

# **CLIMATE CHANGE & CONTAMINANTS IN ALASKA**

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Western Brownfields Workshop  
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# ROAD MAP

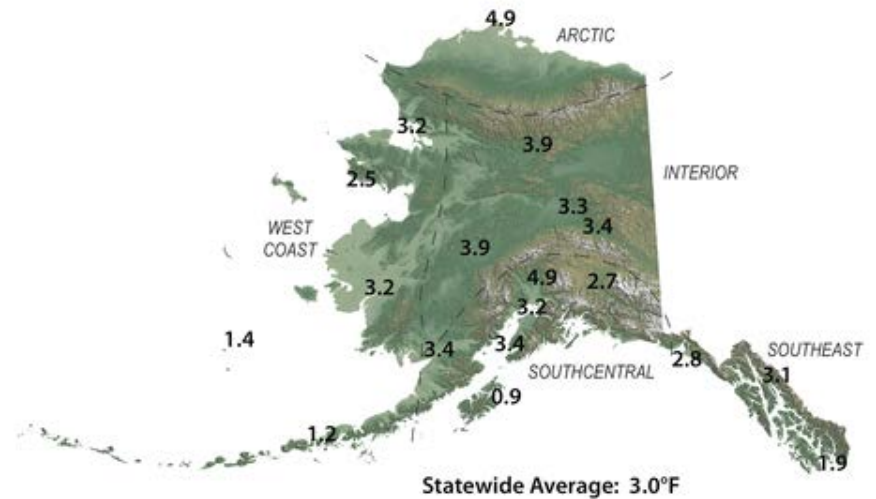


- Climate Change in Alaska
- Impacts - Alaska Natives
- Impacts - contaminated sites
- Solutions
- Resources

# ALASKA CLIMATE CHANGE

- Warming twice as rapidly
  - Earlier snowmelt
  - Reduced sea ice
  - Retreating glaciers
  - Warmer permafrost
  - Extensive wildfires
  - Increased storm intensity
  - Flooding

