Translating Climate Futures Into Forest Management Guidance: the experience from British Columbia

Harry Nelson

Faculty of Forestry

University of British Columbia

Vancouver, BC, Canada

AFORCE Workshop

Paris, France

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Overview

- Adaptation and information requirements
- What kind of information and how
  - Science and management partnerships
  - Knowledge and uncertainty
- The Case Studies
  - The approach and methods
  - The outcomes
- Concluding Remarks

From a survey of the 5000 registered professional foresters in British Columbia from 2013: The biggest barriers I face in working to minimize the impacts of climate change in my forestry decisions are (check all that apply):

Response	Chart	Percentage
Lack of employer awareness of impacts.		12%
Lack of employer interest in minimizing impacts.		18%
Lack of personal knowledge, expertise or ability.		32%
No authority to make adaptation recommendations/decisions.		33%
Lack of strategic vision or policies that support innovation/diversification of practices.		43%
Lack of guidance, standards or best practices.		45%
Costs are prohibitive.		17%
My workload allows little time for this.		25%
No barriers.		14%
Other, please specify...		18%

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No authority to make adaptation recommendations/decisions.		33%
Lack of strategic vision or policies that support innovation/diversification of practices.		43%
Lack of guidance, standards or best practices.		45%
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Other, please specify...		18%

Need for Science-driven information

In the US, the USFS slow to implement CC considerations in planning and on the ground

- Lack of local information
- Absence of policy-driven mandate
- Reticence to address complex issue
- where magnitude and timing are uncertain; and
- Division of values among stakeholders

Littell, Peterson, Millar, O'Halloran. U.S. national forests adapt to climate change through science-management partnerships. Climatic Change. 110:269-296.

What kind of information?

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How can science/models help resource managers around adaptation?

- Vulnerability assessments that help prioritize risks
- Assist managers in understanding potential tradeoffs
- Relate actions to outcomes

- Platform for engagement and communication of risks

Scarlett 2010

The Role of Modeling

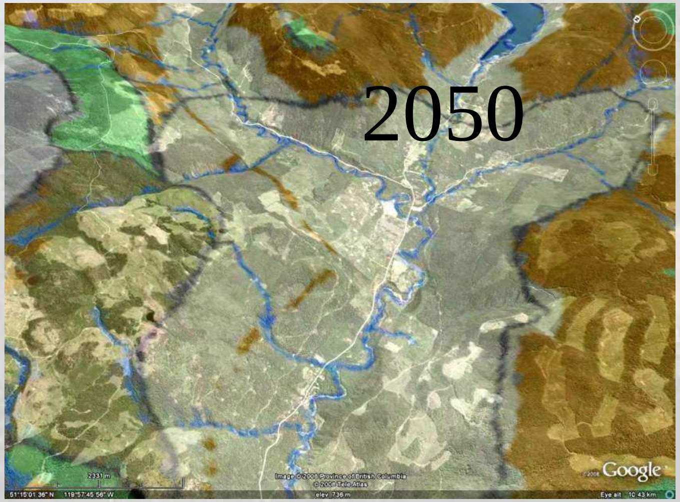
- It allows us to "fast forward" through time and simulate under different scenarios future outcomes

2009

Modelling suite

A.K.A.

Our "time machine"

