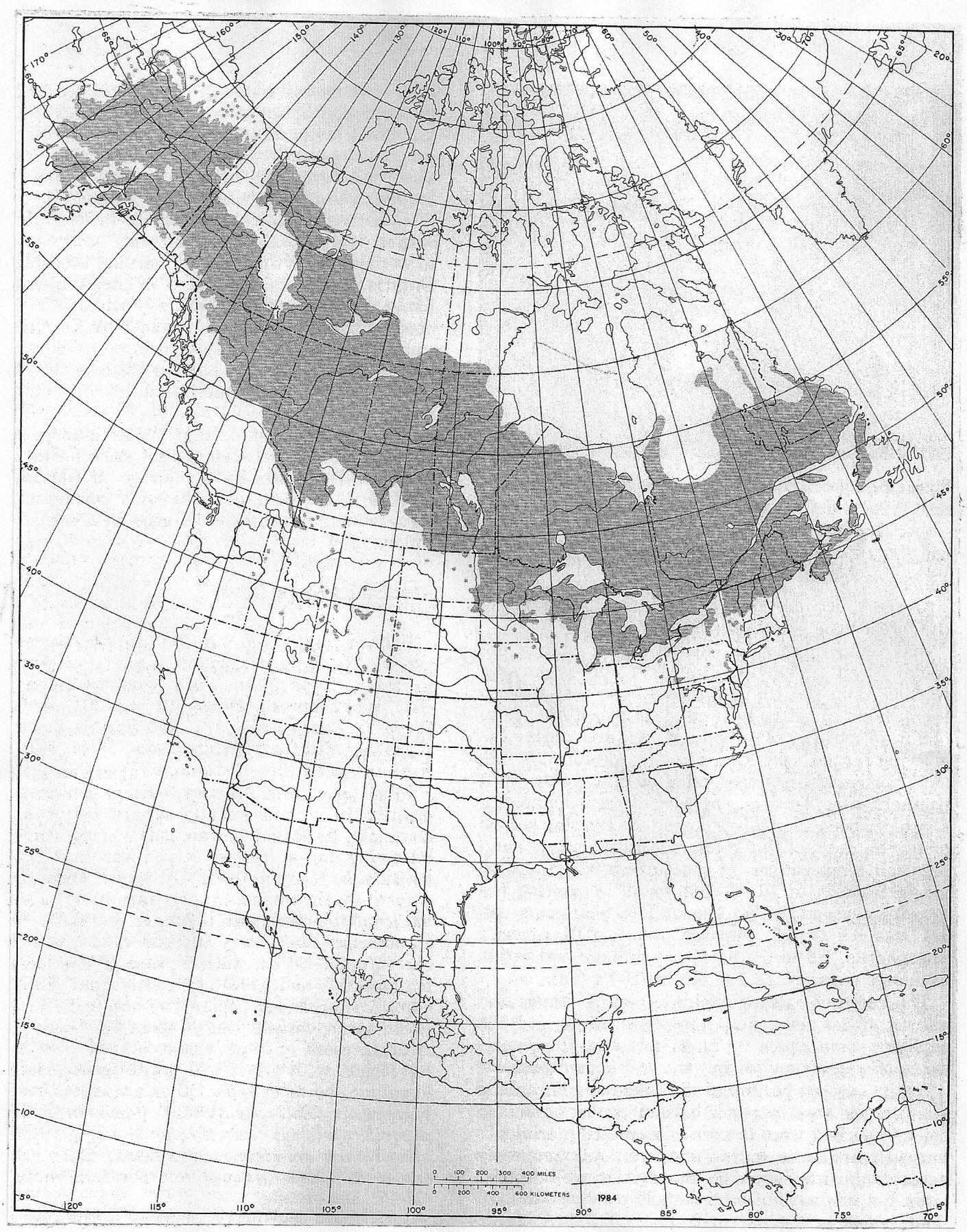
Black Poplar: Poplar is found across across Canada and northeastern US as shown in the figure below. While temperature and moisture conditions vary across its range, prolonged periods of draught are uncommon. Roots of black poplar can extract water from near the water table. Indeed, it is this ability that helps to explain the emergence of poplar in relation to aspen on sites that have excessive water in early spring.

