. A total of 7.4 man months of employment were generated under cone collection - 5 man months at Sandy Lake and 2.4 man months at Goose Bay.

Site Preparation

Site preparation funded under the Agreement commenced during 1974/75 when planting of about 8 ha was done at Cochrane Pond. Twenty-three man months of employment were generated there. In 1975/76, seven men worked three man-months to remove planting stock from the Pasadena Forest Nursery for a federal experimental project. Also during 1975/76, a total of 12.1 ha of site preparation work was reported under reforestation at Thorburn Lake - Unit 2 in the Eastern Region.

During 1978/79, approximately 267 ha were scarified at Northwest Gander, while 53 ha were treated on the Bay D'Espoir Highway. A total of 320 ha were treated at a total cost of $145,737. This figure included $102,901 in capital

costs and $42,836 for salaries and operations. Six man-months of employment were generated during 1978/79 site preparation operations.

Nursery

Work on the nursery sub-element began under the DREE Agreement in 1974/75 and continued through until 1979/80. Three sites are involved: Mount Pearl in the Eastern Region, Wooddale in the Central Region, and a third site in Goose Bay, Labrador. Poor accounting makes the tabulation of costs by location tenuous at best. Table 3.26 provides the available data.

TABLE 3.26
SUMMARY OF OUTPUT AND EXPENDITURES
NURSERY FACILITIES

Nursery Location	Projected output (MM seedlings)	Total Costs $ 1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	Total
Mount Pearl	7	NA	NA	NA	49,482	104,762	-	NA
Wooddale	20	NA	NA	NA	492,954	746,738	93,845	NA
Goose Bay	NA	-	-	-	-	22,902	-	22,902
TOTAL	NA	361,947	283,124	170,153	542,436	874,402	93,845	2,325,907

As the table indicates, no breakdown is available for three years of data between the nurseries at Mount Pearl and Wooddale. Based on the allocation of salaries between both sites, the Wooddale nursery likely received over 80% of total expenditure each year.

The evaluation of sub-elements within the Reforestation program element is difficult for several

reasons. First, incomplete data available to the Evaluation Committee prevent a thorough analysis. Secondly, these sub-elements are, in some cases, still in a development stage and high costs associated with any new program development can be expected to a certain extent. Thirdly, these sub-elements were simultaneously funded through sources other than DREE. The extent to which DREE funds assisted in the implementation of these sub-elements is, therefore, difficult to assess. However, an evaluation of efficiency and effectiveness will be undertaken despite the aforementioned problems.

Seed Production Areas

This sub-element had 3.4 hectares of white spruce thinned at a cost of $7,646. Thus, an average cost of $2249 per ha resulted. This average cost is roughly five times higher than costs for pre-commercial thinning, however, the difference in each type of operation must be recognized. In thinning seed production areas, much greater care in tree selection means a slower and thus more costlier operation than normal thinning operations. Therefore, the costs shown may be quite reasonable. Without comparable data from similiar projects, the Evaluation Committee cannot accurately assess the efficiency of this project. As well, evaluation

of goal achievement is difficult since no operational goals are evident. A more reasonable evaluation may be possible in the future, when the seed supply in this stand is utilized.

Cone Collection

In 1977/78, average cone collection costs were $3.08 per kilogram. These cones were entirely from black spruce. In 1978/79, average collection costs for red pine cones were $8.96 per kg; for black spruce cones, average collection costs were $6.22 per kg. These latter costs are felt to exceed normal expected collection costs especially for pine, although poor seed trees may have contributed to the costs of collection. The practice of integrating cone collection operations with harvesting of seed bearing stands should be investigated. Felling a stand, then allowing cone pickers onto the site before skidding the trees to the landing, is commonly used elsewhere. Lower cone collection costs depend upon the level of co-ordination between cone collectors and logging crews. Cone collection is the basis for any intensive management program involving direct seeding or planting. The Evaluation Committee has learned that overall, quantities of seed procured by the Department of Forest Resources and Lands are meeting demand requirements. At this point, a priority must be to improve cone collection efficiency in terms of minimizing costs wherever possible.