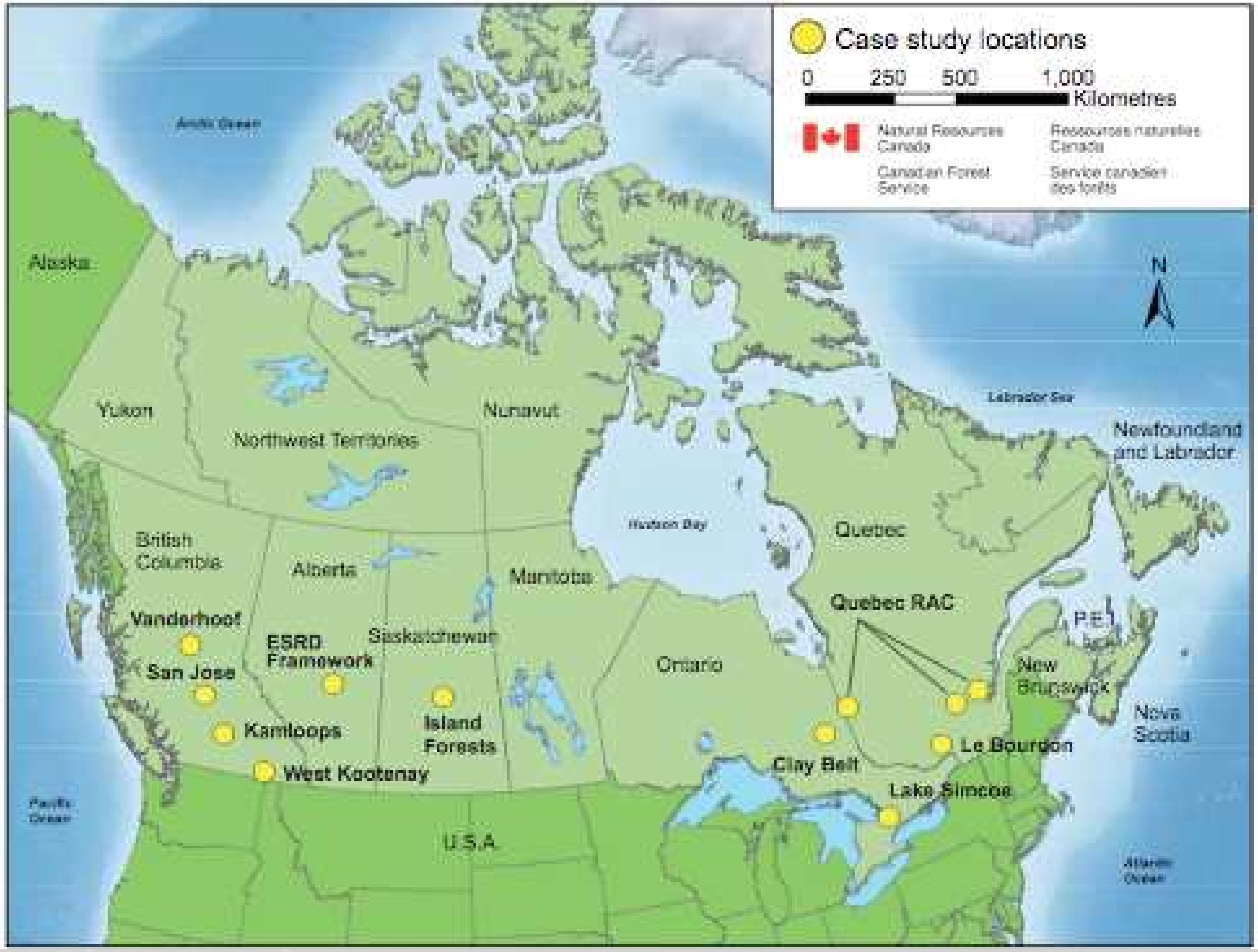


Developing the Decision-Making Framework

To offer management guidance need models that link Climate → growth → management

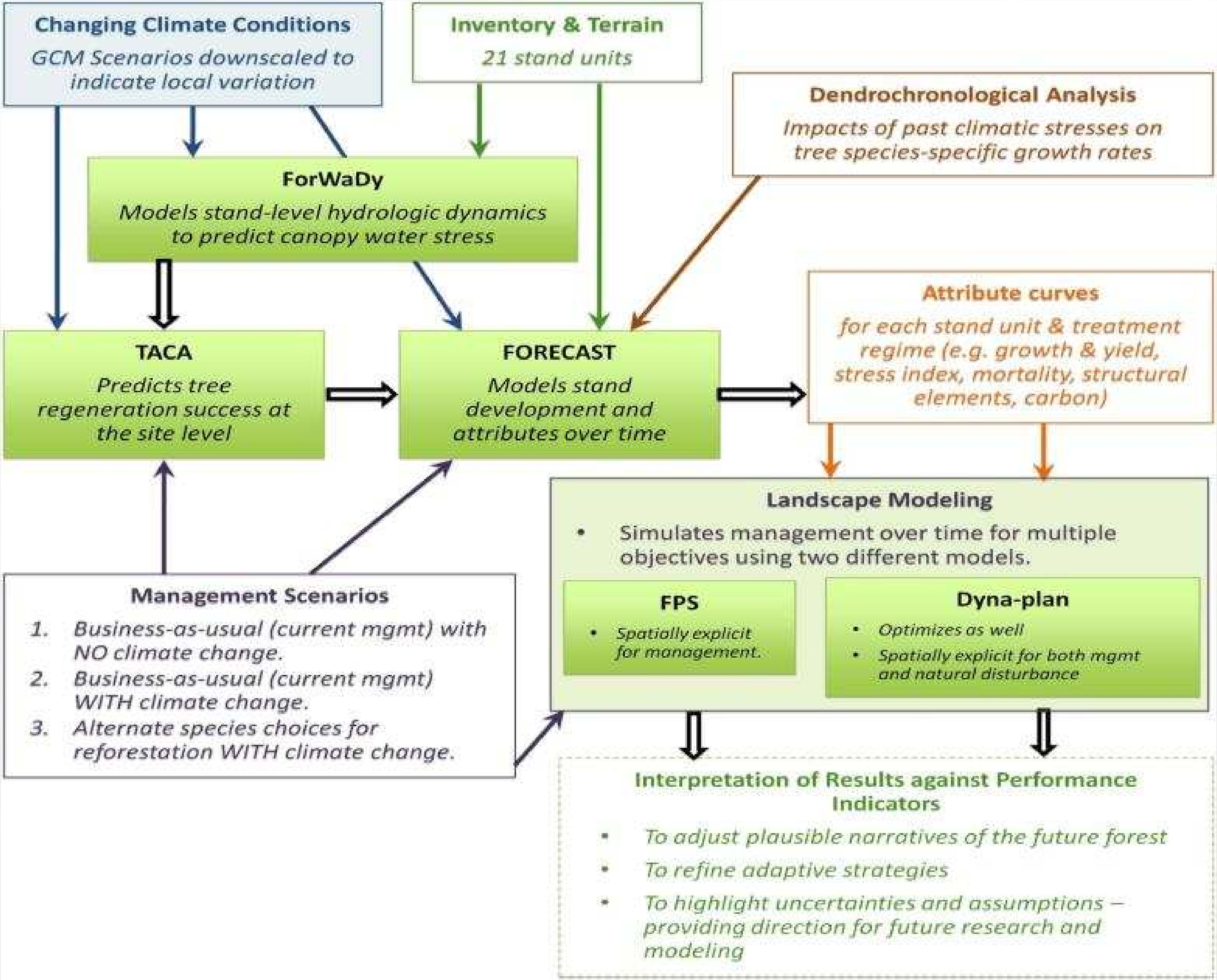
- Impact of climate on forest renewal (**regeneration**)
- Impact on growth (**productivity**)
- Impact on mortality (**disturbance**)
  - tailor model to regional characteristics and conditions
  - allow for diverse responses
  - ideally scale across different levels and integrate assessments across different resource values

Case Studies

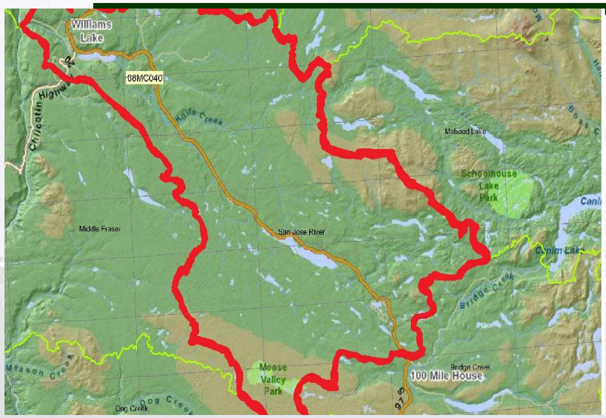


From Johnston and Edwards 2013, Adapting Sustainable Forest Management to Climate Change: An Analysis of Canadian Case Studies

Modeling Suite and Approach: Kamloops



Modeling Suite and Approach: San Jose



START: Initial Landscape (Forest Inventory)

Climate Scenarios

Stand dynamics

Regeneration

Growth and Yield

Landscape dynamics

1. Disturbances

MPB

Management & Harvesting

2. Forest Growth

Policy Scenarios

- Water Management
- Adaptation
- Sustainability

Ending Landscape (Forest Inventory)

Satisfying outcomes?

Natural Processes

Human processes

The Outcomes: Resulting Management Guidance in Kamloops

Guidance to Adapt Forest Management for Climate Change in the Kamloops TSA.

FIRST APPROXIMATION (June 7, 2012) which should be viewed as a continuous work in progress.

