Decision Support Framework:

A mental model for integrating the environmental and human dimensions into management decisions related to changes in natural disturbance events

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Presentation Plan

- Project Background
- Approach
- Decision Support Framework – Model
- Example – Williams Lake TSA
- Questions

Harry Kope - photographer

Project Background

Project team

- **FORREX:**
  Kathie Swift, Al Wiensczyk, Todd Redding, Pedro Lara Almuedo, Don Gayton, Ajit Krishnaswamy, Ellen Simmons, Larry Joseph, Chris Hollstedt, Suzan Lapp, Melissa Ligertwood
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  Phil Burton, Steve Taylor, Sean Haughian, Bryan Pettit
- **Forests, Lands and Natural Resource Operations:**
  Kathy Hopkins and Mike Pedersen
- **Environment:**
  Jenny Feick
- **Interfor:**
  Gerry Fraser

BC Forest Service photograph

Project Background

- **Why?**
  - **Climate change → Shifts in frequency and severity of natural disturbances (IPCC 2011, Walker and Sydneysmith 2008)**
  - **Decision makers – making post-disturbance land management decisions to address to create/maintain ecosystems resilient to shifts**
  - **Lots of information and tools available**
  - **But how to incorporate this information and tools into their decision making?**

Lorraine Maclauchlan - photographer

Decision Support Framework

Approach

- Extension Project
  - Utilizing existing knowledge (science, experiential, TEK)
  - Bridging with other FFESC research projects (e.g., DeLong, Morgan, Chan-McLeod, Nelson, and others)
- Project Components
  - Natural Disturbance projections
  - Topical Syntheses
  - Decision Support Framework

Al Wiensczyk - photographer

Project Components

- Natural Disturbance Projections
  - Climate change impacts on forest disturbance regimes
  - Classifying and Mapping the forest disturbance regimes of British Columbia

BC Forest Service photograph

Project Components

Topical Syntheses

- **Impact of natural disturbance and post-disturbance management on:**
  - **Watershed values (Redding, Lapp and Leach)**
  - **Forest Succession (Swift and Ran)**
  - **Biodiversity (Gayton and Lara Almuedo)**
  - **Forest Carbon (Swift)**
  - **Human Dimensions including First Nations (Krishnaswamy, Simmons and Joseph)**

Todd Redding - photographer

Decision Support Framework

- Why go there?
- Approach taken to develop it
  - Online survey
  - Dialogue session
  - Review of work done elsewhere
- Mental model of the framework

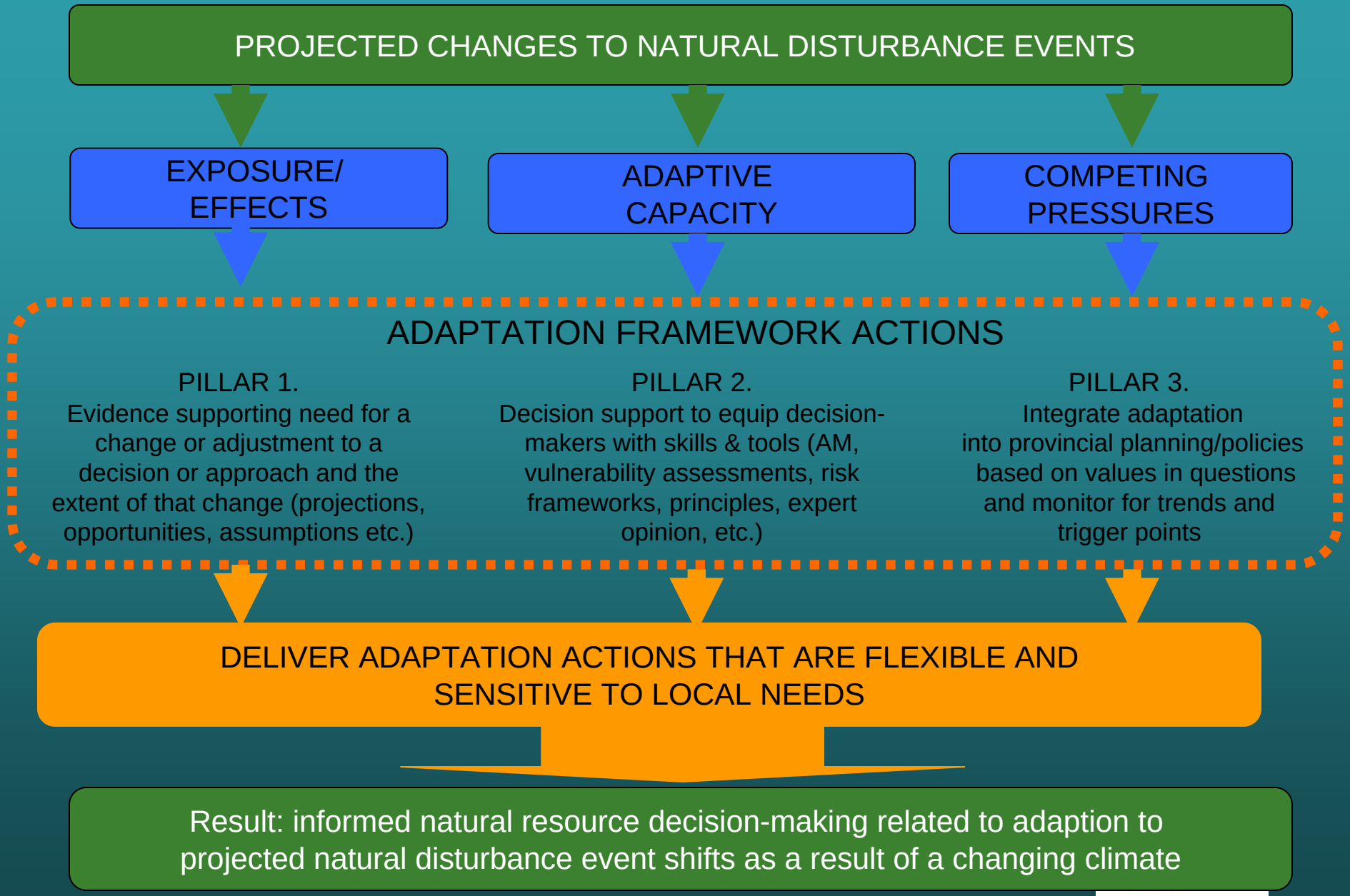
Results from survey

- Integrating information relatively new
- Policies/objectives being considered
- SFM and risk management current frameworks of choice

