Draft Forest Management Scenario Summary

Introduction

The UBC Group, the technical review team engaged by the Municipality of North Cowichan, has conducted a scenario analysis to evaluate Forest Reserve (MFR) and the values and services it provides.

The scenario analysis was conducted using a framework of scientifically credible forest models in combination with a set of criteria and indicators (C&I) established to quantify impacts on a broad range of forest resource values (Figure 1). A set of C&I have been assembled and refined for this purpose based on Round 1 feedback from the public engagement process, professional expertise and experience from previous work. A description of the specific indicators to be employed in the framework is provided in Appendix 1.

It should be noted that the scenario analysis is intended as a tool for exploring different options for managing the municipal forest reserve using a standardized set of generally quantifiable C&I. It will facilitate an evaluation of the trade-offs and synergies between specific ecosystem values and services that flow from different management choices. Moreover, the analysis is part of an iterative process designed to gather feedback from a wide range of stakeholders. Specifically, detailed output from the scenario analysis will be used to inform the next round of public engagement by illustrating the implications and trade-offs associated with each of the scenarios. Further refinement of scenarios and/or methods for weighting indicators will be evaluated after the next public engagement period is completed.
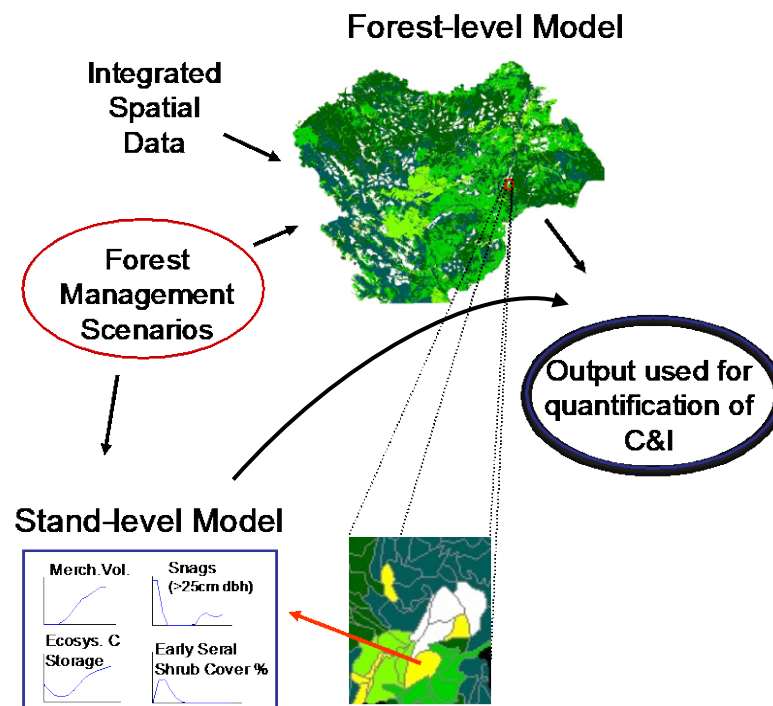
Figure 1. Illustration of the modelling framework used to evaluate alternative management scenarios. Model output is used to help quantify values for specific indicators. Some (but not all) modelled stand attributes are shown in the figure.

Scenarios Analysis

The four scenarios outlined below have been developed by the UBC team in response to feedback derived from the public engagement process. Two scenarios (1: Status Quo, and 4:Passive Conservation) were designed to represent "book ends" of the overall management spectrum for the Municipal Forest Reserve (MFR) with respect to harvest volume. The other two other scenarios represent intermediate options in terms of anticipated management intervention and harvest volume.

The possible development of a carbon project to provide revenue-generating credits has been the subject of much interest within the community. Although no scenario was solely developed to represent a carbon project, Scenarios 2, 3, and 4 could generate carbon credits. In all scenarios, the potential revenue derived from carbon credits and/or harvest has been assessed. In addition, each scenario reports on a broad range of ecological and social indicators of forest condition which are intended to help the public understand and visualize the immediate and longer-term outcomes of each scenario.

The objective of this exercise is to help the municipality and other interested parties develop a better understanding of the long-term implications of different management options on the MFR and the values and services it provides. Output from the modelling framework is used in combination with expert opinion to quantify each of the indicators at specific future time periods as much as possible. Each scenario is summarized and scored based on the complete set of C&I. Results from the scenario analysis will be presented to stakeholders to facilitate further discussion around selecting the most desirable options for managing the MFR. Next steps may include the formulation of additional scenarios for assessment within the modelling framework and/or gathering input from stakeholders that could be used to assign weights to each criterion to allow for objective scenario ranking.

