

MUNICIPALITY OF NORTH COWICHAN

FOREST RESERVE

FOREST DEVELOPMENT PLAN

1997 to 2003

1. INTRODUCTION

The purpose of this Forest Development Plan is to provide the staff of the Municipality of North Cowichan with information on the location and scheduling of proposed roads and cutblocks for harvesting timber in a manner which demonstrates management of all forest resources. Timber (sawlog) production is the primary management objective under an integrated resource management plan. However, the plan also spells out specific policies and guidelines which the Municipal Forestry staff will follow to ensure sustainable forest management and environmental protection of the resources within the Reserve.

The Forest Reserve was created in 1946 by the Corporation of the District of North Cowichan and covers about 5,344 hectares, located to the north and east of Duncan in six major blocks. These are Mt. Prevost, Mt. Sicker, Maple Mountain, Mt. Richards, Mt. Tzouhalem, and Stony Hill. Other smaller, isolated blocks are present, most notably in Copper Canyon.

The Forest Reserve is located on the southeast coast of Vancouver Island and entirely within the District Municipal boundaries. Most of the Reserve lies within the Coastal Western Hemlock Dry Maritime biogeoclimatic sub-zone, but small eastern portions lie within the CDFmm (Coastal Douglas fir) zone or are transitional (e.g. Stony Hill, Chemainus, Fuller Lake and parts of Maple Mountain). Vegetation is dominated by Douglas-fir, Garry oak, Western red cedar, grand fir, and red alder. There are also Bigleaf maple, Arbutus, and other minor species within the Reserve.

Vancouver Island lies under the influence of a maritime climate which is significantly modified by topographical and latitudinal factors. Large areas of land which are under the influence of similar regional climates can be recognized through the distribution of similar climax or near-climax vegetation. These patterns form the basis for the biogeoclimatic classification system.

The topography of the area varies from low elevation flatlands to smaller, local mountains forming part of the Vancouver Island Range - the mountainous backbone of the Island. The Plan area encompasses the latter two of the three major physiographic areas on southern Vancouver Island, namely:

West Coast Lowland
Vancouver Island Range
Georgia Lowland.

The bedrock geology of southern Vancouver Island is complex. The majority of the area is underlain by volcanic rock, but there are also some maritime deposits and shales. The

surficial materials upon which the soils have developed originated from the most recent glaciation which ended 10,000 to 12,000 years ago, and during post-glacial time. During glacial periods, the entire area, except the highest mountain peaks, was covered by ice greater than 1.4 km. thick. This moving ice scoured and rounded the terrain and deposited large volumes of debris. The weight of the ice depressed coastal lowlands below present sea level. As the ice melted, huge rivers were formed, heavily laden with sediment. After the ice left, the land surface gradually rebounded relative to the sea level. These events were the origin of most of the present soils.

This Plan describes and illustrates how harvesting and road development will be managed for a period of five years. It should be updated annually.

2. MANAGEMENT OBJECTIVES AND POLICIES

Multiple use management will be the philosophy under which all parts of the Municipal Forest Reserve Land Use will be managed. The land base will be managed on a long-term sustainable basis to protect water quality and fish habitat, conserve soil productivity, to grow trees, and to facilitate outdoor recreational uses of the Forest Reserve.

A. Silviculture

(1) Reforestation

All harvested areas are to be planted at a density of 1,100 stems per hectare, within the first year after harvesting, if possible. Planting densities may be varied in areas where other than clear cut silviculture systems have been used, such as *seed tree* or *shelterwood* systems. Sometimes planting may not be attainable due to stock availability or site preparation requirements.

Planting stock types will be a minimum of PSB 415 plugs for Fdc, Bg, and Cwc. For Pw, the minimum stock size will be a PSB 410 and potential brush areas will be planted with PSB 615's or equivalent, if available.

- ▶ Species preferences are Douglas-fir, western red cedar, grand fir and white pine. Red alder and cottonwood will be utilized as needed.

