enacted 99/007
mailed 99/013
RC 99/018
Noday 99/11 22

BY-LAW NO. 1
of the Pictou Landing Band
A By-law Dividing the Reserve into Zones

WHEREAS the Council of the Pictou Landing Band desires to make a by-law dividing the reserve into zones in order to regulate the use of land, such use including the implementation of the forest management plan;

AND WHEREAS the Council of the Pictou Landing Band is empowered to make such by-law pursuant to paragraphs 81(1)(g), (q) and (r) of the *Indian Act;*

AND WHEREAS it is considered necessary for the development of the reserve lands and for forest management in one or more of the zones of the reserve;

NOW THEREFORE the Council of the Pictou Landing Band hereby makes the following by-law:

Short Title

1. This by-law may be cited as the "Zoning By-law with respect to Forest Management".

Interpretation

2. In this by-law,

"*Band*" means the Pictou Landing Band;

"*By-Law Officer*" means the person appointed or designated by the Chief and Council under this by-law and charged with the duty of monitoring and reporting of this by-law.

"*Community Forest Management Board*" means the person(s) appointed or designated by the Council under this by-law and charged with the duty of administering the provisions of this by-law as outlined in Schedule "B", the Pictou Landing Forest Management Plan.

"*Council*" means the Council, as defined in the *Indian Act*, of the Pictou Landing Band;

"*Forest management*" means the management and restoration of the forest on reserve lands according to the Mi'kmawy concept of Netukulimk as outlined in the Pictou landing forest management plan shown on schedule "B" hereto, which:

(i) includes the construction of roads, bridges, trails and landings for commercial

and recreational use;

(ii) includes the cutting of trees on reserve, the gathering of plants and other related activities of silviculture.

"'Peace officer' means a peace officer as defined in section 2 of the Criminal Code of Canada."

"*person*" includes an individual, an association, a chartered organization, a firm, a partnership and a corporation;

"*reserve*" means the reserve of the Pictou Landing Band and includes the Fisher's Grant Reserves No. 24 A and Fisher's Grant Reserves No. 24 G and Boat Harbour Reserve No. 37 ;

"*zone*" means a designated area of land use shown on Schedule "A" hereto;

Application of By-law

3. (1) The provisions of this by-law apply to all reserved lands of the Pictou Landing Band as shown on Schedule "A" and to the Pictou Landing Forest Management Plan as shown in schedule "B".

(2) Schedule "A", which is attached hereto, is a part of this by-law as fully and to all intents and purposes as though recited in full herein.

(3) Schedule "B", which is attached hereto, is part of this by-law as fully and to all intents and purposes as though recited in full herein.

(4) The provisions of this by-law are subject to all Federal Laws.

Forest Management By-Law Administration

4. The Council will, by resolution, appoint or designate persons as the Community Forest Management Board whose duty it shall be to administer the provisions of the Forest Management Plan as outlined in Schedule "B". The Community Forest Management Board will consist of, at a minimum, a member of Council, a member of the Band staff and two members of the community. All forest management activities will be determined by the Community Forest Management Board.

Monitoring and Reporting

5. The Council will appoint or designate a person as the By-Law Officer whose duty it shall be to monitor and report on this by-law. The By-Law Officer will monitor the forest management area, as shown in schedule "A" and report any offense of this by-law to the Community Forest Management Board and the Peace Officer.

By-Law Enforcement

6. The Peace Officer will be responsible for enforcing this by-law. This includes seizing equipment, seizing harvested plant material and removing offenders from the Forest Management Area as outlined in schedule "A".

Prohibition

7. No land within then Schedule "A" reserve shall be used except in conformity with the provisions of this by-law.

Zones

8. The reserve is divided into the following zones, as shown on Schedule "A" (Zoning map).

Zones	Zone Symbols
Residential	Zone R
Forestry	Zone F

Forestry (F) Zone Specifications

9. No person may engage in any forest activities as described in schedule "B" unless approved by the Community Forest Management Board.

Inspection

10. The Community Forest Management Board will utilize the services of the community to investigate and monitor forest related activities.

Offence

11. (1)A person who uses land identified in schedule "B" in a manner contrary to any provision of this by-law commits an offence.

(2)A person who interferes with or obstructs the Community Forest Management Board in the administration of the provisions of the Forest Management Plan as outlined in schedule "B" of this by-law commits an offence.

(3)A person who interferes with or obstructs the By-Law Officer in the monitoring and reporting of this by-law commits an offence.

(4)A person who interferes with or obstructs the Peace Officer in the enforcement of this by-law commits an offence.

(5)Where an act in contravention of this by-law continues for more than one day, such act or omission shall be deemed to be a separate offence committed on each day during which it continues, and will be punished as such.

Penalty

12. Any person who commits an offence under section 11 of this by-law is liable on summary conviction to a fine not exceeding $1,000 or to imprisonment for a term not exceeding 30 days , or to both.

13. Any breach of this by-law will result in the seizure of any equipment, vehicles, personal or company property and will be disposed of as per direction of the court.

14. Seizure of any harvested plant material to become the property of the Band.

THIS BY-LAW IS HEREBY made at a duly convened meeting of the Council of the Pictou Landing Band this 7 day of October, 1999

Voting in favour of the by-law are the following members of the Council:

Wayne Denny
(Member of the Council)

Chief Albert W Denny
(Member of the Council)

(Member of the Council)

(Member of the Council)

(Member of the Council)

(Member of the Council)

being the majority of those members of the Council of the Pictou Landing Band present at the aforesaid meeting of the Council.

The quorum of the Council is 3 members.
Number of members of the Council present at the meeting: 4.

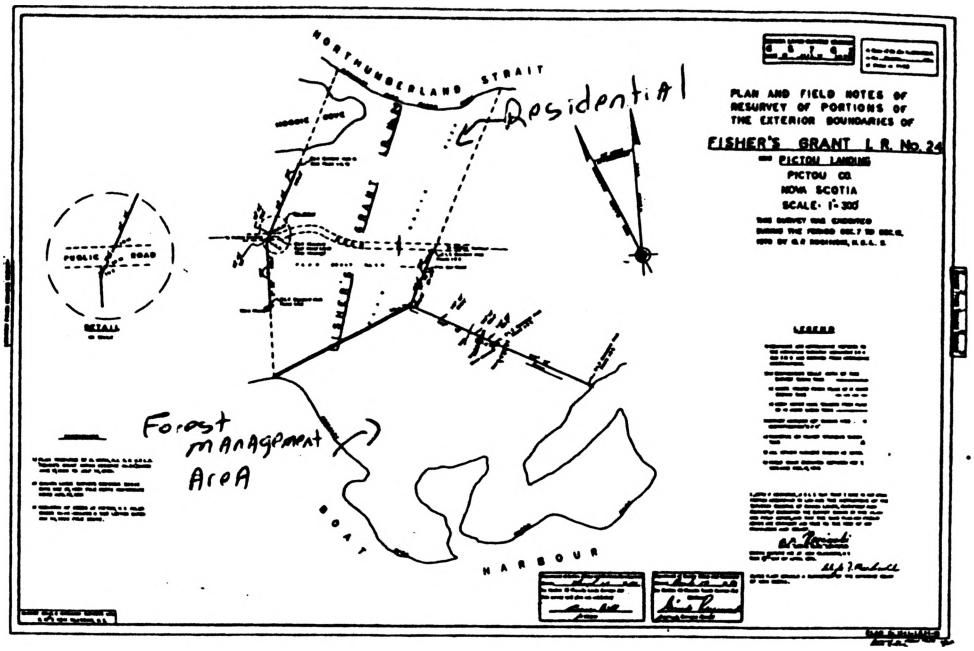
I, Albert Dan (Chief or Councillor) of the Band, do hereby certify that a true copy of the foregoing by-law was **mailed** to the Minister of Indian Affairs and Northern Development at the _____ office of the department pursuant to subsection 82(1) of the Indian Act, this 7 day of October 1999

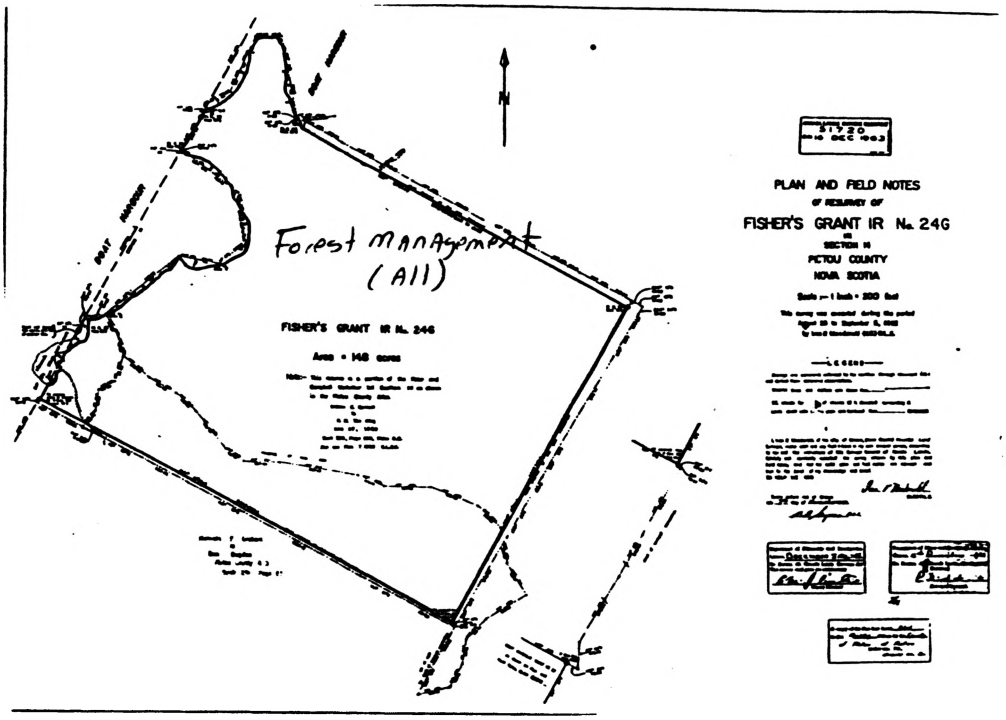
Dan L McLeod
(Witness)

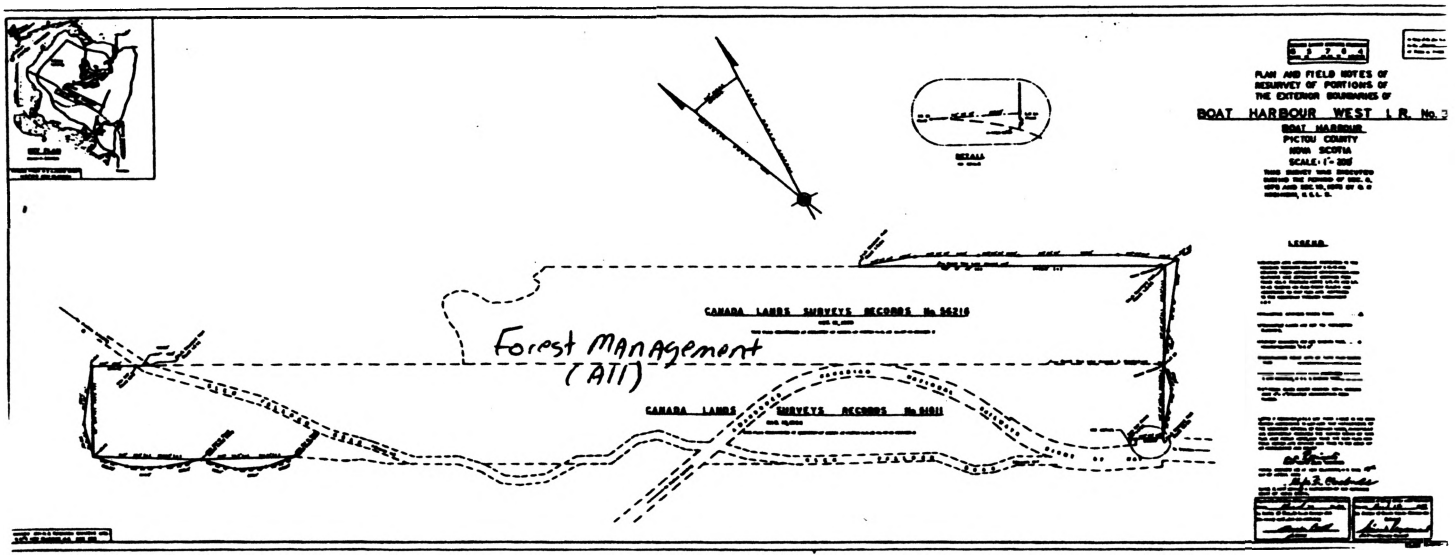
Albert Dan
(Chief or Councillor)

SCHEDULE "A"

ZONING MAP OF THE RESERVE OF THE Pictou Landing BAND







SCHEDULE "B"

FOREST MANAGEMENT PLAN OF THE RESERVE OF THE Pictou Landing BAND

PICTOU LANDING FIRST NATION

FOREST MANAGEMENT PLAN

JANUARY 19. 1999

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

INTRODUCTION

The Pictou Landing Mi'kmaq First Nation is located north of the town of Trenton in Pictou County, Nova Scotia. The Reserve is comprised of approximately four hundred sixty five hectares, of which three hundred eighty five hectares have been designated as forest resource. The balance is developed or reserved for development.

The Community wishes to manage this woodland for the present and future benefit of all its members. This management plan sets out a path to follow towards truly sustainable forest resource management. The goals and objectives of the people are set out clearly, and the advantages and special problems which apply to this situation are discussed. There is a complete description of the Pictou Landing Forest as it is today.

A management strategy for the Forest is set out. This includes planning, administration, operations, and determination of the periodic allowable harvest. Descriptions of, and prescriptions for, each stand, together with a priority summary, are given. Matters of environmental and ecological protection are discussed.

This management plan is meant to be a living document. It will take its first breath with its endorsement by the members of the Pictou Landing First Nation. The plan is to be revised every five years, to incorporate new techniques and knowledge from both the Pictou Landing Forest, and other places within the Acadian Forest Region.

OBJECTIVES

LANDOWNER OBJECTIVES

Social Goals

The Mi'kmaq people have an affinity for the forest, and the natural bounty of that forest, which is founded deep in their history and culture. Consequently, the Pictou Landing Community sees their woodland primarily as a social resource. It is their wish to use the forest to maintain and enhance this inherent connection of the people and traditions with the natural environment.

To this end, the forest is expected to provide :

- High quality recreational opportunities in such activities as hiking, viewing of wildlife, trees, plants, and a variety of habitats, hunting, and gathering of natural food and medicinal plants.

- A forest environment with high-order ecological functions, characterized by inherent stability, production of clean water, and a high degree of plant and animal diversity.

- A medium for the people to increase their understanding of ecology and the forest environment, and in particular how it relates to their woodland and to their own history, culture, and traditions.

Economic Goals

The Community expects the forest to provide economic benefits where and when resource extraction does not negatively impact the cultural and aesthetic quality of the forest. Timber is the foremost economic resource of the forest. Timber harvests should provide:

- Employment opportunities for Band members.
- Income to the Band and community.
- Raw materials for use in native craft activities.
- An opportunity for increased understanding, by the Community members, of the balance between resource use and conservation.

FOREST MANAGEMENT OBJECTIVES

The objectives of the Band are to be accomplished by restoring the forest, over time, to "Acadian Forest" condition. The Acadian Forest is typified by the following characteristics:

- An unevenaged, eventually an all aged, forest.
- A diversity of species of trees and other plants, with red spruce, white pine, hemlock, yellow birch, sugar maple, ash, and beech the dominant tree species.
- An abundance of diverse stand structure, including standing and fallen snags and coarse woody material.
- Stable populations of a diverse array of birds, animals, reptiles, amphibians, invertebrates, and micro fauna.

STRENGTHS AND WEAKNESSES

Use of Boat Harbour as a treatment facility for pulpmill effluent from Abercrombie Point has been a setback for the people of Pictou Landing for thirty five years. Its severe negative impact on the local environment has dampened the inherent interest of the Mi'kmaq in their land. While change occurs slowly, recent adjustments in the treatment process have made marked improvements in the local air and water quality.

The Province of Nova Scotia has committed to closing the Boat Harbour treatment facility in the year 2005. After that time, the Province will clean up and restore the area to its original condition. This is a long term prospect which could substantially enhance the local natural environment in conjunction with the forest lands. Additional woodland and wetlands may be available to the Pictou Landing First Nation at a later time, potentially enabling the Community to gain control of all lands surrounding the Harbour.

A restored and cleansed Boat Harbour will be a significant resource and asset for the Pictou Landing First Nation. The Harbour, the forests and wetlands which surround it, and the Community itself, should be managed together as components of a larger and more sustainable "community". Although years will pass before this development is realized, management should be guided by that vision from this time on. A future generation of Mi'kmaq may inherit a more complete " Boat Harbour Community" than ever experienced before.

Recent land acquisitions by the Band have served to physically connect the original properties with the community itself. The forest is now a contiguous block, which will enable the people to more effectively control access to, and use of, the woodland. The fact that the community is located adjacent to the woodland enables the people to use and enjoy the forest more often and with less effort.

Abandoned agricultural lands on the property are slowly reverting to forest. This has created rich wildlife habitat, and presents opportunities for wildlife management, which fits well with Mi'kmaq culture. Several old wagon roads and logging trails exist which may be incorporated into a hiking trail network.

The degraded nature of the forest means there are presently limited opportunities for demonstration of high order ecology. Many years of careful management will be needed to begin to restore ecological function to the forest. The Community members have shown limited interest in the forest in recent years. A concerted effort will be required to reignite the feelings Mi'kmaq have for this forest.

Much work and a long term commitment to management will be required to restore the Acadian Forest on this property. The poor quality and low value of the

roundwood to be harvested would indicate that timber extraction activities alone will pay only for "passive restoration". The markets for these roundwood products fluctuate greatly, and good demand often does not coincide with other favourable conditions for harvest operations. Access to the property is good. Public highways are nearby, and a good woodlot road network has been established. The terrain is reasonable for road building and there need be no excessive grades. Terrain is generally favourable to the use of small extraction equipment. The species and conditions necessary for restoration are present: they need only be promoted.

DESCRIPTION OF PICTOU LANDING FOREST

FOREST DESCRIPTION

Geography

The Pictou Landing First Nation is located in Pictou County, Nova Scotia. It lies on the eastern side of Pictou Harbour, on the southern shore of the Northumberland Strait. The reserve lands partially encompass Boat Harbour, which was once a tidal lagoon. The Town of Trenton lies eight kilometers south of the Reserve, along Provincial Highway 348, which runs through the community of Pictou Landing.

History

The reserve lands on the north side of Boat Harbour were assembled by Indian and Northern Affairs through various purchases and exchanges between 1874 and 1910. This area, now known as Fisher's Grant 24, has an area of approximately 120 hectares. Title to this land is held by Indian and Northern Affairs Canada (See Appendix VIII). Lands northeast of Fisher's Grant 24, amounting to forty hectares, were acquired recently from the Province of Nova Scotia. This is abandoned homestead and farmland, which has reverted to forest. The portion south of the community and Highway 348 is young, early successional forest which appears to have originated after harvesting. A small amount of forestry work has been carried out in the last five years. Abuse of these lands and forests has been documented for over one hundred years. The Band wishes to designate eighty hectares for the community and future residential development.