Site Preparation

Average site preparation costs in 1978/79 were $321.57 per hectare. Compared to expected operating costs under normal conditions, this cost figure is somewhat high. One should note that this cost is calculated using total costs. A more realistic approach is to use operational costs plus capital costs based on the equipment depreciation schedule. Without the necessary data, the Evaluation Committee cannot accurately estimate average costs. A concern felt by the Committee is that some sites selected for treatment may have been difficult, high-cost areas. If sites treated were difficult areas, the question arises as to how extensive a program of site assessment and selection exists. Perhaps less costly sites were available in the same region. As with many other program elements under Program 7, no operational goals are to be found. Thus, no evaluation of site preparation effectiveness is possible.

Nurseries

An evaluation of nursery efficiency based on cost data is difficult because funding came from sources other

than this Agreement. Thus, the Evaluation Committee can only comment on the relative efficiency of nursery development and the achievement of production goals.

The Mount Pearl nursery has experienced difficulties during the life of the Agreement. The crop due in 1974 was delayed until 1977 for a variety of reasons. Weather problems later caused the destruction of 400,000 larch seedlings out of the 1977 crop. Operations at the Mount Pearl nursery have since been improved and seedling production appears on track.

The nursery in Goose Bay, Labrador has seen little development since 1978/79. At the present time, this nursery is simply being maintained by a minimum crew. The Evaluation Committee questions the need for a nursery in Labrador at this time although it has learned that the crop of seedlings produced were felt to be of high quality when compared to seedlings from the other two nurseries. The difference in soil type has been suggested as a reason for this high seedling quality.

The Wooddale nursery has experienced development difficulties since its conception. Problems with soil quality and frost heaving of seedlings outplanted are the

major concerns. As well, extremely poor accounting practices make an assessment of actual expenditures difficult. Perhaps the greatest criticism heard by the Evaluation Committee was with actual site selection. A nursery of this scale is a costly venture with the resulting output of seedlings critical to future forest management programs in Newfoundland. Poor quality growing stock will greatly hinder reforestation success. Thus, the selection of the best possible growing site, in a central proximity to seedling consumers, should be the basis for site selection. Unfortunately, these selection criteria for the Wooddale nursery do not appear to have been totally followed specifically in the case of the growing site. The main reason for poor selection of the nursery site appears to have been a lack of necessary planning, administrative and technical skills. The extent to which the poor site constrains the quality and quantity of seedlings can only be assessed when the first significant crop of high quality trees are available in 1981. Although a large number of seedlings were produced in 1980, their overall quality has yet to be proven.

3.8.11 Site Reclamation

Original Allocation	Nil
Revised Allocation (1978)	$757,575
Revised Allocation (1979)	794,779
Utilization March 31, 1980	734,913

The objectives of this program element were:

1) To reclaim productive forest sites that previously supported merchantable timber stands but which are now uneconomical to harvest due to detrimental cutting practices, insect attack, disease and other natural catastrophes.

2) To reclaim productive forest sites that are currently occupied by undesirable tree species.

There are many hectares of forest land in the Province supporting decadent or non-commercial stands. These stands are not economical to harvest due to low volumes of commercial species or high volumes of non-commercial species. Many natural or, in some cases, man-made factors, have caused these sites to support such poor quality stands. Unless some type of "sanitation" treatment is carried out, these stands may not revert to supporting high volumes of commercial species. This program element used the technique of clearing the entire site of undesirable timber, thus allowing either

natural or artificial regeneration of commercial species to occur. Any pulpwood or sawlogs salvaged from the old stands will, hopefully, be sold to offset program operating costs.

Operations occurred under this program element for two seasons. In 1977/78, a total of 414.1 hectares were treated at a total cost of $340,746. Employment generated was 352.3 man-months. In 1978/79, 654.0 hectares were treated at a total cost of $394,168. Employment generated was approximately 350 man-months. Total expenditure with this program element was $734,914. Total area cleared and employment generated were 1068.1 ha and 702.3 man-months respectively. Area treated and employment are broken down regionally in Table 3.27

TABLE 3.27
SITE RECLAMATION
SUMMARY OF OUTPUT AND EMPLOYMENT

Item	Region	1977/78	1978/79	Total
Area treated (ha)	Eastern	36.0	117.0	153.0
	Central	302.2	353.0	655.2
	Western	75.9	184.0	259.9
	Total	414.1	654.0	1068.1
Employment (man-months)	Eastern	22.1	84.0	106.1
	Central	276.8	126.0	402.8
	Western	53.4	140.0	193.4
	Total	352.3	350.0	702.3

In 1977/78, 2,500 fence posts, 635m^3 of sawlogs and 3851m^3 of pulpwood were salvaged from site reclamation operations. However, the quantity sold and prices

received cannot be determined from available information. As well, no records can be found regarding salvage volumes for 1978/79. Table 3.28 gives a breakdown of expenditures for the two years of operation.

