



THE STATE
of ALASKA

GOVERNOR MICHAEL J. DUNLEAVY

**DEPARTMENT OF COMMERCE, COMMUNITY, AND
ECONOMIC DEVELOPMENT**

Division of Community and Regional Affairs

**Increasing Resilience in Alaska's
Environmentally Threatened
Communities**

Sally Russell Cox

American Planning Association Housing and Community Development Division Webinar

January 29, 2021



Alaska by the Numbers



Over **1/3** of all Federally Recognized Tribes are in Alaska



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



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



The average rural community population in Alaska



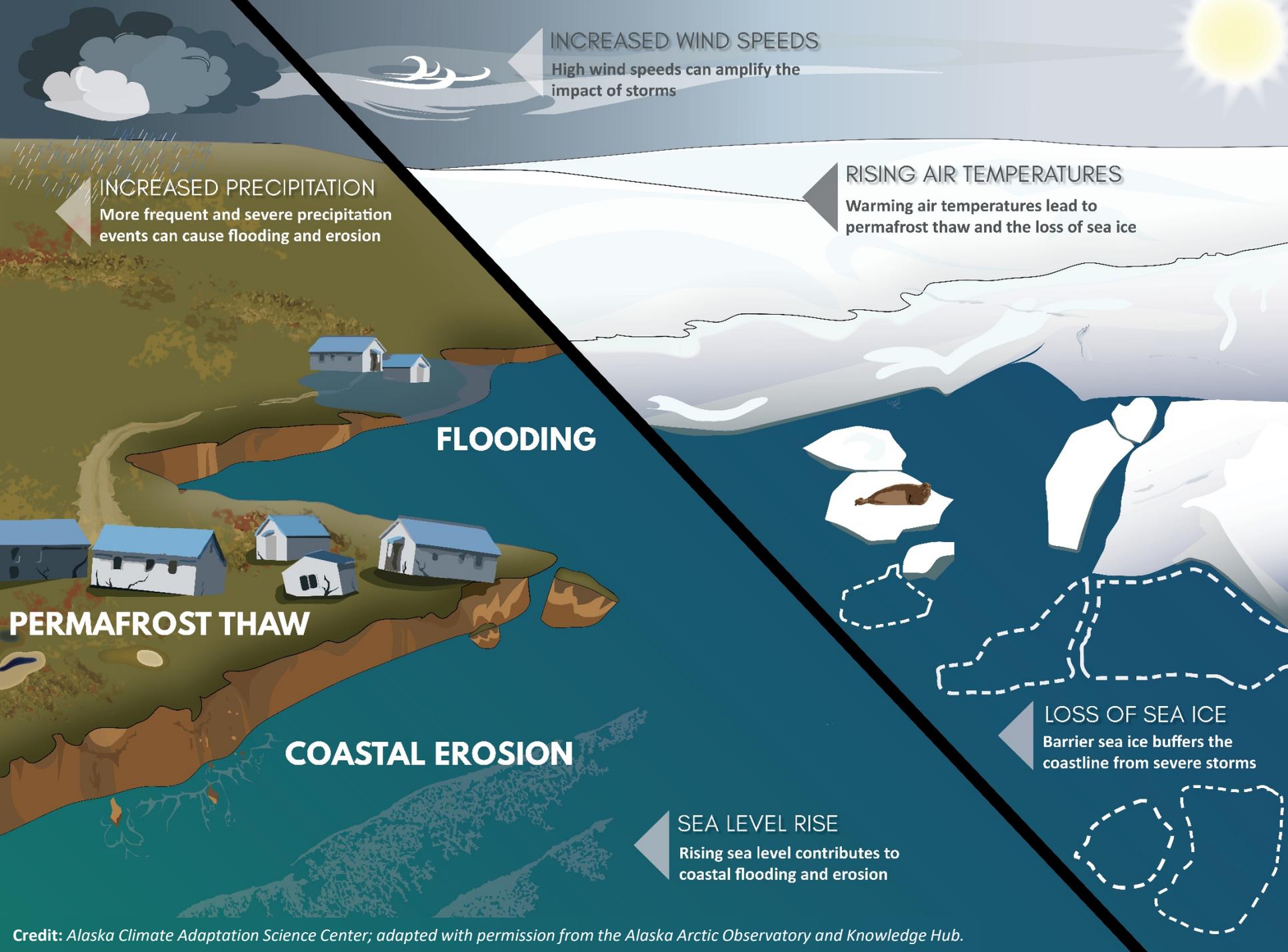
Each year the average rural Alaskan harvests **295 pounds** of food from the land and waters

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.