Browse protection against deer (Vexar tubes, Sinocast shelters, plant skydd, etc.) may be installed or applied, if required.

- ▶ spot fertilization may be done on a selective basis on sites prone to brush encroachment to aid the plantation in reaching free growing status.

(2) Brushing

The goal is to prevent competing vegetation from over-topping the conifers while getting the plantation to the free growing state in as short a time frame as possible. In order to minimize the number of entries, the timing of the treatment is critical to release the crop trees.

- ▶ Options include manual or chemical methods depending on job creation programs, funding availability, efficacy and practicality.

- ▶ To maintain a hardwood component in plantations, broadleaf maple stumps which re-sprout may be left with one or two main stems uncut.

It is hoped that the uncut stems will dominate over the other stems and may produce a commercial size tree in the future.

(3) Juvenile Spacing

The purpose of spacing is to concentrate volume onto fewer stems by removing less desirable trees that would normally be lost to mortality through natural suppression. Trees left after thinning will be larger in size at rotation and reach a given diameter in a shorter time. Spacing is normally undertaken when stands are approaching crown closure (8 to 15 years of age). At this age the crop trees should be readily identified.

Stocking levels are determined at time of treatment with the ultimate goal of producing wood volume and quality (pulpwood and sawlogs) and also depending on planned intermediate entries such as commercial thinning.

- ▶ Conifer species preference is Douglas-fir, grand fir, and cedar. (Note: western hemlock is off-site on most areas).
- ▶ Hardwood plantations will also be spaced.
- ▶ In root rot areas the priority is white pine and cedar.

(4) Pruning

Is the removal of all branches close to the stem that results in the production of clear, knot-free wood. All pruning, with the exception of White pine, will be to a minimum height of 6.0 metres to allow for at least one clear butt log. Will be carried out as funding is available in conjunction with job creation strategies.

For government-funded projects, all stems may be treated.

For municipal-funded projects, the best 300 stems will be pruned, with Priority to Douglas-fir, cedar, then grand fir.

- ▶ All white pine plantations will be aggressively pruned to try to control white pine blister rust.

(5) Fertilization

Is done to increase the size of the stems, and thus the volume per hectare. It can be done manually (by hand) or with aircraft, both fixed-wing and helicopter.

- ▶ If funds are available, fertilization will be done on *medium* and *poor* sites after juvenile spacing, commercial thinning and/or ten years before the final harvest using forest-grade urea at a rate of 200 kg N/ha.
- ▶ Opportunities to utilize waste sludge from the sewage lagoons operated by the Joint Utilities Board will be pursued as well.

3. MANAGEMENT OF KNOWN RESOURCE FEATURES

A. Old Growth

While most of the Forest Reserve has been harvested in the past, small patches and scattered individual specimens of old growth Douglas-fir remain. Treatment of this resource feature will be as follows:

Single old growth trees - these will be assessed by municipal forestry staff

and/or contractors to determine if they pose a safety hazard. If so, they will be removed concurrent with harvesting, or kept in an untouched patch adequately marked with safety zones. If not considered a safety hazard, they will be retained for their genetic and biological diversity, and for use as wildlife trees. Patches of old growth - stands that contain clusters of old growth trees will have a representative sample retained during the harvesting process.

B. Streams, Wetlands, and Lakes:

All water bodies and water courses will be protected at time of harvesting to a standard equal to or better than the **Forest Practices Code of British Columbia**. Riparian areas are those areas immediately adjacent to a stream, lake or wetland and often contain some of the highest timber and non-timber values in the forest. The streamside vegetation protects the water quality, stabilizes streambanks, controls stream temperature, and provides a continual source of woody debris to the stream channel.

Riparian areas will be protected by a Riparian Management Area (RMA), the width of which will be determined by the stream classification. RMA's may have a Riparian Reserve Zone (RRZ) where no harvesting is permitted and a Riparian Management Zone (RMZ) where there are some harvesting limitations; or they can simply have an RMZ.