Based on:

> ***Validating Impacts, Exploring Vulnerabilities, and Developing Robust Adaptive Strategies under the Kamloops Future Forest Strategy (K2-2011)*** – Future Forest Ecosystems Scientific Council (FFESC) Interdisciplinary Climate Change Adaptation Research for Forest and Rangeland Ecosystems.
>
> And
>
> ***Adapting Forest Management in the Kamloops TSA to Address Climate Change*** – The Kamloops Future Forest Strategy (K1 – 2009)

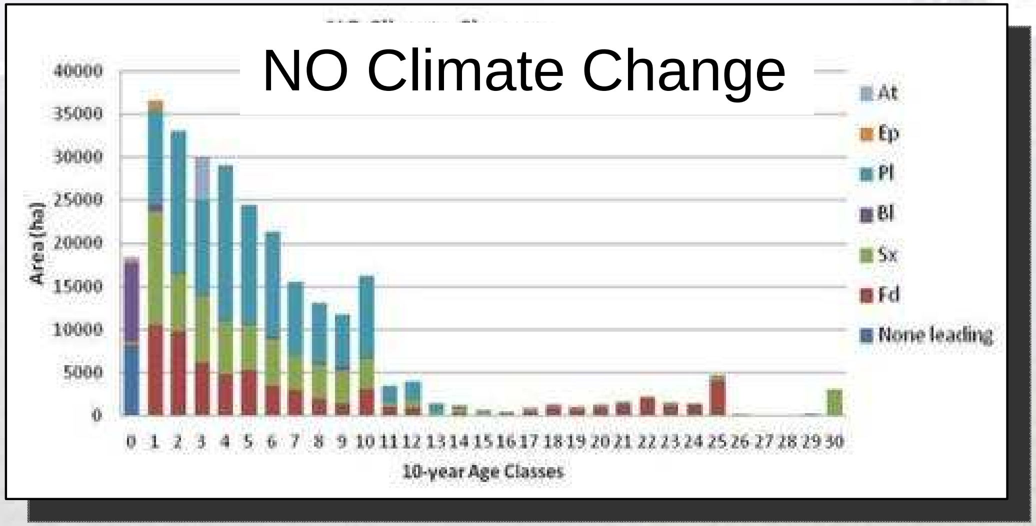
Forest Resources Management
University of British Columbia,
Symmetree Consulting Group Ltd.,
Forsite Consultants Ltd.

INCREASING VULNERABILITIES

Timber Flows BEYOND the 100 year simulation:

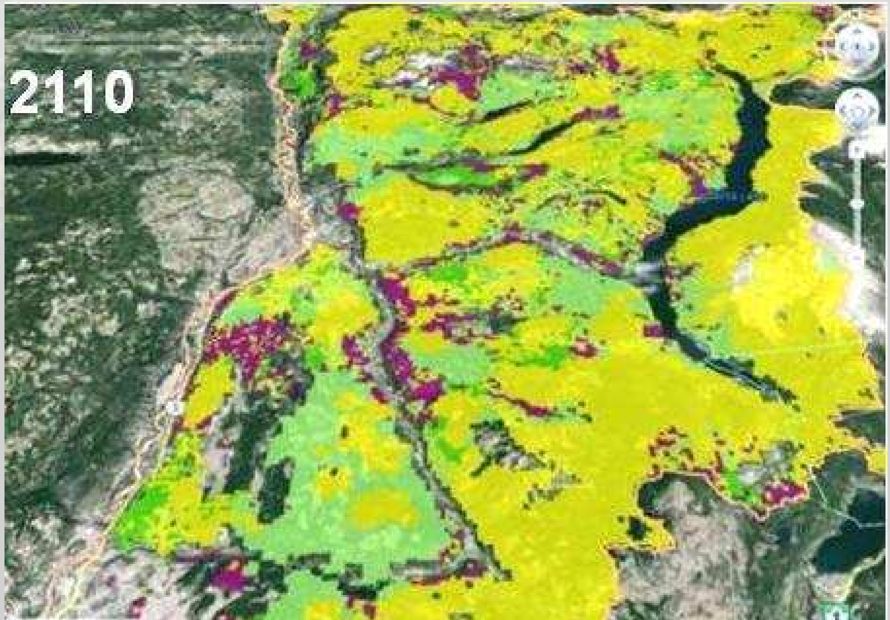
- Could be headed for a big falldown in harvestable timber.