Al Wiensczyk - photographer

Results from dialogue sessions

- Use best (local) information
- Integration across disciplines
- Clear objectives
- Transparent and accountable decision making
- Monitoring
- Opportunities to learn and to make mistakes
- Try to work within existing systems



Adapted from Scotland's Climate Change Adaptation Framework (Donnelley 2009)

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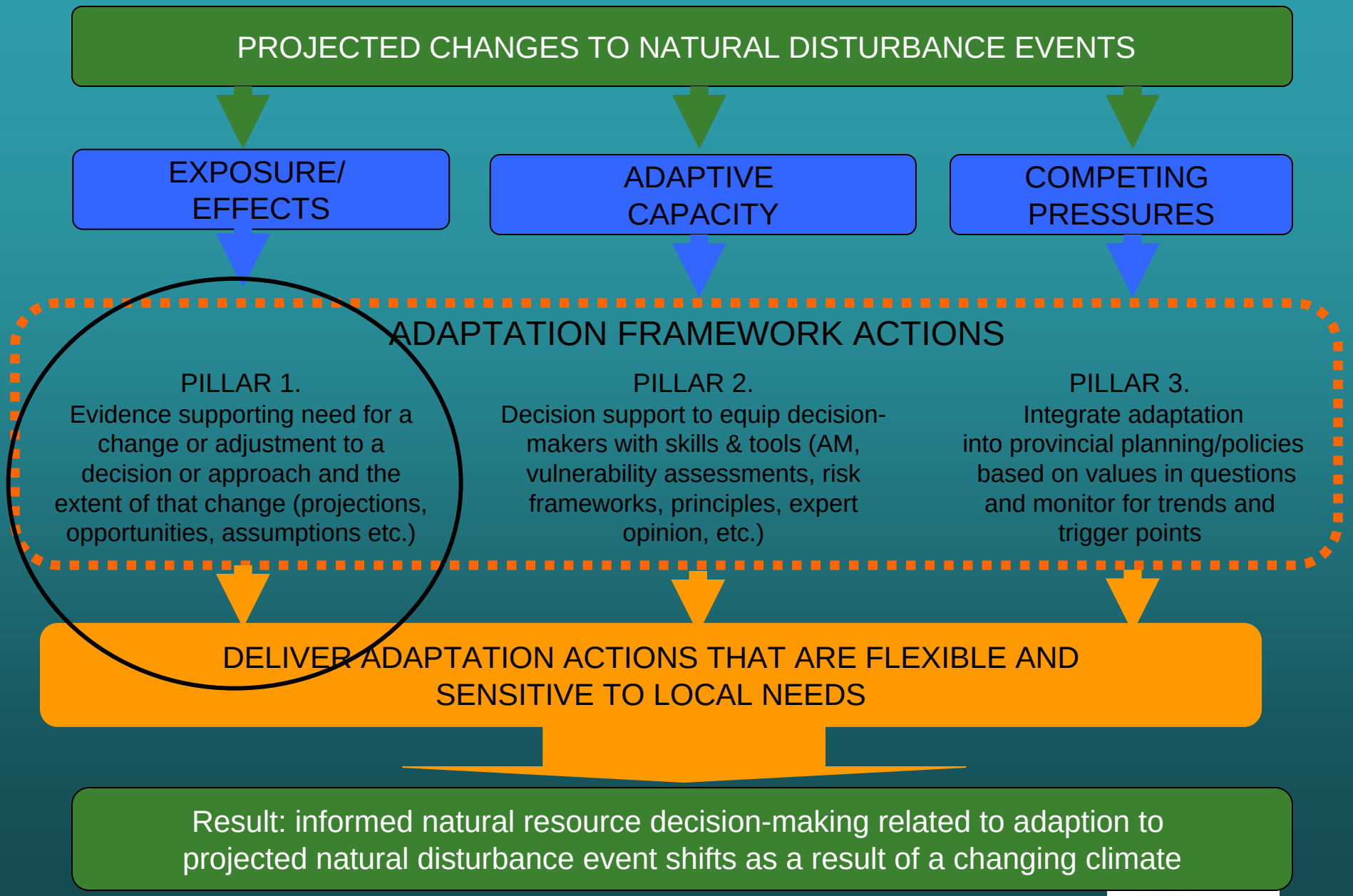

