Incorporation of Adaptation to Climate Change into the EIA Process:

Application of a Practitioner's Guide in the Developed and Developing World

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Presentation

- the international context
- the ClimAdapt Guide and case study application
- application of the approach to the developing world
- wrap-up and questions

International Context

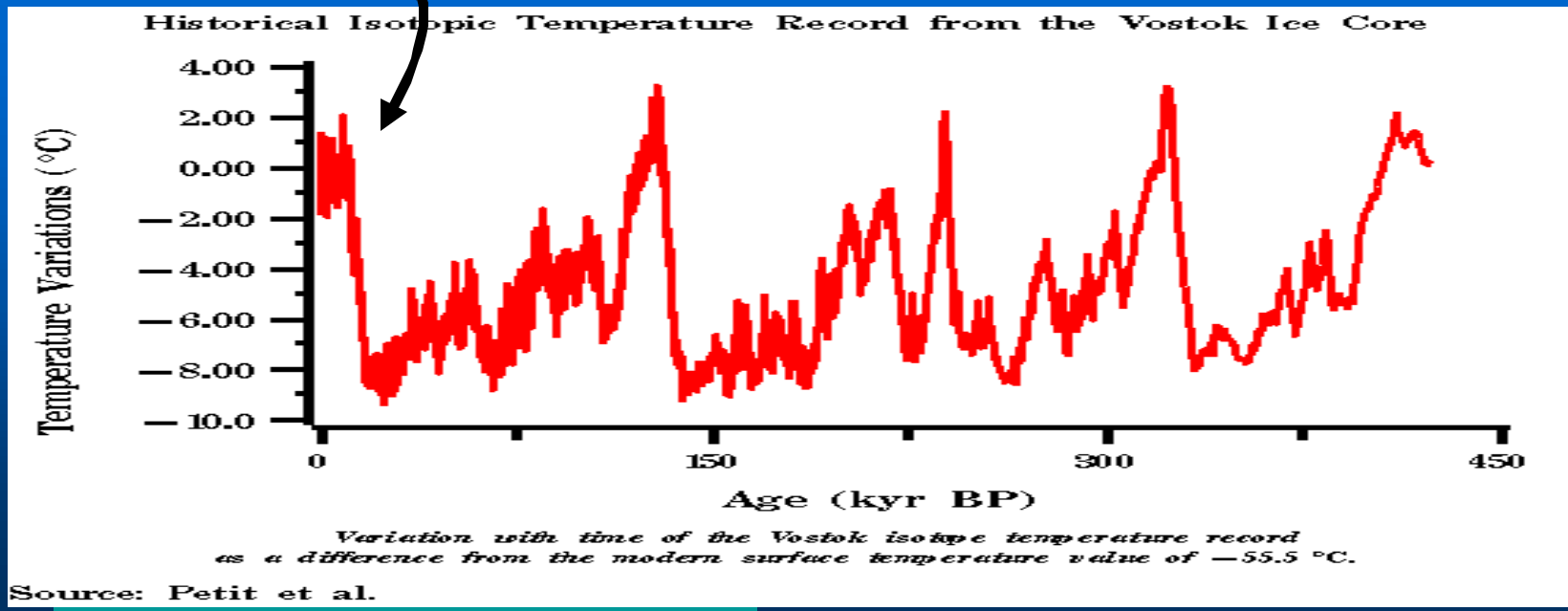
International Context

- Intergovernmental Panel on Climate Change (IPCC) THIRD ASSESSMENT REPORT
  - global average sea level rose between 0.1 and 0.2 m last century and is projected to rise 0.1 to 0.9 m this century
  - most of the warming observed over the last 50 years is attributable to human activities
  - some extreme events have increased in frequency and intensity and will continue to do so

Climate change is natural – but …!

We are at the top of the cycle … Temperatures should be coming down, not up!

