S. HRG. 108–808

ALASKA NATIVE VILLAGE EROSION

HEARINGS

BEFORE THE

COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

SPECIAL HEARINGS

JUNE 29, 2004—ANCHORAGE, AK
JUNE 30, 2004—ANCHORAGE, AK

Printed for the use of the Committee on Appropriations

Available via the World Wide Web: http://www.access.gpo.gov/congress/senate

U.S. GOVERNMENT PRINTING OFFICE

95–486 PDF WASHINGTON : 2005

For sale by the Superintendent of Documents, U.S. Government Printing Office
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TUESDAY, JUNE 29, 2004

ALASKA NATIVE VILLAGE EROSION

TUESDAY, JUNE 29, 2004

U.S. SENATE,
COMMITTEE ON APPROPRIATIONS,
Anchorage, AK.

The committee met at 8:47 a.m., in the Z.J. Loussac Public Library, 3600 Denali Street, Anchorage, Alaska, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens and Burns.

Also present: Senators Murkowski and Sununu.

OPENING STATEMENT OF SENATOR TED STEVENS

Chairman STEVENS. Good morning. I thank you all for attending this field hearing. We begin this hearing now regarding the impacts of coastal erosion and flooding on the Native villages on the west coast of Alaska.

I'm joined here this morning by Senator Conrad Burns of Montana. He's on the Appropriations Committee. Senator Lisa Murkowski, my colleague, who serves on the Energy and Natural Resources Committee, the Environment and Public Works Committee, the Indian Affairs Committee, and the Veterans Affairs Committee, and Senator John Sununu who serves on the Commerce Committee.

Your commitment to take time from your busy schedules to attend these hearings illustrates a national interest on this issue, and we will learn more about how severe erosion has impacted Alaska and its people. The testimony from these hearings will be useful in determining how to coordinate responses and develop solutions to complex problems of erosion and flooding in Alaska.

There will be three panels of witnesses at this hearing today and tomorrow. Each panel will have multiple witnesses, and to keep the hearing on schedule, I request that each witness speak no more than 8 minutes. It's my intention to ask the Senators to withhold their questions until we hear the testimony of all the witnesses on each panel as they come forward. Based on the number of witnesses today, each panel will be allowed total time limits. Panel 1 is allowed 80 minutes; panel 2, 60 minutes; and panel 3, 40 minutes. I hope that's acceptable.

Tomorrow we will hear from villagers from villages most affected by coastal erosion and flooding as well as one witness with commercial expertise in erosion prevention and mitigation. These hearings will try to find whether we have any solutions to the problems and have recommendations from the General Accounting Office—let me back up. We will examine the findings and recommendations

of the General Accounting Office report on the severe flooding and erosion problems faced in Native villages in Alaska.

In May 2001 some of you attended the appropriations field hearings on the impact of climate changes in the Arctic. That hearing was held at the University of Alaska in Fairbanks and attracted, I believe, the Nation's best scientists on the climate change. Later today we'll hear from two individuals on the potential costs and implications of that climate change.

The issue of climate change is involved because of rising temperatures, which was one of the main factors theorized in the GAO report on coastal erosion and flooding in Alaska. My intent at these hearings is to learn how we can provide greater assistance to these communities.

I will now yield to my colleagues to see if they have any opening statements. Senator Burns, do you have a statement?

STATEMENT OF SENATOR CONRAD BURNS

Senator BURNS. Mr. Chairman, thank you very much for your kind invitation to come to Alaska. We enjoy it up here. I represent Montana. As far as flooding and erosion, we've been so damn dry down there we'll take a little of it. We're a little bit better off, but I know that there are challenges it imposes on the communities along the coast of Alaska. I'm fairly familiar with that part of the world up there because I've visited the North Slope, but I've never had the opportunity to go out on the west coast part of the State and would love to do that one of these days. Thank you for your kind invitation. I'll look forward to hearing from the witnesses.

Chairman STEVENS. Senator Murkowski, do you have a statement?

STATEMENT OF SENATOR LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. I do, Mr. Chairman. Thank you. Thank you for calling the hearings. I would also like to welcome Senator Burns and Senator Sununu. I appreciate their being here and having an opportunity to see what is going on. I appreciate Senator Burns' statement, and we're pretty dry up north, too. It's fire season again here.

Mr. Chairman, last year the General Accounting Office examined the performance of two agencies, the U.S. Army Corps of Engineers and the Natural Resources Conservation Service as they assist Alaska Native villages wrestling with challenges of coastal erosion.

The GAO reported that small and remote Alaskan villages are denied assistance under the Corps' flood control and continuing assistance program because they often fail to meet a cost-benefit test; that is to say that when you compare the cost of preventing devastating floods against the value of the public infrastructure in the villages, flood control loses. Those communities that might meet the cost-benefit analysis criteria then fail to qualify for assistance because they can't provide the 25/50 percent local match that's required under the prevailing policy.

The Natural Resources Conservation Service, like the Corps, utilizes a cost-benefit analysis in its funding decisions, but unlike the Corps they consider social and environmental factors when calcu-

lating the benefit of a project. The GAO noted that the Natural Resources Conservation Service also waives cost-sharing requirements when a community can't afford them.

The bad news for Alaska Native communities is that the Natural Resources Conservation Service funding programs are directed at addressing emergencies; in other words, one-time events rather than recurring programs. However, the Natural Resource Conservation Service is generous in providing technical assistance to Alaska Native villages under its conservation and technical assistance program.

So the Corps of Engineers appears to be in the best position to help fund projects to protect our villages against coastal erosion, but cannot effectively carry out this role due to the strings attached to their funding policies. The Natural Resource Conservation Service has a funding policy that is perhaps more sensitive to the realities affecting our villages, but their authority to address the consequences of coastal erosion is limited. This is very disturbing.

Mr. Chairman, I do have a longer opening statement that I would like to have included in its entirety in the record, but I would like to point out at this time that I hope that these hearings are not intended to place blame on anybody, but rather to identify solutions. How do we move forward in identifying the concerns while we're here in these next 2 days?

As we search for the solutions, I think we need to be aware that FEMA, the Federal Emergency Management Agency, has the resources to rebuild that public infrastructure and to help families rebuild structures that are destroyed in catastrophic floods. We have seen this before when FEMA was called upon to address the consequences of flooding in Alatna, in Allakaket and in Hughes as they do elsewhere across the State and in the country.

So I would hope that over the next 2 days, as we identify ways to prevent this destruction before it happens, we focus on that and not on what we do in the aftermath of a catastrophic flood. Again, Senator Stevens, thank you for conducting this hearing, and I look forward to the testimony over the next 2 days.

Chairman STEVENS. Thank you very much, Senator.

Senator Sununu, do you have an opening statement?

STATEMENT OF SENATOR JOHN SUNUNU, U.S. SENATOR FROM NEW HAMPSHIRE

Senator SUNUNU. Thank you, Mr. Chairman. It's a pleasure to be here with you and Senator Murkowski, with whom I was pleased to be elected to the Senate. I had the opportunity to see her work on this and a host of other issues important to Alaska.

New Hampshire and Alaska share a lot of the same wonderful characteristics; a great love for the outdoors, conservation and its tradition, and a beautiful coastline. New Hampshire's coastline is only 13 miles, not 6,000 miles, so as a result, we tend to enjoy our coastline 1 mile at a time. But we have the same appreciation for the problems that erosion and flooding can cause for the communities that live nearby.

That's why I'm pleased to be here to listen to the testimony, to learn a lot more about the problems that have been experienced here. I understand what the Senate can do to help these agencies

that have some ability to make a difference and work together to improve the situation.

Thank you very much for the invitation to be here.

Chairman STEVENS. Thank you very much, Senator Sununu. On the first panel the witnesses will be Brigadier General Larry Davis, Division Engineer, Pacific Ocean Division of the United States Army Corps of Engineers; Mr. John Pennington, Regional Director of the Federal Emergency Management Agency; Mr. Ralph A. Robinson, Managing Director of the Natural Resources Environment of the General Accounting Office; and Mr. Patrick Poe, Alaska's Regional Administrator for the Federal Aviation Administration.

Gentlemen, welcome. General Davis, we'll call on you first. I would like you all to present your statements and not use more than 8 minutes, if you will, and we will have questions when the full panel has presented their witnesses.

General Davis.

STATEMENT OF BRIGADIER GENERAL ROBERT L. DAVIS, DIVISION ENGINEER, PACIFIC OCEAN DIVISION, UNITED STATES ARMY CORPS OF ENGINEERS

ACCOMPANIED BY COLONEL TIM GALLAGHER, COMMANDER, UNITED STATES ARMY CORPS OF ENGINEERS' ALASKA DISTRICT

General DAVIS. Thank you, Mr. Chairman and distinguished members of the committee. I deeply appreciate this opportunity to appear before you to discuss the flooding and erosion issues affecting many Alaskan communities.

I'm Brigadier General Larry Davis, the Commanding General of the U.S. Army Corps of Engineers' Pacific Ocean Division. Accompanying me today is Colonel Tim Gallagher, Commander of the U.S. Army Corps of Engineers' Alaska District. My complete written statement, which I have submitted for the record, provides details on this important issue and what the Alaska District is doing to address flooding and erosion issues and challenges.

With your permission, I'll provide you with a very brief overview of the Pacific Ocean Division, highlight some major issues regarding flooding and erosion affecting Alaskan communities, and highlight the Corps of Engineers' authorities and programs.

The Pacific Ocean Division is headquartered in Honolulu, Hawaii. I have four district offices under my command located in Hawaii, Alaska, Japan, and Korea. All my districts have important military missions. In addition, my Honolulu and Alaska districts have a civil works mission that provides for water resources development and restoration, primarily in the areas of commercial navigation, flood and coastal storm damage reduction, and ecosystem restoration.

It is through our Alaska District's civil works program that we are keenly aware of and involved in addressing flooding and erosion problems affecting Alaskan communities, and we appreciated the opportunity to participate in and contribute data from our past and ongoing studies to GAO's December 2003 report on this subject.

Alaska's coasts and riverbanks serve as the home to over 200 Alaskan communities that utilize the rivers, coastal waters, and surrounding areas for subsistence. Coastal areas are subject to con-

stant attack from wave action, ocean currents, ice and storms. And riverbanks are subjected to flooding, annual and episodic ice jams and erosion.

The flooding and erosion that occurs along Alaska's shorelines and riverbanks can have a devastating impact on the economic, social, and cultural well-being of the Alaskan communities that are located along them. The villages of Kivalina, Koyukuk, Newtok and Shishmaref are examples of communities that are being forced to consider relocating due to severe and chronic erosion and flooding.

Recently the Alaska District has noted an increasing number of requests for flooding and erosion protection assistance. This increase appears to be timed similar to observed climatological changes that may have an impact on flooding frequencies and erosion rates.

Chairman STEVENS. I think it may be one of the connections right here causing the trouble.

General DAVIS. As indicated in the GAO's report, the Corps of Engineers administers key programs for planning and constructing flood and erosion control projects. These programs include our Specifically Authorized Program, Continuing Authorities Program, Planning Assistance to States Program, and the Flood Plain Management Services Program. To date, we have constructed eight flood control and eight erosion control projects in Alaska, and we currently have nine active flood damage reduction and 11 active erosion control studies underway. While we do have the technical capabilities and programs to address flooding and erosion problems, it is often difficult for a majority of these small and remote communities to meet the benefit-to-cost ratio of 1.0 or greater required for Federal participation implementing a solution. The cost of construction in the remote areas, weather and the lack of data, and the subsistence economies of the communities are major contributing factors.

In addition, many of these communities do not have the financial capability to meet the required 35 percent non-Federal cost sharing required for the Corps of Engineers' flood-erosion projects. We like to think of ourselves as problem solvers, and we have the technology and experience to find solutions to these complex problems. However, the title of the GAO's report, "Alaska Native Villages, Most are Affected by Flooding and Erosion, But Few Qualify For Federal Assistance," appropriately summarizes the dilemma faced by these Alaskan communities and the Federal agencies attempting to help them.

Mr. Chairman, this concludes my statement. I'm honored to appear before you. I'd be happy to respond to any questions you may have.

Chairman STEVENS. Thank you very much.

[The statements follow:]

PREPARED STATEMENT OF BRIGADIER GENERAL ROBERT L. DAVIS

INTRODUCTION

Mr. Chairman and distinguished members, thank you for this opportunity to appear before you today to discuss erosion and flooding issues of utmost importance to coastal and riverine communities in Alaska.

I am Brigadier General Larry Davis, Commander of U.S. Army Corps of Engineers' Pacific Ocean Division.

The General Accounting Office has provided a comprehensive review of the erosion and flooding problems in many of the remote communities of the state. I hope that our participation in this hearing will add to and clarify some of the issues presented in this report.

With your permission, I will provide you with a brief overview of the Pacific Ocean Division, review our Corps of Engineers' flood control and erosion authorities and programs, review our prior and ongoing flood and erosion control projects, and highlight the major issues regarding flooding and erosion affecting Alaskan communities.

PACIFIC OCEAN DIVISION

The Pacific Ocean Division is headquartered in Honolulu, Hawaii. I have four district offices under my command located in Hawaii, Alaska, Japan, and Korea. All my districts have important Military Missions. In addition, my Honolulu and Alaska Districts have a Civil Works Mission that provides for water resources development and restoration, primarily in the areas of commercial navigation, flood and coastal storm damage reduction, and ecosystem restoration.

It is through our Alaska District's Civil Works program that we are keenly aware of and involved in addressing flooding and erosion problems affecting Alaskan communities and we appreciated the opportunity to participate in and contribute data from our past and ongoing studies to GAO's December 2003 report on this subject.

ALASKA FLOODING AND EROSION

Alaska's coasts and riverbanks serve as the home to over 200 Alaskan communities that utilize the rivers, coastal waters, and surrounding areas for subsistence. Coastal areas are subject to constant attack from wave action, ocean currents, ice and storms and riverbanks are subjected to flooding, annual and episodic ice jams, and erosion.

The flooding and erosion that occurs along Alaska's shorelines and riverbanks can have a devastating impact on the economic, social, and cultural well-being of the Alaskan communities that are located along them. The villages of Kivalina, Koyukuk, Newtok, and Shishmaref are examples of communities that are being forced to consider relocating due to severe and chronic erosion and flooding.

Recently the Alaska District has noted an increasing number of requests for flooding and erosion protection assistance. This increase appears to be timed similar to observed climatological changes that may have an impact on flooding frequencies and erosion rates.

CORPS OF ENGINEERS AUTHORITIES

The Corps of Engineers has several authorities to address flooding and erosion problems. They include specific Congressional authorization, the Continuing Authorities Program, the Planning Assistance to States Program, and the Flood Plain Management Services Program.

In addressing flooding and erosion problems, the Corps works closely with local, state, Federal, tribal, and private interests to understand the concerns represented by these various stakeholders. The Corps weighs the concerns, balances the needs, and examines the costs and benefits to determine federal interest and to make technically, environmentally, socially, economically sound decisions.

Specifically Authorized

Specifically authorized studies may be initiated as provided by the Rivers and Harbors in Alaska Study Resolution, adopted by the U.S. House of Representatives Committee on Public Works on December 2, 1970. Construction of a project studied under this authority does, however, require specific Congressional construction authorization. Non-Federal cost sharing requirements are 50 percent for feasibility studies, 25 percent for preconstruction engineering and design, and 35 percent for construction of flooding and erosion projects.

The 1946 Shore Protection Cost Sharing Act established Federal policy to participate in construction of projects to protect the publicly-owned or publicly used shores of the United States against erosion from waves and currents.

Continuing Authorities Program

The Continuing Authorities Program authorizes the Corps of Engineers to plan, design, and construct erosion and flood control projects without additional and specific congressional authorization. Most of the Alaska District's erosion and flood control work has been conducted under one of the authorities in the Continuing Authorities Program (CAP). CAP authorities are funded nationwide and are subject to

specific limits on allowable Federal expenditures. The applicable program authorities that address flooding and erosion include the following.

—*Section 14 of the Flood Control Act of 1946, as amended*.—This authorizes emergency stream bank and shoreline erosion protection for public facilities subject to a Federal limit of $1,000,000 per project and $15,000,000 nationwide per year. Non-Federal cost sharing requirement is 35 percent.

—*Section 205 of the Flood Control Act of 1948, as amended*.—This authorizes small flood control projects subject to a Federal limit of $7,000,000 per project and $50,000,000 nationwide per year. Non-Federal cost sharing requirement is 35 percent.

—*Section 208 of the Flood Control Act of 1954, as amended*.—This authorizes snagging and clearing for flood control subject to a Federal limit of $500,000 per project and $7,500,000 nationwide per year. Non-Federal cost sharing requirement is 35 percent.

—*Section 103 of the River and Harbor Act of 1962, as amended*.—This authorizes protection of shores of publicly owned property from hurricane and storm damage subject to a Federal limit of $3,000,0000 per project and $30,000,000 nationwide per year. Non-Federal cost sharing requirement is 35 percent.

—*Section 111 of the River and Harbor Act of 1968, as amended*.—This authorizes mitigation of shoreline erosion damage cause by Federal navigation projects subject to a Federal limit of $5,000,0000. Non-Federal cost sharing requirement is at the same proportion as the associated Federal navigation project.

Planning Assistance to States

The Corps' Planning Assistance to States program allows the Corps to assist states in the preparation of comprehensive plans for the development, utilization, and conservation of water and related resources of drainage basins. This may include consideration of flooding and erosion problems. There is no construction authority associated with this program. Annual Federal funding is limited to $500,000 per state or tribe. Non-Federal cost sharing requirement is 50 percent.

Floodplain Management Services Program

The Corps' Flood Plain Management Services Program allows the Corps' to provide states and local governments with technical services and planning guidance on all aspects of flood plain management planning. There is no construction authority associated with this program. Non-Federal public entities do not have to pay for these services.

Other Authorities

Other Corps of Engineers' authorities that exist include the following.

—*Technical Assistance—Section 55, WRDA 74*.—This authority allows the Secretary of the Army, acting through the Chief of Engineers, to provide technical and engineering assistance to non-Federal public interests in developing structural and non-structural methods of preventing damages attributable to shore and stream bank erosion. Section 55 provides no construction authority. Non-Federal cost sharing is not required.

—*Tribal Partnership Program—Section 203, WRDA 2000*.—This program authorizes feasibility studies of water resource projects that will "substantially benefit Indian tribes and that are located primarily within Indian country or in proximity to Alaska Native villages." Section 203 has a $5,000,000 annual program limit and allows no more than $1,000,000 for one Indian tribe. The program provides no construction authority. Non-Federal cost sharing requirement is 50 percent for feasibility studies.

PRIOR FLOOD AND EROSION CONTROL STUDIES AND PROJECTS

To date, the Alaska District has received 63 requests for assistance with flooding and erosion problems from 60 communities in Alaska. Recently the number of requests for assistance with flooding, storm damage and erosion problems have increased. Of the 63 total requests, 47 have come within the last 5 years.

We have constructed eight flood control (7-Specifically Authorized and 1-Section 205) and eight erosion control projects (4-Congressionally Authorized and 4-Section 14) in Alaska at 14 communities.

Section 14 Projects

The majority of the requests for action for river erosion or coastal storm damage have come in under the Section 14 Emergency Stream Bank and Shore Protection Authority. Forty of the 63 community requests were for assistance under the Section 14 authority. This emergency authority authorizes the Corps to protect essential

public facilities that face an imminent erosion threat. The proposed protection project must cost less than it would cost to relocate the facilities to be protected. This authority differs from other Corps programs, because a least-cost analysis is performed, rather than a benefit cost analysis as is required in other programs.

Despite the number of requests, we have only constructed four projects (Bethel, Deering, Emmonak, and Metlakatla) under the Section 14 authority. More than half of the Section 14 requests resulted in no Federal project because relocation of the threatened structure was the least cost solution or the property at risk was private property. Other reasons include project costs exceeding the project or program funding limits and the financial inability of the community to provide the required 35 percent non-Federal cost share.

Congressionally Authorized Projects

We have constructed seven flood control and four erosion projects through specific Congressional authorization.

Alaska's largest flood control projects are the Chena River Lakes and Tanana River projects that protect the 70,000 residents of the City of Fairbanks and have prevented millions of dollars in flood damages. These projects were specifically authorized by Congress in the Flood Control Act of 1968, Public Law 90–483.

Other projects include erosion control structures in communities like Bethel, Homer, and Galena and flood control structures in Seward (Lowell Creek Tunnel), Skagway, Hyder (Salmon River), Talkeetna, and Juneau (Gold Creek).

CURRENT STUDIES AND PROJECTS

The Alaska District is currently has 9 active flood damage reduction and 11 active erosion control studies and projects underway. They include the following.

Barrow Storm Damage Reduction

The Alaska District's largest coastal storm damage reduction study is underway at Barrow located about 725 miles north of Anchorage, Alaska. In recent years winter storms have caused severe erosion of the shoreline. The erosion is threatening numerous public facilities; of particular concern is the Barrow solid waste landfill. Ongoing studies will obtain the environmental and engineering data necessary to plan and design alternative plans to reduce the storm damage. Fieldwork is currently underway to identify local sources of gravel that could be used to construct various alternatives including the replenishment of beach materials.

Kaktovik Erosion and Flooding

A reconnaissance study at Kaktovik about 650 miles north of Anchorage has identified erosion and flooding of the airport as an important concern that will be addressed by another agency. Erosion of gravesites and lands at Kaktovik is a continuing problem that may warrant further study if a cost-sharing sponsor can be identified.

Kenai River Bluff Erosion

The Kenai River is located approximately 100 miles south of Anchorage, Alaska. Erosion of the bluff along the Kenai River is endangering both public and private facilities. As directed and with funds provided by Congress in fiscal year 2002 and 2003, we initiated and are continuing technical evaluations and reconnaissance level investigations of the bank stabilization needs along the Lower Kenai River. Further study will depend on the findings of these investigations and the prospect for developing a solution that is environmentally acceptable and supported by sound engineering designs.

Matanuska Watershed

The Matanuska River is 77 miles long and originates in the Chugach and Talkeetna Mountains and empties into the Knik Arm of Upper Cook Inlet, approximately 40 miles east of Anchorage, Alaska. With funds provided by Congress in fiscal year 2002, we initiated reconnaissance phase investigations to evaluate potential solutions to the erosion problems along the Matanuska River. The Matanuska Watershed reconnaissance study identified riverbank erosion as an important problem to address in the feasibility stage of study. Local interests are working with the Corps to develop the scope and estimated costs for engineering, economic, and environmental studies that would be appropriate for a feasibility study.

McGrath Flood Damage Reduction

McGrath is located in western Alaska approximately 225 miles northwest of Anchorage, Alaska and serves as the transportation and service center for the surrounding area. Located on a bend of the upper Kuskokwim River, McGrath is often

subject to flood damages and erosion. The water supply treatment plant and important roads, businesses, and residences are in danger during high flow conditions. With funds provided by Congress in fiscal year 2003, we initiated reconnaissance studies, which are scheduled for completion in fiscal year 2004.

Skagway River Flood Control

Skagway is located at the northernmost end of Taiya Inlet, approximately 90 miles northeast of Juneau, Alaska. Much of the old City of Skagway is located within the Klondike Gold Rush National Historic Park. An existing flood control project was completed by the Corps of Engineers in 1940 and consists of a 6,700-foot long dike on the east bank of the Skagway River and a rubble-mound containment structure 1,800 feet long across the tide flats. With funds provided by Congress in fiscal year 2002, we initiated reconnaissance phase investigations to evaluate Federal interest in modifications and improvements to the existing dike and containment structure to prevent flooding to the historic City of Skagway and the airport facilities. The reconnaissance report was completed in November 2003 and found that there is Federal interest in continuing with feasibility phase studies.

Yakutat Flooding

Yakutat is located approximately 370 miles southeast of Anchorage, Alaska. With fund provided by Congress in fiscal year 2004, we are initiating reconnaissance phase investigations to determine Federal interest in flood damage protection from flooding hazards created by the Hubbard Glacier near Yakutat. The Hubbard Glacier is advancing across Russel Fjord where the glacier has created an ice dam twice in the past 20 years. If an ice dam occurs, the water level in Russel Fjord could raise high enough to overflow into the Situk River similar to the overflows that have occurred at least twice in the last few hundred years. The Corps is cooperating with the U.S. Forest Service, state agencies and the city of Yakutat to evaluate potential ways to reduce damages to the world class Situk River fishery and nearby infrastructure including the Yakutat airport. A reconnaissance report will summarize the evaluation of alternatives that has occurred and determine if a Federal interest exists for more detailed studies.

Bethel Bank Stabilization, Alaska

Bethel is located at the mouth of the Kuskokwim River, 40 miles inland from the Bering Sea and approximately 400 air miles northwest of Anchorage, Alaska. In accordance with Congressional direction provided in the fiscal year 2001 Energy and Water Development Act, we initiated engineering activities, from within available funds, to extend the existing Bethel Bank Stabilization project an additional 1,200 feet. Congress also directed the removal of sediments from Brown Slough that hamper navigation. However, it was determined that the Corps does not have authority for the removal of sediments from Brown Slough. The project decision document was completed in December 2001 and the Project Cooperation Agreement was executed in December 2002. The local sponsor is continuing with required real estate acquisition and construction.

Dillingham Bank Stabilization, Alaska

Dillingham is located approximately 330 miles southwest of Anchorage, Alaska. The Dillingham Bank Stabilization project provides 1,600 feet of sheet pile bulkhead to protect water and sewer lines, communication systems, homes, and businesses along an eroding bluff in the City of Dillingham. A Project Cooperation Agreement was executed in January 1998 and a construction contract was awarded in September 1998. Construction was initiated in fiscal year 1999 and was completed in fiscal year 2001. As directed by Congress in the fiscal year 2001 Energy and Water Development Act, we initiated work to extend the project and replace the existing wooden bulkhead at the city dock. In fiscal year 2003 and fiscal year 2004 we are continuing with preparations of plans and specifications, a project decision document, and negotiations for modifications to the existing Project Cooperation Agreement.

Galena Bank Stabilization, Alaska

Galena is located on the north bank of the Yukon River, 270 air miles west of Fairbanks, Alaska. In accordance with Congressional direction and funds provided in the fiscal year 2001 Energy and Water Development Act, we initiated engineering activities to provide additional emergency bank stabilization measures at Galena. The work will be accomplished under the same terms and conditions as the previous emergency bank stabilization project that was completed in 1987. Stream bank survey work was completed in the summer of fiscal year 2001. In fiscal year 2002, we worked on plans and specifications, a project decision document, and negotiations

for the Project Cooperation Agreement. The Project Cooperation Agreement was executed in August 2003. Construction is scheduled for award this fiscal year.

Planning Assistance to States

The Corps' Planning Assistance to the States authority is being used at Kivalina and Newtok in western Alaska to assist each community with plans to relocate so they can avoid serious erosion and flooding problems. Comprehensive community plans are being developed for the new village sites. Due to the lack of existing infrastructure to offload gravel, it has been a challenge to find low cost sources of gravel for constructing pads to prevent permafrost soils from melting under new buildings and for elevating structures above potential flood elevations.

Alaska Village Erosion Technical Analysis

As directed by Congress in fiscal year 2004, we initiated the Alaska Village Erosion Technical Analysis studies for the villages of Shishmaref, Kivalina, Newtok, Unalakleet, Kaktovik, Bethel, and Dillingham. A programmatic environmental impact analysis is being done for the potential relocation of Shishmaref based on specific guidance received from Congress. The studies at each village will estimate the damages caused by erosion, evaluate the potential ways to relocate communities that cannot be economically protected, and estimate when any of these villages would no longer be able to function due to losses caused by erosion and flooding.

Continuing Authorities Program

Under the Continuing Authorities Program, Alaska District has the following projects underway.

Deering

Deering is located on Kotzebue Sound at the mouth of the Inmachuk River, 57 miles southwest of Kotzebue. It is built on a flat sand and gravel spit 300 feet wide and a half-mile long. Storm waves and high water threaten cultural resources along the village shoreline. In July of 2002 remains were uncovered by wave action during a storm. A state trooper visited the village to perform an on site inspection and made the determination that the remains were of ancient origin. Archaeologists from the Northern Land Use Research excavated a portion of the site to further verify that the remains were of human remains from ancient origin. We are currently investigating the erosion problem under the Section 14 authority to determine if there is a design solution that would cost less than performing an archaeological dig to preserve the site.

Kwethluk

Kwethluk is located along the banks of Kwethluk River on its junction with the Kuskokwim River, approximately 12 air miles east of Bethel and 390 air miles northwest of Anchorage. The existing streambank protection is in need of repair at both the upstream and downstream ends of the project. Erosion has created a hole approximately 7 feet high and 6–10 feet deep. The overhanging concrete is posing a threat to children who might be playing in the area. The stream bank adjacent to the city is also in need of protection. It has a 7-foot vertical bank in highly erosive soils that extend approximately 1 mile along the city limits. An analysis of the erosion rates along the Kwethluk River is needed to insure an appropriate long-term solution to the stream bank problem. There is no work being performed this year due to budget limits for the Section 14 authority for this fiscal year. We will request funding for work next year under the Section 14 authority.

Seward

Seward is located on Resurrection Bay, on the east coast of Kenai Peninsula, 125 highway miles south of Anchorage. The Seward Marine Industrial Center (SMIC) site is located on the east side of Resurrection Bay at the south end of the SMIC bulkhead. Wave action has eroded the gravel fill material near the end of the bulkhead. Wave action continues to erode the gravel from behind the bridge sections and along the remaining unprotected shoreline. We are currently investigating the erosion problem under the Section 14 authority and are developing a design solution to protect the utilities in this area from the erosion.

Shishmaref

Shishmaref is located on Sarichef Island, in the Chukchi Sea, just north of the Bering Strait. It is five miles from the mainland, 126 miles north of Nome and 100 miles southwest of Kotzebue. A fall storm has caused increased erosion along the beach shore threatening several public interests, including the public school. A Report recommending construction of a layered rock revetment 230 lineal feet in length has been approved. A Section 14 Project Cooperation Agreement is currently

being developed. Federal construction funds are available with the intent of initiating construction by the end of the fiscal year 2004.

Point Hope

Point Hope is located near the tip of Point Hope peninsula, a large gravel spit that forms the western-most extension of the northwest Alaska coast, approximately 710 miles northwest of Anchorage. With a mean sea level elevation of only 14 feet, wind driven storm surge and flooding impacts the village from all directions of the compass. During flooding events, the only escape route to high grounds is one of the first things to be inundated. This road is in dire need of being raised and fortified. The flooding also is damaging significant cultural resources located along the shore. We are currently investigating the erosion problem under the Section 103 authority to determine if there is a design solution that would be eligible for Federal participation.

Fort Yukon

Fort Yukon is located in the interior region of Alaska on the north bank of the Yukon River near its confluence with the Porcupine River. Fort Yukon lies about 8 miles north of the Arctic Circle and 140 miles northeast of Fairbanks. The city is located immediately upstream of the confluence of the Yukon and Porcupine Rivers. These rivers carry large amounts of breakup ice in the spring and periodically an ice jam is created at the confluence of the two rivers. Ice jams at this location often result in an elevated river stage, which floods the low-lying areas at Fort Yukon. Floods are also caused by coincident increases in river stages due to surges in snowmelt runoff. We are currently investigating the erosion problem under the Section 205 authority to determine if there is a design solution that would be eligible for Federal participation. The community of Fort Yukon has indicated they would participate as the non-Federal sponsor for the study currently being scoped.

Valdez

Valdez is located on the north shore of Port Valdez, a deepwater fjord in Prince William Sound, approximately 305 road miles east of Anchorage. Glacier Stream has been narrowed to pass under a bridge at the Richardson Highway. This created a flooding problem in the stream and threatens the Richardson Highway and Glacier Stream Road. We are currently investigating the erosion problem under the Section 205 authority to determine if there is a design solution that would be eligible for Federal participation.

CHALLENGES

While the Corps of Engineers does have the technical capabilities, authorities, and programs to address flooding and erosions problems, it is often difficult for the majority of these small and remote communities to meet the benefit to cost ratio of 1.0 or greater required for Federal participation in implementing a solution. The cost of construction in remote areas, weather, lack of data, and the subsistence economies of the communities are major contributing factors.

In addition, while some of these communities can meet the requirement for 35 percent non Federal cost sharing, many do not have the financial capability to cost share.

High Cost Environment

The cost of building flood and erosion prevention structures is much higher in remote Alaska than at similar situations in the contiguous United States. Commercial sources of construction material, equipment, trained labor, supplies, support facilities and fuel are very limited in the remote regions of Alaska. Modes of transportation are usually limited to shallow draft barge or air transport. These are costly. The construction season is effectively limited to five or six months due to the extreme weather conditions. Environmental constraints also limit when work can be performed. The most common are restrictions to in-water work and limitations to armor rock extraction activities. These factors drive the cost of construction up.

Many of the communities mentioned in the GAO report are in the Yukon-Kuskokwim delta region (Western Alaska). In the 21,000 square mile area of the Yukon-Kuskokwim delta region, commercial sources for rock are very limited and costly (key material in most bank stabilization projects). Larger, high quality rock is only available at a couple of places, Cape Nome or Saint Paul, both of which are far away and have limited production capacity and transportation options. In some instances it has been more cost effective to barge material from Washington State. Commercial gravel sources are also very limited and typically must be barged into a site from 100 to 150 miles away.

There is some potential for developing local sources of material but the price will often be equivalent to the cost of the nearest commercial source (that may be several hundred miles away) plus transportation. Contractors using these sources are risking the cost to bring in equipment to develop an unknown quantity and quality of material. This risk is reflected in their bids.

Construction equipment is typically not available in remote areas and has to be barged into the site. Most transportation of equipment occurs by barge during very limited shipping seasons. If the equipment does not make the last barge before freeze-up it will sit idle (and may be vandalized) all winter. It is often six months or more until the next barge can make it to the site. Mobilization costs approach a half a million dollars on small-scale bank stabilization projects. Barge access may not be available, in which case the equipment must be walked cross-country in winter. This is a costly high-risk operation for a contractor.

Trained labor, and the supplies and accommodations for labor are in short supply or do not exist in remote areas. Construction camps, with food and supplies shipped in, are the norm. They are costly.

Fuel often needs to be shipped in as well. Many communities in remote areas barge in only as much fuel as can be stored and that they can afford to buy in the fall before the rivers and inlets freeze. Fuel supplies may be very limited in the spring. To get an early start on the limited construction season, contractors may arrive in an area in early spring and find limited fuel and the next fuel barge is not scheduled until June when the river is navigable. These contractors often resort to flying their fuel in on small planes, 150 to 200 gallons at a time. Larger deliveries are not possible given the size of the airports associated with these communities. Gasoline in Shishmaref currently costs over $5.00 a gallon.

When a piece of equipment breaks down it may require a week to get parts out of Anchorage or Seattle. If the personnel at the site cannot repair the equipment, a mechanic may have to be flown to the site to perform the repair.

The expense of construction in much of Alaska is directly related to the remoteness of the sites. This translates into high cost for transportation, materials and labor and a premium for the high risk associated with constructing the project. All of these items are reflected in the limited number of bids received on a project.

Local Economy

Of the authorities that the Corps of Engineers has to address flooding and erosion problems in Alaskan Native communities, all require cost sharing by the local sponsor. While some communities are financially capable, many of the small communities do not have the ability to cost share even the small Section 14 projects that require a local cost share of 35 percent. Their economies are not wholly cash-based, so local governments have a very limited tax base. Many of these communities have a high percentage of the population living "below the poverty level." These communities have a subsistence economy that is often more robust than the cash economy measured and evaluated by the National Census. There are many healthy and socially fulfilled people in these communities living "below the poverty level."

Other sources of funds for the required local cost share have been difficult to obtain. Communities have applied for Community Block Development Grant (CBDG) funds toward construction of erosion control projects, but they were unsuccessful. In recent years, the District's only cost-shared erosion control projects are in Barrow, Bethel, and Homer, all large hub communities that have financial resources, and Shishmaref—where the school district has obtained funds from the State to preserve the school infrastructure. Our other erosion control projects, Dillingham and Galena, were specifically authorized by Congress at 100 percent federal expense.

Data Collection

The Corps of Engineers is uniquely positioned to provide ongoing support to communities in danger of flooding, coastal erosion and other natural disasters. For example, the Floodplain Management Services work performed by the Alaska District provides technical assistance to many communities at risk to flooding. This program helps record maximum high water marks in many areas that are affected by both high flow stage and ice jam flooding. These records correlate with engineering work to define real world flood levels for many communities.

However, there are still significant flooding and coastal data gaps throughout Alaska. Little historical or detailed data exists for the coastal areas north of the Aleutian Islands and in most remote areas. The lack of reliable data can result in higher costs for flooding and erosion solutions because designers must be conservative when working with little or no data. Long term and reliable data collection and modeling are essential to help designers to provide more cost-effective designs, and to develop a better understanding of hazards that exist for these communities.

Both the east and west coasts of the contiguous United States have benefited from regional coastal studies that have developed design data and models for extreme storm events and typical yearly wave climates. These types of data collection studies and models are necessary and essential for the State of Alaska, which has over half of the total national coastline.

CONCLUSION

We like to think of ourselves as problem solvers and we have the technology and experience to find solutions to these complex problems. However, the title of the GAO's report, "Alaska Native Villages, Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance," appropriately summarizes the dilemma faced by these Alaskan communities and the federal agencies attempting to help them.

Mr. Chairman, this concludes my portion of our testimony, and I am again honored to appear before you.

At this time, I am prepared to respond to any questions you or the Committee may have.

PREPARED STATEMENT OF ALEUTIANS EAST BOROUGH

NELSON LAGOON EROSION CONTROL PROJECT

Nelson Lagoon, like some other coastal communities in Alaska, has an erosion problem. Climate change is blamed for the lack of protection, in that in the past the ice pack protected the community's shoreline during severe winter storms. The warming trend of the last 10–15 years has eliminated the ice pack and exposed the shoreline throughout the winter seasons. Last winter alone, more than four feet of beach was lost. Residents further speculate that the Alaska Department of Transportation's excavation of beach sand in another location on the spit (for airport construction) accentuated the problem. Regardless of cause, approximately one mile of shoreline at the community's doorstep is rapidly eroding and ten homes are at risk.

In 1986, a contractor came in to "fix" the erosion problem using gabion baskets filled with rocks. However, the rocks were too small with respect to the size of the gabion mesh and the rocks fell out, were scattered along the beach by wave activity and were eventually washed away.

In addition to the unprotected section of shoreline, another "seawall"—a wooden barrier that ran in front of several homes along the beach—is not working. Nelson Lagoon has a normal tidal range of approximately 18 feet, with storms the tides are in the range of 20–22 feet. Because the wooden barrier has no weight and is not anchored, it floats during high tides and during storms the waves simply roll over it. Thus, while it was originally intended to dissipate waves before they reach the shore, it is not effective.

Residents of one house along the beach have, in desperation, attempted to fashion their own erosion control. The fisherman head of house gathered rocks from an unknown location outside the community and filled a series of old plastic fish totes with rocks, bolting them together for stability. The makeshift "seawall" is approximately six feet wide by fifteen feet long. It is crude but apparently effective. This makeshift solution might be suggested for other homes along the beach, except that Nelson Lagoon has no source of rock and fish totes are not affordable for every household.

The Aleutians East Borough has received $100,000 of Coastal Impact Assistance Program grant funds to provide a demonstration erosion control project. The project combines local labor and equipment with a new technology called "Geotubes". This summer 400 feet of sand-filled fabric tubes will be placed along the beach in Nelson Lagoon in an engineered position. The site has been surveyed and will be surveyed again one year and two years after the Geotubes are in place to determine effectiveness. This successful project will provide a model of erosion control that may be adopted or adapted by other coastal communities and used more extensively in Nelson Lagoon. If unsuccessful, the report will document the failure of the Geotubes for other considering their options for erosion control.

The Aleutians East Borough requests continued support for identifying areas and causes of erosion in Nelson Lagoon and evaluating the Geotube Project and other erosion control options.

Chairman STEVENS. Our next witness is John Pennington, Regional Director of the Federal Emergency Management Agency. John, good morning.

STATEMENT OF JOHN PENNINGTON, REGIONAL DIRECTOR, U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY

ACCOMPANIED BY CARL COOK, DIVISION DIRECTOR, FLOOD INSURANCE MITIGATION DIVISION, U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY

Mr. PENNINGTON. Good morning, Mr. Chairman, and members of the committee. Thank you for inviting us here this morning.

I'm John Pennington, the Regional Director of the U.S. Department of Homeland Security's Federal Emergency Management Agency, Region 10, located in Bothell, Washington. Our four States incorporate areas of Alaska, Idaho, Washington, and Oregon. On behalf of FEMA and the Department of Homeland Security, we welcome and appreciate the invitation to appear today before the Committee on Appropriations. It is a distinct honor and privilege to be here.

With me today is Carl Cook, who is our Division Director for our Flood Insurance Mitigation Division. He's available to answer any technical questions as it relates to FEMA policy. As you well know, FEMA is the lead Federal agency responsible for coordinating disaster response, recovery, and mitigation efforts following the disasters and emergencies that are declared by the President.

STAFFORD ACT ASSISTANCE

Our programs are made available to communities through our State partner organizations, and in this State it is the Alaska Division of Homeland Security and Emergency Management. They are intended to supplement the response activities and recovery programs of States. The programs are authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, commonly referred to as the Stafford Act. The Stafford Act is widely known as the authority by which programs are made available following disaster declarations.

There is a myriad of assistances available under the Stafford Act, and I'd like to point out a couple of them that I think would be of interest to you. First, the Public Assistance Program, which provides assistance for the restoration of public and certain private nonprofit facilities that are damaged by an event, as well as the reimbursement of costs associated with emergency protective measures and debris removal.

The second program is Individual Assistance, which helps individuals and families ensure their essential needs are met after disasters and that they can begin the often long road to successful recovery.

The third and fourth mitigation programs; the Hazard Mitigation Grant Program, which I'll discuss in detail in a moment, as well as the Pre-Disaster Mitigation Program, which is authorized under the Stafford Act.

FEMA's programs are primarily designed to assist States and communities in carrying out their responsibilities and their priorities. Our assistance is available in varying forms, such as grants, as well as in both technical and planning assistance.

Before I get into the area of programs, I think it's interesting to point out that the success of FEMA, both in this region and nationwide, is really built on our partnerships in the State, tribal, and

private sectors. In this State we have been very fortunate to deal with the Alaska Division of Homeland Security and Emergency Management, in particular, Commissioner Campbell—General Craig Campbell, and Dave Liebersbach, who is the Director of the Alaska Division of Homeland Security and Emergency Management. We have forged what can only be described as a very strong professional working relationship with them and we feel really fortunate to have them as a partner.

Considering the subject of "Alaska Native Villages Affected by Flooding and Erosion," I'm going to focus on three of our programs that I believe can be available to the State of Alaska and the Native villages in their efforts to address the complex challenges of flooding and erosion.

PRE-DISASTER MITIGATION PROGRAM

First, the Pre-Disaster Mitigation Program. It was authorized by Congress under the Disaster Mitigation Act of 2000, which was signed on October 30 of that year. This program is available to communities through the State emergency management organizations and is designed to fund the most competitive mitigation projects and planning efforts of States and communities, as are identified and prioritized in State and local mitigation plans. The development and adoption of these State and local mitigation plans is required under the Stafford Act as a result of the legislative amendments of 2000.

Funding for this competitive grant program is not triggered by a Presidential Disaster Declaration, rather it is funded through the annual appropriations process. All States and communities throughout the Nation that have FEMA-approved mitigation plans are eligible to apply for the program. Accordingly, the Pre-Disaster Mitigation Program will help sustain an enhanced national mitigation effort year to year, as opposed to previous years when FEMA mitigation assistance was generally only available after a disaster declaration has taken place.

Examples of projects funded under the program include the development of all hazard mitigation plans, seismic retrofitting of critical public buildings, and acquisition or relocation of flood-prone properties located in the floodplain, just to name a few. All projects submitted are developed at the State or local level, must be cost-effective, and are approved following a nationally competitive peer-review process.

HAZARD MITIGATION GRANT PROGRAM

Second is our Hazard Mitigation Grant Program. It's available to States and communities following Presidential Disaster Declarations. It's quite similar to the Pre-Disaster Mitigation Program just described, though it is only available after a disaster declaration and is available only for the State in which the declaration was made. Further, the amount of assistance available under the Hazard Mitigation Grant Program is a percentage of FEMA's assistance made available under the response and recovery programs, specifically 7.5 percent of the total projected expenditures for the disaster grants. Essentially, the greater the losses an affected State incurs, the greater the hazard mitigation assistance available.

As with the Pre-Disaster Mitigation Program, all projects are developed at the State or local level, need to be cost effective, and are recommended by the State in accordance with the State Hazard Mitigation Plan. Again, examples of projects funded under the Hazard Mitigation Grant Program include the development of all hazard mitigation plans, the seismic retrofitting, et cetera.

FLOOD MITIGATION ASSISTANCE PROGRAM

Third, FEMA's Flood Mitigation Assistance Program. It is authorized for mitigating structures insured by the National Flood Insurance Program within a community participating in that particular program. Projects include the elevation, relocation, and acquisition of flood-prone structures. Because this program is funded by monies collected from policyholders, the recent focus of the program has been on mitigating repetitive loss structures in order to reduce the drain on the actual fund itself. Repetitive loss structures are defined as those insured structures where two or more insurance claims have been filed in any 10-year period.

There are two important points that I'd like to bring to the committee's attention. One—and this is regarding the Flood Mitigation Assistance Program. One, many of the remote Alaskan communities vulnerable to flooding and erosion are not currently in areas mapped for flood hazards and are not participating in the NFIP, which is a requirement for consideration under the Flood Mitigation Assistance Program.

Second, in fiscal year 1998, $600,000 of assistance was actually provided to Shishmaref under the Flood Mitigation Assistance Program for bank protection and the elevation and relocation of approximately nine residences. This assistance was provided, however, prior to the policy change that required all projects to be targeted at NFIP repetitive loss structures.

In summary, FEMA may provide assistance to Alaskan Native villages affected by flooding and erosion primarily in the areas of mitigation planning and project grants. I will ensure that our mitigation staff will certainly do anything that it can in the areas of PDM, HMGP and NFIP to accomplish that.

What I'd like to leave with you is—and I think Senator Murkowski's comments are very appropriate—that a lot of times FEMA does come in afterwards, and I think we are limited by the Stafford Act in so many cases. But if something does occur in those communities, rest assured that we are there to implement the full breadth of the Stafford Act, its policies and programs to ensure that those communities are taken care of.

Thank you.

