



How Businesses Can Analyze and Adapt to Climate Change

Knowledge Forum on Business Adaptation to Climate Change

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ICF International: who are we?

- **Public company on NASDAQ with symbol “ICFI”**
- **Thirty-nine years of experience – founded in 1969**
- **Management, technology, and policy services**
 - ✓ Energy & Climate Change
 - ✓ Transportation & Environment
 - ✓ Health, Human Services & Social Programs
 - ✓ Defense & Homeland Security
- **More than 3,000 employees based in:**
 - ✓ Toronto, Calgary, and 15 offices around the United States
 - ✓ London, Moscow, New Delhi, Beijing, Rio de Janeiro



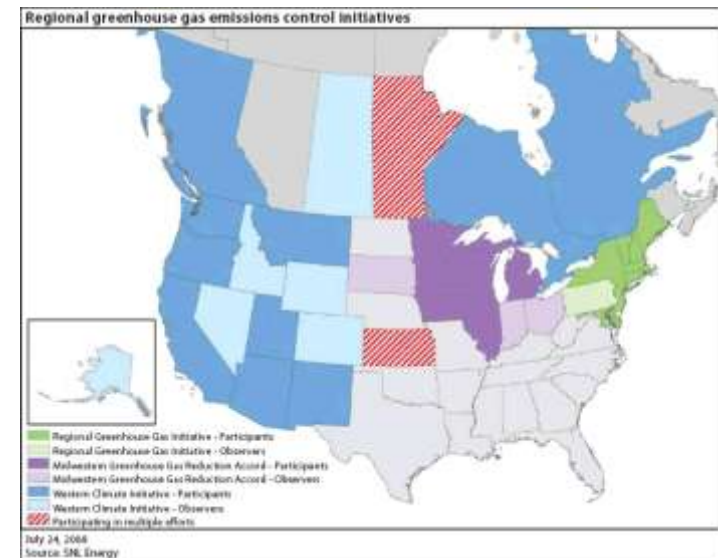
ICF and climate change

- Providing climate change services since 1981
- Over 230 professionals with climate-related expertise
- Provide climate policy advice to > 60 governments and climate strategy advice to > 55 companies in the FT Global 500
- Service offerings include:
 - ✓ GHG Strategy & Policy
 - ✓ Impacts, Vulnerability, & Adaptation
 - ✓ Stratospheric ozone protection



ICF and climate change

- Leading climate change policy expert in the U.S. and Canada
 - ✓ Supporting the US UNFCCC inventory since 1992
 - ✓ Provide policy, scientific, and economic analysis for Environment Canada, NRCan, USEPA programs and analysis
 - ✓ Lead adviser to provincial/state/regional initiatives in US and Canada
 - ✓ Provide multi-sector and electricity sector analytical modelling to support development of GHG and CAC regulations for Environment Canada
 - ✓ Private sector offerings include carbon market analysis, value-at-stake, carbon offset projects, carbon tools (including GHG inventory/carbon footprinting), adaptation screening



- Purpose: to provide a view of current business perspectives on adaptation to climate change and a set of “first steps” for business
- Current attitudes and context
- A business case for adaptation
- Three stage screening
- Case studies: who is taking action now?
- Some lessons from Alaska
- Conclusions

- Perception by many businesses:
 - ✓ Focus on mitigation and carbon markets, rather than adaptation
 - ✓ Climate change impacts viewed as complex, uncertain, and long term in effect
- Growing literature on the need for adaptation and potential adaptation actions
- Business awareness is growing with impetus from insurance industry and businesses facing immediate impacts due to extreme events
- Reality: a limited number of circumstances exist where it is prudent to act
 - ✓ Goal is to present a framework for identifying those circumstances

Let's hope the naysayers are right



The physical effects of climate change






- Increased average temperatures and increased frequency, intensity, and duration of heat waves
- Continuing sea level rise
- Some areas will see increases in wet days and precipitation and others will see increased dry spells
- In some areas, increased intensity and frequency of extreme wind and rain storms, wildfires, or drought
- Accelerating glacier loss
- Reduction in and warming of permafrost

