THE STATE of ALASKA

GOVERNOR MICHAEL J. DUNLEAVY

# Alaska Coastal Resilience Partnership

## Partnering to Support Alaska's Environmentally Threatened Communities

Sally Russell Cox

What's all this I Hear about Sustainability, Resilience, & Climate Change?

*Initiatives at the State-Level, National APA & in the Divisions*

June 16, 2021

# Alaska by the Numbers

Alaska is **1/5** the size of the contiguous Lower 48


66% of all Federally Recognized Tribes are in Alaska


**200** of Alaska's **336** communities are off the road system

The average rural community population in Alaska


Each year the average rural Alaskan harvests **295 pounds** of food from the land and waters

In February 2020, the cost of gas in Noatak, AK was **$10/gallon**


**95 %** of the **144** environmentally threatened communities facing infrastructure impacts from erosion, flooding and permafrost thaw are small and low-income

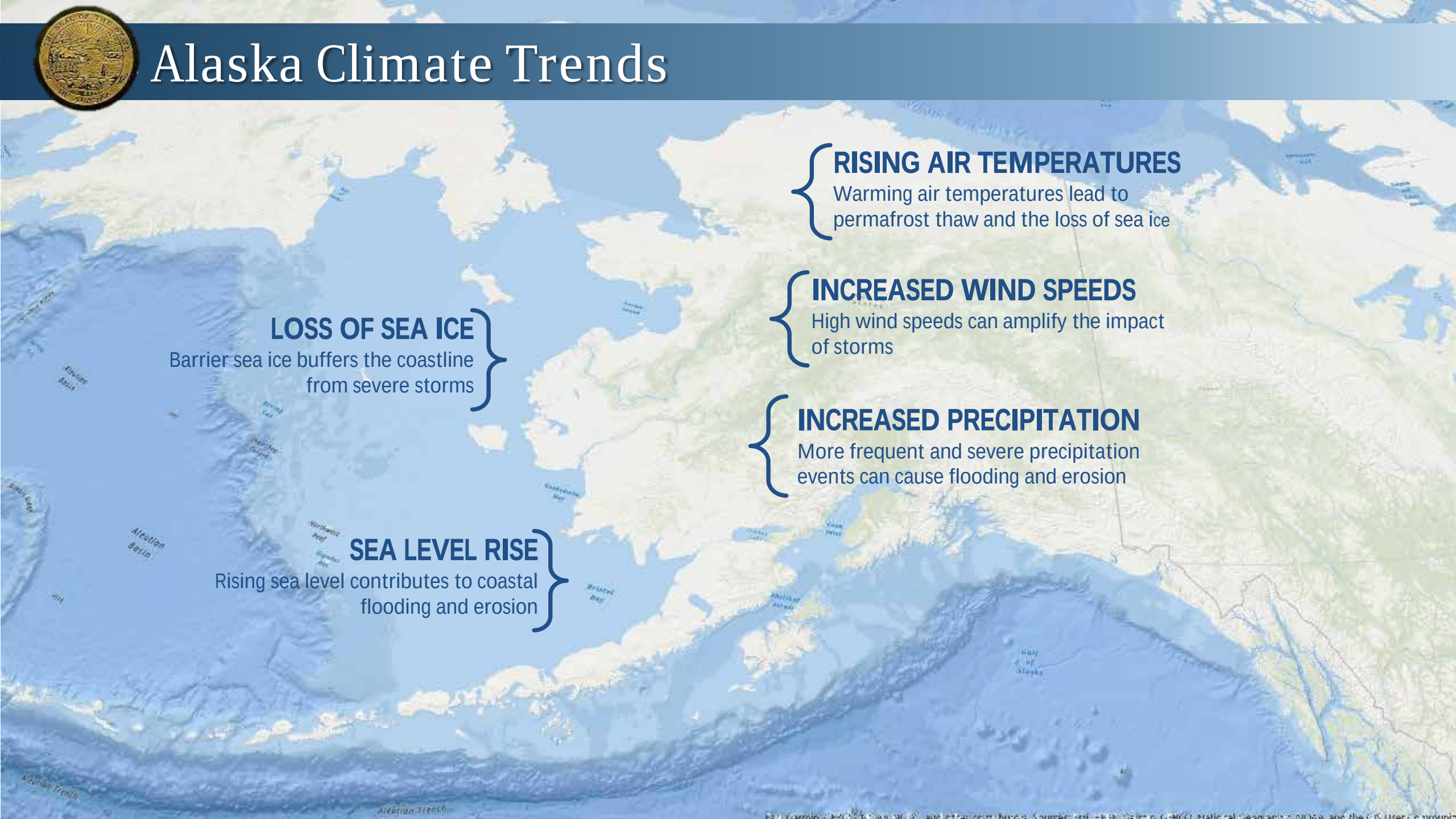
*Adapted with permission from the Alaska Climate Adaptation Science Center.*

