INTERPRETIVE PLAN

BOTTOM BROOK DEMONSTRATION FOREST

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INTRODUCTION

The Bottom Brook Arboretum was established in 1967 by the Canadian Forest Service to provide a demonstration of the growth of native and introduced trees growing in typical forest conditions in western Newfoundland. It is managed co-operatively by the Canadian Forest Service, the Newfoundland Forest Service, and College of the North Atlantic.

In February of 1995 the Newfoundland Forest Service (NFS) drafted a management plan proposing a demonstration forest on the surrounding site south of the Trans-Canada Highway, an area of 1418 ha.

The Bottom Brook valley was selected because of its suitability in developing interpretive themes. These attributes include location in the Western Newfoundland Model Forest and the Newfoundland Pine Marten study area, the Bottom Brook Arboretum, a commercial black spruce plantation, diversity of flora and fauna, proximity to a number of research projects and multiple domestic and recreational uses.

The Bottom Brook Demonstration Forest is located in the West Coast Lowlands physiographic region with soils of glacial sand and gravel on a subhorizonal carboniferous rock base. Slopes range form 0-50% with the majority of the area on slopes of 15-25%. Elevations range from 2m-150m above sea level.

Of the 1418 ha, 1,150 ha (81%) is classified under the Newfoundland Forest Inventory as productive forest land, 212 ha (15%) non-productive forest land, 12 ha (1%) of water, and 43 ha (3%) of developed land (hydro lines, hydro station and gravel pit).

SCOPE OF WORK

As per schedule "A" of the contract, deliverables are:

1. A detailed interpretive master plan of trails in and around the arboretum and First Pond areas.

2. A conceptual master plan of interpretive and recreational trails over the extent of the Bottom Brook Demonstration Forest.

3. Supporting documentation including recommendations, interpretive story board and program.

OBJECTIVES

1. To develop a master plan of interpretive trails within the Bottom Brook Demonstration Forest.

2. To develop a coherent interpretive theme based on integrated resource management.

3. To produce a story board of interpretive features that are connected by the routing of the interpretive trail.

4. To assess signage needs and recommend cost effective options.

5. To write the text of a brochure for use on the interpretive trail.

6. To assess interpretive potential of the entire area and recommend management options to enhance interpretive potential.

7. To provide a variety of trail length and difficulty.

8. To demonstrate variety of land use.

9. To demonstrate the consequences of various land management strategies where possible over time.

10. To provide access to and interpretation of the forest landscape that emphasises multiple uses and understandings.

11. To give meaning to forest landscape features through analogy to common experience.

12. To provide the greatest interpretive detail in and around the arboretum and First Pond areas on trails under 5 km in length.

13. To solicit input from various forest management sectors regarding the interpretive program as time and a availability permits.

THEMATIC INTRODUCTION

Themes for the Bottom Brook Demonstration Forest arise form objectives of the Newfoundland Forest Service and the Western Newfoundland Model Forest as well as opportunities and limitations of the site. The major pedagogic themes for the facility are integrated forest management and sustainable forest management. Some suggested sub-themes are outlined below.

There are a variety of legitimate uses for the forest.
A variety of uses of the forest can be observed on the site. The most visually significant of these is the plantation of black spruce. Domestic wood cutting, snowmobiling, fishing, hunting, canoeing and other recreational uses are common on the site. Hydro transmission lines and the Trans Canada highway are also visible from the arboretum site.

There are different ways of managing the forest.

Management for fibre.
Several of these management options are demonstrated on the arboretum site or can be viewed from the site. These include prescribed burn, plantation, herbicide treatment, pruning, thinning

Management for other uses.
Limited opportunities are available at present to demonstrate concrete examples of direct management for other uses. Views to "unmanaged" areas of the forest and over mature stands offer opportunities to interpret management for fibre. Standing residual hardwoods, in addition to a considerable domestic cutting problem on the Demonstration Forest site, raises the subject of managing fibre resources in concert with domestic cutting.

Conflict
Some of these ways of using and managing the forest can be in conflict while others are not in conflict. Pre-commercial thinning or plantations which do not eliminate hardwoods completely from the stand offer potential browse for moose while maintaining the commercial viability of the stand for fibre. Domestic cutting of residual hardwoods as opposed to direct and indirect interference with the pre-commercial softwood stands. Buffering of water bodies (although probably incidental on this site), is a management option to protect water quality. Although this activity may be in conflict with commercial fibre harvesting, it is necessary to protect a valuable resource. How can such conflicts be resolved?

What is Integrated Forest Management?
Integrated Forest Management is a process by which multiple uses and interests in the land are managed in concert with each other through partnership, public participation and conflict resolution. Interpretation of this concept will be undertaken in the light of potential conflicts.

What is Sustainability?
"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own need." (The Brundtland Report, 1987)
To meet the needs of the future some level of ecosystem health must be maintained.

Who or what is management serving?
This question is raised primarily to highlight the importance of public participation in the IRM process. If the forest is a public resource and its management is to serve that public, then the public should have a way of influencing the management of the resource. Secondarily, this question raises humankind's relationship to the forest in that the eco-system has significance beyond commercial exploitation. Management is goal oriented, therefore the formulation of those goals is critical to the results on the land.

BOTTOM BROOK ARBORETUM

Site Description

The original arboretum site was cleared to 12 ha in 1966. An additional 10 ha was cleared to the south for arboretum expansion that was not used to date and is comprised of regenerating hardwoods and softwoods 10 years old. The main arboretum site is nearly flat and is comprised largely of 30 m planting blocks. A list of species is provided in Appendix II.

The trail was sited and flagged in co-operation with the Newfoundland Forest Service, and construction has been undertaken this season (1995) with clearing of the trail width and height, and placement of granular material for the tread. Mapping of the trail can be found in Figure I. The trail is 1.4 km long spending approximately 50% of its time at the periphery of the planting blocks. Regenerating stands and views to the larger site present good interpretive opportunities.

Some regeneration has taken place in the cut lines between species blocks. Efforts are underway to establish accessibility for user access and for management activities. Where possible, interpretive resources within the cut-line are being retained.