Boat Harbour was at one time an important estuarine resource and facility for the Pictou Landing Mi'kmaq and other local inhabitants. It was converted to a pulpmill effluent treatment facility for the Scott Maritimes kraft pulp mill in Abercrombie Point in 1965. This destroyed the lagoon as an asset to the Band, and caused an extreme decline in the local environment and quality of life for the Community. It also created a physical barrier between the community and two parcels of forest across Boat Harbour which were purchased for the Band's use in the early 1960's.

In 1960, the fifty seven hectare Fisher's Grant 24G, located on the east side of

Boat Harbour, was acquired from a local landowner. There was no road access to this property, and the forest was predominantly young (20-40 years old) softwood which had regenerated naturally after harvesting. There was an old farm in the southwest corner of the lot, which was abandoned around 1940. Little or no use was made of this woodlot by the Band. Some limited selective harvesting was carried out in the early 1970's. Road access was established in the late 1980's. Since that time, one third of the area has been silviculturally treated with the help of federal forestry programs.

Also in the early 1960's, one hundred hectares south of Boat Harbour were purchased for the Band, along with abandoned road rights - of - way for purposes of access. This is known as Boat Harbour West IR # 37. This property, like Fisher's Grant 24G, contained mostly young, naturally regenerated forest. The western portion of the property was at one time cleared land, but now supports sixty year old forest, indicating abandonment around 1940 as well. Selective cutting of softwood stands in the central portion of the property was carried out around 1970. Otherwise, there was little use of the woodlot by the Community until access roads were established under the federal forestry programs in the late 1980's. Silvicultural treatments, including shelterwood cutting, merchantable thinning, remnant removal, planting, and precommercial thinning, have been carried out in the past decade.

Additional lands were acquired by the Band in 1997. Parcel One contains eighty hectares of woodland dominated by mixedwood stands which originated after harvesting approximately sixty years ago. Parcel Two is a thirty three hectare woodlot, some of which was at one time cultivated land. No forestry activity appears to have occurred on this property for at least sixty years, about the time the farm was abandoned. Parcel Three is thirty five hectares which includes one or more old homesteads, and a high proportion of formerly cleared land. Again, it appears that abandonment was fifty to sixty years ago. No activity has taken place since that time. This parcel includes the old Canadian National Railway right - of - way, on which the access road to Boat Harbour West and Fisher's Grant 24G was built.

The Pictou Landing Band does not have a long history of association with their woodlands east and south of Boat Harbour. Their involvement really began when access was established in the late 1980's. It has been nurtured by the forestry activity carried out since that time.

Geology and Soils

The Pictou Landing First Nation is located in the Northumberland Lowlands physiographic zone, which comprises the coastal region and lowland interior region of Pictou County. The underlying bedrock is Carboniferous sedimentary strata. The topography in the zone is predominantly undulating to rolling till plain.

The soils in the Pictou Landing area have developed from Carboniferous sandstones. Four soil associations are found on the Reserve (See Appendix III). In order of decreasing coarseness, they are the Shulie, Hansford, Pugwash, and Cumberland soils. The very well-drained Shulie soil covers most of Fishers Grant 24 and the northern half of Parcel One. The Shulie soil is very stony and slightly rocky. Where the topography is flat, the presence of a compact layer of subsoil impedes drainage, even in this gravelly sandy loam. This compact layer is characteristic of the Hansford and Pugwash soils as well.

An imperfectly - drained Hansford soil is found in areas of low relief in Parcel One, Fisher Grant 24G, and a large part of Parcel Two. The Hansford soil is a sandy loam to gravelly sandy loam, stony and non-rocky. The compact subsoil layer causes a perched water table during wet times of the year. These areas are susceptible to rutting by machinery, and this must be taken into account when planning operations. Some of these areas will be off- limit to machine travel. The western portions of Boat Harbour West and Parcel Three have a well drained Hansford soil, supporting good tree growth.

The moderately well - drained Pugwash sandy loam is found in Fisher's Grant 24G, the southeast corner of Parcel Two, and the eastern portions of Boat Harbour West and Parcel Three. While elevated areas are dry and favourable for operations, a high water table is evident in the low, flat areas most of the year. The Pugwash soil is non-stony and non-rocky.

The wetland in the central part of Boat Harbour West has developed on a Cumberland soil, which is a poorly drained sandy loam over alluvial deposits. This area is reserved from any potential disturbance - causing activity.

In summary, the soils which have developed on the Pictou Landing First Nation are relatively coarse and well - drained where there is elevation and/or slope. The presence of a compact layer forty to eighty centimeters under the surface impedes drainage in flat, low areas. The soils are reasonably fertile, although a substantial organic layer is a necessary component of the nutrient cycle for forest growth. These coarse soils are not typical of the Northumberland shore of Pictou County.

Climate

Pictou County lies within the cool, humid, temperate, climatic zone. The county has a continental climate modified by the maritime location. It receives adequate precipitation, averaging 1100 millimeters per year along the coast. Winters are cold, with frequent snowfall, particularly along the Northumberland shore. Summers are warmer than other coastal areas of Nova Scotia, because of the shallow, sheltered nature of the Northumberland Strait. As a result, the Northumberland shore experiences growing degree days comparable to the Annapolis Valley, although spring comes later to

Pictou County. Spring warming is delayed by the presence of ice in the Strait. The frost free period along the shore usually exceeds 110 days.

Winds along the Northumberland shore are substantially stronger than further inland. Westerlies and north westerlies may be less important to the Boat Harbour area, which is somewhat protected by the Pictou headland.

Ecological Classification

The Pictou Landing Forest is located in the Northumberland Shore District of the Maritime Lowlands Ecoregion of Loucks (1962) Forest Classification for the Maritime Provinces. This is part of the red spruce - hemlock - pine zone, where these species attain prominence on generally heavy soils with imperfect drainage. Black spruce, balsam fir, tamarack, red maple, yellow, white and grey birch, white ash, and poplars are common associates.

Loucks documents two factors which together determine the distinct nature of the Northumberland Shore District. First, the heavy soils and poor drainage preclude prominence of tolerant hardwoods such as sugar maple and beech. Secondly, the effect of prevailing winds off the Northumberland Strait influences both species composition and height growth of the trees. This forest type is subject to significant modification after disturbances such as harvesting or fire.

The Pictou Landing First Nation is subject to some modification from Loucks classification. The soils around Boat Harbour are better drained then elsewhere along the Northumberland Strait. In addition, headlands west of Pictou Harbour and Pictou Harbour itself, may somewhat ameliorate the effects of the prevailing winds and dampness of the Strait.

There is evidence that the Boat Harbour area at one time supported tolerant and intermediate hardwoods. Sugar maple seedlings, saplings, and poles, can be found in several stands. Yellow birch are commonly found in wet areas. Beech is a common understory tree, especially in the Fisher's Grant 24. White ash is found throughout the forest and appears to grow very well when on-site. Red oak, although not common, is also found in all parts of the forest. Young-mature red oak trees appear to be healthy and vigorous. The presence of these hardwoods seem to indicate that the Boat Harbour area shares some ecological characteristics with the higher elevation areas of sugar maple and yellow birch immediately to the south.

Forest Cover

The Pictou Landing Forest today is characterized by early and mid- successional types. Past land clearing, timber harvesting, and fire have altered the precolonial species composition and structure of the forest. Relatively little activity on the Reserve lands during the past forty years has resulted in very few areas of young forest. Only ten percent of the forest is less than forty years old. Seventy three percent of the forest is between forty and eighty years old. These stands originated after harvesting and following abandonment of cultivated lands in the first half of this century. Five percent of the stands are between eighty and one hundred years of age. Unevenaged stands occupy eight percent of the area. A further four percent is non - forest (open fields and wetlands without tree cover)(Figure One).

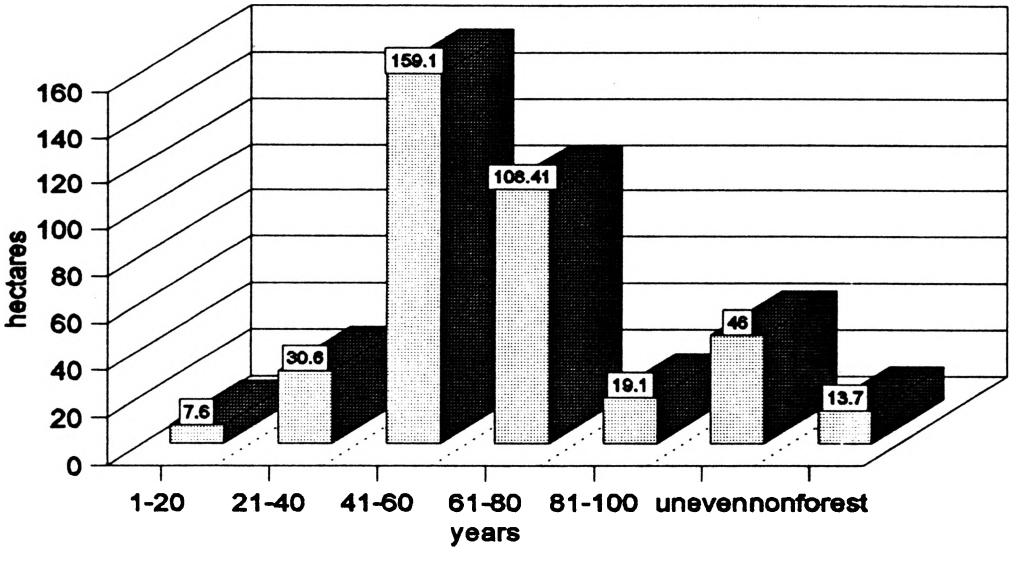


Figure 1. Age Class Distribution of the Pictou Landing Forest

Softwood and mixedwood cover types dominate the forest, accounting for seventy five percent of the land base (Figure Two). The softwood stands (thirty percent of the forest) are comprised of red spruce, white spruce, balsam fir, hemlock, white pine, red pine, and larch. All these species, excepting larch, are found in commercially important quantities. The average age of softwood stands is sixty years. Figure Three (a, b, c) shows the age class distribution of each cover type.

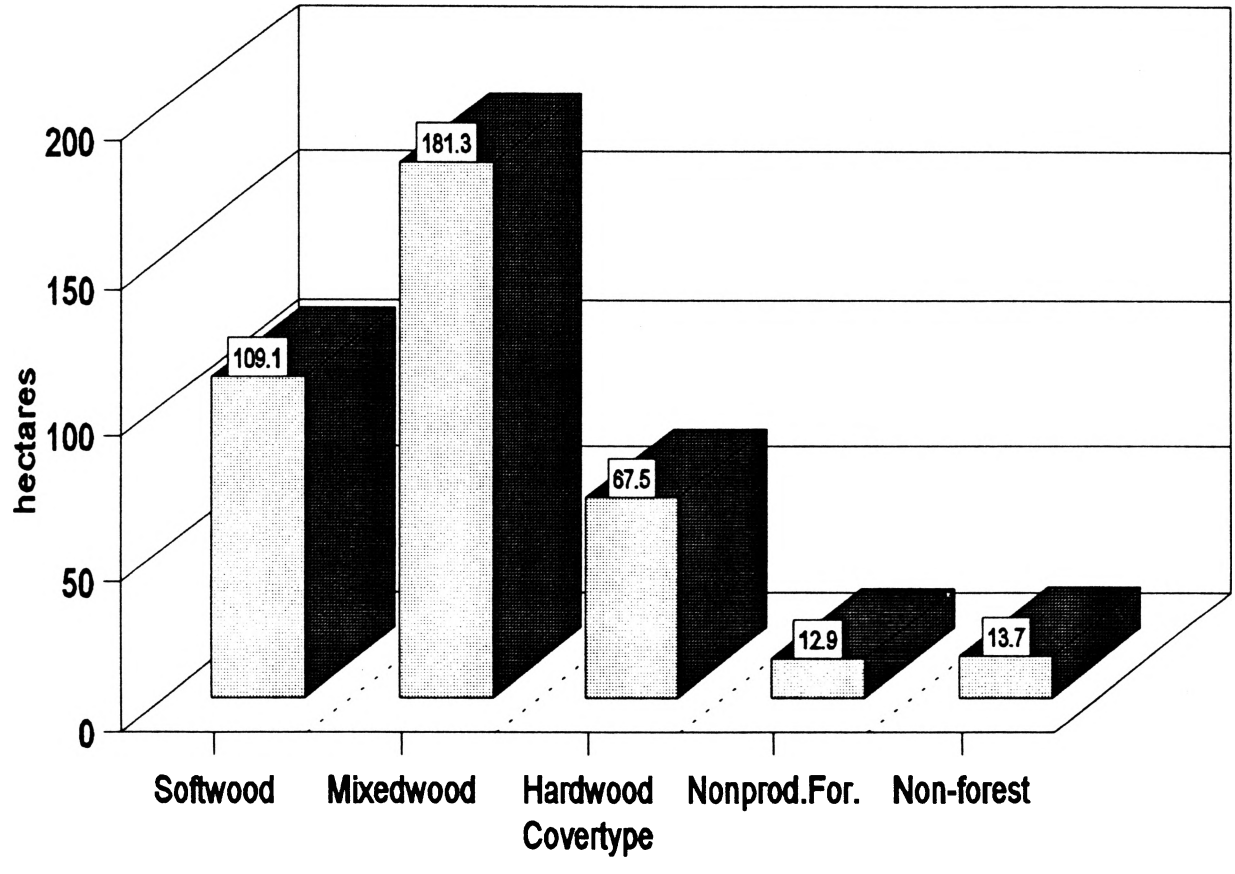
The mixedwood cover type, also averaging sixty years of age, account for forty seven percent of the forest. The same softwoods are represented, along with trembling

and largetooth aspen, red and striped maple, white, grey, and yellow birch, white ash, red oak, and beech. The poplars, red maple, and white birch constitute most of the commercial volume of hardwood at this time.

Hardwood stands are somewhat younger than the other types, with an average age of forty years. All previously listed deciduous species are found in the hardwood cover type. Sugar maple also occurs, but rarely. Again, the intolerant species represent the bulk of the commercial volume (See Appendix IV).

The Pictou Landing Forest contains a merchantable growing stock of approximately thirty five thousand cubic meters, sixty percent of which is softwood species. The softwood volume is evenly distributed between saw material (sawlogs, studwood, poles) and cordwood (pulpwood). The merchantable volume of hardwood species is ninety six percent cordwood (Table One).