# Indigenous Peoples and Languages of Alaska

- 11 distinct cultures
- At least 20 languages among those cultures


***Map:*** *Alaska Native Language Center and University of Alaska Institute of Social & Economic Research*

# Alaska Climate Trends



## RISING AIR TEMPERATURES

Warming air temperatures lead to permafrost thaw and the loss of sea ice

## INCREASED WIND SPEEDS

High wind speeds can amplify the impact of storms

## INCREASED PRECIPITATION

More frequent and severe precipitation events can cause flooding and erosion

## LOSS OF SEA ICE

Barrier sea ice buffers the coastline from severe storms

## SEA LEVEL RISE

Rising sea level contributes to coastal flooding and erosion

# Flooding

Ice Jam Flood in Galena, 2013

**Photo**: National Weather Service

# Erosion

Newtok, Summer 2006

**Photo**: Village Safe Water Program

Newtok, Summer 2019

**Photo**: Alaska Native Tribal Health Consortium

# Thawing Permafrost

Thawing Permafrost turns Kongiganak cemetery into swamp, 2017

**Photo**: Alamy

# Challenges & Vulnerabilities of Rural Alaska

## Development Costs

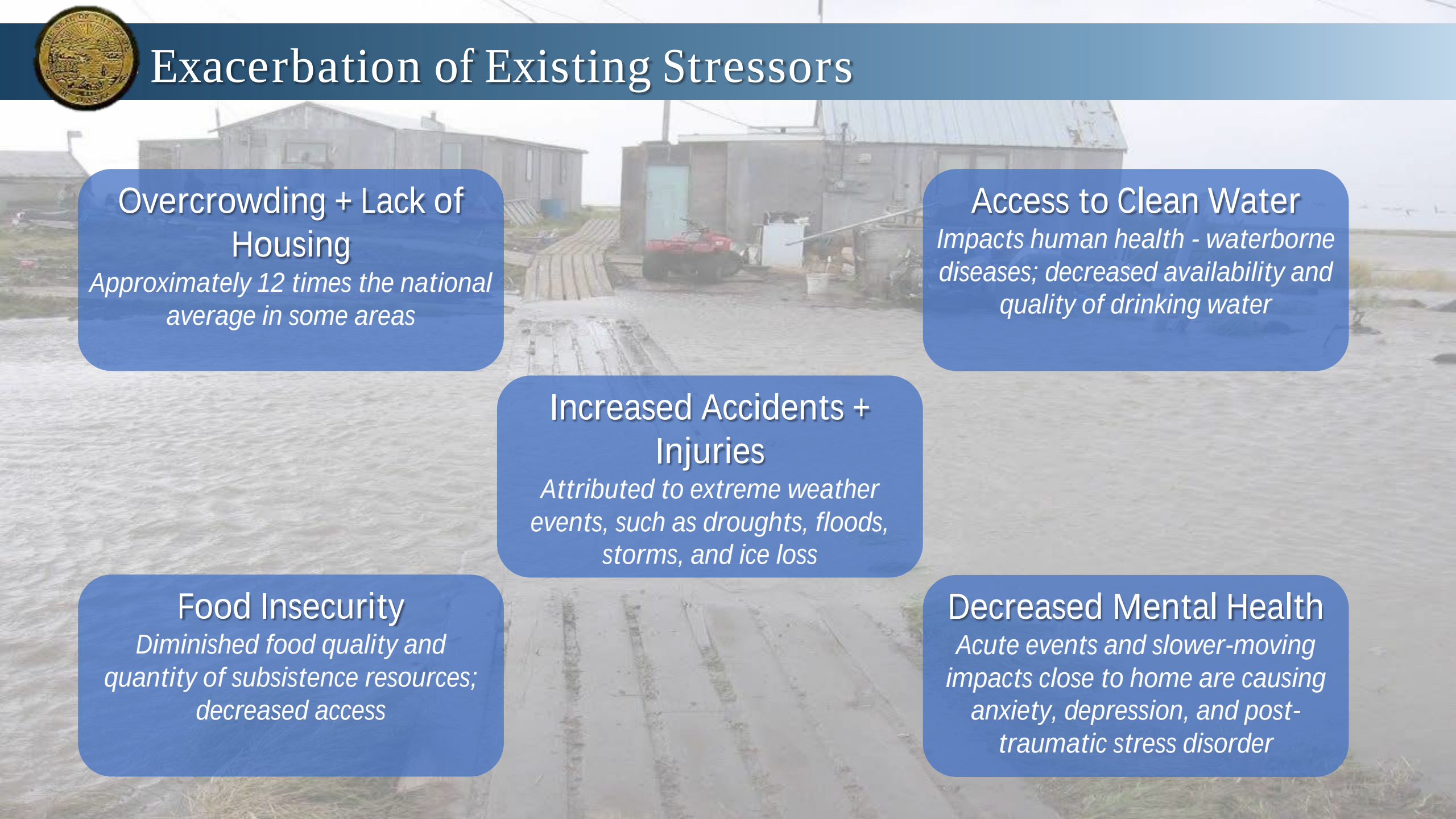
- *High transportation costs due to the vast distances between villages*
- *Lack of roads - about 60 % of Alaska's communities are not connected by roads*
- *Lack of local resources (gravel) for projects*
- *Harsh temperatures*
- *Shortage of remote construction workers*

Level of technical expertise required for most projects

Lack of redundancy in physical infrastructure systems

Limited communication infrastructure

# Exacerbation of Existing Stressors



## Overcrowding + Lack of Housing

*Approximately 12 times the national average in some areas*

## Access to Clean Water

*Impacts human health - waterborne diseases; decreased availability and quality of drinking water*

## Increased Accidents + Injuries

*Attributed to extreme weather events, such as droughts, floods, storms, and ice loss*