Chairman STEVENS. Thank you very much.

[The statement follows:]

PREPARED STATEMENT OF JOHN E. PENNINGTON

Chairman Stevens, and Members of the Committee, I am John E. Pennington, Regional Director of the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 Office located in Bothell, Washington. On behalf of FEMA, and the Department of Homeland Security, we welcome and appreciate the invitation to appear today before the Committee on Appropriations. It is a distinct honor and privilege to be here today.

As you all well know, FEMA is the lead federal agency responsible for coordinating disaster response, recovery, and mitigation efforts following disasters and emergencies declared by the President. Our programs are made available to communities through our state partner organizations, and are intended to supplement the response activities and recovery programs of states. These programs are authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, commonly referred to as the "Stafford Act." The Stafford Act is widely known as the authority by which programs are made available following disaster declarations.

Assistance that is made available to states, communities, and individuals following disasters include:

—The Public Assistance program, which provides assistance for the restoration of public and certain private non-profit facilities damaged by an event, and the reimbursement of the costs associated with emergency protective measures and debris removal;

—The Individual Assistance programs, which help individuals and families ensure their essential needs are met after disasters and that they can begin the road to successful recovery; and

—The Hazard Mitigation Grant program, which I will discuss in detail in a moment.

Additionally, the Pre-Disaster Mitigation program is authorized under the Stafford Act.

FEMA's programs are designed to assist states and communities in carrying out their responsibilities and priorities. Our assistance is available in varying forms, such as grants, technical assistance, and planning assistance.

Before I discuss the specific programs applicable to the topic of this hearing, I must point out that the success of FEMA and our programs is dependent on a strong professional partnership with state emergency management offices. Thanks to the leadership of Major General Craig Campbell, Commissioner of the Alaska Department of Military and Veterans Affairs, and Dave Liebersbach, Director of the Alaska Division of Homeland Security and Emergency Management, we have forged a strong and lasting professional partnership that ensures successful emergency management for Alaskan communities and citizens. FEMA greatly appreciates their leadership, professionalism, and dedication.

Considering the subject of "Alaska Native Villages Affected by Flooding and Erosion," I will focus on three of FEMA's programs that could be available to the state of Alaska and the Alaskan Native villages in their efforts to address the complex challenges of flooding and erosion.

First, the Pre-Disaster Mitigation program was authorized by Congress under the Disaster Mitigation Act of 2000, which was signed into law on October 30, 2000. This program is available to communities through the state emergency management organizations, and is designed to fund the most competitive mitigation projects and planning efforts of states and communities, as identified and prioritized in state and local mitigation plans. The development and adoption of these state and local mitigation plans is required under the Stafford Act as a result of the legislative amendments of 2000. Funding for this competitive grant program is not triggered by a Presidential Disaster Declaration; rather it is funded through the annual appropriations process. All states and communities throughout the nation that have FEMA-approved mitigation plans are eligible to apply for the program. Accordingly, the Pre-Disaster Mitigation program will help sustain an enhanced national mitigation effort year-to-year, as opposed to previous years when FEMA mitigation assistance was generally only available when a disaster was declared in a state.

Examples of projects funded under the program include the development of all-hazard mitigation plans, the seismic retrofitting of critical public buildings, and acquisition or relocation of flood-prone properties located in the floodplain, just to name a few. All projects submitted are developed at the state or local level, must be cost-effective, and are approved following a nationally competitive peer-review process.

Second, the Hazard Mitigation Grant Program is available to states and communities following Presidential Disaster Declarations. This program is quite similar to the Pre-Disaster Mitigation program just described, though it is available only after a Disaster is declared, and is available only for the state in which the declaration was made. Further, the amount of assistance available under the Hazard Mitigation Grant Program is a percentage of FEMA's assistance made available under the response and recovery programs—specifically 7.5 percent of the total projected expenditures for the disaster grants. Essentially, the greater the losses an affected state incurs, the greater the hazard mitigation assistance available.

As with the Pre-Disaster Mitigation program, all projects are developed at the state or local level, must be cost-effective, and are recommended by the state in ac-

cordance with the State Hazard Mitigation Plan. Again, examples of projects funded under the Hazard Mitigation Grant Program include the development of all-hazards mitigation plans, the seismic retrofitting of critical public buildings, and acquisition or relocation of flood-prone properties located in the floodplain.

Third, FEMA's Flood Mitigation Assistance program is authorized for mitigating structures insured by the National Flood Insurance Program within a community participating in the National Flood Insurance Program. Projects include the elevation, relocation, and acquisition of flood prone structures. Because this program is funded by monies collected from policyholders, the recent focus of the program has been on mitigating repetitive loss structures in order to reduce the drain on the National Flood Insurance Fund. Repetitive loss structures are those insured structures where two or more insurance claims have been filed in any 10-year period.

There are two important points I must mention related to the potential eligibility of projects under the Flood Mitigation Assistance program: (1) Many of the remote Alaskan communities vulnerable to flooding and erosion are not currently in areas mapped for flood hazards and are not participating in the NFIP, which is a requirement for consideration under the Flood Mitigation Assistance program, even in unmapped areas; and (2) In fiscal year 1998, $600,000 of assistance was provided to Shishmaref under the Flood Mitigation Assistance program for bank protection and the elevation and relocation of approximately nine residences. This assistance was provided prior to the policy change that required all projects to be targeted at NFIP repetitive loss structures.

In summary, FEMA may provide assistance to Alaskan Native Villages affected by flooding and erosion primarily in the areas of mitigation planning and project grants. I will ensure that the dedicated mitigation staff of FEMA will continue to work with the state of Alaska to identify and provide technical assistance in the development of cost-effective projects for consideration under the Pre-Disaster Mitigation and Hazard Mitigation Grant programs and, for communities participating in the National Flood Insurance Program, the Flood Mitigation Assistance Program. Finally, if one or more communities experience significant flooding and a Major Disaster were declared, please be assured that the full breadth of our Stafford Act programs would become available. FEMA would ensure the recovery and mitigation programs would be provided with the greatest of coordination and allowable flexibility to ensure the long-term plans of the communities are considered, to include the potential relocation of certain structures and facilities.

In closing, I appreciate the opportunity to represent the Federal Emergency Management Agency and the Department of Homeland Security before the Committee on Appropriations. I am pleased to answer any questions you may have.

Chairman STEVENS. Our next witness is Mr. Robert A. Robinson, Managing Director of the Natural Resources and Environment for the United States General Accounting Office. Rob.

STATEMENT OF ROBERT A. ROBINSON, MANAGING DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GENERAL ACCOUNTING OFFICE

Mr. ROBINSON. Thank you, Mr. Chairman. It's always a pleasure to come to Alaska for any reason, and it's a particular privilege to be able to discuss the findings of our December 2003 report on flooding and erosion problems in Alaska villages. Joining me today is Jack Malcolm, who is GAO's expert on Federal Native American programs and the Stafford Act and who worked on this project, as well as our ongoing work for you looking at rights in the States.

Our review of Alaska Native village flooding was undertaken in response to a congressional mandate set forth in the conference report on the 2003 military construction appropriation. It had four distinct objectives. First, to determine the extent of the flooding and erosion problem. Second, to identify Federal and State programs that are available to address the problems. Three, to determine how nine specific villages were responding to their particular problems, and, finally, to identify alternatives for the Congress to consider in providing assistance to the villages. Respecting the time available, let me just hit the highlights of what we found.

For those interested in a fuller discussion, there are some hard copies available in the back of the room as well.

First, flooding and erosion affects the vast majority of Alaska Native villages. The affected villages are in every region of the State, specifically almost 90 percent or 184 out of 213 villages face flooding and erosion problems of some sort. Our findings are consistent with State studies in the early 1980s that found a similar count.

Unfortunately, while many such problems are long-standing, it appears that they are getting worse due in part to rising temperatures. The cost to address these problems could easily exceed $1 billion.

Second, numerous national programs managed by at least seven Federal agencies are available to respond to the flooding and erosion problems as discussed. Multiple Alaska State programs are also available. The principal programs are administered by the Army Corps of Engineers and the Agriculture Department's Natural Resources and Conservation Services, DAT- and HUD-run multiple programs, and of course, as you heard, FEMA runs relative programs as well.

The good news is that many programs exist. The bad news is that the villages often do not meet the key eligibility requirements to qualify for assistance. This is occurring for two main reasons: One, the expected cost of projects to address the problems often exceed the maximum required benefit. The main Federal programs require maximum benefits to exceed project costs before funding can be provided. This legal requirement is set forth in the Flood Control Act of 1936.

Second, villages often cannot come up with the funds needed to satisfy cost-share requirements. As you've heard earlier, the Corps of Engineers generally requires that local communities can fund between 25 and 50 percent of flood control projects. Native villages, of course, do not have the hundreds of thousands of dollars that could be necessary to meet this obligation.

The State of Alaska has jumped in on many occasions in the past to fulfill that obligation, but State budgets are getting short as well.

Relative to the third objective: Of the nine villages that we reviewed, four, Kivalina, Koyukuk, Newtok and Shishmaref are in imminent danger and are making plans to relocate at potentially very high costs. The cost estimates to relocate Kivalina's 388 residents have ranged from $100 million to well over $400 million. No estimates are available for Newtok, Shishmaref and Koyukuk, but the United States Corps of Engineers is actively starting a number of studies to develop cost estimates.

The other five villages, Barrow, Bethel, Kaktovik, Point Hope, and Unalakleet, are considering other alternatives, such as protecting the infrastructure or supplementing existing seawalls. I believe representatives of each one of these nine villages will be speaking tomorrow.

Finally, we presented four options for the Congress to consider as it deliberates over how and to what extent Federal programs could readily respond to the flooding and erosion problems here.

They are, in order, expanding the role of the Denali Commission to include flooding and erosion control among its authorized activi-

ties; directing Federal agencies, particularly the Corps and main NRC programs, to include a value for social and environmental factors in their cost-benefit calculations, not just a consideration for flood and erosion control projects in Alaska Native villages; the programs waiving the Federal cost-sharing requirement for flooding and erosion projects in Alaska villages and, finally, authorizing villages to consolidate or bundle funds from multiple Federal agencies and programs to address the problems or satisfy local cost-share requirements.

Obviously, considering such alternatives is a policy decision resting with the Congress, and we did not weigh in on which, if any, option should be chosen. As needs and potentially other options are raised, however, budgetary costs as well as the implications of any program changes made for Alaska villages would have for the rest of the Nation the precedent-setting aspect would have to be considered.

Mr. Chairman, there is much more we could say and discuss on the subject, but let me close here and just mention that Jeff and I are available and happy to respond to any questions you may have at the appropriate time.

Thank you.

Chairman STEVENS. Thank you very much.

[The statement follows:]

PREPARED STATEMENT OF ROBERT A. ROBINSON

Mr. Chairman and Members of the Committee: Thank you for the opportunity to discuss our work on Alaska Native villages affected by flooding and erosion. As you know, Alaska's shorelines and riverbanks serve as home to over 200 Native villages whose inhabitants generally hunt and fish for subsistence. However, these shorelines and riverbanks can be subject to periodic, yet severe flooding and erosion. Coastal and river flooding and erosion cause millions of dollars of property damage in Alaska Native villages, damaging or destroying homes, public buildings, and airport runways. Several federal and state agencies are directly or indirectly involved in providing assistance for flooding and erosion in Alaska. In addition to government agencies, the Denali Commission, created by Congress in 1998, is charged with addressing crucial needs of rural Alaska communities, particularly isolated Alaska Native villages, although it is not directly responsible for responding to flooding and erosion.[1]

The fiscal year 2003 Conference Report for the military construction appropriation bill directed GAO to study Alaska Native villages affected by flooding and erosion.[2] In December 2003, we reported on Alaska Native villages' access to federal flooding and erosion programs.[3] These programs are administered by several federal agencies, but principally by the U.S. Army Corps of Engineers and the Agriculture Department's Natural Resources Conservation Service. Our report discussed four alternatives that could help mitigate the barriers that villages face in obtaining federal services. Our testimony today is based on that report and focuses on (1) the number of Alaska Native villages affected by flooding and erosion, (2) the extent to which federal assistance has been provided to those villages, (3) the efforts of nine villages to respond to flooding and erosion, and (4) alternatives that Congress may wish to consider when providing assistance for flooding and erosion of Alaska Native villages.

To meet these objectives, we reviewed federal and state flooding and erosion studies and project documents and interviewed federal and state agency officials and representatives from nine Alaska Native villages. We also visited four of the nine villages. While the conference report directed us to include at least six villages in our study—Barrow, Bethel, Kaktovik, Kivalina, Point Hope, and Unalakleet—we

[1] Pub. L. No. 105–277, tit. III, 112 Stat. 2681 (1998).
[2] H. R. Conf. Rep. No. 107–731, at 15 (2002).
[3] U.S. General Accounting Office, *Alaska Native Villages: Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance*, GAO–04–142 (Washington, D.C.: Dec. 12, 2003).

added three more—Koyukuk, Newtok, and Shishmaref—based on discussions with congressional staff and with federal and state officials familiar with flooding and erosion problems. Our December 2003 report, on which this testimony is based, was prepared in accordance with generally accepted government auditing standards.

In summary, we reported the following:

—First, 184 out of 213, or 86 percent of Alaska Native villages experience some level of flooding and erosion, according to federal and state officials in Alaska. Native villages on the coast or along rivers have long been subject to both annual and episodic flooding and erosion. Various studies and reports indicate that coastal villages in Alaska are becoming more susceptible to flooding and erosion in part because rising temperatures delay formation of protective shore ice, leaving the villages vulnerable to fall storms. For example, the barrier island village of Shishmaref, which is less than 1,320 feet wide, lost 125 feet of beach to erosion during an October 1997 storm. In addition, villages in low-lying areas along riverbanks or in river deltas are susceptible to flooding and erosion caused by ice jams, snow and glacial melts, rising sea levels, and heavy rainfall.

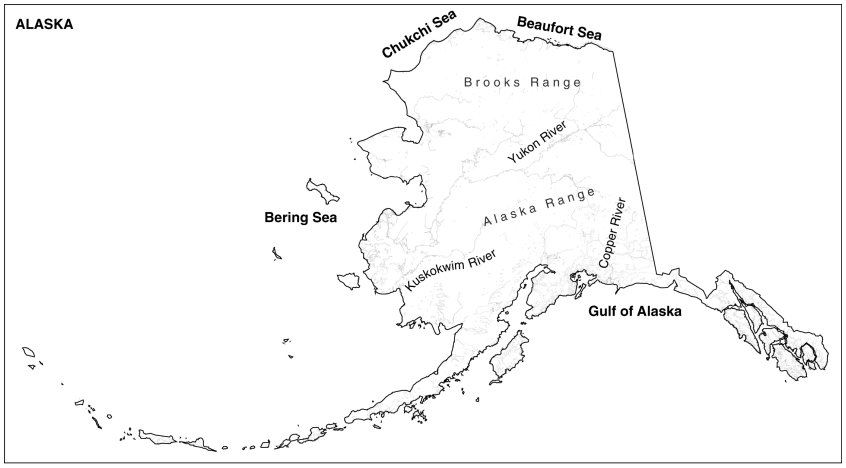
—Second, small and remote Alaska Native villages often fail to qualify for assistance under federal flooding and erosion programs because they do not meet program eligibility criteria. For example, according to the Corps' guidelines for evaluating water resource projects, the Corps generally cannot undertake a project when the economic costs exceed the expected benefits. With few exceptions, Alaska Native villages' requests for assistance under this program are denied because the project costs usually outweigh expected economic benefits as currently defined. Even villages that meet the Corps' cost/benefit criteria may still fail to qualify if they cannot meet cost-share requirements for the project. The Natural Resources Conservation Service's Watershed Protection and Flood Prevention Program also requires a cost/benefit analysis similar to that of the Corps. As a result, few Alaska Native villages qualify for assistance under this program. However, the Natural Resources Conservation Service has other programs that have provided limited assistance to these villages—in part because these programs consider additional social and environmental factors in developing their cost/benefit analysis.

—Third, of the nine villages that we reviewed, four—Kivalina, Koyukuk, Newtok, and Shishmaref—are in imminent danger from flooding and erosion and are making plans to relocate; the remaining villages are taking other actions. Kivalina, Newtok, and Shishmaref are working with relevant federal agencies to determine the suitability of possible relocation sites, while Koyukuk is in the early stages of planning for relocation. Because of the high cost of materials and transportation in remote parts of Alaska, the cost of relocation for these villages is expected to be high. The five villages not currently planning to relocate—Barrow, Bethel, Kaktovik, Point Hope, and Unalakleet—are in various stages of responding to their flooding and erosion problems. For example, two of these villages, Kaktovik and Point Hope, are studying ways to prevent flooding of specific infrastructure, such as the airport runway.

—Fourth, federal and Alaska state officials and Alaska Native village representatives that we spoke with identified the following three alternatives that could help mitigate barriers to villages' obtaining federal services: (1) expand the role of the Denali Commission to include responsibility for managing a new flooding and erosion assistance program, (2) direct the federal agencies to consider social and environmental factors in their cost benefit analyses for these projects, and (3) waive the federal cost-sharing requirement for flooding and erosion programs for Alaska Native villages. In addition, we identified as a fourth alternative the bundling of funds from various agencies to address flooding and erosion problems in Alaska Native villages. While we did not determine the cost or the national policy implications associated with any of these alternatives, these costs and implications are important considerations in determining the appropriate level of federal services that should be available to respond to flooding and erosion in Alaska Native villages. Consequently, in our report we suggested the Congress consider directing relevant federal agencies and the Denali Commission to assess the feasibility of each of the alternatives, as appropriate. In commenting on our report, the Denali Commission and two federal agencies raised questions about expanding the Denali Commission's role to cover flooding and erosion. While each of these entities recognized the need for improved coordination of federal efforts to address flooding and erosion in Alaska Native villages, none of them provided any specific suggestions on how this should be accomplished or by whom. As a result, we continue to believe that expanding the role of the commission is a viable alternative.

BACKGROUND

Alaska encompasses an area of about 365 million acres—more than the combined area of the next three largest states of Texas, California, and Montana. The state is bound on three sides by water, and its coastline, which stretches about 6,600 miles (excluding island shorelines, bays and fjords) and accounts for more than half of the entire U.S. coastline, varies from rocky shores, sandy beaches, and high cliffs to river deltas, mud flats, and barrier islands. The coastline constantly changes through wave action, ocean currents, storms, and river deposits and is subject to periodic, yet often severe, erosion. Alaska also has more than 12,000 rivers, including three of the ten largest in the country: the Yukon, Kuskokwim, and Copper Rivers.[4] (See fig. 1.) While these and other rivers provide food, transportation, and recreation for people, as well as habitat for fish and wildlife, their waters also shape the landscape. In particular, ice jams on rivers and flooding of riverbanks during spring breakup change the contour of valleys, wetlands, and human settlements.



Source: Mapping information from Meridian GeoSystems, Inc.

FIGURE 1. Map of Alaska Showing Major Rivers, Oceans, and Mountain Ranges

Permafrost (permanently frozen subsoil) is found over approximately 80 percent of Alaska. It is deepest and most extensive on the Arctic Coastal Plain and decreases in depth further south, eventually becoming discontinuous. In northern Alaska, where the permafrost is virtually everywhere, most buildings are elevated to minimize the amount of heat transferred to the ground to avoid melting the permafrost. However, rising temperatures in recent years have led to widespread thawing of the permafrost, causing serious damage. As permafrost melts, land slumps and erodes, buildings and runways sink, and bulk fuel tank areas are threatened. (See fig. 2.)

[4] The size is determined by the average rate of flow (discharge at the mouth).

Source: GAO.

FIGURE 2. Sea Erosion at Shishmaref (June 2003)

Rising temperatures have also affected the thickness, extent, and duration of sea ice that forms along the western and northern coasts. Loss of sea ice leaves coasts more vulnerable to waves, storm surges, and erosion. When combined with the thawing of permafrost along the coast, loss of sea ice seriously threatens coastal Alaska Native villages. Furthermore, loss of sea ice alters the habitat and accessibility of many of the marine mammals that Alaska Natives depend upon for subsistence. As the ice melts or moves away early, walruses, seals, and polar bears move with it, taking themselves too far away to be hunted.

Federal, state, and local government agencies share responsibility for controlling and responding to flooding and erosion. The U.S. Army Corps of Engineers has responsibility for planning and constructing streambank and shoreline erosion protection and flood control structures under a specific set of requirements.[5] The Department of Agriculture's Natural Resources Conservation Service (NRCS) is responsible for protecting small watersheds. The Continuing Authorities Program, administered by the Corps, and the Watershed Protection and Flood Prevention Program, administered by NRCS, are the principal programs available to prevent flooding and control erosion. Table 1 below lists and describes the five authorities under the Corps' Continuing Authorities Program that address flooding and erosion, while table 2 identifies the main NRCS programs that provide assistance for flooding and erosion.

TABLE 1.—AUTHORITIES THAT ADDRESS FLOODING AND EROSION UNDER THE CORPS' CONTINUING AUTHORITIES PROGRAM

Program authority	Description
Section 14 of the Flood Control Act of 1946	For emergency streambank and shoreline erosion protection for public facilities.
Section 205 of the Flood Control Act of 1948	Authorizes flood control projects.
Section 208 of the Flood Control Act of 1954	Authorizes flood control activities.
Section 103 of the River and Harbor Act of 1962	Protect shores of publicly owned property from hurricane and storm damage.
Section 111 of the River and Harbor Act of 1968	Mitigate shoreline erosion damage caused by federal navigation projects.

Source: GAO analysis of Corps program information.

[5] The Corps may study and construct erosion protection and flood control structures, provided it receives authority and appropriations from Congress to do so. In addition to building structures, the Corps may also consider and implement non-structural and relocation alternatives.

In addition to the Corps' Continuing Authorities Program, other Corps authorities that may address problems related to flooding and erosion include the following:

—Section 22 of the Water Resources Development Act of 1974, which provides authority for the Corps to assist states in the preparation of comprehensive plans for the development, utilization, and conservation of water and related resources of drainage basins.

—Section 206 of the Flood Control Act of 1960, which allows the Corps' Flood Plain Management Services' Program to provide states and local governments technical services and planning guidance that is needed to support effective flood plain management.

TABLE 2.—NRCS PROGRAMS THAT RESPOND TO FLOODING AND EROSION

Program	Description
Watershed Protection and Flood Prevention Program	Provides funding for projects that control erosion and prevent flooding. Limited to watersheds that are less than 250,000 acres.
Emergency Watershed Protection Program	Provides assistance where there is some imminent threat—usually from some sort of erosion caused by river flooding.
Conservation Technical Assistance Program	Provides technical assistance to communities and individuals to solve natural resource problems including reducing erosion, improving air and water quality, and maintaining or restoring wetlands and habitat.

Source: GAO analysis of NRCS program information.

A number of other federal agencies, such as the Departments of Transportation, Homeland Security (Federal Emergency Management Agency), and Housing and Urban Development, also have programs that can assist Alaska Native villages in responding to the consequences of flooding by funding tasks such as moving homes, repairing roads and boardwalks, or rebuilding airport runways. In additional to government agencies, the Denali Commission, created by Congress in 1998, while not directly responsible for responding to flooding and erosion, is charged with addressing crucial needs of rural Alaska communities, particularly isolated Alaska Native villages.

On the state side, Alaska's Division of Emergency Services responds to state disaster declarations dealing with flooding and erosion when local communities request assistance. The Alaska Department of Community and Economic Development helps communities reduce losses and damage from flooding and erosion. The Alaska Department of Transportation and Public Facilities funds work to protect runways from erosion. Local governments such as the North Slope Borough have also funded erosion control and flood protection projects.

MOST ALASKA NATIVE VILLAGES ARE AFFECTED TO SOME EXTENT BY FLOODING AND EROSION

Flooding and erosion affects 184 out of 213, or 86 percent, of Alaska Native villages to some extent, according to studies and information provided to us by federal and Alaska state officials. The 184 affected villages consist of coastal and river villages throughout the state. (See fig. 3.) Villages on the coast are affected by flooding and erosion from the sea. For example, when these villages are not protected by sea ice, they are at risk of flooding and erosion from storm surges. In the case of Kivalina, the community has experienced frequent erosion from sea storms, particularly in late summer or fall. These storms can result in a sea level rise of 10 feet or more, and when combined with high tide, the storm surge becomes even greater and can be accompanied by waves containing ice. Communities in low-lying areas along riverbanks or in river deltas are susceptible to flooding and erosion caused by ice jams, snow and glacial melts, rising sea levels and heavy rainfall.

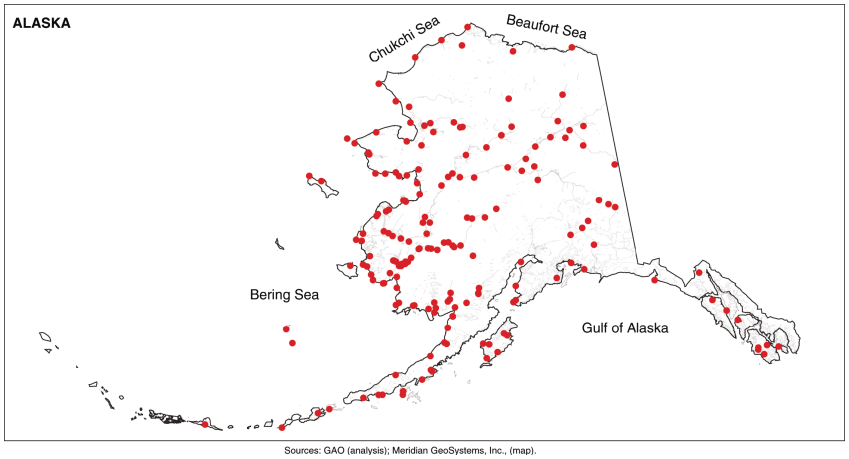


FIGURE 3. Locations of 184 Alaska Native Villages Affected by Flooding and Erosion

Flooding and erosion are long-standing problems in Alaska. In Bethel, Unalakleet, and Shishmaref for example, these problems have been well documented dating back to the 1930s, 1940s, and 1950s, respectively. The state has made several efforts to identify communities affected by flooding and erosion over the past 30 years. In 1982, a state contractor developed a list of Alaska communities affected by flooding and erosion.[6] This list identified 169 of the 213 Alaska Native villages, virtually the same villages identified by federal and state officials that we consulted in 2003. In addition, the state appointed an Erosion Control Task Force in 1983 to investigate and inventory potential erosion problems and to prioritize erosion sites by severity and need. In its January 1984 final report, the task force identified a total of 30 priority communities with erosion problems. Of these 30 communities, 28 are Alaska Native villages. Federal and state officials that we spoke with in 2003 also identified almost all of the Native communities given priority in the 1984 report as still needing assistance.

While most Alaska Native villages are affected to some extent by flooding and erosion, quantifiable data are not available to fully assess the severity of the problem. Federal and Alaska state agency officials that we contacted could agree on which three or four villages experience the most flooding and erosion, but they could not rank flooding and erosion in the remaining villages by high, medium, or low severity. These agency officials said that determining the extent to which villages have been affected by flooding and erosion is difficult because Alaska has significant data gaps. These gaps occur because remote locations lack monitoring equipment. The officials noted that about 400 to 500 gauging stations would have to be added in Alaska to attain the same level of gauging as in the Pacific Northwest.

While flooding and erosion has been documented in Alaska for decades, various studies and reports indicate that coastal villages in Alaska are becoming more susceptible. This increasing susceptibility is due in part to rising temperatures that cause protective shore ice to form later in the year, leaving the villages vulnerable to storms. According to the Alaska Climate Research Center, mean annual temperatures have risen for the period from 1971 to 2000, although changes varied from one climate zone to another and were dependent on the temperature station selected. For example, Barrow experienced an average temperature increase of 4.16 degrees Fahrenheit for the 30-year period from 1971 to 2000, while Bethel experienced an increase of 3.08 degrees Fahrenheit for the same time period.

ALASKA NATIVE VILLAGES HAVE DIFFICULTY QUALIFYING FOR FEDERAL ASSISTANCE

Alaska Native villages have difficulty qualifying for assistance under the key federal flooding and erosion programs, largely because of program requirements that the project costs not exceed economic benefits, or because of cost-sharing requirements. For example, according to the Corps' guidelines for evaluating water resource

[6] This report was prepared for the Alaska Department of Community and Regional Affairs, the predecessor of the Alaska Department of Community and Economic Development.

projects, the Corps generally cannot undertake a project whose costs exceed its expected economic benefits as currently defined.[7] With few exceptions, Alaska Native villages' requests for the Corps' assistance are denied because of the Corps' determination that project costs outweigh the expected economic benefits. Alaska Native villages have difficulty meeting the cost/benefit requirement because many are not developed to the extent that the value of their infrastructure is high enough to equal the cost of a proposed erosion or flood control project. For example, the Alaska Native village of Kongiganak, with a population of about 360 people, experiences severe erosion from the Kongnignanohk River. However, the Corps decided not to fund an erosion project for this village because the cost of the project exceeded the expected benefits and because many of the structures threatened are private property, which are not eligible for protection under a Section 14 Emergency Streambank Protection project. Meeting the cost/benefit requirement is especially difficult for remote Alaska Native villages because the cost of construction is high—largely because labor, equipment, and materials have to be brought in from distant locations.

Even villages that do meet the Corps' cost/benefit criteria may still not receive assistance if they cannot provide or find sufficient funding to meet the cost-share requirements for the project. By law, the Corps generally requires local communities to fund between 25 and 50 percent of project planning and construction costs for flood prevention and erosion control projects.[8] According to village leaders we spoke to, they may need to pay hundreds of thousands of dollars or more under these cost-share requirements to fund their portion of a project—funding many of them do not have.[9]

NRCS has three key programs that can provide assistance to villages to protect against flooding and erosion. One program—the Watershed Protection and Flood Prevention Program—has a cost/benefit requirement similar to the Corps program and as a result, few projects for Alaska Native villages have been funded under this program. In contrast, some villages have been able to qualify for assistance from NRCS's two other programs—the Emergency Watershed Protection Program and the Conservation Technical Assistance Program. For example, under its Emergency Watershed Protection Program, NRCS allows consideration of additional factors in the cost/benefit analysis.[10] Specifically, NRCS considers social or environmental factors when calculating the potential benefits of a proposed project, and the importance of protecting the subsistence lifestyle of an Alaska Native village can be included as one of these factors. In addition, while NRCS encourages cost sharing by local communities, this requirement can be waived when the local community cannot afford to pay for a project under this program. Such was the case in Unalakleet, where the community had petitioned federal and state agencies to fund its local cost-share of an erosion protection project and was not successful. Eventually, NRCS waived the cost-share requirement for the village and covered the total cost of the project itself. (See fig. 4.) Another NRCS official in Alaska estimated that about 25 villages requested assistance under this program during the last 5 years, and of these 25 villages, 6 received some assistance from NRCS and 19 were turned down—mostly because there were either no feasible solutions or because the problems they wished to address were recurring ones and therefore ineligible for the program.

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[7] The Corps' guidelines are based on the Flood Control Act of 1936, which provides that "the Federal Government should improve or participate in the improvement of navigable waters or their tributaries . . . if the benefits . . . are in excess of the estimated costs." 33 U.S.C. § 701a.

[8] The Corps has the authority to make cost-sharing adjustments based upon a community's ability to pay under section 103(m) of the Water Resources Development Act of 1986, as amended. 33 U.S.C. § 2213(m).

[9] According to state of Alaska officials, historically the state has provided the nonfederal matching funds for most Corps of Engineers (and other federal) projects, but with the extreme budget deficits currently faced by the state of Alaska, matching funds have been severely limited.

[10] The Emergency Watershed Protection program was authorized under the Flood Control Act of 1950, Pub. L. No. 81–516 (1950).

Source: NRCS.

FIGURE 4. NRCS Seawall Erosion Protection Project at Unalakleet (c. 2000)

Unlike any of the Corps' or NRCS's other programs, NRCS's Conservation Technical Assistance Program does not require any cost-benefit analysis for projects to qualify for assistance.[11] An NRCS official in Alaska estimated that during the last 2 years, NRCS provided assistance to about 25 villages under this program. The program is designed to help communities and individuals solve natural resource problems, improve the health of the watershed, reduce erosion, improve air and water quality, or maintain or improve wetlands and habitat. The technical assistance provided can range from advice or consultation to developing planning, design, and/or engineering documents. The program does not fund construction or implementation of projects.

FOUR VILLAGES IN IMMINENT DANGER ARE PLANNING TO RELOCATE, AND THE REMAINING FIVE VILLAGES ARE TAKING OTHER ACTIONS

Four of the nine villages we reviewed are in imminent danger from flooding and erosion and are making plans to relocate, while the remaining five are taking other actions. Of the four villages relocating, Kivalina, Newtok, and Shishmaref are working with relevant federal agencies to locate suitable new sites, while Koyukuk is just beginning the planning process for relocation. Because of the high cost of construction in remote parts of Alaska, the cost of relocation for these villages is expected to be high. For example, the Corps estimates that the cost to relocate Kivalina could range from $100 million for design and construction of infrastructure, including a gravel pad, at one site and up to $400 million for just the cost of building a gravel pad at another site. Cost estimates for relocating the other three villages are not yet available. Of the five villages not currently planning to relocate, Barrow, Kaktovik, Point Hope, and Unalakleet each have studies underway that target specific infrastructure that is vulnerable to flooding and erosion. The fifth village, Bethel, is planning to repair and extend an existing seawall to protect the village's dock from river erosion. In fiscal year 2003, the Senate Committee on Appropriations directed the Corps to perform an analysis of costs associated with continued erosion of six of these nine villages, potential costs of relocating the villages, and to identify the expected timeline for complete failure of useable land associated with each community.[12] Table 3 summarizes the status of the nine villages' efforts to respond to their specific flooding and erosion problems.

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[11] The Conservation Technical Assistance Program was authorized under the Soil Conservation and Domestic Allotment Act of 1935, Pub. L. No. 74–46 (1935).

[12] The Senate report for the Energy and Water Development Appropriations Act, 2003, Pub. L. No. 108–7 (2003), directed the Corps to study the following communities in Alaska: Bethel, Dillingham, Shishmaref, Kaktovik, Kivalina, Unalakleet, and Newtok. S. Rep. No. 107–220 at 23–24 (2002). The Energy and Water Development Appropriations Act, 2004 further provided

Continued

ALTERNATIVES FOR ADDRESSING BARRIERS THAT VILLAGES FACE IN OBTAINING FEDERAL SERVICES

The unique circumstances of Alaska Native villages and their inability to qualify for assistance under a variety of federal flooding and erosion programs may require special measures to ensure that the villages receive certain needed services. Alaska Native villages, which are predominately remote and small, often face barriers not commonly found in other areas of the United States, such as harsh climate, limited access and infrastructure, high fuel and shipping prices, short construction seasons, and ice-rich permafrost soils. In addition, many of the federal programs to prevent and control flooding and erosion are not a good fit for the Alaska Native villages because of the requirement that project costs not exceed the economic benefits. Federal and Alaska state officials and Alaska Native village representatives that we spoke with identified several alternatives for Congress that could help mitigate the barriers that villages face in obtaining federal services.

These alternatives include (1) expanding the role of the Denali Commission to include responsibilities for managing a new flooding and erosion assistance program, (2) directing the Corps and NRCS to include social and environmental factors in their cost/benefit analyses for projects requested by Alaska Native villages, and (3) waiving the federal cost-sharing requirement for flooding and erosion projects for Alaska Native villages. In addition, we identified a fourth alternative—authorizing the bundling of funds from various agencies to address flooding and erosion problems in these villages. Each of these alternatives has the potential to increase the level of federal services to Alaska Native villages and can be considered individually or in any combination. However, adopting some of these alternatives will require consideration of a number of important factors, including the potential to set a precedent for other communities and programs as well as resulting budgetary implications. While we did not determine the cost or the national policy implications associated with any of the alternatives, these are important considerations when determining appropriate federal action.

In conclusion, Alaska Native villages are being increasingly affected by flooding and erosion problems being worsened at least to some degree by climatological changes. They must nonetheless find ways to respond to these problems. Many Alaska Native villages that are small, remote, and have a subsistence lifestyle, lack the resources to address the problems on their own. Yet villages have difficulty finding assistance under several federal programs, because as currently defined the economic costs of the proposed project to control flooding and erosion exceed the expected economic benefits. As a result, many private homes and other infrastructure continue to be threatened. Given the unique circumstances of Alaska Native villages, special measures may be required to ensure that these communities receive the assistance they need to respond to problems that could continue to increase.

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any questions you or other Members of the Committee my have at this time.

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that the $2 million previously provided in the 2003 appropriations was "to be used to provide technical assistance at full Federal expense, to Alaskan communities to address the serious impacts of coastal erosion." Pub. L. No. 108–137, § 112, 117 Stat. 1827, 1835–36 (2003).

TABLE 3.—NINE ALASKA NATIVE VILLAGES' EFFORTS TO ADDRESS FLOODING AND EROSION

Alaska Native village	Population[1]	Status of efforts
Villages planning to relocate:		
Kivalina	388	Located on a barrier island that is both overcrowded and shrinking. Cost estimates to relocate range from $100 million to over $400 million. The Corps is currently negotiating a scope of work for relocation alternatives under both the Planning Assistance to States Program and the Alaska Villages Erosion Technical Assistance Program.
Shishmaref	594	Located on a barrier island and experiencing chronic erosion. Recently selected a relocation site. In the meantime, a Bureau of Indian Affairs funded seawall was recently completed to temporarily protect a road project and the Corps is starting a Section 14 project to extend this seawall to protect the school as well.
Newtok	329	Suffers chronic erosion along its riverbank. Legislation for a land exchange with the U.S. Fish and Wildlife Service became law in November 2003 (Pub. L. No. 108–129). Interim Conveyance No. 1876 signed in April 2004. Relocation studies are continuing under the Corps' Planning Assistance to States Program and the Alaska Villages Erosion Technical Assistance Program.
Villages taking other actions:		
Kaktovik	295	Airport runway is subject to annual flooding. The Federal Aviation Administration funded a study to determine least-cost alternative, but consensus on a site for a new airport has not been reached.
Point Hope	725	Airport runway experiences flooding and is at risk of erosion. The North Slope Borough is analyzing construction alternatives for an evacuation road.
Barrow	4,417	The Corps is currently conducting a 5-year feasibility study of storm damage reduction measures. The underlying authority for this study is the "Rivers and Harbors in Alaska" study resolution adopted by the House of Representatives Committee on Public Works on December 2, 1970.
Unalakleet	741	Coastal and river flooding and erosion have combined to create a chronic problem at the harbor. The Corps has begun a study on improving navigational access.
Bethel	5,899	Spring break-up ice jams on the Kuskokwim River cause both periodic flooding and severe erosion along the riverbank. A Corps project to repair and extend the seawall to protect the dock and small boat harbor is stalled over land easements.

[1] Populations for the villages are based on 2003 Alaska State Demographer estimates.

Source: GAO analysis.

Chairman STEVENS. Mr. Pat Poe, Regional Administrator for the Federal Aviation Administration, Alaskan Region. Pat, nice to see you.

STATEMENT OF PATRICK N. POE, REGIONAL ADMINISTRATOR, ALASKA REGION, FEDERAL AVIATION ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Mr. POE. Thanks for including me. It's a privilege to be with you all. To those who have traveled to Alaska, let me say at the outset how pleased I am that you have come to see the people and the environment face-to-face.

IMPORTANCE OF AVIATION IN ALASKA

If I might, I would like to do a couple moments as a scene setter. Here in Alaska aviation is quite different than I think you'll find it anywhere else in the United States. For example, for every 58 citizens in Alaska, 1 of them will have a pilot's license. For every 10 pilots, there are eight airplanes. Within the Anchorage Bowl we have over 4,000 airplanes domiciled right here. There are places in Alaska, for instance, 84 percent of all the post offices only get mail by airplane. And in many villages the only way the children go to school is by airplane, to fly to the next village that has a school.

So aviation is essential to the economy and the lifestyle in Alaska. So if the village moves, so does aviation. There are several ways that can be done, and I want to outline just a couple of them for the committee.

One, if the village moves within easy reach, so to speak, of the existing airport, the FAA is prepared through the Airport Improvement Program grant process to support the building of an access road to the new village location, or if that's not possible, the same program is available to actually build a new airport.

AIRPORT IMPROVEMENT PROGRAM GRANTS

The Airport Improvement Program grant is basically a partnership between the FAA and the airport sponsor. And in terms of all four of the airports that is the State of Alaska and the Alaska village community. The sponsor's role is critical in this because the sponsor, first of all, puts up a degree of matching funds. Under the AIP program the funds range from 5 to 7 percent of the total has to be provided by the sponsor.

For rural Alaska and for rural locations across the Nation, the lower number is used, so we are looking at a 5-percent match. In addition, the sponsor provides the priorities for the State. Where the State is the sponsor for the airports, they request the grants and we react to that. So part of the issue here will ultimately be the priority the State sets on this grant submission.

And the third thing, as the airport sponsor, there's a commitment to all of the grant assurances, which basically say for 20 years these investments will stay as a benefit to the airport and the community they serve.

BUILDING AN AIRPORT IN ALASKA

What does it take to build an airport? Typically in western Alaska we're talking 3 to 5 years. We're talking $15 million to $20 mil-

lion. That cost seems high, the timeframe long, but the reasons are all the challenges of building in rural Alaska. The expense of mobilizing the necessary equipment and workforce, the lack of building materials, and the fact that we have very short seasons in which to perform construction.

The FAA and our approach to cost benefit, for just a moment, has very stringent cost-benefit requirements for where we place nav-aids and for where AIP funds can be used.

However, acknowledging the differences in Alaska and other remote locations, those cost benefits tests have been waived for Alaska's rural communities.

An example of how this might come together at Koyukuk, for example, which is one of the four sites mentioned by GAO. In 2003 an Airport Improvement Program grant was awarded for $10 million to elevate the runway above the 100-year floodplain. That project is underway. The village is looking at two different locations for a new village site, either one of which would continue to be serviced by the existing airport. The FAA, if the need arises, would be prepared through the AIP program to help support the creation of an extended access road.

In closing, I think as far as the airport moving with the village, I think the keys to that success are early discussion, long lead times. The FAA, I think, enjoys a relationship with the State sponsors and other community sponsors for building together the aviation infrastructure in Alaska upon which both the economy and the lifestyles are built.

That concludes my comments, Mr. Chairman.

[The statement follows:]

PREPARED STATEMENT OF PATRICK N. POE

Thank you for the opportunity to testify today to share FAA concerns and issues regarding the erosion in Alaskan communities.

I wish to preface my remarks by setting the scene for this august committee and tell you that Alaska is often called, "the flyingest state in the Union" because its residents depend to such a great extent upon air travel. For more than 200 communities there is no road access connecting them to the rest of the state. Transportation within Alaska is largely by aircraft. There are fewer than 15,000 miles of highway of which only 30 percent are paved in a state of 365 million acres.

Air carriers transport the equivalent of four times the state's population each year compared to 1.7 times the U.S. population carried by air commerce in the other states. There are 225 air carriers certified to operate in Alaska as either scheduled or on-demand carriers. Alaska has 387 public use airports and thousands of unofficial landing areas.

Since 1982, the Federal Airport Improvement Program (AIP) has provided funding for 900 airport construction and improvement projects. This year alone, we anticipate distributing approximately $190 million in grants to State and local airport sponsors in Alaska.

The Federal Aviation Administration (FAA), Airports Division provides grants to improve airport infrastructure development including those threatened by flooding and erosion. The AIP program could potentially contribute a significant portion of the funding for relocation of an airport, if necessitated by community relocation. Once the decision is made to relocate a village, the airport sponsor shall make a determination as to whether the existing airport no longer meets the community's needs. The sponsor may apply for an AIP grant to begin the planning process concurrently with the relocation effort. FAA Airports Division will review the application and either confirm the decision to relocate or offer to assist in funding alternative measures. It should be noted that the following criteria must be met in order for federal AIP funding to be programmed for airport development:

—1. The airport is in the National Plan of Integrated Airport System (NPIAS). Some of the primary factors for the adoption of an Alaska airport into the

NPIAS are: (i) the airport is a public-use airport available for use by all citizens and (ii) the airport serves an established community that receives scheduled U.S. mail service.

—2. Any airport project must comply with the procedures and policies of the National Environmental Policy Act (NEPA).

—3. The proposed new airport must meet all applicable FAA airport design standards and be documented within an FAA-approved Airport Layout Plan (ALP).

—4. Any airport project must be requested and supported financially by the designated airport sponsor. The airport sponsor must have the legal authority and financial capability to carry out its responsibilities under the grant agreement. Those responsibilities include contributing a percentage of funding and operating the airport according to grant assurances.

Alaska Villages Subject to Flooding and Erosion

Alaska villages planning to relocate in an effort to address flooding and erosion include: Kivalina, Shishmaref, Newtok, and Koyukuk. Of these communities, all are State owned and operated airports. Alaska villages taking actions to mitigate erosion and flood damage include: Kaktovik, Point Hope, Barrow, Unalakleet, and Bethel.

Concurrent with deliberations regarding community relocation, the FAA and the villages will consider whether the local airports also need to be relocated or whether the existing facilities can continue to serve the communities at the new village sites.

At the villages of Kivalina, Shishmaref, and Newtok the Airports Division of FAA will support maintaining the existing infrastructure while the communities decide to undertake relocation. No major AIP-funded projects are currently programmed or anticipated in the near future for the current airports. If a village decides to relocate and it is determined that the airport must also be established in a new location, an application for an AIP grant will be entertained by the FAA.

At the village of Koyukuk, a $10,000,000 AIP grant was issued in fiscal year 2003 to elevate the runway out of the 100-year flood plain. This existing State-owned airport will continue to serve the existing community, and either of the two sites currently being considered as new locations for the village. FAA may assist in funding an access road if one is needed to connect the new community site with the airport.

At the village of Kaktovik, the airport is subject to periodic seasonal flooding. A $300,000 AIP grant was issued in fiscal year 2002 for the development of a comprehensive airport master plan. The plan, due to be completed in the spring of 2005, will evaluate current flood and erosion protection at the existing airport and identify future potential airport relocation sites that would best serve the future needs of the village.

At the villages of Barrow, Bethel, Point Hope and Unalakleet the State of Alaska Department of Transportation and Public Facilities owns and operates the airports. The Point Hope airport experiences occasional erosion on the north end and is programmed for future AIP funding to provide erosion control measures (i.e. armored rock). The airport infrastructure at these villages is not subject to coastal erosion or flooding.

