

TOUR OF ALASKA'S COAST AND SHORELINE CHANGE



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Significant contributions from N. Kinsman 2016

COASTLINE OF ALASKA



Shaktolik, AK

(Kinsman 2011)

vs.



San Diego, CA

(www.oceanlight.com)

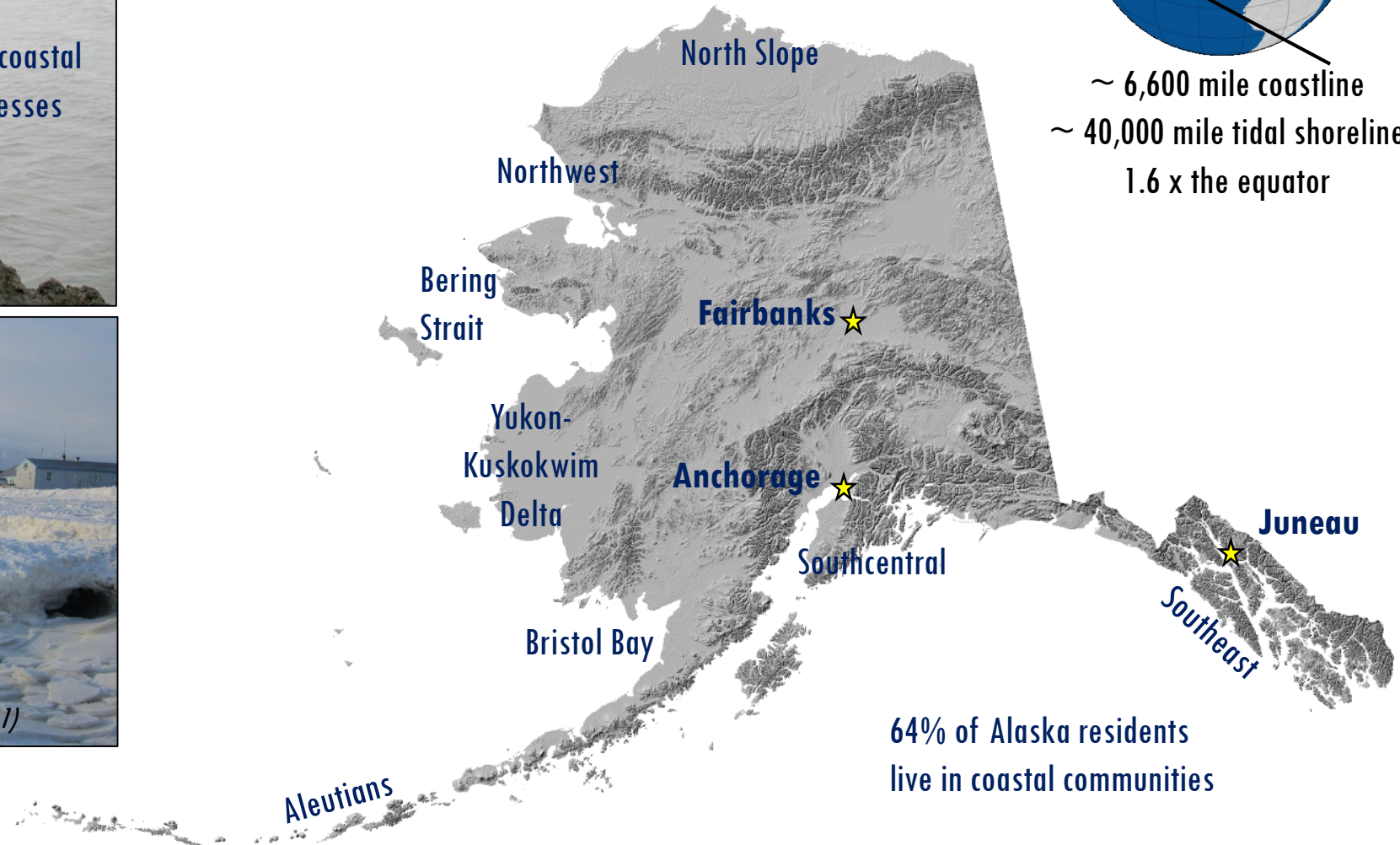
Unique coastal cultures and socio-economic settings compared to the “lower 48”
Emerging infrastructure requirements

Alaska no longer participates in the Coastal Zone Management Program
12% of communities do not participate in the National Flood Insurance Program
Alaska’s coastline is data-limited