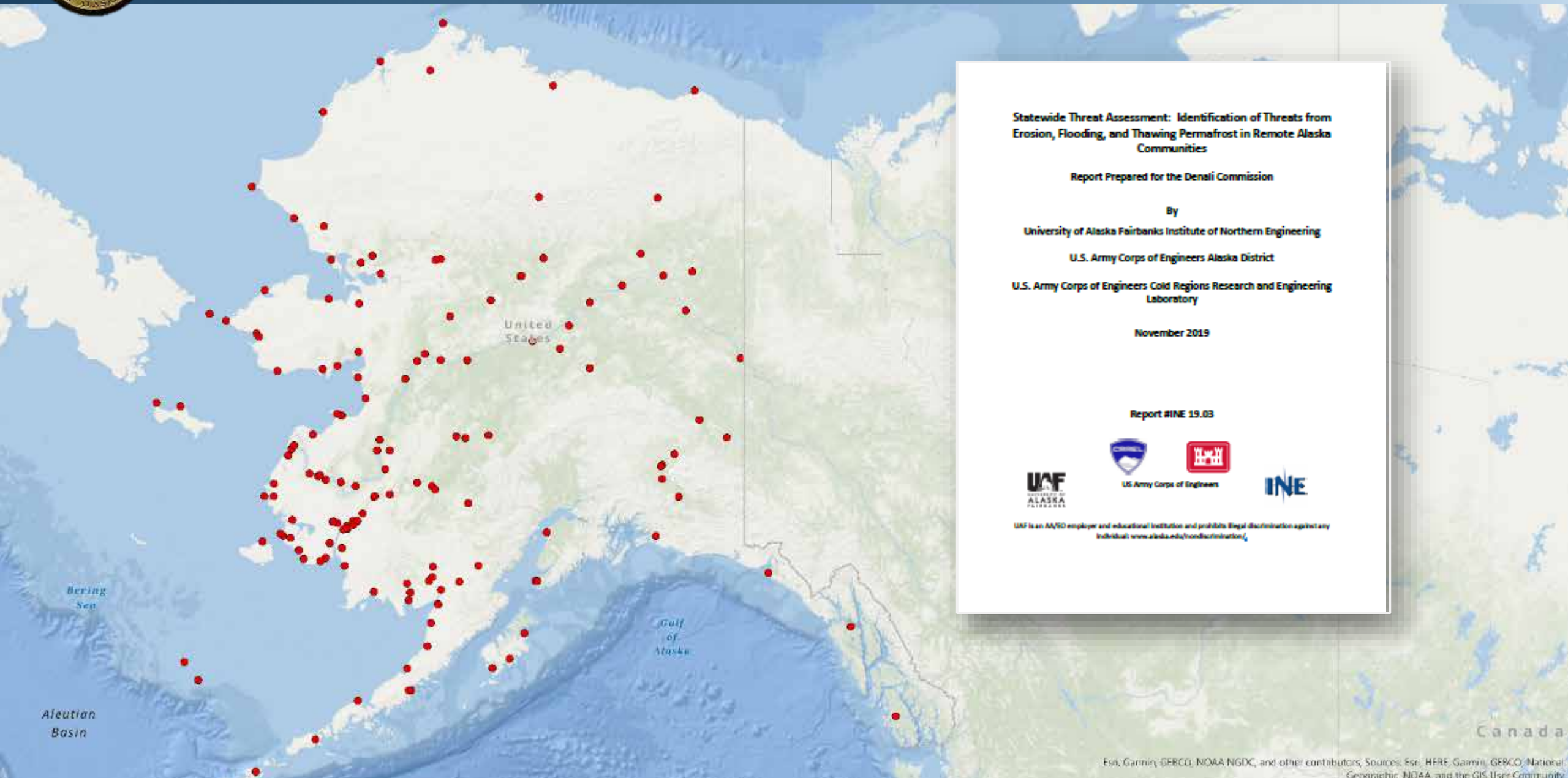
## Food Insecurity

*Diminished food quality and quantity of subsistence resources; decreased access*

## Decreased Mental Health

*Acute events and slower-moving impacts close to home are causing anxiety, depression, and post-traumatic stress disorder*

