

HELPING COMMUNITIES ADAPT TO CLIMATE CHANGE:

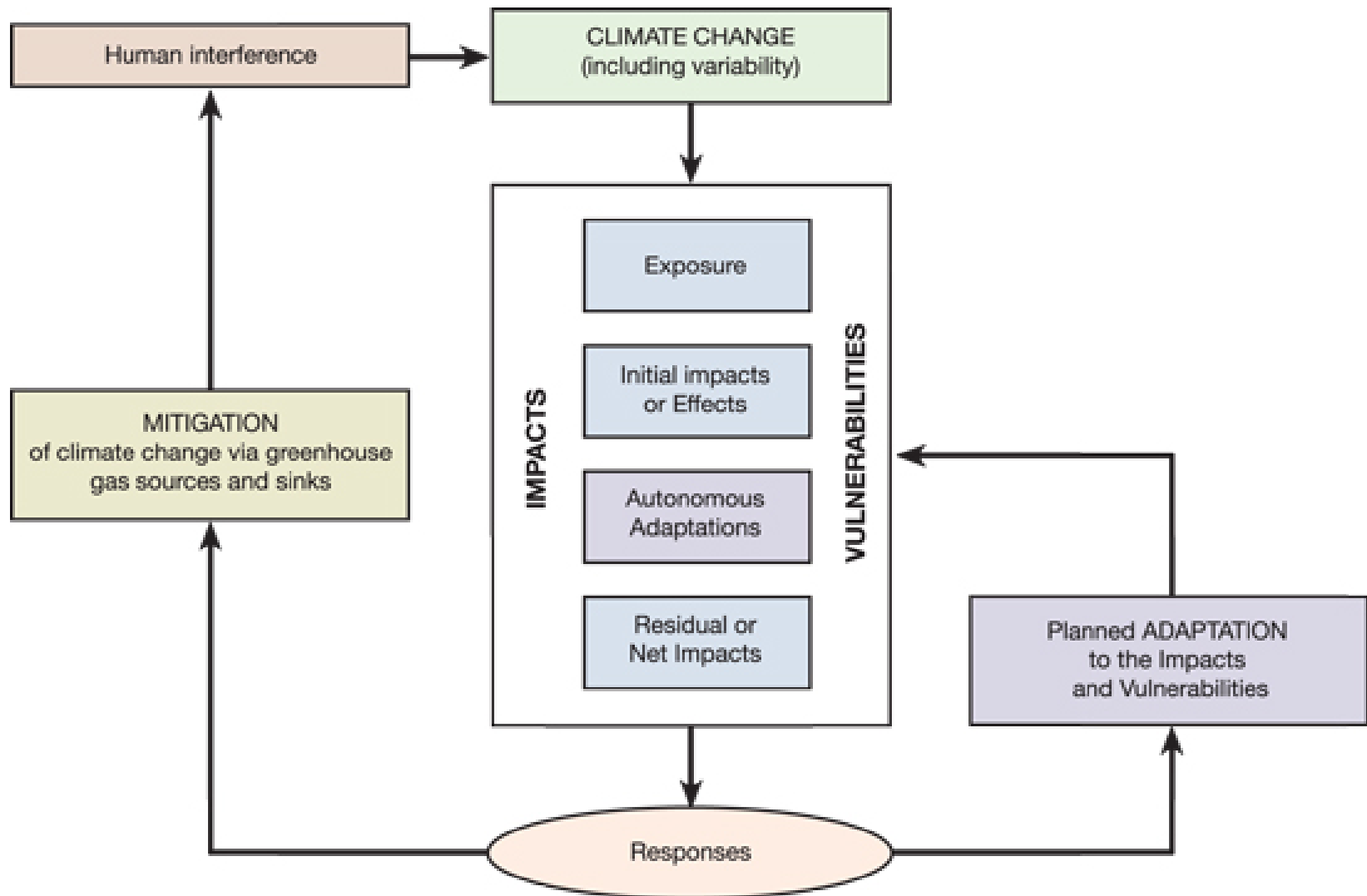
HOW TO USE A RISK-BASED ADAPTATION GUIDE

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February 16, 2010

Background

- 2001-2005 Caribbean climate change and adaptation project – one product was a risk-based Adaptation Guide for Caribbean Countries.
- Natural Resources Canada requested that the Caribbean guide be modified for Canadian municipalities.
- Guides for Ontario, Alberta, B.C., and Arctic and northern communities are completed.