COASTLINE OF ALASKA



~ 6,600 mile coastline
~ 40,000 mile tidal shoreline
1.6 x the equator



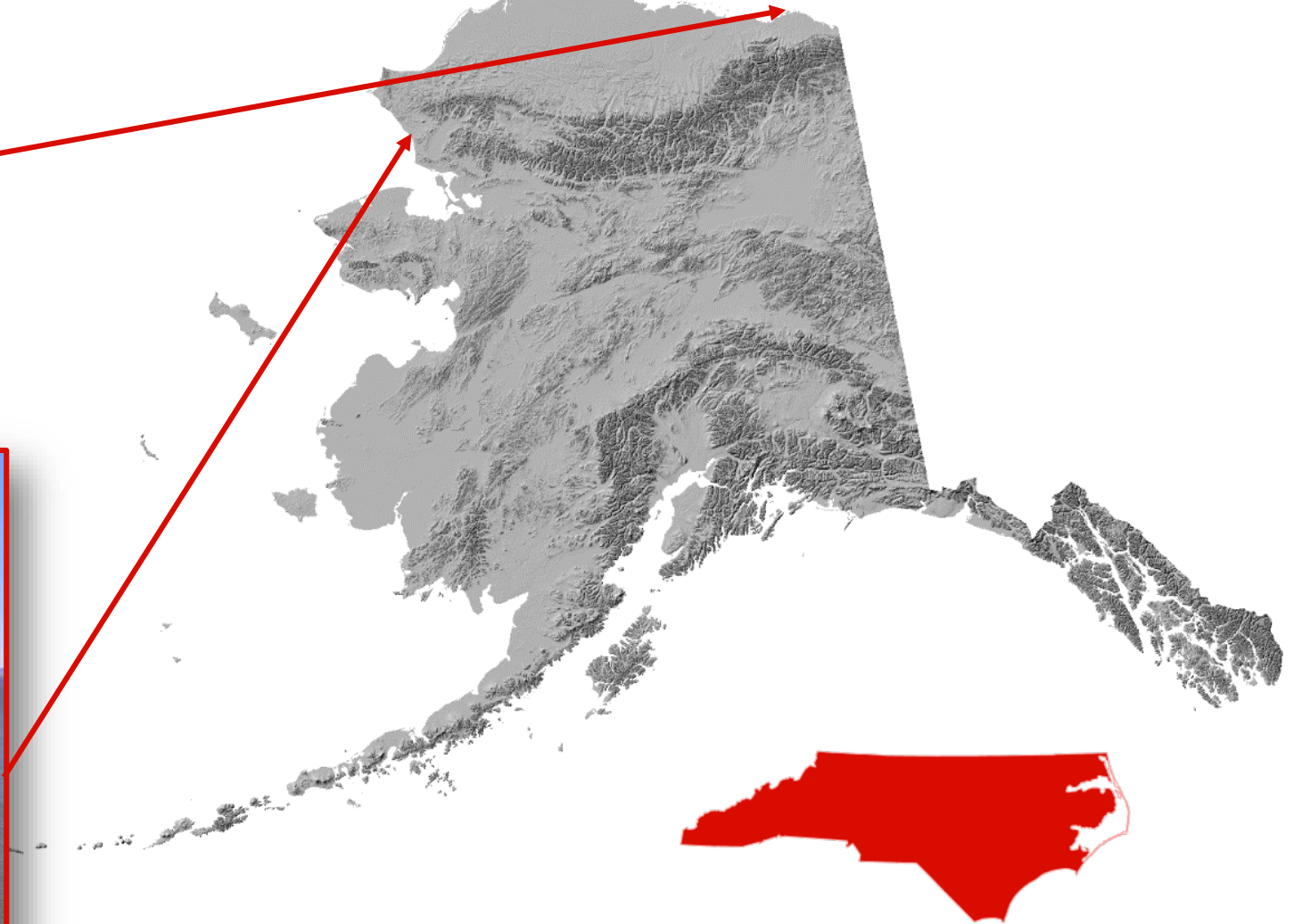
Slide from N. Kinsman 2016

BARRIER ISLANDS OF ALASKA

USGS, 2009



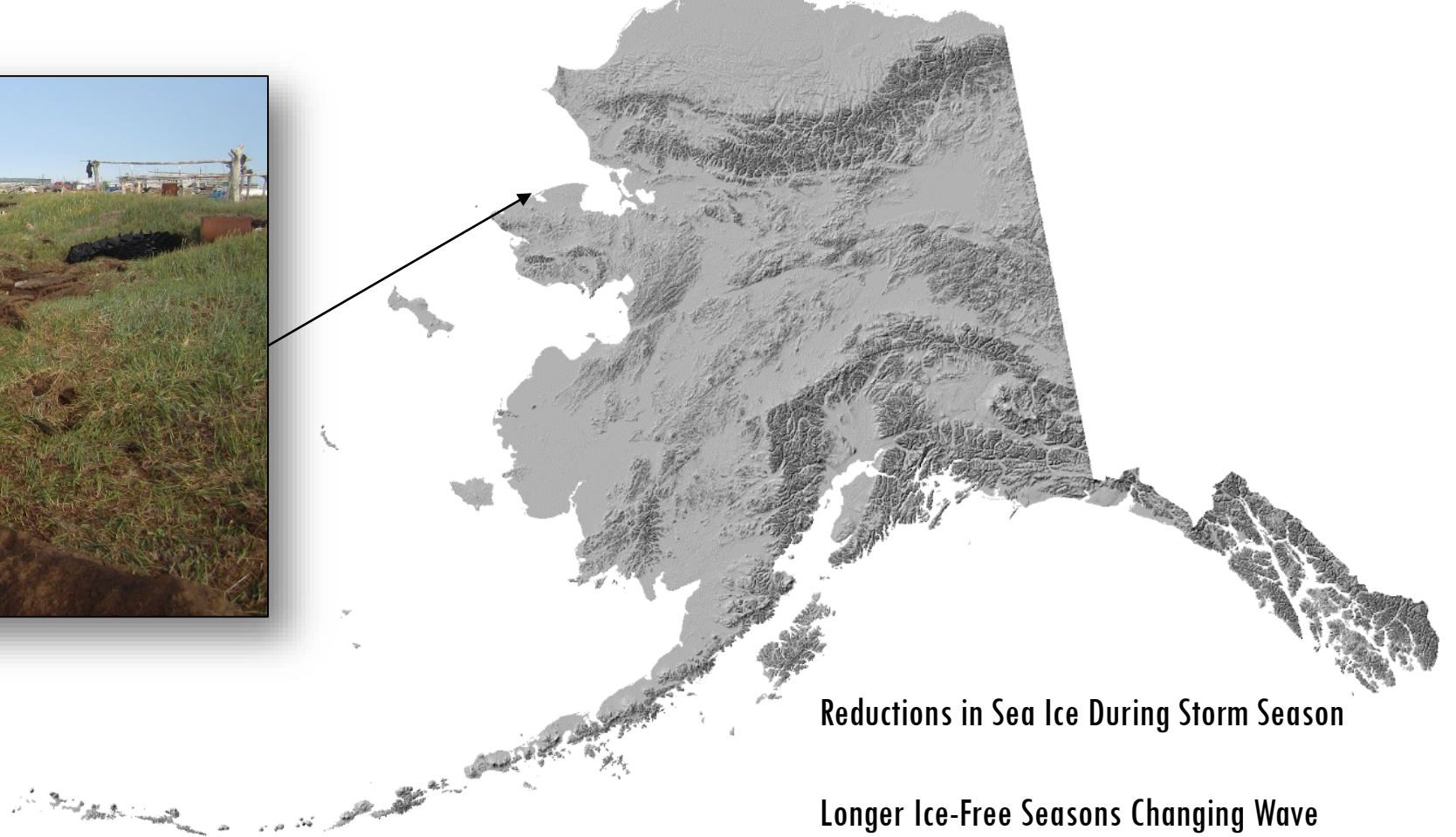
ShoreZone, 2012



Slide from N. Kinsman 2016

BARRIER ISLANDS OF ALASKA

Shishmaref, 2012