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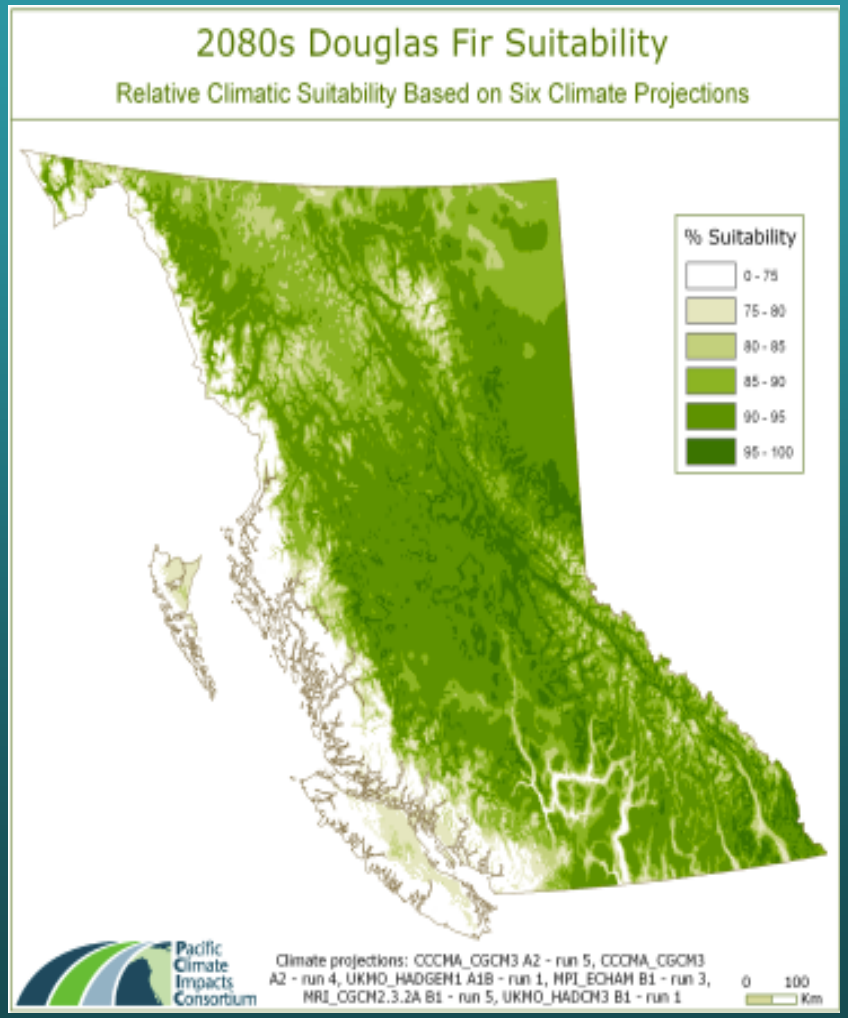
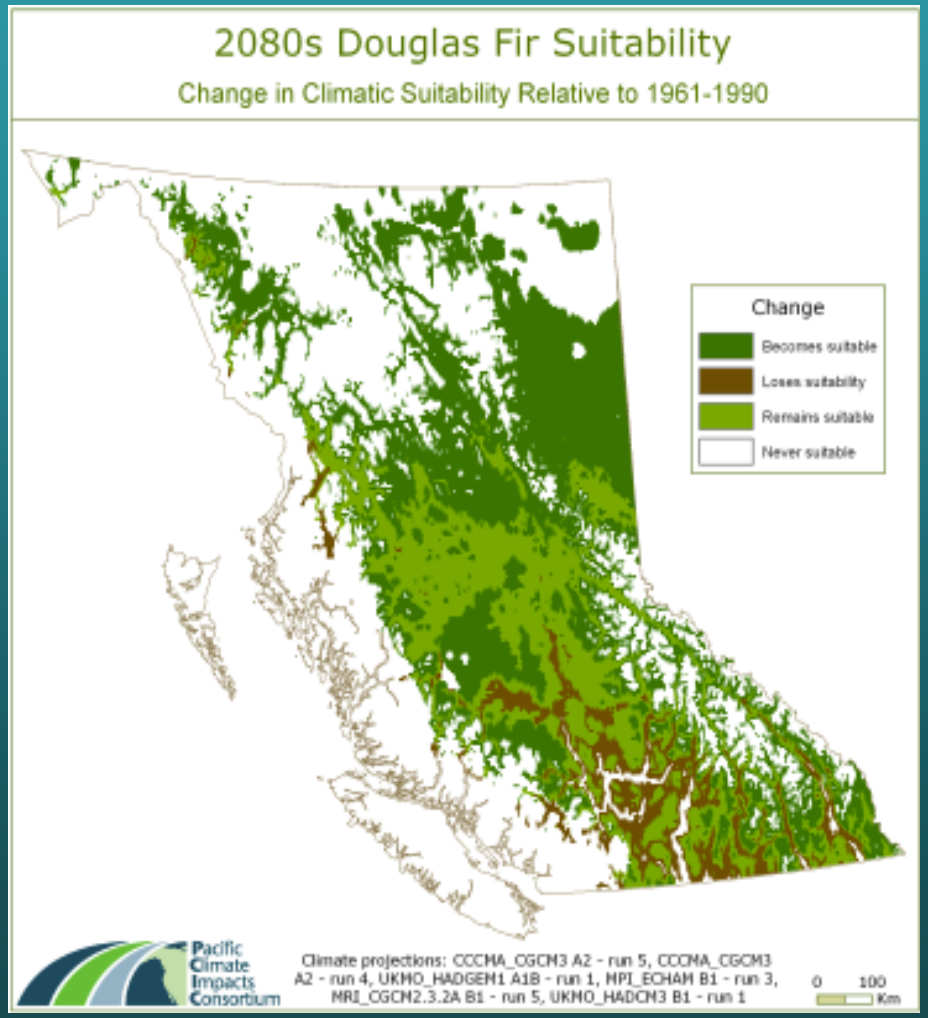
Summary of the six IPCC Special Report Emission Scenarios (2000)