Climate change poses risks to business

- Physical risks
 - ✓ Can affect processes, fixed assets, resource availability
 - ✓ Changes in weather, water availability, changes in temperature, health effects on workforce, cost of adapting
 - ✓ May require corporate preparedness
- Logistics
 - ✓ Vulnerability of supply chain
 - ✓ Fuel dependencies, and ability to switch
 - ✓ Vulnerability to interruptions in power/water
 - ✓ Dependency on transport services
- Competitiveness risk
 - ✓ Changing markets for goods and services
 - ✓ Shareholder risks
 - ✓ Reputational risks

....and opportunities

SOME BIG BUSINESSES ARE HEATING UP THEIR INDUSTRIES.

COMPANY	INVESTMENTS
General Electric	<ul style="list-style-type: none"> • wind power • clean energy technologies 
Cummins	<ul style="list-style-type: none"> • natural gas engines 
BP	<ul style="list-style-type: none"> • lower-emissions fuels • solar power 
Alcoa	<ul style="list-style-type: none"> • fuel-efficient materials for vehicles 
Toyota	<ul style="list-style-type: none"> • environmental technologies for the auto industry 

While climate change also presents opportunities to business, the focus has largely been on the risks, and how to successfully adapt.

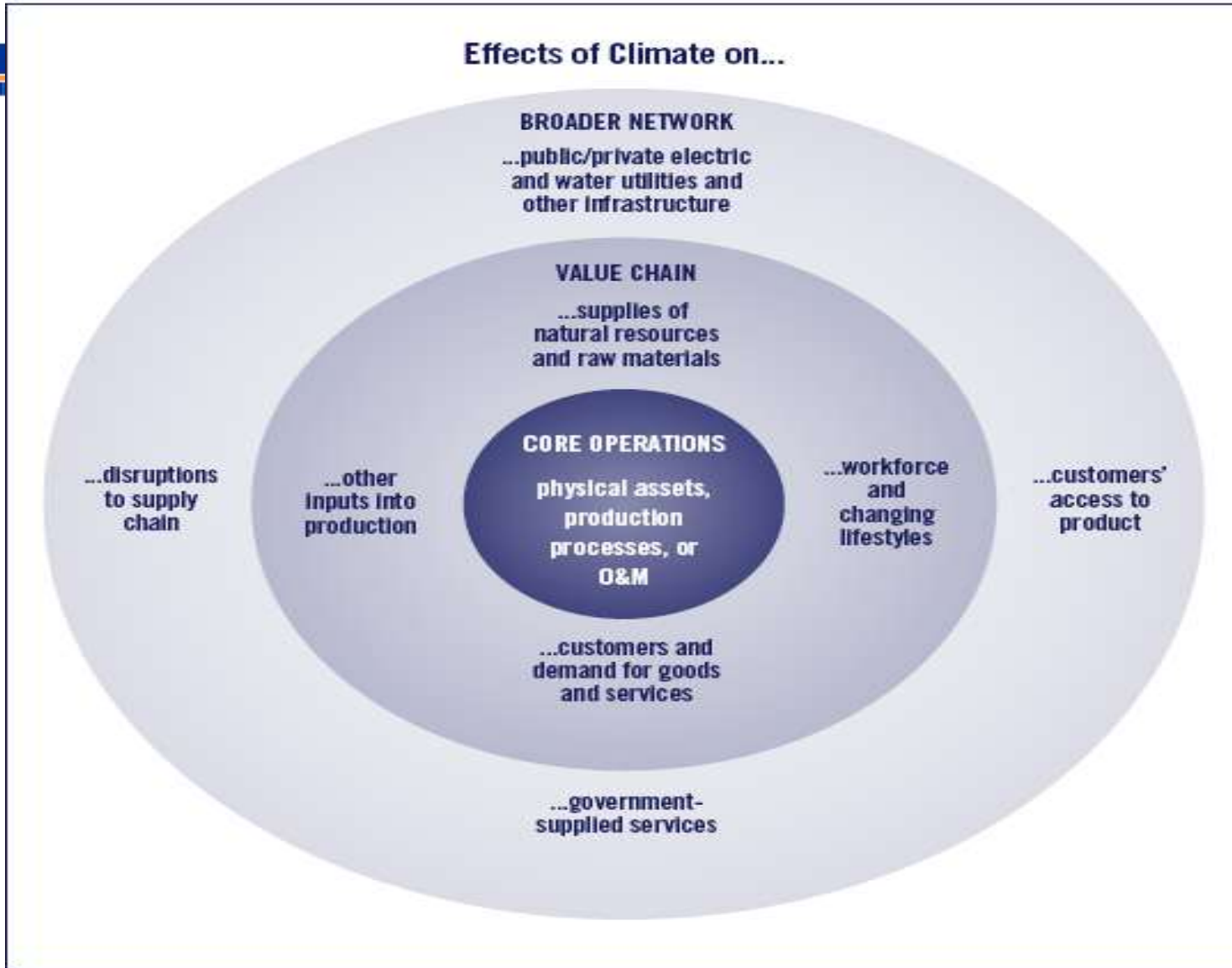
Some implications for selected sectors

- **Electric utilities**—increases in peak demand, risk of damage/stress to infrastructure, reduced water for cooling
- **Mining, Integrated Oil & Gas**—extreme weather events increase risk to operations
- **Food, tobacco, and beverages**—interruptions in food supply, reduced reliability and quality of supply
- **Building design and construction**—infrastructure damage, effects of weather on construction periods and workforce, changes needed in design standards
- **Insurance**—disruptions to business operations, risks to human health, overall natural catastrophe exposure
- **Agriculture**—farm buildings, distribution networks, storage facilities, livestock, crops, workforce all affected by changing climate
- **Motor manufacturing**—effects on supply chain, design standards, process environment

Where are we now?

- Carbon disclosure project (CDP 2007) found four industries expressed the most concern about climate change :
 - ✓ Insurance
 - ✓ Oil and gas
 - ✓ Electric utilities
 - ✓ Beverages, Tobacco, and Food productsFew companies, however, have taken much adaptive action
- Dr. David Keith: *“Unlike mitigation, which is a “public good” and so has broader benefits, adaptation actions directly benefit the business or individual”*