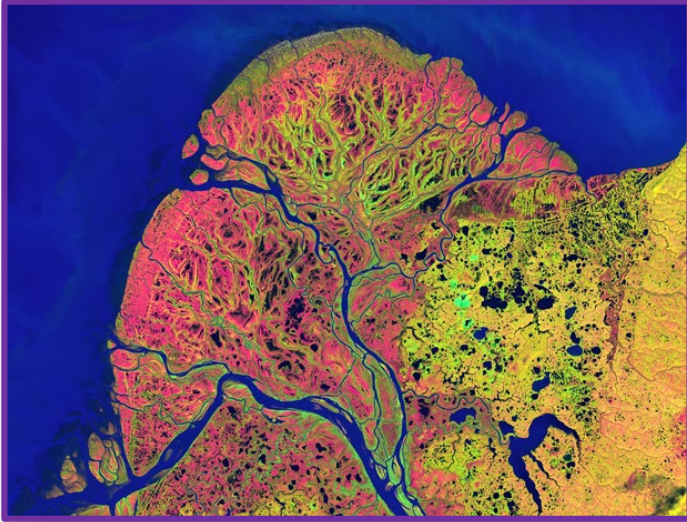


Reductions in Sea Ice During Storm Season

Longer Ice-Free Seasons Changing Wave
Climate

Erosion of Backshore Lagoons Increasing
Tidal Prisms

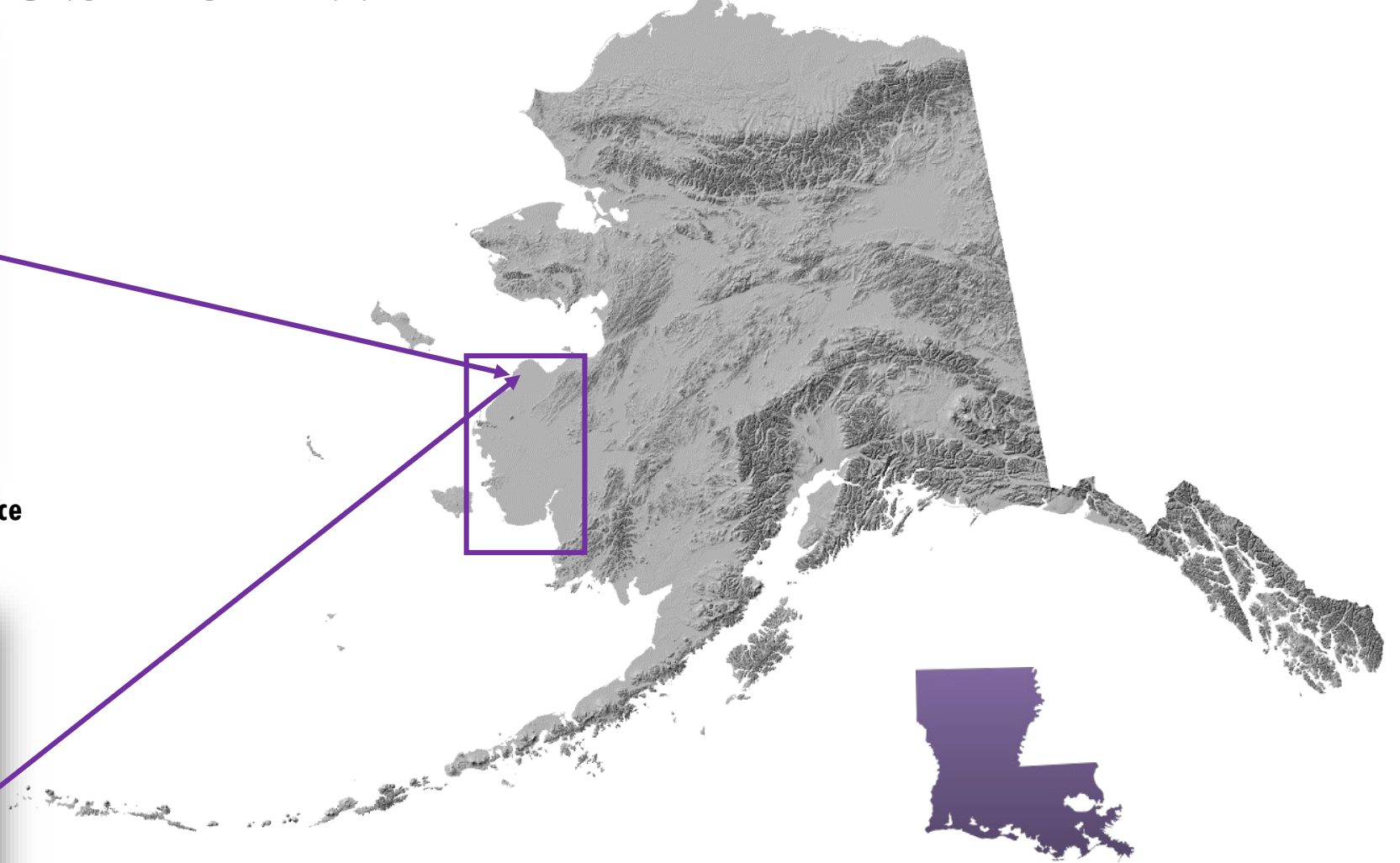
THE YUKON-KUSKOKWIM DELTA



Yukon Delta (Landsat 7, 2002, NASA Goddard Space Flight Center/USGS)