Balsam regenerates very successfully via vegetative means. Production of suckers after disturbance is less though than for aspen. Suckering also occurs from roots within 2 to 10 cm of the top of the soil. As such, care needs to be exercised when harvesting occurs to avoid damaging the lateral roots and compacting the soil. In order to ensure adequate regeneration following harvest, harvesting is restricted to winter season when ground conditions are frozen.

White spruce: White spruce is extensively located across Canada as shown in the figure below. It grows under highly variable conditions, including extreme climates and soils. Good growth requires a dependable supply of well aerated water yet the species will tolerate a wide range of moisture conditions. It will not tolerate stagnate water that reduces root volume however. In general, white spruce does require a better drained site than that of aspen and poplar.

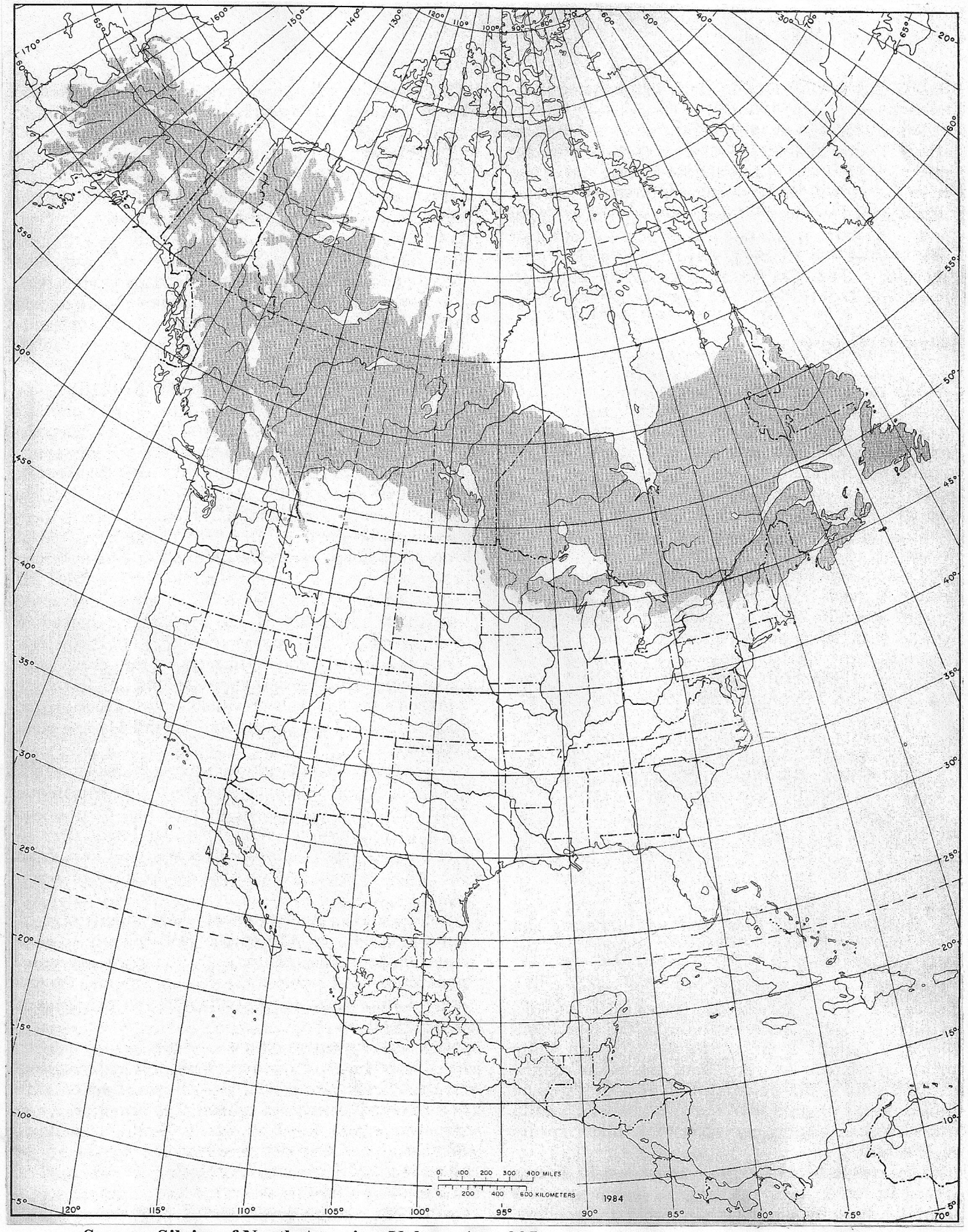
Vegetative reproduction of white spruce is rare to non existent. Natural reproduction of spruce occurs as an understorey in aspen spruce stands to varying degrees as it is partially shade tolerant. Spruce responds very well to nursery conditions where it is produced in a number of age and plug sizes. Indeed, the widespread availability of spruce seedlings interacting with ground conditions guides the selection of this specie for restocking of the reclaimed in block roads.

