



State of Alaska
Governor's Climate Change Sub-Cabinet
Stakeholder Process

Climate Change - Planning for Alaska's Future

U.S. Environmental Protection Agency

July 28, 2009

Jackie Poston, ADEC (on detail from EPA)



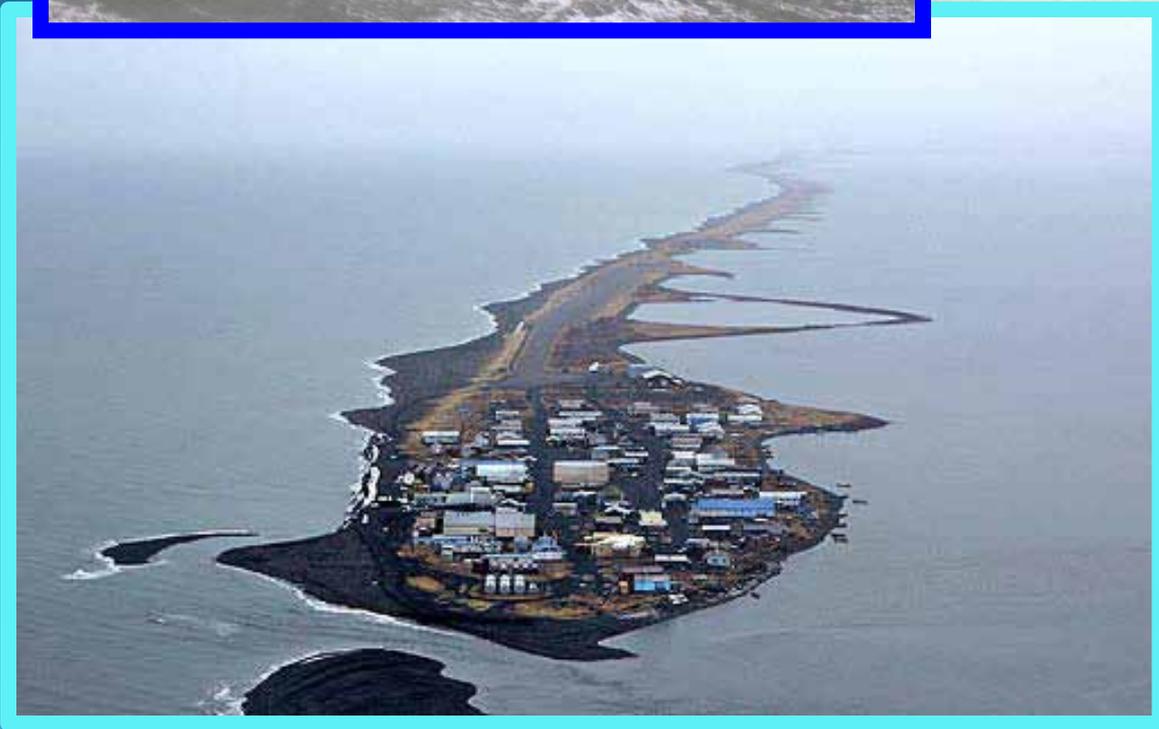
Governor's Climate Change Sub-Cabinet

- Established by Governor through Administrative Order 238 on September 14, 2007
- Called for:
 - **IMMEDIATE ACTION** to address imminent threats to communities [**Immediate Action Work Group**]
 - Identification of **RESEARCH PRIORITIES** [**Research Needs Work Group**]
 - Proposed **CLIMATE CHANGE STRATEGY** [**Mitigation and Adaptation Advisory Groups**]

Immediate Action Work Group



Reports April 2008 and March 2009



**Flooding &
Erosion:
Kivalina**

Flooding & Erosion: Shishmaref



Linda Beyce



BSNC web site



Kelly Eningowuk



Flooding & Erosion: Newtok



Newtok Planning & Construction of Adaptation Measures



Newtok Planning Group

Native Village of Newtok

- Newtok Traditional Council (NTC)
- Newtok Native Corporation (NNC)

State

- § Alaska Department of Commerce, Community, and Economic Development (DCCED), Div of Community & Regional Affairs
- § Alaska Department of Environmental Conservation/Village Safe Water Program (VSW)
- § Alaska Department of Transportation and Public Facilities (DOT/PF)
- § Alaska Department of Military and Veterans Affairs/Division of Homeland Security and Emergency Management (DHS&EM)
- § Alaska Department of Education and Early Development (DEED)
- § Alaska Department of Health and Social Services (DHSS)
- § Alaska Industrial Development and Export Authority (AIDEA)/Alaska Energy Authority (AEA)
- § Alaska Governor's Office
- § Cold Climate Housing Research Center

Federal

- § U.S. Army Corps of Engineers (USACE), Alaska District
- § U.S. Department of Commerce, Economic Development Administration (EDA)
- § U.S. Department of Agriculture, Rural Development
- § U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)
- § U.S. Department of Defense (DOD)
- § U.S. Fish & Wildlife Service (FWS)
- § U.S. Department of Housing and Urban Development (HUD)
- § U.S. Department of the Interior, Bureau of Indian Affairs (BIA)
- § U.S. Department of Transportation, Federal Aviation Administration (FAA).
- § U.S. Environmental Protection Agency (EPA)
- § Denali Commission
- § Senator Lisa Murkowski's Office

