FINAL REPORT JANUARY 2024

The Unmet Needs of Environmentally Threatened Alaska Native Villages:

ASSESSMENT AND RECOMMENDATIONS

ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

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Front page photo: Severe erosion at the village of Huslia. **Credit**: Huslia Village, Alaska

Current photo: Moving in to new homes in Mertarvik, Newtok's relocation site. **Credit**: ANTHC

Introduction

> *"We recognize that our strength and resilience come from our ability to work together to solve problems. Erosion, flooding, and melting permafrost continue to threaten Alaska Native communities, impacting our cultures and our ability to fish, hunt, and gather food for our loved ones."*
>
> **- Valerie Nurr'araaluk Davidson, President/CEO, ANTHC**

The purpose of this report is to help improve the effectiveness of federal and state government support for Alaska communities to address climate and environmental threats to infrastructure from erosion, flooding, and permafrost degradation. Legislative and programmatic changes are needed to remove barriers faced by small rural communities and to create more effective and equitable systems to deliver resources and services. The intended audience for this report is the U.S. Congress, the White House, and federal and state agency leadership and program managers.

This report identifies funding needs, priorities, and recommends implementation strategies. It offers a conceptual whole-of-government coordination framework for Alaska, with specific roles and responsibilities identified for state and federal partners, intended to catalyze the development of a better service delivery system. In addition to informing systemic change that requires action by the U.S. Congress, information in this document may be used by federal agencies to inform the allocation of Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) funding for the near-term benefit to communities.

This report was prepared by a team of service providers from the Alaska Native Tribal Health Consortium (ANTHC) and the State of Alaska Division of Community and Regional Affairs (DCRA), based on their extensive experience and technical expertise supporting Alaska's environmentally threatened Indigenous communities.

Co-production of knowledge is significant in reports like this because the goal is to create change at the local level. Indigenous experts, inclusive of community and subject matter experts, can contribute relevant framing, representative language and tone, link key points and concepts, and assist in elevating and forwarding suggested key messages and actions at the institutional, governance, and societal level. In 2021, the first draft of this report was distributed to multiple communities and partners from local, Tribal, federal, state, and non-profit organizations in Alaska. We received comments from 46 reviewers, including representatives from 11 Alaska Native communities and seven Alaska Native organizations. All comments were addressed to the extent possible in the current draft. In 2022, we hosted workshops for agency staff and community staff and leaders, to provide important feedback that helped restructure the report. In total

the report team received feedback and ideas from more than 150 people. This report had elements of co-production with Tribal community engagement throughout the review process. It was not developed within a co-production process. Appendix E describes the community and partner engagement process in detail.

Use of the term "community" in this report: Alaska has 229 federally recognized Tribes representing forty percent of the federally recognized Tribes in the entire nation, nearly half of whose members are based within 200 Alaska Native villages in rural Alaska. The government structure of Alaska Native communities may contain several distinct governing bodies that perform overlapping governance tasks, including making decisions about how to address environmental threats to community infrastructure. A city government may coexist in a community with a federally recognized Tribal government, which may also be under the jurisdiction of a borough government. Most Alaska Native villages also have a village corporation formed under the Alaska Native Claims Settlement Act[1] which may be the largest landowner in the community. In many Alaska Native communities, individuals who are members of the Tribe may also serve on the city council and be a shareholder of the village corporation. When we talk about infrastructure in Alaska Native communities, ownership is often distributed among the Tribe, city, and village corporation—rarely under a single entity. Regional housing authorities, of which there are 14 in Alaska, implement federal housing funding. We refer to Alaska Native villages as "communities" in this report because unmet needs and impacts to infrastructure are not just to Tribal infrastructure, city infrastructure, or village corporation infrastructure. Environmental threats to infrastructure usually impact the entire community in some way, regardless of the entity that owns the land or structures.

Special pullout sections for specific audiences:

Policymakers & federal agency leaders and staff: pages 1-13.

Members of the media: pages 1-13, Chapter 1, Chapter 2, Appendix C, Appendix H.

Researchers: pages 1-13, Chapter 2, Chapter 6, Appendix B, Appendix C.

1 The Alaska Native Claims Settlement Act (ANCSA, 1971) created a system of 13 regional and over 200 village-based for-profit corporations. Twelve regions and 174 village corporations are currently operating. (ANCSA, 2022).

Author

Alaska Native Tribal Health Consortium

Major Contributor

State of Alaska

Indigenous and Community Contributors

Dan Breeden	Bristol Bay Native Association
Carl Burgett	Huslia Village
Clarence Daniel	Association of Village Council Presidents
Millie Hawley	Native Village of Kivalina
Robert Iyatunguk	Native Village of Shishmaref
Bernice John	Newtok Village
Mark McNeley	Native Village of Nelson Lagoon
Shannon Melton	Native Village of Buckland
Walter Nelson	Native Village of Napakiak
Karen Pletnikoff	Aleutian Pribilof Islands Association
Genevieve Rock	Native Village of Shaktoolik
Bill Tracey	North Slope Borough (Point Lay resident)

A group of 12 Indigenous and Community Contributors from eight Alaska regions was convened to increase participation from Alaska Native people in communities and staff at regional Tribal organizations. This ensures the report includes local Indigenous knowledge. The group reviewed the report, responded to a set of 15 review questions, and made comments and edits that were incorporated in the report revisions. The group provided suggestions to improve graphics and illustrations, incorporate new information, and rework language. Group members also pointed out ways to more thoroughly highlight areas such as food sovereignty and Tribal sovereignty. The group chose to author a letter to support the report and share the importance of protecting Alaska Native people and cultures. The letter from the Indigenous and Community Contributor group can be found in Appendix H.

Reviewers

In March 2021, the authors distributed the first draft of this report to a diverse group of communities and partners. Forty-six individuals reviewed and provided comments on the first draft. In 2022 and 2023, extensive revisions were made based on the guidance of the Indigenous and Community Contributors Group, community Tribal council meetings, community workshops, and an agency and service provider workshop. A final draft of the report was distributed to over 200 communities and partners in April 2023. Not all recipients provided comments on the final draft.

Brett Nelson
U.S. Department of Agriculture, Natural Resources Conservation Service

Bruce Sexauer
U.S. Army Corps of Engineers, Alaska District

Carol Oliver
Chinik Eskimo Community, Golovin, Alaska

Chris Fehrman
Indian Health Service

Clarence Daniel
Association of Village Council Presidents

Dan Breeden
Bristol Bay Native Association

Denman Ondelacey
Indian Health Service

Dennis Wagner
Environmental Protection Agency

Elsie Vent
City of Huslia, Alaska

Erin Dougherty Lynch
Native American Rights Fund

Gordon Brower
North Slope Borough Planning and Community Services

Greg Stuckey
U.S. Department of Housing and Urban Development

Jackie Qatalina Schaeffer
Alaska Native Tribal Health Consortium

Jaci Overbeck
State of Alaska Division of Geological and Geophysical Surveys

Jacob Tobeluk
City of Nunapitchuk, Alaska

Jen Harrington
Alaska Native Tribal Health Consortium

Jeremy Littell
U.S. Department of the Interior, U.S. Geological Survey, Alaska Climate Adaptation Science Center

Joel Neimeyer
Neimeyer Consulting

John Torgerson
Denali Commission

Julie Raymond-Yakoubian
Kawerak, Inc.

Kristi Warden
Federal Aviation Administration

Lauren Divine
Aleut Community of St Paul Island, Alaska

Leigh Hubbard
Indian Health Service

Malinda Chase
Alaska Climate Adaptation Science Center, Alaska Tribal Resilience Learning Network

Mark McNeley
Native Village of Nelson Lagoon, Alaska

Michelle Davis
Environmental Protection Agency

Mike Brubaker
Alaska Native Tribal Health Consortium

Natalie Wagner
U.S. Department of Agriculture, Rural Development

Nicole Kinsman
National Oceanic and Atmospheric Administration

Nikoosh Carlo
CNC North Consulting

Raychelle Daniel
Pew Charitable Trust

Richard Hildreth
State of Alaska Division of Homeland Security and Emergency Management

Rick Dembroski
State of Alaska Division of Homeland Security and Emergency Management

Robert Chambers
U.S. Department of Agriculture, Rural Development

Robert Pearson
State of Alaska Division of Community and Regional Affairs

Robin Bronen
Alaska Institute for Justice

Ryan Maroney
U.S. Department of Agriculture, Natural Resources Conservation Service

Sarah McClellan
City of McGrath, Alaska

Sarah Trainor
Alaska Center for Climate Assessment and Policy

Sean Kelly
University of Alaska Fairbanks

Sean McKnight
Kawerak, Inc.

Sheila Williams
Akiak Native Community, Alaska

Tami Fordham
Environmental Protection Agency

Timi Vann
National Oceanic and Atmospheric Administration

Toby Anungazak, Jr.
Chinik Eskimo Community, Golovin, Alaska

Twyla Thurmond
Native Village of Shishmaref, Alaska

Walter Nelson
Native Village of Napakiak, Alaska

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Executive Summary

National Significance - the critical importance of protecting Alaska Native communities and cultures

Today, Alaska Native communities are on the front lines of climate change. These communities are disproportionately impacted by harmful climate-driven environmental trends and extreme events. Alaska Native economic, social, and cultural ways of being, which have served so well for millennia, are now under extreme threat due to accelerated environmental change. The magnitude and severity of this problem can be difficult to comprehend. In jeopardy are not just buildings, but the sustainability of entire communities and cultures.

Alaska Native villages and Alaska Native cultures are a national treasure. Alaska is home to 160,287 Alaska Native people who are members of 229 federally recognized Tribes—forty percent of the federally recognized Tribes in the United States. Alaska Native people are represented by 11 distinct Indigenous cultures and at least 20 Native languages with more than 200 dialects. Nearly half of Alaska Native people live in 200 small, remote communities that are some of the most underserved areas in the nation. Alaska Native people experience greater disparities in social determinants of health than other races for poverty, education, employment, physical environment, and access to health care due to factors including historical discriminatory policies, insufficient resources, and inefficient federal program delivery (USCCR, 2018; ANTHC, 2017). Entrenched disparities in the nation's laws and public policies have often denied equal opportunity to historically underserved communities (Exec. Order No. 13985, 2021).

National Significance - a model to prevent disasters nationwide and reduce federal fiscal exposure

144 Alaska Native communities face some degree of infrastructure damage from erosion, flooding, permafrost degradation, or a perilous combination of all three hazards. The magnitude and severity of climate change impacts in Alaska, where air temperatures are rising faster than in any other state, will soon occur in communities throughout the United States. The approaches recommended in this report can serve as a nationwide model to prevent disasters. Developing and testing a collaborative funding allocation method based on risk and a whole-of-government implementation framework in Alaska is transferrable to the contiguous United States. This approach is consistent with GAO recommendations for prioritizing climate resilience investments based on need and implementing a climate migration pilot program (GAO, 2019; GAO, 2020).

Purpose and Origin

The purpose of this report is to help improve the effectiveness of federal and state government support for Alaska communities to address climate and environmental threats. Legislative and programmatic changes are needed to remove barriers faced by small rural communities and to create more effective and equitable systems to deliver resources and services. The intended audience for this report is the U.S. Congress, the White House, and federal and state agency leadership and program managers.

The need to improve support for Alaska communities striving to address environmental threats has been reported numerous times over the last several decades. The GAO, State of Alaska, and academic researchers have brought attention to the issue through various initiatives and publications. This effort is unique in that it also offers specific solutions that have been reviewed and endorsed by more than 27 of the most threatened communities.

This document builds on the BIA's submission to the U.S. House Appropriations Committee in 2020, and it expands on the May 2022 GAO analysis titled *Federal Agencies Could Enhance Support for Native Village Efforts to Address Environmental Threats* (GAO, 2022). This work includes an analysis of the effectiveness of 25 federal programs relevant to addressing climate and environmental threats in Alaska. The report identifies funding needs, priorities, and implementation strategies. It offers a conceptual whole-of-government coordination framework for Alaska, with specific roles and responsibilities identified for state and federal partners, intended to catalyze the development of a better service delivery system. In addition to informing systemic change that requires action by the U.S. Congress, information in this document may be used by federal agencies to inform the allocation of Bipartisan Infrastructure Law and Inflation Reduction Act funding for the near-term benefit to communities.

Figure 1: *Despite striving to address coastal erosion for decades, the majority of the shoreline at Shishmaref is unprotected. Also, the community does not yet have adequate information to make an informed decision about addressing projected erosion and flooding later this century. Credit: Native Village of Shishmaref*

What are the Unmet Needs of Alaska's Environmentally Threatened Alaska Native Villages?

Inequitable delivery of resources and services

The federal government has not taken a strategic approach to address climate and environmental threats because resources and services are not prioritized based on need—specifically, the level of risk to communities. Inequitable regulatory barriers and program design have disadvantaged Alaska Native villages from relevant federal programs. These barriers prevent those with the greatest need from accessing competitive grants while those with less need, high capacity, and grant writers routinely win access to resources and services. Supporting the most vulnerable communities who have been historically disadvantaged from access to resources and services should be the highest climate change priority. Federal agencies, particularly those with staff and leadership outside Alaska, regularly fail to design programs to be equitable, in part due to a lack of knowledge of rural Alaska.

> *"Instead of being seen as an asset to the United States of America, it feels like we are ignored by federal agencies. We are excluded. We have been declined funding to replace threatened homes, our preschool, and our fuel tank farm. Our community already faces extreme overcrowding—the Killanak family has 17 people living in an 800-square foot home. More people cannot abandon their homes and move in with relatives. Our pre-school is taught entirely in the Yup'ik language—it should be a national treasure! If the tank farm fails, it will pollute the river, a main food source for our entire community. I feel defeated. We need agencies to value us, our culture, the way we live, and to prioritize our community."*
>
> **- Janet Erik, President**
> **Chefornak Traditional Council, Chefornak, Alaska**

Lack of funding

Approximately $4.3 billion in 2020 dollars is needed over 50 years to mitigate infrastructure damage, as detailed in Chapter 4. There's an $80 million annual funding gap over the next decade, crucial for averting costly disaster responses. Spending $1 on hazard mitigation saves $6 in recovery costs (Multi-Hazard Mitigation Council, 2019). Preventing erosion, flooding, and permafrost-related disasters in Alaska Native villages could save around $25.8 billion in response and recovery costs. Despite the existence of 60 funding programs, only seven have aided environmentally threatened Alaska Native villages. Just two programs specifically support Tribes in protection-in-place, managed retreat, and relocation efforts.

> *"We should not be writing grants to protect our communities"*
>
> - Melanie Bahnke, Chair, Alaska Federation of Natives Climate Task Force

Limited Local Capacity

Local staff positions need support and comprehensive training to strengthen community capacity. Small Alaska Native communities are often assumed to have administrative capabilities akin to those in contiguous U.S. municipalities, but in reality, they lack specialized planning, public works, and administrative departments. In many cases, a single administrator manages various roles, and staff turnover is high. Additional funding is necessary to hire and train community-based staff, as discussed in Chapter 5.

Lack of Technical Assistance

Community-specific multi-disciplinary technical assistance teams are needed to support communities with the tens of thousands of tasks associated with risk assessments, planning, and implementing solutions. Most infrastructure projects in rural Alaska are implemented by regional and statewide organizations that work with communities on planning, design, and construction. However, there is limited technical assistance available to communities to address climate and environmental threats. Current federal programs—such as FEMA Hazard Mitigation Assistance, BIA Tribal Climate Resilience, and EPA Office of Environmental Justice—exclude or make it difficult for Tribal organizations to support Alaska communities with technical assistance. Other agencies, such as the U.S. Army Corps of Engineers, have legislative barriers that block access to the agency's technical expertise and services. See Chapter 5.

> *"Technical assistance has informed most of the recent decisions Shaktoolik has made to address coastal flooding and erosion. We would not be where we are today without a lot of outside support.*
>
> **- Genevieve Rock, Native Village of Shaktoolik**

Community-Specific Hazard Data Collection and Risk Assessments

Few Alaska communities have completed site-specific erosion, flooding, or permafrost risk assessments to inform long-term solutions and develop appropriate mitigation projects. Completing community risk assessments will inform community decision-making, improve the statewide cost estimates presented in this document, and inform the scale of governmental response. This need can be most effectively and equitably addressed through a voluntary statewide data and risk assessment program that communities can elect to participate in. At the time of publication, staff from the State of Alaska, ANTHC, and federal agencies have started to develop this program with the intention of providing an experienced, diverse team to collaborate with each community on collecting data, assessing that data, developing and revising standards, overseeing work, engaging disciplinary subject matter experts for advisory support, and supporting community-specific long-term monitoring programs. See pages 65-66.

"It has been very stressful and frustrating to go through so many agencies to find ways to carry out our Managed Retreat Plan. It would be so much better if government agencies could coordinate among themselves on how they can fund our plan so Napakiak can be safer."

- Walter Nelson, Managed Retreat Coordinator, Native Village of Napakiak

Agency Coordination

Current government support to address climate change and environmental threats is immensely complex, inefficient, and ineffective. For many communities, trying to navigate all potential government programs to address environmental threats can be like trying to assemble a 10,000-piece puzzle without a picture printed on the pieces. Significant adjustments to how agencies collaborate are required to improve accessibility, equity, and efficiency. See Chapter 6.

Recommendations

1. We recommend the U.S. Congress take immediate action to close the $80 million annual funding gap by providing a single, committed funding source to fully cover the costs of protection-in-place, managed retreat, or relocation of threatened Alaska communities. To be effective, we recommend the entity that receives the gap funding has Alaska-based staff and leadership, has significant experience supporting community infrastructure development and environmental threats in rural Alaska, and the entity's funding can be used as a non-federal match to leverage other resources. A viable alternative to a single funding source is dedicated funding to multiple agencies who collaborate and fund projects from a common priority list. An example of an existing collaboration is the Alaska Sanitation Facilities Program. The single funding source or collaboration should provide 100 percent federal funding and should be based on a risk-based prioritization. One hundred percent federal funding should be provided for the following needs in order of priorities in the graphic to the right:

Figure 2: *ANTHC • DCRA • Unmet Needs Report 2023*

2. We recommend that agencies and the U.S. Congress remove programmatic and legislative barriers for small Tribal and rural communities. Identified barriers for more than 25 federal programs are listed in Appendix C. Top priorities include:
   - » The design of many funding programs unintentionally limit small, rural community access to federal programs. Examples include cost-sharing requirements, competitive applications, and benefit-cost requirements that do not fit rural Alaska.
   - » We recommend the U.S. Congress implement changes in enabling legislation that prohibits program support for mitigating climate and environmental threats. Examples of programs that would significantly benefit Alaska communities include: Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance programs, U.S. Army Corps of Engineers programs, the National Oceanographic and Atmospheric Administration (NOAA)/National Fish & Wildlife Foundation (NFWF) National Coastal Resilience Fund, U.S. Dept. of Housing and Uban Development (HUD) Indian Community Development Block Grant (ICDBG) and Community Development Block Grant (CDBG).

3. We propose Congress establish a lasting, all-encompassing framework to help Alaska communities combat environmental threats. This framework should be permanent in law to ensure continuity across administrations and agencies. Chapter 6 outlines specific agency roles, aligning government functions to aid threatened communities. A pilot framework in Alaska, in line with GAO suggestions, could inform a nationwide system. (GAO, 2020; GAO, 2022).

Report Outline

This report includes six chapters:

1. **Our Nation Must Protect Alaska Native Cultures, Tribal Sovereignty, and Self-Determination** provides an overview of Alaska Native cultures, the strengths and resiliency required to thrive in harsh environments for thousands of years, the modern inequities that create disparities in social determinants of health faced by Alaska Native people, the impacts of climate change on Alaska Native communities, and how climate change exacerbates existing stressors.
2. **The Future Survival of Many Alaska Native Communities Rests on Addressing Environmental Threats** describes the primary environmental threats and provides case study examples of how environmentally threatened communities are addressing environmental impacts to infrastructure.
3. **Supporting Community-Driven Processes** discusses the importance of empowering communities to use their Indigenous knowledge and decision-making processes to take action because the results are usually more effective, inclusive, and enduring. This chapter covers the ways communities are responding to environmental threats through protect-in-place, managed retreat, and relocation methods, as well as the process of reducing risk through risk assessment, planning, and implementation.
4. **Close the $80 Million Annual Funding Gap with a Single Source Based on Risk** estimates the cost of addressing the unmet infrastructure needs and the barriers to access in Alaska Native villages resulting from environmental threats.
5. **Increasing Local Capacity and Deploying Community Specific Technical Assistance Teams** discusses the funding and training needs for local staff positions to coordinate community-wide efforts, and the deployment of small teams of community-specific technical advisors from expertise within Alaska to support risk assessments, planning, and project implementation.
6. **A Whole-of-Government Implementation Framework is Needed** describes the need for improved government coordination and introduces a proposal for the design, management, and implementation of a whole-of-government coordination framework for hazard mitigation.

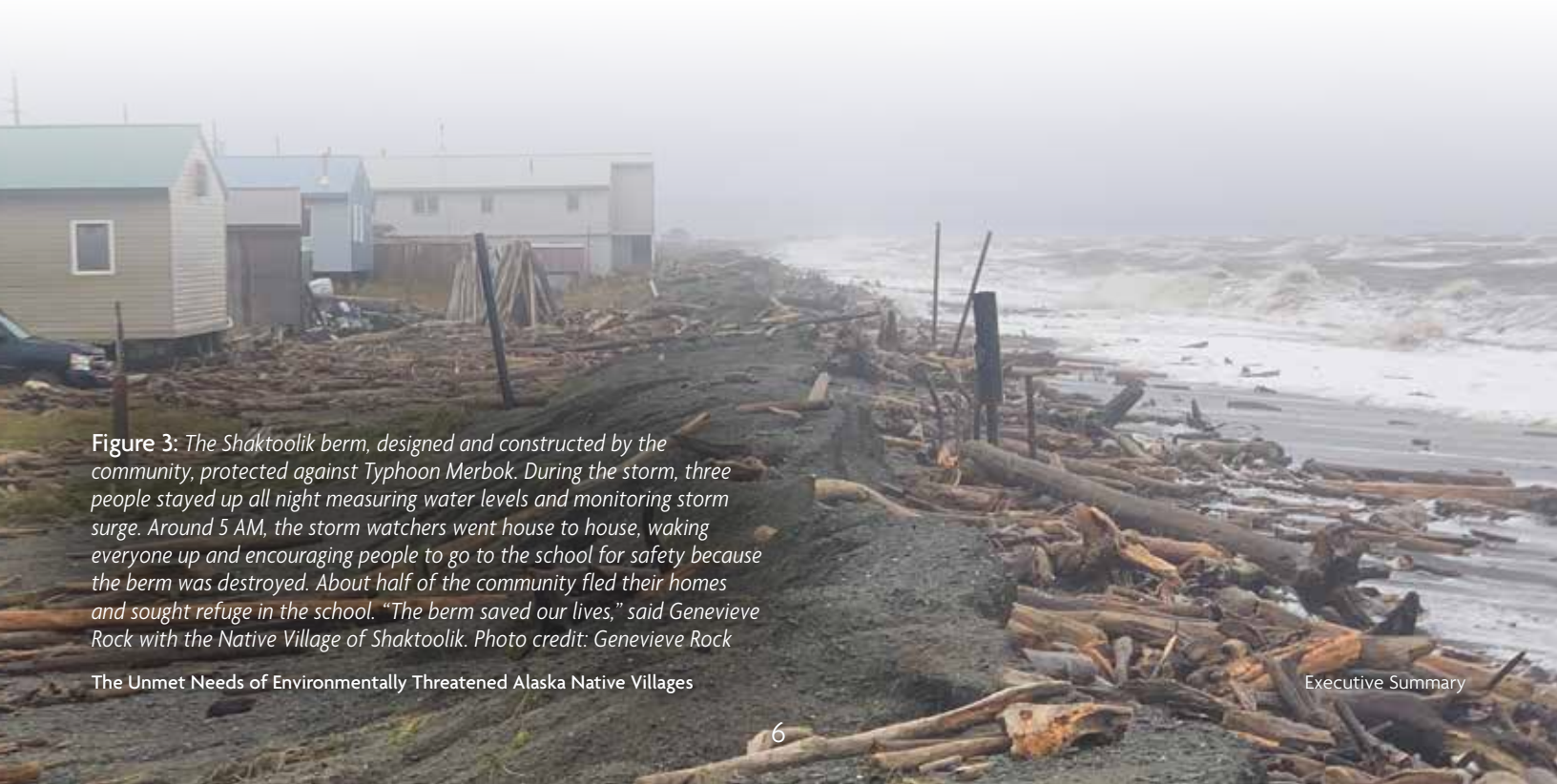


Figure 3: *The Shaktoolik berm, designed and constructed by the community, protected against Typhoon Merbok. During the storm, three people stayed up all night measuring water levels and monitoring storm surge. Around 5 AM, the storm watchers went house to house, waking everyone up and encouraging people to go to the school for safety because the berm was destroyed. About half of the community fled their homes and sought refuge in the school. "The berm saved our lives," said Genevieve Rock with the Native Village of Shaktoolik. Photo credit: Genevieve Rock*

Summary for Policymakers and Agency Leaders

Recommendations

1. **Single funding source based on risk:** We recommend the U.S. Congress close the $80 million annual funding gap by providing a single, committed funding source for Alaska communities to protect-in-place, retreat, or relocate to new community sites. We recommend the entity that receives the gap funding is based in Alaska, has significant experience supporting community infrastructure development and environmental threats in rural Alaska, and the entity's funding can be used as a non-federal match to leverage other resources. A viable alternative to a single funding source is dedicated funding to multiple agencies who collaborate and fund projects from a common priority list. An example of an existing collaboration is the Alaska Sanitation Facilities Program. The single funding source or collaboration should provide 100 percent federal funding and should be based on a risk-based prioritization.
2. **Remove barriers to equity:** We recommend that federal agencies remove programmatic barriers and improve program design for small Tribal and rural communities. Simultaneously, we recommend that the U.S. Congress implement changes in enabling legislation and place conditions on the appropriation of funding for federal programs to remove barriers that limit access and reduce effectiveness. Identified barriers are listed in Appendix C.
3. **Whole-of-government implementation framework:** We recommend the U.S. Congress create a whole-of-government implementation framework to systematically support Alaska communities to address environmental threats. Tribal organizations and federal and state agencies could implement a pilot framework in Alaska as a transferrable model for use nationwide, consistent with U.S. GAO recommendations (GAO, 2020; GAO, 2022). We suggest a potential operational framework with specific agency roles and responsibilities in Chapter 6.

Background

The federal government's system for providing resources and services to address climate change and environmental threats remains inequitable and inefficient. Both legislation and program design create persistent barriers for disadvantaged communities and perpetuate historical underinvestment. 144 Alaska communities face infrastructure damage from erosion, flooding, and permafrost degradation. Lack of funding, technical assistance, local capacity, community-specific hazard data collection, and risk assessments all hinder mitigating environmental threats. Also, ad-hoc agency coordination and inefficiency in implementing projects with multiple funding sources are primary barriers. See Chapter 4. We estimate that:

- $4.3 billion in 2020 dollars will be required to proactively mitigate damage to existing infrastructure over the next 50 years.
- An $80 million annual funding gap exists over the next 10 years.
- Implementing the recommendations can potentially avert approximately $25.8 billion in emergency response and recovery costs.

National Significance

The magnitude and severity of climate change impacts in Alaska will soon occur in communities throughout the United States. The strategies recommended in this report can serve as a nationwide model for how to efficiently deliver resources and services based on need. The report expands on the 2020 U.S. House Appropriations Committee request (BIA TCRP, 2020) and the 2022 GAO analysis (GAO, 2022) through a community, Tribal government, and partner engagement process that included more than 150 people from 27 communities and 39 agencies and organizations. See Appendix E. This report recommends how to invest funding and deliver services, details a whole-of-government implementation framework, and identifies dozens of barriers across federal programs. If adopted, the recommendations in this report will enable an effective approach to building resilience to climate change and improve the benefit of Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) funds. This is an opportunity to act on urgent needs and test an innovative support system that could be expanded nationwide.

Geographic Comparison Map

The state of Alaska compared to the continental U.S. showing the geographic range of 144 environmentally threatened communities, and examples of some of the environmental threats impacting these communities.

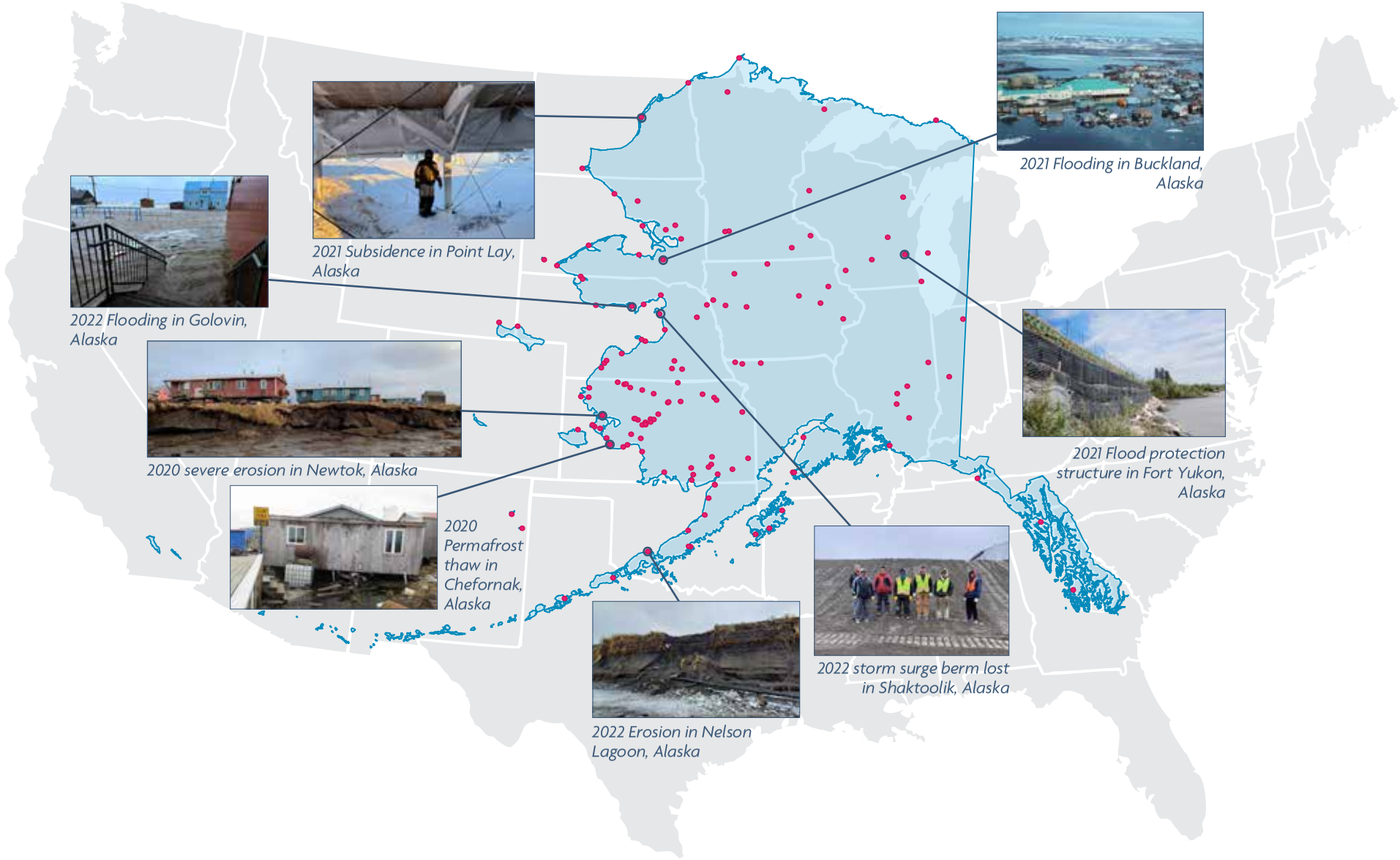


Figure 4: *DCRA • ANTHC • Unmet Needs Report 2023*

Options to Mitigate Erosion, Flooding, and Permafrost Degradation

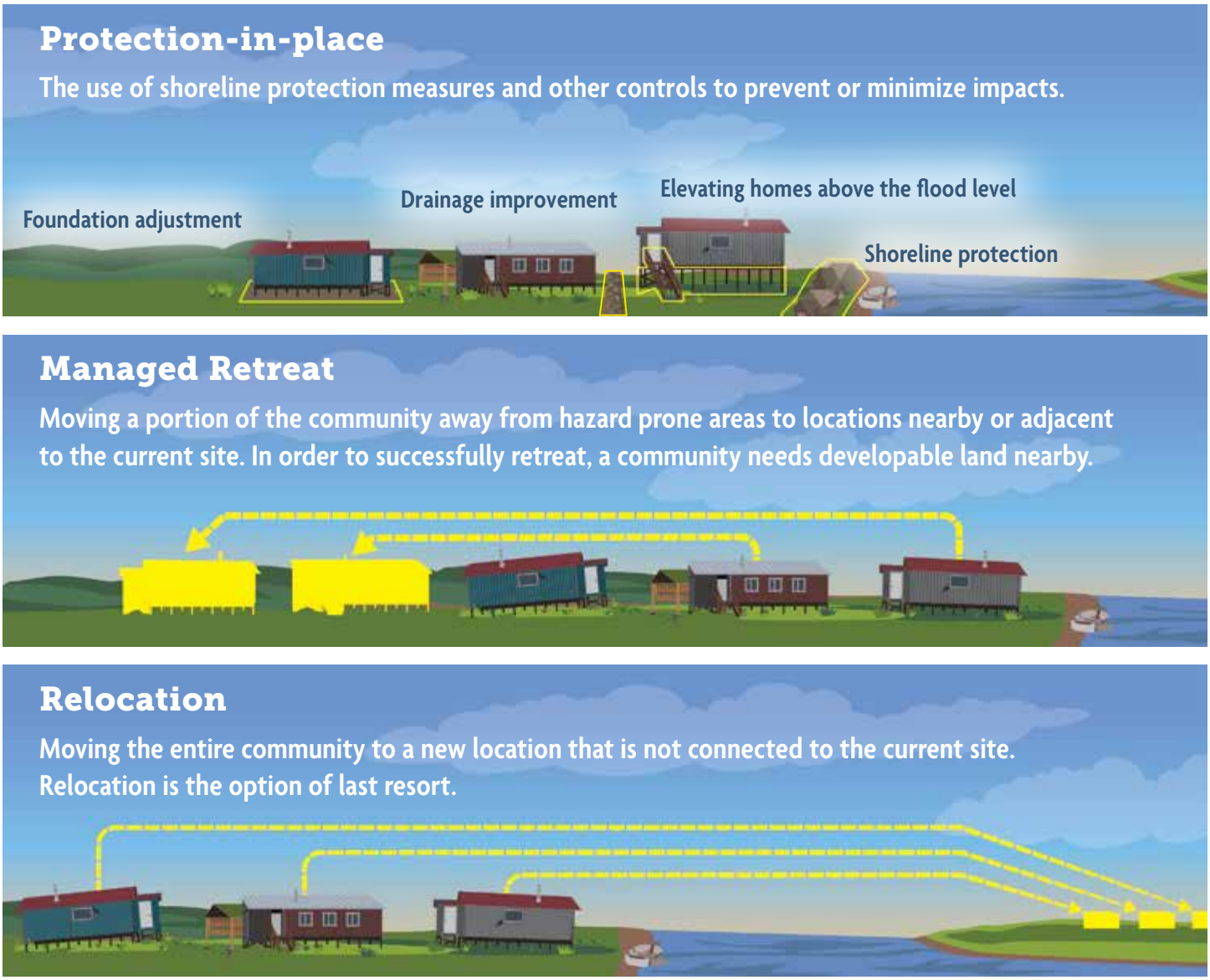


Figure 5: *DCRA • ANTHC • Unmet Needs Report 2023*

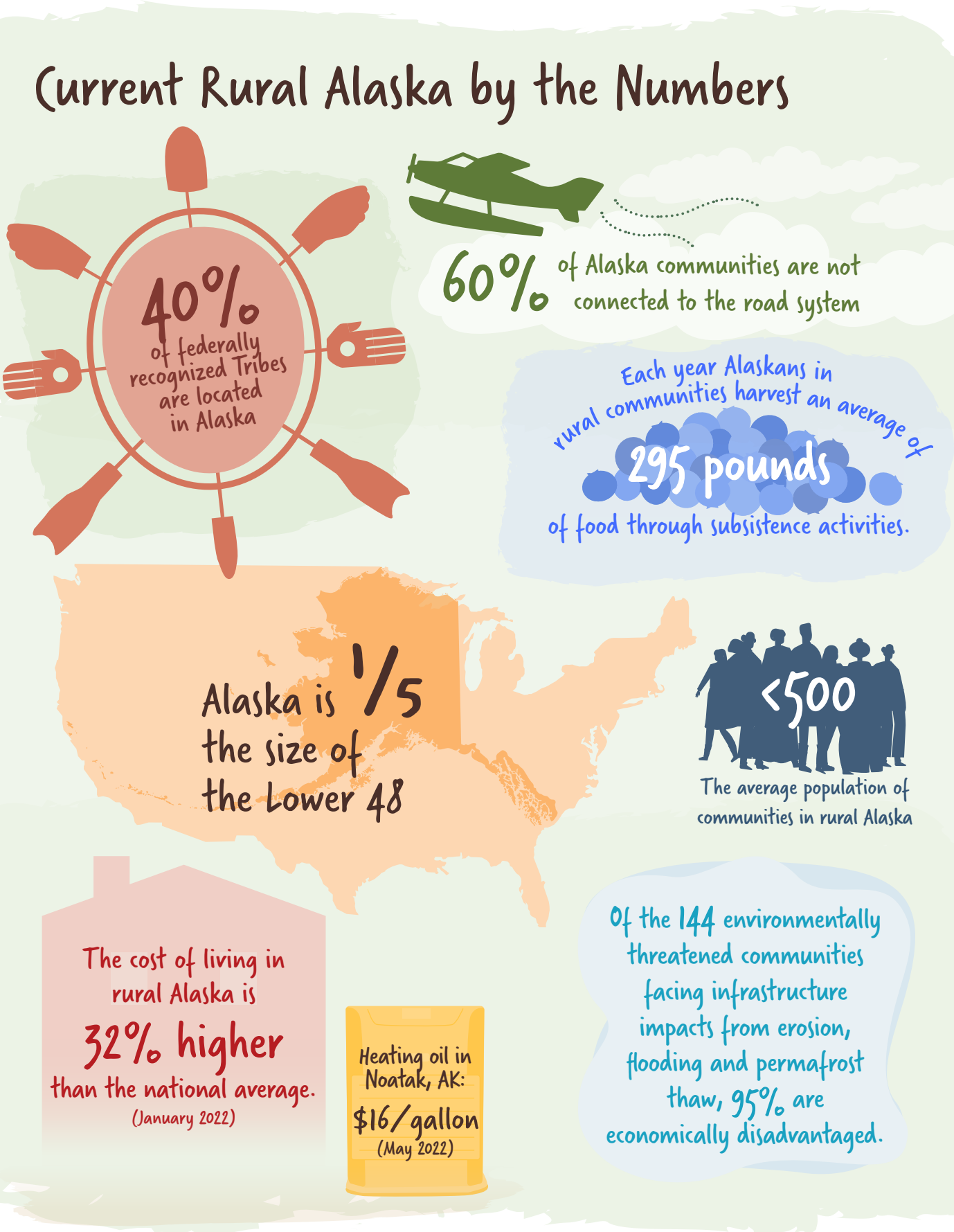


Figure 6: *ANTHC • DCRA • Unmet Needs Report 2023*

Inequitable, Ineffective, and Inefficient System

- Red stop signs represent agency programs that exclude communities.
- Yellow yield signs represent programs that disadvantage communities.
- Green traffic lights represent programs that are effective for communities.

Figure 7: *ANTHC • DCRA • Unmet Needs Report 2023*

Effective and Efficient Community-Driven System

Figure 8: *ANTHC • DCRA • Unmet Needs Report 2023*

Conceptual Alaska Environmental Threat Implementation Framework

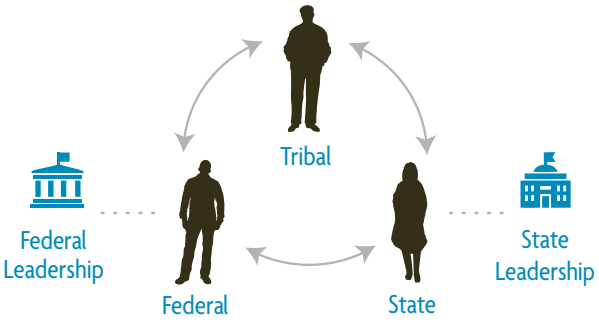
Goal: Mitigate environmental threats for another 10,000 years in our communities. See Chapter 6.

Environmentally Threatened Community

Local/Regional Coordinator

Community-Specific Technical Assistance Team

Each community works directly with a small group of technical assistance providers. This team provides a single point of contact for a community to access the planning, funding, and technical support it needs.



Mitigation Framework Co-Chairs

Three Co-Chairs ensure that government support among State, Federal and regional Tribal agencies are staffed, coordinating with each other, and able to meet their obligations. Federal and State Liaisons provide the Co-Chairs with access to The White House and Alaska State Capitol. The Tribal Co-Chair helps ensure that the decisions of each community's Tribal government are honored.

Government Support Functions

Each government support function includes State and Federal agencies or programs in Alaska with specific expertise needed for the mitigation effort. A community's Technical Assistance Team would recommend involving various government support functions based on the specific needs of the community.

Figure 9: *ANTHC • DCRA • Unmet Needs Report 2023*

Our Nation Must Protect Alaska Native Cultures, Tribal Sovereignty, and Self-Determination

"We are many nations and tribes, with ancient traditions that continue to be practiced today and adapted for the modern world. We are comprised of widely diverse cultures, languages, life ways, art forms and histories, but we share many core values that have guided us for millennia. Eleven distinct cultures can be described geographically: Eyak, Tlingit, Haida, Tsimshian peoples live in the Southeast; the Inupiaq and St. Lawrence Island Yupik live in the north and northwest parts of Alaska; Yup'ik and Cup'ik Alaska Natives live in southwest Alaska; the Athabascan peoples live in Alaska's interior; and south-central Alaska and the Aleutian Islands are the home of the Alutiiq (Sugpiaq) and Unangax peoples."

- Alaska Federation of Natives (AFN)

The First Alaskans

When compared to Alaska, no other state in the nation holds the range and diversity of Indigenous cultures. This diversity spans across languages, world views, ways of life, art forms, and histories. Alaska is home to 160,287 Alaska Native people (U.S. Census Bureau, 2020a) who are members of 229 federally recognized Tribes, representing forty percent of the federally recognized Tribes in the United States. Alaska Native people are represented by 11 distinct Indigenous cultures and at least 20 Native languages with more than 200 dialects.

Thousands of years ago, Alaska Native ancestors settled in the rich, abundant lands of Alaska, relying on nature for survival, culture, and spirituality. Today's Alaska Native people maintain deep connections to the land, air, and sea, transcending village boundaries to their forebears' traditional territories. A spiritual bond unites all Alaska Native cultures, enabling communities to thrive in harsh environments. These ancestral hunting and harvesting grounds still provide sustenance for Alaska Native people.

> *"We are spiritual people with ancestral knowledge. We are stewards of the land. We have inherent rights. We are inclusive and empowered and we are the first peoples of the world."*
>
> **- John Pingayq**
> **Chevak, Alaska (UUSC, 2018)**

Subsistence practices, including the sharing of traditional food sources through hunting, fishing, and gathering, provide a fundamental basis for social identity, cultural survival, and spiritual life (Gerlach & Loring, 2013; Holen, et al., 2015; ICC-Alaska, 2015; Nuttall, et al., 2005; Raymond-Yakoubian, 2019). These activities reinforce family and community relations and celebrate the connections between people, animals, and the environment — connecting individuals to both their histories and their current cultural settings (Nuttall, et al., 2005). Subsistence practices also preserve cultural continuity and reinforce a sense of place and identity for residents of rural Alaska (Holen, 2014; Raymond-Yakoubian, 2019). Persistent distribution networks and traditions of sharing allow individuals and households who are unable to participate in harvesting activities to have access to traditional foods (Magdanz, et al., 2016; Nuttall, et al., 2005)

> *"I know all of you work on a daily basis and go to the grocery store maybe daily or weekly. Our community members work tirelessly in and near their fish racks all summer long. On a daily basis also we eat fish, from our fish racks and smoke houses, kind of like going to the grocery store. Then you also have a savings plan. All the fish that we collect over the summer we hang dry and smoke and store in our freezers for the winter. This is exactly like our savings plan, but without interest rates."*
>
> **- Jacob Tobeluk, Jr.**
> **Community member of Nunapitchuk, AK.**

Many Alaska Native villages have mixed cash-subsistence economies, in which income from part-time or full-time work, seasonal labor, tourism, commercial fishing, or other activities are used to support and supplement subsistence activities. Subsistence harvesting significantly offsets the high cost of living in rural communities and allows residents to continue living in areas with few long-term jobs (Calloway, et al., 1998; Holen, 2014). Cash is essential to harvesting activities because of the required supplies (e.g. boats, snowmachines, all-terrain vehicles, guns, fishing nets, fuel, etc.) (Gerlach & Loring, 2013; Nuttal, et al., 2005; Magdanz, et al., 2016).

Figure 10: *Picking wild blueberries at Newtok's relocation site, Mertarvik.* **Credit:** *ANTHC*

"Since our nation's founding, the United States and Native Americans have committed to and sustained a special trust relationship, which obligates the federal government to promote tribal self-government, support the general wellbeing of Native American tribes and villages, and to protect their lands and resources. In exchange for the surrender and reduction of tribal lands and removal and resettlement of approximately one-fifth of Native American tribes from their original lands, the United States signed 375 treaties, passed laws, and instituted policies that shape and define the special government-to-government relationship between federal and tribal governments. Yet the U.S. government forced many Native Americans to give up their culture and, throughout the history of this relationship, has not provided adequate assistance to support Native American interconnected infrastructure, self-governance, housing, education, health, and economic development needs."

— U.S Commission on Civil Rights, 2018

The Influence of Village Settlement

The Indigenous Peoples of Alaska have a long history of adapting to environmental change; however, current social, political, economic, and institutional changes may constrain their adaptive capacity in the face of climate change (ACIA, 2005; Maldonado, et al., 2013; McNeeley & Shulski, 2011).

Before settlement in stationary villages, people migrated seasonally with their food resources. They could pick up and move without consideration for the permanent infrastructure and buildings of today's villages. If spring floods or fall storms were not conducive to viable habitation, people could move to another location with relative ease. During the 20th century, a variety of socio-economic influences led to the consolidation of population and the development of stationary villages (Berardi, 1999). This settlement has in turn impacted the ability of Alaska Native people to adapt to a rapidly changing environment.

"Before village settlement, our ancestors were small, nomadic groups of families and relatives. They were resilient by their culture and traditions, they lived in an ever-changing environment, very adapted to their surroundings, ever moving from their hunting and fishing grounds to stock themselves with subsisted food for the long winters. They had no written language, but they learned from elders and adults by verbal repetition."

- Bernice John, President, Newtok Native Corporation

"People often question why we chose to live in these places. What many do not realize is these places were chosen for us. The traditional lifestyle of the Yup'ik people had them moving with the land and animals season by season in order to be close to the food source. It wasn't until the 1900s that the Russian fur traders, missionaries, and federal government began grounding people in communities by implanting schools, churches, trading posts, health clinics, and such. The locations were not traditional areas, but for convenience and ease of access; most were established on nearby rivers where tribal members may have been observed to be temporarily camping."

- Clarence Daniel, Community Development Division Director, Association of Village Council Presidents, born and raised in Tuntutuliak, Alaska

The Disparities

Today, more than 48% (78,118 people) of Alaska Native people live off the road system (U.S. Census Bureau, 2020a) in rural villages, whose remote locations have preserved rich subsistence cultures, while simultaneously creating a barrier to equitable services when compared to the rest of the nation. Alaska Native people now experience greater disparities in social determinants of health than other races for poverty, education, and employment. These rural communities are rich in human and natural resources and rely on their indigenous way of life, living off the land, air, and sea. This lifestyle has no monetary economic framework, yet it exists in unison with the Western monetary economy. The U.S. Commission on Civil Rights found that these disparities are due to factors including historical discriminatory policies, insufficient resources, and inefficient federal program delivery (USCCR, 2018). From 2016 to 2020 approximately 24.1% of the Alaska Native population lived below the federal poverty level as compared to 7.2% of Alaska Whites statewide (U.S. Census Bureau, 2020b). Alaska Native people's unemployment rate is 10.4% higher than the statewide average.

Residents of Alaska Native communities face substantial environmental risks in their homes and to the communities as a whole. These threats include a lack of access to clean water, lack of sanitation systems, poor indoor air quality, and exposure to hazardous wastes. While much progress has been made to rural sanitation in the last decade, as of 2022, there are 31 Alaska Native villages in which fifty-five percent or less of the homes are served either by a piped system, septic tank and well, or covered haul system (ADEC, 2022). Residents of these communities must self-haul water and dispose of human waste. Despite public health needs, large gaps exist between funds available for sanitation infrastructure and healthy housing. Alaska Native children suffer from a high burden of acute and chronic respiratory disease, some of the highest rates ever documented in the world (ANTHC, 2017).

