Climate Change Adaptation and Forest Management

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Vulnerability Assessment and Adaptation Planning

- Structured process for:
  - understanding likely climate change impacts, and
  - planning adaptation actions
- Based on IPCC vulnerability approach
- Will use examples from recent forestry approach developed under the auspices of the Canadian Council of Forest Ministers

Vulnerability to Climate Change
The IPCC Approach

$$V = f(E, S, A)$$

V = Vulnerability

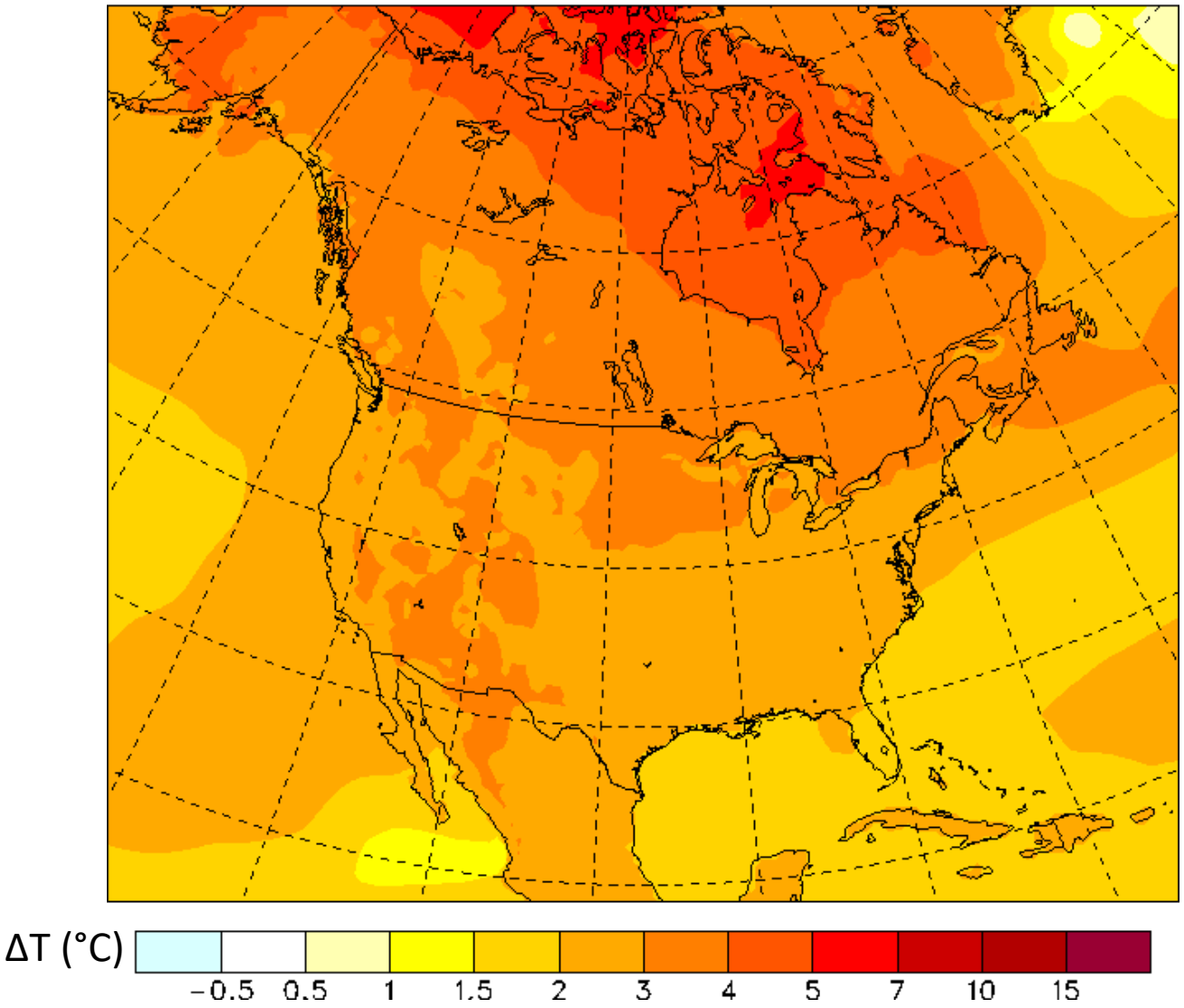
E = Exposure: climatic variability & change