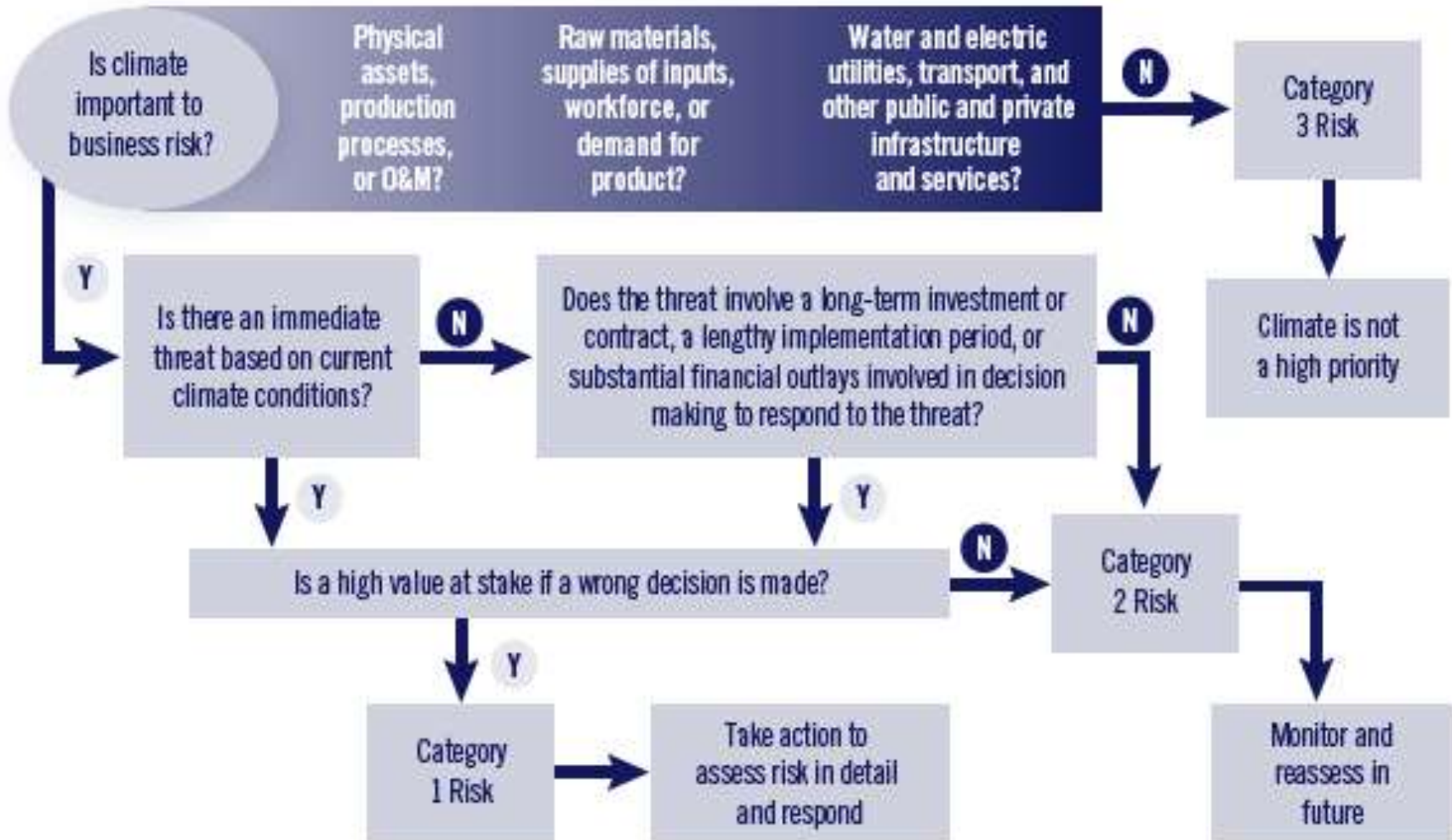
The risk disk



Who needs to take action?

- Three categories of risk:
 - ✓ **Category 1:** Potentially significant climate risks that need to be managed in the short term
 - ✓ **Category 2:** Potential climate vulnerabilities that need to be monitored and reassessed over time
 - ✓ **Category 3:** Climate risks not significant—no further analysis required
- Category 1 risks may require in-depth assessment and development of risk management strategies

Three-stage screening



Three stage screening

Breaking the assessment of climate change impacts into tractable components:

- Stage 1: Is climate important to business risk (the risk disk)
- Stage 2: What is the timing and time horizon of the risk?
 - ✓ Is the risk immediate?
 - ✓ Does it involve long term investments or contracts, location decisions, high capital costs?
- Stage 3: Is a high value at stake if a wrong decision is made?

A “yes” to all questions indicates that risks may require a full-blown risk assessment to determine appropriate actions (a Category 1 risk)

Who is taking action now and why?

- ICF interviewed three companies:
 - ✓ Entergy – electric power generation and distribution – HQ in New Orleans, Louisiana
 - ✓ Travelers Companies, Inc. – provider of personal and commercial property and casualty insurance – HQ in St. Paul, Minnesota
 - ✓ Rio Tinto – international mining group – HQ in UK
- Members of the PEW Center’s Business Environmental Leadership Council (BELC)
- Part of a handful of companies that are taking the physical impacts and potential risks of climate change seriously

- Integrated energy company engaged primarily in electric power production and retail distribution operations
- Delivers electricity to more than 2.6 million customers in Arkansas, Louisiana, Mississippi, and Texas.
- Motivated to action by \$2 billion in losses from Hurricanes Katrina and Rita in 2005:
 - ✓ Relocated important business centers to address immediate threats
 - ✓ Put together a “business continuity group,” to look at the wider implications of cc in the context of other threats. This group undertook a three stage study
 - » Use trend analysis to develop scenarios for future changes in key climatic and physical effects over near, medium, and long terms
 - » Correlate identified risks with Entergy assets and operations
 - » Assess existing risk mitigation plans and seek alternatives to reduce impacts

The Travelers Companies, Inc.

