



THE STATE
of ALASKA

GOVERNOR MICHAEL J. DUNLEAVY

Risk MAP Coordination Efforts in Alaska

Sally Russell Cox

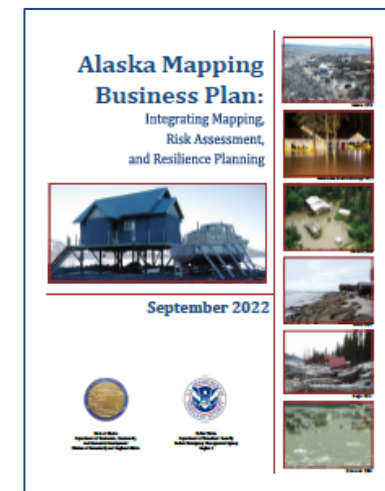
Presentation to FEMA Region 10 Mitigation Summit

March 9, 2023



Role of the Alaska Risk MAP Coordinator

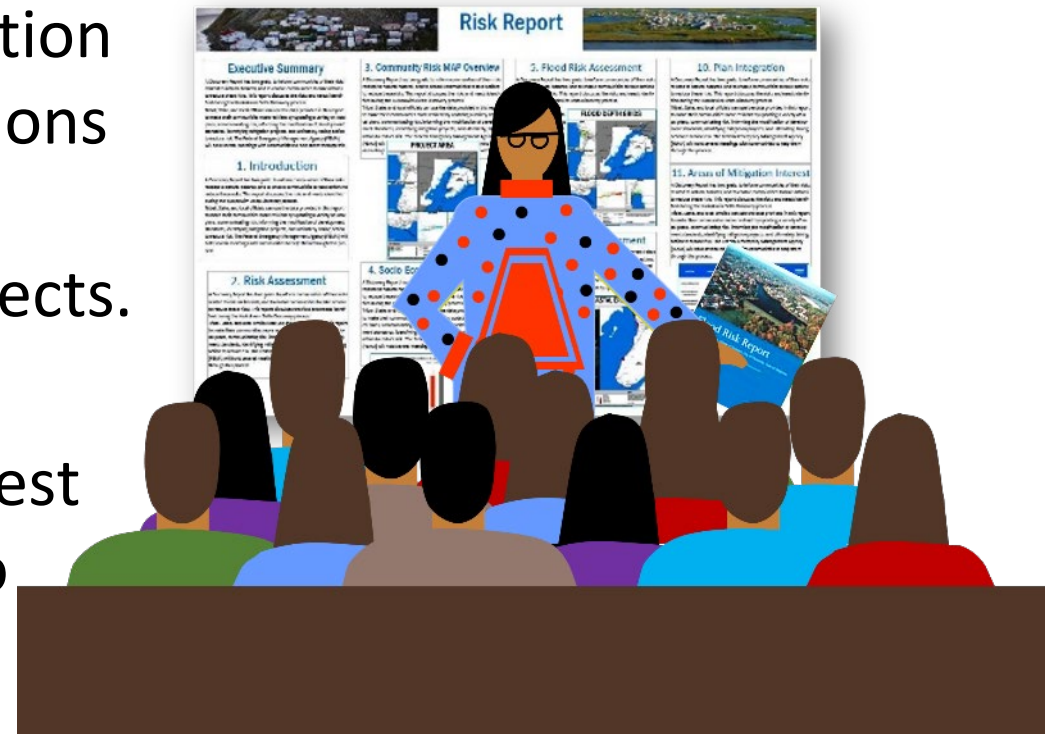
- Serve as primary point of contact for Risk MAP activities
 - Liaison between Alaska local governments (boroughs, cities, Alaska Native villages, other unincorporated communities) and FEMA
- Annually update Alaska's Risk MAP study priorities and Risk MAP strategy
- Plan and implement community outreach and engagement
- Create climate of understanding and ownership of FEMA's mapping process at the state, Tribal, and local levels.
- Leverage Risk MAP data, analyses, products, and/or processes to support communities to advance mitigation actions.





Role of the Alaska Risk MAP Coordinator

- Develop, promote and deliver resources and products to communities for risk awareness and mitigation action.
- Develop and provide training to state and local officials throughout the course of a flood risk project
- Encourage Hazard Mitigation Plan implementation and advance community hazard mitigation actions through technical assistance that supports the Mitigation Planning Process and Risk MAP projects.
- Share CTP program experience and related information with peer participants regarding best practices and process improvements related to COMS activities.





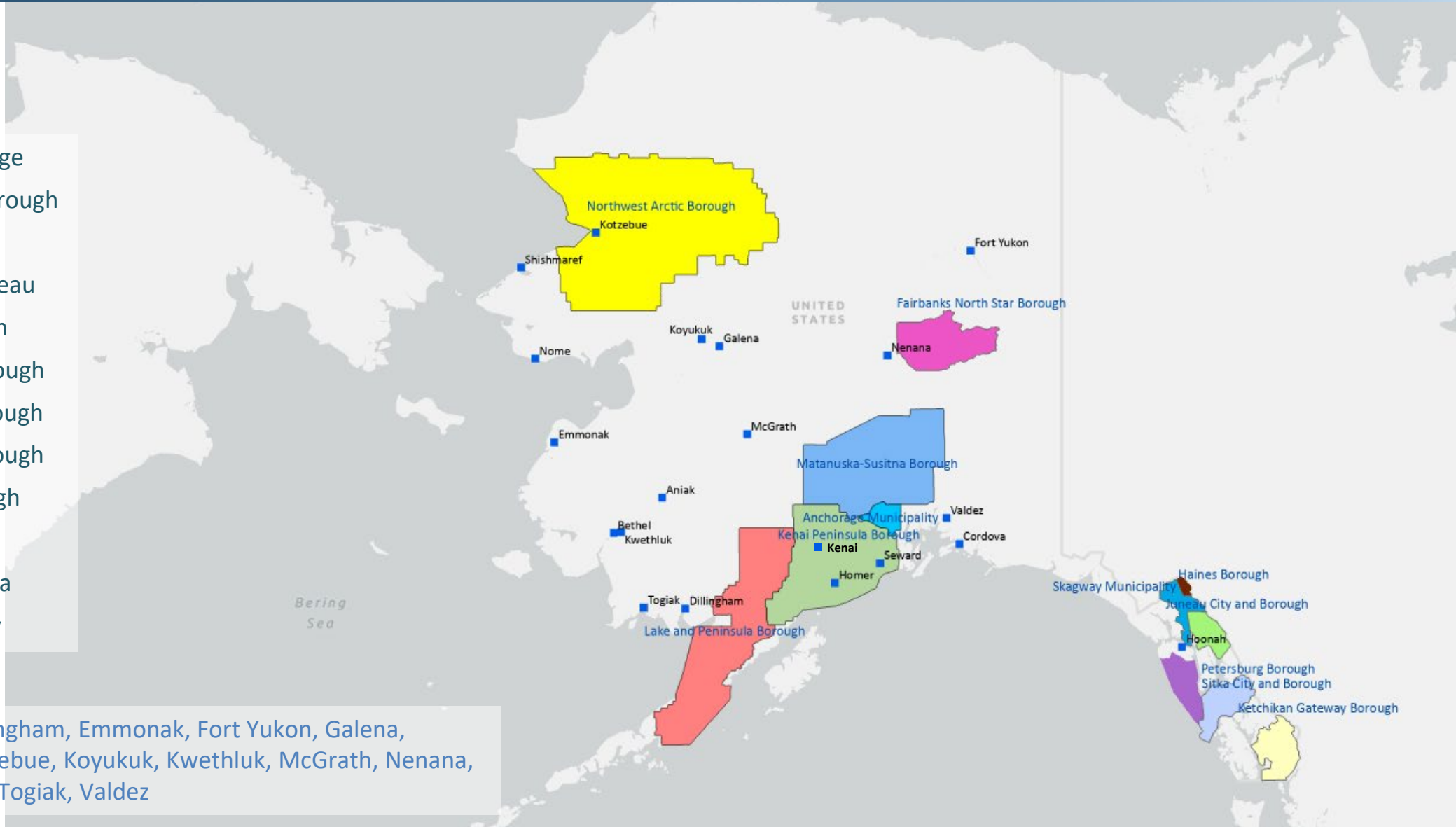
NFIP-Participating Boroughs and Cities

12 Boroughs

- Municipality of Anchorage
- Fairbanks North Star Borough
- Haines Borough
- City and Borough of Juneau
- Kenai Peninsula Borough
- Ketchikan Gateway Borough
- Lake and Peninsula Borough
- Matanuska-Susitna Borough
- Northwest Arctic Borough
- Petersburg Borough
- City and Borough of Sitka
- Municipality of Skagway