S = Sensitivity: system characteristics

A = Adaptive Capacity: ability to implement adaptation

E + S = Impacts

Difference in Annual Mean Temperature: 2050s relative to 1990s



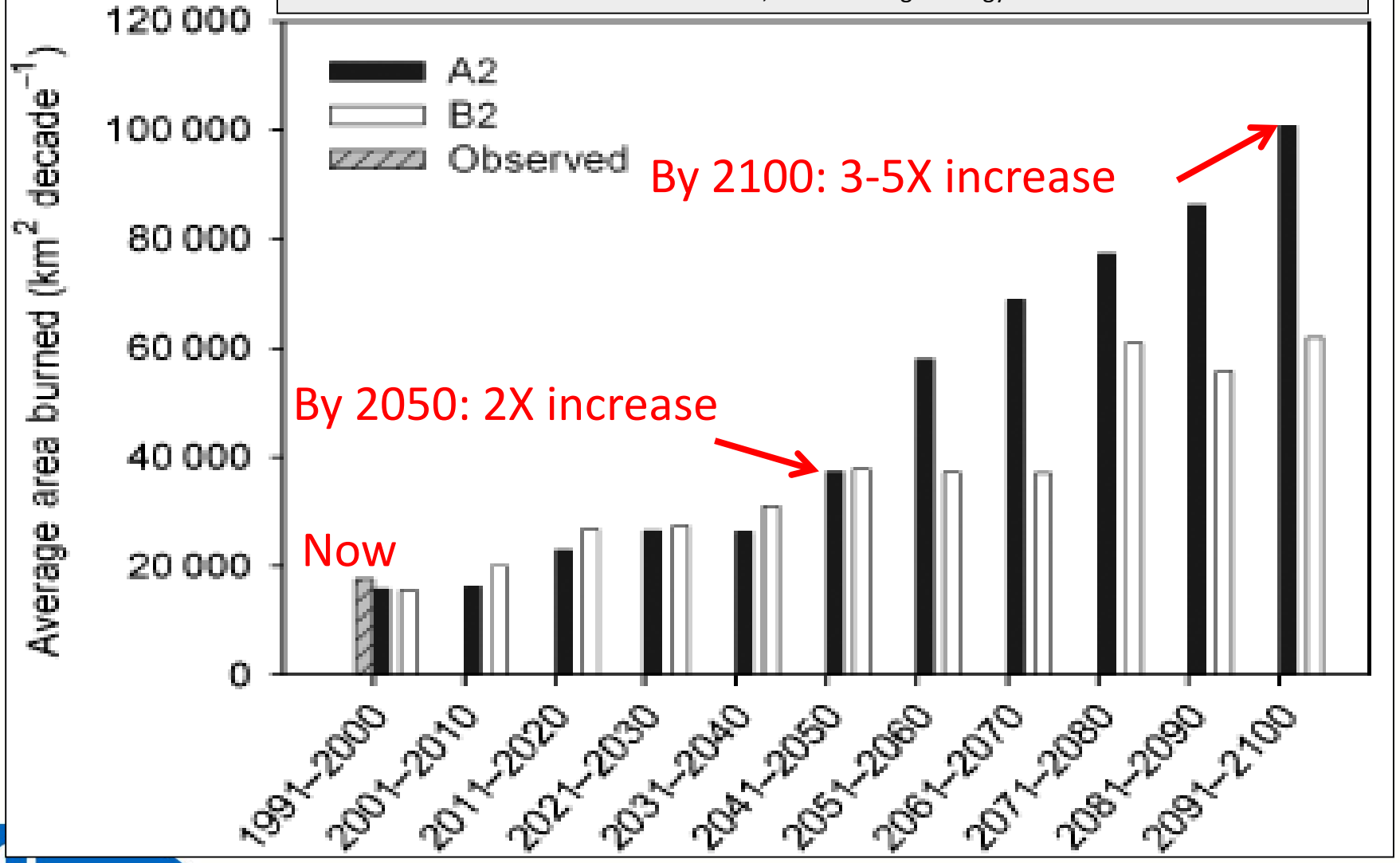
RCP 8.5

Source: Canadian Centre for Climate Modeling and Analysis

Impacts: Fire

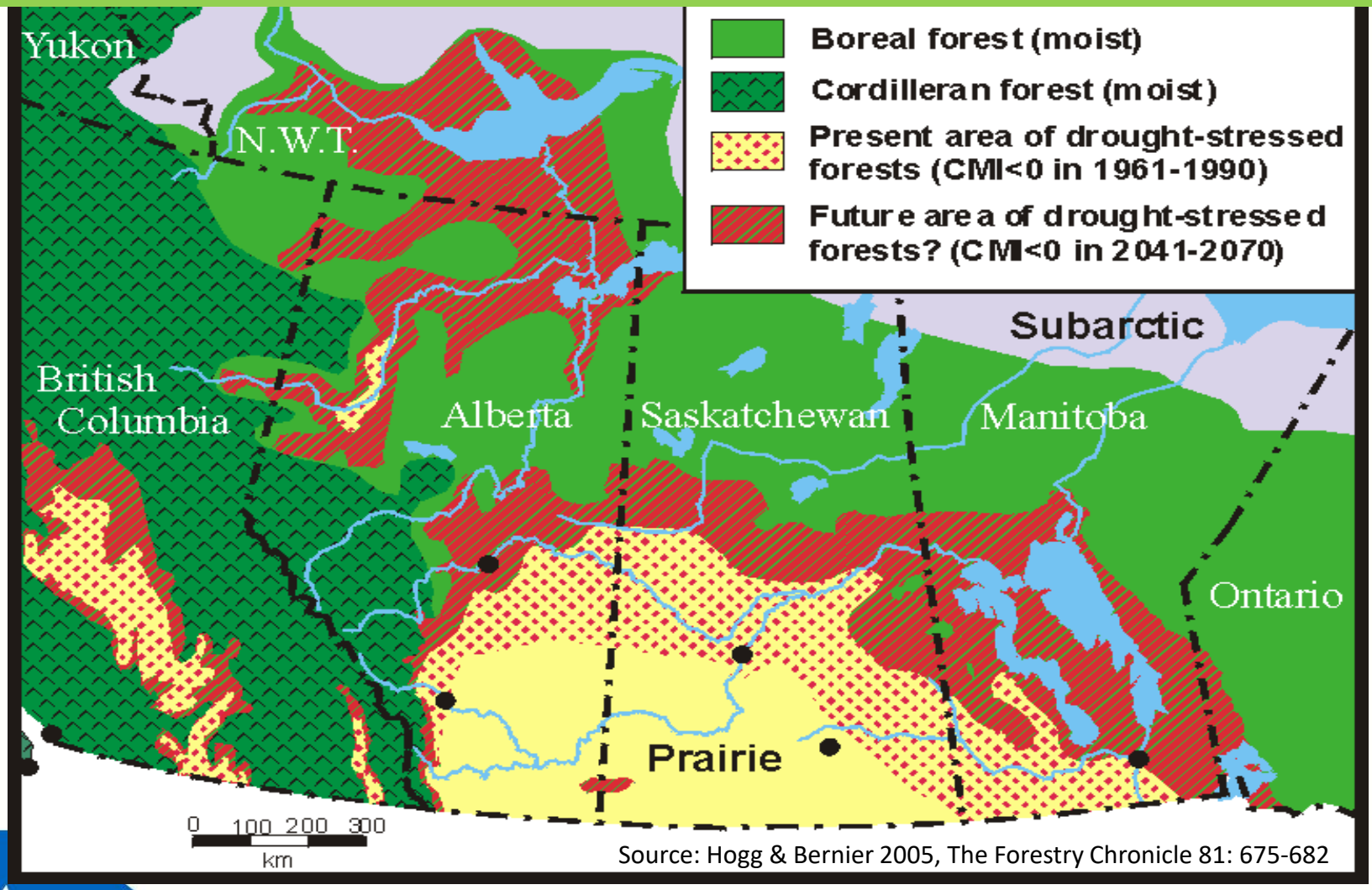
Area Burned for Western Canada (BC to MB)

Source: Balshi et al. 2009, Global Change Biology 15: 578–600



Impacts: Drought

Projected increase in forested areas affected by drought stress under climate change



Source: Hogg & Bernier 2005, The Forestry Chronicle 81: 675-682

Impacts: Field Operations

Shorter operating season on frozen ground

Other Impacts

- Insects, disease
- Invasive species
- Vegetation growth rates
- Species distribution