Map 16.2: The native range of Balsam Poplar



Source: Silvics of North America, Volume 2, p. 519

Map 16.3: The native range of White Spruce



Source: Silvics of North America, Volume 1, p. 205

Silviculture strategy
GPRC will pursue a clear cut harvest regime with variable block sizes and shapes to replicate natural disturbances. To minimize soil compaction and promote vegetative reproduction of aspen and poplar, winter harvest will be applied when ground is frozen.

In D stands, site prep is not anticipated. In DC and CD stands, coniferous species will be planted as required on elevated microsites to ensure that coniferous component is maintained. Elevated microsites are selected to minimize the negative impact of excessive moisture.

The deciduous component for all strata will rely on natural regeneration, primarily suckering. In-block roads will be reclaimed and planted to Sw. In addition, incidental conifer proportions throughout the stand will be maintained through protecting existing conifer understorey and fill planting as required.

The target seedling density at year 5 for deciduous stands is 7,000 stems/ha while conifer component is 1,400 stems/ha. In DC and CD stands the target coniferous density is 1,600 stems/ha.

While reforestation stage intervention for D strata stands is not anticipated, some intervention for DC and CD stands may be required for vegetation controls to reduce competition for conifer.

No intervention is anticipated in the post reforestation stage.

Seed/Vegetative Collection
Since deciduous reforestation is LFN, seed collection is not anticipated for deciduous species.

Coniferous reforestation of reclaimed roads and fill planting as required will utilize appropriate SW seedlots collected by the local forest industry. To date, GPRC needs have been modest and are not expected to exceed 6 thousands seedlings on an annual basis.

To date an insignificant area of DC stands has been harvested. As a result, there has not been a need to plan for and execute SW significant fill planting of the non in block road area. This has kept the expected seedling needs to amounts that can be provided to GPRC through the local industry companies such as CANFOR and Weyerhaeuser.

However, as GPRC continues with execution of its 10 year harvest sequence, the conifer seed supply will be assessed. Before any DC stands are harvested, adequacy of existing seedlots will be reviewed and plans made to collect additional seedlots appropriate to the Training Forest will be made including a seed collecting exercise from G13 for the benefit of the students of the GPRC forestry program.

17. PREFERRED MANAGEMENT STRATEGY

The preferred management strategy balances the educational, ecological, economic, and social objectives embodied in the three goals GPRC has set for itself. The strategy is reflected in a recommended AAC of 1,795 m3/year of conifer and 18,257 m3/year of deciduous.

The strategy is discussed below in the context of GPRC's three goals.

Goal 1: to provide the best possible educational opportunities for GPRC students, staff and other interested agencies

Crucial to achieving this goal are three items:

i. Establishing and nurturing links with other stakeholders with an interest in natural resource management;
ii. Integrating the operation of the forest into the curriculum of the students; and
iii. Ensuring long-term biological and economic health of the forest.

