



**Final Ranked Catalog of Adaptation Actions and Policy Options
November 3, 2008**

“Green” denotes options originally balloted as high, “white” denotes options originally balloted as medium, “rose” denotes options originally balloted as low. Final rankings shown below resulted from additional balloting and discussions. See accompanying file for more detailed option descriptions.

HIGH PRIORITY OPTIONS

Option No.	Adaptation Action/Policy Option	Preliminary Rating	FINAL RANK
3.1	Increase Coast Guard search and rescue, navigation safety, inspection and prevention, enforcement and icebreaking capabilities in the Arctic	High: 6 Medium: 2 Low: 0	HIGH – EA 1
9.3	Make Alaska a world leader in the climate adaptation field: engineering and design services, climate-sensitive infrastructure systems, etc.	High: 4 Medium: 4 Low: 0	HIGH- EA 2 (combine with 5.7)
5.7	Consider future income for selling carbon credits and offsets	High: 1 Medium: 4 Low: 2	HIGH EA 2 (combine with 9.3)
5.13	Develop economic analysis of potential rise or decline of commercial fishing	High: 2 Medium: 6 Low: 0	HIGH – EA 3 (combine with 3.6, 1.6, 6.1, 2.8)
2.8	Develop economic analysis of potential rise or decline of mining and impact on state revenues	High: 2 Medium: 4 Low: 2	HIGH – EA 3 (combine with 5.13, 3.6, 1.6, 6.1, 2.8)
1.6	Consider how potential rise or decline of oil and gas operation and maintenance may affect state revenues	High: 1 Medium: 4 Low: 4	HIGH – EA 3 (combine with 5.13, 3.6, 1.6, 6.1, 2.8)

Option No.	Adaptation Action/Policy Option	Preliminary Rating	FINAL RANK
6.1	Develop economic analysis of potential rise or decline of tourism and impact on state revenues	High: 0 Medium: 5 Low: 3	HIGH – EA 3 (combine with 5.13, 3.6, 1.6, 6.1, 2.8)
3.6	Develop economic analysis of potential rise or decline of shipping and impact on state revenues	High: 0 Medium: 7 Low: 1	HIGH EA 3 (combine with 5.13, 1.6, 6.1, 2.8)
7.7	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	High: 3 Medium: 3 Low: 2	HIGH – EA 4
7.3	Improve mapping and surveying to accurately and efficiently establish boundaries, address boundary disputes as needed and aid charting for safe navigation	High: 4 Medium: 3 Low: 1	HIGH – EA 5 (combine with 10.5)
10.5	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	High: 4 Medium: 3 Low: 1	HIGH – EA 5 (combine with 7.3)
10.2	Allocate a portion of major public works investments toward monitoring, data dissemination, and analysis of climate and other environmental data	High: 3 Medium: 5 Low: 0	HIGH – For Research Needs
10.4	Identify climate trends and downscale models leading to establishing environmental information, analysis tools, and design criteria for use in adapting to climate change.	High: 4 Medium: 3 Low: 1	HIGH – For Research Needs

LOWER PRIORITY OPTIONS AFTER FINAL RANKING AND DISCUSSION

Option No.	Adaptation Action/Policy Option	Notes	Preliminary Rating
1.3	Model coastal vulnerability to establish criteria for pipeline coastal transition setbacks and burial depths and develop shoreline change adaptation public policy, guidance for preventive and mitigative measures, and knowledge of who pays for what	<ul style="list-style-type: none"> - 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. - There are not a lot of projects like this 	High: 4 Medium: 4 Low: 1
2.3	Research cost effective methods to monitor changes and develop flexible strategies to address the conditions reasonably expected to occur with climate change	<ul style="list-style-type: none"> - ADRN 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 - Provide sufficient/increased trained technical staff (e.g., ADNR) to monitor active placer and large hardrock mines and reclamation and closure progress 	High: 3 Medium: 4 Low: 1
6.5	Address road, airport, bridge maintenance and other public infrastructure needs to support tourism		High: 3 Medium: 4 Low: 1
10.1	Invest in monitoring and data dissemination programs to enhance information available for safe and efficient resource development		High: 3 Medium: 4 Low: 1
1.5	Use R&D funds to model sea ice	<ul style="list-style-type: none"> - The state should leverage already existing efforts in this area - Add second half to 1.5 	High: 2 Medium: 7 Low: 0
10.3	Continue to refine the “Cost of Climate Change” study recently completed by the UAA Institute for Social and Economic Research		High: 3 Medium: 3 Low: 2
3.4	Monitor impacts of shipping on environment, hunting, fishing and communities	<ul style="list-style-type: none"> - This could include impacts of increased invasive species 	High: 1 Medium: 4 Low: 2

