



Alaska Center for Climate Assessment and Policy

Welcome to the webinar:

DECISION-MAKING FOR AT-RISK COMMUNITIES IN A CHANGING CLIMATE

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This webinar will be recorded for internal documentation.

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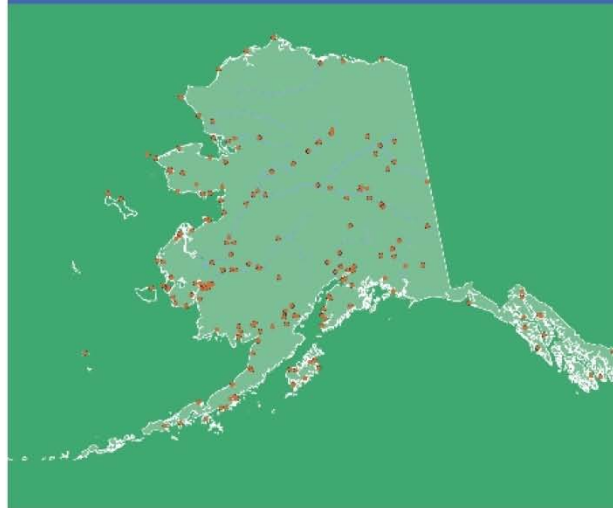
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Decision-making for
at-risk communities
in a changing climate



Prepared by the
Alaska Center for
Climate Assessment
and Policy



Acknowledgements

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- Since 2002, the National Commission on Energy Policy--a bipartisan group of 20 of the nation's leading energy experts -- has been advising Congress, the Executive Branch, States and other policymakers regarding long-term U.S. policy.
- In 2009 and 2010, the Commission is focusing, in particular, on three critical long-term issues: oil security, climate change, and energy infrastructure adequacy and siting.
- The Commission is funded by the William and Flora Hewlett Foundation and its partners

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Summary

- Communities across the United States are at-risk due to environmental change. Decision-makers must determine how best to manage community vulnerability in an environment where future environmental change is uncertain.
- The likely impact of climate change on potential relocation sites should be evaluated to determine if the cost of the move would sufficiently reduce the risk to infrastructure. On site adaptation may be an option if on-going mitigation costs have a lower present value than relocation.

What it is and isn't

- The report is intended to inform decision-makers relating to climate change and uncertainty, risk management, and relocation planning and sustainability - specifically as it relates to infrastructure.
- This report is not intended to be a tailored guide for planning in individual communities where local issues dominate the decision-making. *This report does not address important social, psychological, or cultural issues involved in village relocation.*



Outline

- Introduction
 - Background
 - Goal
 - Strategy
 - Considerations
 - Report Outline
- Planning and Action Matrices
- Decision Making for a Changing Climate
- The Planning Process
- Interagency Cooperation
- Sustainability



Planning and Action Matrices

Bottom-line advice to decision-makers

Action strategies for community relocation can be formulated based on consideration of the likelihood of hazard occurrence and the consequence or severity of the impact. Decision-matrices are provided here for top-level planning and overview decisions.

Ordinal Risk Matrix

Level	Likelihood
A	Remote
B	Unlikely
C	Likely
D	Highly Likely
E	Near Certainty



ASSESSMENT GUIDE

Likelihood	E	M	M	H	H	H
	D	L	M	M	H	H
	C	L	L	M	M	H
	B	L	L	L	M	M
	A	L	L	L	L	M
		a	b	c	d	e
		Consequence				



RISK ASSESSMENT

High (Red) —————

Unacceptable. Major disruption likely. Different approach required. Priority management attention required

Moderate (Yellow) —————

Some disruption. Different approach may be required. Additional management attention may be needed

Low (Green) —————

Minimum impact. Minimum oversight needed to ensure risk remains low



Level	Schedule	and/or	Cost
a	Minimal or no impact		Minimal or no impact
b	Additional resources required; able to meet		<5%
c	Minor slip in key milestones; not able to meet need date		5-7%
d	Major slip in key milestone or critical path impacted		7-10%
e	Can't achieve key team or major program milestone		>10%