Impacts of a Changing Climate

Today, Alaska Native communities are on the front lines of climate change. These communities are disproportionately impacted by harmful climate-driven environmental trends and extreme events. Alaska Native economic, social and cultural ways of being, which have served so well for millennia, are now under extreme threat due to accelerated environmental change. The magnitude and severity of this problem can be difficult to comprehend. In jeopardy are not just buildings, but the sustainability of entire communities and cultures. Alaska Native communities will be disproportionately affected by the impacts of climate change and will be the least likely to have the resources to invest in mitigation and adaptation efforts. Limited progress has been made to support mitigation and adaptation efforts of these communities, such as protection-in-place, managed retreat, and relocation efforts. This lack of progress is primarily due to the lack of resources available to communities (GAO, 2003; GAO, 2009; UAF, USACE, CRREL, 2019).

Environmental threats are exacerbated by the fact that air temperatures in Alaska are warming twice as fast as the global average and are expected to increase by 7°F to 13°F by 2100 (APIA, ABSILCC and WALCC, 2017; Markon, et al., 2018). In northern Alaska, winter air temperatures could increase by 20°F - 27°F by 2100 (Jeremy Littell, personal communication, 2022). Annual precipitation has increased in all regions of the state over the past fifty years (Thoman & Walsh, 2019). The ocean around Alaska is now regularly warmer than at any time in the past 150 years, affecting fisheries, ecosystems, and human health (Thoman & Walsh, 2019). Additionally, the extent, duration, and thickness of sea ice has changed significantly, impacting regional

weather patterns, marine food webs, and human activities (Thoman & Walsh, 2019). Sea ice provides an important buffer to protect communities from coastal storms. Loss of sea ice not only makes communities more vulnerable to coastal storms but also compounds warming through the loss of ice and snow, which reflects ultra violet heat into the atmosphere. Climate change also causes severe swings in weather and weather patterns (Indigenous and Community Contributors, 2021).

> *"Can we continue to live here? If yes, then how can we continue to live here?"*
>
> **Andrew Steven, Tribal Administrator, Atmautluak Traditional Council**

In northern and western Alaska, the expected result from future environmental change is a transition from an environment with an average temperature of 10°F below freezing, without trees, and in which humans and wildlife rely on predictable sea ice, to one where the average annual temperature is above freezing, trees can grow, and spring and fall sea ice is rare if it exists at all (APIA, et al., 2017). Figure 11 illustrates these trends and impacts.

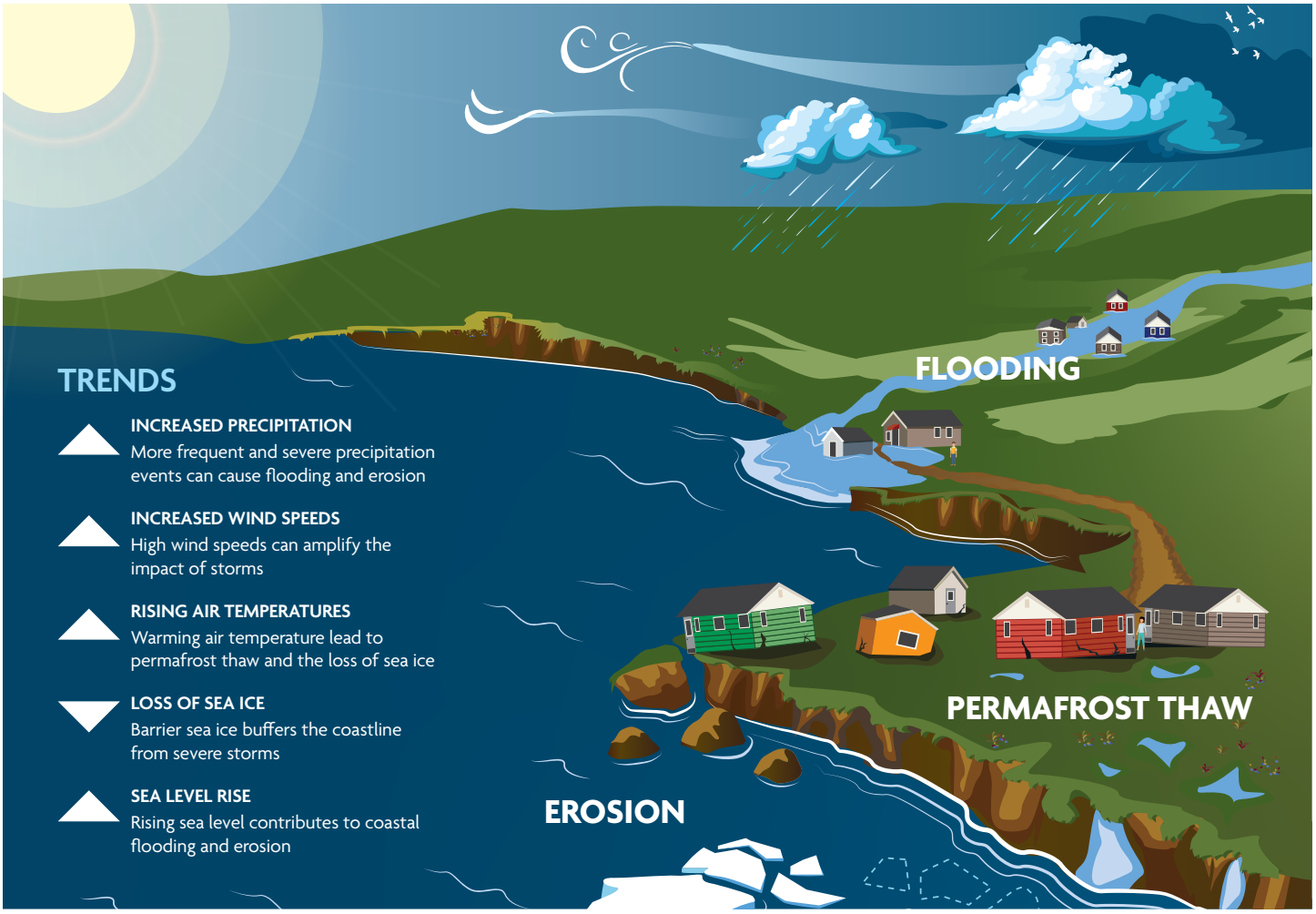


Figure 11: *ANTHC • DCRA • Unmet Needs Report 2023*

Research indicates that climate change is driving ecosystem changes and disruptions in both terrestrial and aquatic environments, which have subsequent impacts on delicate food webs (Grebmeier, et al., 2006; Markon, et al., 2018; Moore & Stabeno, 2015; USGCRP, 2018). These changes are especially prevalent in the marine environment, where rising ocean temperatures, changing ocean chemistry, and other stressors threaten biologically-diverse marine ecosystems that support food systems (Cheng, Abraham, Hausfather, &

Trenberth, 2019). At threat is the delicate balance of traditional subsistence networks by changing the patterns of seasonal timing and availability of culturally important species in traditional hunting, gathering, and fishing areas (USGCRP, 2018). As an example, some plants are thriving, and some are dying off. Some animal species have adapted their migratory routes due to increasing ambient and water temperature and land degradation. (Indigenous and Community Contributors, 2022). Due to the importance of healthy fish and wildlife populations for subsistence food resources, these changes threaten Alaska Native peoples' food sovereignty and the livelihoods and cultures that are built around a deep connection to the lands and waters (Gadamus, 2013; Huntington, 2016).

Communities on the front lines of climate change—those that experience the "first and worst" consequences of climate change—are historically the most vulnerable and underserved in terms of technical resources, services, and support structures to mitigate the impacts of that change (Acharya, 2015; Hirsher, 2021; USGCRP, 2018). These communities require resources and support that is equitable and responsive to community-defined climate adaptation needs (Hahoe, et al., 2018; Markon, et al., 2018).

These changes are already increasing the severity of infrastructure impacts through erosion, flooding, permafrost degradation, and the combination of all three hazards (UAF, USACE, CRREL, 2019). In 2019, the Alaska Federation of Natives passed Resolution 19-56 declaring a climate change state of emergency (AFN, 2019). Consequently, the questions asked by Andrew Stevens of Atmautluak, Alaska, "Can we continue to live here?" and, if yes, "How can we continue to live here?" are echoed by other environmentally threatened communities as well.

Our nation must support the vibrant and irreplaceable cultures of Alaska Native people by proactively addressing environmental threats. By partnering with Alaska Native communities to reduce risks to infrastructure—by working with them to protect shorelines, move homes away from eroding riverbanks, and relocate entire communities—we protect not only the physical communities of Alaska Native peoples but also the traditional kinship connections that are strengthened by living together in cohesive communities.

A worst-case climate scenario would bear devastating consequences for Alaska Native people resulting in food insecurity, widespread resettlement (residents moving to multiple other locations, unlike relocation) due to reduced habitability of village sites, and loss of connection with heritage and cultural and spiritual ties to the land (Maldonado et al., 2013). Although resettlement is frequently tendered as a potential solution to these climate threats, resettlement has been known to cause adverse socio-economic impacts such as racism, being stigmatized, increased homelessness, and other social ills (Indigenous and Community Contributors, 2022).

Environmental Threats Exacerbate Existing Stressors

The impact of environmental threats to infrastructure can exacerbate existing stressors faced by Alaska Native villages, such as food insecurity, access to clean water, accidents and injuries, mental health, overcrowding, and public safety. Environmental threats and climate change can, directly and indirectly, exacerbate these stressors.

Food sovereignty: Food sovereignty is the right of Alaska Native people to healthy and traditional foods including subsistence and way of life, and the right to make decisions about their localized food systems. Rural Alaskan residents depend on subsistence hunting, fishing, and gathering, especially those who live in remote communities (Leschin-Hoar, 2016). Alaska's rural residents harvest about 18,000 tons of wild foods annually—an average of 295 pounds of subsistence foods per person, including fish, whale, seals, sea lions, moose, caribou, birds and wild plants (U.S. Department of the Interior, 2021).

> *"As much as 85%-90% of the food on our table is from the land. If climate change eliminates our food source(s), we will need a subsidy to pay for other food. This is what equity looks like."*
>
> **- Clarence Daniel, Community Development Division Director, Association of Village Council Presidents, born and raised in Tuntutuliak, Alaska**

When subsistence foods become scarce, grocery foods are not a reasonable or reliable replacement. The composition of wild food harvest in rural Alaska includes salmon, other fish, land mammals, marine mammals, birds, shellfish, and wild plants. These foods are excellent sources of nutrients, high in healthy fat, low in unhealthy fats and cholesterol, and usually free of chemical additives—foods that have sustained Alaska's Indigenous people for millennia. Grocery foods of similar nutritional quality are much more expensive and often inaccessible to families who rely on mixed subsistence-cash economies (Fall & Kostick, 2018).

Diminished food quality and quantity, as well as changing distribution and abundance of subsistence resources, are projected to continue to increase due to climate change. Warmer winters, early springs and a shift in typical storm patterns have hampered the ability of Alaska Native families to harvest the subsistence foods they've relied on for thousands of years (Leschin-Hoar, 2016). For instance, unusual freeze cycles in early summer, combined with prolonged warmer temperatures throughout the summer, are impacting many of the subsistence berry harvests.

Thinning ice makes hunting more dangerous. Additionally, warming temperatures have negatively impacted crucial nature-based infrastructure such as traditional underground ice cellars, which collapse and flood, ruining the stored food (Seidl, 2011). The introduction or deletion of predators of a particular species can unbalance the food web in a particular area and even impact the plants and whole ecosystem as a result. Invasive plant species can cause many weeds to take over lands and lakes, even causing lakes (fish habitat) to dry up (Indigenous and Community Contributors, 2022).

In Alaska, the prevalence of food insecurity is higher in the rural parts of the state, especially in western Alaska. The areas with the highest rates of food insecurity include Kusilvak Census Area (28.6%), Bethel Census Area (22.9%), Northwest Arctic Borough (22.5%), Yukon-Koyukuk Census Area (22.0%) and Nome Census Area (19.7%) (Feeding America, 2021).

Many communities have already reported adverse impacts to subsistence harvests, such as major salmon and white fish die-offs, shifting caribou migration, the decline in marine mammals, and increased variability in berry harvests (Yoder, 2018).

Warmer winters and changing ice conditions impacting Saint Lawrence Island have kept hunters from the villages of Gambell and Savoonga from harvesting the Pacific walrus they traditionally rely on as a key food source (Leschin-Hoar, 2016). In 2013, the situation became so severe Alaska's governor declared Saint Lawrence Island an economic disaster (Caldwell, 2016).

Significant declines in salmon fisheries over the last two years resulted in fisheries disaster declarations for the Kuskokwim River salmon fishery in 2020, and the Yukon River salmon fisheries in 2020 and 2021 (MacArthur, 2022).

> *"It's our connection to the ocean and the rivers that we decided to build our communities near these waters not only for a food source but as a highway system to reach far away hunting grounds."*
>
> **- Bill Tracey, North Slope Borough (Point Lay resident)**

Food insecurity in rural communities increased as a result of Typhoon Merbok in September 2022. Floods from the storm caused power outages and wiped out subsistence stores. Numerous power outages reported across the affected communities resulted in stored subsistence foods, which are gathered throughout the year to last through winter, spoiling. Without these stores to rely on, food insecurity becomes a looming concern for many in western Alaska's remote towns and villages (Horn-Muller, 2022).

Access to clean water: Thirty-one Alaska Native villages either do not have adequate piped water and sewer service or have no piped water or sewer service (ADEC, 2022). For these communities, clean water access and sewage disposal are an ongoing challenge. For the Alaska Native villages with water and sewer infrastructure, damage to water and sanitation infrastructure is a regular occurrence due to erosion, thawing permafrost, and flooding. Sewage lagoons are in danger of being washed away by flooding during fall storms, tank farms are encroached upon by erosion, and the structural integrity of above-ground water distribution systems is impacted by failing ground. These damages adversely impact human health by increasing the risk of waterborne diseases and decreasing the availability and quality of drinking water. For example, residents in Kotlik and St. Michael lost running water and flush toilets for several years when flooding and permafrost thaw damaged piped infrastructure. See Kotlik case study in Appendix B. Currently, extremely aggressive erosion in Napakiak is degrading source water quality and a new well may not be completed before the community loses its existing water source.

Accidents and injuries: Accidents and injuries due to extreme weather events—such as droughts, floods, storms, wildfires, and ice loss—are already occurring, and are predicted to increase with climate change. In 2019, Alaska's hottest year on record, at least eight Alaskans died when snowmachines and ATVs broke through unusually thin ice (Lyden, 2019). Increased severity and frequency of flooding is a concern because floods are the second-deadliest weather hazard in the United States (Bell, Herring, & Jantarasami, 2016). Furthermore, unintentional injury is more likely to occur during unusual and unseasonable environmental conditions (e.g., heavier than average precipitation, increased variability in ice conditions), which are increasing due to climate change (Yoder, 2018). Finally, environmental threats are reducing communities' access to emergency medical care. For example, (1) the only emergency evacuation road from Shaktoolik, Alaska is threatened by erosion; (2) the existing airport at Newtok is threatened by erosion and scheduled to be decommissioned with the commissioning of a new runway at Mertarvik, leaving two-thirds of Newtok's population with no means of year-round transport to medical care.

Mental Health: It is not uncommon for Alaska Native people in environmentally threatened villages to experience mental health impacts that can cause anxiety, depression, and post-traumatic stress disorder (Yoder 2018). Acute events, such as floods and storm surges, and slower-moving impacts, such as permafrost thaw and erosion, act as health stressors and may contribute to these mental health impacts (Yoder 2018). Decreased food sovereignty, damaged infrastructure, water quality concerns, and associated economic impacts are also known to exacerbate mental illness (Yoder, 2018). Additionally, environmental threats can affect mental health by causing ***solastalgia***, the distressing sense of loss as a result of unwanted environmental changes that occur close to one's home (Yoder, 2018). In Kotlik, Alaska, community members are "one hundred percent confident" that they will lose their land due to increased flooding and erosion. This sense of impending doom results in feelings of distress, helplessness, and grief.

> *"Thinking of all these environmental changes worries me. Sometimes I feel helpless when I want to do so much to help our community which is experiencing the dramatic impacts of climate change."*
>
> **- Philomena Keyes, Village of Kotlik Resilience Coordinator**

Overcrowding and lack of housing: Homes in Alaska Native villages can be extremely overcrowded due to limited housing stock, natural population growth, and population displacement due to hazard events. Overcrowding is 12 times the national average in some areas (AHFC, 2018). Overcrowding results in negative mental and physical health outcomes (Mangrio & Zdravkovic, 2018; Marshy, 1999; Pepin, et al., 2018). Limited cash resources and the high cost of construction prevent many local residents from building new houses themselves. Communities rely on regional housing authorities to build homes. Lack of new housing funds result in families, relatives, and friends congregating in a single small home. Existing overcrowding can be exacerbated by environmental threats. For instance, if a home is impacted by erosion, residents will need to move into homes with other people. Further, if a larger number of homes are threatened in a community, the long-term sustainability of the community can be put in jeopardy. As an example, the threat of exacerbated overcrowding due to erosion is currently evident in Kotlik. At least 21 homes are threatened by erosion in the near term. Nineteen people live in one small 796-square-foot home threatened by erosion. According to community members, if a new subdivision cannot be constructed in time to mitigate the erosion threat, "people will have nowhere to live" (Victor Tonuchuk, personal communication, November 12, 2019).

Public Safety: In 2019, U.S. Attorney General William Barr declared a public safety "emergency" in rural Alaska due to the lack of critical public safety personnel and infrastructure[1]. Environmental impacts compound this crisis through the loss of existing public safety infrastructure. For example, the Nunapitchuk, Alaska public safety building is imminently threatened[2] by erosion. Due to the structural instability of the current building, the only viable option is to construct a new building in a location safe from erosion. The City of Nunapitchuk and the Native Village of Nunapitchuk[3] unsuccessfully applied to three grant programs over the past two years to design a new building. The fourth attempt was successful. In June 2020, after the BIA Tribal Climate Resilience Program modified its eligible activities to include the design of infrastructure for protection-in-place, managed retreat, and relocation, the community was awarded design funding. However, funding sources for the construction of the new building have not been identified. If the current building is impacted before a new one can be built, Nunapitchuk will lose the community jail, storage for search and rescue equipment, and office space for the Village Public Safety Officers. Another impact to public safety is the impact of wild fires and flooding on airports and other critical infrastructure and the lack of evacuation options this creates. In 2019, some villages in the Bristol Bay area had to evacuate due to wildfires, and the associated smoke created health impacts and air pollution.

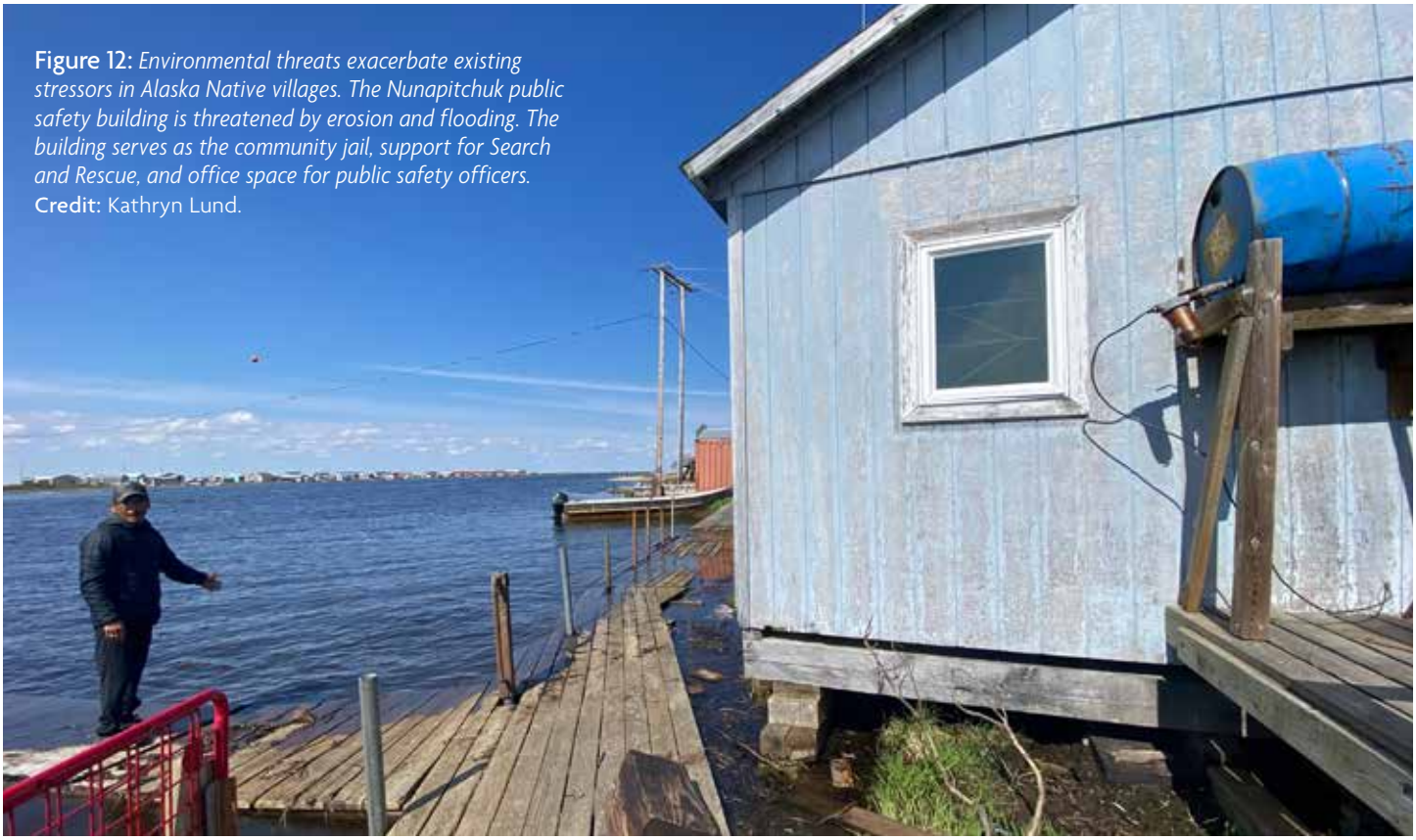


Figure 12: *Environmental threats exacerbate existing stressors in Alaska Native villages. The Nunapitchuk public safety building is threatened by erosion and flooding. The building serves as the community jail, support for Search and Rescue, and office space for public safety officers.*
Credit: Kathryn Lund.

1 This issue has been studied and written about for decades. See Chapter 2 of *A Roadmap from Making Native America Safer, Report to the President and Congress of the United States* (Indian Law & Order Commission , 2013) and others (Alaska Rural Justice and Law Enforcement Commission, 2006; ARGC, 1999; UAAJC, 2013).

2 Threatened within five years or less.

3 Some Alaska Native villages have two governing bodies. Nunapitchuk is an example of this, where the City of Nunapitchuk is the governing body for the city and the Native Village of Nunapitchuk is the federally recognized Tribe. Each governing body has access to different funding resources.

Key Government Efforts to Address Environmental Threats in Alaska

The outline below provides a chronology of state and federal efforts to address environmental threats in Alaska over the past 40 years. Please see Appendix D for more information on efforts through 2011.

1982-1983	State of Alaska developed a list of communities with erosion problems and created an Erosion Task Force, resulting in state legislative funding for erosion assessments.
2001	U.S. Senate Appropriations Hearing on Global Climate change held in Fairbanks, Alaska.
2003	Congress directed the U.S. Government Accountability Office (GAO) to develop report 04-142 *Alaska Native Villages: Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance*.
2004	Senate Appropriations Committee Field Hearing on Coastal Erosion held in Anchorage.
2006 & 2008	The Alaska Governor directed the Division of Commerce, Community, and Economic Development to coordinate with other state and federal agencies to propose long-term solutions to erosion in coastal communities.
2007	Senate Committee on Homeland Security and Governmental Affairs holds Coastal Erosion Field Hearing in Anchorage.
2007	Senator Stevens hosted a Roundtable on Coastal Erosion and Village Relocation.
2007	Alaska's Governor established the Climate Change Sub-Cabinet to lead the preparation and implementation of an Alaska climate change strategy.
2007	The Immediate Action Work Group was formed under the Climate Change Sub-Cabinet to develop an action plan addressing climate change impacts on coastal and other vulnerable communities in Alaska.
2008	The Alaska Climate Change Impact Mitigation Program provided technical assistance and funding to imminently threatened communities.
2009	U.S. Army Corps of Engineers completed the *Baseline Erosion Assessment* to inform the prioritization of resources.
2009	Congress directed GAO to produce report 09-551 *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion.*
2015	President Obama designated the Denali Commission as the lead federal agency for coordinating federal efforts to mitigate the impacts of erosion, flooding and permafrost degradation in rural Alaska.
2015	Denali Commission established the Environmentally Threatened Communities Program. The name was later changed to the Village Infrastructure Protection Program.
2019	Denali Commission published the *Statewide Threat Assessment* which ranked communities based on the level of threat from flooding, erosion and permafrost degradation.
2019	The Bureau of Indian Affairs Tribal Resilience Program adds a category for protection-in-place, managed retreat, and relocation, resulting in increased funds for Alaska communities.
2022	GAO publishes *Federal Agencies Could Enhance Support for Native Village Efforts to Address Environmental Threats*, which incorporated recommendations from the 2021 draft version of this report.

Figure 13: *ANTHC • DCRA • Unmet Needs Report 2023*

The Future of Many Alaska Native Communities Rests on Addressing Environmental Threats

"If we do not get assistance soon, there will be a disaster that will cost the federal government a lot more. People will be displaced. Buildings will be in the river. The river will be polluted and need a major cleanup. An emergency response would be an unacceptable disaster, one that would bring many tears to our people."

– Janet Erik, President, Chefornak Traditional Council

2019 Alaska Statewide Threat Assessment

Erosion, flooding, and permafrost degradation are the three environmental threats that pose the greatest risk to infrastructure in Alaska Native communities. In 2019, an assessment of these threats was completed by the University of Alaska Fairbanks Institute of Northern Engineering, U.S. Army Corps of Engineers Alaska District, and the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory. The *Statewide Threat Assessment*, funded by the Denali Commission, evaluated the risk of damage to infrastructure from erosion, flooding, and permafrost degradation in 187 Alaska Native communities. Communities were scored and placed into three groups for each of the three hazards – Group 1 for high risk of damage to infrastructure, Group 2 for moderate risk of damage to infrastructure, and Group 3 for low risk of damage to infrastructure (UAF, USACE, CRREL, 2019). For purposes of determining the unmet infrastructure needs for this report, the communities that fell into either Group 1 or 2 for any of the three threats were identified as being ***"environmentally threatened."*** An overview of the environmental threats impacting these communities follows.

Erosion

Erosion, the geological process in which land is worn away by a force such as water, poses a threat to most Alaska communities (GAO, 2009; Overbeck J., 2020; UAF, USACE, CRREL, 2019; USACE, 2009). Erosion impacts can range from minor landscape changes to significant land loss that jeopardizes the sustainability of entire communities. When an eroding shoreline reaches community infrastructure, it undermines the foundation

and leads to structural failure. This can result in the loss of critical community assets. Moreover, climate change can accelerate erosion through permafrost-rich river banks and coastlines thawing, diminishing river ice, diminishing shorefast sea ice[1], increasing wind speeds, increasing severity of storm surge, relative sea-level rise, and extreme precipitation events (ADMVA/DHSEM, 2018a; Markon, et al., 2018; Meredith, et al., 2019).

Figure 14: *Rapid erosion in Akiak claimed 50-75 feet of riverbank over two days. Credit: Ivan Ivan*

In some Alaskan communities, erosion is increasing in frequency and severity. For example, in Akiak, Alaska, during a single springtime high water event in May 2019, rapid erosion claimed 50 to 75 feet of riverbank along 1,200 feet of riverfront over two days. No Elder in Akiak could recall an erosion event of this magnitude. See also, Akiak case study, Appendix B, page 133. Although some progress has been made toward addressing erosion threats, Alaska is not currently prepared for the large-scale loss of land from erosion that is expected over the next 50 years. The two greatest needs to address erosion threats in communities are (1) immediate action to implement projects to address the acute threat to existing infrastructure and prevent loss of life (e.g. relocating threatened structures to a new or existing subdivision site), and (2) secure baseline data and risk assessments that inform long-term community decision making and solutions in response to ongoing threats.

The Statewide Threat Assessment identified 29 communities in the highest erosion threat category (Figure 15) and 66 communities in the next highest erosion threat category (Erosion Group 2 communities shown in Figure 16) (UAF, USACE, CRREL, 2019). These communities are shown in the maps on the following pages.

1 Also called landfast ice, shorefast ice is a type of sea ice that primarily forms off the coasts in shallow water. In Antarctica, fast ice may also extend between grounded icebergs (Polar Science Center, 2010).

Communities with the Highest Threat of Infrastructure Damage from Erosion

Figure 15: *Erosion Group 1 Communities: Twenty-nine communities experience immediate threats to infrastructure from erosion according to the Statewide Threat Assessment (2019). Credit: Sally Cox, DCRA*

Communities with the Second Highest Threat of Infrastructure Damage from Erosion

Figure 16: *Erosion Group 2 Communities: In sixty-six communities, erosion is not expected to detrimentally impact critical infrastructure in the near term, but the community is still vulnerable to the threat according to the Statewide Threat Assessment (2019).* **Credit:** *Sally Cox, DCRA*

Community Voices from the Front Lines: Erosion

Napakiak Retreats West on the Island

Napakiak is a Yup'ik community located on the north bank of the Kuskokwim River, in western Alaska's Yukon-Kuskokwim Delta. The Yup'ik have lived in this region since 1000 AD. The Napakiak community maintains a traditional fishing and subsistence lifestyle.

> *"What are we going to do? Send our kids to school with life jackets on?"*
>
> Jacqueline Andrew, Napakiak School Advisory Board

Threat: Extremely aggressive erosion is eliminating the land upon which the community lives. Soon, most of the current site of Napakiak will not exist. The majority of community infrastructure will need to be deconstructed and replaced with new facilities.

Mitigation Strategy: The community has been practicing ad-hoc managed retreat for decades by moving infrastructure away from the eroding shoreline on its own. However, due to a recent increase in the rate of erosion, the community has decided to implement a large-scale effort to retreat to a new, safe site farther back on the island. Impacts to a large number of buildings, the school, water source, and water treatment plant have exceeded the community's capacity to act on its own to address the threats, resulting in the large-scale effort. Napakiak obtained the data and assessments needed to inform a long-term solution after addressing acute threats to homes by sledding them away from the riverfront. The community is using a managed retreat plan to guide their efforts to relocate threatened infrastructure to the new site. The estimated cost of the retreat is approximately $110 million. External support is required for success in this endeavor.

Community Story: The school is often considered the heart of rural Alaska communities, providing space for community gatherings such as basketball games, community meetings and celebrations, cultural activities, and serving as the community's evacuation shelter. As of October 28, 2022, the Napakiak school sits 76 feet from the riverbank. The current building is being decommissioned, yet construction of a new building has not been completed. Children are to be educated in portable classrooms for several years. A $4.6 million investment by the State of Alaska in temporary classrooms could be avoided by proactively addressing the erosion threat to the school (Butte, 2019). Thirty-seven feet of land was lost during the September 2022 storm and the community's sole watering point is 80 feet from the erosion.

Figure 17: *Walter Nelson is the Napakiak Managed Retreat Coordinator, funded by a grant from the BIA Tribal Resilience program. Walter has significantly increased Tribal capacity to address the erosion threat, including coordinating the emergency decommissioning of buildings in response to extremely aggressive erosion.* **Credit:** *Max Neale; ANTHC; 2019.*

Newtok is Relocating to Mertarvik

Newtok is a Yup'ik village located on the Ninglick River north of Nelson Island in western Alaska's Yukon-Kuskokwim Delta Region. Relative isolation from outside influences has enabled the area to retain its traditions and customs, more so than other parts of Alaska. The community maintains an active subsistence lifestyle.

"Not that long ago the water was far from our village and could not be easily seen from our homes. Today the weather is changing and is slowly taking away our village. Our boardwalks are warped, some of our buildings tilt, the land is sinking and falling away, and the water is close to our homes. The infrastructure that supports our village is compromised and affecting the health and well-being of our community members, especially our children."

Moses Carl and George Tom, Newtok Village (ADCCED/DCRA, 2012)

Figure 18: *The eroding riverbank (shown above in 2018) forced Newtok to demolish these homes in 2019 to prevent them from collapsing into the river.* **Credit:** *Andrew John; Village of Newtok; 2018.*

Threat: The eroding riverbank at Newtok, Alaska shows the devastating impacts of usteq, a Yup'ik word for a catastrophic form of land collapse that occurs when frozen ground disintegrates under the compounding influences of thawing permafrost, flooding, and erosion (ADMVA/DHSEM, 2018a). The soil along the riverbank adjacent to the community is composed of ice-rich permafrost, which, in the absence of other processes, would likely thaw relatively slowly. However, due to reduced sea ice, waves batter the bank during fall storms, causing the ice-rich frozen silts to thaw quickly. This thawing of the permafrost destabilizes the river bank and results in a rapid loss of land, up to 72 feet per year (Overbeck J. , 2020).

Mitigation Strategy: Although Newtok's relocation to Mertarvik appears headed for success with the development of a new and safe community within their traditional lands, it is still uncertain whether there will be sufficient funding to provide for the safe and successful relocation of the remainder of the people living in Newtok prior to its loss to erosion. In addition, there is no plan or funding to decommission the old village site.

Community Story: In 1996, Newtok village made the decision to relocate and completed a federal land exchange for a relocation site, Mertarvik, 9 miles away on north Nelson Island. In 2019, seven homes closest to the eroding riverbank were at risk of collapsing into the Ninglick River (see photo,

previous page). To protect the safety of the families in these homes, the Newtok community pursued a federal buyout program to demolish the homes before they were lost and to provide funding for these families to put toward new homes at Mertarvik. Erosion and usteq are impacting the community school and the airport. Soon, the Newtok site will be virtually unlivable. Relocation of the community to a new site is the only viable adaptation strategy.

In the fall of 2019, one-third of Newtok's population (approximately 120 community residents), relocated from Newtok to Mertarvik, nine miles away. The 2019 construction season completed the development of the essential infrastructure required to support a rural Alaskan community and as many housing units as possible. The project constructed a diesel power plant, bulk fuel farm, water treatment plant, interim schoolhouse, interim clinic, and thirteen houses, bringing the total number of housing units to 21 in Mertarvik. By 2023, 28 new homes have been constructed, with several more homes near completion. Homes are connected by gravel roads and many contain a Portable Alternative Sanitation System (PASS) with 100 gallons of treated water storage, a handwashing sink, and a separating toilet and urinal. A small general store, basic cell service, and wireless internet are available in the community. A rock quarry provides gravel materials, a barge landing provides seasonal marine access, and a 2,000-foot by 35-foot gravel landing strip provides year-round access for small planes. The total cost of development in Mertarvik to date is between $60 and $70 million. The total relocation effort is expected to cost approximately $130 million (NVC, 2017).

Three critical projects are remaining for the substantial completion of the Newtok relocation: a school, sufficient housing, and community water and sewer systems. Housing is the highest priority, with an additional 49 housing units (estimated at $22 million) required to relocate the entire population. In the summer of 2023, 14 new homes will be completed which will allow 14 families to relocate from Newtok to Mertarvik (personal conversation with Patrick LeMay, P.E.). The Federal Aviation Administration funded a Mertarvik airport, which was completed and commissioned by the State of Alaska in the winter of 2022. The Lower Kuskokwim School District is beginning design and construction of a new school. Because funding agencies require the establishment of occupied housing before sanitation facility funding can be provided, community water and sewer systems will likely be the last major project of the relocation effort. A new Voluntary Community-Driven Relocation program led by the Department of the Interior allocated $25 million to Newtok; however this funding will be awarded in increments of $5 million/year over a five-year period. Although these funds could cover the cost of homes for the remainder of Newtok's population to move to Mertarvik, the timing and use of these funds has not been determined at the writing of this report. The total estimated remaining need for the relocation, excluding the airport, is approximately $85 million (NVC, 2017).

Figure 19: *Mertarvik, Newtok's new village site. Fall 2019.*
Credit: *United Methodist Committee on Relief*

Flooding

Approximately 6,600 miles of Alaska's coastline and many low-lying areas along the state's rivers are subject to severe flooding — when a waterbody submerges normally dry land (ADMVA/DHSEM, 2018a). Flooding is currently the cause of Alaska's most common disaster declaration, often costing millions of dollars annually and causing major disruptions to society and the loss of life (ADMVA/DHSEM, 2018b). The number of presidentially-declared disasters[1] for flooding and severe storms in Alaska has more than doubled over the past two decades, with most of these events taking place in environmentally threatened communities (Cox, 2019).

> *"I am getting more concerned about our community and the risks we are facing. I'm sure you know that we recently had a large flood. The Tribe has been receiving more phone calls from individuals that are needing assistance raising their homes due to water entering them. A lot of talk is going around that this wasn't the big flood and that another one should be prepared for. It is scary just thinking about it."*
>
> **- Philomena Keyes,**
> **Village of Kotlik Resilience Coordinator, August 2019**

Climate change can lead to increased flooding through diminishing shorefast sea ice, increasing wind speeds, more frequent storms, increasing severity of storm surge, relative sea-level rise, increased precipitation, and extreme precipitation events (ADMVA/DHSEM, 2018a; Markon, et al., 2018; Meredith, et al., 2019). Alaska Native communities have observed increased storm frequency resulting from storms coming from both directions (north and south) due to the lack of sea ice in the Arctic Ocean and the Beaufort Sea (Indigenous and Community Contributors, 2022). In Alaska, very little progress has been made to develop or implement flood mitigation solutions in environmentally threatened communities. Thus, Alaska is not prepared for the increased flooding associated with climate change.

Many Alaska communities do not have the safety net of federal funding that is typically employed in the contiguous United States. For example, most communities are not able to qualify for or have the financial and administrative capacity to participate in the National Flood Insurance Program. Thus, the two greatest current needs to manage unavoidable flooding threats in communities are to (1) implement immediate actions that prevent acute flooding impacts (e.g. elevating structures that are prone to recurrent flooding), and (2) secure baseline data and flood risk assessments that support communities in developing informed long-term solutions.

The Statewide Threat Assessment identified 38 communities with the highest flood threat and 55 communities with the next highest flood threat, shown on the maps on the following pages.

1 A presidentially-declared disaster can be made by the U.S. president to make federal assistance available under the Federal Emergency Management Agency (FEMA) when the response to an event exceeds the combined capabilities of state, tribal and local governments. Erosion damage usually doesn't result in a disaster declaration due to the definition of a disaster in FEMA enabling legislation (Stafford Act).

Communities with the Highest Threat of Infrastructure Damage from Flooding

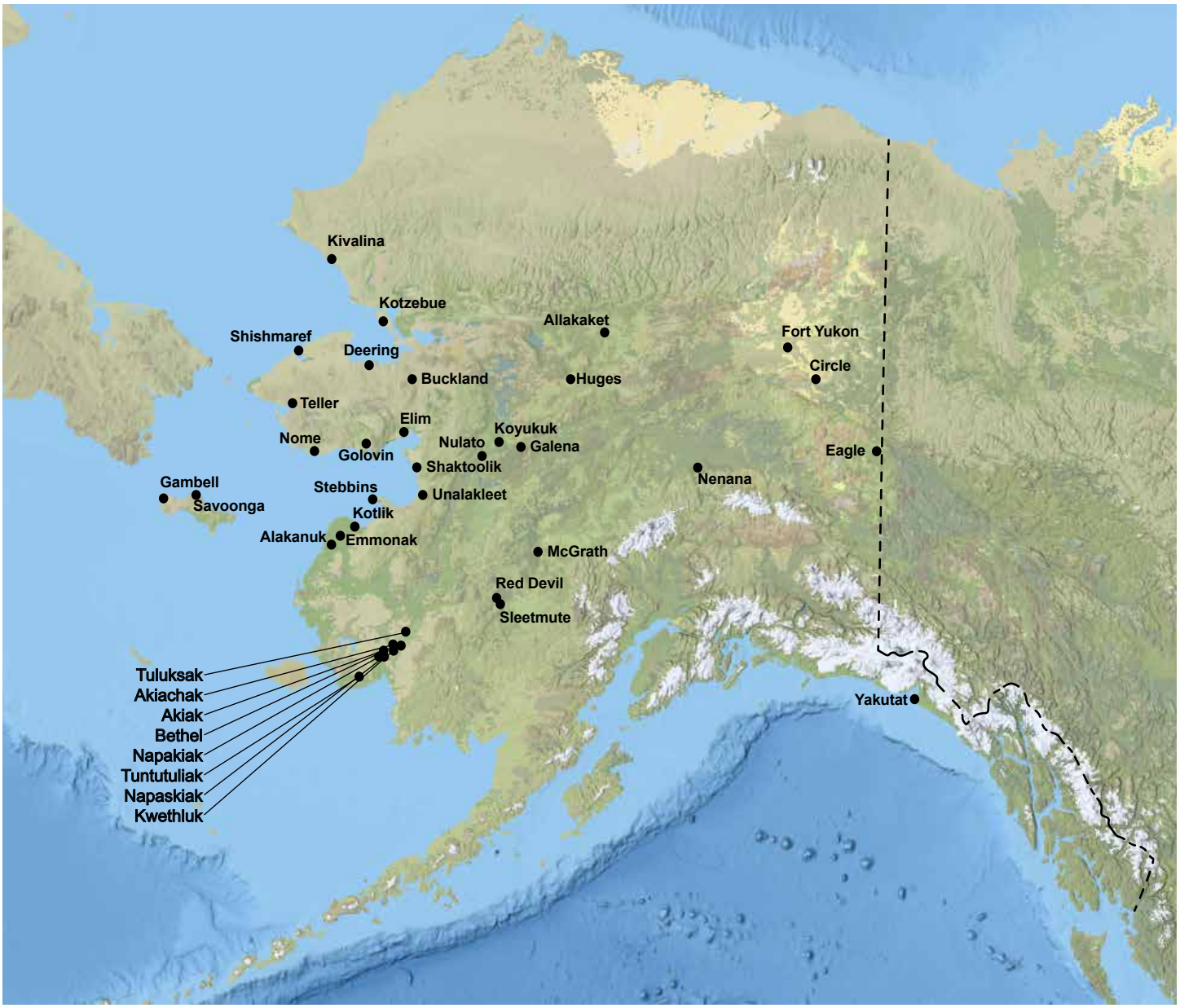


Figure 20: *Flood Group 1 Communities: Thirty-eight communities experience immediate threats to critical infrastructure from flooding according to the Statewide Threat Assessment (2019).* Credit: *Sally Cox, DCRA.*

Communities with the Second Highest Threat of Infrastructure Damage from Flooding

Figure 21: *Flood Group 2 Communities: Fifty-five communities are in group 2, meaning flooding is not expected to detrimentally impact critical infrastructure in the near term, but the community is still vulnerable to the threat according to the Statewide Threat Assessment (2019).* **Credit:** *Sally Cox, DCRA*

Community Voices from the Front Lines: Flooding

Storm Surge Threatens the Community of Shaktoolik, Alaska

Shaktoolik is a Malemiut Yup'ik village located on the east shore of Norton Sound in northwestern Alaska. Shaktoolik was the first and southernmost Malemiut settlement on Norton Sound, occupied as early as 1839. However, the ancestors of the people of Shaktoolik have inhabited this area for thousands of years. The community maintains a traditional fishing and subsistence lifestyle.

> *"Shaktoolik is where my roots are. I feel a deep connection to the land and waters."*
> Marlin Sookiayak, Shaktoolik elder

Threat: Increasingly severe storm surge along with the reduction of protective sea ice threaten the safety of all residents and the long-term viability of the existing community site. According to a 2019 community survey, forty-five percent of Shaktoolik residents have reported flooding and/or storm damage to their homes in the last five years and forty-three percent of residents do not feel safe in Shaktoolik.

Mitigation Strategy: Based on the results of coastal flood modeling, relocation has been determined to be the only long-term solution. Over the years, Shaktoolik has constructed several versions of a storm surge berm with local sand, gravel, and driftwood. The berm has been regularly damaged by storms. These sacrificial berms have protected the community, but must be repaired or replaced after significant storms.

Community Story: In 2022, after completing the construction of a larger and taller berm, Typhoon Merbok destroyed it entirely. During the typhoon, three storm watchers stayed up all night measuring water levels on the river side of the community and monitoring storm surge. The worst part of the night was around 5 AM, when storm watchers went house to house, waking everyone up and encouraging everyone to go to the school for safety because the berm was destroyed and the storm was continuing. About half of the community fled their homes and sought refuge in the school. The storm became less severe, but it still threw logs against homes and buildings. Water and logs were at some doorsteps. There would have been a lot of damage if the storm had kept raging after the berm was destroyed. "The berm saved our lives," said Genevieve Rock with the Native Village of Shaktoolik. Shaktoolik is actively pursuing efforts to relocate to a new site.

Figure 22: *Shaktoolik's storm surge berm in August 2022, shortly before the Merbok storm.* **Credit:** *ANTHC.*

To Protect Future Generations, Golovin, Alaska is Migrating to Higher Ground

Golovin is an Inupiat village located on the Seward Peninsula in northwestern Alaska. The Inupiat village of "Chinik," located at the present site of Golovin, was originally settled by the Kauweramiut who later mixed with the Unaligmiut. The community maintains a traditional fishing and subsistence lifestyle.

Figure 23: *Flooding in Golovin.* Credit: *Chinik Eskimo Community; 2005.*

Threat: Golovin is threatened by flooding, erosion, and storm-driven ice surge. The majority of infrastructure is located on a spit[1], which is located within the 100-year flood plain. Storm impacts are increasing due to a decline in the natural barrier sea ice that provided shoreline protection. Approximately 30 structures were damaged during the 2022 Merbok storm.

Mitigation Strategy: To protect from flooding, Golovin plans to implement a managed retreat solution, in which all community infrastructure will be moved from the spit to higher ground adjacent to the community, an immensely complex process that will require time and technical assistance to complete. Golovin has completed a plan to guide the community's efforts to develop the new subdivision site and relocate infrastructure there.

Community Story: In September 2005, a severe fall storm caused flooding of the entire spit where the community's critical infrastructure is located. Community members were forced to evacuate to higher ground. All infrastructure on the spit, including the school, power plant, clinic, and homes, was impacted. Jack Fagerstrom, a Golovin resident, looks forward to the day when his home is safe on the hill, "with a place for a garden, a well, and solar power." Carol Oliver, an Environmental Coordinator with the Tribe, has a vision for "a safe and resilient Golovin with a thriving local economy, improved infrastructure, clean water, and protection from flooding and erosion."

1 A spit is a section of land that extends into a body of water.

Permafrost Degradation

Alaska communities are experiencing the devastating impacts of degrading permafrost. Permafrost is defined as ground that is frozen for two or more years. Permafrost underlies nearly eighty-five percent of Alaska (ADNR/DGGS, 2020). Similar to the importance of river and sea ice, subsurface ice is structurally important to the health and function of communities (ADMVA/DHSEM, 2018a). The severity of permafrost degradation impacts to communities is a function of the ice content of soils. Greater ice content results in greater impacts. As the ice thaws and changes to liquid water, the structural integrity of the soil can diminish or disappear entirely. Permafrost degradation causes the land to sink (subsidence), resulting in damage to infrastructure, landslides, erosion, the disappearance of lakes, the development of new lakes, and saltwater intrusion of freshwater aquifers and surface waters. Subsidence due to permafrost degradation threatens all community infrastructure that is not mobile, or rapidly adaptable, and can lead to loss of function, inhabitability, and/or collapse. As home foundations move, stairways and water and sewer connections can pull away from buildings, creating safety hazards and environmental pollution as well as air gaps that allow heat to escape and increase heating costs. In addition, doors that don't close due to uneven settling result in increased personal safety risks and decreased privacy (Melvin, et al., 2017).

> *"One thing I learned a long time ago is to listen to our elders, never interrupt, and wait until you're sure they finished what they were saying... My father-in-law told me something when the contractor was putting in the direct bury water and sewer lines. He said that this is never going to last, anything you bury in the permafrost will break and be forced back out of the ground. He was so right. We've had to abandon much of our buried distribution and went back to sewage holding tank, water holding tanks, and or honey buckets. Millions of dollars were spent trying to repair and or replace sections of the buried pipe that we had to walk away from it...*
>
> *We lost an entire fresh water lake due to severe erosion and then we lost our million gallon water holding tank when the floor of the tank gave out due to subsidence. We were forced to ration water. The school had to close. And our firefighting supply of water was limited."*
>
> **- Bill Tracey, North Slope Borough (Point Lay resident)**

Increasing air temperature is a critical driver of deleterious permafrost degradation impacts. As temperatures increase, impacts are expected to first become widespread in the Yukon-Kuskokwim Delta and spread north over time. Furthermore, water is said to be the enemy of ice. Increasing precipitation and flooding can accelerate thawing. Spatial modeling suggests that near-surface permafrost will likely disappear from fifty to seventy-five percent of Alaska by the end of the 21st century and that most permafrost will be eliminated from the Yukon-Kuskokwim region by 2050, causing complete catastophic loss of infrastructure (Jafarov, Marchenko, & Romanovsky, 2012; Pastick, et al., 2015; Markon, et al., 2018; Romanovsky, et al., 2017).

