



**Draft Catalog of Adaptation Actions and Policy Options
Other Economic Activities (EA) Technical Working Group (TWG)**

August 4, 2008 - Revised

Option No.	Adaptation Action/Policy Option (includes regulatory and management options)	Notes
EA-1: Oil and Gas		
1.1	Expand research on construction techniques and in-season monitoring	
1.2	Develop long range infrastructure development and maintenance plan	Roads, man-made shorelines, and other infrastructure maintenance needs may increase.
1.3	Insulate ice pads for extended use	Not feasible on roads. <i>This may be too prescriptive – describe "what" is being addressed, not "how" to get there.</i>
1.4	Develop sea level rise <i>shoreline change</i> adaptation public policy <i>and</i> guidance for preventive and mitigative measures, and knowledge of who pays for what	<i>Shoreline change may result from sea level rise. Currently there are funding streams to respond to spills/hazmat releases due to coastal erosion, but unless there is an "imminent threat" these funding mechanisms cannot be tapped. This section should explore options to change such policies at the fed/state level to expend funds for more preventive measures.</i>
1.5	Explore use of modeling to project new species ranges; confirm with on-the-ground knowledge	May be option for Natural Resources TWG
1.6	Consider additional stresses on marine species	<i>May be option for Natural Resources TWG</i>

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1.7	Use R&D funds to develop new techniques to clean up spills in icy waters	<i>The state should leverage already existing efforts in this area</i>
1.8	Consider how pipeline operations affect state revenues and manage potential disruptions to this and examine polices to continue oil and gas flows	How does cost of operating pipeline affect revenue to state? AK pays 25% of cost of operating pipeline through tariffs.
1.9	Model coastal erosion to establish criteria for pipeline coastal transition setbacks and burial depths	
1.10	Consider use of thermosyphons to maintain frozen permafrost	<i>This may be too prescriptive – describe "what" is being addressed, not "how" to get there.</i>
1.11	Prioritize coastal remediation in places that pose the greatest threat to humans.	
1.12	Monitor climate trends and downscale models to establish engineering environmental design criteria.	This option applies to most sectors, not just oil and gas; <i>Move to Category #10?</i>
1.13	Provide resources for good Digital Elevation Model (DEM) and GIS data, and current and high resolution imagery to establish a more robust information infrastructure to plan and adapt	Link to UAF and their imagery data. Need as close to real time as possible; need permafrost, temp, sea level trends; This is an overarching option that applies to many sectors
1.14	<i>Develop economic analysis of potential rise or decline of oil and gas and impact on state revenues</i>	
1.15	<i>Use sea ice modeling to plan for and respond to future spill potential</i>	
EA-2: Mining		
2.1	Research opportunities for best reclamation practices for changing site conditions	Consider longer growing season to establish revegetation to stabilize reclaimed areas.

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2.2	Consider how operating practices may change based on changed environmental conditions and criteria.	Operators and regulators will need to consider future environmental conditions. The State’s Large Mine Permitting Team (LMPT) under ADNR direction should work with mine operators.
2.3	Research new methods for responding to changed conditions and conduct education for operators on these methods	ADNR place mine permitting staff and LMPT should be involved in facilitating these training opportunities.
2.4	Provide sufficient/increased trained technical staff (e.g., ADNR) to monitor active placer and large hardrock mines and reclamation and closure progress	ADNR and LMPT should work with miners on best, cost effective methods to monitor changes and develop flexible strategies to address the conditions reasonably expected to occur with climate change. Existing vacancies need to be filled; qualified technical personnel need to be recruited; competitive markets for technical staff warrants addressing compensation issues.
2.5	Encourage research and engineering applications for tailings storage in Arctic/Subarctic climates at UAF school of Mines & Engineering	Opportunity for cooperative efforts by industry, government and university to address these challenges

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2.6	Review current regulations and compliance criteria for managing tailing dams and disposal sites and determine if changes are necessary	LMPT and industry should review. Current regulations and criteria for protecting land, air and waters should be maintained. Each project will have unique challenges based on the site conditions; Regulations should address compliance criteria, but not how to comply; cooperative efforts between mine operators and LMPT regulators should be encouraged to find cost effective solutions. Compliance criteria could include monitoring of permafrost or related ground conditions at specific sites
2.7	Encourage research for design and application of new liner materials	Could be public action to stimulate research; This could be an action by operators to better achieve compliance; opportunity for cooperative efforts between industry, state and UA.
2.8	Examine and research techniques for construction that will be responsive and useful in a warmed environment	This includes both available techniques and potential development of new techniques; Applicable to other aspects of construction in Alaska.
2.9	<i>Examine opportunities for mining in newly exposed areas</i>	
2.10	<i>Develop long range infrastructure development and maintenance plan for mining</i>	
2.11	<i>Develop economic analysis of potential rise or decline of mining and impact on state revenues</i>	
EA-3: Ocean Transportation		
3.1	Increase Coast Guard <i>search and rescue, navigation safety, inspection and prevention, enforcement and icebreaking capabilities in the Arctic</i>	