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

RISING AIR TEMPERATURES

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

FLOODING

PERMAFROST THAW

COASTAL 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



Erosion



Newtok, Summer 2006



Newtok, Summer 2019



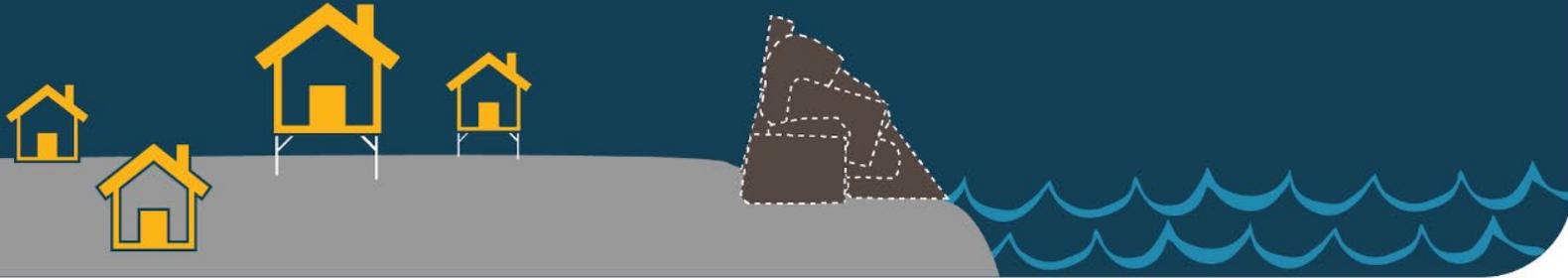
Thawing Permafrost



Shifting Boardwalk in Newtok

Photo: ADN

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



Managed Retreat



Managed retreat in Napakiak



Relocation



Newtok's new village site, Mertarvik

Photo: UMCOR



Phases of Community Resilience

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.
- Decide whether project(s) should be managed locally or with outside assistance.



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

Local Actions to Reduce Risk

Increased Local Resilience



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



Housing Development Costs

Construction

*Total development costs (including land, platting, roads, water and sewer in addition to home construction) typically range from \$450,000 - \$750,000 a unit**

Infrastructure

- *Infrastructure construction typically costs millions of dollars.*
- *Piped water and sewer services may never be feasible in many rural communities*
- *The housing developer (tribe, housing authority, or community organization) is responsible for connecting houses to roads, water, and sewer*



Impacts to Housing Stock

Overcrowding
Nearly 12 times the national average in some rural communities

One-Star Homes
Require at least 4 times the energy of home built to standards

Poor Ventilation
Resulting in widespread mold + residents with respiratory illnesses

Many homes not built for harsh winter weather



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



Newtok 2006-Present



Photo: ANTHC



Photo: Sally Russell Cox



Photo: Sally Russell Cox



Photo: UMCOR



Newtok 2006-Present

1993

Community
decision to
relocate



1994

Review of
alternate
sites/Site
selection
process



2003

Land exchange
with USFWS
for site control



2006

Request to
State for
Assistance



Newtok Planning Group 2006-Present

Newtok

- Newtok Village Council
- Newtok Native Corporation

State of Alaska

- Commerce, Community, and Economic Development/Community and Regional Affairs– *group coordinator*
- Environmental Conservation/Village Safe Water Program
- Transportation and Public Facilities
- Military and Veterans Affairs/Homeland Security and Emergency Management
- Education and Early Development
- Health and Social Services
- Alaska Energy Authority
- Alaska Governor's Office
- Alaska Legislative Representatives

Regional + Non-Profit Organizations

- Association of Village Council Presidents, Regional Housing Authority
- Alaska Native Tribal Health Consortium
- Coastal Villages Region Fund
- Lower Kuskokwim School District
- Rural Alaska Community Action Program
- Yukon-Kuskokwim Health Corporation

