

**THE HARVESTING AND CONSUMPTION OF DOMESTIC FUELWOOD
WITHIN THE WESTERN NEWFOUNDLAND MODEL FOREST**

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EXECUTIVE SUMMARY

Within the Western Newfoundland Model Forest (WNMF), the control of domestic fuelwood harvesting has been identified as a serious forest management problem. To develop solutions to the problem, a thorough understanding of domestic fuelwood harvesting is required. However, as with the rest of the island, there is a lack of information on the subject within the Model Forest. Therefore, a sample survey of local households was undertaken in 1994. The results of the survey are presented below.

In 1993/94, 55 503 m³ of fuelwood was consumed by households within the WNMF. Approximately 5 000 households or 36% of all the households in the area burnt fuelwood as a primary or secondary source of heat. Of the wood-burning households, 11.10 solid m³ of wood was consumed on average per household. The local per capita consumption of fuelwood (1.26 solid m³ per resident) is well above the average in Canada (0.24 m³ per resident).

Approximately two-thirds of the total volume of domestic fuelwood is cut by the members of the household in which it is consumed in the WNMF. The source of fuelwood is evenly split between unalienated crown land and the limits of the pulp and paper firms. In 1993/94, 15 630 and 17 052 solid m³ were cut on unalienated crown land and the limits of the pulp and paper firms respectively. In the same year, 16 306 and 17 545 solid m³ of softwood and hardwoods were harvested for fuelwood, respectively, by local cutters. One-third of the domestic fuelwood that is consumed by local households is purchased from other cutters. Nearly \$600,000 was spent on domestic fuelwood by households in 1993/94. The majority of the expenditure was on hardwoods as opposed to softwoods or slabs. Residents of Corner Brook spent almost twice as much on fuelwood as residents in rural areas.

In general, residents of the Model Forest are reluctant to travel far to obtain fuelwood. Approximately one-half of the domestic fuelwood cutters travel less than 5 km to cut fuelwood. Clearly, domestic fuelwood cutting places tremendous pressure on the forest resource in the vicinity of communities. In addition, fuelwood cutting is highly seasonal. Approximately 75% of the fuelwood is cut during the winter months. Fuelwood cutting climaxes in March and during the remainder of the year domestic cutters are largely inactive.

In 1993/94, 14 186 solid m³ of softwood fuelwood was cut in productive stands within the Model Forest. The volume of domestic fuelwood harvested in productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits. In the same year, 8 104 solid m³ of sawlogs were cut by fuelwood cutters in productive softwood stands. The volume of sawlogs from these productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits. The harvesting of domestic fuelwood and sawlogs accounts for approximately 10% of the total cut within the WNMF in 1993/94. Clearly, local domestic cutters harvest a significant volume of timber.

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by

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INTRODUCTION

Domestic fuelwood, also referred to as firewood, has been a significant source of energy in Newfoundland since the island was first settled over two centuries ago. In 1776, an order of Governor Hugh Palliser stated "that lands that are not actually fenced in shall remain open for the public and common to all persons without distinction, to cut wood for the purpose of fuel....." In the past several decades, Newfoundlanders have continued to depend on fuelwood in response to the sharp rise in the nominal price of oil.

Within the Western Newfoundland Model Forest (WNMF), the control of domestic fuelwood harvesting has been identified as a serious forest management problem (Western Newfoundland Model Forest Proposal Committee 1992). On unalienated Crown land, problems include poor utilization, high-grading and illegal cutting. On the limits of the pulp and paper firms (Corner Brook Pulp and Paper Ltd. and Abitibi-Price Inc.), the indiscriminate cutting of pre-commercial and commercial softwood timber for fuelwood, particularly in silviculturally-treated stands, is an acute concern.

To develop solutions to these problems, a thorough understanding of domestic fuelwood harvesting is required. However, as with the rest of the Island, there is a lack of information on

domestic fuelwood cutting within the WNMF. On unalienated Crown land, which accounts for approximately 10% of the productive forest land of the Model Forest, fuelwood permits are issued by the Newfoundland Forest Service and cutting is closely monitored. On land tenured to the pulp and paper firms which accounts for 90% of the productive forest land, domestic cutting permits are issued by the firms for hardwood only and monitoring is at best sporadic. As a consequence, a sample survey of households was undertaken in 1994.

SAMPLE SURVEY

Objective of the Survey

The objective of the survey was to gather detailed data on the harvesting and consumption of fuelwood within the Model Forest. The reference year of the survey was the 1993/94 fiscal year (April 1, 1993 to March 31, 1994).

Definition of the Population

The population from which the sample was drawn comprised of the total households within the Model Forest. In 1993/94, 14 022 households were estimated to lie within the 707 060 ha of the WNMF based on information provided by the City of Corner Brook, Department of Municipal Affairs, local municipalities and the most recent census (1991) undertaken by Statistics Canada.

In this study, the households within towns that straddle the boundary of the Model Forest, such as Wiltondale, Nicholsville and Deer Lake, were treated as if they lay entirely within its boundary. With few exceptions, the population of the Model Forest is similar to that of forest management district #15 which it encompasses. Therefore, the results of this study are applicable to management district #15. A complete list of the number of households in each town or community within the Model Forest is presented in Appendix A.

Determination of the Sampling Frame

The sampling frame comprised of a list of households within the Model Forest taken from the local telephone directory. Officials with Newfoundland Telephone noted that the directory should contain in excess of 97% of the households in the area.