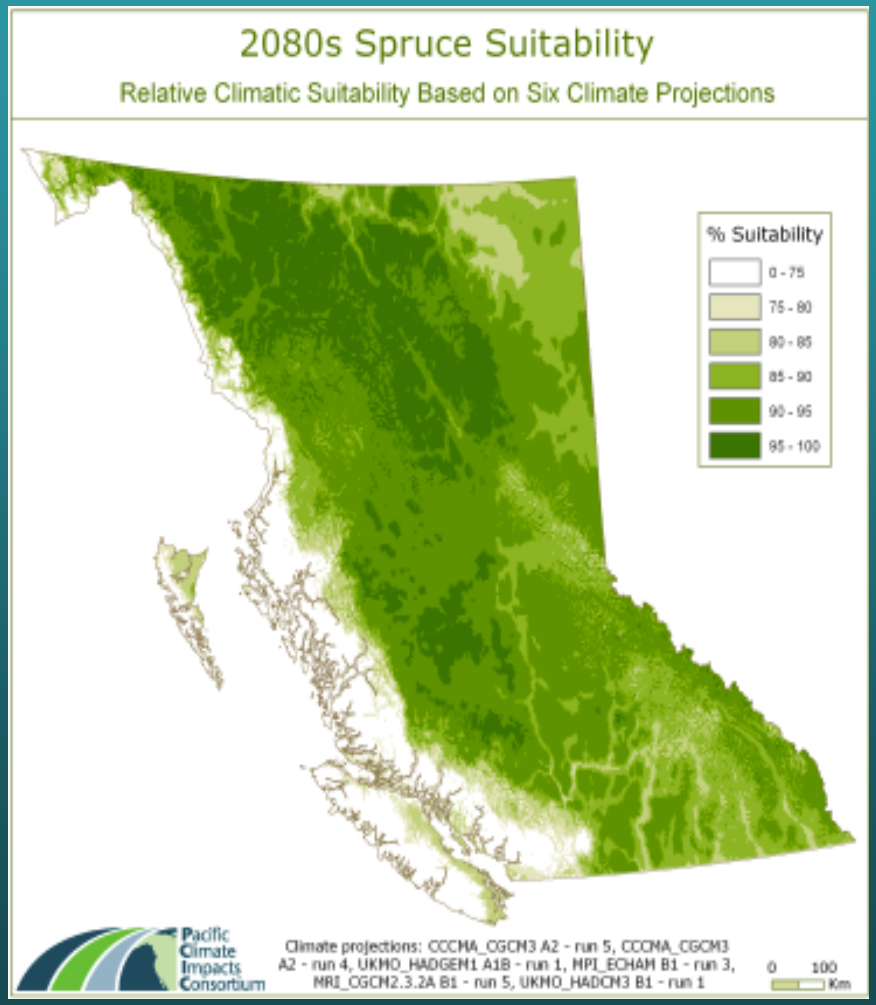
Scenario Group	A1FI	A1B	A2	A1T	B1	B2
Population Growth	Low	Low	Low	High	Low	Medium
GDP Growth	Very High	Very High	Very High	Medium	High	Medium
Energy Use	Very High	Very High	High	High	Low	Medium
Land Use Change	Low-Medium	Low	Low	Medium-High	High	Medium
Oil/Gas Resource Availability	High	Medium	Medium	Low	Low	Medium
Technological Change	Rapid	Rapid	Rapid	Slow	Medium	Medium
Change Favouring	Coal, Oil and Gas	Balanced	Non-Fossil Fuel	Regional	Efficiency and Dematerialization	"dynamics as usual"

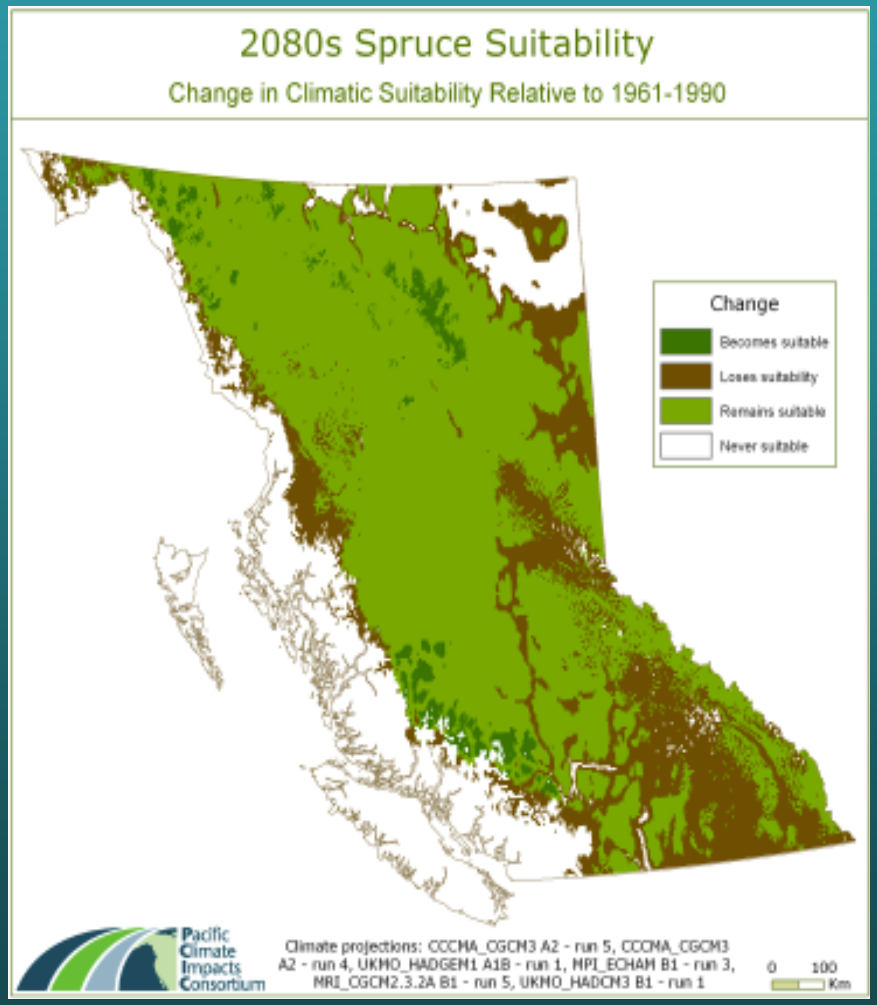
Forecast changes in suitable climate regions for Douglas-fir in 2080





Forecast changes in suitable climate regions for Spruce in 2080





Western Spruce Budworm and Spruce Bark Beetle outbreaks under Warm/Wet Projections