- One of the largest providers of personal and commercial property and casualty insurance products in the US
- Motivated by the severe 2004 and 2005 Atlantic hurricane seasons to develop a more cohesive and integrated approach to climate risk, including
 - ✓ Reassessing coastal underwriting practices
 - ✓ Updating catastrophe modeling to include climate change science in estimates of potential loss
 - ✓ Providing assistance with loss mitigation and adaptation for customers (including building code standards and disaster preparedness)
 - ✓ Redesigning pricing to take into account characteristics affecting losses
 - ✓ Engaging in community and government outreach to encourage disaster awareness and preparedness

- **Leading international mining group; major products include iron ore, aluminum, copper, diamonds, energy products, gold, and industrial minerals.**
 - ✓ Activities span the world but are strongly represented in Australia, North America and Europe
- **Headline weather events over the past few years have reinforced the focus on adaptation**
- **Based on impetus from management, conducted a number of studies:**
 - ✓ Conducted an internal cc risk assessment in 2002—a “desk-top” review using the IPCC Third Assessment Report (TAR)
 - ✓ Followed up with a second study focusing on implications of climate changes over next 50 years, using detailed regional data provided by the UK Hadley Center for Climate Change
 - ✓ Commissioned external engineering consultants to review vulnerabilities associated with engineering design standards
 - ✓ Very detailed site assessments for higher priority sites, following on the engineering review
- **Concluded that near term effects of climate change are small enough and gradual enough that operations will be able to adapt**
- **Over longer term, more significant changes are likely to occur**

Lessons from the BELC case studies

- The potential for—and actual—damage from extreme events was a key motivation
- Each company initially conducted a risk screening followed by more detailed assessments
- Different sources of climate data were used—ranging from trend analysis, to IPCC findings, to more specific, localized climate projections
- Companies are often looking at the range of risks up and down the value chain
- Companies are beginning to recognize the importance of working with gov't, customers, and others to reduce broader risks the company faces

Alaska: adaptation to climate change

- Administrative Order 238 created a Climate Change Sub-Cabinet on September 14, 2007, with a mission to develop a climate change strategy (mitigation and adaptation) for Alaska.
- ICF is providing support to the state of Alaska, through an EPA contract, to assist in the development of an adaptation plan
- Stakeholder-driven process including industry, NGOs, state and local officials
- Goal: development of adaptation strategy

Impacts of Climate Change in Alaska

- Alaska is one of the few states developing an adaptation strategy
- Motivation comes in part from effects that are already being observed, as well as projected:
 - ✓ melting glaciers, rising sea levels, and flooding of coastal communities
 - ✓ thawing permafrost, increased storm severity, and related infrastructure damage to roads, utility infrastructure, pipelines and buildings
 - ✓ loss of subsistence way of life as animal habitat and migration patterns shift and as hunting and fishing become more dangerous with changing sea and river ice
 - ✓ forest fires and insect infestations increasing in frequency and intensity

Impacts already being observed in Alaska



Shishmaref, where the coastline has eroded 100-300 feet in the past 30 years.

Photo: The Nome Nugget

Beetle-killed spruce trees readily ignite.

Photo: Alaska Dept. of Natural Resources



Source: <http://www.climatechange.alaska.gov>

What can we learn from Alaska?

Alaska's approach to adaptation has several components, reflecting the diverse and ongoing nature of the risks:

- Immediate action – actions that need to be taken within 12 to 15 months to protect human health and critical infrastructure
- Less immediate but high priority actions needed to protect public infrastructure, services from natural systems, economic activities (such as oil and gas), and human health and culture.
- Research needs – scientific data, assessments, monitoring, or other information to support the development or implementation of policies/programs or to determine longer term actions
- Cross-cutting actions will also likely emerge from the process, including public-private partnerships, intra-governmental coordination, new planning bodies, and ongoing governmental policy & program development

What can we learn from Alaska?