ShoreZone, 2014



Slide from N. Kinsman 2016

THE YUKON-KUSKOKWIM DELTA



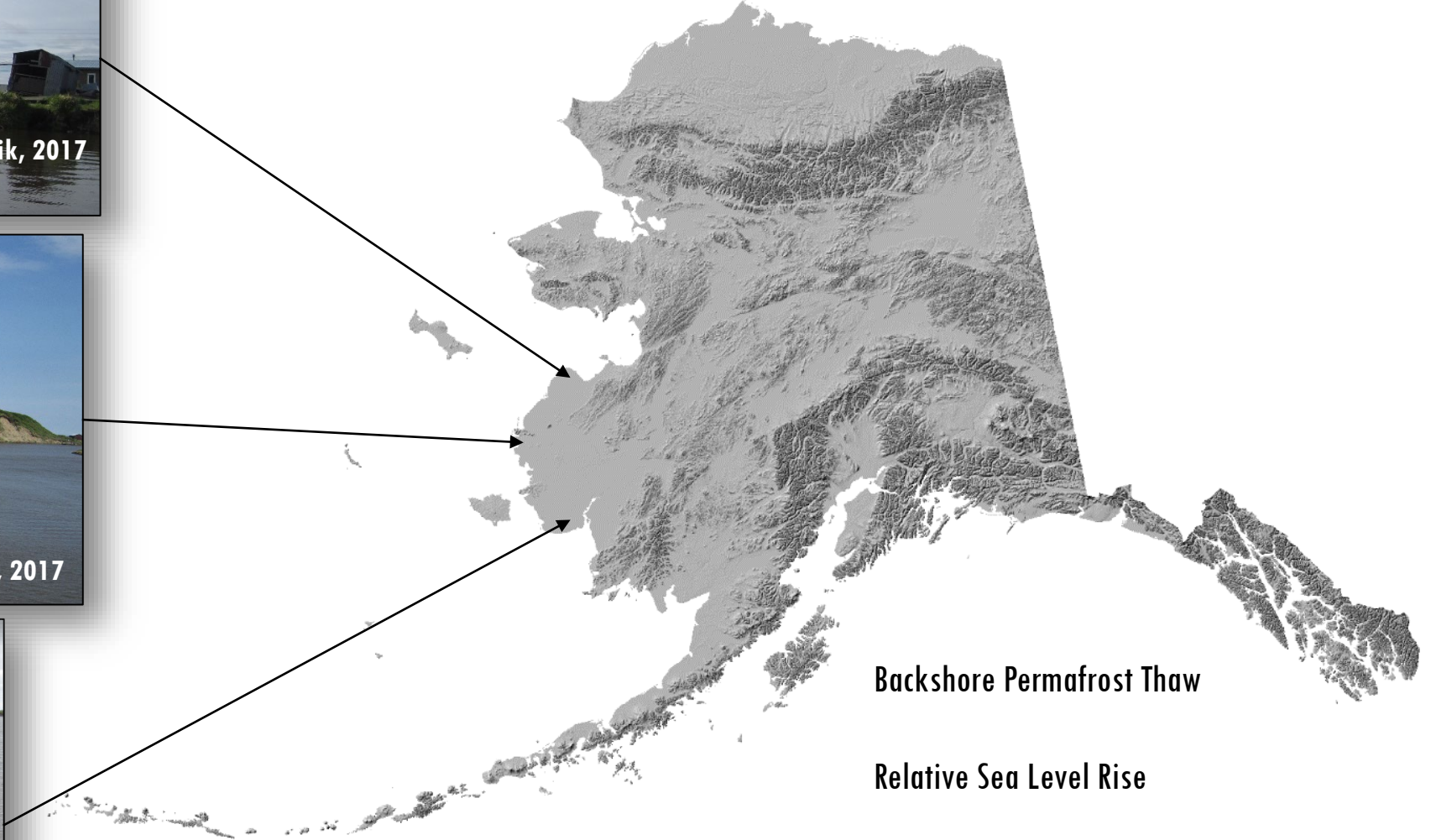
Kotlik, 2017



Chevak, 2017



Kwigillingok, 2017



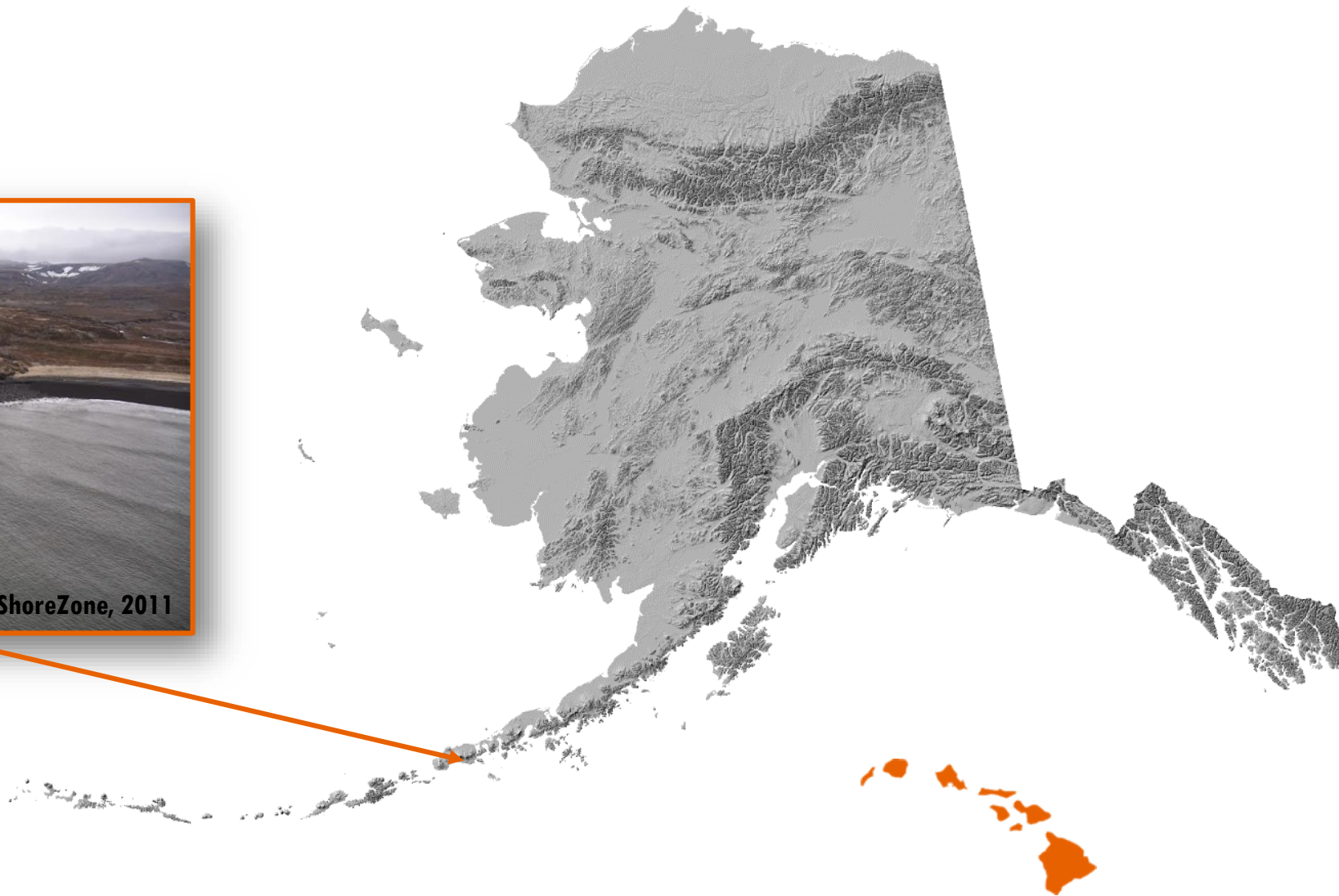
Backshore Permafrost Thaw

Relative Sea Level Rise