Arboretum Interpretive Themes

Themes for the arboretum arise out of stated objectives for the arboretum, objectives of the Newfoundland Forest Service and from objectives and interpretive themes for the Western Newfoundland Model Forest. Not all of these objectives can be represented because of site limitations and the limitation of the user in understanding and retaining information. The "saturation point" for information is quite low.

The Arboretum Interpretive Trail is treated as the primary interpretive program on the Bottom Brook Demonstration Forest. At present it is the only good opportunity to have a short, easily accessible trail on which to address interpretive themes. Road access, parking, the ongoing construction of the trail, and relationship to the rest of the site dictate that the Arboretum site is central to the larger demonstration forest site. For this reason it is necessary to address the significant, conceptual themes on this trail, as well as more direct arboretum related themes. Major pedagogic themes for the arboretum are:

1. The purpose of this and similar arboretums is to observe the performance of exotic (non-native) species with commercial potential for western Newfoundland.

2. The species collected in the arboretum have some interesting attributes.

3. Introduction of integrated and sustainable forest management.

What is an arboretum?

An arboretum is a collection of trees and shrubs assembled for education and scientific purposes.

What is the Bottom Brook Arboretum?

The Bottom Brook Arboretum was established in 1967 by the Canadian Forest Service to provide a demonstration of the growth of native and introduced trees in typical forest conditions in western Newfoundland. It is managed co-operatively by the Canadian Forest Service, the Newfoundland Forest Service and the College of the North Atlantic.

Why was it established?

It was established to test introduced or exotic tree species in Newfoundland to see if other species of trees will grow faster or larger than our local ones.

Why are these arboretum species significant?

Many of these species will have an interest to the general public from a landscape point of view. Forest Managers are doing innovative research to support the economic viability of the paper industry, which has significant economic impact in western Newfoundland. The age and size of various species under these growing conditions raises climate and the time dimension in forest management. Various species raises the issue of alternate lumber species, with potential economic significance.

Local names for trees and shrubs are important

Many local names exist for trees and shrubs such a var (balsam fir), witch hazel (yellow birch) or wild pear (service berry). Local names are a useful in that they reinforce the validity of existing knowledge about the forest, rather than making such knowledge exclusive to academics or professionals. The need for standard names for communication purposes can be elucidated here; that scientific names are designed to make communication easier not more difficult as is often the perception of the general public.

Multiple Use

Multiple use raises the question of how can these uses be reconciled for the present and for the future. These ideas can be addressed directly only at one stop, but are underlying all activities within the demonstration forest.

Brochure Text for Interpretive Stops and Thematic Storyboard

Proposed interpretive brochure text is included below with a story board of interpretive themes at each stop *in italics.*

1. trail head

Welcome to the Bottom Brook Arboretum Interpretive Trail. This trail is 1.4km long and will take about 45 minutes to walk. An Arboretum is a collection of trees and shrubs for

education. Bottom Brook Arboretum was established in 1967 to see if some trees from other places grew better than some of our Newfoundland trees.

Name of Facility; length of trail; time to complete; definition of an arboretum; history; and purpose.

2. burnt stump

Fire is sometimes used to improve conditions for establishment and growth of new trees. Look at the charred inside surface of this stump. After the arboretum was cleared in 1964 the site debris was burnt. Planting of the arboretum began in 1969.

Fire as a management tool; history of the arboretum.

3. larch

Our native larch or tamarack (Larix laricina), commonly called juniper in Newfoundland, can bee seen at the yellow stake ahead. These trees were planted in 1969. Compare them to the Japanese larch (Larix kaempferi) to their left planted at the same time. Under these conditions the Japanese larch are substantially larger

Potential of Japanese larch as a lumber species; intra-genus differences in growth,

4. veitchii fir

These veitchii fir (Abies veitchii) were planted in 1981. They have similar characteristics to our native fir (Abies balsamea) but may not be susceptible to a serious insect pest, balsam woolly aphid.

Potential of veitchii fir for woolly aphid resistance; introduction to a significant forest pest.

5. succession

After this site was cleared and burnt in 1964, most areas were planted with demonstration species, but the surrounding area regenerated naturally to mixed hardwoods and herbaceous plants known as pioneers. These species are the first to move into a disturbed site. In time other plants will move in as the pioneer species make it a better place to live.

succession and natural regeneration; comparison of the manage vs "unmanaged" forests.

6. Christmas trees

What happened here? Christmas tree robbers stole trees from here. Some of the remaining branches grew up to form these multi-stem Scots pine (Pinus syslvestris). Scots Pine and Balsam Fir have traditionally been an important christmas tree species in Canada. Christmas tree farming is beginning to receive some attention in Newfoundland.

theft and vandalism, reaction of some species to topping. Christmas tree species.

7. blister rust

These skeleton trees were probable killed by a disease, white pine blister rust, caused by a fungus. These trees are western white pine (Pinus monticola) which is native to British Columbia. White Pine Blister Rust also affects one of the two Newfoundland pines, White Pine (Pinus strobus). Examples of the two species of native pine are found further along the trail.

introduction to white pine blister rust; intra-genus specificity of disease; Introduction to native pines

8. douglas fir

These douglas fir (Pseudotsuga menziesii) were planted in 1967. Douglas fir is the most important lumber species in North America. Native to the Rocky Mountains and Pacific coast, specimens 65m and higher have been observed. In our climate, under these conditions, growth of douglas fir has been slow.

introduction to douglas fir (Pseudotsuga menziesii) and its significance economically; climatic effects.

9. red pine

This stand of red pine (Pinus resinosa) was planted in 1969. Notice the thick layer of needles below this stand. Few other plants are able to grow here. Notice the lone white pine that has grown from seed at the yellow marker. These two species were important lumber species in Newfoundland history. Their numbers have been in decline due to logging, and in the case of white pine, disease.

red pine; allelopathy; history of pine in Newfoundland;

10. red pine look-off

This forest has been used for thousands of years for lumber, firewood, fresh water, hunting, and berry picking. In more recent years hydro transmission, transportation and harvesting for pulp and paper have had significant impacts on the forest landscape.