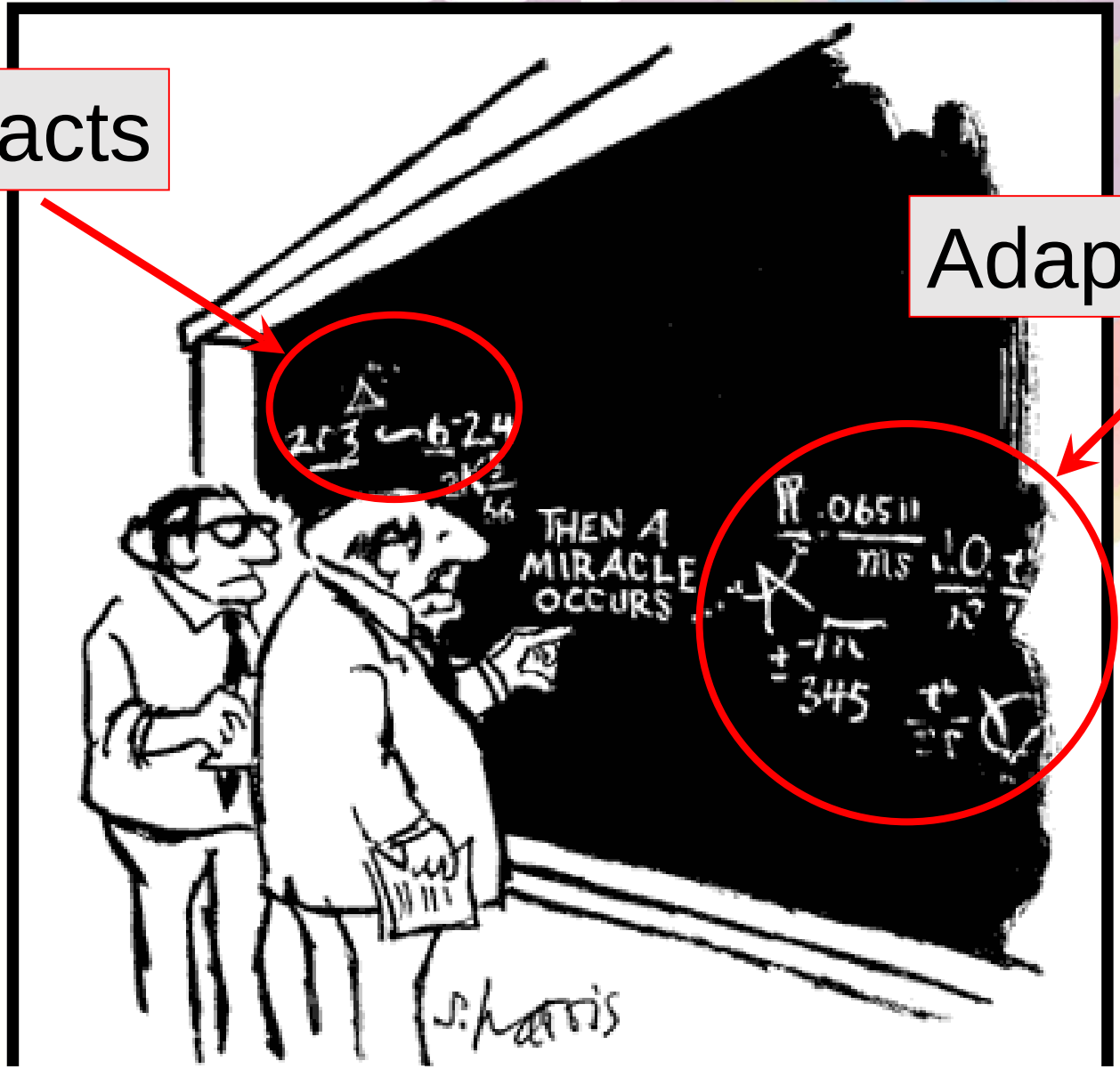
Adaptive Capacity

Factors determining AC:

- Climate change knowledge
- Appropriate technology
- Leadership
- Social capital (relationships and networks)
- Political capital (policy, legislation, etc.)
- Economic and financial resources
- Cultural capital (values and beliefs that support adaptation);

Impacts

Adaptation



“I think you should be more explicit here in step two.”

Vulnerability and Adaptation

- Use impacts information from scenarios
- Assess impacts with regard to each criterion (or management objective, etc.)
- Identify adaptation options for each impact
- Determine whether sustainability objectives will still be met if adaptations are implemented
- If not:
  - Identify additional adaptation measures, or
  - Redefine sustainability objectives (may be unachievable)

CCFM Criteria for Sustainable Forest Management

- Biological Diversity
- Ecosystem Condition and Productivity
- Soil and Water
- Role in Global Ecological Cycles
- Economic and Social Benefits
- Society's Responsibilities

CCFM Approach

- Focuses on *local* management objectives
- Undertaken by *local* practitioners
- Incorporates *local* policies, regulatory environment
- Recognizes *local* landscapes, *local* operations
- Flexible enough to accommodate a wide range of land management regimes
- Has been applied by both government and industry forest managers

Adaptation

- Change in human behavior to reduce negative effects and take advantage of opportunities brought by climate change
- Not biological adaptation (genetics, physiology, etc.)
- Can be reactive – after the fact, or
- Proactive – anticipate impacts

Adaptation and Land Management: Some Examples

- Vulnerability assessment for caribou habitat
- Understanding impacts on wetlands
- Projections of long-term success in mine reclamation under climate change
- How field operations will be affected
- Biosphere reserves?

Further Information

- Contact me:
- Mark.Johnston@src.sk.ca

- CCFM documents available at:
- http://www.ccmf.org/english/coreproducts-cc.asp

- Forestry Adaptation Community of Practice:
- https://www.ccadaptation.ca/en/facop

- Canadian Forest Service, Forest Change Program:
- http://www.nrcan.gc.ca/forests/climate-change/tools-resources/17770

Questions?