Figure 2. Forest Covertype distribution for the Pictou Landing First Nation



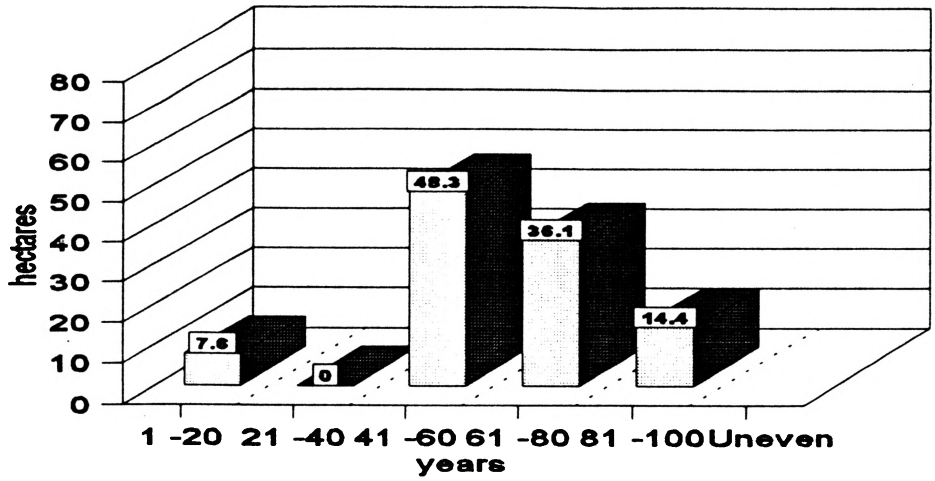


Figure 3a. Age Class Distribution - Softwood

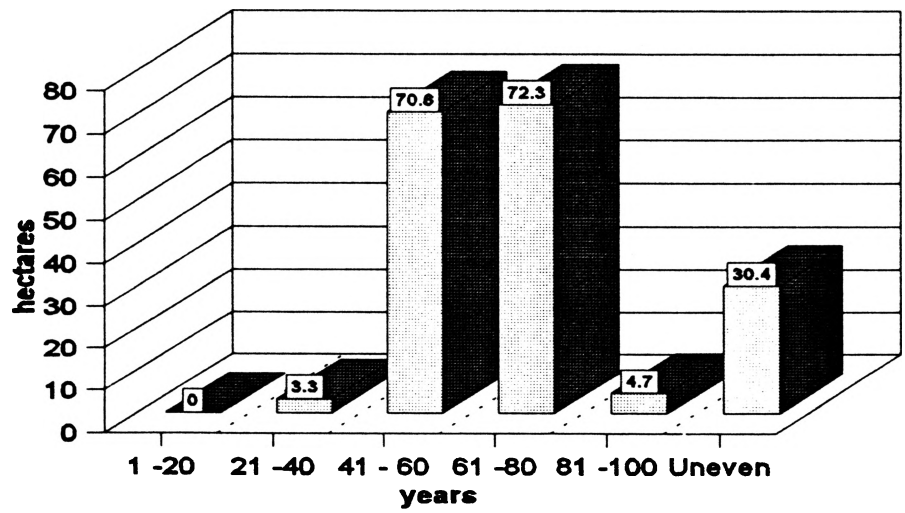


Figure 3b. Age Class Distribution- Mixedwood

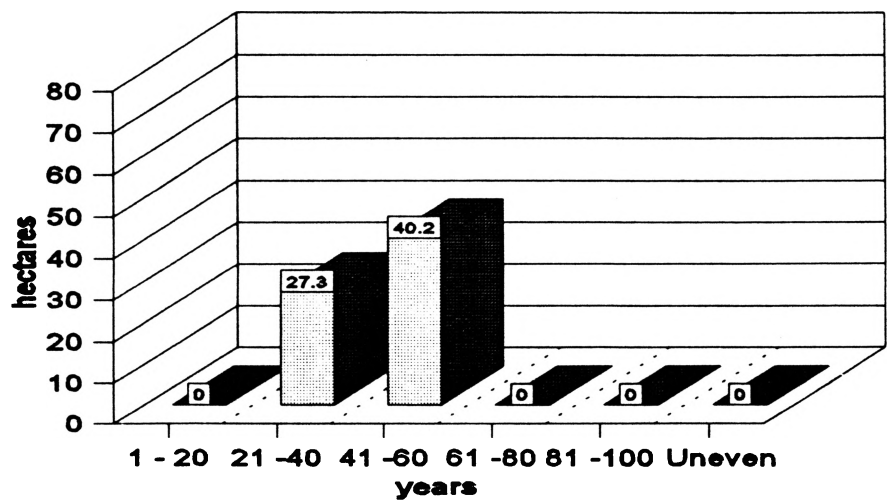


Figure 3c. Age Class Distribution - Hardwood

Table 1. Summary of inventory data for the Pictou Landing Forest

PICTOU LANDING - INVENTORY SUMMARY

tand No.	Area (ha)	Timber Area (ha)	Volume per Hectare, by Product (m3/ha)				Stand Volume, by Product (m3)						Total Stand Volume (m3)		
			Cordwood		Sawlogs		Cordwood			Sawlogs					
			Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Total	Softwood	Hardwood	Total	Softwood	Hardwood	Total
1	2.7	2.7	21	12	25	0	57	31	88	68	0	68	125	31	156
2	9.8	9.8	12	43	0	0	121	420	541	0	0	0	121	420	541
3	4.6	4.6	30	61	16	0	137	280	417	74	0	74	211	280	490
4	2.1	2.1	41	22	54	0	86	45	131	114	0	114	200	45	245
5	1.4	1.4	6	22	0	0	8	31	39	0	0	0	8	31	39
6	13.6	13.6	49	14	63	0	664	194	858	857	0	857	1520	194	1715
7	2.1	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0
8	18.2	18.2	10	106	8	0	175	1936	2111	146	0	146	320	1936	2257
9	2.9	2.9	0	23	0	0	0	65	65	0	0	0	0	65	65
10	3.9	3.9	0	83	36	0	0	322	322	140	0	140	140	322	462
11	3.8	3.8	0	57	45	0	0	217	217	170	0	170	170	217	387
12	12.2	12.2	0	93	12	17	0	1131	1131	146	201	348	146	1332	1479
13	3.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	9.4	9.4	49	9	36	0	464	85	549	337	0	337	801	85	885
15	12.8	12.8	46	31	26	0	588	393	980	329	0	329	916	393	1309
16	4.6	4.6	16	50	13	6	72	228	299	58	25	83	130	253	383
17	5.2	5.2	28	11	124	0	147	56	203	645	0	645	792	56	848
18	4.4	4.4	35	8	54	0	152	34	186	238	0	238	389	34	424
19	8.2	8.2	20	85	13	8	167	698	865	110	63	173	277	761	1038
20	8.1	8.1	48	24	38	0	386	197	582	306	0	306	692	197	889
21	7.4	7.4	72	29	5	0	530	212	741	38	0	38	568	212	780
22	12.3	12.3	19	55	13	12	230	679	909	157	143	300	387	822	1209
23	3.9	3.9	38	45	35	0	147	176	322	136	0	136	282	176	458
24	2.2	2.2	6	11	84	0	14	24	38	185	0	185	199	24	223
25	4.7	4.7	9	28	53	0	42	129	172	248	0	248	290	129	419
26	5.3	5.3	12	7	83	0	63	38	101	438	0	438	500	38	538
27	1.2	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0
28	2.9	2.9	43	13	17	0	125	37	162	48	0	48	173	37	210
29	6.3	6.3	40	56	0	0	252	350	602	0	0	0	252	350	602
30	3.6	3.6	18	2	0	0	64	8	72	0	0	0	64	8	72
31	9.2	9.2	25	18	51	0	230	162	392	471	0	471	701	162	863
32	5.4	5.4	30	22	34	0	162	116	278	183	0	183	345	116	461
33	5.8	5.8	33	15	41	0	191	88	279	240	0	240	430	88	519
34	6.4	6.4	36	5	44	0	228	33	262	282	0	282	510	33	543
35	7.6	7.6	14	19	0	0	103	141	245	0	0	0	103	141	245
36	4.3	4.3	26	10	0	0	110	43	153	0	0	0	110	43	153
37	4.7	4.7	22	50	33	0	102	237	338	153	0	153	254	237	491
38	2.7	2.7	80	11	19	0	217	30	247	52	0	52	268	30	298
39	8.1	8.1	42	55	32	0	343	446	788	257	0	257	599	446	1045
40	2.8	2.8	10	14	60	0	29	40	69	168	0	168	197	40	237
41	3.0	3.0	40	32	12	0	120	97	217	35	0	35	155	97	253
42	14.4	14.4	13	72	0	0	183	1038	1221	0	0	0	183	1038	1221
43	3.6	3.6	27	12	40	0	96	44	140	144	0	144	240	44	284
44	3.6	3.6	34	23	32	10	121	84	205	115	37	152	237	121	357
45	5.5	5.5	17	61	0	0	92	333	426	0	0	0	92	333	426
46	3.1	3.1	20	53	0	0	63	163	227	0	0	0	63	163	227
47	11.0	11.0	30	14	61	0	330	152	482	666	0	666	996	152	1147
48	6.3	6.3	33	35	25	0	205	222	427	160	0	160	365	222	587
49	2.8	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0
50	7.6	7.6	15	15	51	0	114	116	230	389	0	389	503	116	619
51	7.7	7.7	44	36	45	0	340	276	617	344	0	344	685	276	961
52	8.3	8.3	27	26	48	0	222	214	436	395	0	395	617	214	831
53	10.8	10.8	47	20	45	8	504	220	725	482	89	570	986	309	1295
54	3.3	3.3	22	44	11	0	74	145	219	37	0	37	111	145	256
55	8.9	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	4.3	4.3	68	50	18	0	292	216	508	77	0	77	369	216	585
57	3.2	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0
58	12.0	12.0	31	25	16	0	376	301	677	192	0	192	568	301	869
59	1.8	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	10.0	10.0	24	55	35	0	241	551	792	349	0	349	590	551	1141
61	4.7	4.7	37	40	41	0	176	189	365	195	0	195	370	189	560
62	4.7	4.7	16	62	7	0	75	291	366	35	0	35	110	291	401
63	4.1	4.1	50	22	48	0	205	88	293	197	0	197	402	88	490
TOTALS	384.5	370.8			TOTALS		10231	14096	24327	10602	558	11160	20833	14654	35487

Wildlife

Recent improvements in water quality in Boat Harbour have allowed increased use of the water shore habitat by animals. Waterfowl are very abundant around the harbour and fens, where nesting and raising of young takes place. Beavers have built lodges in the harbour, and frogs and snakes are evident. Shorebirds such as sandpipers are abundant. Osprey were sighted soaring over the harbour, but it is uncertain for what purpose. No nests of raptors have been observed on the property by the foresters, employees, or contractor crews who have been working on the Reserve during the past decade.

There are healthy populations of songbirds throughout the hardwood stands, particularly the more mature stands where there is a mixture of softwoods. Ruffed grouse, snowshoe hare, red squirrels, and white tailed deer are especially frequent in previously - cleared stands which have reverted to forest cover. Wildlife populations are enhanced by the Oldfield habitat type, found on the most recently abandoned farmland. These habitat benefits accrue to non - game species as well, particularly to small birds and mammals.

Cultural Features

Past use of this forest, other than Fisher's Grant 24, was primarily by non-natives. Like much of Pictou County, the arable land was cleared during the 1800's for cultivation or development. Rock walls, rock piles, and former homestead sites can be found throughout the forest.

MANAGEMENT STRATEGY

The objective of forest management on the Pictou Landing Forest is to restore the original Acadian Forest type. This forest is characterized by intimate mixtures of hardwoods and softwoods of all ages, from seedlings and saplings established in small gaps in the canopy, to large, overmature trees, cavity trees, and standing and fallen dead trees. The typical species - red spruce, hemlock, white pine, yellow birch, sugar maple and beech - are present today, but are under represented. They only rarely occur at an advanced age which reflects their potential longevity.

It will require many years to restore this type of forest. A strategy must be formulated and put into practice. There is limited experience on which to draw regarding Acadian Forest restoration. As the strategy is put into effect, it must be constantly monitored, evaluated, and any necessary modifications made. The strategy itself must be dynamic and adaptable to new information and observation of previous treatment, both in the Pictou Landing Forest and elsewhere in the Acadian Forest Region.

The strategy proposed in this plan is a starting point. The monitoring, evaluation, and modification aspects are an integral part of the silvicultural system which follows.

DISCUSSION

The forest composition and structure on the Pictou Landing Forest today is substantially different than the conditions found by the first European settlers in the area. There is still some evidence as to the likely composition of the forest, but we are left to surmise the whole picture.

Loucks places this area in the Northumberland Shore Region of the Red Spruce - Hemlock - Pine zone. The Boat Harbour area was likely modified by local landform and climate to have favourable conditions for the growth of valuable tolerant hardwoods. Sugar maple, although rare, can be found in several stands, as seedlings, saplings, or young poles. Yellow birch can also be found throughout the woodlot, usually in low areas where moisture is abundant. Beech is found in the Fisher's Grant 24, although it usually suffers from beech scale disease.

Yellow birch, sugar maple, and beech would have been heavily cut for timber products over the years. Clearing land for agricultural use eliminated them from other good growing sites. Two hundred years of extensive land use have all but eliminated these species as a significant component of the forest.

The challenge of management today is to locate healthy individuals of these species, protect, and nurture them so that they will one day provide a native seed source for natural regeneration . Locating sugar maple is especially important, as they are very rare. Many beech are infected with scale disease. However, individuals can be found which are relatively healthy, and these must be protected and promoted.

The relative species composition of the hardwood component of the Pictou Landing Forest is indicative of the severity of land clearing, harvesting, and fire events over the past two hundred years. Classical intolerant hardwoods - poplar, white and grey birch, and red maple - dominate. In some stands, the poplar has matured and the stands have begun to break up. Regeneration is usually dominated by balsam fir, white spruce, red maple, or even more poplars. Due to the limited seed source of more tolerant hardwoods, succession appears to be proceeding slowly. There is perhaps a place for judicious underplanting or fill planting of valuable hardwoods on the better sites. This could accelerate the restoration of the natural forest.

Red oak is found throughout the forest. It is not common, but it is widespread. There appears to be two age classes of oak - young mature trees up to fifteen meters height, and seedlings . Whenever oak is found, it appears vigorous and well formed. Red oak seems suited to this area and was probably a component of the original forest. The species produces a high value wood fibre, and is a beneficial mast-producer for wildlife. It should be a preferred species in the management strategy.

White ash is common, but not abundant, and is found throughout the forest. In some sites, it is partially succeeding white spruce and poplar on formerly cultivated land. It has also shown excellent growth and development as an understory component of poplar stands. An area where understory white ash was released by felling overstory poplar twelve years ago is showing excellent development. In addition, a second generation of ash has subsequently become established. White ash is a valuable wood when it is grown on clean, straight boles. There are good opportunities for high - value white ash production on a variety of sites throughout the forest. Black ash is an extremely valuable species for Native crafts such as basket - weaving. This species will be planted and promoted if local seed sources can be found.

Yellow birch can be found scattered throughout the forest, but most trees are too young for prolific seed production. It would appear that land clearing and harvesting have virtually eliminated mature birch from most of the better sites in the forest. Most yellow birch on good sites are less than forty years old. The species demonstrates good growth and form when it very rarely occurs on better sites. Forestry activities should

protect and promote individual yellow birch whenever they are found, to create as extensive a future seed source as possible.

Red maple is common on the Pictou Landing Forest. It tends to be included with those intolerant hardwoods that proliferate after logging or fire. This sometimes obscures the fact that vigorous red maple of good form on good sites can live longer, grow taller, and produce a more valuable stem than other hardwoods in that group. Throughout this woodlot, there are individual red maple with excellent form which are ideal timber crop trees. The forest manager, and the forest workers, must follow a procedure which enables identification of these trees prior to on the ground work. In this way, red maple will remain a minor, but important, component of the Acadian Forest.

White birch does not perform well on many of the dry sites in this area. It tends to do best on the lower slopes of knolls which receive water from higher ground, but are not subject to imperfect drainage. White birch does not often produce veneer quality stems here, although this may be more a result of past site degradation than inherent capability of the species.

White birch has an additional value to the Mi'kmaq in that it provides bark for the craft industry, and for some traditional uses. The bark that is most useful is produced by dominant, vigorous individuals on good growing sites. The forest manager must assess the probable future demand for birch bark, and if necessary devise a plan to maintain a place in the climax forest for the intolerant, shorter - lived white birch.

The important conifers on the Pictou Landing Forest are white, red, and black spruce, white and red pine, eastern hemlock, and balsam fir. The frequency and distribution of these species, like the hardwoods, reflects past land use practices. Loucks indicates that, " prior to repeated burnings", red spruce, hemlock, and white pine were probably more abundant than they are today. This is supported by the persistence today of these three species throughout the forest. Hemlock and white pine, in particular, are found almost everywhere, and are represented by a wide range of ages. These species are found on a range of sites.

Red spruce is the least prevalent of the typical Acadian Forest species. It was displaced on many of the formerly cultivated areas by white spruce. There has probably been some genetic degradation of the red spruce on forested sites through repeated high grading over the years. The atmospheric effects of the treatment facility at Boat Harbour may have contributed to soil changes which adversely affected red spruce growth. Observation of red spruce branching habit, cone characteristics, bark, and crown pattern indicate that many trees exhibit characteristics of black spruce, a result of hybridizing with that species.

In summary, red spruce seems to be performing below its potential on the Pictou Landing Forest. Improvements to the treatment facility and its eventual closure should lead to restoration of soil conditions, if this degradation has in fact occurred. The forest manager shall devise a protocol for selecting red spruce which best exhibit red spruce

characteristics. These trees must then receive special protection and promotion, to ensure they are as dominant and long - lived in the stands as possible. It may be possible to significantly improve the red spruce genetic pool; in the meantime, all practical steps must be taken to ensure that the gene pool is not further degraded.

Red pine occurs in various stands throughout the forest. It's status is uncertain, as red pine very rarely occurs naturally east of Colchester and Cumberland counties. It's presence on the Pictou Landing First Nation is almost certainly of natural origin. The best growth occurs in two locations on water receiving sites on well drained Shulie soils. These stands have developed high value timber in high volume stands. In these two locations, the species appear to be "on - site".

Red pine occurs with spruce, white pine, and balsam fir on the well drained Pugwash soil of Fisher's Grant 24G. Here it is most common on the tops of knolls. While the species appears to have grown well during its youth, height growth is definitely curtailed at a relatively early age. Red spruce eventually outperforms the red pine, even on the dry knolls. Here, it appears red pine is "off - site", and its presence is an anomaly. Red pine does not seem to regenerate easily in this area. Naturally established seedlings are extremely rare. The role which fire may have played in the precolonial era is uncertain. Regular fire events would not lead to the establishment of a red spruce - hemlock - white pine climax forest as indicated by Loucks. Yet, the presence of red pine in itself supports the theory that the Boat Harbour area has a unique geo-climatic situation, which differentiates the area from the rest of the Northumberland Shore District. A decision to continue to promote red pine on various sites in this area requires additional research and observation. The management objectives of red pine which has been planted may very well require modification as more information and data become available.

Much of the balsam fir and white spruce found in the Pictou Landing Forest is in the forty to eighty year old age classes. Although most of the softwood harvest over the next twenty years will be of these two species, much of the volume will be recycled naturally. To salvage most of the volumes would require concentrated harvesting over the next ten years. This would unduly promote the evenaged condition in the next rotation. As is the case with the intolerant hardwoods, naturally - recycled fir and white spruce will not be wasted. On many sites, especially those which were previously cleared, there is a need for addition of organic material to the soils. Broken and windthrown trees will reestablish forest conditions in the soil and promote mixing.

Many of the stands have suffered severe depletion of the soil-organic complex, and, as a result, nutrient availability for tree growth is poor. This is especially evident on the coarser Shulie soil when it occurs on higher, excessively drained sites (Stands 2, 9, 14, 18). This condition has led to marked decline in the quality of the forest. It is a result of several factors acting, sometimes repeatedly, on a site. Those actions can be

land clearing, harvesting, and burning. The effects of these actions are especially severe on extreme sites, in this case, sites subject to water deficiencies.

This effect has also shown up on the moderately well - drained Pugwash soils. Red pine plantations were established on sites that were selectively cut twenty years previously. Adequate natural regeneration did not follow those partial harvests. Ground vegetation which has developed on the sites is dominated by ericaceous species, as well as bracken fern. Ingrowth of tolerant conifers is sporadic. Had these sites not been planted, would they support a forest cover trending towards, or away from the climax condition? Careful observation of these and other sites is needed to accurately determine the intensity of harvesting (in terms of volume removal) these drier sites can tolerate, without moving them to an earlier - successional stage.

Stands 2 and 9 on the Shulie soils, seem to have suffered extreme degradation of the soil - organic layer complex. This is reflected in the poor performance of the current tree crop. Situations such as this can best be remedied by allowing this rotation to mature, die, and recycle into the soil. This is a slow process which may appear wasteful, but it is an essential part of soil - building. Similar action, perhaps less drastic, may be necessary on other sites, What is most important, is that forest management activities do not continue to degrade the soil - organic layer complex of the forest, but rather promote soil-building.

Forest management activity over the past ten years has been concentrated in Fisher's Grant 24G, and the central and eastern portions of Boat Harbour West (See Appendix V). In Stands 26 to 34 (Fisher's Grant 24G), a third of the area has been treated. Most of the treatments have resulted in reduced stand structure and diversity. Shelterwood harvesting, merchantable thinning, pre - commercial thinning, and planting accentuate the evenaged condition. In Boat Harbour West, Stands 43 to 52 have been extensively managed, with many of the same treatments.

Already, time has begun to restore some diversity to these stands. Intolerant hardwoods show vigorous growth in the more open shelterwood stands. Regeneration of tolerant conifers is slow but certain. There is ingrowth of intolerant hardwoods and of tolerant conifers in the red pine plantations. Weeding of these plantations shall no longer be carried out as in the past. In the future, weeding shall promote diversity instead of reducing it.

Restoration forestry must work with and use diversity to steer forest development towards the climax condition. Treatments and schedules must be devised to deal with the future growth in stands which were managed on an evenaged basis. For example, red pine plantations must now be "weeded" by removing red pine to allow natural ingrowth ample growing space to flourish . Eventually, the mature stand will have a variety of species (red spruce, red and white pine, balsam fir, hardwoods), which will be vigorous and able to contribute towards the regeneration process. Thus, the next rotation will be a natural forest dominated by those species which were best suited for the site.

PLANNING

Community Management

A formal process shall be established to facilitate the steering of forest management by the Band community. This could take the form of a Community Forest Board, and will constitute wide representation of Band interests. The purpose of this Board is to enable all community members to participate in determining both the objectives of management, and the policies and programs for achieving those objectives. The people must share in the formulation of long term management philosophy.

The first task of the Community Forest Board is to endorse this management plan, which is a starting point for ecologically responsible resource management by the Band. The Community Forest Board will also endorse all of the Principles and Criteria of the Forest Stewardship Council and the Standards of the Maritime Forest Region. This endorsement shall be appended to the management plan.

The Community Forest Board shall also be charged with development of policies including, but not limited to the following:

- In cooperation with the Department of Indian Affairs, put a ForestLands Stewardship Agreement in place which would be a formal policy and process to allow the Pictou Land First Nation to control land use for community benefit and be enforceable in law. It is recognized that this is a new concept and will take time to develop. Nevertheless several First Nation communities have already identified this need of land use policy.

- Control of access to the forest by Community Members, specifically, access points, gates, dumping of garbage, campfires, hunting, and the use of all terrain vehicles.

- Use of the forest by non-community members.

- Development of trails for dual use - extraction and recreation.

- Make recommendations to Community government on day to day management, administration, and operations of community - based forestry.

Successful formation and effective conduct of the Community Forest Board is an important part of building community investment in sustainable forestry.

Continuity

An administration structure and process must be established which will allow for continuity of management initiatives over the long term. Documentation of philosophy, objectives, strategies, treatments, and results will enable the management process to function smoothly through personnel changes. Full restoration of the Acadian Forest will span several human generations. Those involved must learn a new way of thinking which accommodates the accumulation of knowledge and its effective transfer to successive generations.