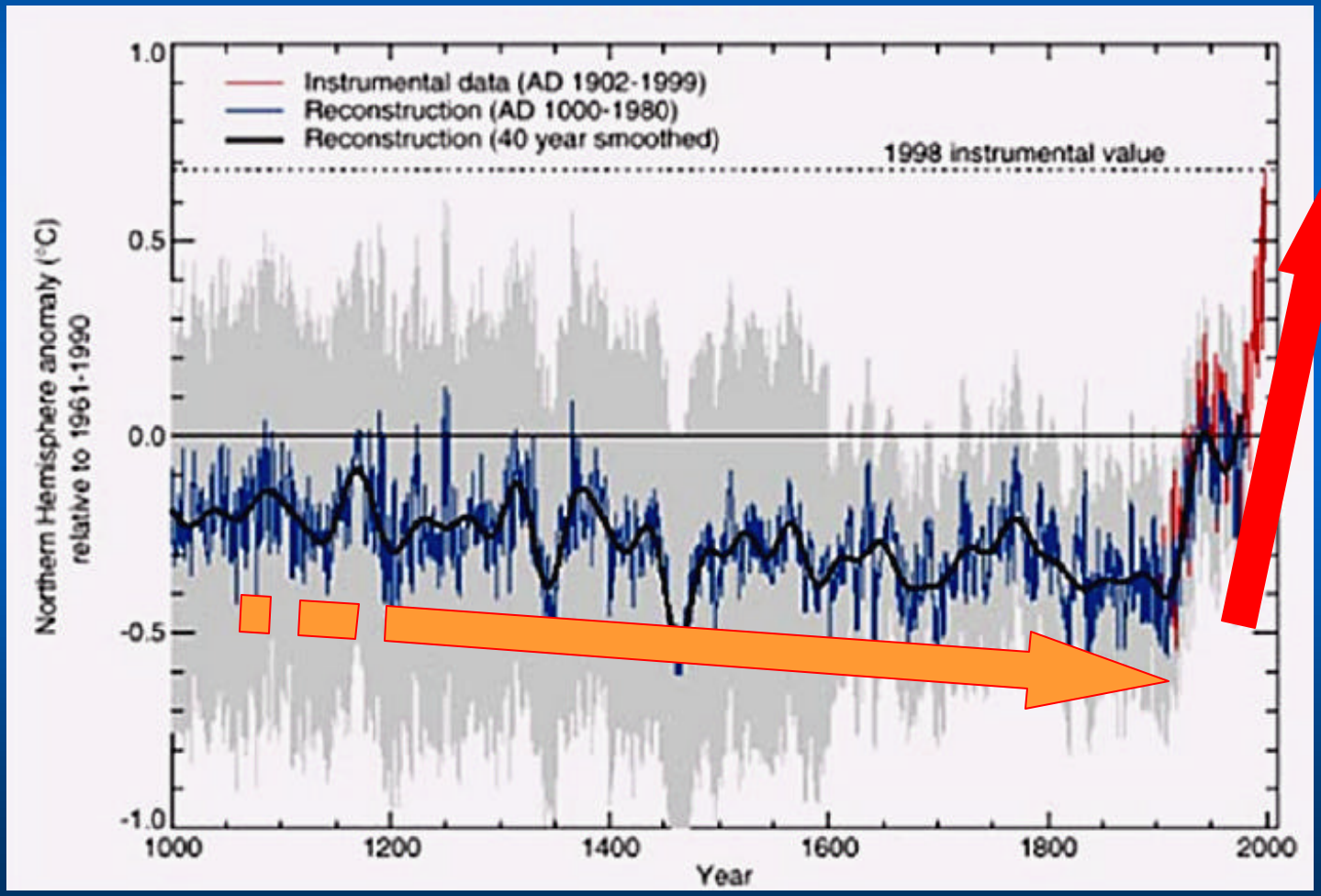
We are here



Variation with time of the Vostok isotope temperature record as a difference from the modern surface temperature value of —55.5 °C.

Source: Petit et al.

The Current Change is NOT Natural



Two Responses to Climate Change

1. **Control of Greenhouse Gas emissions**

   Kyoto Agreement, process and control technology, monitoring, auditing, trading, etc.

2. **Adaptation**

   reduce risks and shift policy and planning to more appropriate areas.

We must both mitigate and adapt

Adaptation Can Be ….

- adaptation can be either *reactive* or *anticipatory*
- planned adaptation is the result of a strategic policy decision needed to return to or maintain a desired state
- planned adaptation can be both reactive and anticipatory

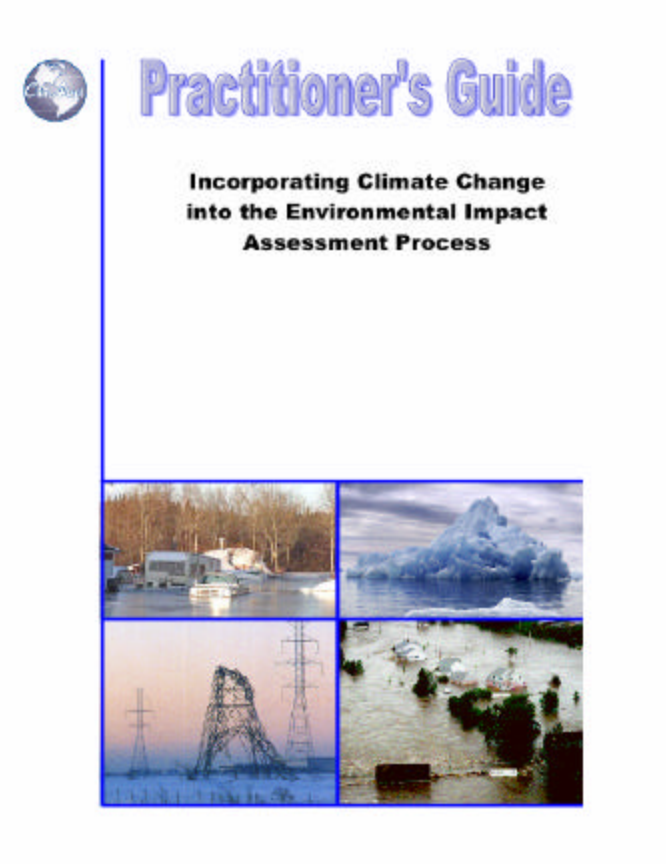
Three Guiding Principles

- adaptation is a portfolio of responses
- adaptation is a shared responsibility
- adaptation links the documented needs of today with the expected problems of tomorrow