Regional Organizations

- § Association of Village Council Presidents (AVCP),
- § Housing Improvement Program (HIP)
- § Coastal Villages Region Fund (CVRF)
- § Lower Kuskokwim School District (LKSD)
- § Rural Alaska Community Action Program (RurAL CAP)
- § Yukon-Kuskokwim Health Corporation

Infrastructure and Services Identifying Vulnerabilities

RECOMMENDATIONS
REPORT TO THE
GOVERNOR'S
SUBCABINET ON
CHANGE CLIMATE



FINAL REPORT
FROM THE
IMMEDIATE ACTION
WORKGROUP
APRIL 17, 2008

IMMEDIATE ACTION WORKGROUP
RECOMMENDATIONS
TO THE
GOVERNOR'S SUBCABINET
ON
CLIMATE CHANGE
MARCH 2009



Requesters
**United States Government
Accountability Office**

GAO

June 2009

ALASKA NATIVE VILLAGES
Limited Progress Has Been Made
on Relocating Villages Threatened
by Flooding and Erosion

GAO-09-551

**Alaska Baseline
Erosion Assessments**

<http://www.poa.usace.army.mil/AKE/Home.html>

**U.S. Army Corps of
Engineers
2009**

Decisions: What to Protect & How to do it

- Relocation efforts involve **multiple agencies**
- Consider designation of lead federal & state agencies
- Examine federal & state **funding requirements for adequacy** in light of climate change (Standard cost-benefit analysis may need modification)
- Develop **common planning criteria**
- Planning criteria **may incorporate sustainability elements**, such as energy efficiency
- Identify & address other **potential legal impediments**
- Give consideration to social factors to **preserve community's culture & social well-being**