20 Cities

Aniak, Bethel, Cordova, Dillingham, Emmonak, Fort Yukon, Galena, Homer, Hoonah, Kenai, Kotzebue, Koyukuk, Kwethluk, McGrath, Nenana, Nome, Seward, Shishmaref, Togiak, Valdez





Current, Completed, and Upcoming Risk MAP Studies

7 Boroughs

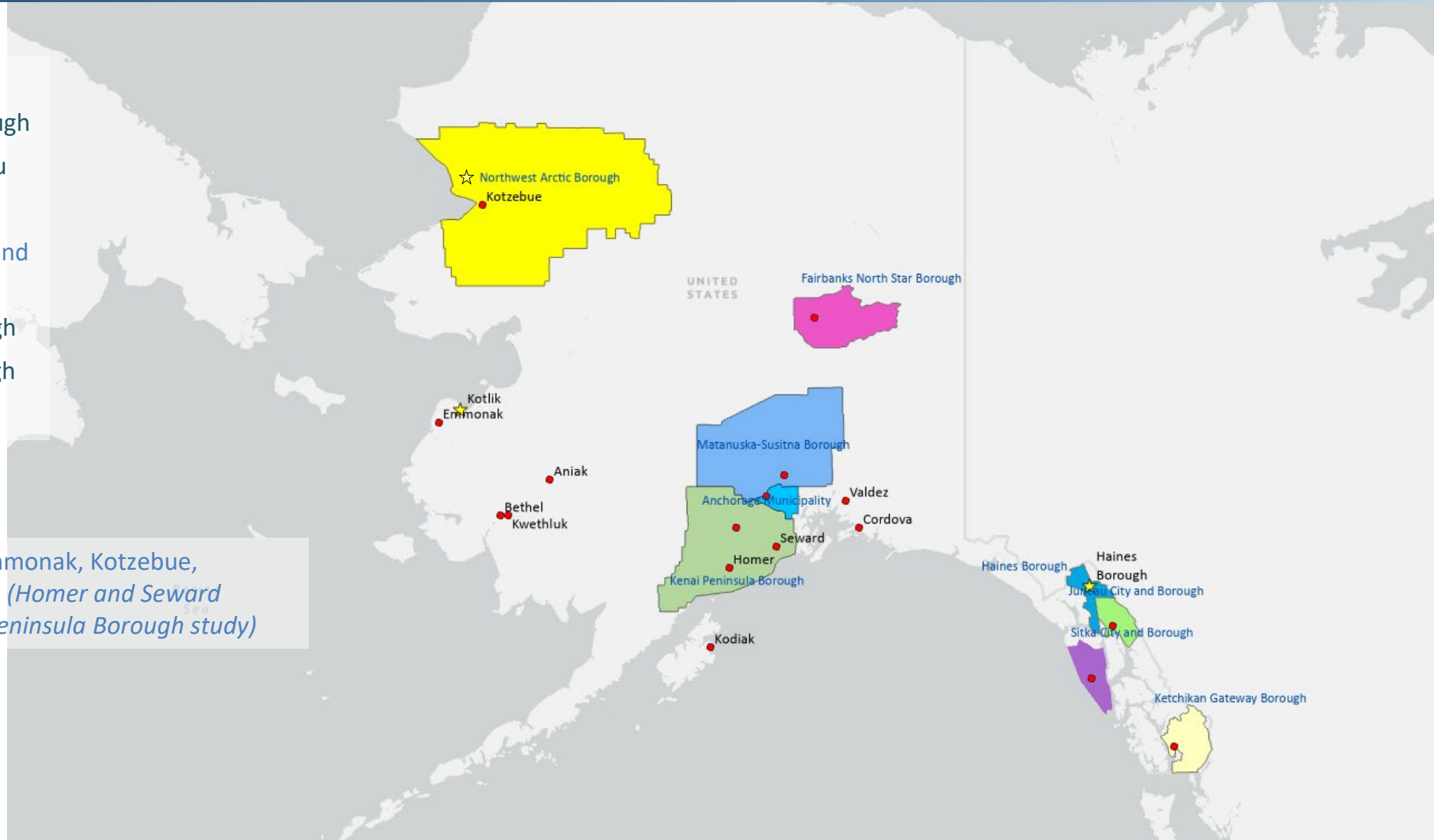
- Municipality of Anchorage
- Fairbanks North Star Borough
- City and Borough of Juneau
- Kenai Peninsula Borough
Including Cities of Homer and Seward
- Ketchikan Gateway Borough
- Matanuska-Susitna Borough
- City and Borough of Sitka

● 10 Cities

Aniak, Bethel, Cordova, Emmonak, Kotzebue, Koyukuk, Kwethluk, Valdez *(Homer and Seward included as part of Kenai Peninsula Borough study)*