Alaska Airport Development Data

Typical costs to construct a new airport in western rural Alaska are approximately $15–$20 million. New construction typically takes 3–5 years to complete depending upon the site, the availability of adequate base materials, and environmental conditions. In an extreme case, where the new location is unknown and the environmental process will have to be conducted, the timeframe could extend to 10 years. Many rural Alaska airports are constructed using a technique termed "silt push up." This method of airport construction involves the placement of a silt subbase material that often takes several years to settle and drain prior to the placement and compaction of the top surface course material.

These high costs and extended construction schedules reflect the challenges of building in rural Alaska with expensive mobilization costs, lack of suitable construction embankment materials, and short construction seasons.

Capital investments undertaken by the FAA are subject to analysis and review requirements set forth in the National Environmental Policy Act, as amended. This process includes mandatory coordination with other State, Federal, local community, and tribal agencies and governments prior to any work being undertaken. Because of these review requirements, it is highly unlikely that any FAA project would commence at a village without knowledge of an impending relocation.

FAA Order 7031.2C, Airway Planning Standard Number One (APS–1) is a working order, which contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and im-

provements of specified types of air navigation facilities and air traffic control services.

Former FAA Administrator Donald Engen wrote the Forward stating the following:

"The safety and efficiency of air traffic determine requirements for air navigational facilities and air traffic control services, but these facilities and services should only be established at locations where the benefits of service exceed the cost to the government. Economic consideration of benefits and costs for both new establishments and improvements to existing facilities or service is related to air traffic activity levels. This order specifies minimum activity levels for terminal air navigation facilities and air traffic control services. For certain types of facilities, the order also establishes a requirement for additional cost benefit and other analyses prior to facility commissioning or decommissioning. Satisfying criteria specified herein does not constitute a commitment by the Federal Aviation Administration to provide, modify, or discontinue eligible facilities or services."

Acknowledging Alaska's dependence upon air transportation, there are provisions in the Order exempting both the agency and airport sponsors in remote locations from the cost/benefit analyses required in other regions of the United States.

If a determination were made requiring the relocations of runways or navigational aids, the instrument procedures for the airport would be developed concurrently with the new airport construction. The current time frame for the development of instrument procedures is approximately 12 to 18 months depending upon the availability of survey data, completion of environmental studies, and establishment of weather and communications facilities.

In association with the creation of a new airport there will be the establishment of air routes and installation of navigation aids. Estimates of costs per airport range from $30,000 to $40,000 for two approaches.

FAA has limited facilities at the Kivalina and Shishmaref airports, and no facilities at the other airports. There are no known FAA environmental cleanup requirements at any of the airports. Costs to remove the facilities at the two airports are estimated at $60,000. There are requirements in the FAA leases to restore the property upon decommissioning of facilities. The estimated costs for FAA facilities restoration are $100,000.

In 2002, Congress funded the Rural Airport Lighting Program to improve access for medical and other emergencies. Lighting continues to be installed at rural airports until any relocation is completed. At three of the four locations referenced in the GAO report (i.e., Kivalina, Shishmaref, and Koyukuk) there are projects identified to establish airport lighting as an aid to rural access as follows:

Establish runway end identifier lights (REIL) and precision approach path indicators (PAPI) on Runway ends 12 and 30 at Kivalina Airport (per the Rural Alaska Lighting Program; funded but not yet scheduled for implementation).

Establish REIL and PAPIs on Koyukuk Airport. A portion of this work is funded by AIP dollars as part of the raising of the runway. This existing State-owned airport will continue to serve the existing community, and the proposed village relocation sites.

Other projects are on schedule as part of the FAA mission to maintain navigation aids while airports remain in use such as:

Replace radio control equipment for the remote communications outlet at Shishmaref Airport (active maintenance operations project).

Replace obstruction lights on the nondirectional beacon tower at Shishmaref Airport (active maintenance operations project).

In closing, the FAA has a long history of partnership with Alaska's communities to develop and improve aviation infrastructure that supports the life and economy of this state. We continue that work as part of our mission and our stewardship of the state's resources.

Thank you for inviting me to present this testimony today and for your interest in this very important topic.

FEDERAL ASSISTANCE TO VILLAGES

Chairman STEVENS. Thank you all very much. I think what we probably have here is so many different villages being affected at the same time. We have had experience in California and down the east coast of separate communities being subjected to wave or flooding damage, but I can't remember a situation where we faced almost 200 different villages threatened, and according to the re-

port, there's at least nine immediately threatened that need something unique for each area.

I do appreciate your being here, Mr. Poe, because what really came to our attention first was the annual flooding of some of these airports, which was the sole means of access for the villages. So we directed the GAO study, and I'm grateful for the GAO study having been done so thoroughly and so promptly. We do have, I think, some guidelines to proceed on.

We've got about 40 minutes left on this first panel, so we'll allocate time to my colleagues, who have approached this to a certain extent new.

Mr. Robinson, with regard to your report, you did indicate, as was quoted by General Davis, that the likelihood of these entities being eligible for Federal assistance as you pointed out is really a difficult question.

Have you come to a conclusion as to any recommendations that you would make to Congress with regard to changing those eligibility requirements under the circumstances that the west coast faces?

Mr. ROBINSON. We have laid out options, options to consider. It's hard to make recommendations—GAO likes to confine its recommendations to management issues and the like on account of efficiency. This involves sort of policy decisions that would have implications all over the State of Alaska and for everybody else. Obviously, there are very special considerations for Alaskan villages and their locations. But we presented our options as alternatives—policy considerations for the Congress to consider without taking a firm position as to which, if any, should be adopted. Any of the four we laid out seems to me would change the equation for villages and their ability to obtain funds.

Chairman STEVENS. Senator Murkowski and I face the problem almost daily of asking for an Alaska exception. I think Congress is getting a little worn out about that. We need to have some certainty in this area whether villages should be treated alike or whether there should be particular categories of exceptions that could be followed by the agencies involved, FEMA and the Corps, or whether we should go down the list and precisely lay down a category of assistance that would be available in each area. When you're dealing with almost 200, that's almost impossible in Federal law.

Mr. ROBINSON. The Corps can also, if directed—a directed project by definition waives the cost-benefit requirement, and that has been used on a number of projects across the country.

Chairman STEVENS. General Davis, do you think we're at that point where we ought to direct you to proceed without regard to local contribution?

General DAVIS. Sir, I think there are a number of alternatives that could be addressed policywise. One of those is for erosion projects, we're not allowed to consider as an alternative a nonstructural alternative. A fancy way of saying, we can't consider relocation even though it may be a less expensive alternative.

We have the authorities continuing in our CAP program, continuing authorities program—gives us the ability to move very

quickly, but it's limited to a $1 million cap on the Federal share. So there's a policy possibility there if we could increase that limit.

We can consider waiving the cost sharing. All of these would be changes to policy that we would need your help with, but all of these would help us apply some of our capabilities, our programs, more consistently in a situation that's very rapidly sneaking up on us.

Chairman STEVENS. Is your agency prepared to make recommendations to Congress as to which option to pursue—relocation versus mitigation versus building of structures to prevent further erosion? Would you take on that task of determining on a site-specific basis what is the best recommendation or solution to follow?

General DAVIS. Sir, I think we try to consider all those in all the studies that we do now. The challenge I mentioned is in some of our authorities, because of existing policy, we're not allowed to consider relocation. But it would clearly show up as we did the economic analysis that that might be the most cost-effective alternative.

The other piece that we have mentioned where we have no mechanism to address right now is costs associated with social and environmental considerations, and there's just nothing in law right now that allows us to include them in our cost-benefit analysis; therefore, a lot of projects that may be on the borderline don't have the benefit of that analysis to go with it.

Chairman STEVENS. Thank you.

AIRPORT RELOCATIONS

Pat, how about terms of airports, are you prepared—do you think it is your province to recommend to Congress which airports must be relocated based upon the studies these other agencies have made, or shall we have to face the question of having the Corps or another entity tell us that that is the preferred option? Can you make the determination? I know several were flooded 2 years in a row now during parts of the summer.

Mr. POE. I think the first-tier consideration would not come from the FAA. I think the village community and whoever the airport sponsor is, whether that's the State or the village, should have first say in what happens. Now, I think the FAA should and does step in and say that there are different mitigation solutions and we can speak to the degree of funding available for each.

In some cases, rural Alaska being one, we have actually done armor rock and so forth to prevent further erosion. In other locations we have combined with other Federal agencies on projects and used the same contractor. The direct answer to your question is, I don't see the FAA as being the most appropriate agency to step in and say where the villages should and how the airport should follow.

FEMA'S PREVENTION AUTHORITY

Chairman STEVENS. Mr. Pennington, I think you emphasized that you come in after the fact. Is there anyplace that you think we should change the laws so you have greater prevention authority?

Mr. PENNINGTON. Good question. There are two of the areas that I pointed out that are actually prior to Pre-Disaster Mitigation and the Flood Mitigation Assistance Program. The challenges that we run into in a lot of the Native village communities, unfortunately, is—Shishmaref opted into the National Flood Insurance Program. As I pointed out in my testimony, the NFIP is a very self-sustaining fund. So they opted in and as a result, they've gotten assistance, $600,000, for relocation, elevation, et cetera.

Other Native village communities that are susceptible to much of the damage have not opted in and have not been very aggressive and, very candidly, we have been very cautious in FEMA because we don't want to lead these communities into the program where it might not be sustainable for them economically. The government infrastructure may not be there to enforce building codes, and once that disaster hits, because they haven't appropriately complied with the NFIP laws, they don't get Federal assistance. So we're very cautious how we move into those areas.

But the pre-disaster mitigation plan, I think, is a good example of getting in beforehand, certainly FMA. And in FEMA's—I've been in FEMA for 2½ years as its regional Director. One of our greatest strengths, Senator, is coordination and collaboration. One of our witnesses mentioned bundling of Federal funds. I do think that there's some merit to that issue.

Where I think FEMA comes in is, it's really leading that coordination and collaboration. We really truly are confined by the Stafford Act. It pretty much says, until that declaration comes in with those glaring exceptions, FEMA's programs pretty much don't kick loose.

Chairman STEVENS. Thank you very much. I'll have other comments later.

Senator Burns.

Senator BURNS. Well, the discussion—thank you, Mr. Chairman—the discussion on this, and I'd like to go out there one of these days and just take a look at that country. I want to ask General Davis: Are these problems that we're encountering now, is this a cyclical thing or is this a continuing thing as conditions along the coast? Is it a deteriorating thing? Is it over several years, or is it cyclical or is it continuing?

General DAVIS. Sir, I'm not a scientist, but in the last couple of years I've been exposed to coastal erosion issues across the United States and I believe the scientists would back me up and say it's a constant issue, that the whole—anybody that lives along an ocean or along the Great Lakes, there is kind of a constant erosion situation that's going to go on and on. I think as we make decisions, we take that into consideration and offer our best advice on whether we armor or whether we try to relocate.

RELOCATE A VILLAGE

Senator BURNS. We all understand the power and the unpredictability of the ocean and we also understand that even with our larger rivers inland, both in the 48 contiguous and here in Alaska. And I guess it boils down to, do you make a decision? Do we try to hold what we have? Or do we relocate with the prospects of it

probably never getting better or some days the ocean will recede to reclaim those lands?

I think in a sense the American taxpayer didn't make the decision on where to locate a village. In the first place, what obligation does the American taxpayer have in order to relocate? Those are questions that—Congress will ask those questions just as sure as we're sitting here. We know most of it—we would like to base it on economic reasons, but there's also some cultural and social issues here where we do have an obligation, I think, to protect and to foster.

So I would ask—I think those are the decisions that we will have to make based on the information we get from GAO and from our Senators that represent us up here. We will take probably their lead on what to do.

Mr. Poe, with the FAA, have you already started doing some studies, and if relocation is necessary, do you have a pretty good idea what your role will be and where you can go with your facilities to land aircraft in the outer banks?

Mr. POE. Senator Burns, yes, we have what we call airport and master plans, and we have funded those through the AIP program. Those are underway. We have looked at and in fact have taken action to relocate airports without the necessity to relocate villages. So we are constantly working closely with the community and with the State sponsors, which, by the way, all airports are not sponsored by the State of Alaska. In many cases it's the community itself.

Senator BURNS. Well, I live down in Montana, you know, and nature is a funny thing. You give unto nature what belongs to nature and what she gives us we have to use very wisely. Those are the unpredictable situations that we deal with. And understanding that, there's going to be some tough decisions made by these communities and these communities are going to make those decisions.

They can't all be made in Washington, DC. After all, you know, we have to do business in 17 square miles of logic-free environment there. I look at it pretty much on the grounds of what is doable and what is not doable.

Thank you, Mr. Chairman.

Chairman STEVENS. Thank you.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

General Davis, you had in your written comments and in your statement this morning pointed to the GAO study and title and noted how appropriate the title is. We have so many of our Native villages that are affected by flooding and erosion, but few qualify for Federal assistance. In response to Senator Stevens' questions, we were talking about the policy and you would need assistance from Congress in effecting changes there.

Can you identify for me—when we're talking about impediments, qualifications for Federal assistance, which derive from statute and how much of it actually derives from policy? What do we need to look to in statute and what do we look to that's policy driven?

General DAVIS. I may need some help with that one. I'm not sure I can distinguish between statute and policy. The cost-sharing piece is law, so that would be statutory. Anywhere from 25 percent to 50

percent, depending on where we are in there. The benefit-to-cost ratio of what we gain protecting versus what it costs us to do it is a combination of both policy and law. I probably owe you something in a follow-up, if you'd let me, to give you a little bit more specifics as to which are which to help you attack those.

Senator MURKOWSKI. I think that would be helpful. If we're trying to determine how we can assist here, we need to know whether statutory changes need to be made versus what you can effect by policy.

In your prepared testimony you made reference to the tribal partnership program, which authorizes the feasibility studies for projects that are located close to the Native villages or located in Indian lands in the Lower 48. I understand that this is a 50-percent cost-sharing requirement for this program. I don't know in the Lower 48 the circumstances down there necessarily, but certainly here in Alaska most of our villages—we don't have those resources. We don't have Indian gaming here in the State, as you know. Generally, we would be unable to meet these specific cost-sharing requirements.

And then down in the Lower 48 I would imagine you're looking at tribes that, unless they have the gaming, most likely don't have access to the funds to meet this requirement. So I guess my question to you is: Because of this cost-sharing requirement being set at this 50-percent level, are you not foreclosing the opportunity to really participate in the programs because of this particular statutory requirement?

General DAVIS. I'd have to agree that that really puts the burden on the Alaskan tribes and Native villages because they don't have the same access to funds that they have in the Lower 48. I don't know where that direction came from. I'm advised again that that was a statutory regulation. That's not one of the Corps' policies, but that was a stipulation put on us.

But I'd like to prove that with some background, ma'am.

Senator MURKOWSKI. Again, that would be helpful to know, if we wanted to look at that to make some fixes there. One more just in terms of this cost sharing and the impact to those that might be able to take advantage of these programs.

Also, this is in your prepared comments, was reference that the Corps programs don't permit your agency to fund more than *x* dollars per project. We know, of course, here in Alaska that our construction and transportation costs are just plain and simple higher than they are anywhere else in the country. Has the Corps considered—or what would your opinion be in terms of hiking these ceilings to recognize the high-cost locations like we have here in Alaska? Is that something that has been considered?

General DAVIS. Yes, ma'am. It's interesting how many of the same challenges we share. Mr. Poe was talking about the cost of construction for airports. We certainly have the same challenges on relocations or armoring the shore. For those that are not familiar with Alaska, my last job was in California. And to haul rock to some of these locations would be equivalent to quarrying on Playa Linda off of the coast of Los Angeles and then dragging it up to Seattle to put it on the shore in Seattle.

One of our most valuable authorities is probably section 14, which gives us a very quick solution—a very quick review process, but it limits us to $1 million plus the cost share. An example at Shishmaref would be of the entire coastline that's affected there, we're able to use that authority to protect a school, but that's like putting a Band-Aid on the entire coastline there, which would take care of the school, but the rest of the coast is at risk.

So that's one of the issues that I mentioned earlier where it would give us more capability to act and react if that limit could be raised beyond the current $1 million limit.

Senator MURKOWSKI. $1 million doesn't go very far up here.

General DAVIS. I know it. We didn't talk about bringing the equipment in, bringing the fuel in, as well as bringing the materials in. So it's a pretty big challenge. I understand Senator Stevens is tired of going to the well to explain why things are unique up here, but there are some differences.

Senator MURKOWSKI. Well, we will just have to continue educating people. That's why it helps to have people like Senator Burns and Senator Sununu here who are listening and understanding, but the challenges that we do have here are extreme in some instances. So I'll look forward to kind of the breakdown, if you will, between the statutory versus the policies. I think that would be interesting to look at.

Mr. Robinson, I appreciate the four recommendations—I don't know whether you call them recommendations, but the factors that have to be considered that came out of the GAO report. As I looked at them, I guess I made the assumption that these were recommendations that should all be considered and that this is not, we'll do this one at the expense of the others.

For instance, the comment that was made both by yourself and General Davis about the importance of having social and environmental factors considered. I would like to think that we would be able to have that included, as well as a good discussion about waiving the Federal cost-share requirement. So I just want to make sure on the record that what you have proposed in this report are not mutually exclusive; if you accept one, then we don't need the others.

Mr. ROBINSON. They are not mutually exclusive. I mean, there are differences that could be adopted, but perhaps it's a matter of nuance. We are relatively sensitive to making recommendations on policy issues. We have been counseled from a variety of forums that that's not a good role for the General Accounting Office, so we tend to try to cast these things as options, legitimate policy options for the Congress to consider. If we thought they were illegitimate, we wouldn't have put them on the table to begin with.

Senator MURKOWSKI. Well, you didn't. Therefore, you would not be willing to prioritize any of these four?

Mr. ROBINSON. Yeah, I would just mention that the one that's probably most cost neutral, if you will, the bundling option, is more of a mechanical common sense kind of a thing. If you've got multiple agencies who can each bring a relatively small number of dollars to the table, and each of those would bring a different set of paperwork and additional requirement and additional standards to meet, if you could establish a mechanism to bundle all those rel-

atively small sources of funds together under one set of requirements, it makes a world of sense from a common-sense standpoint to have that kind of option available to you. That would lessen the cost no more than having them all available separately.

NATIONAL FLOOD INSURANCE PROGRAM

Senator MURKOWSKI. Mr. Pennington, I have to admit a little bit of confusion here. The question was asked, how much can you do from a preventive perspective as opposed to coming in and cleaning up the mess afterwards. You mentioned the pre-disaster relief and flood mitigation, but I think what I understood from your comments is that it is not appropriate or it doesn't make economic sense to certain villages to take advantage of the flood insurance? Help me out here.

Mr. PENNINGTON. I actually stated it a little awkwardly. The last thing I would ever want to do is lead a Native village into the National Flood Insurance Program knowing that the policies are relatively expensive—they're very expensive, and I would not want them to end up defaulting on those policies and then somehow be caught up in the bureaucratic mess that could deny them Federal assistance in the long haul. So we're very cautious about going into those communities.

Any day, any moment, as soon as this hearing is over, if a community wants to jump into the National Flood Insurance Program, we're willing to go there. Shishmaref, like I mentioned, is in the program. And I think the number of policies that are actually issued there are very small. I think it's anywhere from two to nine—I've got the numbers. That gives them the ability to receive FMA dollars. But because there's that lack of building enforcement codes, et cetera, and the expense—I don't want to see the tribes and the Native villagers go broke paying the policies in the process of trying to save the homes just so they can qualify for FMA dollars, if that makes sense.

So we don't have a lot of requests—we have no requests from them to get into the NFIP at this point. We consult with our State partners and those Native villagers and can certainly do that, but we're just a little cautious.

Senator MURKOWSKI. So it's fair to say that you don't go out and advertise and say, come on, we've got a program that can assist you from a prevention perspective recognizing that in many of these villages they won't be able to qualify in the first place because of certain code issues?

Mr. PENNINGTON. I think the short answer is yes and no. Yes, it's a widely popular, widely known, widely advertised program throughout our entire region. How we apply that, like you mentioned in your previous comments about Alaska's Native villages, they are different. They're out there. We just want to make sure that trying to apply that one the broad brush NFIP approach, that if we apply it in those Native villages that it's going to work. And I'm not sure that it necessarily can just yet there because of the economic consequences to the families up front and perhaps in the long haul.

Senator MURKOWSKI. Mr. Chairman, I don't know whether any of the panelists know, or perhaps you do, whether there has been

an effort in the past to do any kind of a coordinated authority to study these issues. If there hasn't, it certainly might be appropriate to have an authority, an erosion control authority that would review and work with the collaboration coordination of the spectrum, as Mr. Pennington was talking about. That might be something that the committee would want to consider.

Chairman STEVENS. I think it's a good idea. I think we ought to pose that question to the agencies. That would be another panel of agencies, also. Seems to me if you follow through on that idea, we should ask Federal agencies and State agencies to come together in an authority and see if we could authorize that authority to have funding under new standards that would give the discretion to waive or limit the local contribution, but also would have a requirement that if it gets to be a decision to relocate, that that relocation would have to be approved by Congress.

I think we could have mitigation and control authority immediately. I do not think we can get the money in a time sufficiently that's large enough money-wise to move these villages if it's going to cost, as anticipated, up to $100 million or more to move one village. I do think that's a good idea if we could get together quickly. When we get back, we'll request the meeting of your agencies in Washington and see if we can come to an agreement before we have the appropriations bill for water and power and see if we can't put in there some basic new authorities that will give the flexibility that these witnesses indicate is necessary.

We'll follow through on that suggestion, Senator.

Senator MURKOWSKI. Thank you.

Chairman STEVENS. Senator Sununu.

Senator SUNUNU. Thank you.

Mr. Robinson, you mentioned bundling, the process of bundling, and the degree to which it might make a difference in helping villages support some of these costs. Are there any other circumstances that you're aware of where this kind of approach or process has been used?

Mr. ROBINSON. Yes. I think BIA is using something very comparable. I think they're quite pleased with the flexibility and the common sense that that's offering them and the ability to get something done with the minimum of administrative costs and the like.

Senator SUNUNU. Are there statutory or legal hurdles to this being done?

Mr. ROBINSON. I believe a statutory exemption would be necessary to possibly meet the need to comply with every agency's individual set of regulations and the like in the concept of the bundling exercise, yes.

Senator SUNUNU. In your report you talk about the cost of relocating villages, and the figures that I recall range between $100 million and $400 million in one case.

Mr. ROBINSON. Yes, sir.

Senator SUNUNU. One, that's an enormous amount of money. But, two, that's a very broad range. What are the key factors that create such a significant cost, and why is the uncertainty so great to have to provide such a range?

Mr. ROBINSON. In the one case, which is the only case where we have a firm estimate, which is the Kivalina case, site A would cost

roughly $100 million, maybe a little more than that, based on Corps analysis. Site B would cost well over $400 million.

It's a difference in the site and the volume of gravel that's necessary to arrange the privilege to protect, the permafrost, to insulate the permafrost, if you will; and brings it above the flood areas. So it's the volume of gravel and, as the General mentioned, the hauling of 8 to 10 inches of gravel hundreds of miles to cover hundreds of acres. It's no small undertaking especially in this high-cost environment.

Senator SUNUNU. General Davis, were the sites that were assessed chosen by the Army Corps, the GAO, the village?

General DAVIS. I think it was a combination of what the locals were asking for and what we were advising under the best engineering practices as the most efficient sites as far as the engineering piece. The other piece in difference in cost is not fully knowing where were the sources of material, whether we could get something locally and bring it in at a low cost or whether it would have to be shipped great distances at a very exorbitant cost.

Senator SUNUNU. Finally, your testimony mentioned a number of flood/erosion projects that you had undertaken successfully.

What key factors would you identify for being the drivers behind the success of those projects?

General DAVIS. I think probably one of the key factors is one we're already familiar with and that is that it was before cost sharing, so we didn't have that additional challenge of a poor community trying to find their cost share. What we found that worked, though, is an aggressive, astute, educated, local constituency that is willing to work with the State and Federal agencies, that understands the process.

A very key factor is the congressional support that the members here in Alaska have given to these projects because most of them don't meet the benefit-to-cost ratios and, therefore, have to be authorized, as opposed to a project that we would recommend. But it's initiative and understanding the process and working through the process.

Senator SUNUNU. Thank you.

Chairman STEVENS. Thank you very much. I do hope that we can find a way to get together and deal with this.

My last question would be: Is there any one of these villages that must be done this year?

Mr. ROBINSON. There are four of them that are categorized as having imminent problems. The problem is, Senator, that I don't think any of them are imminently preparing to move. The site selection issues—Newtok might be the farthest along because it has a land exchange already worked out with the Fish and Wildlife Service. Others are still considering sites.

Koyukuk is way deep in the decision-making process. So I don't think anything is imminent. All the planning and site selection issues still have to be completed in most of the villages.

Chairman STEVENS. It would be my hope that next year at this time we could arrange a field trip and take the Members that are interested out to a series of sites and get an in-depth understanding of some of these problems. I look forward to talking with you all when we get back to Washington and this meeting we hope

to have to see if we can prioritize some of these and set up a time to go. Maybe we'd have to go earlier in the spring to see the real problem. But I think a field trip up there would be helpful to us.

The members have this map in front of us of the nine villages that were really highlighted by the GAO report. We're talking about from Maine to Florida, the distance between some of these. So it's not a locals problem in the sense of distance. It's an enormous problem to deal with the logistics of being able to handle even two of these at the same time with the same agencies; Corps of Engineers working in Bethel and working in Barrow or Kaktovik at the same time. The range of distance is the coastline of the South 48.

So I don't think it's going to be easy to marshal the forces to do more than one or two of these in 1 year. We have to prioritize where we're going as soon as we can.

Mr. ROBINSON. That's a good point. I would say that that work is not theoretical. We visited four villages and our audit teams came back from visiting the sites with their eyes wide open as to the gravity of the issue.

Chairman STEVENS. General Davis.

General DAVIS. Sir, I'd like to follow up on your point of looking at, say, 1 year. One of my additional duties is to be a member of the Corps' Coastal Engineering Research Board. This is chaired by our Director of Civil Works. Three division commanders sit on there and three outside coastal experts sit on there. We meet twice a year.

We met earlier this month and discussed where our next meetings would be. They asked me to host a meeting in Hawaii. I told them, if you're asking me to host a meeting, there are much more pressing coastal issues in Alaska, so we recommend that we hold one of our next two meetings in Alaska. November is probably not the right time. We're looking at next May, June, bringing that board up here that makes recommendations to the Chief of Engineers on where to focus his research efforts in coastal engineering.

So I think it would fit well. Perhaps we might be able to tie it in with a future hearing. It helps us address one of the challenges that we have, as Senator Burns mentioned, is we don't know what we don't know. We won't have the same weight gauge and technical data-gathering equipment here on the Alaskan coast as we have along the Lower 48. So I think it's another step going forward toward the long-range solution that focuses some of our capabilities here in the State.

Chairman STEVENS. That's a great suggestion. Maybe we could arrange the hearing in Hawaii in November and the field trip in the summer.

General DAVIS. I think the rest are going to be in the District of Columbia unfortunately. So you're welcome to come by and visit us.

Chairman STEVENS. On the next panel will be Wayne Mundy, Administrator of the Alaska Office of Native American Programs, Public and Indian Housing, U.S. Department of Housing and Urban Development; Edgar Blatchford, the Commissioner of the Department of Community and Economic Development; and Mr.

David E. Liebersbach, Director of the Division of Homeland Security and Emergency Management.

It is time for our first break.

We appreciate your attendance and ask that you keep comments to 8 minutes so we can keep to our schedule today. I'll call first Mr. Wayne Mundy, Administrator of the Alaska Office of Native American Programs, Department of Housing and Urban Development. Mr. Mundy.

STATEMENT OF WAYNE MUNDY, ADMINISTRATOR, ALASKA OFFICE OF NATIVE AMERICAN PROGRAMS, U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Mr. MUNDY. Mr. Chairman, members of the committee, thank you for the opportunity to testify on this topic, which is so vital to many Alaska communities. Secretary Jackson and Assistant Secretary Liu extend their support to the committee's efforts to take a serious look at these issues. Since housing is a critical component of any community, it is important that the Department of Housing and Urban Development, HUD, be aware of and participate in Alaska's efforts to deal with erosion and flooding issues.

I would also like to take this opportunity to thank you, Chairman Stevens, Senator Murkowski and Representative Young for your ongoing advocacy on behalf of the housing and community development needs of American Indians and Alaska Native peoples throughout the Nation, and especially in Alaska.

Flooding, and the resulting erosion problems have hurt many villages, rendering some locations permanently uninhabitable. HUD programs offer several options to address these problems, or, when necessary, move the village. These programs include the Native American Housing Assistance and Self Determination Acts Program, NAHASDA; the Indian Community Development Block Grant Program, ICDBG; the Rural Housing and Economic Development Program; the State Community Development Block Grant Program; and the Home Investment Partnership Program. These sources could be used to help a community develop capacity as well as to study, plan and help finance community relocation.

We also have two guaranteed loan programs that can provide additional funding sources to assist tribes in leveraging their funds and placing income-eligible families in their own homes. The title VI program allows the tribe or its tribally designated housing entity, TDHE, to leverage their NAHASDA funds and pledge future grants as collateral. This loan guarantee could be used to fund infrastructure construction as well as fund new home acquisition and construction. The Section 184 Loan Guarantee Program provides the tribe, their TDHE or an individual Alaska Native family with a Federal loan guarantee for the purpose of building or acquiring new housing units. At present, both loan funds are significantly undersubscribed.

I am pleased to report that in Alaska, tribes, TDHEs and Alaska Natives are taking advantage of new opportunities to improve their housing conditions by using the Section 184 Loan Guarantee Program. This loan guarantee program is an important part of the administration's efforts to increase home ownership opportunities for the American people, and nowhere is this more important than in Alaska Native villages. I'm proud to report to you that Alaska leads

all area offices of Native American programs in this effort. To date, nearly 350 loan guarantees have been issued in Alaska.

Chairman STEVENS. How many?

Mr. MUNDY. Over 350, sir.

HUD certainly appreciates the contribution of the General Accounting Office in understanding the impact on erosion and flooding. I would like to offer some thoughts based on our experience and involvement with Alaska Native villages.

It is critical that the social impact be considered in the analyses by the Army Corps of Engineers and the Natural Resources Conservation Service, as Senator Murkowski has already pointed out. Alaska's Native villages are isolated communities with unique cultures based on local subsistence practices. We believe a thorough evaluation of the costs and the socioeconomic issues would provide a fuller assessment of any proposed actions.

Alaska Native villages are generally dependent on the State and Federal governments. Rarely do Alaska Native villages have a tax base or other funding source to meet the cost-sharing requirements for existing programs to address flooding and erosion. In order for Alaska Native villages to access these programs, it may be necessary to waive or substantially reduce the cost-sharing requirements.

In the recent past some communities that have decided to undertake village relocation have found themselves eliminated or adversely impacted in their efforts to obtain grants that would allow them to maintain the investments already made at their current locations. Decisions on how long to maintain or operate the existing facilities, and when to stop and begin the relocation are appropriate issues for mutual agreement between the grantors and grantee. This would ensure appropriations are wisely spent and not totally lost when a move occurs.

In HUD's opinion, the bundling of funding sources makes very good sense. However, within the GAO report there was no discussion of the barriers on matching funds from different agencies with different restrictions on the funding. One of the most obvious barriers would be the variety of environmental assessment and review processes used by the probable partners. We recommend that the agencies get together to identify barriers in bundling their funds and consider whether it would be appropriate to make joint recommendations for possible legislative or regulatory or changes to minimize the barriers.

Clearly, the solution to this problem is beyond the control and funding of any single agency. Solutions will only be reached through the cooperation of the tribes, the local governments, the State agencies, the Federal agencies and any private sector entities that are involved. We should be challenged not just to look at the historic solutions to these problems; we need to apply creative remedies and be willing to explore alternatives.

We do not fully understand the causes of flooding and erosion, only that there are communities in distress, and HUD possesses some of the tools to help address those issues. This hearing offers the opportunity to explore real solutions, even if those solutions may be long term. With the collective wisdom and desire of all involved, we believe reasonable solutions may be found. Again, HUD

stands ready to be an active and willing partner in this effort, and we applaud your efforts and leadership in this area.

This concludes my prepared remarks. I would be happy to answer any questions.

Thank you very much.

Chairman STEVENS. Thank you for saying your agency is available to work with us. That's very good.

[The statement follows:]

PREPARED STATEMENT OF WAYNE MUNDY

Mr. Chairman and Members of the Committee, thank you for the opportunity to testify on this topic, which is so vital to many Alaska communities. Secretary Jackson and Assistant Secretary Liu extend their support to the Committee's efforts to take a serious look at these issues. Since housing is a critical component of any community, it is important that the Department of Housing and Urban Development (HUD) be aware of and participate in Alaska's efforts to deal with erosion and flooding.

I would also like to take this opportunity to thank you, Chairman Stevens, Senator Murkowski and Representative Young for your ongoing advocacy on behalf of the housing and community development needs of American Indians and Alaska Native peoples throughout the Nation, and especially in Alaska.

Introduction

Flooding, and the resulting erosion problems have hurt many villages, rendering some locations permanently uninhabitable. HUD programs offer several options to address these problems or, when necessary, move the village. These programs include the Native American Housing Assistance and Self Determination Act's (NAHASDA) Indian Housing Block Grant (IHBG) program; the Indian Community Development Block Grant (ICDBG) program; the Rural Housing and Economic Development (RHED) program; the State Community Development Block Grant (CDBG) program; and the HOME Investment Partnership Program. These sources could be used to help a community develop capacity as well as to study, plan and help finance community relocation.

We also have two guaranteed loan programs that can provide additional funding sources to assist tribes in leveraging their funds and placing income-eligible families in their own homes. The Title VI program allows the tribe or its tribally designated housing entity (TDHE) to leverage their IHBG funds and pledge future grants as collateral. This loan guarantee could be used to fund infrastructure construction as well as fund new home acquisition and construction. The Section 184 Loan Guarantee program provides the tribe, their TDHE or an individual Alaska Native family with a Federal loan guarantee for the purpose of building or acquiring new housing units. At present, both loan funds are significantly undersubscribed. I encourage lenders, tribes and their TDHEs to take a close look at the benefits they can realize by using these programs to enhance housing development and the necessary community infrastructure.

I am pleased to report that in Alaska, tribes, TDHEs and Alaska Natives are taking advantage of new opportunities to improve their housing conditions by using the Section 184 Loan Guarantee Program. This federally guaranteed home mortgage loan program is an important part of this Administration's efforts to increase homeownership opportunities for the American people, and nowhere is this more important that in Alaska Native villages. I am proud to report to you that Alaska leads all Area Offices of Native American Programs in this effort. To date, nearly 350 loan guarantees have been issued in Alaska.

Erosion and Flooding Issues

HUD certainly appreciates the contribution of the General Accounting Office in understanding the impact of erosion and flooding. I would like to offer some thoughts, based on our experience and involvement with Alaska Native villages.

It is critical that the social impact be considered in the analyses by the Army Corps of Engineers and the Natural Resources Conservation Service (NRCS). Alaska Native villages are isolated communities with unique cultures based on local subsistence practices. We believe a thorough evaluation of the costs and the socio-economic issues would provide a fuller assessment of any proposed actions.

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This concludes my prepared remarks. I would be happy to answer any questions you may have.

Chairman STEVENS. Our next witness is Edgar Blatchford, Commissioner for the Department of Community and Economic Development and the former mayor of Seward. Good morning.

STATEMENT OF EDGAR BLATCHFORD, COMMISSIONER, DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT, ANCHORAGE, ALASKA

Mr. BLATCHFORD. Good morning, Senator, and members of the committee. Thank you very much for allowing me to testify before you. This is a very important hearing for the people of Alaska, particularly rural Alaska in the unorganized borough.

I am the Commissioner of the Alaska Department of Community and Economic Development. Mr. Chairman, the Department's name will be changed effective September 2 to the Alaska Department of Commerce and Economic Development. If you notice a change later, it's because of the legislature and the Governor's office changing the name of the department.

I'm here on, Mr. Chairman and members of the committee, on behalf of the State and on behalf of the Governor and we are seeking assistance from the Federal Government and direction from the Senate Appropriations Committee. Erosion and flooding is endemic to our State with nearly all of our communities having some type of flooding and/or erosion impact, as I would venture may be the case in many of the communities in each of the other home States of the members of the committee. Where the problem in Alaska differs is where Native communities, primarily in what we refer to as the unorganized borough where there's no regional government or county equivalent exists and those communities are most at risk. A few villages, Mr. Chairman, have no room for gradual retreat—

the moving back of homes and infrastructure as is occurring in numerous communities throughout our State.

Retreat is no longer an option. For a few villages complete relocation is likely to be the only viable alternative. We cannot fund this daunting task on our own.

Senator Stevens, I believe, has asked us here today to focus on the particular dilemma of this handful of communities that are named in the December 2003 General Accounting Office report titled "Alaska Native Villages: Most Are Affected by Flooding and Erosion, But Few Qualify For Federal Assistance." If we together with Federal agencies lead assistance, we can forge a roadmap for these few. We will also be paving the way for improved planning and development guidelines for the many villages that are at risk, but have not passed into this imminent threat of loss category.

Shishmaref, Newtok, Koyukuk, Kivalina—these villages have not caught up with the visions of sustainability that we push communities to strive for and support through the Denali Commission and our other partner agencies.

Their needs for basic services—a sewer system, a new clinic, improved water supply—are real, but unfortunately must be put on hold because of the high risk in their current village location. In most of the risk communities structural erosion/flood control measures are not a cost-effective option, but in the case of Shishmaref are still being tried. I fear these costly measures will only continue to divert our monetary resources and energies from the primary need—relocation.

Federally led village relocation planning will need to continue, but has not been well supported at the State level because of a lack of funding and staff. The State encourages the Federal lead on relocation planning efforts, but would like to see ties to the Governor's Access to the Future initiative to see if relocation sites may support more locally sustainable economies.

The erosion planning relocation efforts the Department has led, for example, Alakanuk's Erosion and Land Use Plan, found other Federal resources and programs were difficult to tap to move threatened structures, as Federal authorities are not focused or applicable to village relocation needs.

The Department, Division of Community Advocacy's floodplain management efforts have tried to integrate sound erosion management policies with our floodplain management program, but frankly this is difficult without a Federal erosion policy or Federal guidance. For example, the current multimillion dollar, 5-year effort to modernize the Nation's flood maps—for which we are very grateful for and encourage continued Senate Appropriations Committee support—we are told that FEMA flood mapping dollars cannot be used for delineating an erosion risk. Our department is leading this important flood map update effort and will try, with limited resources, to include erosion risk areas on our rural community-based mapping effort. Sound identification of risks is vital to avoid the many problems of the past, including community infrastructure in harm's way.

As the State coordinating department for floodplain management in Alaska, our mission is to "provide technical assistance and coordination to reduce public and private sector losses and damage

from flooding and erosion, primarily to those cities and boroughs that participate in the National Flood Insurance Program." Please understand one person in the State is tasked with this daunting mission and the department has no dedicated program funds to mitigate the significant flood and erosion threats facing families and communities throughout Alaska. Nor, to the best of our knowledge, do any State of Alaska programs address erosion, unless as a special legislative appropriation-directed activity.

Our Department's flood and erosion management mission, however, is dwarfed by our larger departmental mission of promoting economically sustainable communities. Now is the time to see how, with Federal support, we can merge these two missions.

Federal resources must be brought to focus in assisting the most threatened villages. We must come together in a Federal-State partnership to tackle a comprehensive and coordinated plan of action for the most threatened communities named in the GAO report. We do not see this as an easy add-on to the existing authority of the Denali Commission, as suggested in the GAO report, but would welcome discussion of methods to proceed with a Federal-State partnership to address the problem.

My staff will be listening closely to comments, suggestions and directions that may come from this important hearing, as staff is in the midst of preparing a Five-Year Comprehensive Floodplain Management Strategy for Alaska.

Thank you for holding this hearing and for permitting me to testify. I welcome your questions and appeal for your support on behalf of our most at-risk communities. Thank you.

Chairman STEVENS. Thank you very much. Glad to have your comments.

[The statement follows:]

PREPARED STATEMENT OF EDGAR BLATCHFORD

Thank you, Mister Chairman and members of the Committee for traveling to Alaska to hold this important hearing, and for this opportunity to testify on behalf of the State and the Department of Community and Economic Development.

I am testifying before you because of our department's Alaska Constitutional mandate to assist communities. Thus I serve as spokesman for all of rural Alaska.

Frankly Senators, you would not be here today if we did not need the help of the Federal Government and the direction of the Senate Appropriations Committee.

Erosion and flooding is certainly endemic to our State, with nearly all of our communities having some type of a flooding and/or erosion impact, as I would venture may be the case in many of the communities in each of your home states. Where the problem in Alaska differs is where Native communities, primarily in what we refer to as the Unorganized Borough (no regional government or county-equivalent exists), are most at risk. A few villages have no room for gradual retreat—the moving back of homes and infrastructure as is occurring in numerous communities throughout our state.

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The DCED, Division of Community Advocacy's floodplain management efforts has tried to integrate sound erosion management policies with our floodplain management program, but frankly this is difficult without a federal erosion policy, or federal guidance. For example the current multi-million dollar, five-year effort to modernize the Nation's flood maps—for which we are very grateful for and encourage, continued Senate Appropriations Committee support—we are told that FEMA flood mapping dollars cannot be used for delineating an erosion risk. Our department is leading this important flood map update effort and will try, with limited resources, to include erosion risk areas on our rural community base mapping effort. Sound identification of risks is vital to avoid the many problems of the past—locating community infrastructure in harm's way.

As the State-coordinating department for floodplain management in Alaska—our mission is to "provide technical assistance and coordination to reduce public and private sector losses and damage from flooding and erosion, primarily to those cities and borough's that participate in the National Flood Insurance Program (NFIP)". Please understand one person in the State is tasked with this daunting mission and the Department has no dedicated program funds to mitigate the significant flood and erosion threats facing families and communities throughout Alaska. Nor, to the best of our knowledge, do any State of Alaska programs address erosion—unless as a special Legislative appropriation directed activity.

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Thank you for holding this hearing and for permitting me to testify. I welcome your questions and appeal for your support on behalf of our most at-risk communities.

Additional Background

The GAO Report on Villages Affected by Flooding and Erosion recommended that the Denali Commission's role be expanded; likewise DCED is often named as the possible agency to "lead" a State (non-disaster) erosion response effort. DCED, since inception, has been the Governor's designated lead State coordinating agency for the National Flood Insurance Program; leads the Flood Mitigation Assistance planning and project development; and now is lead for Modernizing Flood Maps. Staffing is insufficient to meet these existing and growing demands.

If delegated, DCED would lead coordination if adequately funded. As the Alaska Land Managers Cooperative Task Force subcommittee on floodplain management reported 25 years ago, "Substantial evidence indicates there does not now exist on the State level an adequate program for floodplain planning and management." DCED or any other State agency would not be able to be an effective "lead agency" without clearly stated and adopted roles, responsibilities and functions for a comprehensive erosion area development policy requiring concurrence and coordination with all agencies affected by such actions.

DCED encourages the Senate Appropriations Committee to consider increasing support for better statewide hydrologic information that would be of great use to many users including developers, consultants, agencies organizations and private individuals for the engineering design, planning, forecast, monitoring, and other purposes. There is strong need for a comprehensive State stream gauging system to better define flooding events—especially in rapidly developing areas such as the fast growing Kenai Peninsula, Fairbanks North Star Borough and Matanuska-Susitna Boroughs.

Our State Floodplain Management Coordinator assisted the GAO extensively in their study. Flooding and erosion affect a significant number of Alaskan communities. We agree with the GAO study, indicating that the villages of Kivalina, Koyukuk, Newtok and Shishmaref face increased danger from floods and erosion. Some of these communities have sought assistance with relocation, which is also a goal we support.

Unless a funded, interdisciplinary, systematic approach to relocation is undertaken to assist these most threatened communities, structures will continue to be temporarily moved back to avoid loss, but relocation has not, and will not, occur in several years. Relocation has been a topic of discussion and study for Kivalina, Shishmaref and Newtok for at least two decades.

DCED would like to see the federal disaster assistance programs included in the many assistance mechanisms that will be needed to address the relocation needs of these most threatened Alaska villages. In particular, the Flood Mitigation Assistance Program credited by General Accounting Office as funding the move of fourteen homes in Shishmaref after the 1997 storm, is now limited by the Federal Emergency Management Agency guidance only to "repetitive loss structures" as eligible rather than including "structures subject to imminent collapse or subsidence as a result of erosion or flooding" as is allowable under the Congressional authorizing language.[1] This unfairly limits a viable federal funding mechanism that has successfully mitigated the loss of many structures in Shishmaref but currently cannot be used.

Historically the State has provided the nonfederal matching funds for most Corps of Engineers (and other federal projects) faced by the State of Alaska. However, the matching funds have been severely limited. There is no dedicated State fund for relocation, erosion or structural flood control. A number of special legislative pass-through grants and Community Development Block Grants have been used to fund erosion studies and relocation planning projects but no direct general fund exists at the State level.

To some extent, as many as 213 villages are "affected" by erosion because erosion is a naturally occurring process. Data collection needs some framework for quantification. Standard(s) for measurement; erosion zone guidance and federal (or state) standards by which to judge erosion risk are needed. The national standard for designing, development and siting for the "100-year flood" event exists and is quantifiable and measurable. A standard for erosion, such as a distance measurement needs to be established (such as the life of the structure, which itself may need to be standardized—50-year life for a house, etc.). Congress has provided limited authorization to implement a coastal erosion management program,[2] but this has not advanced to the level of Executive Orders for guiding federal floodplain and wetlands management.

Chairman STEVENS. Our next witness is Dave Liebersbach, Director of the Division of Homeland Security and Emergency Management. Thank you very much for being here.

STATEMENT OF DAVID E. LIEBERSBACH, DIRECTOR, DIVISION OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT, FORT RICHARDSON, ALASKA

Mr. LIEBERSBACH. Thank you, Mr. Chairman and members of the committee, for the opportunity to testify in this hearing today. I appreciate the leadership this committee is providing by focusing attention on the problems of flooding and erosion that threaten Alaska's community.

[1] See Section 1366(e)(5) Eligible Activities (A) of The National Flood Insurance Act of 196 as Amended by the National Flood Insurance Reform Act of 1994.

[2] Managing Coastal Erosion, National Research Council (Library of Congress CC# 89–13845).

As director for the State's emergency management organization, there are three points I'll make today: First, the problems of erosion and flooding are significant dangers to many Alaskan communities. Second, the solution to the problems created by flooding and erosion lay beyond the existing capabilities of the communities and the State.