Top Level Planning and Organizational Actions

Severity of Damage or Degree of Risk	Immediacy (90% certain event will occur within:)			
	Today	1 Year	5 Years	10 Years
High	Follow Emergency Action Plan and Stabilize.	Temporary actions acceptable, may need concurrent protection or emergency relocation	Expedited planning. Gather funding for planning, procure experts	Develop plan. Seek funding for investigations and full planning cycle
Medium	Follow Emergency Action Plan and Stabilize.	Accept suboptimal planning, may be concurrent with protection	Expedited planning, use available funding to hire experts	Seek funding
Low	Local Action	Local/Regional Action	No action	No action

Top Level Planning and Organizational Actions

Severity of Damage or Degree of Risk	Recurrence Interval			
	Annually	10yr	50 yr	100 yr
High	Consider protection, relocation or combination.	Consider protection, relocation or combination	Consider long term plan for protection or relocation	Evaluate economic value of protection or relocation
Medium	Consider protection, relocation or combination	Consider protection, relocation or combination	Consider limited solutions	Evaluate economic value of protection or relocation
Low	Consider localized solutions	Consider localized solutions	No action	No action

Top Level Planning and Organizational Actions

Severity of Damage or Degree of Risk	Recurrence Interval			
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Overview of Decision Type

Severity of Damage or Degree of Risk	Immediacy (90% certain event will occur within:)			
	1 Year	5 Years	10 Years	100 Years
High	Emergency Protection, Emergency Relocation	Expedited Protection, Expedited Relocation	Decide to enter into planning cycle. Take the time to seek funding and gather data.	Defer action or seek funding for long range planning.
Medium	Review emergency plans, public warnings, etc.	Consider relocation or partial or temporary protection	Decide to enter into planning cycle. Take the time to seek funding and gather data.	Defer
Low	Tolerate	Protect within available funding	Do nothing	Do nothing



A bright sun in a hazy sky with silhouettes of evergreen trees.

Threat Analysis and Risk Assessment

A community has economic value that is the sum of the monetary value of its components (assets). The value of the community to its citizens and to the greater society beyond the community is the community's assets plus its non-monetary contributions to the greater society (culture).

Threat Analysis

Whenever a community is threatened, three basic options are available

- Do nothing
- Protect
- Relocate

The preferred option is a function of the nature and magnitude of the threat. In some cases, the entire community may need to be relocated. Such decisions are predicated on a number of factors:

- Impact on the community
- Value of the structure
- Cost of the action
- Ownership
- Community values
- Available resources
- Vulnerability

Risk Assessment

A risk assessment seeks to understand:

- The nature of the threat
- The immediacy of the threat
- The probability of the threat
- The severity (likely impacts) of the threat