TABLE 3.28
SITE RECLAMATION
SUMMARY OF EXPENDITURES

Region	Item	1977/78	1978/79	Total
Eastern	Salaries	$ 15,714	$ 52,556	$ 68,270
	Other	8,152	16,751	24,903
	Total	23,866	69,307	93,172
Central	Salaries	224,519	82,745	307,264
	Other	48,592	84,220	132,812
	Total	273,111	166,965	440,076
Western	Salaries	36,668	94,748	131,416
	Other	7,102	63,148	70,250
	Total	43,769	157,896	201,666
Total	Salaries	276,900	230,049	506,949
	Other	63,845	164,119	227,964
	TOTALS	$340,746	$394,168	$734,914

Records from the Department of Forest Resources and Lands indicate that a total expenditure figure of $783,043 is calculated. Compared to the $734,914 figure in the previous table, a large difference is evident. No explanation is possible for this $48,130 discrepancy with the data available.

The efficiency of this program element is again difficult to assess due to conflicts in data provided to the Evaluation Committee. However, using the figures presented in the preceding table, average costs per hectare are calculated:

	Average cost/ha ($)	
Region	1977/78	1978/79
Eastern	662.94	592.37
Central	903.74	472.98
Western	576.67	858.13
Total	822.86	602.70

As the figures illustrate, no consistent trends are evident. Average costs decreased in the Eastern and Central Region, but increased in the Western Region. Overall, average costs decreased, which is to be expected as experience is gained over time. The range in operating costs was from $478 per ha to $1287 per ha. Reasons given for the higher range costs include poor weather, lack of motivation by the workers and inclusion of wood transportation costs to some projects. Operational costs in the Central Region were thought to decrease due to changes in treatment techniques designed to favour natural regeneration. The lowest operational costs were experienced by contracted projects, due mainly to increased efficiency and profit motivation of the contractors.

Accounting procedures with site reclamation were again weak. Some confusion appears to exist as to the differentiation of several projects under stand tending as opposed to those listed as site reclamation. In many cases, stand tending operations were actually site reclamation projects. This factor may account for the differences in site reclamation total cost figures. The Evaluation Committee cannot compare costs obtained in this Province for site reclamation with similar work elsewhere due to the fact that site reclamation is not a widely used treatment.

The Evaluation Committee cannot find evidence of stated operational goals for this program element. Thus, while areas were treated each year, the absence of quantifiable annual operational targets does not allow evaluation of goal achievement. Operational targets should have been established for each year. The Evaluation Committee notes the extremely high expenditures required to clear a site under this project. Also, additional high expenditures are required to treat the cleared site, in the form of scarification, burning, and stand establishment in the form of seeding or planting. On some sites natural regeneration is an alternative to artificial stand establishment. Essentially, this program element involves the use of public funds to clear sites that private sector

firms would find uneconomic to log. After clearing, further expenditures are required to establish a new stand. In terms of economic efficiency, this program element yields extremely sub-marginal returns. There is little evidence that consistent selection of the best growing sites, or even the lower costing sites, occurred. The Evaluation Committee recommends that alternate means of increasing future wood supplies at least be examined. Also, the extent to which these sites will naturally regenerate should be the subject of intensive research. The massive expenditures required to clear each site could possibly be directed into more efficient programs resulting in the same or better impact on future wood supplies.