Source: Pielke (1998)

The ClimAdapt EIA Guide

EIA Guide



- a draft guide was developed, applied to 6 case studies, peer reviewed, and revised based on application and comment
- the guide was introduced at IAIA'03 in June of 2003

ClimAdapt EIA Guide

The guide provides:

- an understanding of the implications of climate change in relation to the preparation of an EIA
- sources of information for use in assessing climate change implications, and
- step-by-step guidance for practitioners

Why do we need a Guide?

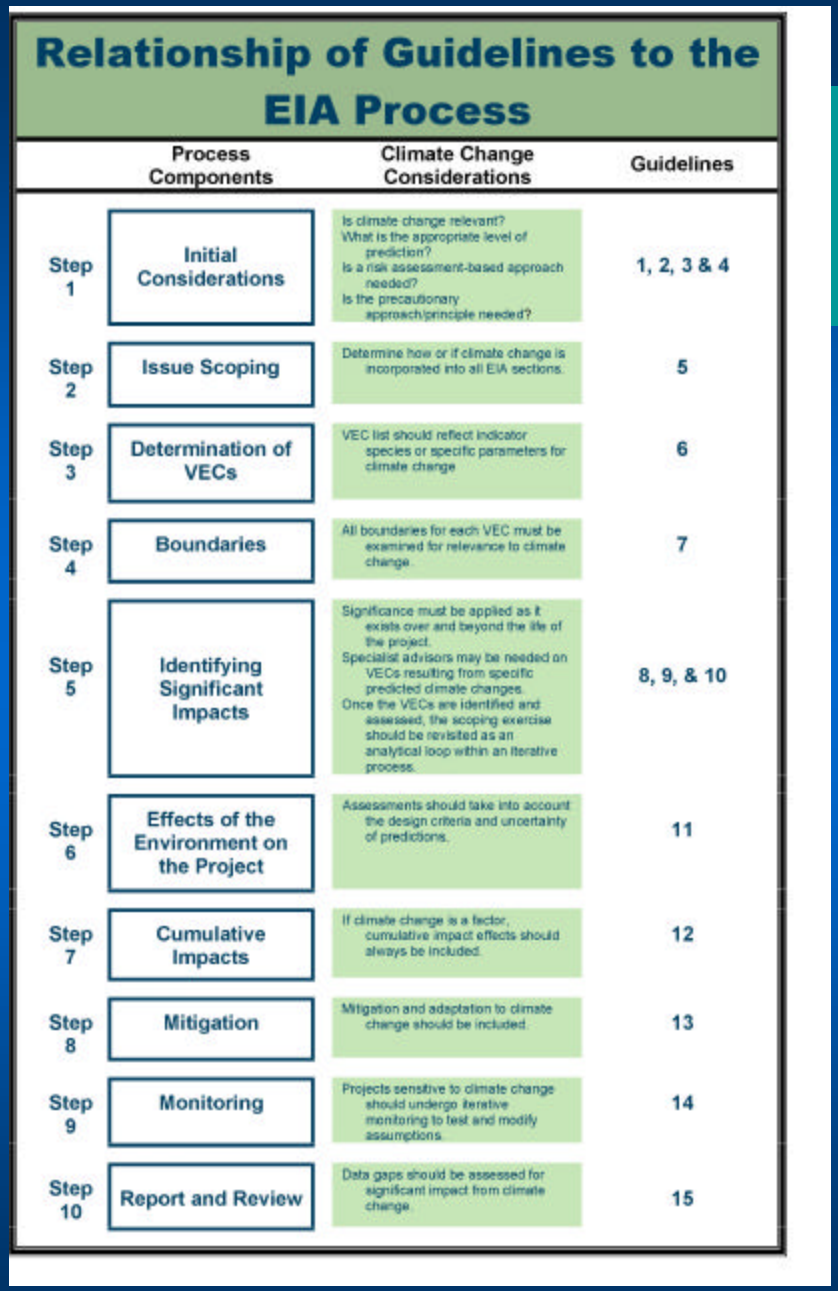
Because extreme events are getting more frequent – EIA helps on a project-specific basis

Why do we need a Guide?

