



**Adapting Natural
Resource Management
to a Changing Climate**

Vernon Oct 28th 29th
Sponsored by FLNR Competitiveness and
Innovation Branch



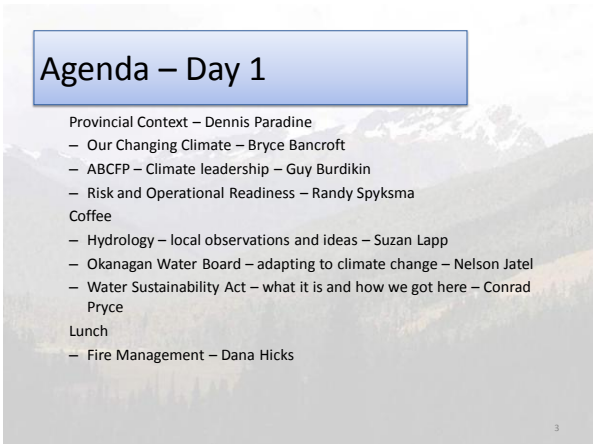
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Introductions – and agenda

- Introduction Bryce Bancroft
- Welcome Robert Wagner – Resource Manager Thompson Okanagan
- Logistics
 - 2 days – begin each day at 8:30
 - Coffee provided – lunch on our own
 - Safety briefing

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Agenda – Day 1

Provincial Context – Dennis Paradine

- Our Changing Climate – Bryce Bancroft
- ABCFP – Climate leadership – Guy Burdikin
- Risk and Operational Readiness – Randy Spyksma

Coffee

- Hydrology – local observations and ideas – Suzan Lapp
- Okanagan Water Board – adapting to climate change – Nelson Jatel
- Water Sustainability Act – what it is and how we got here – Conrad Pryce

Lunch

- Fire Management – Dana Hicks

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Agenda – Day 2

- Day one review – Bryce Bancroft
- BEC and species direction – Deb MacKillop
- Coffee
- Species suitability based on projected drought – Craig Delong
- Climate Based Seed Transfer – Greg O'Neill
- Lunch
- Building economic pathways – Kathy Hopkins – Al Powelson
- Range Management in a changing climate – Clayton Bradley
- Coffee
- Planning the Integrated Silviculture Strategy – Bryce Bancroft
- Cumulative Effects – triggers and action points – Doug Lewis
- Good stewardship = good carbon management – Dennis Paradine
- What did we learn?

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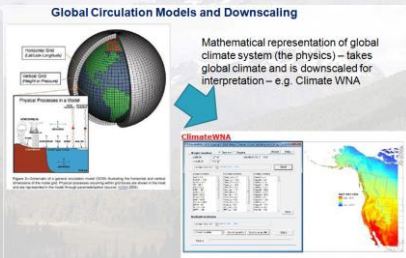
Workbooks

- Some presentation and background materials
- Room for notes
- A handy place to store Climate Change related materials.

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Climate and Weather trends

An overview



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Principles of Climate Change Adaptation

Climate Trends

Natural Variation

Climate the bigger picture

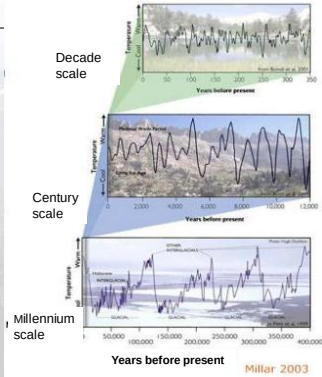
Earth's natural climate system varies over time

Climate changes over time with different patterns and modes.

Modes are nested in annual, decadal, century and millennial scales

Note: Different mechanisms drive different modes

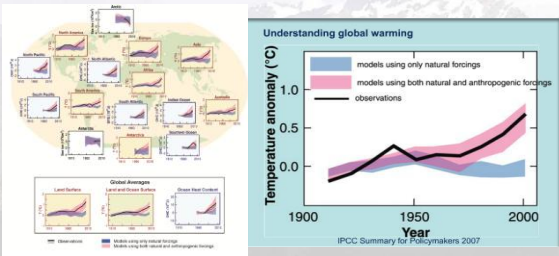
Source: Millar 2003



Principles of Climate Change Adaptation

Climate Trends

Global observations - IPCC



Sources: IPCC http://www.ipcc.ch/publications_and_data/ar4/syr/en/figure-3-1.html http://www.ipcc.ch/publications_and_data/ar4/syr/en/figure-1-1.html