Figure 24: *The exterior walls of the Quinhagak multi-purpose building have settled relative to the interior and the floor tilts 9 inches to the southwest over a horizontal length of 22 feet. There is widespread damage, including a three-inch crack between the wall of the health clinic and the floor. Short-term stabilization is recommended. The long-term solution is to replace the building.* **Credit:** *Chinik Eskimo Community; 2005.*

The two greatest needs to address permafrost degradation are (1) immediate actions to stabilize structures and (2) replacement foundations are needed, along with the development of data and risk assessments that inform long-term solutions.

The Statewide Threat Assessment identified 35 communities with the highest threat of damage to infrastructure from permafrost thaw and 54 communities with the next highest level of threat, shown in the following maps.

Communities with the Highest Threat of Infrastructure Damage from Permafrost Degradation

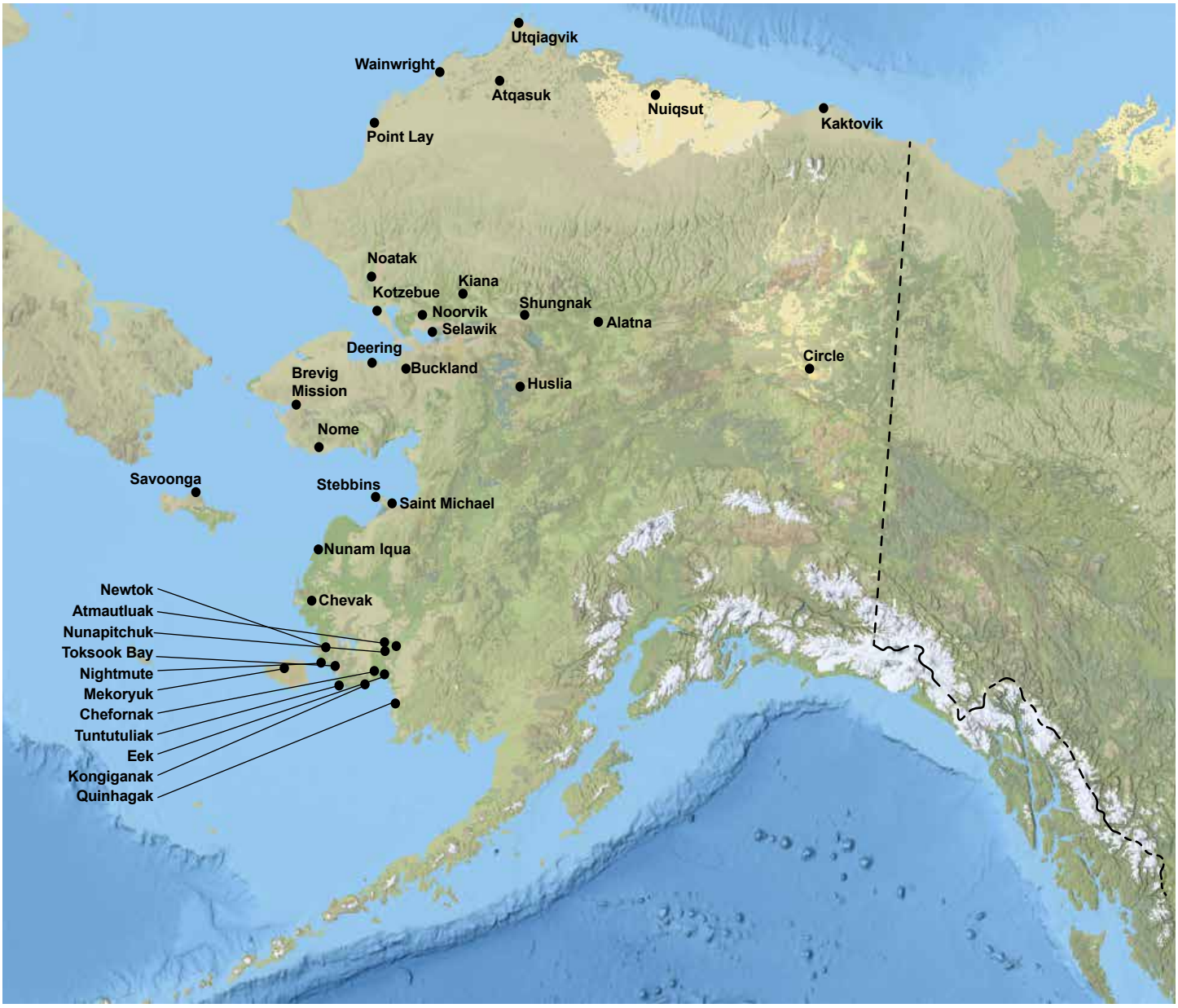


Figure 25: *Permafrost Group 1 Communities: In 35 communities the risk of damage to community infrastructure from thawing permafrost is high according to the Statewide Threat Assessment (2019).* Credit: *Sally Cox, DCRA.*

Communities with the Second Highest Threat of Infrastructure Damage from Permafrost Degradation

Figure 26: *Permafrost Group 2 Communities: Fifty-four communities face a moderate to high risk of damage to community infrastructure from thawing permafrost according to the Statewide Threat Assessment (2019).* Credit: *Sally Cox, DCRA*

Community Voices from the Front Lines: Permafrost Degradation

Thawing Permafrost in Chefornak is Crippling Community Infrastructure

Chefornak is a Yup'ik village located on the south bank of the Kinia River in western Alaska's Yukon-Kuskokwim Delta region. Alexie Amagiqchik moved from a village on the Bering Sea to establish a general store at Chefornak, and others from the original village joined him there. Chefornak residents practice a traditional subsistence lifestyle with some commercial fishing.

Threat: Chefornak faces the combined threat of flooding, permafrost degradation, and erosion, threatening homes, the Head Start building, the fuel tank farm, and the barge landing. Homes in Chefornak are becoming uninhabitable as the land underneath the community subsides due to permafrost degradation. Boardwalks[1] are impassable and sunken and spontaneous sinkholes are forming, which have resulted in injuries and increased fears about safety. Recent thermal modeling and Indigenous knowledge suggest that most foundations in the community will need to be adjusted or replaced over the next 50 years. Flooding currently impacts several buildings. Developing and implementing proactive hazard mitigation solutions in the community is expected to cost more than $25 million over the next 50 years.

Mitigation Strategy: Chefornak is working to develop a new subdivision site for the relocation of acutely threatened infrastructure. The community is also working to repair other impacted facilities including replacing building foundations, replacing or repairing tilting failed electric power distribution poles and constructing new homes to replace those that are not in good enough condition to relocate to the new subdivision site.

Community Story: On May 23, 2020, Delores Abraham and her family—shown in the photo at right— fled their home because a four- to six-foot sinkhole formed beneath the home's foundation. A general contractor inspected the house, determined the foundation could not be re-leveled and recommended the family move out due to its unsafe condition. The structure was effectively condemned. Delores and her family moved in with relatives, resulting in extreme overcrowding. Due to the poor condition of the home, the community is seeking support to replace it with a new home at the new subdivision site.

Figure 27: *Delores Abraham and her family fled their home in Chefornak, Alaska after a large pit developed from thawing permafrost beneath the home.* **Credit:** *Kimberley Abraham.*

1 In many Alaska Native villages, especially those within the Yukon-Kuskokwim Delta region, boardwalks instead of roads provide transportation access throughout the village. This is because many villages are located within wetland areas. Elevated boardwalks provide access for walking and all-terrain-vehicles throughout the village.

Permafrost Thaw and Erosion Threaten Critical Community Infrastructure in Noatak

Noatak is an Inupiat village located on the west bank of the Noatak River in western Alaska, north of the Arctic Circle. Noatak was established as a fishing and hunting camp in the 19th century. The community practices a traditional subsistence lifestyle with families traveling to fish camps in the summer. The community is not accessible by road or barge. All supplies and fuel must be transported by air.

Threat: Riverine erosion threatens the airport, the water source, landfill, and the central developed area. The permafrost underlying Noatak is thawing and destabilizing foundations beneath homes, the underground water and sewer piping, and other infrastructure. There is a large crack in the floor of the water treatment plant and the foundation has settled approximately six inches on one side.

Mitigation Strategy: The Federal Aviation Administration is funding a $40 million airport relocation, which is being implemented by the State of Alaska Department of Transportation. The community intends to relocate the old landfill to prevent it from contaminating the river. The community also plans to repair and extend the existing shoreline protection structure, and complete a new water source investigation to address the threatened water source. Structural and geotechnical assessments of the water treatment plant recommend thermally stabilizing the subsurface with active cooling and adding rigid insulation in the gravel pad around the building. Many homes will need adjustments to the foundations (e.g. additional insulation in the gravel pad) or new foundations (e.g. helical piles).

Figure 28: *Thawing permafrost in Noatak caused a crack in the floor of the water treatment plant and the foundation has settled significantly resulting in threats to the integrity of the pipe system.* Credit: *ANTHC.*

Community Stories: The water and sewer operator in Noatak is constantly repairing leaking pipes due to the settling ground. For example, permafrost degradation in summer 2019—the hottest summer on record—broke a pipe; the break required a month of digging and investigation to find the leak. Within the last decade, more than a dozen water main breaks and leaks due to permafrost thaw have been repaired.

Supporting Community-Driven Processes

"It's important that communities lead the efforts that affect them. Kivalina very successfully completed the construction of an evacuation road, because we led this project. Our local knowledge was critical to informing the design and construction of the road. We led many meetings in which we reviewed maps and provided our local expertise and guidance on where the road could successfully be built and what sensitive areas should be avoided, including areas the subsistence hunters wanted to avoid.

Many times in the past we have been subject to government agencies doing things without consultation or listening to us. Funds were spent by agencies developing a project that benefited them, but which didn't benefit Kivalina. It's so important that we be listened to. Through our traditional knowledge, we protect our natural resources and use them to the benefit of our community. Planning and community development projects work best when we can lead using our traditional knowledge, and government agencies provide us with the technical support and resources we need."

- Millie Hawley, Tribal Administrator, Native Village of Kivalina

Alaska Native people have survived and thrived for thousands of years in some of the harshest environments on earth and have a wealth of knowledge about how to adapt to changing environmental conditions. This Indigenous knowledge is key to mitigating environmental threats to infrastructure. A body of evidence shows that when communities are empowered to use their Indigenous knowledge and decision-making processes to take action, the results are usually more effective, inclusive, and enduring. This is true from the earliest phase when risk is being assessed through the final phase of implementation (FEMA, 2016; IIED, n.d.; Lowlander, 2015; Marino et al., 2019; NACRP, 2017; Steen-Adams et al., 2020; Tye & Coger, 2021). A community-driven approach empowers and honors community decision-making and self-governance.

Community-Driven Responses to Environmental Threats

Alaska Native communities are responding to environmental impacts to infrastructure in three primary ways: protection-in-place, managed retreat, and relocation. These response strategies are defined and illustrated in the figure on page 44. We utilize these categories for planning purposes and to estimate the time, cost, and labor allocations required for each response.

Protection-in-place

Examples of unmet infrastructure needs for protection-in-place solutions include rock revetments or sea walls to slow erosion, elevating homes and building berms to mitigate flooding, and modifying water and sewer systems with flexible service connections to combat subsidence from permafrost thaw.

Managed Retreat

Examples of unmet infrastructure needs for managed retreat solutions include developing a new subdivision site within the existing community to which threatened infrastructure can be moved, to moving cultural resources such as cemeteries and subsistence structures such as fish drying racks.

Relocation

For communities facing relocation, an entirely new village must be constructed at a new location. Relocation is usually considered only as a last resort, after it has been determined that other response strategies such as protection-in-place and managed retreat will not be feasible over the long term. Relocation is the most difficult response strategy to implement, the costliest, the most labor-intensive, and the most time-consuming.

It is common for communities to combine these approaches. For example, a community may reinforce a riverbank (protection-in-place) while gradually moving infrastructure from hazard-prone areas to another place in the community (managed retreat). Similarly, some communities who are planning for relocation in the long-term are in the near-term protecting and retreating until they develop plans and secure the necessary resources for long-term relocation. For example, the U.S. Army Corps of Engineers (USACE) built a rock revetment, a protect-in-place measure, to protect the Village of Kivalina from coastal storms and erosion while Kivalina leadership develops plans for an evacuation road, a new school on the mainland, and relocation. One hundred miles away, the USACE used shoreline protection to protect Shishmaref, Alaska from coastal storms and erosion while Shishmaref leadership plans for site expansion to a safe location.

Communities name their response in ways that maximize the benefit to the community. The name may not align with the definitions above. For example, "site expansion" may be used instead of relocation due to potential resistance to new investments in communities that plan to relocate.

Figure 29: *Managed retreat community meeting in the village of Napakiak.* **Credit:** *Max Neale*

Options to Mitigate Erosion, Flooding, and Permafrost Degradation

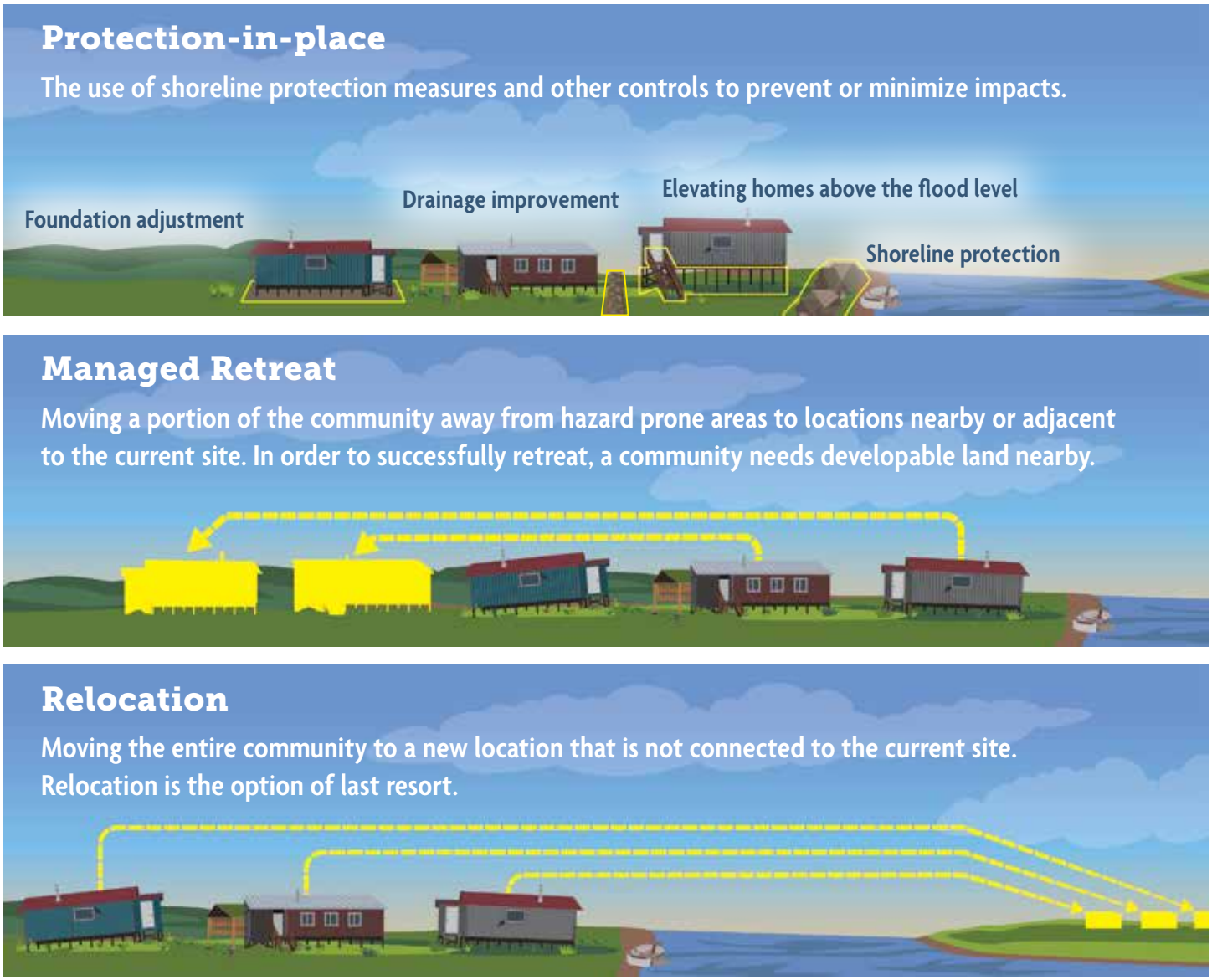


Figure 30: *DCRA • ANTHC • Unmet Needs Report 2023*

Nonviable Responses to Environmental Threats: Co-location

Another term that is used in the context of environmental threats is co-location, which is defined as the forced process of moving one population into an established population. There is plenty of historical evidence of why this strategy is traumatizing and inappropriate, especially to Indigenous Peoples. For example, in 1952, the federal government established the Urban Relocation Program to encourage American Indians to move from reservations into seven large urban cities with the promise of good-paying jobs, good schools, and good housing. However these promises were not kept, and the result was unemployment, low-end jobs, discrimination, and a devastating loss of human support systems: a loss of culture, a sense of place, and connectedness to one's people (Hillard, 2012; NARA, 2016; Nesterak, 2019).

In 1956, Congress passed the Indian Relocation Act, Public Law 959, in response to criticism of the Urban Relocation Program. Shortly thereafter, the Association on American Indian Affairs published a report which criticized these federal efforts. The report compiled a list of complaints against the program, the most common of which were that program workers "place Indian families in slum housing", that "Indian men and women are driven to alcoholism by the pressure of city life", and that there was "inadequate screening of applicants", resulting in the relocation of people who were suffering from mental illness, couldn't speak English, or didn't have any education or work skills (Madigan, 1956; Nesterak, 2019).

In Alaska, there are several cases where communities were forced to co-locate, resulting in negative short-term and long-term impacts, including loss of Native language, loss of traditional events and feasts, decreased culturally-specific knowledge, the hostility of the host community to displaced community members, segregation, increased alcohol use and abuse, increased exposure to illness, changes in subsistence practices and decreased nutrition (Schweitzer, Marino, Ganley, Kingston, & Stasenko, 2005). In this report, co-location is not considered a viable approach to mitigation of environmental threats.

Community-Driven Resilience Phases

Many rural Alaskan communities employ three phases of activities to build resilience to environmental threats: data collection and risk assessment, planning, and project implementation. Each phase builds upon the other. The phases are illustrated in the figure below. As an example of this process, the village of Newtok conducted an erosion assessment which informed the community's decision to relocate. A period of relocation and community development planning took place prior to construction at the community's relocation site, Mertarvik. Pre-construction activities—risk assessments, planning, and design—are the most challenging, time-consuming, and critical stages to successful project implementation.

Figure 31: *DCRA • ANTHC • Unmet Needs Report 2023*

The Risk Assessment Phase

The first phase, the data collection and risk assessment phase, results in the community's understanding of risk, critical for the next phase, planning and decision-making. Having a sound understanding of community risk to environmental threats is central to the community's informed decision-making for responding to those threats. This is crucial at the very beginning of the adaptation or mitigation process to ensure the actions selected are sound.

Hazard risk assessments identify the risks from the individual threats of flooding, erosion, and permafrost degradation, as well as the interaction of the individual hazards. Both historical and scenario-based approaches are necessary for long-term planning. Basic field measurements can guide solutions for immediate threats, such as relocating imminently threatened homes away from an eroding shoreline. However, extensive community-specific data collection and analysis are required for informed long-term planning.

Indigenous knowledge is essential to inform the approach to hazard risk assessments, increase the accuracy of results, and contribute to the design of solutions. Community residents are intimately familiar with their environment. Over time, and on a daily basis, they observe changes and are keenly aware of the impacts environmental threats have on their community, as well as the immediate actions needed to mitigate these threats. A key gap is understanding what the mid- and long-term impacts of these threats will be. This is where science and Indigenous knowledge can partner for data and risk assessments that communities can use to make informed decisions about their futures. Involving community members in the data collection process through community-based observation efforts is an important way to ensure local understanding of risk. Hazard risk assessments are key to informing hazard mitigation plans. Having a clear understanding of the hazard threat is needed to inform long-term solutions. During the Risk Assessment Phase, the following activities may take place:

- Compilation and documentation of Indigenous knowledge of hazard impacts through community surveys and interviews.
- This Indigenous knowledge can then be partnered with:
  - » community-based observations of erosion, flood, and permafrost thaw conditions;
  - » the collection of site-specific baseline data, such as aerial imagery and elevation surveys; and
  - » conducting hazard-specific studies, such as shoreline mapping, and flood and erosion measurements.
- This information can then be used to conduct risk assessments and modeling of erosion, flood, and permafrost thaw which help predict the timing and extent of potential damage to infrastructure.

Technical assistance should be available to the community for compiling and documenting Indigenous knowledge through surveys and interviews, establishing community-based observation efforts, and interpreting risk assessments and studies.

Of the 144 environmentally threatened communities, few communities have completed site-specific, risk assessments that incorporate the combined effects of multiple hazards and analyze hazard mitigation options. Several dozen communities are in the first stage of collecting baseline data, which precedes modeling and engineering analysis. The estimated cost to complete data collection and risk assessments is between $20 million and $30 million for all 144 environmentally communities. Completing baseline data collection and risk

assessments should be done as soon as possible to facilitate the implementation of pre-disaster mitigation solutions. Prototype scopes of work developed as part of the Statewide Threat Assessment can be utilized to guide the procurement and development of risk assessments. More information about risk assessments, including the current status of community-specific data and assessments, are available at the Environmentally Threatened Communities Dashboard.

> *"It's Important to understand that each community is unique which means one size does not fit all, any process put in place has to be flexible enough to allow for that difference with the make-up of each community. Our calendars are different when dealing with a subsistence lifestyle community, hunting, food gathering, ice break-up and even the way we do business can be different even just a few miles away from another community."*
>
> **- Bill Tracey, North Slope Borough (Point Lay resident)**

The Planning Phase

During the planning phase, the community makes decisions on solutions, including a high-level strategy and projects to mitigate threats. Long-term planning to address environmental threats will typically be based upon the results of hazard risk assessments, engineering, and other technical input. Specific community planning actions can include:

- Community planning meetings to assess the technical feasibility, benefits, and costs of solutions (protection-in-place, managed retreat, or relocation). It's essential that technical experts supporting the community participate in these meetings in-person, within the community.
- Making a decision to protect-in-place, retreat, or relocate (or combined approaches).
- Interagency meetings with the community and relevant agencies to discuss the community's decision and needed resources.
- Identifying and prioritizing actions, resources, and a timeline.
- Developing a funding strategy for the preferred solution.
- Developing a written plan.
- Incorporation of strategies and solutions into a Federal Emergency Management Agency (FEMA)-approved Hazard Mitigation Plan to become eligible for FEMA funding.

The Implementation Phase

The final phase is implementation, when the community carries out the preferred solutions or actions. This phase goes beyond studies and planning to actually constructing solutions that reduce risk. The following activities may take place:

- The community decides on locally-managed construction or using outside project management contractors
- Funding is secured
- Infrastructure and facilities design take place with the engagement of community leadership
- Construction takes place using a local workforce supplemented by outside labor as needed

Conclusion

Due to an inability to access resources and services to address environmental threats (described in Chapter 4), most communities are in the early stages of assessing risk and implementing solutions to imminent threats, such as relocating homes away from an eroding river. Only a few communities are known to have made long-term decisions and developed hazard mitigation projects based on risk assessments. Statewide, the highest near-term priorities are to support communities to address imminent threats and to complete data collection and risk assessments.

Allocating funding to complete data collection and risk assessments as soon as possible is integral to success. Having this information is essential to communities having ownership over their efforts and driving the process. The prototype scopes of work in the *Statewide Threat Assessment* can be utilized to guide the development and procurement of risk assessments. Local staff and community specific technical assistance teams (described in Chapter 5) can develop and manage risk assessment projects and long-term hazard data monitoring programs. In some communities, engineering consultants have been competitively selected for riverine erosion and flood assessments, permafrost assessments, and coastal flooding and erosion assessments. All Alaska communities can access those consultants for federally-funded projects through the existing contracts. The current status of community-specific data and assessments can be found at the Environmentally Threatened Communities Dashboard.

Figure 32: *Community-based monitoring is a key part of the local data collection and risk assessment process to inform a community's understanding of its natural hazard risk.* **Credit:** *Jaci Overbeck*

Close the $80 Million Annual Funding Gap with a Single Source Based on Risk

We have been declined funding to replace threatened homes, our preschool, and our fuel tank farm. Our community already faces extreme overcrowding—the Killanak family has 17 people living in an 800-square foot home. More people cannot abandon their homes and move in with relatives. Our pre-school is taught entirely in the Yup'ik language—it should be a national treasure! If the tank farm fails, it will pollute the river, a main food source for our entire community. I feel defeated. We need agencies to value us, our culture, the way we live, and to prioritize our community.

- Janet Erik, President, Chefornak Traditional Council, Chefornak, Alaska

This chapter describes the current barriers that communities face when attempting to access resources and services, explains how we estimated the $80 million annual funding gap, and recommends a single funding source based on risk. The chapter includes six sections:

A. Chefornak Head Start School Case Study
B. Primary Barriers to Accessing Resources and Services
C. Estimating the Unmet Funding Need
D. Recommendation: Single Funding Source Based on Risk
E. Guidance for Congress and Program Managers: How to Design Programs to be Effective and Equitable.
F. Community-Specific Data Collection and Hazard Risk Assessments

Inequitable, Ineffective, and Inefficient System

- Red stop signs represent agency programs that exclude communities.
- Yellow yield signs represent programs that disadvantage communities.
- Green traffic lights represent programs that are effective for communities.

Figure 33: *ANTHC • DCRA • Unmet Needs Report*

4A. Chefornak Head Start School Case Study

This case study demonstrates the importance of a single, committed funding source based on risk.

Figure 34: *Students in the Chefornak Head Start learning shapes and colors. September 2022.* Credit: *Leona Wisemann*

Chefornak is a Yup'ik village located on the south bank of the Kinia River in western Alaska's Yukon-Kuskokwim Delta region. Chefornak residents practice a traditional subsistence lifestyle with some commercial fishing.

The Chefornak Head Start school provides early childhood education, primarily to low-and moderate-income Tribal members, taught entirely in the Yup'ik language. Sheila Beaver, with the Association of Village Council Presidents, said, "The Chefornak Head Start serves as a school for students and is a vital safety net for their families, encouraging healthy parenting practices and an understanding of child development. It would be devastating to lose this resource for early childhood education."

The current building was constructed by the BIA in the 1970s and inherited by the Lower Kuskokwim School District. The community reports excessive heat loss due to inadequate insulation, and problems with mold, asbestos, and lead paint. The building lies adjacent to the Kinia River in an area of regular flooding, which limits access to the building during and after flood events. According to PND Engineers, storm surge flooding accelerated permafrost thaw, which has destabilized the building's foundation.

The recommended solution to the school's deteriorating condition is to demolish the building and construct a new school in a safe location. However, the Lower Kuskokwim School District does not have funding to replace the building. The Association of Village Council Presidents (AVCP) has operated the Head Start program for the last 17 years and does not have funding to replace the building.

"After the Merbok storm, part of the foundation is just hanging. Everything inside rolls toward the river."

– Eliza Tunuchuk, Lead Teacher, Chefornak Head Start

Despite repeated requests to the Head Start school program for assistance securing funding for a new building, the Chefornak Traditional Council (Tribal government) was unable to access new funding on its own. In 2017, staff from Alaska Native Tribal Health Consortium (ANTHC) Center for Environmentally Threatened Communities visited the Head Start building and began supporting the community to develop a managed retreat strategy and secure funding to replace the building. Five years later, after declined funding applications and other setbacks, the design of a new building and a new subdivision for the managed retreat has been completed. However, there is still no clear path to construct the school:

- Replacing the building is not an eligible cost for FEMA Hazard Mitigation Assistance programs. If replacing the school were an eligible cost, Chefornak could not currently meet the agency's ten percent non-federal cost-share requirement for "tribal direct" applications.
- The National Fish and Wildlife Foundation (NFWF)/National Oceanic and Atmospheric Administration (NOAA) National Coastal Resilience Fund (NCRF) Program can fund the decommissioning of buildings, but not the construction of new infrastructure.
- The community is not able to provide the twenty-five percent non-federal match required by the HUD Community Development Block Grant (CDBG) managed by the State of Alaska.
- The HUD Indian Community Development Block Grant (ICDBG) program could fund a portion of the construction. However, the program is highly unlikely to support a phased construction project as the first funder.
- The 2022 BIA Tribal Climate Resilience Grant program has a $3 million cost cap, which is significantly lower than the total estimated cost of the building, boardwalks, and utility services.
- Simultaneously, the community is seeking funding to construct the subdivision site, relocate threatened homes, construct new homes to replace threatened homes that cannot be relocated, design and construct the electric power distribution system, replace the threatened bulk fuel tank farm, design and construct a replacement barge landing, repair and replace failing home foundations due to permafrost degradation and decommission threatened buildings that cannot be relocated.

A single funding source based on risk would support all projects in Chefornak, enabling all solutions to be implemented faster, with significant cost savings due to economies of scale.

4B. Primary Barriers to Accessing Resources and Services

We have observed the following four primary challenges and barriers to accessing resources and services to address environmental threats in Alaska Native communities:

1. Unclear federal leadership;
2. Insufficient federal funding due to inequitable program design;
3. Difficulty navigating the myriad objectives, processes, and limitations of various federal competitive grant programs; and
4. Coordination of piecemeal and ad hoc federal funding into a coherent response is slow, exhausting, and increases the total cost of the solution.

These challenges and barriers are described in detail in the following sections of this chapter. Further observations and recommendations regarding specific federal programs are found in Appendix C

Unclear Federal Leadership

> *"The government has no issue rebuilding third world countries but looks the other way when it comes to U.S. communities living in the same or worse conditions."*
>
> **- Clarence Daniel, Community Development Division Director, Association of Village Council Presidents, born and raised in Tuntutuliak, Alaska**

A 2020 U.S. Government Accountability Office (GAO) report on climate resilience found that unclear federal leadership is the key challenge to climate migration as a resilience strategy (GAO, 2020). This unclear leadership is central to the challenges environmentally threatened communities have had in accessing the resources they need to mitigate environmental threats (GAO, 2020; Newtok Planning Group, 2007). No federal alignment of mission responsibility—with statutory authorities and financial resources to address relocation, managed retreat, and protect in place—and the inequitable delivery of resources and services for small Tribal communities, has been the root cause of the limited progress made to date. Unclear federal leadership inhibits the ability of federal agencies to provide effective assistance to communities. Consensus around this conclusion has emerged over the last two decades (Bronen & Chapin, 2013; GAO, 2009; GAO, 2020; Kettle et al., 2019; Maldonado et al., 2013; Newtok Planning Group, 2007; Ristroph, 2019).

While the Obama Administration focused attention on the impacts Alaska Native villages faced from environmental threats, this focus didn't take place until the final year of the administration's second term, so there was little time to take action. During the Trump Administration, the federal approach to environmental threats in Alaska was "status quo". There were no new barriers and also no new resources to address the deficit. The Biden Administration has initiated several executive orders and initiatives which are currently being implemented by executive branch agencies. Although these orders and initiatives are promising, at the writing of this report, the full benefits of these efforts for Alaska's environmentally threatened communities have yet to be realized.

Insufficient Funding due to Program Design

A 2017 study of climate adaptation planning needs in Alaska Native communities found that the most commonly-cited barrier to mitigating environmental threats was a lack of funding (Meeker & Kettle, 2017). We have observed the lack of funding is primarily a result of federal program design and regulatory barriers that inadvertently disadvantage and exclude Alaska Native communities.

PROBLEM

Riverine erosion threatens 21 homes

SOLUTION

Plan, design and construct a new subdivision site where threatened homes can be relocated

1986–2015

- U.S. Army Corps of Engineers constructed bank stabilization in 1986 which failed by mid-2000s
- No progress made in addressing the erosion threat to Kotlik homes

30 YEARS LATER

2016

- Kotlik requests assistance from Natural Resources Conservation Service to relocate homes. NRCS can fund home relocation, but Kotlik must first plan, design and construct a new site

2018

- Developed community-informed managed retreat plan for at-risk homes and fundable projects with ANTHC
- Denali Commission awards funding for subdivision and home relocation skid design
- Ineligible to apply to FEMA Hazard Mitigation Assistance programs due to lack of Hazard Mitigation Plan and lack of fundable projects

2019

- Flooding impacts homes and accelerates erosion
- Ineligible to apply to FEMA HMA programs due to lack of HMP and lack of fundable projects
- HUD declined application for site construction
- Kotlik receives $100,000 from a non-profit for emergency home relocation and elevation

2020

- Unable to apply to FEMA due to grant requirements and ineligible costs
- Tribes pool bingo funds for emergency temporary home relocation and places sandbags in front of imminently threatened homes to reduce erosion
- NOAA/NFWF and State of Alaska decline applications for site construction and home relocation
- HUD funds electric distribution system and boardwalk to the site for new homes
- Subdivision site design completed

2021

- FEMA awards funding to develop home relocation project and meet application requirements
- Tribes continue to submit applications to HUD for site construction

2022

- HUD awards funding for equipment to relocate homes

CURRENT STATUS

The subdivision construction is incomplete.

No homes have been relocated.

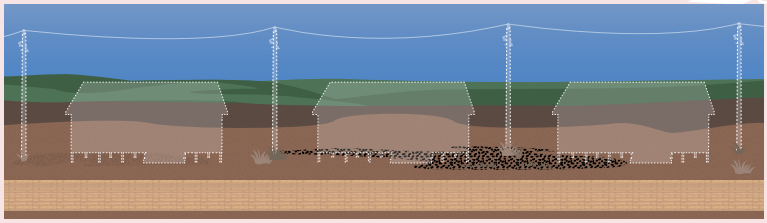


Figure 35: *ANTHC • DCRA • Unmet Needs Report 2023*

Approximately $2.4 billion of federal funding is invested nationally in climate science research each year with the main goal of informing decisions (USGCRP, 2017; USGCRP, 2020). However, we found that almost none has benefited the environmentally threatened communities in Alaska, which are on the frontlines of climate change. Climate information is typically not accessible, understandable, or downscaled enough to be useful to Alaska communities engaged in climate adaptation planning and decision-making (Meeker & Kettle, 2017). Additionally, of the 60 funding programs identified by the *Community Resilience in Alaskan Communities: Catalog of Federal Programs* (Denali Commission, 2018) only seven[1] have awarded funding to Alaska Native villages identified as environmentally threatened. The May 2022 Government Accountability Office (GAO) analysis of 20 federal programs relevant to addressing environmental threats found that all of the programs had at least one barrier for Alaska Native communities (GAO, 2022). Through our work to support communities to access project funding, we have found that only three federal programs are effective at supporting protection-in-place, managed retreat, and relocation in threatened communities—**the Denali Commission Village Infrastructure Protection Program, the BIA Tribal Climate Resilience Program, and the Natural Resources Conservation Service Emergency Watershed Program.**

Examples of barriers that prevent environmentally threatened communities from accessing resources include:

- Most federal program scoring criteria disadvantage small communities with limited administrative capacity by scoring the capacity of the applicant. The administrative capacity of a community should not influence investments to address environmental threats.
- Program cost caps are often less than the project cost. This can prevent communities from being able to apply for funding or requires that the project be broken into multiple phases that require separate funding.
- Many federal programs that address environmental threats only consider specific entities in communities to be the eligible applicants: for example, a city government or a federally recognized Tribe. However, most funding for rural infrastructure in Alaska flows to technical assistance organizations at the regional and statewide scale. For example, federal housing funding is implemented by regional housing authorities, and water and sanitation infrastructure funding is managed by the State of Alaska and the Alaska Native Tribal Health Consortium. Funding to address environmental threats should be able to be received and managed by communities and their preferred partners.
- The low economic value of infrastructure in Alaska Native communities and the high cost of construction in rural Alaska can prevent benefit-cost analyses from meeting agencies' required thresholds for "cost-effective" projects. Also, benefit-cost analyses often exclude non-economic benefits such as culture, kinship connection, and connection to place.
- Public-private partnerships and loans are rarely feasible in most environmentally threatened communities due to the small population and lack of a tax base for revenue generation.

Difficulty Navigating Programs and Processes

There is no clear direction from federal leadership to agencies to assist Alaska Native communities in responding to environmental threats, no resources for agencies to do so, nor a framework to implement a governmental response. Consequently, what exists today is a loose network of federal entities bound only by the resolve of individual civil servants striving to find lasting solutions, each working within the unique

1 The seven programs are U.S Army Corps of Engineers (USACE) Planning Assistance to the States, Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program, FEMA Building Resilient Infrastructure and Communities (BRIC), U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG), HUD Indian Community Development Block Grant (ICDBG), HUD ICDBG Imminent Threat (IDBG-IT), and BIA Tribal Climate Resilience (BIA).

confines of their own programs and implementing projects on an ad-hoc basis. Communities have no choice but to navigate these programs on their own and piece together the disparate resources, which can be immensely difficult and time-consuming, especially while also trying to make a living practicing and maintaining a seasonal subsistence livelihood. There are more than 100 programs in federal agencies, state agencies, and non-governmental organizations that can potentially support Alaska Native communities to address environmental threats. Most environmentally threatened communities have been unable to navigate the myriad objectives, processes, and limitations of these programs to develop and implement solutions to address environmental threats. ***For many communities, the current process required to mitigate climate impacts to infrastructure and community health can be like trying to assemble a 10,000-piece puzzle without a picture printed on the pieces.*** An example that illustrates the difficulty of navigating federal programs and processes is the village of Newtok's relocation to Mertarvik. Despite more than a decade of effort, and more than 40 grants from some 35 different state, federal, and non-governmental funding sources received, to date, the relocation of people from Newtok to the relocation site is only thirty percent complete (Newtok Planning Group, 2022).

> *"We should not have to be experts in their programs, they should be the experts and we should be the recipient of Congressional intent. That is the real purpose of these programs. Because program delivery requirements that are outside many Tribe's capacity, they are not able to participate in the programs at all. To maximize investment in infrastructure and mitigation measures that result in safer and more resilient communities, fair even-handed access to all programs is a must. We need a delivery system all can operate within."*
>
> **– Dan Breeden, Director, Transportation and Infrastructure Development, Bristol Bay Native Association**

Political transitions have eliminated or reduced effective programs

Addressing climate change and environmental threats is a long-term problem that requires committed funding. Progress has been significantly hampered by past political transitions that eliminated or reduced funding for effective programs. The most recent example is the Denali Commission's Village Infrastructure Protection Program. In 2015, the Denali Commission was directed by the White House to serve as the lead coordinating agency for the federal response to erosion, flooding, and permafrost thaw (GAO, 2020). Though no additional funding was provided, the Commission reallocated approximately one-third of its base appropriation funding to provide approximately $5 million annually for resilience investments in threatened communities. Additionally, the agency received a one-time $15 million appropriation for the construction of Mertarvik, Newtok's relocation site. However, in 2019, the Commission's incoming federal co-chair moved the majority of the Village Infrastructure Protection program's funding and staff to focus on other areas (Denali Commission, 2019). Similarly, funding for the State of Alaska Immediate Action Work Group and the Alaska Climate Change Impact Mitigation Program ended when a new Alaska governor was elected in 2010 (Aronson, 2013; Ristroph, 2019). Between 2008 and 2010, the Immediate Action Work Group spearheaded the appropriation of $27 million in State of Alaska funds to provide a local match to U.S. Army Corps of Engineers protection-in-place projects. The Alaska Climate Change Impact Mitigation Program awarded another $1.45 million of State of Alaska Fiscal Year 2009 and 2011 funds to mitigation projects in environmentally threatened communities (See Appendix D).

Consequences of the Current System

Most federal programs are narrowly defined by statutory authorities set forth by Congress. As a result, individual federal program managers have little ability to adapt their programs to assist with environmental threats, although some programs may be more flexible than others. This leads to inconsistencies between programs. These inconsistencies, along with the lack of a committed federal funding source, leave communities with no option but to pursue funding from disparate sources, many of which were not originally intended to address environmental impacts to infrastructure. Consequently, communities must piecemeal funding, which is slow, expensive, and increases the federally-funded cost of the solution. We describe these below.

Piecemeal funding increases the cost of the solution and results in major delays

The pursuit of ad hoc funding results in projects that are designed to accommodate the requirements of the available funding source rather than efficiently meet the needs of the community-defined project. This can significantly increase the cost of the overall solution. For example, instead of using $2 million from one funding source to build a mile-long road for a managed retreat throughout one summer, it may be necessary to secure three separate $800,000 grants for three construction projects over three summers. Each of the three construction projects may require separate equipment rentals, mobilization, and demobilization. In this example, the lack of a single funding source could increase the cost of the solution by $400,000, or twenty percent, due to the redundancies created by the forced segmentation of the project. It also increases the duration of the project by several years. Finally, it can result in an entire project not being accomplished because a critical funding source was not awarded.

Additionally, different funding sources have different administrative reporting and reimbursement requirements and schedules. This further increases the cost of the project and requires the community to spend a significant amount of time on administrative requirements. Likewise, federal and state administrative costs and burdens are similarly increased since multiple project managers across various agencies are involved in related grant administration efforts.

Establishing a committed funding source for environmentally-threatened communities would significantly reduce the time required to implement solutions. Currently, if a community's project requires five funding sources with an average delay of six months between application and award, at a fifty percent success rate, it would take five years to secure funding. Furthermore, the project might lose momentum during these five years due to delays in federal program administration or a lapse in grant funding. These delays in the implementation of environmental threat mitigation projects will increase state and federal financial exposure from any subsequent disaster response.

Securing funding is expensive

Developing a project scope, schedule, and budget for a funding proposal can take dozens of hours and cost up to $10,000 to complete. Most communities do not have local technical expertise or funding to do this work. After the project is developed, creating a competitive grant application can take anywhere from 40 to 200 hours and usually requires revising the project scope, schedule, and budget multiple times to meet the requirements of the funder. In some cases, such as with FEMA Hazard Mitigation Assistance (HMA) funding programs, it can cost more than $100,000 to satisfy the requirements of a grant application. A recent example of this is the village of Kotlik's application for a FEMA Building Resilient Infrastructure and Communities (BRIC) grant. FEMA requires a Hazard Mitigation Plan at the time of application. The community sought support from the State of Alaska to complete that plan, which then made the Tribe eligible for a $143,000 project development grant to meet BRIC application requirements for the relocation of threatened homes. The total cost of meeting eligibility requirements to relocate homes totaled approximately $200,000. Simplifying funding through a single, committed funding source would result in taxpayer cost savings as well as great benefits to communities. We provide additional recommendations to increase the efficacy and efficiency of FEMA programs in Appendix C.

Consequences of Announcing the Intention to Relocate

Announcing the intention to relocate has made some communities ineligible for investments in new infrastructure at the current site (e.g. water and sewer, bulk fuel tanks, power plant, clinic, etc.). Additionally, agency policies can prevent investments at the relocation site because the community does not exist at the relocation site yet—specifically, infrastructure is not established or there is an insufficient population (ASCG Inc., 2004; Newtok Planning Group, 2007). This vicious cycle of underinvestment inhibits the relocation and harms the community at both locations. For example, the village of Newtok has experienced a reduction in quality of life due to lack of investment in infrastructure development and maintenance, and also compromised health. A comprehensive environmental public health assessment conducted by the Yukon Kuskokwim Health Corporation and the Alaska Native Tribal Health Consortium found a direct connection between the lack of infrastructure development and maintenance and the compromised health of Newtok residents, including alarmingly high rates of lower respiratory tract infections, pneumonia, respiratory syncytial virus (RSV), and pneumonia RSV in infants (Ritter, Stafford, Dobson, & Edelmann, 2006).

Another example is in Shaktoolik. When the community announced they were planning to relocate in a grant application for a new clinic, funding for the clinic was denied. Additionally, the former mayor, Edgar Jackson, said Shaktoolik has been denied funding to build a road that is needed both for an emergency evacuation route from the barrier spit and for transportation of building materials to the proposed relocation site (Goode, 2016). Today, residents still have no evacuation road off the flood-threatened spit.

4C. Estimating the Unmet Funding Need

Three prior research efforts have sought to estimate the cost of climate change impacts to infrastructure in Alaska.

1. Larsen et al. (2008) estimated that permafrost degradation, flooding, and coastal erosion could add $5.6 - $7.6 billion in 2008 dollars to future costs for all public infrastructure statewide between 2008 and 2080 or an average of $250 to $420 million per year in 2015 dollars (Markon, et al., 2018);
2. Melvin et al. (2016) estimated that climate-related damages to Alaska's public infrastructure would cost $5.5 billion between 2015 and 2099. This estimate was limited to public infrastructure and likely excluded most infrastructure in rural Alaska due to lack of data, and;
3. Berman and Schmidt (2018) estimated an annual cost of $50 million to $100 million for Alaska communities to protect and move in response to environmental threats.

In 2020, the authors of this report collaborated with a group of subject matter experts to develop an estimate of the cost of unmet infrastructure needs due to the impacts of erosion, flooding, and permafrost thaw to infrastructure in the 144 environmentally threatened Alaska Native villages. First, we estimated the total cost of protecting existing infrastructure in communities between 2020 and 2070. This process is described in the Total Need section on the following page. Second, we estimated the resources available to communities using 2019 funding data from agencies. This is described in the Existing Support section on page 61. Finally, we estimated the funding gap using this formula: Total Need - Existing Support = Unmet Need. A detailed description of the cost estimation methodology is provided in Appendix A.

The analysis completed here differs from past research by:

- Limiting the scope to the 144 environmentally threatened communities;
- Focusing on the threats of erosion, flooding, and permafrost degradation;
- Utilizing professional judgments regarding the most likely community-specific mitigation approach;
- Developing community-specific cost estimates for protection-in-place, managed retreat, and relocation solutions;
- Estimating the annual funding gap based on agency survey results, data from communities, and professional opinion.

Total Need

The three key results from our analysis are presented below.

1. Over the next 5 years, we estimate $20 - $30 million is required to complete all site-specific vulnerability assessments required to guide cost-effective and functional solutions in environmentally threatened communities. Few communities are known to have completed site-specific, threat-specific risk assessments for their greatest threats.
2. Over the next 10 years, approximately $90 - $110 million per year will be required to protect infrastructure in environmentally threatened communities from damage due to flooding, erosion, and permafrost thaw. This is based on idealized allocation and spending models and includes funding for vulnerability assessments. It also assumes that projects can be implemented as pre-disaster mitigation projects before disaster events that require an emergency response.
3. Approximately $4.3 billion in 2020 dollars will be required over the next 50 years to protect existing infrastructure in environmentally threatened communities from damage due to flooding, erosion, or permafrost thaw. This amount is illustrated by geographical region in the figure below. The total amount includes $833 million in estimated costs for the hub communities of Bethel, Dillingham, Kotzebue, Nome, Unalaska, and Utqiagvik.