It is not just links which are important however. GPRC also needs to demonstrate that it is an active participant in the natural resource community. This will encourage practicing professionals and other stakeholders with an interest in natural resource management to share their experience and wisdom with the next generation of natural resource manager.

The GPRC management strategy incorporates:

A. Sponsored research projects on the forest and encouragement of faculty to participate in research projects off the forest;

B. Operation within an AAC that is biologically supportable over the long-term;

C. A dedicated position half time to manage the training forest;

D. Active use of the forest as a laboratory for courses taught in the classroom;

E. Establishment of links with other institutions providing educational opportunities.

Goal 2: to be a good steward of the GPRC Training Forest

Managing a forest goes beyond simply ensuring that a harvest is sustainable over the long-term to incorporate respect for the land, the flora and the fauna. As important to what is produced is how it is produced and the extent to which all stakeholder values are considered.

The strategies to balance the different values of the landscape include:

F. Constant consultation with local PLFD, Fish and Wildlife and other knowledgeable sources to minimize harvest activity in parts of the forest that are sensitive to disturbance;

G. Mimicking nature as far as anthropogenic disturbance on the landscape in size and shape of harvesting blocks;

A central part of good stewardship is of course maintaining biological diversity on the landscape. Maintenance of biodiversity of course implies a good inventory of what already exists in the forest. This is something that the College presently lacks.

The management strategy then incorporates:

H. Activities to build an inventory of the flora and fauna in the forest through links with the BMD project and through student initiated inventory projects.

While maintenance of flora diversity is relatively easy given the static nature, maintaining diversity in the fauna is more troubling. The natural ranges of fauna can be quite broad with presence of animals linked to the existence of natural habitat.

The GPRC management strategy then is directed at:

I. Ensuring a diversity of habitats that attract fauna rather than managing for the fauna itself;

J. Maintaining a range of age classes at all times while replacement stands will be patterned after the composition of stands removed;

K. Maintaining the usefulness of the harvested areas through extensive leave patches within the cut bloc area.

Fisheries and aquatic resources are an important part of the natural resource fabric. Timing and location of disturbance can have a significant impact on the landscape.

The management strategy focuses on:

M. Significant buffers along the major waterways to the height of land;

N. Ensuring that harvest activity only takes place under frozen ground conditions;

O. Cumulative harvest monitored to ensure that ECA threshold levels are not exceeded.

Biodiversity, and sustainability of the forest can be impacted by factors other than harvesting. These factors include insects, diseases and fire.

Insects and disease outbreaks have not been present to date. However, the emergence of mountain pine beetle threat in AB cannot be ignored. While the impact on the harvest is non existent (as most of the pine stands are located in the passive landbase), the presence in pine stands could significantly increase the threat of fire. Pine stands in the forest are located on the sandy dunes and suffer from moisture deficits.

GPRC management strategy includes:

P. Monitoring closely the forest and surrounding area for signs of outbreaks in conjunction with the SRD and local companies.

The forest does not suffer from significant risk of fire given extensive deciduous forest. However, harvesting activities by their nature increase both the concentration of combustible material and the dryness of the ground cover. The GPRC strategy focuses on the reduction of a risk of fire starting and spreading.

The strategy is:

Q. To burn debris piles as soon as possible and create debris clear zones along the cut block boundary.

Goal 3: To facilitate interaction with other stakeholders of the Training Forest in a management planning process that considers the multiple uses of the forest

Goal 3 in many respects is linked back to Goal 1. A key ingredient to provide educational opportunities for students and other stakeholders lies in presenting the different perspectives to natural resource management. While faculty are well placed to provide technical skills to students, a wider appreciation for the different approaches to natural resource management can only be had by incorporating the many stakeholders into the educational and management process of the forest. Interested stakeholders include not only those external to the College but stakeholders from the different departments within the GPRC.