# 2019 Alaska Statewide Threat Assessment




**Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities**

**Report Prepared for the Denali Commission**

**By**

**University of Alaska Fairbanks Institute of Northern Engineering**

**U.S. Army Corps of Engineers Alaska District**

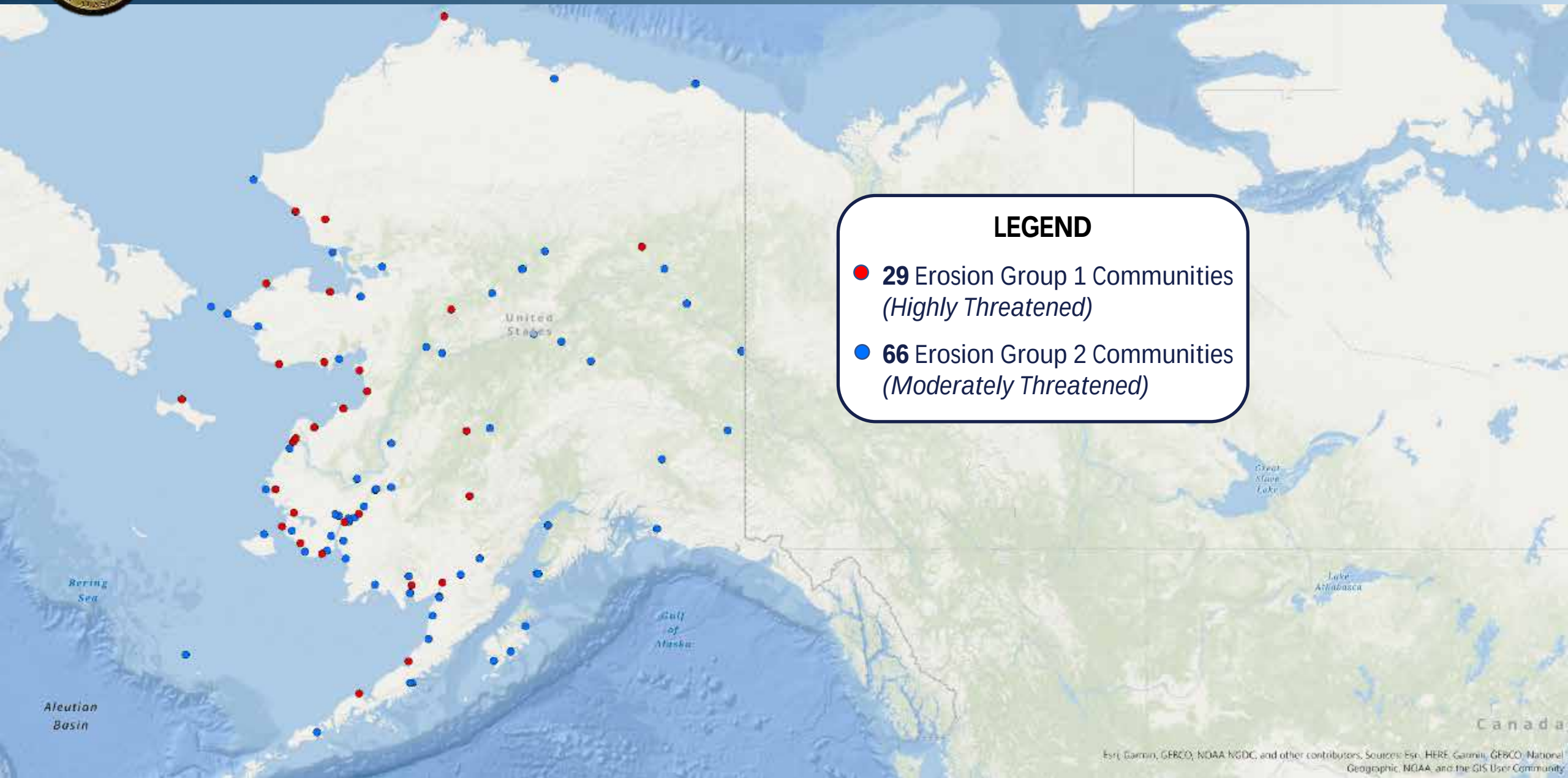
**U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory**