Where Adaptation Fits



Why a Risk-based Adaptation Guide

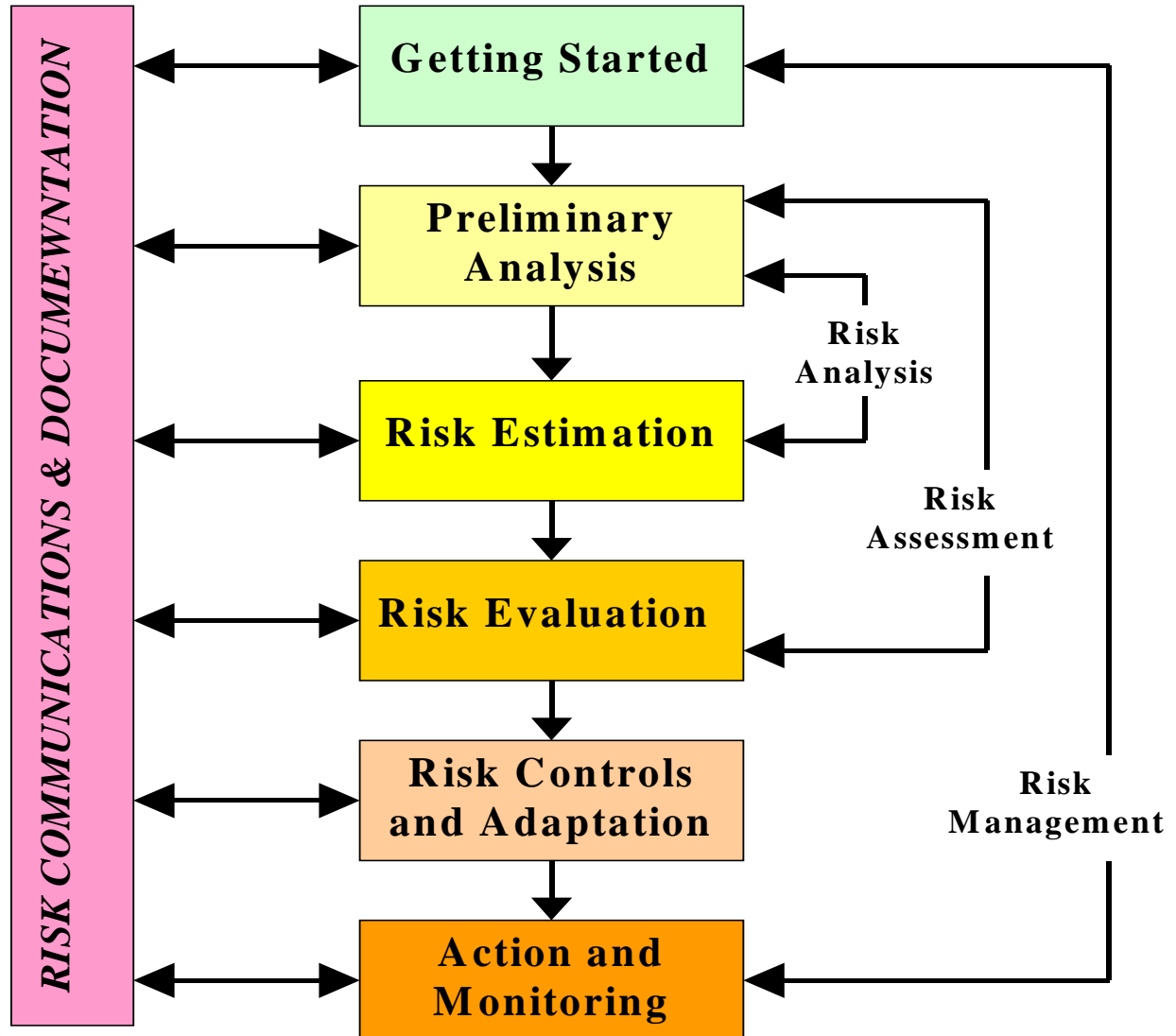
- The climate change issue has been focused mostly on science and mitigation, very little on what we are going to do about it (i.e. adaptation).
- Adaptation is seen by many people to be complicated and difficult; in reality we have been doing this for centuries.
- Most climate change impacts involve some risk to society, the economy or the environment – a risk management process helps us determine which are the most important issues and develop solutions.
- There are few user-friendly, simple, tools available to help us deal with adaptation issues.