Estimated Mitigation Costs by Alaska Region

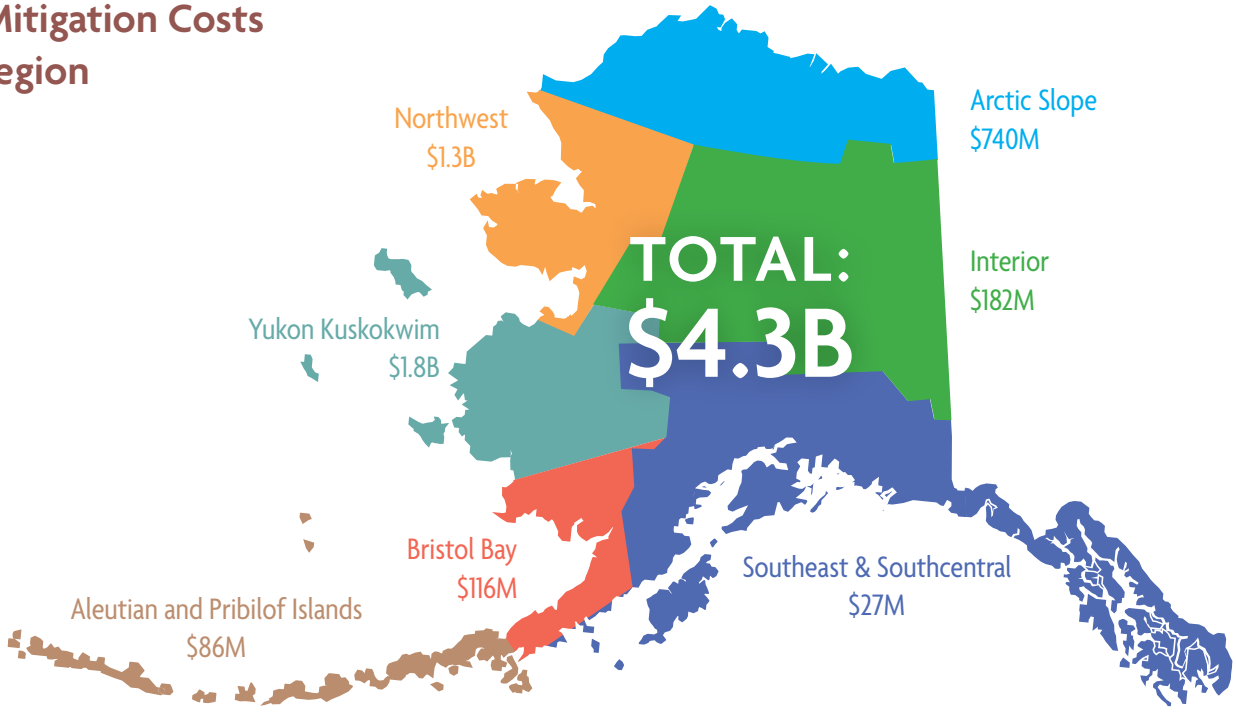


Figure 36: *ANTHC • DCRA • Unmet Needs Report 2023*

Funding Awarded to Address Environmental Threats in 2019

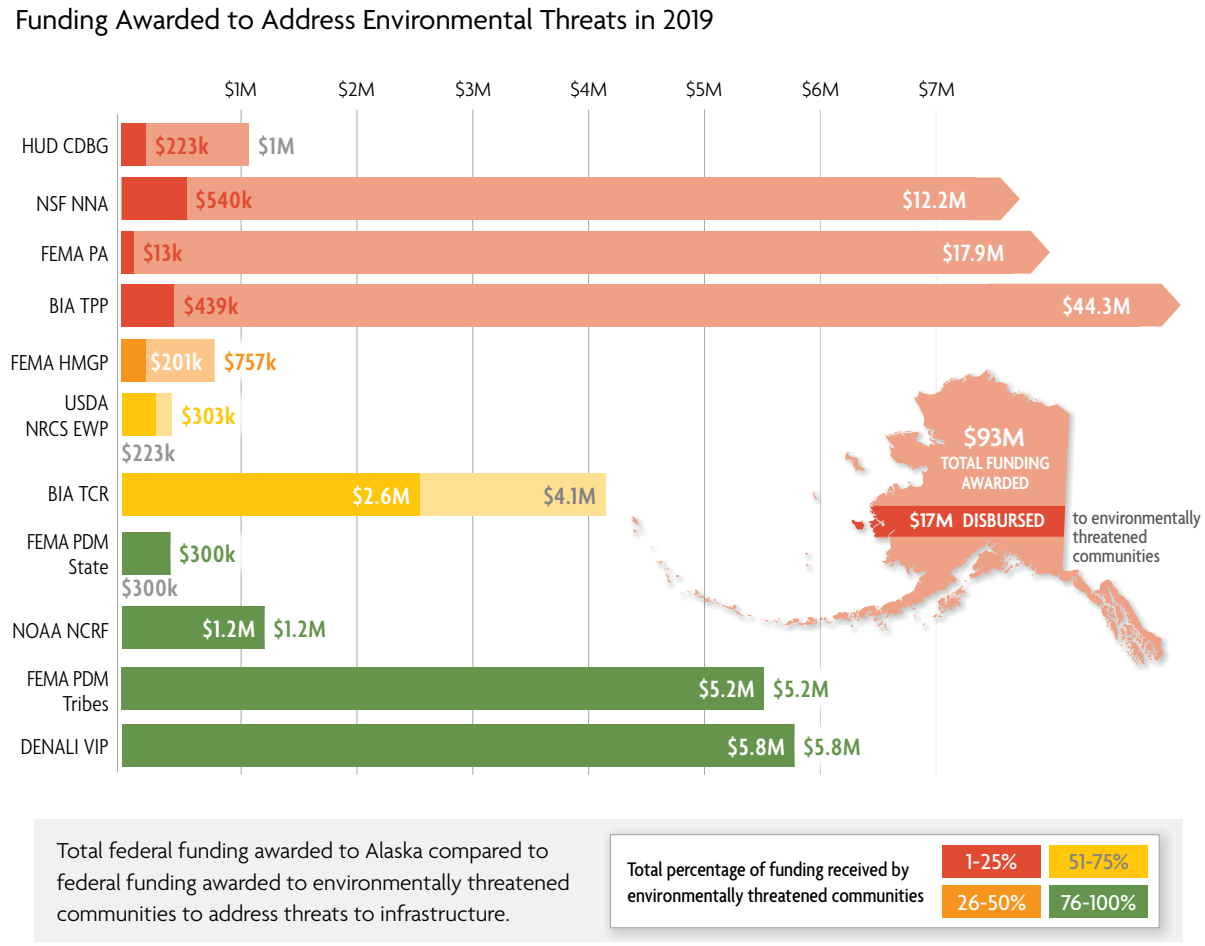


Figure 37: *ANTHC • DCRA • Unmet Needs Report 2023*

Exsisting Support

In total, we found that approximately $17 million of federal funding was awarded to environmentally threatened communities from state and federal sources to address environmental impacts to infrastructure in Fiscal Year 2019. This estimate is derived from publicly available information and our consultation with agency representatives. The figure above summarizes the amounts awarded by relevant programs in 2019 to Alaska as a whole and the amounts awarded for relocation, managed retreat, or protection-in-place efforts in the 144 environmentally threatened communities. The bar graph displays amounts disbursed in 2019, although the funding may have been appropriated in Fiscal Year 2017 or Fiscal Year 2018.

The results from our 2019 analysis here are consistent with the subsequent analysis by the GAO, which gathered funding data for Fiscal Years 2016 through 2020, and found an annual average of $18.4 million disbursed to Alaska's environmentally threatened communities to address environmental threats excluding U.S. Department of Transportation projects (GAO, 2022).

Unmet Need

Due to the lack of site-specific risk assessments, we estimate a funding gap of $80 million, (2019 dollars) each year over the next ten years. Therefore, existing funding is only sufficient to meet approximately twenty percent of the total need in environmentally threatened communities. The vast majority of unmet funding is required for the implementation of solutions, such as relocating homes, replacing a threatened fuel tank farm, building protective berms and sea walls, and constructing new sites for the relocation of threatened structures.

4D. Recommendation: Single Funding Source Based on Risk

We recommend the U.S. Congress close the $80 million annual funding gap by providing a committed funding source to fully cover the costs of protection-in-place, managed retreat, and relocation. To be effective, we recommend that a single entity receives the gap funding and that this entity has Alaska-based staff and leadership, has significant experience supporting community infrastructure development and environmental threats in rural Alaska, and the entity's funding can be used as a non-federal match to leverage other resources.

> *"We should not be writing grants to protect our communities"*
>
> - Melanie Bahnke, Chair, Alaska Federation of Natives Climate Task Force

A viable alternative to a single funding source is dedicated funding to multiple agencies who collaborate and fund projects from a common priority list. An example of an existing collaboration is the Alaska Sanitation Facilities Program, where federal agencies collaboratively fund projects from a common priority list and provide programmatic funding for full-time dedicated technical assistance staff to support communities with assessing needs, developing projects, securing funding, and implementing projects. The single funding source or collaboration should provide 100 percent federal funding and should be based on a risk-based prioritization. In these systems, a master list of projects is maintained and scored based on published criteria. Each year, the highest priority projects based on risk are selected and funded up to the limits of annual program allocations. A similar risk-based criterion could be established for award of environmental threat mitigation funding, and eliminate the need for communities to directly compete with one another.

Funding Priorities for Alaska's Environmentally Threatened Communities

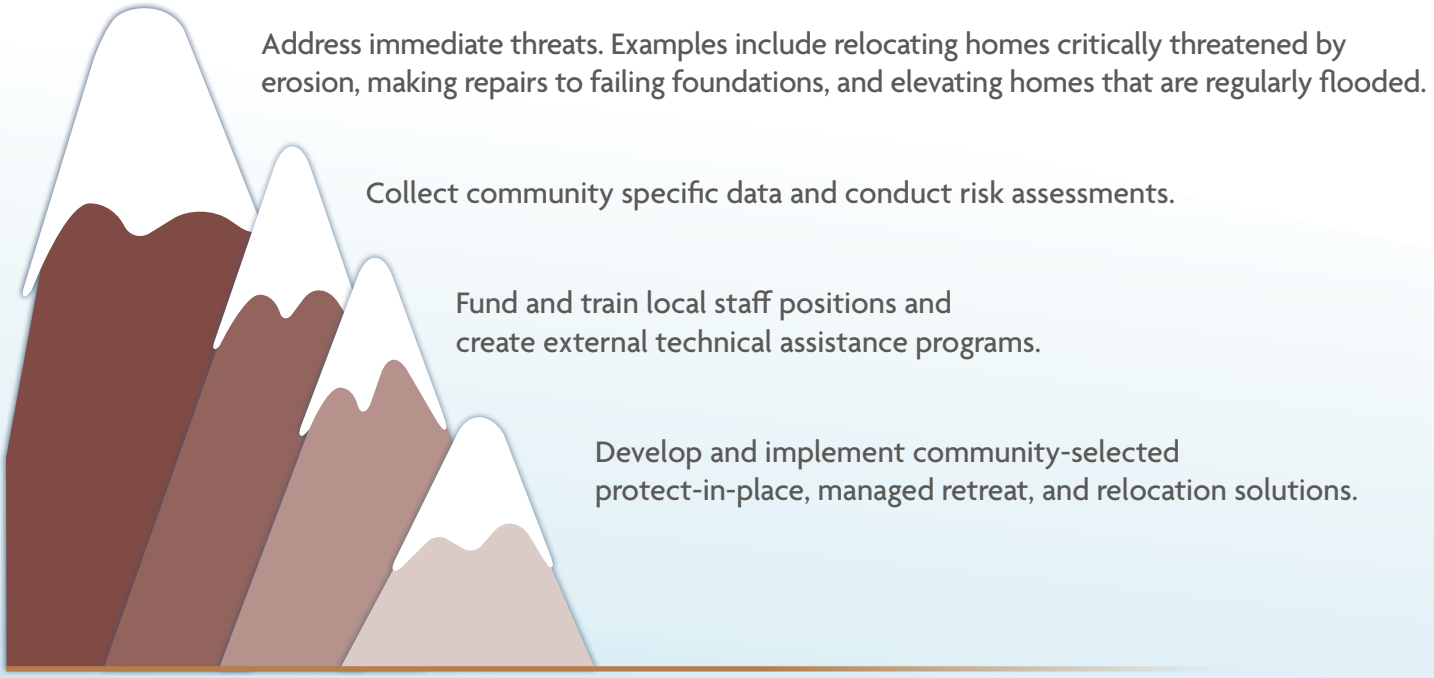


Figure 38: *ANTHC • DCRA • Unmet Needs Report 2023*

4E. Guidance for Congress and Program Managers: How to Design Programs to be Effective and Equitable

Based on our experience with dozens of federal and state programs (see Appendix C), we offer the following recommendations to improve the design of programs that deliver resources and services to small Tribal communities.

Eliminate competitive applications or provide technical assistance with project and application development

Most federal programs require that interested recipients submit competitive applications to access the program's resources or services. This is inequitable. The application itself disadvantages or excludes small communities with limited administrative capacity (discussed more in Chapter 5) because communities often are not aware that programs exist and may not have the administrative or financial capacity to apply. Most communities also do not have the technical capacity to develop "fundable projects" with technical project descriptions (scopes of work), schedules, and budgets sufficient to meet the requirements of funding agencies.

Allocate funding based on the environmental risk of the community

Federal grant programs typically make award decisions based on unique competitive criteria established for each grant opportunity. These criteria are often based on narrow program objectives and do not consider community need. Funding for environmental threat mitigation should be awarded based on some consideration of community risk to ensure that limited available funding is directed toward the highest need.

Provide one hundred percent federal funding

Most Alaska communities do not collect taxes and, therefore, do not have the financial capacity to contribute toward a cost-share. Projects to address environmental threats should receive one hundred percent federal funding.

> *"No Alaska Tribe should have to produce a non-federal cost share for any federal grant. This goes back to the most basic element of the government trust responsibility to each and every tribe."*
>
> **– Dan Breeden, Director, Transportation and Infrastructure Development, Bristol Bay Native Association**

Provide funding and technical support to meet program requirements

Section 322 of the Stafford Act requires that communities have a FEMA-approved Hazard Mitigation Plan in order to be eligible for FEMA funding opportunities. However, according to September 2022 data from the State of Alaska Division of Homeland Security and Emergency Management, ***seventy percent of Tribal governments in Alaska do not meet this requirement and, therefore, cannot apply for FEMA Hazard Mitigation Assistance funding.*** This is an example of a requirement that inadvertently excludes communities—including the communities with the greatest need—from accessing resources. Hazard Mitigation Plans are not simply an instrument to secure FEMA funding, but also a critical guiding document for communities to identify and address environmental threats. Federal programs should provide funding and robust technical support to assist communities with development of actionable planning documents.

Enable communities to designate a partner to receive and manage funding on their behalf

Most community infrastructure projects in rural Alaska occur in partnership with regional and statewide organizations that implement projects in communities. However, some federal agencies — such as the Federal Emergency Management Agency (FEMA) and Bureau of Indian Affairs (BIA) — do not recognize tribal or regional organizations as eligible applicants. This is a major barrier. Communities should be able to designate a partner organization to apply for and manage funding on behalf of their community.

4F. Community-Specific Data Collection and Hazard Risk Assessments

What community-specific data collection and analysis are needed?

Basic engagement with the community through a site visit can guide solutions for immediate threats, such as relocating homes away from an eroding shoreline. However, extensive community-specific data collection and analysis are required to help long-term community decision-making, develop solutions that are feasible and cost-effective, and design infrastructure to be resilient to future environmental change. Risk assessments are also needed to meet many funding agency requirements.

Data collection

Environmental threats to Alaska communities are complex and specific to the community's location and conditions. Most data and assessments commonly found in the contiguous United States have not been developed for Alaska communities (e.g. Federal Emergency Management Agency Flood Insurance Rate Map). Good data sets are essential for conducting meaningful vulnerability analysis and modeling as discussed in the following section. Examples of data collection needs are listed below:

- Ground temperature and salinity
- Geotechnical data (e.g. drilled holes) and geophysical data (e.g. ground penetrating radar)
- Bathymetry, LIDAR, digital surface models, surveyed elevation data, bank elevation profiles, cross-shore beach elevation profiles, and other topographic data
- Aerial and satellite imagery
- Water level
- High water marks
- Waves
- Sediment transport
- Sea ice extent
- Coastal geology, such as grain size

Climate change

Incorporating climate change projections in risk assessments is essential to making informed decisions and developing effective long-term solutions. Typical data on future environmental conditions include air temperature, precipitation, relative sea level change, wind speed and direction, and ice extent.

Analysis

Analysis needs depend on the unique hazards and conditions at each community. In 2019, the Denali Commission published prototype scopes of work in the ***Statewide Threat Assessment*** for riverine erosion and flooding, coastal erosion and flooding, and permafrost degradation vulnerability assessments in Alaska Native villages. These scopes of work are an available resource to inform consistent community-level data collection and analysis methodology. The Federal Flood Risk Management Standards for coastal and riverine flooding and geomorphic change assessment are another resource to inform assessment methods. Typically, analysis involves gathering data to establish a historic baseline and subsequent modeling to project future exposure to the hazard(s). Modeling methods vary by hazard. After the modeling is completed, engineering analysis is needed to assess alternatives, plan, and design the community's preferred solutions.

Indigenous Knowledge

Indigenous knowledge about hazards is essential to enable technical support teams to develop and implement effective risk assessments. Communities have invaluable knowledge about all relevant data and historical context that is necessary to inform science and engineering methods and to assess the potential efficacy of solutions. Examples of Indigenous knowledge include ocean currents, waves, wind, historical high water marks, ground surface and subsurface conditions, and the successes and failures of past construction projects, etc. Community representatives must be involved throughout the entire risk assessment process.

Data Consistency

We have found that oversight of data collection, analysis, and engineering are critical to creating high-quality information that can be used to make important decisions that impact current and future generations. Examples of technical support and oversight include developing scopes of work, assuring data quality, and engaging various disciplinary experts to review data, analyses, reports, designs, etc. Significant oversight from a diverse group of subject matter experts is needed.

Current status of data collection and risk assessments

Most communities have not started data collection or risk assessments

The State of Alaska and Alaska Native Tribal Health Consortium (ANTHC) collaborate to maintain the Community Flooding, Erosion, and Permafrost Risk Assessment database available at https://dggs.alaska.gov/hazards/coastal. Currently, the majority of the 144 threatened communities have not started site-specific risk assessments. Several dozen communities are in the first stage of collecting baseline data. A handful of communities are in the engineering analysis stage.

The estimated cost to complete the remaining data collection and risk assessments is approximately $20 - 30M. The actual cost varies significantly by the community depending on the number of significant hazards, existing data, and the modeling and analysis needed to understand long-term risk with confidence. The cost of establishing long-term monitoring programs, such as water levels, ground temperature, time-lapse cameras for flooding and erosion, etc. is not included in this estimate.

Recommendation

We recommend increasing funding for data collection and analysis. Allocation of funding should be based on communities' level of risk using the Denali Commission Statewide Threat Assessment rankings to inform community decision-making regarding appropriate solutions to threats. This need can be most effectively and equitably addressed through a voluntary statewide data and risk assessment program that communities can elect to participate in. The program could provide an experienced, diverse team to collaborate with each community on data collection and assessment methodologies, selecting consultants, overseeing work, engaging other disciplinary subject matter experts for advisory support, developing and revising standards, and supporting community-specific long-term monitoring programs, etc.

Increasing Local Capacity and Deploying Community Specific Technical Assistance Teams

"Technical assistance has informed most of the recent decisions Shaktoolik has made to address coastal flooding and erosion. We would not be where we are today without a lot of outside support. Technical assistance has helped the Shaktoolik Tri-Organization (leadership from the tribe, city, and village corporation) make informed decisions about a storm surge berm to protect our community, with selecting and contracting with an engineering consultant, and with funding a position at the tribe to coordinate our response to environmental threats. We meet every two weeks with our technical assistance team to plan, design, acquire funding, and implement more than a dozen successful projects. This has been essential to our resilience efforts."

- Genevieve Rock, Development Coordinator, Native Village of Shaktoolik

Increasing Local Capacity to Address Environmental Threats

Many small, remote Alaska Native communities have limited administrative and technical capacity to address environmental threats. For example, communities generally have several full-time staff at the Tribal government, city government, and village corporation that operate all community programs and services, including planning, developing, operating, and maintaining all community infrastructure. Community staff are typically overloaded, and staff turnover can have a significant impact on community capacity and the ability to address environmental threats. In contrast, larger municipalities in Alaska and the contiguous United States have dedicated planning and public works departments to plan, design, and construct infrastructure projects, as well as legal, accounting, and other administrative staff. The capacity of Alaska Native communities to address environmental threats varies by community. Some communities have heavy equipment, skilled operators, skilled carpenters, and staff for planning, grant writing, and accounting. Other communities hold occasional leadership meetings, have few part-time staff, and partner with other organizations to lead the development and implementation of infrastructure projects in the community. Increasing administrative capacity can be a critical component of supporting communities as they endeavor to address environmental threats. To increase local capacity to address environmental threats, we recommend providing funding and robust training for a local staff position in the community.

Local Coordinator Positions

History: The importance of having a local coordinator in the community to represent the community, interact with government agencies and organizations, seek funding, and manage projects has been recognized since at least 2008 (Immediate Action Work Group, 2008; Immediate Action Work Group, 2009). From 2012 to 2016, the State of Alaska Division of Community and Regional Affairs' (DCRA's) Alaska Community Coastal Protection Project funded full-time local coordinators for the communities of Kivalina, Shaktoolik, and Shishmaref, which resulted in resilience plans for each community. When the grant for that project ended, the Denali Commission Village Infrastructure Protection (VIP) Program funded the local coordinator positions for the three communities and has since provided funding for local coordinators in other communities. Due to limited VIP program funding, ANTHC staff have supported communities to secure BIA Tribal Climate Resilience Funding for coordinator positions in at least six communities, including working with communities to draft job descriptions, access relevant training, and provide ongoing support for some positions. Dedicated full-time or part-time coordinator positions are most important when communities are planning and implementing retreat and relocation, which are highly complex solutions with dozens of projects and coordination with a large number of entities.

Lessons Learned: The impact of Denali Commission and BIA-funded coordinator positions has varied based on the individual hired for the position and the amount of supervision and mentorship available for the position. Denali Commission and BIA have not provided robust training for local positions, which is an area for future improvement. It is important to have a good job description with minimum requirements. In 2022, the BIA Tribal Climate Resilience Program began a cohort for coordinator positions and funded coordinator positions in some communities. We recommend a robust training program designed by experienced Alaska-based staff in coordination with communities. Community members have also suggested that issues with staff-turnover might be addressed by hiring a part-time staff person to be mentored and work alongside the local coordinator so there is always someone available to step in and pick up the work (Indigenous and Community Contributors, 2022).

Needs: The capacity needs of each threatened community must be assessed, and each community needs non-competitive funding for a local coordinator position for the duration of the community's mitigation efforts without requiring an application from the community. The second need is a robust training program and cohort being created for the community staff to build skills and knowledge and enable communities to learn from each other.

Coordinator Position Responsibilities

The goal of current local coordinator positions is to increase the community's capacity to address environmental threats through the duration of the community's mitigation efforts and to ensure the community is leading the mitigation effort. The following activities are adapted from a community's Environmental Threat Coordinator job description:

Planning

1. Coordinate the community's response to environmental threats by identifying the current needs and priorities of the community, keeping track of ongoing projects in the community, and keeping all entities and the public informed of progress and challenges.
2. Work collaboratively with local and outside organizations to develop plans to protect the community.
3. Collaborate with the city, Tribe, and corporation to serve as a central point of contact for the community's efforts to respond to environmental threats.
4. Host a monthly protection-in-place, managed retreat, or relocation (whichever is the community's desired solution) meeting with the city, Tribe, corporation, and key partners.
5. Collaborate with consultants to conduct a community survey to gather feedback from residents about community priorities and the managed retreat.
6. Conduct hazard monitoring and work with partners to process and analyze data.

Funding

1. Collaborate with partners to develop grant applications
2. Manage all Tribal grants related to addressing environmental threats, including grant reporting in collaboration with the tribal administrator.
3. Support the city to manage grants related to addressing environmental threats, including grant reporting.
4. Other duties as determined beneficial by the tribal council.

Implementation

1. Serve as the local project manager for environmental threat projects.
2. Coordinate visits to the community from partners and contractors.

> *"We have so little information. We don't have the capacity. Then the requirements and regulations are confusing and difficult. If we had a team that our smaller communities could use to access other resources, it would save the government a lot of money because it would prevent disasters."*
>
> **– Sheila Carl, Tribal Resilience Coordinator, Akiak Native Community**

Training for Coordinator Positions

Long-term training in the following areas will increase local capacity to address environmental threats through the duration of the community's mitigation efforts. The ultimate goal of increasing staff and providing training is to enable communities to address environmental threats on their own, without outside technical assistance. Training could be made available to community staff and leadership. The second need is the creation a cohort of local staff working to address environmental threats with annual in-person meetings to share successes, challenges, and lessons learned. The community specific technical assistance teams described in the next section can be an important mechanism to provide one-on-one training for community staff and leadership.

Suggested training topics:

- Computer skills, including Microsoft Office Suite, typing, and file storage
- Writing in English
- Communication skills, including presentation skills for meetings and conferences
- Project management
- Grant writing
- Community planning
- Contracting and procurement
  - » Grant and financial management including 2 CFR 200 training
  - » Fundamentals of civil engineering and arctic engineering
  - » Fundamentals of erosion, flooding, and permafrost degradation

Community Specific Technical Assistance Teams

History: Most environmentally threatened communities have been unable to navigate the myriad objectives, processes, and limitations of the more than 100 programs at federal, state, and non-governmental organizations that could be utilized to develop and implement solutions to environmental threats. For many communities, the current process required to mitigate climate impacts to infrastructure and community health can be like trying to assemble a 10,000-piece puzzle without a picture printed on the pieces. Technical assistance to support communities with risk assessments, planning, and project implementation is essential.

The GAO emphasized the significance of technical assistance for small, low-income, and historically disadvantaged communities, especially for Alaska Native villages facing environmental threats (GAO, 2022). Despite this need, limited investment has been made in programmatic technical assistance. The Denali Commission and ANTHC offered direct services, while other agencies provided short-term, project-specific technical assistance.

> *"The purpose of the Community Specific Technical Assistance Team is all about giving the community the tools they need to be successful."*
>
> - Clarence Daniel, Community Development Division Director,
> Association of Village Council Presidents, born and raised in Tuntutuliak, Alaska

Needs: Some communities have been successful at procuring technical assistance on an ad-hoc basis through community-specific grant funding and programs in statewide organizations. However, this ad-hoc method is not serving the majority of communities due to limited funding and limited capacity within these programs. To address the large technical assistance gap, a formal comprehensive technical assistance program is needed. One suggestion for creating a technical assistance structure is described in Chapter 6. Until an intergovernmental implementation framework exists, community specific technical assistance teams will still be needed. Funding for technical assistance should not be contingent upon the creation of a formal framework.

Non-competitive funding must be provided to each environmentally threatened community for new local staff positions, training for community staff, and leadership to increase capacity to address environmental threats. Simultaneously, funding for community specific technical assistance teams to support communities with risk assessments, planning, and project implementation is needed. Local staff positions and community specific technical assistance teams, with support from contracted consultants, can implement day-to-day efforts to address environmental threats, guided by community leadership. This organizational structure is shown in Figure 42 on page 91. To achieve the best results, this should be implemented via the proposed Alaska Environmental Threat Mitigation Framework described in Chapter 6.

Figure 39: *The core team to address environmental threats typically includes a local staff position, community leadership, and a technical assistance team.* Credit: *ANTHC • DCRA • Unmet Needs Report 2023*

Purpose

The purpose of a technical assistance team is twofold: (1) to provide technical guidance to help inform community decision-making, and (2) to reduce the number of touchpoints to external entities required to develop and implement solutions to environmental threats. A key function of the technical assistance team is to create a single point of contact through which to access government resources and services.

> *"I reviewed a $125,000 permitting fee proposal from a community's engineering contractor. It was out of bounds expensive for a small housing subdivision. I felt like the contractor was trying to sell unneeded services and ignoring the necessary cultural resource requirement which was specifically listed under exclusions. It was obvious they do not have experience with the HUD NEPA documentation process or USACE permitting requirements."*
>
> **– Karen Brown, Environmental Manager, ANTHC**

Community Specific Technical Assistance Team Structure and Services

The Community Specific Technical Assistance Team is a small group of technical advisors established for a specific community for the duration of the community's mitigation efforts. In addition to providing technical capacity that does not exist locally, the team should serve as a single point of contact to access external resources and services. The team should consist of a small group of technical advisors with expertise in the following areas:

- Planning to address environmental threats, including an overall needs assessment, developing a high-level strategy, and continually coordinate with the community and partners.
- Program management and strategic planning.
- Project development, including creating technical project descriptions, cost estimates, and schedules sufficient to meet the requirement of funding agencies.
- Collaboration with communities and science and engineering experts to develop community-specific data collection and risk assessment projects for riverine erosion and flooding, coastal erosion and flooding, and permafrost risk assessments.
- Contracting and procurement
- 2 CFR 200
- Environmental permitting
- Cultural resources
- Land management
- Legal support to address the legality of land transfers and other land management issues
- Navigate available federal and state assistance programs necessary to address environmental threats.
- Grant writing
- Project management for planning, design, and construction projects.
- Grant management
- Provide oversight of contractors, including the reasonableness of costs and project performance.

The amount and type of technical assistance a community might benefit from depends upon the severity and timing of environmental threats. Some communities with high capacity and a low level of near-term threat may seek little to no assistance. However, a large managed retreat effort requiring a new subdivision typically exceeds the capability of small communities. For example, Napakiak has been able to relocate residential and other small structures away from the erosion threat over the last decade. However, as the erosion threat has now reached the school, water treatment facilities, and bulk fuel facilities, additional support is needed to reinforce the local response.

A Whole-of-Government Implementation Framework is Needed

"It has been very stressful and frustrating to go through so many agencies to find ways to carry out our Managed Retreat Plan. It would be so much better if government agencies could coordinate among themselves on how they can fund our plan so Napakiak can be safer."

- Walter Nelson, Managed Retreat Coordinator, Napakiak, Alaska

Introduction and Summary

In order to maximize benefits to meet the unmet needs of Alaska's environmentally threatened communities, the efforts of individual agencies must be inclusively and efficiently coordinated, and the $80 million annual funding gap must be closed efficiently and effectively. A re-alignment of government authorities, resources and responsibilities is required to build capacity, increase technical assistance, and facilitate coordination at all levels of government. This re-alignment will effectively and efficiently address the large magnitude of environmental threats Alaska communities face.

Filling the funding and technical assistance gaps will require collaboration, leveraging of resources, and coordination of expertise across Tribal governments, state and federal government, non-governmental organizations, and the private sector. This section shares a brief history of recent work regarding establishing a governmental organizational structure and introduces a conceptual level implementation framework intended to improve governmental support to environmentally threatened communities in Alaska. We present a conceptual "Mitigation Framework" intended to advance efforts toward the development and adoption of a formal framework.

Brief History

Some prior work has been done to consider how a government organizational structure could effectively address the needs of Alaska's environmentally threatened communities. Options considered by the GAO, state and federal agencies, Tribes and Tribal organizations, academic researchers, and others have included everything from a lead federal agency, sometimes with a lead state counterpart, to a new agency, to a federal climate migration pilot program, to a multidisciplinary coordinating government framework with relevant state and federal agencies, Tribes and Tribal serving organizations (GAO, 2003; GAO, 2009; GAO, 2020; Immediate Action Work Group, 2009). The most recent progress made toward the implementation of a federal inter-agency coordination structure in Alaska was the 2015 appointment of the Denali Commission as the lead federal coordinating agency for the federal response to erosion, flooding, and permafrost thaw in Alaska Native Villages. However, the agency's new role was launched based only on a Presidential announcement and came with no additional funding or authority. The Denali Commission has been limited in its ability to coordinate disparate federal agencies for several reasons. To start with, the lack of clear executive policy and statutory authorities that require agencies to support communities in adressing environmental threats coupled with the lack of defined agency responsibilities, roles, and functions has hampered coordination. The lack of funding to support the engagement of other agencies to leverage their unique skill sets contributes significantly as well. Thus, the Commission has made little lasting improvement to the governmental response to impending environmental threats.

A July 2020 GAO report recommended that Congress establish a federal climate migration pilot program with leadership "from a defined federal organizational arrangement to identify and provide assistance to climate migration projects for communities that express affirmative interest in relocation as a resilience strategy." This organizational arrangement would incorporate risk management best practices to "clarify federal leadership and define agency roles to better assist communities that consider migration" (GAO, 2020). Some academic works have been completed in attempts to define the need for and a framework and possible functions (Bronen & Chapin, 2013; Bronen, 2021; Koppel Maldonado, J., et al., 2013; Zetter & Morrisey, 2014). However, no specific organizational structures have been proposed until this report. The lack of progress toward the creation of a framework is most likely due to the lack of authorities and defined responsibilities previously cited throughout this report.

Towards a Mitigation Framework

While no comprehensive organizational structure has been established specifically to address environmental threats, there are examples of successful collaborations within Alaska that can serve as a model to address environmental threats. State and federal sanitation facilities programs in Alaska have combined resources to provide water and wastewater facilities to nearly 100 underserved communities over the last three decades. This effort has been a collaboration between Alaska communities, Tribal service providers, the State of Alaska, and the federal government.[1] The program has been successful because it has defined roles and responsibilities, shared priorities for investments, recurring and dedicated funding sources, agreements to share funding resources between programs, adopted operating procedures and best practices, and functional community advocacy (GAO, 2018).

1 Primary partners in the sanitation program include Alaska Native Tribal Health Consortium; Alaska Department of Commerce, Community, and Economic Development; Alaska Department of Environmental Conservation; Indian Health Service; U.S. Department of Agriculture Rural Development Program; Environmental Protection Agency; and the Denali Commission.

Lack of funding remains the most often cited barrier to addressing environmental threats (GAO, 2003; GAO, 2009; Meeker & Kettle, 2017; UAF, USACE, CRREL, 2019). The allocation of additional funding through existing programs would have an immediate and significant impact on the ability of Alaska communities to mitigate environmental threats and avoid impending disasters even without the establishment of a formal governance framework. Conversely, a formal framework in and of itself would add nominal value without the simultaneous injection of sufficient financial support. Therefore, establishing a government framework is not a prerequisite for allocating funding to address unmet needs. That having been said, as unmet needs of threatened communities continue to accumulate, the absence of a formal governance framework will have a negative impact on the ability to efficiently and effectively respond to mounting needs in Alaska's communities. A formal governmental framework designed specifically to address environmental threats is needed to bring sufficient technical and financial resources to bear; to ensure efficient use of public resources and avoid duplication and redundancies; to facilitate economies of scale; to reduce the burden on distressed communities by easing access to programs; and to ensure just and equitable distribution of resources.

Key Elements for a Successful Alaska Mitigation Framework

There are multiple ways to create a governance framework to address environmental threats for both Alaska communities and others throughout the United States. These may include the creation of a new agency with unique authorities, reauthorization of an existing agency with new authorities, and/or defining collaborations amongst agencies within their existing authorities. Regardless of the approach, we recommend that the following key elements or objectives should inform and guide the creation of any mitigation framework intended to serve Alaska communities.

Alaska Relevant: The needs, issues, and resources of Alaska communities are unique. As is demonstrated in Chapter Four and Appendix C, national programs have been generally unsuccessful in supporting Alaska's environmentally threatened communities. Any federal climate mitigation program established by Congress should be relevant and adaptable to the unique needs of Alaska communities.

Nationally Significant: An effective governance coordination framework does not have to be on a national-scale to be nationally significant. Mitigation frameworks could be developed for other states which focus on the specific needs of the environmentally threatened communities within those states using local experts. While the agencies and organizations participating in the support functions may change, the basic structure of the coordination framework can be applied to a variety of settings and circumstances. The proposed Alaska Mitigation Framework is designed to be a model that can be tested an applied to the contiguous United States.

Self-Governance and Tribal Sovereignty: A response framework must recognize the importance of local governance, planning, and decision making. It must ensure communities are fully empowered and informed in decision making and the development of community-centered solutions. It must create and provide data and technical resources necessary to support and inform local decision-making.

Cultural Nourishment: Recognize the importance of protecting and nurturing cultural practices and Indigenous worldviews and lifestyles. Evaluate program structures and policies to ensure they do not oppress or restrict unique community cultures.

Social Equity: Ensure equal access to government programs for small and distressed communities. Evaluate program policies for provisions that inadvertently disadvantage rural communities and create unequal access to critical and limited resources needed to address environmental threats.

Consistent Community Interface: Streamline community access to federal and state programs and resources. Create a clearinghouse of government resources that are pertinent and easily accessible. Create single-point access to government programs and eliminate the need for communities to approach multiple agencies with disparate requirements to piecemeal a solution to an environmental threat.

Government Coordination: Shift the paradigm of communities coordinating multiple government programs to an internally coordinated government response to community needs. Improve existing bureaucratic processes to mobilize the most appropriate government resources. Facilitate shared prioritization across multiple federal, state, and local entities. Create economies of scale through coordinated response activities. Create efficiencies and reduce redundant efforts through the assignment of specific roles and responsibilities. Facilitate collaborations with non-governmental partners and service providers.

Technical Assistance and Capacity Building: Provide access to the technical assistance necessary to progress through the phases of mitigation planning and implementation (risk assessment, planning, design, and construction). Develop local resources and skill sets needed to develop and implement mitigation projects, including regional or state level capacity if local is unavailable.

Scalability: Identify and mobilize only those resources needed based on specific community requirements and expand and contract resource mobilization on an as-needed basis. For example, implementation of a protect-in-place solution such as a rock revetment will require the involvement of fewer government resources than a community relocation, which will require the participation of multiple agencies. The framework must also be able to receive and deploy varying levels of funding, including rapid increases and decreases in funding.

Cycles of Improvement: Government systems must encourage the identification of institutional, programmatic, and legislative barriers to successful mitigation of environmental threats. Establish effective communication channels and contacts with decision makers and lawmakers to communicate barriers and champion solutions.

One Model: The National Disaster Recovery Framework

In the remainder of this chapter, we discuss an existing model that has been successfully used when whole-of-government coordination efforts are needed during times of natural disasters or national emergencies. Then we present one example of how this model might be adapted to specifically address the needs of Alaska's threatened communities.

The National Disaster Recovery Framework (NDRF) was created as part of the National Preparedness System. The NDRF establishes principles, processes, roles, responsibilities, and a coordination structure designed to support communities as they recover from an incident such as a natural disaster. Though the NDRF was specifically created to facilitate community recovery from a disaster, we believe it can serve as a model for the development of a framework to improve governmental support of Alaska communities actively working to mitigate environmental threats. The coordinated engagement of multiple agencies and partners, the scalability, and the structure of the NDRF provides examples of the collaborative response that could take place between environmentally threatened communities and government agencies in Alaska. Ultimately, we chose the NDRF from which to model our conceptual mitigation framework not only because it addresses many of the key elements needed for a whole-of-government response, but also because it is an existing system that will be familiar to the many entities already engaged in support of threatened communities. While our focus is on a framework that is specific to Alaska, this framework could provide a model to other states to address environmental threats.

In general, the NDRF model is defined by the following features and elements, each of which have been incorporated into the conceptual mitigation framework for Alaska communities.

Guiding Principles: The NDRF is based on eight guiding principles that are deemed vital to successful recovery and the establishment of a more resilient community. Guiding principles essentially act as common best practices for all entities mobilized in response to a disaster. The principles work to ensure common purpose and collaboration between agencies and entities with distinct missions.

Coordinating Structure: The coordinating structure is built on six Recovery Support Functions (RSF). The RSFs are essentially assemblies of resources around areas of subject matter expertise. The RSFs facilitate problem-solving, foster more efficient coordination, and improve community access to resources. Each RSF consists of an identified lead agency, main contributors, and supporting organizations. In the NDRF structure, these entities are identified as Coordinating, Lead, and Support organizations respectively. Federal RSF teams carry out their roles in direct partnership with state, Tribal, and local authorities.

Management: The framework includes a defined leadership structure. It includes local, Tribal, and state levels of leadership which are supported by a federal leadership structure.

Roles and Responsibilities: To facilitate effective collaboration and nurture team effectiveness, the NDRF defines specific roles and responsibilities for participating agencies.

Scalability: Selective implementation of the framework's support functions, based on the scope of community needs, provides for a response proportional to a specific incident.

For additional reading on the NDRF, please refer to National Disaster Recovery Framework, Second Edition, June 2016, which is available on the FEMA website.

Conceptual Alaska Environmental Threat Implementation Framework

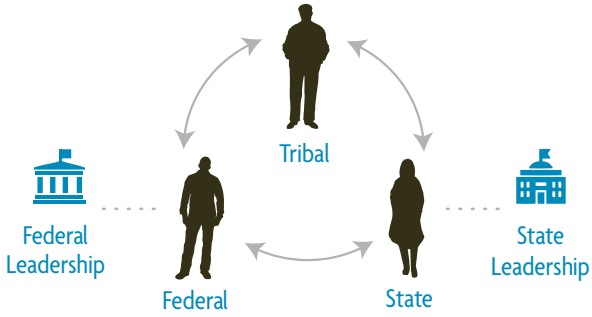
Goal: Mitigate environmental threats for another 10,000 years in our communities.

Environmentally Threatened Community

Local/Regional Coordinator

Community-Specific Technical Assistance Team

Each community works directly with a small group of Planning and Technical Assistance providers from various government support functions for the entire response effort. This team provides a single point of contact for a community to access the planning, funding, and technical support it needs.



Mitigation Framework Co-Chairs

Three Co-Chairs ensure that government support among State, Federal and regional Tribal agencies are staffed, coordinating with each other, and able to meet their obligations. Federal and State Liaisons provide the Co-Chairs with access to The White House and Alaska State Capitol. The Tribal Co-Chair helps ensure that the response decisions of each community's Tribal government are honored.

Government Support Functions

Each government support function includes State and Federal agencies or programs in Alaska with specific expertise needed for the mitigation effort. A community's Technical Assistance Team would recommend involving various government support functions based on the specific needs of the community.

Figure 40: *Conceptual Alaska Environmental Threat Mitigation Framework* Credit: *ANTHC • DCRA • Unmet Needs Report 2023*

Conceptual Alaska Environmental Threat Mitigation Framework

Introduction and Goals

This conceptual framework is being presented as a conversation starter—as a conceptual proposal for community and partner analysis, critique, deconstruction, and subsequent enhancement.

The term mitigation is used in the title of this conceptual framework. In this context, we use the term to refer to hazard mitigation as opposed to climate change mitigation efforts, such as emissions control or reductions. We assume that threat mitigation will consist of solutions such as protection-in-place, managed retreat, or community relocation efforts.

The presentation of our conceptual Alaska Environmental Threat Mitigation Framework (hereafter Mitigation Framework) proposal is organized according to the NDRF model presented earlier, and includes discussions regarding principles, coordinating structure, roles and responsibilities, and management. Our concept assumes that it can be implemented at the state level. That is, federal agencies are generally associated with regional and/or Alaska program offices rather than national-level departments or programs. In addition, the assignment of roles and responsibilities and the staffing of support functions are not limited to federal actors as is generally the case with the NDRF. Conceptual assignments in this framework are pulled from Tribal, state, and federal partners based on expertise, mission, and resources. Therefore, the subsequent discussion primarily involves government agency functions and positions. Our framework assumes that the community is the key driver and decision-maker, backed by additional external resources which can be mustered via the framework.

Guiding Principles

Guiding principles are a common set of guidelines adopted by all participants to better coordinate the activities of disparate government entities. It is acknowledged that agencies must operate within their own unique legislative authorities. These principles do not alter existing authorities. They align activities and priorities toward a common purpose.

We offer the following principles to guide all partners regarding their roles within the context of the Mitigation Framework:

1. **Community-Led:** Solutions to environmental threats are most effective when community-led, with broad community participation, from visioning through implementation (FEMA, 2016; Lowlander, 2015; Marino et al., 2019; Steen-Adams et al., 2020). A community-driven approach empowers and honors community decision-making, sovereignty, and self-determination. A community-driven approach also prioritizes local workforce development and other locally-sourced resources needed to implement projects. In this way, the Mitigation Framework supports community-driven collaboration in every phase of the process.
2. **Mitigation First:** The focus of government support should be on threat mitigation and impact avoidance rather than post-disaster damage response. A mitigation orientation prioritizes solutions for near-term and long-term hazard mitigation, such as elevating buildings or relocating structures from flood-prone areas before a flood event. The National Institute of Building Sciences found that every $1 spent on hazard mitigation in the United States saves society $6 (Multi-Hazard Mitigation Council, 2019). Beyond the economic benefits, pre-disaster threat identification and mitigation can greatly improve the speed and effectiveness of community recovery in the event of a natural disaster.

3. **Holistic Approach:** Successful mitigation demands a holistic approach that sustains the community's physical, emotional, social, and economic well-being. This approach addresses not just the physical and economic impacts of natural hazards, but also the psychological, emotional, and behavioral health needs associated with environmental threats and the challenges of mitigating those threats. Successful mitigation acknowledges the links between individuals, families, social networks, and whole communities. It draws upon the deeply rooted historical wisdom and adaptive capacity that a community has developed over generations (NACRP, 2017; Raymond-Yakoubian & Daniel, 2018).
4. **Progressive Partnerships:** Independently navigating state and federal bureaucracies for coherent responses to environmental threats is challenging for Alaska's communities, exacerbated by language barriers. Progressive partnerships, however, reverse this trend by taking resources directly to communities, ensuring usability. These partnerships engage all community aspects, including those with special needs, children, elders, and non-English speakers. This approach involves creating resource roadmaps, reducing access points, offering culturally appropriate communication, providing interpreters, translating materials, addressing community-specific training gaps, and dedicating time and resources to building trust and relationships.
5. **Unity of Effort:** Successfully addressing environmental threats requires a unified, coordinated effort to establish common priorities, reallocate existing resources, establish working procedures, and engage traditional and nontraditional partners. Unity of effort respects the authority and expertise of each participating organization while simultaneously coordinating efforts around common priorities and objectives. The adoption of common priorities will promote the pooling of resources and facilitate efficiencies through economies of scale. In addition to shared priorities, unity of effort is maximized through a well-defined, integrated, and adaptive management structure, including shared roles and responsibilities.
6. **Timeliness and Flexibility:** Mitigation support activities will be conducted and delivered promptly to minimize delays and lost opportunities. While working expediently, government partners simultaneously honor community timelines for decision-making. Activities will be strategically sequenced to promote coordination across all mission areas, avoid redundancies, and address potential conflicts. Partners acknowledge that communities are planning for a changing environment and thus plans, practices, procedures, policies, and programs will be crafted to adapt to evolving mitigation needs.
7. **Fully Informed Decision Making:** Understanding risk is foundational to a community's ability to make informed decisions and implement appropriate solutions. Risk identification and analysis must be an integral part of a whole community mitigation process and is a prerequisite to the development of an actionable hazard mitigation plan. A comprehensive understanding of risk can be achieved only through the integration of Indigenous knowledge and scientific analysis. Partner agencies will facilitate informed community decision-making via focused investments in monitoring and tracking assessment needs, data collection, and the development of prototype scopes of work and standard methodologies.
8. **Resilience and Sustainability:** Resilience is the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience is about bouncing forward, rather than "bouncing back" to the way things were before (FEMA, 2016; NACRP, 2017). The term "resilience" is commonly used to describe the ability of individuals or communities to recover from difficult situations and continue moving forward toward their goals. Fostering community resilience through agency mitigation support functions is a desired outcome of this engagement. Equally important in this context is the resiliency of governmental entities in terms of their ability to adapt to the changing needs of constituents. Agencies must self-evaluate their program for barriers to success and identify solutions that will make them more responsive to the needs of constituents.

Effective and Efficient Community-Driven System

Figure 41: *ANTHC • DCRA • Unmet Needs Report 2023*

Coordinating Structure

Following the model of the NDRF, our Mitigation Framework is coordinated around several mitigation support functions. These support functions are essentially a division of labor by a common skillset or technical discipline. The creation of support functions facilitates the assembly of resource teams based on primary skills and capabilities. The support functions are defined based on core capabilities necessary to support the development, planning, design, and implementation of a range of solutions that may be needed to mitigate environmental threats, including community relocation, managed retreat, and protect-in-place projects. We propose eight mitigation support functions based on functional areas.

The eight mitigation support functions and support function responsibilities are described below.

1. **Community Planning & Technical Assistance:** This support function serves as the primary interface between the community and other support teams. This will be accomplished through the identification of a small group of technical professionals, the Community Specific Technical Assistance Team, assigned for the duration of mitigation efforts in the community. General responsibilities of the community planning and capacity building support function include acting as the clearinghouse of federal and state programs which fund mitigation-related efforts; ensuring integration of the interest of the whole community; evaluating community capacity and technical training needs; developing vulnerability assessments including the establishment of data collection and risk assessment standards; tracking and analysis of statewide data collection needs; facilitating comprehensive community planning and strategy development, including site analysis and selection; planning and developing mitigation projects; and identifying of other support functions needed to carry out the mitigation strategy.
2. **Finance:** The finance support function is primarily responsible for identifying financial resources available to support community mitigation efforts and providing technical support for the acquisition and management of financial awards as necessary. Other general responsibilities include tracking, mapping, and reporting statewide unmet needs and funding gaps; planning ways to maximize leverage of government and non-government financial resources; developing interagency agreements to facilitate financial efficiencies and economies of scale; identifying barriers to government resources and programs; and developing recommendations for removal of these barriers.
3. **Housing:** The primary responsibility of the Housing Support Function is to identify and implement housing solutions in support of threat mitigation. The scope of responsibilities of the Housing Support Function also includes the development of strategies to protect and/or restore subsistence resources such as fish drying racks and community game processing centers. General responsibilities include development and/or procurement of community-specific housing plans, including teacher and workforce housing; development of technically appropriate and affordable housing standards; development of locally actionable standards for hardening and/or relocating housing in rural communities in response to flooding, erosion, or permafrost thaw; identification of financial resources available to support mitigation housing needs, including strategic private-sector mortgage packages which may be accessible to threatened communities.
4. **Community Infrastructure Systems:** The primary responsibility of the Community Infrastructure Support Function is to facilitate the development or restoration of public and private utility systems including power generation and distribution, water and wastewater, solid waste, transportation, and communications facilities. Other general responsibilities include facilitation of infrastructure development at a system-wide level through the development of comprehensive site/utility plans; identification and adoption of design standards for resilient infrastructure; and coordination of infrastructure construction to realize all potential economies of scale in material procurement and shipping, labor, and heavy-equipment usage.