Third, failure to find a solution to the flooding and erosion problems of our communities will place many Alaskan residents at an increasing risk in future years.

My agency, the Division of Homeland Security and Emergency Management, acting under the authority of the Governor of Alaska, will assist in protecting life and property when local governments are overwhelmed by natural disasters or acts of terrorism. Additionally, we assist the State, local governments and private institutions in planning and preparing for disasters or terrorism events.

Our mission is defined by law in Alaska Statute, title 26, chapter 23, which states, "The Governor is responsible for meeting the dangers presented by disasters to the State and its people." Disasters are defined as the "occurrence or imminent threat of widespread or severe damage, injury, loss of life or property, or shortage of food, water or fuel from an incident."

The law limits the response by the Division of Homeland Security and Emergency Management to events which pose "a widespread and severe threat" to human life or property. One home being washed away by a flood is a tragedy. It is not, however, a State disaster because it is neither "widespread" nor "severe."

Similarly, the constantly changing courses of our rivers and eroding coastlines are causing tragedies in local communities, but not disasters. The village of Noatak is but one example where gradually, house by house, one-half the village has been forced to relocate as the riverbank erodes. The residents have accomplished this, as is proper, without any assistance from my agency.

Since the 1977 reorganization of this agency, the division has been involved in over 200 disaster events of varying size, dealing with every type of hazard. In the last 20 years we have responded to 97 flooding or erosion disaster events, which account for 51 percent of our responses. We can only guess what the next 20 years will bring, but we can improve our situation with good mitigation measures.

Elevating or relocating structures are examples of disaster mitigation. However, outside of a federally declared disaster, the State of Alaska has no program to fund disaster mitigation projects. For a federally declared disaster the State may spend up to 7½ percent of the total disaster funding on approved mitigation projects. Currently, we are using these mitigation funds to relocate houses in Alakanuk and elevate houses in Red Devil and Sleetmute. Last year this program funding was reduced by 50 percent.

The 2003 report by the United States General Accounting Office titled, "Alaska Native Villages" is a tremendously important study. Our agency assisted the GAO in this study and supports the conclusions. Flooding and erosion affect a significant number of Alaskan communities. We agree with the GAO study indicating that the villages of Kivalina, Koyukuk, Newtok and Shishmaref face increased danger from floods and erosion. Some of these communities

have sought assistance with relocation, which is also a goal we support.

The problem is most acute for some of Alaska's smallest communities. Again, the GAO report painted an accurate portrait of these problems. The small populations, the limited tax bases and the undeveloped nature of local governments are manifested in the communities most at risk also being those with the fewest local resources available to cope with the problems. We also believe the risk of flooding and erosion in many communities appears to be increasing and we readily share the concerns expressed by residents of Alaska's rural communities.

In conclusion, our agency has vast experience in disaster response and recovery. We will be there for each and all of these communities when the next storm strikes. We will be there for all the storms that follow. However, our legal mandate does not give us the authority, or the funding, to move a community out of the path of a storm.

Clearly, there needs to be legal authority and funding to relocate communities that are at risk for catastrophic events. I believe these hearings are providing a good forum to develop the answers to these critical issues.

Thank you for holding the hearings and permitting me to testify. I welcome questions.

[The statement follows:]

PREPARED STATEMENT OF DAVID E. LIEBERSBACH

Thank you, Mister Chairman and Members of the Committee for the opportunity to testify in this hearing today. I appreciate the leadership this Committee is providing by focusing attention on the problems of flooding and erosion that threaten Alaska's communities.

As the Director of the State's emergency management organization, there are three points I will make today. First, the problems of erosion and flooding are significant dangers to many Alaskan communities. Second, the solution to the problems created by flooding and erosion lay beyond the existing capabilities of the communities and the State. Third, failure to find a solution to the flooding and erosion problems of our communities will place many Alaskan residents at an increasing risk in future years.

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Since the 1977 reorganization of this agency, the Division has been involved in over 200 disaster events of varying size, dealing with every type of hazard. In the last 20 years, we have responded to 97 flooding or erosion disaster events, which accounts for 51 percent of our responses. We can only guess what the next 20 years will bring, but we can improve our situation with good mitigation measures.

Elevating or relocating structures are examples of disaster mitigation. However, outside of a federally declared disaster, the State of Alaska has no program to fund disaster mitigation projects. For a federally declared disaster, the State may expend up to 7.5 percent of the total disaster funding on approved Mitigation projects. Currently, we are using these mitigation funds to relocate houses in Alakanuk and elevate houses in Red Devil and Sleetmute. Last year, FEMA reduced this program funding by 50 percent.

The 2003 report by the United States General Accounting Office titled "Alaska Native Villages" is a tremendously important study. My agency assisted the GAO in this study and supports the conclusions. Flooding and erosion affect a significant number of Alaskan communities. We agree with the GAO study, indicating that the villages of Kivalina, Koyukuk, Newtok and Shishmaref face increased danger from floods and erosion. Some of these communities have sought assistance with relocation, which is also a goal we support.

The problem is most acute for some of Alaska's smallest communities. Again, the GAO report painted an accurate portrait of these problems. The small populations, the limited tax bases and the undeveloped nature of local governments are manifested in the communities most at risk also being those with the fewest local resources available to cope with the problems. We also believe the risk of flooding and erosion in many communities appears to be increasing and we readily share the concerns expressed the residents of Alaska's rural communities.

In conclusion, my agency has vast experience in disaster response and recovery. We will be there for each and all of these communities when the next storm strikes. We will be there for all the storms that follow. Unfortunately, our legal mandate does not give us the authority, or the funding, to move a community out of the path of the storm.

Clearly, there needs to be legal authority and funding to relocate communities that are at risk from catastrophic events. I believe these hearings are providing a good forum to develop the answers to these critical issues.

Thank you for holding the hearings and for permitting me to testify.

ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT SUMMARY OF FEDERAL & STATE DECLARED DISASTERS (MARCH 1984 TO PRESENT)

DISASTER	DSTR #	Category	Total Cost State/Fed	On the GAO Study	Total Disasters/Percentage and Cost
Environmental and Economic Disasters					
Crown Point/May 1, 1986	86–53	E–5	$712,097.00	.....	
Valdez Oil Spill/March 29, 1989	89–89	E–5	$361,679.00	.....	
Moose/March 28, 1990	90–108	E–5	$196,522.00	.....	9 Disasters
Norton Sound Herring Fish/July 13, 1992	93–159	E–5	$0.00	.....	5 percent of total
Kuskokwim Chum/July 19, 1993	94–163	E–5	$0.00	.....	
Bristol Bay Fish/July 18, 1997	98–184	E–5	$2,007,846.00	.....	
WAFD/July 30, 1998/FEDA	99–189	E–5	$18,000,000.00	.....	
WAFD/July 30, 1998/ELE	99–189	E–5	$6,106,751.35	.....	
Operation Renew Hope/July 19, 2000	1–194	E–5	$747,122.10	.....	
Total Cost	.....	.....	$28,132,017.45		
Other Infrastructure					
Thorne Bay (Bridge)/February 3, 1986	86–52	E–4	$11,778.00	.....	
Klehini River Bridge/November 9, 1987	88–68	E–4	$92,482.00	.....	6 Disasters
Whittier/August 8, 1989	90–98	E–4	$634,103.00	.....	3 percent of total
Broadcasting/February 22, 1990	90–106	E–4	$130,000.00	.....	
Lowell Creek Tunnell/September 27, 1990	91–124	E–4	$369,786.00	.....	
Kotzebue Radio Tower/August 13, 2001	2–197	E–4	$41,226.77	.....	
Total Cost	.....	.....	$1,279,375.77		
Fuel Shortages					
Gambell/May 17, 1985	85–35	E–3	$33,673.00	.....	
Togiak/October 1987	88–67	E–3	$35,000.00	.....	6 Disasters
Kongiganak/March 2, 1990	90–107	E–3	$20,000.00	.....	3 percent of total
Manakotak/April 5, 1990	90–109	E–3	$15,000.00	.....	
Karluk/February 22, 1991	91–129	E–3	$22,000.00	.....	
Aniak Loan/August 7, 1991	92–147	E–3	$5,082.00	.....	
Total Cost	.....	.....	$130,755.00		

ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT SUMMARY OF FEDERAL & STATE DECLARED DISASTERS (MARCH 1984 TO PRESENT)—Continued

DISASTER	DSTR #	Category	Total Cost State/Fed	On the GAO Study	Total Disasters/Percentage and Cost
Public Services					
Search and Rescue/September 13, 1989	90–102	E–2	$100,000.00	.....	3 Disasters
Snow and Ice Removal/1990	90–112	E–2	$2,000,000.00	.....	2 percent of total
Shaker IV/1993	94–166	E–2	$357,778.00	.....	
Total Cost	.....	.....	$2,457,778.00		
Utilities (Not caused by Natural Disaster Events)					
Cold Bay/May 5, 1984	84–27	E–1	$1,345.00	.....	
Cold Bay/July 31, 1984	85–30	E–1	$740,000.00	.....	
Metlakatla/December 10, 1985	86–48	E–1	$90,547.00	.....	
Venetie/March 3, 1986	86–51	E–1	$54,615.00	.....	
Aniak (Sewer)/October 27, 1986	87–57	E–1	$52,500.00	.....	
Angoon/November 6, 1987	88–66	E–1	$29,514.00	.....	
Beaver/March 8, 1988	88–71	E–1	$22,990.00	.....	
Chenega Bay/March 25, 1988	88–73	E–1	$36,423.00	.....	
Eagle/July 22, 1988	89–79	E–1	$8,242.00	.....	
Marshall/February 25, 1991	91–130	E–1	$15,741.00	.....	
Angoon/May 3, 1991	91–131	E–1	$91,468.00	.....	14 Disasters
Little Diomede/July 25, 1991	92–146	E–1	$67,684.00	.....	7 percent of total
Seward Sewage/November 20, 1991	92–152	E–1	$754,541.00	.....	
Kake Water Incident/July 31, 2000	1–195	E–1	$409,699.25	.....	
Total Cost	.....	.....	$2,375,309.25		
Earthquakes, Volcanoes, Landslides and Avalanches					
Mt. Redoubt/December 20, 1989	90–103	D	$269,886.00	.....	6 Disasters
KPB Mt. Redoubt/January 11, 1990	90–104	D	$149,403.00	.....	3 percent of total
Earthquake Mitigation/November 7, 1991	92–151	D	$225,748.00	.....	
Mt. Spurr/September 21, 1992	93–161	D	$287,846.00	.....	
Central Gulf Coast Storm/February 4, 2000 [1]	0–191	D	$17,320,725.00	.....	

Denali Earthquake/November 6, 2002 [1]	2–203	D	$19,934,500.00		
Total Cost			$234,937,361.72		
Fire: Wild Land and Structural					
Russian Mission/August 9, 1984	85–31	C	$89,325.00		
Gambell/August 31, 1985	86–44	C	$201,693.00		
Manakotak/November 22, 1985	86–46	C	$69,449.00		
Venetie/January 9, 1987	87–58	C	$86,000.00		
Delta Junction/May 28, 1987	87–61	C	$22,257.00		
Wainwright Fire/October 6, 1987	88–65	C	$2,186,931.00		
Barrow School Fire/February 16, 1988	88–69	C	$2,410,159.00		
Chefornak/March 23, 1988	88–72	C	$272,735.00		
Pitka's Point/March 29, 1988	88–74	C	$97,761.00		
Nondalton/April 5, 1988	88–75	C	$776,897.00		
Klawock/October 17, 1988	89–81	C	$48,157.00		
Yukon Flats/November 10, 1988	89–82	C	$84,757.00		
Tatitlek/January 31, 1990	90–105	C	$92,242.00		
Stebbins/April 9, 1990	90–110	C	$1,000,000.00		
Fire Suppresion/May 30, 1990	90–115	C	$1,000,000.00		
Teklanika Fire/May 31, 1990	90–116	C	$1,000,000.00		
Statewide Fires/July 4, 1990	91–118	C	$1,995,914.00		
Eagle/December 28, 1990	91–126	C	$33,174.00		
DNR/July 11, 1991	92–143	C	N/A		
Whitestone/July 25, 1991	92–145	C	$168,700.00		
Diomede Fire/September 20, 1991	92–148	C	$974,172.00		
DNR Fire Disaster/July 7, 1992 [2]	93–158	C	N/A		
Tenakee Springs Fire/July 19, 1993	94–164	C	$169,369.00		
Department of Natural Res/August 3, 1993	94–165	C	$1,000,000.00		
DNR Statewide Fire/June 22, 1995 [2]	95–179	C	N/A		
Miller's Reach Fire/June 2, 1996 [1]	96–181	C	$7,540,509.00		
DNR Fire Suppression/July 14, 1997 [2]	96–183	C	N/A		31 Disasters
DNR Fire Suppression/June 5, 1998 [2]	98–187	C	N/A		16 percent of total
DNR Fire Suppression/May 24, 2000 [2]	0–192	C	N/A		
DNR Fire Suppression/June 23, 2000 [2]	0–193	C	N/A		
Sleetmute Fire/December 20, 2001	2–199	C	$148,646.57		
Total Cost			$21,468,847.57		

ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT SUMMARY OF FEDERAL & STATE DECLARED DISASTERS (MARCH 1984 TO PRESENT)—Continued

DISASTER	DSTR #	Category	Total Cost State/Fed	On the GAO Study	Total Disasters/Percentage and Cost
Extreme Freezing Temps and High Winds					
Unalakleet/March 5, 1984	84–23	B	$726,865.00	.....	
Mountain Village/March 8, 1984	84–24	B	$986,427.00	.....	
Elim/March 9, 1984	84–25	B	$384,588.00	.....	
Kotzebue/April 30, 1984	84–26	B	$673,101.00	.....	
Savoonga/February 26, 1985	85–34	B	$255,954.00	.....	
Thorne Bay/December 5, 1985	86–47	B	$258,512.00	.....	
Pelican/March 19, 1986	86–52	B	$18,024.00	.....	
Kotzebue/February 5, 1987	87–59	B	$1,231,610.00	.....	
Omega Block(Cold Wthr)/January 28, 1989	89–83	B	$1,319,656.00	.....	
Northwest Arctic Borough/February 1, 1989	89–84	B	$4,974,908.00	.....	
St. George/February 9, 1989	89–85	B	$229,853.00	.....	
Sand Point/February 27, 1989	89–86	B	$23,062.00	.....	
Ahkiok/March 2, 1989	89–87	B	$45,937.00	.....	
Galena/April 20, 1989	89–90	B	$175,124.00	.....	18 Disasters
Hazard Mitigation C.W./1990	91–119	B	$556,754.00	.....	9 percent of total
Togiak/February 8, 1991	91–127	B	$51,384.00	.....	
Larsen Bay/February 14, 1991	91–128	B	$20,000.00	.....	
South-central Windstorm/March 2003 [1]	3–204	B	$5,577,248.00	.....	
Total Cost	.....	.....	$17,509,007.00		
Flood and Erosion Type Events for the last 20 years					
Southeast Alaska/November 26, 1984	85–32	A/B	$958,519.00	.....	
Unalaska/December 13, 1985	86–49	A/B	$181,937.00	.....	
North Slope Borough/March 8, 1989	89–88	A/B	$113,364.00	([3])	
Alakanuk/June 13,1984	84–28	A	$277,544.00	([3])	
Emmonak/June 15, 1984	84–29	A	$22,884.00	([3])	
Haines/January 25, 1985	85–33	A	$1,581,506.00	.....	
Buckland/May 30, 1985	85–36	A	$83,585.00	([3])	
Kobuk/May 30, 1985	85–37	A	$17,979.00	([3])	
Anvik/June 5, 1985	85–38	A	$17,878.00	([3])	
Emmonak/June 11, 1985	85–39	A	$72,832.00	([3])	

Pilot Station/June 18, 1985	85–40	A	$34,736.00	(3)
Upper Kuskokwim River/June 18, 1985	85–41	A	$56,826.00	(3)
Pitka's Point/July 9, 1985	86–42	A	$12,740.00	(3)
Bethel/July 10, 1985	86–43	A	$475,507.00	(3)
Cordova/October 31, 1985	86–45	A	$16,462.00	.....
Napakiak/May 15, 1986	86–54	A	$15,000.00	(3)
Artic (North Slope) Sea Storm/September 25, 1986	87–55	A	$3,791,026.00	(3)
Southcentral AK Flood/October 12, 1986	87–56	A	$8,642,440.00	.....
Sleetmute/Red Devil/May 28, 1987	87–60	A	$51,602.00	(3)
Aniak/May 29, 1987	87–62	A	$993,861.00	(3)
Buckland/June 16, 1987	87–63	A	$203,548.00	(3)
DOT—July 24, 1987 [4]	88–64	A	N/A	.....
Haines Flooding/February 29, 1988	88–70	A	$78,590.00	.....
Crooked Creek/May 12, 1988	88–76	A	$133,230.00	(3)
Napakiak/Napaskiak/May 24, 1988	88–77	A	$125,292.00	(3)
Kaltag/May 26, 1988	89–78	A	$28,883.00	(3)
Shishmaref/August 5, 1988	89–80	A	$318,072.00	(3)
Glennallen/May 6, 1989	89–91	A	$15,000.00	
Circle/May 6, 1989	89–92	A	$196,657.00	(3)
Ft. Yukon/May 6, 1989	89–93	A	$194,812.00	(3)
89 Spring Floods/June 10, 1989	89–94	A	$4,739,881.00	(3)
Klawock/June 19, 1989	90–95	A	$9,927.00	.....
Fairbanks North Star Boro/August 4, 1989	90–96	A	$65,640.00	.....
Mat-Su Borough/August 4, 1989	90–97	A	$358,772.00	.....
Municipality of Anchorage/August 30, 1989	90–99	A	$2,261,615.00	.....
Seward/Kenai Peninsula/August 30, 1989	90–100	A	$529,552.00	.....
DOT—September 13, 1989 [4]	90–101	A	N/A	.....
Hazard Mit. 89 Spring Flood/April 14, 1990	90–111	A	$619,828.00	.....
McGrath/May 16, 1990	90–113	A	$39,409.00	(3)
Kobuk/May 17, 1990	90–114	A	$6,153.00	(3)
Bethel/July 2, 1990	90–117	A	$600,176.00	(3)
Lower Kuskokwim/September 4, 1990	91–120	A	$835,297.00	(3)
Kotzebue/September 4, 1990	91–121	A	$328,845.00	(3)
Nome/September 10, 1990	91–122	A	$105,000.00	.....
Teller/September 10, 1990	91–123	A	$173,723.00	(3)
Diomede/November 21, 1990	91–125	A	$622,594.00	(3)
Fairbanks North Star Boro/May 3–23, 1991	91–132	A	$1,664,378.00	(3)
Aniak/May 1991	91–133	A	$550,089.00	(3)
McGrath/May 1991	91–134	A	$608,391.00	(3)
Red Devil/May 1991	91–135	A	$239,953.00	(3)

ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT SUMMARY OF FEDERAL & STATE DECLARED DISASTERS (MARCH 1984 TO PRESENT)—Continued

DISASTER	DSTR #	Category	Total Cost State/Fed	On the GAO Study	Total Disasters/Percentage and Cost
Anvik/May 1991	91–136	A	$181,700.00	(3)	
Grayling/May 1991	91–137	A	$78,630.00	(3)	
Emmonak/May 1991	91–138	A	$398,246.00	(3)	
Holy Cross/May 1991	91–139	A	$20,265.00	(3)	
Alakanuk/May 1991	91–140	A	$210,506.00	(3)	
Shageluk/May 1991	91–141	A	$57,867.00	(3)	
Galena/May 1991	92–142	A	$67,061.00	(3)	
Mat-Su Borough/July 18, 1991	92–144	A	$515,900.00	.....	
New Koliganek/October 14, 1991	92–149	A	$67,526.00	(3)	
Kodiak/November 2, 1991	92–150	A	$1,564,957.00	(3)	
Eagle Village Flood/May 19, 1992	92–153	A	$183,729.00	(3)	
Eagle City Flood/May 19, 1992	92–154	A	$61,147.00	(3)	
Galena Ice Jam Flood/May 26–29, 1992	92–155	A	$442,615.00	(3)	
Flood Response/June 9, 1992	92–156	A	$22,059.00	.....	
Yukon River Flood/June 17, 1992	92–157	A	$1,167,796.22	(3)	
DOT—August 14,1992 [4]	93–160	A	N/A	.....	
DOT—October 5, 1992 [4]	93–162	A	N/A	(3)	
DOT—October 29, 1993 [4]	94–167	A	N/A	.....	
Fort Yukon Haz Mit/1993	94–168	A	$356,765.00	.....	
McGrath Road Disaster/May 23, 1993	94–169	A	$170,999.00	.....	
Galena Flood/May 10, 1994	94–170	A	$614,005.00	(3)	
Cummins Road/July 13, 1994	95–171	A	$38,810.00	.....	
Mat-Su Borough Loan/July 1, 1994	95–172	A	$500,000.00	.....	
1994 Falls Floods/August 24, 1994	95–173	A	$60,883,422.00	(3)	
1994 Koyukuk Flood Hmit/August 24, 1994	95–173	A	$11,402,495.00	(3)	
1994 Koyukuk Flood TH/August 24, 1994	95–173	A	$335,616.00	(3)	
Metlakatla/November 10, 1994	95–174	A	$31,863.00	(3)	
Skagway/November 16, 1994	95–175	A	$112,786.00	.....	
Yukon-Delta Kuskokwim/June 5, 1995	95–176	A	$207,852.00	(3)	
Aniak/June 5, 1995	95–177	A	$210,213.95	.....	
Bethel/June 5, 1995	95–178	A	$128,861.00	(3)	
1995 Southcentral Flood/September 21, 1995	96–180	A	$10,526,962.15	.....	
96 Southeast Storm/September 25, 1996	96–182	A	$528,180.80	.....	
Tanana/Copper River Flood/1997	97–185	A	$946,144.32	(3)	

Shishmaref/October 6, 1997	98–186	A	$1,462,788.11	(3)	
Endicott Mtn Flooding/June 18, 1998	98–188	A	$667,905.92	(3)	
Southeastern Storm/October 27, 1998	99–190	A	$1,119,927.94	(3)	
Middle Yukon flood/May 31, 2001 [1]	1–196	A	$600,000.00	(3)	
Shismareff Erosion/October 27, 2001	2–198	A	$87,858.74	(3)	
Interior Flood/May 30, 2002 [1]	2–200	A	$5,809,300.00	(3)	
Northwest Fall Sea Storm/October 23, 2002 [1]	3–201	A	$851,000.00	(3)	
Kenai Peninsula Flooding/November 2002 [1]	3–202	A	$19,758,068.00	.....	97 Declared Disasters
Salcha Flood/2003 [1]	3–205	A	$600,000.00	.....	51 percent of total
July Riverine Flood/July 2003 [1]	4–206	A	$500,000.00	.....	
2003 Fall Flood [1]	4–207	A	$683,508.00	.....	
Kassan Landslide/2003 [1]	4–208	A	$524,528.00	.....	
2003 Fall Sea Storm [1]	4–209	A	$695,000.00	.....	
Total Cost	.....	.....	$158,466,399.15		

Legend:
A = Flood, Erosion, and Landslides caused by heavy rains. 97 Events. 51 percent.
B = Extreme Freezing Cold Temps and High Winds. 18 Events. 9 percent.
C = Fire: Wild Land and Structural. 31 Events. 16 percent.
D = Earthquakes, Volcanoes, Landslides and Avalanches. 6 Events. 3 percent.
E = Other.
E–1: Utilities (Not caused by Natural Disaster Events). 14 Events. 7 percent.
E–2: Public Services. 3 Events. 2 percent.
E–3: Fuel Shortages. 6 Events. 3 percent.
E–4: Other Infrastructure. 6 Events. 3 percent.
E–5: Environmental and Economic. 9 Events. 5 percent.
20 Year Disaster Total: 190.
Total Cost All Events: $466,756,850.91.
[1] Disaster listed are Authorized Costs for the disaster based on Damage Estimates authorized in the Disaster Declaration, all others are actual costs.
[2] DNR Fire Suppression Disasters are tracked and reported on by DNR.
[3] On the GAO study.
[4] DOT Federal Highway Funding Disasters are tracked and reported on by DOT.

Chairman STEVENS. Thank you very much. First, Mr. Mundy, you mentioned NAHASDA. What can a village use your funding for in connection with flooding and erosion issues?

Mr. MUNDY. Mr. Chairman, NAHASDA provides a lot of flexibility to tribes to determine how to use their grants. Primarily, the grant is for housing and housing-related activities, affordable housing-related activities. Shishmaref as well as Kivalina have used their NAHASDA grants in the means of moving houses, I believe it was from the 2000 storm that came on fairly suddenly and their TDHE went in and moved about four houses, I believe it was, and prevented them from literally falling into the ocean.

Chairman STEVENS. Do you have authority for prevention or just to react to disasters?

Mr. MUNDY. Again, if the tribe incorporates that into their housing plan. It's how you write things into your housing plan, which is an annual requirement under NAHASDA. You can, and in Kivalina's case, they annually put into their plan a portion of their monies being spent, actively being spent on planning for their move, their relocation. The tribe, if they adequately put verbiage in it, they can just about do anything, Senator. There does not need to be a declaration. They could react relatively fast. Again, the constraint becomes the plan. They've got that plan and they can amend that plan and have amended the plan in some cases to take action.

I believe the Shishmaref plan was amended to allow an activity; the tribe submitted their amendment to HUD by fax. I returned that very quickly and it was an approved activity for which funding could flow on. So, again, it is very flexible, sir.

Chairman STEVENS. You say that you have programs that can leverage village funds? What do you mean by that?

Mr. MUNDY. Under the title VI program, sir, Congress approved a guaranteed program that allows a tribe to come in and take a portion or all of their grant funds and seek a loan from a commercial lender and then use those funds to do whatever activity they're trying to do, be it build infrastructure or whatever. What they're doing, they're pledging the repayment of that loan with their future grant funds.

Chairman STEVENS. Does each tribe in Alaska have funds allocated under NAHASDA?

Mr. MUNDY. Yes, sir. Each tribe has an amount of funds that is allocated under a formula. Now, some of those tribes may determine if they want to go under an umbrella organization such as the regional housing authorities. They assign those funds to the regional housing authorities. Then the regional housing authorities in concert with that tribe make the decisions on how to expend funding.

Chairman STEVENS. How much funding is available for that in Alaska?

Mr. MUNDY. Approximately $100 million for all of the villages.

Chairman STEVENS. That's annually?

Mr. MUNDY. Annually, sir.

Chairman STEVENS. And your agency is prepared to make money available on the basis of leveraging—borrowing the funds for the future?

Mr. MUNDY. That's the way that Congress has structured it, sir.

Chairman STEVENS. Yes, but how far in the future?

Mr. MUNDY. Again, they're allowed to leverage 5 years of funding. So if the tribe gets their allocation of $100,000, they can leverage that to $500,000. As long as they can demonstrate how that can be repaid to the lender, the lender is willing to deal with them. We have done several title VI's within Alaska.

Chairman STEVENS. Can they use that money for the local share of the Corps of Engineers' project?

Mr. MUNDY. That's a good question, sir. I will have to look into that.

Chairman STEVENS. Okay. What other sources of HUD funding are available besides that village entitlement?

Mr. MUNDY. There's—probably one of the more active programs that has historically been used in emergencies, flooding and erosion emergencies, has been the Indian Community Housing Development Block Grant Program. Shishmaref took advantage of that in their 1997 event and were awarded what was known as an imminent threat. Under the IHBG a portion of the overall grant is set aside for eminent threat nationally. Then as threats come up, those are then funded out of this set-aside, if you will, from the congressional appropriation.

Chairman STEVENS. Those are for individual houses?

Mr. MUNDY. Typically in—well, in Alakanuk and in Alatna, Alakanuk moved eight houses with ICDBG funds and Alatna moved two houses with ICDBG funds. The problem with that, the eminent threat portion—again, it's a historic program. It's been done for probably the past 20 years. As recently as about 1½ weeks ago, the department was prepared to set aside those funds again and within our budgeting process we submitted our department's operating plan for 2004 to the House Appropriations folks for their concurrence. And, unfortunately, that set-aside of approximately $4 million was not approved. So in 2004 we have no set-aside.

Chairman STEVENS. That was a national figure of $4 million?

Mr. MUNDY. Yes, sir.

Chairman STEVENS. All right. Are you working now with any of these nine communities in terms of their planning process?

Mr. MUNDY. Sir, we've been involved with Kivalina, and generally we don't jump in; we wait to be asked. The community really has to be willing to take the lead in this. We're not the leaders. We're just one of many partners in this co-effort. We've had active roles in Shishmaref, Kivalina, Newtok, with staff participating on relocation committees in each of the villages.

Chairman STEVENS. Edgar, is your agency the lead agency or is Mr. Mundy's the lead agency?

Mr. BLATCHFORD. Senator and Mr. Chairman, members of the committee, the department is the lead State agency in dealing with erosion and flood control. We have the Division of Community Advocacy within the department. It's the coordinating office for the national insurance program. The constitution in the State of Alaska mandates that there shall be a State agency that advises and assists communities in the unorganized borough.

So with that responsibility upon the department, we work closely with the local municipalities, like Shishmaref and Kivalina. In Shishmaref's case what they have done, Mr. Chairman, is that they have—in their flood and erosion ordinance they have set management standards and they require such things as a foundation system that allows for the relocation of structures and that the site be certified by a professional engineer to be safe from erosion for the useful life of the structure or 15 years.

Now, Mr. Chairman, members of the committee, the Department is also contracting out for relocation maps for Newtok and Shishmaref.

Chairman STEVENS. Senator Burns.

Senator BURNS. I think Mr. Mundy answered most of my questions as far as the money is concerned and how he operates. It just sounds like that one figure of $4 million nationwide is a pretty low figure. That can be used up awfully fast.

Mr. MUNDY. Yes, sir, it could.

Senator BURNS. How about—are we hearing from anybody at SBA, Mr. Chairman, in this thing? Are they involved in these hearings?

Chairman STEVENS. They're not involved in these hearings, no.

Senator BURNS. Okay. I think he answered most of my questions. As far as funding is concerned, we may be a little bit low in some areas. But he answered most of my questions. Thank you.

Chairman STEVENS. In the village area the small businesses have a limited role, but we will deal with them in Washington to the extent we have to after this hearing.

Senator Murkowski.

Senator MURKOWSKI. Mr. Chairman, this could probably be addressed by either you, Mr. Mundy, or Commissioner Blatchford. The 184 other communities out there that experience some level of flooding or erosion that have been identified in this GAO report—we have been kind of focused on the nine communities—but in the programs that you have available through HUD, when a community is asking for assistance or wants to locate some homes and they are in these villages that are not necessarily under eminent threat, but we know we have erosion difficulties, we know we have flooding problems, what guidance, if any, is given within these communities?

Commissioner Blatchford, you mentioned, and I think your point is right on, that we need to identify the risks in the areas to avoid problems of the past. In other words, we don't want to be—we don't want to be putting ourselves in the way of problems in the future. So what role, if any, do you have as you provide for these programs to make sure that we are locating in an area that's going to be relatively safe?

Mr. BLATCHFORD. Mr. Chairman and Senator Murkowski, the department's role is that of a community advocate. We don't go into a community unless we have been invited into the community. We work as closely as we can with the local community through our regional offices. We look to the future, Mr. Chairman and Senator Murkowski, and we ask this question constantly: Are these communities going to be able to sustain the kind of growth that we see coming down the road, that the Alaska Native communities are

growing, the Alaska Native population is growing. So we look for economically viable activities.

We recognize that subsistence is an economic activity, in our definition, and the need to preserve the economics or the subsistence lifestyle and the culture that goes with subsistence activities. But we always look to the future, what these communities will look like in 10 to 15 years, and that is our primary goal.

So through our regional offices we work closely with the communities when we are invited in. We do some research for them. We write ordinances or assist in writing ordinances. We work with the Federal Government—in various agencies of the Federal Government and in almost all cases we work with the other departments in the State government.

Just to summarize, Senator Murkowski, there is a subcabinet group within the cabinet of the Governor and its responsibility—one of its responsibilities is to develop economic opportunity and policies for rural Alaska, a rural strategy. I hope I've answered your question.

Senator MURKOWSKI. Well, you kind of addressed the big picture. I guess I'm wondering whether there is presented within these respective villages a map, as best we can identify. We don't know which way the river is going to go. We don't know the level of wave activity. There is so much we just simply cannot anticipate with Mother Nature. But I guess I would want some kind of assurance that we are aware that we're dealing with Mother Nature at her best or her worse and are building in areas that are going to be less efforts than others. I don't know whether there's a process that is out there either through your department or whether it's something that the agencies actually take a look at.

Mr. MUNDY. If I might, Senator Murkowski and Mr. Chair. HUD—when tribes build new houses, they must conform to our environmental review process. And within that we consider erosion, we consider floodplain, we consider those natural elements. And I believe that there is some level of assurance there that keeps us out of, if you will, harm's way for new construction. For the existing properties it becomes a little bit more difficult to the extent that they're there and we have to deal with them as it happens.

I'm in a unique position because for 5 years before I came to work with HUD, I ran the Bering Straits Regional Housing Authority out in Unalaska, and Shishmaref was one of the villages that we moved houses in. I'm pleased to report that while I was there that HUD was very willing to work with the housing authority and the tribe to make sure that concerns were met and issues were dealt with and that we clearly could act in a very timely way to move houses out of harm's way and deal with some of the bureaucracy at a later date.

So I think that for a large degree for NAHASDA funds there's a definite level of flexibility. When you get into some of the other HUD funds, it gets a little bit more rigid. There's more regulations in place, and they are competitive grants except for the imminent threat grant. So, as an agency, we fall back on the environmental heavily. I think that would offer some assurance to Congress that it's being addressed.

Senator MURKOWSKI. One more question, and this follows on your comments, Dave, about the responses over the past 20 years, that your division has dealt with 97 flooding or erosion disaster events, which accounts for 51 percent of the responses. And recognizing that that's what we deal with, we know that this occupies a great deal of the time, energy and resources within the division, within the department, and yet we have no dedicated funds—excuse me—no dedicated program within the State of Alaska to deal with flood or erosion issues.

And, Commissioner, you mentioned this in your testimony as well. We know that this is an endemic issue to the State. It's something that we have been dealing with in my time in the legislature. I see Representative Joule in the audience here. Every year that I was there the issue of Shishmaref was brought up and he was insistent we must do what we can to help. That was one village at that specific time.

But it just seems to me that we've got a situation that continues year after year, and if it's not Shishmaref, it's Newtok or Kivalina or we can go down the list. I guess the question would be to you, Commissioner: Why have we not had a more specific focus at the State level on this issue of erosion to our coastal communities and to our river communities? Is it simply an issue of funding or does it go beyond that?

Mr. BLATCHFORD. Mr. Chairman, to Senator Murkowski, I think it's an issue of our ability to focus. I have a particular fondness for Shishmaref since my grandmother was from the Shishmaref area. Under another administration, under Governor Hickle, I visited Shishmaref and we looked at that problem back in the early 1990s. The impetus right now, the focus should be on avoiding the problems so that if—I was going to say if I come back under another administration, but I don't see that happening—that we won't have this problem again.

We work closely with the communities and we take the lead from the people in the community, and we ask for their thoughts and their suggestions and at times, Senator Murkowski, the local leadership has a better understanding of the elements of nature than we do. And so we're careful that we listen to their advice and incorporate their advice as we develop policy.

I think that as we go in, too, Senator and members of the committee, we also look at the sustainability to the community, whether there would be other economic activities in the surrounding area if we were to, say, relocate or encourage the relocation of that village. Can we have a self-sustaining economy or more private sector jobs that would be further away? We look at mining activities, we look at natural resource development, and see how that complements and works with the subsistence economic base of the community.

So, in essence, Senator Murkowski, what we do is avoid the problem, or try to avoid the problem so that we don't see this happening again.

Senator MURKOWSKI. Just very briefly, then. In your opinion what can the State do within the department structure to provide more focus to this issue that we know we will continue to deal with?

Mr. BLATCHFORD. Senator Stevens, Senator Murkowski and members of the committee, what we can do is work closely or closer with the Denali Commission and the other Federal agencies and fully recognize that the department is the lead agency.

There's only one department in the State government that has that constitutional responsibility to deal with the unorganized borough, to be their advocate, so we take that responsibility very seriously. We would urge the Federal Government to also recognize the unique responsibility of the department to the unorganized borough.

Senator MURKOWSKI. Thank you, Mr. Blatchford.

Chairman STEVENS. Senator Sununu.

Senator SUNUNU. Mr. Blatchford, in your last series of responses you talked about the desirability of strengthening local economies and enabling them to have more sustainable industry and activity, and in your written testimony you also mentioned the Governor's access to the future initiative and that you would like to see stronger ties with that initiative in order to help develop and identify those sustainable economies.

Could you talk a little bit more about that initiative and also how those efforts would be integrated with Federal programs?

Mr. BLATCHFORD. Thank you. Mr. Chairman, to the Senator, access to the future is the Governor's recognition that the best locally driven economy is one based on self-determination and locally driven activities. We look at the private sector as complementing traditional activities, traditional economic activities such as subsistence, fishing, gathering, hunting. And some private sector opportunities are there.

We locate an area and if the community or group of communities wishes to be involved in the State planning effort, we work closely. For example, out in southwest Alaska three communities have asked for our assistance in recognizing the opportunity that comes with the Bering Sea Fishery. We look at working closely with the Denali Commission and the Federal agencies. The Denali Commission has done a wonderful job in creation of some of these opportunities.

In the Nightmute area you have a subregional airport and then you have a subregional health clinic. I believe the clinic has been completed. But also we look at the Federal Government's activities, tie it with the traditional activities, and tie it with the private sector activities that might be developed, like I just said, like in the Bering Sea.

Senator SUNUNU. Thank you. Thank you, Mr. Chairman.

Chairman STEVENS. Senator Murkowski had to leave to escort the Secretary of Transportation to another meeting. So she will be with us tomorrow morning.

I would like to go back to you, Mr. Liebersbach. How do you relate to Edgar Blatchford's commission? If you handle disasters and he handles planning; sounds like he's handling some planning for disasters. How do you coordinate?

Mr. LIEBERSBACH. Mr. Chairman, we work with the Department of Community and Economic Development in identifying mitigation measures, particularly when it relates to floodplains, but also in other areas where these communities can be affected in things that

we recommend to the communities and to the department, Mr. Blatchford's department, on types of things to be considered when they're looking at community development of any kind or relocations, and it's not always limited just to flooding.

We have issues obviously in Alaska with wildfire, which right at this very moment as we sit here, we have a rural community that's imminently threatened by a wildfire and people are being evacuated from it. We have avalanches. We work with them in that. But the actual work to move a community, if you will, or determine where a community ought to move to falls within the purview of the Department of Community and Economic Development and our input provides where to avoid risks, if you will, if they're moving into new areas.

Beyond that, of course, we work directly with them when a disaster is imminent and/or occurring because they are going to be there involved with us in the recovery from that disaster as we try to put back in place health and safety and rebuilding the community, if necessary, in an economic sustainable fashion.

Chairman STEVENS. Well, the report we have indicates that your agency was not involved in the Noatak planning and relocation. Why was that?

Mr. LIEBERSBACH. Noatak continues to relocate. It is not relocated at this time. But the Noatak relocation, again, as I said, has never been declared, if you will, a disaster. It's a house-by-house relocation of it. In that situation all we would be involved with in terms of engaging in it would be to identify the areas they should move back to, not necessarily from a funding standpoint, as our funding is related to a declared disaster event.

Now, the one time we did engage there did not include the moving of houses, but it was in the 1994 fall floods that occurred throughout northern Alaska, including Noatak, and there was some involvement in moving part of the graveyard that we were engaged in. It had to be done under an emergency declaration scenario.

The moving of the houses in Noatak have been through a multiple of funding sources of agencies that work in the Alaska villages; the Electrical Cooperative, the Corps of Engineers, Department of Housing and Urban Development, HUD, Natural Resource Conservation Service and several others, including the Alaska Department of Transportation and public facilities have been involved in the gradual movement of that community and structures in that community, but it's been on a, once again, one-by-one, if you will, basis. It's not been a widespread declared disaster in Noatak as they move.

We have other communities similar to that where this has gone on. Galena is an example where they have had multiple floodings and they have gradually moved to a new site. We have Koyukuk, which is getting flooded and is being looked at for a possible relocating. Kobuk, a similar type of thing where they have to move back from the river, partly due to disaster response, but as they get later erosion going on on the Kobuk River, they're having to move back from that. They're doing it through the use of HUD monies and these other agencies, the Corps of Engineers help, possibly Alaska DOT, where it may impact roads and/or airports.

Senator BURNS. Is that an ongoing situation; in other words, do they do that as necessary, a case-by-case basis?

Mr. LIEBERSBACH. Senator Burns, through the Chair, yes, that's correct. They don't have an event that's occurring. It's just erosion constantly going on and they're having to move back and it is a continuing situation for them.

Even Shishmaref is continuing. Although they have some significant storm events that may periodically ratchet that community up to a disaster level where we have to go in and quickly move some houses, but the erosion is constantly out there and is not event-driven; it's just ongoing. Eventually, we believe, although I'm not a scientific expert, but we feel it's going away.

Chairman STEVENS. In reviewing past relocation efforts I went back through some history. I don't want to mention the village where it occurred. But there was one village that refused to move in the past to the desired location because the relocation plan did not cover moving the cemetery. Who was involved in that in terms of cemetery relocation? Mr. Mundy, would your relocation plan include cemeteries as well as houses?

Mr. MUNDY. That's a good question. My gut feeling is probably no.

Chairman STEVENS. How about you, Edgar?

Mr. BLATCHFORD. Senator Stevens and members of the committee, I think it would include moving cemeteries. I think if we move an entire community, since the Department's role is that of community advocate, it would take in everything that the community is about.

Chairman STEVENS. General, I see you're still here. Do your plans include moving cemeteries?

General DAVIS. It would just be public facilities.

Chairman STEVENS. Because of that, I did talk to a person involved in handling that move in question, and he told me it became quite a considerable impediment to move at all. As you reviewed these—where's my friend from GAO? Are you still here? I don't think they're here. We'll have to ask them that question. I don't really remember a discussion of the cemeteries per se in these reports and the current controversy over these coastal villages. Have any of you dealt with that question yet?

Mr. LIEBERSBACH. Senator Stevens, we deal with that question during an event-driven situation. We've had to not necessarily relocate, but reinter and be involved in the reinterment of caskets, remains, if you will, where because of the way these cemeteries are along the river areas and when we get a flood, they will actually literally be floated up out of the ground and they have to be reinterred.

This happened in Alaktak during the 1994 floods. In Noatak actually it was washing away, caskets were sticking out of the ground and they were removed. Here recently due to fall storms over in—and I don't recall the name—within the last year we were involved with a multi-agency involving several Federal agencies where a mass grave site from the early 20th century epidemics that occurred out there, mass graves and people were being washed out of those. We were involved in getting medical examiners out there to be sure there was no continued threat from the epidemic

a century later here and then worked at getting those folks—the ones that were recovered—reinterred. But the actual relocation pre-disaster, if you will, has not been anything that we have been involved in addressing.

Chairman STEVENS. I think that's one of the issues we better address and make sure we cover it. Because if we start helping locate new sites, my information is that, as I said, that was a stumbling block when the plan did not include moving the cemetery. The village people are very much connected to their past, and I think we better be sure that the plans include moving all of the coastal aspects of the village. I hope everyone puts their mind on that. I don't know whether we'll have to mention it specifically in Federal legislation or not. But I think, Edgar, you better look into that for us.

Mr. BLATCHFORD. We will, Senator.

Chairman STEVENS. Any other questions of this panel?

We're going to take another 10-minute break. We'll come back to the third panel.

We have our third panel. Dr. Tom Karl, Director of the National Climatic Data Center, National Oceanic and Atmospheric Administration and Dr. Syun-Ichi Akasofu, the Director of the International Arctic Research Center at the University of Alaska Fairbanks.

Gentlemen, we're pleased to have you here. We will turn to Dr. Karl first and wind up with you, Dr. Akasofu. Good morning, sir.

STATEMENT OF DR. THOMAS R. KARL, DIRECTOR, NATIONAL CLIMATIC DATA CENTER, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Dr. KARL. Thank you, Mr. Chairman and distinguished members of the committee. I'm pleased to have this opportunity to testify before you today because NOAA has a variety of climate observing systems, data, and computer models to help us understand climate variability and change as it relates to coastal erosion and flooding in Alaska. Also, because it's great to be back in Anchorage where I first learned just how difficult it can be to predict weather as a weather forecaster in the National Weather Service.

Mr. Chairman, the climate in Alaska is indeed warming. The Intergovernmental Panel on Climate Change stated that most of the observed warming over the past 50 years is likely to have been due to the increases in greenhouse gases, and this was generally agreed to by the National Research Council Report in its report to President Bush in 2001. However, as also pointed out by the NRC and the IPCC, the science of climate change does have a degree of uncertainty that will make predictions subject to many revisions in the future.

Alaska's Arctic is recognized as the area of the world where changes to the climate are likely to be the largest, and is also an area where natural variability has always been large. But there are a variety of climate variables that can directly affect coastal erosion and flooding.

Generally, sea ice is important because it thwarts ocean wave energy. Wave energy is dependent on distance traveled by the wind over open water. Less extensive sea ice exposes the coastline to more frequent and potentially higher ocean waves and swells. Temperature drives the extent of sea ice, but changes in atmospheric

and ocean circulation also play an important role in understanding multi-year variations of sea ice extent. Changes in precipitation type, amount and intensity as well as snow cover and ice cover extent can also contribute to coastal erosion from stream flow and overland runoff to the sea. Loss of permafrost along the coasts can lead to subsidence of the land that occurs when ice beneath the sea and along the shoreline melts.

Alaska has considerable permafrost along its northern and western coasts. The height of the sea level to the land is the ultimate long-term driver for coastal erosion, but Alaskan sea level rise is complicated by both climatic factors and geologic forces.

If I may, Mr. Chairman, I'd like to show some of these changes and some of these variables in a viewgraph presentation, if I can get the projector here.

Chairman STEVENS. That's fine.

Dr. KARL. I'll speak to that mike over there.

As I pointed out, the warming in Alaska is among the largest in the world, and this diagram shows the mean winter temperature changes from 1965 through 2004.

Let's see if we can get our technician here.