The management strategy incorporates other stakeholder involvement by:

R. The existence and operation of an advisory body of interested stakeholders (Forest Resources Advisory Committee);

S. The existence and operation of an advisory body of interested stakeholders (Internal Stakeholder Advisory Committee).

18.0 SCHEDULE OF OPERATIONAL PLANS

During the preparation of the FMP, Grande Prairie Regional College has been guided by the 1994 Alberta Timber Harvest Planning and Operating Ground Rules. Following the approval of the FMP new operating ground rules will be developed following the new template rather than the 1994 version.

The Alberta Timber Harvest Planning and Operating Ground Rules (1994) require the submission of management and operational plans in order to secure the authority to actually harvest.. The authority is conveyed through approval of the Annual Operating Plan (AOP).

18.1 MANAGEMENT AND OPERATIONAL PLANS

GPRC will include as part of the planning, regulatory and review processes the following plans.

General Development Plan
The General Development Plan (GDP) covers a five year period, which includes all the necessary licenses and permits. It is designed to provide an up to date strategy that gives direction and coordination for identifying the operator's timber supply, issuing timber dispositions, developing roads and AOP's, integrating operations with other timber operators and non-timber resource value's, and inspecting, maintaining and reclaiming the timber operator's roads.

Annual Operating Plan
The AOP describes how timber harvesting will be implemented in a timber disposition. It describes how, where and when the operator will develop roads, harvest timber, integrate operations with other resource users, mitigate the impact of logging, reclaim disturbed sites, and reforest harvested areas in the disposition. The AOP consists of five major sections which include: timber operations, forest protection, silviculture, road management and forest resource integration.

1. Timber Operations Section
The timber operations section will outline the timber harvest prescription which will include factors such as: relevant stand and site factors, a contingency description of all watercourse crossings, list of cutblocks including: harvest season, cutblock number, species, volume, special operating conditions along with a list of subsequent-pass blocks showing their areas and estimated volumes. Detailed cutblock plans and contingency plans will also be developed where required.

2. Forest Protection Section
This section will address prescribed silvicultural burns, fire control plans, and insect and disease concerns. In the case of prescribed burns, a detailed plan would be submitted as outlined in the Prescribed Burn Manual and submitted with the Preliminary Harvest Design.

3. Silviculture Section

This section will provide a detailed description of the three following areas:

i) The silviculture system or strategies by which the next timber crop will be established whether by even-aged or uneven-aged cutting systems.

ii) The reforestation tactics which may include one or combinations of the following tactics: leave for natural (seed or root suckering), planting, seeding, site preparation or no site preparation, and post-harvest surveying or subsequent tactics.

iii) Also included will be a map showing all cutblocks to be treated and all roads and stream crossings to be constructed or used along with their season of use.

4. Road Management Section

The primary goal is to reduce the impact on the environment as much as possible. This section will identify the roads and stream crossings, their life expectancy, and their maintenance schedule. Also included will be maps showing planned and existing roads, road class, access where control is required, all stream crossings, "as-built" location of temporarily abandoned Class IV permanent roads for reforestation access, and identification of erosion and mass-wasting areas. Schedules and tables will also be included as described in the Operating Ground Rules.

5. Forest Resources Integration Section

Integrated Resource Management will be the primary focus of all harvest operations. The purpose of this section is to consult and resolve any conflicts that persons either operating in or around the area may have with any operational activities taking place within the Training Forest. It will document all contacts with other resource users and how their concerns were addressed. All possible efforts will be made to resolve any concerns or conflicts.

18.2 AUTHORITY TO HARVEST

A Deciduous Timber Permit must be in place before actual harvest occurs. The authority to harvest wood from the Training Forest is granted to GPRC through the issuance of an Annual Operating Plan from the local PLFD. DTPs are issued subject to an acceptable AOP with execution of the AOP subject to all pertinent acts and regulations.

In the past, the length of the DTPs coincided with the process which GPRC used in disposing of its wood. During the first three years of operation, GPRC disposed of the wood annually, with it not being clear who was the successful bidder or even if there were going to be any bidders, until the bidding process was concluded in October of each year.

In 2005, GPRC entered into an educational partnership agreement with Tolko High Prairie. This agreement, which runs for 5 years, guarantees for GPRC a buyer of its

harvest and a predictable revenue stream on which to plan the forestry programs at the College.

