

Ecosystem Vulnerabilities – forecasting change, identifying thresholds, fostering resilience

Panel Members:

Harry Nelson, UBC

Craig Delong, Ecora Resources Group

Rita Winkler, MFLNRO

Lauchlan Fraser, MFLNRO

Rachel Holt, consultant

Ecosystem: FFESC Research Projects- many vulnerabilities and values

- Impacts-
 - Forest pests
 - Forest diseases
 - Invasives
 - Drought
 - Changing hydrology
 - Extreme weather
 - Fire
- Management Values
 - Forest health
 - Biodiversity
 - Timber supply
 - Water supply
 - Watershed health
 - Rangelands
 - Fuel hazards
 - Carbon

Ecosystem vulnerabilities: Desired Outcomes

- Connected landscapes- landscapes allow for species migration & minimize risks associated with wildfire, invasive species & pests/pathogens (appropriate retention, silviculture systems, species selection etc.)
- Silviculture strategies facilitate species survival, health, growth, migration.
- Minimal negative impacts to forest and range productivity and biodiversity by invasive species (exotics, pests & disease)
- Forest and range management focuses on regions and sites where benefits will be greatest – i.e. management in areas where:
 - risks from drought, forest health issues, and wildfire can be minimized,
 - risks to ecological services (e.g., water supply) can be minimized, and
 - growing sites are most productive.
- Forest management practices support sustainable water supplies in areas vulnerable to drought stress.

Ecosystem vulnerabilities:

Reforestation

- Promote tree species and genetic diversity at landscape and stand scales during planning:
- design comprehensive strategies to manage the composition, density (biomass) and age classes of stands and landscapes to increase resilience – including appropriate harvesting and reforestation strategies. Ensure appropriate landscape pattern and composition (e.g., mix of hardwoods and conifers)
- develop and use tree species selection decision support tool to guide appropriate choices of tree species, populations and densities to improve productivity and reduce risks
- promote resiliency by increasing stand age and species diversity (e.g., wrt hardwoods, diverse seral stages)
- use site preparation to enhance species survival and growth (e.g. increase moisture availability)
- develop appropriate fertilization strategies that help ensure crop trees reach rotation age, increase carbon storage, etc.
- ensure future seed supply - particularly of more resilient species that will be in greatest demand and where intermittent seed crops and extreme weather may limit seed supply
- focus management on currently productive sites and those likely to remain more productive under future climates, and reduce efforts on poor sites

Ecosystem vulnerabilities:

- All of these projects linked these areas in order to generate information, tools, or recommend actions
- How was the assessment framed and how did that influence focus
 - What scope was chosen-provincial, regional or local
 - what ecosystems and impact were considered
- What values were identified or specifically considered
 - Was it from legislation, stakeholder group, area of expertise, other?

Ecosystem vulnerabilities: Assessment Process

- How did you work through the linking?
- Winnowing down the laundry list
 - Identifying impacts and relating them to risk
 - identifying options
 - screening options
- How these then lead to actions (or information can be used)

Ecosystem vulnerabilities: Extending Assessment

- Can process be translated to other values/places?
- Can information generated be used beyond project? Did it lead to any kind of explicit risk rating?
- Does action make sense in context of other values?
- Is action tied back to decision-making framework and /or users?

Ecosystem vulnerabilities: Projects

- Panel's FFESC projects:
 - Harry Nelson – adapting forest management planning and practice
 - Craig Delong – Drought and Tree and Stand risk analysis
 - Rita Winkler – Climate change and natural disturbance impacts on forest hydrology
 - Lauchlan Fraser-Climate change and rangelands
 - Rachel Holt-Prioritizing risks and resiliency

Managing for the Ecological and Socioeconomic Effects of Climate Change on BC Rangelands