For the forest to be able to provide for future generations, we must plan how to use it wisely. This is sustainable use. We should not destroy something on which we depend for survival, and social and economic well being.

Multiple use; sustainability

11. white pine

Several white pine can be seen on the right. Notice the ooze from the White Pine Blister Rust lesions on the trunks. When these lesions become large enough to encircle the trunk the tree will die. Some trees seem to tolerate some level of disease.

disease stages of white pine blister rust; tolerance of disease.

12. yellow/white birch

This stand of trees is as old as the arboretum and was allowed to regenerate naturally. Several white birch and yellow birch can be found here. Young bark of both species is reddish and their mature heights are similar at about 20m.

Mature bark of white birch is chalky white to cream coloured. Leaves taper to a sharp tip, with a broadly rounded or wedge-shaped base. White birch is our most common hardwood species in Newfoundland.

The yellow birch has a more yellow bark as it matures. Older bark is darker and broken into plate-like scales. Leaves taper more gradually from about the middle of the leaf with rounded or heart-shaped bases. Its twigs taste like wintergreen. Sometimes yellow birch is called "witch hazel" in Newfoundland.

identification of white (B. papyrifira) and yellow birch (B. lutea); concept of distinguishing characteristics.

13. glaciation

The gravels revealed here are inhospitable for most plant life. There are few nutrients, and little ability to hold water. Changes occur slowly at first, with primitive plants laying the foundation for other species to move in later by providing for nutrients and water. Notice the whitish pearly everlasting (Anaphalis margaritacea), which is often one of the first flowering plants to establish on dry sites. It is called pearly everlasting for its ability to retain its coloration when dried. Glaciation of Newfoundland, thousands of years ago caused this process of primary succession to occur on a grand scale.

primary succession; glaciation, identification of pearly everlasting

14. eastern/western cedar

These eastern white cedar (Thuja occidentalis) and western red cedar (Thuja plicata) were planted in 1971. The eastern white cedar has grown much better under these conditions than its western counter part. It is these comparative results that the arboretum was established to determine.

introduction to white (T. occidentalis) and western cedar (T. plicata); effect species and climate; purpose of the arboretum.

15. provenance

These Norway Spruce came from different parts of europe and were planted in 1970-71. Do you notice any differences between these 5 populations of trees? Where a particular population of trees comes from is called its provenance.

Intra-species variability in form and vigour; definition of provenance.

16. weeping birch

This weeping birch (Betula verrucosa) from Germany was planted in 1969 has grown as well as any tree in the arboretum. Perhaps it could be used as a landscape or lumber tree in Newfoundland. Compare it to two different japanese birch ahead on the trail.

Introduction to exotic birches; possible landscape or lumber uses for exotic trees; intra-genus comparison

17. trail end

Thank you for using the Bottom Brook Arboretum. Please feel free to rest in the dappled shade here by the larches. Your use of the forest to walk, to be in contact with nature, or to learn is important. The other ways you use the forest are important to you as well whether you hunt, fish, watch birds or cut firewood.
Make it known that you want forests for the future.
Participate in decisions about your forests.

cooling effect of the forest; aesthetic value; sustainability and public participation and ownership.

Arboretum Signage

Signage for the Bottom Brook Arboretum consists of directional, informational, Interpretive and regulatory components. Often in practice these components are combined on modular signs.

Directional Signage

Directional signage consists of direction arrows and map signs. Directional arrows need to be erected at intersections along the trail. As the trail tread is to be constructed of granular material along its length, there will be only minimal confusion direction-finding until the trail system begins to grow. At this time directional arrows will be required to identify routing to other trails.

Trail and trail system mapping is desirable at the trail head. Map signs at the beginning of the trail tend to encourage the user to landmark before setting out on the trail, making the experience more convenient and pleasant.

Informational Signage

Informational signage, apart from that which is interpretive, describes or identifies the facility or features of the site. The main informational requirement for the arboretum is at the trail head. The facility name, trail name, and length and approximate time to walk are needed. Other trails, facilities or features may be described. A brief description and history of the Bottom Brook Arboretum and Demonstration forest is desirable. Here informational signage has taken on somewhat of and interpretive role, but is discussed here because of its general informational, rather than thematic, nature.

In addition, the original identification posts and tags for the species blocks in the arboretum are in extremely poor condition or are missing. All blocks should be identified for orderly data-keeping and identification for users.

Interpretive Signage

Interpretive signage for the arboretum includes numbered stop markers for the self guided trail, and two interpretive panels at the red pine look-off. Due to the expense of producing interpretive panels, they are limited to this one stop and are designed to introduce themes of the larger demonstration forest to the user of the arboretum trail. As the trail system is developed, these panels will introduce the resources and opportunities that will exist along the trails.

Marker posts need to be installed at the interpretive stops along the trail. These posts should be numbered in agreement with the brochure and have a characteristic colour band. A detail is provided in Appendix I, using larch posts.

The interpretive panels each address two significant sub-themes of the larger demonstration forest. To the east, a view of the Corner Brook Pulp and paper black spruce plantation (and the surrounding "natural" forest) presents an opportunity to interpret this significant form of forest management. A total area of 386.5 ha was cleared of 2-3m second growth balsam fir 24 years old. Balsam woolly aphid infestation on this fir was serious resulting in poor growth and productivity. Following clearing with brush-saw or roller blade, a prescribed burn was undertaken using a Helitorch, suspended below a helicopter. The site was subsequently planted with black spruce in 1984-85. A herbicide was applied in 1986 to reduce competition from herbaceous species.

From the southeast to the west a panorama of forest uses can be observed. These multiple forest uses and how they can be integrated is the subject of the second interpretive panel. Some of the uses evident are: transportation, hydro transmission, logging, cabins, habitat, hunting, fishing, boating and berry-picking. The multitude of possible uses for the Bottom Brook valley raises the question: how can these uses exist side by side or on the same site without exhausting the future potential for any one use? An understandable answer to this question has three components.

1. Co-operation. Agencies or interested groups or individuals must be willing to work together. By participating in a co-operative process, is the only way to have ones interests represented.