Ordinal Risk Matrix

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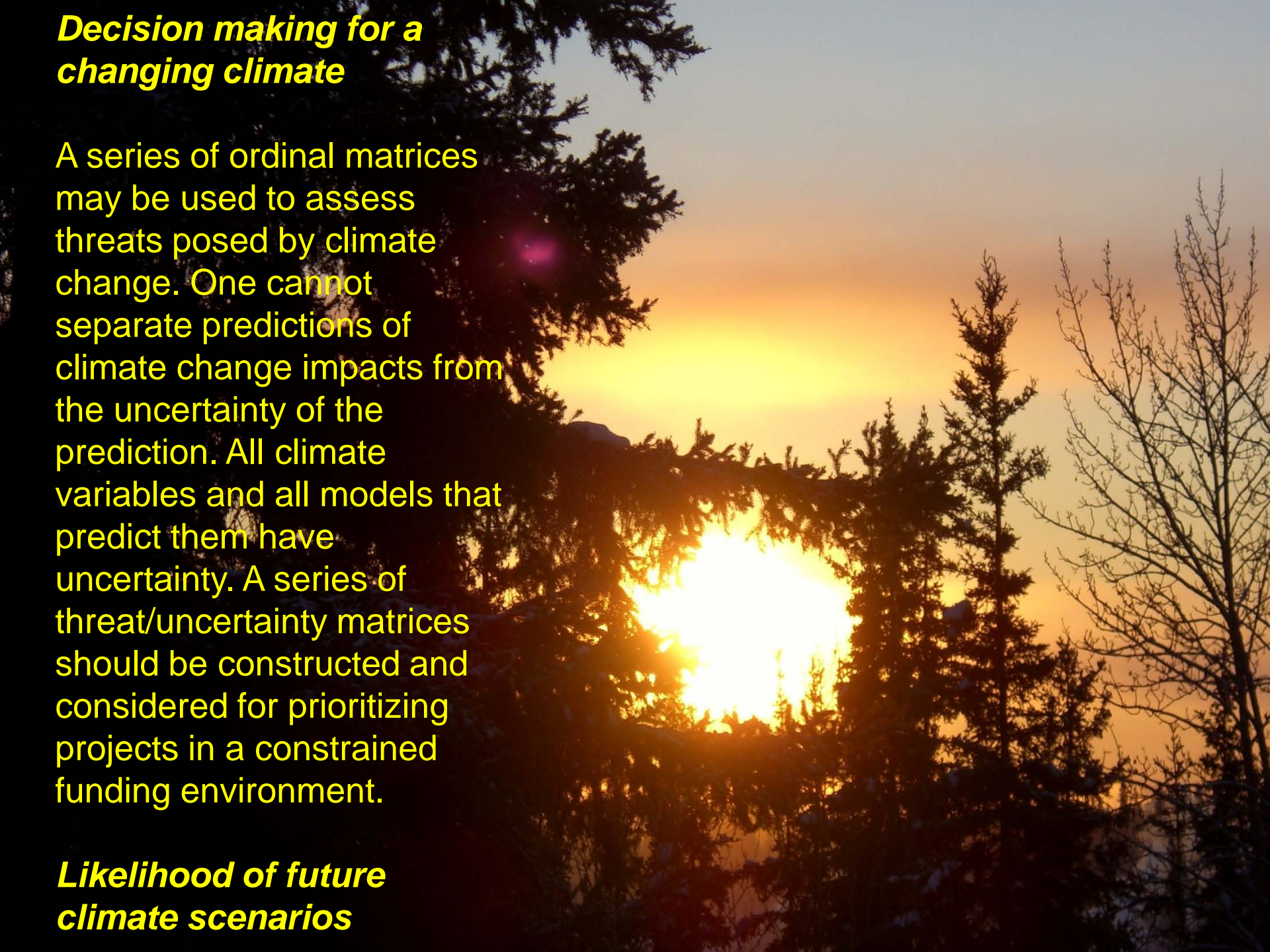


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Decision making for a changing climate

A series of ordinal matrices may be used to assess threats posed by climate change. One cannot separate predictions of climate change impacts from the uncertainty of the prediction. All climate variables and all models that predict them have uncertainty. A series of threat/uncertainty matrices should be constructed and considered for prioritizing projects in a constrained funding environment.