Reductions in Sea Ice During Storm Season

Channel Migration of Coastal Rivers

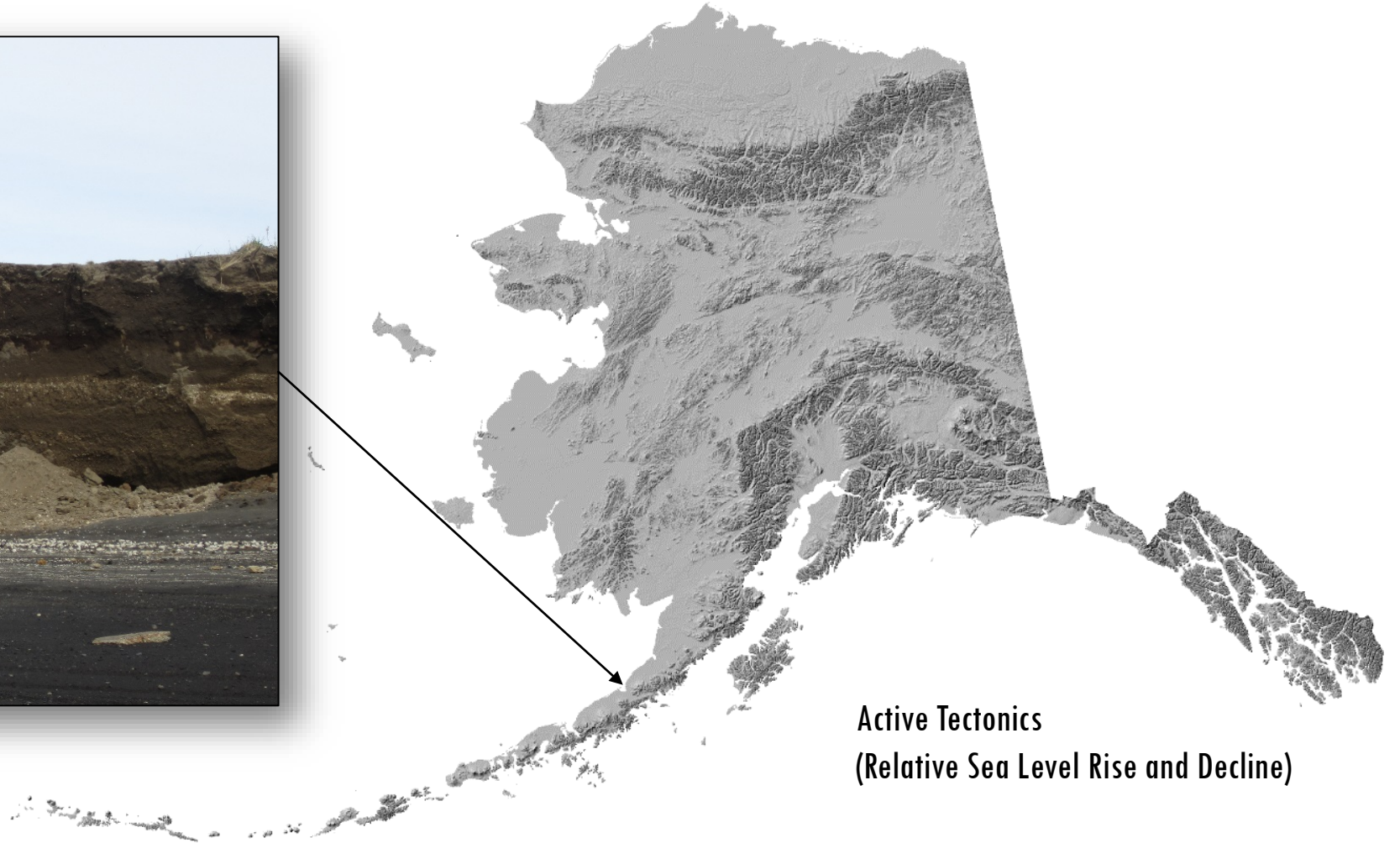
VOLCANIC COASTLINES OF ALASKA



Slide from N. Kinsman 2016

VOLCANIC COASTLINES OF ALASKA

Port Heiden, 2017