Ministry of
Forests and Range



Lauch Fraser



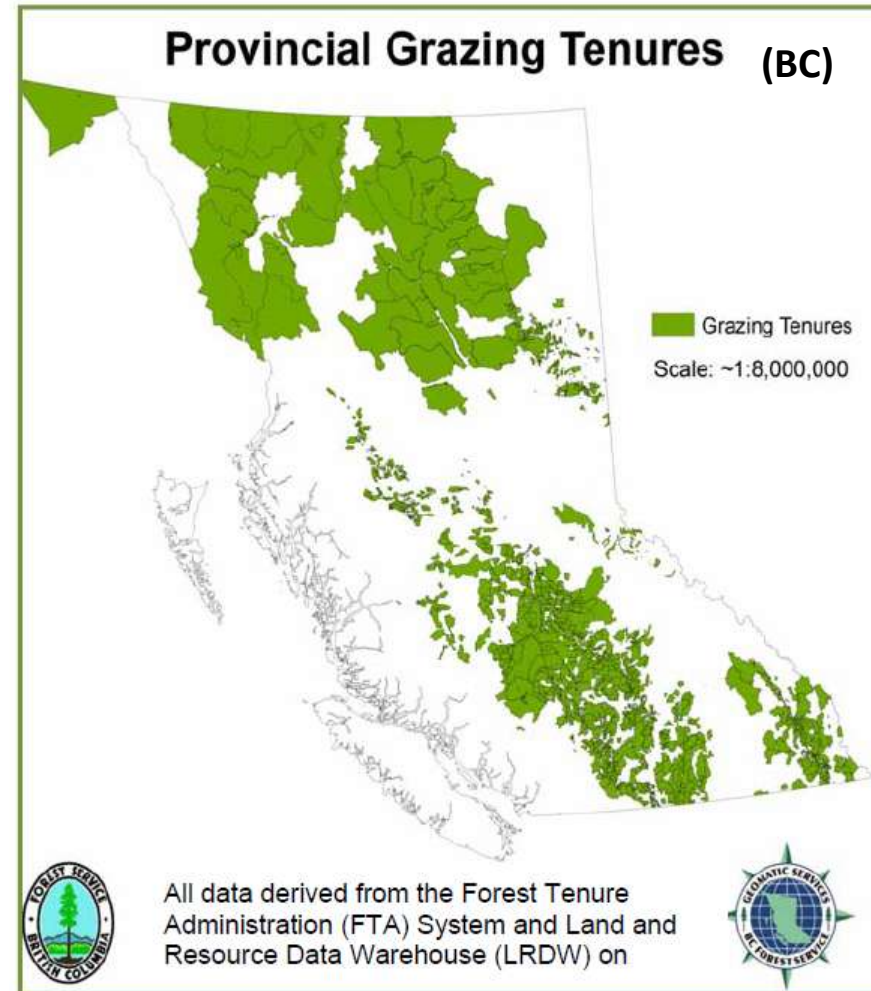
THOMPSON RIVERS
UNIVERSITY
KAMLOOPS, BC

Future Forest Ecosystems Scientific Council

Grazing



**Rangelands in BC
occupy about 58 million
ha on a 95 million ha
land base**



Primary Objectives:

- 1) Test effects of climate change on grassland ecosystem stability.**
- 2) Identify existing or new financial tools based on economic modeling that may be viable to support sustainable agriculture and grasslands conservation in BC.**
- 3) Forge policy recommendations for government that will support a viable and ecologically sustainable ranching industry in BC.**

- 10 Teams**
- 39 Participants**



Range Team
Survey Team
5 Ecology Teams
Natural Capital Team
Planning Team
Extension Team

Key strategies developed:

- Maintain an aggressive weed control program against high priority weeds especially in areas projected to have significant losses of perennial herbaceous plant species.
- Start the process of reducing AUM allocation for pastures where declines in forage supply due to climate change can be verified.
- Start the process of increasing AUM allocation for pastures where increases in forage supply due to climate change can be verified.
- Develop a monitoring program with the objective of detecting forage supply changes resulting from climate change.
- Adopt livestock management regulations and practices that can deal with low or highly variable forage supply.



QUESTIONS?