5. **Protect-in-Place Systems:** The primary responsibility of this support function is development of civil infrastructure such as protective berms, rock revetments, sea walls, sheet piles, and other constructed barriers intended to protect communities from flooding and erosion threats. The scope of responsibilities may also include other large civil works such as rock quarry and barge landing development. Other general responsibilities include the development of regional data collection and design standards for protect-in-place civil works; coordination of intra-community construction activities across support functions; and development of regional inter-community coordination strategies to realize economies of scale through shared resources and/or procurement contracts for costly products such as large revetment rock.
6. **Public Health:** The primary responsibility of the Public Health Support Function is to assess community health and social service needs and develop and implement strategies to protect the health and safety of the community from environmental threats. General responsibilities include administration of surveys to ensure community-wide input; development of strategies to identify and address health and emotional impacts resulting from environmental stressors; development and adoption of standards for community health facilities; and restoring, hardening, and/or developing health care facilities, systems, and networks.
7. **Education:** The primary responsibility of the Education Support Function is to ensure that educational services continue without interruption and that educational standards are maintained in environmentally threatened communities. General responsibilities include analysis, tracking, and mitigation of environmental threats to school facilities; development of strategies to prioritize the hardening and/or relocation of most at-risk facilities; development of phased education strategies for a community relocation considering divided student populations, distance learning, and temporary facility needs; development of standards and strategies for the rapid mobilization of temporary facilities; and the design of new permanent school facilities and teacher housing.
8. **Governance & Culture:** The primary responsibility of the Governance and Culture Support Function is to ensure the protection of cultural resources and to support the preparation of local governing bodies for the development and implementation of threat mitigation strategies. General responsibilities include identifying and documenting all culturally significant resources including graves and individual harvesting/fish processing facilities; ensuring that preservation of natural and cultural resources are incorporated into overall mitigation strategies; reviewing and recommending updates to policies and procedures; developing local workforce development and training strategies, and developing and implementing strategies that mitigate impacts to natural and cultural resources.

In addition to the specific support function responsibilities described above, each support function shares the following common responsibilities:

- Develop the subject matter expertise and technical support capabilities within the support function to sufficiently support the needs of multiple communities simultaneously, including the development of private sector service contracts that may be needed to extend capacity.
- Identify existing financial resources and grant-making capabilities available within the support function; enable ease of access to these financial resources; self-identify barriers to access and facilitate barrier removal; leverage existing resources to the greatest extent possible; and identify and advocate for additional financial resources required to carry out the support function.
- Ensure communications and cross-functional integration with other mitigation support functions and with federal and state liaisons to communicate and resolve barriers and realize efficiencies and economies of scale.
- Facilitate and ensure that local participation and decision-making are incorporated in all planning and activities.

Establish a strategic plan for the implementation of support function capabilities to ensure coordinated and efficient delivery of services, including the establishment of any necessary internal operating procedures, processes, and policies.

Individual support functions will be "activated" to engage with a specific community only on an as-needed basis. Support function activation will depend on an individual community's proposed mitigation plan, technical support requirements, and risk profile. For example, if a protect-in-place strategy is to be implemented, only the Community Planning and Capacity Building, Finance, and Protect-in-Place Systems Support Functions may need to be activated. However, if a full community relocation is required, then all eight support functions are likely to be activated at some point along the relocation process timeline. Individual support function activation will be recommended by the Community Planning and Capacity Building Support Function to the framework Management Support Functions (See the Management section below for information on the referenced Management Team).

An additional perspective on individual support function roles, in terms of hazard mitigation project phases, is provided in Table 1 on the next page.

Proposed Roles and Responsibilities of the Support Functions within the Alaska Environmental Threat Mitigation Framework

			RISK ASSESSMENT	PLANNING	IMPLEMENTATION
COMMUNITY *Drives and leads the process, makes all major decisions*			Collects baseline data on erosion, flood, and permafrost degradation using community-based observations and science Conducts erosion, flood, and permafrost modeling and engineering analyses Compiles data into risk assessment report for review by community members and leaders	Develops solutions to mitigate risk based on technical feasibility, and benefits and costs of actions Makes decision on preferred solution: protect-in-place, retreat, or relocate. Prioritizes related actions, resources and timelines Develops written plan summarizing hazards and priority projects to reduce risk	Develops local workforce for construction Drives project design Acquires and manages projects funding in accordance with funding program requirements Manages construction project implementation by working with local or outside project management contractors.
		Administration			
SUPPORT FUNCTION	Community Planning & Technical Assistance (CPTA)	Identifies technical support, expertise and funding available through the Community Planning & Technical Assistance Support Function. Identifies membership of Technical Support Function. Establishes precision standards for assessments. Fulfills primary liaison role with community. Ensures cross-function integration with federal and state liaisons. Drives process improvement.	**Technical Assistance Team** (4 -5 staff from the CPTA agencies and organizations) travel to community to begin the needs and risk assessment and hazard identification process. Support on studies and activities include: Assists community with collection of site-specific baseline data such as LIDAR, bathymetry, tidal determinations, river currents, sediment transport, flood history, and geotechnical investigations Assists community in determining the suitability of available climate projections and downscale models if appropriate Assists community in conducting hazard-specific forecasts such as shoreline mapping, inundation and storm surge modeling, hydrodynamic modeling, permafrost degradation modeling, etc. Assists community in understanding results of risk assessments CPTA members help with the delivery of study information to the community.	Provides support to community in assessing technical feasibility, benefits and costs of solutions and makes decision to protect-in-place, retreat, and/or relocate. Provides support to community as it identifies and prioritizes actions, resources, and timeline Provides support to community as it develops resilience/ adaptation plan with prioritized fundable projects The CPTA Support Function: Coordinates with the other support functions, whose strategies will flow from the community's plan. Assists community in applying for funding through other support functions, as needed. Develops communications strategy.	Provides support to community as it decides on implementation process through locally-managed construction or outside project management contractors Supports community in acquiring and managing project funding Supports community through project design Supports community during project construction by local workforce
	Finance	Establishes funding available through the Finance Support Function. Provides funding to communities through risk-based project prioritization system. Develops systems to track community financial needs and funding gaps, as well as systems to track available financial resources.	Fills in funding gaps for data-collection and hazard studies that conventional programs do not cover. Assesses current and future finance needs together with community leadership.	Fills in funding gaps for strategies to address environmental threats to housing, infrastructure, public health and education facilities and services in environmentally threatened communities. Develops strategic plan to maximize and leverage financial resources.	Fills in funding gaps to construct housing, infrastructure, public health and education facilities and services in environmentally threatened communities. Helps develop community capacity to a) survey, track and apply for disparate types and sources of grant resources, b) develop interagency agreements to facilitate financial efficiencies and economies of scale, and c) identify and facilitate removal of barriers; communicate financial data/ needs to federal and state liaisons.

Table 1 *Proposed Roles and Responsibilities of the Support Functions within the Alaska Environmental Threat Mitigation Framework. The framework is purely conceptual. It is intended to demonstrate a possible framework for inter-agency coordination; it is not intended to obligate any agencies to any policies or activities.* **Credit:** *DCRA • ANTHC • Unmet Needs Report 2023*

Proposed Roles and Responsibilities of the Support Functions within the Alaska Environmental Threat Mitigation Framework cont.

SUPPORT FUNCTION	Administration	RISK ASSESSMENT	PLANNING	IMPLEMENTATION
Housing	Identifies technical support, expertise and funding available through the Housing Support Function. Develop technically appropriate, and affordable housing standards. Evaluates, develops, and tracks private sector mortgage programs. Coordinates with appropriate state and regional housing authorities.	Assesses current and future housing needs together with community leadership, including residential, accessible, and workforce housing (teachers, construction crews).	If activated based on the community's preferred solution, collaborates with community to develop a housing master plan, including a plan for federal, state and regional housing funds.	Identifies agency funding streams to implement housing strategy. Establishes reasonable timelines for meeting housing needs.
Infrastructure Systems	Identifies technical support, expertise and funding available through the Infrastructure Systems Support Function. Facilitate and administer grants for infrastructure development.	Assesses current and future infrastructure needs together with community leadership.	If activated based on the community's preferred solution, collaborates with community to develop infrastructure development strategies.	Identifies agency funding streams to implement infrastructure (water/ sewer, energy, transportation). Develops subject matter expertise and technical capacity to provide technical assistance regarding infrastructure development. Ensures coordination of utility planning and construction to realize all potential economies of scale.
Protect-in-Place Systems	Identifies technical support, expertise and funding available through the Protect-in-Place Systems Support Function. Facilitates and administers grants for protect-in-place development. Develops, designs, and implements standards for protection berms, rock revetments, sea walls, piles, and other constructed barriers to protect communities from flooding and erosion threats.	Assesses current and future protect-in-place needs together with community leadership.	If activated based on the community's preferred solution, collaborates with community to develop protection-in-place strategies.	Identifies agency funding streams to implement protect-in-place systems. Develops subject matter expertise and technical capacity to provide technical assistance regarding protect-in-place development. Ensures coordination planning and construction activities with other functions to realize all potential economies of scale; and coordinate projects regionally to command quantity discounts for rock products.
Public Health	Identifies technical support, expertise, and funding available through the Public Health Support Function. Develop or adopt standards for village health facilities.	Completes assessment of affected populations and community health and social service needs together with community leadership and representatives.	If activated based on the community's preferred solution, collaborates with community to develop a public health strategy.	Identifies agency funding streams to implement public health strategy. Implements strategies to restore health care systems and networks. Administers grants for health and safety infrastructure activities using conventional funding streams. Ensures coordination of facility planning and construction with other functions in order to realize all potential economies of scale.
Education	Identifies technical support, expertise, and funding available through the Education Support Function. Ensure education standards and curricula are met for children in environmentally threatened communities.	Assess current and future education needs together with community leadership and representatives. Review and assess environmental impacts to school facilities.	If activated based on the community's preferred solution, collaborates with community to develop an education strategy; Unmet need gaps will be addressed in annual report.	Identifies agency funding streams to implement education strategy: school, teacher housing, etc. Designs temporary and permanent school facilities, including teacher housing.
Governance & Culture	Identifies technical support, expertise, and funding available through the Governance & Culture Support Function Ensures that government structure, policies, and procedures are prepared for implementation of mitigation strategies. Identifies and documents culturally significant resources.	Assists with tribal consultation, ensures local interests and self-determination are being met.	Assists with tribal consultation, ensures local interests and self-determination are being met. Develops plan to mitigate impacts to natural and cultural resources.	Assists with tribal consultation, ensures local interests and self-determination are being met. Develops and trains local workforce. Ensures coordination with other functions in order to realize potential economies of scale.

Table 1 cont. *The framework is purely conceptual. It is intended to demonstrate a possible framework for inter-agency coordination; it is not intended to obligate any agencies to any policies or activities.* **Credit:** *DCRA • ANTHC • Unmet Needs Report 2023*

Roles and Responsibilities within Support Functions

Within each support function, we mirrored the roles established for the NDRF so that each support function is led by a designated coordinating agency. The coordinating agency is assisted by identified primary and support agencies. To ensure accountability and effective operation of the support team, clearly defined roles and responsibilities within the support function are deemed to be critical. As such, conceptual roles and responsibilities for support function agencies are defined below, based on a designation of coordinating, primary, or support agency.

Coordinating Agency:

- Provide the leadership, management, and support staff needed to coordinate the support function, including the designation of a senior level position to serve as Support Function Manager.
- Act as a primary coordinator of the activities of federal, state, and non-governmental entities participating in the support function as primary and support entities.
- Develop and implement a strategic plan for the delivery of support function resources to facilitate collaboration and information sharing amongst partners.
- Identify and develop the human resources within the support function needed to fulfill the technical assistance role of the support function. Establish partnerships to bolster technical capacity.
- Provide agency liaison support to communities to facilitate their access to support function resources.
- Provide regular reporting of activities management.
- Support the collection of data necessary to inform community decision-making and facilitate the development and implementation of community-based mitigation plans.
- Identify resources available within the support function and facilitate community access to these resources. Identify barriers to access and work with framework management to remedy these barriers.
- Coordinate economic activities of the support function; develop economic partnerships and agreements to leverage efficiencies associated with simultaneous project implementation.
- Establish standards to ensure consistent delivery of services to communities, including the development of shared project prioritization methodologies.
- Coordinate activities with other support functions.

Primary Agency:

- Support the coordinating agency with subject matter expertise and technical assistance, with financial resources, and through unique agency authorities.
- Develop an internal operating structure including the identification of responsible personnel. Use existing standards, plans, and/or protocols to the greatest extent possible.
- Participate in meetings/communication forums called by the coordinating agency to facilitate successes, and remove barriers to mitigation framework collaboration and information sharing among support function partners.
- Provide advisory support to the Coordinating agency for the development of a Support Function Strategic Plan.
- Facilitate grant making to assist with support function activities; develop economic partnerships to create economies of scale through simultaneous project management and implementation, and leverage investments made by other government and non- government entities.
- Provide agency liaison support to facilitate access to agency-specific programs.

Supporting Agency:

- Participate in meetings/communication forums established by the coordinating agency to facilitate collaboration and information sharing amongst support function partners.
- Provide advisory support for the establishment of a Support Function Strategic Plan.
- Contribute to the support function mission by providing subject matter expertise and technical assistance.
- Administer grants to leverage state and federal resources by meeting the non-governmental match requirements.
- Participate in economic partnerships developed to leverage available economies of scale associated with simultaneous project management and implementation.

Proposed Support Function Participation

In our conceptual framework, support function roles and responsibilities are to be carried out by federal, state, Tribal, local, and non-governmental entities. Although we have no authority to direct the participation of any entity in these support functions, we believe that it may be instructive to evaluate potential assignments if such a framework were to be implemented. Accordingly, we have created a complement of coordinating, primary, and support entities for each of the eight support functions.

In this exercise, we did not limit ourselves to federal and/or state agencies when identifying coordinating, primary, and support entities. We considered all governmental and non-governmental entities to bring together the best available resources for each defined support function. Our support function designations are made in consideration of onboard subject matter expertise, available resources, authorities, existing practice, and general ability to assist in the delivery of the team function.

Current agency capacity issues will be addressed as part of the establishment of a formal framework. In order to ensure adequate agency participation, coordinating agencies would need to receive funding to support up to two full-time staff. Primary Agencies would need to receive funding for up to one full-time staff. Agencies providing staff to participate in the community specific technical assistance teams would receive support for these positions. This funding would be through Congressional appropriation.

It should be noted that individual agencies have not been approached as part of this exercise to ascertain willingness to participate in such a framework. Therefore, agency identification in the proposed support function matrix illustrated on the next page does not constitute agency concurrence.

Conceptual designations of coordinating, primary, and support entities are delineated in Table 2.

Alaska Environmental Threat Mitigation Framework: Proposed Mitigation Support Functions and Potential Designations

SUPPORT FUNCTIONS	FEDERAL AGENCIES	STATE AGENCIES	TRIBAL/NATIVE ORGANIZATIONS	REGIONAL & NGOS
Community Planning & Technical Assistance (CPTA)	DC; FEMA; BIA/TCR, USDA/RD &NRCS, EPA, CEQ, NOAA	DCCED/DCRA, DNR/DGGS, DMVA/DHSEM, UAA, UAF	ANTHC, AFN, THOs, Regional Native Non-Profits	Boroughs, RCAC, RuralCAP
Finance	DC, HUD, IHS, USDA/NRCS, BIA, EPA, FEMA, NOAA, NSF	DCCED, DHSEM, AHFC, DOTPF	ANTHC, THO, Regional Native Non-Profits, AFN, ANC	Boroughs, Philanthropic
Housing	HUD; BIA/HIP, USDA, EDA, FEMA, DC	AHFC, DHSEM, DCRA	Regional Housing Authorities, AFN	CCHRC, AAHA , AML, RCAP, Philanthropic
Infrastructure Systems	USDA/RD, DC, IHS, FAA, USDOE, USDOT, USDA/NRCS, BIA TTP, EPA, EDA, USACE	AEA; DEC/VSW&RMW, DOT&PF, School Districts, UAA, UAF	ANTHC, BIA, Regional Native Non-Profits, THOs/RMW, Tribal Colleges	Electrical Coops, AE Community, AML
Protect-in-Place Systems	USACE, USDA/NRCS, DC, USDOT; EDA, NOAA	DNR, DHSEM, DGGS, UAA, UAF	Regional Native Non-Profits, THO, AFN, Tribal Colleges	Boroughs, ANC, Philanthropic, AE Community, NFWF
Public Health	DHHS/IHS, DC, EPA, CDC, BIA	DHSS, DEC	ANTHC, THOs	HANF
Education	DOE, DC, BIA	School Districts, DEED, UAA, UAF	Regional Native Non-Profits, AFN, Tribal Colleges	Boroughs, Philanthropic
Governance & Culture	BIA, IHS, EPA	DCCED/DCRA Local Govt Assistance	ANTHC, THO, AFN	Boroughs, NARF, Philanthropic, Assoc. of Env. Planners

Table 2 *Alaska Environmental Threat Mitigation Framework: Proposed Mitigation Support Functions and Potential Designations. This framework is purely conceptual. It is intended to demonstrate a possible framework for interagency coordination.* **Credit:** *DCRA • ANTHC • Unmet Needs Report 2023*

Orange = Coordinating Agency
Green = Primary Agency
Blue = Supporting Entity

Acronyms Used in Table 2

A/E Community: Architecture & Engineering Community

AEA: Alaska Energy Authority

AFN: Alaska Federation of Natives

AHFC: Alaska Housing Finance Corporation

AML: Alaska Municipal League

ANC: Alaska Native Corporations

ANTHC: Alaska Native Tribal Health Consortium

AAHA: Association of Alaska Housing Authorities

BIA: Bureau of Indian Affairs

CCHRC: Cold Climate Housing Research Center

CDC: Centers for Disease Control

CEQ: Council on Environmental Quality

DC: Denali Commission

DCCED/DCRA: AK Dept. of Commerce, Community, & Economic Development, Division of Community & Regional Affairs

DEC: AK Dept. of Environmental Conservation

DEC/VSW & RMW: Village Safe Water; Remote Maintenance Workers

DEED: AK Dept. of Education & Early Development

DHHS/IHS: U.S. Department of Health and Human Services/ Indian Health Service

DHSS: Alaska Department of Health and Social Services

DMVA/DHSEM: Alaska Department of Military and Veteran's Affairs/Division of Homeland Security and Emergency Management

DNR/DGGS: AK. Dept. of Natural Resources, Division of Geological & Geophysical Surveys

DOE: U.S. Dept. of Education

DOT&PF: AK Dept. of Transportation & Public Facilities

EDA: Economic Development Administration

EPA: U.S. Environmental Protection Agency

FAA: Federal Aviation Administration

FEMA: Federal Emergency Management Agency

HANF: Healthy Alaska Native Foundation

HUD: U.S. Dept of Housing & Urban Development

IHS: Indian Health Service

NARF: Native American Rights Funds

NFWF: National Fish & Wildlife Foundation

NSF: National Science Foundation

RCAP: Rural Community Assistance Partnership

RHOs: Regional Housing Authorities

RNNs: Regional Native Non-Profits

THOs: Tribal Health Organizations

THO/RMW: Tribal Health Organization Remote Maintenance Workers

UAA: University of Alaska Anchorage

UAF: University of Alaska Fairbanks

USACE: U.S. Army Corps of Engineers

USDA/NRCS: U.S. Dept. of Agriculture, Natural Resources Conservation Service

USDA/RD: USDA Rural Development

USDOE: U.S. Dept. of Education

USDOT: U.S. Dept. of Transportation

Management

In addition to clearly defined roles and responsibilities, dedicated full-time positions will be necessary to provide oversight of partner activities and ensure the effective operation of the mitigation framework. These positions are intended to provide management of routine day-to-day activities, facilitate partner coordination, improve community representation and program access, and provide effective communication between framework partners and state and federal decision-makers and/or lawmakers.

The full and effective integration of partner investments and activities requires dedicated human resources to coordinate and implement across local, state, Tribal and federal levels. Proposed functional roles are described below.

Local Coordinator

In many communities, existing Tribal and city government staff are fully tasked with their day-to-day public service responsibilities. They may lack the local capacity needed to tackle additional coordination, planning, and implementation efforts associated with the community's response to environmental threats. Therefore, additional staffing is often needed to fill this manpower gap. A local coordinator position is recommended in each community to ensure an effective community-driven response. The position should be selected by the individual community, and located within the city or Tribal office, at the community's discretion.

The local coordinator will represent the community as the primary liaison to other framework partners and managers. Other duties may include threat monitoring and data gathering, coordination of local discussion and decision making, mitigation plan development, community representation at meetings, grant writing and grant management, and coordination of partner activities to align with community goals.

Regional, state, and/or federal support will be necessary to maintain local coordinator positions. Support may include the development of position descriptions, recurring funding for salaries, technical training for incumbents, network development to facilitate information sharing between communities, mapping state and federal processes, and establishing single-point access to governmental programs.

Regional Coordination

Alaska is a large culturally and geographically diverse state. Often the environmental challenges of one geographical region and the appropriate solutions to those challenges will vary significantly from the next region. Logistical challenges, such as material procurement and shipping, have regional commonalities; and culturally appropriate solutions may also align with geographical location. Thus, there is a case to be made for a decentralized approach to environmental threat mitigation across the state, based on existing geographical, cultural, and/or municipal divisions.

Regional coordinating entities should be integrated into the mitigation framework. The Regional Coordinator could be an existing entity, such as a Native Non-Profit or Borough Government, or a newly created entity. The primary role of the Regional Coordinating Entity is to support and backstop local coordinators, ensure geographically and culturally appropriate solutions, establish regional standards, and facilitate economies of scale via cross-community project development and implementation coordination.

Community Specific Technical Assistance Team

Community Specific Technical Assistance Teams were introduced in the previous chapter. The Technical Assistance Team is a small group of technical advisors established for a specific community for the duration of the community's mitigation efforts. As envisioned in this conceptual framework, the team will be assembled by the Community Planning and Technical Assistance Support Function upon engagement with the community and will consist of planners, agency representatives, and/or professional services consultants. The objective of establishing a dedicated technical assistance team is to facilitate consistent community interface and relationship building, to better understand and amplify the community voice, to ensure consistent communication and support, to act as a conduit to government and philanthropic programs to minimize access points, and to develop and provide technical resources necessary to support informed community decision making.

Co-Chairs

The mitigation framework activities would be carried out by partner agencies and entities within the Threat Mitigation Support Functions and in accordance with prescribed roles and responsibilities. In addition to these technical planning and project implementation activities, there is also a significant role required to manage and integrate the activities of many disparate entities and agencies in an equitable, timely, and customer-oriented manner. To fill this daily coordination role, we suggest three full-time co-chairs representing the federal, state, and Tribal partners in the framework. A Tribal co-chair is critical for Alaska because the majority of threatened communities in the state are represented by Tribal governments.

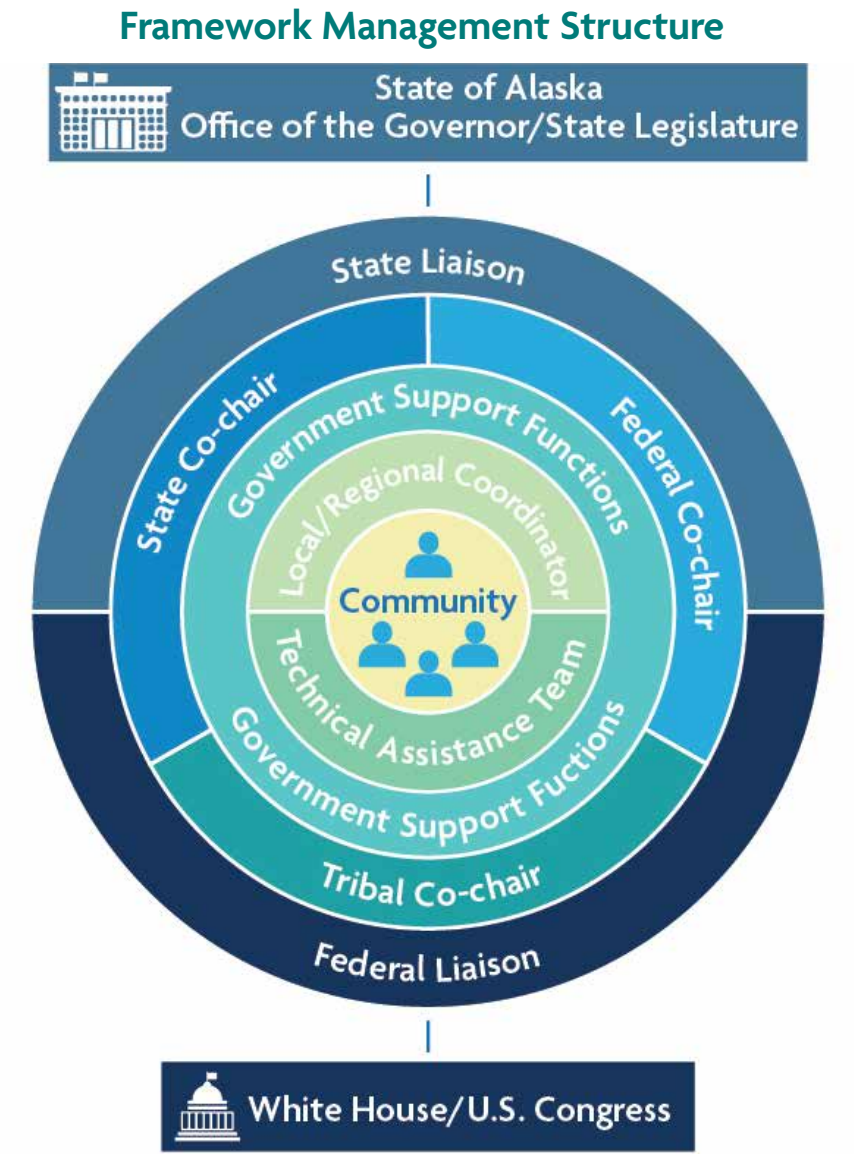


Figure 42: *Proposed Management Structure of the Alaska Environmental Threat Mitigation Framework. This framework is purely conceptual. It is intended to demonstrate a possible framework for inter-agency coordination; it is not intended to obligate any agencies to any policies or activities.* Credit: *ANTHC • DCRA • Unmet Needs Report 2023*

Federal Co-chair: The federal co-chair is envisioned to be a full-time career civil service position located within one of the participating federal agencies. While the federal co-chair could be positioned within any federal agency, consideration should be given to placement within an agency having authority to receive funds from and award funds to other federal and state agencies; as well as one with broad authorities related to threat mitigation and

community relocation. The federal co-chair is responsible for the general coordination of federal activities and will act as a single federal point of contact for local and regional coordinators and community specific technical assistance teams. Other duties may include activating government support functions as needed to address community threats, assisting with the development of community specific technical assistance teams for individual communities, and aligning multiple agency programs with community mitigation goals.

State Co-chair: The state co-chair is envisioned as a full-time non-exempt position located within a state agency. DCRA within State of Alaska Department of Community Commerce and Economic Development (DCCED) has been the lead state entity for addressing environmental threats in rural communities over the past two decades. Therefore, we recommend that DCRA is the appropriate agency within which to locate a state co-chair.

The state co-chair is responsible for the general coordination of state activities and will endeavor to align various state programs with community mitigation goals via the development of cooperating and funding agreements. The state co-chair will act as a single state point of contact for local and regional coordinators and technical assistance teams. Together with the federal and Tribal co-chairs, the state co-chair will recommend the activation of the various government support functions for specific community threats.

Tribal Co-chair: The Tribal co-chair is a full-time position located within an established tribal organization having statewide reach and/or responsibilities. The Alaska Native Tribal Health Consortium has a unique long-term relationship with Alaska Tribes, experience with rural infrastructure, and knowledge of environmental threats. We recommend that ANTHC is the Tribal co-chair.

The primary role of a Tribal co-chair is to provide general oversight of state and federal activities to ensure that local tribal voices are effectively leading the planning and implementation of mitigation strategies. The Tribal co-chair would act as a single point of contact for local and regional coordinators and technical assistance teams for issues related to Tribal affairs. Other responsibilities may include recommending activation of government support functions and providing general support to Tribal governments including the development of funding agreements and assistance with grant management for directly allocated project funding.

State and Federal Liaisons

The primary role of a state and a federal liaison in the conceptual framework is to provide oversight of agency engagement and to act as a conduit to government officials and lawmakers. The liaisons will work to ensure that agencies have the tools necessary to collaborate effectively, such as through the development of formal resource-sharing agreements and ensure that agencies are fulfilling their assigned roles. Liaisons will also work directly with state and federal elected officials to help facilitate the allocation of resources as well as to ensure that agencies have authorities to carry out their roles.

It is assumed that both the federal liaison and state liaison would be a task force and/or advisory body of federal and state employees respectively. Because of the oversight role, membership should consist of agency leaders and/or government appointees. These bodies could be entirely new entities assembled specifically for this purpose, or an existing body well positioned to take on the role. For example, on the federal side, the Alaska Federal Executive Association (AFEA) is an existing group comprised of Alaska agency heads tasked to ensure the coordination of federal activities.

The AFEA exists under Presidential Directive, with a mission to "create value to the public by fostering communication, coordination, and collaboration with federal, state, and local government agencies." If it were formally tasked with environmental threat mitigation as a strategic objective, then the AFEA might be well situated to fill this role. At the state level, similar bodies have been used in the past to address environmental issues. These include the Immediate Action Working Group (IAWG) and the Climate Action Leadership Team (CALT). Both of these entities were established by Alaska governors. A new state body could be similarly created to fulfill the role of state liaison and modeled after the successes of the past.

The management structure of the conceptual mitigation framework and the relationships between framework management positions, government support functions, and local governments is illustrated for correct reference on page 91.

Mitigation Framework Implementation Considerations

Funding Paradigm

As described in Chapter 4, there is currently an annual unmet needs gap of approximately $80M, and funding remains the primary barrier to successful mitigation of environmental threats in Alaska. The Infrastructure Investment and Jobs Act of November 2021 is expected to provide funding to help close that gap, at least temporarily. Even with the passing of the infrastructure deal, the funding environment is likely to remain uncertain and variable into the future. Therefore, a mitigation framework implemented in this environment must be capable of delivering value through a range of funding scenarios.

Fully funding the unmet needs, in accordance with the estimates shared in this document, would result in a 5-fold increase in existing financial resources and would summarily increase the human resources needed to successfully deploy these funds for the mitigation of environmental threats. This potential funding variability underlines not only the need for a scalable structure but also the need for clear inter-agency coordination strategies that will be required to operate effectively and efficiently. Congressional action will be required to provide the resources to meet the unmet funding need to mitigate environmental threats in Alaskan communities, and to enable agency participation in a coordinating governance framework.

In 2017, the Denali Commission and the Alaska Division of Community and Regional Affairs conducted tabletop exercises with several threatened communities. These communities gathered with their respective planning documents in hand from which they developed a list of priority community projects. Then, each was tasked to use the Catalogue of Federal Programs, a near comprehensive list of federal agencies and their resilience programs, to identify potential grants that could support these priority projects. Two primary barriers became evident from this exercise. First, it is a near impossible task for small Alaskan communities to independently navigate the myriad of potentially available federal programs, learn the nuances of each program, and effectively match priority mitigation needs with relevant grant opportunities having a high potential for success. As a result, limited resources can be squandered chasing funding opportunities with little chance of award. Second, there is often no straight line between priority needs and grant opportunities. Priority projects most often must be dissected and reshaped to match narrowly shaped grant objectives.

Under existing conditions, threatened communities compete against one another for limited state and federal funds through a patchwork of existing programs that are often ill-suited or incapable of fully addressing needed mitigation. Some communities have pieced together disparate grants to advance their mitigation strategies. However, many have not been successful. To increase the odds of success, communities must adjust their priorities and re-arrange ideal project implementation steps to match projects with available funding streams. Project delivery suffers from reshuffling, and it takes significant human resources. Economic efficiencies are lost in this process.

Communities should not have to independently navigate state and federal bureaucracies to assemble jigsaw puzzle-like solutions; rather, government systems should provide mapped access and support. For any mitigation framework to successfully address the growing needs of Alaska communities, it must reinvent this operating model. Even without the injection of any additional funding, implementation of a mitigation framework can provide significant value if it can offer support and resources specifically configured to Alaska's mitigation needs and if it can facilitate equitable access to these resources.

The limitations of existing programs have been explored throughout this document. It is incumbent on all partner agencies to conduct thorough self-assessments that identify and verify their limitations and endeavor to remove them through a change in practice, policy, and pursuit of revised legislative authorities. Agencies must develop strategic funding and grant-making partnerships that enable full funding for mitigation projects that protect lives, livelihoods, property and the environment from unmitigated climate impacts.

Risk-Based Prioritization

As noted in the introduction to this section, sanitation facilities construction programs in Alaska are a good example of successful government coordination. Multiple agencies have joined forces to collaborate on the funding and construction of projects to address high-priority water and wastewater deficiencies throughout the state. One ingredient to the program's success is the creation and adoption of a common project prioritization system. The adoption of shared priorities facilitates resource pooling among multiple partners while focusing on common projects until they are fully funded and constructed. The creation and/or adoption of a priority system as part of a mitigation framework could similarly help to align the efforts of state and federal agencies assembled to mitigate environmental threats.

In November of 2019, the Denali Commission published the "Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities" (Threat Assessment). The Threat Assessment is an update of an earlier erosion assessment completed by the U.S. Army Corps of Engineers ten years prior. The document is an attempt to evaluate the relative risk to a community's built environment from erosion, flooding, and permafrost thaw, amongst a list of 187 assessed communities. While this document is acknowledged to be an approximation based on available data at the time the study was completed, it likely represents our best available understanding of relative community risk. As such, we recommended that the Threat Assessment be considered as the starting point for a risk-based prioritization methodology, which can be adopted and shared by all partners engaged in environmental threat mitigation in Alaska.

State and Federal Leadership and Policy Direction Support

While attempts to coordinate federal and state responses to environmental threats in Alaska have been made, none have come with the endorsement of state and federal leadership. Without the voice of state and federal leadership, it is unlikely that any new attempt to formally coordinate government support will be successful in Alaska or throughout the United States. State and federal leadership are critical to the whole-of-government approach needed to address the impacts of environmental threats on Alaska communities. State and federal leadership must provide clear instruction, through explicit executive policy, directing agencies to engage in a formally coordinated structure, and through resource commitments. For example, the following actions could be pursued by the White House to ensure successful implementation: (1) formally adopt a mitigation framework including assigned roles and responsibilities; (2) direct agency participation; and (3) facilitate interagency collaboration and coordination amongst federal and state, local, and Tribal partners. Similar measures taken by the Office of the Governor will ensure collaboration across all layers of government. The successful implementation of a coordinated government framework will require Congress to commit resources, and it will require the support of federal, state and Tribal leadership.

To date, efforts to address environmental threats in Alaska have generally been grass-roots efforts. While community engagement and leadership are vital, threat mitigation throughout Alaska cannot be completed successfully without the engagement of state and federal partners. It is past time for state and federal leaders to bring the full resources of their governments to the community table.

Glossary

Alaska Environmental Threat Mitigation Framework: A whole-of-government framework to coordinate the resources, funding and technical expertise of state and federal agencies and Tribal entities to streamline and make more efficient the support provided to environmentally threatened communities. This support extends through the mitigation process, from the risk assessment phase to the implementation of the community's preferred solutions. The proposed Alaska Environmental Threat Mitigation Framework is modeled after FEMA's National Disaster Recovery Framework, specific to Alaska communities, with Alaska-specific partners, and focused on disaster mitigation rather than disaster recovery.

Alaska Native Claims Settlement Act (ANCSA): The Alaska Native Claims Settlement Act (ANCSA) of 1971 was intended to resolve long-standing issues surrounding aboriginal land claims in Alaska, as well as to stimulate economic development throughout Alaska. The settlement established Alaska Native claims to the land by transferring titles to twelve Alaska Native regional corporations and over 200 local village corporations. A thirteenth regional corporation was later created for Alaska Natives who no longer resided in Alaska.

The impetus for ANCSA was two-fold:

1. When Alaska became a state in 1959, the statehood act authorized the newly-formed state government to select a land entitlement of 104 million of the 375 million acres of land in Alaska. This entitlement elevated concerns over the impact the state selections would have on traditional Alaska Native uses and aboriginal land rights. In 1966, the Secretary of the Interior placed a freeze on the conveyance of State-selected lands pending completion of the settlement of Native land claims.
2. When oil was discovered on Alaska's North Slope in 1967, the long-standing issues surrounding the aboriginal land title of Alaska Natives had to be resolved for Congress to authorize the development of the Prudhoe Bay oil field and the construction of the Trans-Alaska Pipeline.

ANCSA provided a federal land settlement extinguishing aboriginal claims to the state's 375 million acres of land and territorial waters by providing Alaska Natives with forty-four million acres of land and nearly one billion dollars.

ANCSA 14 (c) and (c)(3): Section 14(c) of the Alaska Native Claims Settlement Act (ANCSA) is a responsibility unique to Alaska Native village corporations. It requires each village corporation to re-transfer some of the land it gets from the federal government under ANCSA to individuals and the community. Section 14(c)(3) provides that the village corporation shall convey to a municipal corporation (city), or the state in trust, lands identified for present and future community needs.

Alaska Native Community: Used interchangeably in this report with Alaska Native village, one of approximately 200 remote, rural communities in Alaska. The average population of these communities is less than 500 people, most of whom are Alaska Native. A vast majority of these communities are not connected to a road system and are accessible only by plane or boat. These communities have at least one federally recognized Tribe and most are reliant on a subsistence economy.

Alaska Native Tribal Health Consortium (ANTHC): The Alaska Native Tribal Health Consortium (ANTHC) is a statewide Tribal health organization serving 229 Tribes and all Alaska Native and American Indian (AN/AI) individuals in Alaska. ANTHC and Southcentral Foundation co-manage the Alaska Native Medical Center, the tertiary care hospital for all AN/AI people in Alaska. ANTHC also provides a wide range of statewide public health, community health, environmental health and other programs and services for Alaska Native people and their communities.

Co-Location: The forced process of moving one population into an established population. A great deal of historical evidence shows this strategy is traumatizing and inappropriate, especially to Indigenous Peoples.

Community: Alaska has 229 federally recognized Tribes representing forty percent of the federally recognized Tribes in the entire nation, most based within 200 Alaska Native villages in remote, rural Alaska. The government structure of Alaska Native communities may contain several distinct governing bodies that perform administrative tasks, including making decisions about how to address environmental threats to community infrastructure. A federally recognized tribal government may coexist in a community with a city government, which may also be under the jurisdiction of a borough government. Most Alaska Native villages also have a village corporation formed under the Alaska Native Claims Settlement Act which often is the largest landowner in the community. In many communities, individuals who are members of the Tribe may also serve on the city council and be a shareholder of the village corporation. When we talk about infrastructure in Alaska Native communities, ownership is often distributed among the Tribe, city, and village corporation, but rarely a single entity. For this reason, we refer to Alaska Native villages as "communities" in this report, because unmet needs and impacts to infrastructure are not just to Tribal infrastructure, city infrastructure, or village corporation infrastructure. Environmental threats to infrastructure usually impact the entire community in some way, regardless of the entity that owns it.

Denali Commission: The Denali Commission is an independent federal agency based in Anchorage, Alaska that provides critical utilities, infrastructure, and economic support throughout Alaska. It was established in 1998 by the Denali Commission Act of 1998 and modeled on the Appalachian Regional Commission, a similar federal-state partnership in Appalachia. With its creation, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. The role of the Commission is to provide economic support through the development of critical infrastructure. The Denali Commission is led by a six-member commission and a federal co-chair. Rather than the President of the United States, the Secretary of Commerce —with advice and consent of the Senate —appoints the co-chair. As a single state commission, its state co-chair is the Governor of Alaska. The remaining five commissioners consist of the University of Alaska president; the Alaska Municipal League president; the Alaska Federation of Natives president; the Alaska State AFL-CIO president; and the Associated General Contractors of Alaska president.

Division of Community and Regional Affairs: The Division of Community and Regional Affairs (DCRA) is a division within the Alaska Department of Commerce, Community, and Economic Development (DCCED). Known as the local government agency for the State of Alaska, DCRA is the only executive branch agency mandated by Alaska's Constitution. Article X, Section 14 of Alaska's Constitution directs that "An agency shall be established by law in the executive branch of the state government to advise and assist local governments. It shall review their activities, collect and publish local government information, and perform other duties prescribed by law." DCRA carries out the directives to DCCED from Alaska Administrative Orders (AAO) 231 and

239 "to act as the state coordinating agency to coordinate with other state and federal agencies to propose long-term solutions to the ongoing erosion issues in the City of Kivalina and other affected coastal communities in this state". AAO 239 was issued in 2007 just after the village of Kivalina self-evacuated during a severe coastal storm. DCRA is also the state coordinating agency for the National Flood Insurance Program (AAO 175).

Emergency Watershed Protection (EWP) Program: A program of the U.S. Department of Agriculture Natural Sources Conservation Service (NRCS) that offers technical and financial assistance to help local communities relieve imminent threats to life and property caused by floods, fires, windstorms and other natural disasters that impair a watershed.

NRCS offers financial and technical assistance for various activities under the EWP Program, including:

- Remove debris from stream channels, road culverts and bridges;
- Reshape and protect eroded streambanks;
- Correct damaged or destroyed drainage facilities;
- Establish vegetative cover on critically eroding lands;
- Repair levees and structures;
- Repair certain conservation practices, and
- Purchase of floodplain easements.

Environmentally Threatened Communities: The 144 Alaska Native communities that were determined to be 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, in the 2019 Statewide Threat Assessment funded by the Denali Commission and conducted by the University of Alaska Fairbanks Institute of Northern Engineering, the U.S. Army Corps of Engineers Alaska District, and the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory.

Federal Aviation Administration (FAA) Office of Airports (ARP): Through its Airport Programs, the FAA helps ensure a safe, efficient, and environmentally responsible national airport system that meets the needs of the traveling public, the nation and the world.

- FAA ARP works with airport sponsors (owners and operators) to identify priority projects for funding. After determining project eligibility and justification, FAA receives grant applications from airport sponsors.
- FAA's system for protecting airports is successful in part because airport sponsors, including the State of Alaska Department of Transportation, have the capability and capacity to develop and implement large capital projects, and develop applications for FAA funding.

Federal Compact: An executed document based on the government to government relationship of Indian Tribes and the federal government that sets forth the terms and conditions of the self-governance relationship between the tribe and a particular federal governmental entity.

Federally Recognized Tribe: Federally recognized Tribes are those Native American Tribes recognized by the U.S. BIA for certain federal government purposes. As of 19 February 2020, 574 Indian Tribes were legally recognized by the BIA of the United States. Forty percent (40%) of all federally recognized Tribes in the United States are based in Alaska.

Hub Communities: Hub communities are defined as Alaskan communities which are off the road system but not considered remote because they are accessible by commercial flight carriers that have direct flights to Anchorage, Fairbanks, and sometimes Juneau. Hub communities serve as regional service areas for services generally not found in more remote communities within the region, such as a regional hospital, barge terminal, and other amenities that small, remote communities may not have.

Indigenous Knowledge: Indigenous knowledge is a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence acquired through direct and long-term experiences and extensive and multigenerational observations, lessons and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation. (Inuit Circumpolar Council, n.d.)

Managed Retreat: Managed Retreat involves moving a portion of the community away from hazard-prone areas to locations in the community or adjacent to the current site. To successfully migrate, a community needs developable land nearby.

National Coastal Resilience Fund: The National Coastal Resilience Fund program stems from the public-private partnership between NOAA and the NFWF that was established by Congress under Title IX of the National Oceans and Coastal Security Act. Although NFWF was chartered by Congress in 1984, it is a private, nonprofit, tax-exempt organization. It re-grants federal funds. This partnership model imposes limits on NOAA's programmatic flexibility because the agency is no longer the sole agent; roles and responsibilities are shared with NFWF. As a private partner, NFWF does not have the same federal trust responsibility and obligation as NOAA does under the executive branch of the federal government.

Presidentially-Declared Disaster: A presidentially-declared disaster can be made by the U.S. president to make federal assistance available under FEMA when the response to an event exceeds the combined capabilities of state, tribal, and local governments.

Protection-in-Place: Protection-in-place involves the use of shoreline protection measures and other controls to protect or minimize impacts. These measures allow the community to remain in its current location. Examples include rock revetments or sea walls to slow erosion, elevating homes and building berms to mitigate flooding, and modifying water and sewer systems with flexible service connections to combat subsidence from permafrost thaw.

Regional Corporation: Under ANCSA, the state was divided into twelve geographic regions based on common heritage and interests. Twelve Native associations (for-profit regional corporations) were formed to represent each region, responsible for the enrollment of past and present residents of the region. Individual Alaska Natives enrolled in these associations — and their village-level equivalents (see village corporation) — were made shareholders. The twelve for-profit regional corporations, and a thirteenth region representing those Alaska Natives who were no longer residents of Alaska in 1971, were awarded the monetary and property compensation created by ANCSA (43 USC Ch. 33: Alaska Native Claims Settlement).

During the 1970s, ANCSA regional and village corporations selected land in and around native villages in the state in proportion to their enrolled populations. Village corporations own the surface rights to the lands they selected, but regional corporations own the subsurface rights of both their own selections and of those of the village corporations.

The regional and village corporations are now owned by Alaska Native people through privately owned shares of corporation stock. Alaska Natives alive at ANCSA's enactment on December 17, 1971, who enrolled in a Native association (at the regional and/or village level) received 100 shares of stock in the respective corporation. In 2006, the 109th Congress passed S.449 which amended ANCSA and allowed for shares to be more easily issued to those who had missed the enrollment or were born after the enrollment period by reducing the requirement for voting from a majority of shareholders to a majority of attending shareholders at corporation meetings.

Alaska's regional corporations are a major component of Alaska's economy. From southeast alaska and the Aleutians to interior Alaska and the north slope, these corporations own some of the state's largest enterprises and are among the largest employers of Alaskans. (RDC, 2023)

The twelve regional corporations include:

1. Ahtna, Incorporated
2. Aleut Corporation
3. Arctic Slope Regional Corporation (ASRC)
4. Bering Straits Native Corporation (BSNC)
5. Bristol Bay Native Corporation (BBNC)
6. Calista Corporation
7. Chugach Alaska Corporation
8. Cook Inlet Region, Incorporated (CIRI)
9. Doyon, Limited
10. Koniag
11. NANA Regional Corporation
12. Sealaska Corporation (ANCSA Regional Association, 2019)

Regional Native Non-Profit Organizations: Alaska Native regional non-profit organizations were created to provide social services and health care for Alaska Native peoples. While the specific objectives of the organizations vary, their services generally focus on health, cultural, and educational opportunities. The regional non-profits deliver a range of services through federal compacts, grant funding, support from the regional corporations, collaboration with village non-profit organizations, and other means. Regional non-profits provide physical and behavioral health care, scholarships for Alaska Native students, sponsorship of cultural events, Alaska Native language preservation efforts, protection of sites with historic or religious importance, and more.

Relocation: Relocation involves moving the entire community to a new location that is not connected to the current site. Relocation is usually considered only as a last resort, after it has been determined that other response strategies such as protection-in-place and managed retreat will not be feasible over the long term. Relocation is the most difficult response strategy to implement, the costliest, the most labor-intensive, and the most time-consuming.

Resilience: Resilience is the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions, including naturally occurring threats or incidents. True resilience is about bouncing forward, rather than "bouncing back" to the way things were before. It addresses the root cause of why disruptions occurred, calling for solutions at the intersection of people, the environment, and the economy.

Shorefast Sea Ice: Also called landfast ice, shorefast ice is a type of sea ice that primarily forms off the coasts in shallow water. In Antarctica, fast ice may also extend between grounded icebergs (Polar Science Center, 2010).

Solastalgia: The distressing sense of loss as a result of unwanted environmental changes that occur close to one's home.

Spit: A spit is a section of land that extends into a body of water.

Statewide Threat Assessment: In 2017, the Denali Commission contracted the University of Alaska Fairbanks Institute of Northern Engineering, the U.S. Army Corps of Engineers Alaska District, and the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory to conduct a study to 1) assess individual threats to public infrastructure associated with erosion, flooding, and thawing permafrost in Alaska communities; 2) evaluate the combined threat imposed by interactions between erosion, flooding, and thawing permafrost in Alaska communities; and 3) guide decision-makers regarding the technical information required to develop mitigation or adaptation strategies related to those threats. The study report was finalized in November 2019. This was a "desktop study" in that data collection focused entirely on publicly available data and data volunteered by agencies or the private sector. No communities were visited, nor was any effort made to validate the data beyond a review by the study team for consistency and reasonableness. It is recognized that the amount and reliability of the data vary among the communities. The numerical results of the individual threat evaluations for erosion, flooding, and thawing permafrost were placed into groups according to relative threat (Group 1 = high, Group 2=medium, Group 3= low) as well as a combined threat ranking. The rankings and groupings developed are intended to be used to identify those communities requiring additional investigation.