As I was saying, this diagram shows the temperature changes across the globe over the last 40 years. You can see the dark areas, Alaska and some of the other Arctic areas in central Asia, have had the largest warming over these past 40 years, more than four degrees Celsius. So clearly the Alaska region is one of the areas——

Chairman STEVENS. Four degrees from where to where?

Dr. KARL. From the period 1965 to 2004, so over the last 40 years we have warmed over four degrees Celsius in the Alaska region. The only other parts of the world that have warmed as much have been central Asia. This kind of change or the warming this brings in the higher latitudes is what most of the climate models have in mind with increasing greenhouse gases.

Chairman STEVENS. Have there been changes in the Earth concomitant with that where the temperatures were lower in this period?

Dr. KARL. During this period, you will see some there are some areas in green and blue where temperatures have actually decreased. So if you look at the Northeast part of North America, there's some slight cooling, but the level of cooling is significantly smaller than the rate of temperature increase.

Chairman STEVENS. How many degrees cooler?

Dr. KARL. It's about one-half a degree to sometimes three-quarters of a degree at the largest. Most of the world has been warming, the largest is in the higher latitudes, especially in Alaska.

Chairman STEVENS. Are there any areas that have cooled to the extent that this area has warmed?

Dr. KARL. No. This diagram shows the statewide temperatures for Alaska for the four seasons; winter, spring, summer, autumn. As you can see, the time series go back to about 1920. The temperatures for two 5-year periods in the wintertime in the 1930s and in the 1940s were almost as warm as what we've seen today, that is you can see by the red bars we sustained a warming in the last several decades for a much longer period, a number of record warm temperatures that occurred in the wintertime, but more significant

from the standpoint of consistent change are the changes occurring in spring and summer.

Although the overall temperature increases are only two to three degrees C, we can see them more consistent as temperatures have a more gradual rise; the same thing in the summertime, temperatures about one to two degrees C warmer over the last couple decades compared to earlier in the century. Often in autumn there is very low evidence for temperature change. Although I said earlier most of the models predict higher warming in the latitude, the seasonal character of the way these changes occur are entirely consistent with what some of our models suggest.

The next slide shows how these temperature changes stack up in the four seasons around the world. Red dots represent the warming, the blue, cooling; the size of the dots are proportional to the rate of warming. These are in terms of degrees C per decade. As you can see, Alaska is consistent with much of the rest of the high latitudes and, again, you'll only notice blue dots here in the fall over parts of Europe and parts of Asia and you'll see a few blue dots in the wintertime. Most of the other seasons you'll see mostly red indicating warm.

Chairman STEVENS. How much of that is related to or consistent with fallout here in Alaska as compared to the rest of the world?

Dr. KARL. In terms of aerosols in the air?

Chairman STEVENS. Persistent organic pollutants.

Dr. KARL. Soot? Yeah.

Chairman STEVENS. Charts that show us persistent organic pollutants fall in Alaska to a greater extent than anywhere else in the world.

Dr. KARL. That's a very good question. To be honest with you—I'll try to be as honest as I possibly can. The amount of contribution due to soot is known to be significant, but it's very difficult to put an exact quantifier on that. Dr. Hansen at the Goddard Institute for Space Sciences has suggested it may contribute as much as 10, 20 percent, a significant part of the overall warming. However, this has not yet been confirmed by the broader scientific community. It's an area of ongoing research.

The next slide. The next slide is a very important aspect in understanding coastal erosion and flooding has to do with sea level changes. These are sea level changes measured from satellites that have been flown on a joint mission by Alaska and our French partners. The interesting thing about this diagram is you see the gradual rise in sea level represents a doubling of the rise in the rate of sea level compared to the earlier part of the century.

These measurements are only 10 years long, but if we compare it to our longer sea level rise, there is some suggestion that the sea level rise is actually accelerating. During the 20th century, our best estimates from the time tables is that sea level rose between one-tenth to two-tenths of a meter. These data would suggest that sea level, if it would continue at this rate, would be rising at two- to three-tenths of a meter. The protections for the 20th century level, our models suggest that the rate of sea level rising in this century will be one-tenth of a meter to nine-tenths of a meter.

Chairman STEVENS. By what time?

Dr. KARL. By the end of the century. Between one-tenth and nine-tenths of a meter by the end of this century.

At the present rate of sea level rise, two- to three-tenths of a meter; this is significantly less than the high end as predicted by the models. But there is a considerable amount of uncertainty because we don't quite know what will happen to the Greenland Ice Sheet, whether the increase of margin will accumulate more snow up there or whether the increased margin will melt more snow and the accumulation of snow won't be able to compensate.

So the bottom line here is sea level is indeed rising, and there's some potential it may actually be accelerating from the last decade. The next diagram shows what's happening to sea ice extent. It's very important because as we mentioned, sea ice extent is a good buffer for the wave energy. But sea ice is melting, and in fact if you take a look at the rate of sea ice melt in spring, the red line, we've lost more sea ice since 1950 than equivalent to the size of the State of Alaska.

At the rate of sea ice melt, by the first part of the next century we will not have summer sea ice in the Arctic. There are a number of models that have been run to try to look at what would be projected in terms of sea ice melt rate. There's a suggestion in one of the most extreme models that sea ice could entirely melt from the Arctic in the first half of this century. Most other models suggest that there would still be sea ice into the beginning of the 22nd century.

Chairman STEVENS. What about the Antarctic? When we were down there, I was told that the ice in the Antarctic is increasing.

Dr. KARL. Because it's so much colder in the Antarctic, even though the temperature is warm, the accumulated precip actually increases. So it's quite conceivable that ice and snow in the Antarctic could actually increase as opposed to decreasing. Here in the Arctic we don't have extreme temperatures like the central parts of the Antarctic.

The next slide here is an important aspect of the ability of storms to generate waves. As the sea ice melts, the number of intense winter cyclones, or intense cyclones any time of year is important because they're responsible for high seas. The best data that we have suggests that the number of intense winter cyclones is in fact increasing.

This diagram shows the number that you would expect in any square mile across the North Pacific. You can see that the trend is increasing. We're not 100 percent sure that this data is as robust as we see it because we know we are better able to measure the storms over the last 20 years because of satellites, and we try to account for that in these time series, but we're not sure we have been able to eliminate all of that potential bias.

Most models suggest that there may be more intense cyclones as global temperatures increase, but, again, that's not a real clear indication because of some key factors. One factor would suggest that the temperature would raise between the poles, so cyclones should decrease as well. Another factor on higher levels of the atmosphere suggests it will go the other way. So the jury is still out on the effect of understanding this, but the data on this suggests we are seeing more intense cyclones.

The next slide shows a reduction in snow cover extent. I won't spend much time here. But less snow cover extent exposes the land to precipitation.

The next diagram shows—I'll skip this in the interest of time. The next shows how precipitation has changed. It's very difficult to measure precipitation in Alaska because the density of stations up here is much less than it is, for example, in the Lower 48. Our best estimates suggest that precipitation increases 10 to 12 percent mainly in the summer and wintertime. Interestingly enough, what we're finding is that most of the increase where we have more stations south of 62 degrees north, that increases the coming of heavier precipitation events. Of course that's more conducive to erosion and potential flooding. The next diagram shows——

Chairman STEVENS. Pardon me. How extensive is your coverage of the coastline?

Dr. KARL. The coastline is probably—I say probably because I haven't done an analysis—but off the top of my head I would suspect that the coastline is probably better monitored in the interior, but still considerably undermonitored compared to the Lower 48, for example. Another issue in trying to understand the precipitation is trying to adjust for the biases of wind-driven snow. It's quite a challenge to try and make sure we are actually measuring precipitation as opposed to snow that's falling in the gauge. This will give you an idea of the size of the corrections we have to apply to some of the data. This is for Fairbanks. The black line is true; the red line has been adjusted for biases.

The next diagram shows some of the stations that were installed in Alaska. This is in Fairbanks, Alaska. You can see the elevated fence around the precipitation gauge trying to eliminate windblown snow into the gauge.

The next diagram presents a bit of the challenge that we have. This is a station we put up in Barrow, and you can see polar bears decided to do some modifications, as you see the way these shields are bent, the polar bear decided it looked kind of interesting.

Again, these are some of the challenges, and I think one of our key contributions in future years will be to increase the density of stations and observing sites across the State.

If I could just conclude. Changes in the Alaska climate are among the largest in the world. They have likely played an important role in determining the extent of coastal erosion and flooding in Alaska and are likely to continue to do so in the future. Accelerated coastal erosion and flooding in Alaska cannot be ruled out.

We at NOAA have got numerous climate monitoring, data management and analyses, and climate modeling activities that should help us understand, adapt and mitigate the impact of climate variability and change on the State of Alaska.

Thank you, Mr. Chairman, for allowing me to contribute to this important hearing. I look forward to answering any questions you might have.

Chairman STEVENS. Thank you very much, Dr. Karl.

[The statement follows:]

PREPARED STATEMENT OF DR. THOMAS R. KARL

Mr. Chairman and Members of the Committee: As Director of the National Climatic Data Center, which is part of NOAA's Satellite and Information Services, and Program Manager for NOAA's Climate Observations and Analysis Program, I am pleased to have the opportunity to testify before you today. NOAA has a variety of climate observing systems, data, and computer models to help us understand climate variability and change as it relates to coastal erosion and flooding in Alaska.

Climate Change in the Arctic

The Intergovernmental Panel on Climate Change (IPCC) stated that most of the observed warming over the past 50 years is likely to have been due to the increases in greenhouse gases, and this was generally agreed to by the National Research Council (NRC) in its report to President Bush in 2001. However, as also pointed out by the NRC and the IPCC the science of climate change does have a degree of uncertainty that will make predictions subject to many revisions in the future.

The Arctic is recognized as the area of the world where changes to the climate are likely to be the largest, and is also an area where natural variability has always been large. Current climate models predict a greater warming for the Arctic than for the rest of the globe. The amount of warming would lead to significant impacts. The projections of future changes however, are complicated by possible interactions involving stratospheric ozone, human-induced atmospheric aerosols, and changes in other parts of the Arctic system. For this reason, current estimates of future changes to the Arctic vary significantly among climate models. The model results disagree as to both the magnitude of changes and the regional aspects of these changes. We also know that the Arctic undergoes considerable natural climate variation on decadal and longer time scales and this must be considered in addition to any anthropogenic change.

As an outgrowth of discussions among NOAA, the Arctic Council and the International Arctic Science Committee, and the National Science Foundation in fiscal year 2000, it was agreed that the International Arctic Research Center (IARC) could be the site for the Secretariat of a new international activity, the Arctic Climate Impact Assessment (ACIA). As an activity of the Arctic Council, the ACIA is nearing completion. Scientists from all eight Arctic countries have contributed to its completion. NOAA is the minor co-sponsor of the ACIA, while the National Science Foundation is providing the major support to the ACIA through the IARC. The Secretariat for the ACIA is located at the University of Alaska and is headed by Dr. Gunter Weller, who is also Director of NOAA's Cooperative Institute for Arctic Research.

The ACIA will result in improved knowledge regarding past climate variability and change over the entire Arctic, projections of Arctic climate variability in the future, and an evaluation of the impacts of climate variability and change on the biological environment, human uses of the environment, and social structures. The Arctic Council will use this knowledge to prepare a policy report discussing actions that governments should consider in response to anticipated changes in Arctic climate. More information on ACIA can be found on its website at http://www.acia.uaf.edu.

Climate Considerations Related to Coastal Erosion and Flooding in Alaska

There are a variety of climate variables that can directly affect coastal erosion. Our degree of uncertainty regarding how these variables are changing and could change over the course of the 21st Century is not uniform from variable to variable. For climate monitoring, this uncertainty arises from the length of the data record, its spatial and temporal resolution, as well as the capability of instruments used to measure climate-related change. Many of our long-term climate model projections are also subject to considerable uncertainty. Climate variables of particular interest related to coastal erosion and flooding include: (1) sea ice, snow cover, and permafrost extent all directly driven by temperature change and to some extent by atmospheric and oceanic circulation; (2) storminess as related to wave height and storm surges; (3) precipitation and related snow and ice cover; and (4) sea level as related to land ice, ocean temperature, and movement of the land relative to the ocean owing to geologic features and glacial rebound of the land as land ice melts.

Generally, sea ice extent is important because it thwarts ocean wave energy. Wave energy is dependent on distance traveled by the wind over open water. Less extensive sea ice exposes the coastline to more frequent and potentially higher ocean waves and swells. Temperature drives the extent of sea ice, but changes in atmospheric and ocean circulation also play an important role in understanding multi-year variations of sea ice extent. Changes in precipitation type, amount and intensity as well as snow and ice cover extent, can also contribute to coastal erosion from stream flow and overland runoff to the sea. Loss of permafrost along coasts can lead to subsidence of the land that occurs when ice beneath the sea and along the shore-

line melts. Alaska has considerable permafrost along its northern and western coasts. The height of the sea relative to the land is the ultimate long-term driver for coastal erosion, but Alaskan sea level rise is complicated by both climatic factors and geologic forces affecting local and regional changes in the height of the land relative to the ocean.

Atmospheric Temperature

Temperatures in Alaska have increased. Observed data indicate that Alaskan spring and summer surface temperatures have increased by about 2 to 3 degrees Celsius (about 4 to 5 degrees Fahrenheit) in the last few decades. However, there are no discernible trends of temperature during autumn, and changes in winter temperature are more complex. There were two five-year periods in the first half of the 20th Century when temperatures were nearly as warm as today, but during recent decades record-breaking high temperatures have become more common.

Although the number of reporting stations in Alaska is quite low relative to our station network in mid-latitudes, the data uncertainties are not large enough to overwhelm the increases observed. Additionally, NOAA has now established two Climate Reference Stations to help discern any acceleration or deceleration of current temperature trends.

Most climate model projections for temperature change during the 21st Century suggest that Alaska, and the Arctic as a whole, will warm at least twice as much as the rest of the world. The warming is expected to be largest during the cold half of the year. The observed lack of warming during the autumn and the relatively large increases during other times of the year is not entirely consistent with model projections. They do not depict this asymmetry. This suggests we require more observations, and better and higher resolution models.

As temperatures increase and more sea ice is melted, a natural climate feedback occurs, due to the less reflective character of the ocean formerly covered by sea ice. These feedbacks can lead to an accelerated warming and additional sea ice melting. For example, the average of the five models used in the Arctic Climate Impact Assessment project substantial reductions in summertime sea ice around the entire Arctic Basin, with one model projecting an ice-free Arctic in the summer by the middle of this century. On average, the climate models project an acceleration of sea ice retreat, with periods of extensive melting spreading progressively further into spring and fall.

Sea Ice Extent

Large portions of Arctic sea ice form during the cold seasons and melt during the warm seasons. Considerable sea ice persists through the melt-season, but due to ocean circulation and the resultant movement, multi-year sea ice makes up only a fraction of the total ice extent. Our records indicate that the formation of new sea ice each year cannot keep up with the rate of melting. This melting is consistent with observed surface warming. Arctic sea ice has been steadily decreasing since the 1950s, measured largely from continuous coverage provided by NOAA polar orbiting satellites beginning in the 1970s. Prior to that time, assessment of Arctic sea ice extent during the first half of the 20th Century was limited to reports from land stations and ocean surface observations. We have less confidence in the data from the first part of the Century, but independent anecdotal evidence, such as interviews with native peoples of Alaska, also suggests substantially greater sea ice extent during this time. NOAA is working to increase our sea ice monitoring capability through ice-tethered buoys to determine sea ice thickness and other key aspects of sea ice.

It is important to understand the trends of coastal sea ice extent since sea ice extent is an important determinant of wave energy affecting coastlines. As the storms which create wave energy also have a strong component of seasonality, it is important to know how sea ice is changing by season. In the Pacific, major extra-tropical storms occur most frequently during autumn through spring. Since the 1950s, sea ice extent during winter and autumn has decreased from 15 to 14 and 12 to 11 million square kilometers, respectively. Since the 1950s, decreases in spring and summer are substantially greater, down from an average of 15 to 12 and 11 to 8 million square miles, respectively. This is equivalent to more than 10 percent of the North American land mass and is a larger area than the State of Alaska. At the present rate of decrease, the Arctic would be ice-free in summer during the first half of the 22nd Century. All climate models project this trend to continue regardless of the emission scenario used and the sensitivity of the model.

Storms

The climatology of Pacific Ocean storms favors the development of the strongest storms (extra-tropical cyclones) from autumn to spring. Although there are remain-

ing uncertainties in the quality of data, analyses of Pacific Ocean extra-tropical cyclones over the past 50 years indicate little change in the total number, but a significant increase in the number of intense cyclones (storms with low central pressure and resultant high winds and waves). The increase in extra-tropical storms is punctuated with considerable year-to-year variability. The extent to which the increase in intense cyclones is related to global warming remains uncertain, although there is some evidence to suggest as the world warms the intensity of cyclones could increase. But because there are competing factors that act to cancel each other, the case for an increase in cyclone intensity is yet to be settled. Similarly, our ability to remove biases in the data also remains uncertain owing to more plentiful data on storm intensity in recent decades.

Regardless of whether intense cyclones are increasing in number or whether they will increase in the future, the greater expanse of open water with less extensive sea ice means that ocean waves with resultant coastal erosion can occur more frequently and with greater impact.

Precipitation and Snow Cover Extent

One of the most difficult quantities to measure across the State of Alaska is precipitation. This is due to the variable nature of precipitation in general, the relatively low number of observing stations across the State, and the difficulty of providing high-quality data in the harsh Arctic environment. Over time, we anticipate that NOAA's Climate Reference Network and the modernization of NOAA's Cooperative Observing Network could help to alleviate this problem.

Based on existing records, however, there is evidence to indicate that during the past 40 years as temperatures have warmed, more precipitation is now falling in liquid form (rain) as opposed to solid form (snow, ice). The quantity of precipitation has also increased during the 20th Century, with much of that occurring during the recent period of warming over the past 40 years. The increase is estimated to be between 10 to 20 percent with most of the increase occurring during the summer and winter as opposed to the transition seasons. Owing to greater overall precipitation in the summer, the percent increase in summer equates to a greater quantity of precipitation compared to winter.

The large uncertainty in the estimated precipitation trends is, in large part, attributed to the low density of observing stations, but also stems from the difficulty of measuring wind-blown solid precipitation. Analyses of changes in heavy precipitation events have been conducted for areas south of 62 degrees north latitude, and they show that the frequency of heavy precipitation events has substantially (30 to 40 percent) increased during the past several decades. Additionally, a disproportionate amount of the precipitation increase is attributed to the heaviest precipitation events.

Climate models project that precipitation will increase by a greater proportion in the high latitudes compared to the rest of the world. This is consistent from model to model, as is the fact that this increase is expected to be disproportionately large in the heavier precipitation events. Both can lead to increased erosion.

NOAA's polar-orbiting environmental satellite data and surface-based observations have also observed major changes in snow cover extent. North American snow cover extent has decreased by about 1 million square kilometers and this trend is expected to continue or accelerate. Surface observers also report a one to two week reduction in the number of days with snow on the ground across the State. In addition, in the Arctic, the lake and river ice season is now estimated to be 12 days less compared to the 19th Century.

The increase in total precipitation and liquid precipitation, especially when falling on less extensive snow cover, can affect soil erosion. However, the complicated effects of changes in precipitation type and intensity, earlier break-up of winter ice, and less extensive snow cover have not been well evaluated with respect to potential impacts on coastal erosion and flooding. It will be necessary to know which factor dominates in order to understand whether coastal erosion and flooding will be enhanced or ameliorated due to changes in precipitation and snow cover extent.

Permafrost

The thawing of the permafrost, especially along the northern coasts, is expected to continue. Long-term measurements of temperatures within the permafrost are rare, but it is clear that as the air and ocean temperatures have warmed permafrost is also melting. As permafrost melts along the coastlines the effect on coastal erosion can be compounded by sea ice retreat. The thaw causes the land to subside along the shore exposing more land to the action of the waves.

Sea Level

As ocean temperatures warm and glacial ice melts, global average sea level is increasing. Sea level rise during the 20th Century is estimated to be between 0.1 and 0.2 meters. To put this in context, the Intergovernmental Panel on Climate Change (IPCC) estimates that during the last 6,000 years, global average sea level variations on time-scales of a few hundred years and longer are likely to have been less than 0.3 to 0.5 meters. The IPCC also notes that no significant acceleration in the rate of sea level rise during the 20th century has been detected.

Under a scenario of climate warming, climate models project changes in sea level by the end of the 21st Century of between 0.1 to 0.9 meters. This large range is related to uncertainties regarding increasing snowfall in Greenland and Antarctica as the climate warms (warm air can hold more water vapor leading to heavier snowfall when temperatures are below freezing) versus the rate of melting due to warming. Generally, increases in sea level are projected by climate models to be higher in high latitudes. Such a general increase in sea level would expose more land to coastal erosion through wave energy and storm surges.

However, it is important to recognize that there are many local and regional variations of sea level rise and such variations are no exception in Alaska. Complications arise due to geologic forces, the rebound of the land as glaciers melt and, in some areas, local engineering projects. For some areas in Alaska, sea level is actually falling due to natural geologic and glacial rebound effects, (e.g., parts of Southeast Alaska), but this is generally not the case in much of Alaska. The global rise in sea level is due to both melting of land ice and the thermal expansion of ocean water. There are other factors that also play a role in sea level such as the amount of water held back by human-made land reservoirs, leading to sea level falls, but this effect does not dominate.

NOAA maintains a global network of tide gauges that have provided the only data to calculate global sea-level rise prior to the satellite era. High quality tide-gauges are a high priority within NOAA to ensure adequate reference points to gauge sea level changes. NASA, in cooperation with our French partners, has been flying a satellite altimeter as part of their Topex/Poseidon and JASON missions. These missions provide high precision global sea level data when calibrated with NOAA and other country tide-gauges. Recent analyses of these data suggest that global sea level may have accelerated its increase during the 1990s by a factor of two or more compared to increases. Additional data will be required to confirm such a trend, and points to the importance of continuing satellite altimetry missions and maintenance and expansion of global tide gauges.

Conclusion

Changes in Alaskan climate are among the largest in the world. They have likely played an important role in determining the extent of coastal erosion and flooding in Alaska and are likely to continue to do so in the future. Accelerated coastal erosion and flooding in Alaska cannot be ruled out.

NOAA has numerous climate monitoring, data management and analyses, and climate modeling activities that should help us understand, adapt and mitigate the impact of climate variability and change on the State of Alaska.

Thank you, Mr. Chairman for allowing me to contribute to this important hearing. I look forward to answering any questions you might have.

Chairman STEVENS. Your turn, Dr. Akasofu.

STATEMENT OF DR. SYUN-ICHI AKASOFU, DIRECTOR, INTERNATIONAL ARCTIC RESEARCH CENTER, UNIVERSITY OF ALASKA, FAIRBANKS

Dr. AKASOFU. Mr. Chairman and members of the committee, thank you for providing me an opportunity to testify at this important hearing today.

I'd like to address the cause and effect of climate change on the coasts and coastal communities of Alaska.

First of all, it's important to recognize that prominent climate change has been in progress in the Arctic during the last several decades. During the past few decades, the area of the Arctic Ocean sea ice has shrunk approximately 5 to 10 percent, but at an accelerating rate, and its thickness is decreasing.

Mr. Chairman, I would like for you to see viewgraphs. Is it okay if I stand here?

Chairman STEVENS. Yes, sir, go ahead.

Dr. AKASOFU. This shows the changes of sea ice in the Arctic Ocean from 1979 to 2003. So you can see quite a bit of shrinkage.

Chairman STEVENS. What time of year is that, Doctor?

Dr. AKASOFU. Since 1979 and then we are comparing 1979 and 2003.

Chairman STEVENS. Spring, summer, fall? What is it?

Dr. AKASOFU. The summer, and 1979 the first time that satellite data became available, so those are satellite data.

The Arctic is quite unique in that, as the previous speaker mentioned, climate change is prominent in comparison to the rest of the Earth. It is generally believed that various ice forms in the Arctic cause positive feedback in enhancing climate change.

Many of these climate change phenomena in the Arctic could be interpreted as a result of "warming," the warming in quotations. Scientists have been seriously debating whether or not the cause of the "warming" is natural or manmade. Here, "manmade" means the greenhouse effect. It's fair to say, both. Then the question is, how much each is contributing. I do not think that any decent scientist can claim explicitly how much the greenhouse effect is contributing to the present Arctic "warming" trend.

So I'd like to show you an example. It's a bit difficult to see. The shrinking of sea ice in the Arctic Ocean appears to be related to inflow of warm North Atlantic waters into the Arctic Ocean. You can see the red one, the green one, Alaska near the top. The red one is the warm Atlantic water coming into the Arctic Ocean.

The strength of the inflow varies as a part of what we call the North Atlantic oscillation, which is a natural phenomenon; it has multi-decadal periods and has been intense during the last several decades, so that it is not really accurate to claim that the present shrinking of sea ice is all manmade. Many scientists find "warming" trends, but cannot refer to their causes explicitly, and the press takes excerpts from these to claim that all warming is manmade.

The scientific consensus is that large natural variations are superimposed on any trend caused by greenhouse effects, as the previous speaker also emphasized. But what's important here is that aside from the debates on the cause of the "warming," is that climate change is in progress and Alaskans have to face this trend seriously. Since the subject of coastal erosion is not my specialty, I consulted with several of my colleagues including Dr. Orson Smith, School of Engineering, UAA, Dr. John Walsh, International Arctic Research Center, and Dr. Glenn Juday, UAF. As far as coastal erosion is concerned, they are of the opinion that sea level rise caused by global warming is expected to be about 16 inches, 40 centimeters, in the next 100 years. With the present rate it is not the most serious threat in the near future.

The most important threat comes from the expected retreat of sea ice in this region. In fact, this almost looks like the new movie, "The Day After Tomorrow." So what's happening is that because the sea ice is retreating, the gap between the coastline and the sea ice, that is the place that intense cyclones tend to form. In fact,

during the last 6 or 7 years or so, of seven damaging coastal flood events, five were born in the Arctic Ocean.

This was a study by the National Weather Service in Fairbanks. And so this is the type of cyclone. In fact, this caused very severe damage in Barrow and I'm sure in other places.

This diagram shows that looking at the entire Arctic region, the number of extreme events causing coastline erosion have been increasing from about the 1960s. The only problem we have now is that we have not finished looking at the data earlier. So how this trend is a new trend or was there any earlier event similar to that, we are not investigating. So at least I can say that at this point there are some newspaper articles to say in some of the villages this is due to global warming. This is very hard to prove.

Definitely the coastline is changing, but we are not sure—that's hard to prove that this is due to a greenhouse effect. I had an opportunity to talk to Mr. Kenneth Toovak, Sr. in Barrow. He was trying to explain that at the present time the—this is from Barrow to Point Barrow Road—and this is what's happening now, that the waves are crossing. And at the present time lots of water is going on to make this the barrier, but he thinks that it's not really working. Waves are still crossing. He is of the opinion that the sloughs are a way of building the bank much better. So that's what he told me.

I would like to conclude my testimony.

Chairman STEVENS. Doctor, to what extent will this be—it's on the west coast as well as the Arctic coast?

Dr. AKASOFU. I'm sorry, I don't have data on this, but definitely my understanding is that coastline erosion in Alaska is very serious. But I cannot compare Alaskan erosion and the west coast's erosion in general.

Chairman STEVENS. I mean the west coast of Alaska.

Dr. AKASOFU. At the present time this is what we call extreme event, very intense cyclones tend to form Northwest of Alaska in the open sea area and then start to move to the Southeast direction. So hitting the Barrow area and also the northern part of the Bering Sea because of the straight coastline. So I think they are about the same. The cyclones tend to form in the open sea because the sea is open now and then move toward Barrow. That is a general trend the National Weather Service people told me.

Chairman STEVENS. And the thinning of the sea ice means that the shoreline is more affected by the wave action coming in?

Dr. AKASOFU. The sea ice tends to protect the coastline from the big waves, but now if this warming trend or shrinkage of the Arctic Ocean sea ice continues, the coastline, the protection by the sea ice is lost. Also the open sea tends to encourage the formation of intense cyclones. Is this a new trend or what? At the International Arctic Research Center we're trying to find out.

Chairman STEVENS. Thank you very much, Doctor.

[The statement follows:]

PREPARED STATEMENT OF DR. SYUN-ICHI AKASOFU

Thank you for the opportunity to testify at this important hearing today.

Today, I would like to address the cause and effect of climate change on the coasts and coastal communities of Alaska.

First of all, it is important to recognize that prominent climate change has been in progress in the Arctic during the last several decades. During the past few decades, the area of the Arctic Ocean sea ice has shrunk approximately 5–10 percent, but at an accelerating rate, and its thickness is decreasing (from about 4m to 3m). Many Alaskan glaciers are receding; the Columbia Glacier is receding at a speed of more than 10m per year. Permafrost temperature in Alaska is changing. Air temperature records show an increase of 1 °C (~2 °F) per decade in Siberia, Alaska, and Canada; the global average increase is about 0.6 °C (~1.2 °F) per century.

The Arctic is quite unique in that climate change is prominent in comparison to the rest of the earth. It is generally believed that various ice forms in the Arctic cause positive feed-back in enhancing climate change.

Many of these climate change phenomena in the Arctic could be interpreted as results of warming. Scientists have been seriously debating whether or not the cause of the warming is natural or man-made? Here, man-made means the greenhouse effect. It is fair to say, both. Then, the question is how much each is contributing? I do not think that any decent scientist can claim explicitly how much the greenhouse effect is contributing to the present arctic warming trend.

I would like to summarize several important findings of the arctic research community.

The shrinking sea ice in the Arctic Ocean appears to be related to inflow of warm North Atlantic waters into the Arctic Ocean. The strength of the inflow varies as a part of the North Atlantic Oscillation (NAO), which is a natural phenomenon; it has multi-decadal periods and has been intense during the last several decades, so that it is not accurate to claim that the present shrinking of sea ice is all man-made. It is not certain if NAO is enhanced by the greenhouse effect.

Some of the past records on glaciers indicate that glaciers in Alaska and Greenland began receding as early as 1900 or earlier (e.g. the Portage Glacier), well before the CO_2 increase became serious. Furthermore, the collapse of the Columbia Glacier is partly due to mechanical causes. In Norway, glaciers are advancing.

Permafrost temperatures decreased until about 1970 and then began to increase. The increase appears to have slowed down recently. Meanwhile, the amount of CO_2 has been increasing monotonically since 1900.

These are a few examples to show that it is not appropriate to claim all warming trends are caused by the greenhouse effect. The collapse of houses built on permafrost is certainly man-made (heating), not a direct consequence of the greenhouse effect. There is too much confusion on such issues.

Computer modeling has been improved greatly during the last decade or so. However, the computer is a very imperfect "earth" when we conduct CO_2 experiments with it. For example, clouds cause warming by trapping infrared radiation, but cause cooling by reflecting solar energy back to space. Scientists are still debating which is more important. A computer behaves exactly as we instruct. Until we understand quantitatively all major processes related to climate change, a computer cannot provide reasonably accurate prediction on future climate. Computer modeling is now predicting the shrinking of sea ice in the Arctic Ocean in 2050 or 2100. However, the models cannot reproduce the seasonal changes; observations show the maximum shrinking in summer, while computer simulations indicate it to be in the winter. There are still many contradictions of this kind. We have too many unknown factors in instructing the computer. There is still too much unknown to rely completely on the computer to predict the temperature in 2100.

Many scientists find warming trends, but can't refer to their causes explicitly, and the press takes excerpts from these to claim that all warming is man-made. The scientific consensus is that large natural variations are superimposed on any trend caused by greenhouse effects. I would like to repeat that any decent scientist cannot claim explicitly how much the greenhouse effect is contributing to the present arctic warming trend.

What is important here, aside from the debate on the cause of the warming, is that climate change is in progress and Alaskans have to face the trend seriously. Since the subject of coastal erosion is not my specialty, I consulted with several of my colleagues including Dr. Orson Smith, School of Engineering, UAA, Dr. John Walsh, International Arctic Research Center, and Dr. Glenn Juday, UAF.

Coastal Erosion

Sea level rise caused by global warming is expected to be about 40cm (~16 inches) in 2100. With the present rate, it is not the most serious threat in the near future.

The most important threat comes from the expected retreat of sea ice, exposing coastlines to wave/surge effects.

According to the National Weather Service, there were 7 damaging coastal flood events during the last six years. Among them, five were caused by cyclones that

were born in the open region of the Arctic Ocean and moved in the SW direction. Both Kivalina and Shishmaref are affected by this effect. This is a new trend. Furthermore, according to National Weather Service research, a number of intense cyclones over the entire Arctic have been increasing in recent years. However, it is hard to prove that such a trend is caused by global warming.

In this report I would like to mention that Mr. Kenneth Toovak, Sr., Barrow, is of the opinion that the present bank-building in Barrow is not working. I would also like to add also that Dr. Orson Smith has made various presentations on the subject of design criteria in preventing coastal erosion.

Permafrost Melting and Others

The temperature of permafrost is near the melting point (0 °C/32 °F) in the interior of Alaska, so that permafrost in the Interior is quite sensitive to climate change, in particular to the present warming trend. As you are well aware, thawing of permafrost causes considerable damage to house structures, roads, forests, and other structures.

In addition to the warming trend, the precipitation has decreased considerably in the Interior during recent years, causing a variety of effects on vegetation. Trees are suffering directly from this effect and also indirectly from insects.

Mission of the International Arctic Research Center

An important responsibility of scientists at IARC and the arctic research community is to reduce uncertainty of the present prediction of: the southern edge of sea ice of the Arctic Ocean; the occurrence of extreme events; permafrost temperature; temperature and precipitation; and shift of the tree line.

The first two studies will be able to bring fruitful collaboration as we combine efforts of scientists and engineers at both UAF and UAA.

Thank you again for the opportunity to present this testimony today, and thank you for your interest in this important issue. Please feel free to contact me if you have any additional questions.

Chairman STEVENS. I must confess that the variety of reports we've had, it's amazing we haven't had more of these stations put up in Alaska.

Dr. Karl, is your agency seeking establishment of these sort of listening posts in the area where this change is taking place?

Dr. KARL. Yes, Senator. In fact, you asked a question earlier that I could clarify. My colleague from the National Weather Service did in fact indicate that 5 to 10 percent of the stations in Alaska are along the coast. It's probably one of our greatest needs, is additional stations.

We have a number of additional programs ongoing. We have a cooperative weather observation monitorization program going on in the agency, which over time will increase and improve the observing sites in Alaska. We have a couple of climate network stations and we're working hard trying to increase the number up in Alaska.

We have 20 or so tie gauges, which are extremely important to help pin down the satellite measurements from space. The measurement of precipitation, as I mentioned, also could be important for some of the inland areas for erosion. Yes, indeed we are trying to improve the networks.

Chairman STEVENS. Are these floating buoys, are they the ones you've got permanently affixed to the land?

Dr. KARL. Well, working in cooperation with some of the other agencies, I've asked to have some ice-tethered buoys in the Arctic to not only trying to measure ocean temperatures, but to actually look at the ice thickness because that also would be an important key, to look at how ice extent will change if we can better understand what ice thickness is actually doing.

Chairman STEVENS. Are you working with the Corps of Engineers on this project, or is this your own?

Dr. KARL. Right now we are not to my knowledge working with the Corps of Engineers on that project. We have in the past, around the 1980s, completed some spectral looking at wave extent for the Army Corps on a number of coastlines that enabled them to be able to use that for planning.

To do those analyses requires a dedicated effort to go back and look at all the historical data and run a model consistently to generate data to see how they're changing. Today you can actually project in the future on various scenarios to see how that might change.

Chairman STEVENS. There's no requested funding for additional sites?

Dr. KARL. In the President's budget there is funding for additional sites for a climate reference network and a weather monitorization program.

Chairman STEVENS. In Alaska, that is?

Dr. KARL. Two included in Alaska.

Chairman STEVENS. Thank you very much.

Dr. Akasofu, do you see any emergencies arising out of the information that's available to you so far as far as the Arctic is concerned? Any of these things that have to be done now to try to deal with these changes that you predict?

Dr. AKASOFU. What I can say is that what we call extreme events, they tend to happen in Alaska about once a year. But there is indication they're increasing in number, but I do not see that right away immediately that the extreme events come once a year, so——

Chairman STEVENS. Senator Burns.

Senator BURNS. This is an interesting discussion. I'm interested in these cyclones. Tell me what they are. I was raised in the Midwest. I know what a cyclone is as far as the Midwest is concerned. We call them tornadoes today, but they used to be called cyclones.

Dr. KARL. Yes, and I apologize for not clarifying that. Probably the best way to describe it is in the Midwest it's a winter storm, the kind of weather you get with a winter storm in the Midwest where you get winds and snow or rain.

Senator BURNS. No. A cyclone—it's a circular motion like a tornado.

Dr. KARL. In terms of the terminology I use—I understand people have used the term cyclone or tornadoes in the Midwest, but tropical cyclones is a term that the scientific community has given to storms that are outside the tropics. Inside the tropics is a tropical cyclone. They really refer to large-scale circulations. These are circulations that are thousands of miles across, typical to the winter storms that you would see in the Midwest. When I said the number of intense winter cyclones are increasing, I'm referring to those kinds of storms that you would experience in the Midwest during the wintertime.

Senator BURNS. But our storms aren't circular. They're just a straight wind, and on those blizzards and everything like that. I mean, that's a straight wind. That has no circular motion to it at all. I'm not going to get into semantics with you.

I would like to see some of your slides. I would like to take some slides that you showed us. I would like to have a copy of those, if I could. I would suggest that there's a book on the market. It came out about 10 or 15 years ago written by a man by the name of Hancock, "Fingerprints of the Gods." Have you read that?

Dr. KARL. No, I haven't.

Senator BURNS. Have you ever heard about it?

Dr. KARL. No, I haven't.

Senator BURNS. There's a 28,000-year wobble in the Earth. I can have a man that's got a doctorate in geology that would come up and tell you that the equator used to go across Montana. Where are we finding our dinosaurs in our digs? They're found in the Dakotas and Montana. We know that their environment was tropical mostly, very warm, and that's where we're finding them today.

Have we done any bores in the ice in the Arctic that would give us some idea of the changing of seasons?

Dr. KARL. Yes, we have actually, Senator, have cores both in Greenland as well as Antarctica to help try and understand. I think perhaps what you're referring to is the Milankovitch cycles.

Senator BURNS. Have we had changes in climate this dramatic before in the history of those ice packs?

Dr. KARL. One of the difficulties in looking at those today is trying to get the resolution that would be needed to look at a very small period of time like the erosion over the last 4 years. But indeed, there's been large changes in the past that occurred over longer periods of time. There is an interesting issue—the National Research Council put out a report on the climate change. There is some suggestions in the past that indeed sometimes the climate can change very abruptly. For example, 11,500 years ago when the glaciers were melting and the St. Lawrence River broke into the Atlantic and changed the climate for 500 years in Europe and North America as the world was in fact warming. Indeed there is evidence in the past that we've had abrupt climate changes.

Senator BURNS. Well, we had the Missoula flood, too, that went all the way to Portland. What I'm saying is that, yes, I think we're in a climate change, but I think we're always in a constant climate change. If there's a wobble in the Earth, and Hancock pretty well substantiated that in this book that I would suggest you read, and it had to do with the building, of all things, the pyramids, and also how they relate to Machu Picchu and how similar mindsets—how they relate to each other and the times that they were built. And what happened to all of that knowledge it took to build a perfect pyramid went away for some reason or another. Also, the dinosaurs and other what we refer to as prehistoric animals. What happened to them, that lived in a tropical setting in a tropical environment, which that's what their bones tell us. Yet they're being found in an area where it's basically very cold today and semi-arid.

I think there has to be some reading on this. I'm not a very educated guy. I don't have a college education. I just run cows. But it seems like even the rings of trees will tell us, the growth range of the canyon of the trees will tell us what kind of seasons we have.

Dr. Akasofu, do you want to comment on that?

Dr. AKASOFU. I think what you're emphasizing is there are many natural changes, so the question is now—what's happening now, is

it natural changes or man-made or both? If both, how much is due to man-made? That's the one that scientists are working on, emphasizing the major natural changes.

Senator BURNS. Well, we know it wasn't a man-made situation that done away with the dinosaurs, I don't think. Thank you for these. I appreciate these slides and your information. Very interesting. I appreciate your testimony, too. Thank you.

Chairman STEVENS. Dr. Burns, thank you very much. Dr. Sununu.

Senator SUNUNU. I would also like a copy of the slides. I thought they were well done.

Dr. Akasofu, you talked about the impact of the North Atlantic oscillator on the retreat of the sea ice in the North Atlantic, and that it's a variation and the movement or the strength of that oscillator. Is there a good series of data going back 30 or 40 years to try to correlate?

Dr. AKASOFU. That's as far as we can go, and you can see that this temperature changes that go with the NAO, North Atlantic oscillation. They start to increase around 1920 and they reached a 1940 maximum and then began to decrease until about 1970 and started to increase.

Senator SUNUNU. So the blue line that says Arctic——

Dr. AKASOFU. The blue is Arctic and the red one is the global average that most people talk about.

Senator SUNUNU. The blue line labeled Arctic, is that the temperature of the North Atlantic oscillator or the temperature at a particular point?

Dr. AKASOFU. Around the Arctic coastline at more than 50 observatories and this is the average. It represents the Arctic situation.

Senator SUNUNU. But it's the land temperature or——

Dr. AKASOFU. Coastland, yes. So we have the effect of both the land and the ocean as well. The Arctic Ocean temperature changes in a similar way. So there's a big natural change, as you can see, and what we have been—I've been looking at is the changes after 1970. And our question is, we had something similar around 1920 to 1940, so the question is: Is the increase after 1970 due to manmade or natural? We're not sure yet.

Senator SUNUNU. Do you have a similar time series that shows the inflows or the temperature of the inflows from the North Atlantic?

Dr. AKASOFU. We have also a data from North Atlantic seawater, a very similar change. So we think that the inflow, the intensity changes all the time over a period. It's very interesting, the Arctic temperature.

Senator SUNUNU. You note in your testimony that there are some places here in Alaska that are advancing. Although you sort of indicate there are a large number of glaciers that are retreating. But you point out that in Norway most of the glaciers are advancing and advancing. Can you elaborate on that? Do you have any data to describe the rate of advancement of glaciers in Norway?

Dr. AKASOFU. I think that most people think that when the NAO, North Atlantic oscillation, they tend to have more snow in the Norway area, so that's maybe the cause.

Senator SUNUNU. You also note that permafrost temperatures decreased until about 1970. How good is the data for showing that decrease, and how far back can we go before we lose accurate data?

Dr. AKASOFU. This is permafrost temperature changes in Fairbanks and it's very similar in Barrow as well. You can see that the temperature decreased quite a bit until about 1970 when it started to increase, so this is a period that, again, we were worrying about that all the permafrost is thawing. But now that trend seems to kind of slow. During this period, carbon dioxide is increasing so why this change in—we can't correlate too well with CO_2. But nevertheless this is a similar trend also in Siberia and other places similar change.

Senator SUNUNU. Dr. Karl, one of the things that Dr. Akasofu described in his testimony is the computer technology of the modeling. We are fortunate to be in the age that the models and computers are constantly improving. He notes that existing models can't reproduce seasonal changes accurately and that the observations show the maximum shrinkage of the Arctic ice in the summer, well, computer simulations indicate that it ought to be in the winter.

Do you agree with those statements, or would you add anything?

Dr. KARL. First off, I would like to add a few things. I just wanted to mention—perhaps the Senator might be interested—I do have a graph of the North Atlantic oscillation and the Arctic oscillation.

Senator SUNUNU. Yes, if you could include that with your testimony, I would appreciate it.

Dr. KARL. Clearly climate models are by no means perfect. They are, however, the best tool to understand what we might expect in the future. There are many flaws in models and people have written books about the flaws in the models. However, by and large, if we take a look at how we would evaluate them, what we've been able to do is go back in terms of looking at the past climate records and use the models to see if we could understand whether our understanding would be able to reproduce the gross features of past climate.

In general, I think they have done a reasonably good job. When you begin to look at details, that's when they begin to fall apart. I would agree there are still many improvements that need to be made and seasonal cycle is one issue, being able to reproduce the diurnal cycle is another issue. The list goes on.

Senator SUNUNU. Final question, you mentioned clouds. Is it a matter of determining the tradeoff between their blanketing effect and their reflectivity?

Dr. KARL. Yes. It's a matter of high clouds versus low clouds, reflectivity. We're struggling even to understand how clouds have changed based on the observed record with our satellites. So even if you were to give me a model that you believed perfect and you asked me to compare it with observations, I would have a hard time telling you which I believed, the model or the observations.

Chairman STEVENS. Thank you. I think that all of us appreciate your taking the time, each of you doctors, to come and share your knowledge and interpretations with us. It may be necessary for us to pursue this further next year when we get the legislative efforts for sort of long-term legislation to deal with the phenomena we're

looking at now. I really would appreciate your help, Dr. Karl, if you'd tell us what you think we really need along the coastline to get some of this data that's missing now.

Dr. Akasofu, I know you know we're putting some effort into Barrow and effort into the university there. We would like to have your guidance as to what you also think you would need to further your studies, Arctic Institute studies of these changes. Give us some indication of where you think this is going.

The information that our trees are growing further up north, that there is less density to the permafrost on shore seems to be a phenomena that's not exclusively along the coast. We don't know if we're going to have some changes on the land mass of the Arctic of Alaska that need attention in the foreseeable future.

Dr. AKASOFU. We work with National Weather Service and NOAA, so we're happy to work with Dr. Karl.

Chairman STEVENS. This would be nice to have that cooperation between your people in the Arctic Institute that you head and NOAA, so we can get some guidance with regard to what else is going to happen in Alaska. The coastal storms, the coastal damage erosion is one that seems to be the most predicted right now, although I think that the timeframe is longer than we thought it was for the change. I think we have more time to work on it than was apparent.

If it's true that there are some 200 villages that are ultimately going to be affected along the coastline and along the rivers, I think we have to have a long-term plan to see what we can do and maybe bring about some relocation of the villages far before the crisis period arrives because it's more expensive to move over a crisis than it is in the long term.

COMMITTEE RECESS

But I do thank you very much for coming to help us understand the problem further. We're going to recess this hearing and start again tomorrow morning at 8:30. Tomorrow we're going to listen to the Alaska villagers, tribal organizations, and we also have one witness who has some commercial expertise in erosion prevention and mitigation that may be of interest to you, also. So we do thank all the witnesses this morning, and we will recess until 8:30 tomorrow morning.

[Whereupon, at 12:15 p.m., Tuesday, June 29, the committee was recessed, to reconvene at 8:30 a.m., Wednesday, June 30.]