Federal

- U.S. Army Corps of Engineers, Alaska District
- Economic Development Administration
- National Oceanic and Atmospheric Administration
- DoD Innovative Readiness Training Program
- USDA, Rural Development
- USDA, Natural Resources Conservation Services
- Housing and Urban Development
- Bureau of Indian Affairs
- Federal Aviation Administration
- Environmental Protection Agency
- Denali Commission
- Alaska Congressional Delegation Representatives



Source: Vice News



Pioneer Infrastructure Development



Photo: Sally Russell Cox



Conceptual Community Layout Planning

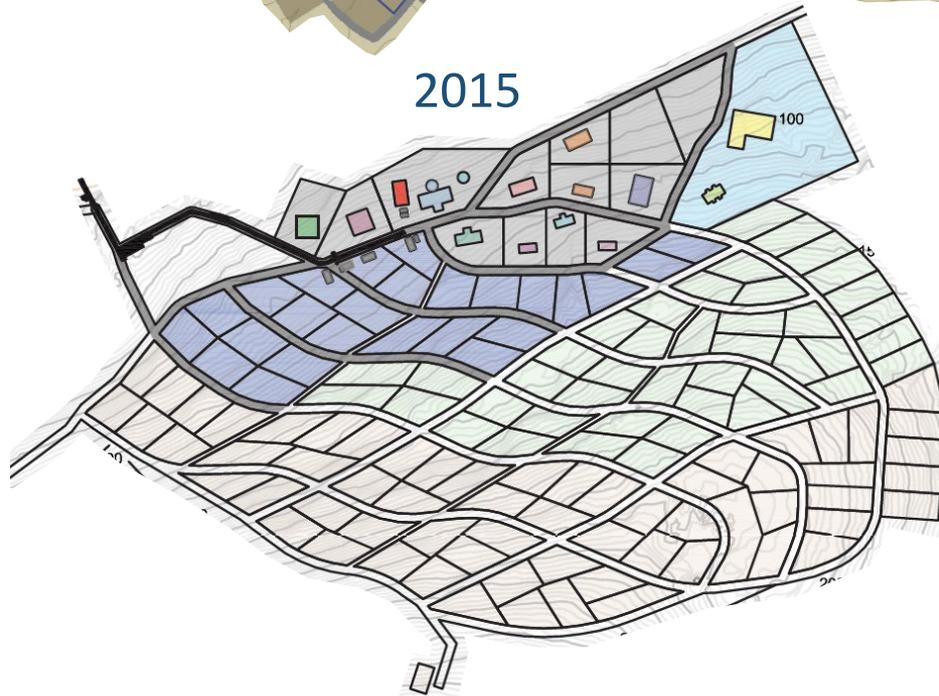
2008



2011



2015





2012 Mertarvik Strategic Management Plan

Strategic Management Plan

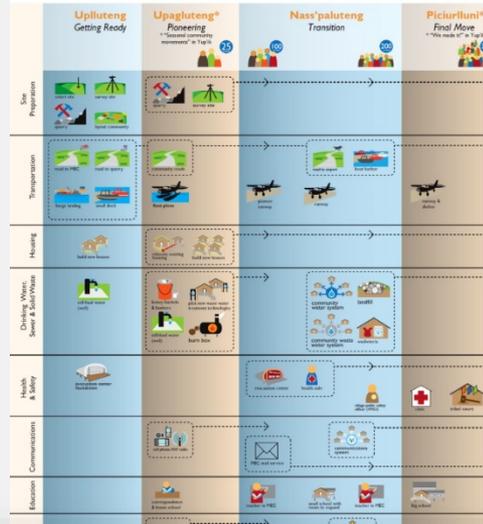
Newtok to Mertarvik

March 2012



**Nunailemteggun ikayuqulluta tamamta
assirluta aknirtenritellerkamtenun,
nuggtarlentenuun ciunerkamteni**
*a community that builds together
for the safe and healthy future of Newtok*