Conclusion

From the data available, the Evaluation Committee can only account for estimated expenditures under this program of $6,061,319, representing a utilization level of 95% of the final allocation shown in Table 3.1. Records supplied by the Intergovernmental Affairs claiming section show that all of the allocation was expended. The Evaluation Committee was unable to account for this variance. In terms of employment, a total of 3,934 man months were generated with this program, however, this figure is based on

incomplete data, indicating higher levels of employment were actually achieved. The extent to which these workers indirectly stimulated further employent is difficult to determine. One can assume with a high degree of confidence, that a large portion of direct employment was a marginal increase, as many previously unemployed workers did become employed.

With respect to the evaluation of individual program elements, the most common weakness was the almost complete lack of accurate accounting procedures. Evaluations were difficult due to incomplete data on costs, area treated and employment generated. The Evaluation Committee was unable, in some cases, to determine exactly how much was spent on the particular program element. Data sources supplied to the Committee did not agree on cost figures. As an example, the pre-commercial thinning expenditures had an error range of over $100,000. This type of accounting is completely unacceptable and reflects less than full appreciation for cost accountability on the part of those involved in program operation. The Committee cannot understand why this was the case. By carefully monitoring costs and area treated on a continuous basis, greater program efficiency

would most likely have resulted. As well, long delays in forwarding relevant data to the Evaluation Committee would have been avoided.

A further cause of concern to the Evaluation Committee was the apparent lack of annual operating goals for most of the program elements. These goals may or may not have been set internally by the Department of Forest Resources and Lands. In any case, goals for each program element should have been stated to allow an evaluation of program effectiveness. Stating operational goals and the follow-up analysis of achievement levels are basic fundamentals of any program management. Operating goals for each program element and target dates for completion should have been a requirement under this program.

From analysis of allocations and expenditures, the direction of this program appeared to change. Instead of expending large sums on a wide range of programs for which little expertise existed, funding shifted to concentrate on pre-commercial thinning, nurseries and site reclamation. The Evaluation Committee agrees with this change in program direction. Program elements such as commercial thinning, clearing flooded areas, stand tending, demonstration areas,

fertilization and hardwood removal are difficult to justify at present. More urgent areas requiring funding existed and this was recognized by the officials concerned. For example, the development of nurseries is critical to future forest management in Newfoundland. Pre-commercial thinning, while yielding sub-marginal economic returns does provide substantial biological benefits. The Evaluation Committee does, however, express the opinion that caution must be exercised in investing large sums of money on site reclamation. While growing sites are being established, the economic costs are high and difficult to justify in terms of economic benefits. There was little evidence to indicate a consistent selection process of sites utilizing a priority ranking system. Such a system, utilizing criteria such as expected clearing costs, site productivity and distance to mills, would be an important planning tool if site reclamation were to continue. The Evaluation Committee also recommends that prescribed burning be examined more thoroughly as to its use in this province. This treatment is a low cost silvicultural tool which is widely used in some areas of the mainland.

From an overall aspect, this program appears to have been beyond the ability of the Department of Forest

Resources and Lands to successfully manage. A lack of manpower and expertise, especially in the areas of program planning and information systems, were constraining factors. Simply put, the Department did not possess sufficient resources to handle the large budget and expanded program. The Department tried to change the thrust of its program from one of extensive, to intensive management, in too short a time period. This quantum leap in program content could not have been expected to be fully achieved over the life of the Agreement. In this situation, problems could be expected to develop and in fact, this was the case.

3.9 PROGRAM 8 - Administration

Objective: To increase the size and operational capability of the Newfoundland Forest Service.

Original Allocation	$5,868,900
Revised Allocation (1978)	8,268,900
Revised Allocation (1979)	9,483,000
Utilization (1976)	4,871,002
Utilization (1978)	7,233,984
Total Utilization March 31, 1980	9,483,000

The overall objective of this program was to recruit additional technical, administrative and professional staff to permit implementation of the other seven programs contained in the Forestry Subsidiary Agreement. It was also to undertake in-service training and education and to provide equipment and new accommodation facilities.

The total utilization for Program 8 represented 16.9% of the total Agreement expenditures.

3.9.1 Additional Staff

Original Allocation	$2,634,600
Revised Allocation (1978)	6,348,700
Revised Allocation (1979)	7,427,376
Utilization (1976)	2,460,848
Utilization (1978)	4,584,241
Utilization March 31, 1980	7,427,376

The objective of this program element was to allow the Department of Forest Resources & Lands to strengthen its technical and professional staff in order to effectively administer an expanded forest management program. This required the recruitment of additional staff and necessitated a restructuring of the organization present at that time to allow employees to be able to perform their jobs effectively. The Department of Forest Resources & Lands was, therefore, reorganized to allow a decentralization of administration.