**November 2019**

**Report #INE 19.03**

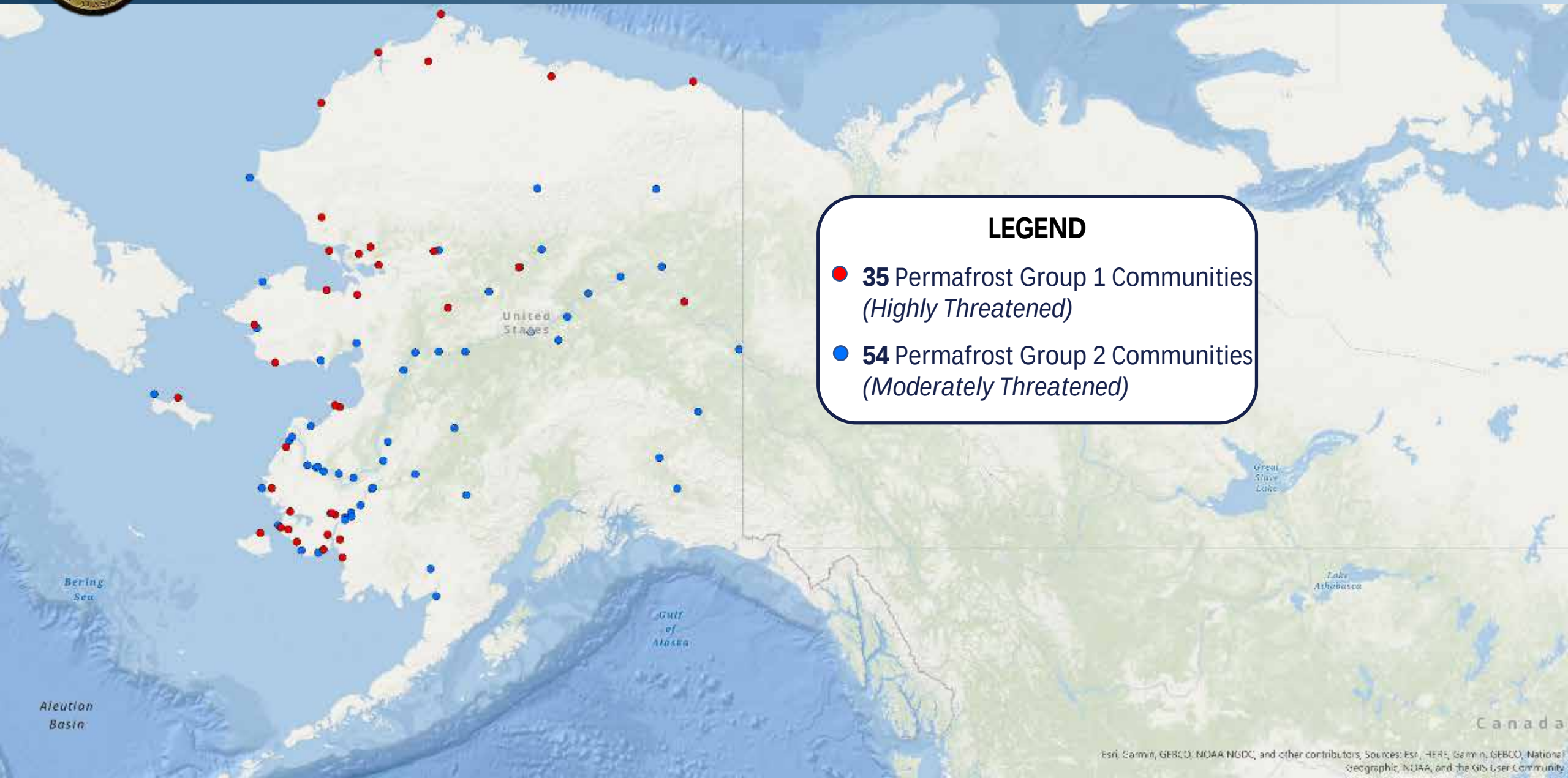
US Army Corps of Engineers

# 95 Erosion Group 1 & 2 Communities



# 93 Flood Group 1 & 2 Communities

# 89 Permafrost Group 1 & 2 Communities



**Protection-in-place:** The use of shoreline protection measures and other controls to prevent or minimize impacts. These measures allow the community to remain in its current location.

**Managed retreat:** Moving a portion of the community away from hazard-prone areas to locations in the community or adjacent to the current site. In order to successfully retreat, a community needs developable land nearby.

**Relocation:** Moving the entire community to a new location that is not connected to the current site. Relocation is the option of last resort.

# Protection-in-Place

Rock revetment in Kivalina

Photo: Alaska ShoreZone

# Managed Retreat

Managed retreat at Napakiak

Photo: city of Napakiak

# Relocation

Newtok’s new village site, Mertarvik

Photo: UMCOR

# Three Phases of Adaptation

## Assess Risk

- Collect site-specific baseline data such as LIDAR, bathymetry, tidal determinations, river currents, sediment transport, flood history, and geotechnical investigations
- Determine the suitability of available climate projections and downscale models if appropriate
- Conduct hazard-specific forecasts such as shoreline mapping, inundation and storm surge modeling, hydrodynamic modeling, permafrost degradation modeling, etc.

## Planning

- Develop strategies to respond to the risks identified in the previous step, accounting for the requirements of individual types of infrastructure, such as power plants, water and sewer distribution lines, barge landing sites, schools, washeterias, community centers and other vital offices or facilities.
- Identify both near-term and long-term solutions.

## Implementation

- Carry out preferred solutions or pathways through locally-managed construction or outside project management contractors.
- Includes permitting, contracting, administrative reporting, and reimbursement processes.

**Local Understanding of Risk** → **Develop Actions to Reduce Risk** → **Increased Local Resilience**

# Partnering to Support Alaska's Environmentally Threatened Communities

*Alaska Native Tribal Health Consortium*

Center for Environmentally Threatened Communities

Grant Writing & Technical Assistance

*Alaska Division of Geological and Geophysical Surveys*

Coastal Hazards Program

Hazard Studies, Modeling & Risk Assessments

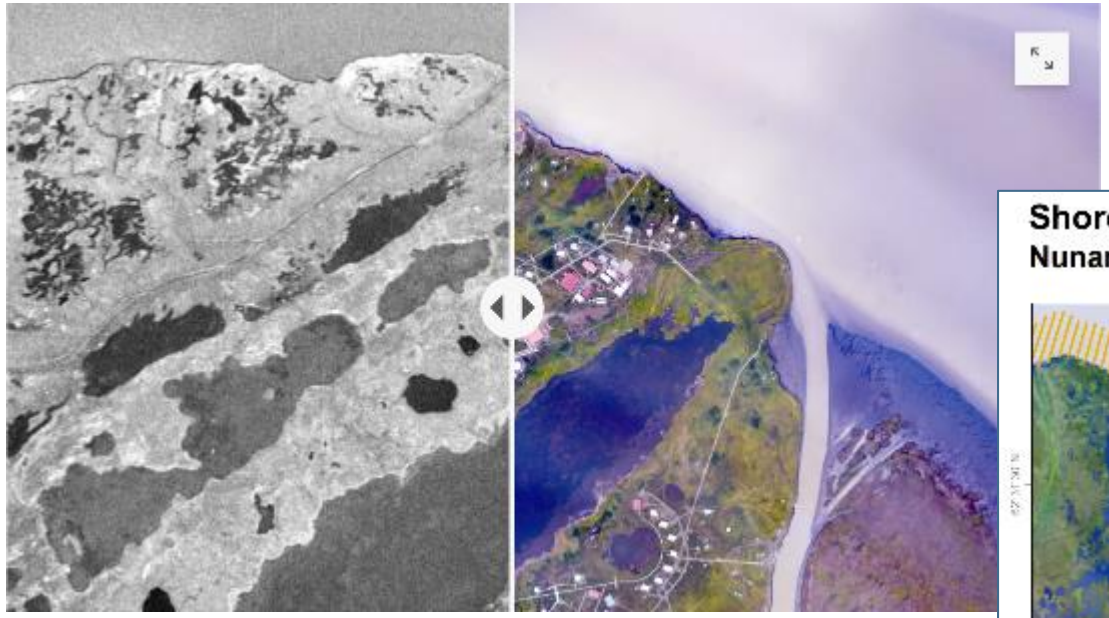
*Alaska Division of Community and Regional Affairs*

