

# Some Examples of Management Questions for K2: Arising from the sensitivities and proposed actions in K1

## As a starting point for K2 Clients

### **Introduction**

This document describes broad themes emerging from the 2009 phase 1 of the Kamloops Future Forest Strategy (K1), with one or two key examples of possible questions for each theme that Phase 2 (K2) might address. These questions came from the *Developing Questions Table Dec 15-09 (separate file)* that compares ecological sensitivities, management sensitivities, and management adaptation actions across the five subzone groupings in the Kamloops TSA (from K1). The following themes are used to best reflect potential linkages functionally within the current K2 project and to provide a framework to allow clients to more clearly identify their priorities for K2 as the workshop proceeds (Fig 1).

#### ECOLOGICAL SENSITIVITY THEMES

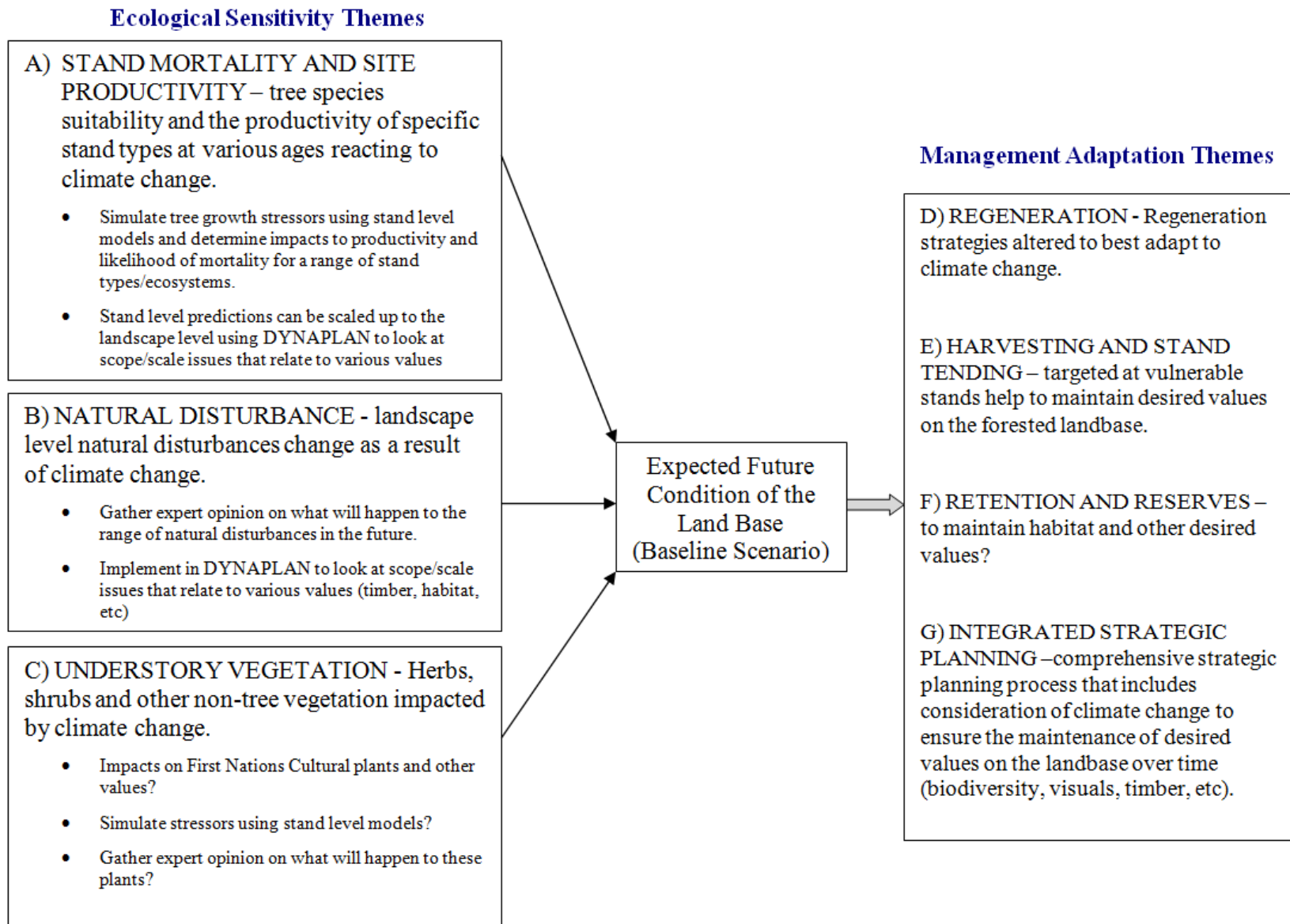
- A. Stand Mortality and Site Productivity
- B. Natural Disturbance
- C. Understory Vegetation