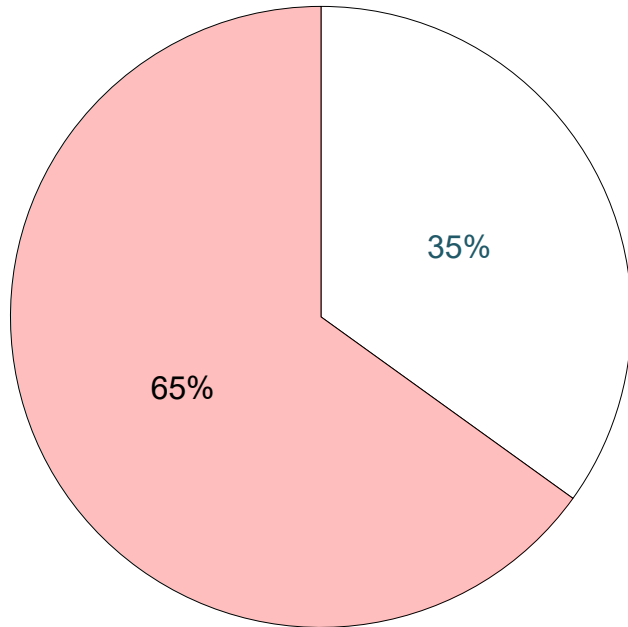
★ Future Studies

Northwest Arctic Borough
Haines Borough
Kotlik



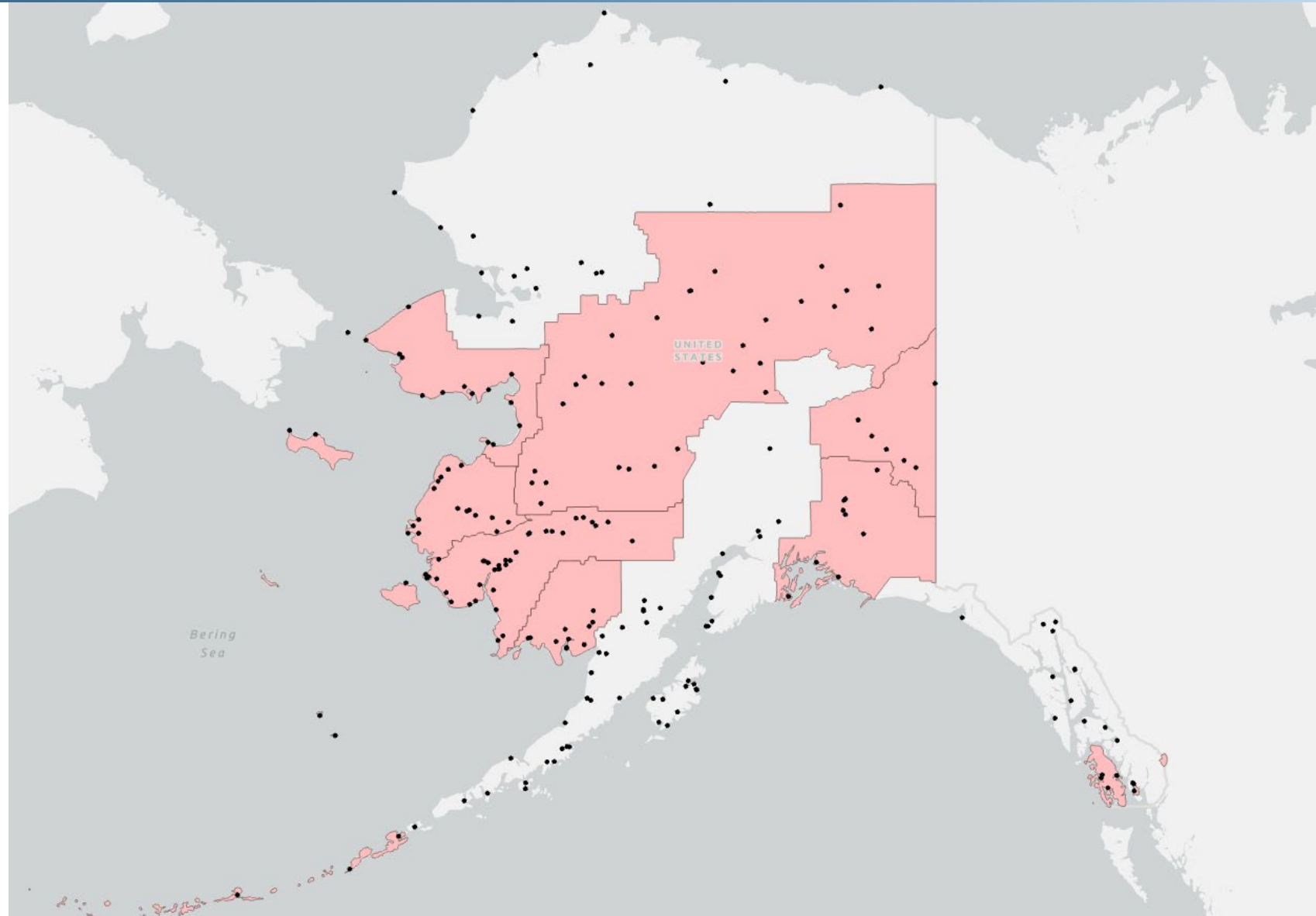


Federally Recognized Tribes in Alaska



 Tribes in Organized Boroughs

 Tribes in Unorganized Borough



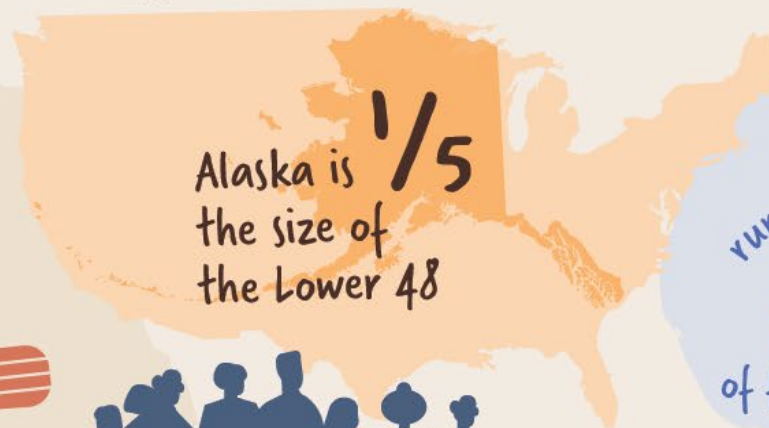


Some Rural Alaska Statistics...

Rural Alaska by the Numbers



60% of Alaska communities are not connected to the road system



The average population of communities in rural Alaska

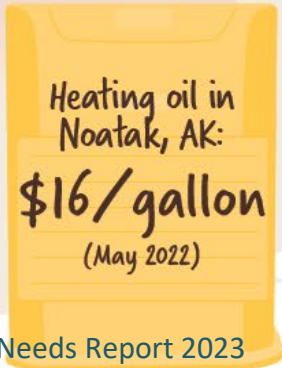
Each year Alaskans in rural communities harvest an average of

295 pounds

of food through subsistence activities.

Of the 144 environmentally threatened communities facing infrastructure impacts from erosion, flooding and permafrost thaw, 95% are economically disadvantaged.

The cost of living in rural Alaska is 32% higher than the national average. (January 2022)



Source: ANTHC • DCRA • Unmet Needs Report 2023



Reports on Climate-Impacted Alaska Communities


United States General Accounting Office
Report to Congressional Committees

GAO

December 2003


ALASKA NATIVE VILLAGES

Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance



GAO
Accountability • Integrity • Reliability


GAO-04-142



U.S. Army Corps of Engineers
Alaska District


Study Findings and Technical Report

Alaska Baseline Erosion Assessment



Erosion at the community of Iktomak

RECOMMENDATIONS REPORT TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE





In Chignikook, Alaska, a house is threatened by rising sea levels.

FINAL REPORT FROM THE IMMEDIATE ACTION WORKGROUP

APRIL 17, 2008

IMMEDIATE ACTION WORKGROUP

RECOMMENDATIONS TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE

MARCH 2009


United States Government Accountability Office
Report to Congressional Requesters

GAO

June 2009


ALASKA NATIVE VILLAGES

Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion




GAO
Accountability • Integrity • Reliability

Imperiled Community Water Resources Analysis



Prepared for
Immediate Action Workgroup
Group of the Governor's Climate Change Sub-Cabinet

Prepared by
 **TETRA TECH**

2000 Chapel Hill Parkway, Suite 100 • PO Box 14409
Research Triangle Park, NC 27709
1400 Shure Drive, Anchorage, AK 99513

June 30, 2010

IAWG: Support to climate-impacted Alaska Native communities should be based on level of natural hazard threat and not competitive grants



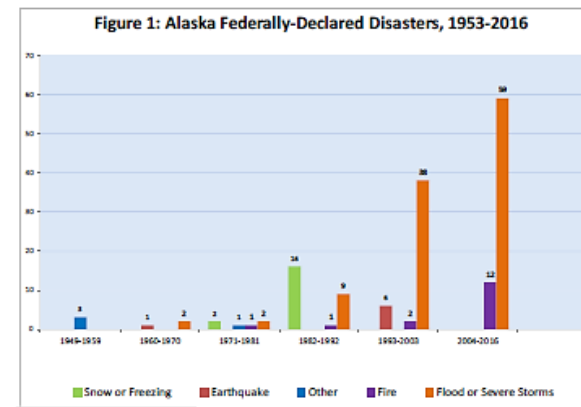
2017 Mitigation Summit Break-Out Session

Improving Alaska Native Village Coordination – February 16, 2017

1. Begin development of new Risk MAP process to support the unique needs of AK Native Villages with the engagement and support of key stakeholders.
2. Discuss need for process to rank Alaska Native communities **based on risk**. Input should be sought from the Tribes regarding factors they would like considered in their ranking.

Risk Mapping, Assessment and Planning: Assisting Alaska Native Villages

Over the last several decades, the number of presidentially-declared disasters in Alaska has increased dramatically, as illustrated in Figure 1, below¹. The majority of these disasters are caused by flooding associated with severe storms. Over the past decade, most of these events have occurred in the Bethel and Yukon-Koyukuk census areas (see Figure 2). Both census areas are comprised of small, remote, predominantly Alaska Native communities. These communities are especially vulnerable because both census areas are part of Alaska's vast unorganized borough where there is no borough form of government to provide services and other resources to address disaster events. Only six of the 68 Alaska Native villages within these two census areas participate in the National Flood Insurance Program (NFIP).² Half of the villages within these census areas are ineligible to participate in the NFIP because they are not incorporated municipalities³. Storm events are increasingly putting these communities at risk to loss of life and property. Recent studies indicate that the frequency and intensity of these storms is likely to increase, especially in western Alaska.⁴



¹ Data acquired from <http://www.fema.gov/disasters/grid/state-tribal-government/286>

² The six communities are Aniak, Bethel, Kwethluk, Galena, McGrath and Nenana.

³ To participate in the NFIP, communities agree to enforce regulations for land use and new construction in high-risk flood zones. In Alaska, municipal incorporation is required for land use regulation.