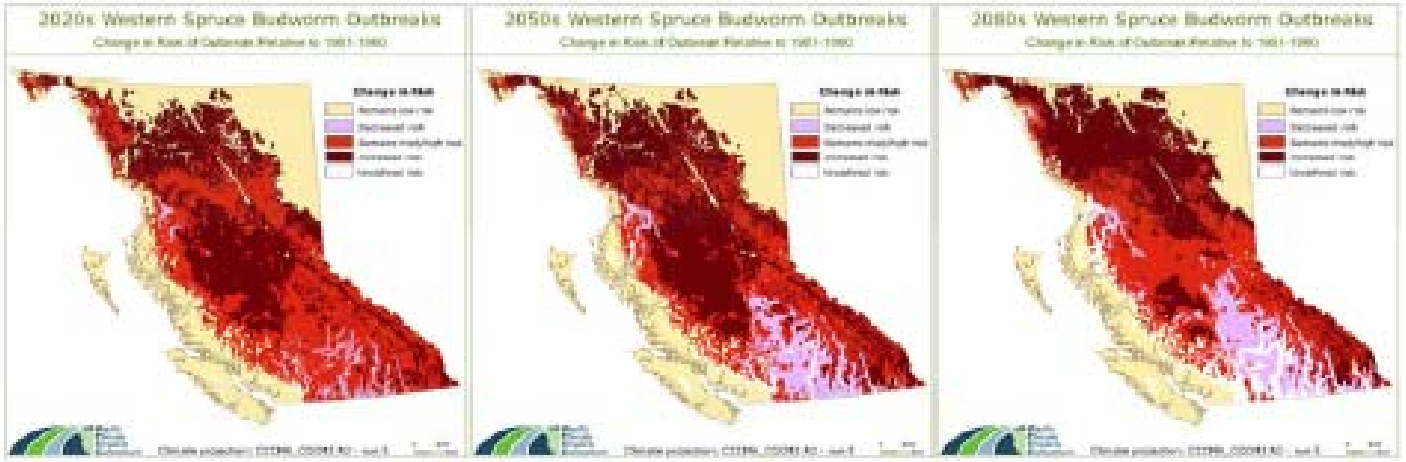


Figure 35 - Projected Western Spruce Budworm outbreak risk: Warm/Wet projection (CGCM3 A2 run 5).

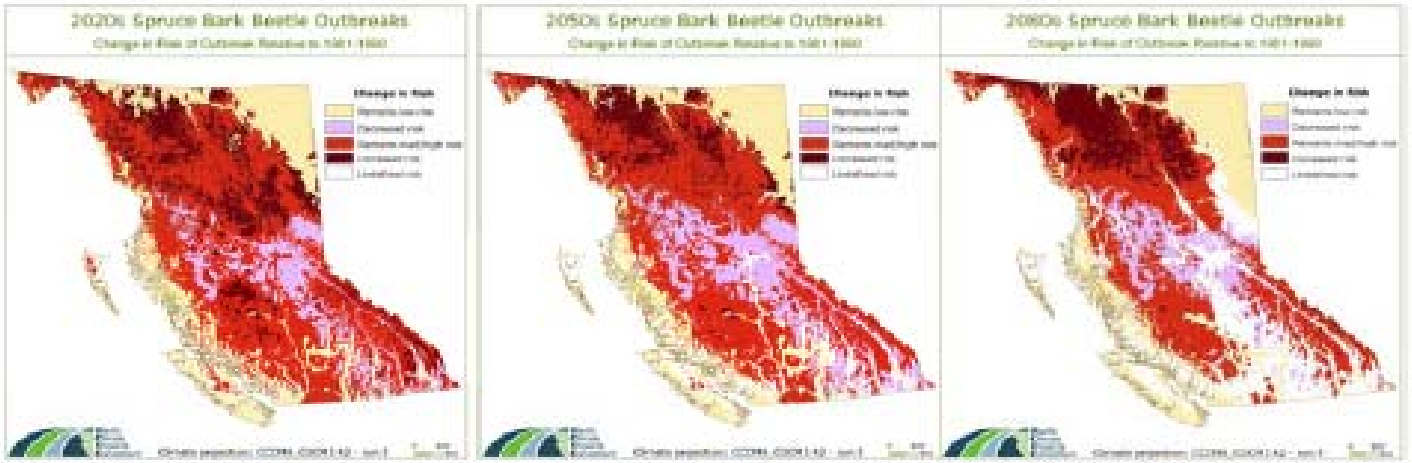


Figure 36 - Projected Spruce Bark Beetle outbreak risk: Warm/Wet projection (CGCM3 A2 run 5).

Western Spruce Budworm and Spruce Bark Beetle outbreaks under Hot/Dry Projections

Figure 37 - Projected Western Spruce Budworm outbreak risk: Hot/Dry projection (HadGEM A1B run 1).