Selection of Sample Design

The simplest and most common methods of sampling are (i) simple random sampling and (ii) stratified random sampling (Singh and Chaudhary 1986). In this report, the method of stratified random sampling was selected. Stratified random sampling involves the division or stratification of a population into two or more relatively homogenous groups, referred to as strata, and the independent selection of random samples in each stratum. Stratification was desired because it produces greater precision in the estimated parameters for a heterogeneous population than simple random sampling or any other survey technique.

Formation of Strata

The population of households was stratified into two mutually exclusive groups, households within and outside of Corner Brook. *A. priori*, the harvesting and consumption of domestic fuelwood was believed to differ between Corner Brook and the area outside of Corner Brook. Corner Brook is an urban community whereas the surrounding area is comprised of small rural towns and isolated homes. Within the WNMF, 7 400 and 6 622 households lie in and outside of Corner Brook respectively.

Development and Pre-testing of the Questionnaire

In February 1994, a questionnaire was developed by the Canadian Forest Service in cooperation with the Model Forest's Domestic Cutting Working Group. The questionnaire was then pre-tested and modified based on the pre-test. Appendix D contains a copy of the questionnaire.

Organization of the Field Work

Five technicians were hired to undertake the survey of households among other duties. Four technicians represented the local development associations:

- (i) Bonne Bay Development Association (Wiltondale);
- (ii) Humber Valley Development Association (Deer Lake);

- (iii) North Shore - Bay of Islands Development Association (Gillams); and
- (iv) Bay of Islands - South Shore Development Association (Frenchmen's Cove).

A fifth technician was hired by the WNMF to coordinate the activities of the other technicians and survey the area in Corner Brook. The field work, which began on March 21, 1994 and ended on April 29, 1994, was supervised by the Domestic Cutting Working Group of the WNMF. The technicians completed the questionnaires through personal interviews with members of the randomly sampled households.

Analysis of the Data

Completed questionnaires were scrutinized and edited to amend recording errors. The confidentiality of the information provided by households was assured throughout the survey process. The information from completed questionnaires was encoded into a database. The database was analyzed using the statistical software SAS.

Response Rate of Households

Of the 14 022 households within the Model Forest, 300 were sampled (Table 1). In total, 57 of the sampled households were classified as non-respondents. Non-respondents include households where no one was found at home (52) or the occupant was deceased (5). Of the corrected sample size of 243 households, 7 households refused to participate in the survey. Questionnaires were completed

for 236 households yielding an effective response rate of 97%.

RESULTS OF THE SURVEY

The results of the survey are presented in three sections. The first section deals with the *consumption* of domestic fuelwood. The second section focuses on the *acquisition* or *harvesting* of fuelwood by households. In the third section, the views of respondents on various aspects of domestic fuelwood harvesting are summarized.

(1) Consumption of Fuelwood by Household

Number of households burning wood

In 1993/94, 5 001 households or 36% of the total households within the Model Forest burnt wood as a primary or secondary source of heat (Table 2). These households have found wood burning to be an effective and economical way to heat their homes. In 1983, 40% of the total households in management district #15 burnt wood (Northland and Associates Ltd. 1984). The proportion of households burning wood appears to have declined slightly over the past decade.

As expected, households burning wood are more prevalent in rural rather than urban areas. In 1993/94, the proportion of households burning wood within and outside of Corner Brook was 27 and 45% respectively. Households in Corner Brook rely more on other sources of heat, such as oil and electricity, than households in the surrounding rural areas of the WNMF.

The proportion of wood-burning households within the Model Forest is almost double the national average. Currently, 20% of the households in Canada use wood as either a primary or secondary source of heat (Natural Resources Canada and Canada Mortgage and Housing Corporation 1993).

Total volume of wood burnt

In total, 55 503 solid m³ of wood were burnt by households within the Model Forest in 1993/94 (Table 3). The majority of this wood was burnt at primary residences while small volumes were burnt at cabins. Approximately 65% of the wood was consumed by households outside of Corner Brook.

Average volume of fuelwood burnt per household

Of the households that burnt wood within the Model Forest, on average 11.10 solid m³ of wood was consumed per household in 1993/94 (Table 3). The average volume of wood consumed was greater in households outside of Corner Brook (11.99 solid m³) as opposed to

Corner Brook (9.77 solid m³).

Average volume of fuelwood burnt per capita

In 1991, 44 120 individuals resided within the boundaries of the Model Forest (Statistics Canada 1994). Based on this figure, the average consumption of fuelwood was 1.26 solid m³ per resident (Table 4). The local per capita consumption of fuelwood is well above the average in Canada (0.24 solid m³) and less developed countries (0.5-1.0 solid m³).

Types of wood-burning equipment

Among the respondents who reported burning wood at their residence, the single most common type of equipment used was a wood-burning stove (Table 5). Nearly one-half (45%) of the respondents used a wood-burning stove. Wood furnaces followed by wood/oil furnaces were the next most popular type of equipment. Only 10% of respondents used fireplaces. Fireplaces are far less efficient than other types of equipment. They tend to draw a large amount of heat out of a house while producing very little heat (Natural Resources Canada and Canada Mortgage and Housing 1993).

Future intentions

Two-thirds of the households that consume fuelwood intend to burn the same volume of

fuelwood in the future (Figure 1). Only 12% of the wood burning households plan to consume more fuelwood. The volume of fuelwood burnt within the WNMF will most likely not increase in the future.

(2) Acquisition of Fuelwood by Household

As noted above, this section deals with the *acquisition* or *harvesting*, as opposed to the *consumption*, of fuelwood.