Subject Matter Advisory Team: A team of engineers, planners, state and federal agency representatives, and representatives from regional Tribal organizations, each with direct experience working with environmentally-threatened communities. This team made professional recommendations regarding the most likely strategy to be implemented in each community to protect threatened infrastructure. In order to estimate the cost of infrastructure impacts in each of the 144 environmentally threatened communities, it was first necessary to identify an appropriate strategy that could be implemented to effectively mitigate the threat. Protection-in-place, managed retreat, and relocation strategies have yet to be determined at the individual community level.

Tribal Climate Resilience: A branch of the Bureau of Indian Affairs whose mission is to enable climate preparedness and resilience across all Indian Affairs programs and for all federally-recognized Tribal nations and Alaska Native villages. Technical and financial assistance, access to scientific resources, and educational opportunities enable this preparedness and resilience.

Usteq: From the Yup'ik word meaning "surface caves in" is a catastrophic form of permafrost thaw collapse that occurs when frozen ground disintegrates under the compounding influences of thawing permafrost, flooding, and erosion.

Village Corporation: Established under ANCSA, over 200 village corporations correspond to the list of villages published in the text of ANCSA. Most corporations serve a single village, though some smaller villages have consolidated their corporations over the years. Village corporations and their shareholders received compensation through the regional corporations. During the 1970s, ANCSA village corporations selected land in and around native villages in the state in proportion to their enrolled populations. Village corporations own the surface rights to the lands they selected, but regional corporations own the subsurface rights of both their own selections and of those of the village corporations.

The fact that many allegedly Alaska Native villages throughout the state were not empowered by the ANCSA to form village corporations later led to a number of lawsuits.

Acronyms

ACRONYM	AGENCY/ORGANIZATION/PROGRAM
ACCAP	National Oceanic & Atmospheric Administration 's Alaska Center for Climate Assessment and Policy
ACCIMP	Alaska Climate Change Impact Mitigation Program administered by the Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs
ADCCED/DCCED	Alaska Department of Commerce, Community, and Economic Development
ADEC/DEC	Alaska Department of Environmental Conservation
ADNR/DNR	Alaska Department of Natural Resources
ADOT&PF/DOT & PF	Alaska Department of Transportation & Public Facilities
ANTHC	Alaska Native Tribal Health Consortium
BIA	Bureau of Indian Affairs
BIA/HIP	BIA Housing Improvement Program
BIA/TCRP	BIA Tribal Climate Resilience Program
BIA/TTP	BIA Tribal Transportation Program
BRIC	FEMA's Building Resilient Infrastructure and Communities Program
CCHRC	Cold Climate Housing Research Center
CDBG	HUD's Community Development Block Grant Program administered by
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CETC	ANTHC's Center for Environmentally Threatened Communities
DC	Denali Commission
DCRA	Alaska Department of Commerce, Community, and Economic Development 's Division of Community and Regional Affairs
DEC/RMW	Alaska Department of Environmental Conservation Remote Maintenance Workers
DEC/VSW	Alaska Department of Environmental Conservation, Village Safe Water Program
DEED	Alaska Department of Education & Early Development
DGGS	DNR's Division of Geological and Geophysical Surveys
DHHS/IHS	U.S. Department of Health and Human Services/ Indian Health Service
DHSS	Alaska Department of Health and Social Services
DMVA/DHSEM	Alaska Department of Military and Veteran's Affairs/Division of Homeland Security & Emergency Management
DNR/DGGS	Alaska Department of Natural Resources, Division of Geological & Geophysical Surveys
DOE	U.S. Dept. of Energy
EDA	U.S. Department of Commerce, Economic Development Administration
EPA	U.S. Environmental Protection Agency
EWP	USDA/NRCS's Emergency Watershed Protection Program
FAA	Federal Aviation Administration

FEMA	U.S. Department of Homeland Security Federal Emergency Management Agency
HMA	FEMA's Hazard Mitigation Assistance Grant Program
HMGP	FEMA's Hazard Mitigation Grant Program
HUD	U.S. Department of Housing and Urban Development
ICDBG	HUD's Indian Community Development Block Grant Program
IGAP	EPA Indian General Assistance Program
IHS	Indian Health Service
NARF	Native American Rights Fund
NCRF	NOAA's National Coastal Resilience Fund implemented by NFWF under a NOAA Cooperative Agreement
NFWF	National Fish and Wildlife Foundation
NNA	NSF's Navigating the New Arctic Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	USDA's Natural Resources Conservation Service
NSF	National Science Foundation
PAS	USACE's Planning Assistance to the States Authority
RCAC	Rural Community Assistance Corporation
RHAs	Regional Housing Authorities
Risk MAP	FEMA's Risk Mapping, Assessment, and Planning Program
RurALCAP	Rural Alaska Community Action Program
TCR	BIA's Branch of Tribal Climate Resilience
THO/RMW	Tribal Health Organization Remote Maintenance Workers
TTP	BIA Tribal Transportation Program
UAA	University of Alaska Anchorage
UAF	University of Alaska Fairbanks
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDA/NRCS	U.S. Dept. of Agriculture, Natural Resources Conservation Service
USDA/RD	USDA Rural Development
USDOE	U.S. Dept. of Energy
USDOT	U.S. Dept. of Transportation
VIP	Denali Commission Village Infrastructure Protection Program

APPENDIX A.
Methodology for Cost Estimates

General Assumptions

- Relocation, managed retreat, and protection-in-place are strategies to respond to the environmental threats of erosion, flooding, and permafrost thaw on infrastructure, and include the processes of assessing risk, developing plans, and implementing solutions.
- Infrastructure is defined as human-built structures and facilities and cultural and subsistence resources.
- Since most communities do not have completed risk assessments, which are necessary to determine appropriate adaptation solutions, assumptions regarding community-specific mitigation solutions were required to complete cost estimates.
- Most communities decide whether or not to relocate but can only do so if they have the data needed and provided in ways that help inform their decisions. Therefore, assumptions regarding community-specific mitigation solutions were required to complete these cost estimates.
- Due to the lack of community-specific risk assessments and insufficient time to consult with all 144 environmentally-threatened communities, this report does not list specific unmet infrastructure needs within each community.

Calculation of Total Need

Introduction

Many Tribal communities in Alaska face significant environmental threats to their lands and infrastructure, yet few have developed specific construction-ready strategies to address these challenges. The primary hurdle is the lack of authoritative site-specific threat analyses, essential for effective long-term solutions. For instance, communities impacted by erosion need projections of shoreline erosion over 50 years to plan for the future. Similarly, barrier island communities require flood recurrence modeling to decide on home protection or relocation. Communities on frozen ground need detailed permafrost mapping to understand potential impacts and select suitable mitigation measures.

In 2019, the Denali Commission published the *Statewide Threat Assessment* (Threat Assessment), an analysis of the relative environmental threats facing rural Alaskan communities, with a focus on impacts to infrastructure from flooding, erosion, and permafrost thaw. The report provided several prototype scopes of work that can be used to collect the authoritative data needed to inform the mitigation of environmental threats at the local level. Once these studies are completed and mitigation strategies have been defined for each community, then estimating the direct cost of the impacts of environmental threats to tribal infrastructure will be a straightforward construction cost-estimating exercise. However, in lieu of these data sets, an alternative theoretic approach for deducing mitigation strategies and subsequently estimating mitigation costs is required. The following sections outline the specific strategy that was developed and implemented to estimate environmental threat costs for Alaska's tribal communities. This work was completed in March through May 2020.

Shortlist of Communities

The shortlist of 144 Alaska Native communities was selected from the Threat Assessment, which evaluated environmental threat risks for 187 rural communities throughout Alaska. The Threat Assessment evaluated impacts to infrastructure from erosion, flooding, and permafrost thaw and developed risk rankings for each of these three threats. The Threat Assessment reported its results in "Groups" of communities. Group 1 represented those communities considered to be at the highest risk of damage from a given threat. Group 3 represented communities deemed to be at the lowest risk. Group 2 communities fell in the middle. For this analysis, all communities identified as either Group 1 or Group 2, for any of the three threats, were at risk to some degree of infrastructure damage from climate change impacts. This delineation resulted in a "shortlist" of 144 communities in the state.

Subject Matter Advisory Team

As previously noted, to estimate the cost of infrastructure impacts in each of the 144 shortlisted communities, it was first necessary to identify an appropriate mitigation strategy that could be implemented to effectively mitigate the threat. As protection-in-place, managed retreat, and relocation strategies have yet to be determined at the individual community level, a Subject Matter Advisory (SMA) team was assembled to make a professional recommendation regarding the most likely strategy to be implemented in each community to protect threatened infrastructure. The SMA team consisted of engineers, planners, state and federal agency representatives, and representatives from regional tribal organizations, each with direct experience working with environmentally-threatened communities. The SMA team members and their affiliations are listed in the table below.

The timeline for the response to the congressional inquiry did not afford the opportunity to conduct direct consultation with 144 individual tribal entities. Also, the impacts from the COVID-19 pandemic complicated engagement with individual Tribes. In lieu of direct consultations, regional representatives were invited to participate in the SMA team. In addition to direct participation on the SMA team, additional post-analysis outreach was made to other regional representatives for further input.

The SMA team conducted four two-hour meeting sessions, during each of which a regional subset of the 144 communities was discussed. Team members participated in the various meetings based on individual availability and specific knowledge of the subset of communities being discussed at the given meeting time. About sixty percent of the team members participated in each of the calls.

Each community was evaluated on an individual basis, for which the team made a professional judgment as to the expected mitigation strategy (e.g., protection-in-place, managed retreat, relocation). Various mapping products — including shoreline change maps when available — were used as the basis for the discussions. After determining the appropriate mitigation strategy, the team delineated the project durations, areas, and/or structure counts to better estimate the associated cost. During the discussions, it was a rare occurrence that no one from the team had any direct experience working with the community in question. In those cases, local hazard mitigation plans were referenced to inform decision-making. Meeting discussions were documented by designated notetakers at each meeting. Measurements were documented via annotations in Google Earth software products and saved in KMZ file formats.

Name	Affiliation
SUBJECT MATTER ADVISORY TEAM	
Bruce Sexauer	USACE, Acting Deputy Chief of Program and Project Management Division
Wendy Shaw	FEMA Region X, Civil Engineer
Brett Nelson	USDA, Natural Resources Conservation Service, State Conservation Engineer
Rachael Novak	BIA, Tribal Resilience Coordinator
Jacquelyn Overbeck	Alaska DNR, Coastal Hazards Program Manager
Richard Hildreth	Alaska DHS&EM, Planning Program Manager
Sally Russell Cox	Alaska DCRA, Community Resilience Programs
Danielle Meeker	Alaska Center for Climate Assessment & Policy (ACCAP)
Don Antrobus	Alaska Native Tribal Health Consortium (ANTHC)
Max Neale	ANTHC, Center for Environmentally Threatened Communities
Sean McKnight	Kawerak, Transportation Program Director
Bob White	Yukon Kuskokwim Health Corporation, Remote Maintenance Worker
Clarence Daniel	Association of Village Council Presidents (AVCP), Transportation Manager
Karen Pletnikoff	Aleutian Pribilof Islands Association, Inc. (APIA), Env. and Safety Program Manager
Malinda Chase	APIA, Tribal Liaison
William Justice	Tanana Chiefs Conference
Jeff Stanley	CRW Engineering, LLC, Principal/Civil Engineer
Andrea Meeks	CRW Engineering, LLC, Principal/Civil and Environmental Engineer
Joel Neimeyer	Neimeyer Consulting (Former Denali Commission Co-chair)
POST MEETING CONSULTATIONS	
Rexford Spofford	Bristol Bay Area Health Corporation (BBAHC), Environmental Health Dept. Manager
Forrest "Deano" Olemaun	North Slope Borough (NSB), Chief Administrative Officer
Chris Dankmeyer	Maniilaq Association, Environmental Health Manager

Figure 42: *Members of the Subject Matter Advisor Meetings* **Credit:** *ANTHC • DCRA • Unmet Needs Report 2023*

Estimating Cost

An estimate of the total cost of tribal infrastructure impacts directly related to climate change impacts was developed using a spreadsheet model. The model generated costs at the individual community level for 144 communities. While the total cost is believed to be representative of the investments needed to protect and/or relocate threatened Tribal infrastructure over the next 50 years, it must be noted that assumptions made regarding individual community mitigation strategies do not represent formal decision-making on the part of Tribal communities.

The cost estimating process followed the completion of the evaluations by the SMA team. The key elements from the SMA process that guided cost estimates included the assumed mitigation strategy (protect-in-place, managed retreat, or relocation) and the map annotations created during the discussion. The selection of the mitigation strategy determined the algorithm to be used to estimate the cost, and the map annotations were used to extrapolate the quantities needed to feed the algorithms. A general description of the cost model for each mitigation measure follows. A flow chart of the SMA and estimating process is provided in Figure 43.

In a few individual cases where authoritative community-specific studies and/or project cost estimates were identified, information from these documents was used to override the cost estimating algorithms described herein.

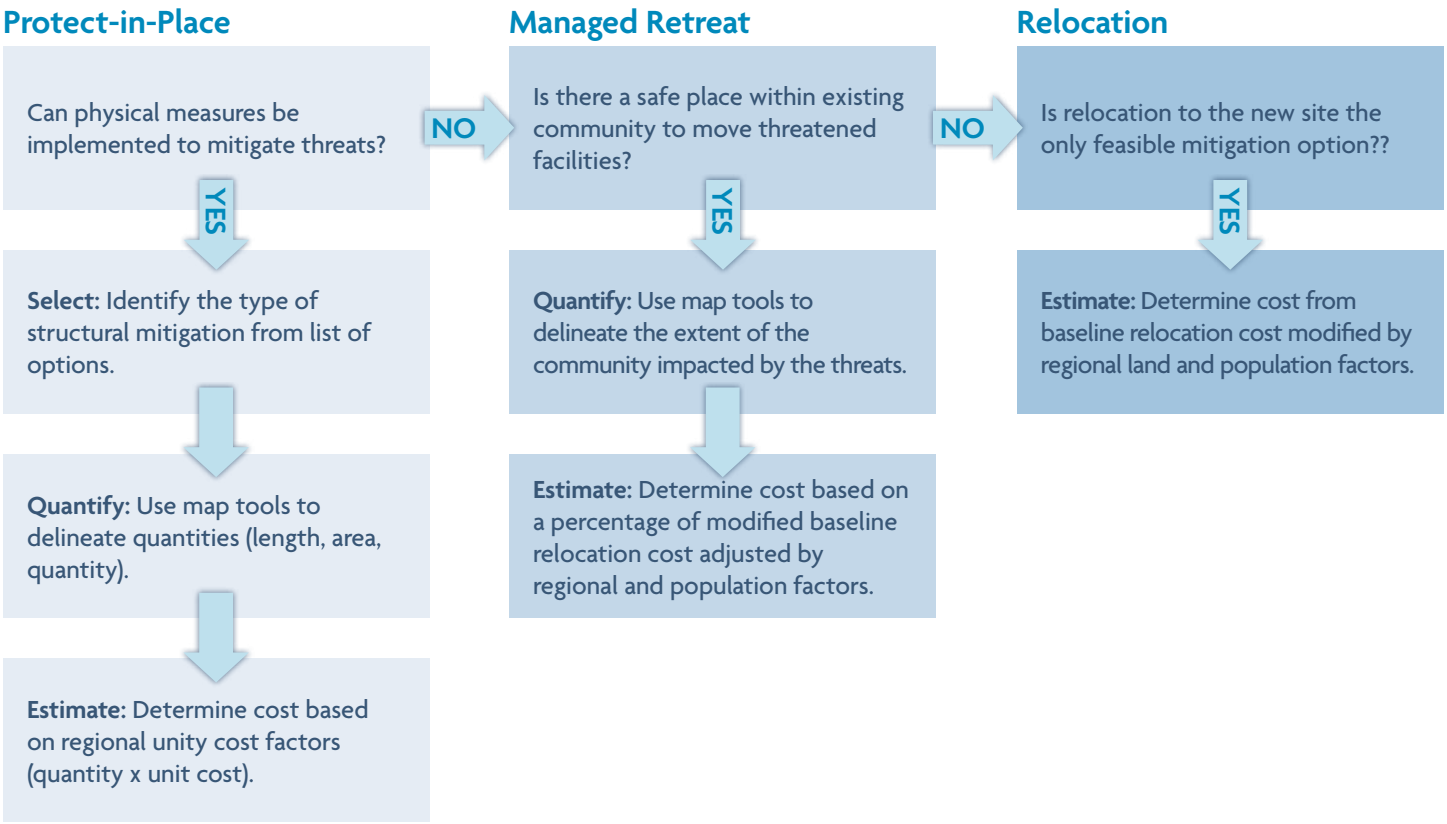


Figure 43: *The flow chart above describes the process used by the Subject Matter Advisory team to determine the mitigation strategy and associated cost for each community.* Credit: *ANTHC • DCRA • Unmet Needs Report 2023*

Relocation Cost Algorithm

Whole community relocation costs were developed from a "typical" community relocation cost that was derived from existing and projected costs for the relocation of Newtok. The relocation of Newtok to its new townsite, Mertarvik, is roughly forty percent complete in terms of constructed development. The remaining projects are well defined and easily estimated. Therefore, Newtok costs were used to establish a baseline from which other community relocation costs could be projected. This baseline relocation cost was modified based on population and regional cost factors to arrive at specific community estimates.

Not all costs related to community relocation can be directly scaled based on population. For example, rural gravel airstrip construction requirements generally do not change much based on population. Therefore, several major construction costs -- including the airport, school, and wastewater treatment lagoon -- were removed from the baseline cost before applying regional and population factors. After scaling for regional and population differences, costs for these facilities were re-added to establish the total relocation cost estimate. The general formula for relocation cost estimates is as follows:

(Scalable Baseline Cost x Population Factor x Location Factor) + Airport + School + Lagoon Costs

When calculated as noted, the subsequent relocation cost estimates include costs for the following infrastructure: residential homes, schools, airports, roads, barge landings, power plants, and power distribution, piped water and wastewater facilities, solid waste disposal facilities, bulk fuel storage facilities, rural clinics, telecommunications, and other community facilities such as government offices.

Managed Retreat Cost Algorithm

The scalable portion of the relocation cost algorithm described above was also used as the basis for generating a managed retreat cost algorithm. However, because there are elements embedded in the relocation estimate that are only relevant to a relocation exercise and not to a managed retreat scenario, additional modification was required. The modification was made by simply subtracting line items that pertain only to the relocation of an entire community. Examples of such line items needed to facilitate a full-scale relocation but not expected to be required in a managed retreat exercise include full-service construction camp facilities, new quarry development, and multi-purpose facilities that can serve as temporary schools, clinics, and offices. After these modifications, managed retreat costs were then estimated by multiplication of the "modified" scalable baseline costs by applicable regional and population factor; then they were multiplied by an estimate of the percent of community impact as established by SMA evaluations. In the case of managed retreat scenarios, costs for the airport, school, and/or wastewater lagoons are only added into the managed retreat costs if they have been specifically identified as needing to be moved. The general formula for managed retreat cost estimates is as follows: ((Modified Scalable Baseline Cost x Population Factor x Location Factor x Percent Impact) + Airport + School + Lagoon Costs if applicable)

When calculated as described above, managed retreat costs include allocations for the expansion of roads, public utilities, and telecommunication systems, in addition to the costs associated directly with the movement of structures. This is deemed reasonable because existing utility-ready subdivisions to which threatened infrastructure can be moved simply do not typically exist in rural Alaska. Managed retreat costs do not include cost allocations for airports, schools, or wastewater treatment lagoons unless these facilities are specifically identified as threatened and needing to be relocated.

Protect-in-Place Cost Estimates

When the SMA team judged that protect-in-place mitigation was the most likely response for a given community, then the group was also tasked to both identify the structural measure likely to be implemented and to delineate the area and/or linear footage where the measure will be applied. The bulleted list below identifies the range of structural measures delineated by the SMA team. One of these measures was identified as the primary response for each protect-in-place community. The delineation of quantities was recorded on map products as previously discussed.

- **Erosion Protection:** Structural barrier to stop erosion.
- **Flood Protection:** Foundation renovations to raise structures above the flood threat.
- **Permafrost Thaw Protection:** Foundation renovations to prevent damage from thawing permafrost.
- **Surface Drainage:** Repairs and upgrades to drainage systems to accommodate increased annual precipitation.

After the SMA team members completed their work, a professional consultant was engaged to develop unit costs for more specific structural options. Regionally-adjusted unit costs for each structural measure were established using the same regional factors as described in the relocation and protect-in-place sections. The list of detailed unit costs used in cost estimates follows below.

- Coastal Rock Revetment for Erosion Control (per linear foot)
- Riverine Rock Revetment for Erosion Control (per linear foot)
- Residential Structure Foundation Renovation for Flood Protection (per each)
- Sheet Pile Wall (per linear foot)
- Community Building Renovation for Flood Protection (lump sum for a typical set of public structures)
- Residential Structure Foundation Renovation for Permafrost Protection (per each)
- Community Building Renovation for Permafrost Protection (lump sum for a typical set of public structures)
- Surface Drainage for Increasing Annual Precipitation (lump sum per community)

It should be noted that while the list of structural options delineated above is representative of typical options expected to be implemented, it is not a comprehensive list of all available mitigation options. As site-specific vulnerability assessments are completed, then additional options are likely to be developed to fit community-specific requirements

For estimating purposes, only one of the above options was selected as the primary structural response for each community. The generalized formula for subsequent protect-in-place cost estimates is illustrated below.

(Structural Measure Unit Cost x Quantity Required)

Unique considerations for the establishment of quantities and estimating cost for the specific mitigation options considered are further delineated in the sections below.

Rock Revetments and Sheet Pile Walls: As part of the estimating process, an estimator (professional civil engineer) returned to the map products developed by the SMA team to extract specific quantities from the map annotations. In the case of rock revetments and sheet pile walls, linear measurements were made using tools available in the Google Earth software product. Linear measurements were taken along the shore or coastline identified for protection by the SMA. For consistency, a single individual made these measurements for each community.

Foundation Renovations for Permafrost Thaw: For estimates of foundation renovations that will be required to address permafrost thaw, quantities were established based on an estimate of the percentage of community structures likely to be impacted by permafrost thaw. Data from the Threat Assessment were used to estimate the impact percentage. Communities identified as Group 1 permafrost thaw threats were assumed to be eighty percent impacted; communities identified as Group 2 threats were assumed to be 50 percent impacted, and communities identified as Group 3 threats were assumed to be twenty-five percent impacted. Group 3 impacts were only applied if located in the Interior, Yukon Kuskokwim, or Northwest regions. The percentage of impact was then applied to the lump sum estimate for renovations to public building foundations and to the unit cost estimate for residential structures to estimate the total cost of permafrost thaw protections in the given community.

The lump sum estimate for public buildings is based on a common set of public infrastructure in rural Alaska communities and includes a school, water treatment plant/washeteria, community center, water storage tank, clinic, powerhouse, wastewater treatment lagoon, and tribal office. The unit cost estimates assume the installation of adjustable foundation systems and/or active cooling systems for buildings and tanks and berm repairs for earthen structures.

Foundation Renovations for Flood Protection: Estimates to renovate foundations for flood protection were made in a manner like those for foundation measures to address permafrost thaw. For these flood threats, it has been assumed that damage can be mitigated by raising structures above the flood threat via some type of foundation renovation. Although the specific foundation renovation measures will be different than renovation measures to address permafrost thaw, they have been deemed sufficiently similar in effort to justify the use of the same unit costs.

Estimates for the cost of foundation mitigation to address flood threats differed from the permafrost-related estimates in the establishment of the quantities used in the estimates. For flood threats, quantities were established by counting the number of residential structures located within the flood-prone areas identified by the SMA team. A percentage of total community impact was then calculated from the number of impacted residential homes divided by the total number of residential homes in the specific community. The percentage of impact was subsequently applied to the unit cost estimates for public buildings and residential structures to estimate total flood protection costs.

Annual Cost Allocation Methodology

The results of the exercise described above produced an estimate of the total costs of impacts to infrastructure over the coming decades. The total amount won't be needed all at once, nor could that magnitude of project activity be undertaken at once by the engineering and construction community. Rather, the total amount must be allocated over time based on expected project start dates and project durations in order to estimate annual needs. This section summarizes the methodology used to allocate total costs over time to establish an estimate of annual investments needs.

Estimates of annual investments required to address infrastructure impacts were made by allocating total estimated costs over time, based on a projected project start date and idealized project implementation and investment schedule.

Projected project start dates were determined based on a time-to-damage estimate extracted from the Threat Assessment. The Threat Assessment estimated the time to damage for each community as Short Term (1-10 years), Medium Term (10–20 years), or Long Term (> 20 years). Project start dates were extrapolated accordingly.

Implementation schedules were established for Relocation, Managed Retreat, and Protect-in-Place projects. Relocation projects are assumed to last for 15 years from the start date; managed retreat projects for 10 years from the start date; and protect-in-place projects for 10 years from the start date. Community project costs were allocated over the noted time spans based on an idealized investment schedule.

Vulnerability Assessments

As previously noted, one hurdle to developing this cost estimate is the lack of defined mitigation planning at the village level. This challenge highlighted the critical need to complete community-specific vulnerability assessments over the next 3 – 5 years to guide the selection and implementation of reasoned mitigation strategies. As part of this exercise, a separate estimate of the cost to complete these mitigation studies was generated. This estimate was also based on data pulled from the Threat Assessment. It was assumed that a unique vulnerability assessment would be required for every Group 1 or Group 2 community, as designated in the Threat Assessment. An estimate of the cost to complete all necessary vulnerability assessments was calculated as follows:

No. of Group 1 & 2 Designations x average unit cost of vulnerability assessment

General Comments and Assumptions for Estimates and Allocations

There were many assumptions made to complete this cost estimating exercise. This section is intended to capture all the assumptions that have been incorporated into the estimation process.

- The planning horizon for these impact estimates is 50 years.
- Cost estimates were developed as a desktop exercise based on readily available public information and the experience of the members of the Subject Matter Advisory team.
- This evaluation considered 144 Tribal communities throughout Alaska that were included based on the results of the Threat Assessment.
- Individual rural Alaska Tribal consultations and community visits were not conducted as part of this exercise.
- Cost estimates assume that projects can be implemented as pre-hazard mitigation in advance of a disaster and as such do not include any emergency response costs.
- For this study, regional hub communities with substantial commercial and industrial operations and/or that may have a majority of non-Native populations have been excluded from the summary costs. While hub communities are acknowledged to be critical for both the safety and the economic viability of tribal communities, there is no readily available strategy for separating Tribal and non-tribal impacts. This results in an exclusion of more than $833M in costs for environmental threat mitigation that is likely to be required for Bethel, Dillingham, Kotzebue, Nome, Unalaska, and Utqiagvik.
- Rural Alaska Tribes will continue to exist as unique individual place-based communities.
- Professional judgments regarding mitigation options that were made as part of the estimating process do not represent formal decisions that have been made by Alaska Tribes. Ultimate Tribal decision-making regarding mitigation strategies may vary from the assumptions made to generate this cost estimate.

- In general, no cost-benefit analysis of the selected mitigation options has been conducted. In a few specific community cases where two mitigation options might be feasible, both were estimated, and the lesser cost was included.
- All costs are presented in 2020 dollars. No adjustments have been made for the time value of money.
- Cost estimates for both relocation and managed retreat assume that structures will have to be replaced and cannot be physically relocated. In some instances, this may overestimate mitigation costs.
- Estimated costs for school facilities do not include stand-alone water and wastewater facilities.
- Flood and permafrost mitigation costs for protect-in-place communities are focused on the protection of structures via foundation modifications and do not consider the potential additional costs to elevate or modify existing roads, water reservoirs, and lagoons.

Methodology for the Existing Support Estimate

Available Financial Resources Estimate

To estimate existing financial support for environmentally-threatened communities, the project team sent a series of survey questions to federal and state agencies with relevant programs. Agency representatives were asked to describe the level and type of support their programs have provided for projects related to relocation, protection-in-place, and/or managed retreat in the 144 environmentally-threatened communities identified in the Threat Assessment. Agency staff were also asked to list any major program successes in these communities, as well as any noted barriers or areas for improvement. Additionally, feedback on the strengths, major successes, barriers, and areas for improvement was solicited from state, federal, and Tribal organizations, as well as private sector consultants.

The methodology for this survey could be improved by surveying all federal and state agencies, including the Alaska Department of Transportation and Public Facilities (ADOT&PF). ADOT&PF implements projects to address environmental threats, such as installing shoreline protection to mitigate the coastal erosion threat to the airport. These projects can be expensive (e.g. $40 million for a new airport) and occur relatively infrequently. Despite the exclusion of ADOT&PF data, the results are representative of the annual amount available to environmentally threatened communities for hazard mitigation projects.

Capacity Building and Technical Assistance

In addition to assessing financial support from federal agencies, the project team also sought to understand the level and type of support provided by Tribal organizations and nonprofits. A survey containing similar questions to those asked of funding agencies was sent to all regional Tribal nonprofits that serve environmentally threatened communities, as well as additional relevant Tribal organizations. State and federal agencies were not included in this survey.

APPENDIX B.
Case Studies from the Front Lines of Climate Change

The stories on the following pages illustrate the impacts to Alaskans.

- Shoreline Protection Costs Hundreds of Millions of Dollars in Utqiagvik
- In Northern Alaska, Thawing Ice Means Losing Food for the Entire Year
- Akiak Relocates 200 Gravesites due to Erosion
- Armoring the Eroding Riverbank in McGrath Protects Critical Community Infrastructure
- Erosion Threatens to Cut off Water Service to 70 Homes in Huslia
- Flooding Can Cause Catastrophic Damage in Kotlik
- Unprecedented February 2019 Rain Floods Permafrost-Impacted Home in Nunapitchuk
- Quinhagak Has $11.5 Million in Immediate Needs to Protect Community Infrastructure
- Coastal Erosion in Shishmaref

Shoreline Protection Costs Hundreds of Millions of Dollars in Utqiagvik

Utqiagvik is the northernmost community in Alaska, located 725 miles from Anchorage. The majority of Utqiagvik residents are Inupiat. Archaeological sites in the area indicate ancestors of today's Inupiat residents lived in the area from 500 to 900 A.D. Utqiagvik residents traditionally depend on subsistence marine mammal hunting, supplemented by inland hunting and fishing. Traditional marine mammal hunts and other subsistence practices are an active part of the culture. Bowhead, gray, killer, and beluga whales migrate near Utqiagvik each summer.

> *"We brace ourselves every fall when we have a surge of waves eroding our beach line. Millions of dollars are spent every year on the gravel bar, but each time it would disappear due to the wave surge. We can't fight nature, but we can plan a better future by being proactive, instead of reactive."*
>
> - Charlotte and Eugene Brower, Utqiagvik Elders

Threat: Utqiagvik is the political and economic hub of the North Slope Borough (NSB). The community experiences frequent and severe coastal storms, resulting in flooding and erosion that threaten public health and safety, over $1 billion of critical infrastructure, and access to subsistence areas. Currently, a gravel berm and sandbags help to prevent flooding and erosion but do not offer any "real protection" according to Scott Evans, Assistant Risk Manager with the NSB.

Mitigation Strategy: To mitigate the erosion threat, the NSB engaged with the USACE to complete a $3 million feasibility study to analyze alternatives to protect the shoreline. The study, which required a fifty percent non-federal cost share, recommended the construction of a five-mile-long revetment, which would armor the shoreline with rocks weighing nearly three tons. The next step for this study is to fully develop the design. The total construction cost of the project is estimated at $364 million, with NSB required to provide thirty-five percent or $110.5 million as a non-federal cost share. The project will save NSB approximately $8.3 million in annual emergency response costs. If constructed, the structure will be the longest, largest, and most expensive erosion protection structure USACE has completed in Alaska. While the NSB has available resources to implement such a costly project, the majority of Alaska's rural communities would not be able to meet the thirty-five percent cost share requirement.

Figure 44: *A five mile gravel berm provides insufficient shoreline protection from coastal erosion in Utqiagvik and must be repaired after every storm, as shown above, which costs $8.3 million annually. The U.S. Army Corps of Engineers project will construct a fortified rock revetment to protect the shoreline.* **Credit:** *North Slope Borough.*

In Northern Alaska, Thawing Ice Means Losing Food for the Entire Year

Figure 45: *Gordon Brower is a Whaling Captain in Utqiagvik and hunts for bowhead whales every spring and fall. He relies on ice cellars to store the harvested whale meat, which have been failing across Alaska. Failing ice cellars threaten the food sovereignty and livelihoods of Alaska Native people.* **Credit:** *Gordon Brower.*

Gordon Brower is a whaling captain in Utqiagvik and hunts for bowhead whales, which Alaska Native people have been hunting for thousands of years. Harvesting whale is essential for protecting food sovereignty and preserving a subsistence way of life. When a whale is harvested, meat is divided among the crew and shared with the entire community. Whale meat is stored in ice cellars, which are a natural form of refrigeration constructed within permafrost. In Utqiagvik, ice cellars are failing due to flooding and collapse, caused by warming temperatures. According to Gordon, some ice cellars in Utqiagvik are caving in and most are suffering from temperature fluctuations that are causing the meat to go bad. Gordon and others have resorted to pulling meat out of the cellars and putting it in walk-in freezers — "solely to save it." Ice cellars are critical infrastructure for communities such as Utqiagvik. Failing ice cellars threaten traditional food supply and put communities at risk for foodborne illness, food spoilage, and even injury from structural failure.

Akiak Relocates 200 Gravesites due to Erosion

Akiak is a community of approximately 462 located on the west bank of the Kuskokwim River in the Yukon-Kuskokwim Delta in southwest Alaska. In 1880, the village of "Ackiagmute" had a population of 175. The name Akiak means "the other side," since this place was a crossing to the Yukon River basin during the winter for the area's Yup'ik population. The Akiak Post Office was established in 1916. A U.S. Public Health Service hospital was built in the 1920s. The city was incorporated in 1970. Akiak is a Yup'ik village with a reliance on subsistence and fishing activities.

Threat: Akiak is threatened by aggressive erosion of the Kuskokwim River. In 2010, erosion exposed the community cemetery, which was used since the 1880s, resulting in "skulls, human remains, and coffins along the bank," said Sheila Carl, Tribal Administrator for the Akiak Native community. To prevent over 200 graves from being swept into the river, Akiak residents banded together with no external resources to dig up all the graves and relocate them to a new cemetery, where they held a service to honor the dead.

Erosion has accelerated in recent years. In May 2019, a massive erosion event ripped 75 to 100 feet from the riverbank and put three homes in danger of collapsing into the river. Another erosion event in May 2020 put homes in immediate jeopardy. The community quickly took action to relocate homes to a safe location using funding awarded by the Natural Resources Conservation Service (NRCS) Emergency Watershed Protection program.

Mitigation Strategy: To protect their community, Akiak has decided to pursue a managed retreat. It is estimated that the managed retreat will cost up to $27 million.

Figure 46: *In 2010, Akiak relocated 200 gravesites that were eroding into the river. Akiak had to undertake the emotional process without the support of outside resources.* **Credit:** *Akiak Native Community; 2010.*

Armoring the Eroding Riverbank in McGrath Protects Critical Community Infrastructure

McGrath was a seasonal Upper Kuskokwim Athabascan village that was used as a meeting and trading place for area residents. Since McGrath is the northernmost point on the Kuskokwim River accessible by large riverboats, it became a regional supply center. After a major flood in 1933, some residents decided to move to the south bank of the river. Changes in the course of the river eventually left the old site on a slough, useless as a river stop. Slightly more than half of the population of McGrath are Alaska Native. As a regional center, McGrath offers a variety of employment opportunities, but subsistence remains an important part of the local culture.

Threat: Erosion occurs along the entire riverbank in McGrath and threatens emergency access roads, residences, the water plant, powerhouse, the fuel tank farm, the landfill, and other infrastructure. Accelerating erosion also exacerbates the risk of flooding for McGrath, which has a history of significant flooding.

Mitigation Strategy: In 2015, the Natural Resources Conservation Service (NRCS) Emergency Watershed Protection (EWP) program assisted McGrath with the reconstruction of a protective levee and armored the eroding riverbank with rock to protect community infrastructure from future damage. The next phase of the project will continue to mitigate riverine erosion by installing rock barbs, which slow and redirect the river current out into the main channel of the river away from the bank.

Figure 47: *Armored riverbank at McGrath.* Credit: *Natural Resources Conservation Service; 2015.*

Erosion Threatens to Cut off Water Service to 70 Homes in Huslia

Huslia is an Athabascan village, and most residents are related by birth or marriage. Originally spelled Huslee, Huslia was named after a local stream. In 1949, the community moved to the present site, because the old town site flooded frequently, and the ground was swampy. The new site had been used as a burial site since 1886, but, by the time of the move, most of the old cemetery had been destroyed by erosion. In 1950, the first school was established, followed by a post office, airport, and road construction in 1952. At this time, families began to live year-round at Huslia. In 1960, a health clinic was constructed, and, in 1963, 29 individual hand-pumped water wells were installed. The city government was incorporated in 1969. Running water and indoor plumbing arrived in 1974.

Threat: The community of Huslia sits on the north bank of the Koyukuk River in interior Alaska and experiences rapid erosion. The bank lost 80 feet in 2018 due to erosion and nearly 100 feet in 2019. The erosion rate is increasing due to ice jams, permafrost melt, vehicle traffic on the beach and the bank, and boat traffic. Although the community has moved homes away from the river, power lines, water service lines, and sewer service lines remain threatened and are expected to be impacted in the near future. If water and sanitation infrastructure is impacted, total damages would be approximately $2 million and service to 70 homes would be jeopardized.

Figure 48: *In 2018, sections of the riverbank in Huslia were lost to rapid erosion.*
Credit: *Huslia Village; 2018.*

Mitigation Strategy: To protect their community, Huslia needs to relocate all threatened infrastructure to a safe location. Between 2014 and 2018, the NRCS EWP program funded the relocation of 7 homes in Huslia and the demolition of 9 buildings. The community has the necessary equipment and skills to move homes and has moved nine homes away from the eroding riverbank since 2014. There are approximately 20 more homes that need to be relocated in the next decade. Some threatened homes cannot be relocated and need to be replaced with new construction. Moving away from the eroding river requires expanding water and sewer service and the electric distribution system to new house sites.

Flooding Causes Catastrophic Damage in Kotlik

Kotlik, Alaska is a Yup'ik community of approximately 655 residents located at the confluence of the Kotlik and Little Kotlik Rivers in the Yukon Kuskokwim Delta, five miles from the Bering Sea coast. When a BIA school was constructed at Kotlik in the mid-1960s, residents of the nearby villages of Channiliut, Hamilton, Bill Moore's Slough, and Pastolaik relocated to Kotlik.

Threat: Kotlik is vulnerable to major flooding. Additionally, erosion threatens 21 homes in the near-term and all infrastructure along the riverbank in the long term. The frequency and severity of flooding are increasing in Kotlik, creating rising concern among community members about potential disasters. Philomena Keyes said, "I am getting more concerned about our community and the risks we are facing. I am sure you know that we recently had a large flood. The Tribe has been receiving more phone calls from individuals that are needing assistance raising their homes due to water entering them. A lot of talk is going around that this was not the big flood and that another one should be prepared for. It is scary just thinking about it."

Mitigation Strategy: To mitigate the threat, Kotlik is pursuing a managed retreat by developing a subdivision at their old airport site, which is safe from erosion and flooding impacts.

Community Story: In November 2013, an ice-jam flood inundated the entire community, resulting in

Figure 49: *November 2013 ice-jam flood in Kotlik.* Credit: *Village of Kotlik; 2013.*

a federal disaster declaration and $9.8 million in damages to the water and sanitation system alone. During the flood, all residents were forced to evacuate their homes and shelter at the school. However, not all residents were able to leave their homes in time and were rescued by community members using boats to navigate the floodwaters. Without access to the utilidor, the community was unable to properly dispose of sewage or gain access to clean drinking water until the damage was fixed. Kotlik went without running water or access to toilets and was living in a disaster area for months. Victor Tonuchuk Jr., Kotlik community member and IGAP Coordinator, described the flood as "something scary to witness."

Unprecedented February 2019 Rain Floods Permafrost-Impacted Home in Nunapitchuk

Nunapitchuk is a Yup'ik village first listed in the 1939 U.S. Census with a population of 121. Residents are involved in commercial fishing and subsistence activities. During the 1970 U.S. Census, Nunapitchuk and the nearby villages of Atmautluak and Kasigluk were enumerated as "Akolmiut."

> *"Elders used to say, in 20 or more years, Nunapitchuk will just be water."*
>
> - Bernice Sallison

Threat: Nunapitchuk is located amongst low-lying wetlands in the Yukon- Kuskokwim region. Increased erosion, flooding, and permafrost degradation threaten critical community infrastructure including the washeteria, public safety building, and residential homes. Nunapitchuk sits on permafrost, which is unstable and degrading due to warming. Community member Golga Frederick explains that with the combination of erosion and melting permafrost in Nunapitchuk, "we are losing the land very fast." Morris Alexie described how the permafrost is "very soft... very loose... Once you have trampled on the tundra, it will deteriorate. It will easily break and easily sink... Every building you see in the village is slanted or warped. We might level it up, but by the next spring, it is slanted again. There is no hard ground." In February 2019, unprecedented winter rain in Nunapitchuk flooded the home of Zechariah Chaliak, Jr. The first floor filled with several feet of water, displacing the family for several weeks and damaging the home.

Figure 50: *In February 2019, an unseasonable storm caused a home to flood in Nunapitchuk, displacing the residents. Nunapitchuk is uncertain how severe future impacts to their land will be.* **Credit:** *Native Village of Nunapitchuk; 2019.*

Mitigation Strategy: Nunapitchuk is currently engaging with engineering contractors to conduct erosion and permafrost risk assessments to forecast impacts and develop solutions. The risk assessments will enable the community to make decisions that ensure the long-term safety of the community.

Quinhagak Has $11.5 Million in Immediate Needs to Protect Community Infrastructure

Quinhagak is a long-established village in the Yukon-Kuskokwim Delta in western Alaska whose origin has been dated to 1000 AD. It was the first village on the lower Kuskokwim to have sustained contact with Europeans. Gavril Sarichev reported the village on a map in 1826. After the purchase of Alaska in 1867, the Alaska Commercial Company sent annual supply ships to Quinhagak with goods for Kuskokwim River trading posts. Between 1906 and 1909, over 2,000 reindeer were brought into the Quinhagak area. They were managed by the native-owned Kuskokwim Reindeer Company, but the herd had scattered by the 1950s. Residents of Quinhagak are primarily Yup'ik who fish commercially and are active in subsistence food gathering.

Threat: "Quinhagak is at the tip of the iceberg," says Vivian Korthuis, the president of the Association of Village Council Presidents, a regional body for 56 Tribes in the Yukon-Kuskokwim Delta. Thawing permafrost is causing differential settlement for most of the structures that are not on driven pile foundations as well as the roads and airport. The community's highest priority is to address impacts to the multipurpose facility, which operates as the clinic and washeteria and experiences significant differential settlement due to permafrost thaw that will likely lead to foundation failure if not addressed.

> *"Quinhagak, in response to climate change, will accept new teachings, listen more attentively, involve our kids, use our qannryyutit to adapt with a Yup'ik mindset for the future survival of our traditional ways, and respect our land and elders."*
>
> **– Quinhagak Vision Statement**

Mitigation Strategy: Staff from the Alaska Native Tribal Health Consortium (ANTHC) visited Quinhagak and produced a report in April 2019 that developed recommendations to address the community's top priorities for mitigating environmental threats, which include approximately $11.5 million in immediate needs to protect health:

- Permafrost impacts to the foundation of the multipurpose building, water treatment plant, and Head Start building.
- Erosion impacts to the wastewater treatment lagoon, solid waste landfill, homes, and fish camps.
- Flooding impacts to the road in the center of the community near the community store.

In 2019, after reviewing ANTHC's Threatened Infrastructure Assessment Report, leaders in Quinhagak invited ANTHC's Jackie Schaeffer to lead a visioning session. The visioning session guided attendees through exercises that looked back seven generations for wisdom from ancestors and to develop a unifying vision for the community. The meeting helped the community build consensus about the next steps and produced the vision statement above.

Figure 51: *Quinhagak, Alaska* **Credit:** *ANTHC.*

Coastal Erosion in Shishmaref

Shishmaref is a traditional Inupiat village with a traditional subsistence lifestyle, located on Sarichef Island, in the Chukchi Sea, just north of the Bering Strait. The original Inuit name for the island of Shishmaref was Kigiktaq. In 1816, Lieutenant Otto Von Kotzebue named the inlet Shishmarev, after a member of his crew. Archeological excavations of the island in 1821 found evidence of Inupiat habitation from several centuries earlier.

Figure 52: *The majority of the coastline in Shishmaref remains unprotected due to a lack of funding.* Credit: *Davis Dennis, 2020.*

Threat: Shishmaref, located on an island in the Chukchi Sea, is one of the most threatened communities in Alaska. Sea ice has developed later and later each year, making the community more vulnerable to fall and early winter storms, which result in erosion. Both sides of the island are eroding. The community has moved a dozen homes away from the coastline. Several structures have fallen into the sea. Approximately $100 million is needed to protect the community at the current location.

Community Story: The only road to Shishmaref's landfill and sewage lagoon was damaged and repaired as part of a FEMA disaster response. The road has been repetitively damaged by storms in 2019, 2020, 2021, and 2022. The sewage lagoon is the only waste facility for the entire community of 589 people who do not have access to piped water or sewer utilities. Protecting this infrastructure is currently the highest priority. Next, the entire shoreline to the north needs to be protected. Due to a lack of match funding for Army Corps and FEMA programs, the community recently wrote to BIA leadership and the Alaska Congressional delegation requesting $5 million of match funding that would enable the community to do a $50 million shoreline protection project.

APPENDIX C.
Summary of Relevant Federal Programs and Barriers to Equity

- This appendix provides an overview of federal programs relevant to addressing climate and environmental threats in Alaska, identifies observed barriers, and recommends areas for improvement.
- Observations and recommendations for each agency are presented as standalone pull-outs intended for agency decision-makers. Agencies are sorted alphabetically.

Introduction

In 2018, the Denali Commission updated the Catalog of Federal Programs as a resource for Alaska communities requiring funding to address environmental threats. The document identifies approximately 60 federal funding resources. However, in practice, we have learned that only a few of the programs have been used successfully to support communities with environmental threats. The programs were generally not designed to address the threats communities face. Barriers in programmatic design and restrictions in enabling legislation impede access to the programs. Restructuring federal programs to provide equitable access and efficient, effective delivery of resources and services for communities will require deliberate legislative action as well as revising specific programs to remove barriers.

The Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) provided significant additional funding to existing programs, including FEMA Hazard Mitigation Assistance programs, the BIA Tribal Climate Resilience Demonstration Projects program, and BIA Tribal Climate Resilience Annual Awards program. Due to the relatively large amount of funding available, addressing barriers within these programs has the potential to provide the most immediate benefit to Alaska's threatened communities.

Assessing Program Performance

We grouped federal programs into three categories based on their observed benefit to environmentally threatened communities.

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
NRCS Emergency Watershed Protection Program	FEMA Risk Mapping, Assessment, and Planning (Risk MAP)	USGS Pacific Coastal and Marine Science Center
FAA Office of Airports	BIA Tribal Climate Resilience Demonstration Projects	EDA Public Works and Economic Adjustment Assistance Programs
	Army Corps of Engineers programs	EPA Environmental Justice
	HUD Indian Community Development Block Grant Programs (ICDBG) and Community Development Block Grant Programs (CDBG)	EPA Indian General Assistance Program
	NRCS Watershed Program	NOAA National Coastal Resilience Fund
		NOAA Alaska Sea Grant
		NOAA Alaska Center for Climate Assessment and Policy
		NOAA Effects of Sea Level Rise
		BIA Tribal Transportation Program
		BIA Housing Improvement Program
		DOT Infrastructure for Rebuilding America
		DOE Powering Unelectrified Tribal Buildings

Effective Programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages. The list also includes two new federal programs that are intended to make investments in Alaska communities but have yet to do so.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Contents

Army Corps of Engineers (USACE)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
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Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

The USACE is one of the few agencies with existing authority and technical expertise to support Tribal communities facing erosion and flooding. However, the agency lacks funding and regulatory barriers prevent programs from being accessible to environmentally threatened communities. A summary of USACE programs is available in the Institute for Water Resources "Partnering with the U.S. Army Corps of Engineers: A Guide for Communities, Local Governments, States, Tribes, and Non-Governmental Organizations." On average, the USACE Alaska District provides an estimated $10-15 million statewide through Civil Works programs, which include infrastructure projects to address environmental hazards. However, USACE does not provide consistent funding to environmentally threatened communities seeking to relocate, protect-in-place, or implement a managed retreat. USACE Alaska District staff identified $97.8 million of support provided to construction projects in environmentally threatened communities between 1997 and 2019. The majority of that was awarded because of earmarks (designating funding for a specific purpose). No project has been completed since 2017. The Bipartisan Infrastructure Law (BIL) will provide nearly $1 billion of funding for USACE Civil Works construction in Alaska (e.g. $250 million port project in Nome, $364 million erosion protection project in Utqiaġvik). However, due to the high cost-sharing requirements of some programs and limitations to other programs, USACE resources and expertise are largely not accessible to small Alaska Native communities striving to address environmental threats. Also, USACE has a variety of beneficial programs that are not funded on an annual basis, which makes them unavailable to communities.