Likelihood of future climate scenarios



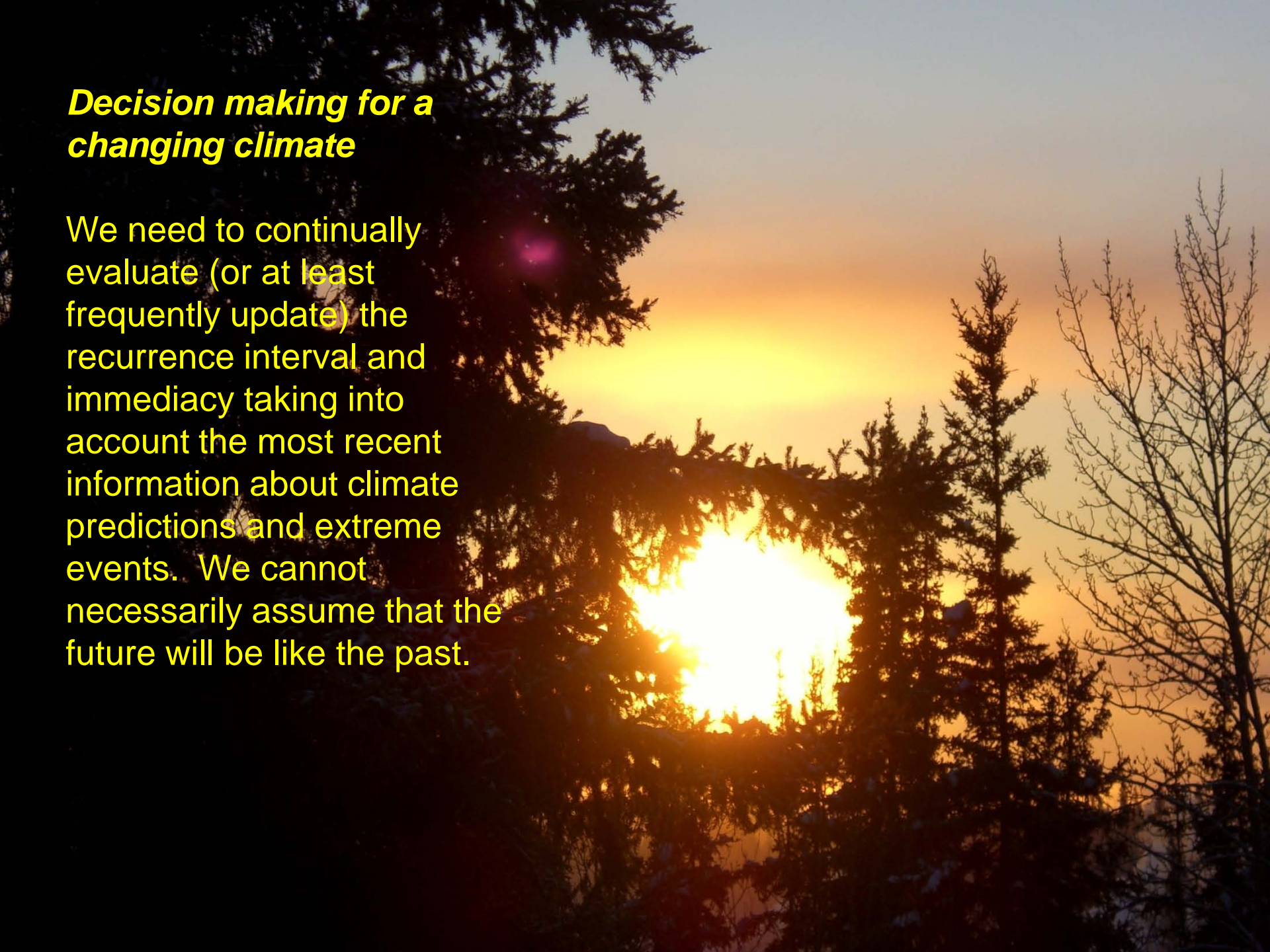
		Uncertainty in prediction		
		Low	Medium	High
Climate change impact	High	Action required	Action recommended	Planning for future action
	Medium	Action recommended	Action recommended	Monitoring and assessment
	Low	Planning for future action	Monitoring and assessment	No action

Overview of Decision Type

Severity of Damage or Degree of Risk	Immediacy (90% certain event will occur within:)			
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Decision making for a changing climate


We need to continually evaluate (or at least frequently update) the recurrence interval and immediacy taking into account the most recent information about climate predictions and extreme events. We cannot necessarily assume that the future will be like the past.