Although the overall utilization of funds for this program element was significantly higher than the original allocation, a total of 119 new employees were hired under the Additional Staff program element. As a result of hiring these people, all 19 management unit offices became fully operational, thereby achieving the goal of decentralizing operations and administration which overall improved management of the resource. A breakdown of employees hired is given below:

Positions	Number of Employees
Foresters	29
Forest Technicians	63
Radio Technicians	4
Clerks and Stenos	20
Administrative Officers	3
TOTAL	119

In conclusion, it appears that considerable progress has been made towards better management of the forest resource through the improvements in technical and professional capabilities made possible by the Additional Staff program element. There is little doubt about the benefits derived from the decentralized administrative framework made possible through the hiring of additional staff. The specialists recruited have indeed had a significant impact upon the management of all programs and decisions pertinent to the overall management of the Province's forest resource.

3.9.2 - Construction of Buildings

Original Allocation	$1,140,020
Revised Allocation (1978)	1,288,040
Revised Allocation (1979)	1,283,794
Utiliztion (1976)	934,983
Utilization (1978)	1,262,473
Utilization March 31, 1980	1,283,794

The objective of this program element was to provide the Department of Forest Resources & Lands with additional office space to accommodate increases in staffing, as well as to provide garage and storage facilities for forest fire suppression vehicles and equipment. Such facilities were required as a result of the establishment of management unit offices necessary for decentralization of operations.

Activity under this program element resulted in some new construction of offices, garage, and storage facilities as well as some additions to existing installations at twenty-three locations on the Island and at three locations in Labrador.

Activity carried out under this program element was virtually completed by the end of 1978 fiscal year. The first interim evaluation report devoted considerable attention to variances which occurred in construction costs, however, these will not be repeated here. In 1979 funds were expended to complete buildings at Winterland, Goose Bay and Wabush.

In conclusion, the objective of this program element was achieved with work completed on schedule. There were some indications that management controls were not as tight as they could have been and costs were high for some projects. The Evaluation Committee feels that this program element was handled within a reasonable level of cost and has been and will continue to be effective in providing adequate office and storage space to meet the demands of additional staffing and future requirements. The following table (3.29) gives further details.

TABLE 3.29
CONSTRUCTION OF BUILDINGS

SITE	DESCRIPTION
Bay D'Espoir	Extension to unit office
Bay of Islands	Ranger station and garage
Bishop's Falls	Construction of unit office, garage and fire suppression facilities
Bonne Bay	Ranger station and garage
Cape Broyle	Unit office and garage
Clarenville	Unit office and garage
Deer Lake	Accommodation for water bomber unit at airport
Gambo	Renovations to ranger station, unit office and a garage
Gander	Forest service office building; chain link fence and storage facilities
Grand Falls	Cold storage for nursery
Lewisporte	Extension to unit office
Paddy's Pond	Extension to garage
Point Saunders	Renovations to ranger station
Princeton	Ranger station
Pynn's Brook	Workshop storage and fire suppression facilities and garage
Roddickton	Unit office and garage
Salmonier	Garage
Sops Arm	Improvements to ranger station
Springdale	Extension to existing ranger station
St. Catherines	Garage and Improvements to ranger station
St. Georges	Extension to unit office
Whitbourne	Unit office, garage and storage facilities
Winterland	Garage
Labrador	
Forteau	Ranger Station
Goose Bay	Unit office, workshop and garage
Labrador City/ Wabush	Unit office, garage and storage facilities for fire suppression equipment.

3.9.3 - Data Processing

Original Allocation	$94,000
Revised Allocation (1978)	6,310
Revised Allocation (1979)	4,020
Utilization	
March 31, 1980	4,020

The objective of this program element was to conduct a study to determine the feasibility of computer applications in handling and processing forestry data.

Activity under this program element consisted of a small study into the feasibility of computer applications to the collection and storage of data on forestry programs. Additional funds were expended for temporary clerical staff to generate data for the first interim evaluation report.