An important step in determining the appropriate riparian prescription is to correctly identify those streams that are fish bearing and those without fish. All streams within the Forest Reserve will be classified by a Registered Professional Biologist and be included in the future as an appendix to this Development Plan.

Streams are classified from S1 to S6 based on:

- presence of fish;
- channel width;
- presence of a community watershed.

See Appendix II for creek classification

Major streams and lakes in the Forest Reserve are:

Chemainus River: considered a large river and will have a 70-metre RMA along both sides (50m. RRZ and a 20m. RMZ).

Richard's Creek: will have a 25-metre RMA along each bank. This creek is mostly an S3 below Crofton Lake and becomes an S2 in the agricultural areas.

Bonsall Creek: a 15-metre RMA will be identified along both banks up to Plantation Road.

Crofton Lake: since this lake is a community watershed, a 50-metre Lakeside Management Zone will be established around the lake. Cover constraints in the Crofton Watershed allow a maximum of 25% of the area to be supporting vegetative cover less than nine metres in height at any one time.

All falling and yarding will be directed away from any fish bearing stream.

Harvesting activity around non-fish bearing streams will feature fall away/yard away prescriptions where practical. Where this is impractical due to topography or cost, cross-stream yarding will be permitted but rubber matting or logs will be used to protect streambank integrity. All watercourses will be hand or machine cleaned upon completion of harvesting activities. Where it is necessary to cross a stream course with a piece of equipment (e.g. a hoechucker), crossings will be made at right angles utilizing a temporary culvert, rubber mats, or logging slash/logs that will be removed upon completion of the harvesting activities.

Wetlands will be protected by retaining adjacent hardwoods and/or conifers. Yarding will not be permitted through swamps and other wetlands, but walking machinery through a wetland may be permitted under certain circumstances by the Municipal Forester or Assistant by placing and removing mats or puncheon.

C. Terrain Stability

The Forest Advisory Committee and Municipal forestry staff have identified a need for a Terrain Stability Assessment of the entire Forest Reserve. This assessment will identify potential areas of instability on the Reserve and prescribe measures to enhance long-term productivity of forest soils, while minimizing impacts on water quality. This project will be implemented when economic conditions improve.

D. Forest Health

Forestry staff will continue to monitor the condition of the Forest Reserve in their day-to-day activities for any forest health problems. Identification of root rot areas is currently the biggest problem.

If a potentially serious forest health problem is identified, a consultant will be retained to map out the problem area(s).

E. Forest Recreation

The Forest Reserve is both a working forest and an area of forest recreation opportunities. These non-destructive recreation opportunities include:

hiking	mountain biking
horseback riding	orienteering
4x4's on designated roads	nature watching
motorcycles	viewscapes
bird watching	harvesting of lesser vegetation
hunting	

- ▶ Key features in the Reserve are:
- ▶ *Preservation Zone* on Maple Mountain for recreation use only;
- ▶ Hiking trails on Maple Mountain;
- ▶ Development of other hiking trails and/or mapping of existing trails on other areas of the Forest Reserve as funding becomes available;
- ▶ War Memorial Cairn on Mt. Prevost;

- ▶ Wildflower reserve on the west peak of Mt. Prevost;
- ▶ Hang gliding off the east peak of Mt. Prevost.
- ▶ Alternative Silviculture Zone on Maple Mountain;
- ▶ A Garry oak stand on Maple Mountain within the Preservation Zone;
- ▶ Chemainus River corridor;
- ▶ Chemainus Rod and Gun Club shooting range;
- ▶ Future expansion of the Trans Canada Trail through portions of the Forest Reserve yet to be determined;
- ▶ When completed, an *Integrated Resource Management Plan* for the Reserve for future development of recreation features and facilities.
- ▶ Arboretum on Maple Mountain.
- ▶ Domestic watersheds.