Total Change in Mean Annual Temperature (°F), 1949 - 2011

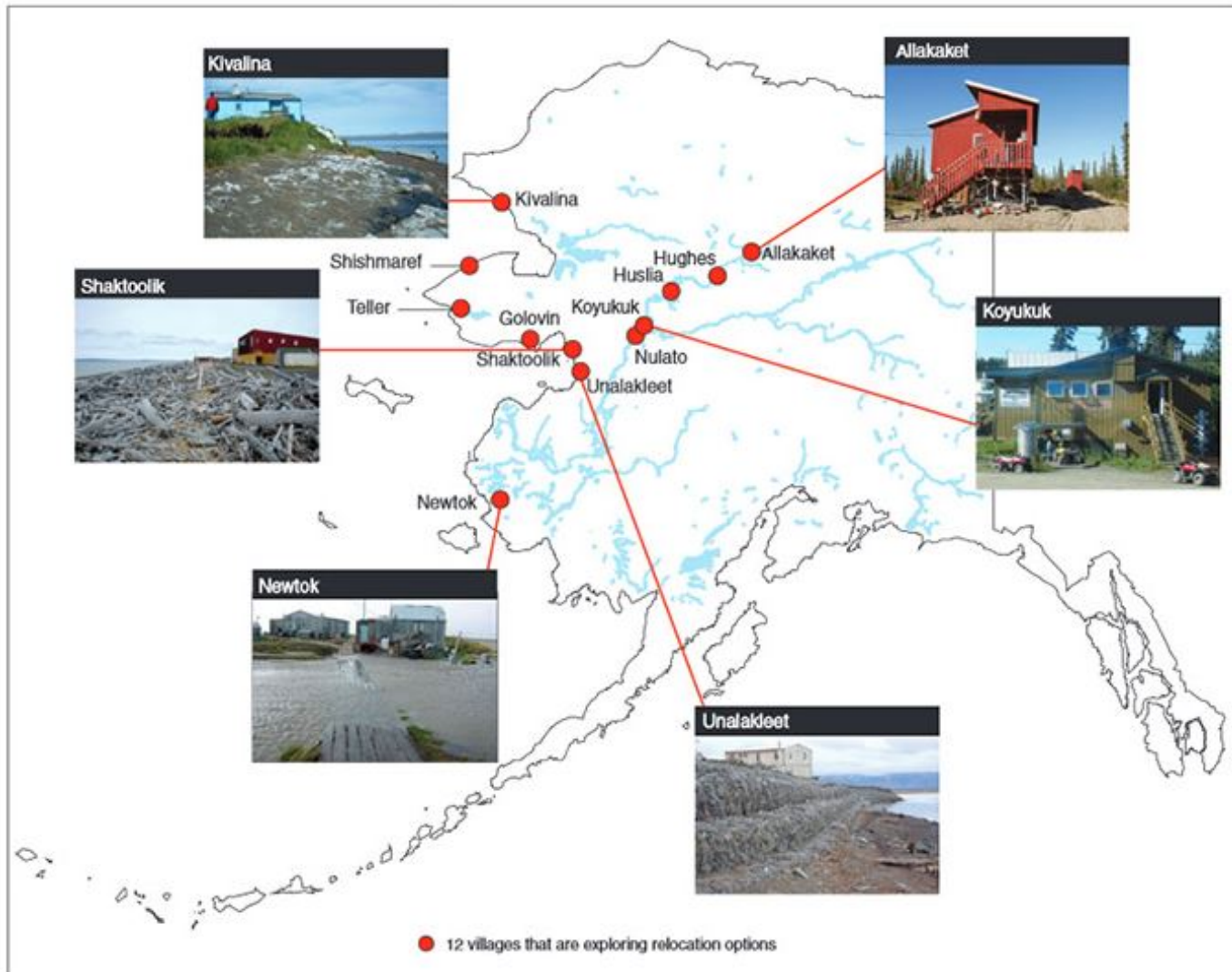


# IMPACTS — ALASKA NATIVES

- 40% of the federally recognized tribes in U.S.
- Small number of jobs, high cost of living
- Vulnerable to climate change through impacts on traditional hunting and fishing



# Alaskan Villages Considering Relocation



Sources: GAO (analysis); Pitney Bowes Business Insight (map).

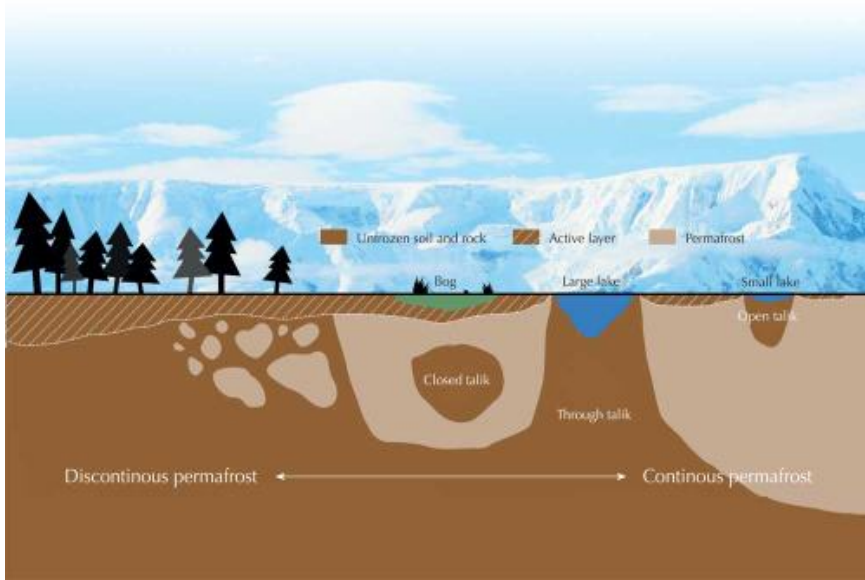
# CLIMATE CHANGE & CONTAMINATION



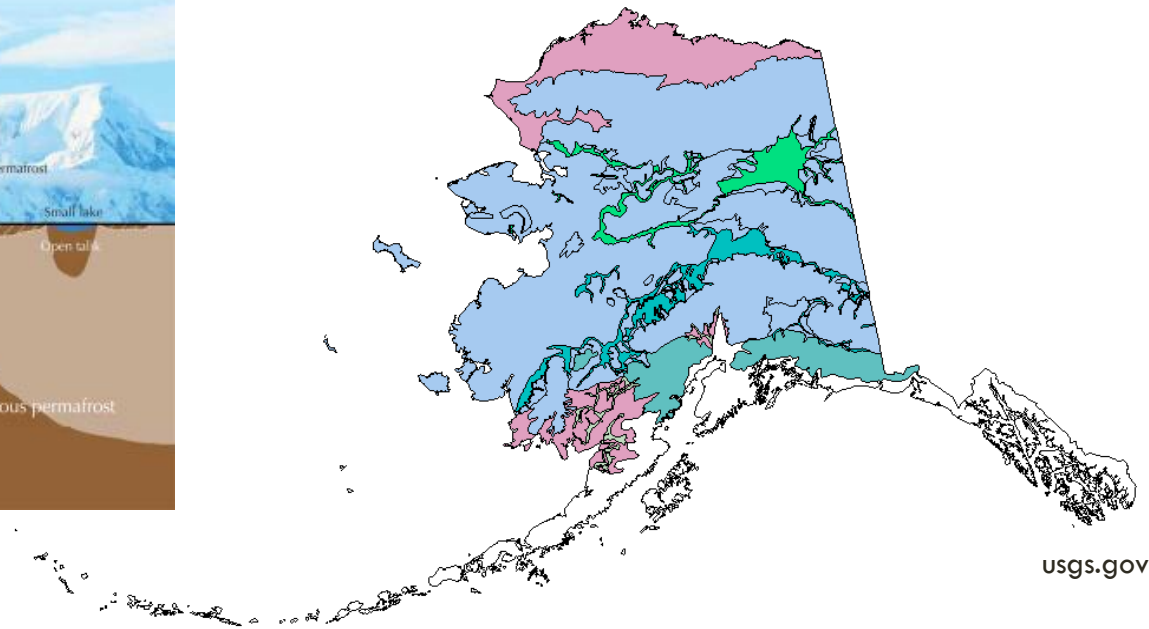
- Warming Permafrost – Containment
  - Contaminated sites
  - Sewage lagoons
  - Landfills
  - Mining operations – tailing ponds
- Reduced sea ice
  - Erosion of shoreline infrastructure – bulk fuel storage, etc.
  - Offshore development potential
  - Increased shipping routes