The Evaluation Committee has noted in previous evaluation reports, the need for efficent data collection and processing techniques. Maintenance of such essential information is required for sound decision making with respect to both departmental administration and forest management. Despite previous recommendations for the establishment of such a system, the Committee notes that to date a management information system has not been established within the Department of Forest Resources and Lands. The objective of this program element was, therefore, not met;

and the Evaluation Committee feels that priority should be given to introducing such a system in the near future. The importance of a sound management information system as a basis for future planning must be recognized by all managers of the forest resource.

3.9.4 Provision of Equipment and Facilities

Original Allocation	$2,000,000
Revised Allocation (1978)	1,108,900
Revised Allocation (1979)	767,809
Utilization (1976)	1,475,171
Utilization (1978)	1,383,248
Utilization March 31, 1980	767,809

The objective of this program element was to provide equipment and helicopter charter facilities for implementation of the forest management program.

This program element was generally used as a source of funds for charter of aircraft - mainly helicopters to implement the Forest Protection and Forest Management Programs. Although incomplete records make it virtually impossible to definitely state which activities were funded, indications are that roughly 90% was spent on helicopter charter for aerial surveillance, installation of a VHF radio system, insect and disease surveys, routine management

activities, special projects (cable logging) etc. The remaining 10% went towards vehicle purchase.

The accounting system for utilization of funds under this program element was subjected to two audits which reduced the figures twice during the term of the Agreement. Due to incomplete records and poor accounting procedures, the Evaluation Committee notes that it was unable to perform a thorough assessment of the efficiency and effectiveness of this program element. The program element was, however, certainly effective in providing the Department of Forest Resources & Lands with a generous amount of aircraft flying time. It was impossible to determine how efficiently the funds were allocated among the various forestry activities such as fire protection, inventory surveys, insect and disease surveys, etc. It was also difficult to determine if the flying time provided was too much or too little for the work produced. Therefore, there could be no accurate measurement of program element output.

The Evaluation Committee recommends that in the future, a strict accounting system be instituted so that all expenditures can be traced to a specific forestry activity as well as to specific programs.

CONCLUSIONS

The Evaluation Committee concludes that overall the Administration Program was partially successful in attaining its objectives. The Additional Staff program element was successful in recruiting expertise, thereby, significantly increasing the administrative and management capability of the Department of Forest Resources & Lands. The Construction of Buildings program element was successful to the point where additional space has been made available for present as well as short-term future requirements. Both program elements also contributed greatly to the decentralization of the administration and management of the Province's forest resource.

The objectives of the Data Processing program element were not met and a management information system was never instituted thereby impairing the long-term planning and management capability of the Department. The Evaluation Committee feels that a management information system should be introduced on a priority basis to facilitate effective future planning with respect to the forest resource. The Provision of Equipment and Facilities program element was unable to be evaluated in terms of efficiency and effectiveness as a result of incomplete records and a poor

accounting system. The Evaluation Committee recommends that a strict accounting system be instituted to account for all funds expended for all forestry activity in the future. The Evaluation Committee concludes that the Administration Program was not totally effective in achieving its objectives.

CHAPTER 4

CONCLUSIONS

4.1 Introduction

The stated objective of the Canada/Newfoundland Forestry Subsidiary Agreement is:

> "... to enable Canada and the Province to take advantage of opportunities for expanding and diversifying Newfoundland's forest industries and thereby increasing income and employment opportunities in Newfoundland".

The Evaluation Committee presents the following list of selected global indicators which depict overall forest industry trends over the life of the Agreement. It must be noted that the decline in virtually all indicators in 1975 and 1976 reflects both the phase out of the Labrador Linerboard Mill in Stephenville and a general cyclical downturn in the entire industry. Any clear trend over the life of the Agreement is, therefore, masked. It is fair to say, however, that the newsprint industry has recovered in the period 1977 through to the present, resulting from a recovery of world newsprint demand, favourable exchange rates, and higher world newsprint prices. Inflation is responsible for a substantial proportion of the increases in wages and value of shipments. With the opening of the new