2. Conflict Resolution. Conflict is inevitable when multiple interested parties work together. There needs to be a way to work out resource use conflicts when they arise in the same way we resolve social conflicts with litigation or alternate conflict resolution processes such as mediation or arbitration. Do we need a land use mediation or arbitration court?

3. Looking Towards the Future. To mange the resources of the landscape so that they are not exhausted for any one use, there is a need to look to the future. We need to take care of the resources.

Regulatory Signage

Regulatory signage is used to convey regulations which apply to the user. Generally, it is wise to limit this type of signage wherever possible and address issues through education and interpretive programs or through design.. Due to the serious extent and nature of the domestic cutting practices in the area "No Cutting" signs are needed immediately. The generic signs that have been used in the area are a satisfactory short term solution, although greater coverage is needed. Specific Bottom Brook Demonstration Forest signs are desirable to assert the facilities identity on the land.

Additional regulatory signs may be needed specific to the activities on the site. For instance it may be desirable to attempt to regulate snowmobile traffic in the arboretum, should it become a problem.

FIRST POND AREA

Site Description

The second study area for this project is the area from first pond to the arboretum. There is a desire to expand the interpretive trail system to this area to be able to address a wider range of appropriate interpretation. See Figure II for mapping of this area.

The forest surrounding the arboretum site is second growth fir regenerating from the logging activities of the 1960's (bF2). An area directly south of the arboretum was cleared in 1985 for arboretum expansion and has yet to be used (bF112). It has regenerated with significant hardwood composition and abundant raspberries, and some blueberries. This area has excellent opportunities to demonstrate alternate management techniques and alternate uses over time.

A 386.5 ha plantation of black spruce planted by Corner Brook Pulp and Paper in 1985 is found largely to the east of our area of interest. The southwest corner of this plantation protrudes into the site, and provides an interesting contrast in appearance and management. The road that bisects the site is Bottom Brook Road. It is a class A standard woods road passable but rough, that runs 25 km inland. The bridge at Caribou Falls, 10 km in, is not passable in vehicle. Alders encroach on a considerable part of its length.

South of Bottom Brook Road the top of the slope is occupied by second growth fir (bF2) a third the way down the slope. Below this and running to the beach, is over mature hardwoods-softwoods (wBbF).

The forest is quite diverse across the First Pond site. Excellent specimens and stands are found, a complete list of species identified during field work is found in Appendix II. Of particular interest is a regenerating stand of white pine (Pinus strobus) below the road, remnant large white pine both below road and above, regenerating hardwoods on the 1985 cut over as opportunities for management. and the good stands of raspberries (Rubus ideas).

Proposed Themes for the First Pond Trail

The dominant pedagogic theme for the Bottom Brook Demonstration Forest is integrated resource management. Of particular interest and most suitable for the site are the sub-themes of integrated forest management and sustainable forest management.

The BBDF will be administered as a working forest, not a preserve. As harvesting of -timber, wildlife and fish will be permitted at levels as dictated by sustainable IRM principles, sustainable management and integrated forest management as major pedagogic themes need to be addressed.

Integrated forest management is based on the idea that there should be shared decision making, a high degree of coordination and cooperation, and the recognition of the legitimacy of multiple interests and the need for conflict resolution in forest management and planning.

Sustainable forest management seeks to meet the needs of the present without compromising the ability of future generations to meet their needs. The forest systems need to be sustained rather than exploited in order that they may continue to sustain humankind.

Integrated Forest Management Themes

Conflicts can arise between interested parties.

The Newfoundland Pine Marten habitat issue raises a clear conflict. It is assumed that large tracts of mature and over-mature forest is required to support significant populations. Much of this wood is desirable as fibre for paper production.

Co-ordination and Partnership can help resolve conflicts.

A good deal of domestic cutting activity can be observed, while at the same time residual birch. Co-ordination between commercial and domestic operators and land managers could reduce wastage of wood, by both parties.

Alternate management for the future.

Traditionally the forests of western Newfoundland have been managed for fibre for the pulp and paper production. We need to manage the forest with an eye to a future in which other forest products are economically significant and integrate these uses into management plans.
e.g. Management for hardwoods for lumber; management of hardwoods for browse; management for raspberry production; management for Christmas tree production; management of softwoods for lumber and firewood.

Landscaping with native trees and shrubs.

The trees and shrubs of western Newfoundland have an ecological fit here. There is value in providing these species as part of gardens and built landscapes. Not only do they grow better, but often provide additional benefits by providing habitat and generally require fewer inputs of energy and chemicals than alternatives.

Forest Ownership.

The forest is largely owned by the people. How can we as individuals help decide how the forest should be used. Commercial activities on the site, particularly the black spruce plantation raises questions in peoples mind due to the effect on the visual landscape. Is this the way we should be using or forests? How else should we use the forests and who should decide.

Sustainable Forest Management Themes

White Pine Management

Regenerating white pine stands offer opportunities to examine possibilities for management of white pine as a commercial lumber species. White pine is protected in Newfoundland due to its scarcity as a result of the effects of white pine blister rust and historic logging practices. Additional and unique opportunities also exist to discuss the significance of disease process and the population's ability to withstand endemic disease and to develop resistance.

Habitat

Part of sustainable development is the provision of habitat, at least for species that humankind uses directly. The importance of habitat specificity and connection between habitat sites should be addressed. Both waterfowl and pine marten habitat interpretive sites are found.

History and the effect of technology

Evidence of the historic logging activity is present in the form of old haul roads and large remnant stumps. Relate history of horse-logging with buck saws to modern-day domestic cutters with chainsaws and snow mobiles. Can the forest support wasteful or accelerated use if the resource is to be intact for future generations?

Proposed Use

Proposed Trail Location

The route of the proposed interpretive and recreational trail is found on figure II. The trail route was selected based on the interpretive resources, trail suitability of the route, and development of a cohesive trail system. Connection at the edge of the fire break allows good connections across the road to the cove adjacent to the gravel pit. should this pit be developed. This cove has an old road that may be upgraded to allow access with canoes. Passing down this slope between the fire break and the cut over the is an opportunity to have a cross slope trail to access the ridge and interpretive opportunities across the slope.