Vulnerability, Resilience and CC: Adaptation Potential for Ecosystems and Their Management in the West Kootenay

Prepared for Panel on : *Ecosystem Vulnerabilities –forecasting change, identifying thresholds, fostering resilience*
UBC June, 2012

www.kootenayresilience.org



Greg Utzig, P.Ag. and
Rachel F. Holt, Ph.D., R.P.Bio

Climate Change Risk Analysis and Decision Support Tool

Craig DeLong – overall and stand component lead

Vanessa Foord (MFLNRO) – landscape component lead

Bruce Rogers (MFLNRO) – stand component lead

Hardy Griesbauer (CNC) – data analysis

Craig Nitschke (U of Melbourne) – TACA advisor

Goals

- To develop a tool that assigns the relative risk of forest stands to climate change-induced mortality from drought and related drought-induced biotic agent impacts
- To develop a tool to predict landscape level risk based on triggers to extreme events such as landslides, floods, wildfire, and pest outbreaks.
- To establish a method for evaluating risk of frost damage to seedlings.
- To propose a home for the tools and a required budget for maintenance and upgrading.
- To test output from the stand level tool against field based assessments of tree stress.

Outcomes

Landscape

- increased risk of future debris slides under increasing MAP
- decreasing trend in area burned under increasing MAP
- increasing trends in MPB and spruce beetle that could be related to spring warming

Stand

- strong agreement between modelled estimates of ASMR and expert estimates of ecologists
- for all areas of province ASMR is decreasing
- lots of landscape at low drought risk
- some areas of PI at high drought risk but low frost risk

Operational Implementation

- Landscape component requires more analysis
- Excel tool developed that allows drought risk assessment by BGC unit and RSMR for each tree species
- Excel tool developed that allows frost hazard assessment by BGC unit and slope position
- Drought risk mapping completed for PG and Cranbrook TSA with project funds. Drought risk and frost hazard mapping of Williams Lake TSA completed with District operational funds
- Requests to do several Community Forest areas

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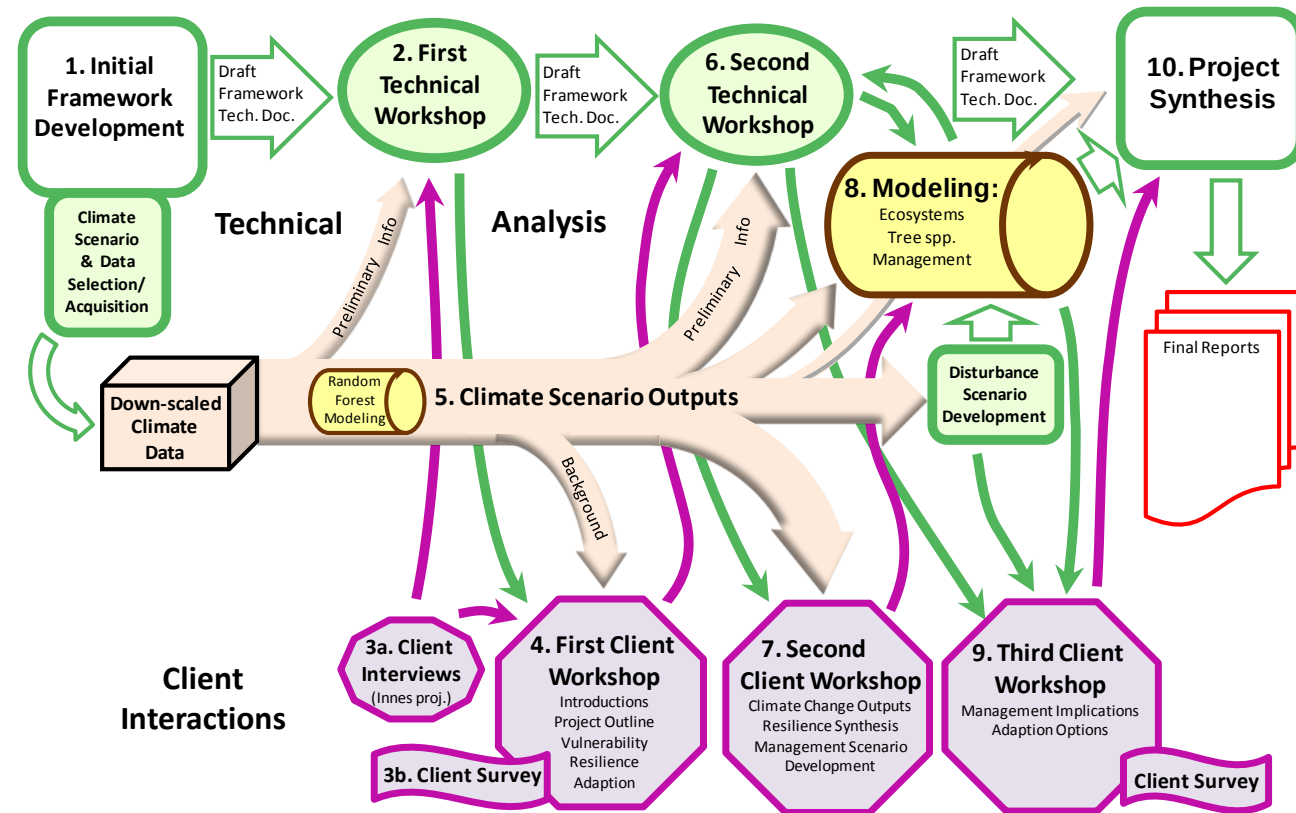
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Project objectives