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3.2	Finance and build basic shipping infrastructure <i>to support increased shipping, fishing, mining, offshore drilling, tourism</i>	
3.3	Develop an understanding of inventories of fish stocks that may be related to shipping changes and implement reliable regulations and limitations on harvests as needed	Establishing inventories of stocks and fluxes of resources may be an option for Natural Resources TWG; <i>Consider changes to invasive species as well?</i>
3.4	Increase construction of <i>airport, rail</i> , port, fueling and perhaps housing facilities at strategic locations to handle increased ocean transport	
3.5	Monitor impacts of shipping on environment, hunting, fishing and communities	<i>This could include impacts of increased invasive species</i>
3.6	Ensure oil spill response and clean up capabilities	Is this covered under existing regulation (non-tank vessel plans)?
3.7	Examine need for new standards and regulations	
3.8	<i>Develop long range infrastructure development and maintenance plan for ocean transportation and shipping</i>	
3.9	<i>Develop economic analysis of potential rise or decline of shipping and impact on state revenues</i>	
EA-4: Rural Non-Road Ground Transportation		
4.1	<i>Consider issues of traditional transportation between villages (e.g., more drownings, losing machines)</i>	
EA-5: Other Economic Sectors		
5.1	Establish federal "all perils" insurance guarantee program	
5.2	Reward climate protection at residential and commercial properties	
5.3	Encourage private insurers, as investors, and the state pension funds to consider climate impact prevention in the prudent investment of portfolios	
5.4	Explore potential of insurance industry to contribute to funding as beneficiaries of reduced risk	
5.5	Identify incentives for private investment in creating 'climate safe' development	
5.6	Anticipate and address increased insurance costs	
5.7	Encourage private insurers to invest in climate science as a 'present value of avoided future costs' strategy	

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5.8	Consider future income for selling carbon credits and offsets	<i>Fit better in Mitigation Advisory Group</i>
5.9	Assess permit needs for safe drinking water and sanitation in villages	
5.10	Consider prescribed fire as an approach for wildfire control	Could be an option for the Natural Resources TWG to consider
5.11	Explore, install, permit new wind, geothermal, solar, and other renewable energy projects	<i>Fit better in Mitigation Advisory Group</i>
5.12	Explore possibilities for new hydroelectricity sources	<i>Fit better in Mitigation Advisory Group</i>
5.13	<i>Consider how climate change will impact the application of federal laws on specific economic development efforts</i>	<i>E.g. Endangered Species Act</i>
5.14	<i>Develop economic analysis of potential rise or decline of commercial fishing</i>	
5.15	<i>Develop long range infrastructure development and maintenance plan for commercial fishing</i>	
EA-6: Tourism and Recreation		
6.1	Develop economic analysis of potential rise or decline of tourism and impact on state revenues	
6.2	Consider allowing use of higher elevation lands for skiing based on changes to snow	
6.3	Study cost of snow production	
6.4	Explore alternative winter tourism options, considering the benefits of warmer, but sub-freezing temperatures, for selected locations	
6.5	Address road, airport, bridge maintenance needs to support tourism	
6.6	Consider extension of services and marketing for a longer summer season	
6.7	Develop permit and other changed itinerary requirements	
6.8	Address tourist health issues from wildfire smoke and increased risks of drowning	
6.9	Locate/re-locate visitor centers	
6.10	Expand cruise tourism infrastructure into Arctic Ocean	
6.11	<i>Develop long range infrastructure development and maintenance plan for tourism and recreation</i>	

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EA-7: Boundaries, Ownership (<i>Question – should this include Mapping activities?</i>)		
7.1	Advocate for Law of Sea Convention Treaty provisions	The Law of the Sea Convention provides nations a basis to extend their sea floor resource rights beyond the foot of the continental slope if they meet certain geological criteria backed up by scientific data. The U.S. has not yet ratified this treaty.
7.2	Conduct field research re: <i>boundaries and use of</i> Outer Continental Shelf	
7.3	Improve mapping and surveying to accurately and efficiently establish boundaries, address boundary disputes as needed and <i>aid charting for safe navigation</i>	
7.4	Establish new boundaries to manage river erosion and property impacts	
7.5	<i>Reinstate a fully effective Alaska Coastal Zone Management program to reduce unwise investments along the coast</i>	
7.6	<i>Review the state policy on boundary change, with a focus on fixed versus migratory boundaries</i>	
7.7	<i>Participate in international forums dealing with Arctic issues (e.g. resource management, boundaries, shipping, etc.) to better inform U.S. delegations on the desires/needs/interests of the State and its native populations</i>	
EA-8: Energy Demand		
8.1	<i>Examine options for alternative energy sources (e.g., wind)</i>	
EA-9: Evolving Alaska’s Jobs and Economy		
9.1	Conduct long and short term jobs analysis to identify which sectors/occupations will be positively/negatively impacted, with an eye towards job creation opportunities (<i>at all levels, including community</i>)	
9.2	Re-tool education and job training programs for new workforce to take advantage of green economy growth	
9.3	Make Alaska a world leader in the climate adaptation field: engineering and design services, climate-sensitive infrastructure systems, etc.	

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9.4	Promote activities that will promote climate change adaptation and the responsible use of state resources through education and outreach	State’s ability to conduct adaptive activities will be dependent on continued responsible use of state’s resources, including training additional resources - these capabilities may be promoted through universities
EA-10: Information Collection and Dissemination		
10.1	<i>Invest in monitoring and data dissemination programs to enhance information available for safe and efficient resource development</i>	
10.2	<i>Allocate a portion of major public works investments toward monitoring, data dissemination, and analysis of climate and other environmental data</i>	
10.3	<i>Continue to refine the "Cost of Climate Change" study recently completed by the UAA Institute for Social and Economic Research</i>	