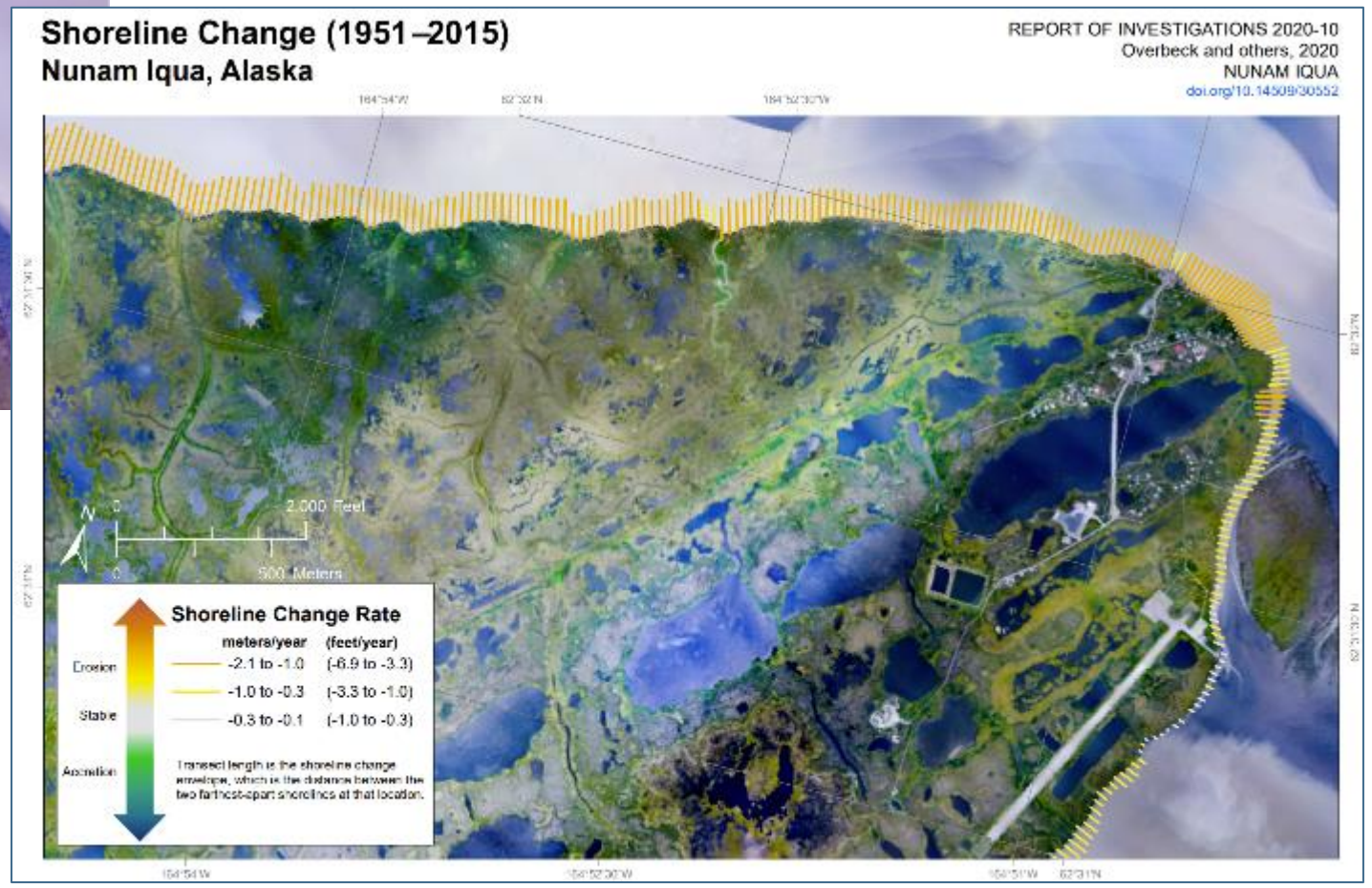
Community Resilience Programs

Risk Assessments, Community Planning & Technical Assistance

Alaska Coastal Resilience Partnership

# Historical Shoreline Change Rate





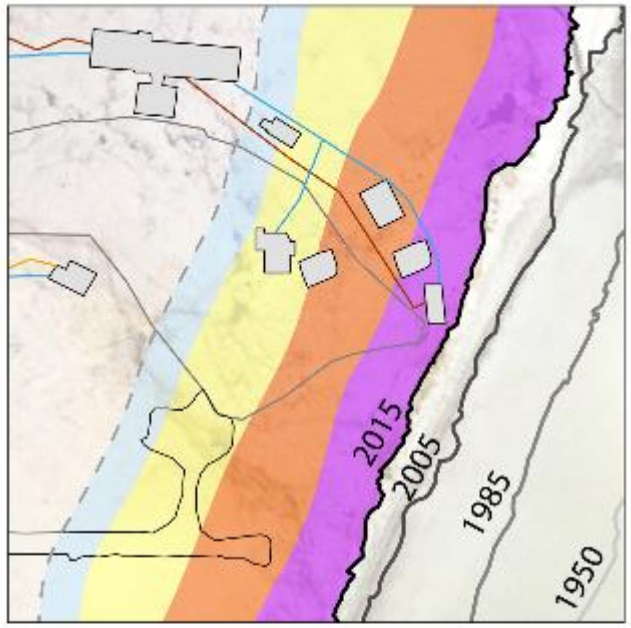
# Baseline Erosion Forecast

Historical Erosion

Erosion Forecast

# Baseline Erosion Forecast

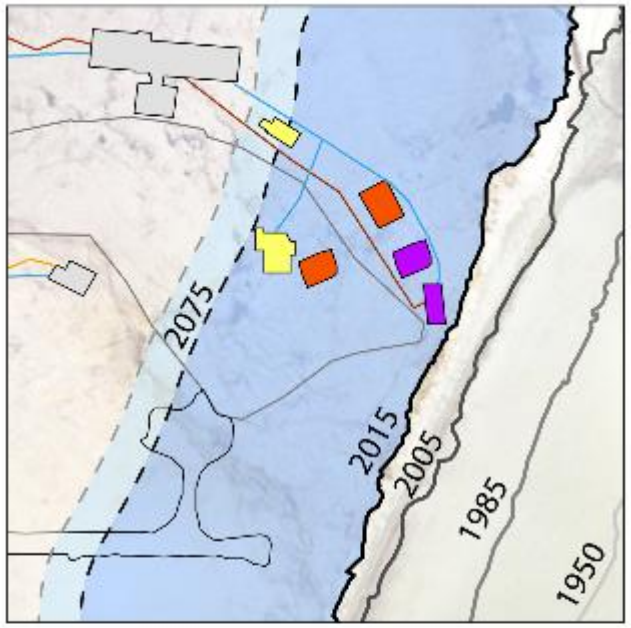