Strengths

- The USACE Section 117 program, which is now discontinued, provided one hundred percent federal cost- share for storm damage prevention and coastal erosion projects. Section 117 enabled the USACE Alaska District to implement many beneficial projects and research efforts in threatened communities, largely a result of Congressional earmarks. Examples include the 2009 Baseline Erosion Assessment and rock revetment projects in Shishmaref (2007-2009), Kivalina (2009-2010), Unalakleet (2010), and elsewhere.
- In 2018, the Alaska Silver Jackets Team (an interagency group focused on flood risk management) provided USACE Interagency Nonstructural Flood Risk Management funding for a portion of Adapt YK Delta, a climate change adaptation planning effort in the Yukon Kuskokwim Delta, and, in 2019, funded water level data collection in Kotlik. A hardworking group of interagency partners and exemptions to program requirements (e.g. Silver Jackets cannot fund data collection) enabled these projects to succeed. Due to the limitations placed on Silver Jackets funding, it is not expected to be a significant funding source for Alaska Native communities to address impacts to infrastructure.
- A waiver allows Tribal communities to waive cost-sharing requirements for projects up to $484,000. This is currently enabling Deering and Alakanuk to access USACE support under the Planning Assistance to the States program.

Barriers and areas for improvement

1. Barrier: USACE programs have cost-sharing requirements that are prohibitively high for the vast majority of Alaska Native villages—50 percent for design and studies and 35 percent for construction.

Recommendation: We recommend that Congress eliminate the USACE non-federal match requirement for Tribal communities nationwide. One hundred percent federal funding was present in the discontinued Section 117 program, enabling it to be of great benefit to Alaska communities. One hundred percent federal cost-share should be applied to the current 116, 103, and 14 programs.

2. Barrier: Construction projects in rural Alaska are extremely expensive. USACE programs have a limited ceiling for project costs.

   Recommendation: We recommend increasing the cap on project costs for these programs: Section 116 (Alaska Coastal Erosion Authority), Section 103 (Beach Erosion and Storm Damage Reduction), and 14 (Emergency Stream Bank and Shoreline Protection).

3. Barrier: The amount of Planning Assistance of the States (PAS) projects in Alaska is limited by staff capacity at the Alaska District level and the need to compete nationally for funding. With support from Alaska Native Tribal Health Consortium, 12 environmentally threatened communities have submitted PAS program requests to the USACE Alaska District since 2018. However, only three projects have moved forward.

   Recommendation: We recommend USACE staff prioritize small projects that benefit Tribal communities to address environmental threats, such as PAS, and make adjustments to the PAS program design to be easier to access and enable the Alaska District to increase staff, if needed, to deliver services under the PAS program.

4. Barrier: The statutory requirement that benefits exceed costs can prevent USACE programs from investing in projects in Alaska Native villages due to the low value of infrastructure in communities and the high cost of construction in rural Alaska.

   Recommendation: We recommend USACE evaluate opportunities to adjust the benefit-cost analysis methodology.

Bureau of Indian Affairs (BIA) Tribal Climate Resilience Annual Awards Program

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Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

BIA operates four programs relevant to climate and environmental threats in Alaska. Two of these programs are part of the BIA Branch of Tribal Climate Resilience (TCR). The TCR originated as a nationwide grant program to support Tribes and Tribal Organizations to address landscape conservation. TCR has been reorganized to the Branch of Tribal Climate Resilience and operates an Annual Awards competitive grant program for a variety of climate adaptation purposes. TCR also operates a non-competitive Demonstration Projects program for Tribes to address protect-in-place, managed retreat, and relocation projects. Through both of these programs, TCR has received close to $500 million in additional funding through the Bipartisan Infrastructure Law and Inflation Reduction Act. Other BIA programs include the Tribal Transportation program (TTP) and the Housing Improvement Program (HIP).

Tribal Climate Resilience Annual Awards Program

Strengths

- The program has been effective at addressing environmental threats in Alaska because it is specifically intended for that purpose.
- In general, program leadership has been responsive to recipients' needs. For example, in 2019, program leadership traveled to Alaska to meet with local, federal, and statewide practitioners to better understand how to configure the program to meet Alaska Tribal needs. As a result, the 2020 grant program created a new category to address environmental threats to infrastructure. Also, in response to Tribes' request for administrative support, TCR created a non-competitive category for staff positions in environmentally threatened communities
- The program provides one hundred percent federal funding for awards, which makes grants accessible to small and low-income communities that would not otherwise be able to meet a cost-share match requirement.
- A wide variety of planning and implementation activities are eligible, enabling the program to meet the unique needs of communities.
- The program is restricted to Tribes and Tribal Organizations. This reduces the competition for limited funding. This is in contrast to other programs, such as NSF Navigating the New Arctic and the NOAA/NFWF National Coastal Resilience Fund, which allow a wide range of applicants whose proposed projects rarely provide direct benefit to environmentally threatened communities.

Barriers and areas for improvement

1. Barrier: The Annual Awards program evaluates awards funding based on specific grant criteria. The methodology tends to favor applicants with the best grant writing skills. TCR does not appear to have a methodology that incorporates risk into award decisions.

   Recommendation: We recommend that TCR adopt a strategic approach to award methodology that takes into account the relative risk to individual communities across all hazard types.

2. Barrier: The Annual Awards grant application process exceeds the administrative capacity of most small, remote Tribes in Alaska. Also, English may be the second language for community staff and leadership, which can disadvantage those communities as they compete with Tribes with greater administrative capacity and English writing skills.

   Recommendation: We recommend providing robust, proactive training on grant writing and BIA's online systems. We also recommend simplifying the application. For example, BIA could take steps to reduce the amount of information required by the community (e.g. utilize existing information about the community, risk level, etc.).

3. Barrier: The 2022 TCR Annual Awards program had 12 categories with different amounts of funding available in each category. There were multiple planning and implementation categories for different types of projects. This approach is difficult for an interested applicant to understand what categories are most relevant to them or what category has the highest probability of award. The complexity of navigating the program contributes to the difficulty of the application process. We recommend that TCR award funding based on the relative level of risk to individual communities with fewer categories. Impacts to infrastructure and food security are two potential categories.

4. Barrier: The program lacks clarity about Tribal organization eligibility. For example, the 2022 Request for Proposals stated "Authorized Tribal organizations, as defined at 25 U.S.C. 5304(l) are also eligible to apply." However, the program declined to fund a regional Tribal organization due to eligibility.

5. Barrier: In 2022, BIA declined to invest in an Alaska regional Tribal Health Organization because the TCR program considered the organization ineligible. Excluding Tribal organizations is incongruent with this report's recommendations regarding community capacity building, technical assistance, and supporting communities to develop and implement all types of climate adaptation projects.

   Recommendation: Regional and statewide non-profit Tribal organizations in Alaska must be eligible for TCR funding.

6. Barrier: Many Alaska Tribes and Tribal organizations have observed that BIA TCR staff are unavailable or do not have the capacity to respond to communications and questions regarding the program or active projects.

   Recommendation: We recommend increasing TCR staff to provide adequate support to Tribes and Tribal organizations.

7. Barrier: BIA's evaluation process does not provide an opportunity for the agency to seek clarification on the proposed project or correct an error or omission in the application. This process disadvantages small Tribes because most staff in environmentally threatened communities do not have significant grant writing experience and English may be their second language. Consequently, BIA has declined to fund important projects in high-risk communities.

Recommendation: We recommend that the TCR evaluation process provide an opportunity for reviewers to assess the completeness of applications and enable applicants to correct omissions. This would be consistent with the practices of other federal agencies, such as FEMA, which request additional information about a project after an initial review.

8. Barrier: The program makes it difficult for Tribes to partner with Tribal consortia and other regional organizations that work to develop and implement infrastructure projects with communities. For example, the North Slope Borough is not eligible to apply to the program despite its role as the primary organization that works with North Slope communities on infrastructure projects. Similarly, the Transportation Program at Kawerak, a regional Tribal Organization, is not eliglible to apply on behalf of communities. Currently, communities must apply for and directly manage grants, which can disadvantage and/or exclude communities that don't have the administrative capacity to do so.

   Recommendation: When desired by Tribes, we recommend that TCR enable Tribal consortia and other organizations to apply for and manage BIA TCR funds on behalf of one or more Tribes.

9. Barrier: The cost caps prevent communities from accessing the full amount of funding needed to develop and implement solutions. For example, $3 million can only construct a small portion of a new subdivision site to relocate imminently threatened homes.

   Recommendation: We recommend removing the cost cap on all projects that address protection-in-place, managed retreat, and relocation or making multi-year awards that enable communities to complete what is feasible each year.

10. Barrier: Understanding and complying with grant requirements can be difficult to achieve for small communities. Failure to comply will likely make it more difficult or impossible to get additional support in the future.

    Recommendation: We recommend that TCR significantly increase technical assistance for award recipients, including one-on-one training in grant management, accounting, reporting, and online grant systems.

11. Barrier: A declined application can discourage applicants from reapplying for future funding. This is especially true when applicants are unaware of areas needing improvement and the probability of future success. We have observed that it is difficult for TCR applicants to receive feedback on declined applications.

    Recommendation: To build applicant capacity, we recommend that TCR provide all declined applicants with reviewer feedback and scoring information upon notice of decline and invite all declined applicants to debrief the application and reviewer feedback with BIA staff via voice.

12. Barrier: The program is not codified and is dependent on future appropriations from Congress, which are not guaranteed.
    Recommendation: As needs for climate resilience evolve over time, and environmental changes continue to emerge, we recommend codification of this program to ensure funding for future needs.

Tribal Climate Resilience Community Driven Relocation Demonstration Projects Program

In November 2022, BIA TCR announced the creation of "Community-Driven Relocation Demonstration Projects" that will provide two Alaska Tribes and one Lower 48 Tribe with up to $75 million over five years to address protection-in-place, managed retreat, and relocation for a wide variety of climate and environmental threats. The program will also invest $5 million each in four Alaska Tribes and four Lower 48 Tribes.

Strengths

- The communities identified for funding were not required to complete an application. This is an improvement compared to the TCR Annual Awards program because competitive grant applications are a major barrier to equity.
- Three communities will receive $5 million annually. These amounts can improve efficiency by funding a complete project, or larger components of expensive projects, rather than small components of projects.

Barriers and areas for improvement

1. Barrier: BIA did not collaborate with Tribes and non-federal partners and practitioners on the program design.

   Recommendation: In addition to increasing engagement with Tribes, we recommend increasing engagement with non-federal partners and practitioners.

2. Barrier: The distribution of Demonstration Projects funding over time and the program's eligible costs do not appear to be based on the needs of communities. Here are some examples:

   It appears that implementation is not an eligible cost for Tribes selected for $5 million Demonstration Projects planning grants. However, many communities face acute mitigation needs that will be ineligible.

   The selection of Napakiak for "full relocation" funding does not align with the community's decision to remain on the island and implement a managed retreat. Investing in communities that are relocating to a new, distant site would align with the announced intent of the Relocation Grants program.

   It is not clear if the Demonstration Projects program will support the community projects the agency declined to fund through the Annual Awards program (e.g. Huslia's application for new home construction and Point Lay's application for a community-wide permafrost vulnerability assessment).

   Replacing threatened homes that cannot be relocated or are not worth relocating (due to the condition of the home and the high cost of relocation) is an essential disaster prevention solution. Three of the Tribes selected for Demonstration Projects funding applied for and were declined TCR Annual Awards grants for new home construction. However, at the time of the Demonstration Projects announcement, BIA staff did not know if new home construction was an eligible cost.

Recommendation: We recommend engaging with Tribes and other community stakeholders in environmentally threatened communities to understand what solutions are available for mitigating infrastructure risk and/or relocating at-risk infrastructure. Include the components of these solutions as allowable grant expenditures. Communicate all allowable grant costs to BIA grant administrative staff through trainings or other means so staff can help awardees understand what's allowable and what is not.

3. Barrier: BIA's process for selecting communities for awards was opaque to communities and other federal agencies. If the program is intended to be a demonstration project rather than simply directed project funding, other agencies must be involved in the development of the program and fully understand the goals and objectives.

   Recommendation: We recommend clearer delineation of the program's goals and objectives so those applying for funding have a clear sense of whether or not their community's needs align with the program's mission.

Tribal Transportation Program (TTP)

The mission of the TTP is to provide safe and adequate transportation and public road access to and within Indian reservations, Indian lands, and communities for Native Americans, visitors, recreationists, resource uses and others while contributing to economic development, self-determination, and employment of Native Americans. The TTP is jointly administered by the BIA and the Federal Highway Administration (FHA).

The 229 Alaska Tribes receive about $44 million annually from the TTP program, or an average of $190,000 each, although for any given Tribe the amount fluctuates greatly based on population and road mileage. TTP funds contributed to all of the following: design, equipment purchase, equipment maintenance, fuel, road construction, project management, construction management, road maintenance, quarry development and operations, man camp construction, purchase of a landing craft, bulk order and transport of materials, etc.

- In the relocation of Newtok to Mertarvik, TTP contributed to the construction of a road to a rock quarry and community streets. The Newtok project received nearly $440,000 of TTP funding in FY 2019.
- When Tribes elect to allocate their TTP shares as part of a consortium, the ability of the TTP program to support environmentally-threatened communities can be influenced by consortium leadership. In Napakiak, for example, the Association of Village Council Presidents provided $2.5 million to fund a road for a new subdivision in the summer of 2020 that is essential for the retreat of half the community and the construction of a replacement school.

This program's mission must continue to help environmentally threatened communities across the state work to mitigate threats as necessary.

Housing Improvement Program (HIP)

The HIP is a home repair, renovation, replacement, and new housing grant program BIA administers for federally-recognized Indian Tribes, American Indians, and Alaska Natives (AI/AN). BIA HIP is mandated by

Congress to service low-income Tribal members with sustainable housing.The Village of Newtok has used HIP funding to build the first three homes constructed at Mertarvik, the village relocation site. The project cost approximately $600,000 ($200,000 per house). Unfortunately, the demand for HIP funding far exceeds the amount available. In 2019, HIP was only able to meet the needs of roughly one percent of its 1,721 applicants. Consequently, HIP is not a reliable funding source to support communities facing climate change impacts to infrastructure. We recommend increasing the amount of funding regularly allocated to this program every year so more need can be addressed, and, consequently, those with homes uninhabitable because of an environmental threat can use this resource to secure housing.

Denali Commission

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

The Denali Commission (Commission) is an independent federal agency established to support economic development in rural Alaskan communities through the development of critical infrastructure. With the creation of the Denali Commission, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities.

Village Infrastructure Protection Program (VIP)

The Village Infrastructure Protection program (VIP) was created in 2015 when a Presidential Directive tasked the Commission with coordinating the federal response to erosion, flooding, and permafrost thaw in Alaska. Between 2015 and 2019, the Commission awarded $38.9 million to environmentally threatened communities for capacity building, data collection, risk assessments, planning, design, and construction projects. So far, the Denali Commission's Village Infrastructure Protection program funding has been used to leverage an additional $27 million. The VIP program has been the most effective federal program for supporting environmentally threatened communities in Alaska.

Strengths

- The flexibility of Commission funding, due to its broad hazard mitigation-related authorities, clearly provides two primary benefits: first, it enables funding of a community's highest priority mitigation project; and second, it has facilitated projects with cross-cutting programmatic elements that traditional competitive federal programs cannot address. For example, the Commission has been able to invest in all-inclusive community planning for the Newtok relocation—addressing housing, schools, public facilities, transportation, and all associated utilities. In contrast, many other federal programs, limited by program definition and authorities, can only consider investing in specific areas, such as housing, with little or no consideration for other wrap-around services.
- All of the funding decision-makers (seven commissioners) live and work in Alaska and are well-versed in rural Alaska matters. The Presidential Directive did not come with additional funding. However, the commissioners, being aware of the need to support threatened communities, pulled funds from other programs to fund the VIP program.

- Denali Commission staff have historically provided significant technical support to communities. Examples include assisting communities in competitive solicitation processes for technical consultants, active support in the development of awarded projects, and problem-solving support for award recipients. This type of active support is rare with federal funding agencies and is a result of staff and personnel assignments with prior federal experience, project management skills, and rural Alaska field experience.
- VIP grant awards can be used to satisfy non-federal cost-sharing requirements. This has enabled Alaska Native village grantees to meet the otherwise prohibitive match requirements for other federal programs (e.g. FEMA and HUD), leveraging tens of millions of dollars in additional funding to communities.

Barriers and areas for improvement

1. Barrier: The 2015 Presidential Directive envisioned the Commission as the lead agency that would coordinate the federal response to environmental threats in Alaska's rural communities. However, the Directive did not provide the Commission with any additional funding or any authorities to carry out this role. The Commission does not have any statutory authority to guide the activities of other agencies. Similarly, other agencies do not have any obligation to follow the Commission's lead. The lack of authority inhibited the Commission's ability to fill the role of lead coordinator, leaving a coordination and leadership gap in the federal response (GAO, 2022).

   Recommendation: We recommend that Congress establish a formal government framework specifically designed to respond to environmental threats. To inform this discussion, a model framework is outlined in Chapter 6.

2. Barrier: In Fiscal Year 2018, the Commission received an additional $15 million for the VIP program, which agency leadership voted to provide for the development of Mertarvik (the village of Newtok's relocation site). Beyond this one appropriation, funding for the VIP program has been limited, which inhibits the program's effectiveness. Commissioners must redirect funding from other needs to continue to support the VIP program.

   Recommendation: We recommend that the U.S. Congress establish a consistent annual funding amount for the VIP program.

3. Barrier: The Commission's enabling legislation requires a 20% cost share match for construction projects. This limits most communities' ability to access Commission funds for project implementation as they are unable to fund, finance and/or identify a cost share for expensive mitigation projects.

   Recommendation: We recommend amending the Commission's enabling legislation to remove the cost-share requirement for environmental threat mitigation projects.

Department of Agriculture (USDA)

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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Natural Resources Conservation Service (NRCS)

NRCS has two programs that are relevant to addressing environmental threats in Alaska Native villages, the Emergency Watershed Protection Program and the Watershed Program.

Emergency Watershed Protection Program

Overview

The Emergency Watershed Protection (EWP) program, extensively used in Alaska, constructs shoreline protection structures, relocates threatened buildings due to erosion, and moves endangered fuel tank farms. From 2015-2020, seven projects in threatened Alaska Native communities received $8.4 million in funding. Although not a hazard mitigation program, EWP's expert staff assist communities in addressing imminent threats to life and property, aligning with watershed conservation goals.

Strengths

- The EWP is not a typical competitive grant program. Communities do not need to complete a detailed project proposal or application to compete for funding. A letter requesting assistance is sufficient to engage the program.
- After receiving a letter from the community notifying the program of a qualifying environmental event, NRCS staff directly engage with communities, beginning with a site visit to identify risks, define and develop mitigation projects, and subsequently implement those projects. This level of technical assistance is not currently offered by any other federal program. It is a primary driver of the EWP's success in Alaska.

Barriers and areas for improvement

1. Barrier: The program favors small projects in communities with the financial ability to meet cost-share requirements. The cost-share requirement can prevent the EWP from supporting communities with the greatest need. For example, the communities with the most urgent need to relocate buildings away from an eroding shoreline may not have the financial reserves to meet a cost-share requirement.

   Recommendation: We recommend NRCS remove the cost-share requirement for the EWP.

2. Barrier The program requires that an environmental "event" occur for the program to support a community.

   Recommendation: The EWP would be more effective if it offered proactive assistance based on risk, independent of specific environmental events.

3. Barrier: Many environmentally threatened communities are not aware of the EWP program. Additionally, there is limited guidance on program requirements and limitations.

   Recommendation: We recommend that NRCS create a guide to the program's purpose, requirements, and limitations specifically for environmentally threatened Alaska Native communities and distribute it to all threatened communities and relevant Tribal organizations.

4. Barrier: Constraints around eligible costs limit the program's effectiveness. For example, it is often difficult to find suitable locations to which communities can relocate threatened infrastructure. A new, safe, site may need to be constructed to enable the relocation of threatened infrastructure. However, the construction of that new site is not an eligible cost for the EWP.

   Recommendation: The whole-of-government implementation framework recommended in Chapter 6, can help to address this limitation of the EWP.

5. Barrier: The EWP can relocate homes threatened by erosion but cannot cover the cost of connecting homes to utilities, such as power, water, and sewer. Consequently, communities must navigate other hazard mitigation and traditional community development funding sources to piece together funding for utility connections and manage the associated grants and projects. Also, this limitation of the EWP program has forced some families to abandon water and sewer services to save their homes.

6. Barrier: The EWP uses a cost reimbursement model, which requires the project sponsor to provide the construction capital before receiving reimbursement from the NRCS. Most small Alaska communities do not have sufficient cash reserves available to front-fund a reimbursement project. This model disadvantages or excludes financially disadvantaged communities.

   Recommendation: Instead of a cost reimbursement model, recommend the EWP advance funding to communities at project inception.

7. Barrier: The EWP expects projects to be completed within a 220-day completion window that starts when funding is released. This can be a difficult goal to complete in Alaska where a typical summer construction season may last only 4 months.

   Recommendation: We recommend the EWP extend the completion window for projects in rural Alaska.

8. Barrier: Awards are not always available because the EWP program is funded by supplemental appropriations.

Watershed Program

Overview

In 2022, NRCS announced the availability of $39 million to support Alaska communities to address near-term environmental threats through the Watershed Program. Prior to this announcement, the Watershed Program had not been utilized in Alaska for this purpose.

Strengths

- Most of the program design and implementation decision-making lies with Alaska-based staff and leadership. Investments will be made based on risk using the Denali Commission Statewide Threat Assessment.
- The program does not require applications from communities.
- NRCS is expected to support communities to implement projects, such as compliance with funding requirements, planning, and contracting.

Barriers and areas for improvement

1. Barrier: Preliminary community selection was based on community interest during a relatively short time period. Interested high-risk communities were not selected if they did not respond during that time.

   Recommendation: We recommend that investments be made based on the relative level of risk to community infrastructure.

2. Barrier: The program requires a two to three-year planning period prior to design.

   Recommendation: Reducing the extent and duration of planning would enable agency funding to benefit communities faster, accomplishing the goal of addressing near-term threats.

Little is known about the program at this time, including eligible costs, how NRCS planning will integrate with existing community risk assessments and planning, final community selection, funded projects, and implementation methods.

Department of Energy (DOE)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
NRCS Emergency Watershed Protection Program	FEMA Risk Mapping, Assessment, and Planning (Risk MAP)	USGS Pacific Coastal and Marine Science Center
FAA Office of Airports	BIA Tribal Climate Resilience Demonstration Projects	EDA Public Works and Economic Adjustment Assistance Programs
	Army Corps of Engineers programs	EPA Environmental Justice
	HUD Indian Community Development Block Grant Programs (ICDBG) and Community Development Block Grant Programs (CDBG)	EPA Indian General Assistance Program
	NRCS Watershed Program	NOAA National Coastal Resilience Fund
		NOAA Alaska Sea Grant
		NOAA Alaska Center for Climate Assessment and Policy
		NOAA Effects of Sea Level Rise
		BIA Tribal Transportation Program
		BIA Housing Improvement Program
		DOT Infrastructure for Rebuilding America
		DOE Powering Unelectrified Tribal Buildings

We grouped federal programs into three categories based on their observed benefit to environmentally threatened communities.

Effective programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Office of Indian Energy - Powering Unelectrified Tribal Buildings Program

Overview

This program focuses on electrifying Tribal buildings that would otherwise be unelectrified. The program has the potential to support communities to expand electric power distribution systems as part of a managed retreat.

Barriers and areas for improvement:

1. Barrier: The program has a 10% cost-share requirement mandated by statute and therefore, the Office of Indian Energy does not have the discretion to remove the cost-share requirement. Specifically, the statute as amended by the Energy Act of 2020 states the "Secretary of Energy may reduce any applicable cost share required of an Indian Tribe, intertribal organization, or tribal energy development organization in order to receive a grant under this 3 subsection to not less than 10 percent if the Indian Tribe, intertribal organization, or tribal energy development organization meets criteria developed by the Secretary of Energy, including financial need."

   Recommendation: We recommend that the U.S. Congress eliminate the cost-share requirement for small Tribes.

2. Barrier: it is unclear if the design and construction of electric power distribution systems at new subdivisions are an eligible cost.

   Recommendation: We recommend that DOE expand the focus of the program to support the design and construction for the expansion of electric power distribution systems, thereby benefiting communities facing managed retreat and relocation, which need to relocate buildings to electrified areas.

Department of Transportation (DOT)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Infrastructure for Rebuilding America (INFRA)

Overview

The INFRA has $8 billion available across FY 2022 – 2026 for transportation projects. Despite a stated focus on climate change, environmental justice, and racial justice, the program requires a forty percent non-federal cost-share and favors projects with national and regional benefits. None of the 2016 – 2022 investments have benefited Alaska. To be effective in supporting Alaska's environmentally threatened communities, the program would need to identify alternatives to the cost-share requirement and prioritize projects that benefit individual communities with a small populations.

Members of this report's Indigenous and Community Contributors Group consistently shared challenges accessing U.S. DOT programs due to program design requirements and characteristics that disadvantage and exclude rural Alaska.

Economic Development Administration (EDA)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
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Beneficial Programs with Potential:

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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

EDA's purpose and mission do not expicitly include assisting Tribes with environmental impacts to infrastructure. However, several environmentally threatened communities have been able to access EDA funding for protection-in-place, managed retreat, and relocation.

Public Works and Economic Adjustment Assistance Programs

New job creation is a requirement of the Public Works and Economic Adjustment Assistance Program. EDA has provided one relevant award in Alaska: In 2007, the State of Alaska and the Village of Newtok received an $8 million EDA award for a barge landing and staging area at Mertarvik. This was the first infrastructure project developed at Mertarvik and set the stage for future community development. The purpose of the EDA grant was to support local fishermen and their small businesses. At the time of writing, EDA announced funding for Chefornak to design a new barge landing to replace the current structure, which is threatened by erosion and flooding. The Chefornak project is the second design project the program has funded.

American Rescue Plan Indigenous Communities Program

One-time funding from the American Rescue Plan enabled EDA to award $100 million through the American Rescue Plan Indigenous Communities program. This was a competitive grant program. One grant was made to an environmentally threatened community in Alaska. Huslia Village was awarded funding to construct an electric power distribution system for the managed retreat away from the eroding Koyukuk River.

Environmental Protection Agency (EPA)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
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BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Environmental Justice Small Grants

The Environmental Justice Small Grants (EJSG) program could be utilized to support data collection, risk assessments, and planning. However, the maximum award amount of only $30,000 prohibits most meaningful projects due to the high cost of data collection, travel, and planning.

EJ Collaborative Problem-Solving Cooperative Agreement Program (CPS)

This program can support planning efforts to address environmental and public health issues using EPA's "Environmental Justice Collaborative Problem-Solving Model." This program favors regional projects, which is incongruent with the need for site-specific data, analysis, and planning. Furthermore, the program only awards one $120,000 project per EPA region—EPA Region 10 includes Alaska, Idaho, Oregon, and Washington. Due to the program's competitiveness and its exclusions of most community-specific needs, the CPS program is not expected to be effective for environmentally threatened communities.

The Environmental Justice Thriving Communities Technical Assistance Centers (EJ TCTAC) Program

This new program will establish technical assistance centers across the nation to provide technical assistance, training, and related support to communities with environmental justice concerns. Two Alaska Native Tribal Health Consortium programs considered applying, but did not due to the agency's requirement that the technical assistance center serve all four states in EPA Region 10.

Indian General Assistance Program (IGAP)

The goal of GAP is to assist Tribes and intertribal consortia in developing the capacity to manage their environmental protection programs and to develop and implement solid and hazardous waste programs in accordance with individual Tribal needs and applicable federal laws and regulations. Eligible activities include planning and developing the capacity to implement environmental protection programs administered by EPA and the implementation of solid and hazardous waste programs. In Alaska, there are over 230 active GAP programs.

In Fiscal Year 2020, awards to Alaskan Tribes ranged from $75,000 to $125,000. Alaska Native Tribal Health Consortium, which partners closely with GAP-funded Tribal environmental professionals, has observed that environmentally threatened communities typically do not use GAP funding for protection-in-place, managed retreat, and relocation activities. Doing so can eliminate the Tribe's only existing capacity to address other critical environmental challenges, such as recycling and the backhaul of hazardous waste. A funding increase could allow the existing environmental programs in communities to remain and simultaneously increase communities' ability to conduct low-cost climate change activities, such as erosion, permafrost, and flood monitoring. However, increasing funding to the BIA Tribal Resilience Program, which is designed specifically to address environmental threats to infrastructure, is likely a more effective action.

Environmental and Climate Justice Block Grant Program

EPA announced the creation of a new $3 billion environmental and climate justice funding program. At the time of writing, it is unclear if the program will benefit Alaska's environmentally threatened communities to address climate and environmental threats to infrastructure.

Federal Aviation Administration (FAA)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
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Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Office of Airports

Overview

The Federal Aviation Administration (FAA) Office of Airports (ARP) has been effective at providing funding to develop and sustain aviation infrastructure in environmentally threatened communities, including both protecting existing airports at their current location or replacing critically threatened airports. We have observed that funding exists for this purpose and that FAA and the agency's partners have been largely successful in proactively mitigating environmental threats to airports. The primary funding source is the FAA Airport Improvement Program (AIP) in combination with supplemental appropriations funding.

Strengths

- FAA's system for protecting airports is successful in part because airport sponsors, including the State of Alaska Department of Transportation, have the capability and capacity to develop applications for FAA funding, and to design and implement large capital projects.
- The responsibility of securing funding and managing projects to protect the airport often lies with an entity outside the community, with existing grant management and project implementation experience and capacity. This greatly benefits small communities that do not have similar local capacity. (However, this can be a barrier if the community is not effectively engaged during project development and implementation).
- Examples of successful FAA investments in threatened communities include a new $45 million airport in Mertarvik to support Newtok's relocation to the new community and a $9 million shoreline protection in Shishmaref to protect the west end of the airport.

Barriers and areas for improvement:

1. FAA funding only protects airport infrastructure. Communities are responsible for protecting adjacent land and infrastructure. Also, due to the requirements and timelines of disparate funding sources, it can be difficult to coordinate FAA-funded projects with community projects and harness economies of scale through collaborative projects.
2. FAA funding cannot be used to repair damage from natural events and disasters. For example, if a storm floods an airport or damages a rock revetment that protects an airport, FAA funding cannot support a quick-fix solution.
3. These barriers and limitation can be addressed by the U.S. Congress implementing this report's recommendation to close the funding gap by providing a single, committed funding source for Alaska communities to protect-in-place, retreat, or relocate to new community sites and create a whole-of-government implementation framework to systematically support Alaska communities to address environmental threats. See the Executive Summary, Chapter 4, and Chapter 6 for more information.

Federal Emergency Management Agency (FEMA)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
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Effective programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

FEMA operates two disaster prevention programs under its Hazard Mitigation Assistance (HMA) division:

1. The Building Resilient Infrastructure and Communities program (BRIC) program has enormous potential to support Alaska communities due to the large amount of funding available nationwide. Approximately $2.3 billion was available in Fiscal Year 2022.

2. The Hazard Mitigation Grant Program (HMGP) provides pass-through funding administered by the State of Alaska Division of Homeland Security and Emergency Management (DHS&EM). The amount available annually depends on the dollar value of recent Presidentially-declared disasters in Alaska. The State of Alaska contributes the required non-federal cost share, which makes the program more accessible to environmentally threatened communities if all other FEMA requirements can be met. FEMA states that at least 40 percent of the benefits of the BRIC program will go towards disadvantaged communities, per the Administration's Justice40 Initiative. However, both BRIC and HMGP face a large number of program design and regulatory barriers that disadvantage and exclude Alaska Native communities. Approximately $5 million in FY 2018 FEMA funding was awarded to environmentally threatened communities in 2019. This is approximately five percent of the estimated annual need. There were no FY 2021 BRIC awards in Alaska.

FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) program provides technical assistance to communities and can fund risk assessments. To date, limited funding has been allocated to environmentally threatened Alaska Native communities for risk assessments.

Finally, the Flood Mitigation Assistance (FMA) Program is not effective for environmentally threatened communities. Most Alaska Native villages are not able to participate in the National Flood Insurance Program (NFIP) and, therefore, cannot receive funding from the FMA program.

Hazard Mitigation Assistance (HMA) Programs

Strengths

- FEMA programs have significant funding available to address impacts to infrastructure.
- Projects can be funded in amounts up to $50 million. The higher cap makes more construction projects eligible without needing to break them into pieces to fit within funding requirements.
- An applicant is not limited in the number of applications that can be submitted for consideration.

Barriers and areas for improvement

1. Barrier: Communities are required to provide ten percent of total project costs from non-federal sources for applications to FEMA for the BRIC program. This requirement makes the BRIC program inaccessible to most Alaska Native villages, which cannot afford to meet the match requirement.

Recommendation: We recommend removing the 10 percent cost share requirement for small and impoverished communities: 95 percent of Alaska's environmentally threatened communities meet FEMA's definition of a "small and impoverished community."

2. Barrier: FEMA requires that cities and Tribes have a FEMA-approved Hazard Mitigation Plan (HMP) at the time of application to the BRIC program and at the time of award with the HMGP program. The purpose of an HMP is to demonstrate to FEMA that the proposed project(s) align with the hazards in the community. However, this requirement prevents communities from accessing FEMA funding. According to data from the State of Alaska, as of September 2022, only 57 of the 229 Tribes in Alaska (25%) were eligible to apply directly to FEMA for funding due to the Hazard Mitigation Plan requirement. The agency has provided insufficient technical assistance and financial resources to support Alaska communities in meeting its requirement to maintain active Hazard Mitigation Plans (HMP). Due to the large number of procedural and content requirements for a FEMA-approved HMP, Alaska communities rarely have the capacity to develop HMPs on their own (see Chapter 5 for more information on local capacity and technical assistance). Applying directly to FEMA for HMP funding is a significant barrier for Alaska communities and, if awarded funding, communities must manage both the funding and a consultant to develop the HMP. Furthermore, the only eligible activities that Tribes can apply for under BRIC without an HMP are mitigation planning activities under the Capability and Capacity Building category. Project scoping, design, and construction are not eligible.

"Tribal Nations must be made eligible for existing and future federal natural resource and disaster resilience funding programs for which states are eligible, but from which Tribal Nations are currently, or might be, excluded."

- National Congress of American Indians Resolution SAC-21-036

Recommendation: We recommend FEMA provide funding and technical assistance to complete FEMA-approved Hazard Mitigation Plans for all Alaska communities or provide exemptions to the Hazard Mitigation Plan requirement to enable communities to access FEMA funding.

At least three million dollars of non-competitive funding and technical assistance to complete Hazard Mitigation Plans will enable both City and Tribal government in every community to be eligible for FEMA HMA funding without requiring communities to apply for or manage funding or planning consultants. This could be completed in partnership with the State of Alaska, through FEMA staff, FEMA contractors, and other methods. The State of Alaska has been successful in supporting communities with HMPs, including managing FEMA funding and consultants that develop HMPs with communities. However, only $1 million of the $2 million FY 2022 BRIC State Set-Aside can be utilized for Hazard Mitigation Plans. That amount would enable approximately 33 HMPs per year, which is not enough to quickly enable the remaining 170 Tribes to become eligible for HMA funding.

Alternatively, FEMA could apply the exception of 44 CFR § 201.6 (a)(3) to all environmentally threatened Alaska Native communities that do not have a FEMA-approved Hazard Mitigation Plan. 44 CFR § 201.6. Local Mitigation Plans (a)(3) provides that Regional Administrators may grant an exception to the HMP requirement in extraordinary circumstances "such as in a small and

impoverished community" when justification is provided. In these cases, the HMP must be completed within 12 months of the award of the project grant. FEMA could enable all Alaska Native communities to apply through this exemption while simultaneously providing funding and technical assistance to complete the agency's Hazard Mitigation Plan requirement.

> *"Indigenous Peoples must have direct, open access to funding, capacity-building, and other technical assistance, with their free, prior and informed consent, to address the immediate and long-term threats from climate change. Tribal Nations should have the ability to designate a Tribal organization to apply for FEMA tribal pre-hazard mitigation program funding to deliver federal services and programs to the Tribal Nation or Tribal Nations."*
>
> - National Congress of American Indians Resolution SAC-21037

3. Barrier: Currently, HMPs expire after five years.This is a major barrier to accessing FEMA funding because every community in Alaska must complete a HMP every five years to be eligible for funding. We recommend extending the duration of HMPs from five years to ten years. This extension reduces barriers to accessing funding and decreases FEMA expenditures.

4. Barrier: FEMA HMA programs do not allow Tribal organizations to apply for funding. Due to the limited administrative capacity in some communities (see Chapter 5), most funding for rural infrastructure in Alaska flows to technical assistance organizations at the regional and statewide scale. For example, federal housing funding is implemented by regional housing authorities, and water and sanitation infrastructure funding is managed by the State of Alaska and Alaska Native Tribal Health Consortium.

   Recommendation: We recommend enabling Tribal organizations to apply for and manage FEMA grants and be eligible through the State of Alaska Hazard Mitigation Plan. Currently, FEMA allows other organizations to support community projects, but the community must be the applicant.

5. Barrier: It is critical to ensure that federal investments in hazard mitigation are effective and efficient. However, FEMA's method of assessing cost effectiveness through the agency's benefit-cost analysis is a major barrier to applying for FEMA funding. Small communities often do not have the administrative capacity to complete the benefit-cost analysis requirement. Therefore, communities may need to secure funding to pay a consultant or receive other technical support to complete the benefit-cost analysis. Additionally, the FEMA benefit-cost analysis requirement disadvantages all Alaska communities due to (1) the very high cost of construction in Alaska, and (2) the low appraised value of infrastructure in rural Alaska.

   Recommendation: Instead of mandating communities to adhere to the agency's cost-effectiveness requirement, we suggest that FEMA take responsibility for conducting benefit-cost analyses for projects in "economically disadvantaged rural communities." This approach promotes fairness and aligns with the practices of other agencies in Alaska, such as the USDA Natural Resources Conservation Service and the U.S. Army Corps of Engineers, which already conduct benefit-cost analyses for their hazard mitigation investments.

Furthermore, FEMA should adapt the benefit-cost analysis methodology to account for Alaska's unique conditions, including the elevated project costs and the lower appraised value of rural Alaskan infrastructure.

Finally, an alternative to evaluating cost-effectiveness evaluation is to remove the benefit-cost analysis for "economically disadvantaged rural communities" and implement a simpler method to ensure that federal hazard mitigation investments in "small and impoverished communities" are effective and efficient.

6. Barrier: The BRIC program has $50 million cost cap for construction projects. However, the FY22 BRIC program had a $2 million cost cap for planning activities under the Tribal Set-Aside. Planning complex solutions such as a new site for managed retreat and relocation can cost millions of dollars.

   Recommendation: We recommend removing the Tribal Set-Aside cost cap for the Capability and Capacity Building category to support communities to conduct necessary risk assessments, planning, and architectural and engineering design faster than the $2 million phases would allow.

7. Barrier: BRIC's emphasis on investing in projects proposed by applicants who adopt and enforce mandatory building codes—a priority for the program according to page seven of the Fiscal Year 2022 Notice of Funding Opportunity—disadvantages Alaska communities because building codes largely do not exist in rural Alaska.

   Recommendation: The presence or absence of building codes in small, remote, Indigenous communities should have no impact on whether a mitigation project is selected for funding. Do not include building codes in the BRIC program's technical evaluation criteria for "small and impoverished" communities. Minimum building standards could be applied to the project award.

8. Barrier: FEMA's HMA guidance, which defines eligible project costs, excludes the majority of activities necessary for managed retreat and relocation. We provide two examples:

   When homes are threatened by erosion, FEMA can fund the relocation of a structure to an existing developed site, but it cannot support the construction of community-wide infrastructure that must be developed before relocating the structures. For example, the community must seek alternative funding sources for roads, water and sewer, and electric utilities.

   The HMA Guidance prevents funding the replacement of structures that cannot be relocated. In many communities, the only viable solution to protect community infrastructure is to replace it new. For example, inhabited, overcrowded homes that are in structurally unstable "condemned" conditions cannot be relocated. The only option is to construct new homes. Similarly, a replacement can be the only effective option to preserve fuel tank farms with failing foundations due to permafrost thaw or erosion.

Recommendation: We recommend that HMA guidance be updated to enable programs to meet the needs of environmentally threatened communities.

9. Barrier: Applying for FEMA HMA grants can be extremely time and cost-intensive. According to the former Pre-Disaster Mitigation program manager at the State of Alaska Division of Homeland Security and Emergency Management, it takes an average of 200 hours to apply for a FEMA HMA grant. This does not include the time or cost required to develop a fundable project (e.g., scope, schedule, and budget).

   Recommendation: We recommend that FEMA provide staff based in Alaska to provide technical assistance to Alaska communities to develop applications for HMA programs.

10. Barrier: FEMA does not have a strategic approach to funding investments based on risk.

    Recommendation: We recommend implementing risk-informed funding using locally developed criteria to allocate resources to the areas of greatest need. For example, the 2019 Denali Commission Statewide Threat Assessment could be incorporated into FEMA HMA scoring criteria to allocate supplemental points to Alaska communities identified in Groups 1 and 2 for erosion, flooding, and permafrost degradation. This way, communities can be prioritized based on the level of risk.

11. Barrier: The money spent in the aftermath of disasters is disproportionate to the amount spent on disaster prevention. For example, the amount of money put into the BRIC program is based on a percentage (6%) of previous disaster expenses. Funding to prevent disasters should not simply be based on the most recent disaster.

    Recommendation: We recommend that the amount of funding available for programs such as BRIC be based partly on the expected benefits of mitigating future disasters. Assuming a return on investment of 13 to one (NIBS, 2021), supporting all environmentally threatened communities to meet the expected cost of hazard mitigation projects for existing infrastructure over the next 50 years will save the federal government $26 billion.

Risk Mapping, Assessment and Planning (Risk MAP) Program

Strengths

- The program is designed specifically to address data collection and risk assessments for flooding.
- The program funds a planning position at the State of Alaska that has been instrumental in providing technical assistance and coordination activities, connecting communities to resources, and facilitating interagency partnerships.
- The largest financial investment to date was a multi-million investment in lidar data collection for dozens of communities.

Barriers and limitations

1. Barrier: The average cost of a Cooperating Technical Partners (CTP) project is generally in the $50,000 to $250,000 range.
   Recommendation: We recommend that Risk MAP prioritize larger investments in Alaska data collection and risk assessments that benefit multiple communities.

2. Barrier: The program has limited funding available for FEMA Region 10.

   Recommendation: We recommend increasing funding for Region 10.

Flood Mitigation Assistance (FMA) Program

Barriers and limitations

1. Federal law governing the National Flood Insurance Program (NFIP) do not recognize unincorporated Alaska Native villages in Alaska's unorganized borough as eligible units of general local government.

2. Small, remote, rural Alaskan communities may lack the resources and administrative capacity needed to administer NFIP requirements.

3. NFIP premiums are often too high for residents of remote, rural communities (GAO, 2013). FEMA's NFIP regulations define a community as any state or area or political subdivision thereof or any Indian Tribe or authorized tribal organization, or Alaska Native Village or authorized native organization, that has the authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction. However, Tribes in Alaska generally do not have the authority to enact land ordinances due to the Alaska Native Claims Settlement Act, which revoked all but one Indian Reservation in Alaska (GAO, 2013). As a result, the 45.5 million acres of land transferred under ANCSA no longer serve as a basis for tribal jurisdiction (Landreth & Dougherty, 2011). Since the ability to have jurisdiction over land use (authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction) is a basic requirement of NFIP participation, the 64 federally recognized Tribes in Alaska's unorganized borough that are not co-located with a city government are not eligible to participate in the NFIP (GAO, 2013).

4. Even when an Alaska Native village in the unorganized borough is co-located with a city government with legal authority to regulate land use, participation in the NFIP can be administratively burdensome and costly. The development and enforcement of floodplain management ordinances require dedicated staff that most small, remote communities do not have. Also, many Alaska Native villages do not have a tax base and are based on a mixed cash-subsistence economy, which makes payment of NFIP premiums infeasible (GAO, 2013).

NFIP-participating communities who have been mapped and identified as having a Special Flood Hazard Area but choose to no longer participate in the NFIP are subject to sanctions. FEMA-imposed sanctions under the NFIP may include an added premium for each flood insurance policy sold or renewed in the community, a suspension on new policy purchases and existing policy renewals, and ineligibility for certain types of disaster assistance (GAO, 2013).

Housing & Urban Development (HUD)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
NRCS Emergency Watershed Protection Program	FEMA Risk Mapping, Assessment, and Planning (Risk MAP)	USGS Pacific Coastal and Marine Science Center
FAA Office of Airports	BIA Tribal Climate Resilience Demonstration Projects	EDA Public Works and Economic Adjustment Assistance Programs
	Army Corps of Engineers programs	EPA Environmental Justice
	HUD Indian Community Development Block Grant Programs (ICDBG) and Community Development Block Grant Programs (CDBG)	EPA Indian General Assistance Program
	NRCS Watershed Program	NOAA National Coastal Resilience Fund
		NOAA Alaska Sea Grant
		NOAA Alaska Center for Climate Assessment and Policy
		NOAA Effects of Sea Level Rise
		BIA Tribal Transportation Program
		BIA Housing Improvement Program
		DOT Infrastructure for Rebuilding America
		DOE Powering Unelectrified Tribal Buildings

We grouped federal programs into three categories based on their observed benefit to environmentally threatened communities.

Effective programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Indian Community Development Block Grant (ICDBG) and Community Development Block Grant (CDBG)

Overview

The HUD Office of Native American Program (ONAP) operates the Indian Community Development Block Grant (ICDBG) program to assist Tribes with community and economic development. The program is not intended to address environmental threats. However, ICDBG has supported some environmentally threatened communities with protection-in-place, managed retreat, and relocation. Additionally, following an emergency, disaster, or other major contingency, Congress has sometimes enacted supplemental appropriations to the ICDBG program. In response to the COVID-19 pandemic, for example, the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020 appropriated $100 million for the ICDBG-CARES program to address community and economic impacts of the pandemic. Additionally, the American Rescue Plan Act of 2021 included $280 million in supplemental ICDBG funds (ICDBG-ARP), to prepare for and respond to imminent threats posed by the coronavirus. Both the ICDBG-CARES and ICDBG-ARP programs benefited some of Alaska's environmentally threatened communities with the capacity to develop and implement projects, and submit grant applications. Finally, the ICDBG-Imminent Threat grant program, which can support Tribes to address immediate threats to the health and safety of the entire community, has been used by several communities to address environmental threats.

The HUD Community Development Block Grant (CDBG), administered by the State of Alaska Division of Community and Regional Affairs, has the potential to benefit environmentally threatened communities. Similar to the FEMA HMGP, which is administered by the State of Alaska Division of Homeland Security and Emergency Management, barriers and areas for improvement with the CDBG program lie at the federal level, not at the state level.

Strengths

- HUD is one of the only existing federal funding sources designed to support the construction of new housing and community infrastructure in Tribal communities. If the ICDBG program had more funding, the agency could be an instrumental financial resource for managed retreat and relocation.
- HUD ONAP and the State of Alaska Division of Community and Regional Affairs has significant Alaska-based staff that provide technical assistance to interested applicants and award recipients.

Barriers and areas for improvement

1. Barrier: The existing amount of ICDBG funding is far below what is necessary to meet the community development needs in rural Alaska communities, not to mention addressing environmental threats. The annual ICDBG program allocated approximately $8 million to $9 million annually to Alaska in FY 2019, FY2020, and FY2022. The ICDBG program is highly competitive due to the limited funding. For example, there were 230 eligible entities in Alaska for the $7.9 million of FY 2019 ICDBG funding.

Recommendation: We recommend increasing the amount of funding to the ICDBG program to not only address existing infrastructure deficiencies but also to address environmental threat mitigation.

2. Barrier: The ICDBG and CDBG programs require extensive, difficult grant applications that communities often cannot complete. The grant applications are significant barriers to accessing funding, resulting in allocating resources to the projects with the best grant applications, not to the areas of greatest need.

   Recommendation: We recommend that HUD significantly simplify the ICDBG and CDBG program applications.

3. Barrier: Although we recommend that investments to address environmental threats are made based on the relative level of risk at the community level, the ICDBG and CDBG programs are intended to support a wide range of community development needs.

   Recommendation: HUD's mandate could be broadened to include hazard mitigation activities so that the agency can better assist communities seeking to protect themselves or relocate in the face of natural disasters. If that were to occur, we recommend that HUD prioritize investments based on environmental risk.

4. Barrier: The legislation and regulations authorizing ICDBG and CDBG grants do not specifically provide for hazard mitigation activities like structure elevation and relocation, but such activities might fall within the permissible category of "rehabilitation." This definition could be amended to provide for all hazard mitigation activities.