Mertarvik Relocation Plan



Strategic Focus Areas	2012		2013		2014	
	winter/spring	summer/fall	winter/spring	summer/fall	winter/spring	summer/fall
Site Preparation						
1. Fund, develop townsite plan						
2. Fund, carry out survey						
3. Resolve land ownership questions						
4. Determine lot allocation strategy						
5. Construct pioneer roads						
6. Establish basic housing development rules						
7. Develop quarry resource						
Building Capacity						
1. Identify partnership team						
2. Define MCDC role, strengthen functions						
3. Assess needed skills, create training plan						
4. Assess regional demand for rock/gravel						
5. Build relationships with foundations						
Emergency Response + Public Health						
1. Redesign MEC if necessary						
2. Hire MEC construction manager and crew						
3. Develop, implement MEC funding strategy						
4. Identify health professional pioneer						
5. Complete MEC vertical construction						
6. Develop long-term plan for clinic						
Housing						
1. Complete site preparation tasks						
2. Conduct housing survey						
3. Develop a housing strategy						
4. Relocate houses						
5. Implement housing programs						
6. Research housing energy technologies						
Drinking Water + Sanitation						
1. Identify practical system alternatives						
2. Evaluate + select alternatives						
3. Develop business plan						
4. Pursue funding for design + construction						





Guiding Principles for Newtok Relocation

The relocation of Newtok will be defined by our Yup'ik way of life.

Our Guiding Principles are:



*Ikayuqurluteng, aknirtenritellkainek,
assirluteng calillerkaitnek*
*a community that builds together
for the safe and healthy future of Newtok*

- To remain a distinct, unique community – our own community
- To stay focused on our vision by taking small steps forward each day
- To make decisions openly and as a community and look to elders for guidance
- To build a healthy future for our youth
- Our voice comes first – we have first and final say in making decisions and defining priorities



Guiding Principles for Newtok Relocation

- To share with and learn from our partners
- No matter how long it takes, we will work together to provide support to our people in both Mertarvik and Newtok
- Development should:
 - *Reflect our cultural traditions*
 - *Nurture our spiritual and physical well-being*
 - *Respect and enhance the environment*
 - *Be designed with local input from start to finish*
 - *Be affordable for our people*
 - *Hire community members first*
 - *Use what we have first and use available funds wisely*
- To look for projects that build on our talents and strengthen our economy





Developing Mertarvik





Developing Mertarvik





Mertarvik Housing





Mertarvik Housing

HUD Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA)

Bureau of Indian Affairs Housing Improvement Program

FEMA Hazard Mitigation Grant Program (*housing buyouts*)

FEMA Pre-Disaster Mitigation Program (*housing pads*)

Congressional Allocation to Denali Commission (*Cold Climate Housing Research Center homes*)

Cares Act (*isolation units which will later revert to community housing*)



Mertarvik Housing Policies

- Identifies how families will become eligible for housing based on level of threat and income
- Developed by the Newtok Village Council and reviewed by state/federal agencies with housing expertise
- Compliments other policies for the relocation effort, including procurement and purchasing policies and construction standards



Newtok Village Council
P.O. Box 5596
Newtok, AK 99559

Mertarvik Community
Phone (907)237-2202

Mertarvik Housing Policies

Adopted May 23, 2019, Revised Jan. 14, 2020

1. Purpose and Scope:

- 1.1. These Policies guide the relocation of the entire village of Newtok to Mertarvik—the first time in recent years that a village has completely relocated outside of a federal disaster declaration.
- 1.2. The Policies are intended to be consistent with all applicable federal and state laws and policies that relate to dwelling unit funding, including but not limited to 2 C.F.R. Part 200 and the policies of the Association of Village Council Presidents Regional Housing Authority (AVCP). The Policies were reviewed by a committee of housing agencies who offered technical assistance. Under the policies of some funding programs, only residents with sufficiently low-income are eligible to receive dwelling units. Other residents will receive dwelling units through other funding that is less restrictive. In the event of conflict between the Mertarvik Housing Policies and those of an entity providing funding for a given home, the latter shall prevail.
- 1.3. These policies are intended to complement other Newtok/Mertarvik policies, including but not limited to the Newtok Procurement and Purchasing Policies and the Mertarvik Construction Standards.