In the fall of 2006, GPRC plans on applying for a DTP of up to 5 years to reduce the amount of administration linked to preparing the forest for harvest. The buyer is known (Tolko) and the destination mill is known (Tolko OSB in High Prairie). The annual volume harvested would fluctuate around the deciduous AAC and in no circumstances would the cumulative harvest exceed 5 times the annual deciduous harvest in the 5 years.

18.3 VOLUME ESTIMATES

There are two parts to preparing volume estimates in any one year. The parts are the estimate of the volume per hectare in each block scheduled for harvest and the estimate of the area assigned to each block.

Volume per hectare estimate for the year in question are based on a combination of student placed inventory cruise plots in conjunction with ocular estimate based on historical per hectare data from previous years' harvest. Depending upon timing issues linked to when (non academic or academic part of year) block is laid out in the field and when a mensuration course is offered for students determine presence of student inventory plots.

Table 18.1 shows historical net volume per hectare for the past three years of harvest.

Table 18.1: Net volume per hectare for different harvest years

Harvest season	Block	Net volume per hectare
2002/3	**A**	**144**
	B	**160**
2003/4	**A**	**137**
	B	**157**
2004/5	**A**	**213**
	B	**213**

Source: C.A. Backman

Preliminary block boundaries are located in the field based on an estimate taken from photos and AVI map. The block is then gpsed and area determined accordingly. Block boundaries are adjusted to ensure that harvest volumes estimated in the given year conform with plan figures.

The variance between actual volume harvested and the estimated volume in any given year become more critical in the final year of the cut control period. During the final year of the cut control period, greater reliance will be placed on inventory cruise plots to ensure that the volume estimated conforms more closely with the volume actually harvested.

19.0 PERFORMANCE MONITORING

GPRC has identified a number of goals with objectives that it would like to see the forest achieve. Linked to the objectives are a number of strategies which GPRC plans to execute in order to achieve them.

In order to provide a feedback mechanism to compare actual performance to target performance, to test whether the strategies chosen to achieve the objectives are working, and to allow for mid-course corrective measures to be smoothly implemented, the College will introduce a performance monitoring plan.

While the details of the performance monitoring plan will be developed in the first year following approval of the Forest Management Plan, an integral part of it will include an annual report to the community and the five year stewardship report. The annual report will be presented to the public in the fall annual public meeting. The five year stewardship report will be prepared at the end of the first five year period following approval of the FMP.

Data that will be incorporated into the performance monitoring reports are identified below in **Table 19.1**.

Table 19.1: Reporting items for the annual and stewardship reports

Goal. Objective. Measure Reference	**Measure**	**Target**	**Item to be included in annual and/or stewardship report**
1.1.A	# research projects	2-3/five years period	Annual performance and five year stewardship reports to identify research projects
1.2.A	Annual harvest volume	Plus or minus 10% of approved AAC	Annual report to identify volume harvested on an annual basis, estimate of specie (Aspen, poplar, birch), percentage cull, and volume per hectare.
1.2.B	Cumulative harvest within cut control period	Plus or minus 5% of periodic AAC	Annual report to identify cumulative information as in 1.2.A within cut control period. Stewardship report to contain above information for the current reporting period and previous reporting periods.