- Ecological Vulnerability Assessment
- Collaboratively learn
 - with forest managers and scientists
- Identify opportunities and barriers
 - to advance “resilience management” in the West Kootenays and the province

Project Overview



Reports

1. Overview
2. Theoretical approaches
3. Climate projections
4. Fire impacts
5. Bioclimate envelope shifts
6. Forest health impacts
7. Ecosystem vulnerability
8. Adaptation barriers
9. Adaptation actions
10. Consultation/ outreach
11. Lessons learned

Website: www.kootenayresilience.org

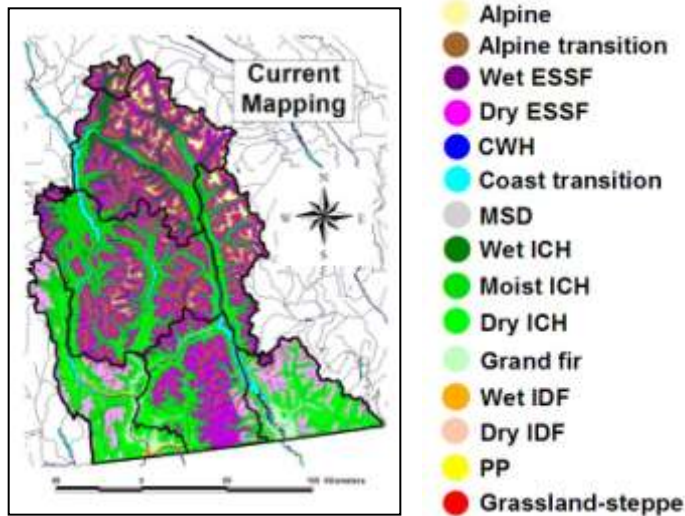
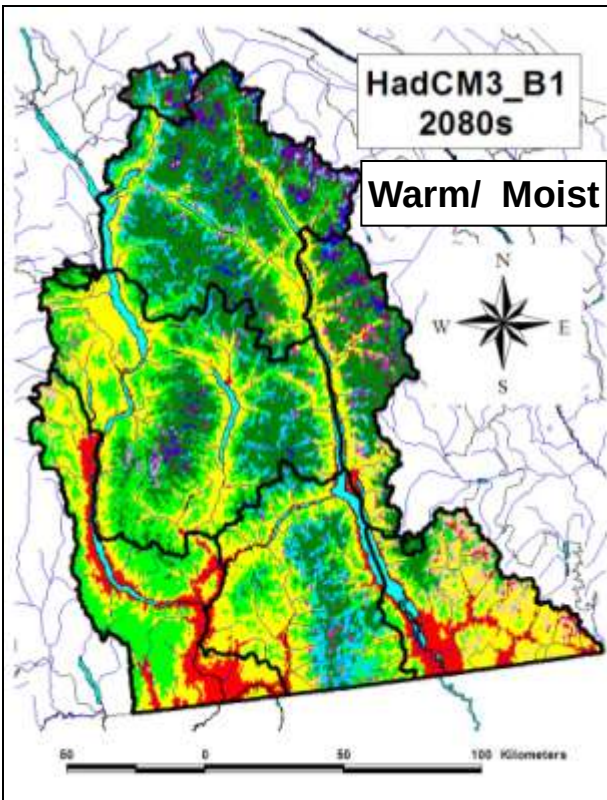
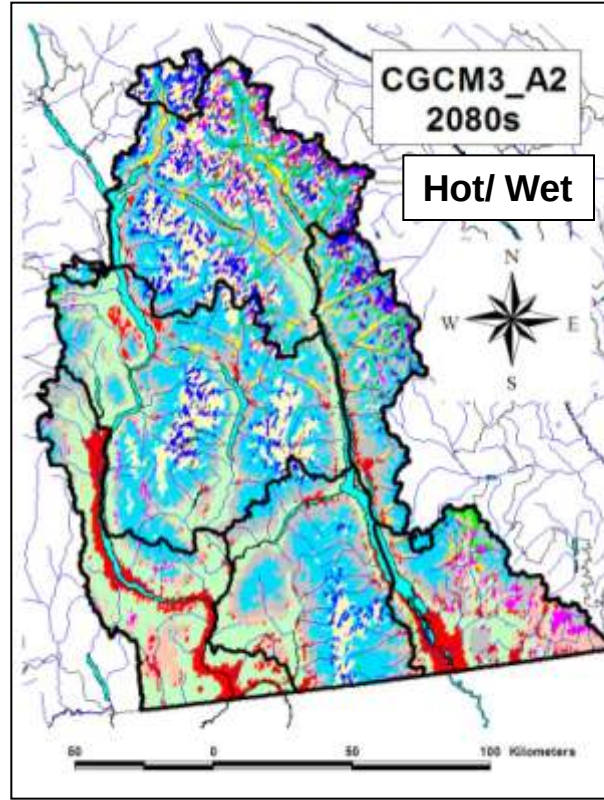
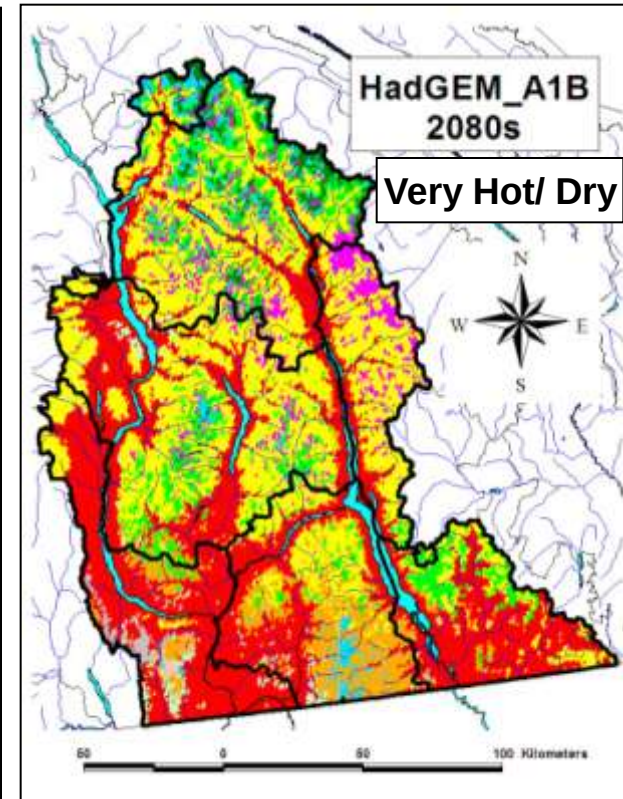
Study Area West Kootenays