F. Visual Landscape Management

The Municipal Forester feels that Visual Landscape Management is important within the Reserve because of changes in the pattern of development and community lifestyles within the Municipality over the past decade. Increased urbanization, up-grading of the Vancouver Island Highway to handle increased volumes of traffic, and extensive development of recreation activities (e.g. Trans-Canada Trail), have all contributed to an increased focus on logging activities carried out within the Forest Reserve.

A landscape inventory of the Forest Reserve is currently being carried out and will be completed in early 2001.

The Municipality will institute landscape management practices as integral components of forest management. A long-term management strategy will be prepared for areas visible from the highways, major residential areas, and travel corridors on water (e.g. Sansum Narrows), which will allow the forestry staff to achieve their objectives of managing forest lands in a suitable manner, while still addressing visual quality concerns of the public.

G. Biodiversity

Biodiversity will be maintained at current levels or enhanced where possible. The Municipality is committed to protecting outstanding examples of unique ecosystems, and they will be excluded from harvesting areas when identified.

H. Wildlife Management

The choice of a silvicultural system and the location, pattern, and size of reserves should reflect natural disturbances and overall management objectives (S. Leigh-Spencer, 1996). Designing cutblocks to retain important structural features such as wildlife trees, coarse woody debris, horizontal and vertical structural diversity, diversity of tree species and understory vegetation will help maintain stand level biodiversity. Stand level biodiversity will be retained by:

- ▶ Retaining some non-merch understory trees that are sound and of good form and vigour.
- ▶ Retaining trees damaged during the harvesting phase for possible future wildlife trees (i.e. snags).
- ▶ Retaining all western red cedar trees with indications of woodpecker activity, if safe to do so.
- ▶ Retain a representative sample of green, sound, old growth Douglas-fir that do not constitute a safety hazard.

I. Fire Prevention

The Municipal philosophy has been to not undertake undue risks and to shut down operations prior to extreme fire weather hazards. The forestry staff, through the Ministry of Forests and local private companies, monitors the **Fire Danger Rating Index** - as one of the keys to operational status.

The Municipality is an active member of the Lake Cowichan Combined Fire Organization and has signed a Memorandum of Understanding for fighting forest fires and mutual aid. The philosophy of the L.C.C.F.O. is for all members to provide assistance to their member neighbours and to attack any fire vigorously, put it out, then settle who pays the suppression costs later.

For initial attack, the Municipality utilizes four local volunteer fire departments based in the Municipality, namely the North Cowichan Volunteer Fire Department, which consists of Chemainus Hall, Crofton Hall, Maple Bay Hall, and South End Hall. A separate contractor supplies fire-fighting labour, with the Municipality supplying fire tankers and other miscellaneous fire equipment.

A **Forest Fire Protection and Fuel Management Plan** is prepared and updated annually. It defines access routes, staff responsibilities, contact telephone numbers, and contains equipment lists and contractor availability.

To minimize the possibility of fires in harvesting areas, the forestry staff ensure logging contractors do roadside cleanup to eliminate the hazard and reduce the risk of fire. Roadside debris is piled beside the roads, and the piles are partially covered with plastic sheeting so they can be kept dry and burned in the fall or winter when the chance of broadcasting has passed. In addition, excavators may be used to pile the fine fuels throughout the settings where it is warranted, while leaving some coarse woody debris on-site.

4. HARVESTING

Sterling Wood Group Inc. completed a Timber Supply Analysis of the Forest Reserve in 1995 . It showed an uneven distribution of age classes, and a fairly wide range of sustainable harvests. The Forest Advisory Committee recommended an Annual Allowable Cut (A.A.C.) of 20,000 cubic metres to Municipal Council, which was approved by Council in 1995.

The Forest Reserve operates as a market logger and is poised to take advantage of any

positive markets when they arise.