**Climate change will alter how contaminants move in the environment**

# WARMING PERMAFROST



80% of Alaska's surface lies above permafrost



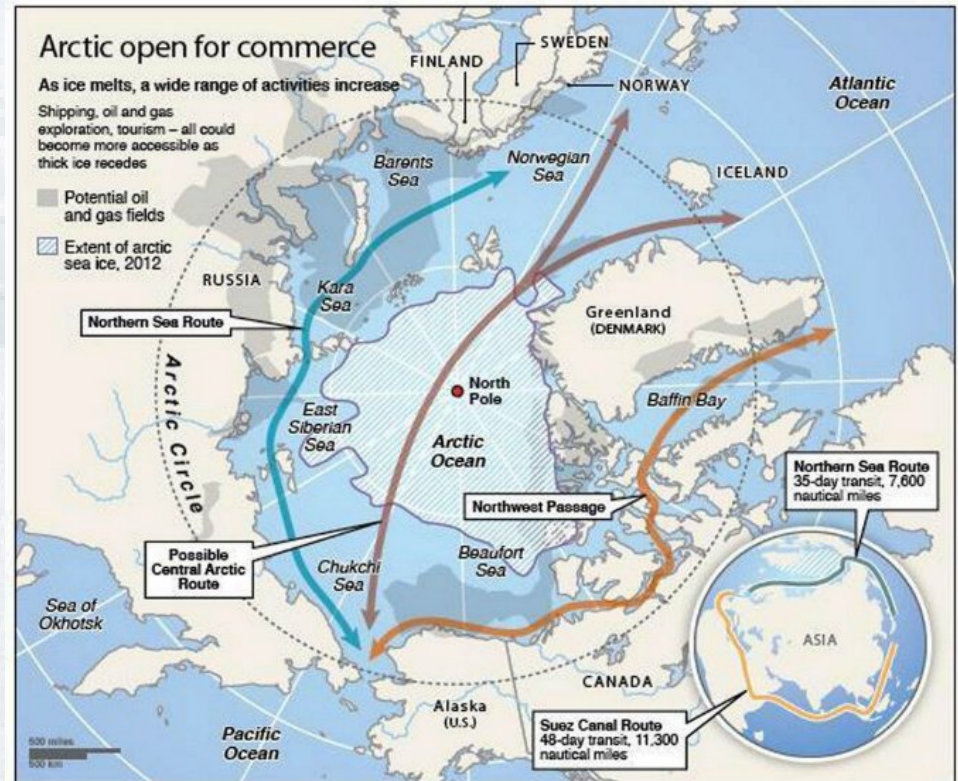
# WARMING PERMAFROST





# SEA ICE

- Less “protective” shore ice
- Offshore development opportunities
- Increased shipping/routes



# KIVALINA, ALASKA

- First U.S. climate change refugees
- Barrier Island
- 8-10ft thick sea ice mostly gone
- Underwater by 2025



*“What we’re facing is real.” “It is threatening our livelihood, our culture, our way of life. We are a people who are able to adapt to changes, but we need to move our village.” – Mike Hawley, president Native Village of Kivalina*

# SOLUTIONS

- Identify vulnerabilities in your community
- Brownfields
  - TRPs – incorporated climate change observations into inventories
  - Prevent future brownfields – outreach, response planning, etc.
- Make and record observations
  - Traditional ecological knowledge
  - LEO Network
- Update community action plans
- Incorporate climate change into site characterization/cleanup planning



# FUNDING & RESOURCES

## Brownfields

<https://www.epa.gov/brownfields>

<http://dec.alaska.gov/spar/csp/brownfields.htm>

## USDA – Rural Development Program

<http://www.rd.usda.gov/ak>

## BIA Tribal Climate Resilience Program

<http://bia.gov/WhoWeAre/BIA/climatechange/>

## Denali Commission

<http://www.denali.gov/index.php>