Goal. Objective. Measure Reference	Measure	Target	Item to be included in annual and/or stewardship report
1.2.C	Mapped 20 year harvest sequence of approved FMP	Refer to "target"	Annual report to contain table comparing harvest area segregated into area identified in 10 year sequence and that which is not part of the 10 year sequence.
1.3.A	Dedicated GPRC staff member as Training Forester	One-half release time on an annual basis	Annual and stewardship reports to identify staffing levels dedicated to the training forest.
1.3.B	Competitive process for sale of GPRC wood	Secure multi-year educational partnership agreement	Annual and stewardship reports to contain information identifying length of educational partnership agreement and time remaining until its expiration.
1.4.A	Number of courses using the training forest	At least 90% of forestry courses incorporating the training forest into each course outline at least once	Annual and stewardship reports to contain list of forestry courses using the training forest at least once and those courses which do not.
1.4.B	A forestry program	Existence of an MoU/transfer agreement linked to forestry courses	Annual and stewardship reports to contain a table identifying students enrolled in the forestry transfer program.
2.1.A	A current landbase net down map	Revisit landbase deletion process for next FMP	Stewardship report to identify process and outcome linked to land base net down of the training forest.
2.1.B.i, 2.1.E.iii, 2.1.E.iv	In block roads reclaimed and reforested	All in-block roads reclaimed and reforested year that harvesting takes place	Refer to 2.1.E.iii
2.1.B.ii	In block road density	No more than 5% of block area roaded	Annual and stewardship reports to contain table delineating harvesting by block (year harvesting takes place, total area, area of block roaded).

Goal. Objective. Measure Reference	Measure	Target	Item to be included in annual and/or stewardship report
2.1.C	A growth and yield program	Establishment of first TSP and PSP	Annual and stewardship reports to contain data describing the number of plots established and their type.
2.1.D, 2.4.B	Distribution of cut block sizes over a 10 year period	Block size distribution mimics natural disturbances	Annual and stewardship reports to identify block size (ha) annually and cumulatively over the reporting period.
2.1.E.i	# of active operating units	No more than 2 units active in a 10 year period	Annual and stewardship report to identify which operating units have activity.
2.1.E.ii	Inventory of water crossings	A data base of water crossings	Annual and stewardship reports to identify water crossings by establishment year, location, crossing type, status, year removed.
2.1.E.iii	Inventory of roads	A data base of roads	Annual and stewardship reports to contain a table identifying in-block roads, their length, status (reclaimed, reforested, otherwise), and year activity takes place (constructed, reclaimed, replanted), extent that road was existing access; roads other than in block by establishment year, location, road class, status, year reclaimed, length, extent that road was existing access.
2.1.E.iv	Percent of road development utilizing existing access		Refer to 2.1.E.iii
2.2.A	Inventory of biodiversity	Completion within 10 years	In the stewardship report, identify progress towards inventory.
2.2.B	Area of MOM C, D, DC, CD stands	At least 10% of C, D, CD, DC stands classified as MOM	Annual and stewardship reports to contain table identifying for the active landbase total area by cover group and the amount of which is MOM.
2.2.D	A soil map of active land base	Completion within 10 years	Annual and stewardship reports to contain the number of soil pits established in the training forest in the identified time period.

Goal. Objective. Measure Reference	Measure	Target	Item to be included in annual and/or stewardship report
2.2.E	Existence of uncommon plant communities and sensitive sites.	A data base of sites	Report on sites identified and their status.
2.2.F	In block retention area over stewardship reporting period	8% of volume converted to area	In the Annual and stewardship reports identify current and cumulative data on net block area, total block area, and share of total area left as reserve when translated into volume equivalent.
2.2.G	Trumpeter swan habitat	Adherence to guidelines	Identify in stewardship report location of trumpeter swam water bodies and proximity to harvesting.
2.3.A.i	Watershed boundaries	A watershed map using DEM	In the stewardship report, identify whether a watershed map has been completed or not.
2.3.A.ii	Harvesting within watershed	Cumulative area harvested by watershed	In the annual and stewardship reports present data on the area harvested in each watershed as a share of the total area in the watershed.
2.3.B.	Season of crossings access	Winter/frozen access	In the reporting table of 2.1.Eii, include the timing of the accesses.
2.4.A	Age of stand at harvest	Age of D stands no less than 70 and for C stands no less than 90	In annual and stewardship reports, identify the average age of stands harvested.
2.4.B	Distribution of block sizes over control period	Deciduous stands on average 60 ha	In the stewardship report, identify size of blocks over the time horizon and the average for the period.
2.4.C.	Regeneration survey	D stands SR within 5 years and DC stands SR within 8 years	In the annual and stewardship reports, identify area harvested by block, specie group, year harvested, and status in year of the report (abated for fire hazard, regenerated).
2.4.D	Maintenance of riparian buffer		Identify activity within the passive landbase (Year, area, justification)
2.5.A	Debris piles	Debris piles to be abated to SRD standards	See 2.4.C
2.5.E	Fire salvage plan	Develop plan within 5 years	In the stewardship report, identify and comment on the plan.