Forest Manager

The key personnel involved in management of the Pictou Landing Forest is the Forest Manager. Provision must be made for the manager to become intimately familiar with the forest. It is important that the manager possess the necessary professional, personal, and ethical qualifications to accomplish restoration forestry. The manager must also be qualified to deal with the social aspects of forest resource management. The ability to effectively communicate to the people the philosophy and methods of forest operations is essential. The forest manager will be responsible to the Community Forest Board.

Management Plan

The management plan contains the information necessary to begin the restoration of the Acadian Forest type on the Pictou Landing Reserve. The plan is meant to be a flexible document, to be updated and modified as the results of forest work become apparent. The management plan shall be revised every five years. It shall incorporate the findings of forest inventory, permanent sample plots, monitoring of regeneration and stand development, and stand response to various harvesting techniques.

Inventory System

The forest manager shall design a forest inventory program for the Pictou Landing Forest. The program should provide as much growth, yield, and product information as can be justified by the value of a sustainable timber harvest. Re-inventory of the forest should be scheduled so that the data it provides will be current for the revision of management plans. This is not to say that the an inventory need be done every five years, but rather that fresh data should be able to be used immediately.

The inventory program should provide for the collection of data respecting non-timber forest products. This includes material for Native craft industries , natural food and medicinal plants, wildlife habitats and populations, water quality, and recreational values of the forest resource.

Access

There is no need for further construction of truck roads in the Pictou Landing Forest. All potential timber extraction areas are within acceptable forwarding distance of truck roads. Further construction would only serve to increase fragmentation of wildlife habitat, reduce the area of productive forest, and increase the potential for impairment of water quality.

In areas where no forestry operations have been carried out in the past, it will be necessary to develop a network of extraction trails. Before operations begin in any area, it should be determined whether extraction trails will also serve a recreation function, i.e. hiking, or access to a point of interest. Remember that extraction trails will always be used by any persons traveling through a treated area, for whatever purpose that may be. It is therefore essential that the trails be situated to take the best advantage of moderate terrain, firm ground, and particular points of interest (eq. a very large or otherwise noteworthy tree).

Forest operations must be scheduled so that extraction of timber is completed during seasons when extraction trails will be least damaged. It may be necessary to repair an extraction trail after wood is forwarded, to maintain its recreational value; if so, this must be considered a cost of timber extraction . On the other hand, investment of social resources (monetary or otherwise) in developing a trail system to serve both recreation and extraction may be justified in some locations.

Boundary Lines

Boundary lines shall be maintained in good condition so that the property limits are easily located at all times. The manager shall develop a program for boundary line maintenance, including a protocol for posting and maintaining appropriate signage.

Special Management Areas

The designation of areas for special consideration is done to recognize exceptional aesthetic, wildlife, or ecological value, or environmental sensitivity (See Appendix II). A management prescription should be formulated for each of these areas. Assessment methods must be designed to monitor forest development and response to treatment. (No intervention is also a treatment.)

Stand 36 is found in a location somewhat isolated from the current access road network. It is formerly cultivated land which is reverting to forest. On the west, it is bordered by open treatment area which, after restoration and reclamation, could well become an extensive wetland area. Stand 35 to the east is designated as "Special Management Zone - water quality". Stand 36 will provide important wildlife habitat as a dry knoll surrounded by wet areas, and is therefore designated as a " special management zone - wildlife". It is anticipated that a large area of wetland to the west will eventually be similarly - designated in the future.

All areas within sixty meters of the shoreline of Boat Harbour are designated as a "Special Management Zone - riparian area". These areas are to receive special attention whenever a management activity or development is planned within this area. The riparian zone is subject to the guidelines set out in Appendix VIII. Most noteworthy is a no - logging zone of twenty meters width adjacent to the water. In addition to those restrictions, any management activity must be evaluated for its affects on wildlife travel, water quality, and aesthetics quality. Preservation of these values is the primary function of this designation. A riparian zone also is established thirty meters on each side of brooks under one meter in width. Adjacent to the brook is a ten meter no- logging zone on each side.

Stands 7, 13, 16, 22, 35, 55 are designated as "Special Management Zone - water quality". These stands are water collecting sites which are subject to perched water tables for much of the year. Soils are often soft and the areas are not conductive to operation of machinery. The primary function of these stands is to store, filter, and purify runoff water before it enters Boat Harbour. A secondary function is to provide wildlife habitat. Timber extraction is not completely forbidden. Very low volumes of high value material (e.g. white ash) may be removed on frozen, snow covered ground by

toboggan, for example. The forest manager must complete a comprehensive operational plan for management of these areas.

Stand 19, in addition to being a "Special Management Zone - riparian area", is also designated as " Special Management Zone - wildlife". The eastern extension of the stand includes two brooklets, and the area in between. Together they constitute a strip of one hundred fifty meters width, which will serve as a wildlife travel corridor to the woodlands east of the property.

Stands 54, 57, 58 and 59 are designated as " Special Management Zone - wildlife". This includes a variety of habitat from cultivated field, through oldfield habitat complete with remnant orchards, to sites almost completely reverted to forest. These four continuous stands provide a high incidence of edge habitat, species, age, and size diversity, and are heavily used by a wide variety of game and non - game wildlife. The primary function of this area is to continue to provide the unique conditions common to the Oldfield habitat type. Through research and experimentation, the management program for this area to maintain its present value as wild life habitat.

In addition to riparian areas, wildlife travel areas must be maintained in a condition which does not diminish their value to wildlife. Intensive harvesting and excessively wide extraction trails can fragment the stand to the extent that animals find the area no longer meets their traveling or security needs.

Market Information

The forest manager will conduct timber harvesting operations when a profitable result can be expected without compromising other social or forest management objectives. The manager will know where he wants to make interventions and he knows what timber products will be taken from those various locations. It is essential that he be current with respect to market demand for various roundwood products. To be able to profitably accomplish the treatments necessary to achieve the objectives, the manager must be able to quickly take advantage of positive demands for timber products, especially those with relative low value. This is not to say that markets will drive forest management, but rather it recognizes the extreme volatility of roundwood markets in today's economy. The manager must establish regular communication with customers, mills, other producers, and woodlot owner groups to ensure that the information he is working with is current.

At the time of the writing of this plan, the demand for softwood and hardwood pulpwood is very poor. This situation can be expected to continue through much of the next five year period. All efforts must be made to secure markets at a reasonable price for low grade wood fibre.

Much of the hard wood to be harvested in the next ten years is poplar. Some of this may be of veneer quality, but probably not a large proportion, even if the growing stock is selectively cut. Some may be suitable for pallet stock. Much of this poplar will be suitable for oriented - strand board mills. The Extension Department of St. Frances Xavier University has been attempting to bring sellers and buyers of hardwood roundwood together. Advantage should be taken of the work they have done.

Much of the softwood harvest over the next ten years will be studwood, the lower end of the saw material grade. At this time, good quality saw material roundwood is readily sold at a good price. Negotiations with various mills should be undertaken to find a market for as much low grade softwood as practical. This is often a trade off between quality of roundwood demanded by the mill and the price they are willing to pay. Many mills will unofficially modify their demands for individuals suppliers. The manager must carefully assess the average quality of roundwood being produced in harvesting operations, and the increase in yield that can be expected by an acceptable price concession.

Silvicultural System

This management program designed to restore the Acadian Forest type is a modification of the selection system. A program of frequent, low - intensity harvests will be implemented in stands which are suitable for timber management. These harvests will take the form of single tree and group selection, of irregular shelterwoods, and of crop - tree release and crop - tree improvement. Various methods will sometimes be combined in a single operation. Unlike the selection system, little attention will be paid to developing a regulated diameter class distribution throughout the stand or the forest. Such a goal would be distracting at this point in time.

The first priority (and this may not change for twenty years) will be to promote desired species - red spruce, pine, hemlock, yellow birch, red oak, sugar maple, and ash - throughout the forest. To do this, individuals of these species, both young and old, must be accorded adequate protection and promotion wherever they occur. This must be the first concern of harvesting personnel. This is not to say that no trees of these species can be harvested. However, the impact of cutting such individuals must be always considered.

Of equal importance at this stage of restoration, is the creation of natural forest structure. Frequent, light harvests will begin to add to the vertical diversity of the stands. However, understanding of the gradual creation of live and dead cavity trees, standing and fallen dead wood, and other elements of structure must be attained by the people working the forest.

Trees removed during harvesting are those which contribute least to the Acadian Forest condition. In many cases, it will be necessary to determine those trees which are to most important to be retained, before selecting those which are to be removed. This is an element of crop tree management, and is appropriate in some of the stands.

The following **Crop Tree Management Guidelines** should be used when determining which trees will be cut.

①The maximum height of the stand is to be maintained by retaining the tallest trees, reasonably dispersed, and representing as many species as possible. The eventual replacement of one overstory by another (e.g. spruce - hemlock overtaking poplar) must be considered.

② Try to maintain vertical structure in the stand by retaining healthy individuals representing as many species, age, diameter, and height classes as possible.

③ Retain dead standing trees, and those which will become dead standing trees, distributed as well as possible through the stand.

④ Do not cut live non - profitable trees if they are not competing with others which need release.

⑤Maintain species diversity by retaining examples of most species in the stand, with preference to those late successional species which typify the natural pre - colonization forest composition, (yellow birch, sugar maple, white ash, red oak, beech, red maple, red spruce, hemlock, white pine, and red pine).

⑥Retain horizontal coarse woody debris including long lengths. Some broken or windthrown trees of high value may be removed if enough are left to satisfy ecological needs.

⑦ Remove slow growing trees which are no longer quickly increasing in value. These should be selected for removal only so far as it will be profitable to do so, and it will not compromise the ecological integrity of the stand.

⑧In softwood stands, remove very few hardwoods. In hardwood stands, remove very few softwoods. This will encourage the trend towards mixed forest.

Monitoring, Assessment, Research

A series of Permanent Sample Plots will be established to give the forest manager local data regarding growth and yield on the forest. Basic PSP's are established to gather data on forest capability and the development of the natural forest condition. The results gathered at these PSP's will be important when reviewing allowable harvest calculations in the future. These should be established on representative sites throughout the range of capability classes. They must be situated so that they will provide data on the variety of species present. The role of insects and disease will also be monitored.

Another group of permanent and temporary sample plots should be established to measure the effects of harvest and silvicultural treatments. The variables to be measured at these points will be those which indicate progress towards restoration of the Acadian Forest. Useful information such as the natural regeneration and development of desired species under various size gaps in the canopy, in various cover types, on various site types, is not abundant in forest research literature. These plots also will measure other variables such as stand structure, physical and biological diversity, and water quality.

THE ANNUAL ALLOWABLE CUT

The primary management objectives for the Pictou Landing Forest are of a social nature. Economic benefits from timber extraction are important, but secondary none the less. Restoration of the Acadian Forest is the path chosen to lead to attainment of the objectives. In this light, the approach taken towards calculating a periodic allowable cut is conservative in all respects.

LC – Dominant Ht. / Age at B. Ht. 5 tallest

Capability and Productivity

Forest capability is defined as the ability of a given site to grow wood fibre, i.e. its potential wood production. It is measured in terms of cubic units of wood fibre, and expressed in terms of periodic annual increment. The average yearly growth over the life of a stand of trees is called the mean annual increment (MAI).

Forest productivity differs in that it is a measure of the actual production of the site. Productivity refers to other values and products than just wood fibre. In terms of wood fibre production, productivity of a site is affected by variables such as species suitability, conifers vs. deciduous species, genetic suitability to the site, origin of the

hygrading

forest (seedlings versus coppice origin), and past activities or other disturbances on the site.

The productivity of many sites in the Pictou Landing Forest has declined due to abusive land use practices over the past two hundred years. Much of the land was cleared and farmed for several generations before reverting to forest. While productivity of the first forest to reoccupy the site may be high in terms of fibre production, ecological functions have not been restored. It is unlikely that these sites will recover their original capability unless this ecological integrity is reestablished. The forest has also suffered the effects of selective forest harvesting. Forest harvesters invariably selected the tallest, largest, straightest, most valuable trees of the most valuable species. Inferior individuals of inferior species were not usually harvested. Instead, they were left to dominate the site and regenerate.

Today, productivity of the Pictou Landing Forest is estimated to be approximately fifty percent of its' capability. (See Table 2). There is a preponderance of poplar, balsam fir, and white spruce, all short- lived species whose mean annual increment declines after forty to sixty years of age. Much of the poplar and balsam fir growing stock will be lost to natural causes over the next ten years if not harvested. There is evidence that moderate losses of white spruce to blowdown can be expected over the next ten to twenty years. These losses to natural forces will contribute to the reestablishment of ecological processes in the forest. In the meantime, we must be aware that these stands will make limited contribution to the total forest fibre increment.

Rationale

To calculate the annual growth of timber on the forest, it was necessary to remove some areas from the timberland base altogether. This deduction represents areas from which no timber shall ever be harvested. It includes non - forest and non - productive forest land (fields, fens, bogs, swamps), and also that portion of each stand which falls within the no-logging portion of riparian zones. Any areas which are set aside as permanent reserves would fall into this category. An additional adjustment was made for special management zones in which timber extraction is limited, but not prohibited. This includes water quality and wildlife habitat special management zones. The contribution of these areas to timber increment was reduced by up to ninety percent.

The annual increment of commercial timber has been calculated on the basis of the capability of the land to produce wood fibre. Land Capability Curves developed for Nova Scotia by the Department of Natural Resources were used to determine potential fibre production for each stand. These curves use the height - age relationship of free - to - grow trees to make this determination.

A conservative approach was taken during the field work. Sample trees were selected which represented that component of the stand which are likely to provide most

of the growth over the next decade. The best performing trees were not selected if they were not representative of the current stand.

The Land Capability Classes are predictions of the mean annual increment of fully - stocked, healthy stands of trees which are genetically and specifically matched to the site. To estimate the actual expected increment, it is necessary to make adjustments for several factors. The prediction of annual increment was adjusted downwards to reflect the actual stocking levels of the stand. This was based primarily on the measured basal area as compared to the basal area of fully stocked stands of a given cover type. The latest data by Department of Natural Resources researchers indicates that increment begins to decrease below a sixty percent stocking level. This was used as a benchmark.

Other considerations were taken into account:

- distribution of growing stock throughout the stand could impact growth;
- the health and vigor of the growing stock;
- the maturity of the stand, and therefore the trend of the Mean Annual Increment over the next ten years;
- the projected development of the growing stock.

The allowable harvest was reduced to allow for losses to insects and disease. The magnitude of the reduction for these factors should reflect the average age of the stands, and the expected longevity of the major species. In the Pictou Landing Forest, poplar, balsam fir, and white spruce are major components of the forty to eighty year age class. Although there are only minor occurences of insect and diease losses at this time, the probability of greater losses in the next decade is appreciable.

Areas of mature white spruce have suffered blowdown. Windthrow has also occurred in mature stands which have been thinned or shelterwood harvested. A severe storm event with heavy rain or snow accompanied by high winds could have devastating effects on those stands. It is prudent to further reduce the allowable cut to allow for this possiblity.

Red pine in eastern Nova Scotia, including Pictou County, has recently been found to be infected by the Scleroderris canker, a serious fungal diease in red pine plantations. Some of these incidences have been so severe as to lead to harvesting of plantations less then twenty years old. The extent of this problem is not yet clear, but there is obviously a serious threat to red pine in eastern Nova Scotia where natural occurrence of the species is very rare. Therefore, the contribution of young red pine plantations to annual growth was reduced by ninety percent. This cautious approach

should be maintained until there is a much clearer idea of what to expect of these plantations in the long term.

Results

The total area under management is 384.5 hectares. Fifty four and one half hectares have been excluded from the timberland base (non - forest, non - productive forest, and riparian areas). Three hundred and thirty hectares constitutes the area available for timber harvesting, although forty five of those hectares are subject to some degree of restriction respecting timber production.

The total annual available growth on the timberland base is 467 m^3 of softwood, 228 m^3 of hardwood, for a total of 695 cubic meters (solid wood).

The annual allowable cut has been calculated by reducing the potential growth for various factors.

	Softwood (m^3)	Hardwood (m^3)	Total (m^3)
Total Available Growth	467	228	695
Reductions for:			
Insects 10%	47	23	70
Disease 10%	47	23	70
Blowdowns 15%	70	0	70
Buffer 10%	46	23	69
	257	159	416

Annual Allowable Cut For Period 1998 - 2002	
Softwood	1285 m^3
Hardwood	795 m^3
Total	2080 m^3