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Principles of Climate Change Adaptation

Climate Trends

Scenarios – IPCC

Representative Concentration Pathways

Variable	Scenario	2046-2065		2081-2100	
		mean	likely range ^a	mean	likely range ^a
Global Mean Surface Temperature Change (°C) ^b	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8
		mean	likely range ^a	mean	likely range ^a
Global Mean Sea Level Rise (m) ^c	RCP2.6	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82
		mean	likely range ^a	mean	likely range ^a

These scenarios provide a range of concentrations over time
The RCP2.6 is a mitigation strategy – where CO₂ peaks then declines by 2010
RCP4.5 and 6 are stabilization scenarios, while RCP8.5 is a scenario with increasing greenhouse gas emissions.

The RCPs can thus represent a range of 21st century climate policies, as compared with the no-climate-policy of the Special Report on Emissions Scenarios (SRES) used in the Third Assessment Report and the Fourth Assessment Report.

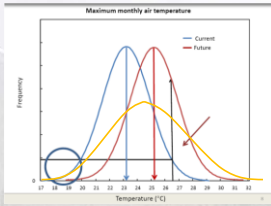
Sources: http://www.ipcc.ch/report/ar5/wg1/r18_UKXFTz3rbGg

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Principles of Climate Change Adaptation

Climate Trends

Regional plausible futures



E.g., Shift of the mean and extremes

(Spittlehouse 2012)

It is *virtually certain* that there will be more frequent hot and fewer cold temperature extremes over most land areas on daily and seasonal timescales as global mean temperatures increase. It is *very likely* that heat waves will occur with a higher frequency and duration. Occasional cold winter extremes will continue to occur (see Table SPM.1). (12.4) http://www.ipcc.ch/report/ars/wg1/#_UkXFIzJrbGg

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Climate Trends

US & Canada

July was Earth's hottest month on record, NOAA says

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Scientists say they expect 2015 to be the hottest year since records began

July was the hottest month on Earth since records began, averaging 16.6 C (61.9 F), according to US scientists.

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Climate Change Projections for the Thompson Okanagan

(Context) Over last century (1900's), 1°C temperature increase

Over this century (2000's), projected temperature increase of **1.6 to 4.4°C** [similar to moving from Williams Lake to Merritt, or Princeton to Kamloops (3.3°C warmer)]

By the **2050's**:

Precipitation: 7% more in winter;
9% less in summer (overall annual increase of 6%)
Snowfall: 11% less in winter; **55% less in spring**
Frost free days: 24 more

Extreme weather: more heat waves



From Regional summaries compiled by Kristine Weese.

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Principles of Climate Change Adaptation Climate Trends

Activity: Use of Plan2Adapt

PLAN2ADAPT
PCC Version 1.0 Contact Us

Summary of Climate Change for South Coast in the 2050s

Climate Variable	Season	Projected Change from 1981-2010 Baseline Ensemble Median	Range (10th to 90th percentile)
Mean Temperature (°C)	Annual	+1.7 °C	+1.0 °C to +2.5 °C
Precipitation (%)	Annual	+1%	-2% to +12%
	Summer	+1%	-2% to +12%
	Winter	+1%	-4% to +12%
Wettest* (%)	Winter	-2%	-4% to +12%
Driest* (%)	Spring	-12%	-73% to +13%
Growing Degree Days* (degree days)	Annual	+126 degree days	+203 to +129 degree days
Heating Degree Days* (degree days)	Annual	-103 degree days	-103 to -102 degree days
Frost-Free Days* (days)	Annual	+24 days	+13 to +36 days

The table above shows projected changes in average (mean) temperature, precipitation and several derived climate variables from the baseline period (1981-2010) to the 2050s for the South Coast region. The ensemble median is a best-practice value, chosen from a PCC standard set of Global Climate Model (GCM) projections (see the Notes tab for more information). The range of values represent the lowest and highest results within the set. Please note that the summer table does not reflect the 'Summer' choice made under the Region & Time tab. However, this setting does affect results obtained under each variable tab.

* These values are derived from temperature and precipitation. Please select the appropriate variable tab for more information.