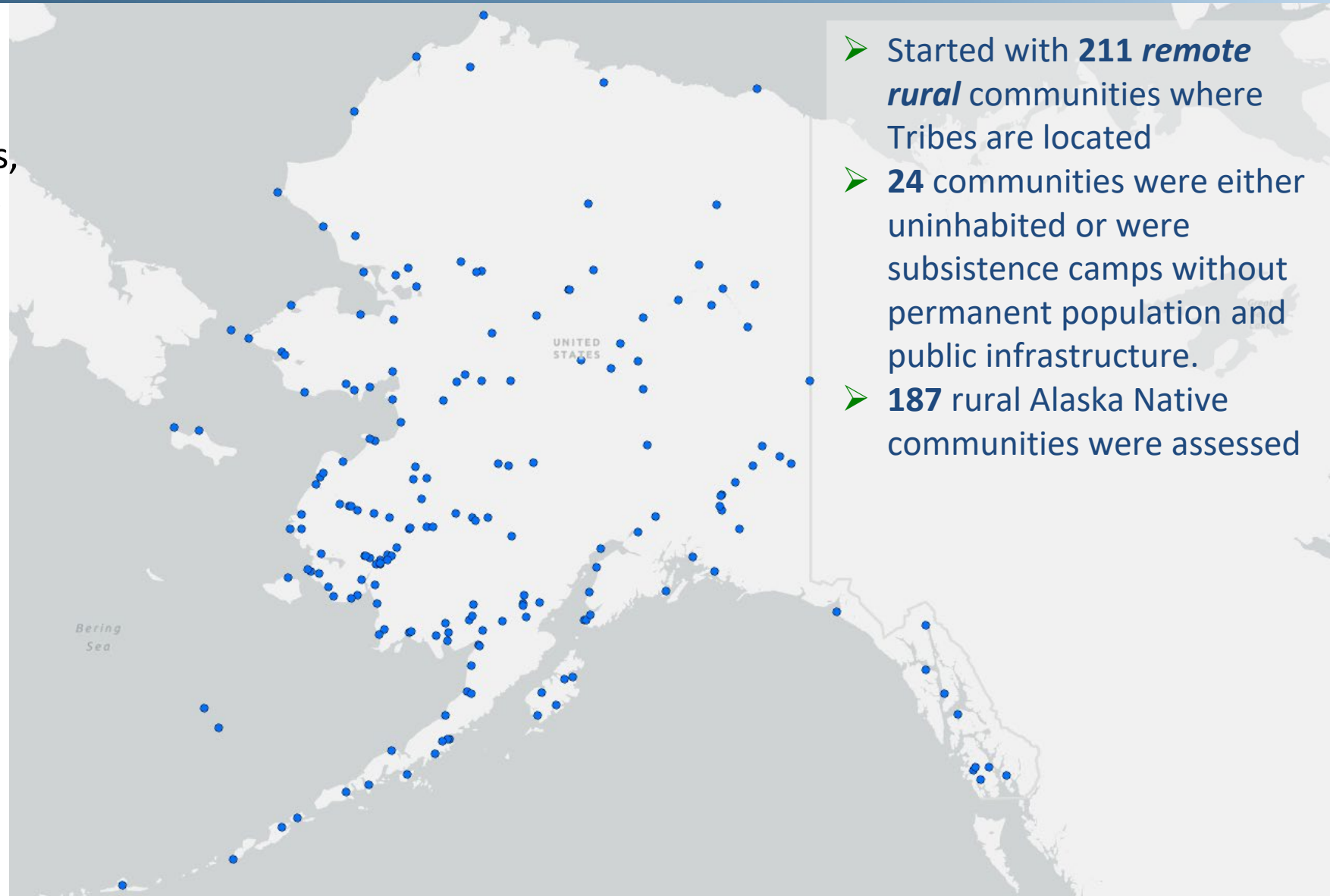
⁴ Tereszt, John; Ely, Craig R.; Jorgenson, M. Torre (2014): Storm-surge flooding on the Yukon-Kuskokwim Delta, Alaska. In *Arctic* 67 (3), pp. 360-374. DOI: 10.14430/arctic4403. See also: <http://arcticjournalhosting.ucalgary.ca/arctic/index.php/arctic/article/view/4403>



Alaska Statewide Threat Assessment

Focus: to identify the most vulnerable communities so community members, policy makers, and government agencies can make better-informed decisions.

1. Assess individual threats to public infrastructure associated with erosion, flooding, and thawing permafrost
2. Evaluate combined threat imposed by interactions between erosion, flooding, and thawing permafrost
3. Provide guidance to decision makers regarding technical information required to develop mitigation or adaptation strategies related to those threats



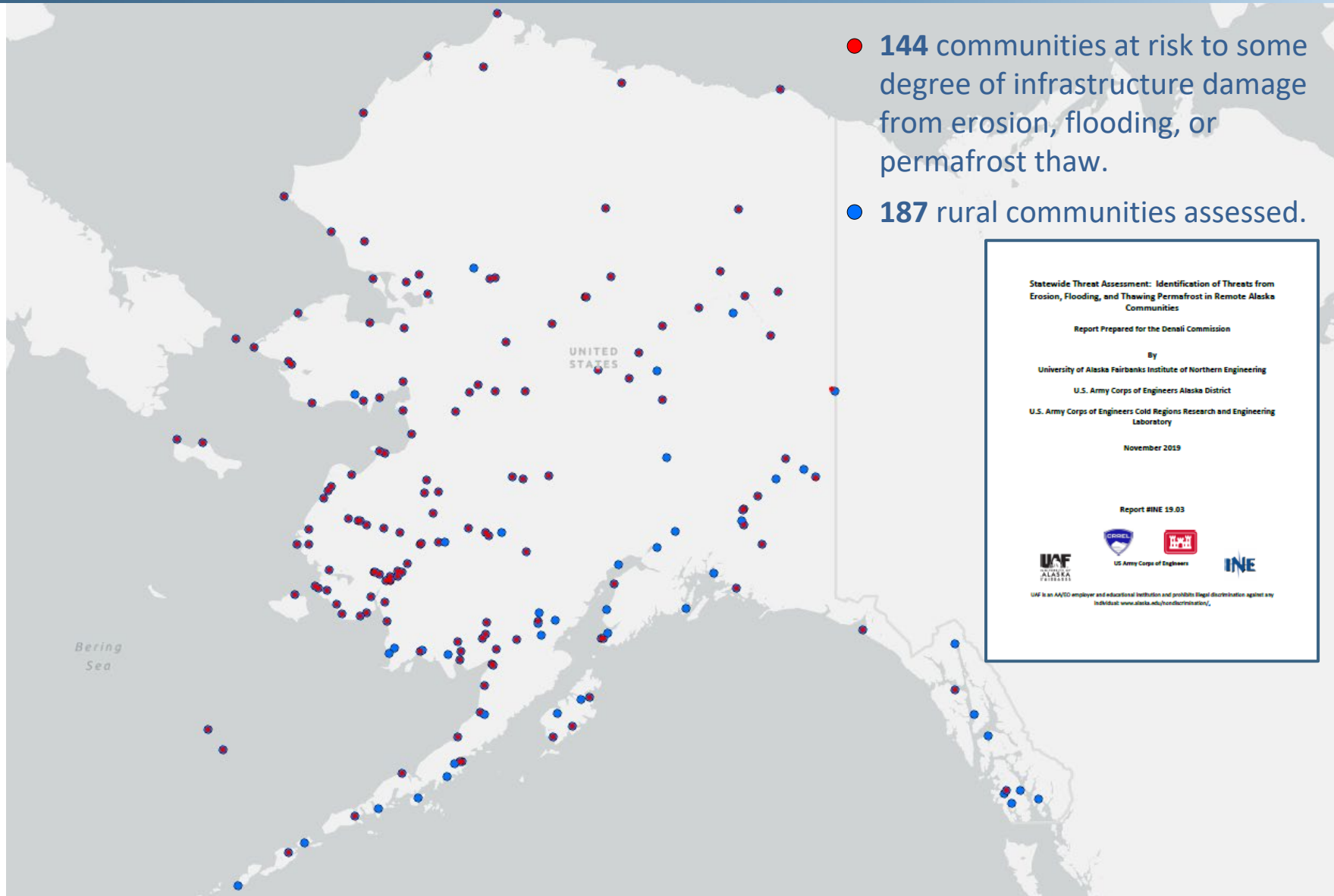
- Started with **211 remote rural** communities where Tribes are located
- **24** communities were either uninhabited or were subsistence camps without permanent population and public infrastructure.
- **187** rural Alaska Native communities were assessed



144 Environmentally Threatened Communities

Environmentally Threatened Communities:

The 144 Alaska Native communities identified in the *Statewide Threat Assessment* as highly threatened (in Group 1) or moderately threatened (in Group 2) by infrastructure damage from at least one of the environmental threats assessed: erosion, flooding or thawing permafrost.



- 144 communities at risk to some degree of infrastructure damage from erosion, flooding, or permafrost thaw.
- 187 rural communities assessed.