Table 2. Calculation of annual growth on the Pictou Landing Forest

CALCULATION OF ANNUAL INCREMENT

Stand #	Area ha	SMZ Area ha	Net Area Timber ha	Land Capability Class Swd	Land Capability Class Hwd	Extra Reduction for Special Mgmt Zones Swd	Extra Reduction for Special Mgmt Zones Hwd	Reduction for Stocking Swd	Reduction for Stocking Hwd	Reduction for Add. Considerations Swd	Reduction for Add. Considerations Hwd	Comment	Estimate of Actual % of Land Capability Swd	Estimate of Actual % of Land Capability Hwd	Estimated Annual Increment (m3) Swd	Estimated Annual Increment (m3) Hwd	Total	Per Ha	Per Ac
1	2.7	1.2	1.5	4	2	0.10	0.10	0.51	0.81				39	9	2.340	0.270	2.610	1.740	0.311
2	9.8	0.0	9.8	4	2	0.00	0.00	0.91	0.56		0.10	site degraded, v. dry	9	34	3.528	6.664	10.192	1.040	0.186
3	4.6	1.2	3.4	4	2	0.00	0.00	0.73	0.40		0.10	wolf trees, unthrifty	27	50	3.672	3.400	7.072	2.080	0.372
4	2.1	0.0	2.1	4	2	0.00	0.00	0.44	0.78				56	22	4.704	0.924	5.628	2.680	0.479
5	1.4	0.0	1.4	4	2	0.00	0.00	0.93	0.68				7	32	0.392	0.896	1.288	0.920	0.164
6	13.6	1.2	12.4	4	2	0.00	0.00	0.40	0.84				60	16	29.760	3.968	33.728	2.720	0.486
7	2.1	2.1	0.0	2	1	1.00	1.00	0.00	0.00			swamp; n.- p. forest	0	0	0.000	0.000	0.000	0.000	0.000
8	18.2	2.9	15.3	4	3	0.00	0.00	0.87	0.11		0.30	overmature poplar	13	59	7.956	27.081	35.037	2.290	0.409
9	2.9	0.0	2.9	4	2	0.00	0.00	1.00	0.59				0	41	0.000	2.378	2.378	0.820	0.146
10	3.9	1.4	2.5	5	3	0.00	0.00	0.80	0.30		0.30	overmature poplar	20	40	2.500	3.000	5.500	2.200	0.393
11	3.8	1.2	2.6	4	2	0.00	0.00	0.78	0.17		0.20	dry site	22	63	2.288	3.276	5.564	2.140	0.382
12	12.2	3.5	8.7	4	2	0.00	0.00	0.93	0.00		0.20	overmature poplar	7	80	2.436	13.920	16.356	1.880	0.336
13	3.0	3.0	0.0	0	0	1.00	1.00	0.00	0.00			wetland	0	0	0.000	0.000	0.000	0.000	0.000
14	9.4	0.0	9.4	4	2	0.00	0.00	0.43	0.88				57	12	21.432	2.256	23.688	2.520	0.450
15	12.8	0.0	12.8	4	2	0.00	0.00	0.49	0.68				51	32	26.112	8.192	34.304	2.680	0.479
16	4.6	0.0	4.6	4	2	0.90	0.90	0.00	0.00			SMZ- water quality	10	10	1.840	0.920	2.760	0.600	0.107
17	5.2	1.2	4.0	4	2	0.00	0.00	0.16	0.90				84	10	13.440	0.800	14.240	3.560	0.636
18	4.4	0.0	4.4	4	2	0.00	0.00	0.42	0.90	0.20		dry; degraded; poor rS	38	10	6.688	0.880	7.568	1.720	0.307
19	8.2	3.5	4.7	4	2	0.00	0.00	0.80	0.24				20	76	3.760	7.144	10.904	2.320	0.414
20	8.1	0.0	8.1	4	2	0.00	0.00	0.49	0.78				51	22	16.524	3.564	20.088	2.480	0.443
21	7.4	2.9	4.5	4	2	0.00	0.00	0.52	0.74				48	26	8.640	2.340	10.980	2.440	0.436
22	12.3	0.0	12.3	4	2	0.90	0.90	0.00	0.00			SMZ - water quality	10	10	4.920	2.460	7.380	0.600	0.107
23	3.9	0.0	3.9	4	2	0.00	0.00	0.53	0.57	0.10		overmature bF	37	43	5.772	3.354	9.126	2.340	0.418
24	2.2	0.0	2.2	5	2	0.00	0.00	0.49	0.84				51	16	5.610	0.704	6.314	2.870	0.513
25	4.7	0.0	4.7	4	2	0.00	0.00	0.60	0.76				40	24	7.520	2.256	9.776	2.080	0.372
26	5.3	1.0	4.3	4	2	0.00	0.00	0.49	0.94				51	6	8.772	0.516	9.288	2.160	0.386
27	1.2	0.0	1.2	4	2	0.00	0.00	0.70	0.70				30	30	1.440	0.720	2.160	1.800	0.322
28	2.9	0.6	2.3	4	2	0.00	0.00	0.50	0.71				50	29	4.600	1.334	5.934	2.580	0.461
29	6.3	2.3	4.0	4	2	0.00	0.00	0.73	0.48				27	52	4.320	4.160	8.480	2.120	0.379
30	3.6	0.0	3.6	4	2	0.00	0.00	0.90	0.90			red pine plantation	10	10	1.440	0.720	2.160	0.600	0.107
31	9.2	0.0	9.2	4	2	0.00	0.00	0.57	0.79				43	21	15.824	3.864	19.688	2.140	0.382
32	5.4	0.0	5.4	4	2	0.00	0.00	0.62	0.78				38	22	8.208	2.376	10.584	1.960	0.350
33	5.8	1.2	4.6	4	2	0.00	0.00	0.53	0.86				47	14	8.648	1.288	9.936	2.160	0.386
34	6.4	0.0	6.4	4	2	0.00	0.00	0.53	0.87				47	13	12.032	1.664	13.696	2.140	0.382
35	7.6	7.6	0.0	3	1	0.90	0.90	0.00	0.00				10	10	0.000	0.000	0.000	ERR	ERR
36	4.3	4.3	0.0	4	2	1.00	1.00	0.00	0.00			SMZ - wildlife	0	0	0.000	0.000	0.000	0.000	0.000
37	4.7	0.0	4.7	4	2	0.00	0.00	0.70	0.57				30	43	5.640	4.042	9.682	2.060	0.368
38	2.7	0.0	2.7	4	2	0.00	0.00	0.40	0.86				60	14	6.480	0.756	7.236	2.680	0.479
39	9.1	0.0	8.1	5	2	0.00	0.00	0.53	0.52	0.10	0.10	overmature IH,bF,wS	37	38	14.985	6.156	21.141	2.610	0.466
40	2.8	0.0	2.8	4	2	0.00	0.00	0.60	0.87				40	13	4.480	0.728	5.208	1.860	0.332
41	3.0	0.0	3.0	4	2	0.00	0.00	0.67	0.71				33	29	3.960	1.740	5.700	1.900	0.339
42	14.4	0.0	14.4	4	3	0.00	0.00	0.92	0.26		0.10	overmature Po, bF	8	64	4.608	27.648	32.256	2.240	0.400
43	3.6	0.0	3.6	5	2	0.00	0.00	0.60	0.87				40	13	7.200	0.936	8.136	2.260	0.404
44	3.6	0.0	3.6	4	2	0.00	0.00	0.58	0.68				42	32	6.048	2.304	8.352	2.320	0.414
45	5.5	0.0	5.5	4	2	0.00	0.00	0.87	0.43				13	57	2.860	6.270	9.130	1.660	0.297
46	3.1	0.0	3.1	4	2	0.00	0.00	0.87	0.46				13	54	1.612	3.348	4.960	1.600	0.286
47	11.0	0.0	11.0	4	2	0.00	0.00	0.43	0.86				57	14	25.080	3.080	28.160	2.560	0.457
48	6.3	0.0	6.3	5	2	0.00	0.00	0.65	0.67				35	33	11.025	4.158	15.183	2.410	0.431
49	2.8	0.0	2.8	4	2	0.00	0.00	0.90	0.90			red pine plantation	10	10	1.120	0.560	1.680	0.600	0.107
50	7.6	0.0	7.6	4	2	0.00	0.00	0.63	0.86				37	14	11.248	2.128	13.376	1.760	0.314
51	7.7	2.0	5.7	4	2	0.10	0.10	0.49	0.65				41	25	9.348	2.850	12.198	2.140	0.382
52	8.3	0.0	8.3	5	2	0.00	0.00	0.58	0.82				42	18	17.430	2.988	20.418	2.460	0.439
53	10.8	0.0	10.8	4	2	0.00	0.00	0.47	0.74				53	26	22.896	5.616	28.512	2.640	0.472
54	3.3	0.0	3.3	5	3	0.00	0.00	0.76	0.62				24	38	3.960	3.762	7.722	2.340	0.418
55	8.9	8.9	0.0	0	0	1.00	1.00	0.00	0.00			wetland	0	0	0.000	0.000	0.000	0.000	0.000
56	4.3	0.0	4.3	5	3	0.00	0.00	0.49	0.59	0.20	0.10	overmature bF,wS,Po	31	31	6.665	3.999	10.664	2.480	0.443
57	3.2	3.2	0.0	4	2	1.00	1.00	0.00	0.00			SMZ - wildlife	0	0	0.000	0.000	0.000	0.000	0.000
58	12.0	0.0	12.0	4	2	0.00	0.00	0.69	0.75				31	25	14.880	6.000	20.880	1.740	0.311
59	1.8	1.8	0.0	4	2	1.00	1.00	0.00	0.00			cultivated field	0	0	0.000	0.000	0.000	0.000	0.000
60	10.0	0.0	10.0	4	2	0.00	0.00	0.67	0.55				33	45	13.200	9.000	22.200	2.220	0.397
61	4.7	0.0	4.7	4	2	0.00	0.00	0.56	0.65				44	35	8.272	3.290	11.562	2.460	0.439
62	4.7	0.0	4.7	4	3	0.00	0.00	0.82	0.49				18	51	3.384	7.191	10.575	2.250	0.402
63	4.1	0.0	4.1	5	2	0.00	0.00	0.40	0.78				60	22	12.300	1.804	14.104	3.440	0.615

Total Area	384.5 ha
Reserves	58.2 ha
Timberland Base	326.3 ha

Total Annual Softwood Increment	465.799 m3	2.125	0.380
Total Annual Hardwood Increment	227.643 m3		
Estimated Total Annual Increment	693.442 m3	1.803	0.322

must be accorded to the tallest trees in a stand. One of the goals is to achieve a greater dominant height. This will be done by retaining a number of the tallest trees of a variety of species in each stand. Trees must be selected and retained as cavity trees, snags, standing and fallen coarse woody material. An ongoing supply of these must be planned for. Individual trees within a group must be evaluated for vigor, form, and likelihood of becoming a future crop tree.

When a portion of a stand is to be treated, an intensive inventory should be done. This will provide volume and basal area information for that particular part of the stand. This will allow for comparison of projected and actual volume and basal area removals, and residual conditions. This intensive inventory will provide guidance on relative frequency of species, and will also provide the opportunity for the manager to look for rare or threatened species or habitats. The manager will determine the intensity of this inventory by considering the size of the treated area relative to the whole stand, the variability of the whole stand, the suitability of the area to provide desired growth and yield data, and the uniqueness of the site.

It is during this detailed stand assessment that final decisions will be made regarding the treatment a stand is to receive. Effective communication of the manager's decisions to the workforce is then needed. This importance of this assessment lies in the potential loss of the few trees in the stand which can best contribute in the future to restoration of the Acadian Forest type. Harvesting these trees is not a reversible act.

Harvesting System

The cut - to - length system will be best suited to most of the work to be done on the Reserve. This involves felling, delimbing, and bucking at the stump, with wood extraction by forwarder. If forwarder trails are properly located, if slash is felled into trails wherever possible, and if the operation is carried out at the right time of year, ground disturbance will be minimal.

A variation of this is to use a skidder to skid logs which have been bucked at the stump. Skidding short lengths avoids the damage to residuals which usually accomplish tree - length logging. Use of a winch and cable enables the extraction of timber from steep slopes, wet spots, or other areas where forwarders are inappropriate. Skidding may also be applied where it is desirable to achieve scarification of the forest floor to enhance regeneration of certain species. Skidding on frozen ground is practical, because logs will stay clean.

Economical skidding is usually restricted to larger logs, especially on longer distances. The forest manager should seek out and encourage, if possible, the use of small scale extraction equipment. Restoration forestry on the Pictou Landing Reserve

will entail frequent entries with low volume removal; this type of operation is often uneconomical when using expensive machines designed for clear - cutting operations.

Sometimes, a combination of pre-skidding and forwarding of cut - to - length wood enables one to enjoy the advantages of both systems. It may be necessary to accept higher extraction costs in order to achieve the forest management objectives.

Handling Special Management Zones

Special Management Zones are not always off limits to timber extraction. They are designated as such because special attention and care is warranted when operating in these stands. See Appendix VIII for guidelines.

Extraction of wood products must be accomplished without ground disturbance in wet areas. The maintenance of high water quality requires undisturbed soil surface conditions. Timber extraction will be prohibited if an acceptable economical means of extraction cannot be devised. For example, it may be possible to use a snowmobile, and an all terrain vehicle, or a winch to move wood from a wet area during winter when there is frozen ground and a good snow cover. Usually, only higher value products are worth the expense of this special consideration.

Other special management zones are heavily used by wildlife. The forest manager must understand the conditions which attract wildlife to that area, and modify timber operations so as not to impact on those conditions. For example, where wildlife uses an area as a travel corridor, it must not be fragmented with large openings or straight, wide extraction trails. Very often, timber operations can enhance wildlife habitat, if conducted with a good understanding of wildlife's needs.

Restoration of Forest Structure

All operations shall be designed to enhance and improve the structure of mature forests. This includes diversity of species, height, diameter, age, standing dead wood, especially of large diameter stems, live cavity trees, and fallen coarse woody debris (especially in long lengths). The forest manager must plan for both a present and future supply of trees to achieve these elements of structure. These must be marked during the selection process. Harvesting crews must also have a solid understanding of the restoration process and structural features.

The Pictou Landing Forest has lost many of the structural features of the natural forest over the past two hundred years. There are very few large diameter cavity trees, either living or dead. Long - lived hardwoods such as sugar maple and yellow birch are best able to provide the most valuable cavity trees and snags. It will be many years

before this will be possible. The first large yellow birch to be grown will be much more valuable as a seed source and as cavity trees and eventual snags than as timber products.

There is an abundance of fallen material in some stands, but this is usually not of great diameter or length. In the next twenty years, much of the mature poplar and balsam fir will, if not harvested, die and begin to recycle through the forest soil system. This will provide some dead coarse woody debris, although not in the sizes that are most beneficial. In many stands there will be a need for the manager to designate larger, taller, more valuable trees (spruce, hemlock, pine) as candidates for standing deadwood and, eventually, coarse, woody debris.

Training of Harvesting Crews

Forest workers, foremen, supervisors, and employers must be trained in forestry techniques and safety procedures. They may not work in the forest without proper training. It is the responsibility of the forest manager to ensure that this requirement is met. Forest workers must adhere to the standard of " The Forest Professional", published by the Nova Scotia Department of Labour, Occupational Health and Safety Division.

The manager shall ensure full compliance with the Occupational Health and Safety Act of the Province of Nova Scotia by all workers, contractors, and employers engaged to carry out management activities on the reserve.

ENVIRONMENTAL PROTECTION

Fire Protection

Work crews on the Pictou Landing Forest will be equipped with fire prevention and fire fighting equipment as required by the Provincial Forests Act. The minimum period during which on site precautions are required is from April 15 to October 15. This period may be extended by the Minister of Natural Resources, or by the forest manager, if the fire hazard warrants.

The forest manager will ensure that work crews are made aware of procedures to follow should a fire be detected. This will include a plan to notify the manager or his designate, as well as initial containment procedures. Safety of personnel will be paramount.

There is no formal agreement with the Province to fight forest fires on Reserve Lands. However, the Department of Natural Resources will respond to a report of fire regardless of the ownership status of the land. The Province will bill expenses to the

Regional Office of Indian Affairs. The cost of fire fighting does not accrue to the Pictou Landing First Nation.

During March of each year, the forest manager shall make written contact with DNR district offices, and the District Manager. This is to ensure that all district Department of Natural Resources personnel are aware that they are to treat a fire report on the Pictou Landing Forest no differently than on any other ownership, and to ensure there will be no delay in responding to a fire call on the Reserve.

Pest and Pathogens

The forest manager shall make regular inspections of the Pictou Landing Forest to monitor changes in disease conditions or insect populations. It is also important to maintain communication with the appropriate Department of Natural Resources staff, to be aware of developing problems.

Insects and disease are natural elements of the forest ecosystem. In most instances, damage by these agencies will be considered a natural process. Restoring diversity, structure, and the Acadian Forest species composition is the method chosen to maintain insects and disease in balance. Recognizing that many years will pass before diversity and structure are restored to the forest, the manager must deal with mortality in a way that advances the restoration process. Salvage of some high value timber in certain locations may be done if restoration is not compromised.

Road Building and Maintenance

Road building and maintenance procedures will be carried out in accordance with the standards found in " Woodlot Roads, Stream Crossings", Brathwaithe, 1992, and Road Construction Manual, First Nations Forestry Association, McKay and Hudson, 1998. Most of the work to be carried out on the Pictou Landing Forest will road and culvert maintenance. There must be a policy for this program which designates regular inspections and reports, intervals for road grading, procedures for seeding of ditches and roadsides, and provision for unexpected damage due to severe weather, and events.

Rare and Endangered Species

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has assigned status endangered (E), threatened (T), or vulnerable (V), to nine native Nova Scotia plants. None of these plants are known to have been found in the Pictou Harbour

area. Nevertheless, the manager shall become familiar with their appearance and life history. They are:

Scientific Name	*Common Name*	*Status*
Clethra alnifolia L.	Sweet Pepperbush	(T)
Coreopsis Rosea Nutt.	Pink coreopsis	(E)
Drosera filiformis Raf.	Thread - leaved sundew	(E)
Geum peckii Pursh.	Mountain avens	(E)
Hydrocotyle umbellata L.	Water pennywort	(E)
Juncus caesariensis Coville	New Jersey rush	(V)
Lilaeopsis chinensis (L.) Kuntze		(V)
Lophiolia aurea Ker-Gawl	Golden crest	(T)
Sabatia Kennedyana Fern.	Plymouth gentian	(T)

The following plants which are considered rare in Nova Scotia are known to have been collected in the Pictou Harbour area:

Scientific Name	*Common Name*
Achillea Borrealis Bong.	Northern yarrow
Hudsonia tomentosa Nutt.	Beach or False Heather
Lilium Canadense L.	Canada Lily
Oenathera fruticosa L. ssp. glauca(Michx.)	Narrow- leaved Sundrop
Salix pedicellaris Pursh	Bog willow
Verbena hastata L.	Blue verrain

The following animals considered rare in Nova Scotia have been collected in the Pictou Harbour area:

Scientific Name	*Common Name*
Aplexa hypnorum (Linnaeus)	Polished Tadpole Shell
Pupilla muscorum (Linnaeus)	Moss pupa snail
Clemmys insculpta (Linnaeus)	Wood turtle

The manager must become familiar with these species and their habitats. During detailed stand assessment, attention should be paid to examine any likely habitats for the presence of these rare species.

The manager must stay current with the knowledge of COSEWIC and the Nova Scotia Museum of Natural History regarding rare and endangered species. In addition, the manager should enlist the cooperation of local naturalists and clubs to help in the identification of likely habitats.

Landscape Level planning

The size of the Pictou Landing Forest does not warrant ambitious landscape level planning on its own. The Band must make its neighbours aware of its willingness to work with others to implement this program.

Assuming that the Forest may someday encompass Boat Harbour, the harbour becomes the focal point for visual landscape planning.

PROGRAM RECOMMENDATIONS

A detailed plan is laid out for the first five year period, which is deemed to begin in 1998. This includes several initiatives in addition to a forest harvesting schedule. The schedule for the second period, 2003 -2007, includes a forest harvesting schedule. Social initiatives are not detailed, as much of the planning will occur subsequent to this management plan. Hopefully, during the next revision of the management plan (in 2002), the Community Forest Board will have advanced its social planning horizon to twenty years. The schedule for the period 2008 - 2018 is a general discussion of harvest plans and social development.

PROGRAM FOR THE PERIOD 1998 - 2002

Policy making

The Community Forest Board shall formulate social, economic, and forest management policy through a process of complete community involvement. Some of the issues which must be dealt with are:

① Endorsement of this management plan, the Principles and Criteria of the Forest Stewardship Council, and the Standards of the Maritime Forest Region.

② Control of access to and use of the Pictou Landing Forest by both members of the Band and those of adjacent communities. This includes use of roads and trails by motor vehicles and all terrain vehicles.

③ Regulation of hunting, fishing, timber harvest, and gathering of natural products.

④ Formulation of specific social goals to guide the development of trail networks, recreation sites, day use and overnight campgrounds, and cultural or spiritual use areas. This is particularly important for the Fisher's Grant 24 and for Denny's Park (Stand 26).

⑤ Examination of the issue of ecological reserves and decisions regarding the designation of lands as perpetual reserves.

Housekeeping

There are several areas that should be tidied up immediately.

① Garbage has been dumped in Stands 1, 17, and 19. This should be picked up and removed.

② Red pine timber in Stand 17 has been felled. This should be forwarded to the landing and marketed. The landing should be leveled up with a small bulldozer.

③ Roundwood which was left at roadside after previous harvest operations should be hauled and marketed. This can be found throughout Fisher's Grant 24G and Indian Reserve 37.

Interpretive Trail and Picnic Park

A recreation and picnic area should be developed in Stand 11. Along the shore of the harbour is a one acre stand of red and white pine, maple, and oak, which is very park like and attractive. This area is close to the community and therefore easily utilized by the people.