Method of acquiring fuelwood

Members of a household acquire fuelwood by cutting it themselves or purchasing it from other cutters. In Corner Brook, the majority of domestic fuelwood (58% by volume) is purchased (Table 6, Appendix B). Outside Corner Brook, most of the fuelwood (81%) is cut by members of the household in which it is consumed. Within the entire Western Newfoundland Model Forest, approximately two-thirds of the total volume of fuelwood is cut by members of the household in which it is consumed.

Source of fuelwood harvested by land tenure

The source of fuelwood is evenly split between unalienated crown land and the limits of the pulp and paper firms. In 1993/94, 15 630 and 17 052 solid m³ were cut on unalienated crown

land and the limits of the pulp and paper firms respectively (Table 7). A small portion of fuelwood was cut on private land or in areas where the tenure was unknown.

Species of fuelwood

The species of trees from which domestic fuelwood is cut are classified as either softwood (e.g. balsam fir, black spruce) or hardwood (e.g. white birch). In 1993/94, 16 306 and 17 545 solid m³ of softwood and hardwood fuelwood, respectively, were harvested by domestic cutters in the WNMF (Table 7). Some cutters prefer hardwoods because the heat output per unit volume of hardwoods is higher than softwoods. Other cutters favor softwoods because it is lighter and easier to handle than hardwoods.

Distance traveled to harvest fuelwood

In general, residents of the Model Forest are reluctant to travel far to obtain fuelwood. Approximately one-half (46%) of the domestic fuelwood cutters travel less than 5 km to cut fuelwood (Figure 2). Only 15% of the domestic fuelwood cutters travel more than 20 km to cut fuelwood. Clearly, domestic fuelwood cutting places tremendous pressure on the forest resource in the vicinity of communities. The transportation of fuelwood over great distances is not feasible because it has a high ratio of weight to caloric output.

Method of fuelwood transport

The majority of fuelwood is transported using a combination of methods in the WNMF. For example, a cutter may transport fuelwood from stump to roadside by snowmobile and then from roadside to home by truck. Snowmobiles are the most frequent method of transporting fuelwood. Approximately 80% of the domestic fuelwood cutters used snowmobiles in 1993/94 (Figure 3). Snowmobiles are ideal for transporting fuelwood in the winter months - the period in which the majority of wood is cut. On the other hand, ATV's are used infrequently because they are unable to operate in the deep snow which so commonly accumulates in the winter on the westcoast of Newfoundland.

Period of harvest

Approximately 75% of the fuelwood is cut during the winter months (January, February and March) (Figure 4). Fuelwood cutting climaxes in March and during the remainder of the year, domestic fuelwood cutters are largely inactive. Many reasons exist for the predominance of fuelwood cutting during the winter. First, the snow-covered ground permits access by snowmobiles. Second, cutting fuelwood in the winter months allows the wood sufficient time to season for consumption in the following winter. Third, seasonal unemployment is highest in winter. Workers idled by seasonal layoffs remain active by cutting fuelwood.

Average price of fuelwood

Households within the WNMF paid \$39, \$34 and \$10 per solid m³ of hardwood, softwood

and slab fuelwood respectively (Table 8). The average price of fuelwood was higher within as opposed to outside of Corner Brook.

Total expenditure on fuelwood

Nearly \$600,000 was spent on domestic fuelwood by households within the Model Forest in 1993/94 (Table 9). The majority of the expenditure was on hardwoods as opposed to softwood or slabs. Residents of Corner Brook spent almost twice as much on fuelwood as residents in rural areas.

Non-productive and productive domestic fuelwood harvest

Domestic fuelwood is harvested in varying types of softwood and hardwood stands. In past studies of domestic fuelwood cutting in Newfoundland, the total volume of softwood fuelwood was assumed to be harvested in stands that would have yielded pulpwood and sawlogs (Northland and Associates 1980, 1984). As a consequence, the impact of domestic fuelwood harvesting on the softwood allowable annual cut was exaggerated. In this report, the condition of stands in which softwood fuelwood was cut is divided into two categories:

- (1) non-productive stands (cutovers, stand remnants, scrub, dead standing timber etc.); and
- (2) productive stands (immature or mature, green standing timber).

Softwood fuelwood cut in the former category does not affect the sustainable yield or annual allowable cut of commercial timber. On the other hand, softwood fuelwood cut in the latter category reduces the sustainable yield.

In 1993/94, 14 186 solid m³ of softwood fuelwood was cut in productive stands within the Model Forest (Table 10, Appendix C). The vast majority of the timber was harvested in mature, as opposed to immature, stands of timber. The volume of domestic fuelwood harvested in productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits.

Non-productive and productive domestic sawlog harvest

Softwood sawlogs are often cut by domestic fuelwood cutters in productive stands of softwood timber thereby posing another threat to the supply of commercial pulpwood and sawlogs. In 1993/94, 8 104 solid m³ of sawlogs were cut by fuelwood cutters in productive softwood stands within the Model Forest (Table 11, Appendix C). The volume of sawlogs from these productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits.

Domestic fuelwood and sawlog drain

As noted above, 14 186 solid m³ of domestic fuelwood and 8 104 solid m³ of domestic

sawlogs were cut in productive stands of softwood timber in 1993/94 (Table 12). In contrast, 198 795 solid m³ of commercial pulpwood and sawlogs were harvested. The harvesting of domestic fuelwood and sawlogs accounted for approximately 10% of the total cut within the WNMF in 1993/94. Clearly, domestic cutters harvest a significant volume of timber within the Model Forest.