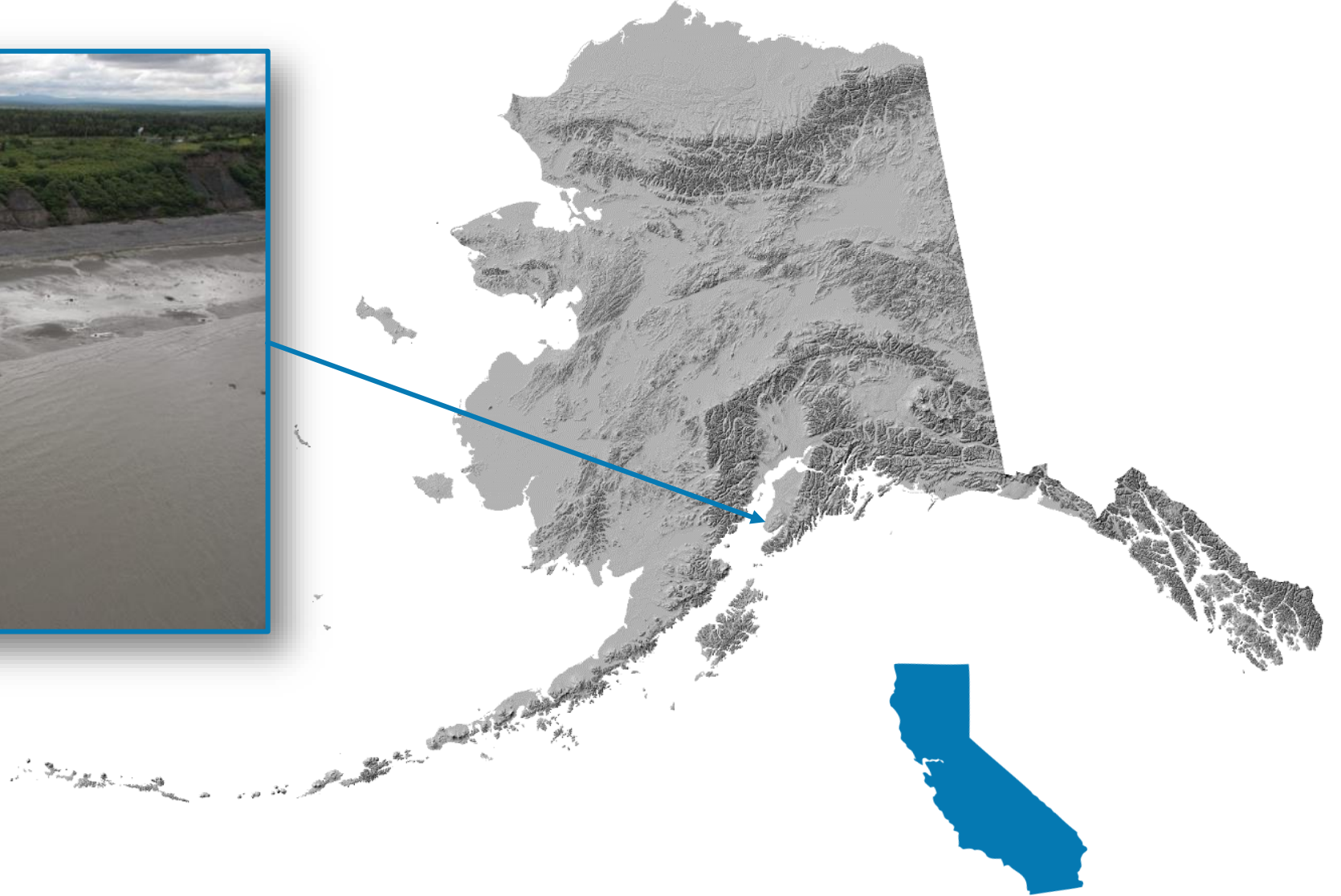


Active Tectonics
(Relative Sea Level Rise and Decline)

Reductions in Sea Ice During Storm Season

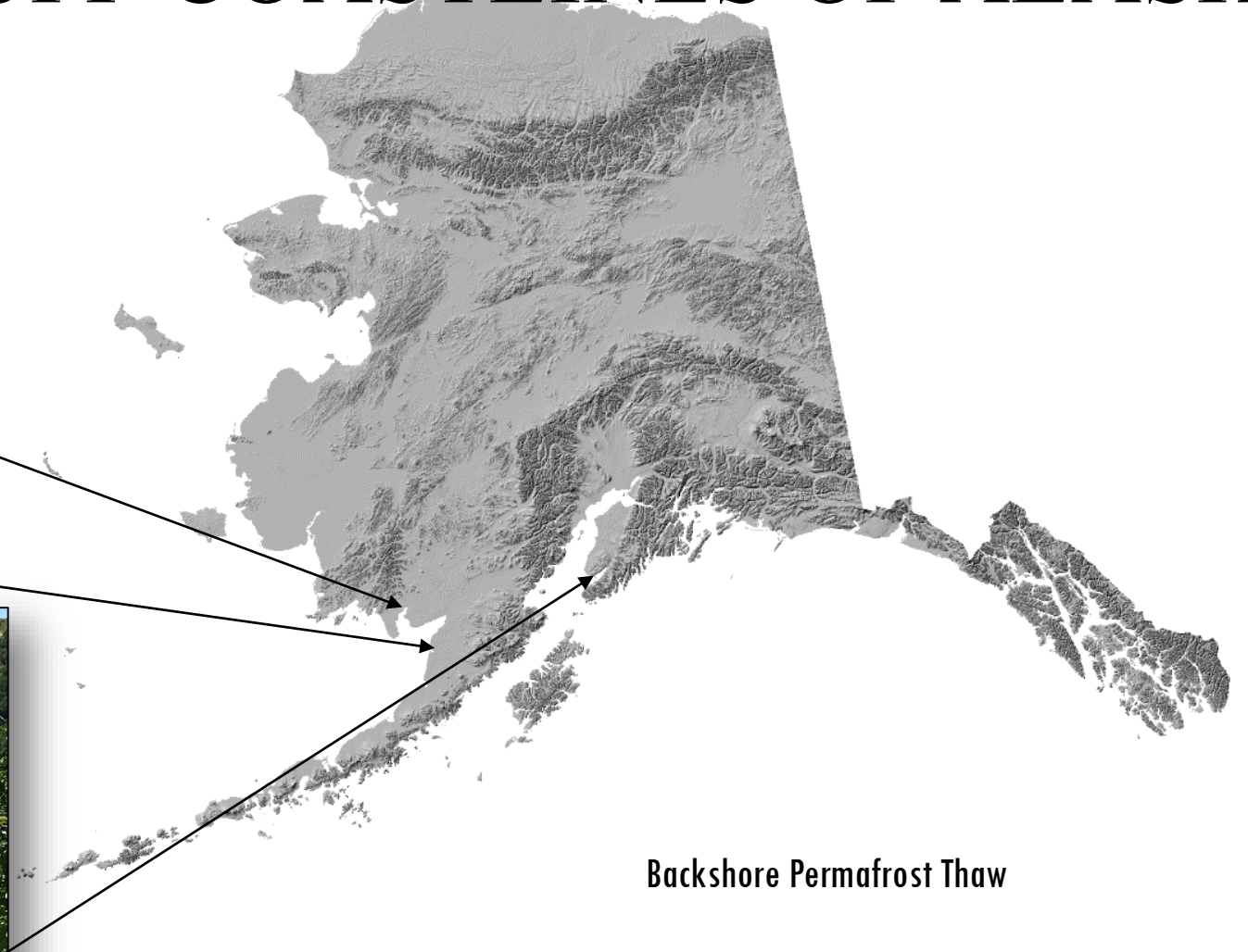
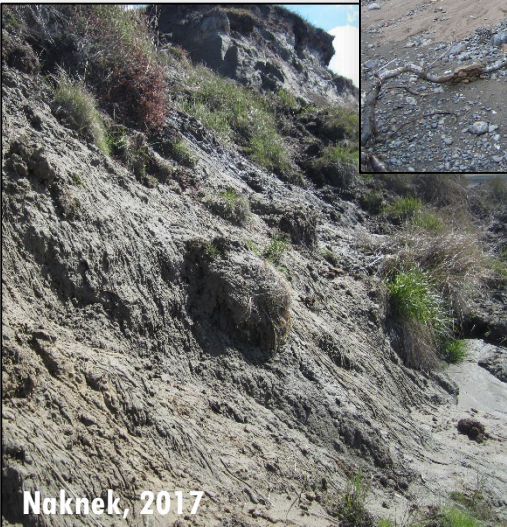
Loose Volcanic Sediments Erode Easily