Harvesting priorities are:

- (1) To take advantage of market opportunities as they arise.
- (2) Conversion of hardwood stands to conifer when economically profitable. Recovery of any blowdown, diseased stands, fire-affected stands, insect outbreaks, etc. where it is economically feasible. This recovery will be completed within a 12-month time frame, before the wood loses its economic value.

Harvesting activities are governed by Rainfall Shutdown Limits where heavy rains for more than four (4) hours, or less in some cases, causes harvesting activities to cease on ground-based systems. Harvesting operations utilizing a highlead system will normally be shut down after eight (8) hours of heavy rains. Operations may resume when there has been no precipitation for four (4) hours.

Utilization standards and cutting specifications are:

a) Obligatory

Stumps will be cut low enough to minimize waste, and in no case higher than thirty (30) centimetres on the side adjacent to the highest ground except when necessary in the judgement of the Municipal Forestry staff.

In order to minimize waste, all trees containing X grade logs or better will be utilized to a small top diameter of ten (10) centimetres inside bark.

All logs and parts of logs three (3) metres and over in length which contain X grade logs or better shall be removed.

Logs and/or parts of logs less than three (3) metres in length and broken at both ends are classed as breakage.

Logs shall not be bucked or trimmed in such a manner as to reduce grade.

b) Optional

All trees and parts of trees which contain only Y grade logs may be removed and utilized at the contractor's option. If the Y grade material is not utilized, the Municipal Forester may require it to be yarded to the landing or roadside.

c) Obligatory

All living and dead trees, or down trees, that meet the utilization requirements of the foregoing, unless otherwise designated, must be cut.

All living trees three (3) metres and over in height not otherwise required to be felled shall be felled by the contractor within areas designated for cutting under the terms of the contract as directed by the Municipal Forester, unless specifically required to be retained under the terms of the contract.

A. Silviculture Systems

The Municipal Forester will use a mixture of systems such as:

- ▶ patch cut (with no retention)
- ▶ patch cut with green tree retention
- ▶ seed tree
- ▶ shelterwood
- ▶ commercial thinning with a target of leaving approximately 300 stems per hectare. Thinning will be of two types:
 - 1) low crown
 - 2) high crown

B. Harvesting Methods

Harvesting will include both high lead and ground-based systems as follows:

- ▶ High lead - mini-tower, swing yarder.
- ▶ Ground - hoe forwarding to designated skid trails;
 - horse logging;
 - Iron Horse.
- ▶ Aerial - helicopter.

C. Special Forest Products

The Municipal Forester will explore all aspects of producing specialty wood products from the Forest Reserve. These will include:

- ▶ Poles and piling including house logs. If an opportunity arises for increased revenues from this category it will be pursued.
- ▶ shake and shingle recovery.
- ▶ Douglas-fir cants from dead-and-down old-growth.
- ▶ specialty hardwoods such as maple and arbutus for value-added producers.

D. Lesser Vegetation

In addition to wood products, the Municipal Forester will pursue production of the following products:

- ▶ salal, sword fern and mushrooms.
- ▶ berry picking.
- ▶ other botanical products for medicinal purposes. Areas will be excluded from harvesting if found to contain significant amounts of lesser vegetation suitable for medicinal purposes.

5. ROADS

Roads are considered a capital asset (investment) and are to be maintained for forest management and recreation activities. The general public will be allowed access over the roads subject to the following limitations:

All commercial users of Municipal Forest roads will enter into a Road Use Agreement and pay a fee towards road maintenance and upkeep.

Public access is restricted on Mt. Richards to protect the Crofton water supply from Crofton Lake. At sometime in the future, if the Crofton Lake water supply is replaced, public access to the area will be reviewed.

Access on Mt. Tzouhalem is restricted to protect the water tower servicing the residential area of The Properties. Automobile access is restricted through the use of gates and barriers. Access may also be restricted during periods of high fire hazard. This is accomplished by locking gates, posting closure signs, and advertising in the local papers.

The forestry staff may, at their option, restrict access to some areas to facilitate forest management activities. For example: short-term (4 to 6 weeks) closures to restrict hunting during active logging operations.