1. **Status Quo**
   This scenario represents a continuation of historical harvesting practices within the MFR based upon the past 25 years of data records. Both the historical rate of harvest (volume and area harvested per year) and the methods of harvest will be emulated. No carbon credits will result from this scenario. Stands will be targeted for harvest considering potential yield, accessibility, and ecological impacts. Harvesting will be reduced in visually sensitive areas with levels of tree retention intended to mitigate visual impacts while allowing the model to meet annual harvest targets. This scenario provides a valuable reference point for evaluating the other scenarios and establishes a baseline to help determine the potential development of carbon credits in other scenarios. The average annual harvest volumes derived from the MFR in this scenario are expected to be targeted around 17,500 (m³/yr) based on past harvesting records. A similar scenario was evaluated as the historical baseline in the MNC Carbon Project Feasibility Assessment prepared in 2020.

2. **Reduced Harvesting**
   Annual timber harvesting in this scenario will be reduced to 35 to 50% of the historical harvesting rate compared to Scenario 1: Status Quo. The selection of stands and methods of harvesting will be designed to provide a balance between income and employment opportunities associated with timber harvesting while minimizing the impact of harvesting on visual aesthetics, recreation

opportunities, and biodiversity. The bulk of harvesting in this scenario will be variable retention (small openings) harvesting. Harvesting will be distributed across the MFR landbase but not in ecologically vulnerable and socially important areas. Road networks required to support harvesting will be included. The number of carbon credits generated under this scenario are anticipated to be less than Scenarios 3 and 4.

3. **Active Conservation**
   This scenario will focus on targeted harvesting with a goal of restoring/enhancing ecosystem conditions that promote biodiversity while providing some income from harvesting. Specifically, 1) remove some conifers from oak and arbutus woodlands to limit the competitive loss of woodland tree species and remove excessive shading to encourage development of a vigorous and diverse understory vegetation; 2) thin overly dense conifer stands to accelerate the development of old-stand features important for biodiversity; The number of carbon credits generated under this scenario will be greater than Scenario 2 but less than Scenario 4.

4. **Passive Conservation**
   The principal objective of this scenario is to let the forests within the MFR develop with minimal human intervention. This scenario is expected to enhance the development of wilderness recreation opportunities[1] by reducing the footprint of human activities. This scenario will likely generate maximum carbon credits as compared to any other scenario. Like Scenario 1, this scenario provides a valuable reference point for the overall analysis. The quantity of carbon credits generated from this scenario is expected to be similar to that derived from the no-harvesting scenario presented in the MNC Carbon Project Feasibility Assessment prepared in 2020 (average of ~19,000 t CO2e per year over a 30-year project period). The potential value of carbon credits has changed since the 2020 evaluation and has been updated as part of the current scenario analysis.

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[1] Recreation such as hiking where one is less likely to encounter clear signs of human activities and disturbance on the landscape (See Indicator 3.2.1, Appendix 1)

Appendix 1. Criteria and Indicators

The following criteria and indictors were evaluated to assess the impacts of alternative scenarios at predetermined time periods.

ECOLOGICAL

Criterion	*Indicator*
1.1 Sensitive Ecosystems	1.1.1 Area of sensitive ecosystems (SEI) impacted by harvest (ha or %)
1.2 Protection/Enhancement of Mature & Old Forest and associated bird habitat	1.2.1 Recruitment of old forest (ha)
	1.2.2 Quantification of bird habitat by species or groups (ha)
1.3 Ecosystem Carbon Storage / Emissions	1.3.1 Total ecosystem C storage within the Municipal Forest (MT C)
	1.3.2 Quantification of net CO2 emissions (reductions) associated with forest management (t CO2e)
1.4 Water Services	1.4.1 Total disturbed area in key watersheds (ha or %)
1.5 Regional Habitat Connectivity	1.5.1 Habitat Connectivity analysis incorporating adjacent forest areas

ECONOMIC

2.1 Timber Revenue	2.1.1 Total annual harvested volume (m³)
	2.1.2 Estimated net revenue after accounting for expenses ($) based on scenario specifics[1]
2.2 Carbon Revenue	2.2.1 Estimated annual net revenue from carbon credit sales ($)

2.3 Recreation Revenue	2.3.1 Not able to distinguish between scenarios[2]

SOCIAL

3.1 Visual Quality	3.1.1 Degree to which visual quality objectives are met (%)
3.2 Recreation Opportunity	3.2.1 Area affected by harvesting activities (buffer analysis)
3.3 Trail Access	3.3.1 Not able to distinguish between scenarios
3.4 Fire Risk	3.4.1 Area with different fire risk rankings (%) based on fuel types

Notes:

1. Costs of harvestings activities and estimated timber prices estimated based on the harvest systems and timber profile likely to be used/generated in each scenario.

2. Indicators for which we were unable to distinguish between scenarios have been flagged accordingly.