Table 4.1

Global Indicators

	1974	1975	1976	1977	1978	1979
Pulpwood Production for newsprint thousands of cunits)	707.8	515.5	563.7	620.3	659.0	668.2
Pulpwood production for particleboard (thousands of cunits)	2.9	2.6	2.6	3.1	7.2	3.4
Pulpwood for export (thousands of cunits)	-	-	-	4.6	8.5	23.6
Sawlog production (thousands of cunits)	73.1	49.3	70.2	77.8	79.0	83.0
Domestic Use (thousands of cunits)	38.9	34.9	37.8	65.3	64.6	95.3
Employment in Logging (jobs)	2800	2319	1588	1625	1324	1315
Total Salaries and Wages in logging ($Millions)	N/A	27.1	21.6	24.6	21.9	22.7
Pulp and Paper Mills - employees	3326	2903	3252	2630	2538	2611
Pulp and Paper Mills, newsprint thousands of (short tons) production	627.6	475.7	540.5	609.7	636.2	667.9
Pulp and Paper Mills Salaries & Wages ($ Millions)	44.2	41.4	52.3	48.0	53.1	56.7
Value of shipment pulp and paper mills $ Millions)	189.7	146.9	170.3	202.4	226.8	261.9
Lumber Production (Mfbm)		28,600	37,500	42,500	48,700	50,000

SOURCE - Department of Forest Resources and Lands;
Statistics Canada, Logging, Cat. 25-201;
Pulp and Paper Companies: Annual

Abitibi newsprint mill in Stephenville, the pulp and paper industry is in generally better shape at this point in time than at any other time during the life of the Agreement, and seemingly has recovered from the impact of the Labrador Linerboard closure. The sawmill industry has also shown improvement as indicated by the sawlog production figures, and increases in lumber production. It is against this background of industry trends, that the following overall general conclusions on the impact the Agreement has had on the industry, and the extent to which the Agreement has met its basic overriding objective, are registered.

4.2 Summary of Strengths and Weaknesses

While the objective of the Agreement is worded to give the impression that the program mix is heavily oriented towards promoting industry expansion, and improving productivity, an analysis of Agreement expenditures reveals the contrary to be the case. Table 4.2, following, lists major expenditures by item, and indicates the proportion of total Agreement expenditures allocated to each.

Table 4.2
Major Expenditure Items

	EXPENDITURE ($ Millions)	PERCENTAGE (%)
Forest Access Roads	17.2	31.3
Logging Equipment	9.5	17.3
Administration	8.2	14.9
Acquisition of Lands	4.1	7.5
Protection	3.9	7.1
Forest Inventory	3.2	5.8
Reforestation	2.5	4.5
Pre-Commercial Thinning	2.1	3.9
Buildings	1.3	2.4
Stand Reclamation	.8	1.5
Forest Management	.4	0.7
Other	1.7	3.1
TOTAL	54.9	100.0

As can be seen, almost 40% of the total expenditures under the Agreement can be catagorized as having as their thrust the improvement of forest management procedures and the provision of manpower and facilities to implement forest management and protection policies. Examples are administration expenses, the acquisition of alienated forest lands, salaries paid to technical and professional staff, the compilation of a comprehensive forest inventory, protection expenditures on canso water bombers and a new radio system, and the construction of new forest management unit buildings. Generally, with some reservations as indicated in detail in Chapter 3, the above grouping of expenditures have been effective in providing the Province

with a vastly improved capability to manage and protect the resource. While this grouping of expeditures has not made any direct contribution to the overriding objective of the Agreement, it would be unreasonable to expect otherwise, especially in the short time frame under analysis.

One program element which could have been expected to make a significant contribution to industry expansion was the $9.5 million expenditure on logging equipment. This expenditure accounted for in excess of 17% of all Agreement expenditures. Unfortunately, with the closure of Labrador Linerboard the bulk of the equipment was vastly underutilized. It is also unfortunate that the Forestry Subsidiary Agreement was chosen as the mechanism to provide a large infusion of funding to the Labrador Linerboard Mill, as the complete failure of these expenditures tainted the effectiveness of the Harvesting and Utilization program, if not the entire Agreement. In large part, it is the Evaluation Committee's understanding that the basic rationale for the program element was that it represented a mechanism for the Federal Government to subsidize Labrador Linerboard without attracting charges of unfair treatment from competitors of the Stephenville Mill on the world market. The Management Committee for the Agreement cannot be faulted for the complete failure of this program element to generate any substantial long term benefits to the forest industry in the Province.