The Access Management Policy is to retain main access routes but debuild short stubs/spurs that are used for short-term harvesting access.

A. Deactivation of Roads

The Municipality will carry out road deactivation as required to minimize the risk of mass wasting, to restore natural drainage patterns, to regain lost growing sites and improve the visual aesthetics of harvesting areas.

Roads will have three levels of deactivation:

- ▶ Temporary
- ▶ Semi-permanent
- ▶ Permanent

Temporary Deactivation: is used for roads whose regular maintenance is to be suspended for up to three years. The measures incorporated primarily include water management techniques (cross-ditches and water bars). Field inspection of road drainage structures should be conducted after major storms, during spring break-up, and prior to fall rains.

Semi-permanent Deactivation: is used for isolated areas or where there is potential for landslides, and regular maintenance is to be suspended until the next return for harvesting. Field inspections should be carried out after major storm events to assess the adequacy of the deactivation or repair any problem areas. The water control measures to be incorporated will include cross-ditches, water bars, culvert removal, road access barriers, and armouring of ditches with rock and vegetation, re-seeding on exposed soils in fisheries sensitive areas

Permanent Deactivation: is to be used for roads which are permanently closed. Roads which are required for short-term access only will be debuilt to restore productivity on the effected site, to de-compact soils within the road prism, re-vegetation of exposed soil surfaces, and reforestation. Deactivation measures would include such activities as re-establishing natural water flow pattern, remove all culverts and bridge structures, re-contour the affected area to its original state, and large organic debris will be placed on the debuilt road surfaces. Field inspection will be carried out periodically over the first three to five years of debuilding the road to ensure the road is stable, to ensure there are no erosion problem, and the site is re-vegetated.

6. HARVESTING AREAS

B.R.A.T. Expediting was contacted in 1995/96 to develop a Five Year Harvesting/Development Plan for the Municipal Forest Reserve. The Forest Practices Code and Guide Books were used as a basis for sound planning and development. The following parameters were to be included in the development of the plan:

- ▶ To cover a five year period
- ▶ 20,000m³/yr with 25% per year in hardwoods, and a maximum of 20% in commercial thinning/yr.
- ▶ Cut block size:
 - Patch Cut - Range 0.5 to 11.0 ha
 - Commercial Thinning - ≤ 25.0 ha
- ▶ Cut block design: Incorporate Landscape design methodology to minimize visual impact of cut block. For further details see Visual Landscape Inventory as completed in early 2001.
- ▶ Silviculture systems to be used:

- Patch Cut
 - with single green tree retention
 - retention of conifer regeneration
 - retention of old growth Fdc
 - retention of islands of dominant and co-dominant trees
- Seed Tree
 - 25 stems per hectare of dominant and co-dominant trees
 - 5 stems per hectare of dominant and co-dominant trees
- Shelter Wood -
- ▶ Harvesting Methods: Recommend the type of systems that could be used for each block and treatment timing. methods used to date on MNC land:
 - Mini-Tower
 - Hoe Forwarding to designated skid trails and skid rubber-tired skidders on trails only.
 - Horse Logging
 - Heli-logging
- ▶ Buffer strips to be left on the Chemainus River, Divide Creek, and Richards Creek. (see 1:20,000)
- ▶ Identify any potential unstable slopes, special areas, other resources, or concerns in the area.
- ▶ Cut Blocks will have a cutting permit type of timber cruise and will specify species by volume, grade, decay and waste, and breakage by block.
- ▶ The project will include three years field layout for harvesting areas, and two years paper layout for the remaining areas.
- ▶ Road layouts will include three years full field layout, including spur roads, landings, and culvert locations and sizes. The last two years will be mainline layout only, including culvert locations and size.
- ▶ Creeks to be traversed, mapped, and classified.
- ▶ Mapping of cut blocks is to be submitted on 1:5,000 scale, to Ministry of Forest standards.