Below the road the trail runs west climbing the ridge before dropping back down to First Pond. A diverse plant population is encountered over this length of trail. The cove itself is rich in species.

At the pond in the east the trail travels up an old haul road that passes through forest with large specimens of several species, rising up in the young fir that travel to the road. From the road we

travel up the hill again at first close to the black spruce plantation, and continuing up through the cut over to the red pine look off at the arboretum.

Proposed Management Options

To enhance the interpretive potential of the site several management options are suggested.

1. Management for hardwoods for lumber and firewood. An area is proposed on the 1985 cut-over to thin for the production of maple and birch. Little work has been done in this area in western Newfoundland.

2. Management of raspberries for domestic consumption. Not only does such a demonstration provide interpretive potential but is a draw to the facility and promotes multiple uses on the site.

3. Demonstration of species that are native to western Newfoundland that have potential for landscape use. Some of these species can be found *in situ* or can be planted in a naturalistic manner. Candidate species are listed in appendix II.

4. Management for white pine. A regenerating stand of white pine offers an ability to manage this stand over time and to see the progression and levels of resistance to white pine blister rust.

First Pond Trail Interpretive Stops

The following interpretive stops have been selected and fall along the interpretive trail.

Thinned regeneration vs unthinned
Erosion on old fire break
Management for hardwoods
Management for berry production
Management for Christmas tree production
Primary and secondary management for wildlife
Wildlife/habitat
Moose; caribou; osprey; salmonids
Wildlife/habitat
Waterfowl
20 year fir regeneration
80 year hardwood/softwood stand ("over mature")
Regenerating white pine stand
Old haul road
Red Pine Look off

DEMONSTRATION FOREST BOUNDARY

Site Description

The Bottom Brook Demonstration Forest is 1,418 ha extending approximately 10 km along the north side of Bottom Brook Valley. Bottom Brook Road runs the length of the site and provides access 25 km inland. As with the immediate First Pond area, a variety of forest types exists across the site with stands which pre-date the 1960's harvesting, second growth form that harvest, and a 1985 CBP&P plantation predominating. Bog and scrub accounts for approximately 15% of the site. A history of significant and varied logging and management activity on the site adds to its richness as an educational, demonstration and interpretive potential. Significant components of this history include: 19th century logging of large white pine, fir and spruce for domestic and export markets, 1964 salvage cut by Bowaters (Nfld) following hemlock looper infestation, 1984-85 species conversion of woolly aphid infested second growth fir to black spruce, 1984 clearcut harvest at Jones Road/Trout Brook, and domestic fuel wood cutting, especially in recent years.

A systematic field survey of wildlife using the site has not been undertaken. Mammals typical to this area are: moose, caribou, black bear, fox, lynx, Newfoundland pine marten, otter, muskrat, weasel, snowshoe hare, red squirrel, chipmunk, beaver, mice, shrew, and meadow vole. Moose, caribou, chipmunk, shrew, snowshoe hare and mink have been sighted or evident.

Osprey, Bald eagle, Goshawk, Merlin, Rugged-legged Hawk and Boreal and Northern owls frequent the area seasonally. Willow ptarmigan and ruffed grouse are resident. Common Loon, Canada Goose, American Bittern and several species of ducks appear seasonally. A marsh at the east end of First Pond is particularly rich in duck and geese.

Bottom Brook Demonstration Forest is part of the Newfoundland Pine Marten Study Area, making trapping and snaring for all species prohibited.

The Bottom Brook system within the demonstration forest boundaries consists of three ponds, First, Second, and Third Ponds, and one significant tributary, Caribou Brook. Bottom Brook and Caribou Brook are both scheduled rivers. Atlantic salmon, sea trout, resident trout, American smelt, American eel, stickleback and freshwater clams are found.

Interpretive Potential

Significant interpretive potential exists on the site because of its diversity of forest type, its diverse management history and its potential as a recreation site. Commercial management activities especially north of Bottom Brook Road provide examples of the commercial working forest. South of the road to the river system offers diversity of vegetation. The river system offers opportunities associated with history, habitat, fishing and water quality.

Bottom Brook Demonstration Forest is large enough to address themes related to the commercial working forest and recreation. Both resources are substantial. The integration of uses on the site at present and those adopted by the demonstration forest is one of the most important interpretive

opportunities. To interpret Integrated Resource Management on any one site a diversity of uses is required.

Proposed Linkages and Facilities

Two significant linkages are proposed south of Bottom Brook Road to complement the trails in the arboretum and First Pond Area. These are a trail running between the road and the river system to connect the First Pond Trail to Caribou Falls, and a canoe route from First Pond to Caribou Brook.

The proposed trail develops a system which connects the arboretum, First Pond trails, and the gravel pit access to the larger site. Such a trail is proposed largely as a recreational use, but its general and specific interpretive potential may lend itself to self-guided or guided interpretation.

The canoe route is also primarily proposed as recreational, at least in the short term. From the river system there are good vies of the forest and unequaled access to the rich riparian zone. The water course contains no structures, and consists of connecting steadies between the westerly three pond with gentle rapids and steadies on the upper portion. At present it is not known if the upper portion can generally be travelled at all times of the season.

Conceptual the site has a commercial working forests character north of Bottom Brook Road and a recreational character below the road. This approach provides good linkages and a greenway between the gravel pit and Caribou Brook. This approach is in agreement with the proposal of a trailer camping site at the gravel pit and a group camping facility at Caribou Brook in the Draft Bottom Brook Demonstration Forest Development Plan (1984).

To facilitate the uses discussed above more direct road access to the gravel pit would be desirable from near the entrance to the demonstration forest. A canoe launch is also proposed on an old road near this pit.

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APPENDIX I

SIGNAGE RECOMMENDATIONS

Directional signage should be provided at all intersections. A distinctive directional arrow with consistent colour should be used throughout the trail system. Details for three options used in other jurisdictions are offered. The compact proportions make these and similar arrows easy to mount on posts or as part of a modular sign.