Option No.	Adaptation Action/Policy Option	Notes	Preliminary Rating
1.1	Expand research on ice road and pad construction techniques and in-season monitoring to maximize seasonal use and minimize impacts.	<ul style="list-style-type: none"> - For example, this research could focus on insulating ice pads for extended use - Could be high priority for consideration if it was focused on scientific criteria for establishing tundra seasons, insulation is fairly well understood 	High: 1 Medium: 7 Low: 1
1.2	Develop long range infrastructure development and maintenance plan for oil and gas	<ul style="list-style-type: none"> - Roads, man-made shorelines, and other infrastructure maintenance needs may increase. - Low priority for oil and gas, perhaps high for public assets, could also be combined with 1.8 	High: 3 Medium: 3 Low: 3
1.7	Expand research on climate change impacts on permafrost engineering design.	<ul style="list-style-type: none"> - For example, research and consider use of thermosyphons or other technologies to maintain permafrost 	High: 2 Medium: 5 Low: 2
1.8	Prioritize coastal remediation in places that pose the greatest threat to humans.	<ul style="list-style-type: none"> - Low priority for oil and gas, perhaps high for public assets, could also be combined with 1.8 	High: 3 Medium: 3 Low: 3
2.1	Examine and research cost-effective techniques for construction, operation, and reclamation that will be responsive and useful in changed environmental conditions	<ul style="list-style-type: none"> - Consider longer growing season to establish revegetation to stabilize reclaimed areas. - Operators and regulators will need to consider future environmental conditions. - The State's Large Mine Permitting Team (LMPT) under ADNOR direction should work with mine operators. - This option includes both available techniques and potential development of new techniques - Applicable to other aspects of construction in Alaska. - Encourage research for design and application of new liner materials and other technologies - Consider costs and types of energy for mining in remote areas (state energy plan consideration). 	High: 1 Medium: 6 Low: 1
5.14	Develop long range infrastructure development and maintenance plan for commercial fishing	<ul style="list-style-type: none"> - Couple with 1.2 	High: 1 Medium: 6 Low: 1
2.4	Encourage research and engineering applications for tailings storage in Arctic/Subarctic climates at UAF school of Mines & Engineering	<ul style="list-style-type: none"> - Opportunity for cooperative efforts by industry, government and university to address these challenges 	High: 0 Medium: 7 Low: 1

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2.5	Review current regulations and compliance criteria for managing tailing dams and disposal sites and determine if changes are necessary	<ul style="list-style-type: none"> - LMPT and industry could review. - 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 	High: 2 Medium: 3 Low: 3
2.7	Develop long range infrastructure development and maintenance plan for mining	<ul style="list-style-type: none"> - Consider river barging as an access option for increased mining infrastructure development - Couple with 1.2 	High: 0 Medium: 7 Low: 1
4.2	Consider expansion of river barging due to expanded open season		High: 1 Medium: 5 Low: 2
5.8	Assess permit needs for safe drinking water and sanitation in villages		High: 2 Medium: 3 Low: 3
6.4	Explore alternative winter tourism options, considering the benefits of warmer, but sub-freezing temperatures, for selected locations		High: 1 Medium: 3 Low: 4
6.11	Develop long range infrastructure development and maintenance plan for tourism and recreation	- Couple with 1.2	High: 0 Medium: 7 Low: 1
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.	High: 1 Medium: 5 Low: 2
7.4	Establish new boundaries to manage river erosion and property impacts		High: 1 Medium: 5 Low: 2
1.4	Explore use of modeling to project new species ranges and consider stresses on species; confirm with on-the-ground knowledge	- May be option for Natural Resources TWG	High: 1 Medium: 3 Low: 3