Lessons Learned

Community-Driven Approach

- *Empowers and honors community decision-making, sovereignty, and self-determination*
- *Prioritizes local workforce development*

Engaged Partnerships and Governmental Coordination

- *Addressing funding and technical assistance gaps requires collaboration, leveraging of resources, and coordination of expertise*

Data Collection + Risk Assessments

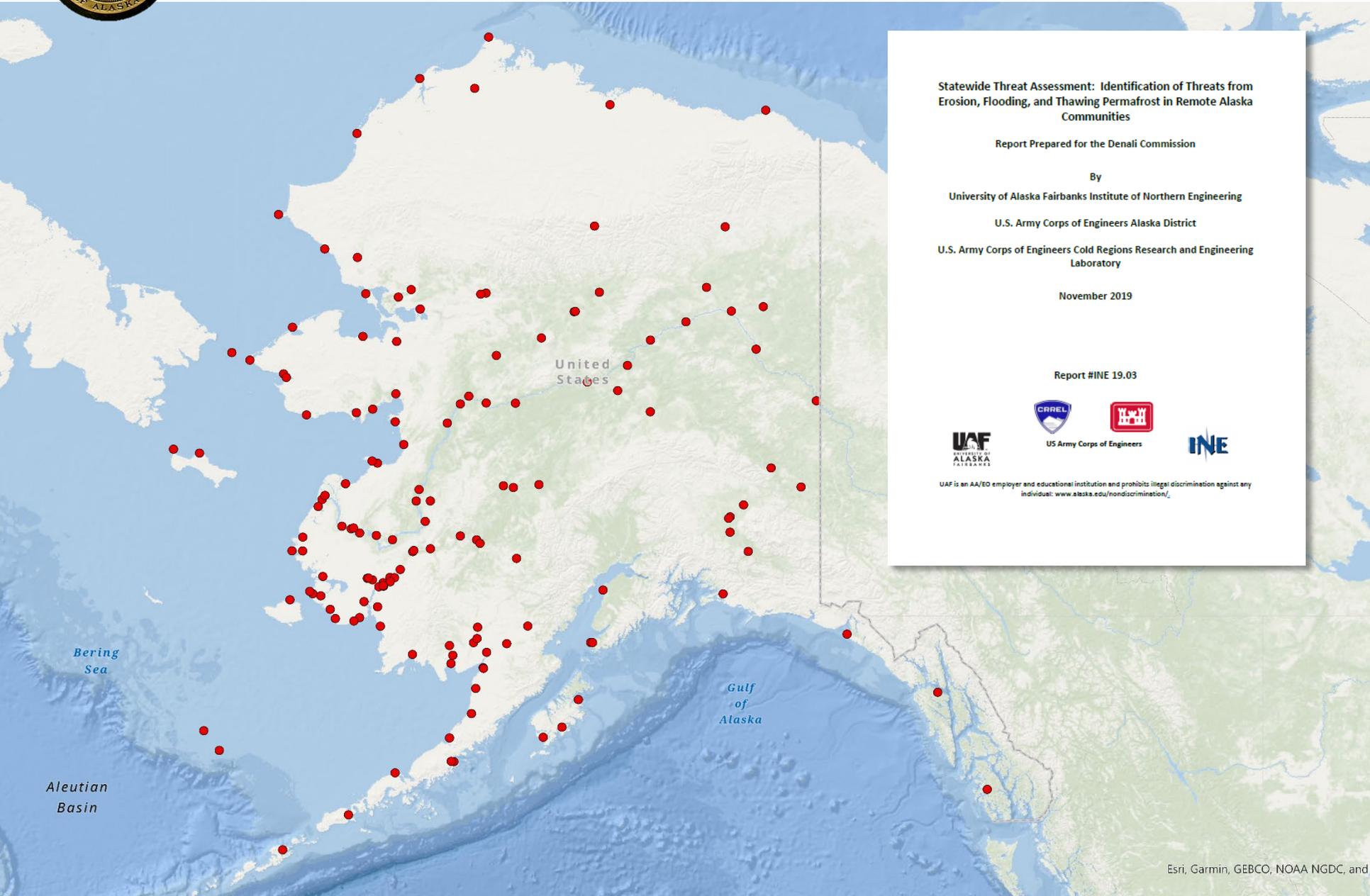
- *Foundational to community understanding risk and making informed decisions about adaptation*

Reprioritized Development

- *The speed and severity of environmental threats may necessitate the development of pioneer housing before final infrastructure is in place.*



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



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Unmet Infrastructure Needs of Alaska Native Villages

Congressional Request to Bureau of Indian Affairs:

“...develop a report outlining the unmet infrastructure needs of tribal communities and Alaska Native Villages in the process of relocating to higher ground as a direct result of the impacts of climate change on their existing lands.”