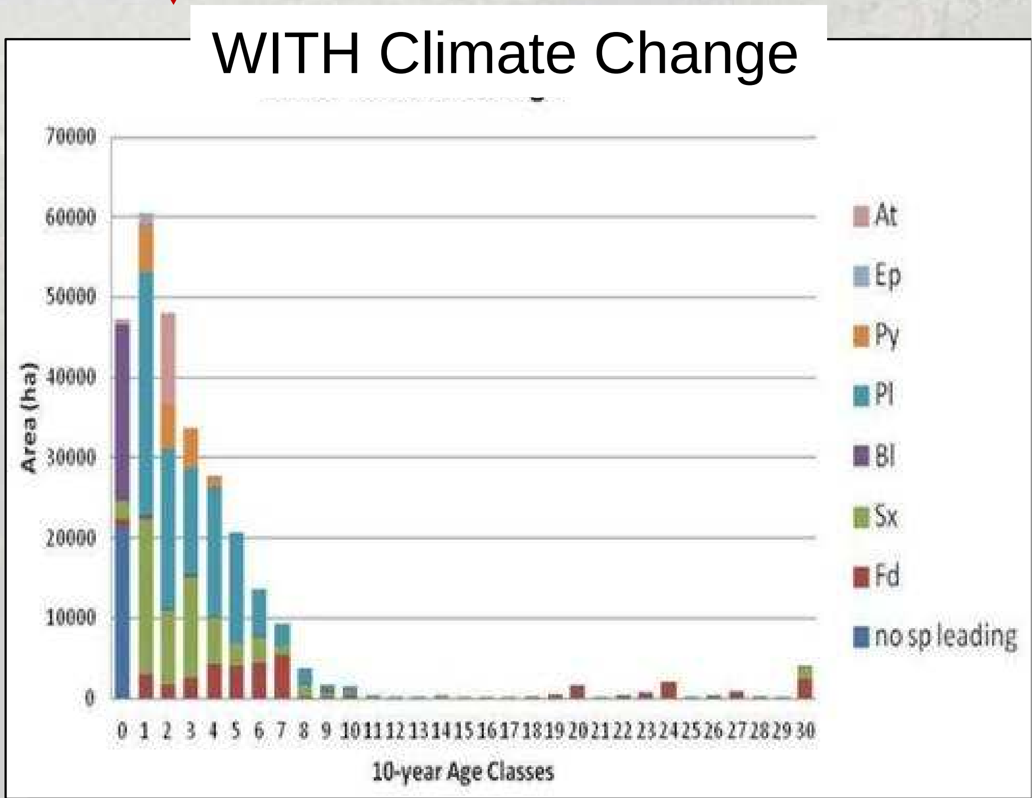
2110



Forest Age

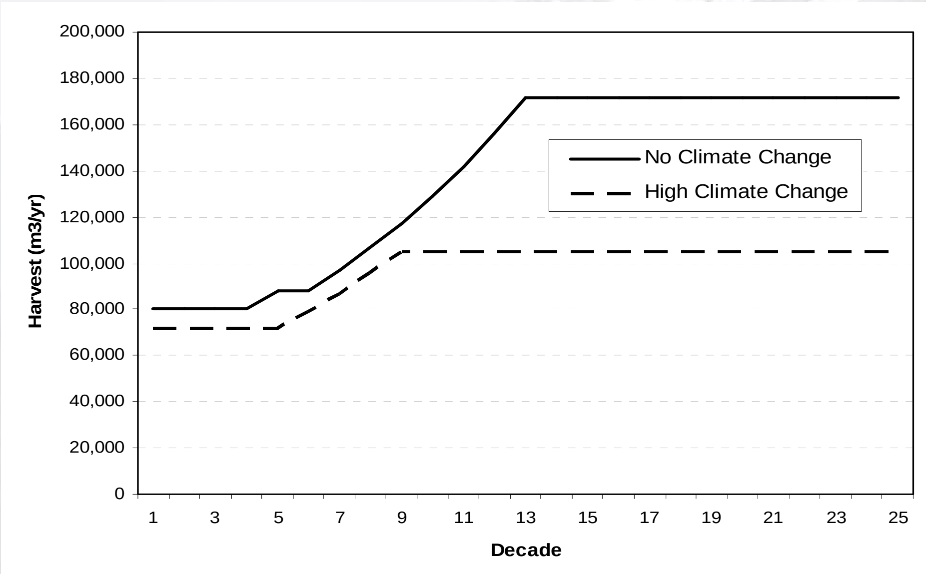
- 0-30 yrs old forest
- 31-60 yrs old forest
- 61-100 yrs old forest
- 101-139 yrs old forest
- >140 yrs old forest