Decision-making for At-risk Communities in a Changing Climate

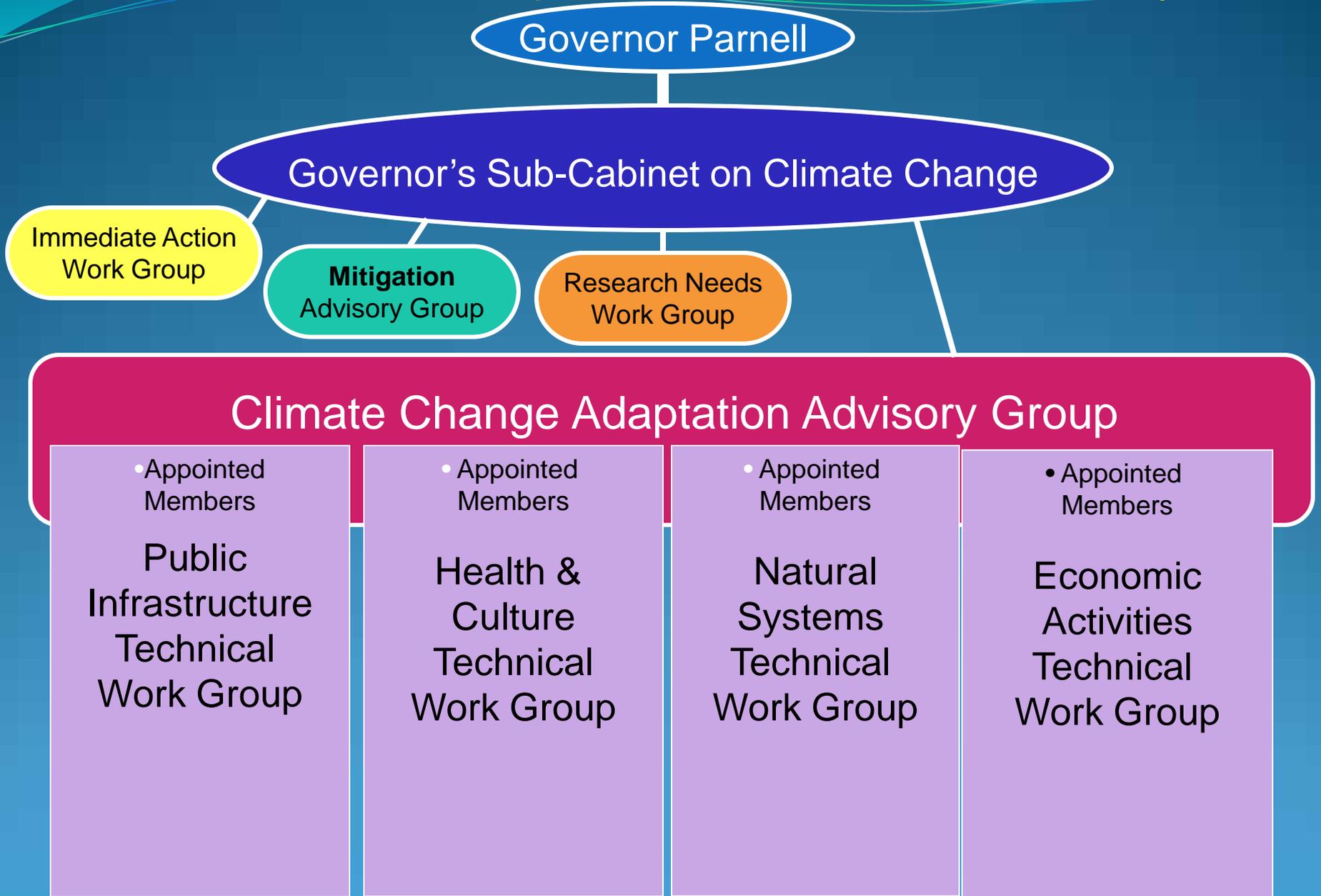


Prepared by the Alaska
Center for Climate
Assessment
and Policy

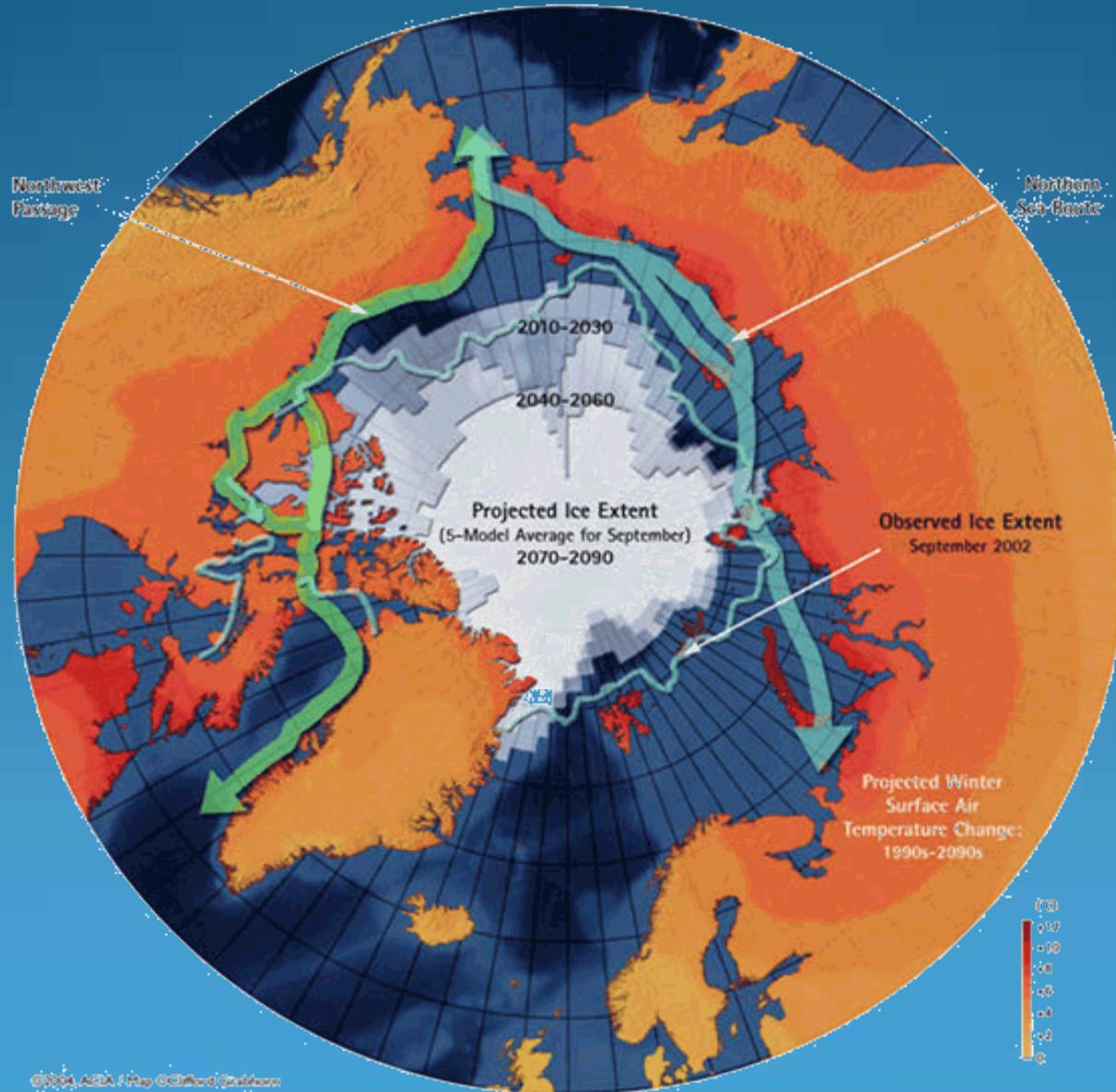
ADAPTATION



Technical Work Groups for **Adaptation** Advisory Group



Opening of the Arctic and Potential for New Shipping Routes



Preparing to Meet New Challenges

- Lack of deep water ports and “harbors of refuge”
- Need for increased emergency response capability
- Federal &/or state oil-spill contingency needs for foreign vessels
- Lack of monitoring of ships
- Relatively less knowledge and capacity to respond to spills in broken ice conditions
- Invasive Species & other natural resource concerns



Public Infrastructure Technical Work Group

Recommendations to Sub-Cabinet: A Vision supported by 3 Integrated Policies

Policy	Title
Vision	Sustainable Infrastructure that supports Communities in an Uncertain Environment
PI - 1	Create a Statewide System for Key Data Collection, Analysis, Monitoring and Access
PI - 2	Promote "Current Best Practices" Improvements
PI - 3	Build to Last. Build Resiliency into Alaska Public infrastructure. Vision

Cost to Replace Public Infrastructure in Alaska (Million 2008 \$)

TOTAL INFRASTRUCTURE: \$58,879

PUBLIC BUILDINGS: \$12,192

- Schools \$5,953
- Government Buildings \$2,468
- Public Hospitals \$1,261
- Court Facilities \$1,056
- Health Buildings \$868
- Law Enforcement \$415
- Emergency Services \$171

PUBLIC UTILITIES \$13,472

- Energy \$5,598
- Sewer Systems \$4,327
- Water Systems \$1,683
- Electric Grid \$1,000
- Natural Gas \$462
- Telecommunications (portion in AK only) \$402