5. Barrier: ICDBG program requirements disadvantage small communities with limited administrative capacity. For example, many communities new to administering infrastructure development projects may not yet have the policies and procedures, procurement requirements, and code of conduct that are required by HUD. Further, the capacity of the applicant is a significant scoring criterion that can prevent threatened communities from scoring competitively. These barriers increase the effort required to apply and prevent communities from receiving funding.

   Recommendation: We recommend HUD review the ICDBG scoring criteria to assess and remove barriers for small Tribal communities with limited local administrative capacity.

6. Barrier: ICDBG and CDBG funding programs prohibit the purchase of equipment, which is often the critical component necessary for communities to repair damage from storms, relocate threatened homes, and build protective structures such as gravel berms and dikes.

   Recommendation: We recommend that the purchase of equipment be an allowable cost for threatened communities.

7. Barrier: Immediate benefit requirements impacted Kotlik and Napakiak retreat projects, hindering vital infrastructure creation. Though gravel roads and house pads were planned, lack of funding for relocating buildings and essential support systems, such as the power distribution, raised scrutiny.

   Recommendation: HUD could expand its timeline for evaluating project benefits to five years for all Community Block Development Grants. This change would enable more hazard mitigation projects to meet agency requirements and score competitively.

8. Barrier: HUD mandates ICDBG-funded housing projects to be managed by CBDOs, posing challenges when these organizations lack capacity. While they handle various programs, expanding or outsourcing housing projects to address community environmental issues is difficult.

   Recommendation: We recommend that HUD identify ways to enable new home construction when the capacity at CBDOs does not exist.

9. Barrier: The ICDBG Imminent Threat (IT) program, which provides emergency funding to address immediate threats to community-wide health and safety, requires that applicants complete an environmental review before submitting a grant application. This barrier can prevent Alaska Native villages from applying because they do not have the capacity to complete the environmental review.

   Recommendation: We recommend that HUD allow IT applicants to complete environmental reviews at the time of award.

10. Barrier: The ICDBG-IT program has a cost cap of $450,000 for disasters that are not Presidentially-declared and $900,000 for Presidentially declared. We have observed that recovery funding is typically available for Major Disasters. However, there is often little to no other federal funding to support small disasters and the $450,000 IT cost cap is insufficient for most rural Alaska construction projects.

    Recommendation: We recommend increasing the cost cap for non-Presidentially declared disasters—including erosion, flooding, and permafrost degradation—to enable communities to implement solutions.

11. Barrier: The CDBG program requires a 25% match. This disadvantages and excludes Alaska Native villages.

    Recommendation: We recommend removing the match requirement to enable the program to provide 100% federal funding.

12. Barrier: In Fiscal Year 2022, the CDBG had $2.5 million available for Alaska. This amount is far below what is necessary to meet the community development needs in rural Alaska communities, not to mention addressing environmental threats.

    Recommendation: We recommend increasing CDBG funding for Alaska.

National Oceanic & Atmospheric Administration (NOAA)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
BIA Tribal Climate Resilience Annual Awards	FEMA Hazard Mitigation Grant Program (HMGP)	USGS Alaska Climate Adaption Science Center
NRCS Emergency Watershed Protection Program	FEMA Risk Mapping, Assessment, and Planning (Risk MAP)	USGS Pacific Coastal and Marine Science Center
FAA Office of Airports	BIA Tribal Climate Resilience Demonstration Projects	EDA Public Works and Economic Adjustment Assistance Programs
	Army Corps of Engineers programs	EPA Environmental Justice
	HUD Indian Community Development Block Grant Programs (ICDBG) and Community Development Block Grant Programs (CDBG)	EPA Indian General Assistance Program
	NRCS Watershed Program	NOAA National Coastal Resilience Fund
		NOAA Alaska Sea Grant
		NOAA Alaska Center for Climate Assessment and Policy
		NOAA Effects of Sea Level Rise
		BIA Tribal Transportation Program
		BIA Housing Improvement Program
		DOT Infrastructure for Rebuilding America
		DOE Powering Unelectrified Tribal Buildings

We grouped federal programs into three categories based on their observed benefit to environmentally threatened communities.

Effective programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

NOAA has four relevant programs that are relevant to environmentally threatened communities in Alaska.

National Fish & Wildlife Foundation (NFWF) National Coastal Resilience Fund (NCRF) Overview

The first of which is the National Coastal Resilience Fund. NCRF restores, increases, and strengthens natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife. Projects must benefit both the protection of communities and fish and wildlife habitats.

Strengths

- Between 2018 and 2022, the NCRF has made over $10 million in awards that benefit Alaska's environmentally threatened communities.
- The NCRF has made several significant grant awards to Alaska, including decommissioning infrastructure in Newtok, constructing a storm surge berm in Shaktoolik, supporting a large project to collect baseline flood and erosion data and community-specific risk assessments, and relocating threatened homes in Napakiak and Kotlik.
- The NCRF can fund the purchase of equipment. The organization's $1 million award to the Native Village of Shaktoolik provided $500,000 to purchase two off-road dump trucks and a water truck to construct and vegetate the community's sand and gravel storm surge berm.

Barriers and areas for improvement

1. Barrier: the NCRF does not have a strategic approach to funding investments based on risk.

   Recommendation: We recommend implementing risk-informed funding using locally developed criteria to allocate resources to the areas of greatest need. For example, the 2019 Denali Commission Statewide Threat Assessment could be incorporated into NCRF scoring criteria to allocate supplemental points to Alaska communities identified in Groups 1 and 2 for erosion, flooding, and permafrost degradation. This way, communities can be prioritized based on the level of risk.

2. Barrier: The NCRF issues a call for voluntary project reviewers and does not have an effective technical review process to assess project methods and costs. Consequently, the program has invested in projects with unreasonably high costs and uncertain technical feasibility.

   Recommendation: We recommend improving the project review process to include Alaska-based coastal hazard experts and enable a robust evaluation of technical feasibility and the reasonableness of proposed project costs.

3. Barrier: A minimum 1:1 non-federal match in cash or in-kind services is strongly encouraged for NRCF projects. This discourages communities from applying and if factored as part of the merit review can discourage communities
   Recommendation: We recommend that the U.S. Congress revise the program's enabling legislation to

remove the cost-share requirement for small economically disadvantaged communities.

4. Barrier: The NCRF prioritizes natural infrastructure over hardscape infrastructure (e.g. rock revetments) and has discouraged investments in managed retreat projects that relocate infrastructure.

   Recommendation: Managed retreat should be considered a nature-based solution and be evaluated equally with nature-based protection-in-place solutions.

Alaska Center for Climate Assessment and Policy

Alaska Center for Climate Assessment and Policy (ACCAP) was established in 2006 as one of 11 NOAA-funded Regional Integrated Sciences and Assessment (RISA) programs. ACCAP's purpose is to conduct interdisciplinary research to inform resource management, planning, and public policy, and to build the capacity to prepare for and adapt to climate change. While the organization contributes value in creating regional and statewide resources, Western science largely does not benefit Alaska Native villages in the development of actionable resilience projects at the local level. A recent survey of environmental planning training participants from the Institute for Tribal Environmental Professionals (ITEP) and ANTHC found that current Western science is not useful for Tribal adaptation planning in Alaska (Kettle et al. 2019). According to survey respondents, the regional scale of most climate science is not effective for their community planning, is difficult to understand, and is hard to access. Seventy-five percent of the survey respondents agreed that more detailed and locally-specific Western climate science is needed for their adaptation planning efforts.

Adaptation Sciences (AdSci) Program

The Adaption Sciences (or AdSci) Coastal Resilience program element is designed to support partnerships and engagement in the development and transfer of climate-related research and information. Although Tribes and Tribal organizations are eligible to apply for the program, the results of past research and the education and experience of the applicant are key scoring criteria. As such, the program appears to favor funding academic scientists, commercial organizations, and non-profit research entities over community-based researchers. Although the AdSci Coastal Resilience program element is described as addressing the needs of decision-makers at various levels dealing with complex climate-related issues in coastal and marine environments, it appears difficult to utilize this program to address the practical science needs in threatened communities. For example, it is unclear how a community-based researcher could access this program to secure a private sector engineering consultant to conduct the research and analysis needed for hazard modeling and identification of adaptation options under rapidly changing climate conditions.

Effects of Sea Level Rise

The Effects of Sea Level Rise program is a multidisciplinary research program that co-develops science products with coastal managers to identify local coastal vulnerability and solutions to mitigate flood risk.

Although these are relevant issues for all environmentally threatened Alaska Native communities, none of the current or past project awards have engaged Tribes in the co-development of science products or directly benefited environmentally threatened Alaska Native communities. Overall, it appears that the research program is difficult for Tribes and Tribal Organizations to directly access and utilize to address priority needs for site-specific data collection and analysis.

Alaska Sea Grant

The Alaska Sea Grant program is one of 33 Sea Grant programs nationwide and conducts research, education, and outreach to improve the health of coastal resources in Alaska. The coastal community resilience program has one full-time staff, a Coastal Community Resilience Specialist, who focuses on designing and facilitating community resilience workshops and assisting Tribes with climate adaptation planning. Additionally, Sea Grant has made small grant awards to researchers studying coastal erosion. With one staff and minimal funding, Alaska Sea Grant has not been a significant source of technical or financial assistance for threatened communities statewide.

National Science Foundation (NSF)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
Denali Commission Village Infrastructure Protection	FEMA Building Resilient Infrastructure and Communities (BRIC)	NSF
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We grouped federal programs into three categories based on their observed benefit to environmentally threatened communities.

Effective programs:

Characteristics of effective programs include providing large investments in a single community at one time (e.g. $15 million for housing at a community's relocation site), supporting dozens of communities, and having Alaska-based staff that provide robust technical assistance with project development and implementation.

Beneficial Programs with Potential:

Programs included in the "beneficial" category have supported communities with hazard data collection, vulnerability and hazard assessments, community planning, and infrastructure development, but which also have significant policy and programmatic barriers that currently prevent these programs from being more effective for Alaska Native villages.

Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Overview

The National Science Foundation programs tend to offer funding opportunities to academic applicants and do not present many (if any) funding opportunities to Tribes, Tribal organizations, or other related stakeholders that could help further efforts to improve the status of environmentally threatened communities in Alaska. Two examples of relevant NSF programs are Navigating the New Arctic and Coastlines and People, briefly described below.

Navigating the New Arctic (NNA)

Although the goal of the NNA program aligns with the needs of threatened communities, the program is not yet designed or administered such that funding is accessible to Alaska Native communities for practical science. The program does not achieve its stated purpose of enabling research that informs and enables resilient and sustainable communities. Between 2017 and 2019 the NNA program funded 48 projects totaling $40,212,234. Of that amount, $12.2 million has been awarded to Alaska-based organizations. One awarded project and a portion of another--$540,171 or 1.3 % of awarded NNA funding--are estimated to directly support Alaska Native villages in addressing environmental impacts to infrastructure during that time. Four Alaska Native organizations have submitted two letters to NSF regarding the barriers and improvements to the NNA program. The first letter is available at https://kawerak.org/natural-resources/knowledge-sovereignty/. The second letter is available at https://www.aleut.com/wp-content/uploads/2022/01/NNA-Follow-Up-Letter-Final_20Dec21.pdf. At the time of writing, NSF has not made substantive changes to address the recommendations from Alaska Native organizations.

Coastlines and People

The NSF Coastlines and People program has many of the same characteristics as the NNA program. The primary barrier is it favors academic applicants, which makes it difficult for communities to access data collection and analysis to understand hazards and develop solutions. In 2021, NSF declined a $20 million project to address coastal hazards from Alaska-based partners. In 2022, NSF awarded a $20 million project to Haskell Indian Nations University that includes a social science component in Alaska, However, the project does not include community-specific hazard data collection and analysis recommended in this report.

U.S. Geological Survey (USGS)

Observed Benefit of Federal Programs for Alaska's Environmentally Threatened Communities

Effective Programs	Beneficial Programs with Potential	Other Relevant Programs
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Beneficial Programs with Potential:

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Other Relevant Programs:

A variety of other relevant programs have supported projects that address environmental impacts to infrastructure or have the potential to.

Alaska Climate Adaption Science Center (CASC)

USGS operates the Alaska Climate Adaption Science Center (CASC), which focuses on providing climate data to land management and other entities to support decision-making. Although highly valuable for natural resource management, CASC services and products have been of relatively limited benefit for communities striving to address climate impacts to infrastructure. While the CASC mission does not explicitly address infrastructure, their work related to climate impacts on fish and wildlife can be applied in the context of infrastructure needs and they have funded other relevant USGS work. USGS has an active $211,186 project funded through an internal CASC competition that is completing coastal inundation modeling for three Alaska communities. FY22 funding from Typhoon Merbok Disaster Supplemental Appropriations ($7M over three years) has enabled the expansion of flood modeling efforts to an additional 15 coastal communities.

Pacific Coastal and Marine Science Center (PCMSC)

USGS has an active $211,186 project funded through an internal CASC competition that is completing coastal inundation modeling for several Alaska communities in Norton Sound. USGS PCMSC staff have significant expertise with coastal modeling. However, the active project is supporting communities with existing topographic data—not the communities with the highest risk who do not yet have access to inundation modeling. In the future, USGS could scale its inundation modeling services to support additional Alaska communities.

APPENDIX D.
Summary of Former Relevant State of Alaska Programs

Early Efforts to Address Erosion and Flooding in Alaska Native Communities

Efforts to address the impacts of environmental threats in Alaska Native communities have been an ongoing process in Alaska since at least the early 1980s when the Alaska Department of Community and Regional Affairs[1] contracted the preparation of a report, ***"A Listing of Alaskan Communities for Documentation of Erosion Problems"***[2]. Although the report included every community in the state, sixty-eight percent (169 of 248) of the communities identified as impacted by erosion and flooding were Alaska Native villages.[3] In 1983, an ***Erosion Control Task Force*** was appointed by the State of Alaska to investigate and inventory potential erosion problems on a statewide basis, prioritize the erosion problem sites by severity and need, and provide preliminary design plans where immediate remedial action is required.[4] Sites were rated based on public safety, public property, private property, time of projected loss, ability to move, approximate replacement value, and economic value. The task force focused on public infrastructure threatened by erosion. Several Alaska Native communities, including the village of Newtok, were the recipients of State Legislative Grants to study and address erosion. It was Newtok's erosion assessment that informed the Tribal council's decision to relocate.

Parallel Congressional Efforts including the 2003 Government Accountability Report

State attention to climate-related environmental threats paralleled some of the efforts by the U.S. Congress. In 2003, Congress directed the Government Accountability Office to study Alaska Native villages affected by flooding and erosion and to 1) determine the extent to which these villages are affected, 2) identify federal and state flooding and erosion programs, 3) determine the current status of efforts to respond to flooding and erosion in nine villages, and 4) identify alternatives that Congress may wish to consider when assisting with flooding and erosion. This report cast a national spotlight on the plight of Alaska Native communities. On June 29-30, 2004, Senator Ted Stevens, Chair of the U.S. Senate Appropriations Committee, held a special hearing, Alaska Native Village Erosion in Anchorage. Much of the focus of this field hearing was on the 2003 GAO report. Testimony was heard from the leadership of several federal agencies. A common message was that flooding and erosion were endemic among Alaska's remote villages. Testimony was also heard from the leadership of regional organizations from rural Alaska, as well as representatives from several rural communities regarding the difficulties they were facing due to environmental threats.

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1 Now Alaska Department of Commerce, Community, and Economic Development (DCCED)
2 State of Alaska, Department of Community and Regional Affairs, *A Listing of Alaskan Communities for Documentation of Erosion Problems*, Prepared by Woodward-Clyde Consultants (Anchorage, Alaska: September 1982).
3 These 169 communities were included in the 213 Alaska Native villages GAO identified in 2003.
4 State of Alaska, Department of Transportation & Public Facilities, Task Force on Erosion Control Final Report, Prepared by J.J. Simpson (Alaska: January 1984).

Kivalina Self-Evacuation and the Alaska Climate Change Sub-Cabinet

Focus on environmental threats to Alaska Native communities came to a head in the fall of 2007. On September 12, 2007, a severe fall sea storm drove the village of Kivalina to self-evacuate from the barrier island on which it is located. Community members evacuated by skiff across Kivalina Lagoon, and then by ATV down the stormy beach to the Red Dog Mine Port Site. Red Dog employees then bused residents to the mine, which served as an emergency shelter. Two days later, Alaska Governor Sarah Palin signed Administrative Order 238 establishing the Alaska Climate Change Sub-Cabinet to prepare and implement an Alaska climate change strategy.

Alaska Coastal Erosion Field Hearing and 2007 Roundtable on Coastal Erosion and Village Relocation

Less than a month later, on October 11, 2007, U.S. Senators Ted Stevens and Mary Landrieu of the Senate Ad Hoc Committee on Disaster Recovery held a field hearing on the State and Federal Response to Storm Damage and Erosion in Alaska's Coastal Villages in Anchorage. The leadership of several federal agencies provided testimony on the challenges of their respective agency programs in responding to the needs of threatened communities. Representatives of the Alaska Native villages of Kivalina, Newtok, Shishmaref, and Unalakleet provided testimony on the impacts of erosion and flooding on their communities and the challenges they faced in responding to these impacts.

After the coastal erosion hearing, Senator Stevens hosted a Roundtable on Coastal Erosion and Village Relocation in 2007. Attended by state and federal agencies, as well as affected villages, the aim was to establish priorities and funding requests for Congress. It was agreed that both governments had a duty to aid threatened communities. This led to Alaska's decision to create a program offering funding and technical support for planned shoreline protection, building relocation, and village relocation.[5]

Immediate Action Workgroup and the Alaska Climate Change Impact Mitigation Program

In November 2007, a working group under the Sub-Cabinet was formed.[6] The Immediate Action Work Group (IAWG), was an interdisciplinary, interagency working group created for the early assessment and development of an action plan addressing climate change impacts on coastal and other vulnerable communities in Alaska.

The IAWG was tasked with identifying the short-term, emergency actions the State of Alaska needed to take to prevent loss of life and property in imminently-threatened communities. Using the 2003 GAO report as guidance, the IAWG focused on six imminently threatened communities – Kivalina, Koyukuk, Newtok, Shaktoolik, Shishmaref, and Unalakleet.[7]

5 The Alaska Climate Change Impact Mitigation Program was established by Alaska's Twenty-Fifth Legislature to provide technical assistance and funding to communities imminently threatened by climate-related natural hazards such as erosion, flooding, storm surge, and thawing permafrost.

6 A catalyst for the formation of the IAWG was the self-evacuation of the village of Kivalina during a severe fall storm September 12-13, 2007. This event brought heightened awareness within the State of Alaska of the plight of Alaska Native villages and the need for an immediate action strategy to respond to their needs.

7 The IAWG arrived at these villages using the GAO-04-142 report, which identified 9 highly threatened communities (Shishmaref, Newtok, Kivalina, Koyukuk, Unalakleet, Barrow, Bethel, Kaktovik, and Point Hope). Based on meetings held in Fairbanks and Anchorage, Alaska November 6, 2008 and November 19-20, 2008 respectively, the list was shortened to the communities of Shishmaref, Newtok, Kivalina, Koyukuk, and Unalakleet and the village of Shaktoolik was added.

The State of Alaska created the Alaska Climate Change Impact Mitigation Program (ACCIMP) in 2008 in response to recommendations by Alaska's Congressional Delegation that the State should be a part of the solution to addressing the needs of environmentally threatened Alaska Native communities. This effort was a direct outcome of the October 2007 Coastal Erosion Field Hearing held by Senators Stevens and Landrieu in Anchorage, and a November 2007 Roundtable on Coastal Erosion/Village Relocation held by Senator Stevens in Anchorage.

The purpose of the ACCIMP has been to help communities begin the decision-making process of adaptation planning through environmental studies (Hazard Impact Assessments) that provide baseline data and projections which can inform local decisions regarding adaptation planning. The second grant through the ACCIMP allows the community to conduct further study, preliminary design work, or to begin the adaptation planning process, based on information from the Hazard Impact Assessment.

The relationship that developed between the IAWG and the ACCIMP created a "bottom-up" approach to community resilience. Communities received grants for Hazard Impact Assessments which assessed the local hazards and made recommendations for how the community might best respond to the environmental threat. Communities then received Community Planning grants to develop a planned approach to the recommendations from the Hazard Impact Assessment.

Community representatives together with state planning staff attended IAWG meetings where they reported on the funding needs of projects identified through the ACCIMP. This led to the IAWG recommending more than $27 million that was approved in state capital budget funding, some of which provided the state match to leverage multi-million-dollar rock revetments in Kivalina, Shishmaref, and Unalakleet and for the design and construction of infrastructure to support Newtok's relocation to Mertarvik.

With the election of a new state administration with new priorities in 2011, the IAWG disbanded and the ACCIMP was no longer funded. Nevertheless, the best practices that were derived from these efforts continued to influence work in Alaska. Informed by the ACCIMP approach, from 2012-2016, the state planners managed the Alaska Community Coastal Protection Project to address phase two of the resilience process for three environmentally-threatened communities, Kivalina, Shishmaref, and Shaktoolik. This effort funded full-time local coordinators in each village and developed Strategic Management Plans for each community. These plans identified actions to be implemented to increase community resilience.

While the state's fiscal shortfall makes it unlikely that the ACCIMP will receive funding in the near future, the state is pursuing alternative means to achieve similar outcomes for the ACCIMP through FEMA's Risk Mapping, Assessment and Planning (Risk MAP) Program. In 2017, the State of Alaska prioritized a new focus of the Risk MAP Program to assist environmentally threatened Alaska Native villages through the study and analysis of local hazards and providing risk assessment tools to inform local decisions in the adaptation planning process. While relocation is perhaps the most extreme decision on the adaptation planning spectrum, local hazard study and assessment combined with Indigenous knowledge is critical to ensuring informed local decisions to relocate or protect-in-place.

APPENDIX E.
Community and Partner Engagement

Introduction

The original intent of this report was to address threats to infrastructure in rural Alaska villages. The report originated in 2020 and expanded after an initial review was completed. After receiving comments from reviewers, the report sought to create a more robust review process and engage communities and residents, including agencies and Tribal-serving organizations. This process was to ensure the report met the needs of communities, represented the Tribal voice, and incorporated the observations and lessons learned from agencies and organizations that support environmentally threatened communities. Since then, more than 150 individuals engaged in the report. Those individuals were from 27 environmentally threatened communities; 13 regional entities, including six regional Tribal consortia; seven state agencies; 16 federal agencies; and seven non-governmental organizations. This appendix describes the engagement process to review and improve the report.

2020 House Appropriations Committee Report

Representatives from eight environmentally threatened communities reviewed the response draft submission to BIA for the agency's report to the U.S. House Appropriations Committee in 2020.

2021 First Draft Unmet Needs Report

The author team decided to expand on the submission to BIA by developing the first draft of this report. In March through April of 2021, the author team distributed the first draft of the report to a diverse group of 46 reviewers from 10 environmentally threatened communities, four regional Tribal consortia, two state agencies, 11 federal agencies and four non-governmental organizations. The review comments were compiled into a 153-page document which was used to address the comments. The overarching comments were:

1. Reviewers were highly supportive of the document.
2. The process is as important as the product. Incorporate more Alaska Native people and communities as authors and into the report review process.
3. Revise the executive summary to be more concise.
4. Reframe the report language to be more positive.
5. Restructure the document around the key messages.
6. Add a glossary of terms, including terms generated for the report.
7. Add consistency and clarity to the report terminology.

Between spring 2021 and summer 2022, we secured grant funding for community and partner engagement and revised the report significantly to address the comments. In summer 2022, we began another extensive engagement that included:

- An Agency and Regional Service Provider Workshop on August 3, 2022 with 71 participants.
- Three community workshops held on September 20, 27, and 28, 2022. Forty-seven community members participated.
- Meetings with the leadership of Chefornak and Alakanuk, who requested meetings to review the report.
- The creation of a 12-member Indigenous and community contributors group, which reviewed the report in-depth and advised on the final report development and distribution process.

August 2022 Agency and Service Provider Workshop

On August 3, 2022, we held a virtual workshop for service providers from state and federal agencies and regional entities to discuss the whole-of-government coordination framework described in Chapter 6. The purpose of the workshop was to understand the level of support by service providers from state and federal agencies and regional entities for the report's key findings and recommendations and to discuss how a whole-of-government implementation framework could be created, how it would work, and potential challenges. The workshop was attended by 71 individuals. The focus of the facilitated virtual discussion was on the following three questions:

- What do you anticipate as the main barriers to implementing the all-of-government framework described in the 2022 Unmet Needs Report?
- Can you envision your agency actively engaging in the support functions and in the roles defined in the draft framework? If not, how would you define your agency participation in a coordinated government framework?
- How could the all-of-government framework or other strategies assist you in more effectively helping and supporting local leaders and fulfill your mandates?

There was widespread support for a coordinated process and many questions about the implementation of the framework. Common comments from the discussion groups included:

- Working within a Support Function could benefit agencies rather than working alone.
- One benefit of the interagency approach is pooling funds to provide support for the community, such as fully funding a project at one time, instead of the community seeking multiple funding sources and implementing the project in inefficient phases over a longer time period.
- The framework is a mechanism to coordinate, efficiently and effectively understand needs, prioritize, and provide the technical assistance.

Questions and Author Team Responses

What is the process of determining when to work with a certain community? At what point does a community become involved with the framework?

Author Team Response: We recommend creating a statewide priority rank that includes erosion, flooding, and permafrost degradation. Services can be provided to communities based on priority until the hazards have been addressed. The 2019 Denali Commission Statewide Threat Assessment should be considered as the starting point for a risk-based prioritization methodology, which can be adopted and shared by all partners engaged in environmental threat mitigation in Alaska. Information generated for the 2020 cost estimating is another resource for prioritization. For example, the communities that expect to face relocation to a new community site could be prioritized to support early progress with the relocation.

If 20 communities approach the agencies at the same time, and an agency can only accommodate 10 communities with the level of staffing and/or other resources they have at the time, how does the agency choose which 10 communities to work with?

Author Team Response: The combined rank prioritization in the 2019 Denali Commission Statewide Threat Assessment would be used to prioritize assistance through the framework. The level of threat/risk is expected to change over time as progress is made to implement solutions or if new events cause the threat to increase.

Is this Alaska-specific or nationwide? Will this only focus on Alaska moving forward?

Author Team Response: The proposed framework is specific to Alaska and can be adopted for nationwide or regional use. Background: In 2020, the GAO recommended a climate migration pilot program. The Alaska framework could serve as a nationwide model. The partners, support functions and other details would change when applied elsewhere, but the general coordination framework could be implemented in a similar fashion. This provides an opportunity to test the model before implementing it at a larger scale.

Where do the government positions come from? Is it one per Tribe/community? One for all? Would it likely need to be top-down directed? One position at a Tribal organization, and then state and federal co-chairs, and then liaisons to agencies? How will these positions be filled?

Author Team Response: The Management section of Chapter 6 describes the proposed roles. Each community will have a Local Coordinator and a Community Specific Technical Assistance Team. Funding will support hiring Local Coordinators. The Technical Assistance Team, formed by the Community Planning and Technical Assistance Support Function, will comprise planners, agency reps, and consultants. This team ensures consistent community engagement, amplifies community voices, enhances communication, minimizes access points, and provides necessary technical resources for informed decision-making.

There is a significant role required to manage and integrate the activities of many disparate entities and agencies in an equitable, timely, and customer-oriented manner. To fill this daily coordination role, we suggest three full-time co-chairs. Three co-chairs are suggested to represent the federal, state, and Tribal partners in the framework. A Tribal co-chair is critical for Alaska because most threatened communities in the state are represented by Tribal governments.

The primary role of a Tribal co-chair would be to provide general oversight of state and federal activities to ensure that local Tribal voices are effectively leading the planning and implementation of mitigation strategies. The Tribal co-chair would act as a single point of contact for local and regional coordinators and technical assistance teams for issues related to Tribal affairs. Other responsibilities may include recommending activation of Government Support Teams and providing general support to Tribal governments including the development of funding agreements and assistance with grant management for directly allocated project funding.

All positions associated with the framework would be funded by the U.S. Congress.

For the co-chairs, the positions should be high enough in the agency that they can speak for the agency or on behalf of the entities, a decision maker, so you're not waiting for leaders after a meeting.

Author Team Response: Correct. These would be high-level positions.

Where does the cost fit in the framework, so our communities can assess the feasibility of the decision to protect-in-place, managed retreat, or relocation?

Author Team Response: An analysis of costs for different solutions is beneficial to inform the community's long-term decision. This is completed as part of planning and is based upon the results of hazard risk assessments, engineering analysis, and other technical input. Completing community-specific risk assessments to inform long-term decisions is currently one of the highest priorities to address environmental threats. See Chapter 4 for more detail on this phase.

If there is no land available for retreat, the village is left with relocation. Is that represented in community cost estimates?

Author Team Response: Yes. Relocation is the decision of last resort when protection-in-place is not a long-term solution and there is no land nearby to retreat to. This was considered in the cost estimates. Detailed methodology is provided in Appendix A.

Who would make up the Community Specific Technical Assistance Team?

Author Team Response: The Community Specific Technical Advisory Team will be assembled by the Community Planning and Technical Assistance Support Function upon engagement with the community and will consist of planners, agency representatives, and/or professional services consultants. The expertise and skillsets of each Community Specific Technical Support Team will be determined by the needs to the community. See Chapter 4 for more information on the technical assistance teams.

Who is the employer for the Community Specific Technical Assistance Team? Would they be with the same "employer," like an interagency team?

Author Team Response: the team would likely have multiple employers from different agencies and organizations based on the unique needs of the community.

September 2022 Community Workshops

The report team held three virtual workshops with environmentally threatened communities on September 20, 27, and 28, 2022. A total of 47 community members representing 16 communities attended the three workshops. Communities represented included: Alakanuk, Allakaket, Chefornak, Deering, Kwigillingok, Nelson Lagoon, Nuiqsut, Point Lay, Shaktoolik, St. Michael, Stebbins, Teller, Togiak, Tuntutuliak, Unalakleet, and Wainwright. A North Slope Borough representative also participated. The purpose of the workshops was to answer questions from community representatives and understand the level of support by community Tribal and municipal leaders for the report's key findings and recommendations. The focus of the facilitated virtual discussion included the following questions:

- What comments, questions, or concerns do you have about the report key findings and recommendations?
- What has it been like to work with different agencies to try to protect your community from environmental/climate threats? How could that coordination and/or experience be improved?
- Currently, your community must assess what all federal and state agency programs can do to help your community, and then apply to access their resources and services. Chapter 6 of the Unmet Needs Report proposes an all-of-government coordination system where agencies work together for your community. Do you support this approach?
- Do you agree with the recommendation to provide direct funding to communities based on risk versus the requirement that every community, no matter what the need, be required to submit grant applications for assistance?
- How can the Unmet Needs Report be improved?
    - » Does anything needed to be changed for you and your organization to support the report? Is there anything missing?
    - » Do you support the submission of this report to Congress?
    - » Would you be comfortable with others advocating for these recommendations on your behalf?

What We Heard

In each community workshop, the participants were overwhelmingly supportive of the report recommendations. The conversations included community-specific threats and how the report's key findings and recommendations might address those challenges. Participants agreed the Unmet Needs Report will help address the communities' needs. There were no objections to moving forward with the report.

A sample of community comments and questions is included below:

Community Comments

- Lack of capacity, training, and staff is a challenge for rural communities: training and staffing are major challenges in applying for grants and grants management. Grant management should be its own job with specific training, but that is not usually the case in small communities. Turnover is also a major challenge. With the time it requires to apply for and manage some grants, other important community services get sacrificed. The report recommendations could help with these challenges.
- Speaking to the Community Specific Technical Assistance Teams as recommended in the report, one participant remarked "Having someone working on our behalf would be instrumental in our success."

- The report recommendations are important to help the community navigate the cultural challenges in dealing with government and bureaucracy. It's not typical in Yup'ik culture to be a "squeaky wheel" but often that is what it takes to be successful in these types of projects. Projects are likely missed out on because of this cultural divide.
- Lack of workforce in rural Alaska currently makes it difficult to complete projects within grant timelines. Some communities have missed grant opportunities because of the lack of capacity and lack of trained workforce to complete a project, including a lack of available workforce and equipment needed for ongoing mitigation efforts or relocation.
- Working with one agency (as the report recommendation suggests) seems more effective, especially when planning for future projects. It would be helpful if all agencies and organizations were more coordinated on their own projects, like a master list of plans from all agencies.
- Matching funds are a major obstacle and challenge for rural villages for some grant requirements, especially during an emergency.
- Assistance with environmentally threatened challenges is not moving fast enough. Rural communities can't keep up with climate change. It affects everything in the villages, including the economy.
- Currently, grant applications make it competitive between communities. We want all communities to get what they need, not to have to compete among our communities. Competing among villages for federal funding is not our way. Recommendation 1 would help address this. We do not want to have to compete for funding or wait for competitive grant approval; we do want funding to go directly to the people.
- The current level of funding doesn't go far enough to address our challenges in rural areas. The needs are surprisingly expensive and more expensive per person than in most lower 48 communities.
- Many issues associated with climate related disasters are preventable, or could be mitigated, but most state and federal programs go into effect after infrastructure is already damaged. Current programs are more about post-disaster response and recovery rather than what villages really need, which is pre-disaster mitigation. Workshop participants supported the recommendation in the report that mitigation to protect infrastructure and communities should be prioritized.
- Several community participants commented that when they've tried to discuss "relocation" with the federal agencies, they lost communication and didn't get to access funding. If relocation is needed, funding should be available.
- Locals doing this work know the community, the land, and the needs. Some of that Indigenous knowledge could be lost if this assistance comes from "outside" and those providing it are not familiar with the community.
- Seasonal storms are becoming more damaging. We need to try to contain what we have now.

Community Questions and Author Team Responses

Grant writing capacity is also needed. Not all communities have grant writers.

Author Team Response: The Community Specific Technical Assistance Teams would include grant writing to access other agency resources.

Food sovereignty is also a part of emergency response and planning. We lose electricity or must spend a lot of money to unhook and hook up electricity if moving a house. Electricity is needed for freezers and food supplies. In a power outage, people lose their subsistence harvest.

Author Team Response: A more detailed section on food sovereignty was added to the report.

Are biologists and geologists on board to answer some of our questions at this workshop? Ten years ago, they told communities to be ready and be on higher ground. Nothing ever came into play. Why aren't the climate scientists and experts joining us for this conversation today?

Author Team Response: This workshop is for communities. The report was reviewed by more than 40 people in 2021 and a separate workshop was hosted for service providers and agencies with 71 participants.

How can funding be "politics-proof", especially between presidential administrations?

Author Team Response: If implemented, the report recommendations would withstand changes in administrations.

One-on-One Meetings with Communities

August 11, 2022 Chefornak Meeting

The report team held two one-on-one meetings with Chefornak (a combination of in-person and virtual on August 11, 2022). After the first meeting, Chefornak leadership took the report home to read it before they met again and voted to support the draft report.

- Discussion noted current conditions: high rates of poverty, lack of funding for staff, and challenges with capacity, skills, and education in grant writing and grant management. All of these are things report recommendations would likely address.
- A suggestion was offered to translate the report synopsis and recommendations for communities to use in their review and discussion process.
- There seemed to be support for submitting the report to AFN for a resolution, but as a group of several communities, not as a single community.
- The Tribal Council and village corporation board of directors supported the key findings and recommendations in the report.

Alakanuk One-on-One Meeting, October 7, 2022

The report team held a virtual meeting with the communality of Alakanuk on October 7, 2022. Here are key discussion points from this meeting:

- Moving forward with the Unmet Needs Report will help address our most immediate needs.
- We are living it; we're seeing it firsthand.
- The Tribe believes it's necessary for people to hear from them directly.
- Seasonal storms are becoming more damaging. We need to try to contain what we have now.
- The report will be discussed at the next Tribal council meeting on October 11, 2022.
- Alakanuk IGAP staff can take aerial photos with their drone camera.

Indigenous and Community Contributors Group

A group of 12 Indigenous and Community Contributors from eight Alaska regions was convened to increase participation from Alaska Native people in communities, staff at regional Tribal organizations, and ensure the report includes the Tribal voice. Communities and organizations represented included:

1. Aleutian Pribilof Island Association
2. Association of Village Council Presidents
3. Bristol Bay Native Association
4. Native Village of Buckland
5. Huslia Village
6. Native Village of Kivalina
7. Native Village of Napakiak
8. Native Village of Nelson Lagoon
9. Newtok Village
10. Native Village of Point Lay
11. Native Village of Shaktoolik
12. Native Village of Shishmaref

In response to comments from the Spring 2021 report review, which recommended compensating individuals for contributing to the report, the Indigenous and Community Contributors group members were offered an appreciation payment for their time. Some members, or their employers, received the appreciation payment. The group spent hours reviewing the report, responding to a set of 15 review questions in writing or via voice with an author team representative, and making comments and edits that were incorporated in the report revisions. The group provided suggestions to improve graphics and illustrations, suggestions to rework language and incorporate new information, ways to highlight areas more thoroughly such as food sovereignty and Tribal sovereignty and discussed how to best distribute the report and gain support for the report's recommendations. The group was highly supportive of the report. The group pursued an Alaska Federation of Natives resolution supporting the report. The group chose to author a cover letter to introduce the report and share the importance of investing in protecting Alaska Native people and cultures. Some group members were eager to support engagement with agencies and decision-makers to advance the report. All comments and edits from the group have been incorporated in the final report.

APPENDIX F.
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APPENDIX G.
Acknowledgements

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APPENDIX H.
Letters of Support

1. Indigenous Alaskans and Community Contributors' Letter
2. State of Alaska

TO: State and Federal Leadership and Staff

FROM: Indigenous Alaskans and Community Contributors

CC: Leadership and Staff for Alaska Native Tribal Health Consortium & Center for Environmentally Threatened Communities; and, Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, Community Resilience Programs

DATE: December 2022

SUBJECT: The Unmet Needs of Environmentally Threatened Alaska Native Villages: Assessment and Recommendations

> *"Our ancestors, with their wisdom and knowledge of the land, chose these lands for a reason. To promote the health and safety of our people and live our subsistence way of life. We, as Native People, care very much about each other. We care about all communities and their people. These are our people. We want them to be safe. We cannot compete against each other to be safe. That is not our way."*
>
> Genevieve Rock, Native Village of Shaktoolik

Dear Leadership and Staff,

Consider Our Call to Action

We are the Indigenous Alaskans and Community Contributors, a group of Tribal, community, and organizational leadership and staff who have provided our individual and collective knowledge and experience to the Unmet Needs Report effort. **We are grateful for your attention and careful consideration of the report background and recommendations to address the unmet and unfilled needs of the most environmentally threatened communities in our nation.** We write this letter not to complain or make demands, but to request action.

Our request and the recommendations in this report are about basic life essentials, our health, our children's future, and the historical, ongoing, and projected negative impacts of environmental (both physical and systems-level) challenges to our nation's most at-risk communities. **As agencies collaborate in new and effective ways to improve program delivery to threatened communities, and as community leaders work in partnership with their federal and state partners to implement these programs efficiently and effectively, together we will build greater community capacity and more resilient infrastructure to address the challenges we face.** Your action – full support and shepherding of the report recommendations – is the next step to get us where we need to be; we thank you for your attention and efforts to honor Our People, Our Place, Our Story.

"The devastation many Alaskan communities are facing from the effects of climate change including flooding, erosion and permafrost degradation is much larger than what we face from storms alone. Climate change has been an ongoing slow-moving disaster ravaging our communities for decades which has accelerated 10-fold lately. Every day changes happen which are not reversible, such as losing our drinking water source through erosion and/or entire communities divested by these climate changes. Subsidence has forced my community to abandon much of its piped water sewer distribution system. The very ground beneath our homes has subsided six feet. River channels are changing. Lagoons are becoming shallow due to silting, making it extremely difficult to reach our hunting grounds. People ask why we choose to stay here. The answer is always the same. This is our home. It's the home of our ancestors..."

Bill Tracey, Point Lay, North Slope Borough

Honor Our Past & Planning Our Future

All life stories begin at home. Our history is written over endless lifetimes with community spirits coming and going. As we grow, our experiences plant the seeds for later plans and expectations. During these times, it is natural for each of us to examine our role us we grow, heal, and thrive, forging our own path in life. We are products of our parents and the environment that shapes us in a life that plays out like a script with our role in relationships, needs, and expectations both met and unmet. **This report tells part of our story, in our voices, about the harsh realities of worsening environmental conditions that threaten Alaskan lives; it also tells the story of federal and state funding systems that have continuously set us up for failure, with competitive and complicated funding applications, and overly burdensome and unrealistic administrative and reporting requirements.**

We are small, Tribal communities with limited capacity to do the administrative work to comply with agency requests while also implementing programs that will save our communities from further degradation. Current program delivery requirements are outside many Tribes' capacity, and because of this, many are not able to participate in federal and state programs that can save and better plan for vital community infrastructure and improve quality of life for rural Alaskans. **To maximize investment in infrastructure and mitigation measures that result in safer and more resilient communities, fair evenhanded access to all programs is a must; we need a delivery system all can operate within.** The report recommendations offer hope and tangible solutions that honor those that came before us, those that lead our communities today, and those that will forge future paths. **Implementing these recommendations will strengthen our collective bond through respect, empathy, and love.**

"We are faced with trauma caused by changes in the environment that threatens the safety of our families, the survival of our community, and the very survival of our culture! We, the people who have contributed least to climate change, are suffering the worst consequences because our forefathers did NOT act on climate change. We are in dire need of help! It is the

Federal government that MUST provide us with the funding needed to protect our lives! We in the State of Alaska are United States Citizens!"

Genevieve Rock, Native Village of Shaktoolik

Acknowledge the Threats to Our People, Culture & Ways of Life

Months later, many of our coastal Alaskan communities are still reeling from the impacts of Typhoon Merbok which hit our shores in August 2022. Without better, safer choices, many of our brothers and sisters across generations have been forced out of their uninhabitable homes into already crowded houses. Add to that, this year's loss of traditional subsistence camps, equipment, and stored foods, coupled with poor salmon returns in some of our most at-risk communities, we are experiencing increased and severe food insecurities, created new and greater economic disparities, and dramatically increased poverty across multiple regions in the state. **We cannot overemphasize – food insecurity is one of the greatest risks our communities and cultures face.** Decreased access to subsistence resources and forced purchase of store-bought, western foods have known health risks to Alaska Native peoples and are a direct threat to culture identify and resilience. **Collectively, these factors put additional stress and strain on our already compromised and overworked education and public health system and workers in rural Alaska and exacerbates the economic gap between rural communities and the rest of the state and country.**

"As much as 85%-90% of the food on our table is from the land. If climate change eliminates our food source(s), we will need a subsidy to pay for other food. This is what equity looks like."

Clarence Daniel, Association of Village Council Presidents

Address Longstanding Systemic Inequities & Retain Connections to Our Places

The issues described above and in more detail in the report, are longstanding systemic inequities faced by rural residents in Alaska. Limited access to affordable, quality, and reliable transportation, communications, energy, health care, education, housing, delivery of the most basic goods and services, and the increased costs associated with everyday living are all difficulties faced by our communities as we struggle to sustain our traditional lifestyle and live on our ancestral lands. **To protect our infrastructure from increasing environmental change, we are moving further away from resources we depend on, which increases travel time, fuel costs, and time away from work and school.** Greater distance further limits who can participate in these cultural subsistence practices, who will have the skills to teach the next generations, and the opportunity for our children to develop their taste for our precious foods. Staying on our traditional lands affords us these cultural connections. **Investments that improve distributed, smaller-scale infrastructure can give us greater flexibility to protect in place and manage infrastructure and community retreat over longer time scales, reclaiming some of the resilience that allowed our cultures to thrive for thousands of years.**

"Each of our communities are in their own specific locations. It was suggested that one time, when Kivalina was in dire strait of washing into Chukchi Sea, that we move to other villages and save our families. That never panned out, and that suggestion was pretty offensive to the

leadership of the community at the time. The land we are on, the place, is our identity. How we process our foods, how we take care of our families is who we are. It's our culture. Each of the villages have different ways, different unsaid laws. Each community is different… one village site does not identify the village as the village. Each of our villages, we have a mile radius type of thing that identifies us. We go up to 30 miles inland to get our caribou, our berries. We go between here and Point Hope, and that identifies our people as one small village. Our identity expands up to an 80-mile radius. I'm sure other villages have that."

Millie Hawley, Native Village of Kivalina

Losing our identity and connection to place does more than damage one community; it undermines our Alaska Native people and cultures. This loss breaks family ties and community relations established over countless years and strips us of the language tied to the place, the resources, and each other. Forced relocation is still part of our remembered, and tragically regrettable, history. Forced relocation must never be repeated, whether through misguided intent or the negligence of failing to act in time to meet the greatest challenge of our era, adapting to the consequences of our decisions. **Taking action that aligns disparate funding streams and supports those communities at most immediate environmental risk is what is required to maintain Alaska's rich cultural diversity.**

Abandoning our ancestors' bones, no longer using the land of our birth, and being ordered to vacate what is still useable and needed is counter to our values, including the shared value of financial responsibility. How can we live up to our ideals as a nation and overcome our failings of the past, while current policy inhibits Alaska Native communities overall, diminishes our peoples' numbers and does not allow the natural growth of our populations? Communities are not created by a zip code or old facilities, but by the group of people. Our names for sites, their continual use by the same peoples, our 'ownership' of these lands through exclusive resource use and stewardship, our cultures' shaping by our lands and our shaping of our lands by our cultures, and many other metrics of fully 'inhabited' apply to all the lands, and waters. **Others' definitions of our length of residency, and thereby our future right to stay in any given spot, are not theirs to define, but remain an integral part of Tribal self-determination.** Current agency policy denying necessary projects to protect our communities and failing to design policies and programs that prioritize us, knowingly penalizes a minority population for a situation outside their control.

Work With Us – Act Today to Implement Report Recommendations

We stand united as a group of Indigenous Alaskans and Communities ready to provide specific details for effective implementation of the report recommendations. The impacts of Typhoon Merbok are a siren for direct and significant action. We need robust resources – leadership, staff, and funding – to equitably address the needs of all at-risk rural, Tribal, and Indigenous communities. This fiscally responsible approach offers us the opportunity to test new technologies in our harshest environments, continuing a long tradition of Alaska Native People and rural communities innovating and working with federal and state partners to create first-world infrastructure. Together, we can protect our communities, our cultures, and prevent further suffering of American citizens in rural Alaska.

Thank you for considering our concerns, our requests, Our Story, and for your immediate action on the recommendations outlined in this report.

With great respect,

Indigenous Alaskans and Community Contributors
Alphabetical by first name

Bernice John, Newtok Village

Bill Tracey Sr., North Slope Borough Assemblyman, Resident and Member of the Native Village of Point Lay

Clarence Daniel, Association of Village Council Presidents

Dan Breeden, Bristol Bay Native Association

Genevieve Rock, Native Village of Shaktoolik

Karen Pletnikoff, Aleutian Pribilof Islands Association

Mark McNeley, Native Village of Nelson Lagoon

Millie Hawley, Native Village of Kivalina

Norman Carl Burgett, First Chief of Huslia Tribe

Robert Iyatunguk, Native Village of Shishmaref

Shannon Melton, Native Village of Buckland

Walter Nelson, Native Village of Napakiak

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Commerce, Community, and Economic Development

OFFICE OF THE COMMISSIONER
Juneau Office

P.O. Box 110800
Juneau, Alaska 99811-0800
Main: 907.465.2500
Fax: 907.465.5442

August 3, 2023

Valerie Nurr'araluk Davidson
President/CEO
ANTHC
4000 Ambassador Drive
Anchorage, AK 99508

Dear Ms. Nurr'araluk Davidson,
I am writing to congratulate you on the work of the *Unmet Needs of Environmentally Threatened Alaska Native Villages: Assessment and Recommendations* report. I know that Sally Cox with the Division of Community and Regional Affairs (DCRA) has been an instrumental part of the team collaborating for threatened communities.

As you know, the division regularly communicates with communities all across Alaska through the Rural Utility Business Advisor program, Alaska Risk Mapping, Assessment, and Planning program, National Flood Insurance Program and a variety of grant opportunities including the CARES Act fund distribution. Their staff are also working with the Department of Environmental Conservation's Village Safe Water team on the IIJA effort to provide water and sewer service to unserved and underserved communities. Many of the communities DCRA interacts with are on the Threatened Community list and this report provides an opportunity for collaboration by all agencies assisting them.

State agencies have long been aware of the threats from flooding, erosion, and permafrost degradation facing rural Alaska communities. The Unmet Needs Report puts a spotlight on the key issues and barriers that Alaska's environmentally threatened communities face in addressing these environmental threats and will undoubtedly be an important tool moving forward.

Again, congratulations on the completion of a very important report and we look forward to working with you and others to assist Alaskan communities.

Sincerely,

Julie Sande
Commissioner

Cc:
Jackie Schaffer, ANTHC
Sandra Moller, Director DCRA

ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

Division of Environmental Health and Engineering

dehe@anthc.org