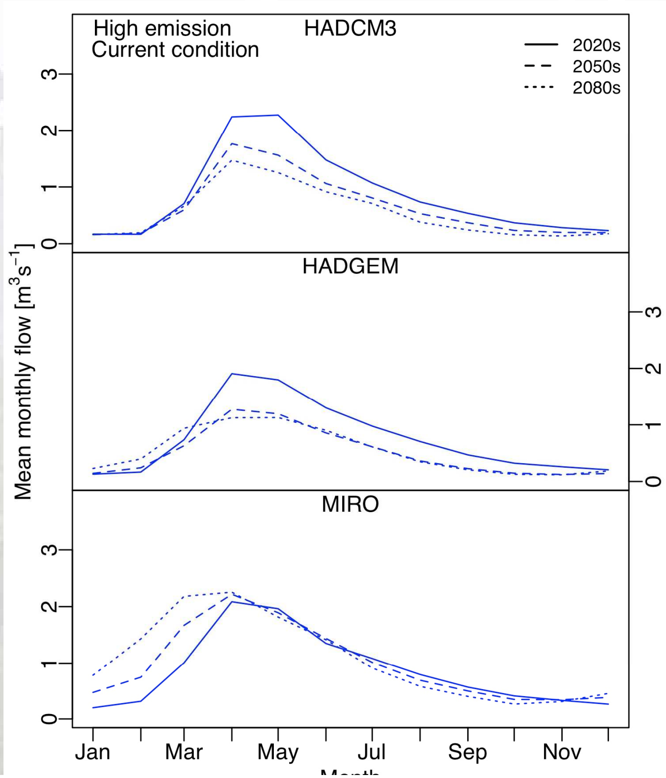


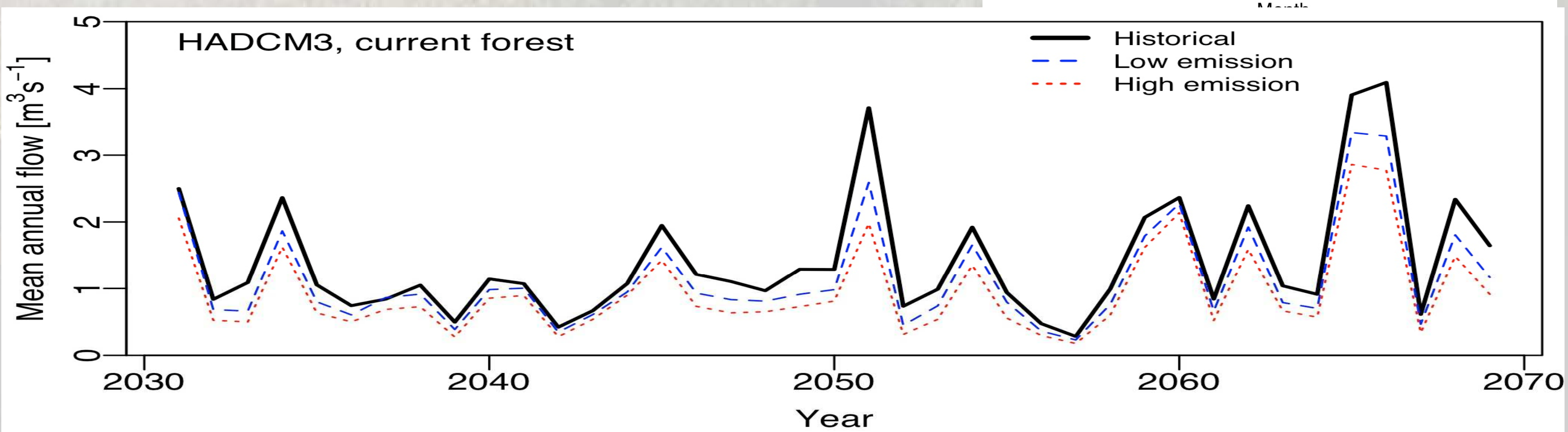


The Outcomes: San Jose

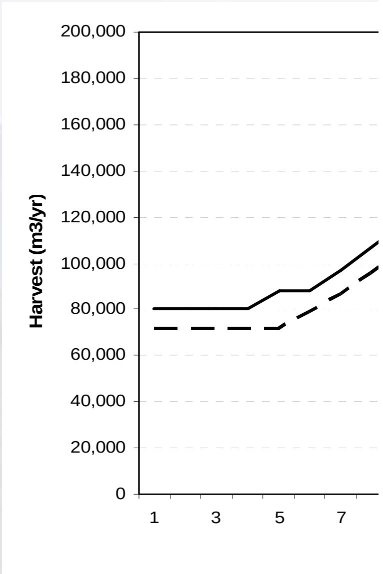
- Increasing vulnerabilities







The Outcomes: San Jose



YOU ARE INVITED

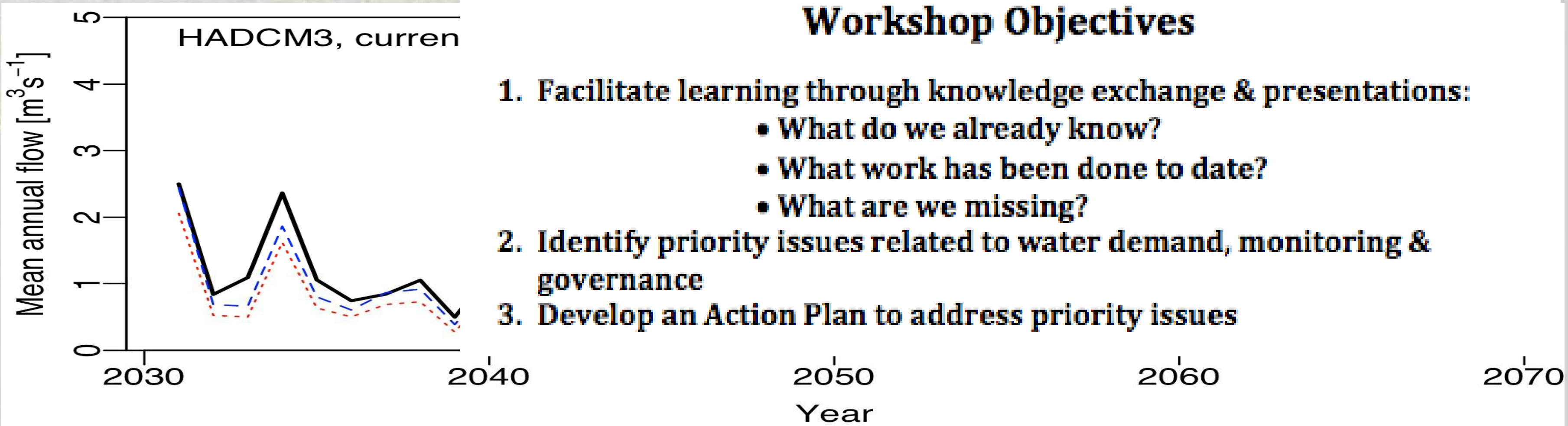
Planning for Collaborative Stewardship in the San Jose Watershed

Monday, April 29, 2013
8:30 AM – 3:00 PM
Lunch provided

Room 106, Pioneer Complex
Williams Lake, BC

Workshop Objectives

1. Facilitate learning through knowledge exchange & presentations:
   - What do we already know?
   - What work has been done to date?
   - What are we missing?
2. Identify priority issues related to water demand, monitoring & governance
3. Develop an Action Plan to address priority issues



Concluding Remarks: the issue of uncertainty and limits of information

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Ecological Landscape (Ecozones)	Associated BEC subzones	Guidance	Details
Plateau	Transitional to higher elevations (e.g. MSdm, SBS mm ESSFdc)	Avoid conversion of Douglas-fir or Spruce leading stands to Pli leading stands	Manage for a majority of Fd, Py, Lw, Pw and other appropriate non-pine species. Restrict Pli to 20-30% of stocking or restrict to "acceptable" stocking status in silvicultural surveys.
		Encourage species diversity across the landscape.	On average across the landscape, maintain species diversity at natural / historic levels. Target warm lower elevation sites for increased amounts of Douglas-fir (e.g. 20-35%) where it is ecologically feasible.
Plateau (cont)	Transitional to higher elevations (e.g. MSdm, SBS mm ESSFdc)	Maintain presence of At on landscape for habitat and species diversity	Avoid removal of aspen (where concentrated) through brushing and other activities. Make strategic use of stratification and free-growing stocking standards.
Wet ESSF	e.g. ESSFwk	Encourage tree species diversity as much as possible across the landscape	Spruce is still a good choice for regeneration – monitor carefully for increased weevil damage at lower elevations, where redcedar should be gradually mixed in.

Harvesting:

The harvesting guidance below is strategic in nature and as such requires thoughtful strategic planning directing well-coordinated tactical plans. Work will be necessary to identify the vulnerable stand types and make appropriate decisions regarding economics and timing of treatment. Incentive and other mechanisms not yet in place may be needed.