An interpretive trail should be designed to leave the roadway, pass through Stands 8 and 10 to reach the picnic area. There are a variety of micro sites, tree species, shrubs, and ground vegetation which can be identified along the route. The process of reestablishing the link between community and environment can be started with this project.

Oldfield Habitat Project

Wildlife is an important component of Mi'kmaq culture, and maintenance of the special habitat conditions provided by abandoned farmland will increase the appeal of the forest to Community members. It is recommended that the manager investigate the feasibility of maintaining, Stands 54, 57, 58, and 59 in an Oldfield Habitat condition.

Forest Harvesting

It is recommended that 2080 m^3 of roundwood be harvested during the period 1998 to 2002. Softwood constitute sixty percent of the harvest (1285 m^3) and hardwoods forty percent (795 m^3) . Balsam fir and white spruce are the softwoods which should be preferred for harvest. Poplar is the targeted species for the hardwood harvest. All harvesting must be carried out in accordance with the tree selection guidelines.

Table 3 lists the stands which should be harvested in this period. Estimates of the harvest volume are based on a 20% - 30% removal of the growing stock. The harvest should be distributed throughout the stand as much as practical (Also See Appendix VII).

Table 3. Harvest Schedule for the period 1998 - 2002

FIVE YEAR HARVEST SCHEDULE
1998-2002

Stand No.	Total Area (Ha.)	Area to be Harvested (Ha.)	Softwood Harvest (m^3)	Hardwood Harvest (m^3)	Total Harvest (m^3)
8	18.2	6.0	0	130 - 190	130 - 190
10	3.9	2.3	15 - 25	40 - 55	55 - 80
11	3.8	1.0	10 - 20	10 - 20	20 - 40
12	12.2	8.7	0	120 - 190	120 - 190
14	9.4	9.4	160 - 240	0	160 - 240
19	8.2	4.7	30 - 50	40 - 60	70 - 110
20	8.1	8.1	140 - 210	0	140 - 210
38	2.7	2.7	55 - 80	0	55 - 80
39	8.1	8.1	120 - 180	90 - 135	210 - 315
42	14.4	7.4	0	105 - 160	105 - 160
53	10.8	7.0	130 - 190	0	130 - 190
56	4.3	4.3	75 - 110	45 - 65	120 - 175
60	10.0	10.0	120 - 175	110 - 165	230 - 340
61	4.7	4.7	75 - 110	40 - 55	115 - 165
63	4.1	4.1	80 - 120	0	80 - 120
Allowable Five Year Harvest			1285	795	2080

PROGRAM FOR THE PERIOD 2003 - 2007

Social Initiatives

Harvesting in Stand 12 will have created a network of extraction trails which shall be incorporated into the hiking / picnic area of Stand 11. This will provide a hiking opportunity for those who want a trail length in the two kilometer range.

Forest Harvesting

The revised management plan of 2002 will modify this harvest schedule and the periodic allowable cut, if necessary. At this time it is recommended that 2080 m^3 of roundwood be harvested. Again, softwoods shall constitute 60 % of the removals (1285 m^3) and hardwoods 40 % (795 m^3).

Table 4 lists the stands which should be harvested. The average quality of the harvest may be slighty better than during the first period, as the average stand age is a bit lower. However, it must be expected that poplar will again be the targeted hardwood in the tree selection process.

Table 4. Harvest Schedule for the period 2003- 2007

FIVE YEAR HARVEST SCHEDULE
2003 - 2007

Stand No.	Total Area (Ha.)	Area to be Harvested (Ha.)	Softwood Harvest (m^3)	Hardwood Harvest (m^3)	Total Harvest (m^3)
3	4.6	3.4	30 - 50	40 -60	70 - 110
4	2.1	2.1	40 - 60	0	40 - 60
8	18.2	6.0	0	130 - 190	130 - 190
15	12.8	12.8	185 - 275	80 - 120	265 - 395
17	5.2	2.9	90 - 135	0	90 - 135
18	4.4	4.4	80 - 120	0	80 - 120
21	7.4	4.5	70 - 105	25 - 40	95 - 145
23	3.9	3.9	55 - 85	35 - 55	90 - 140
25	4.7	4.7	60 - 90	25 - 40	85 - 130
37	4.7	4.7	50 - 75	45 - 70	95 - 145
41	3.0	3.0	30 - 45	20 - 30	50 - 75
42	14.4	4.6	0	65 - 100	65 - 100
44	3.6	3.6	45 - 70	25 - 35	70 - 105
45	5.5	3.2	0	40 - 60	40 - 60
46	3.1	2.0	10 - 15	20 - 30	30 - 45
48	6.3	2.9	35 - 50	20 - 30	55 - 80
54	3.3	3.3	20 - 35	30 - 45	50 - 80
58	12.0	12.0	115 - 170	60 - 90	175 - 260
Allowable Five Year Harvest			1285	795	2080

PROGRAM FOR THE PERIOD 2008 - 2018

Forest Harvesting

The revision of the management plan in 2007 shall reflect the performance of the stands which were merchantably thinned and shelterwood harvested prior to 1998. The treatment accorded these stands will be determined then. At this time, it is projected that these stands should receive a light harvest in accordance with the restoration forestry program discussed earlier. Half of the area of these stands will be treated in the period 2008 - 2012, along with the stands that were treated in 1998 - 2002. The remaining previously thinned stands will be treated in the 2013 - 2017 period, as will those stands from the 2003 - 2007 operating period.

This will establish a ten year average reentry cycle for all the timberland area. It is important to reiterate that rigid adherence to set reentry intervals and volume removal levels are not characteristic of restorative harvesting. The ten year interval represents the best estimate for effective, economical harvesting at this time.

Social Development

The 2007 edition of the management plan shall include the progress of the Boat Harbour reclamation process, including an understanding of its extent, and a time frame for its completion. Recreational development in the forest shall have set the stage for opportunities to benefit from improvements to the water quality and Boat Harbour ecosystem. By this time it will be easier for the people to relate to the community, the Harbour, and the surrounding forest as an ecological unit to be sustainably managed for the future generations.

STAND DESCRIPTIONS

FISHER'S GRANT 24

Overview

This area is the best chance to introduce the members of the community to the forest. Due to its proximity to the community, it is possible for more people to use the area, more often, and with less effort, than that area east and south of Boat Harbour. It is also important to remember that as Boat Harbour is cleaned up and restored to its original condition, it will be much more attractive to the Band as a recreational source. The focus of activity in the period 1998 - 2002 is to develop a trail system through Stand 8 and 10 to a rest/picnic area in Stand 11. The crop tree release technique, with careful handling of slash, and interpretive signs, will be used to create an attractive and educational hiking opportunity along the route. Preliminary work can be done on an extension of the trail east to Stand 12. Some harvesting of mature poplar is scheduled for Stands 8 and 12, during the first ten years.

Stand 1

Stands 1 is located north of Highway 348. This area has been used very little by the Band. Access to the area is not developed. There is an old homestead in this stand along the shore of the Strait. This shoreline in this area does not have good beach qualities, although there is a scenic view from the old homestead. Garbage has been dumped there, and this should be removed. At any rate, the Band has access to a beach area further to the west. Part of the stand is an open area overgrown with alders,

goldenrod, and raspberry. On the margins, scattered clumps of rough white spruce, white pine, poplar, and red maple have grown in. There is at least one apple tree which is not bearing fruit, and a red oak. There is a small patch (less than 1/2 hectare) of white spruce saw material of good form. No activity is recommended for this stand until the Community has had ample opportunity to evaluate a full range of social and economic options over the next ten years.

Stand 2

Stand 2 occupies a hilltop and slopes. This stand has been cut and burned in the past and the site appears to be severely degraded. The cover of poplar, white spruce, white birch, grey birch, and beech is of poor quality, and has produced little merchantable volume . The site is rocky and dry. Soil building is needed here. This site should be left to develop a more substantial organic layer. The current tree crop should be allowed to mature and recycle naturally. During that process an understory dominated by white spruce will probably become established. Frequent precommercial thinning of small patches during the period of renewal will accentuate age differences throughout the stand, and provide some species diversity as well.

Stand 3

Stand 3 is poorly stocked with white spruce, poplar, white birch and red maple. For the most part, the trees have poor form and low value. The southeastern part of this stand constitutes the buffer area along the Boat Harbour outlet, which is a steep slope, and therefore should be a no-entry special management zone, and not included in the timberland base. The northern portion of the stand is scheduled for a light partial cut during 2003 - 2007, to harvest white spruce sawlog material. Patches of established regeneration should be released at that time.

Stand 4

Stand 4 occupies the mid elevation between Stands 2 and 3. This is a stand of white spruce / white pine patches separated by small areas of red maple, white birch, and poplar. The softwood is nearing maturity. During the 2003 - 2007 period, a restoration harvest is scheduled for the stand. Care should be taken to distribute the cut well

throughout the stand, as this stand could be susceptible to blowdown during storms with high easterly winds.

Stand 5

Stand 5 is a small area of immature intolerant hardwoods which has developed on an old bulldozed area and burn. A few old red pine are present (with evidence of a burn) but red pine regeneration was not successful. No treatment is recommended. The present forest cover should be allowed to mature and recycle naturally. This will take twenty to forty years.

Stand 6

Stand 6 is a softwood stand (red spruce, white pine, and hemlock) with two age classes. Sixty year old red spruce is interspersed with patches of older spruce, pine and hemlock. Some of this older wood has had shelterwood treatments done in 1993. Patches and strips of hardwoods (red maple, white birch, and yellow birch) are found throughout the stand. Softwood regeneration is developing in the treated areas, and regeneration of intolerant hardwoods is occurring in the more open areas of treatment.

No harvesting is recommended for this stand in the next ten years. Restoration harvesting can be carried out after 2008, along with partial pre - commercial thinnings in the previously treated areas. The restoration harvesting should aim to release pockets of established regeneration in untreated areas.

Stand 7

Stand 7 is a non-productive area which is off limits to any operations. This wet area is a water storage and filtering area located close to a housing area. As such, it serves an important role in maintenance of water quality.

Stand 8

This is a stand of intolerant hardwoods, with scattered white spruce, hemlock, white pine, and balsam fir. The intolerant hardwood component is fifty years of age, with the poplars showing better development than white birch and red maple. There are

areas where the poplar has begun to decline. No favourable trend in establishment of advance regeneration is noticed.

Throughout the stand, there are scattered, but regularly found, seedlings, saplings, and pole timber of more valuable species such as red oak, sugar maple, yellow birch, hemlock, and white pine. This situation suggests that crop tree release is the appropriate technique for these stands. It will require skillful monitoring and control of overhead light and competition to promote the development of selected crop trees.

This stand is scheduled for restoration harvesting over the next ten years. Areas dominated by poplar should be delineated and treated. Very careful assessment of the scattered regeneration will be needed both prior to, and during, the harvest operation. That area of the stand through which the trail to Stand 11 will pass, should be treated appropriately.

Stand 9

This is a stand of hardwoods which have developed very poorly on a dry site. The crown closure is complete and no trend of succession is yet apparent. In the western part of the stand, poor quality beech is dominant; in the eastern part, white birch (of poor size and form) dominates. Grey birch is also present. This stand should be left to develop on its own and reevaluated in ten years. This stand requires a soil building process. Underplanting perhaps of white pine with the intention to allow the current crop to naturally recycle, may be a reasonable option for this stand. The site should be evaluated as to suitability for white pine, red pine, red spruce, or yellow birch.

Stand 10

This mixedwood stand is located on a flat, damp site along the shore of Boat Harbour. The site receives runoff from the slope of Stand 8, and the compact subsoil creates a perched water table during wet periods. The site is fertile, with good growth of scattered white pine and hemlock. The hardwood component is dominated by poplar, some of which have died and become snags. There is a fairly well- developed understory which if promoted, will quickly create some vertical closure. The stand is suitable habitat for birds and small mammals. There are good-quality stems of 60 year old white pine which should be pruned. Any work done in this stand should be relevant to the establishment of an attractive route for an interpretive trail, as discussed earlier.

Stand 11

Stand 11 offers an opportunity to introduce the community to this part of the forest. On the southwestern shore of the peninsula is a natural park like stand of red pine, with a few white pine, red oak, and red maple. This is a very attractive spot and is exposed to the prevailing summer winds off Boat Harbour. The peninsula offers an easy chance for a short hiking trail, and there are scattered red oak, white and red pine, and yellow birch which can be released.

Combining low-impact forestry treatments with recreation and interpretation will contribute greatly to the appreciation of the forest by the Community.

This stand is approximately four hundred meters from the road. The terrain is favourable for trail building. This trail should be of a standard which allows and encourages use by all the members of the community. The trail can be located to take advantage of attractive red and white pine and hemlock through Stand 10. This project can be expanded to include interpretative signs to identify tree and shrub species along the route. This is the top priority recommendation for the Fisher Grant 24.

In keeping with the social objectives of the Band, this is an appropriate project to promote the interest of the Community in the new program to manage their forest.

Stand 12

This is a larger peninsula extending into Boat Harbour. Poplar is dominant, but there are also more valuable trees - red oak, sugar maple, yellow birch, hemlock, red pine, and white ash. Some of the beech is healthy with no sign of beech scale disease. Regeneration of oak , sugar maple , beech, white and red pine, and hemlock is found throughout the stand, although it is not abundant. Crop tree release is appropriate here, where attention should be paid to releasing trees whether they be seedlings or mature individuals.

Restoration harvesting is scheduled for the period 1998 - 2002. This harvest should target poplar, and other species as necessary to release selected crop trees. An extraction route can be located so that eventually, a trail around this peninsula can be tied in with the trail to Stand 11. Like Stand 11, this is an attractive area and could be developed into an interesting hiking route for those who want a longer outing.

Stand 13

This stand includes fens along the shore of Boat Harbour. Cattails are the dominant vegetation. Waterfowl use of these areas is very evident, especially in the two

coves of the harbour. There is a recently-abandoned beaver lodge. The beavers utilized hardwoods, especially poplar, from the surrounding stands. The wet areas should be protected, with assurance that no sedimentation from the neighboring slope will occur as a result of harvesting operations.

PARCEL ONE

Overview

This parcel has had very little harvesting done over the past sixty years. It contains high value red pine pole timber, which constitutes part of a aesthetically pleasing area with potential for trail and recreational development. This parcel includes nearly two kilometers of shoreline along Boat Harbour. Stand 19 divides the parcel into two area; north of Stand 19, any timber extraction will be done to the north to the landing area in Stand 17, and south of Stand 19, the timber shall be forwarded southerly to Fishers Grant 24G. This is to maintain the seventy hectare area practically free of roads. Light harvest cuts (restorative harvests)and minor silvicultural treatments are recommended over the next decade.

Stand 14

This is a poorly stocked softwood stand, located on a very well drained hilltop, which was cut sixty years ago. The site is dry with ericaceous ground cover, which is probably why the stand regenerated sparsely after the previous harvesting operation. White pine demonstrates the best growth here, followed by red spruce. Balsam fir, black spruce, and white spruce have not done well on this site, and are showing significant mortality. There are a lot of fallen dead wood and standing snags, although most are small diameter stems. The white birch, grey birch, and red maple have not developed to any size or quality stems. Where the balsam fir and black and white spruce have fallen, softwood regeneration, dominated by balsam fir and red and black spruce, is becoming established. There is a small proportion of white pine in the regeneration. Improving the future productivity of this site depends on promoting white pine and red spruce, while ensuring there is a substantial component of healthy deciduous species. Improving the future productivity of this site depends on promoting white pine and red spruce, while ensuring there is a substantial component of healthy deciduous species.

Harvesting which is scheduled for 1998 - 2002, to promote further regeneration

should be very light with the objective to releasing established regeneration. It is also recommended that a light precommercial thinning of the regeneration be conducted. The objective of this is to release white pine and red spruce saplings and seedlings from competition by black spruce and balsam fir regeneration. This treatment should be carried out throughout the stand every ten years, or otherwise as determined.

Stand 15

This softwood stand was cut heavily sixty years ago. Some smaller hemlock and white pine were left at that time, and these now form a scattered overstory. Regeneration after that harvest was to balsam fir, red spruce, white spruce, white birch, and red maple. On the higher areas, the hardwoods show poor growth, probably due to moisture deficiencies. There are good quality red spruce, white pine, and red pine, red maple and yellow birch, which should be promoted by a light harvest, which is scheduled for the 2003 -2007 period. Balsam fir should be targeted for harvest as it is mature in many areas of the stand.

Stand 16

This open stand of older hardwoods (poplar, red maple, yellow birch, and white ash) with a few scattered mature spruce, hemlock, and fir, occupies a wet site. It includes a flat area with periodic perched watertable, as well as the surrounding slopes. There are several large fallen trees, and standing dead or nearly dead stems. The open conditions promote a lush ground vegetation and abundant bird life. This stand has been designated as a Special Management Zone - Water Quality . It receives runoff from the surrounding stands, in which harvest operations will be conducted. The stand will therefore serve a function in collecting, storing, filtering, and discharging water to Boat Harbour. Management of wildlife crop trees is compatible with this primary objective. This is one of few locations with the potential to provide large, standing cavity trees and snags in the immediate future.

Stand 17

This is a stand dominated by red and white pine, red spruce and hemlock. In spots, red pine form pure, dense areas of pole quality trees up to twenty meters in height. Some unregulated cutting has taken place in the past two years. This stand is very attractive, and because it is easily accessible from the highway, aesthetic objectives must

be considered. At the same time, it contains the most valuable timber in the Pictou Landing Forest. It should be treated with both objectives in mind. The work that has been done recently should be tidied up, the felled timber forwarded to the landing and marketed. The landing area, where garbage has been dumped in the past, should also be cleaned up and leveled. A parking area should be designed; however, this must be accompanied by policy regarding land use.

The openings created by recent harvesting should be closely monitored to determine trends in regeneration. The natural course of succession here, in the absence of fire, is probably towards a white pine, hemlock, and red spruce climax. Frequent light harvests may enable red pine, red maple, yellow birch, or red oak to maintain a presence in the stand. This may require underplanting (in the case of yellow birch and red oak). The stand is scheduled to be lightly cut in the period 2003 - 2007. Developments in the understory by then should give a better indication of the course to pursue at that time.

Stand 18

This is a stand of sixty year old softwood (mostly red, black, and hybrid spruce) located on a high knoll. Drainage is excessive, which probably contributes to the somewhat poor stocking throughout much of the stand. Site productivity is also reduced by limited moisture during much of the year. Sites subject to moisture deficiencies are more easily degraded by fire and heavy cutting, and this has probably occurred here. This must be taken into account during timber removal operations, which is first scheduled for the period of 2003 - 2007. It may be advisable to limit the volume removal to no more than twenty percent. Red spruce should be promoted over black spruce and hybrids. White pine may be a suitable species for promotion on this site. If so, underplanting may be considered.

Stand 19

This is an older stand of mixed woods along the shore of Boat Harbour and extending up along two small brooks which drain into the Harbour. Poplar, white ash, red maple, and red oak are mixed with red and white pine, hemlock, red spruce and balsam fir. The pines appear to be out competing the spruce, which are suffering significant mortality. The poplar are overmature and also declining.