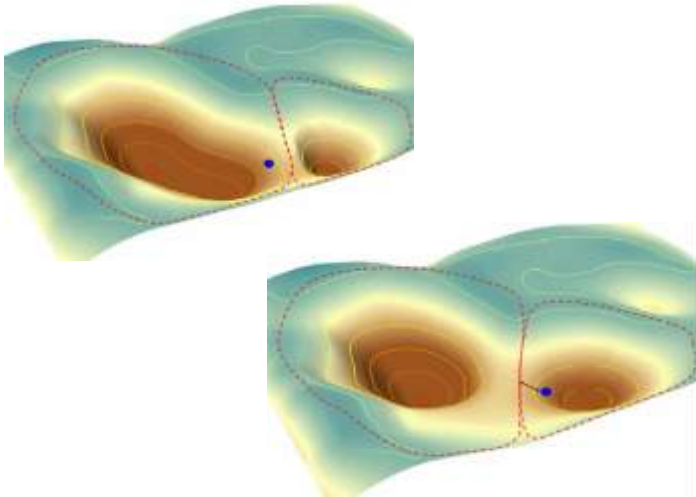
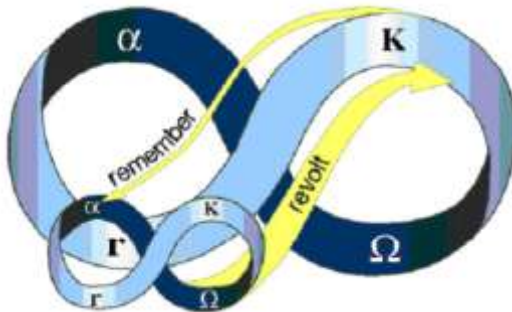
Vulnerability 'of what'?

- 'Enduring features' based on macrotopography
- Define areas with relatively homogeneous regional climates
- Expect to shift in uniform fashion
- Regional Landscapes
- Using a 'systems' rather than individual values approach.

Projected Bioclimate Envelopes



Most vulnerable?



Apply resilience concepts:

- No Regime Shift
- Non-Catastrophic regime shift
 - Different natural disturbance regime
 - Different tree species
 - Similar pathway
- Catastrophic regime shift
 - Different natural disturbance regime
 - Different species
 - Stalled pathway / invasive species, brush .. ? Very slow or difficult to manage out of.

What did we learn?

- Regional Landscapes
- WNA as basis for bioclimate projections
- Range of projections - manages uncertainty – FM implications
- Provide ‘local’ information
- Interpret significance of change based on a resilience framework
- Part of the information to prioritise action

People

- On-going cooperation – routed in local information and issues.
 - Cross-section of managers, practitioners, technical support, scientists
- Responsibility
 - at multiple levels, within government
- Leadership

Yesterday – we heard three things:

- Mainstream
- Co-benefits
- Large agreement about how to manage for resilience

Mid-Term Timber Supply Mitigation Options

Presentation for the
Special Committee on Timber Supply
June 6, 2012
Kevin Kriese, ADM

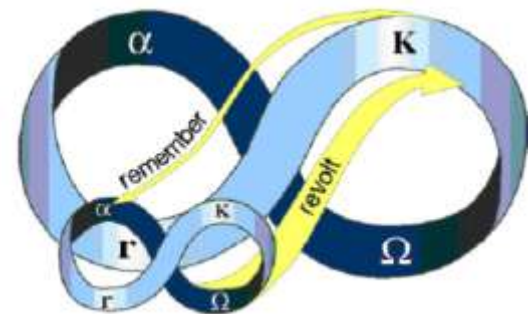


Ministry of
Forests, Lands and
Natural Resource Operations

Composite scenario – Lakes Treaty

- It is possible to increase mid-term timber harvest by 1,000 m³/year by:
 - Eliminating VQO requirements
 - Eliminating green-up in the early seral forest ISA
 - Repeal spatial OGMA and spatial targets; reduce the definition of old forest
 - Remove matrix forest
 - Remove late seral forest created
 - Allow wildlife connectivity corridors
 - Remove constraints for caribou management

Climate change is not mentioned as a factor for consideration





www.kootenayresilience.org

Thank You

“We have options, but the past is not one of them”

Sauchyn and Kulshreshtha 2008, p.295

“Times have changed – no longer is our goal sustainable development our goal must now be sustainable survival”

Blackstock 2008, p.15