BLUFF COASTLINES OF ALASKA



Slide from N. Kinsman 2016

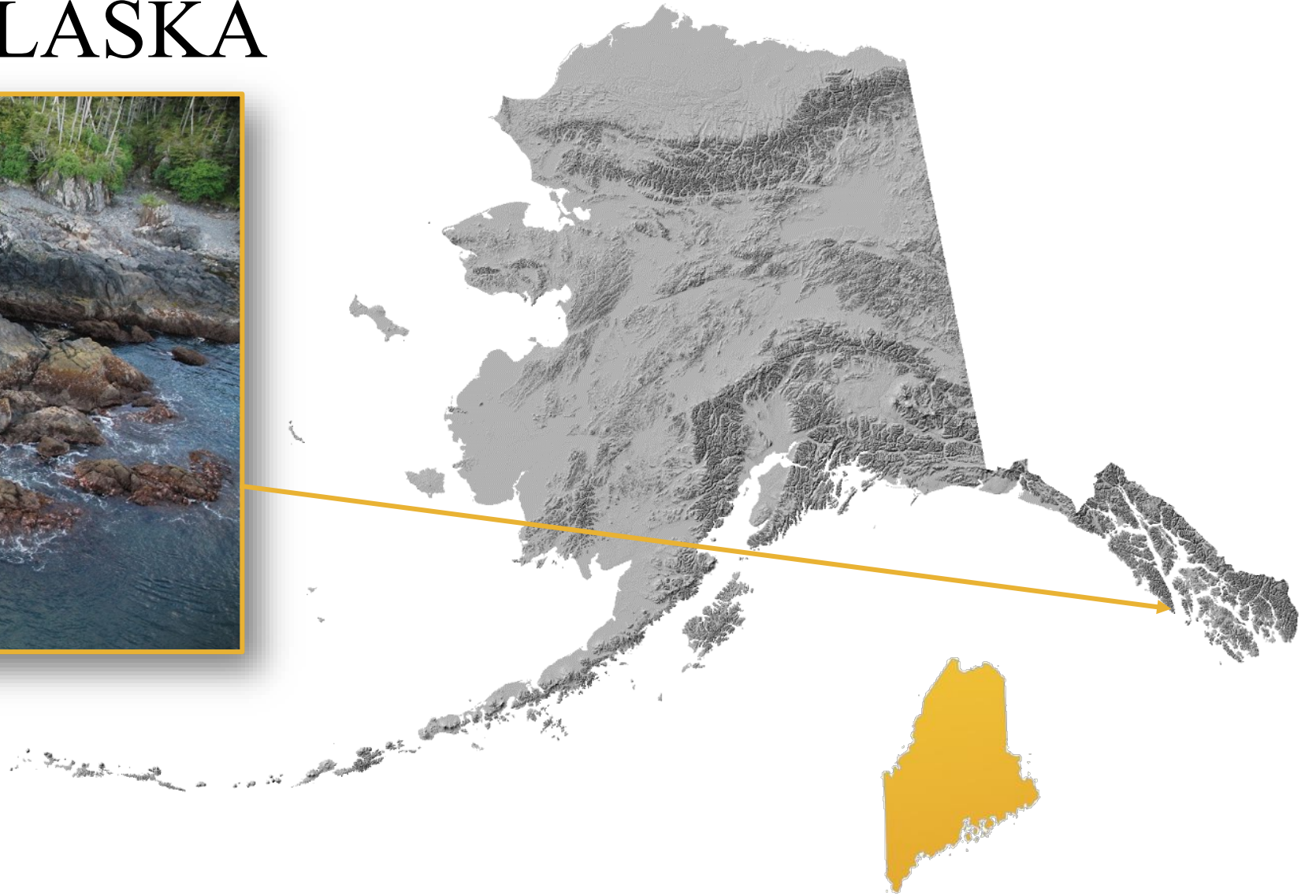
BLUFF COASTLINES OF ALASKA



Backshore Permafrost Thaw

Groundwater Discharge Through Steep
Slope with Fine Materials

SOUTHEAST ALASKA

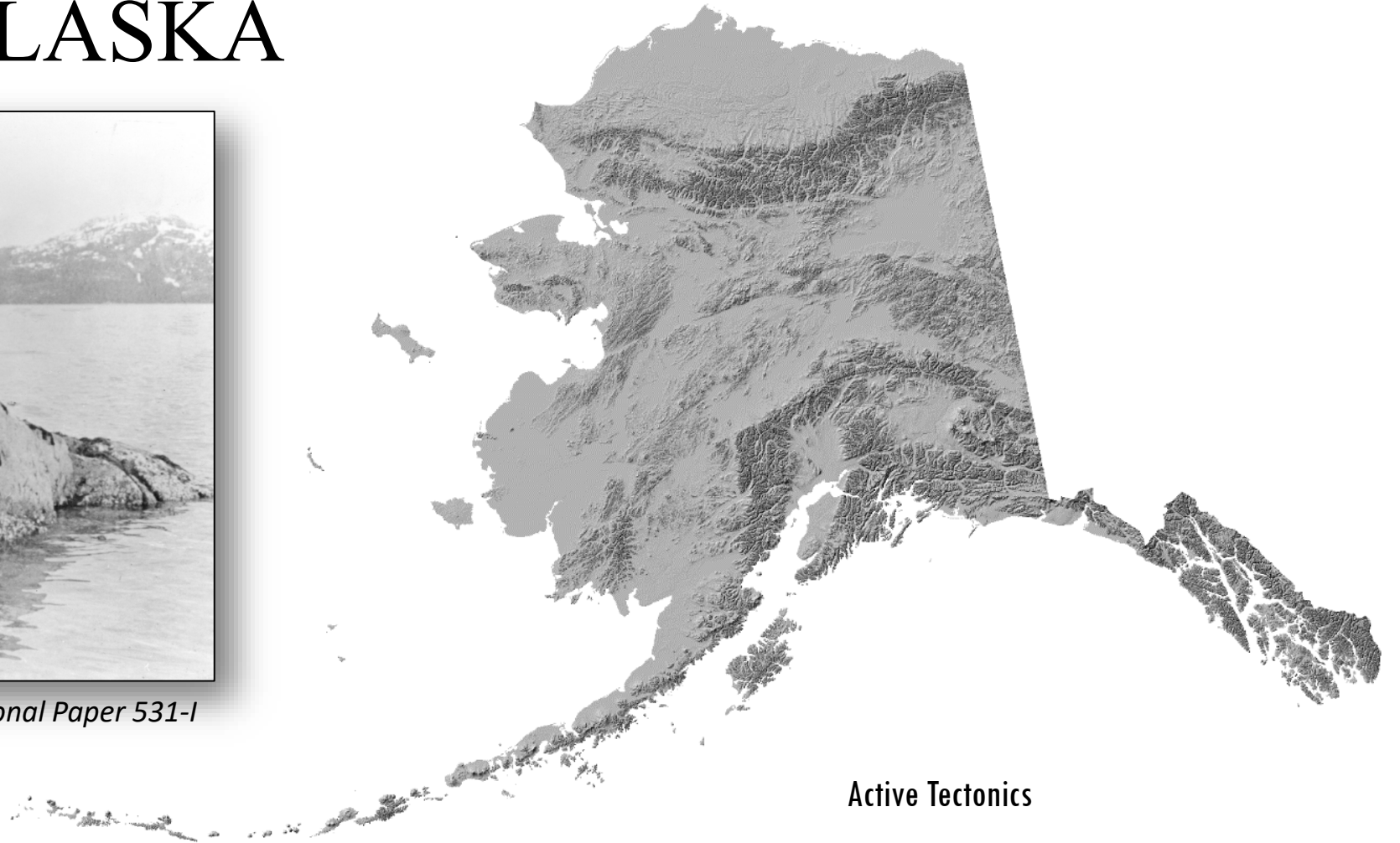


Slide from N. Kinsman 2016

SOUTHEAST ALASKA



USGS Professional Paper 531-I



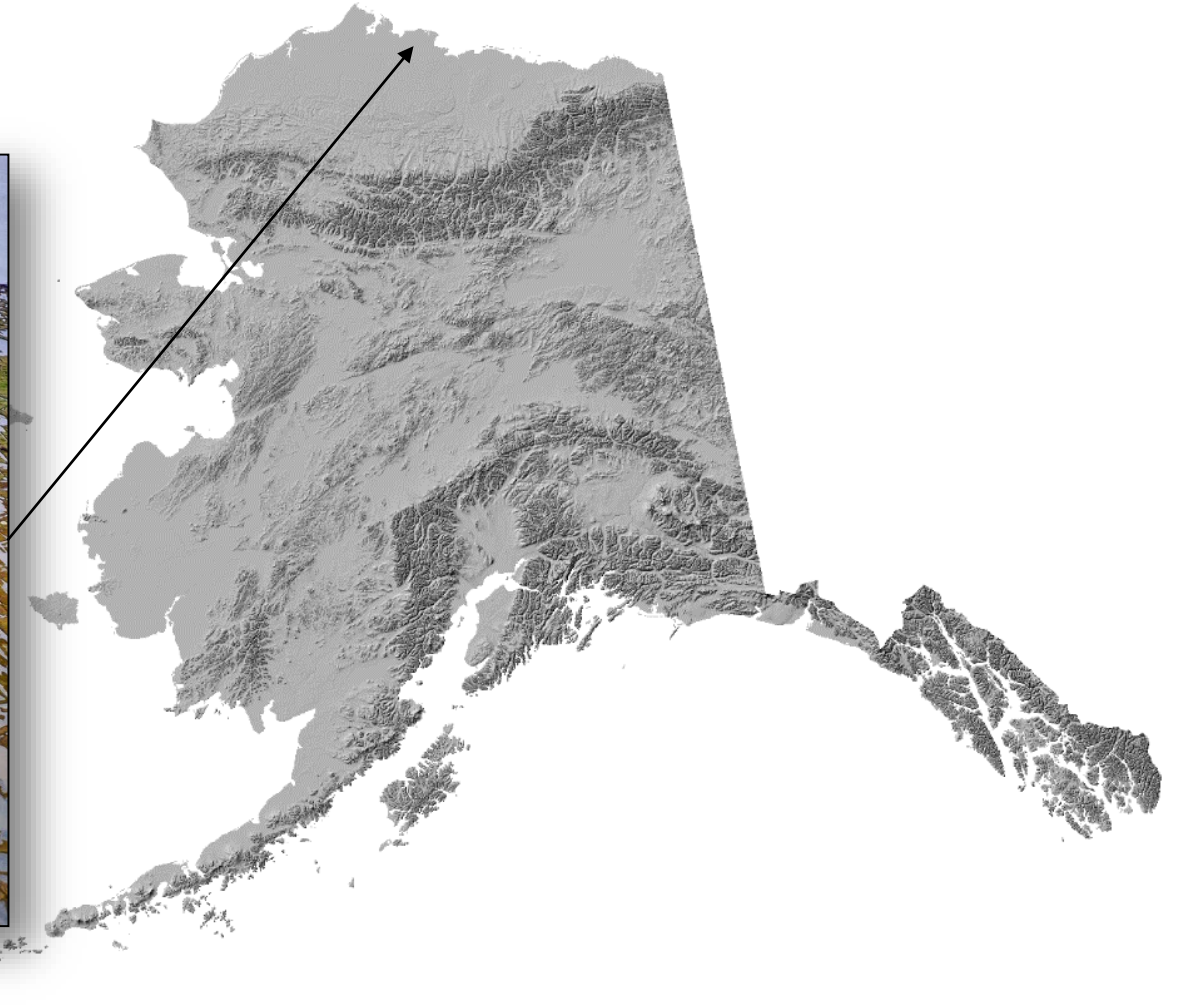
Active Tectonics

Isostatic Rebound (Relative Sea Level Decline)