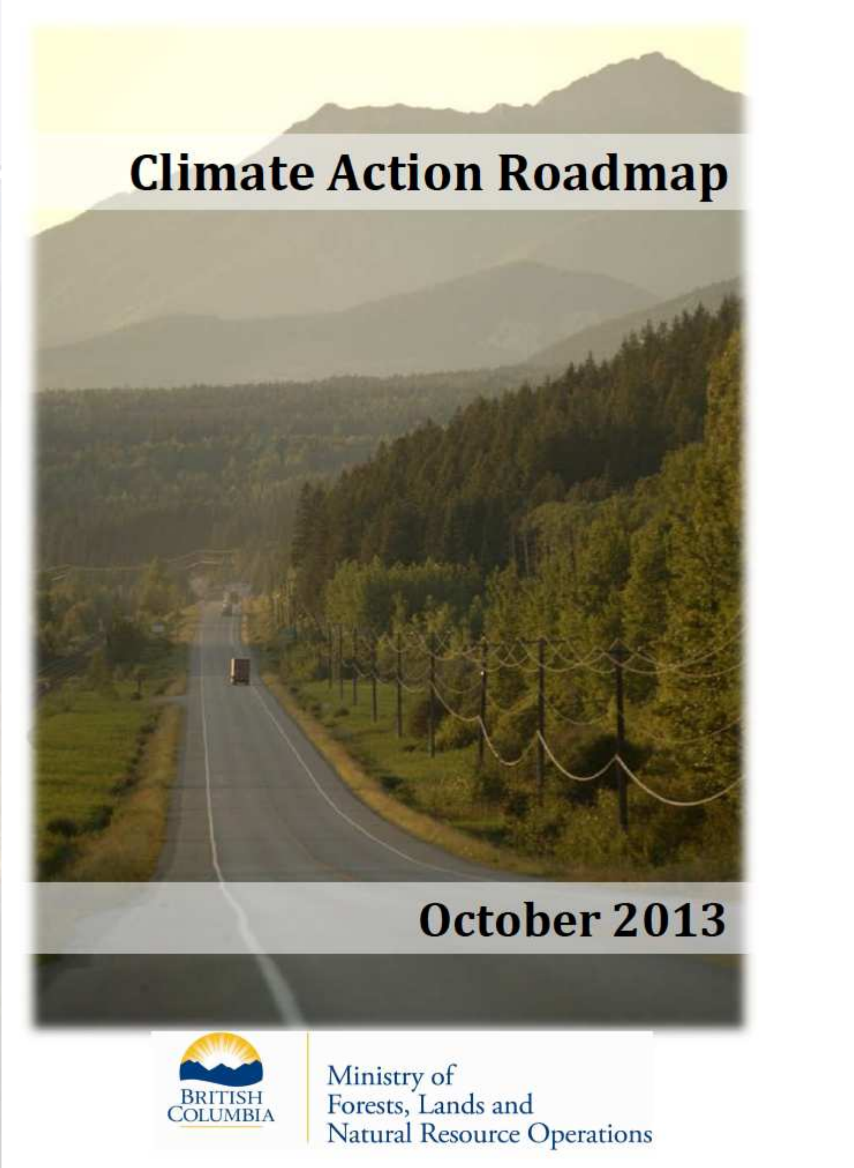
Ecological Landscape (Ecozones)	Associated BEC subzones	Guidance	Details
Dry Fdi (Py)	IDF and PP subzones too dry for Pli	Reduce fuels with commercial thinning and/or juvenile spacing	With well designed fire management strategies encourage vigor and health and reduce fire risk by significantly reducing stand stocking densities.
Dry subzones with Pli	IDF with Pli (e.g. IDFdk) and very dry MS (e.g. MSxk)	Targeted harvesting to address high risk stands.	Target stands more vulnerable to fire (with climate change) as a priority for harvesting, retaining those stands that are less vulnerable for future passes and other objectives.

3

Guidance was developed with inputs from practicioners that strengthened modeling that also helped in validation of outputs…

Concluding Remarks: the issue of uncertainty and limits of information

We find ourselves in an emerging paradox where while information is essential it is not the lack of information itself that is the issue- we either have too much or will never have it



Assess: Climate Action Toolkit

Sample assessment tools

- PCIC Tools and Data
- Plan2Adapt
- Future Forest Ecosystem Scientific Council Output
- Climate Change Vulnerability Assessment for British Columbia's Managed Forests

Manage: Climate Action Toolkit

Sample management tools

- FLNR Climate Change Forest Policy and Guidance
- 6 Step Adaptation Planning Process
- CBT rapid action planning
- FAO Climate Change Guidelines for Forest Managers
- FLNRO Tree Species Selection Tool

Current research addressing governance and enabling decisions

Project assessing economic instruments for adaptation to climate change

- Collaborative research involving the Provincial government, Federal government (CFS), licensees and other stakeholders, funded by Federal government (NRCan)
- Organized around three major risk areas: fire, forest health, and forest resilience
- Goal: identify promising instruments for implementation