TRANSPORTATION \$33,215

- Roads \$21,399
- Airports \$5,793
- AK Railroad \$2,625
- Bridges \$1,898
- Harbors \$1,500

Excludes Department of Defense facilities

Potential Impacts of Climate Change on Diseases with Human Health Implications

✓ Foodborne Diseases

- § Anisakiasis
- § Botulism
- § Campylobacteriosis
- § *Echinococcosis*
- § *E. coli* infection
- § Paralytic Shellfish Poisoning
- § Salmonellosis
- § Shigellosis
- § Toxoplasmosis
- § Trichinellosis
- § *Vibrio parahaemolyticus* infection

✓ Waterborne Diseases

- § Cryptosporidiosis
- § Giardiasis
- § Hepatitis A infection
- § Legionellosis

✓ Vectorborne Diseases

- § Tick-borne Encephalitis
- § West Nile Virus
- § Northway Virus
- § Snowshoe hare Virus

Enhanced Surveillance & Sharing of Information

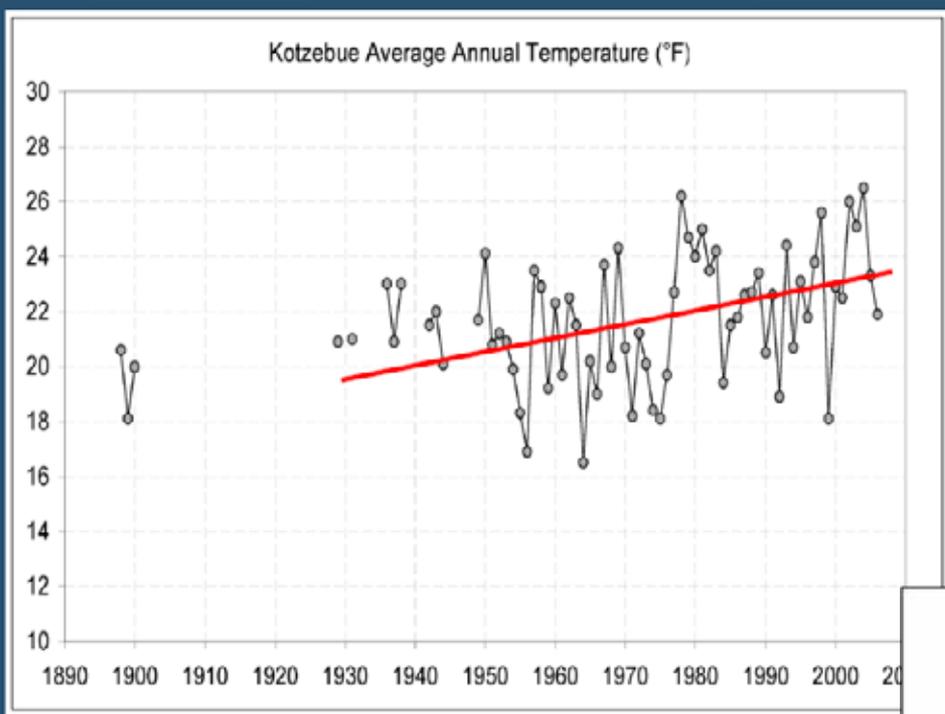


A Climate and Health Assessment is currently being performed by ANTHC in the Northwest Arctic region of Alaska.

The purpose is to record local climate observations and data, and to identify potential health impacts.

The goal is to develop adaptive strategies that reduce negative effects to community health.

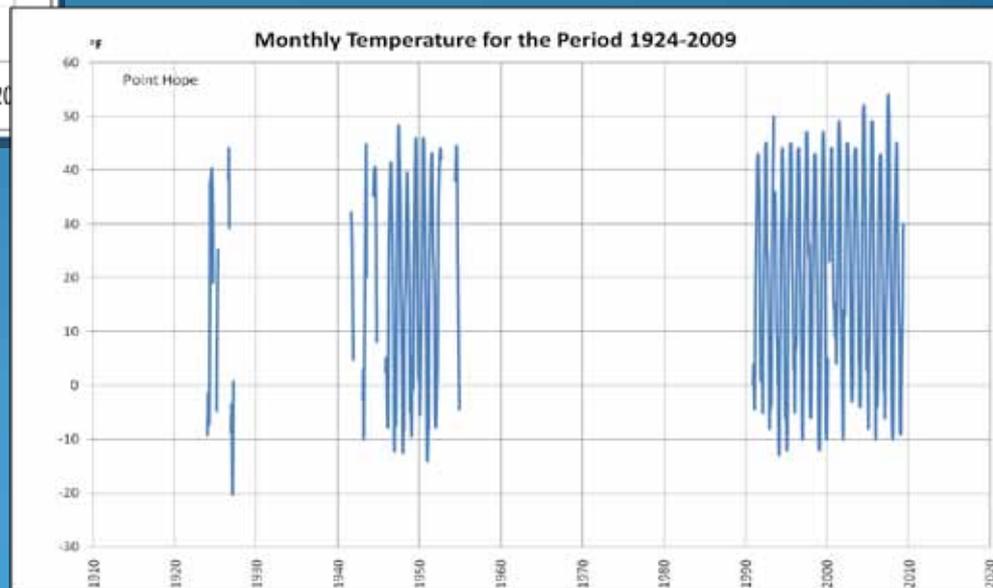
Temp Record for Kotzebue, AK



Source: UAF: Alaska Climate Research Center

Air temperatures have been increasing in the Northwest Arctic. Summers are typically short and cool ranging from 30 - 50°F . Record temperatures, as high as 80°F were recorded in Kotzebue, in July of 2008. Good archive data is available at regional hubs such as Kotzebue but not in most villages.