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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Assistance to Environmentally Threatened Communities

State of Alaska / Commerce / Community & Regional Affairs / Planning & Land Management / EVCs

ASSISTANCE TO ENVIRONMENTALLY THREATENED COMMUNITIES

► Resources for Environmentally Threatened Communities

DCRA staff provides assistance to environmentally threatened communities in partnership with the Alaska Native Tribal Health Consortium **Center for Environmentally Threatened Communities**, the Alaska Division of Geological and Geophysical Surveys **Coastal Hazards Program**, the Denali Commission **Village Infrastructure Protection Program**, and a number of other state and federal agencies and organizations. Currently, the focus is on the communities* who were ranked highest for flood, erosion, permafrost degradation and combined threats in a **2019 Statewide Threat Assessment**. DCRA staff assists these communities with local planning as well as providing access to the broad range of local government resources DCRA has to offer.



Click to open interactive map of Environment:

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/EVCs.aspx>

PLANNING & LAND MANAGEMENT LINKS

Planning & Land Mgmt Home Page

Alaska Climate Change Impact Mitigation Program

Alaska Community Coastal Protection Project

Alaska Risk MAP Program

Community Coastal Impact Assistance Program

Community Profile Maps

Floodplain Management

Interactive Mapping

Municipal Land Trustee Program

Planning & Land Mgmt Publications

Community Plans Library

Who's Planning Alaska



Resources for Environmentally Threatened Communities

State of Alaska / Commerce / Community & Regional Affairs / Planning & Land Management / EVCs

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PLANNING & LAND MANAGEMENT LINKS

Planning & Land

Alaska Climate C
Program

Alaska Commu
Project

Alaska Risk MAP

Community Coas
Program

Community Profi

Floodplain Management

Interactive Mapping

Municipal Land Trustee Program

Planning & Land Mgmt Publications

Community Plans Library

Who's Planning Alaska

Click on this drop-down to reveal a variety of resources for community-based monitoring, infrastructure protection planning, and scopes of work for erosion, flood, and permafrost assessments.



Resources for Environmentally Threatened Communities

State of Alaska / Commerce / Community & Regional Affairs / Planning & Land Management / EVCs

ASSISTANCE TO ENVIRONMENTALLY THREATENED COMMUNITIES

▼ Resources for Environmentally Threatened Communities

▼ Community-Based Methods for Monitoring Erosion, Flooding, and Permafrost Thaw

▼ Community-Based Erosion Monitoring

- **Understanding and Evaluating Erosion Programs** by the Alaska Division of Community and Regional Affairs
- **Community-Based Methods for Monitoring Coastal Erosion** by the Alaska Division of Geological and Geophysical Surveys

▼ Community-Based Flood Monitoring

- **High Water Mark Project Toolkit** by the Federal Emergency Management Agency
- **High Water Mark Sign Guide** by the National Weather Service

▶ Community-Based Permafrost Monitoring

▼ Prototypical Scopes of Work for Erosion, Flood and Permafrost Studies

- **Prototype Scope of Work: Rural Alaska Coastal Erosion and Storm Surge Flood Assessment** from Denali Commission Statewide Threat Assessment (Appendix B)
- **Prototype Scope of Work: Rural Alaska Riverine Erosion Assessment** from Denali Commission Statewide Threat Assessment (Appendix C)
- **Prototype Scope of Work: Rural Alaska Permafrost Vulnerability Assessment** from Denali Commission Statewide Threat Assessment (Appendix D)

▼ Infrastructure Protection Planning

- **Template for Near-Term Infrastructure Protection Plan (Microsoft Word)**
- **Template for Near-Term Infrastructure Protection Plan (Adobe PDF)**

PLANNING & LAND MANAGEMENT LINKS

Planning & Land Mgmt Home Page

Alaska Climate Program

Alaska Community Project

Alaska Risk Mgmt

Community Co-Program

Community Pr

Floodplain Ma

Interactive Ma

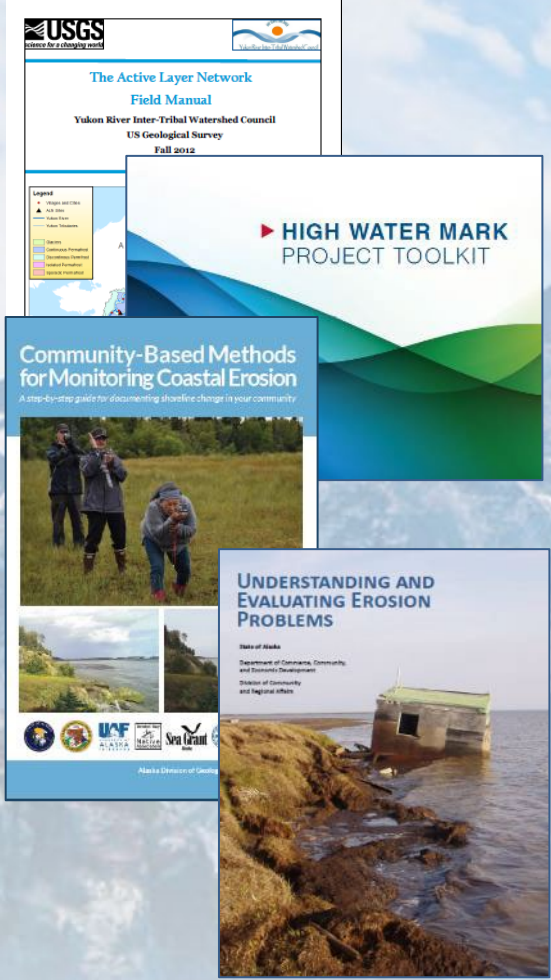
Municipal Land

Planning & La

Community Plans Library

Who's Planning Alaska

Handbooks and guides for community-based methods for monitoring erosion, flooding, and permafrost thaw, infrastructure protection planning, and scopes of work for erosion, flood, and permafrost studies.





Assistance to Environmentally Threatened Communities

The Communities

For information on community history, culture, economy, governance, critical infrastructure, natural hazard threats and current/proposed efforts to address each the natural hazards impacting each community, please explore the drop-down menu below.

- ▶ Akiak
- ▶ Alakanuk
- ▶ Allakaket
- ▶ Bethel
- ▶ Cheforanak
- ▶ Circle
- ▶ Deering
- ▶ Diomede
- ▶ Eagle
- ▶ Emmonak
- ▶ Fort Yukon
- ▶ Galena
- ▶ Golovin
- ▶ Hughes
- ▶ Huslia
- ▶ Kivalina
- ▶ Kotlik
- ▶ McGrath
- ▶ Napakiak
- ▶ Napaskiak
- ▶ Newtok

Drop-down menus with information on community history, culture, economy, governance, critical infrastructure, environmental threats, and current/proposed projects





Assistance to Environmentally Threatened Communities

Summary of environmental threats, meeting documents, reports, studies, plans

▼ Akiak

Akiak experiences severe riverine erosion, flooding, severe weather events, subsidence due to permafrost degradation, and wildland fire. Riverine erosion is Akiak's greatest natural hazard threat. In May 2019, more than 75 feet of riverbank was lost in a single event along a mile-long stretch of the Kuskokwim River, resulting in the loss of several smokehouses and endangering residences. . In 2012, flooding eroded more than 150 feet of the community's riverbank, resulting in the loss of the community's original cemetery, fuel header protective embankment, and a house. As a result of this event, Akiak's tribal and city governments jointly submitted a disaster declaration to the Governor of Alaska requesting disaster relief.

In 2009, the **US Army Corps of Engineers (USACE) Alaska Baseline Erosion Assessment** identified Akiak as a **Priority Action Community** in which erosion is threatening the viability of the community, significant resources are being expended to minimize such threats, or both conditions are present, and the community should be considered for immediate action in either initiating an investigation or continuing with ongoing efforts to manage erosion. The USACE also selected Akiak for a **Detailed Erosion Assessment**. The assessment determined that Akiak was losing 31,900 square feet of land per year (.73 acres). The assessment projected that Akiak would lose an additional 37.33 acres of land with property damages totaling \$373,000 and building damages totaling \$4.5 million over a 50-year period of analysis. The **2009 Government Accountability Office Report on Flooding and Erosion in Alaska Native Villages** identified Akiak as one of 31 Alaska Native Villages facing imminent flooding and erosion threats. At the community's request, Akiak will be prioritized for a new Risk MAP project in 2020.