Sea level is rising and shoreline erosion is increasing in severity

Developing the EIA Guide

- EIA is an iterative process – as a result, climate change is incorporated throughout the process
- the Guide emphasizes where more attention is needed and why
- it stresses balance between precision in climate change and ecological prediction



Relationship of Guidelines to the EIA Process

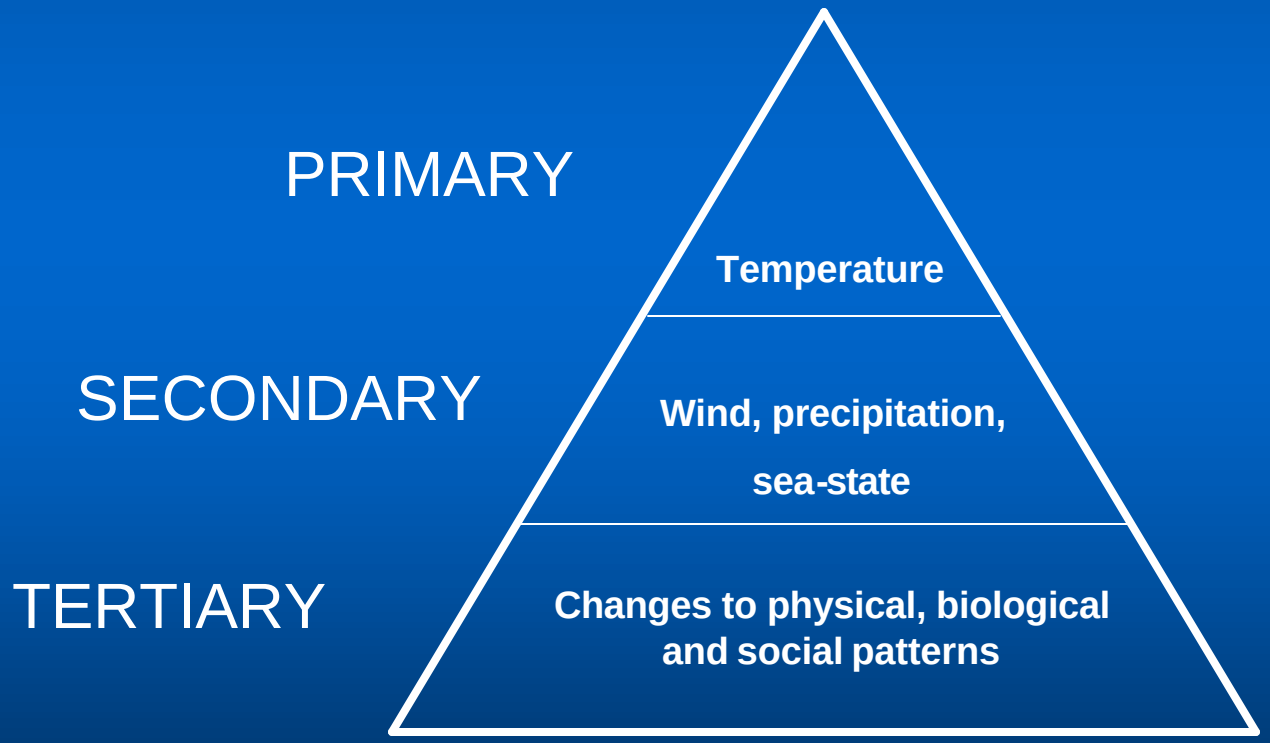
	Process Components	Climate Change Considerations	Guidelines
Step 1	Initial Considerations	Is climate change relevant? What is the appropriate level of prediction? Is a risk assessment-based approach needed? Is the precautionary approach/principle needed?	1, 2, 3 & 4
Step 2	Issue Scoping	Determine how or if climate change is incorporated into all EIA sections.	5
Step 3	Determination of VECs	VEC list should reflect indicator species or specific parameters for climate change	6
Step 4	Boundaries	All boundaries for each VEC must be examined for relevance to climate change.	7
Step 5	Identifying Significant Impacts	Significance must be applied as it exists over and beyond the life of the project. Specialist advisors may be needed on VECs resulting from specific predicted climate changes. Once the VECs are identified and assessed, the scoping exercise should be revisited as an analytical loop within an iterative process.	8, 9, & 10
Step 6	Effects of the Environment on the Project	Assessments should take into account the design criteria and uncertainty of predictions.	11
Step 7	Cumulative Impacts	If climate change is a factor, cumulative impact effects should always be included.	12
Step 8	Mitigation	Mitigation and adaptation to climate change should be included.	13
Step 9	Monitoring	Projects sensitive to climate change should undergo iterative monitoring to test and modify assumptions.	14
Step 10	Report and Review	Data gaps should be assessed for significant impact from climate change.	15

- 15 guidelines identify key issues for each step in the EIA process
- the Guide is intended to give someone the equivalent of 6 months experience working with Climate Change

Overarching Considerations

- climate changes that may occur over the life span of the project or the life span of its impacts;
- impacts of those changes on the Valued Environmental Components (VECs), and
- changes to the project due to climate change over its life, altering its impact characteristics.