[1]

[1] FY 2020 House appropriations report 116-100

[2] Including 4 Alaska Native Non-Profits and 4 Alaska Native Regional Health Corporations

[3] Communities in Threat Groups 1 and 2 for erosion, flooding and thawing permafrost

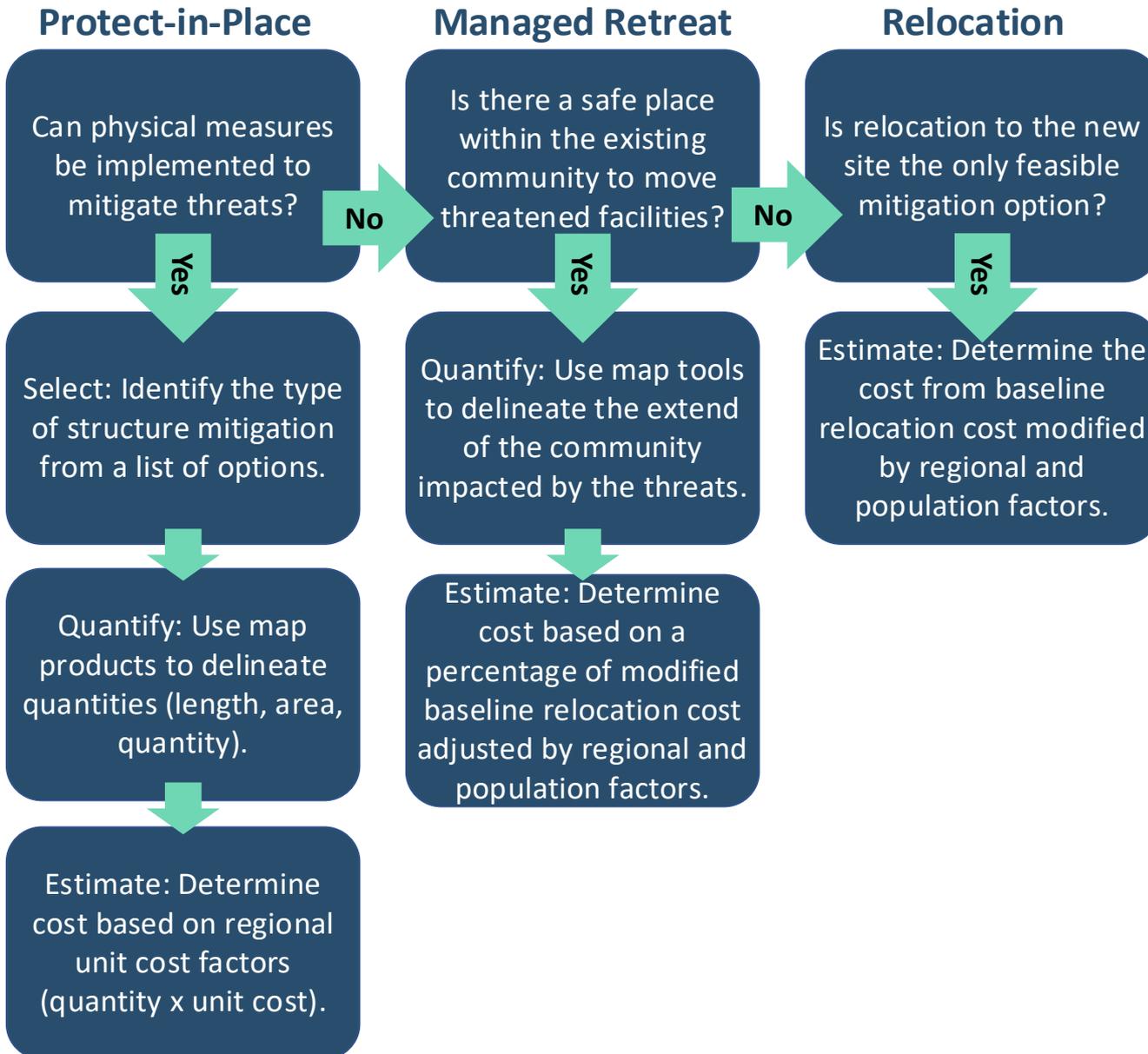


Estimating Unmet Needs





Estimating Infrastructure Costs





Estimating Unmet Needs



*Alaska Native villages face an estimated \$3.5 billion in threats to infrastructure over the next 50 years from erosion, flooding, and permafrost thaw.