What is the Risk-based Adaptation Guide?

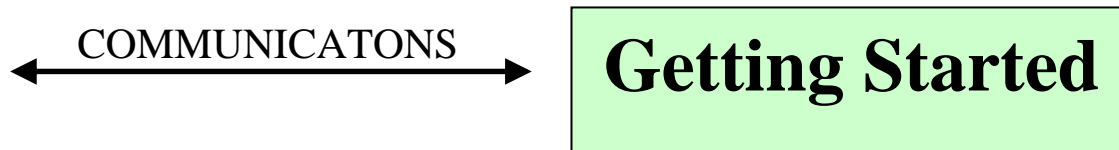
1. The Guide provides a clear summary of what climate changes can be expected in a particular region over the next 20-50 years.
2. It shows how we can use a risk management approach.
3. It explains each of 6 steps in the risk management process and includes:
 - The purpose of each step;
 - What to do and how to do it;
 - The expected output;
 - The decisions to be made at the end of each step; and
 - A checklist of the major tasks at each step.
4. Finally, the guide contains a brief discussion of risk perception and communications, a summary of adaptation and risk terms and a workbook containing all the tables used in the process and a number of case studies to illustrate how to do each step .

Overview of the Risk Management Process

The Risk Management Process



Step 1 in the Risk Management Process



- Be clear about the aim.
- Carefully define the problem and identify the hazard.
- Set up the project team, assign responsibilities, resources, and timeframes.
- Identify the organisations or groups and stakeholders that should be involved in the process.
- Identify other stakeholders and interested parties and begin to consider how you will keep them informed.

TERMS - HAZARD

A source of *potential* harm, in terms of human injury or death, damage to health, property, the environment or other things of value.

TERMS - RISK SCENARIO

The *sequence of risk events* that could result from a hazard.

Hazard and Risk Scenario Examples

- Hazard = climate change: risk scenario -
 - Extreme weather events, e.g. winter storms
 - Higher sea levels
 - Warming temperatures
 - Etc.
- Hazard = higher sea levels : risk scenario –
 - High water especially under conditions of high tides, storm surge, high waves
 - Salt water intrusion
 - Flooding of sensitive critical infrastructure from the sea
 - Etc.
- Hazard = high water: risk scenario –
 - Overland flooding
 - Large scale evacuations
 - Sewer back-up
 - Water contamination
 - Etc.