Predictability Hierarchy



Prediction Method Selection

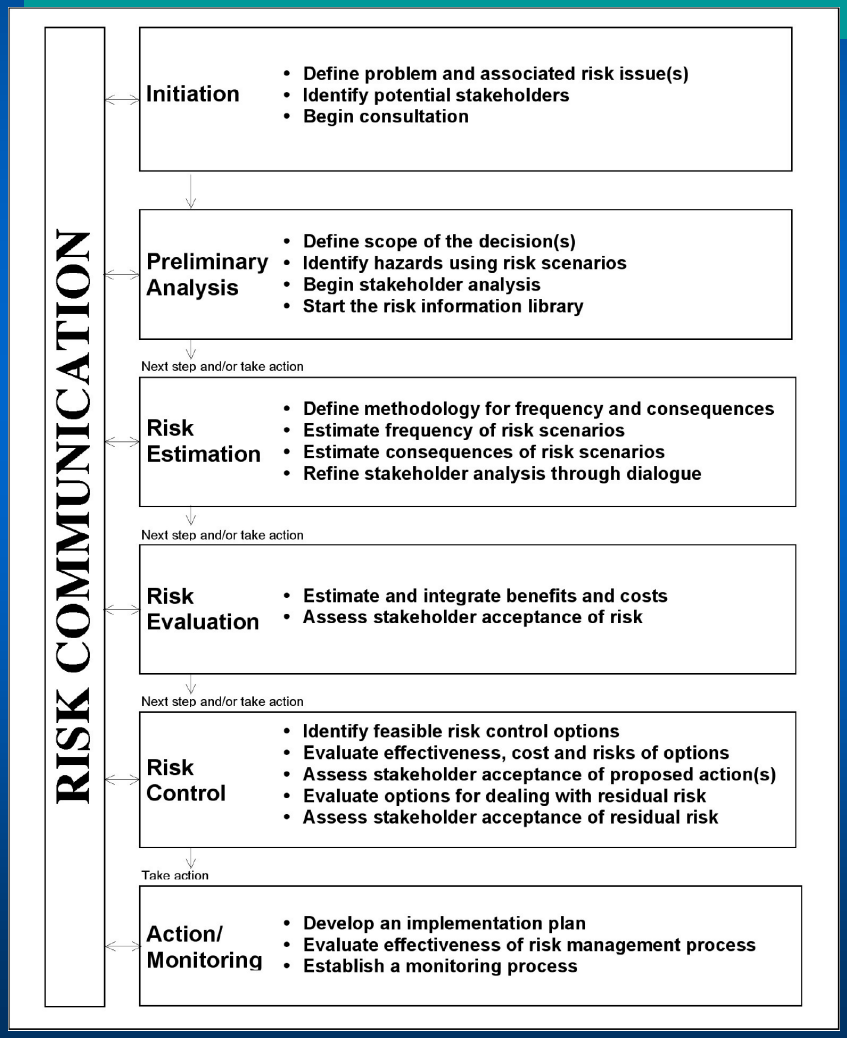
- prediction of resulting ecological changes may be limiting
- prediction of intensity and frequency of extreme events still a difficulty
- level of effort should match the scope of the EIA overall

Sources of Climate Predictions

The Guide identifies four approaches:

- generally available climate change regional projections from global models (e.g., IPCC)
- country- or region-specific studies available from governments and other agencies (U of Victoria);
- project-specific climate-change modeling, and
- risk-assessment-based approaches.

A Risk-based Approach



The risk-based approach draws on standard approaches to balance benefits and costs using realistic scenarios

Effects of the Environment on the Project

- emphasis should be on human health and safety
- operation and productivity of the project may be adversely affected
- cost of development may rise and project design may need to be modified
- maintenance requirements may increase
- monitoring may be more important

Cumulative Effects

- always considered if climate change is important
- increased transport of physical or chemical constituents
- an increase or decrease in habitat area for a species or species group that is already affected by the project
- secondary effects related to climate-change modification to the environment or its effects on the project

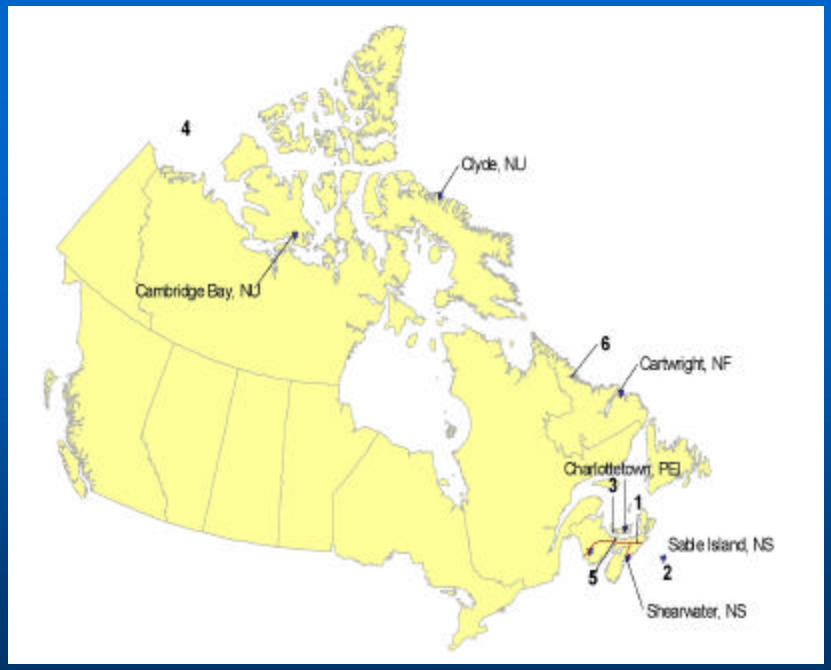
Testing of the Guide

- the Guide was peer reviewed at the advance draft stage and revised accordingly
- under a contract with Canadian Environmental Assessment Agency (CEAA), the Guide was applied to six existing EIAs in Canada
- after the case study application, the guide was revised and a final peer review completed