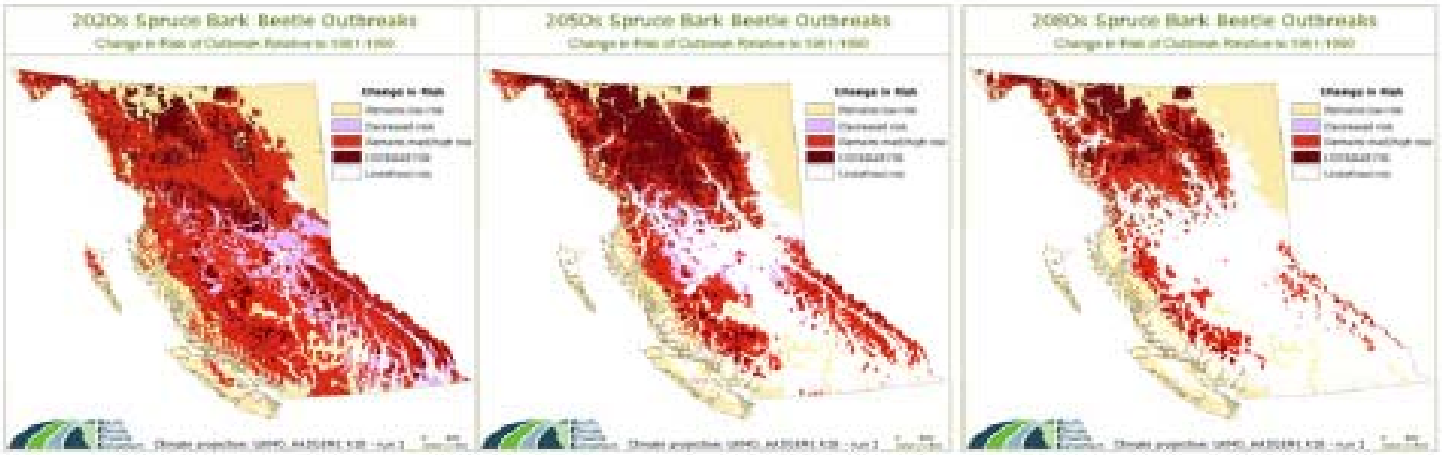
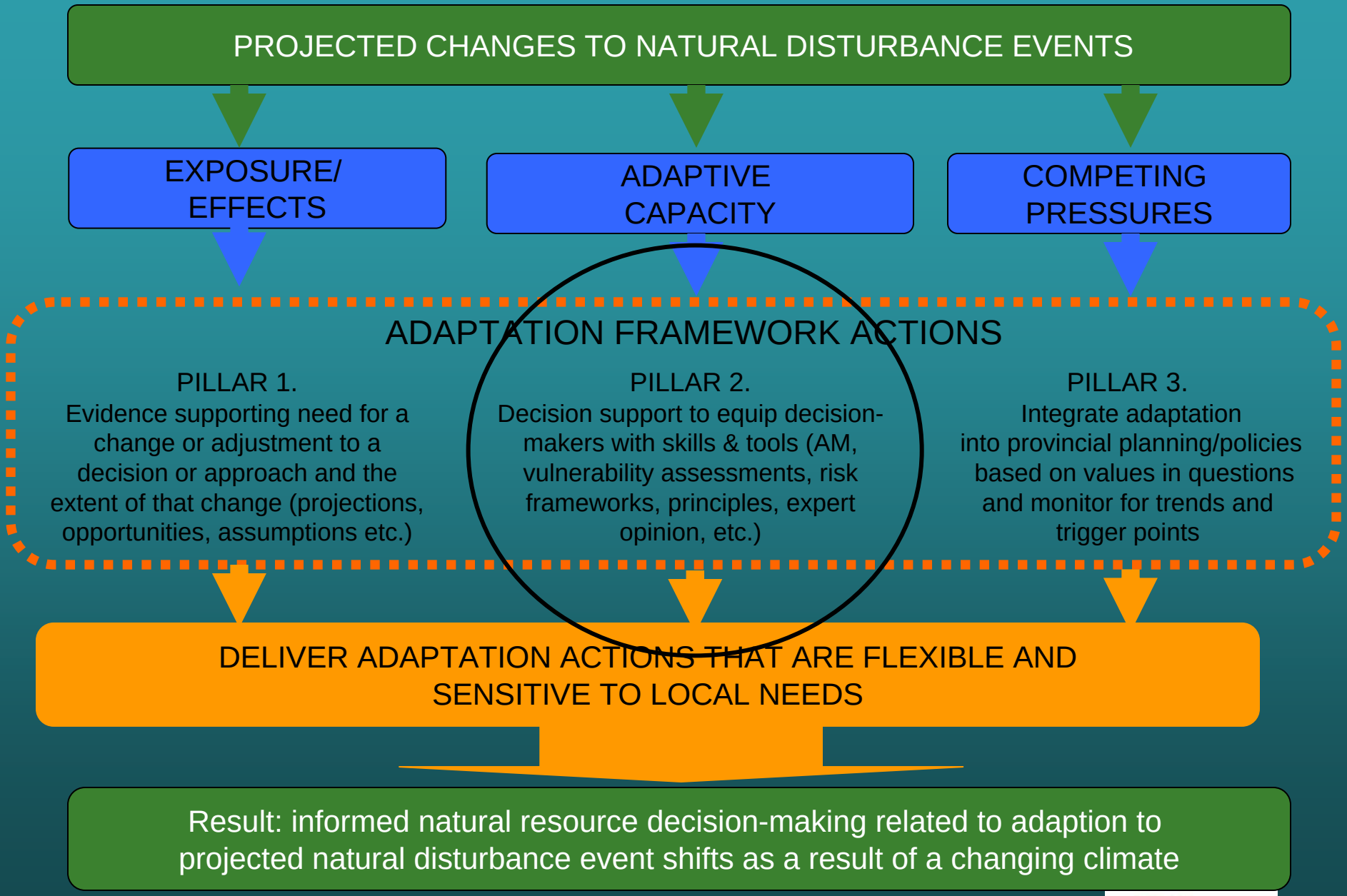


Figure 38 - Projected Spruce Bark Beetle outbreak risk: Hot/Dry projection (HadGEM A1B run 1).