#### MANAGEMENT ADAPTATION THEMES

- D. Regeneration
- E. Harvesting and Stand Tending
- F. Retention and Reserves
- G. Planning

The example questions for each theme are provided to prompt ideas for questions from clients at the Feb 10-11 Kamloops Workshop. Note that the scale of interest is listed under each key question. It should not be assumed that “landscape” necessarily means that landscape modelling should be done to address the question – a simple scaling up from the stand to the landscape may satisfy the question. Matching questions to models is an exercise that is intended to be completed as the priorities for K2 are determined. K2 will use models that can directly incorporate changes in climatic conditions to assess the impacts on tree vulnerability and productivity, and where the outcomes under different management actions and climate change scenarios can be assessed either at the stand level or landscape level. These models will be reviewed in our February workshop.

Please consider the few questions we have provided here and come to the workshop prepared to expand on these questions, or provide other questions you think are important. It will become apparent that some questions will be easier to answer than others and not all questions could possibly be addressed within the timeframe of this project. For that reason we will need to establish priorities for K2 clients, and then carefully select the questions that can realistically be addressed from those identified by the clients and the K2 team.



**Fig 1.** An Overview of the themes for potential management questions and their anticipated linkages in the project.

# ECOLOGICAL SENSITIVITY THEMES

## ***THEME A: Stand Mortality and Site Productivity***

This first theme is focused on trees (stands) and site productivity because of its importance for disturbance, ecosystem function, and habitat structure. A major driver of management actions recommended in K1 is the impact of climate change on mortality in stands and the subsequent changing forest landscape for timber, habitat / biodiversity, fire risk in the urban interface, and other values or considerations.

Many of the stands that are currently young and will be growing and maturing through this period of anticipated climate change may be poorly suited to the evolving climate (and changing extremes). Our potential to influence these stands with management is considerably lower since they are already well established and likely will need to grow over significant time period before structure and composition can be altered under a breakeven (economic) treatment. This same issue exists for recent plantations –they will likely need to persist on the landbase for an even longer time to reach an economic condition where alternate species can be established.

As the climate changes, it is anticipated that some currently productive sites for timber will become not just uneconomic, but may potentially fall below their productive capacity to contribute to sustainable timber harvests. Some of these areas may even move from being forested to being semi-forested or non-forested. As important context for management to follow, stand mortality and productivity are central themes for further exploration.

### **Example Questions**

- 1. How much area within a given subzone group will move out of the Timber Harvesting Landbase (THLB)<sup>1</sup> as productivity for timber declines with climate change (most relevant to Subzone groups A and B – see Developing Questions Table2.docx for subzone group categories<sup>2</sup>)?**

**(Scale of interest = landscape level with the stand as the starting point to look at stand level stress)**

---

<sup>1</sup> That area assumed available for harvesting and forest management due to its ability to produce economic sustainable harvest opportunities for timber.

<sup>2</sup> The table provides a breakdown of sensitivities and recommended management actions (from K1) by Eco Grouping that comprises a number of BEC subzones within the Kamloops TSA.

2. **How susceptible are certain mature (and old) stand types within the subzone-group to mortality and at what point might mortality significantly limit their value for timber, biodiversity and other values? (linked with THLB impact questions above)**

**(Scale of interest = landscape level with the stand as the starting point to look at stand level stress)**

3. **How susceptible are certain young-to-maturing stand types (e.g., young regenerated lodgepole pine plantations) within the subzone-group (E.g., subzone group A) to mortality and at what point might mortality significantly limit their value for the range of values?**

**(Scale of interest = landscape level with the stand as the starting point to look at stand level stress)**

4. **How will climate change (and associated natural disturbances) impact the quality and amount of broadleaf stands in the landscape?**

**(Scale of interest = stand and landscape levels)**

## ***THEME B: Natural Disturbance***

Natural disturbance emerged over the past twenty years as a contextual focal point for management of natural ecosystems in BC. Consideration of *natural disturbance regimes* and the *range of natural variability* (RONV) are used to help understand plant communities and ecological processes, and integrating this knowledge into management. Climate change threatens to alter this paradigm substantially in southern BC. It is therefore imperative that we explore potential impacts on natural disturbances and consider these changes as we consider management adaptations.