EIA Case Studies

Case studies included:

1 Sutherlands River, Nova Scotia



Climate projections were obtained for the communities named on the map

EIA Case Studies

2 Deep Panuke Offshore Gas Project, Nova Scotia

3 Confederation Bridge, New Brunswick and Prince Edward Island

4 Beaufort Sea Gas Development, Canadian Arctic

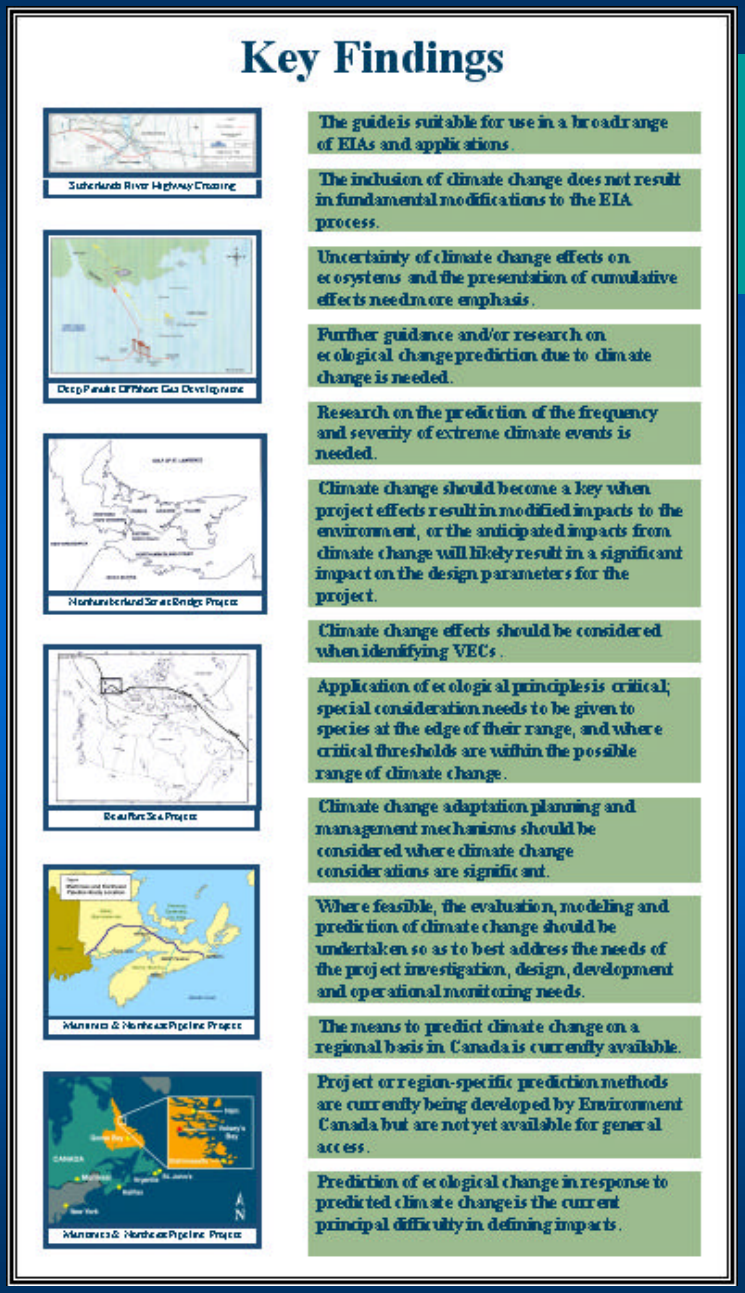
5 Maritime and Northeast Gas Pipeline, Nova Scotia and New Brunswick

6 Voisey Bay Mine, Newfoundland and Labrador

Predicting Climate Change

Predicted Change in Average Temperatures by 2040 – 2069 (°C)

Time of Year	Weather Sites Nearest the Locations of the ClimAdapt Case Studies						
	#1	#2	#3	#4	#5	#6	
	Shearwater Nova Scotia	Sable Island NS	Charlottetown Prince Edward Island	Fredericton New Brunswick	Cartwright Newfoundland and Labrador	Cambridge Bay Nunavut	Clyde Nunavut
January-March	3.1	1.7	3.2	3.3	-0.6	5.9	6.5
April-October	2.2	1.5	2.3	2.3	2.9	2.8	3.1
November-December	1.5	1.8	1.6	1.0	-0.6	5.1	3.9
Annual Average	2.4	1.6	2.4	2.3	-1.8	3.9	4.2