Temp Record for Pt. Hope, AK



Data from Weather Underground (wunderground.com) and the National Weather Service

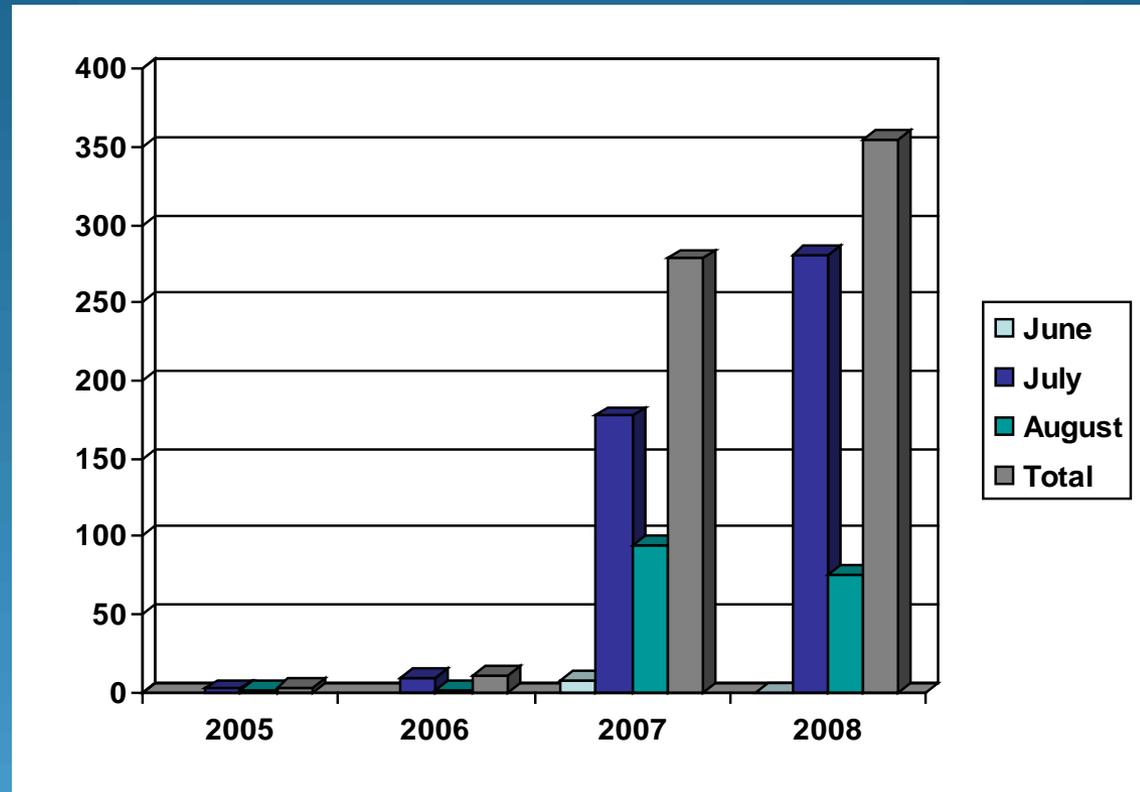
A graph of average annual temperature for Pt. Hope is incomplete, demonstrating challenges in assessing climate data at the local level.

Water System Observations

- Air temperatures have been increasing in the Northwest Arctic. Record temperatures have occurred in the past two summers.
- Between June and September water treatment commence in many Arctic communities. Over a few months, enough water must be produced to last for an entire year.
- Recently, surface water has been effected in several communities with reduced *quantity* of water caused by evaporation, reduced precipitation and obstructions caused by wildlife (e.g. beaver). Reduced *quality* of water (source) has been occurring due to increased biologic content (e.g. larvae), increased sediment from erosion, and contamination associated with flood and storm surge events.

Correlation between Impacts and Climate Change

Filter Changes per Month - 2005 to 2008



Local metrics such as frequency of filter changes in the water plant can provide an indication of a climate related problem.

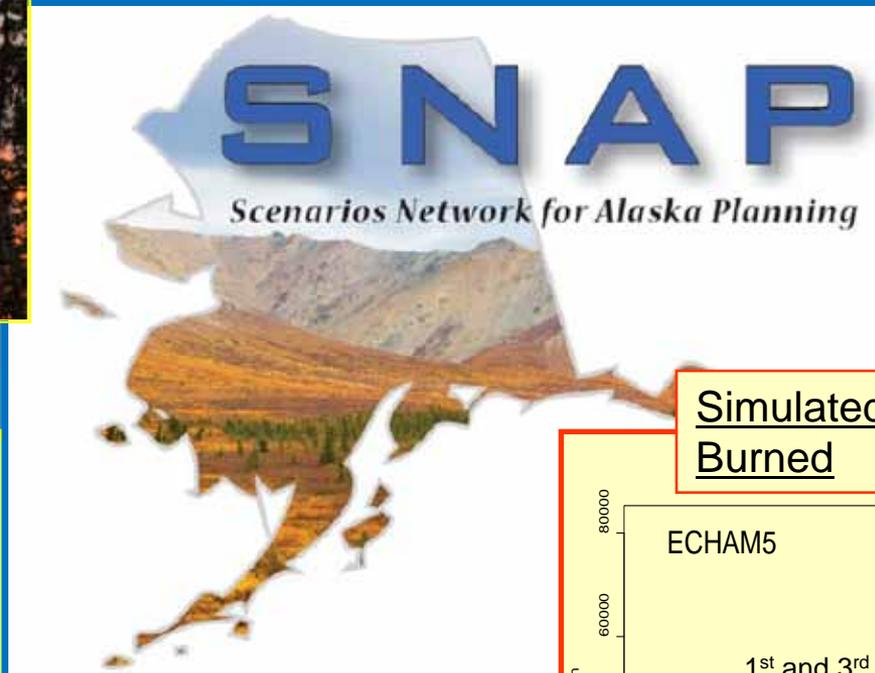
Challenges to Managing Wildlife & Their Habitats in a Changing Climate