1. **How might natural disturbance influence changes in structures and composition across the landscape?**

**(Scale of interest = landscape level)**

## ***THEME C: Understory Vegetation***

- 1. What First Nations culturally important plants are most at risk within a given subzone group, and how might these risks unfold over time?**

**(Scale of interest = stand and landscape levels)**

## **MANAGEMENT ADAPTATION THEMES**

### ***THEME D: Regeneration***

A significant management recommendation in K1 is to regenerate sites with a greater diversity of species than previously used within a given subzone group. The species suggested have been used as a minor species within the various subzones, or they are currently slightly out of their natural range (by elevation or latitude). A major theme is to plant less lodgepole pine in subzones where considerable lodgepole pine is currently planted.

- 1. How much of a given subzone-group can be planted right now with the recommended new species mixes?**

**(Scale of interest = stand and landscape levels)**

- 2. When might the majority of the subzone-group be suitable for planting the recommended species mix? OR - When is the current approach to species planting (perhaps lodgepole pine dominated) compromised by climate change?**

**(Scale of interest = stand and landscape levels)**

- 3. What difference might planting of recommended novel species mixes (and associated site prep treatments) make for timber supply or future harvesting opportunities?**

**(Scale of interest = stand and landscape levels)**

## ***THEME E: Harvesting and Stand Tending***

Harvesting (both partial-cutting and clearcutting) and stand tending are powerful tools to affect the character of the landscape. Replacement of stands and alteration of structures and composition can be used strategically to build resilience and promote adaptations that could reduce impacts on key forest values.

- 1. How might targeted harvest of vulnerable stand types (and conversion to more resilient species mixes) influence timber supply over time, when considered with climate change?**

**(Scale of interest = landscape level)**

NOTE: Vulnerable stands are those that over the next fifty years or so have a high number of ecological and management sensitivities that will likely prompt significant mortality and ecological change.

- 2. How might targeted harvest of vulnerable stand types (and conversion to more resilient species mixes) influence habitat supply and biodiversity over time, when considered with climate change?**

**(Scale of interest = landscape level)**

NOTE: Vulnerable stands are intended to be the same as those defined above for #1.

- 3. How may the risk of interface fires increase over time, and how much difference could fuel management treatments make?**

**(Scale of interest = stand and landscape levels)**

## ***THEME F: Retention and Reserves for Conservation of Biodiversity***

Reserves and retention are generally designed to work together for conservation strategies. Currently in BC we have numerous requirements for reserves, many of which are considered to be spatially static. All of our assumptions and objectives for reserves and retention must be tested in the context of climate change and the uncertainty that accompanies it.

- 1. How will climate change (and associated natural disturbances) impact the integrity of reserves that are currently in place for a particular purpose (Old**

**Growth Management Areas, Identified Wildlife Habitat, Designated Winter Range and others)?**

**(Scale of interest = stand and landscape levels)**

### ***THEME G: Integrated Strategic Planning***

Climate change underscores the importance of managing and planning in a truly sustainable and well-integrated fashion. Comprehensive strategic planning analyses of ecological and management trends will highlight emerging issues over time, leading to the design of strategies with targets and indicators to address these issues, and the evaluation of a range of planning scenarios to integrate these strategies most effectively.

While all adaptive management actions (previously addressed) could be included under this theme, we have only included adaptive management questions specifically related to such a planning process, or value-related planning questions that hinge on such a planning process.

- 1. How important is it to design a comprehensive strategic plan for biodiversity that considering impacts of climate change at various scales over time? What impact will it have on risks to species and habitat supply?**

**(Scale of interest = landscape level)**

- 2. Without any special management for climate change, what might happen to visual landscape management in areas where that objective is relevant?**

**(Scale of interest = landscape level)**

- 3. How might water supply within an average (or specific) watershed be impacted over time by climate change?**

**(Scale of interest = landscape level)**