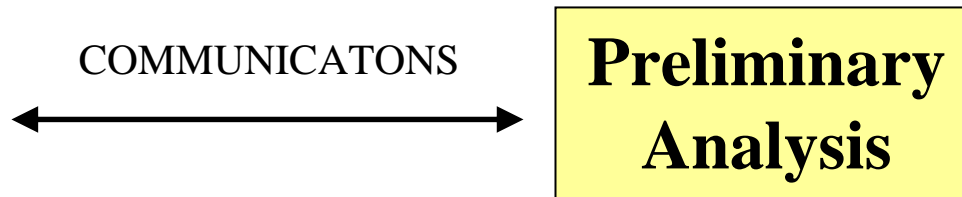
PRESENT ESTIMATES (2008) OF OBSERVED AND PROJECTED CLIMATE CHANGES FOR ALBERTA

Change	From 1950 to 2000	From 2000 to 2050
Mean annual temperature	1 to 2°C	2 to 4°C
Mean Winter temperature	1.5 to 3°C	4 to 6°C
Frost free days	+5 per decade interior	+17 per decade interior
Total Annual precipitation	Near 0% in South to +10% in North	Near 0% in South to +20% in North
Snow as % of total	-9% Winter, -15% Spring	-20% Winter, -30% Spring
Summer rainfall	-5% in South to +5 to 15% in North	Near 0% in South to +10 to 30% N
Extreme rainfall	+5% Spring and Summer	20 year event will be 10 yr event
Total runoff and groundwater	-4% to 1%	-4% to -25% S and Central +20% N
Drought	Rapid increase <i>Palmer Drought Severity Index</i>	2 x present frequency
Glaciers	-25% over century	-40% ??
Forest Fires (<i>insect infestations</i>)	Increased area burned (Canada) 100,000 km ²	+75% to 120% by 2100
Permafrost Thaw	30% of area in North	+60% of area in North

TERMS - RISK

Risk is a *product* of the probability of the hazard and the consequences of or vulnerability to that hazard. *The perception of the stakeholders about the consequences can change the level of the risk.*

Step2 in the Risk Management Process



- Develop the risk scenarios - the sequence of events that could be created by the hazard.
- Establish the current risk baselines and start collecting information for estimating risk.
- Begin a more detailed consideration of stakeholders: who could be affected, involved and/or interested and how to engage and inform them.
- Start keeping copies of all information - the risk information “library”.

Preliminary Hazard and Risk Scenario Assessment Template

HAZARD:

RISK	VULNERABILITY	FREQUENCY			CONSEQUENCE			COMMENT or POSSIBLE CONTROL
		1	2	3	1	2	3	

Notes: Make rough estimates of (these will be expanded in Step 3)

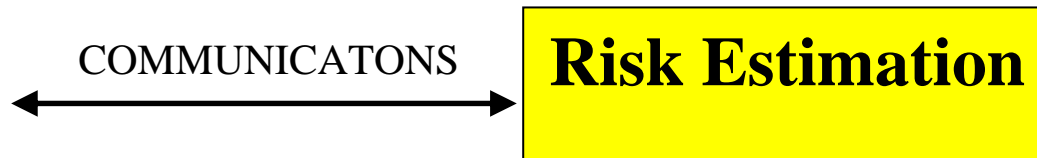
Frequency:

1. Unlikely to occur
2. Moderately frequent occurrence
3. Almost certain to occur

Consequences:

1. Low
2. Moderate
3. High

Step 3 in the Risk Management Process



- Decide how you are going to estimate the frequency or probability of events.
- Estimate the frequency of the possible outcomes.
- Estimate the consequences or potential results of the outcomes.
- Assess stakeholders' perceptions of the risk.

Suggested Template for Frequency or Probability Rating

Frequency Risk	Very Unlikely to Happen	Occasional Occurrence	Moderately Frequent	Occurs Often or More Frequently	Virtually Certain to be Much More Frequent
Risks from risk scenario (list each)	Not likely to occur during the planning period	May occur sometime but not often during the planning period	Likely to occur at least once during the planning period	Likely to occur several times during the planning period	Happens often and will happen again during the planning period

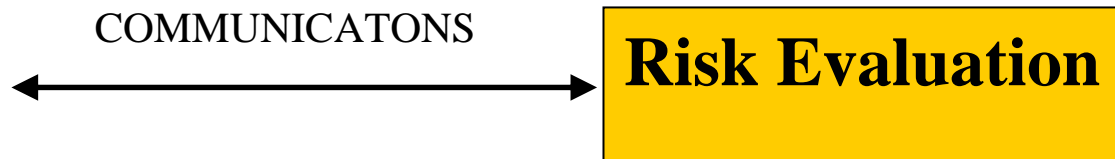
Suggested Template for Consequence Rating (for each event in the risk scenario)

Impact Degree	Social factors				Economic factors			Environmental factors			
	Health & Safety	Displacement	Loss of Livelihood	Cultural Aspects	Property Damage	Regional Financial Impact	Impact on Municipal Finances	Air	Water	Land	Eco-systems
Very low											
Low											
Moderate											
Major											
Very Severe											

Suggested display for stakeholders and risk perception.