There is a trail through this stand originating at the landing in Stand 17. Garbage dumped along this trail should be cleaned up. The flat terrain, large trees, and the prospect of a cleaner harbour, make this stand a possible recreation site. Harvesting in this stand should be light, and should promote large, attractive trees. Areas of

regenerating saplings should be thinned before live crowns are reduced. The trail should be maintained in a condition to encourage hiking. A light harvest for a portion of the stand is scheduled for 1998-2002, to salvage some of the overmature material along the trail area.

The eastern portion of the stand includes the area between two small streams which drain into the Harbour. The stand in this area is younger. This area of about one hundred fifty meter width will be managed as a special zone to maintain connectivity with the woodlands to the east, to provide a wildlife travel corridor, to protect the two brooklets from contamination, and to reduce the fragmentation effects of harvesting activities.

Stand 20

This mixedwood stand was heavily cut sixty years ago. Poplars, red maple, and white birch form an uneven open overstory over white and red spruce, balsam fir, and occasional white pine. There are a few older spruce and hemlock residuals. Tops of knolls exhibit poorer growth of fir and spruce, but white pine does quite well there.

In scattered spots, residuals left after the last harvest have fallen down. The regeneration which has gradually become established has created a degree of vertical structure - a start towards an all - aged stand.

Harvesting which is scheduled for the 1998 - 2002 period, in this stand should imitate this natural process. At the same time, saplings should undergo light precommercial thinning to maintain a reasonable growth rate. This is especially important when balsam fir is significant in the younger age class, as is the case here. Maintaining the health of balsam fir should promote the pace of natural succession. It will mature sooner, and reach merchantable size at an earlier age. If a seed source of red spruce and white pine can be maintained in the overstory, these species should become established beneath the maturing balsam fir.

Stand 21

This stand borders the shore of the harbour. It was heavily cut sixty years ago. Reestablishment of tree cover seems to have occurred over a period of twenty or more years following that harvest. As a result, the stand shows a variety of stages of development. In places, the hardwood overstory forms the main stand; in other areas, the poplars, white birch, and red maple are a minor component. There are patches of vigorous, healthy red spruce-fir about 45 years old. No treatment is recommended for this stand in the next operating period. However, a light harvest should be carried out

during the 2003 - 2007 interval. Balsam fir should be cut. Special attention must be given to creation of an aesthetically pleasing riparian area as viewed from Boat Harbour.

Stand 22

This mixedwood stand is located on an imperfectly drained site and includes small brooklets which drain westward into Boat Harbour. This stand has been designated as a "Special Management Zone - water quality". The priority for management is to maintain the stand as an area to collect, store, and filter water from the surrounding stands where harvesting will take place.

The stand has a variety of species (including white ash, yellow birch, red spruce, and hemlock) and age/size classes. Regeneration is scattered, mostly balsam fir, with a small amount of red spruce. This condition makes the stand attractive to a variety of wildlife as feeding and security cover. This characteristic should be maintained.

There are good quality white ash and yellow birch in this stand. Crop tree management techniques could be used to increase the diameter growth of selected crop trees. The stand would , in twenty years, begin to yield occasional high quality veneer or sawlogs. These must be extracted only in frozen and snow - covered ground conditions, and using a small machine.

To summarize, the management priorities for this stand are (1) water quality control, (2) wildlife habitat, and (3) high - value, ultra low volume wood production.

Stand 23

This mixedwood stand was harvested about sixty years ago. Some red spruce and hemlock saplings survived the logging and exposure, and now form a scattered upper canopy layer. Balsam fir, white spruce, white and yellow birch, red maple, and poplar filled in between the advance regeneration. The stand is quite mature, and is scheduled for a light harvest in the 2003 - 2007 period. The site capability is good.

A light harvest is recommended for this stand, in accordance with guidelines set out in the restoration strategy. It will be important to nurture the advance regeneration of red spruce along, and to actively discourage the balsam fir which is most prevalent. To accomplish this, a light precommercial thinning should be carried out in conjunction with the harvest operation. To promote regeneration of red spruce and white pine, those species should be maintained as long as possible in the overstory. Balsam fir and poplar should be removed. The spruce and pine will continue to provide greater overall height, and will eventually contribute dead snags and large fallen trees.

Stand 24

This is a softwood stand located on a knoll, on which a shelterwood cut was carried out in 1997, leaving an open stand of red and white pine, and red spruce, with an occasional white birch, and red maple. The northern fringe, dominated by hardwoods, was left intact. As the residual stocking is low, a vigorous understory of intolerant hardwoods may become established over the coming years.

Nothing is recommended for the next decade. Monitor the development of the understory. In the subsequent period, it may be necessary to treat the understory to ensure representation of the more valuable species (red spruce and white pine). The undisturbed northern slope of the knoll should be left as it is. During the 2008 - 2017 period, this stand should receive a light harvest cut, along with a partial precommercial thinning. This will lead towards greater species and structural diversity.

Stand 25

This stand was harvested sixty years ago, but not quite as heavily as other stands in this immediate area (Stands 15, 18, 20, 21, 23). Consequently, there is a more definite 80- year plus age class in this stand. There are some good red spruce sawlogs, although mortality has been occurring in these veterans for twenty years or more. As a result, there are a variety of age/size classes, there is an element of vertical structure, and there are large snags and large fallen trees. Balsam fir dominates the regeneration, which is patchy but spread throughout the stand.

This stand offers an opportunity to work with a number of elements of structure. A light harvest is recommended for the period 2003 - 2007. Of particular note is to attempt to improve the quality, health, and vigor of the understory of balsam fir. This species dominates the young growth and must be accepted in the next stand. However, a partial precommercial thinning and strategic removal of overstory trees could greatly improve the condition of the young fir, and favour other more valuable species, including hardwoods, at the same time.

FISHER'S GRANT 24G

Overview

This parcel was fairly intensively managed over the previous decade. Over one third of the area was treated, primarily with shelterwood harvesting, merchantable

thinning, and plantations. Forest harvesting and silvicultural activities are not scheduled for the next ten years. Prescriptions to respond to unforseen developments may be carried out, however. A feature of this parcel is Denny's Park, a peninsula extending into Boat Harbour, on which are found large pines in an attractive setting, This area may be appropriate for a recreational or cultural initiative for the Band.

Stand 26

Denny's Park

This stand of red and white pine, red spruce, white birch, and red maple is located on a peninsula extending into Boat Harbour. A shelterwood harvest was conducted here in 1994. Residual stocking is low, but there has been very little blowdown or breakage, despite the relatively exposed location. Regeneration of softwoods (white pine, red spruce, balsam fir) has been good. In some spots, white birch and red maple have developed a vigorous coppice understory.

This stand is located in a sensitive site, both environmentally and aesthetically. A large portion of this stand is within sixty meters of the shoreline. Due to its location near the water, and to its high canopy, large trees, and pleasing appearance, this stand has significant recreation /aesthetic potential.

It is recommended that this stand be left to develop naturally over the next period. It is important that an understory develop to begin to regain some vertical closure. During this time, the question of integrating recreational/aesthetic use with the stand's primary function as a shoreline buffer and riparian zone can be examined by the Community Forest Board.

Stand 27

Regeneration release was carried out in this stand in 1994. Almost all of the overstory was removed. Where advance regeneration was successfully preserved, a new and vigorous softwood stand has begun to develop. In other areas, there was no advance regeneration, or it was destroyed in the operation, and a new stand is only now beginning to seed in. Balsam fir, red and black spruce, white pine, red maple, and white birch will form the new stand.

It is recommended that precommercial thinning be carried out on those patches which are most advanced. This should be done soon, and repeated at regular intervals. This treatment will have the effect of emphasizing size class differences in an essentially

evenaged stand. This is one of the few methods of restoring diversity to a stand of this age and condition.

Stand 28

This stand is located within the riparian special management zone along Boat Harbour. A merchantable thinning was carried out in 1990, with a good residual stocking of red spruce, balsam fir, and white pine. There has since been little blowdown, and the stock is in good condition to respond with increased diameter growth to the thinning.

The undisturbed portion of the stand should be left alone, due to the extent of the work done in the vicinity over the past decade. The thinned portion of the stand should be allowed to grow and become more windfirm. Towards the end of the next period, the stand should be reassessed. It maybe desirable to conduct a very light harvest, to prevent too much reduction of live crown ratios. All remaining hardwoods in the treated area should be retained. That portion of the stand along Boat Harbour is low, and ground conditions are wet and soft.

Stand 29

This is a mixedwood stand of young mature trees located partially within the riparian zone. This stand constitutes the single largest block of undisturbed forest in the original Fisher's Grant 24-G. For this reason, no work is recommended for this stand in the next period. The area adjacent to Boat Harbour is a low, water - receiving site which serves an important water quality function, and serves as wildlife habitat. The eastern portion of the stand extends onto a dry knoll, where tree growth is somewhat limited by moisture deficiency. The stand should be evaluated in ten years, in conjunction with neighboring stands. The balsam fir component will be mature by that time, and a light harvest of the non-riparian areas may be appropriate.

Stand 30

This stand is comprised of two small red pine plantations dating from 1991. Site preparation was carried out the previous year by a Marden Roller, following remnant removal and salvage cutting. Scattered, mature red pine were left. These do not show good height growth to support the suitability of red pine for this site. There is a narrow

buffer strip of mature wood between the two planted areas. Manual weeding of the area has been carried out, which should not be repeated.

The planted stock appears healthy and is growing well. The site seems appropriate for red pine at this early stage. It is essential that the strip between the two planted areas be protected and maintained. As discussed previously, the proper procedure for handling these red pine plantations is yet to be determined.

If ingrowth (of hardwoods or softwoods) occurs in the planted area, this should be nurtured by cutting out pine to allow selected ingrowth to survive. This process must begin before the stand closes completely. Careful monitoring of the area should be done to watch for this opportunity. This is the quickest way to reintroduce diversity and some elements of structure to the stand. It will also provide a safety net in the event that the red pine plans fail to prosper.

Stand 31

This mature softwood stand contains red and white spruce, red and white pine, hemlock, and a small amount of red maple and white birch. Red pine occurs in the softwood component on the higher, drier parts of the stand. On lower areas, red spruce and hemlock predominate. Red pine is perhaps not well-suited to this site, as its growth lags behind red spruce and white pine. Regeneration is mostly spruce, white pine, balsam fir, and intolerant hardwoods.

Ninety percent of the area of this stand has been treated with shelterwood or merchantable thinning over the past eight years. These treatments have reduced diversity and stand structure. To begin the process of restoration, no more work should be done in this stand in the next period. It is especially important to preserve and protect the ten percent of the stand which was not treated. The developing understory should be monitored, and appropriate thinning carried out to encourage diversity of species and good stem form.

Stand 32

This stand contains red and white pine, red spruce, balsam fir, hemlock, with a minor hardwood component. The southern part of the stand has had a shelterwood harvest carried out. In this treated area, white pine and red spruce show superior height growth to red pine. There are a few red pine seedlings, but not enough to call regeneration successful. Red spruce, white pine, and fir are regenerating well. The untreated portions of the stand is of a lower quality growing stock; the portion of fir is higher, and the red spruce has been replaced by hybrid red - black spruce.

No treatments are recommended for this stand in the next decade. The development of regeneration and the understory should be watched closely. During the 2008 - 2017 period, parts of the understory will need a light precommercial thinning.

Stand 33

This stand includes an old farm; much of the area was cleared for cultivation. After abandonment, sixty years ago the area grew up in white spruce, poplar, and red maple. Red spruce and black spruce are lesser components of the stand.

The stand underwent shelterwood cutting three years ago. A one acre clump of younger hardwoods and alder, including apple trees, was left untouched. This area must be protected. No further work should be done here in the next decade. A light harvest will be needed during the 2008 - 2017 period.

Stand 34

Part of this softwood stand was highgraded thirty years ago. Regeneration of red spruce and balsam fir began to develop, and was released ten years ago by removing the remainder of the overstory. Damage to young pine by the white pine weevil is extensive. Shelterwood cutting was carried out in the eastern half of the stand three years ago. The western part of the stand is relatively undisturbed on a somewhat wetter site. The work that has been done so far has not increased forest structure or diversity. Consequently, no work is recommended for the next decade.

After that, it should be possible to increase diversity in that central portion of the stand (where previously a remnant removal was carried out) by doing a partial precommercial thinning. The objective will be to allot growing space to species other than spruce and fir, and to emphasize and encourage differentiation into height and diameter classes. White pine should be maintained as a component of the stand, even if it is necessary to favour stems deformed by the weevil.

PARCEL TWO

Overview

This parcel has seen very little human activity over the past fifty years. Farmland in the western end was abandoned sixty years ago. A substantial portion (forty percent) of the parcel is designated as "Special Management Zone" , both for water quality and wildlife objectives. As an undisturbed area with good connectivity to the east, harvesting operations should be especially careful to avoid fragmentation of the habitat and landscape. Well- distributed, light harvests and narrow, well-designed extraction trails are very important in this parcel.

Stand 35

This is a low wet area which drains into Boat Harbour. There are several defined brooklets and areas of standing water in this stand. The ground conditions are soft. This stand has been designated as a "Special Management Zone - water quality". It is also important wildlife habitat.

Use of the area by songbirds and small mammals is evident, and there are open areas with scattered large and small trees and a prolific shrub layer. It appears to be a travel and security hiding area for deer.

Crop tree release to develop appropriate structures and conditions to benefit wildlife should be carried out. However, any trees cut will be allowed to remain where they fall - no timber extraction is to be done here.

Stand 36

This is a previously cultivated area which has grown up to become ideal wildlife habitat, especially for birds. There are a variety of trees - species, sizes, ages, heights - with open areas dominated by shrubs and old apple trees. The stand is bordered on the west by a setting pond and very large open area. The stand is heavily used by wildlife, in conjunction with the neighboring wet area (Stand 35). It has been designated as a "Special Management Zone - wildlife". Management treatments should be designed to maintain water quality control and maintain or improve wildlife habitat. The apple trees should be managed to increase their production of fruit and maintain their health. No timber is to be harvested .

There is now an ATV trail through this stand which is being regularly used. The trail should be rendered inaccessible and restored to a natural condition. This must be

coordinated with new policy formulation by the Committee Forest Board regarding ATV use, and use of the Reserve Lands by non - community members.

Stand 37

This is a mature mixedwood stand found on a formerly cleared and cultivated site. The character of the stand is open, with large trees, although the stocking is quite high. There are some well formed hardwoods amongst the red maple, poplar, white ash, and yellow birch. The white ash is younger, seeding in gaps. The softwood component is white spruce, hemlock, balsam fir, and white pine.

There are some fallen trees in this stand, as well as snags and candidates for future snags. This stand should receive a light partial cut during 2003 - 2007 period, with emphasis on removing merchantable poplar, red maple, balsam fir, and white spruce. There is an opportunity for white ash crop tree management in this stand, by carefully releasing the ash where good stems occur.

This stand is well used by birds and mammals, in conjunction with Stands 35 and 36. It is important that the stand not be fragmented by extraction trails which are wider than necessary, or by large openings. There are understory clumps of alders which should be left undisturbed.

Stand 38

This softwood stand has a scattered overstory of red spruce, white pine, hemlock, and balsam fir of the 81 - 100 year age class. The main canopy is dense red spruce, hemlock, and balsam fir which is forty five years old. There is a small component of hardwoods - red maple, white birch, grey birch - in the main stand.

Treatment in this stand should be a light thinning of the main canopy, favouring the best quality red spruce and hemlock. This is scheduled for the 1998-2002 period. Hardwoods in the main stand should be retained. A few members of the overstory may be removed. However, harvesting of the overstory trees must be spread over a period of sixty years, with some trees reserved to die and become snags, and eventually fallen woody debris.

Stand 39

This mixedwood stand, located on a good site, has good species diversity, and a fair number of potential crop trees of several species. There is a good opportunity to select trees for current and future cavity trees and snags. This stand should be given a light harvest in the next operating period, removing balsam fir, poplar and white birch.

The lower slope of the stand borders Stand 35, and is somewhat soft ground. Extraction must be done carefully to avoid mineral soil distribution on the slope. There are white ash and yellow birch which should be released. They will become future seed sources.

BOAT HARBOUR WEST IR 37, CENTRAL AND EASTERN PORTION

Overview

Road access was established in 1989, and much of the area, especially the softwood stands, have been treated since that time. Shelterwood harvests, merchantable thinnings, and seed tree cuts, with a wide range of residual basal areas, were carried out. The post - treatment development of the stands will provide guidance on optimal levels of basal area respecting blowdown, increment, and regeneration success. Sample plots should be established here. Only a small amount of harvesting will be carried out here in the next ten years.

Stand 40

A shelterwood treatment was conducted in this stand in 1995. Blowdown has occurred since that time, and the stand is now quite open. Regeneration of intolerant hardwoods (poplar, white birch, red maple), both from seed and vegetatively, is vigorous. Softwood regeneration is showing up (red spruce, white pine, balsam fir), but in many areas will soon be completely dominated by the young hardwoods. It is recommended that no further work be done in this stand in the next decade. In ten years, the regeneration status should be evaluated. It may be necessary to partially thin the understory to favour red spruce, white pine, and hemlock. The future handling of this stand will depend largely on the amount of blowdown which occurs over the next few years.

Stand 41

This mixedwood stand is located on a imperfectly drained site. Ground conditions are stable enough for harvesting if done carefully and at the right time of year. Along with Stands 35 and 36, it forms a large area of good wildlife habitat, and is an important area for filtering runoff from roads and logging areas. Light harvesting is recommended for this stand in the period 2003 - 2007. Extra caution should be taken to avoid negative impacts on the wildlife use of the stand. Balsam fir should be removed, favouring the spruce and hardwoods.

Stand 42

This is a young-mature stand of intolerant hardwoods. The maturity varies throughout the stand, and two areas have been treated recently. One half hectare of white birch was thinned in 1995. There was no negative response to the sudden exposure, as the crown cover was kept fairly tight. Sometimes, however, shock due to sudden exposure takes a few years to become apparent, so the treated area should be watched carefully throughout the next period.

Another area was pre - commercially thinned, during which some fairly large trees were cut down. To date, the results look promising, but more time must pass before passing judgement in this treatment.

Some areas of this stand contain large diameter poplar. A light harvest to select occasional veneer quality stems is recommended for the next period. Pulpwood will be harvested in the process. An intense examination of this stand would reveal seedling and saplings of sugar maple, white ash, and red oak. Hopefully, release of these higher values species could be accomplished during the restoration harvest.

Stand 43

This is a softwood stand (primarily red spruce) on which shelterwood cutting was carried out in 1995. Stocking of the residual stand is higher than many of the shelterwoods done, but structure and diversity have been reduced nonetheless. There is some vigorous growth of hardwoods in larger openings, but shade from the overstory may control this for the most part. No work is recommended for this stand in the next decade.

Stand 44

This mixedwood stand is located on a flat, water - receiving site. The site quality is good, and there is a good diversity of species found in the stand. Softwoods include red and white spruce, balsam fir, and hemlock. Hardwoods include poplar, white, grey, and yellow birch, red maple, white ash, and red oak.

It is recommended that a light harvest be carried out on this stand. Favour the more valuable species; most removals should be the shorter-lived trees. Some good regeneration is present (but scattered), such as yellow birch, red spruce, white ash, and red oak. Where these seedlings can be located, try to give them growing space and light, so their growth rate will be promoted. This stand should be harvested carefully during a dry period, using low impact extraction equipment.