Undisclosed production and sale of domestic softwood fuelwood

Fuelwood cutters are classified as either domestic or commercial. Domestic cutters are not permitted to sell fuelwood. Instead, the fuelwood that they harvest is used solely to fulfill their personal requirements. On the other hand, commercial cutters sell the fuelwood that they harvest. In 1993/94, 3 914 solid m³ of softwood fuelwood were purchased from domestic and commercial cutters by households in the Model Forest (Appendix B). If we assume that net imports or exports from the region were nil and the sale of commercial softwood fuelwood totaled only 150 solid m³ (as recorded by the Newfoundland Forest Service) during the year, 3 764 solid m³ of softwood fuelwood appears to have been harvested and sold by domestic cutters within the Model Forest¹. Members of households within the WNMF appear to be cutting and selling a significant volume of domestic softwood fuelwood but not divulging information on these activities. If this is the case, the volume of domestic softwood fuelwood harvested would be greater than the estimates presented in this report.

¹ Softwood fuelwood purchased by households (3 914 m³) less softwood fuelwood sold by commercial cutters (150 solid m³) equals the apparent harvest and sale of softwood fuelwood by domestic cutters (3 764 m³).

(3) **Views on domestic fuelwood harvesting**

All respondents, whether or not they cut or burn fuelwood, were asked a series of questions on a variety of issues associated with the harvesting of fuelwood. Their responses are presented below.

Public's concerns on domestic fuelwood harvesting

The majority of respondents are concerned with domestic fuelwood cutting within the WNMF (Table 13). Residents of Corner Brook and outside of Corner Brook are equally concerned with domestic fuelwood cutting. The primary concern of the public with regard to domestic fuelwood harvesting is the poor utilization of timber (Table 14). One-third of those surveyed are concerned with the poor utilization of timber (e.g. large tops left on sites). Overcutting is the next greatest concern. Residents of Corner Brook are far more concerned with overcutting than residents outside of the town. Other notable concerns include poor forest management and the sale of domestic fuelwood.

Public's opinion on the regulation of domestic fuelwood cutting

Most of the respondents believe that the enforcement of fuelwood cutting regulations is adequate within the Model Forest (Table 15). Only one-quarter of the respondents believed that

the regulation of domestic fuelwood cutting is inadequate. The opinion of respondents did not vary between Corner Brook and rural areas.

Public's knowledge of the fuelwood regulations of the pulp and paper firms

Most of the public are unfamiliar with the domestic fuelwood regulations of the pulp and paper firms within the WNMF (Table 16). Only 38% of the public believe that they are familiar with the regulations.

Public's views on the adequacy of access to domestic fuelwood cutting

Most of the public believe that they have adequate access to the harvesting of fuelwood or sawlogs within the WNMF (Table 17). Only one-third of the public believe that access to fuelwood or sawlogs is inadequate.

SUMMARY AND CONCLUSIONS

The consumption of domestic fuelwood is significant in the WNMF. In 1993/94, 55 503 m³ of fuelwood was consumed by households in the area. Approximately 5 000 households or 36% of all the households in the Model Forest burnt fuelwood as a primary or secondary source of heat. Of the wood-burning households, 11.10 solid m³ of wood was consumed on average per

household. The local per capita consumption of fuelwood (1.26 solid m³ per resident) is well above the average in Canada (0.24 m³ per resident). Most members of wood-burning households intend to burn the same volume of wood in the future.

Approximately two-thirds of the total volume of domestic fuelwood is cut by the members of the household in which it is consumed in the WNMF. The source of fuelwood is evenly split between unalienated crown land and the limits of the pulp and paper firms. In 1993/94, 15 630 and 17 052 solid m³ were cut on unalienated crown land and the limits of the pulp and paper firms respectively. In the same year, 16 306 and 17 545 solid m³ of softwood and hardwoods were harvested for fuelwood, respectively, by local cutters. One-third of the domestic fuelwood that is consumed by local households is purchased from other cutters. Nearly \$600,000 was spent on domestic fuelwood by households in 1993/94. The majority of the expenditure was on hardwoods as opposed to softwoods or slabs. Residents of Corner Brook spent almost twice as much on fuelwood as residents in rural areas.

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In 1993/94, 14 186 solid m³ of softwood fuelwood was cut in productive stands within the Model Forest. The volume of domestic fuelwood harvested in productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits. In the same year, 8 104 solid m³ of sawlogs were cut by fuelwood cutters in productive softwood stands. The volume of sawlogs from these productive softwood stands was evenly split between unalienated crown land and the pulp and paper limits. The harvesting of domestic fuelwood and sawlogs accounts for approximately 10% of the total cut within the WNMF in 1993/94. Clearly, local domestic cutters harvest a significant volume of timber.

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Table 1. Results of the stratified sample survey of households within the Western Newfoundland Model Forest, 1994.

Area	Number of households a	Number of households sampled b	Number of households that did not respond c	Corrected sample size (d = b - c)	Number of households surveyed e	Effective rate of response (%) [(d/e) x 100]
Corner Brook	7 400	n.a.	n.a.	72	70	97
Outside Corner Brook	6 622	n.a.	n.a.	171	166	97
Western Newfoundland Model Forest	14 022	300	57 ^a	243	236	97

^a The number of households that did not respond includes the households that could not be reached (52) or the occupant was deceased (5).

Table 2. Number and proportion of the households which burned domestic fuelwood within the Western Newfoundland Model Forest, 1993/94.

Area	Number of households	Number of households which burnt fuelwood	Proportion of households which burnt fuelwood (%)
Corner Brook	7 400	2 009	27
Outside Corner Brook	6 622	2 992	45
Western Newfoundland Model Forest	14 022	5 001	36

Table 3. Volume of fuelwood burnt by households within the Western Newfoundland Model Forest, 1993/94.