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6.10	Expand cruise tourism infrastructure into Arctic Ocean		High: 1 Medium: 4 Low: 3
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	High: 0 Medium: 6 Low: 2
2.9	Consider changes in baseline conditions that may result from climate change and how this will affect standards that are floating based on that baseline.	- Baseline conditions may change over the life of a project, which should be taken into account as the project is monitored - Consider sedimentation and other environmental conditions	High: 0 Medium: 5 Low: 3
4.1	Consider issues of traditional transportation between villages (e.g., more drowning, losing machines)		High: 1 Medium: 3 Low: 4
5.3	Encourage private insurers, as investors, and the state pension funds to consider climate impact prevention in the prudent investment of portfolios and to invest in climate science as a 'present value of avoided costs' strategy		High: 1 Medium: 3 Low: 4
5.6	Anticipate and address increased insurance costs		High: 1 Medium: 3 Low: 4
7.5	Reinstate a fully effective Alaska Coastal Zone Management program to reduce unwise investments along the coast	- Possible linkage to EA-1.3	High: 1 Medium: 3 Low: 4
2.2	Conduct education for operators on new methods identified from research	- ADNR place mine permitting staff and LMPT should be involved in facilitating these training opportunities.	High: 0 Medium: 4 Low: 4
5.12	Consider how climate change will impact the application of federal laws on specific economic development efforts	E.g. Endangered Species Act	High: 2 Medium: 0 Low: 6
2.6	Examine opportunities for mining in newly exposed areas	Considered Low Priority for Analysis by TWG	

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4.3	Consider expanded use of rural air strips	Considered Low Priority for Analysis by TWG	
5.1	Establish federal “all perils” insurance guarantee program	Considered Low Priority for Analysis by TWG	
5.2	Reward climate protection at residential and commercial properties	Considered Low Priority for Analysis by TWG	
5.4	Explore potential of insurance industry to contribute to funding as beneficiaries of reduced risk	Considered Low Priority for Analysis by TWG	
5.5	Identify incentives for private investment in creating ‘climate safe’ development	Considered Low Priority for Analysis by TWG	
6.2	Consider allowing use of higher elevation lands for skiing based on changes to snow	Considered Low Priority for Analysis by TWG	
6.3	Study cost of snow production	Considered Low Priority for Analysis by TWG	
6.6	Consider extension of services and marketing for a longer summer season	Considered Low Priority for Analysis by TWG	
6.7	Consider need to change or develop permit and changed itinerary requirements due to changing climate conditions	Considered Low Priority for Analysis by TWG	
6.8	Address tourist issues from wildfire smoke and increased risks of drowning	Considered Low Priority for Analysis by TWG	
6.9	Locate/re-locate visitor centers	Considered Low Priority for Analysis by TWG	
7.2	Conduct field research re: boundaries and use of Outer Continental Shelf	Considered Low Priority for Analysis by TWG	
7.6	Review the state policy on boundary change, with a focus on fixed versus migratory boundaries	Considered Low Priority for Analysis by TWG	
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 at all levels, including community	Considered Low Priority for Analysis by TWG	

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9.2	Re-tool education and job training programs for new workforce to take advantage of green economy growth	Considered Low Priority for Analysis by TWG	
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	Recommend to Natural Systems TWG (Considered Medium Priority by EA TWG – 2.4)	
5.9	Consider prescribed fire as an approach for wildfire control	Recommend to Natural Systems TWG (Considered Medium Priority by EA TWG – 2.5)	
3.2	Plan, finance, and build basic shipping infrastructure, including port planning and design, to support increased shipping, fishing, mining, offshore drilling, tourism	Recommend to Public Infrastructure TWG (Considered Medium Priority by EA TWG – 2.0)	
5.10	Explore, install, permit new wind, geothermal, solar, and other renewable energy projects	Recommend to MAG (Energy Supply and Demand TWG?)	
5.11	Explore possibilities for new hydroelectricity sources	Recommend to MAG (Energy Supply and Demand TWG?)	
8.1	Examine options for alternative energy sources (e.g., wind)	Recommend to MAG (Energy Supply and Demand TWG?)	
3.5	Ensure oil spill response and clean up capabilities. Use R & D funds to develop new techniques to clean up oil spills in icy waters.	Recommend to MAG (Oil and Gas TWG?)	

Option Category Key (first digit of option numbers outlined below)

- 1: Oil and Gas
- 2: Mining
- 3: Ocean Transportation
- 4: Rural Non-Road Transportation
- 5: Other Economic Sectors

6: Tourism and Recreation

7: Boundaries and Ownership

8: Energy Demand

9: Evolving Alaska's Jobs and Economy

10: Information Collection and Dissemination