



Sector 4: Other Economic Activities

All the impacts included in the Economic Activities sector are described below and organized according to subsector. This sector focuses on Alaskan economies affected by a changing climate that are not directly dependent on living ecosystems.

OIL AND GAS

- 1. Onshore operations:** Current impacts – shorter and warmer winters have resulted in reduced operation windows for exploration and development during winter (e.g., between 1970 and 2002, the number of days tundra travel was allowed declined by 50% -- the number increased subsequently due to new standards but is still lower than in the 1970s); warmer summers have resulted in reduced efficiency of gas compression and reinjection during warmer months, resulting in reduced production; impacts on seismic and other activities because of animal behavior and distribution changes (e.g., more polar bears denning on land). *Future projections – more reduced ice road, tundra ice travel, and ice platform opportunities; reduced efficiency of gas compression (this issue could be reduced or eliminated once a gas pipeline is constructed); increased rate and amount of animal behavior changes impacting oil and gas activities (e.g., more walruses and polar bears on land); changes in permafrost could result in flooding of gravel pads and the migration of contaminants into the environment.*
- 2. Offshore development:** Current impacts – increased interest and investments in offshore opportunities because of less ice and high price of oil (the degree to which this can be attributed to less sea ice versus high oil prices is a subject of some disagreement); record breaking Chukchi sale in 2008 (over \$2.6 billion). *Future projections – potential extensive development in offshore areas in Bering, Chukchi, and Beaufort Seas (again, the degree to which this is driven by oil prices versus less sea ice is a subject of disagreement); possible impacts from animal behavior and distribution changes (e.g., humpback whales in Arctic Ocean); increased oil spill risks in new areas, such as northern Bering and Chukchi Seas.*
- 3. Pipeline damage and relocation:** *Future projections – sea level rise and coastal and river erosion may impact buried or above-ground oil and gas pipelines; thawing permafrost may undermine support for existing buried or above-ground pipelines.*

4. **Existing infrastructure:** Current impacts – some oil and gas (O&G) coastal infrastructure has been submerged by eroding coastline (e.g., NPR-A Lonely DEW site); old NPR-A waste pits near coast have been breached. *Future projections – much greater threat to coastal infrastructure from sea level rise, eroding coastline, thawing permafrost (e.g., 30 old wells in NPR-A need to be plugged before submerged additional waste pit breaches).*

MINING

5. **Placer mining erosion:** Current impacts – major erosion issues where vegetation has been stripped because of warmer temperatures and exposed permafrost. *Future projections: greater erosion potential.*
6. **Tailings dams and tailings disposal sites:** Current impacts – less permafrost “freezeback”; less stability and more seepage. *Future projections – reliance on freezeback questionable; need to address stability and seepage issues for tailings dams and tailings disposal sites; past and future mine tailings dams must have sufficient freeboard and adequately sized emergency spillways for anticipated future precipitation events; some modification may be needed, especially to perpetuity dams.*
7. **Mining access:** Current impacts – reduced operations window for exploration and development during winter. *Future projections – further decrease in window for winter exploration and development.*

OCEAN TRANSPORTATION

8. **Increased shipping opportunities and needs:** Current impacts – less ice in Arctic Ocean and Bering Sea, opening up summer shipping lanes and opportunities (a 10% decline in sea ice per decade since the 1970s); some increase in traffic already observed, including cruise and recreational traffic; offshore oil and gas exploratory traffic may increase in previously ice-covered ocean areas; rapidly melting glaciers causing navigation problems (such as Columbia Glacier during the first part of its retreat); more activities resulting in higher risk of marine accidents and oil/fuel spills in Bering Sea, Chukchi Sea, and Arctic Ocean. *Future projections – even greater opening of Arctic Ocean and Bering Sea for longer periods for shipping and marine activities; increased navigation and safety issues and concerns. NOTE: This item is also addressed in the Public Infrastructure sector.*

RURAL NON-ROAD GROUND TRANSPORTATION

9. **Ice road impacts:** Current impacts – season length for ice roads and travel over permafrost has been significantly reduced. *Future projections – even greater reductions*

in season length for travel over frozen surfaces. NOTE: This item is also addressed in the Public Infrastructure sector.

