Draft Vulnerabilities, Impacts and Opportunities
Other Economic Activities (EA) Technical Working Group (TWG)

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Vulnerabilities, Impacts, Opportunities	Applicable Option(s)	Notes
Oil and Gas: Onshore		
Reduced ice road, tundra travel, ice platform opportunities	1.1, 1.2, 1.3	Impacts on-tundra construction season and gravel mining. Increased vegetation could impact ice-road routing and construction. Ice roads require some snow; changes in snow patterns could impact ice road construction.
Possible extensive onshore development associated with worldwide energy and resource demands	1.2	Need supporting infrastructure
Affect on coastal communities with operating facilities caused by flooding	1.4	
Reduced efficiency of gas compression		May be a company decision versus public policy; Increased horsepower requirements and fuel consumption
Animal behavior and distribution changes	1.5	
Increase in gravel required for new pads to contain seasonal thaw depth		
Flooding and shore erosion, North Slope oil field facilities		
Changing river hydraulics, flooding deposition as glaciers melt		
Increased length of open water season increases coastal erosion of natural and man-made shore line	1.2	
Increased depth of active layer impacts stability of roads, pads, structural and pipeline piles.	1.2	Changes in temperature and snow pack can influence depth of active layer.

Oil and Gas: Offshore		
Possible extensive offshore development	1.6	This opportunity implies that reduced ice pack will increase development activity. Ice is not likely to be a major decision factor unless the summer ice pack disappears completely. Resource value is more significant driver of the development economics.
Animal behavior changes	1.5, 1.6	
Increased oil spill risk from increased activity	1.7	Risk to individual activities should go down with less ice
Increased open water season		Potentially allows longer season for seismic acquisition, drilling, construction, etc.
Oil and Gas: Pipeline		
Sea level rise and coastal erosion impacts	1.9	
Thawing permafrost affects buried or above-ground pipelines	1.8, 1.9, 1.10	Possible increased pipeline tariff affection state revenues; Possible increased pipeline maintenance; Increased risk of landslides, liquefaction, etc; Possible cooling of crude oil temperatures caused by ground water flow
Surface landslides and other changes in surface such as the stream network or morphology changes		
Oil and Gas: Existing Infrastructure		
Coastal infrastructure, old wells and waste pits submerged and breached, migration of contaminant from flood of gravel pads	1.11	Not sure that the presumption of more significant or more frequent flooding events is consistent with climate change data or modeling results. Existence of contamination is scrutinized under existing regulations.
Uncertainty in engineering design criteria (heating/cooling indices, soil bearing capacities, precipitation, wave intensity, river flows, etc.)	1.12, 1.13	
Regulatory changes (cap and trade, endangered species, etc.) may have impact existing infrastructure and activities		
Mining: Placer Mining		
Longer operating season for placer mines	2.1, 2.2, 2.3, 2.4	Increase in placer mining activity would increase revenue to the state; Increase in activity may require increase in staffing – DNR would have to assess needs

Potential for increased thawing of permafrost	2.1, 2.2, 2.3	DNR placer mine permitting staff should work with operators to determine how best to monitor changes what corrective actions are appropriate
Animal behavior and distribution changes	1.5	
Mining: Tailings Dams and Disposal Sites		
Reduced freezeback for tailings dams and modifications to disposal sites	2.4, 2.5, 2.6, 2.8	State Large Mine Permitting Team (LMPT) should work with mine operations to determine best methods to cost effectively monitor changes and determine if modifications to current stipulations are necessary
Tailings disposal, design and planning can be optimized to provide insulating layer(s) (tailings or other materials) to minimize potential seepage	2.4, 2.5, 2.6, 2.7, 2.8	LMPT should work with mine operations to assess how designs and planning could be improved and optimized for changing conditions
Seasonal aspects of tailings storage	2.4, 2.5, 2.6, 2.7, 2.8	Facility construction planning can be optimized by applicants
Mining: Mining Access		
Glacier melting exposes new areas to exploration	2.4	Impacts could lead to increase in mineral exploration activities with longer season, which could lead to more discoveries and overall mining activity – and increased revenues from mining
Reduced season for ice roads	2.4	Generally, may need flexibility in access concepts to ensure miners have cost effective access to mine sites
Longer barging season on rivers	2.4	Increased mapping and monitoring of common barging routes should be considered
Longer “summer” construction season	2.4	
Reduced season for overland access on frozen ground conditions		
Ocean Transportation: Increased Shipping Opportunities and Needs		
Open shipping lanes due to less Arctic ice	3.1, 3.2	
Longer summer access to northern seas	3.1, 3.2	
Increased access to mineral and natural resources, including oil, coal, fish, and metals	3.3	
Increased need for support industry to serve commercial, fishing and recreational vessels	3.4	
Increased probability of oil spills or other contamination of pristine seas	1.2, 3.5, 3.6, 3.7	

Increased possibility of vessels trapped in sea ice as fishermen and shippers press marginal access	3.7	
Increased probability of conflicts over natural and mineral resources	3.7	
Ocean Transportation: Ocean Recreation		
Increased cruise and recreational traffic	3.4, 3.7	
Rural Non-Road Ground Transportation: Ice Road Impacts		
Reduction in season length		
Other Business Impacts		
Individual and government insurance impacts	5.1 – 5.9	
Wild land fire increase	5.10	Need for more prescribed burns. Increased health hazard from smoke
Energy Supply Impacts		
Increased demand for new and diversified energy sources	5.11, 5.12	
Increase opportunities for hydroelectricity sources	5.12	
Increased energy costs from regulatory changes (carbon tax or similar)		Impacts to mining and other resource development could be significant; How does the state continue to encourage responsible development of its resources amid rising costs of operation?
Tourism and Recreation: Downhill Skiing		
Changes in snow accumulations and texture, less cold weather	6.1 – 6.3, 6.11	
Tourism and Recreation: Other Winter Tourism		
More comfortable temperatures for some locations	6.4 – 6.7, 6.11, 6.12	
Tourism and Recreation: Summer and Shoulder Seasons		
Damaged roads, diseased or dying forests, smoke	6.5, 6.8	
Longer summer season	6.6, 6.9, 6.10	
Boundaries and Ownership: Outer Continental Shelf		
Arctic countries surveying and “laying claim” to Arctic Ocean submerged lands	7.1, 7.2	
Boundaries and Ownership: Boundary Adjustments		
Changes in property ownership (state, federal, municipal, private) due to coastline changes and river erosion	7.3, 7.4	
Energy Demand		
Reductions in winter fuel needs		

Reductions in peak demand		
Increase in summer demand for cooling		
Increased costs of living in rural local communities of energy and other climate change impacts		This affects several categories – e.g., mining
Evolving Alaska's Jobs and Economy		
		Generally, the state will continue to be dependent on the responsible development of its natural resources to generate revenue to pay for government and to function, including addressing the costs of adapting to climate change. Alaska's dependence on developing our natural resources will only increase and the responsible development of these resources needs to be promoted and encouraged.
Other Impact Areas		