- Developing useful climate forecasts, scenarios & derivative products
 - Communication of such to decision-makers
- Adequate observation systems to identify & track changes
- Implementing new management strategies, such as adaptive management, to better account for unknowns
- Working across different land ownerships
- Avoiding unnecessary disruption of existing commercial, personal & subsistence harvests



Ongoing State-Federal Collaborations in Alaska

Managing Wildland Fire

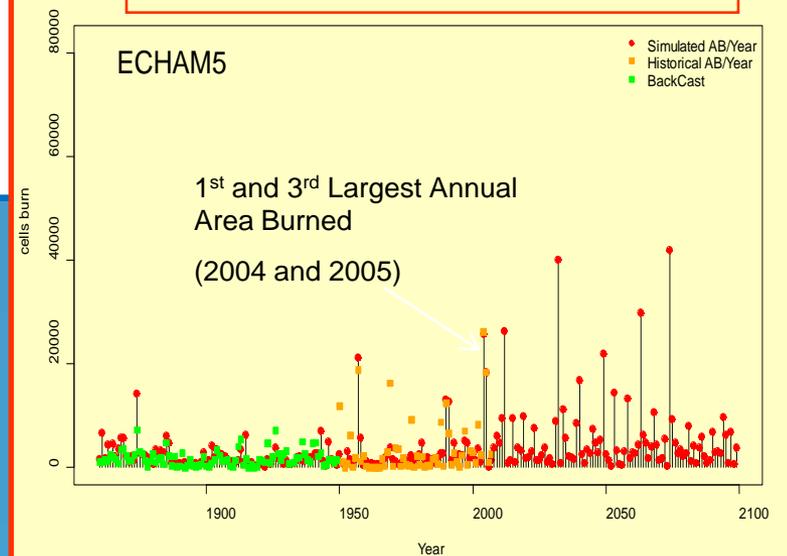


Partners & Information sources :

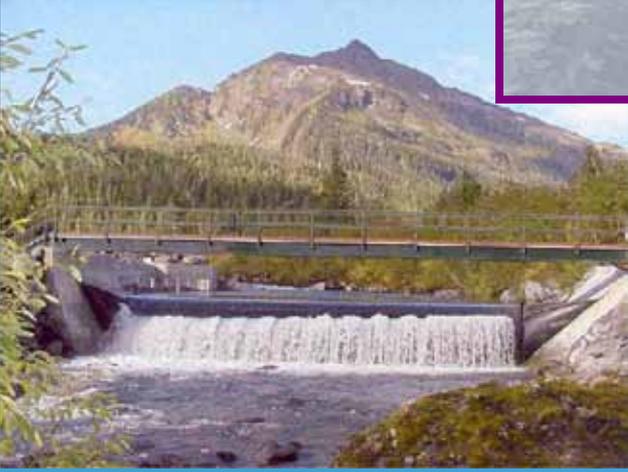
- University
- AK Department of Natural Resources
- NOAA
- IPCC
- Google Earth
- Others