ALASKA NATIVE VILLAGE EROSION

WEDNESDAY, JUNE 30, 2004

U.S. SENATE,
COMMITTEE ON APPROPRIATIONS,
Anchorage, AK.

The committee met at 8:40 a.m., in the Z.J. Loussac Public Library, 3600 Denali Street, Anchorage, Alaska, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens and Burns.

Also present: Senators Murkowski and Sununu.

OPENING STATEMENT OF SENATOR TED STEVENS

Chairman STEVENS. I'd like to call Representative Joule, Mr. Ahmaogak, Ms. Bullard and Mr. Naneng to the table, please. We welcome you all to the second day of these hearings. Yesterday was a very successful day for us. We learned a great deal from the scientific and government people who were here.

We were pleased to hear that HUD has a plan now to allow the leveraging of $100 million to start the process of dealing with some of these areas that are threatened by erosion, and we will follow through with them when we get back to Washington.

This is a United States Senate Appropriations field hearing. Senate Murkowski and I thank our colleagues, Conrad Burns and John Sununu, for joining us, and I thank the witnesses who have traveled here from very many remote locations to present testimony today.

There are three panels of witnesses this morning. Each panel will have multiple witnesses, and to keep the hearing on schedule I request, again, as we did yesterday, that the witnesses not speak for more than 8 minutes. Senators will hold their questions until all the panel has testified, and then we will ask questions and stay within the allotted time for each panel.

The first panel is allowed 1 hour; the second panel, 1 hour; and the third panel 1 hour and 15 minutes. We have witnesses from Alaska's community organizations and regional and State elected officials, as well as one witness who has expertise in erosion prevention and mitigation.

These 2 days of field hearings are a result of an appropriations field hearing held in Fairbanks in May 2001 on the impacts of climate change in the Arctic and the congressional directed General Accounting Office report to study Alaska Native villages affected by severe erosion and flooding to determine what Federal and State programs may be able to provide assistance.

It's critical to hear from people who have witnessed the flooding and erosion to understand the magnitude and severity of how the villages have been impacted and changed in many ways forever the Alaska coastline and ecosystems.

Senator Burns is a member of the Appropriations Committee. We'll call on him first.

Senator BURNS. Thank you, Mr. Chairman. Yesterday was a very fruitful day. I have no formal statement. I look forward to hearing from the witnesses.

Chairman STEVENS. Senator Murkowski.

STATEMENT OF SENATOR LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman. I too appreciate the hearings and gained a lot from what we heard yesterday. While I don't serve on the Appropriations Committee, I do serve on three committees that do have certainly an interest in what is going on here this morning and yesterday. I serve on the Environment and Public Works Committee. We've got oversight of natural hazards and flood control issues. Also on the Indian Affairs Committee and Energy, which does have certain ties here today.

I won't be able to stay with you for the full morning. I am convening a summit on domestic violence at 10 a.m. this morning, but my chief of staff will be here throughout the morning and will be listening and reporting back to me as to the comments that we hear this morning.

I would like to offer just a couple brief observations on what we gathered yesterday. In my opinion the Congress and the State need to be focused on two very distinct issues. The first is how we protect our communities from the flood and storms while they remain in their locations, and the second component is how do we find the resources to move these communities if relocation is the route to go for a long-term solution.

I would ask those that will be presenting this morning—I'm very interested in your experiences that each of you have had in your communities working with the Corps of Engineers as well as the other Federal agencies that are involved. Are they engaged in your problems? Do they understand? Are they helping in the level and in the manner in which you really need? And if not, what can they do—what can we do to improve this?

And I would look forward to hearing your perspectives from that angle.

Mr. Chairman, I appreciate again the opportunity to join you this morning, and I'm so very pleased that we could have our colleagues from Montana and New Hampshire join us as well.

Chairman STEVENS. Senator Sununu, do you have a statement this morning?

Senator SUNUNU. I'd simply like to thank the witnesses for travelling to be here. The testimony yesterday was outstanding and I don't think we could possibly develop the depth of understanding for a problem like this without this kind of thorough hearing. So it's extremely helpful and I look forward to today's testimony.

Chairman STEVENS. Thank you very much. On our first panel is Representative Reggie Joule. Representative Joule represents District 40 in the Alaska Legislature.

Good morning, Representative. I would, again, ask that all witnesses hold their statements to 8 minutes. We're pleased to hear from you.

STATEMENT OF HON. REGGIE JOULE, ALASKA STATE REPRESENTATIVE

Mr. JOULE. Thank you. Good morning, Mr. Chairman. Senator Murkowski, welcome home. Senator Burns and Senator Sununu, welcome to Alaska.

My name is Reggie Joule, for the record. I am from the community of Kotzebue, Alaska, located just 30 miles north of the Arctic Circle where this time of the year the Sun does not set. I represent House District 40, which stretches from the Canadian border in the north, encompasses all of the North Slope and down to the Kotzebue area, the Northwest Arctic Borough, and over to Shishmaref, almost from the Canadian border to the Russian border, 19 communities in my district in an area of about 120,000 square miles.

In Alaska we are bound on three sides by coast, over 6,000 miles of coastline. This accounts for more than half of the entire U.S. coastline. We also have 12,000 rivers, 3 of the 10 largest in the country; the Yukon, the Kuskokwin and the Copper. While we are the largest in the United States in mass, we're, I think, way down second to the last in terms of number of people. We have just over 600,000 people, of which 19 percent or approximately 120,000 are Alaska's Native people. Many of Alaska Native people live in remote villages and have been there for generations.

Most of our villages are located along the coastline or our river systems and we have located to those places because of the resources that are there, food resources. And today and for a few years now erosion is threatening many of our homes. As you heard yesterday, 184 communities are impacted either by coastline erosion or flooding. While many of the problems with erosion and flooding are longstanding, various studies indicate that coastal villages are becoming more susceptible to flooding and erosion due, in part, to our changing temperatures.

The Geophysical Institute in Fairbanks has compiled some interesting data on mean annual temperature trends in Alaska for the 1971 to 2000 time period as indicated by some of the data below. In Barrow, for instance, annual temperatures increased 4.16 degrees with spring temperatures increasing 6.97 degrees. Kotzebue: Annual temperatures increased 1.68 degrees with spring temperatures increasing 3.56 degrees. And in Bethel, annual temperatures increased 3.08 degrees while spring temperatures increased a whopping 7.64 degrees.

Additionally, a 1999 report for the U.S. Global Change Research Program found that the extent and thickness of sea ice in the Arctic has decreased substantially with thickness decreasing by more than 4 feet or approximately 40 percent. Thickness at one point was at 10 feet; today it's measured at 6 feet, and that is kind of an add-on to some of what you heard yesterday.

Let's talk about some things at the State level first. Currently, there are no specific State programs or funding for erosion management. The three main departments in the State of Alaska that help assist with erosion and flooding on an emergency basis are the Department of Transportation (DOT), the Department of Community and Economic Development (DCED), and the Office of Emergency Management (OEM). The State currently only has one staff member in DCED to work on floodplain erosion management and this position is largely funded by the Federal Government through the FEMA program. Generally speaking, the State departments don't have the authority to focus on prevention of problems, but rather deal with situations when it is an emergency and life or property is threatened.

There is no State program to fund mitigation projects outside of a federally-declared disaster or in special instances if the State were to make special appropriations. The Office of Emergency Management intervenes only when there's "an occurrence or imminent threat of widespread or severe damage, injury, loss of life or property, shortage of food or fuel from an incident."

A State or Federal disaster declaration must be issued before the OEM can assist. Similarly, the other departments intervene only when disaster strikes.

The only available funding for erosion problems has been as a supplemental request when an emergency arises. Oftentimes, like in the case of Shishmaref, it's taken some time to be able to get some of that funding. The Alaska State Legislature has begun to recognize the issues, but this recognition has been long in coming. This year the State legislature passed Senate Joint Resolution 25, a resolution which recognized Alaska's erosion problems and requested the Federal Government to ease some of its requirements for the funding. Unfortunately, recognition has come at a time when the State is struggling financially, so there aren't the financial resources available that we would like to have to address some of these issues.

Let's talk about some of the possible solutions, first at the State level, and then we'll move on to the Federal level. Possible solutions to expand the role of the Denali Commission or a State department, such as DCED, to include managing a flood and erosion assistance program and fund and staff the entity appropriately so that it can begin to tackle the problem. The designated agent should be an entity that already has a positive relationship with rural Alaska and an alliance with the construction industry. The agent can work to ensure that by hiring reputable and experienced engineers, hydrologists, and other professionals erosion abatement money is maximized.

Designate the same entity to coordinate the erosion issue between the State and Federal government.

Adopt a statewide erosion plan, which includes an assessment of the villages.

Adopt State policies about building infrastructure in threatened areas or a policy covering structural erosion control projects. Develop a planning process so capital facilities are built outside of erosion and flooding zones or are built so that they can be moved at a later date. Policies should also be adopted regarding relocation

of villages that include site selection criteria that ensures a village will not have to be relocated for a long period of time. We don't need to be going through this over and over.

Adopt State legislation on flood/erosion plan management, if needed.

Provide designated funding for erosion management.

Educate both State and Federal officials about the erosion and flooding problems and how best to combat erosion abatement.

When working through all of the ideas outlined above, rural Alaskans should be included in the process. Additionally, if communities are relocated, the residents should be allowed to maintain their connection to the area.

Chairman STEVENS. The time?

Mr. JOULE. Yes. The cost-benefit analysis: Federal agencies aren't allowed to undertake projects whose costs exceed expected benefits. So you heard some about this yesterday.

But in closing, Mr. Chairman, members of the committee, direct the Corps of Engineers and the Natural Resources Conservation Service (NCRS) to include social and environmental factors in their cost-benefit analysis for requested projects, and to consider the economic impact of lost subsistence resources.

Direct the Corps and NCRS to account for the higher cost of construction and fuel.

And, Mr. Chairman, the rest of this is on my written statement for your review. I just would like to say that remote Alaska villages face challenges found nowhere else, and these obstacles range from harsh climates, the permafrost issues, limited infrastructure. And we urge this committee to consider action and help many of the villages in the State. Thank you.

Chairman STEVENS. Thank you very much. There's no question that your district has substantial problems right now, and we'll work with you, the State legislature in January. We will have some suggestions for the legislature too.

[The statement follows:]

PREPARED STATEMENT OF HON. REGGIE JOULE

Good afternoon. Thank you for the opportunity to testify in this important hearing today. My name is Representative Reggie Joule and I represent House District 40. I represent a unique area of the state. My district stretches from the Canadian to the Russian Border. It is an area rich in natural resources (Prudhoe Bay and Red Dog Mine). It is also an area that has been inhabited by the Inupiat for thousand of years. Today I am here to talk with you about erosion and flooding in our remote area of the state.

Introduction and Background

First, one must ask why Alaska as a state is having such a problem with erosion and flooding. In part, it is because as the largest state we have an enormous coastline and river system.

—Alaska encompasses 365 million acres, more than the combined area of the next 3 largest states (Texas, California and Montana).
—Our state is bound on three sides by water and has a coastline of 6,600 miles.
—Our coastline accounts for more then half of the entire U.S. Coastline.
—Alaska also has more then 12,000 rivers, including three of the ten largest in the country (Yukon, Kuskokwim and Copper Rivers).
—Although the largest state, Alaska is the second least populated state with only 630,000 people of which 19 percent or about 120,000 are Alaska Natives.
—Many Alaska Natives live in remote villages that have been inhabited by the same families for generations. Most of these villages are located along a coast-

line or river system so that Native people can utilize the food resources. Today erosion threatens many of our homes.

In fact, flooding and erosion impacts 184 out of 213 Alaska Native villages or about 86 percent of the villages. (Number of villages impacted may be higher but quantifiable data for remote villages is unavailable). Between 1972 and 1991, the state spent over $40 million for erosion control statewide.

What are the potential causes of the erosion and flooding and why has it worsened in recent years?

While many of the problems with erosion and flooding are long-standing, various studies indicate that coastal villages are becoming more susceptible to flooding and erosion due, in part, to rising temperatures. The Geophysical Institute in Fairbanks has compiled some interesting data on mean annual temperature trends in Alaska for the 1971 to 2000 time period as indicated by the data below:

—Barrow: Annual temperature increased 4.16 degrees with spring temperatures increasing 6.97 degrees.

—Kotzebue: Annual temperatures increased 1.68 degrees with spring temperatures increasing 3.56 degrees.

—Bethel: Annual temperatures increased 3.08 degrees with spring temperatures increasing a whopping 7.64 degrees!

Additionally, a 1999 report for the U.S. Global Change Research Program found that the extent and thickness of sea ice in the Arctic has decreased substantially with thickness decreasing by more then 4 feet (from 10 feet to 6 feet thick).

Rising temperatures cause protective shore ice to form later in the year leaving villages vulnerable to fall storms because the shore ice that would normally protect the shore from the crashing waves isn't there. Moreover, with less ice, storm surges have become more sever because large, open water areas generate larger and more destructive waves. This has resulted in more serious erosion in recent years with over 100 feet of land being lost in a single storm. A village in my district called Shishmaref, which is only 1,320 feet wide, lost 125 feet of beach to erosion in a single storm in October 1977.

In recent years rising temperatures have also resulted in widespread thawing of the permafrost, causing serious damage. Melting and thawing permafrost is also more sensitive to small variations in temperatures. (1997 Report of the Intergovernmental Panel on Climate Change). As permafrost melts buildings, bulk fuel tank farms, and runways sink. Additionally, river villages are impacted by erosion and flooding caused by ice jams, snow and glacial melts, heavy rainfall and rising sea levels all of which have been exacerbated by rising temperatures and melting permafrost.

Gaining perspective by taking a closer look at some specific villages and the erosion and flooding problems they face

I would like to familiarize you with this topic by taking a look at some of the villages in my district. I represent 19 villages, 16 of which are impacted by erosion and flooding. The villages impacted by coastal erosion are Barrow, Kaktovik, Point Hope, Point Lay, Wainwright, Kivalina, Kotzebue, Deering and Shishmaref. The villages impacted by river erosion and flooding are Nuiqsut, Ambler, Buckland, Kiana, Kobuk, Noatak, Noorvik, and Selawik.[1]

In the district I represent two villages, Shishmaref and Kivalina, are in imminent danger of flooding. These two villages are planning to relocate entirely.

Shishmaref

Shishmaref is a small village of about 562 people. It lies on a barrier island in the Chukchi Sea and experiences chronic erosion along the shorelines. The island is no wider then a quarter of a mile. Since the 1970s the community has tried a variety of erosion protection measures, from sandbags and gabion seawalls to a concrete block mat. Ultimately, all of the attempts failed to prevent long-term erosion. To date 19 homes have been moved to prevent them from literally falling into the sea. The community is currently working on constructing a temporary seawall, which is expected to last 10 to 15 years, to give the village time to relocate. Money for the seawall is coming from several sources including the State of Alaska, the Corps of Engineers (Corps), Kawarek Corporation, and other federal monies. The village is currently working with Natural Resource Conservation Services (NCRS) on selecting an appropriate site to build a new village.

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[1] Note that many rural villages do not have a naturally occurring gravel source to build a seawall or other protective system. This means the gravel for a project must be barged in to an area from the nearest source, which can be a significant distance. This of course adds a significant cost to the project.

Kivalina

Kivalina is a small village of about 377 people. It also lies on a barrier island that is surrounded by the Chukchi Sea and Kivalina Lagoon. The village is shrinking from chronic erosion on both shorelines. There is no further room for expansion and the only option for the village is to relocate. It is believed that the right combination of storms could flood the entire village at any time, resulting in the loss of property and life. Cost estimates to relocate the village range from $100 million to $400 million. The village is working with the Corps on finding possible new sites as the first two site selections for a new village failed to meet certain criteria.

Other villages in my area are conducting flooding and erosion studies or are improving infrastructure to cope with flooding and erosion problems. Below is a sampling of the villages and the issues they face:

Kaktovik

The village of Kaktovik is located on Barter Island at the northern edge of the Arctic National Wildlife Refuge. The village has a problem with the runway, which floods every fall, shutting the airport down for several days at a time. When evaluating the situation it is important to note that for many remote communities the only real access to urban facilities, including hospitals, is by air. A flood study at the airport has been conducted. The village, with the assistance of the FAA, is now exploring whether it is cheaper to fix the existing airport or to build a new runway in a different location that won't flood. The FAA will support the least-cost alternative and will fund 93.75 percent of the project with the local government covering the rest of the cost.

Kotzebue

Kotzebue is a second-class city with a population of about 3,082 and serves as the urban center for all of the villages in the Northwest region. The city is located on a spit surrounded by the Chukchi Sea and Kotzebue Sound. In recent years, former Governor Knowles declared the road along the beachfront (Shore Avenue) area a disaster due to washout caused by severe fall storms. This summer the community will rebuild the road infrastructure with the assistance of the Department of Emergency Services. In 2006, the city will work with the Department of Transportation to prevent further erosion by building a seawall along the shoreline in front of the city.

Barrow

Barrow is a first-class city with a population over 4,000. The city is located on the Chukchi Sea and serves as the urban center for all of the villages in the North Slope Borough. It is estimated that approximately $500 million of Barrow's infrastructure is located in the flood plain. Barrow, in conjunction with the Corps, has a study underway for coping with beachfront erosion that threatens the village's multi-million dollar utility corridor and local landfill. In the past, the city has used sandbags and dredging to rebuild the beachfront and to prevent erosion with little success. North Slope Borough officials estimate that each time there is a flood it costs the community approximately $500,000.

Point Hope

Point Hope is located near the end of a triangular spit, which juts 15 miles into the Chukchi Sea. This peninsula is one of the longest continually inhabited areas in Northwest America. Some of the earliest residents came to the peninsula some 2,000 years ago after crossing the Siberian land bridge. Today some 800 people call Point Hope home. Due to concerns about erosion and flooding, Point Hope is researching alternatives for an emergency evacuation road and relocating the runway.

Noatak

Noatak is located on the west bank of the Noatak River, 55 miles north of Kotzebue. It is about 60 feet above sea level. Approximately 400 people, mostly of Inupiaq Eskimo descent, call this small community home. Due to flooding the community of Noatak had to move graves and build a new graveyard. The project is still not complete, as a road to the new gravesite remains unfinished. The changing course of the river and riverbank erosion has also forced about half of the residents to relocate or move their existing homes. The residents have done most of the work on their own with little to no assistance from the state.

Noorvik

Noorvik is also a river community. It is located on the bank of the Nazuruk Channel on the Kobuk River. Approximately 550 people call Noorvik home. Noorvik also had to relocate its airport due to flooding.

As you can see from these examples, the erosion and flooding problem is very real and costly in Alaska. We need help.

What state programs are available to assist villages with erosion and flooding and why aren't they working?

There is no specific state program or funding for erosion management. The three main departments that help assist with erosion and flooding on an emergency basis are the Department of Transportation, Department of Community and Economic Development (DCED), and the Office of Emergency Management. The state has only one staff member in DCED to work on flood plain erosion management and this position is largely funded by the federal government (75 percent) through the FEMA program. Generally speaking, the state departments don't have the authority to focus on prevention of problems but rather deal with the situation when it is an emergency and life or property is threatened. There is no state program to fund mitigation projects, outside of a federally-declared disaster. The Office of Emergency Management intervenes only when there is "an occurrence or imminent threat of widespread or severe damage, injury, loss of life or property, shortage of food, or fuel from an incident." See A.S. 26.23. A state or federal disaster declaration must be issued before the OEM can assist. Similarly, the other departments intervene only when disaster strikes.

The only available funding for erosion problems has been as a supplemental request when an emergency arises. Oftentimes, like in the case of Shishmaref, it has taken years to get funding. Shishmaref began asking for money to build a seawall around 1984. During the intervening years it did receive sporadic funding ($1.7 million) and built a partial seawall that failed. Finally this year Shishmaref received some state funding to build a partial seawall, which will help protect the village for another 10 to 15 years while it relocates. There is no statewide erosion policy or plan on how to tackle the problem. There is no state policy about building infrastructure in threatened areas or a policy covering structural erosion control projects. Therefore, there is no planning process to insure that capital facilities are built outside of erosion and flooding zones or built so that they can be moved at a later date. In fact, there is no state legislation on flood/erosion plain management at all. There is no state or federal agency designated or funded to coordinate erosion control between the state and federal governments. In sum, there is a real lack of state resources to address erosion problems.

The Alaska State Legislature has begun to recognize the issues but this recognition has been long in coming. This year the legislature passed SJR 25, a resolution which recognized Alaska's erosion problems and requested the federal government to ease some of its requirements for funding. Unfortunately, recognition has come at a time when the state is struggling financially, so there aren't the financial resources available that we would like to have to address the problems. Additionally, there are a number of legislators who favor funding projects in urban areas of the state where most of the population resides. There are also a few legislators who believe that no money should be spent in rural areas and that threatened village residents should simply move to the city.

What are some possible solutions to the erosion problem on the state level?

Listed below are some possible solutions to Alaska's erosion and flooding problem:

—Expand the role of the Denali Commission or a state department to include managing a flood and erosion assistance program and fund and staff the entity appropriately so that it can begin to tackle the problem. The designated agent should be an entity that already has a positive relationship with rural Alaska and an alliance with the construction industry. The agent can work to ensure that by hiring reputable and experienced engineers, hydrologists, and other professionals erosion abatement money is maximized.

—Designate the same entity to coordinate the erosion issue between the state and federal government.

—Adopt a statewide erosion plan, which includes an assessment of the villages.

—Adopt state policies about building infrastructure in threatened areas or a policy covering structural erosion control projects. Develop a planning process so capital facilities are built outside of erosion and flooding zones or are built so that they can be moved at a later date. Policies should also be adopted regarding relocation of villages that include site selection criteria that ensures a village will not have to be relocated in the foreseeable future.

—Adopt state legislation on flood/erosion plain management if needed.

—Provide designated funding for erosion management.

—Educate both state and federal officials about the erosion and flooding problems and how best to combat erosion abatement.

—When working through all of the ideas outlined above rural Alaskans should be included in the process. Additionally, if communities are relocated the residents should be allowed to maintain their connection to the area.

Adoption of any of these measures would be a step in the right direction.

What federal programs are available to assist villages with erosion and flooding and why aren't they working?

The principal federal programs that prevent and control erosion and flooding are administered by the Corps of Engineers (Continuing Authorities Program) and the Natural Resource Conservation Services (Watershed Protection and Flood Prevention). The problem with these programs is that the villages usually fail to qualify for federal assistance because they can't meet the federal requirements listed below:

—*Cost Benefit Analysis*.—Federal agencies aren't allowed to undertake projects whose costs exceed expected benefits. This requirement fails to account for social or environmental factors, or the economic or cultural value of subsistence. Only one NCRS program, the Emergency Watershed Protection program, accounts for these factors. Additionally, there is no adjustment to account for the high cost of construction and fuel in remote areas. Most villages fail to meet this requirement.

—*Match Requirement*.—The match requirement requires local communities to fund between 25 to 50 percent of the project. A few programs will waive this requirement. Some of the poorest communities in the state are being asked to contribute thousands of dollars in match money, a requirement they simply can't meet.

How can we solve the funding issue and get the needed resources to our villages?

Listed below are some possible funding solutions to Alaska's erosion and flooding problems:

—Direct the Corps and the NCRS to include social and environmental factors in their cost/benefit analysis for requested projects, and to consider the economic impact of lost subsistence resources. An additional consideration might also be whether a cultural heritage site or a national historic landmark is at risk. (Point Hope is recognized as a nationally significant cultural site as is Barrow and many other villages);

—Direct the Corps and NCRS to account for the higher cost of construction and fuel in Alaska in the cost/benefit analysis;

—Waive the federal cost share requirements for flooding and erosion projects in Alaska;

OR

—Fund the Denali Commission with specific provisions that the funds can be used by the communities to meet the required cost share provisions;

—Authorize the bundling of funds from various agencies to respond to flooding and erosion;

—Earmark some of the federal income from the state for oil, timber or other natural resources revenues to fund erosion and flooding projects in Alaska; and

—Expand the role of the Denali Commission to include managing a flood and erosion assistance program.

Remote Alaska villages face challenges found nowhere else in the United States. These obstacles range from harsh climates, ice-rich permafrost soils, limited infrastructure, high fuel and shipping prices, short construction seasons, and limited or no access to transportation networks. The proposed changes outlined above would give federal agencies more flexibility and would allow them to address Alaska's unique rural flooding and erosion challenges. I urge you to seriously consider these changes and help Alaska begin to tackle erosion and flooding.

Thank you for your time.

Chairman STEVENS. Good morning, Mayor. It's nice to see you. Appreciate you coming down to be with us from Barrow. Can we have your testimony?

STATEMENT OF GEORGE AHMAOGAK, SR., MAYOR, NORTH SLOPE BOROUGH, BARROW, ALASKA

Mr. AHMAOGAK. My name is Mayor George Ahmaogak. I'm now serving my fifth term in office. Each term is 3 years. You can see I've went through a lot of storm-related situations in my time.

I represent the North Slope Borough. The North Slope Borough is the regional government for northern Alaska charged with responding to storm-related emergencies and planning for erosion control. Five of our villages are coastal and have significant erosion problems. Sandy soils, low elevation, and permafrost make erosion a fact of life in Arctic Alaska. Unlike most soils, exposed permafrost warms and melts then slumps and washes away. Instead of helping to rebuild beaches, erosion material on our shores just disappears.

A strong warming trend has led to multiple shrinking of the Arctic Ocean ice and has made our subsistence way more difficult from my personal observation. Gravel was scraped from Barrow's beaches in 1940 for the construction of the Naval Arctic Research Lab. The same approach was used for the construction of the State of Alaska airport runway for the Will Rogers Airport in Barrow. This loss of beach material accelerated erosion along the shore.

Storms have the greatest impact on erosion in our coastal villages. Storms in 1954, 1963, and 1986 caused extensive flooding and carried away large chunks of our coastline. The 1986 storm resulted in the State of Alaska disaster declaration for all of our coastal communities. Federal and State private studies of coastal erosion in our region have documented the problems for 50 years or more. Estimates of the annual loss of soils from coastal areas suggest that we're losing an average of about 4 feet of coastline per year.

The airport runways at the coastal villages of Kaktovik near the Canadian border and Point Hope to the west of Barrow flood each and every year cutting these communities off from any transportation link to the outside world.

Our whaling culture is tied to the sea and our coastal villages are in traditional locations for access to subsistence activities. Erosion is a constant challenge for us. We welcome your interest in this problem, and we look forward to Federal participation in finding solutions. I also want to mention the fact that the North Slope Borough as part of the solution has supported the effort in creating the Barrow Global Climate Change Research Facility. I'm sure you've seen my letters time and time over, the letter-writing campaign, supporting the need for this research facility to start now getting the baseline data of the climate changes taking place. We still wholeheartedly support that. My understanding is now that we're in a planning stage of this facility.

We are in extreme need of getting that baseline data to find out what exactly in scientific terms is going on with the global changes that are taking place. If I had a message to you this morning, I would accelerate my interest in that facility and you make it a reality. I think science is one method and baseline data is what we need to find out what the problem is. Barrow is going to be the host of this research facility. So we need your support in that effort to make this a reality.

I had a question on the Corps of Engineers—in our experience with the Corps of Engineers. As you know, we have other coastal villages that are subject to the flooding. Barrow is one of the worst ones. We have a memorandum of understanding with the Corps of Engineers to deal with our erosion problem and that other local

government at this stage will pay 50 percent of the local costs—of the overall costs in restoration and engineering and construction mitigation of any flooding to take place.

Unfortunately, ironically, the other villages that are subject to erosion as well, we can't convince the Corps of Engineers to meet their criteria to be able to be accepted just like Barrow is. Our municipality is very interested in trying to do that. We have been trying to overcome that problem of getting those other villages recognized by the Corps of Engineers so they can have a mitigation plan, a design plan and a construction plan for the coastal erosion that takes place.

Barrow is the only one that we've worked so hard to be able to make it a reality. So we have a memorandum of understanding with the Corps of Engineers just for Barrow. The other three outlying villages need the Army Corps of Engineers. If there are any solutions to be had, I would suggest that any assistance you can offer to try to convince the Corps of Engineers to include those three other villages. We're willing and able to try and work with them. It's like working with a brick wall and the bureaucratic process you have to do to qualify some of these villages is astronomical.

I just wanted to mention that we do have an MOA just for Barrow and we're willing to pay capital costs. We're fortunate enough to have the resources in local funds to be able to pay the 50 percent share of the capital costs. I feel also—what about the other rural Alaskans, which they don't have financial resources to even come up with their 50 percent share of the costs. You know yourself that rural Alaska is in a real critical financial situation out there. They will never have the financial resources to be able to address those needs.

I feel for those guys that are having the same problems we are but have no financial resources. I want to talk about disaster declarations at the local level when we do have storms that are like we had in 1986. We made emergency declarations at the local level. It's a tedious process. Once you make a declaration, then you have to get the State of Alaska to also agree with your declaration and the Federal level.

The responsibility and burden of proof is laid on the local communities to make that disaster declaration and the damage assessments that need to be done so they can get it termed as a disaster. We're going through this tedious process of meeting those requirements. Fortunately, the borough has been able to do that. At times when we declared a disaster, we couldn't get the State of Alaska to agree with us. Now it's the local communities that bear the costs for these disasters.

You can't convince the State, you can't convince the Federal agencies and FEMA. I think if there was suggestions and solutions to this all, there needs to be improvement on the declaration process and when these coastal villages declare declaration, they need help now. You have to understand, they have no telephone when they have a disaster, no communication.

We're fortunate in the North Slope Borough to have the resources. When we declare a declaration, we can call out, then do the damage assessment with our staff and try to convince the State and then try to convince the Federal process and the FEMA proc-

ess. That's an extreme awful difficult process. If there's any suggestions or solutions to be had, once a local community declares a declaration, they need help and that means improvement, at least for now when they declare disaster declaration.

I thank you for the opportunity to testify here. I'll stay within my 8 minutes. Thank you.

Chairman STEVENS. Thank you, Mayor. Nice to have you here.

[The statement follows:]

PREPARED STATEMENT OF GEORGE N. AHMAOGAK, SR.

Thank you for this opportunity to share information and local perspectives on erosion in the northernmost coastal communities of Alaska. These problems have become severe in recent decades and give every indication of worsening in the future.

Background

The North Slope Borough is the regional government for the entire area north of the Brooks Range. Our municipal powers make us the entity charged with responding to storm-related emergencies, addressing near-term erosion issues, and planning a coordinated response to the long-term effects of erosion in all of our communities.

The North Slope Borough has several thousand miles of coastline within its borders and thousands of miles of rivers. Our people reside in eight villages, all of which have historic ties to our Inupiat Eskimo ancestors. Five of the eight communities—Kaktovik, Barrow, Wainwright, Point Lay and Point Hope—are located along the coast. Two others—Nuiqsut and Atqasuk—are situated on rivers and experience some of the same problems, though to a much lesser degree.

Our prevailing sandy soils, low elevations and permafrost probably guarantee a certain amount of erosion as a fact of life on the Arctic coastal plain. Our average tidal change is only around a foot, but wave action during storms can create ocean surges of ten feet or more. Since much of the region is just a few feet above sea level, the effects of storms can be devastating. A 1963 storm, for example, flooded millions of acres along the coast.

Our sandy soils and permafrost tend to aggravate storm-related erosion considerably. The sandy soils are easily eroded, and as their ice-rich underpinnings are exposed in shoreside bluffs, they simply melt and wash away instead of replenishing the beach as most soils do.

Human Factors in North Slope Erosion

Human interventions in the past 50 years have aggravated the natural occurrence of erosion considerably. A strong warming trend in the Arctic has led to very noticeable declines in the extent of the Arctic ice pack. Our whaling communities comment on this frequently, as the retreating ice pack increases the open water area during whaling season and makes whaling more difficult. A greater expanse of open water also allows storms to generate more wave action, making them more damaging when they hit the shore.

Construction activities have also accelerated erosion. When the Navy built the Naval Arctic Research Lab near Barrow during the 1940s, gravel was scraped off nearby beaches for use in roads and building pads. Similarly, gravel was mined from local beaches for the construction of Barrow's first airport runway. These changes to the natural slope of the waterfront noticeably increased erosion in subsequent years.

Storm Damage and Responses in Recent History

Storms in 1954, 1963 and 1986 were the most significant erosion events in the past half-century. The September 1986 storm did significant damage to the North Slope. As a result, all the coastal communities of the North Slope Borough were declared disaster emergencies by the State of Alaska. This classification resulted in FEMA and the North Slope Borough developing a Hazard Mitigation Plan. This plan resulted in repairs to infrastructure in the communities, but no mitigation of future erosion was possible under the program.

After a pair of storms in September of 1986, the North Slope Borough hired the firm of Tekmarine from California to inspect the storm damage and evaluate various protection measures. Tekmarine was a coastal engineering firm that had been providing erosion protection to the oil industry at Prudhoe Bay in support of offshore island construction. The report, completed in 1987, was titled *Bluff and Shoreline Protection Study for Barrow, Alaska*. It is relevant to both Barrow and Wainwright, due to the similarities of coastal conditions at both communities.

Page 1 of the Tekmarine report includes a statement that reflected conditions at the time of the storm and has only grown more relevant as time has passed:

"The coastal erosion at Barrow has been recorded in scientific literature for at least the past 30 years, but the erosion has become a serious problem recently as it began to threaten the local community. In particular, the receding bluff-line has encroached upon the housing and the streets of Barrow, and it is feared that the spit separating the sewage and fresh-water lagoons may be breached if the shoreline erosion is allowed to continue."

Page 9 of the Tekmarine report reviews some of the documented history of North Slope coastal erosion. While the comments are specific to Barrow, these or similar events have occurred at all the coastal communities within the North Slope Borough over the last 60 years:

"The most devastating single episode of bluff erosion in this region occurred during the storm of October 3, 1963, described as 'the worst storm in the memory of the Eskimo people' (Hume and Schalk, 1967). The water was open at the time and a storm tide estimated to be about 12 feet developed. The entire Barrow spit was under water and more sediment was moved 'in a few hours than would normally be transported in 10 years' (Hume and Schalk, 1967). Just how much of the bluff retreated as a result of that storm is unknown, although it may well have been as much as one polygon width, according to Max Brewer, who was Director of the Naval Arctic Research Laboratory at the time (Walker, 1985). The debris line investigated by Hume and Schalk (1967) clearly demonstrates that during the 1963 storm, the sea overtopped the spit to inundate both the fresh-water and sewage lagoons.

"Prior to 1963, a fall storm in 1954 (Schalk, 1957) was the worst ever, in which a surge elevation of 9 to 10 feet is reported to have occurred. A storm accompanying a storm surge of 4 to 6 feet occurred in September 1986, causing considerable damage to the bluffs at Barrow and Wainwright (Interagency Hazard Mitigation Team, 1986)."

This historical information is important to the people of the North Slope because it shows just how severe storm and coastal erosion damage has been and can be. If the events of the 1986 storm resulted in a disaster declaration for all of the coastal communities within the borough, it is not hard to image what would result with a re-occurrence of either the 1954 or 1963 storm events.

Over the past 30 years, the Anchorage engineering firm of LCMF, LLC has participated in a number of erosion and mitigation studies for the North Slope Borough. The following excerpt from one of their reports provides detail on the extent and nature of storm-related erosion in the Arctic:

"The rate of [beach] erosion at Barrow has been estimated by various studies as anywhere from 0.2 feet to 6 feet per year. After evaluating the results of several studies on the local erosion rate, the Tekmariner report (1987) settled on a rate of 4 feet per year.

"Storms are the critical factor in both bluff erosion and retreat of the shoreline. Along the coast, undercutting is caused by the action of waves, mainly during storm surges. According to MacCarthy (1953), the undercutting is followed by slumping and landsliding down the face of the bluff. When ice wedges surrounding tundra polygons are present within the solids of a bluff, the fracturing of the wedges causes large parts of the polygons to fall from the bluff as a unit. Ice and water within the permafrost melt and wet the soil, acting to loosen the slumping materials when thawed, so that they are quickly mixed into the sea and beach." (LCMF—May 1991, page 4)

The 1986 storm submerged Kaktovik's airport runway on Barter Island in the eastern reaches of the North Slope Borough. The runway continues to flood on an annual basis, as outlined in the recent GAO report, *Flooding and Erosion in Alaska Native Villages*. While the community is buffered from coastal erosion by the runway, the permafrost bluffs adjacent to the lagoon and community do not escape erosion problems. In the early 1980s, a seawall had to be built in conjunction with roadways along the lagoon to prevent continued erosion from encroaching into the right-of-way and causing the new roadway to fail.

Another effect of erosion occurred at the DEW line (Distant Early Warning) station at Barter Island, which is no longer in operation. As part of its decommissioning, the DEW line landfill was closed by encapsulation (covered with dirt). Unfortunately this landfill is adjacent to the coast, and by the year 2000, erosion had caused the encapsulation to fail.

Erosion is a constant enemy across the North Slope. Materials for use in mitigation measures are scarce and very expensive. Consequently, most responses in the past have been sporadic and have met with limited success. However, two villages have been completely relocated due to erosion. Point Hope was moved in the early 1970s, but significant loss of cultural artifacts has continued in the area of the old townsite. Point Hope is notable as the oldest continually inhabited settlement in North America. In its current location, access to higher ground is severely limited. There is one roadway leading from Point Hope towards higher ground, but a portion of it descends to the northerly edge of the spit along Marrayatt Inlet where it is also submerged and dangerous during flooding. The village's runway continues to flood in the fall every year, as mentioned in the GAO report cited above.

The community of Point Lay was relocated from the coastal barrier islands to land at the mouth of the Kokolik River in the late 1970s. However, this move was not sufficient to escape flooding in the area. Five years later, the community was moved again to its current location on high ground behind the barrier islands. Even so, coastal erosion continues to impact access to the community by sea lifts, and community infrastructure—such as the sewage discharge line—is losing stability at its discharge point due to erosion in that area.

Conclusion

Low elevations, permafrost and the loss of protection from shrinking sea ice expanses makes erosion a constant challenge and an occasional disaster for the people of the North Slope. The range of mitigation responses is limited and expensive, but our Inupiat whaling culture is inextricably bound to the sea and our communities are destined to remain near the water's edge. Our best hope is for a coordinated effort among agencies at all levels, using the best engineering experience and technology, and based on careful planning and respect for the needs of local communities. We appreciate your concern and we look forward to federal participation in this urgent problem.

Chairman STEVENS. Ms. Bullard.

STATEMENT OF LORETTA BULLARD, PRESIDENT, KAWERAK, INC.

Ms. BULLARD. Thank you. Good morning, Senators. Thank you for the opportunity to testify and welcome to Alaska. My name is Loretta Bullard and I'm the president of Kawerak, which is a Native nonprofit corporation and consortium of 20 federally-recognized tribes in Northwest Alaska. We contract with the Federal and State governments to provide diverse services throughout the Bering Straits Region.

I want to state that Kawerak is one of the few organizations in the Nation that has contracted with the Bureau of Indian Affairs (BIA) roads program and using some of our BIA roads money we have been able to provide assistance to Shishmaref, which is one of our northern communities that has severe erosion problems. We are able to use our BIA roads program dollars to match our Federal money. So while we didn't use it on a match basis for the situation in Shishmaref, we did have some discussions with the Corps early on to possibly use our BIA roads dollars to provide that match.

This is in response to the question by Senator Murkowski earlier about the Corps. We had discussions with the Corps about using our roads dollars to match their dollars to go through the planning and feasibility process so Shishmaref will be able to have protections in place in their community. We subsequently decided not to because we spent all of our matching dollars to go through the planning and feasibility process. There are photos in this display here showing that we had taken our BIA dollars and constructed a 450-foot seawall protection for the town.

We concluded that Shishmaref didn't have the time to go through a 3 or 5, 6-year feasibility process only to find that they had a 50 percent match which they couldn't afford versus if we took our lim-

ited money we were able to construct a seawall to help protect that community. So that's what we did.

We have had discussions with the Corps of Engineers that they have been redirected to look at their cost-benefit analysis that they did a number of years ago. They did a cost-benefit analysis to determine whether Diomede could have a docking facility. From the initial analysis the conclusion was the benefit was not there, therefore, they could not have their needs addressed. We also included photos of Diomede to show their access problems.

While they're not extremely subject to erosion, they do get major storms out there and do have flooding. They're not able to access assistance through the Corps of Engineers because of the cost-benefit analysis. Diomede is a small community, 150, 160 people, 45 percent children. They simply don't have the match available to construct a small harbor facility. Because they don't have a docking facility out there, the only thing they have is a fuel barge.

Major freight just doesn't get out there unless you put it on a plane which lands on the sea ice which is there from January through maybe mid-May. There was a time people freighted their items on very small boats, 20, 25-foot boats max. The size is limited. But they're another example of a community that is not able to meet the Corps' match requirement, and the Corps has been talking with them about using the BIA roads dollars. Kawarek is contracting for the entire region and to match to the Corps' dollars, which, you know, we could explore doing that, but I would hate to get in the position of having extremely limited roads dollars that everyone is hoping to match State funds to get projects in other villages.

We were able to do the project in Shishmaref, but I would hate to see us spend every single dollar to match the Corps' dollars. We concur with many of the recommendations in the report. I just want to suggest that when you do—we encourage that a work group be appointed. When Secretary Thompson went to Shishmaref, the first thing he said was, who's in charge? There was nobody in charge in terms of a Federal agency.

I kind of think the position the rural villages are faced with is a huge bureaucracy. To do the applications, manage the money, folks really need help, and many of our smaller communities don't have that ability to manage the large engineering projects. Just coordinating people, I think, is a huge amount of work.

We also suggest that, you know, the Corps be the lead and that a work group be established of Federal and State agencies and rural Alaskans be appointed to serve on that. It also helps to educate those of us in rural Alaska that have to work these systems in order to gain assistance. So I would encourage that to be done.

In closing, we encourage funds to be made available, appropriated on a basis to help us address these issues. Thank you for the opportunity to testify.

Chairman STEVENS. Thank you very much, Loretta. I have read your statement and we do thank you for the recommendations you've made and we'll try to follow up. I will have some conversation later.

[The statement follows:]

PREPARED STATEMENT OF LORETTA BULLARD

Thank you Senator Stevens and members of the committee for the opportunity to testify today. My name is Loretta Bullard. I am President of Kawerak, Inc. Kawerak is a regional Native non-profit corporation and consortium of 20 federally recognized tribes in northwest Alaska. We contract with the federal and state governments to provide diverse services throughout the Bering Straits region.

Thank you for giving us this opportunity to present our needs and recommendations. We are pleased that Congress is exploring erosion and flooding concerns in Alaska.

To start, I would like to thank Senator Stevens and this Committee for directing the GAO to compile their recent report on erosion and flooding issues in village Alaska. The GAO report explored in detail the needs of several of our communities (Shishmaref and Unalakleet) and did a good job in laying out the issues. I find myself supporting just about every single recommendation in the report. Alaska has over 6,600 miles of coast line. I've attached a map to my testimony that reflects the sheer size of the State of Alaska in relation to the lower 48. While our population is small and our communities remote, just about every single village in the state is located on the ocean or along a major river where erosion and flooding problems are more likely to occur.

Kawerak is one of the few tribal organizations nationally—and the only tribal consortium—which has contracted to perform the entire Bureau of Indian Affairs "Indian Reservation Roads" (IRR) program under the Indian Self-Determination and Education Assistance Act. IRR funding, when it is available, is an ideal funding source for village Alaska because under federal law, it can be used for a local match to leverage other funding sources, including federal funds. Over the past year and a half, the Corps of Engineers has explored meeting some of our villages need for assistance, with the idea that Kawerak would provide the local match.

Because we are compacting to provide the IRR program in the Bering Straits Region, we were able to make resources available to Shishmaref to construct a small sea wall to protect a portion of their roads and community infrastructure until such time as they relocate—and to fund a position at Shishmaref to serve as staff support to the Shishmaref Erosion and Relocation Coalition to aid them in their relocation planning.

I know what we've been able to do to assist our villages utilizing our BIA IRR resources—but question what federal agency is taking the lead in providing assistance to other villages in desperate need of assistance? Based on our experience, I'd have to conclude there is no one agency in the lead. Secretary Thompson cut to the chase last summer during his trip to Shishmaref when he inquired which federal agency was in charge of helping Shishmaref?—and there was not a definitive response. The villages are basically placed in the position of trying to identify and set in place a patchwork of assistance. In my mind—it's probably akin to herding cats and not a very effective way of getting things done.

We concur with the recommendation contained in the GAO report that a federal agency should be appointed to lead a work group consisting of the various federal and state agencies to work on erosion and flooding issues in rural Alaska.

We recommend that the responsibility be delegated to a work group led by the Corps of Engineers, rather then the Denali Commission. It could perhaps be a work group within the Denali Commission itself. The Corps has the in-house expertise to handle the issues. It would also serve to insure decision making is not driven by politics. We recommend that rural Alaskans be appointed to serve on the work group so that we are able to channel our issues, concerns, and recommendations and have them fully considered in the decision making processes. This process could also serve to help educate rural Alaskans as to potential sources of assistance and how to access them.

The Denali Commission's latest draft of their Investment policy states that the Commission will only consider proposals to create new communities if Congress directs the relocation of an existing community. I interpret this language to say the Denali Commission does not want to be the lead in this arena. Rather, they have elected to defer to Congress to make the decision as to whether a community should receive assistance to relocate. If this is going to be the process, a process needs to be set in place to allow for this.

Once the work group is appointed, we recommend that their first order of business be to gather data so that those communities in greatest need of assistance, receive the help they need.

In reviewing the list of communities identified in the region as being impacted by erosion and flooding, I think the list could be substantially reduced. The sheer number of villages identified as possibly in need of aid serves to discourage agencies

and appropriators from making resources available to address needs. It's pretty overwhelming. Where does one start? I encourage the task force to solicit regional and local involvement in the prioritization of support. If you were to ask, for example, our Kawerak Board of Directors to identify what villages in the region had significant erosion and flooding problems that were in immediate need of assistance, the answer would not be the list contained in the report.

We recommend that the work group be tasked with developing recommendations for consideration by Congress and the State of Alaska—to streamline the planning, application, award and management of funds and technical assistance to provide coordinated, collaborative, non-duplicative and timely support.