Trail mapping should be included on signage at major intersections in the trail system. Screen printing affords a practical way of producing several signs for such locations. It is most cost effective to subcontract fabrication of the printing screens for printing in house where possible, so that extras signs may be fabricated as needed. Signs should be customized to provide orientation at each installation with "you are here arrows" and text where required.

Interpretive stops for self guided interpretive walks should be marked with numbered posts. A detail is provided using larch posts available from the from previous work at the arboretum.

"No Cutting" signs should be posted along the roads, on the beach at first pond, and on trails. Uncontrolled domestic cutting has been a problem on the site. A Bottom Brook Demonstration Forest "No Cutting" sign should be produced although NFS signs should be erected as an interim measure. Specific demonstration forest signs are important to assert an identity on the land.

An informational sign should be erected at the trail head of trails within the demonstration forest. It should include a history and description of the arboretum and demonstration forest, and a description of the interpretive trail and self-guided tour, including length, difficulty and duration of trails.

Details of a large sign boards suitable for interpretive panels is included.

If possible mount all signs on posts rather than trees. Although there may be more expense it projects an attitude or respect and creates institutional identity.

APPENDIX II

SPECIES LISTS

Arboretum Species

Species		Provenance
Spruce	Picea	
black spruce	P. mariana	Northumberland Co., NB
black spruce	P. mariana	Badger, NF
white spruce	P. glauca	Guysborough Co., NB
red spruce	P.rubens	Northumberland Co., NB
Englemann spruce	P. englemannii	Kamloops, BC
sitka spruce	P. sitchensis	Bella Coola, BC
sitka spruce	P. sitchensis	Terrace, BC
sitka spruce	P. sitchensis	Kitimat, BC
Norway spruce	P. abies	Vilppula, Finland
Norway spruce	P. abies	Maridalen, Norway
Norway spruce	P. abies	Senum, Norway
Norway spruce	P. abies	Region VIII/16, Germany
Serbian spruce	P. omorika	Knuthenborg, Denmark
Serbian spruce	P. omorika	Germany
oriental spruce	P. orientalis	Jutland, Denmark
Hondo spruce	P. jezoensis	Tokyo University Forest, Japan
Larch	Larix	
juniper/tamarck	L. laricina	Guysborough Co., NB
Japanese larch	L. kaempferi	Region VII, Germany
Japanese larch	L. kaempferi	Nagano, Honshu, Japan
European larch	L. decidua	Central Europe
European larch	L. decidua	Germany
Hemlock	Tsuga	
eastern hemlock	T. canadensis	Italy
Cedar	Thuja	
eastern white cedar	T. occidentalis	Central Europe
western red cedar	T. plicata	New Zealand

Birch	Betula	
weeping birch	B. verrucosa	Southern Germany
Japanese birch	B. ermannii	Hokkaido, Japan
Japanese birch	B. maximowicziana	Japan
Pine	Pinus	
red pine	P. resinosa	Petawawa, ON
jack pine	P. banksiana	Newcastle, NB
lodgepole pine	P. contorta	Long Beach, Wash.
western white pine	P. monticola	Solsqua-Sicamous, BC
Scots pine	P. sylvestris	Kuorevesi, Finland
Scots pine	P. sylvestris	Speymouth Forest, Scotland
Scots pine	P. sylvestris	Landvik, Norway
Scots pine	P. sylvestris	Hornes, Norway
Austrian pine	P. nigra var. austriaca	Sherwood Forest, U.K.
Austrian pine	P. nigra var. austriaca	Austria
Austrian pine	P. nigra var. austriaca	Central Europe
Austrian pine	P. nigra var. austriaca	Southern Europe
Douglasfir	Pseudotsuga	
Douglas fir	P. menziesii	Shushwap L. BC
Douglas fir	P. menziesii	Central Europe

Interpretive Species for First Pond Area

Interpretive programs often include species identification as part of their program. This is not a primary theme or objective of the BBDF. Species identification can contribute to larger themes of integrated forest management and sustainable forest management by providing context and a feeling of familiarity and conceptual ownership.

The species listed below have been encountered in the field work on the First Pond trail. In many instances outstanding specimens are found.

Inventory of species for identification interpretation:

Black ash (Fraxinus nigra)
mountain maple (Acer spicatum)
red maple (Acer rubrum)
lambskill (Kalmia angustafolia)

bog laurel (Kalmia polifolia)
alternate leaf dogwood (Cornus alternifolia)
red-osier dogwood (Cornus sericea)
soapberry (Shepherdia canadensis)
red elderberry (Sambucus pubens)
Canadian yew (Taxus canadensis)
common juniper (Juniperus communis)
white spruce (Picea glauca)
black spruce (Picea mariana)
balsam fir (Abies balsamea)
white pine (Pinus strobus)
red pine (Pinus resinosa)
larch (Larix laricina)
highbush cranberry (Viburnum trilobum)
witherod (Viburnum cassinoides)
squashberry (Viburnum edule)
mountain-holly (Nemopantus mucronata)
winterberry holly (Ilex verticillata)
pin cherry (Prunus pensylvanica)
choke cherry (Prunus virginiana)
trembling aspen (Populus tremuloides)
balsam poplar (Populus balsamifera)
white birch (Betula papyrifera)
yellow birch (Betula lutea)
American mountain ash (Sorbus americana)
showy mountain ash (Sorbus decora)
shrubby cinquefoil (Potentilla fruticosa)
northeastern rose (Rosa nitida)
Virginia rose (Rosa virginiana)
red raspberry (Rubus ideas)
blackberries (Rubus spp. esp. R. canadensis)