- [Alaska Community Database Online Story Map for Akiak](#)

▶ **Akiak Interagency Planning Meeting Agendas, Notes and Meeting Materials**

▶ **Akiak Low Earth Orbit Broadband Project**

▶ **Akiak Home Relocation and Managed Retreat Project**

▶ **Akiak Community Plans**

▶ **Akiak Community Profile Maps**

▶ **Akiak Reports and Studies**

▶ **Akiak in the News**



Assistance to Environmentally Threatened Communities

Alaska Division of Community and Regional A

Interactive Map of Environmentally Threatened Communities

Environmentally Threatened Communities

This interactive map shows the location of communities* identified as most threatened by erosion, flooding, permafrost degradation and combined threats in the **2019 Statewide Threat Assessment** funded by the Denali Commission and conducted by the US Army Corps of Engineers and the University of Alaska Fairbanks. For more information on these communities, please also visit DCRA's webpage on [Environmentally Threatened Communities](#).

*Diomedede was added by DCRA

Information Provided by this Interactive Map

Click on the **dot** where a community is located and a **pop-up** will appear providing information specific to that community. The arrow at the top of the pop-up allows you to scroll through the following information for each community:

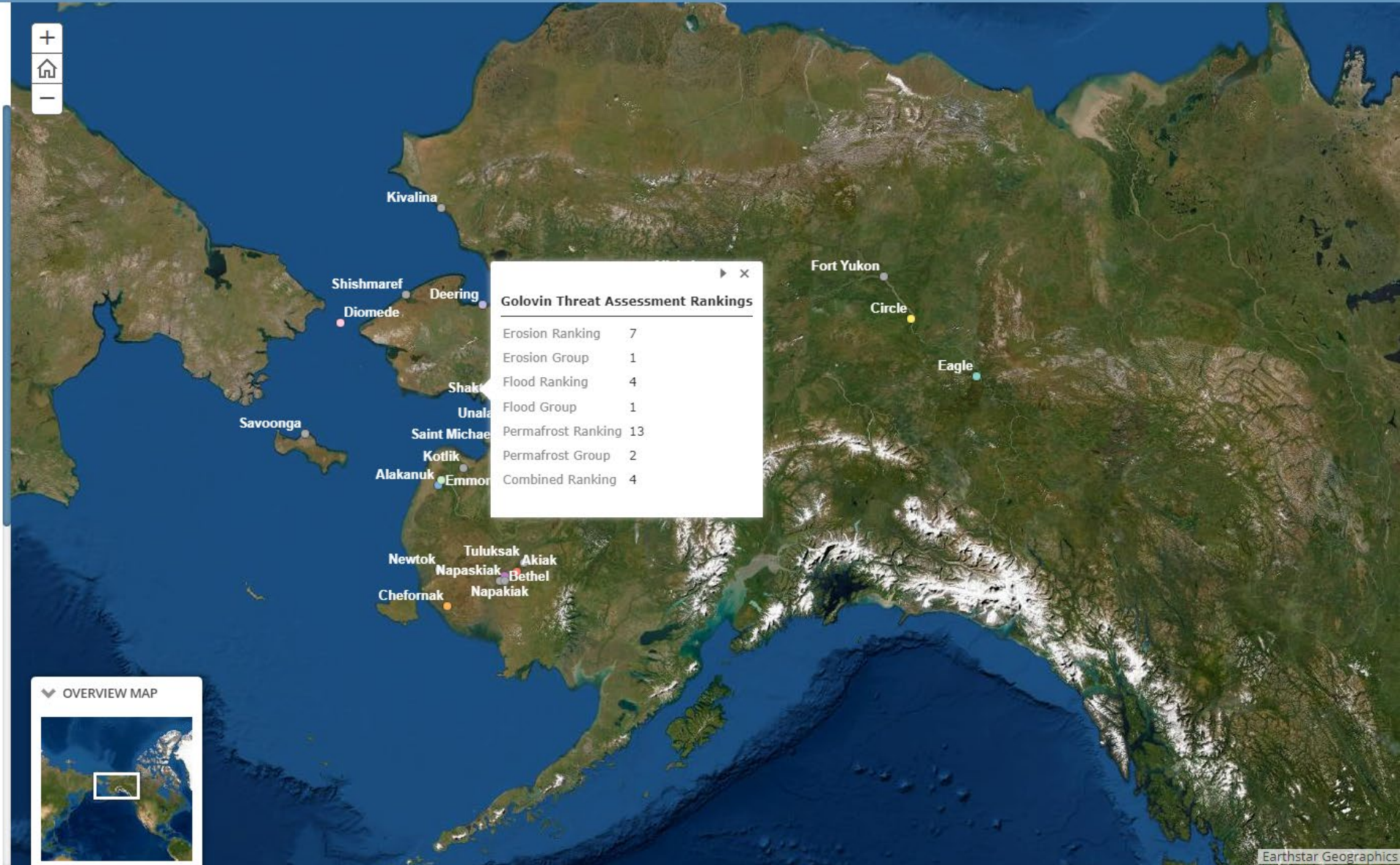
Hazard Summary: this layer provides information on the key hazard threats to the community and provides a summary of the impact of these threats.

Threat Assessment Ranking: this layer provides information on the rank the community received for erosion, flooding, permafrost degradation and combined threats from the **2019 Statewide Threat Assessment** and identifies the group the community was placed in for each of these threats (group 1 being the most threatened communities).

Hazard Study History: this layer provides information on the community's inclusion in the key hazard studies and efforts carried out over the past three decades (excluding the 2019 Statewide Threat Assessment).

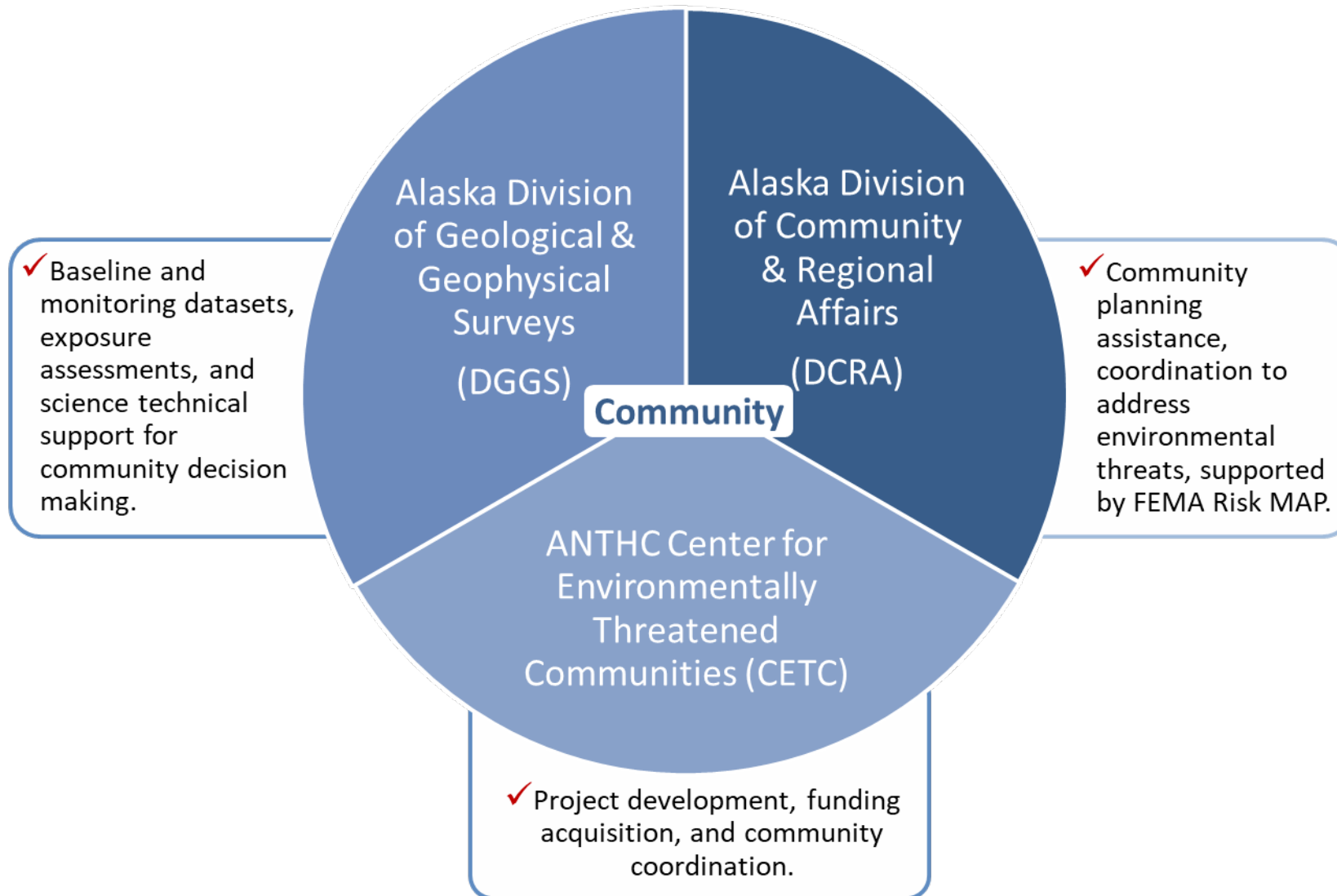
These studies and efforts include:

1. 2009 Baseline Erosion Assessment (US Army Corps of Engineers)
2. 2009 Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion (US Government Accountability Office)
3. 2008 Immediate Action Work Group (State of Alaska Climate Change Sub Cabinet)



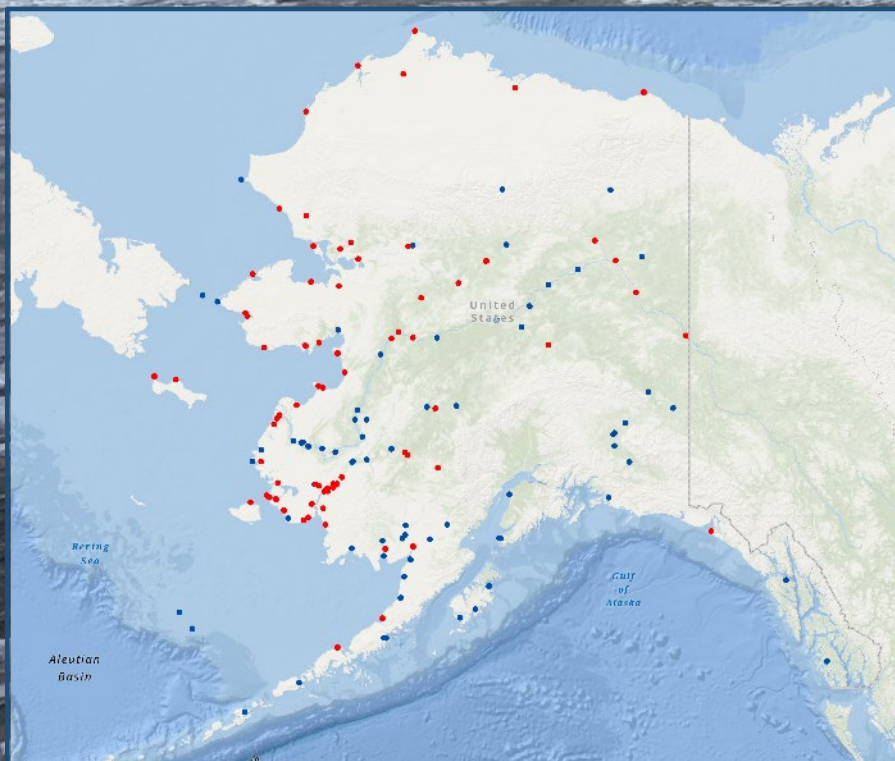


Alaska Coastal Resilience Partnership





Alaska Coastal Resilience Partnership



- Environmentally threatened communities face an estimated \$4.3 billion in costs to infrastructure from environmental threats over the next 50 years.
- Most environmentally threatened communities do not have access to baseline risk assessments to quantify the magnitude or severity of threats.



Alaska Coastal Resilience Partnership

Building Capacity and Conducting Coastal Risk Assessments in Remote Alaska Native Communities (National Coastal Resilience Fund)

1. Quantify and assess vulnerability
2. Develop resilience strategies with mitigation solutions (*protect-in place, managed retreat, relocation*)
3. Obtain funding and implement actions to reduce risk
4. Monitor effectiveness

Protection-in-place
These use of shoreline protection measures and other controls to prevent or minimize impacts.

Foundation adjustment Drainage improvements Elevating homes above the flood level Shoreline protection

Managed Retreat
Moving a portion of the community away from hazard prone areas to locations nearby 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.

Credit: DCRA • ANTHC • Unmet Needs Report 2023



The Three Phases of Adaptation

RISK ASSESSMENT



- Collect baseline data on erosion, flood, and permafrost thaw using community-based observations and scientific data
- Erosion, flood, and permafrost modeling and engineering analyses
- Data compiled into risk assessment report for review by community members and leaders

RESULT

Community understanding of risk

PLANNING



- Community solutions to mitigate risk are developed based on technical feasibility, and benefits and costs of actions
- Community decides to protect-in-place, retreat or relocate, and prioritizes related actions, resources, and timelines
- Community develops Hazard Mitigation Plan (HMP) and resilience/adaptation plan with prioritization of fundable projects

RESULT

Written plan summarizing hazards and priority projects to reduce risk

IMPLEMENTATION



- Community drives project design
- Community acquires and manages project funding
- Community manages construction project implementation by working with local or outside project management contractors
- Construction using local workforce