Climate Factors: (Hazards)	Risk Scenarios - Aspects of Hazards and Risks to Community	Stakeholders and Perception of Risk

Step 4 in the Risk Management Process

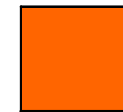


- Estimate the overall level of the risk for each scenario.
- Compare the risks
- Estimate the costs and benefits.
- Consult with stakeholders and assess their acceptance of risk.

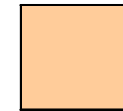
Suggested Display of Overall Consequence and Probability

Risk Evaluation Table

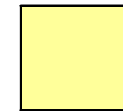
SUMMARY OF IMPACT SEVERITY	Extreme	Major flooding of homes and work places			Land slides	
	Major				Water pollution incidents from increased erosion	
	Moderate	Large scale evacuations	Flooding beyond previously designated flood plains			
	Low		Loss of crops and livestock and serious agricultural soil losses from erosion	Major power and telephone lines outages		Culverts and storm sewer systems capacity exceeded
				Silting of downstream river beds, reservoirs and deltas		
	Very Low					
	Very Unlikely to Happen	Occurs Occasionally	Moderately Frequent	Occurs Often	Virtually Certain to Occur	
	FREQUENCY / PROBABILITY					



Extreme risk: Immediate controls required



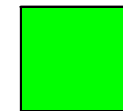
High risk: High priority control measures required



Moderate risk: Some controls required to reduce risks to lower levels



Low risk: Some actions, such as public education, may be desirable



Negligible risk: Scenarios do not require further consideration

Example based on: flash floods in urban areas

Step 5 in the Risk Management Process

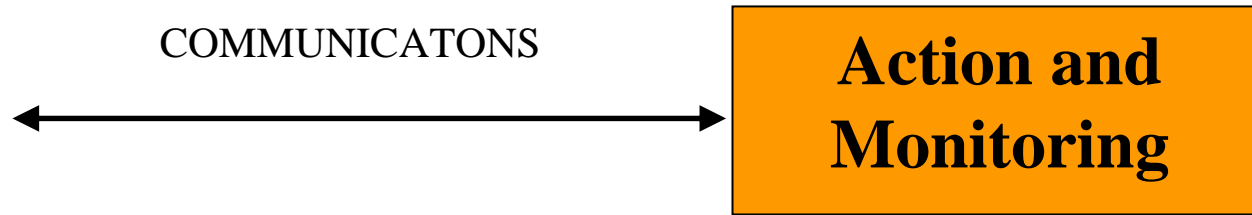


- Identify feasible risk control or adaptation options and opportunities.
- Evaluate options in terms of cost, benefits, effectiveness, acceptability with stakeholders, risks created and other factors.
- Assess acceptability of risk control options.
- Assess residual risk.

Suggested Display for Risk Controls and Adaptation Measures

Risk (Use as many rows as needed)	Control or Adaptation Measure (Use as many rows as needed)	Time Frame	Cost	Effective -ness	Accept-ability	Comment / Evaluation

Step 6 in the Risk Management Process



- Consider an adaptation implementation plan.
- Make recommendations to decision-makers.
- Include a monitoring process and “sunset” timeframes (if applicable).
- Continue dialogue with stakeholders.
- Review and repeat process if needed.

Risk Communications

- Risk communications is a meaningful dialogue among all those who might be affected or involved at all stages in the process.
- Stakeholders are all who should or could be affected, including those who *think* they are stakeholders.
- The results of ineffective risk communications can be disastrous leading to loss of credibility, unnecessary and costly conflicts, bitter and protracted debates and, sometimes, complete failure of the project.

SUMMARY

- Considered the risks and choices related to climate change.
- Examined the risk management process as an aid to decision-making.
- Looked briefly at the components of the risk management process.
- Considered some of the advantages offered in making effective adaptation choices.

Questions and Discussion