Findings

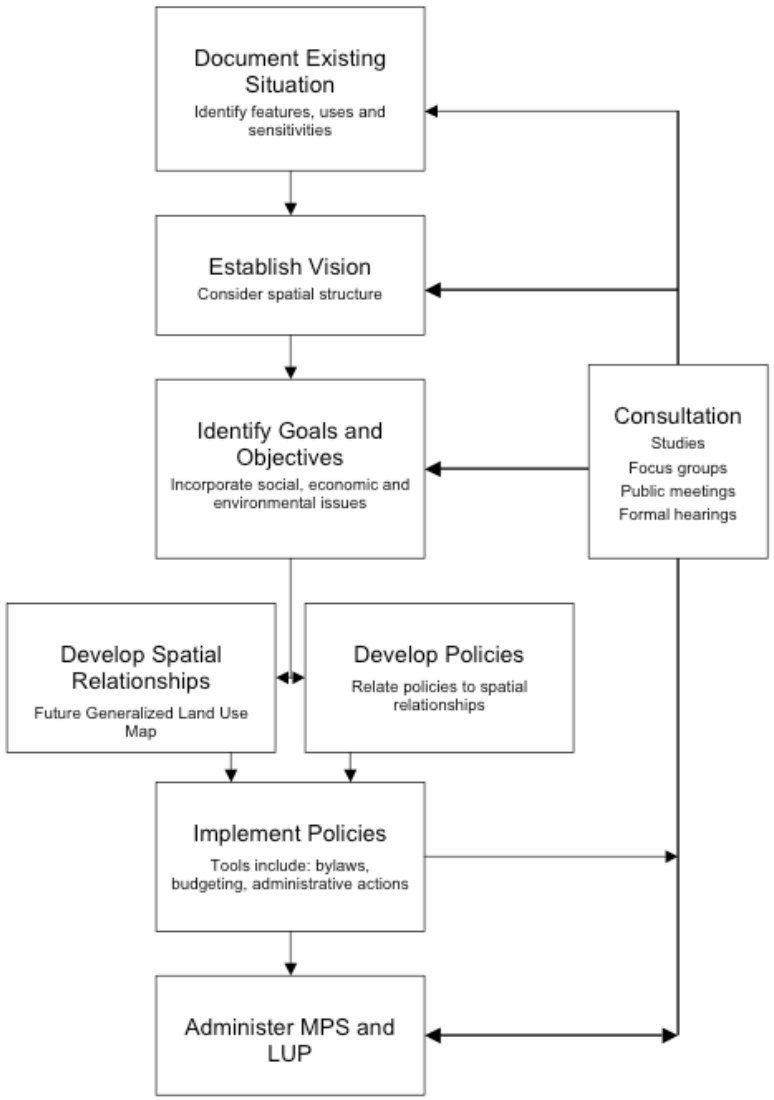
- regional predictions of climate change are now readily available
- understanding local and microclimate effects are still difficult
- balance is needed between risks and detailed climate projections

Conclusions About the Guide

- the ClimAdapt Guide worked well
- peer review comments were highly favourable
- further research is required on predicting ecological changes to climate change
- further research is required on the prediction of the frequency and intensity of extreme events

An LUP Guide

- We're now working on a guide for the land-use planning process based on a typical process as shown here



Planning Issues

- **mitigation** can provide politically correct comfort, but **adaptation** raises uncertainty, costs and risks
- EIA is iterative but planning is a step-wise, comprehensive process
- planning should be revised at regular intervals, but these intervals tend to be longer than initially envisioned
- climate change will have a major effect on how planning is done and how it is viewed