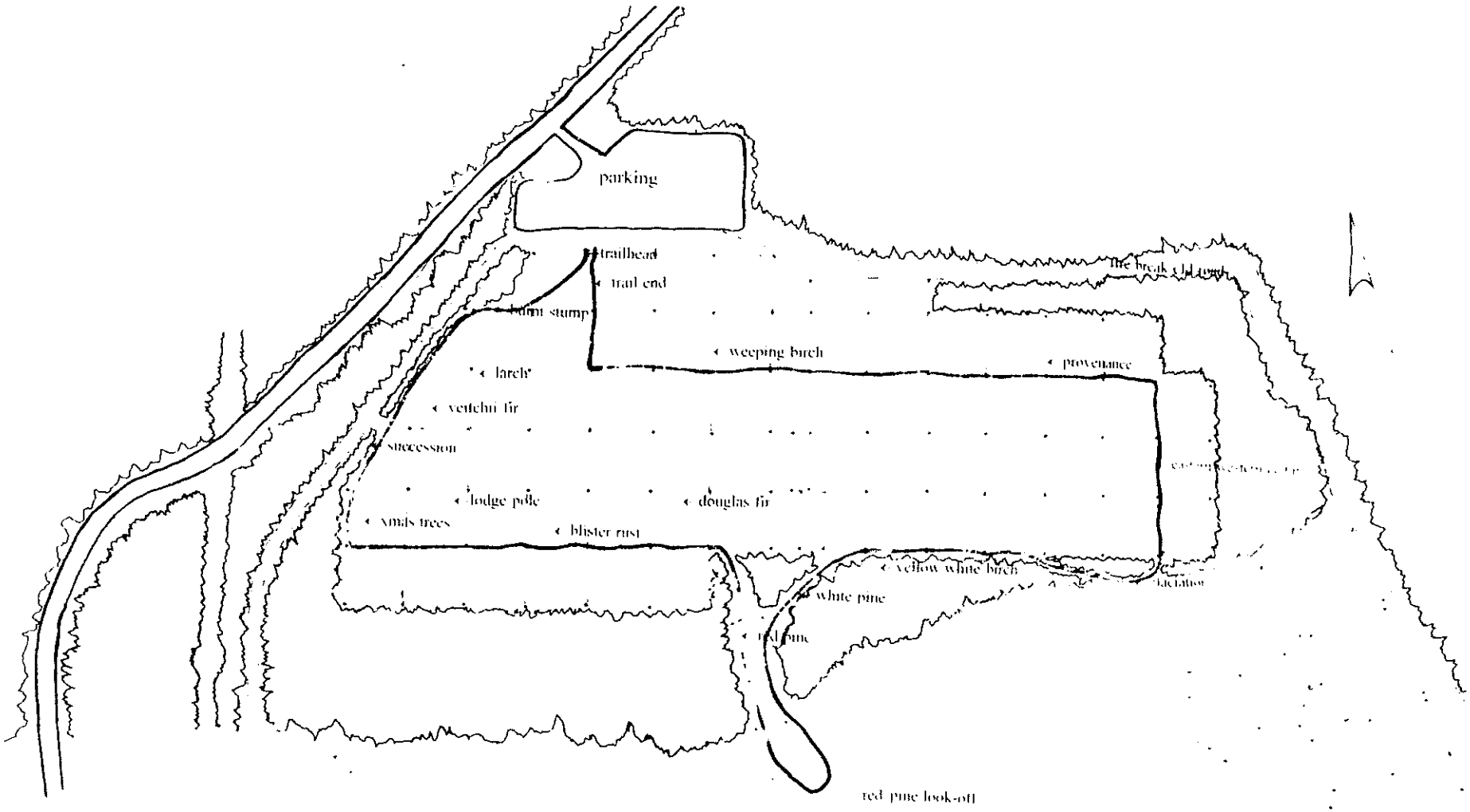
Suggested Landscape Species

mountain maple	Acer spicatum
red maple	Acer rubrum
chuckley pears	Amelanchier spp.
red osier dogwood	Cornus sericea
alternate-leaf dogwood	Cornus alternifolia
beaked hazel nut	Corylus cornuta
black ash	Fraxinus nigra
common juniper	Juniperus communis
larch	Larix decidua
white spruce	Picea abies

red pine	Pinus resinosa
trembling aspen	Populus tremuloides
balsam poplar	Populus balsamifera
shrubby cinquefoil	Potentilla fruticosa
red elderberry	Sambucus pubens
mountain ash	Sorbus spp.
highbush cranberry	Viburnum trilobum
squashberry	Viburnum edule
witherod	Viburnum cassinoides
roses	Rosa spp.