Results Summary

- **Total Need: \$3.45 Billion**

- \$3.5 Billion over 50 years
- \$90 - \$110 million per year over the next 10 years
- Additional \$830 million for hub communities

- **Vulnerability Assessment**

- 119 communities need 1 or more assessments
- \$32M required for assessments

- **Key Assumptions**

- Threats can be addressed as mitigation
- Professional judgements don't represent community decision-making
- Costs in 2020 dollars

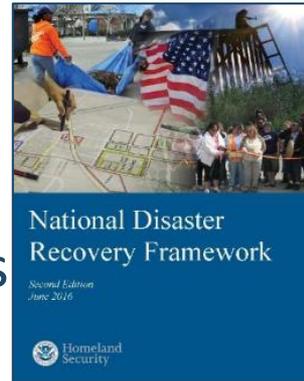
Geographical Region	Regional Costs
Aleutian and Pribiloff Islands	\$ 68,805,000
Arctic Slope	\$ 281,600,000
Bristol Bay	\$ 72,290,000
Interior	\$ 158,480,000
Northwest	\$ 1,172,710,000
South East and South Central	\$ 26,430,000
Yukon Kuskokwim	\$ 1,673,535,000
TOTAL	\$ 3,453,850,000



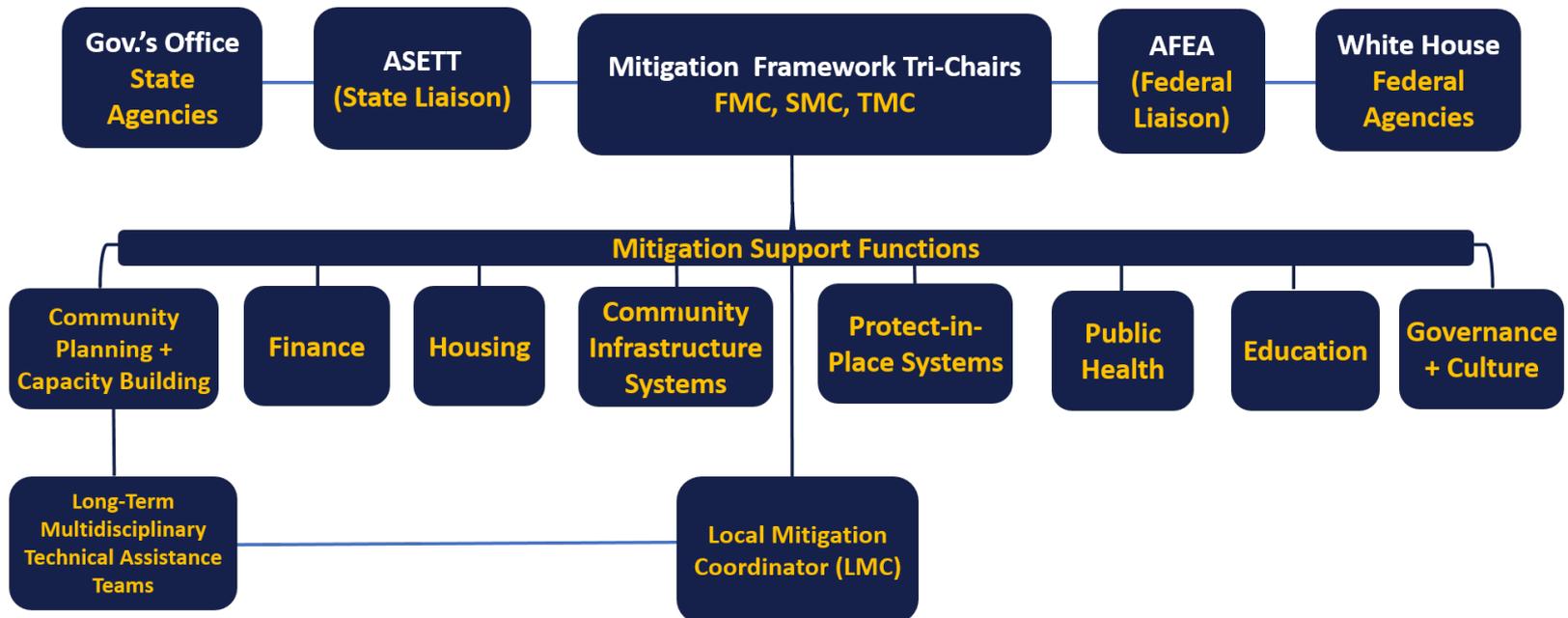
Environmentally Threatened Community Mitigation Framework