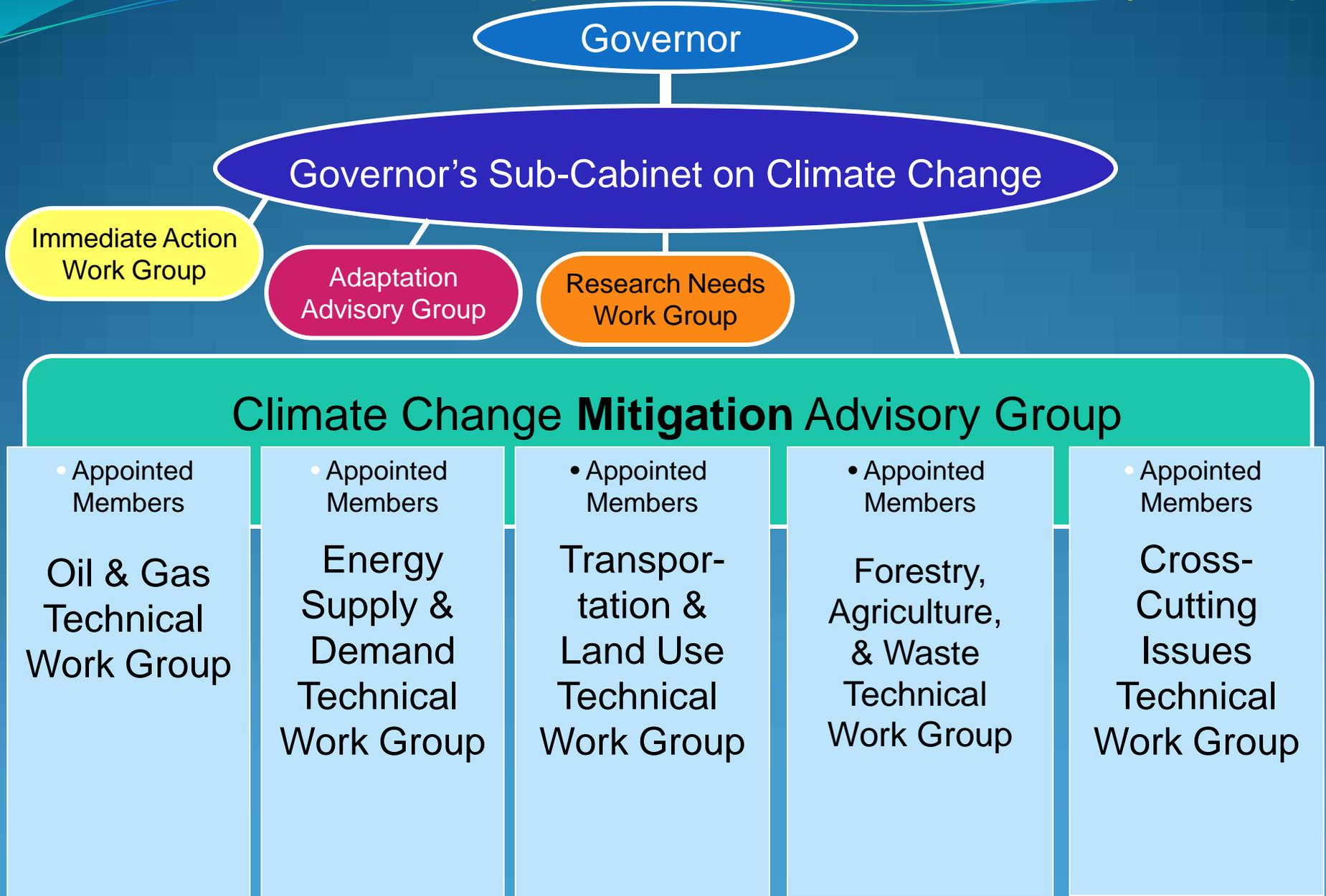
Simulated Annual Area Burned



MITIGATION



Technical Work Groups for **Mitigation** Advisory Group



Mitigation Technical Work Groups

Collaboration of individuals with relevant expertise
from Government, Native Community,
Academia, Industry, & the Public

Review emissions inventory and Identify Potential
GHG Reduction Options

Provide input to Mitigation Advisory Group

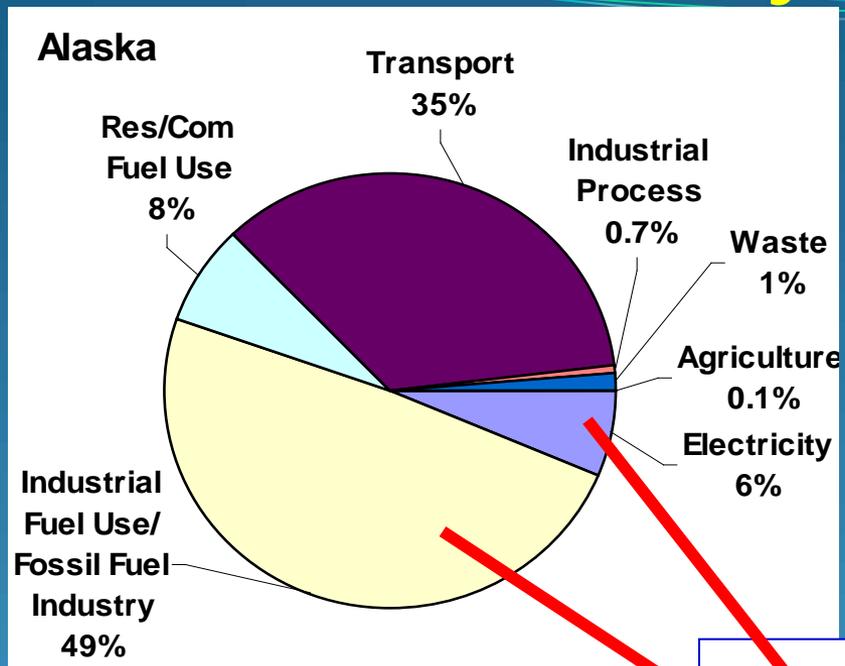
What You Should Know....

- Recommendations are from experts in Technical Working Group & do not represent industry or company positions
- All recommendations are based on thorough, albeit preliminary, deliberations, i.e. further analysis is essential
- Barriers to adoption or implementation include, but are not limited to:
 - Cost
 - Technology
 - Regulatory
 - External Drivers