Federal and State agencies all have different planning, applications, grant accounting, management, match requirements, fiscal and programmatic reporting requirements associated with their assistance. I'm surprised that anything gets done in rural Alaska given the complexity of the various statutes, regulations, and applications that small rural communities must successfully navigate and contend with in order to access assistance from the federal and state governments. There is a certain population threshold at which municipalities and boroughs can manage and inter-act effectively with the federal and state governments on complex engineering projects. Many villages in Alaska do not meet those thresholds and require assistance even to know what assistance is available and how to go about accessing it. I stress assistance in a timely fashion. I understand the Corp informed Shishmaref in 1953 that it would be cheaper for them to relocate than to construct a seawall. Well, here we are 51 years later—and they haven't moved yet! Timeliness is of concern given agencies reluctance to invest resources in communities that may move at some remote point in the future.

In reviewing the Table 4 in the GAO report, the List of Federal Programs That Can Address Problems Caused by Flooding and Erosion, I was surprised to see that GAO included the BIA Roads Maintenance and Housing Improvement Programs as possible sources of funds to address erosion and flooding issues. The Alaska Regional Office budget for the BIA Roads Maintenance program for the entire state is $300,000. The entire Alaska Regional Office budget to construct or repair homes is only $4.1 million. Our region's share of those funds for fiscal year 2004, is only $350,000. With this funding, we are able to construct 3 homes.

We encourage the Corp of Engineers to amend their cost/benefit analysis process to provide consideration for the protection of and value of subsistence resources available at that location.

Some of our village sites have been continuously occupied for 4,000 to 6,000 years. The reason we have occupied these sites is that the sites themselves are very rich in natural resources upon which we depend. A good example is Little Diomede.

The village of Little Diomede is located on a very small, steep island about 40 miles off the tip of the Seward Peninsula between Alaska and Russia. They have a population of about 150 people. Little Diomede is situated there because of the proximity to subsistence resources. There are huge migrations of whales and walrus through the Bering Straits spring and fall. Residents are able to fish and hunt for seals year around and crab are readily available. Hundreds of thousands of seabirds nest on the island each spring—eggs and birds are taken for subsistence purposes. Edible plants grow on the island and are harvested by villagers. While Diomede is a wonderful location to access subsistence foods, it's extremely difficult to safely transport people and goods to and from the community.

Little Diomede does not have an airport, they have a heliport. The U.S. Postal Service contracts with Evergreen to deliver mail and small freight, once a week via a helicopter during the ice free months. Mail has priority on the helicopter, passengers are a secondary concern. Individuals trying to get to Diomede can sit in Wales for weeks, trying to get home with limited space available on the helicopter, weather—and the once a year mechanical inspection of the helicopter. When the sea ice freezes thick enough and doesn't float away with the current, (January-February?) residents of Diomede construct an ice runway on the sea ice. At that point, small computer airlines provide daily service until the runway floats away (which is usually late April-mid May). Diomede residents travel back and forth to the mainland during the ice free months via small 16–22 foot boats. Diomede does not have an erosion or flooding problem—they have what I consider to be an access problem.

Because Diomede does not have a docking facility and freight barges have had to wait for calm weather to offload, barge companies are very reluctant to barge freight into Diomede. The only barge that now goes into Diomede on an annual basis is the Crowley fuel barge. I understand a private individual in Nome occasionally hauls freight to Diomede via a small landing craft. Last summer, Rural Cap chartered a fishing boat to bring housing renovation materials to the island. Other then that, Diomede residents either have to airlift freight in during the time they have

an ice runway, fly it in via the helicopter if the item(s) will fit in a helicopter—or transport items to the island in their own personal boats. This can have fatal consequences—as happened in 1998 when a heavily laden boat disappeared between Wales and Little Diomede. Two boats departed Wales, one boat made it—the other didn't. Six lives were lost.

Little Diomede could benefit tremendously from a docking facility, but under earlier analysis by the Corps, they did not qualify under the cost benefit analysis. Even if they had, given that Diomede has a population of 150—of which 46 percent are children and a subsistence-based economy, they would not be able to meet the Corps match requirements. Unfortunately, our small city governments have little tax base and do not receive municipal assistance from the State of Alaska. Our tribal governments do not have taxing authority. Capital improvements are dependent on outside funding. I understand, thanks to direction by Senator Stevens' office, that the Corps is re-evaluating the situation and that language has been incorporated into H.R. 2557 that would address this specific situation. I encourage members of Congress to support this provision.

I bring Diomede up because this to me is a situation where exceptions should be made. The Corps funding process needs to provide assistance in those situations where no other options are available. If Diomede had a docking facility, they could bring in freight and passengers at a substantially reduced cost during the ice free months.

We encourage the Corp of Engineers to set up a process whereby communities can request that the match requirement be waived; to waive the local match requirement when the local government(s) are unable to contribute; and provide for an appeal mechanism so that the decision can be fully considered.

And in closing, we encourage Congress to make funds available so that these very real needs can be addressed on a phased basis.

Thank you for the opportunity to testify today.

Chairman STEVENS. Myron, good morning. Myron Naneng is president of the Association of Village Council Presidents. We're glad to have your testimony.

STATEMENT OF MYRON P. NANENG, SR., PRESIDENT, ASSOCIATION OF VILLAGE COUNCIL PRESIDENTS

Mr. NANENG. Good morning, Senator, and good morning to the distinguished guests who are here to talk about the flooding and erosion problems within our State. Thanks for coming and hello. If you were in a group, it would probably translate, what's up?

I would like to thank you for giving me the opportunity to testify before you on some of the problems in the Yukon/Kuskokwim Delta. My name is Myron Naneng. I'm the president of the Association of Village Council Presidents. I have a consortium of 56 villages on the Yukon/Kuskokwim Delta. There are many problems that are occurring in the villages regarding flooding and erosion.

On an annual basis during springtime on the river system, the Kuskokwim and Yukon, we used to have floods there because of ice conditions. Because of the weather changes or climate changes, we haven't had one major flood within the Lower Yukon or Kuskokwim since about 1985, but we still do have floods that affect our villages. That does not stop the erosion that's still occurring in the villages.

The village of Newtok is one prime example of a village that needs to relocate to another site because of erosion. Other villages are also looking at long-term impacts of erosion. In the village of Hooper Bay last week they had a meeting regarding the airport. They built that airport back in 1968 when I was still running around not knowing what's on the horizon. The runway is now starting to get shorter. Every year they're doing mitigation of the runway. They're starting to discuss potential sites for a new location away from the beach.

Chairman STEVENS. What village?

Mr. NANENG. The village of Hooper Bay. So the DOT and the community got together, and they've been in discussions with them since January about a potential new site, but they got together to get local comments with DOT about a potential site that would be away from the coast. They talked about potential mitigation, meaning what can we do to prevent further erosion of the runway. They went to a lot of effort to try and prevent that erosion from happening, but it is still occurring.

Villages on the Yukon, especially those on the Lower Yukon at the mouth of the river, are more subject to erosion due to the soil conditions. The efforts made by some of the villages like Alakanak, Emmonak, Kotlik and Nunam Iqua regarding the erosion of the riverbanks. At Emmonak they put some rock piles on the riverbanks to prevent that. That's working, however, there's a site above the village that's slowly moving in to what was once the community dump site. So as they deal with what's in front of the village, they're also concerned about what's going on above the village. So that's one situation that has to be dealt with by the community and outside entities.

And Kotlik and Nunam Iqua are in the same situation. One of the things that has happened with many of the villages on the Yukon and Kuskokwim is new construction of homes and infrastructure is being moved away from the riverbank, which has been the life-sustaining and subsistence activity, sustenance of our people. So they are moving away from the riverbanks.

On the Kuskokwim erosion is pretty much evident throughout the river system due to the similar soil and river conditions that are occurring on the Yukon, just like on the Lower Yukon. I could say much about Bethel. You have the representative that will be discussing the Bethel issue. It's really no different that the rest of the small villages. The coastal villages on the Bering Sea between the mouth of the Yukon from Kotlik to Platinum are really no different as far as this erosion and flooding issue.

I have stated what Hooper Bay is trying to do in terms of relocating their airport, but the other villages, as many as 10 other villages are affected annually. The flooding occurs mostly during the fall time when the weather changes, but flooding causes erosion to occur similar to what you have heard of the effects on Shishmaref which is up north. So our villages are being impacted by that.

And one of the recommendations that I have is I think we need to go to each of the villages to identify what problems they are having in terms of erosion. What problems with the long-term impact with the flooding that occurs annually. Each village will identify their own problems and how it affects them, because if we go from one village which may be 10 miles away, they say the problem we have is different than the next village.

So, with that, I think one of the things that you've heard regarding some of the issues that they have identified, you know, a potential site, but there's more to do in terms of trying to stop or prevent the erosion from occurring. And I think that would require working together, being able to relocate to a site that's more suitable and will not affect them for long term.

So we need to involve the villages, those that are going to be directly impacted at the village level, in planning and implementation of how to address some of the issues that they have regarding flooding and erosion. You know, if we have a great big plan of someone coming in from the outside to say that this is the way the erosion is going to be addressed and this led to further damage, they may not identify some of the things that the people in the villages have seen and not included in the plans of how to address them.

So I'd like to thank you for the opportunity to write some information regarding the issues that we have with flooding and erosion. I will state that I'm not an engineer, but I think that the people that live in the villages have a better idea of how to address some of these concerns and might also be able to address some of the identifiable problems they have observed for many years.

Thank you very much.

[The statement follows:]

PREPARED STATEMENT OF MYRON P. NANENG, SR.

My name is Myron P. Naneng, Sr., President of the Association of Village Council Presidents. The Association of Village Council Presidents is a tribal consortium that represents 56 villages on the Yukon/Kuskokwim Delta in Western Alaska.

First, I would like to thank you for this opportunity to make a presentation regarding the problems of the floods and erosion that is effecting our numerous villages on the Yukon/Kuskokwim Delta.

Floods occur on an annual basis and this is primarily caused by snow and ice conditions in the river systems, while on the coast, it is caused by weather. The floods occur on the coast during the fall season before winter sets in to freeze the lakes and sea on the coast.

However, erosion is more of a problem that faces many of the villages within the region, both on the coast and river systems. The village of Newtok is the prime example of a village within our region that needs to relocate to a new site. The location has been arranged by all stakeholders who have landholdings that would allow this now, however, the problem may be how to accomplish it.

Other villages are now looking at longer term impacts of erosion on their infrastructure. Take for instance, the airport in Hooper Bay. Over the years, the airport has gotten shorter due to erosion at one end. Now, it may eventually all be at sea, due to the erosion that is occurring along the whole length of the runway. The village corporation, and the local community are having planning meetings with State of Alaska, Department of Public Facilities and Transportation to identify a new site for the airport that is far removed from the coastal erosion.

Villages on the Yukon River, especially those near the mouth of the river are more subject to erosion than those further upriver. This is more due to the soil and tundra that the villages are located on. Villages of Alakanak, Emmonak, Kotlik and Nunam Iqua are slowly eroding on the riverbanks. At Emmonak, rocks have been placed on the riverbank to slow the erosion down and it is showing some success. However, a site above the village is eroding that may cause some concern for the village eventually. Alakanak is in a similar situation, with erosion eating away some land front along the river. Whatever can be used to slow the erosion has been placed on the riverbank. Nunam Iqua and Kotlik face the same problem of eroding riverbank.

On the Kuskokwim River, the villages of Upper/Lower Kalskag's, Tuluksak, Akiak, Akiachak, Kwethluk, Bethel, Napaskiak, Oscarville, Napakiak, Tuntutuliak, Eek have erosion problems. Other villages that are in the tributaries are also affected by erosion. Bethel has been addressing the problem with a seawall that extends most of riverfront, and Kwethluk has placed sand bags in areas that are considered problematic.

Coastal villages are not exempt from the problem as well. Quihagak, Kongiganak, Kwillingok are also having erosion issues. However, these villages are affected by floods in the fall that are similar to those that affect Shishmaref, but not to as great extend as that village.

A survey of erosion problems should be done with each village. Understanding the seasonal impacts, such as the spring floods in the river systems, with ice has an

impact on the riverbanks. Fall flooding and tidal impacts along the coast have more of an impact on coastal villages. However, each village has its own identifiable problem, that causes the erosion that is part of the eco-system and villages need to be participants in planning and addressing the erosion problem.

Thank you for the opportunity to present information on the problems of erosion. Since I am not an engineer, I will not suggest how to deal with these erosion problems, but would highly recommend that who ever is going to be working on these that local input be garnered to the maximum extend possible. Have a great stay here in Alaska, and if you have come back for a short time, welcome back and if you're a first time visitor, welcome.

Chairman STEVENS. Thank you very much. If the Senators will look at the map that we have provided, the A, B, C, D areas are between the Yukon and Kuskokwim, the lower river is the Kuskokwim and the upper is the Yukon. It has 56 villages in that area. I think this is the area that probably has the worst flooding problem as compared to those that are on the shoreline that have the erosion problem, primarily from the sea, but the erosion is the same on the rivers even though there's no flooding, right?

Mr. NANENG. Yes. One thing I would like to add is when you go to each and every village, like Russian Mission on the Yukon and Kuskokwim, you will see these measuring—what they call the measuring tape type things where they show 5 feet, 6 feet, all the way down to 4 feet. And it shows what they consider to be the flood levels and how high the water gets when it's threatening villages.

Chairman STEVENS. There's a photo right now up there on erosion. Because Senator Murkowski has to leave, let me yield to her first. Senator Murkowski.

Senator MURKOWSKI. Thank you, Senator Stevens. I appreciate that courtesy. As you well know, Myron, when I was out in the YK Delta last summer, I had an opportunity to look at the erosion in some of those river delta communities. We did see the measurements in every community. I don't think there was a single community that I visited of the 12 or 13 where we didn't see evidence of flooding. The high-level mark unofficially on some building or whether going down on the riverbank itself. So it was very apparent, very visible as we know.

Just listening to the testimony of the four of you, there's a common theme here. Loretta, you mentioned just the bureaucracy that you have to deal with with the Corps and all the hoops and hurdles that need to be jumped, but I also heard a request, if you will, for an assessment of what we have out there. Representative Joule, I noticed in your testimony under your proposal for possible solutions, you suggested adopting of a statewide erosion plan, which includes an assessment of the villages.

I would ask the panel, whether or not there is an informal assessment, whether with, Myron, in your area, is there a regional assessment of the status of erosion, or is there any coordinated effort at this point either at the local or State level that you are aware of? I throw that out to all four of you.

Mr. JOULE. Senator Murkowski, at the State level, as I stated, there's—basically we have to wait for a declaration of some sort. We're aware of areas that will have a problem, but generally because we don't have State policies in place, we're kind of hamstrung to do anything until the declaration has been declared of some sort. So we're pretty much in the reaction mode.

I'll let the other panelists speak more to their own. I will state that sometimes opportunities present themselves and with the expertise and testimony that we've had and also in some of the work that we're currently doing with the current administration, we can take a lot of this information and begin the ground work so it can happen on a statewide level.

Senator MURKOWSKI. Anybody else want to add to that?

Mr. NANENG. Senator Murkowski, there is no coordinated effort that I know of to identify the concerns regarding the flooding and erosion. Like Representative Joule says, the only time they start—have a major concern about it is when major flooding or erosion is taking away infrastructure in the community.

Senator MURKOWSKI. So there is no preemptive effort; it's all crisis management.

Mr. AHMAOGAK. I'll try to answer your question in terms of whether there has been an assessment. At the local level we do our own assessment in terms of erosion and mitigation plans that we know are the best of our level, but there is poor coordination at this time in terms of erosion practices and why, when, what parts of it. For our part from the North Slope, it's done entirely on our own. No coordination at the State, no coordination at the Federal level, just to answer your question.

Studies have been conducted at our own level, but nobody at the State or Federal agencies coordinate or help us in our effort.

Ms. BULLARD. Just one comment. If you can move houses fast enough so they don't get damaged, therefore you don't have a disaster, therefore you don't get assistance. That's kind of what folks are faced with. You move stuff fast enough, you don't have a disaster.

Senator MURKOWSKI. Mayor, I wanted to follow up on your comments. First of all, as far as the Barrow research facility, I had an opportunity to talk with you folks up there about that and all the promises that that holds. So I'm looking forward to working with you to make that a reality. You mentioned the memorandum of understanding that Barrow has insofar as a mitigation plan, but that you're the only community up there in your area that has a mitigation plan.

Other than the cost and meeting the 50-percent cost sharing, what are the other barriers to working out a mitigation plan that the other villages have up on the Slope there? Is it just the cost issue, or are there any other factors involved?

Mr. AHMAOGAK. I don't think it's purely on a cost issue alone. I think it goes a lot more than that. Qualifications to meet their stringent requirements to be able to qualify as a village, to be able to partner with the Army Corps of Engineers is really strict and difficult to try to achieve and convince them.

We've attempted numerous times to try to enable some of our villages to be at it. We've never been able to do so. It's not just cost. Their requirements are placing them as part of the mitigation plan and to pay 50 percent, all of those sort of requirements are very difficult. We've done it only for Barrow.

Senator MURKOWSKI. Why was Barrow able to be more successful with it than, say, any of the other villages?

Mr. AHMAOGAK. We took it one step further and allowed for some technical research, scientific advice, and those requirements to meet a lot of the strict requirements. I can't per se right now pinpoint what those difficulties are, but we couldn't convince the Corps to accept the other two villages, to be under the Corps of Engineers.

I think the qualifications in place up there to be included as a mitigation plan, their requirements are very strict and difficult at best to achieve. We're willing to work with the villages by all means to help them out, but it's the Corps of Engineers that keeps saying no, no, no.

Senator MURKOWSKI. Ms. Bullard, you had mentioned using the BIA roads money in an attempt to use this as the match, and I appreciate the dilemma that that puts you in, and a decision as to whether or not to utilize all those monies for something like feasibility and then realize you have nothing available to do the preventive maintenance work to be done right now in order to stop it, whether it's putting rocks out on the banks or what have you.

What else can we do? I'm concerned because the problems that we're talking about here—it's not as if you've got a different situation in different regions of the State. Sounds like it's pretty much uniform across the board. We don't have the ability to meet the match. We're dealing with a Corps that is certainly well intentioned, but you've got a bureaucratic process that is difficult to negotiate at best.

You have suggested that you think that through this working group you can make some headway, but really where do we go? If we don't have the money and we're dealing with a level of bureaucracy that can't be penetrated, what do we do?

Ms. BULLARD. My suggestion is that a process be set in place whereby the matching requirement can be waived and that, you know, these communities need to be helped and they don't have the money, many of them don't have the money.

Senator MURKOWSKI. But it sounds like it's more than just the money. As the mayor has indicated, the cost share is a big factor, but perhaps not the only factor. How do we get beyond the dollar problem that we have, but also in working things out with the Corps so we can make some progress?

Ms. BULLARD. I think that, again, perhaps this work group could develop recommendations and consideration by Congress in terms of streamlining the process, streamlining the application process, the money management process, so that you can put those resources together. For example, right now you've got this agency doing this little piece maybe, if we can get them to do it, and someone over here doing something entirely different. They all have different qualifications in terms of their sharing funds.

I'm surprised anything gets done in the bush because it's all so complicated. Trying to drive these processes from a community of 200, 300, 400 people. It's very difficult.

Mr. AHMAOGAK. If I could interject to your question. In light of—I realize there's a lot of funding needed here to do a lot of mitigation. We sense that all across Alaska—relocations for the storm surges. But I think the villages and the regions outside of rural Alaska are in dire need, and like I stated, my suggestion is that

we need help when we declare an emergency. That's the first and foremost thing, that when we need help, we need help.

That would be a big plus on our part in the event we don't get mitigation funds. We're still vulnerable to coastal erosions and disaster preparations and all what have you. But science, I believe, is one effort that, like what we suggested before with global climate change and the reason why we wanted to do it is to get the baseline data on what is really happening out there.

The first and foremost thing is if science can be had, then perhaps maybe as a tool that we can find out what is the best cost benefit that we can do to reduce the cost to do the mitigation plan. We don't have that technical expertise per se. It will certainly help us out if we have the best coastal erosion people in the world to help us and say, hey, we can help you design something that would be cost effective and economical.

We don't have any of those resources. I would highly suggest that something like this be looked at from our standpoint. It would be cheaper for the Federal Government and at the State and local level. We don't have expertise like that at the State; we need that. That's only a small part of what needs to be done before mitigation plans.

Senator MURKOWSKI. Mr. Chairman, I regret it, but I am going to have to excuse myself. Thank you for bringing this very important hearing and inviting so many qualified speakers.

Chairman STEVENS. Thank you very much, Senator.

Senator Burns.

Senator BURNS. Thank you, Mr. Chairman. I've been just sitting here and listening to the conversation and the challenges you have in your villages, especially along the Yukon River. It's been our experience in Montana, these darn rivers go where they want to go, and no matter what the conditions are around them, we're going to have times of flooding and times of low water and these kind of things. But I was interested in Ms. Bullard's comments that sometimes when you try to coordinate an area as large as you have to deal with here and as many challenges as you have, it's kind of like herding calves on horseback.

You would operate really well in Washington, DC, which I still maintain is 17 square miles of logic-free environment. Whenever you've got to coordinate, especially between bureaucracies; you've got the BIA, you've got the Department of the Interior, you've got the Corps of Engineers, and then you've got your State people who have specific ideas on how we're either going to try to control erosion here or relocate or whatever for what's happening.

I happen to believe that we've got a situation that is both environmental and cyclical at the same time. Those are very serious challenges. The chairman of the Appropriations Committee sitting over here on the right has made a comment that sometimes these agencies are bound by law on what they can do, so we're going to have to do something in Congress to change some of the ways we react to your part of the world and Mr. Naneng's part of the world because there's different circumstances.

Then Mr. Joule has got to coordinate the whole thing. So it's very interesting, very interesting dialog here, and I don't have a specific question. These hearings are very, very good for me because it's

hard for us to fathom the challenges you have coming from the Lower 48. Because you have—it's a different world. I realize that. I've been here many times. I've always understood it. We'll have to deal with it.

Sometimes Congress only deals with disasters and catastrophes. That's what changes quicker and sometimes in the wrong direction than any other time. We react to different losses at different times. Thank you for your testimony this morning. I appreciate that very much. Thanks for being candid with us. You've been very candid and very realistic about the challenges that you have. Thank you.

Chairman STEVENS. Senator Sununu.

Senator SUNUNU. Are there any examples of emergency response or mitigation in the villages with which you work that have been successful? Where the emergency response was well coordinated, organization was effective, or specific mitigation projects that have been built or constructed either with a State, Federal or local initiative that's been successful that we should look at as a model of what might be achieved? Mr. Mayor.

Mr. AHMAOGAK. Thank you. Good question. We do have—we wrote up our own emergency disaster standard operating procedures at the local level including the input of all the villages, so it's well coordinated just for our region, that we have laid out numerous procedures that are there in case we have to declare a disaster and all resources are certainly there at the local level. But then outside of that, we have nothing.

And I think the State and local agencies need to work closely with these localities that have written these plans and to fit in and coordinate much more so and not have even copies of them if they can. We do have some small minor grant funds that we have to apply for that are highly competitive in writing these things. It's really a competitive grant, and that's the process we had to go through to write our own disaster coordination plan and standard operating procedures.

I think it should be suggested that this be much more freely resources available so that all the regions and all the villages not compete for this. It doesn't make any sense. Make funds available to write their plans. At the local level, once they have their plans at the State and Federal levels, disaster plans, in terms of mitigation that you should use as a model, that's a very difficult question. Financial resources are very limited. You've heard it all across here that we don't have the resources with the budget cuts and the economy going down, I mean, that's very difficult.

We would like to have the resources and make a lot of suggestions at the local level and to the State agencies and Federal agencies and try to set that model, but it's not all coming together well. We're entirely on our own, so to speak, out there when we have situations like that. But we're willing to attempt to do that from the North Slope, to build a model that's something that can really work. That's how I would answer your question.

In terms of mitigation, Army Corps is just one example where attempts to see how that's going to play out with planning and design and matching capital grants and the engineering that's going to happen and the resources that's going to be made available, like gravel to do the mitigation. I'm trying to see if that's going to be

a worthwhile model. It takes, I think ironically, a 6-year period working with Army Corps of Engineers from the planning stages to engineering to construction. By that time, you have 6 years of storms. So I can't answer that question. This is the first model we have attempted at the local level.

Senator SUNUNU. That's in Barrow?

Mr. AHMAOGAK. That's in Barrow, that's right.

Senator SUNUNU. Mr. Naneng.

Mr. NANENG. It takes a Governor or someone higher up to declare a disaster before anything happens, before a disaster is responded to. For instance, out in Bethel, Governor Knowles' declaration of disaster took time to get money from Congress to address the seawall, the erosion of the seawall. That applies in the same way to each and every one of the villages.

Senator SUNUNU. Thank you.

Senator BURNS. Could I ask the mayor a question? The storms that you have alluded to, were they summer storms?

Mr. AHMAOGAK. Pardon me?

Senator BURNS. The storms you've alluded to in the testimony you had, were these storms in the summer or winter?

Mr. AHMAOGAK. These storms are happening mostly in the fall time, like October.

Chairman STEVENS. Well, I hope you are all familiar with the study that the GAO made. We would like the GAO to review this. They've made some great suggestions, but there are some alternatives there. I would appreciate if you would give us your opinion concerning their suggestions. I do think, George, your concept of these baseline studies is really, really sound. We must do that. We must know what we're working against.

The testimony we heard yesterday about the cyclones, the winter cyclones is rather startling. And if that's a true prediction, we're going to start getting more winter storms. That will be difficult to handle in your part of the State. There's no question about that. I would urge you to take a look at this. We've got extra copies back there. Give us ideas as to what options they suggest you feel are best. They have made their suggestions based upon past reactions in other parts of the country.

I do think that Lisa's suggestion yesterday that we try to set up an authority to deal with the erosion/flooding control made some sense. Whether that should be a State authority or a Federal authority or something like a Federal/State authority needs to be examined. Again, we would like to have your suggestions on that too. We do thank you very much for coming and for your participation in this hearing.

It is something we have to pay some attention to because every indication is, unfortunately, things are going to get worse in terms of this area of flooding and erosion.

We will now take a 10-minute recess while we get ready for the next series of witnesses. Our next panel is Mayor Hugh Short, Ms. Vorderstrasse, Mr. Ivanoff and Mr. Rock.

Thank you for coming very much. Good morning. Glad to see you. Call on the mayor of Bethel, Mr. Hugh Short, first. Let me again ask you to keep your statements to 8 minutes or less. Two other panels are left this morning. Mr. Short.

STATEMENT OF HUGH SHORT, MAYOR, BETHEL, ALASKA

Mr. SHORT. Thank you, Senator Stevens, Senator Burns and Senator Sununu. It's a real honor to be sitting here to provide my testimony to you.

First off, I would like to welcome you to Alaska and tell you a little bit about Bethel. The city of Bethel is located on the north shore of the largest oxbow along the Kuskokwim River. The lower Kuskokwim River is an active meandering river that travels through low-lying tundra regions to the Bering Sea. In a region without interconnecting roads, this river provides the principal transportation corridor for most heavy commodities including fuel.

Because of the river's active meander and low-lying terrain, it is susceptible to both active erosion and flooding. The Kuskokwim River is the key to economic self-sufficiency in our region, and Bethel serves as the host that can promote economic self-determination.

There's about 6,000 residents in the city of Bethel. We serve as the regional hub for about 25,000 residents in the YK Delta. If you look in the GAO report, there's 56 communities; 49 of the 56 communities in our region are on that list of communities that are affected by flooding and erosion, so this issue is very close to the heart of many people in the region.

The location and growth of the city of Bethel is attributable to its being the farthest upriver location that can accommodate large ocean-going vessels. This governed the location of the U.S. Army Air Corps airbase developed during World War II. The port and the airbase would provide the necessary beginning infrastructure for many other large Federal Government in the 1950s, such as the White Alice communications facility, the regional IHS hospital and a large Air Force facility that was later converted to the regional BIA headquarters.

The community has always been challenged with active river erosion. In earlier periods, the 1960s through the 1970s, the community itself attempted to contain this erosion. I was born and raised in Bethel. I was born in 1973. My father is in the taxi cab business, and one of the first attempts growing up in the 1970s in Bethel was when a car was broken down, they would take it down to the bank and sit it on the beach there. I have pictures of hundreds of cars sitting on the beach of Bethel as an attempt of the community to try and deal with the erosion. In fact, there are postcards still floating around with that picture.

However, it was soon learned that the resources needed to effectively manage this were far beyond the means of the community. As a result, vast amounts of river frontage real estate were lost to erosion. In 1968 Congress, by resolution, directed the Corps of Engineers to investigate this erosion problem. Unfortunately, Bethel found itself in a similar status as many of the smaller communities now being mentioned in the GAO December 2003 report—the cost of an effective erosion control project far exceeded the required cost/benefit ratio.

It would be another decade, 1978, before Congress again directed the Corps, through a continuing resolution of its original 1968 resolution, to again investigate the erosion problem. Tragically, throughout the previous decade, a significant amount of irreplace-

able land was lost. However, because significant large infrastructures were now being threatened, including the bulk fuel facility and the IHS hospital, the Corps determined that an effective erosion containment project would have a positive cost/benefit ratio.

As a result of this, in the 1980s and 1990s, through both State and Federal funding, the 8,000 linear feet of erosion protection was put into place. Since this construction, no further uplands have been lost. Just a side note that's not included in here, the city of Bethel currently spends approximately $300,000 per year in maintenance of that seawall and erosion protection.

As mentioned in the report, the city again is engaged through the Corps in rehabbing, extending and improving another 1,200 feet of this wall system.

We certainly support the recommendations being offered in the December 2003 GAO report. Particularly, the recommendation that social and environmental factors be considered in cost/benefit analysis and the cost/benefit requirement relief proposed in H.R. 2557. If such had been available to the city during the 1960s and 1970s, literally hundreds of thousands of dollars of valuable land could have been saved, as well as homes.

Additionally, we support the recommendation that the Denali Commission serve as the clearinghouse for future erosion and flooding support. The Denali Commission has set the bar for coordination and intervention of major projects in rural Alaska.

In conclusion, it is also important to mention that a significant portion of the city's downtown is situated in a FEMA-determined special hazard flood area. The city has been in the National Flood Insurance Program since 1974. It historically maintains a rigorous management posture when it comes to development within this special flood hazard area. We believe the community's flood claim history over the past decades bears this out.

A side note, Bethel has the resources, Bethel has the infrastructure and the population to support a relationship with the Corps of Engineers. We have the capabilities, we have staff within the city to do that. Unfortunately, many of the communities that Mr. Naneng spoke about earlier do not have those resources.

The best example that I can see of a successful Denali Commission intervention probably has been health clinic construction in the State of Alaska. If you look at the amount of clinics constructed in the last 5 years through the Denali Commission and the coordination that the Denali Commission has provided, it has allowed smaller communities to be able to access that kind of scale. There's resources there, there's the staff at the Denali Commission, ANTHC is available.

Thinking about Senator Murkowski's comments earlier, I believe that if an approach was taken with the erosion and flooding to allow the Denali Commission or another organization to be the clearinghouse to be able to provide that technical assistance to small villages and someone was on the other end of the line to answer that phone and help them, I believe that will go a long way, along with relationships with regional organizations.

If you look at the most successful areas, regional organizations provide that infrastructure to be able to get the information and type of assistance out there.

So, I thank you. I hope I haven't gone over the 8 minutes. I'd be willing to answer any questions later on.

Chairman STEVENS. Thank you very much, Mr. Short.

[The statement follows:]

PREPARED STATEMENT OF HUGH SHORT

Dear Senator Stevens and members of the Committee on Appropriations, thank you for providing the City of Bethel and other rural communities affected by flooding and erosion the opportunity to testify about this extremely important issue.

The City of Bethel is located on the north shore of the largest oxbow along the Kuskokwim River. The lower Kuskokwim River is an active meandering river that travels through low lying tundra regions to the Bering Sea. In a region without interconnecting roads this river provides the principal transportation corridor for most heavy commodities including fuel. Because of the rivers active meander and low lying terrain it is susceptible to both active erosion and flooding. The Kuskokwim River is the key to economic self-sufficiency in our region, and Bethel serves as the host that can promote economic self-determination.

The location and growth of the City of Bethel is attributable to its being the farthest upriver location that can accommodate large ocean going vessels. This governed the location of the U.S. Army Air Corps airbase developed during WW II. The port and the airbase would provide the necessary beginning infrastructure for many other large federal government projects in the 1950's such as the White Alice communications facility (part of NORAD), the regional IHS hospital and a large Air Force facility that was later converted to the regional BIA headquarters.

The community has always been challenged with active river erosion. In earlier periods (1960's through the 1970's) the community itself attempted to contain this erosion. However, it was soon learned that the resources needed to effectively manage this were far beyond the means of the community. As a result vast amounts of river frontage real estate were lost to erosion. In 1968 Congress, by resolution, directed the Corps of Engineers to investigate this erosion problem. Unfortunately Bethel found itself in a similar status as many of the smaller communities now being mentioned in the GAO December 2003 Alaska Native Villages report—the cost of an effective erosion control project far exceeded the required cost/benefit ratio.

It would be another decade (1978) before Congress again directed the Corps, through a continuing resolution of its original 1968 resolution, to again investigate the erosion problem. Tragically, throughout that previous decade, significant amounts of irreplaceable land was lost. However, because significant large infrastructures were now being threatened (bulk fuel facility and the IHS hospital compound) the Corps determined that an effective erosion containment project would have a positive cost/benefit ratio.

As a result of this in the 1980's and 1990's, through both state and federal funding, the 8,000 linear feet of erosion protection now in place was erected. Since this construction no further uplands have been lost to erosion.

As mentioned in the December 2003 GAO report, the city is again engaged through the Corps in rehabbing, extending and improving another 1,200 feet of this wall system.

We certainly support the recommendations being offered in the December 2003 GAO report. Particularly the recommendation that social and environmental factors be considered in cost/benefit analysis, and the cost/benefit requirement relief proposed in H.R. 2557. If such had been available to our city during the 1960's and 1970's, literally hundreds of thousands of dollars of now irretrievable land could have been saved.

Additionally, we support the recommendation that the Denali Commission serve as the clearinghouse for future erosion and flooding support. The Denali Commission has set the bar for coordination and intervention of major projects in rural Alaska.

In conclusion it is also important to mention that a significant portion of the city's downtown is situated in a FEMA determined Special Hazard flood area. The city has been in the national flood insurance program since 1974. It historically maintains a rigorous management posture when it comes to development within this special flood hazard area. We believe the communities flood claim history over the past decades bears this out.

Thank you again for your interest in erosion and flooding in Alaska Native villages. Please let me know if you have further questions.

Chairman STEVENS. Ms. Vorderstrasse.

STATEMENT OF EDITH A. VORDERSTRASSE, MAYOR, BARROW, ALASKA

Ms. VORDERSTRASSE. Good morning, Senator. Mr. Chair and members of the committee, thank you for giving me the opportunity to testify on behalf of our community, Barrow.

I was born and raised in Barrow. I have seen many changes to our coastline. As a child, I got to enjoy the vast coastline we once had. The coastline was once our playground, a place for celebration of our communities. For those of you who may not understand what nalukataq is, it's when we have a successful spring whale hunt and the crews select their day of celebration, a gathering place of our successful hunters where they butchered their harvest.

We in Barrow have always lived near the sea because we depended on the sea for our livelihood. Particularly, when we lived in sand houses and had little in the way of infrastructure. However, in the last hundred years we have put down roots that did not foresee the erosion of our coastline. We have millions of dollars in infrastructure in harm's way. As the ice on the Arctic Ocean grows more fragile, so does our coastline.

We are experiencing more frequent storms as early as July, and the ice is nowhere to be seen for at least 150 to 200 miles. We are at a crossroads. Is it practical to stand and fight our mother ocean, or do we surrender and move? Do we sacrifice our beautiful beaches to concrete and barriers to our livelihood or do we pull back?

One way or the other we have to make an attempt to salvage or plan new facilities to take the places of the ones that currently exist. We are very fortunate that the North Slope Borough was established in 1972 where the Borough took most of the municipality's powers so that they can provide for our community, and we work very closely with Mayor Ahmaogak. Mayor Ahmaogak provided you wonderful information today with the history of the storms and erosion, the riverbanks and their erosion. It's not just our beach, but it's also the rivers where our ancestors went out hunting.

My parents have had to move their hunting cabins several times away from the rivers. Sitting here listening to all the different panels from yesterday and today, we have come to an understanding of how we all need to work together. And I want to thank you for recognizing the bureaucratic dilemma that we are in when we have a storm in trying to address the needs and trying to declare a disaster.

I think as we all sit here listening to all the testimony, questioning the scientists talking about the weather changes, it has brought us to a closer relationship to where we as community leaders, as our legislature—and how we all need appropriations from you, from the United States, in order to address these needs that we have in our communities. I just would like to thank the Senate Appropriations Committee for coming to Alaska to listen to our concerns, and hopefully that there will be enough money appropriated in order to address some of these.

Some of our communities have a much greater serious need, and I just would like to thank all of you for coming here and listening to our concerns. Thank you.

Chairman STEVENS. Thank you.
[The statement follows:]

PREPARED STATEMENT OF EDITH A. VORDERSTRASSE

Mr. Chairman and Members of the Committee, thank you for giving me this opportunity to testify on behalf of my community Barrow.

Born and raised in Barrow, Alaska, I have seen many changes to our coastline. As a child I got to enjoy our vast coastline we once had. The coastline was our playground, a place where celebrations of the community take place such a Nalukataq (summer celebration of the successful whaling captains and their crews after the spring hunt), and gathering place of our successful hunters where they butchered their harvest.

We in Barrow have always lived near the sea because we depend on the sea for our livelihood. This was practical when we lived in sod houses and had little in the way of infrastructure however in the last hundred years we have put down roots that didn't foresee the erosion of our coastline. We have millions of dollars in structures and infrastructure in harms way. As the calming hand of ice on the Arctic Ocean grows more fragile so does our coastline. We are experiencing more frequent storms as earlier as July and the calming hand of the ice in nowhere to be seen for it is at less 150 to 200 miles away. We are at a crossroads. Is it practical to stand and fight our mother ocean? Or do we surrender and move. Do we sacrifice our beautiful beaches to concrete and barriers to our lifeblood or do we pull back? One way or another we have to make an attempt to salvage or plan new facilities to take the place of the ones that currently exist.

We as a community will need to make some difficult decisions in the very near future to address the above and we don't have the financial means to address it.

Sitting here listening to all the different panels from yesterday and today, we all have come to an understanding that we need to work together in order for us to accomplish the task that is before us. Organizations must be willing to restructure the application process so that communities will be able to qualify for the assistance that they need. Thank you for recognizing the bureaucratic dilemma we endure when our communities are in distress and need the assistance of the agencies during a storm or after the assessment of the storm.

Chairman STEVENS. Mr. Ivanoff.

STATEMENT OF STEVE IVANOFF, PRESIDENT, UNALAKLEET NATIVE CORPORATION

Mr. IVANOFF. Thank you, Mr. Chairman. Welcome back home. To Senator Burns and Senator Sununu, welcome to our State. We hope this is a very pleasant experience for you in the hope that you will make it back again.

I'll be speaking to you today as President of the Unalakleet Native Corporation and thank you for this opportunity. Unfortunately, our village is very experienced on both flooding and erosion issues.

Unalakleet is roughly 400 miles west of Anchorage. The site location was chosen for its access, quick and easy access to the subsistence resources in that area. This settlement has been in existence for over 2,000 years, as confirmed by an archaeologist. Historically, we have been host to several Federal agencies. We had an Air Force Base located 5 miles northeast of the village. We had White Alice communication site stationed 10 miles to the east, and we had an FAA site in the past.

These facilities have all closed down with the end of the cold war and modern technology. As a child, I was experienced with the floods of 1964 and 1974. We spent several days at the Air Force Base waiting out the storms with the other children, women, and others from our village while the men basically stayed back and watched the storms consume our community.

For 29 years we were fortunate to not have floods of this magnitude. However, we did see the normal fall storms that consumed

some structures and in my lifetime I have seen several buildings moved. Our community was successful in having a declaration of disaster from last year's fall storm. Unfortunately, we have yet to see these funds allocated, and meanwhile we continue to see with the storms that have been coming our structures and gabion wall erode slowly.

My comments are not intended to be critical of the National Resources Conservation Service or any agency involved in assisting us. We appreciate any and all of the services they have provided. I mention the NRCS because they have been the most receptive agency to be here in our needs. They have been good to work with and their interpretation is rural friendly, we feel, and we appreciate their work.

But in the month of November is when we have the storms in our area, as you saw yesterday the cyclones develop in the Arctic Ocean. Growing up we didn't see that. All of our storms historically came from the Bering Sea, but with the ice moving it's a new scenario.

In the late 1970s, after the flood of 1974, the State DOT built a road along the west side of the village, creating an access road between the airport and the business section of town, but more importantly a barrier between the community and the ocean. This has held safely for our structures for 29 years.

Erosion, the greatest erosion occurs at the mouth of the river. Additionally, erosion occurs along the beach. Erosion takes place somewhat in the springtime, but primarily with the fall storms. In 2000 the NRCS built us a retaining wall in our village beginning at the mouth of the river and stretching along the beach. It was a $1 million project. Without this wall we would have seen some structures in our communities, I believe, fall into the ocean. The retaining wall is good, but has room for improvement.

We were not allowed to improve on the contour of the land, but basically to be a pro-active measure, but with the guidelines we have to follow the contour of the land. The Native Village of Unalakleet working with this program built this, recognizing that the wall was too low in some areas, and we believe that the wall basically saved some of the buildings from structural damage. The above are considerations for future improvements.

They were left out of the original project due to funding constraints. We feel the life of this project has been diminished due to stringent funding guidelines. We are in desperate need of immediate protection from flooding and erosion. As you've heard before, we don't qualify for the projects under the Corps' interpretation of the guidelines. The State of Alaska has provided local match for studies by the U.S. Army Corps of Engineers in the amount of over $50 million and has yet to see a construction project of significance from this study.

Our village has been, and currently is active, in trying to make changes to these policies. However, we are frustrated with the hurdles that we face. Until there are changes in Federal policies or an exemption is made for underdeveloped States such as Alaska, we will remain vulnerable. While most of the revenue generated in Alaska is extracted from the rural areas, we still struggle for simple things such as safety. In rural Alaska subsistence is the biggest

driving force of existence and has not been accounted for in the benefit side of the policies. However, I understand that it is now being considered.

We have seen some successes with the construction of the roads and the gabion wall, but we need to eliminate the hardships that come with each disaster. Unfortunately, there are funds available for reactive measures, but little for proactive safeguards.

We are one of the youngest and the most underdeveloped States in the Union. This makes the job of our Alaska congressional delegation, and you, our Senate Appropriations Committee, a monumental task given Alaska's immediate needs, especially when compared to the existing infrastructure of the other States. Our wonderful State has a lot to offer, but we do need to make it a safe place for all, residents and visitors alike. We sympathize with the other communities facing their own flooding and erosion problems and realize there is no one-size-fits-all solution.

An elder from our village was telling us last week that he paid $19 for a roll of roofing paper and $102 to get it to our village, so his $19 roofing paper cost him $121.

In conclusion, I invite you to visit Unalakleet and see the threats we face. The Federal programs are not functioning the way they should and the way we think you intended. We appreciate the study done by the General Accounting Office released last December and urge Congress to implement its recommendations.

Again, thank you.

Chairman STEVENS. Thank you, Mr. Ivanoff.

[The statement follows:]

PREPARED STATEMENT OF STEVE IVANOFF

Welcome to our great State of Alaska. We hope this is a very pleasant experience for you, in the hope that you will come back again. I am Steve Ivanoff from Unalakleet and will be speaking to you today as the President of Unalakleet Native Corporation.

Thank you for the opportunity to testify on the flooding and erosion problems we have, and have had in our community of Unalakleet. Unfortunately, we are experienced on both of these issues.

Introduction—Background

Unalakleet is 393 air miles west of Anchorage on the easternmost part of Norton Sound. This location was selected to provide quick and easy access to the many subsistence activities that this area has to offer. It sits on a sand-spit between the Unalakleet River and the Norton Sound. This settlement has been estimated to be in existence for over 2,000 years. The population is approaching 800 with an Alaska Native population of approximately 85 percent, Inupiat and Yupik Eskimos, and Athabascan Indians. It is classified as a regional sub-hub, serving mail and freighting services for itself and four other villages. The Bering Straits School District central offices are located in Unalakleet serving 15 villages in the Norton Sound region, and a sub-regional clinic that provides medical services for Unalakleet residents and four other villages. Commercial fishing was the driving force of economics for decades but with the decline of the salmon stock and the crash of the herring market, Unalakleet has become a service providing community. A 6,000 foot runway was constructed in the 60's as our village was a host to hundreds of Air Force service men for a couple of decades having an Air Force base 5 miles northeast of the village. A White Alice site was also stationed 10 miles to the east, along with a Federal Aviation Administration facility, housing a number of workers and their families. These facilities were all shut down with the end of the cold war and modern technology. As a result of these services we still have contaminated soils being extracted from our subsistence grounds as I speak.

As a child I remember staying at the Air Force base for a few days during the floods of 1964, and 1974 along with the other youth, women, and elders from our village. Some homes, including ours, were removed from their foundations and many

others filled with water halfway up the walls during these floods. For 29 years we were fortunate to experience milder fall storms and did not have another surge of this magnitude until the flood of 2003. However, within those 29 years we did experience the normal fall storms and saw buildings moved to escape disaster and some structures consumed by the ocean. With their own resources the community tried to combat the storms with crude means but saw all of these temporary fixes overwhelmed by the ocean. The village agencies were successful in having Unalakleet declared a disaster from the flood of 2003. The funds have yet to be allocated that will cover the cost of the clean up and repair to the gabion wall. In addition, areas that had protective rock need to be restored. This flood filled yards and basements with seawater that made it over the wall. I had to have rock hauled in by a local contractor to divert the water surge around my home. The first load he hauled in was sand and dissipated in seconds but fortunately the rock quickly diverted the water.

My comments are not intended to be critical of the National Resource Conservation Service (NRCS) or any agency involved in assisting us. We appreciate any and all of the services they have graciously provided.

Flooding.—The month of November is when we have the storms that have threatened our community with water surges from the ocean. In the late 70's a road was constructed on the ocean side of the village serving two purposes. It provided an access route between the airport and the business section of the village, and more importantly, a barrier between the community structures and the ocean. This road is 0.9 of a mile long and had water surging over it only on the lower section on the southern end. This lower section of the road is roughly 2 feet below the high point of this road and would be more effective if the whole road were to be raised at or above this level. Another road was constructed in the 80's on the north-eastern part of the village providing an access road to the hillside and a barrier from the water surge. These two locations are different with the western side providing a relief from the pounding ocean waves.