The failure of the logging equipment program element (which accounted for over 94% of all expenditures under the Harvesting and Utilization Program) overshadowed some of the good work done under the cable crane logging, whole tree chipping and integrated logging program elements. Substantial progress has been made in introducing these techniques to the Newfoundland forest industry, however, improvements are still required. The work done under the small sawmills program element also had beneficial results for the sawmill industry in the Province.

The Forest Access Roads program accounted for another 31% of Agreement expenditures. It too had an industry orientation, and in the judgement of the Evaluation Committee has been successful in providing access to the forest resource to the extent which was possible with the funds available. Much of the justification for future expenditures of this type lies in providing access to the resource to practice management and protection, as well as to harvest dead or dying budworm damaged wood, as opposed solely to opening up areas for routine harvesting for the sawmill industry. In general terms, sufficient access is now available to the resource to provide a steady supply of wood to the sawmill industry on much of the Island, with some exceptions, most notably the Northern Peninsula.

The remaining 10% of Agreement expenditures are accounted for in the Forest Improvement Program. The mix of program elements which were funded under this program was dominated by four program elements; namely, reforestation, pre-commercial thinning, stand reclamation, and commercial thinning. The Evaluation Committee has serious doubts about the long term payoff from much of the expenditures under this program. Commerical thining has been proven uneconomic, while other improvement techniques which were experimented with such as fertilization, clearing flooded areas, demonstration areas, stand tending and hardwood removal have yielded dubious benefits, at best. The stand reclamation technique of site preparation has proven to be costly and when combined with further treatments such as prescribed burning, scarification and planting, represents substantial investments up front to increase wood supplies with no return for at least 40-50 years. Emphasis has to be placed upon researching cheaper methods of site preparation than site reclamation. The reforestation expenditures, primarily designed to provide the Province with nursery facilities capable of producing high quality seedlings, hold promise for the future. The problems experienced in the past with the nursery site at Wooddale have been mentioned earlier, however, given the present level of investment in this

facility every effort in the future has to be directed towards improving seedling quality. Perhaps the brightest aspect of the Forest Improvement Program was the apparently successful introduction of pre-commercial thinning as a forest management technique. Costs have come down over the life of the Agreement, and pre-commercial thinning now looks like a low cost technique for increasing future wood supplies.

4.3 Administration of the Agreement

The Evaluation Committee, in this concluding chapter of the final evaluation report for the Agreement, feels that the program management and administration practices must come in for specific criticism. In numerous instances throughout this report when discussing specific program elements, the Evaluation Committee drew attention to the fact that poor accounting practices prevented the Evaluation Committee from thoroughly assessing the efficiency and effectiveness of the program element under review. The Evaluation Committee drew attention to these problems in previous evaluation reports, and in conducting this final evaluation for the Agreement found this criticism to be still valid.

The Evaluation Committee also draws attention to the fact that it has made repeated suggestions over the life of the Agreement that a management information system be installed. A system is required which enables program managers to continuously track project costs and benefits and quickly provide senior departmental management and evaluators with a breakdown of program output. At the expiration of the Agreement there is no evidence that any progress has been made to correct this glaring deficiency in program management. Sufficient funds existed under the Agreement to establish such a system but insufficient action was taken to install a good system.

4.4 Conclusion

In conclusion, much progress occurred under the first Canada/Newfoundland Forestry Subsidiary Agreement. It is estimated that it provided 1,450 man years of employment. Many mistakes were made which is to be expected when mounting a massive, multi-pronged program of this nature. The question remains, however, as to whether the Agreement met its original objective. In the judgement of the Evaluation Committee, the Agreement did not meet the objective set for it, but this is more of a criticism of the objectives than the performance of the Agreement. An Agreement whose thrust was to build an internal competence to

manage the forest resource could not have been expected to significantly impact upon global industry indicators such as employment, incomes, and diversification of production. The ground work has now been laid, and the Evaluation Committee is optimistic that the second Canada/Newfoundland Forestry Subsidiary Agreement will have the desired impacts originally envisaged for the first Agreement.