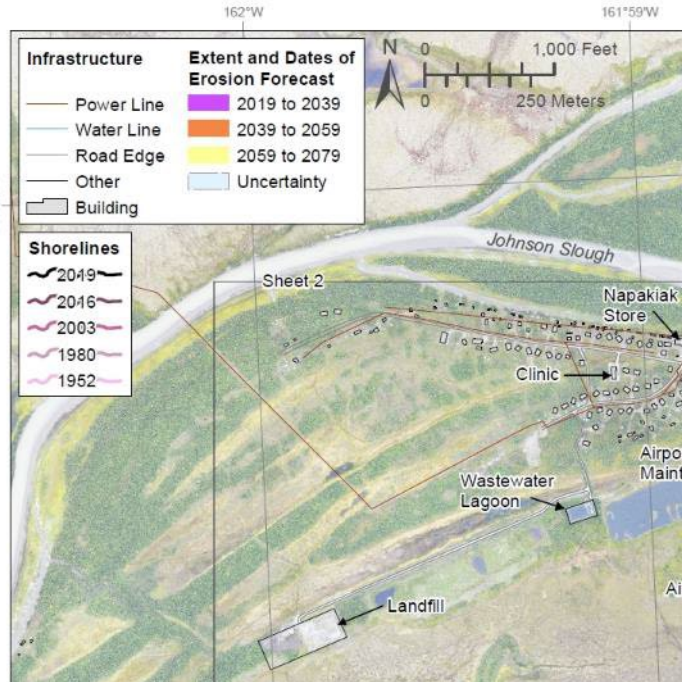
RESULT

Reduced risk to environmental threats



Risk Assessment and Planning Deliverables

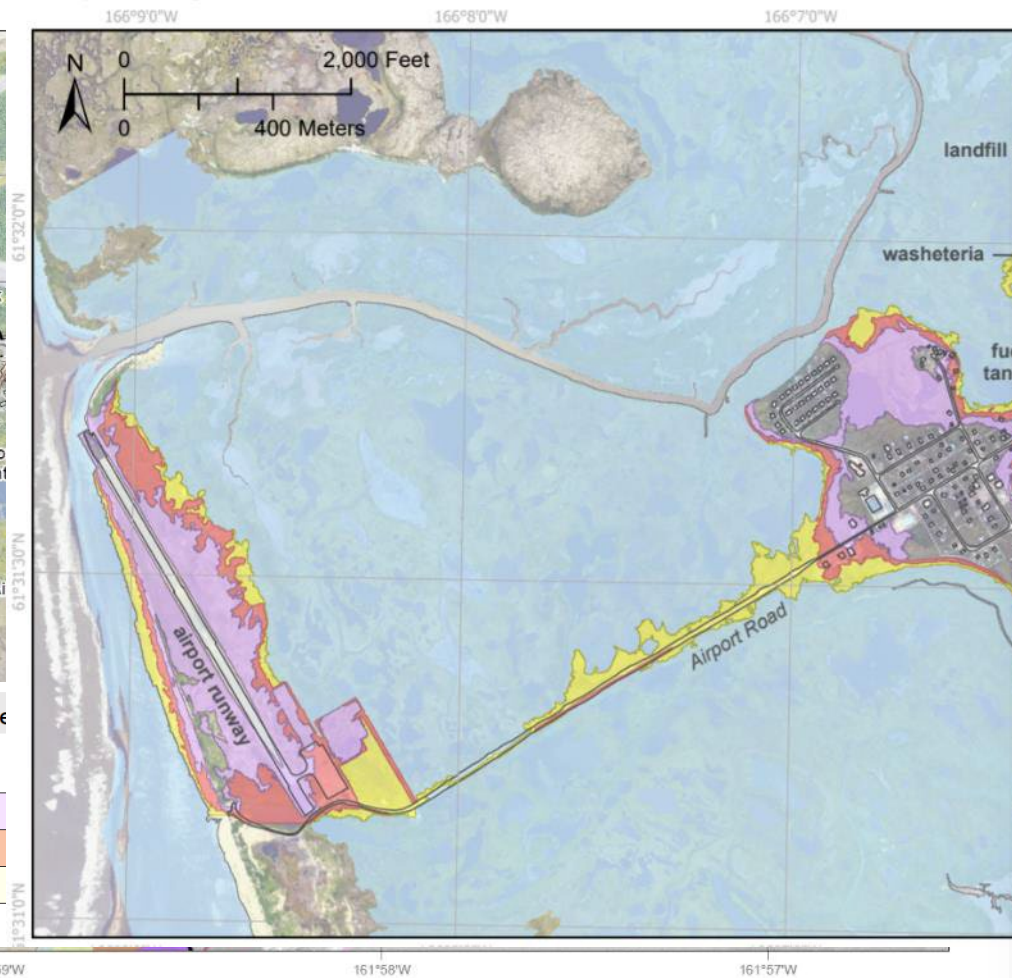
Erosion Forecast Napakiak, Alaska



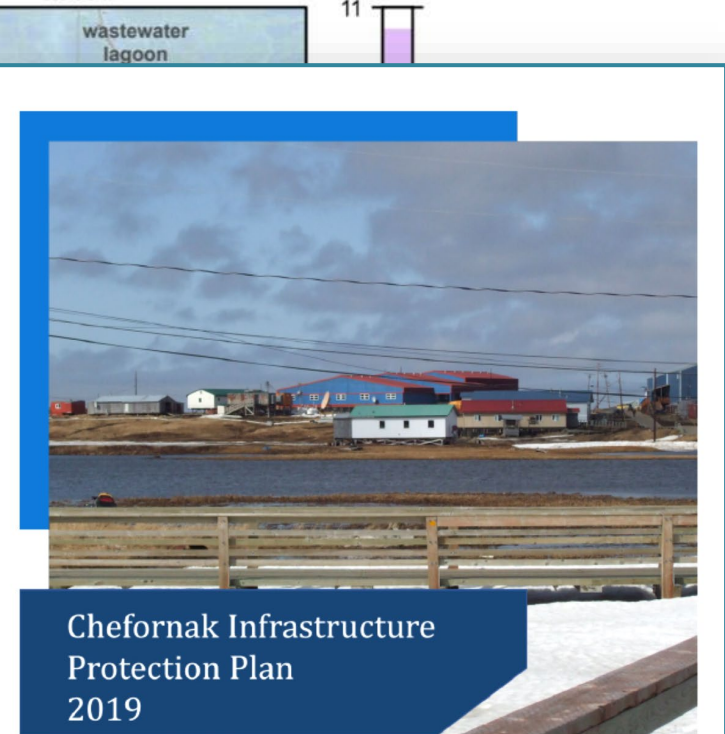
Cost to Replace Exposed Infrastructure

Erosion Forecast Date Range	Buildings & Tank Facilities	Power Lines	Water Lines	Roads
2019 to 2039	\$41,525,900	\$196,500	\$239,100	\$836,400
2039 to 2059	\$13,050,000	\$223,400	\$115,000	\$1,235,000
2059 to 2079	\$8,450,000	\$244,400	\$0	\$951,000
Combined Total	\$63,025,900	\$664,300	\$354,100	\$3,022,400

Coastal Flood Impact Map Hooper Bay, Alaska



REPORT OF INVESTIGATION 2021-1
Buzard and others, 2021
HOOPER BAY



Chefnak Traditional Council
P.O. Box 110
Chefnak, AK 995610110

City of Chefnak
PO Box 29
Chefnak, AK 99561

Chefnarmute, Incorporated
P.O. Box 70
Chefnak, AK 99561



Monitoring Progress & Coordinating Efforts

Conducting work and tracking progress with 144 communities requires a consistent and continuously updated catalog.

Resource for agencies and other organizations to understand ongoing activities and remaining gaps.

Data and assessment tracking catalog created in ArcGIS Online database, allows for sharing across organizations and with the public.
<https://dggs.alaska.gov/hazards/coastal/>

Community flooding, erosion, and permafrost risk assessment status

Use the dropdown in the top right to view data. Type or Select Community Shishmaref

General Information	Baseline Data	Monitoring	Risk Assessment
Shishmaref General Information Population 542 Geographic Setting coastal	Time Period: 1950, 1985, 2003, 2016 Date Completed: 2018 Source: USGS Link: Modern Imagery: Complete Date: 2016, 2021 Note: fixed-wing Source: USGS, USACE Link: Ortho Topography: Complete Date: 2004, 2021 Note: 2004-lidar, 2021-pending topobathy lidar Source: USACE Link: lidar Bathymetry: Complete Date: 2012, 2021 Source: DGGS, USACE Note: single-beam, topobathy lidar Link: bathymetry First Floor: In progress Elevation Survey: Date: 2021 Source: Denali Commission Link:	Coastal Elevation In progress Profile Status Date 2012, 2017 Source Alaska Institute for Justice Link ACPT Community Based Inactive Erosion or Flood Monitoring Date 2017 Source Alaska Institute for Justice, AOOS Link Monitoring Site	Historical Shoreline Complete Change Rate: Date: 2019 Source: USGS Link: Shoreline Change Report Historical Flood Funded Assessment: Date: 2023 Source: NCRF Link: Baseline Erosion Complete Forecast: Date: 2021 Source: Denali Commission Link: https://dggs.alaska.gov/pubs/id/30672 Hydrodynamic Flood Funded Model:
Statewide Threat Assessment Community Shishmaref Flood Group 1 Erosion Group 1 Permafrost Group 2 Combined Group 1		Water Level Data More information at Alaska Water Level Watch NOAA None Real-Time Water Level ID Alternative GNSS-R Water Level Activity Status Recommended Date Source NOAA 9469854	Engineering Assessment Engineering Analysis: Recommended Date: Source: Link: Engineering Report: Recommended Date: Source:

Map for Search Results

This map only flashes the result of the search in the top right. You must select a community using the search in the top right.



Project Phases, Key Partners, Deliverables, Desired Results

RISK ASSESSMENT

*Primary Partner with Community: DGGS
Supported by DCRA + ANTHC*

- Baseline Data Collection to support Flood Modeling (DGGS)
- Community surveys of local knowledge of hazard impacts (DCRA)
- Coastal Erosion and Flood Risk Assessments (DGGS)
- Coastal Flood Modeling (DGGS)
- Assistance to community to understand risk assessments (DCRA + ANTHC)

Deliverables:

- Erosion Forecast Map
- Coastal Flood Impact Map

RESULT:

Community understanding of risk

PLANNING

*Primary Partner with Community: DCRA
Supported by ANTHC + DGGS*

- Community assesses technical feasibility, benefits and costs of solutions and makes a decision to protect-in-place, retreat or relocate (DCRA + ANTHC)
- Community identifies and prioritizes actions, resources and timeline
- Develops strategic actions and sequencing of tasks (DCRA)
- Develops funding strategy (ANTHC)

Deliverables:

- Infrastructure Protection Plan

RESULT:

Community decisions to reduce risk

IMPLEMENTATION

*Primary Partner with Community (ANTHC)
Supported by DCRA + DGGS*

- Community manages construction project implementation by working with local or outside project management contractors (ANTHC)
- Community acquires and manages project funding (ANTHC)
- Community drives project design
- Construction using local workforce

Deliverables:

- A pipeline of fundable projects

RESULT

Reduced risk to environmental threats



Contact:

Sally Russell Cox

State of Alaska Risk MAP Coordinator

Alaska Department of Commerce, Community, and Economic Development
Division of Community and Regional Affairs

sally.cox@alaska.gov

(907) 269-2588

<https://www.commerce.alaska.gov/web/dcra/CommunityResilienceandClimateAdaptationPrograms.aspx>