Area	Number of wood burning households a	Total volume of wood burnt b	Volume of wood burnt per household (c = b/a)
		- solid m ³ -	
Corner Brook	2 009	19 625	9.77
Outside Corner Brook	2 992	35 878	11.99
Western Newfoundland Model Forest	5 001	55 503	11.10

Table 4. Consumption of domestic fuelwood per capita in selected areas, various years.

Region	Per capita consumption
	- solid m ³ -
Western Newfoundland Model Forest	1.26
Canada ^a	0.24
Less developed countries ^b	0.5 - 1

^a In 1992, 6.5 million solid m³ of fuelwood were consumed in Canada (Canadian Forest Service 1993).

^b Based on estimates by Arnold and Jongma (1978).

Table 5. Distribution of the types of wood-burning equipment in households within the Western Newfoundland Model Forest, 1993/94.

Area	Fireplace	Wood-burning stove	Wood-burning furnace	Wood/oil furnace	Other	Total
	- percent -					
Corner Brook	17	48	13	22	0	100
Outside Corner Brook	5	43	34	17	1	100
Western Newfoundland Model Forest	10	45	25	19	1	100

Table 6. Percent of the volume of domestic fuelwood cut or purchased within the Western Newfoundland Model Forest, 1993.

Source of fuelwood	Comer Brook	Outside Comer Brook	Western Newfoundland Model Forest
	- percent of volume -		
Cut	42	81	67
Purchased	58	19	33
Total	100	100	100

Table 7. Domestic fuelwood harvested by tenure and type within the Western Newfoundland Model Forest, 1993/94.

Tree species of fuelwood	Tenure			Western Newfoundland Model Forest
	Unalienated Crown land	Pulp and paper limits	Tenure unknown or private land	
	- solid m ³ -			
Softwood	8 127	7 130	1 049	16 306
Hardwood	7 503	9 922	120	17 545
Total	15 630	17 052	1 169	33 851

Table 8. Average price paid for fuelwood by households within the Western Newfoundland Model Forest, 1993/94.

Category	Region		
	Corner Brook	Outside Corner Brook	Western Newfoundland Model Forest
(\$/solid m ³)			
Softwood	37 (89) ^a	- 31 (75)	34 (82)
Hardwood	42 (100)	36 (86)	39 (93)
Slabs ^b	11 (27)	8 (18)	10 (23)

^a The price of fuelwood per cord is in parentheses.

^b The price of slabs should be viewed with caution because the number of observations were too few.

Table 11. Volume of softwood sawlogs harvested by stand type within the Western Newfoundland Model Forest, 1993/94.

Type of stand	Unalienated Crown land	Pulp and paper limits	Tenure unknown	Total
- solid m ³ -				
Non-productive stands (cutover, stand remnants, scrub, dead standing timber)	-	1 966	-	1 966
Productive stands (immature or mature, green standing timber)	4 279	3 345	480	8 104
Total	4 279	5 311	480	10 070

Table 12. Domestic and commercial harvest of softwood timber within the Western Newfoundland Model Forest and forest management district #15, 1993/94.

Category	Volume (solid m ³)	Percent
(1) Commercial softwood harvest ^a		
Pulpwood - Crown land & Crown Exchanges	14 147	
Pulpwood - Corner Brook Pulp & Paper	179 975	
Commercial sawlogs - Crown land & Crown Exchanges	4 673	
Sub-total	198 795	90
(2) Domestic softwood harvest ^b		
Domestic sawlogs - Crown and CBPP land	8 104	
Domestic fuelwood - Crown and CBPP land	14 186	
Sub-total	22 290	10
TOTAL	221 085	100

^a The estimates of the commercial softwood harvest are for management district #15 as opposed to the entire Model Forest.

^b The estimates of the domestic softwood harvest are for the WNMF and include only the volumes of domestic fuelwood and sawlogs cut in stands of either immature or mature green standing softwood timber.

Table 13. Proportion of the public who are concerned with domestic fuelwood cutting within the Western Newfoundland Model Forest, 1993/94.

Response	Region		
	Corner Brook	Outside Corner Brook	Western Newfoundland Model Forest
	- percent -		
Concerned	53	49	51
Not concerned	40	49	44
Undecided or missing response	7	2	5
Total	100	100	100

Table 14. Concerns of the public with domestic fuelwood cutting within the Western Newfoundland Model Forest, 1993/94.

Concern	Region		
	Corner Brook	Outside Corner Brook	Western Newfoundland Model Forest
- percent -			
Poor utilization (e.g. remnants left on site)	30	38	34
Overcutting	28	6	17
Poor management	15	17	16
Sale of domestic firewood	7	13	10
Miscellaneous/other	20	26	23
Total	100	100	100

Table 15. Public opinion on the enforcement of domestic fuelwood cutting regulations within the Western Newfoundland Model Forest, 1993/94.

Response	Region		
	Corner Brook	Outside Corner Brook	Western Newfoundland Model Forest
	- percent -		
Adequate enforcement	43	44	44
Inadequate enforcement	24	27	25
Undecided or missing observation	33	29	31
Total	100	100	100

Table 17. Public's views on the adequacy of access to domestic fuelwood or sawlogs within the Western Newfoundland Model Forest, 1993/94.