Application to the Developing World

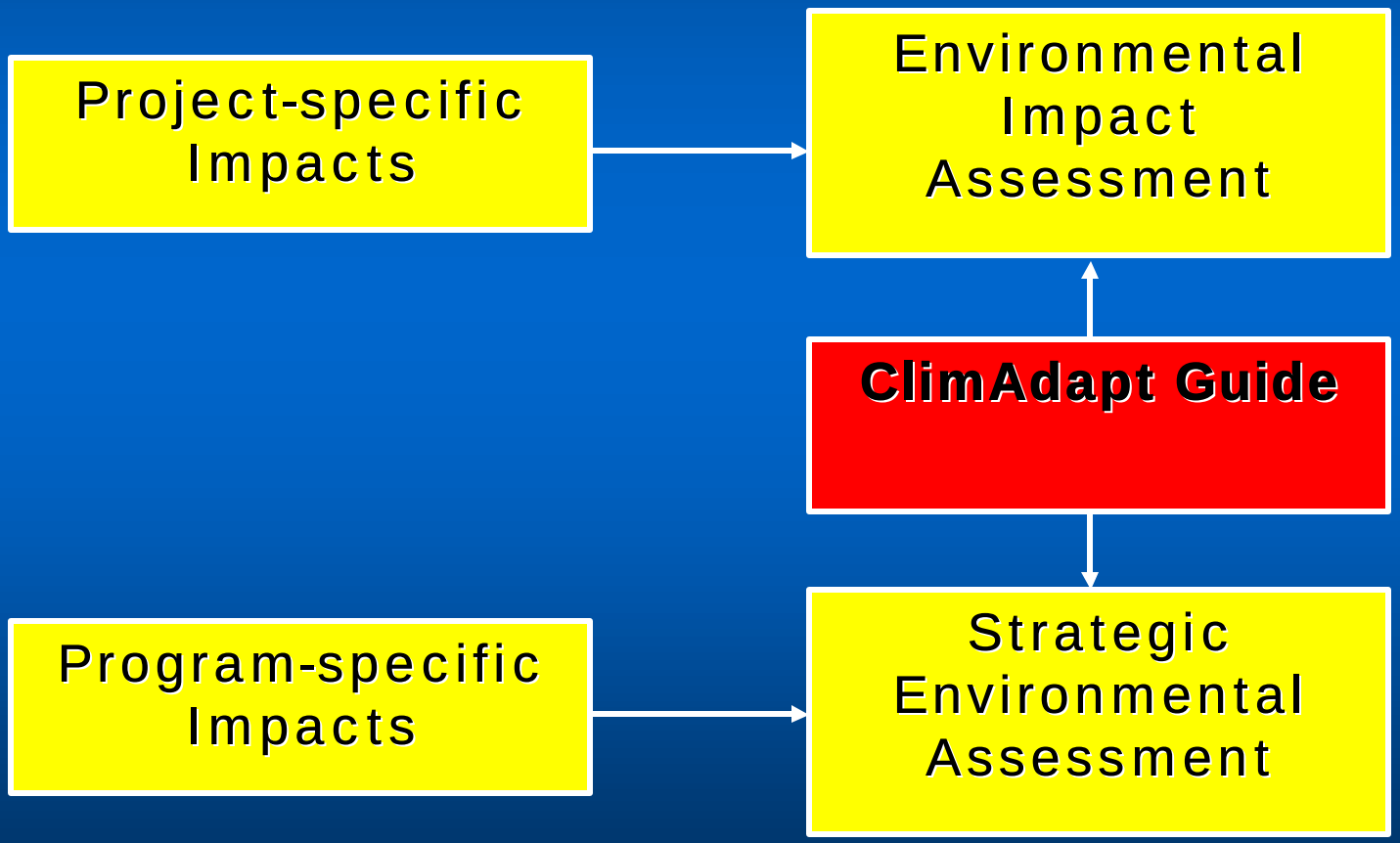
Application to the Developing World

- the World bank is beginning to address adaptation to climate change
- concerns include those projects where direct impacts of climate change may affect the viability of the project itself, and
- programs where consideration of climate change should be incorporated to avoid risks

Relevant Projects

- vulnerable projects include coastal infrastructure, large hydro plants, or agriculture vulnerable to drought
- programs where risk could be reduced include agricultural research designed to increase output or irrigation projects

Guide Application



Country Vulnerability

- factors include (from Burton and van Aalst, 1999)
  - low lying coastal lands periodically inundated by sea water driven inland by cyclonic storms (Bangledesh, Papua New Guinea)
  - floods and flash floods (Guyana, Papua New Guinea, Zimbabwe)
  - drought (Bangledesh, Papua New Guinea, Zimbabwe)
  - El Niño (Ecuador, Guyana)
  - rigid sea defenses (Guyana)
  - small size and limited portfolio (Samoa)

Island States were First

- Climate change was initially addressed for island states, including the Caribbean
- A guide to EIA and climate change has been developed for the CARICOM member states, with assistance from CIDA, conforming to the World Bank procedures
- The guide provides Natural Hazard Impact Assessment, part of the Caribbean Development Bank's EIA process

Then India

- India was selected as the first large, non-island state for addressing climate change issues
- in 2003, the World Bank sent an appraisal team to India to identify climate change issues requiring immediate attention
- Drought relief in Andhra Pradesh has been selected as a primary project

Look Before You Leap

- In 2004, the World Bank outlined a management approach to deal with adaption (Burton and van Aalst, 2004)
- Questions addressed:
  - How can concerns of developing countries be incorporated without climate change losing status as a global priority?
  - How can adaptation be ‘mainstreamed’, without distorting the development process?

Look Before You Leap

- A routine Project Risk Assessment will identify high risk, moderate risk and low risk projects
- Evaluation would use a Climate Risk Management Knowledge (CRMK) base
- Good Practice Examples should be included in the CRMK Base
- Projects in Climate Risk Hot Spots can be selected as priorities

Conclusion

- climate change can be incorporated in EIA and SEA without major changes to the process
- the ClimAdapt Guide provides assistance to practitioners and can be tailored to specific applications, such as a **Best Practices Guide**
- we look forward to developing further applications of the guide

Questions?

Thank You

For more information
www.climadapt.com