Erosion Forecast Map




Infrastructure
- Power
- Fuel
- Water
- Road
- Building

Extent of Erosion Forecast
- 2015 to 2035
- 2035 to 2055
- 2055 to 2075
- Uncertainty

Erosion Impact Map

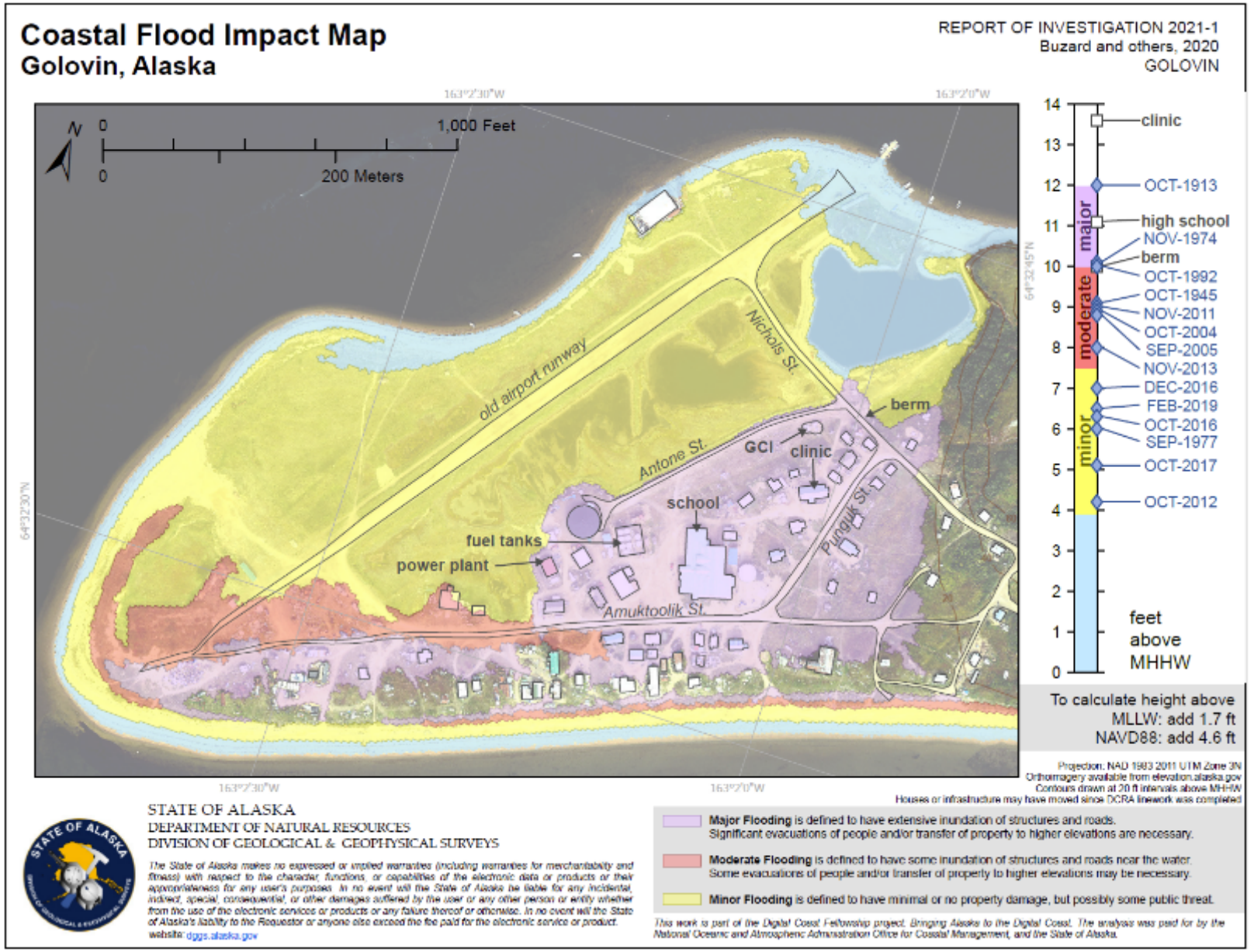



Infrastructure
- Power
- Fuel
- Water
- Road

Buildings Forecast to Erode by Years
- 2015 to 2035
- 2035 to 2055
- 2055 to 2075
- > 2075