Response	Region		
	Corner Brook	Outside Corner Brook	Western Newfoundland Model Forest
	- percent -		
Adequate access	84	66	76
Inadequate access	3	29	15
No response or missing observation	13	5	9
Total	100	100	100

Figure 1 Intended fuelwood consumption in the future
by households within the WNNMF

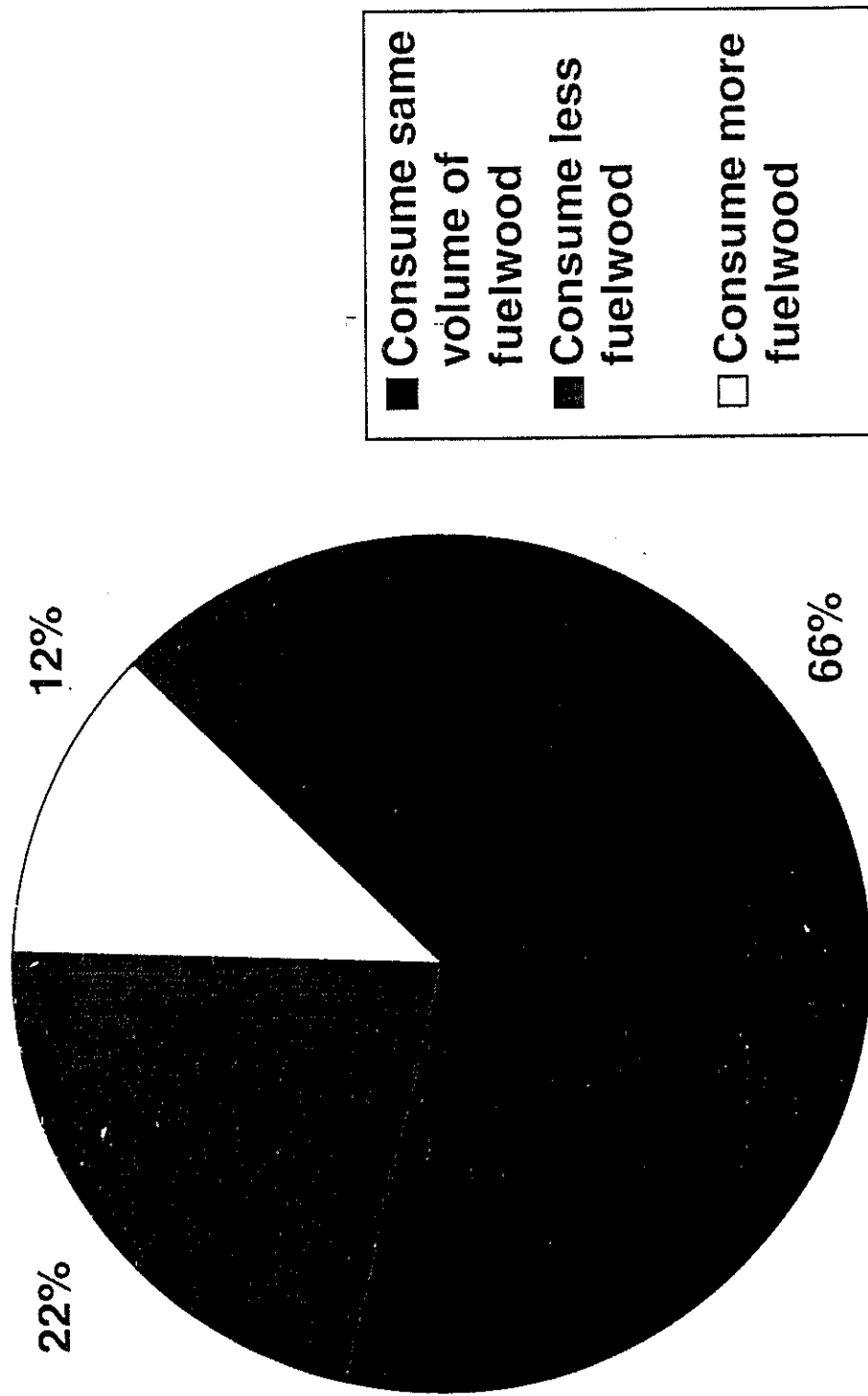