Goal. Objective. Measure Reference	Measure	Target	Item to be included in annual and/or stewardship report
2.5.F	Detection of insect/disease within forest	Conduct survey of 100% of area within 5 years	In the stewardship report, identify and comment on the survey.
2.5.G	Noxious weed program	Develop a noxious weed program within 5 years	In the stewardship report, identify and comment on the program.
3.1.A.i	Public meetings	At least one meeting per year	In the annual and stewardship reports, present a table showing by year the number and place of public meetings.
3.1.A.ii	# FRAC meetings	At least two meeting per year	In the annual and stewardship reports, present a table showing by year the number and place of FRAC meetings.
3.1.A.iii, 3.2.A.i, 3.4.A	Stakeholder groups represented	At least 5 external stakeholder groups represented	In the annual and stewardship reports, identify the different stakeholder groups represented.
3.2.A, 3.1.A.iii, 3.4.A	Stakeholder groups represented	Representatives from forest companies, SRD and non-timber interest groups on FRAC	In the annual and stewardship reports, identify the different stakeholders, including non-timer interest groups, represented.
3.2.B	Forestry technical sessions	At least two per year by College faculty	In the annual and stewardship reports identify the technical sessions attended.
3.3.A.i	ISAC	At least one meeting per year	In the annual and stewardship reports, identify the number of ISAC meetings held.
3.3.A.ii	TF Steering Committee	At least 4 per year	In the annual and stewardship reports, identify the number of committee meetings held.

List of Abbreviations

AAC	Allowable annual cut
AB	Alberta
ABMP	Alberta Biodiversity Monitoring Program
ANHIC	Alberta Natural Heritage Information Centre
AOP	Annual operating plan
ASE	Arts, science and education
ASRD	Alberta sustainable resource development
AVI	Alberta vegetation inventory
BAFRM	Bachelor of Applied Forest Resource Management
BCIT	British Columbia Institute of Technology
BSc	Bachelor of Science
BSOD	Biodiversity Species observation database
C	Coniferous
CANFOR	Canadian Forest Products
CAPF	College of Alberta Professional Foresters
CD	Coniferous-deciduous
CIF	Canadian institute of forestry
D	Deciduous
DC	Deciduous-coniferous
DTP	Deciduous timber permit
E	East
ECA	Equivalent clearcut area
EST	Estimated
FMP	Forest management plan
FMU	Forest management unit
FRAC	Forest resources advisory committee
FW	Fish and wildlife
G13	ASRD designation for land area occupied by the GPRC training forest
GDP	General Development Plan
GPRC	Grande Prairie Regional College
GPS	Geographic positioning system
HA	Hectare
HFI	Head fire intensity
HR	Human resources
IRP	Integrated resource plan
ISAC	Internal stakeholders advisory committee
KM	Kilometer
LFN	Leave for naturals
M	meter
M^3	cubic meters
MD	Municipal districts
MLA	Member of the legislative assembly
MOM	Mature and overmature
MOU	Memorandum of understanding

N/A	Not applicable
NAIT	Northern Alberta Institute of Technology
No	Number
OGR	Operating ground rules
PEAK	Physical education and kinesiology
PFMP	Preliminary forest management plan
PIP	Public involvement plan
PLFD	Public Land and Forest Division
PSP	Permanent sample plot
RMA	Resource management area
RFP	Request for proposal
SHS	Spatial harvest sequence
SR	Satisfactorily restocked
SRD	Department of Alberta Sustainable Resources Development
TOR	Terms of reference
TSA	Timber supply analysis
TSP	Temporary sample plot
UNBC	University of Northern British Columbia
UOA	University of Alberta
Vol	Volume
W	West
WTR	Wildfire Thread Rating