Stand 45

This is an immature stand of intolerant hardwoods - poplar, white and grey birch, red maple, and a few pole stage red oak with good form. There are scattered white pine (some old relicts), white spruce, and balsam fir. Natural white pine seedlings are found in the western part of the stand. In the northeastern part of the stand, white pine seedlings were planted under the overstory of intolerant hardwoods in 1997. So far they have survived.

It will be necessary to closely monitor the planted seedlings, as they are at risk from rodents, snowshoe hare, competition from the ground vegetation, and suppression by the overstory. Control of the overstory will be necessary to ensure the survival and growth of these seedlings. In the remainder of the stand (particularly the western part), it is recommended that the red oaks be released from competition where necessary. In the period, 2003-2007 it will be time to harvest some of the poplar as veneer logs and pulpwood.

Stand 46

This is a stand of young intolerant hardwoods, primarily poplar, red maple, white and grey birch, along with scattered white spruce and balsam fir. There are a few white ash seedlings/ saplings in the understory. A small area of the poplar was clearcut about fifteen years ago. This stand should be left alone for the next period. By the end of that time, more white ash may have become established in the understory. If so, the overstory can then be lightly harvested to promote the growth of the young white ash. This is scheduled for the 2003 - 2007 period.

Stand 47

Most of this stand was thinned in 1990 and 1991. The age and vigor of the residual trees (mostly red spruce with some white spruce, balsam fir, hemlock, red maple, and white birch) was such that there appears to have been a good growth response to the treatment.

Regeneration is becoming established, but the intolerant hardwoods predominate in many areas. In the next decade, nothing is to be done in this stand. Monitor the development of the understory; pre-commercial thinning should be started as soon as large enough patches are ready. Thereafter, the procedure will be followed to create a multiaged stand of tolerant species.

Stand 48

This mixedwood stand, located on a good site, has had several treatments over the past decade. Shelterwoods and merchantable thinnings have been carried out in those parts of the stand which were most mature. In addition, semicommercial thinning without extraction was carried out where the stand was younger, due to partial cutting carried out thirty years ago. Some vertical structure has begun to develop here.

No treatment is recommended here for the next five years. After that time, light harvests at regular intervals should be conducted in such a way as to accentuate, rather than diminish, the species, height class, and age class diversity which is beginning to show in this stand. The first restorative harvest is scheduled for the 2003 - 2007 period.

Stand 49

This stand was cleared of all remnants of a previous harvest in 1990, and prepared with a Marden Roller for planting of red pine in 1991. The pine has become successfully established and is exhibiting good growth rates. Weeding was recently carried out. Weeding to release the ingrowth from red pine will be necessary, as in the case of Stand 30.

Stand 50

This softwood stand now has three distinct age/size classes, after receiving several treatments over the past decade. These age classes are, however, situated on distinct areas, and are not intimately mixed. Blowdown of mature residuals has been a problem, particularly where an attempt was made to leave red spruce seed trees.

Whereas all of the area of this stand has received a "simplifying" treatment, no further work is recommended for the stand. In the next decade, the procedures for stand restoration will be followed. This process may be facilitated by the patchwork of age classes which have been created here. The procedures followed previously in precommercial thinning should be modified to promote, rather than reduce, diversity.

Stand 51

Much of this softwood stand has been treated by shelterwood cutting over the past four years. During the last work to be done, an attempt was made to leave higher residual stocking than was left during earlier harvests. There was also an effort made to preserve some elements of vertical structure and species diversity. This was found to be difficult in this stand type.

No further harvesting is recommended in the next decade. That portion of the stand which was not treated should be preserved in its natural state until such time as structural diversity is achieved in the remainder of the stand. The untreated areas are important to wildlife, given the relatively open nature of much of this stand and its neighbours.

Stand 52

This softwood stand has been merchantably thinned in two operations. Residual stocking is high enough to give a measure of restriction to the development of a vigorous understory of intolerant hardwoods. Blowdown has been limited. A small area with developed softwood regeneration was cleaned in 1997. Effort was made to favour some species and height diversity during this spacing operation. It should be monitored over the next years to see if this was successful. Otherwise no work is recommended in the next decade. A light harvest should be conducted in the 2008 - 2017 period. Development of the understory may warrant precommercial thinning by that time.

PARCEL THREE

Overview

Most of this parcel was previously cultivated land which has reverted, in various degrees, to forest. However, it also contains a stand which has more characteristics of old growth than anywhere else in the forest. It is recommended that a management plan be devised which will maintain the formerly cleared land in a condition of Oldfield Habitat. Adjacent to this will be the premier stand of Acadian Forest on the Pictou Landing Forest. The contrast, in itself, suggests future possibilities for nature tours and interpretive development.

Stand 53

This mixedwood stand contains some structural elements and characteristics of old growth forests. Several age classes are present, but they are mixed only patchwise. There are large old trees, particularly hemlock. Red spruce and yellow birch are also found. Large fallen trees are present. There are patches of mature white spruce which have largely deteriorated and are regenerating to conifers, usually balsam fir. Other valuable species can be found, such as red oak and white ash.

This stand has good height growth, which is matched only by the red pine in Stand 17. Many of the trees have good form, with long clean boles.

With respect to restoration of the Acadian Forest type, there is more to work with in this stand than in most others on the property. This warrants an especially thorough detailed stand assessment, and a well considered harvesting plan before any work is started. This stand will be expected to provide a blue print for the restoration of other stands, most of which will be decades behind this stand.

Detailed inventory of the structure and diversity of the stand must be done. After work is carried out, permanent sample plots should be established to collect detailed information on the response to the work done. Part of this stand may be set aside as a benchmark area, as a reminder of the objective of the restoration program.

Stand 54

This open mixedwood stand has developed on a previously cleared site. Some spots are dominated by white spruce, which occasional forms almost, pure patches, other

spots are dominated by poplars, and still others are quite open and dominated by alders, shrubs, and grasses.

The stand is young and the natural process of restoring forest to this stand has only begun. The only recommendation for this stand relates to a patch of dense white spruce in the northwest corner. There are occasional white pine and hardwoods in this patch which should be released from competition by the very vigorous white spruce. This will contribute to the diversity of the stand in the future. A light harvest during the period 2003 - 2007, may encourage establishment of seedlings of more valuable species which may subsequently be released in later light harvests.

Any slash produced in this stand should be lopped so that it lies close to the ground. This stand is used heavily by whitetail deer as a traveling, resting, and loitering area during the fall. The low branches, tree density, and clean ground surface are the features which encourage this activity. Any cutting should be designed to minimize the impact on this condition.

Stand 55

This is an area of low ground, wetland, adjacent to the treatment ponds still in use. These areas would be classified as fens, where sedges (particularly cattails) are the predominant vegetation. These areas are heavily used by birds as nesting and feeding areas, and the areas of open water are used by waterfowl.

This stand is not productive forest land; its most important function is in the maintenance of water quality and the control of water flows and water storage. Under no circumstances are these areas to be used for any activity which can damage the delicate ecological balance. This area shall be a candidate area for permanent reserve. In the meantime, it is described as " Special Management Zone - water quality."

Stand 56

This is a mature mixedwood stand dominated by poplar and balsam fir. Substantial mortality is occurring in these short - lived species. It is recommended that a light harvest be conducted to salvage some valuable timber and release patches of advance regeneration. There are some good stems of red oak, yellow birch, and maple which should be favoured in a harvest operation. There are also good items of young, vigorous white pine which should be pruned with the objective of producing clear lumber or veneer. This stand should be managed in conjunction with Stand 53. There are signs

of heavy use of this stand by wildlife, so large openings and wide trails should be avoided.

Stand 57

This stand is the site of an old farm which was abandoned about fifty years ago. Stand 54 is part of the same farmland. This stand differs in that much of the former cleared land is still dominated by grasses and shrubs . There are several apple trees and wild rose in the old field. To the east, north, and west, the stand loses elevation; the low areas are dominated by alders and goldenrod. The drainage is gathered into small brooks which flow north into Stand 56, and eventually into Boat Harbour. This old farm should be maintained as wildlife habitat, as was previously discussed. This will require treatments (mowing, burning, crushing), that will maintain the domination by grasses and other early successional vegetation. The apple trees should be maintained in a healthy and productive condition.

Stand 58

This stand has developed on previously cleaned land. There are a range of ages in the stand, from newly established seedlings, softwood thickets in sapling stage, young pole stands, mature poplar, and scattered relict white pines. There is an old orchard in the western part of the stand where it meets Stand 59, which should be rehabilitated. Light harvesting is recommended for this stand, to be conducted in such a way that the wildlife habitat value of the area is maintained. There is an opportunity to create small openings, up to .2 ha, by clearcutting patches of poplars. This will benefit many species of birds and mammals. This stand must be managed in conjunction with other stands in the parcel if real wildlife habitat benefits are to be achieved.

Stand 59

This is a field which is still being mowed to produce hay. The field borders on Stand 58, which is overgrown cultivated land and contains an old orchard. These stands, together with Stand 54 and 57, are heavily used by wildlife of all types. As part of the plan to manage these stands, as wildlife habitat, it is recommended that this field continue to be mowed. This will maintain the gradient of all successional types from field to mature forest, in this southern portion of the property.

BOAT HARBOUR WEST IR 37, WESTERN PORTION

Overview

Although this parcel was part of the previously managed forest, only a small percentage of the area has been worked on to this point. The area is mostly farmland reverted to sixty year old forest. The main feature is a stand of white ash which was released several years ago by felling the overstory of poplar, which was not extracted. The response of the ash was excellent, as was the development of a new crop of ash in the regeneration. White ash is prominent in this parcel, and it's management is the focus of activity in this area.

Stand 60

This is a stand of mature white spruce, red spruce, and balsam fir, and poplar which developed on abandoned farmland. White ash has established itself in gaps, especially amongst white spruce. Ash is now quite abundant, is younger and smaller than the softwoods. The ash is still in the stage of growing up through holes in the canopy. In the process, it is developing straight, clean boles.

The emphasis of management in this stand is on ash, wherever ash occurs. Where appropriate crop tree management techniques should be applied to the ash, but very carefully. The objective is to enhance, if possible, the process which has been occurring naturally over the past thirty years. Controlled release should improve the "value" increment, which is a function of volume and stem quality.

There are very few mature ash trees which have provided a seed source to this point. As a younger generation is released and develops larger crowns, the seed source should improve. A light harvest throughout the stand will create opportunities for the establishment of a new crop of ash It should be possible to enjoy the benefits of high quality ash production for many decades on the route to the Acadian Forest type.

Stand 61

This is a mature softwood stand dominated by red and white spruce. The northern part is dominated by poplar. A small area of this was cleared of residuals in 1992, and planted with red spruce in 1993. Natural regeneration of poplar has completely dominated the site, and the planted red spruce are doing very poorly - most did not survive. Red spruce which are raised in nurseries and planted are not very

tolerant of shade. A light harvest the remainder of this stand is recommended for the first harvesting period.

Stand 62

This is a hardwood stand which was converted from poplar to white ash. Ten years ago, the mature poplar overstory was felled. No wood was extracted. White ash was present in the lower part of the canopy, and also as seedlings and saplings in the understory. The white ash of all ages responded very well to this release. As a result, the stand is now reasonably well stocked with high value stems. There are two distinct age classes. A small area of young white ash was released from overstory competition in 1992.

No further work is recommended for this stand at this time, as the basal area is quite low. The status of the understory, white ash, and any trends in regeneration should be monitored, to help devise a future course of action for this stand. Light pre-commercial thinning of the understory will be warranted once the small white ash have developed straight, clean boles.

Stand 63

This is a mature stand of white spruce, hemlock, and balsam fir, with lesser amounts of poplar, red maple, white and yellow birch, red spruce, and white pine. Substantial mortality is beginning to occur throughout the stand, but particularly in the southern part where fir is more prevalent. It is recommended that this stand receive a light harvest in the current period. Twenty to thirty percent of the volume should be removed; those trees selected for cutting should release the crowns of healthy, young red spruce and yellow birch wherever possible. There is an opportunity here for repeated light harvests to dramatically improve the average tree quality over time.

APPENDICES

APPENDIX I
LIST OF REFERENCE MATERIALS

Guide to Wildlife Tree Management in New England Northern Hardwoods. USDA Forest Service, General Technical Report NE- 118.

Woodlot Roads Stream Crossings. Cooperation Agreement for Forestry Development 1991 - 1995. Canada / Nova Scotia, 1995.

Watercourse Buffer Zone Guidelines for Crown Land Forestry Activities. New Brunswick Department of Natural Resources and Energy, 1966.

Riparian Forest Buffers. USDA Forest Service, NA - PR - 07 - 91.

Wetlands and Woodlots. North American Wetlands Conservation Council (Canada). Issues Paper, No. 1995 - 1.

Nova Scotia Wet Places Series. Eastern Habitat Joint Venture. 1997.

A Guide to Trout and Salmon Habitat for Loggers. Department of Fisheries and Oceans Canada, 1982.

Nova Scotia Wildlife Habitat Conservation Manual. Nova Scotia Land Use Committee, 1994.

Road Construction Manual, First Nations Forestry Association, McKay and Hudson, 1998.

APPENDIX II
WATERCOURSE BUFFER ZONE GUIDELINES

Riparian buffer zones must be maintained adjacent to all bodies of water and water courses. The extent and protection of these buffer zones must be adequate to serve all the functions of such zones in primary forests. These functions include, but are not limited to, control of erosion of soil and organic debris;

- control of stream sedimentation;
- stabilization of surface and ground water flow fluctuations;
- stabilization of water temperatures;
- provision of organic debris (including large diameter wood) for the aquatic habitat; and provision of habitat (shelter, water, food, travel corridors, etc.) for many species of plants and animals.

Minimum standards which must be met in order to assure that these functions are maintained include the width of the buffer zones and the activities which are permitted within the buffer zones.

A) Width of the buffer zone. Riparian buffer zones greater than 30 meters wide are required on all sides of all bodies of water and all watercourses with an average width greater than 1 meter. On watercourses with an average width of 1 meter or less, buffer zones may be reduced to as little as 15 meters wide. These buffer zones must reflect changes in forest condition, slope, erosion and windthrow hazard (see Appendix) along the length of the watercourse. Where the variation in these conditions is not delineated, the applied width should equal the maximum determined for the range of objectives identified for the buffer. Factor modifying required buffer zone widths and the required widths for each case follow. Only those objectives for which it is proven conclusively that there is no potential for their realization may be omitted from consideration in determining riparian buffer zone width. Where more than one value or condition is present, the greatest of their required buffer zone widths shall be taken as the standard.

1) Slopes: 6-10%=30 m buffer
>10% = 60m buffer
>20% = site specific, minimum 100 meters.

2) Erosion hazard: moderate=30m buffer
high=60m buffer
3) Windthrow hazard: moderate/high=30m buffer

4) Government designated watersheds = as required by the appropriate authority

5) Waterfowl production areas with a GOLET score of 70-84=60m buffer; a GOLET score over 85=100m buffer

6) Actual wildlife travel corridors and moose calving areas:
on brooks, streams, bogs, ponds= 50 m buffer
on rivers and lakes=100m buffer

7) Recreational waters: high use=30-60m
govt. listed =30-100m

B) Forestry activities within riparian buffer zones. Activities must be in accordance with the following standards:

1) All riparian buffer zones must include an area, adjacent the watercourse edge, where no logging is done. This "no logging zone" shall be one third of the width of the buffer zone (alt:10 meters); no machinery or tracking is permitted within this area (except at stream crossings), and no timber products may be removed.

2) Forestry activities in the balance of the watercourse buffer zones also must maintain and/or enhance the ability of the buffer zone to provide its "natural" functions.

3) Exposure of mineral soils resulting from forestry operations is not permitted within 30 meters of the bank of the watercourse unless it can be shown to be necessary for buffer zone restoration purposes, and that it will not adversely affect water quality or aquatic habitat. Exposure of mineral soil in the remainder of the buffer zone must be minimal and must not adversely affect water quality or aquatic habitat.

4) An abundance of dead wood, standing and fallen, of the full range of sizes available, must remain within the entire riparian buffer zone after any harvesting activity.

5) Riparian buffer zones must be managed so as to maintain or increase existing crown closure and wind firmness.

6) Trees within the riparian buffer zone must be felled away from water courses.

7) No primary forest product shall be piled within 30 meters of a natural watercourse.

8) No vehicle shall travel through, or in , an natural watercourse except for approved road building purposes; exposed mineral soil must be stabilized immediately.

9) With the exception of stream crossings, no ruts, mineral soil exposure, compaction, or root damage may occur in the buffer zone. At stream crossings any exposed mineral soil must be restored to appropriate natural vegetation immediately.

10) Forest and logging roads should not be located in watercourse buffer zones except at approved watercourse crossings. Road right-of -ways built parallel to a watercourse must have a treed buffer zone greater than 30 meters in width.

11) Vernal pools, or seasonal ponds, must be protected as follows:- No motorized vehicles in the depression itself- Slash and siltation must be kept out.- No ruts within a 30 meter buffer area.

APPENDIX III
AREAS SILVICULTURALLY TREATED 1989-1997

Treatment Number	Stand Number	Year	Treatment	Area (ha)
1	26	1994	Shelterwood	4.6
2	27	1994	Regeneration Release	1.0
3	28	1990	Merchantable Thinning	0.8
4	30	1991	Plantation	1.7
5	30	1991	Plantation	1.0
6	24	1997	Shelterwood	1.3
7	31	1997	Shelterwood	0.7
8	31	1990	Shelterwood	0.6
9	31	1997	Shelterwood	0.5
10	31	1990	~~Merchantable Thinning~~ SHW	4.7
11	31	1997	Shelterwood	0.8
12	34	1995	Shelterwood	2.5
13	34	1989	Remnant Removal	1.5
14	32	1990	~~Merchantable Thinning~~ SHW	2.0
15	33	1995	Shelterwood	4.2
16	33	1996	Shelterwood	0.6
17	32	1996	Precommercial Thinning	0.5
18	43	1995	Shelterwood	3.1

Front part in 1994

19	42	1997	Precommercial Thinning	0.4
20	42	1995	Merchantable Thinning	0.5
21	40	1995	Shelterwood	2.4
22	47	1990	Merchantable Thinning	6.2
23	46	1992	Precommercial Thinning	0.7
24	48	1996	Shelterwood	0.5
25	48	1990	Merchantable Thinning	0.8
26	48	1990	Merchantable Thinning	0.4
27	50	1990	Merchantable Thinning	0.3
28	49	1991	Plantation	2.8
29	50	1990	Precommercial Thinning	0.3
30	50	1990	Regeneration Release	1.1
31	50	1995	Shelterwood	3.4
32	50	1991	Remnant removal	1.5
33	51	1994	Shelterwood	0.6
34	51	1995	Shelterwood	2.9
35	51	1997	Shelterwood	0.8
36	52	1991	Merchantable Thinning	1.2
37	52	1997	Precommercial Thinning	0.3
38	52	1996	Merchantable Thinning	1.5
39	6	1993	Merchantable Thinning	1.2
40	6	1993	Merchantable Thinning	2.2
41	6	1995	Shelterwood	1.1
42	N/A	1995	Shelterwood	2.3
43	60	1994	Shelterwood	1.0

44	60	1994	Shelterwood	0.6
45	61	1992	Remnant removal	0.3
46	62	1992	Regeneration Release	0.3
47	45	1997	Underplanting	1.0
48	47	1990	Plantation	0.4