More supporting information

- Disturbance Regime Projections
- Topical Syntheses



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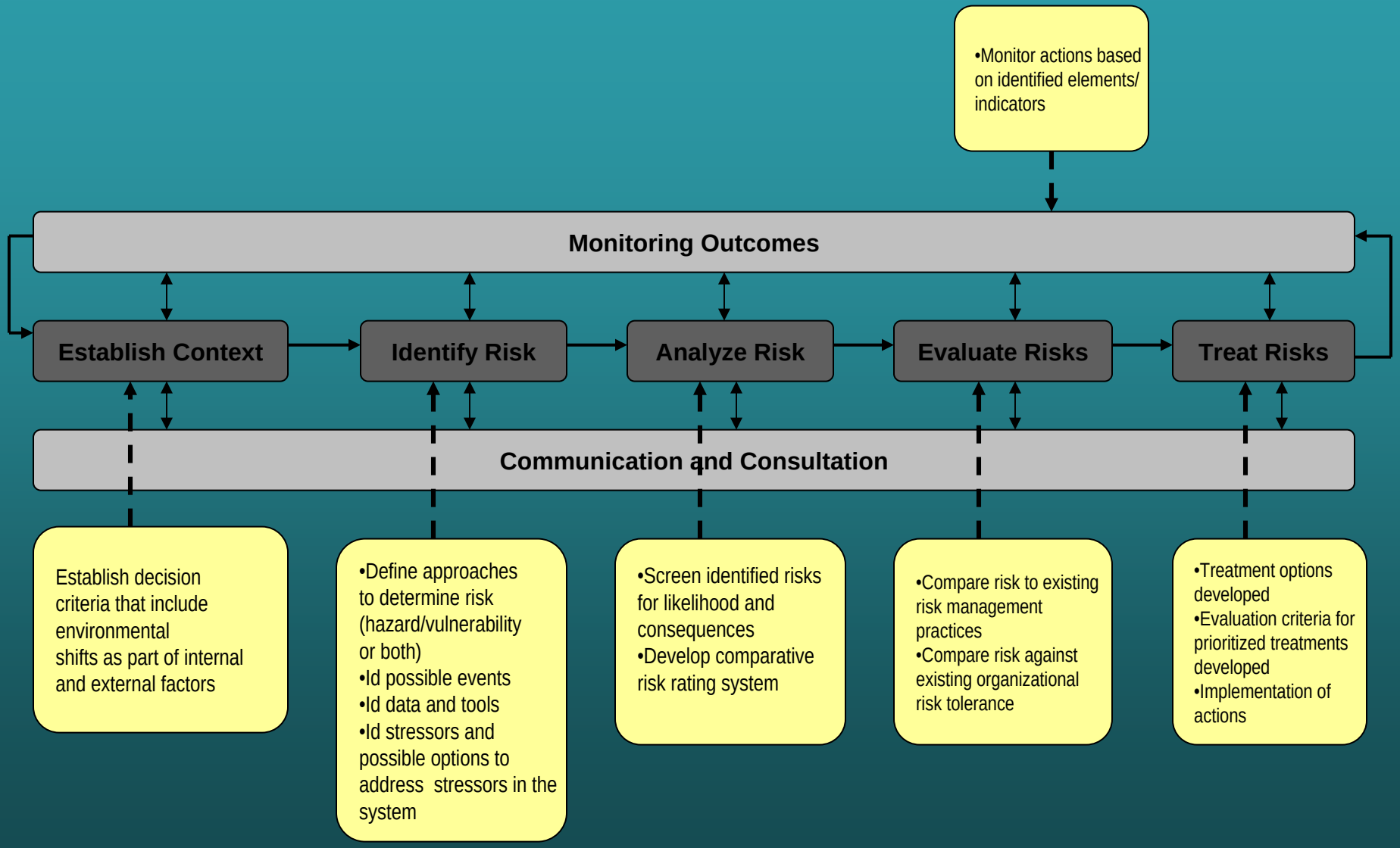
Example of modified risk tools



Adapted from ISO 310000 Risk Guidelines, Province of British Columbia (2011)

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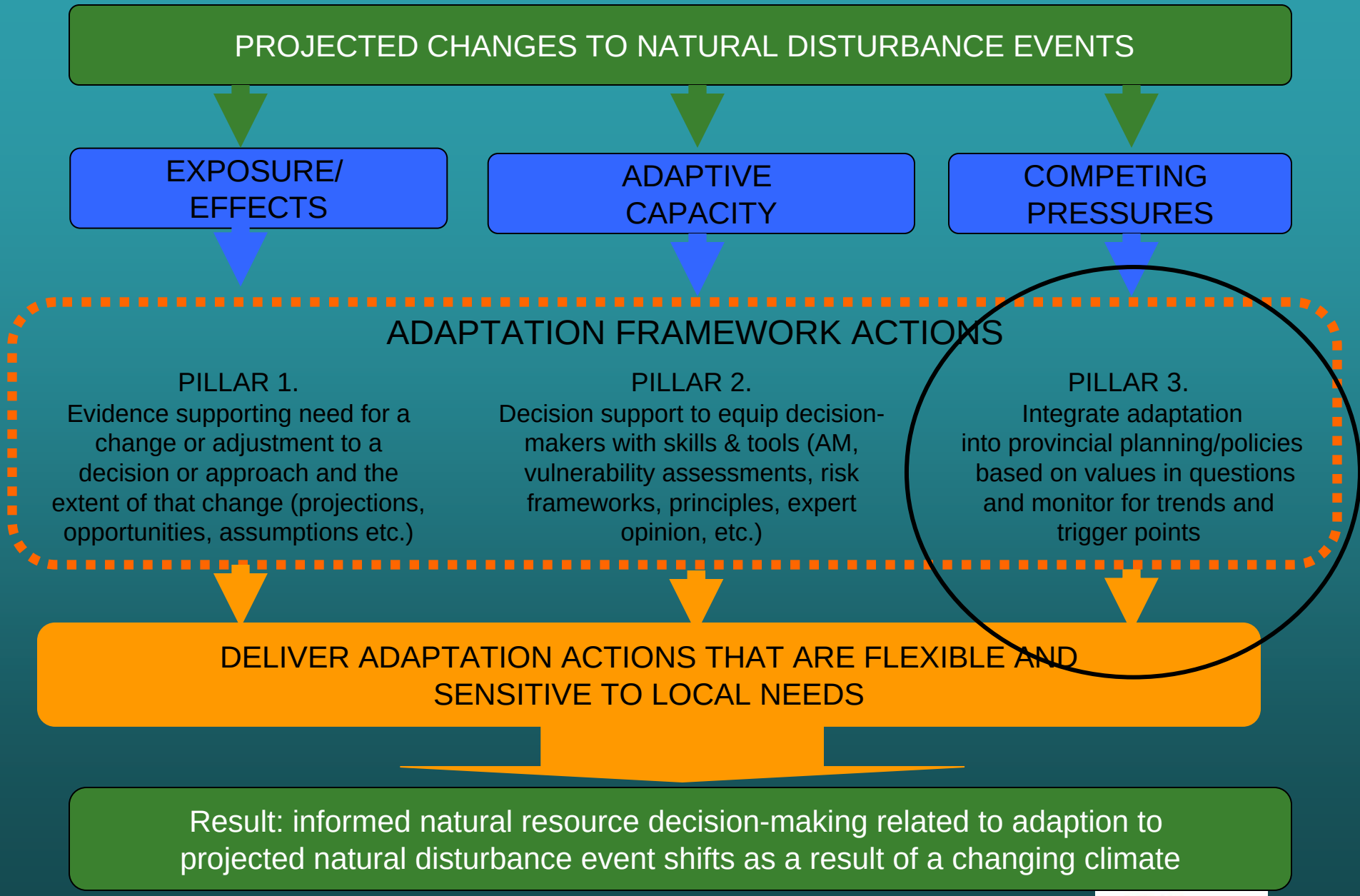