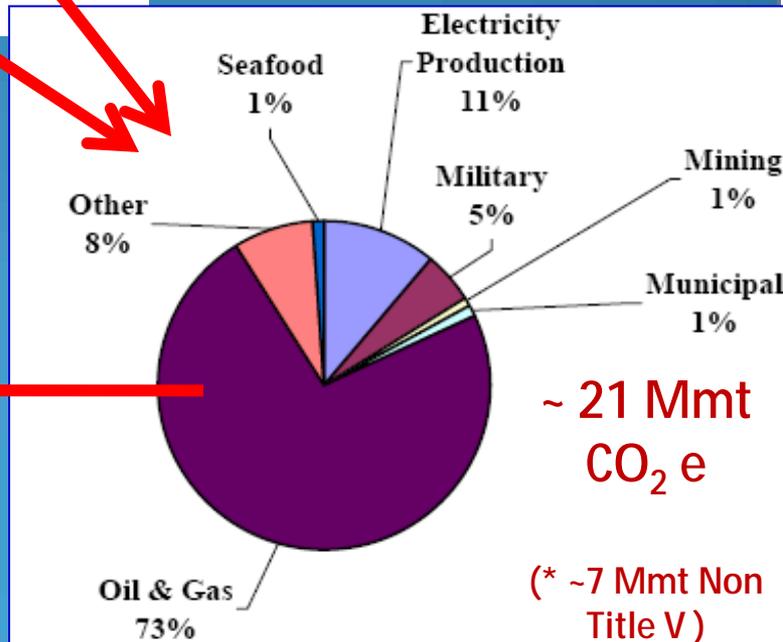
Alaska Gross GHG Emissions by Sector (2005)

~ 52 Mmt CO₂ Equivalent

(~0.7% US Emissions)



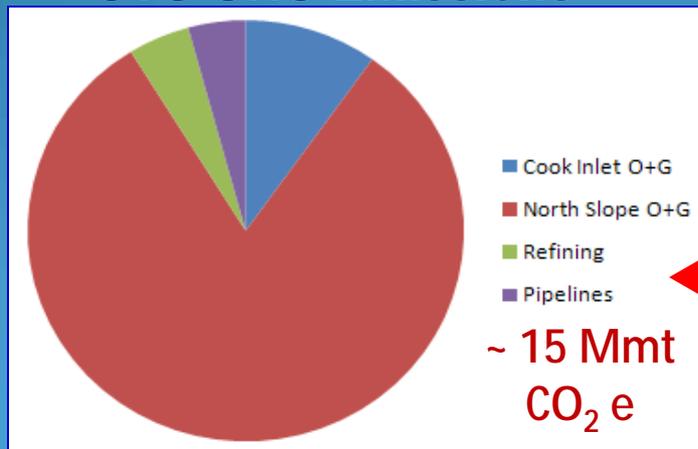
Alaska Title V GHG Emissions*



~ 21 Mmt CO₂ e

(* ~7 Mmt Non Title V)

O+G GHG Emissions



~ 15 Mmt CO₂ e

	Summary List of Options	Potential GHG Reductions 2010-2025 (MMT CO ₂ e/yr)	\$/ton reduced
Conservation	1 Overall conservations activities, e.g. reduce liquid fuel consumption, other best practices	Not quantified	Not quantified
	2 Reduce Fugitive Methane Emissions	3.2	\$57
Thermal Energy Efficiency	3 Electrification of Oil and Gas Operations, with Centralized Power Production and Distribution	26.6	\$293
	4 Improved Efficiency Upgrades for Oil and Gas Fuel burning Equipment	19.7	\$81
	5 Use of Renewable Energy Sources in Oil and Gas Operations	8.0	\$327
Carbon Capture and Sequestration (CCS)	6 CCS from High CO ₂ Fuel Gas at Prudhoe Bay	7.8	\$176
	7 CCS from Combustion Sources in and near Existing Oil and Gas Fields - Focus North slope	16.1	\$192
	8 CCS away from Known Geologic Traps - (Interior AK)	8.0	\$994

O&G Conclusions

- Best Practices & Conservation can be implemented almost immediately
- An analysis of fugitive emissions & pursuant actions can result in potential reduction of emissions
- North Slope has highest emissions for O&G sector, increased energy efficiency there could result in significant emissions reductions . Will require massive investments and changes to regulatory environment.
- North Slope Carbon Capture and Geologic Sequestration could be used to further significantly reduce emissions. Technology is in early stages, will require major facilities upgrades, and additional fuel will be burned.
- Some options are also applicable to Cook Inlet

Research Recommendations

(Technical)

- CO₂ capture technologies for North Slope and Cook Inlet
- Study where renewable energy sources co-exist with Oil and Gas operations
- Feasibility of using hydrogen produced from methane as a fuel source
- Feasibility of producing power on North Slope, capturing and sequestering the emissions there, and using long distance transmission lines to deliver power to markets

Research Recommendations (cont.)

(Economic)

- Short and long term value of carbon
- Short and long term value of natural gas
- Impact of various incentives to encourage major capital improvement investments

Prospective Timetable – AK Climate Change Strategy

DATE	ACTION
May 15 & 16, 2008	1st Mtg: Orientation to Process & meet with IAWG
July 15 & 16, 2008	2 nd Mtg: Review Process, Vulnerability
September 22 & 23, 2008	3rd Mtg: Status Report; Example Options
<i>October 27, 2008</i>	<i>Full Day Mtgs of Adaptation TWGs; AK Tribal Conference on Environmental Mgmt (ATCEM); U.S. Climate Change Science Program (CCSP)</i>
November 6 & 7, 2008	4th Mtg: Priority Options
<i>February 2-6, 2009</i>	<i>Alaska Forum on the Environment</i>
February 5 & 6, 2009	5th Mtg: Approve Straw Proposals
April 2 & 3, 2009	6th Mtg: Initial Assessment of Options
May/June 2009	7 th Mtg: Approve Recommended Options
Summer 2009	Report from Stakeholders to Sub-Cabinet
Late 2009	Public Workshops
Fall/Winter 2009	Sub-Cabinet develop Draft Strategy
December/January 09/10	Finalize Draft for Governor's consideration
Governor issues Alaska Climate Change Strategy	

Thank you!

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

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