- **Key Mitigation Framework Elements:**

- Guiding Principles
- Dedicated Management/Leadership Positions
- Coordinating Structure of Required Support Capabilities
- Assigned Agency Roles and Responsibilities
- Adoption by Both State and Federal Leadership



- Modeled after FEMA's National Disaster Recovery Framework





A Phased Approach to Village Relocation



1: Relocation Decision Phase 1A

- Conduct environmental threat assessment/hazard impact analysis
- Prepare a relocation/protect-in-place options analysis report
- Get state, federal, local government action agreement

Phase 1B

- Establish local relocation coalition
- Ensure administrative procedures, procurement and financial policies are in place
- Obtain professional services as necessary
- Select local relocation coordinator
- Find support for community travel costs
- Develop emergency response / evacuation plan
- Implement temporary protection measures



2: Site Selection and Acquisition

Phase 2A

- Define community criteria for relocation site
- Identify potential relocation sites
- Analyze potential relocation sites
 - Perform aerial photography and site mapping
 - Perform geotechnical - hydrological investigation of alternative relocation sites
- Conduct the site election process

Phase 2B

- Acquire title to land



3: Getting Ready 0 population

Phase 3A

- Conduct baseline envtl studies
- Conduct geotechnical and bathymetric studies
- Complete planning stage topographical study
- Conduct airport relocation study
- Complete barge landing analysis + design study
- Prepare quarry recon. report
- Prepare sanitation facilities prelim. engineering report

Phase 3B

- Complete Strategic Mgmt Plan
- Select airport + townsite sites
- Construct barge landing
- Prepare master plans for energy, water/sewer + housing
- Environmental Analysis
- Prepare community layout
- Prepare airport layout plan
- Design/construct homes, access roads, landfill
- Design evacuation shelter, water + wastewater systems



4: Pioneering

Phase 4A 0 population

- Complete building relocation assessment
- Design pioneer runway
- Prepare townsite development plan
- Design townsite roads
- Complete platting, rights-of-way, site control
- Develop material source
- Install man-camp, eqpt. + temporary fuel storage
- Design staged power + water + sewer plants

Phase 4B 25-100 population

- Build multi-purpose/evacuation shelter
- Build access roads
- Build townsite roads
- Install modular power and water/sewer plants
- Build/relocate more homes
- Design bulk fuel
- Design school + clinic



5: Transition

Phase 5A 100+ population

- Install temporary community service space in evacuation shelter for school, clinic, post office
- Design telephone + cable systems
- Build more townsite roads
- Build pioneer runway
- Build sewage lagoon + landfill
- Build/relocate more homes
- Install onsite sanitation systems in homes
- Finalize airport + access road design

Phase 5B 200+ population

- Complete telephone + cable systems
- Build FAA lighted airport
- Build bulk diesel + gasoline tank farm; connect tank farm to power plant
- Install fuel header pipeline from barge landing to tank farm



6: The Final Move 350 + population

- Build/relocate clinic
- Build/relocate remaining community buildings
- Build remaining townsite roads (Townsite Roads Stage III)
- Build/relocate remaining homes (housing Stage III)
- Design/build piped water/sewer + water treatment systems
- Design/build power grid
- Build cross-wind runway



7: Decommissioning the Old Village 350 + population

- Conduct inventory + assessment of remaining buildings, infrastructure and facilities at old village
- Develop a workplan for assessing the site
- Conduct field assessment to determine safe contaminant levels for subsistence use
- Prepare a Site Characterization Report
- Remediate the old village site



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