APPENDIX III

FIGURES 1 AND 2



Bottom Brook Arboretum
Interpretive Trail

1:2000

Figure 1

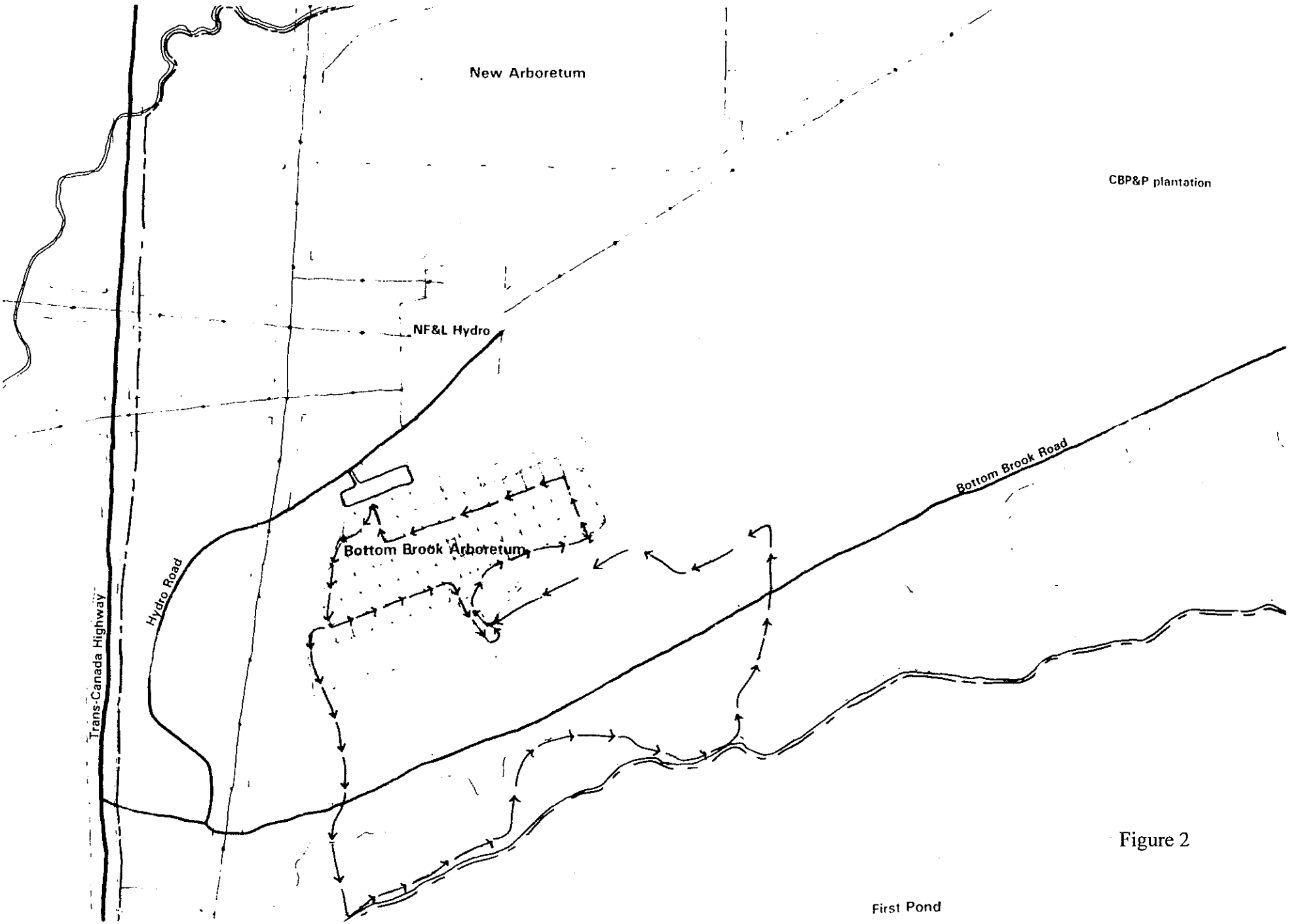
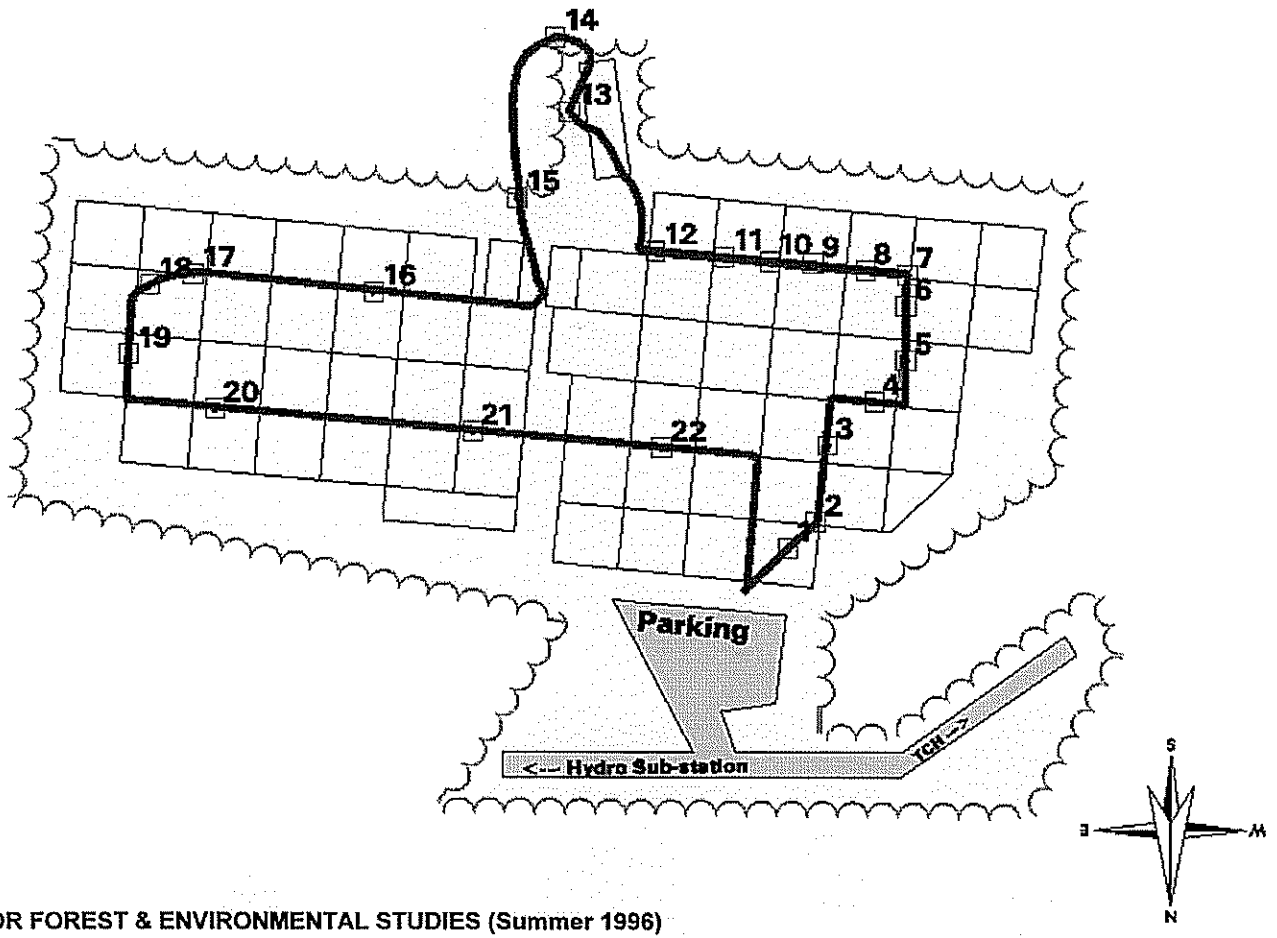

New Arboretum
CBP&P plantation
NF&L Hydro
Bottom Brook Road
Bottom Brook Arboretum
Hydro Road
Trans-Canada Highway
First Pond

Figure 2

BOTTOM BROOK ARBORETUM

--- Evergreen Path ---



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