THE NORTH SLOPE



ShoreZone, 2012

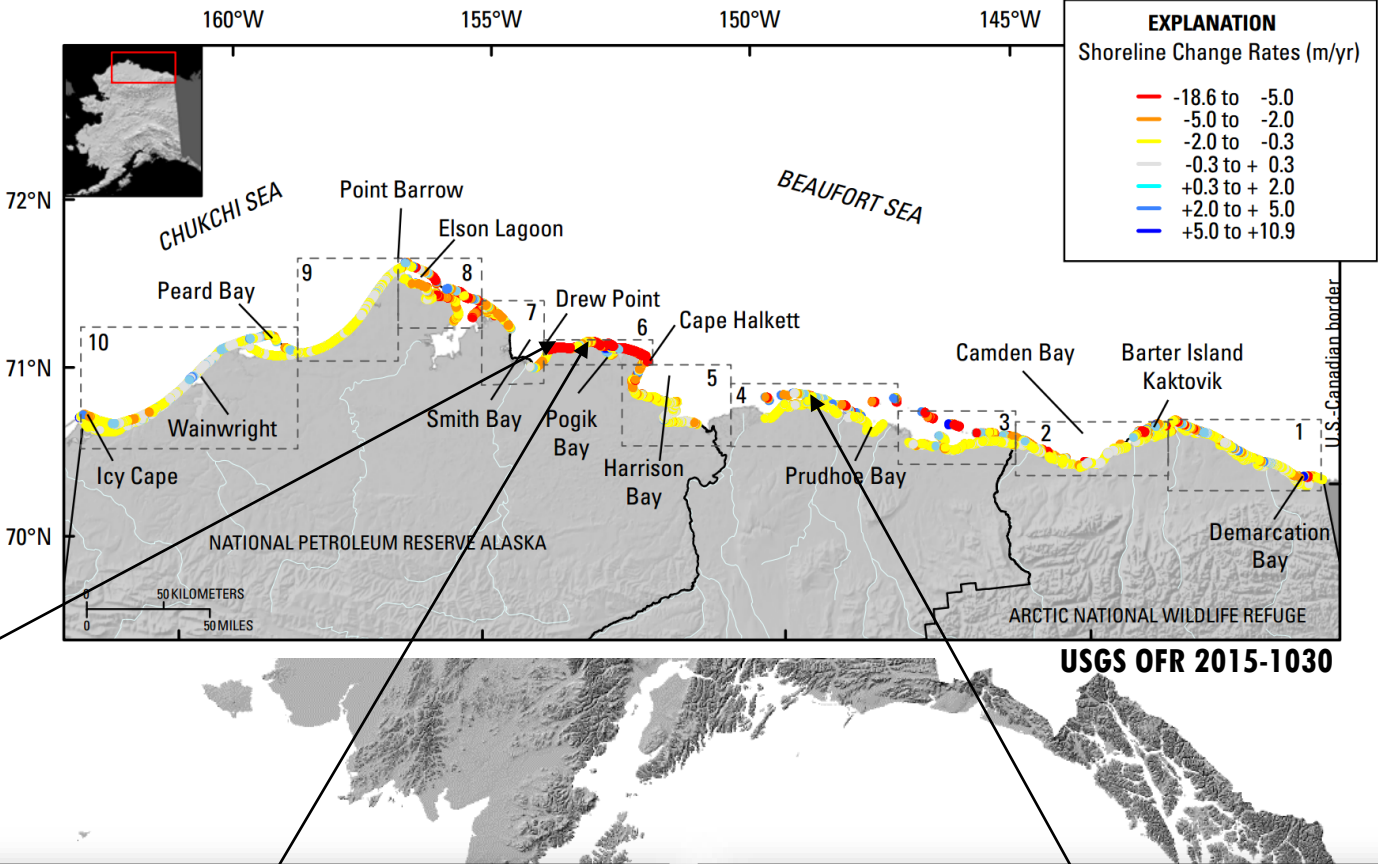


THE NORTH SLOPE

Niche Erosion/ Block Collapse

Bluff Face Thaw/Slump
Thermokarst

Backshore Permafrost Thaw



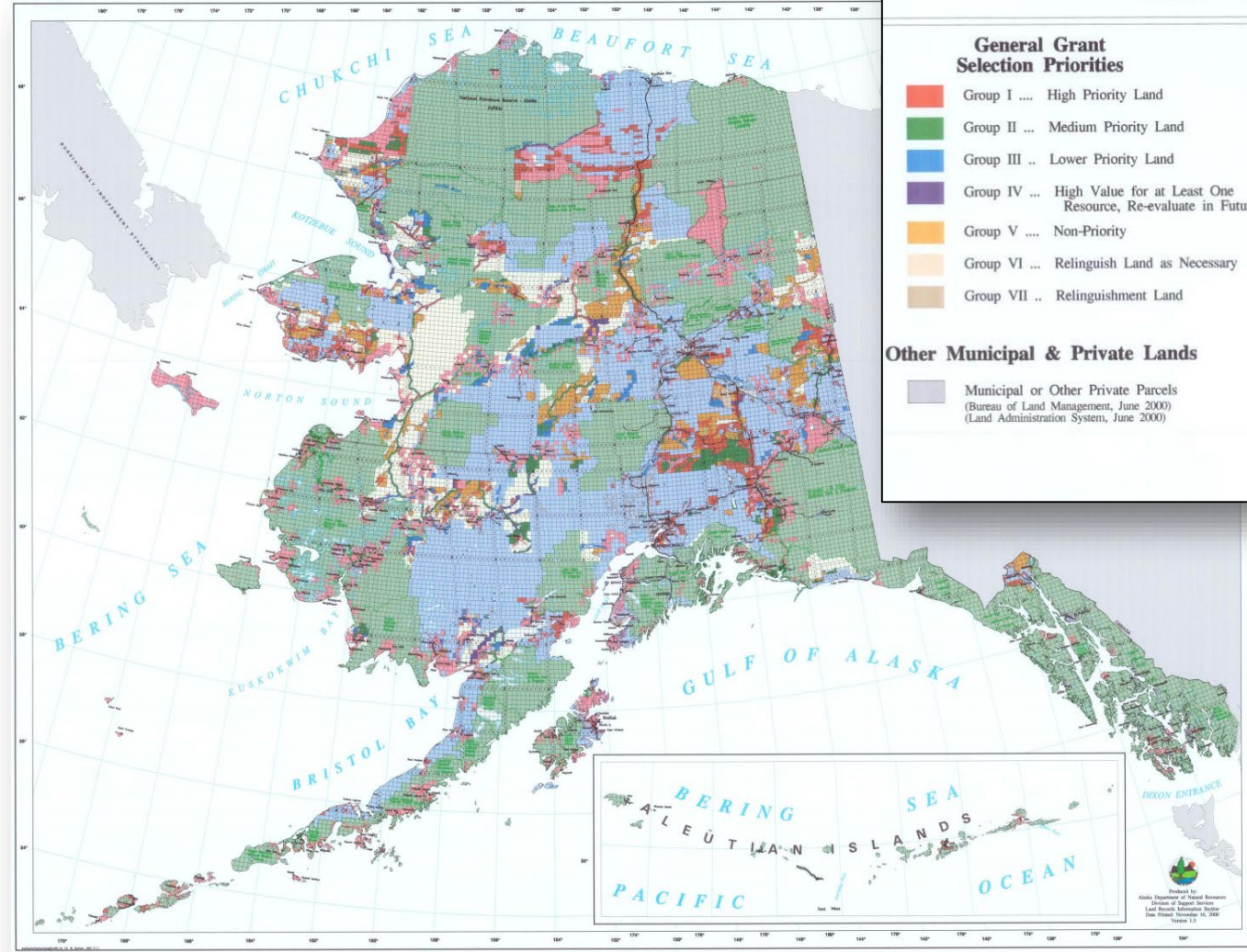
COASTLINES OF ALASKA

Erosion at community infrastructure, cemeteries, subsistence hunting and gathering grounds.
Relative sea level **inundation** and **exposure** of coastal infrastructure.

Land Ownership

State 24.5%
Federal 65%
Native 10%
Private <1%

Much of the Erosion and Processes Leading to Erosion Remain Undocumented Due to **Minimal Monitoring Equipment** Such as Tide Gauges and Remote Sensing Surveys.



State of Alaska Department of Natural Resources



Additional photos and content provided by Nicole Kinsman, Shorezone, U.S. Geological Survey, and Richard Buzard.



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