Extent of Erosion Forecast
- 2075
- Uncertainty

# Historical Flood Assessment



# Historical Flood Assessment

| | Elevation Feature | Elevation (ft MHHW) | Vertical Uncertainty (ft) | Subject to Wave Runup |
|---|---|---|---|---|
| Other | Wastewater facility | 15.0 | 0.5 | |
| | Airstrip | 14.5 | 1.0 | |
| | Drinking water source | 14.0 | 0.8 | |
| | School | 13.6 | 1.0 | |
| Major | Several buildings | 10.5 | 1.0 | ⛰ |
| | Fuel tanks | 9.8 | 0.5 | ⛰ |
| | **Major** | 9.8 | 0.5 | |
| Moderate | Airstrip use or access | 8.2 | 0.3 | |
| | Access way to larger parts of town | 8.2 | 0.3 | |
| | Lowest residences | 7.0 | 1.0 | ⛰ |
| | **Moderate** | 7.0 | 0.3 | |
| Minor | Lowest building | 7.0 | 0.3 | ⛰ |
| | Access road threatened | 5.5 | 0.8 | ⛰ |
| | Beach property | 5.0 | 0.5 | ⛰ |
| | **Minor** | 5.0 | 0.5 | |

# Community Planning & Technical Assistance

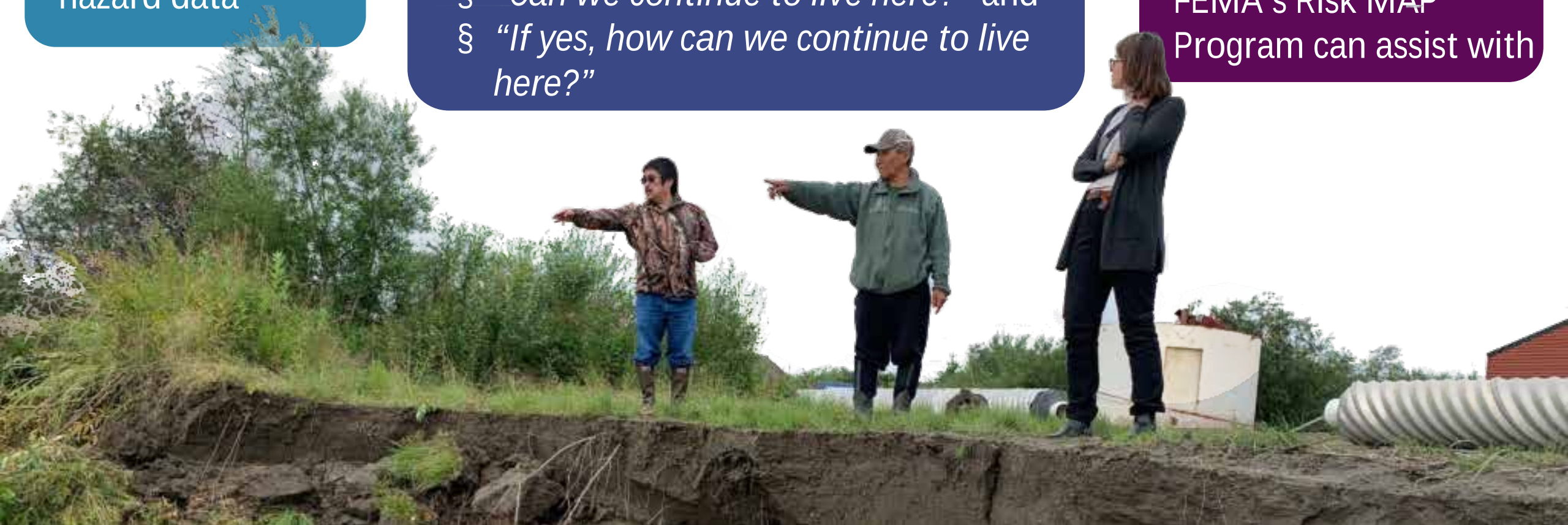

Engage with 14 of the most environmentally threatened communities.

**Pending community consultation*

# Community Engagement + Risk Understanding

## DCRA + ANTHC travel to 14 communities to discuss erosion and flood risk assessments conducted by DGGS

- Support community with interpreting hazard data
- Support community on decisions such as:
  - *"Can we continue to live here?"* and
  - *"If yes, how can we continue to live here?"*
- Identify data and risk assessment gaps that FEMA's Risk MAP Program can assist with



# Community Plan Development

DCRA + ANTHC will support community on assessing adaptation alternatives and selecting preferred alternative

DCRA + ANTHC will support community on turning solutions into fundable projects with scope of work, schedule, and budget sufficient for the community to seek funding.

DCRA will support community in developing a written plan to address erosion and flooding. The plan will include a pipeline of fundable projects.

# Project Funding Acquisition

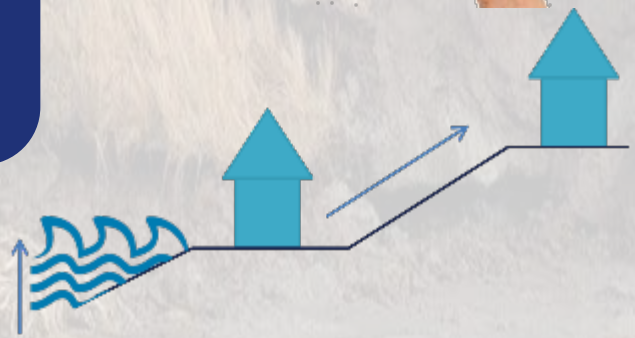
## ANTHC Center for Environmentally Threatened Communities will support communities in:

Securing funding for immediate actions by developing grant applications


Working with communities and Tribal attorneys to develop required policies and procedures

Completing benefit-costs analyses


Competitively selecting consultants via a methodology that meets or exceeds the requirement of all federal agencies

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