Settings

Region: South Coast

Time Period:

- ☐ 2030s (2030-2039)
- ☒ 2050s (2040-2049)
- ☐ 2080s (2070-2079)

Season:

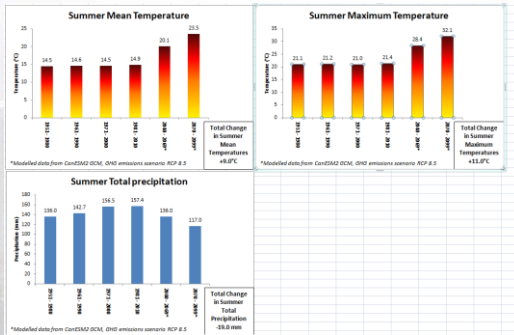
- ☐ Winter (DJF)
- ☐ Spring (MAM)
- ☒ Summer (JJA)
- ☐ Fall (SON)
- ☐ Annual

Buttons: [Cancel] [Apply]

<http://www.pacificclimate.org/tools-and-data/plan2adapt>

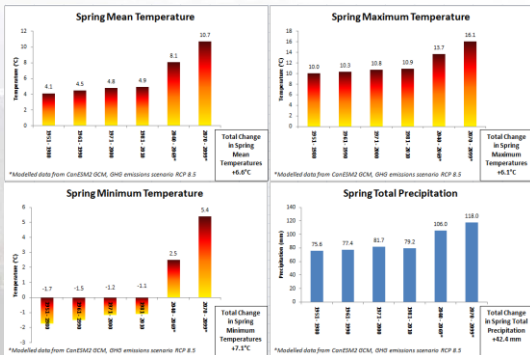
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Climate Trends – this from Williams Lake



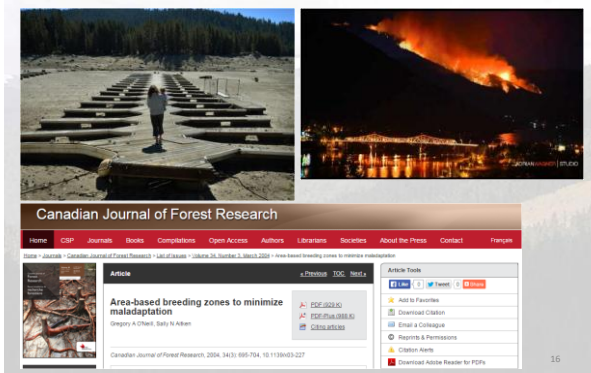
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Climate Trends – this from Williams Lake



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So where to now?



Canadian Journal of Forest Research

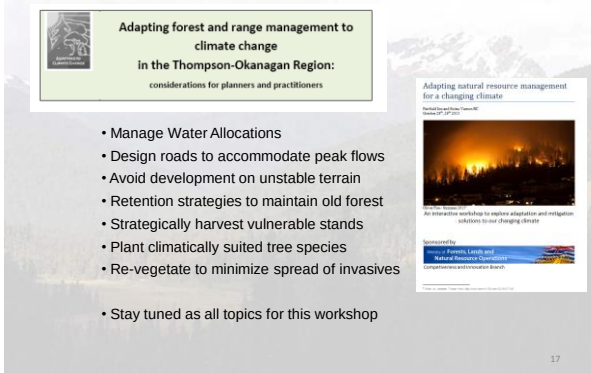
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Area-based breeding zones to minimize maladaptation
Gregory A. Clark, Sally A. Adam, et al.

Canadian Journal of Forest Research, 2014, 44(3): 695-704, 10.1139/cjfr-2014-0027

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So where to now?



Adapting forest and range management to climate change
in the Thompson-Okanagan Region:
considerations for planners and practitioners

- Manage Water Allocations
- Design roads to accommodate peak flows
- Avoid development on unstable terrain
- Retention strategies to maintain old forest
- Strategically harvest vulnerable stands
- Plant climatically suited tree species
- Re-vegetate to minimize spread of invasives
- Stay tuned as all topics for this workshop

Adapting natural resource management for a changing climate
Workshop Summary
An interactive workshop to explore adaptation and mitigation solutions to our changing climate

Downloadable
Adapting Forest Landscapes and Natural Resource Management
Workshop Summary Report

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