Figure 2 Distance cutters traveled to cut fuelwood within the WNMIF



Figure 3 Method of transporting fuelwood within the WNNMF

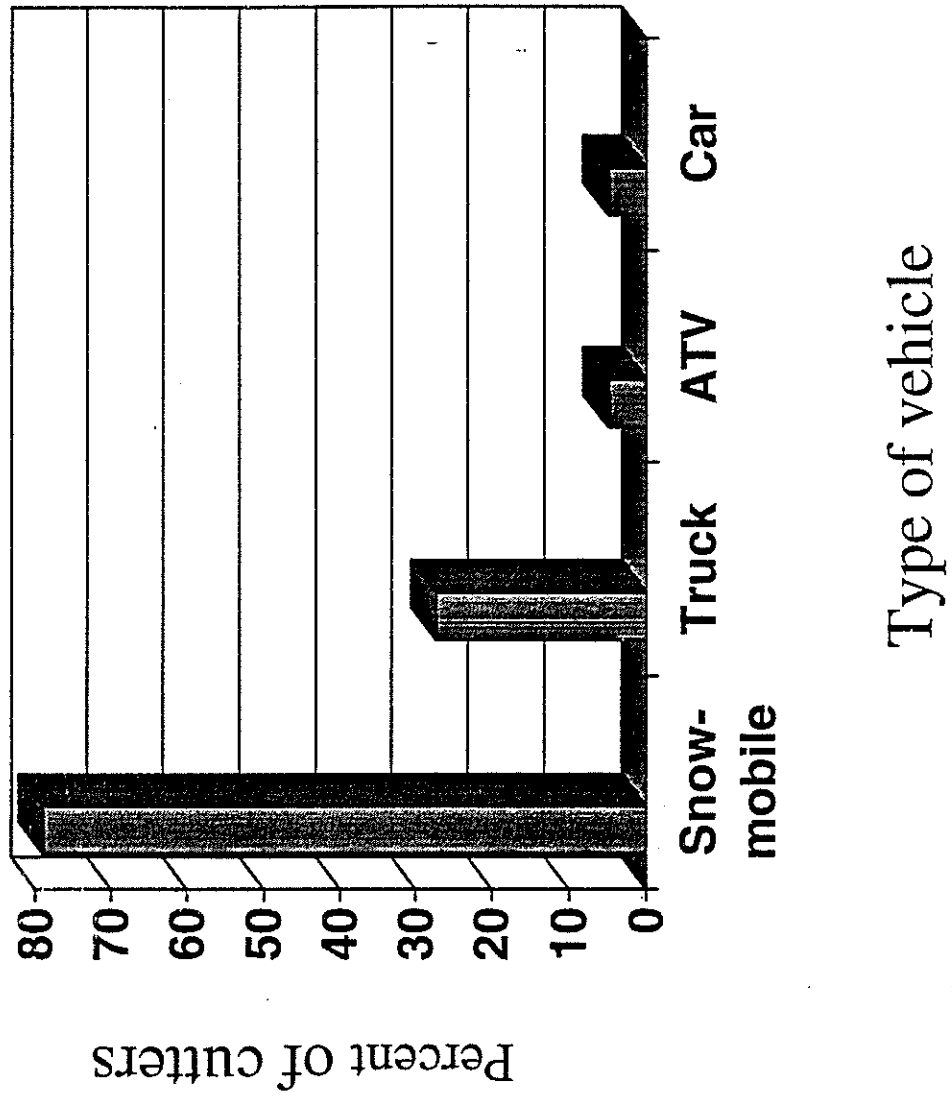
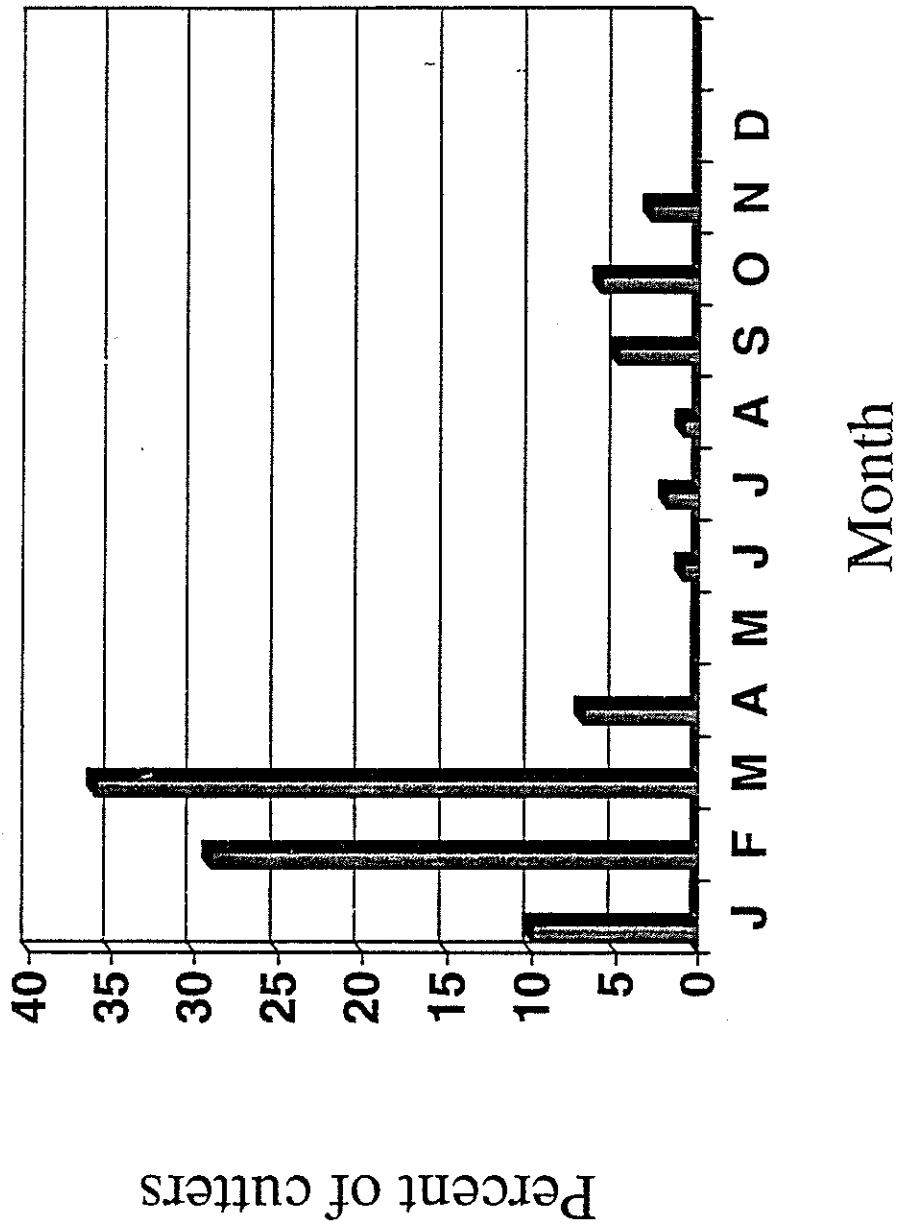


Figure 4 Wood cut by month within the WNMIF



Appendix B

Sources and volumes of domestic fuelwood within the Western Newfoundland Model Forest, 1993/94.