Alternative Development

Once the risk assessment is complete, a plan to manage the threat must be developed. Development of a plan requires the analysis of likely alternatives to manage the risk. Such analysis includes:

- Developing an understanding of the desires of the community
- Developing an understanding of both opportunities and constraints
- Listing available alternatives
- Developing Benefit/Cost analysis for each viable alternative
- Factoring in intangible benefits and costs
- Selecting the most acceptable alternative.



A list of alternatives must be developed. There are always constraints under which decisions must be made. These can include

- Costs
- Physical constraints such as land, water, resource availability
- Political and social constraints
- Decision to stop investing in the existing community's assets (O&M) and begin investing in the new community's assets

Opportunities can include

- Improved living standards
- More energy efficient infrastructure
- Increased accessibility

Point of View - Qui Bono

At this point the analysts must recognize that there are three different points of view: Individuals in the community, the community, and the larger political/economic society that includes the community.

A cost to one may be a benefit to another.

In many cases the viewpoint of the analysis will determine whether there is a cost or a benefit.



Strategic Management Plan

In order to begin a successful process of relocating a community, a strategy is needed. Not a “good” strategy, but a “great” strategy.

This strategy must provide the framework to develop a new community that is sustainable like no other community development to date.

The strategic management plan should recognize the many difficulties in the process and allow management flexibility during the long process.

The cost of adaptation v. relocation





The Planning Process

The planning process should include collaboration and partnership on local, regional, state, and federal levels. Key steps are to identify a lead agency, create a responsibility matrix, identify funding, build legislative support, and engage consultants as necessary.



Financial Planning

The Army Corps of Engineers estimated in 2006 that relocation for just three rural villages in Alaska-Shishmaref, Kivalina, and Newtok-would cost nearly \$500 million in current dollars.

Matching costs and sources of revenue are critical.



Access

Planning for relocation requires access to the new location. The level of transportation infrastructure currently available will make a significant impact on the options available and the ease of relocation.

The type of access and the timing are site dependent.

Land Ownership



Community engagement

There is no doubt that successful relocation efforts start at the community level. A community must drive the process from its inception. Many documents and on-going special interest groups have already discussed community engagement and the importance of including knowledge from within the community.



What are site development costs and time?

Site development costs are developed through community involvement in feasibility plans. These plans include time and cost estimates.

The implementation of the site development is a function normally of many constraints, including climate, logistics, equipment availability, and others. Permits will have a significant impact on all aspects of a relocation project, but will impact the onset of a project to a great deal.

Implementation and Sequencing

Sustainability



Construction and design in a new location should include consideration of sustainability.

Energy demand and peak load should be evaluated and renewable energy sources considered.

Transportation systems should be designed for highest energy efficiency in conjunction with land use planning.

Water, sewer and waste management utilities should be designed based on evaluated demand, feasibility and cost of alternatives, energy efficiency and waste reduction (especially hazardous waste).

Planning for new location should include considerations of sustainable economic development and cost of living.



Cost of Living

In community relocation, cost of living for individual residents and municipal governments is an important aspect of long-term sustainability. If new construction will take place, basic parameters of "communities-as-usual" can be re-conceptualized to dramatically reduce the cost of energy by including multifamily housing, clustered dwellings and district-heat-compatible building layout.



Checklist and case study

- **1. Frame the Problem**
- **2. Collect and Assess Information**
- **3. Prepare Plan**
- **4. Decide and Take Action**
- **5. Learn from Experience**



Thank you.



CLIMATE RESEARCH CONNECTIONS

Traditional and Western Networking Reception

WEDNESDAY, FEBRUARY 10th, 5-7:30PM
ANCHORAGE MARRIOTT DOWNTOWN
SPACE LIMITED, RSVP REQUIRED

Please join us to connect with leading traditional and western researchers in the fields of weather and climate, permafrost, coastal issues, oceanography, marine biology, human subsistence and health, wildlife, and forestry. Learn about data collection and integration, management, and access. Network with other participants and take home new connections to the most scientifically accurate, reliable, and timely climate change information available to your organization or community.

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PLEASE RSVP: 907.465.5065, CLAIRE.FISHWICK@ALASKA.GOV