OTHER BUSINESS IMPACTS AND OPPORTUNITIES

10. **Other business impacts:** *Future projections – possible greater insurance premiums to cover more catastrophic weather conditions; possible future income for selling carbon credits and offsets (e.g., renewable energy companies and utilities).*
11. **Regulatory changes:** *Future projections – greater strain on staffing and increased data needs to respond to rapidly changing environment (e.g., up to \$1 million over next 10 years for Department of Environmental Conservation); may require permit reassessments and modifications to ensure safe drinking water and sanitation in villages.*
12. **New energy supply impacts:** *Current impacts – new wind, geothermal, solar, and other renewable energy projects have been recently installed or are seeking permits (e.g., Kotzebue, Toksook Bay, Chena Hot Springs). Future projections – much greater demand for wind, geothermal, solar, biomass, tidal, and wave power; permitting, siting, regulatory, and other needs.*

TOURISM/ECO-TOURISM/RECREATION

13. **Downhill skiing impacts:** *Current impacts – some reduction in season length (e.g., Eaglecrest, Alyeska, and Moose Mountain); increased cost of snow production. Future projections – larger reductions in season length, possibly leading to closures; possible increases in precipitation, especially in southeast Alaska. Note: Effects on recreation are addressed in the Health and Culture sector.*
14. **Other winter tourism impacts:** *Current impacts – shorter season; some adverse impacts include canceling of dog sled racing events (cancellation of Fur Rendezvous races 3 times in the last 9 years), changing start of Iditarod, less cross-country skiing; positive impacts include warmer temperatures in previously very cold locations such as Chena Hot Springs and Bettles. Future projections – increased reduction in winter season, dog sled races, and lower elevation cross-country skiing; continued more comfortable temperatures for previously very cold locations.*
15. **Summer and shoulder seasons:** *Current impacts – longer summer and shoulder tourism season; expansion of cruise season; expansion of other summer and shoulder tourism opportunities throughout the state; some adverse impacts on summer tourism, including melting of glaciers, reducing tourism attractions (e.g., Portage), damaged roads, and diseased and dying forests; summer smoke from large wildland fires causes disruption in tourism (e.g., visibility diminished of Denali and other sites, highway closures); health*

issue for tourists (e.g., smoke and Vibrio); hotter temperatures without air-conditioning. *Future projections – even greater expansion of summer season; increased melting, decline, and/or elimination of glaciers; more dead and dying trees; greater disruption from smoke over a longer season; hotter, especially in interior Alaska.*

BOUNDARIES AND OWNERSHIP

16. **Coastline:** Current impacts – Alaska’s coastline is already eroding on northern and western coasts, changing boundaries between federal and state governments (e.g., portions of North Slope have lost 3,000 feet). *Future projections – greater coastline changes requiring boundary jurisdiction changes.*
17. **River:** Current impacts – greater river erosion with changed boundaries. *Future projections – greater river erosion issues requiring more boundary jurisdiction changes.*
18. **Outer continental shelf:** Current impacts – Arctic countries surveying and “laying claim” to Arctic Ocean submerged lands based on Law of the Sea Convention. *Future projections – need to resolve Arctic Ocean submerged lands ownership issues (the degree to which this has been driven by less sea ice versus other considerations remains a subject of some disagreement).*

ENERGY DEMAND

19. **Costs to businesses:** Current impacts – decreased heating demands during winter due to warmer weather; reduced fuel bills; increased summer energy demands for cooling; increased summer fuel bills; retrofitting for cooling; possible impacts on businesses in remote locations that generate own power. *Future projections – further reduced winter fuel needs for heating; potential reductions in peak demand; further increases in summer energy demands for cooling.*