- The process is focusing on identifying an array of risks and alternatives, implicitly using a screening much like the 3-stage screening
- Workgroup meetings involve community leaders, business representatives, and other stakeholders, as well as state and local government
- While workgroups are focused on government action, the impacts up and down the value chain—as well as on human health and coastal communities—are factoring into the recommendations.

How important is adaptation to Alberta?

Water issues
-Industrial
-Agricultural
-Municipal

Annual Moisture Index

1961-1990



2050s

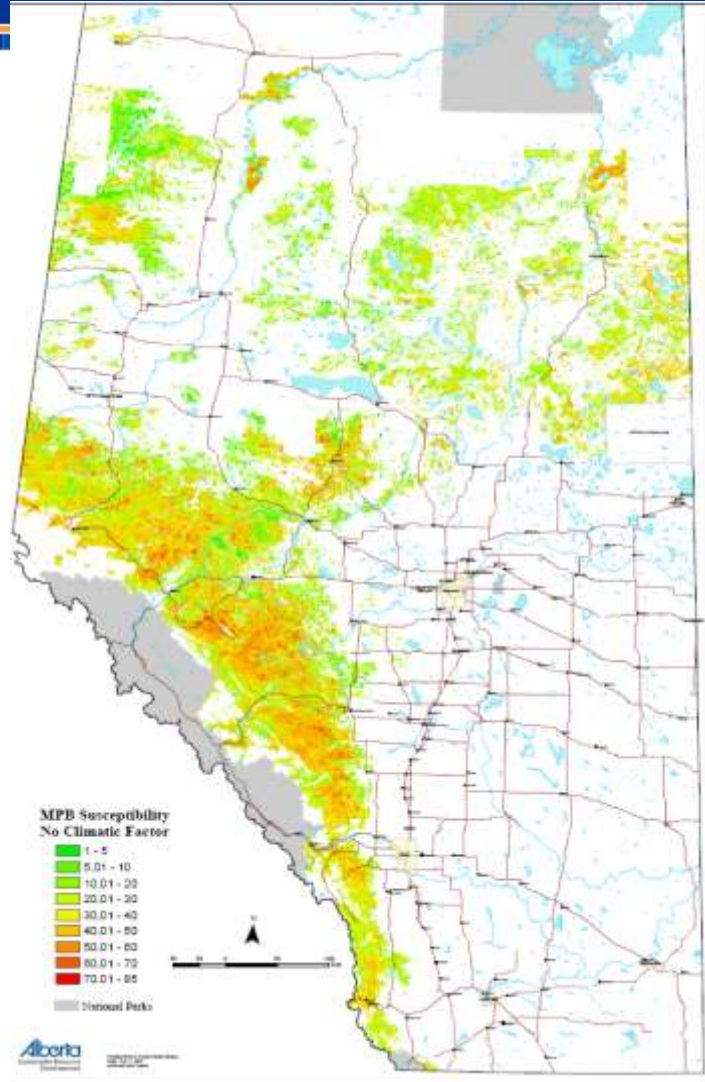


● Most Moist
○ Least Moist

How important is adaptation to Alberta?

Insect Infestation

- Industrial
- Agricultural
- Tourism



Conclusions

- Interest and attention to adaptation is growing
- Climate change has implications beyond the direct effects of weather
- Businesses can take the first step—a screening to determine susceptibility to climate risk to determine whether more in depth assessment is needed.
- Most pressing are the risks posed to businesses that are climate sensitive or dependent on sectors that are climate sensitive, have long term investments or long term planning underway, or that are located in geographic areas susceptible to increasing extreme events
- The entire value chain should be evaluated when determining climate risk, including the impacts of actions taken—or not taken—by government, stakeholder, and other decision makers
- Screening can identify not only risks, but also opportunities associated with climate change





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