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Example – Williams Lake TSA

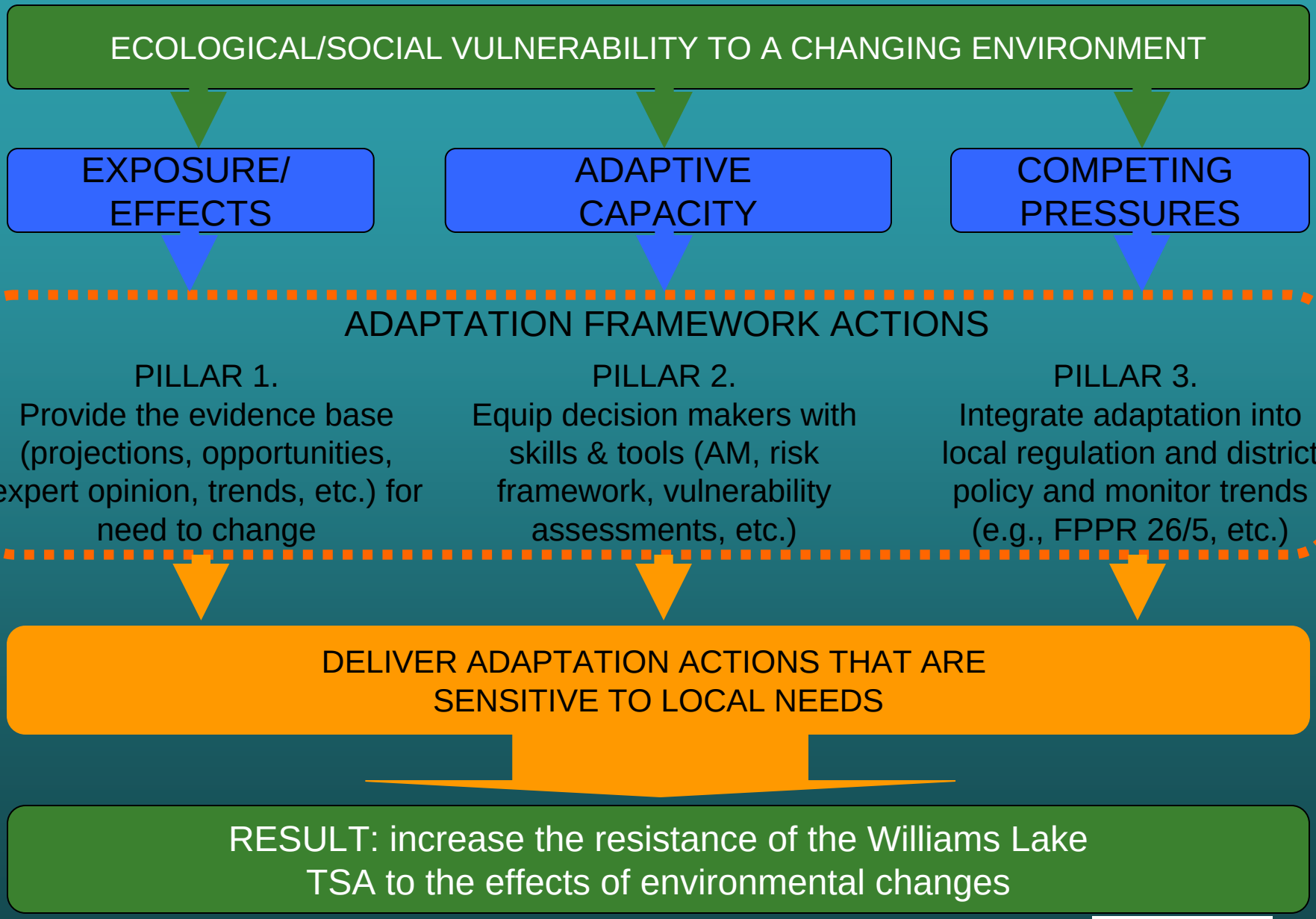
- Experiencing changes due to MPB and wildfire
- Increased occurrence of drought
- Regeneration failure of lodgepole pine seed
- Increased incidence of forest health concerns
- Desire to adapt to changing environment and build resilience for the future

On the ground realities of change

Guy Burdikin - photographer

On the ground realities of change

Guy Burdikin - photographer



Adapted from Scotland's Climate Change Adaptation Framework (Donnelley 2009)

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Project Publications

- Wiensczyk, A. 2012. Reducing vulnerabilities and promoting resilience of British Columbia's natural and human systems through adaptation of post-disturbance land management options. BC Journal of Ecosystems and Management 13(1): http://jem.forrex.org/index.php/jem/article/viewFile/195/120
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- Swift, K. 2012. Climate-induced changes to natural disturbance regimes and management responses: Impacts on successional responses. BC Journal of Ecosystems and Management 13(1): http://jem.forrex.org/index.php/jem/article/viewFile/171/113
- Swift, K. 2012. Forest carbon and management options in an uncertain climate. BC Journal of Ecosystems and Management 13(1): http://jem.forrex.org/index.php/jem/article/viewFile/169/110
- Krishnaswamy, A., E. Simmons, and L. Joseph. 2012. Increasing the resilience of British Columbia's rural communities to natural disturbances and climate change. BC Journal of Ecosystems and Management 13(1): http://jem.forrex.org/index.php/jem/article/viewFile/168/115

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Thank you

Questions?