Stand type	Corner Brook			Outside Corner Brook			Western Newfoundland Model Forest			Total
	Softwood	Hardwood	Slabs/ scraps	Softwood	Hardwood	Slabs/ scraps	Softwood	Hardwood	Slabs/ scraps	
Cut	1 714	5 074	698	14 362	12 062	1 339	16 076	17 136	2 037	35 249
Purchased	1 903	7 610	127	2 011	3 830	622	3 914	11 440	749	16 103
Total	3 617	12 684	825	16 373	15 892	1 961	19 990	28 576	2 786	51 352

- solid cubic metres -

Appendix C

Distribution of the volume of domestic fuelwood and sawlogs by stand type within the Western Newfoundland Model Forest, 1993/94.

Stand type	Unalienated Crown land			Pulp and paper limits			Tenure unknown			Total
	Softwood fuelwood	Hardwood fuelwood	Softwood sawlogs	Softwood fuelwood	Hardwood fuelwood	Softwood sawlogs	Softwood fuelwood	Hardwood fuelwood	Softwood sawlogs	
Cutover, stand remnants	814	1 507		559	3 260	1 966		120		8 226
Mature, green standing timber	6 237	5 612	4 279	6 180	6 470	3 345	1 049	480		33 652
Immature green standing timber	696			24						720
Dead standing timber	96	384		367						847
Scrub	284									284
Total	8 127	7 503	4 279	7 130	9 730	5 311	1 049	120	480	43 729

- solid m³ -

Appendix D

WESTERN NEWFOUNDLAND MODEL FOREST
DOMESTIC FUELWOOD SURVEY

Section A

1. Place of residence _____

Telephone no. _____

2. In the last 12 months, have you cut or purchased any wood (fuelwood, scraps or sawlogs)?

_____ Yes (go to question 4)

_____ No (go to question 3)

3. Do you intend to cut or purchase any wood (fuelwood, scraps, or sawlogs)?

_____ Yes (go to question 19) Why? _____

_____ No (go to question 19)

4. Please fill in the chart below. Please indicate all the locations where you cut wood in the last 12 months (include all those locations where you cut for your home and/or cabin and the management district).

	Geographical Location	Species	Amount Cut (Cords)	Land Tenure*	Harvest Code**	Amount Bought (Cords)
Hardwood						
Softwood						
Slabs/scrap						
Sawlogs						

* Land tenure

- A. crown land
- B. company land
- C. private land

**Harvest Codes

- 1. cutover, stand remnants or points
- 2. green standing timber - mature
- 3. green standing timber - immature
- 4. dead standing timber
- 5. scrub

Section B - Fuelwood

5. Do you burn wood in a (check applicable)

_____ fireplace

_____ wood burning stove

_____ wood furnace

_____ wood/oil furnace

_____ other (please specify) _____

6. How much fuelwood did you burn in the last 12 months?

_____ cords

7. Approximately, what percentage of your home heating is obtained from wood?

_____ 25%

_____ 50%

_____ 75%

_____ 100%

_____ burn wood for enjoyment only

8. What is the approximate size of your house?

_____ square feet

9. How long have you been burning wood?

_____ 1 year

_____ 2 - 5 years

_____ 6 - 10 years

_____ 11 - 20 years

_____ over 21 years

10. Currently, do you burn

a) _____ more

_____ less

_____ or the same amount of wood as last year

b) _____ less

_____ or the same amount of wood as 5 years ago

c) _____ more

_____ less

_____ or the same amount of wood as 10 years ago

11. In the future, do you plan to burn

_____ more

_____ less

_____ or the same amount of wood as this year

12. Currently, how do you obtain your firewood?

_____ cut your own

_____ buy

_____ buy slabs or scrapwood

_____ buy some _____ % and cut some _____ %

_____ other

13. What was the total amount of money you spent on fuelwood in the last 12 months?

Softwood

_____ \$ per cord

_____ number of cords

_____ \$ pick up load

_____ number of pick up loads

Hardwood

_____ \$ per cord

_____ number of cords

_____ \$ pick up load

_____ number of pick up loads

Slabs

_____ \$ pick up load

_____ number of pick up loads

Section C - Sawlogs

14. Did you cut any sawlogs in

	No	Yes	Mfbm	Sawlog Use
1993	_____	_____	_____	_____
1992	_____	_____	_____	_____
1991	_____	_____	_____	_____
1990	_____	_____	_____	_____
1989	_____	_____	_____	_____

18. In the last 12 months, how much time have you spent collecting wood? (Please include the time spent preparing trails, cutting and hauling wood, and splitting and stacking)

_____ days

Section E

19. Are you employed

_____ full time

_____ part time

_____ seasonal

_____ fisheries compensation package

_____ not employed

20. Which of the following categories best represents your annual **household** income before taxes? (Please check the appropriate category).

_____ \$0 - \$9,999

_____ \$50,000 - \$59,999

_____ \$10,000 - \$19,999

_____ \$60,000 - \$69,999

_____ \$20,000 - \$29,999

_____ \$70,000 - \$79,999

_____ \$30,000 - \$39,999

_____ \$80,000 - \$89,999

_____ \$40,000 - \$49,999

_____ \$90,000 - \$99,999

_____ over \$100,000

21. a) Do you have any concerns about domestic cutting practices?

_____ Yes

_____ No

24. a) Do you feel you have adequate access to domestic fuelwood/sawlogs?

_____ Yes

_____ No

b) If no, what do you think could be done to improve access to domestic fuelwood/sawlog permits?

c) Do you feel you have adequate access to domestic fuelwood/sawlogs permits?

_____ Yes

_____ No

d) If no, what do you think could be done to improve access to domestic fuelwood/sawlog permits?

25. Additional comments