Erosion.—The greatest erosion occurs at the mouth of the river, additional erosion occurs along the beach. This takes place during the spring thaw and the fall storms. In the year 2000, a gabion wall erosion protection project was constructed beginning at the mouth of the river and running along the beach. This 1,400-foot project was funded by NRCS in the amount of $1 million. The gabion wall is shown in the attached photos. This wall protected structures within the community during the November flood of 2003. The gabion wall is good, but has room for improvement, as we all know hindsight is 20/20. As a former site supervisor for this project I feel these improvements can be applied:

—The ends of a gabion wall needs to start and end at a solid base, this project should have been pulled in at the end to the existing road. Any structure should be back filled to eliminate the backwash that causes the loss of rock as observed. The plans did not call for backfill but we asked the site inspectors to have this done, fortunately they approved this otherwise a lot more damage would have occurred.

—The ocean side of the project should have had a toe constructed below the low-tide line on the beach. This would eliminate the undercutting we are now observing.

—A stronger wire mesh or alternate material should be used for the gabion baskets as we are seeing a high level of wear and tear from driftwood. We are concerned about the longevity of the wire mesh, as much of the coating on the wire has worn off, exposing the wire to the corrosive saltwater and accelerating rust.

—We were not allowed to elevate the structure, leaving us to follow the contour of the surrounding grounds. Elevating the wall would have eliminated the need for a declaration providing disaster assistance. The Native Village of Unalakleet and funding from a Kawerak heavy equipment training program, provided for the haul of additional rock for the top of the gabions. This additional material acted as a splash rail that saved some buildings from structural damage. These are considerations for future improvements. They were left out of the original project due to funding constraints. We feel the life of this project has been diminished due to stringent funding guidelines.

We are in desperate need of immediate protection from flooding and erosion. Based on current cost benefit analysis guidelines of the federal programs that address flooding and erosion we do not qualify for projects. The State of Alaska has provided local match for studies by the Army Corps of Engineers in the amount of over $50 million, and has yet to see construction projects of any significance from these studies. Our village has been, and currently is active, in trying to make a change to these policies. We are frustrated with the hurdles that we face. Until

there are changes in federal policies, or an exemption is made for underdeveloped states such as Alaska, we will remain vulnerable.

While most of the revenue generated in Alaska is extracted from the rural areas, we still struggle for simple things such as safety. In rural Alaska, subsistence in the biggest driving force of existence and has not been accounted for in the benefit side of the policies, however, I understand that it is now being considered.

We have seen some successes with the construction of the roads mentioned above and the gabion wall but we need to eliminate the hardships that come with each disaster. Unfortunately there are funds available for reactive measures but little for proactive safeguards.

We are one of the youngest and the most underdeveloped states in the Union. This makes the job of our Alaska Congressional delegation, and you, our Senate Appropriations Committee, a monumental task given Alaska's immediate needs, especially when compared to the existing infrastructure of the other states. Our wonderful State has a lot to offer, but we do need to make it a safe place for all, residents and visitors alike. We sympathize with the other communities facing their own flooding and erosion problems and realize there is no one size fits all solution.

In conclusion, I invite you to visit Unalakleet, and see the threats we face. The federal programs are not functioning the way they should, and the way we think you intended. We appreciate the study done by the General Accounting Office, released last December, and urge Congress to implement its recommendations.

Chairman STEVENS. Mr. Rock.

STATEMENT OF REX ROCK, CHIEF EXECUTIVE OFFICER, TIKIGAQ CORPORATION

Mr. ROCK. Mr. Chairman, members of the committee, I would like to thank you for the opportunity to testify in this important hearing today on behalf of our Tri-Lateral Committee which consists of our Native Village of Point Hope, the city of Point Hope, and Tikigaq Corporation. I am currently the Chief Executive Officer of Tikigaq Corporation and am testifying on behalf of the Tri-Lateral Committee.

Point Hope is the oldest, continually inhabited community in Northwest Alaska, which dates back to 600 B.C. Point Hope is recognized nationally as a culturally relevant site. Today approximately 850 residents call Point Hope home. Our population is primarily Inupiaq, or in the western culture referred to as Eskimo. We are part of the North Slope Borough and are a second-class city. Point Hope is a bowhead whaling community.

You might ask, why emphasize the fact that we are a bowhead whaling community? Our community has many traditions surrounding our whaling, and if there's one thing it has taught us, it is that working as one for our people, you can accomplish great things. Our whaling culture is so much a part of our daily life that our community synergy is defined by it. Our community has worked together on our flooding issues and now we need your help.

We've noticed a lot of changes in the weather patterns in Point Hope. The ice breaks up and leaves the shore a lot earlier than usual. We have always had ice until July and now it is gone the first week of June. In the fall the shore ice is late and often isn't there to protect the shoreline when the fall storms hit. Storms are earlier with larger and stronger wave patterns. Our underground ice cellars are not as cold as they used to be. Some cellars that were built in permafrost are now melting and are full of water during the summer.

Our beaches now have runoffs either from the ocean or from the lagoon or lakes, which makes the gravel a lot softer. Our runway

has been in jeopardy of flooding several times. Community members worry about evacuation in the event of flooding.

Over the past decade we realized that three separate organizations working to obtain any assistance for funding projects was cumbersome and likely to end unsuccessfully. Using common goals as our guiding factor, the Tri-Lateral Committee was formed in 2001. Quarterly meetings are held and hosted by the different organizations. A list of priority projects was created and the organizations have supported working together as a method to target legislation and assistance from the North Slope Borough, the State of Alaska, and the Federal Government.

The number one priority on the list is an evacuation road that would lead to higher ground in case of flooding. This was the primary concern of the community that came up at a variety of gatherings, from the Native Corporation's annual meetings to community meetings and gatherings.

Tikigaq relocated back in the late 1970s from the west side of our runway to where it is today due to extreme flooding. Today we still face flooding issues, mainly in the fall. The flooding occurs from strong winds blowing out of the West and Northwest creating large waves that bombard our North beach. Our North beach is about 12 miles long and the south side is 18 miles long. The water actually reached the North end of our runway last year. Flooding of the runway is a growing concern of our community.

One thing that I would note is that during last year's storms, the winds were blowing at 30 knots. If they were at 45, definitely they would have been flooding the runway.

Until last year we were able to push gravel with heavy equipment forming berms to stop the wave action. During last year's storms we weren't able to do this because our equipment began sinking in the gravel. This has never happened before. We were unable to use vehicles and equipment to help monitor the flooding. Simple things such as ATV four-wheelers sank into the gravel. That's never happened before.

Unlike prior years we didn't know how much water was actually coming over the beach into the lagoon due to the sinking problem. You may be asking, why is this a concern? The only way out of our community during these storms is to the East on a 7-mile road that leads to our freshwater lake source. We constantly monitor the road during each storm. If this road is cut off due to flooding, we are stuck with nowhere to go.

Potentially, all life and property would be lost. Sometimes during these storms the Kukpak River's outlet into the ocean becomes sealed, then both the river and ocean begin filling and flooding the lagoon compounding the problem. During the storms, people begin to panic and worry, especially when we are unable to even monitor the severity of the problem like last year. What is of great concern is the possible loss of lives if we don't get an evacuation road built.

How would building an evacuation road help our community? First and foremost it would save lives in the event of flooding. It will also provide access to an area where we would be able to build a new runway. We all know that it is just a matter of time before the current one is under water and we will need a new one. We ask that you help us plan and build an evacuation road.

Again, I would like to thank you for allowing my community to be a part of this important hearing. We look forward to hearing from you on behalf of our Tri-Lateral Committee. Our village extends an open invitation to all of you. Thank you.

[The statement follows:]

PREPARED STATEMENT OF REX ROCK

I would like to thank you for the opportunity to testify in this important hearing today on behalf of our Tri-lateral Committee which consists of our Native Village of Point Hope (tribal organization), the City of Point Hope, and Tikigaq Corporation (Native corporation). I am currently the Chief Executive Officer of Tikigaq Corporation and am testifying on behalf of the Tri-lateral Committee.

INTRODUCTION AND BACKGROUND INFORMATION

Point Hope (Tikigaq) is the oldest continually inhabited community in Northwest Alaska, which dates back to 600 B.C. Point Hope is recognized nationally as a culturally relevant site (National Historic Landmark). Today approximately 850 residents call Point Hope home. Our population is primarily Inupiaq, or in the western culture referred to as Eskimo. We are part of the North Slope Borough and are a second-class city. Point Hope is a Bowhead whaling community. In fact, our ancestors crossed the Siberian land bridge some 2,000 years ago to hunt bowhead whales.

You might ask why emphasize the fact that we are a Bowhead whaling community? Our community has many traditions surrounding our whaling and if there is one thing it has taught us, it is that working as one for our people you can accomplish great things. Our whaling culture is so much a part of our daily life that our community synergy is defined by it. Our community has worked together on our flooding issues and now we need your help.

The Problems in Point Hope

We have noticed a lot of changes in the weather patterns in Point Hope. The ice breaks up and leaves the shore a lot earlier then usual. We have always had ice until July and now it is gone the first week of June. In the fall the shore ice is late and often isn't there to protect the shoreline when the fall storms hit. Storms are earlier with larger and stronger wave patterns. Our underground ice cellars are not as cold as they use to be. Some cellars that were built in permafrost are now melting and full of water during the summer. Our beaches now have runoffs either from the ocean or from the lagoon or lakes, which makes the gravel a lot softer. Our runway has been in jeopardy of flooding several times. Community members worry about evacuating in the event of flooding.

What we have done as a community to address the problems

Over the past decade we realized that three separate organizations working to obtain any assistance for funding projects was cumbersome and likely to end unsuccessfully. Using common goals as our guiding factor, the Tri-lateral Committee was formed in 2001. Quarterly meetings are held and hosted by the different organizations. A list of priority projects was created and the organizations have supported working together as a method to target legislation and assistance from the North Slope Borough, the State of Alaska and the Federal Government.

The number one priority on the list is an evacuation road that would lead to higher ground in case of flooding. This was the primary concern of the community that came up at a variety of gatherings from the Native Corporation's annual meetings to community meetings and gatherings.

Tikigaq relocated back in the late 70's from the west side of our runway to where it is today due to extreme flooding. Today we still face flooding issues, mainly in the fall. The flooding occurs from strong winds blowing out of the West and Northwest creating large waves that bombard our North beach. Our North beach is about 12 miles long and the south side is 18 miles long. The water actually reached the North end of our runway last year.[1] Flooding of the runway is a growing concern for our community.

[1] Our runway lines up with the prevailing winds out of the Northeast. The problem with this is that you are not always able to land aircraft due to the crosswinds from the Northwest. This means that in certain emergencies we may not be able to use the runway to evacuate the community.

Until last year we are able to push gravel with heavy equipment, if needed, to help slow the wave action and protect the beach and the community.[2] During last years storms, we weren't able to do this because our equipment began sinking into the gravel, this has never happened before. We were unable to use vehicles and equipment to help monitor the flooding. Unlike prior years we didn't know how much water was actually coming over the beach into the lagoon due to the sinking problem. You may be asking why is this a concern? The only way out of our community during these storms is to the East on a 7-mile road that leads to our fresh water lake source. We constantly monitor the road during each storm. If this road is cut off due to flooding, we are stuck with nowhere to go. Potentially all life and property would be lost. Sometimes during these storms the Kukpak rivers outlet into the ocean becomes sealed then both the river and ocean begin filling and flooding the lagoon compounding the problem. During the storms people begin to panic and worry especially when we are unable to even monitor the severity of the problem like last year. What is of great concern is the possible loss of lives if we don't get an evacuation road built.

Conclusion

How would building an evacuation road help our community? First and foremost it will save lives in the event of flooding. It will also provide access to an area where we would be able to build a new runway. We all know that it is just a matter of time before the current one is under water and we will need a new one. Please help us plan and build an evacuation road.

Again I would like to thank you for allowing my community to be a part of this important hearing. We look forward to hearing from you and on behalf of our Trilateral Committee. Our villages extends an open invitation to all of you, know that you will be welcome in our community at any time. If you have questions or comments feel free to call either Rex Tuzroyluk, Jr., President of Native Village (368–2330), Ronald Oviok, Sr., City Mayor (368–2537) or Sayers Tuzroyluk, Sr., Chairman Tikigaq Corp. (368–2235)

Chairman STEVENS. Thank you very much. Your village was moved in the past once, wasn't it, Mr. Rock?

Mr. ROCK. That's correct, in the 1970s.

Chairman STEVENS. The new location is on the other side—on the upland side of the airport now?

Mr. ROCK. Back then it was what the Borough could afford. We moved on the east end of the runway, about 1½ miles.

Chairman STEVENS. Have you surveyed out a site that if you have to move you would prefer to move to?

Mr. ROCK. Yes. It's higher ground and it's about 10 to 15 miles from where we currently are.

Chairman STEVENS. Has the FAA or the State helped you locate a new site for a runway?

Mr. ROCK. No, they haven't.

Chairman STEVENS. You have a traditional graveyard in your area, don't you?

Mr. ROCK. That's correct. It's marked by whale jawbones.

Chairman STEVENS. Does your plan include moving that graveyard?

Mr. ROCK. Not currently, no. We just continually expand it, you know.

Chairman STEVENS. Didn't it suffer some erosion recently?

Mr. ROCK. It's getting very close to that.

Chairman STEVENS. Thank you.

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[2] Some of the photos we submitted show burms we built out of the beach gravel to protect our community. A subsequent photo shows that our efforts failed and the burm was washed out to sea. About three years prior to that, the water reached the west side of our runway and the runway itself served as an actual barrier for our community. You will also notice in some photos a partial seawall was built out of huge rocks that were brought in from Nome. That wall has begun to wash out as well.

Mr. Short, your area is the one area that has been successful in obtaining the funds. I remember we worked on that for a long time with the Corps of Engineers. You sound satisfied with what the Corps of Engineers has done. Is that right?

Mr. SHORT. For the most part, yes.

Chairman STEVENS. Do you have plans for an extension of that now? Are you asking the Corps to extend it further?

Mr. SHORT. 1,200 more feet.

Chairman STEVENS. Thank you.

Ms. Vorderstrasse, I was in Barrow and it seems to me that the beach is coming close now to your sewage containment pool and also to your city landfill dump. Is that right?

Ms. VORDERSTRASSE. That's correct, Senator. It is very close. We have one pump station which is very close to our beach, and that pump station provides service to at least one-third of our community. And our community center is very close to the beach, and during the storms, as you've been seeing here on the slides, it becomes a great concern.

And as you very well know, where Oliver Letuk's (ph) house is on the bluffs—the erosion there—we have already moved some of those houses once before. They are going to have to be relocated here in the very near future.

Chairman STEVENS. That's because of the melting of the substructure in the permafrost, right?

Ms. VORDERSTRASSE. Correct.

Chairman STEVENS. Has your city approved a relocation plan?

Ms. VORDERSTRASSE. No, we haven't. We work very closely with the North Slope Borough in reference to plans such as relocation and whatnot. We work with Mayor Ahmaogak. They're adding to our runway. It's kind of a concern because of the rapidness of the erosion and whatnot. Our runway is close to—one end of it is going to be very close to our beach.

Chairman STEVENS. Mr. Ivanoff, what's the situation with regard to your runway? It's down closer to the sea than the village.

Mr. IVANOFF. Yes, sir. In the flood of last fall part of the fencing on the runway was eroded. The State DOT is coming out with a project that will put in rock on the west side, ocean side, and I'm not sure if they are going to build it up. But they are in the process of upgrading the runway. But for the most part, the runway—just a section of the runway, that's correct.

Chairman STEVENS. Mr. Burns, do you have any questions?

Senator BURNS. I don't have any questions. The structure we're going to have to change in order to do some of these things. Knowing what your situation is, I don't have any questions for you, but we're going to deal with the structure on what will facilitate maybe getting you some help. That's what we're dealing with right now. You've all got your different challenges in your communities. It's good to hear about those. Thank you.

Chairman STEVENS. Senator Sununu.

Senator SUNUNU. I would be interested to know, in each of your villages, what, if anything, has been done locally to try to slow the erosion process and whether or not any of these efforts, even in the short term, have been at all successful.

Mr. SHORT. I sort of talked about what we initially did back in the 1980s was construct an 8,000-foot seawall. We're currently looking at putting in another 1,200 feet, which would give us just under 2 miles of seawall right in front of our community. It's been very stable; we haven't lost any more land since then.

The $4 million that Senator Stevens helped us get to extend that 1,200 feet has been very helpful along with the other funds.

Senator SUNUNU. That work was originally done in the 1980s?

Mr. SHORT. In the 1980s and throughout the 1990s. It has been a continuous process to get there. I think probably Bethel is one of the success stories, and we would be happy to share any of that information.

Senator SUNUNU. What was the total, or what has been the total cost of the seawall construction?

Mr. SHORT. Right now I think we're right around $28 million with the new 1,200 feet.

Senator SUNUNU. It's along the river?

Mr. SHORT. Yes. We call it a seawall.

Ms. VORDERSTRASSE. The city of Barrow has used real huge bags and they stuffed the bags with gravel, and then they put them up against the bluffs and along the beach. And as you have seen here on the slides, during the storms and even before the storms they used a tractor to make berms of gravel, and that is kind of our temporary seawall.

Senator SUNUNU. How successful has it been?

Ms. VORDERSTRASSE. Not very successful. Because as the storms come in—and it just—the ocean just beats on those bags, it beats beyond the bags, and the erosion is continuing to where the—it's just creating another section in the back and the waves that come in sometimes are greater than the temporary sand berms that they built and they come onto our road.

Senator SUNUNU. Is the labor and the organization for that effort handled locally?

Ms. VORDERSTRASSE. It's handled by the North Slope Borough.

Senator SUNUNU. Mr. Ivanoff.

Mr. IVANOFF. In the back of my testimony you'll see some pictures. On the first page you'll see a higher section of the road built in the late 1970s that prevented water. The logs that you see in these photos came out of the Yukon River. With the tide they move north and they land up on our beaches there.

But the top photo shows the road that was built in the 1970s. The high part of that road has really seen some influx from the ocean, but the southern end is 2 feet lower than the higher part of the road and has water and debris going over the top.

On erosion, you'll notice the gabion wall on the second page of the pictures. It was constructed in 2000 and it has been a major blessing, you know. There are problems with it. You'll see on the bottom photo, the second page, the wire mesh part is starting to break up. It has halted the erosion, but we're worried about the longevity of the life of this product.

Senator SUNUNU. What was the total cost of the work done in 2000?

Mr. IVANOFF. It was in the area of $1 million.

Senator SUNUNU. And how was it funded?

Mr. IVANOFF. Through NRCS.

Senator SUNUNU. Mr. Rock?

Mr. ROCK. We don't have anything that's been successful. In the summer during these months, the corporation with the Borough, loaned equipment and we have a lot of volunteers that go and actually push gravel and push berms up to help protect for the fall storms that we know are going to hit. They tried at one time some rocks from Nome; they imported from Nome to certain sections to see if that would work. That's getting washed out. The runway itself that sits to the west of the community serves as an actual barrier. The water came up to the level of the runway and it stopped right there.

Senator SUNUNU. Thank you.

Chairman STEVENS. We thank you all very much. We are going to go back with a lot more information than we had before. Thank you very much for those photographs. They're helpful, Mr. Ivanoff. I do appreciate that. We appreciate your coming to give us the information we need to go back and try to work this out. Thank you very much.

Our next panel is Dr. Joseph Suhayda, oceanic consultant; Mr. Rexford from Kaktovik; Luci Eningowuk, Chairperson on Shishmaref Erosion and Relocation; Enoch Adams, Chair from Kivalina's Relocation Planning Committee; and Stanley Tom, Tribal Liaison for Newtok Tribal Council.

Dr. Suhayda, if you will wait, we'll make you a separate panel at the end. Okay?

Dr. SUHAYDA. Yes, that's fine.

Chairman STEVENS. You're going to show us the Bastion. Let's take a 5-minute break.

Senator Sununu is on a long distance call and he'll be in in a minute, but I'm pleased to welcome Mr. Tom, Stanley Tom, Tribal Liaison from Newtok; Mr. Enoch Adams from Kivalina, their Relocation Planning Committee; Ms. Eningowuk, Chairperson from Shishmaref; and Mr. Rexford, the tribal administrator from Kaktovik.

The last witness has a little display, so we'll get with him after the four of you. Let's start with you, Mr. Tom.

Thank you very much for coming.

STATEMENT OF STANLEY TOM, TRIBAL LIAISON, NEWTOK TRADITIONAL COUNCIL

Mr. TOM. Thank you. My name is Stanley Tom. I serve on the Newtok Traditional Council. I have been with the Newtok Traditional Council since 1997 as president, before the Newtok Traditional Council became contracted to Public Law 93–638. We are fairly new with Public Law 93–638. It's our fourth year and we are in the learning process.

Newtok Traditional Council had a 3-year agreement with the Army Corps back in October 2001, and it was Planning Assistance to State project with an agreement for cost-share study relocation improvement. Ever since the agreement, I feel it's a slow process and the Native Village of Newtok needs to lay out the new village site at Nelson Island before erosion hits the existing village.

The land exchange was finalized between the Newtok Native Corporation and Fish and Wildlife Service on April 28, 2004, by Secretary of the Interior, Gale Norton.

The Army Corps of Engineers needs to speed up the new village site. We had a previous meeting with the agencies and I had a concern with the FAA. They said they would not build the airport, only if we moved the village site, and it's way too late to build an airport.

How will we ship the supplies to the new village site when we start to build the town on the new site such as: The barge landing area, water infiltration gallery area, the proposed airport site, and the area of the proposed infrastructure for roads and streets?

The ASCG made a proposed land use and transportation plan for Newtok back in 2001 to BIA. During the BIA workshop I checked our proposed planning list. We are at the bottom of the list for the year 2020. That's way too late for the roads to be built for the village site.

ASCG, Inc. also made a background for relocation report for January 2004, and the report was sent to various agencies. We had some replies from the background and relocation report. The report covered the introduction, village characteristics, the ocean problem, contained the erosion problem, statistical analysis of the erosion rate. The average annual erosion rate is about 62 to 130 feet per year. The existing barge landing is being impacted by erosion now and by 2006 it will be gone.

Under my observation the existing airport will be impacted in the year 2011 or less, because there are small lakes in that area and in that area our water resource will be impacted first.

The Department of Commerce and Economic Development will be doing a community profile mapping of the existing and the new relocation site, and I need both to be done as soon as possible, especially the new village site so we can start working on the environmental review record for the new village site, also known as the National Environment Policy Act.

The Newtok Traditional Council needs to do a community comprehensive planning for the new village site, and I just finished a mini-grant for $30,000 from the State of Alaska. I hope it will be approved because the Federal and State will not appropriate any funds without a community comprehensive plan for any planning funds.

The Newtok Traditional Council has approved its village move by the Background for Relocation Report. We need to start establishing the new site this year. If the Army Corps of Engineers are not ready to start a new site, the Newtok Traditional Council should hire an architect and engineer to speed up the new village site. The problem is the Newtok Traditional Council does not have any funding.

I know we made a 100 percent Federal partnership agreement with the Army Corps of Engineers to assist us on the development of our relocation effort.

There are three funds available. The first is the Planning Assistance Program, Alaska Villages Erosion Technical Assistance Program, and the Energy and Water Development Appropriation Act.

I would like the full Senate Committee to speed up the Newtok relocation to start on the village site before the existing village is impacted by erosion.

Chairman STEVENS. Thank you. We'll have some questions later.

[The statement follows:]

PREPARED STATEMENT OF STANLEY TOM

My name is Stanley Tom, Tribal Liaison, for the Newtok Traditional Council.

I have been working with Newtok Traditional Council since 1997 as President, before the Newtok Traditional Council became contracted to Public Law 93–638.

We're fairly new with Public Law 93–638, it's our 4th year and we are in a learning process.

Newtok Traditional Council had a 3-year agreement with the Army Corps back in October 2001, and it was Planning Assistance to State (PAS) project with the agreement for cost-share study relocation improvement project.

Ever since the agreement, I feel it's a slow process and Native Village of Newtok needs to lay out the new village site at Nelson Island, before the erosion hits the existing village.

The land exchange was finalized between the Newtok Native Corporation and Fish and Wildlife on April 28, 2004 by Secretary of the Interior Gale A. Norton.

The Army Corps of Engineers need to speed up the new village site. We had a previous meeting with agencies, and I had a concern with the FAA. They said they would not build the airport, only if we moved the village site, and it's way too late to build an airport.

How will we ship the supplies to the new village site when we started to build the Township or the new village site such as: barge landing area, water infiltration gallery area, the proposed airport site, and the area of the proposed village infrastructure area roads and streets.

The ASCG, Inc. made a proposed land use and transportation plan for Newtok village back in December of 2001 to Bureau of Indian Affairs. During the BIA Providers Workshop, I checked on our proposed transportation planning list. We are on the bottom list for fiscal year 2020. That's way too late for the roads to be built for the new village site.

ASCG, Inc. also made a "Background for Relocation report" January of 2004, and the report was sent to various agencies. We had some replies from the background relocation report, the report covered the introduction, village characteristics, summary of erosion problem, it contained the erosion problem, statistical analysis of the erosion rate, the average annual erosion rate is about 62 to 130 feet per year, the existing barge landing is being impacted by the erosion now and by 2006 it will be gone.

Under my observation the existing airport will be impacted in the year 2011 or less because there are small lakes in that area, and in that area our water resource will be impacted first.

Department of Commerce and Economic Development will be doing a community profile mapping of the existing and the new relocation site, and I need both to be conducted as soon as possible, especially the new village site so we can start working on the environmental review record for the new village site.

The Newtok Traditional Council needs to do a community comprehensive planning for the new village site, and I just finished a mini-grant for $30,000 from the State of Alaska and I'm hoping it will be approved, because the federal and the State will not appropriate any funds without the community comprehensive planning for any planning funds.

The Newtok Traditional Council has proved its village move by "Background for Relocation Report." We need to start establishing the new village site this year and if the Army Corps of Engineers are not ready to start the new village site, then the Newtok Traditional Council should hire an architect and engineers to speed-up the new village site. The problem is that the Newtok Traditional Council does not have any funding.

I know we made a 100 percent federal partnership agreement with the Army Corps of Engineers to assist us on the development of our relocation effort.

There are three funds available; first program is Planning Assistance to State Program (PAS), Alaska Villages Erosion Technical Assistance program (AVETA), and Energy and Water Development Appropriation Act (EWDA).

I would like the full Senate Committee to speed-up the Newtok relocation effort to start on the new village site, before the existing village is impacted by the erosion.

Chairman STEVENS. Mr. Adams. You are chair of the Kivalina Relocation Planning Committee.

STATEMENT OF ENOCH ADAMS, JR., CHAIRMAN, KIVALINA RELOCATION PLANNING COMMITTEE

Mr. ADAMS. Yes, sir.

Mr. Chairman and distinguished members of the committee, I appreciate the opportunity to testify before you today to discuss the flooding and erosion issues affecting Kivalina. I'm Enoch Adams, Jr., chairman of the Kivalina Relocation Planning Committee.

With your permission, I would like to present background information regarding our relocation efforts, the misunderstandings that came about, and a possible solution that's deemed necessary by the Kivalina Relocation Planning Committee.

In the late 1980s and early 1990s the subject of relocation was brought to Kivalina's attention because the Federal Government would not build a water and sewage system due to the former and current conditions of our community. At a joint meeting of the city of Kivalina and the Native Village of Kivalina, a decision was made by both entities to establish a planning committee made up of local community members that had various differing backgrounds to ensure that all segments of the community would be represented. I was appointed to this committee to represent the education community because I was a teacher at the local high school at the time.

While I'm not currently a teacher, I'm still a member of the committee as the local entities made one of the conditions of the committee to be that the members serve in perpetuity so that attrition of knowledge be held to a minimum. In other words, the less new appointments are made, the less need for educating new members.

Soon after the appointments were made, the Kivalina Relocation Planning Committee was formally recognized by the local entities and introduced to the community in 1996. Shortly, the Northwest Arctic Borough was asked to become involved as the lead entity because of the apparent lack of resources as to how this whole relocation idea would be implemented. Because of the mitigating costs recognized by the Federal Government of building a water and sewer system at the present site, the Alaska Army Corps of Engineers, Alaska District was involved from the beginning.

Currently, we are in the eighth year of a 5-year planning phase. This fact is largely due to the fact that all those involved, including the Army Corps of Engineers, have never done a comprehensive relocation project where an entire community has been moved. Although some of those involved have mentioned the fact that such a move is costly is the primary reason for the length of time that this has taken.

According to the original timeline draft by the Corps, construction of the site should have begun last summer, in 2003. But we are at some point in the last half of the planning stage. And I have always believed that when the time comes for seeking funds for this apparently "daunting" project, as the GAO report has described it, we do have a legitimate reason to ask for such funds. Because, beneath it all, the U.S. Government does have the underpinnings of equity. It is that sometimes which has to be brought to the surface by anyone involved.

Over the years in countless meetings and discussions both public and private by all those involved, some things have been said that should not have been said, conclusions have been made that are not accurate, especially about our people, and, particularly, our community, which has brought some of us to the point of not speaking at all. But those of us from Kivalina will still continue to strive to have healthy discussions about our needs, especially with this relocation effort. We are still trying to help others understand where we as a community are coming from.

I do not think that a blanket funding for the Alaskan villages is wise. I believe every community's flooding and erosion issues are so unique that they need to be dealt with individually. My biggest fear regarding this is that some community's, or communities', need, or needs, might be overlooked. I think we all agree that an expanded role of the Federal Government is necessary. We all agree, too, that the cost/benefit analysis requirements need to be changed, maybe even new ones be added.

I further believe that it is incumbent of us to remind the Federal Government of its trust responsibility to tribes, which brings me to my last point.

As you may understand why, I purposely did not go into detail about the misunderstandings that resulted. I also need to mention that yesterday some stated that they represent all the villages in Alaska. I respectfully disagree with that statement because what I further heard, I disagree with. And I do not think I need to go into detail what it was because of the solution I think that is needed.

In Kivalina we do have an excellent working relationship with the Native Village of Kivalina. In the memorandum of agreement between the city of Kivalina, the Native Village of Kivalina, and the Northwest Arctic Borough, for some reason or reasons only the Native Village of Kivalina has backed up its responsibilities with both financial and staffing requests from the KRPC. Because of certain Federal agencies' trust responsibility to tribes, the Native Village of Kivalina is in a unique position to work directly with the U.S. Congress.

I do not think an expanded role of the Denali Commission is necessary because they may just end up repeating services that can be capably done by the Native Village of Kivalina. I need to mention that for several years the KRPC functioned very well when we received funds through the Native Village of Kivalina to hire a local relocation coordinator, which is called for in the memorandum of agreement. I know that if this sort of relationship is established with the Federal Government regarding our village relocation, that the needs of our people will be met.

Thank you for listening to my testimony, and I will try my best to answer any questions that you may have.

Chairman STEVENS. Thank you very much. Appreciate that.

Ms. Eningowuk.

STATEMENT OF LUCI ENINGOWUK, CHAIRPERSON, SHISHMAREF EROSION AND RELOCATION COALITION

Ms. ENINGOWUK. The Shishmaref Erosion and Relocation Coalition thanks you for this opportunity to testify before you today.

I am Luci Eningowuk, Chairperson of the Coalition, which is made up of the governing bodies of the city of Shishmaref, the Native Village of Shishmaref, and the Shishmaref Native Corporation. We have also representatives from the youth council and the elder council. I wish to state that the elders are an integral part of our planning.

Shishmaref is where it is because of what the ocean, rivers, streams, and land provide to us. If the water and land couldn't sustain us, we would have moved out long ago. Subsistence is our economic base. Why do you work if not to feed your families? Our grocery store is out there, in the water and on the land. We are Shishmaref; we are Inupiaq Natives. Subsistence is our way of life. We are hunters and we are gatherers. Who and what we are is based on how we live and the way we live. We have been here for countless generations. We value our way of life; we value the environment as it sustains us; it provides for our very existence.

I have been very fortunate in my life. I have traveled to many places, including the home of our Federal Government, Washington, DC. I have seen our national treasures. Shishmaref, too, is a national treasure. But right now we are holding on as we watch the sea eat away at everything we, and you, have built.

We are proud people. It is very difficult for us to ask for your assistance, but we do ask for it, for our very existence, for my people. Please remember that we are your people, too. I am here to ask for your help.

We have provided a packet for you with additional information, photos, and a CD with a video file of the November 2003 storm.

I plan to address four points that are important to the Village of Shishmaref. They are relocation of the existing community to the mainland, ongoing beach erosion and efforts to minimize its impact, lack of funding for immediate infrastructure needs, and the need for State and Federal multi-agency coordination.

The Coalition is committed to the relocation of the community. A relocation project is underway and is currently in its early planning stage. The relocation project must be completed as the integrity of our community is dependent upon it.

Our goal for the project is to provide expedited relocation of the community to the mainland. Within this effort the project must provide both a safe place to live and conditions that support the subsistence lifestyle for the people of Shishmaref. The people of Shishmaref are committed to keeping our community intact and we are committed to our heritage, which includes the subsistence way of life passed on to us by our ancestors.

The community was established as a year-round settlement as a result of the introduction of Government services, including education and health care. Also, tribal members moved within our traditional lands for the subsistence harvest. We, like our ancestors, follow the seasons.

Every year, until the protective winter pack ice returns, we agonize whether the next storm will be the one that wipes us out. To date, we have lost numerous buildings and boats, an ATV, snow machines, meat-drying racks and buried food. Tragically, we have lost one home. So far we have been able to move 18 threatened homes to the National Guard Armory building. Moving these struc-

tures is a labor-intensive process. We are quickly running out of space on our ever-shrinking island.

The community of Shishmaref had determined that the threat to life from reoccurring beachfront erosion required immediate action.

I want to cover my points; I have four.

One, relocation of the existing community to the mainland.

The community has expressed and reconfirmed its desire to retain community integrity through relocation. Overwhelming support was shown through a community-wide vote held on July 10, 2002. The community and Coalition would like to stress the immediacy of the problem and continue to push for an expedited relocation of Shishmaref to a place on the nearby mainland location, Tin Creek.

The Coalition, with the support of the Kawerak, has to date coordinated a significant number of agencies, including the National Resources Conservation Service. I wish to take a moment to thank NRCS for their work in assessing suitable relocation sites. Their resource team has shown the greatest respect of our needs and has proven that working with a high level of cooperation is possible. With the assistance of the NRCS we have narrowed the search for our mainland location.

Others that we have worked with include the U.S. Army Corps of Engineers, Alaska Department of Community and Economic Development, and local and regional entities. Our experience has shown that there's a lack of continuity between the various Federal and State agencies and programs. There is an extensive amount of executive branch interpretation.

For the most part we have found that none of the agencies have programs that cover a full range of our needs. Matching requirements in many cases are exorbitant, precluding us from qualifying for assistance, as Shishmaref has no viable funding source.

Our community is heavily reliant on subsistence, as are most rural Alaskan communities. Our diet is based on the animals and plants found nearby. Relocation of our community to an area away from our home territory would have a devastating effect on how we exist and who we are.

Consolidation with another community is not acceptable as it will cause extensive competition for subsistence foods and depletion of natural resources. Our way of life is centered around subsistence; it is the driving force of our existence. This is illustrated by the scattering of Alaska Native villages across the State.

The no-action option for Shishmaref is the annihilation of our community by dissemination. We are a community tied together by family, common goals, values, and tradition. We are different from our neighbors. The community of Shishmaref has a long and proud history. We are unique and need to be valued as a national treasure by the people of the United States. We deserve the attention and help of the American people and the Federal Government.

Our plight has attracted statewide, national, and international attention. To date we have provided information to numerous media organizations. The international press is particularly interested to know what the Federal Government is doing to help us.

Two, ongoing beach erosion and efforts to minimize its impact.

The use of Federal funds places a requirement for advance planning. This requirement precludes an immediate relocation as an intact community, because we anticipate that even an expedited relocation will take years to prepare for. In the meantime, we continue to seek assistance to provide shoreline protection for the immediate community. Our Strategic Relocation Plan for resettlement is anticipated to begin by 2009.

Kawerak, our regional nonprofit tribal government consortium applied for and built on our behalf a 450-foot armor rockgabion seawall. The funding came from the Indian Reservation Roads, IRR, program which allows 100 percent Federal funding. Nineteen villages that participated in Kawerak's program helped to fund our project with funds identified for their benefit by the IRR program.

We have been approved for a section 14, emergency shoreline protection project with the Army Corps of Engineers. The project is to provide protection for the shoreline in front of our school, approximately 230 feet. The section 14 has a $1 million Federal cap and requires a 35 percent match. The State has committed to provide the local match for this project; however, it is very difficult for the State to come up with funding for these projects. Therefore, we request that the Federal Government waive the cost-share requirement for the Alaska Native village projects associated with flooding and erosion.

In addition, Shishmaref has worked closely with the State to find additional funding to protect an additional 3,000 feet of the community. The legislature has put $2 million in appropriations, but the appropriation is not yet finalized. These funds are intended to provide for local match to Federal programs. We continue to have serious concerns that these funds would be required to go toward feasibility studies instead of construction.

We recommend that Federal programs designed to help communities at risk must be redesigned by Congress to minimize burdensome planning requirements. The emphasis must be on funding actual construction. In addition, amendments to legislation must be written that consider the ability of a community to fund the local match or the local match requirement should be allowable.

Disaster programs are designed to do cleanup after the emergency rather than allocating funds for prevention. Both the State and Federal agencies have told us they couldn't provide assistance until a disaster declaration has been made. The declaration itself requires a dollar value for the damage. In our case, because no value is provided for the lost land and because we have been able to take homes out of harm's way, we don't qualify. Alaska Natives don't have the infrastructure found elsewhere in the United States; therefore, there is little value assessed when there are losses within Alaska's rural communities.

Three, lack of funding for immediate and future infrastructure needs.

Shishmaref does not have modern water and sewer. Honeybucket haul systems are located in front of every two to four homes. The city hauls these containers to the landfill 1.5 miles to the west end of the island. In 2002 shortly after the community voted to relocate, we learned that the agencies who had previously identified infrastructure projects for Shishmaref would no longer provide us with

assistance, such as a new clinic, tank farm, water and sewer. We believe that the decision made by funding agencies to either assist or not needs to take into consideration the human impacts.

Alaska Village Electric, AVEC, designed our tank farm project so that it could be relocated, however, this was not acceptable to the funding agency, the Denali Commission. We prefer that the water and sewer project be reserved for our relocation site. Haphazard actions and decisions have far-reaching negative social and economic impacts.

Currently, there is no infrastructure at the new site. We request assistance to build an emergency evacuation building at the Tin Creek relocation site, a structure that would be the command center and provide room for evacuation offices, clinic, school, and warehouse for emergency supplies should the island have to be evacuated. Continued development of current basic essential health and sanitation needs must be done. The community needs a healthy environment.

We don't know the actual costs to relocate the village. We believe that much of the infrastructure that will be needed for the new location has been moved from our current location. Because of this, the deferred infrastructure development that would have been needed on the island, roads, clinic, water, sewer, et cetera, should be considered in the equation of calculating the costs of relocation.

Four, the need for State and Federal multi-agency coordination.

The process of relocating an entire community requires extensive inter-agency cooperation and coordination. There is currently no one agency stepping forward to take the lead. To be blunt, no agency's programs are designed to provide for a project as complex as a full village relocation. Each agency has its own responsibility, and often there is a gap in responsibility from program to program.

We have reviewed the GAO report completed in December 2003 and we encourage you to consider their recommendations. We strongly agree that the coordinated effort to address issues caused by erosion and flooding of the threatened Alaska Native villages is necessary. We believe that whichever agency is assigned to lead the effort, it must be one that has proven itself to be reliable in addressing the needs of Alaska Native villages.

The situation facing Shishmaref needs to be categorized as an emergency, and overly burdensome Federal regulations must be eased. Many Federal requirements drive up the costs. We believe that the relocation could be accomplished at a significantly reduced cost if the agencies were allowed to act under emergency exceptions and if the agencies were not required to implement overly burdensome feasibility studies and cost-benefit analysis. We are not requesting a lessening of the engineering or NEPA requirements, but an approach that utilizes common sense.

The GAO report provides excellent recommendations to address the needs of Alaska Native villages threatened by erosion and flooding. We urge Congress to take action based on their report. However, our situation is urgent. We are unlikely to survive until new statutes, regulations, or policies can be developed and implemented.

Because of this, we request that Shishmaref be identified as a demonstration project with maximum flexibility authorized and

that it be used to help determine what changes are needed in the statutes, regulations, and policies overall.

Shishmaref does not have the necessary internal administrative capacity to facilitate such a massive effort without additional funding and technical assistance. Kawerak provides staff support and facilitation to Shishmaref, but is limited primarily to the transportation components of the relocation. Shishmaref requests additional assistance from the Federal Government.

I thank you for this opportunity to testify before you and to share with you my home, Shishmaref.

Chairman STEVENS. Thank you very much. Excellent statement.

[The statement follows:]

PREPARED STATEMENT OF LUCI ENINGOWUK

The Shishmaref Erosion and Relocation Coalition thank you for this opportunity to testify before you today. I am Luci Eningowuk, Chairperson of the Coalition. The Coalition is made up of the governing bodies of the City of Shishmaref and the Native Village of Shishmaref (the federally recognized tribe), and the board of the Shishmaref Native Corporation. We have provided a packet for you today with additional information, photos, and a CD with a video file of the November 2003 storm.

I plan to address four points that are important to the community of Shishmaref. They are: (1) relocation of the existing community to the mainland; (2) ongoing beach erosion and efforts to minimize its impact; (3) lack of funding for immediate infrastructure needs; and (4) the need for state and federal multi-agency coordination.

The Coalition is committed to the relocation of the community. A relocation project is underway and is currently in its early planning stage. The relocation project must be completed, as the integrity of our community is dependent upon it. Our goal for the project is to provide for an expedited relocation of the community to the mainland. Within this effort, the project must provide both a safe place to live and conditions that support the subsistence life style for the people of Shishmaref. The people of Shishmaref are committed to keeping our community intact, and we are committed to preserving our heritage, which includes the subsistence way of life passed on to us by our ancestors.

Before I begin, on behalf of the Coalition, I must commend the United States Department of Agriculture's Natural Resource Conservation Service (NRCS), for their work in assessing suitable relocation sites. Their research team has shown the greatest respect of our needs, and has proven that working with a high level of cooperation is possible. To date, the NRCS has assessed nine sites identified by the community. With their assistance, we have narrowed the search for a mainland location.

Introduction—Background

The community of Shishmaref is situated on a barrier island no wider than one-quarter of a mile and 3 miles in length. Shishmaref is located approximately 20 miles south of the Arctic Circle and 50 miles northeast of the Bering Strait. The community is home to 600 people mostly consisting of Inupiaq Natives. The community is a traditional native village that is heavily reliant on subsistence lifestyle activities based in and around the Chukchi Sea. The local economy is subsistence based, supplemented by part-time and seasonal jobs, and the sale of traditional arts and crafts.

The community, was established as a year round settlement, as a result of the introduction of government services including education and health care. Prior to this, tribal members moved within our traditional lands for the subsistence harvest. Our ancestors followed the seasons, moving from the rivers and streams, to the coast, and then on to the coastal islands. This tradition is still followed today.

Our subsistence lifestyle takes us to our camps in numerous locations along the mainland and coastal islands. We travel by snowmachine over the ice and by boat when the ice is no longer safe. Our primary subsistence foods include: bearded seal, walrus, fish (salmon, white fish, trout, and herring) moose, musk-oxen, caribou, ducks, geese, ptarmigan, berries (salmon berries, blackberries, blueberries, and cranberries), and assorted greens. To preserve the fish and meat, we hang it on drift wood racks to dry. Many of our residents store their food in the permafrost to pro-

vide natural cold storage. Subsistence foods are also stored in containers of seal oil, which is a natural preservative.

The land under Shishmaref is a fine, silty sand that is highly vulnerable to erosion. Permafrost is prevalent throughout the area and normally is found at a depth of 3 feet. The permafrost binds the moist sand together and helps slow the rate of erosion. On average, the island's northern shore has experienced erosion of 3–5 feet per year. Higher rates of erosion were experienced during the storms of: November 9th and 10th, 1973; October 4th, 1997; October 7th, 2001; and most recently November 21st and 22nd, 2003. During these storms, highly susceptible areas had losses of as much as 125 feet horizontal distance.

Every year, until the protective winter pack ice returns, we agonize that the next storm will be the one that wipes us out. To date, we have lost numerous storage buildings and boats, an ATV, 2 snowmachines (snowmobile), meat-drying racks, and buried food. Tragically we have lost 1 home; so far we have been able to move 18 threatened homes and the National Guard Armory. Moving the structures is a labor-intensive process, which includes placing the structure on beams, hooking them up with heavy chains, and dragging them to a safer location on the island utilizing available heavy equipment. However, those of us living here know, that it is merely a matter of time before we experience greater losses. We are quickly running out of space on our ever-shrinking island.

We experience erosion creeping in from both the southern lagoon side and the northern Chukchi Sea side of the island. High tide is 3 feet higher than the normal tide. During high tide storms, the wave action can increase an additional 3 feet or more above the high tide. The impact to the island is that more of the exposed bluff is in direct contact with the water, erosion is accelerated, more of the bluff is undercut, and in many locations the waves crest over the bluff.

The community of Shishmaref had determined that the threat to life and property from reoccurring beachfront erosion required immediate action. The community established the Erosion and Relocation Coalition. The makeup of the Coalition is the governing members of the City of Shishmaref and the Native Village of Shishmaref (Indian Reorganization Act), the board of the Shishmaref Native Corporation, along with representation from the Elder and Youth Councils. The Coalition was formed to provide a unified community voice, One People, One Voice, to seek assistance in providing immediate erosion protection for the island while we focus our efforts on relocation to the mainland.

Shishmaref is not alone; other Alaska Native Villages are facing a significant threat from ongoing global climate changes. Areas that have in the past been protected by our durable permafrost are now at risk. More and more communities are reporting problems with persistent erosion and flooding.

Relocation of the existing community to the mainland

The situation at Shishmaref is dire, and we believe that a disaster is pending that will cause loss of life and property. The rate of erosion and the number of flooding events has accelerated. Even though the storms have been moderate in level, the damage is more severe in recent years. The community has expressed and reconfirmed its desire to retain community integrity through relocation. Overwhelming support was shown through a community wide vote held on July 10, 2002. The community and Coalition would like to stress the immediacy of the problem and continue to push for an expedited relocation of Shishmaref to a safe place on the nearby mainland location—Tin Creek.

The Coalition, with the support of Kawerak, Inc., has to date coordinated and communicated with: NRCS, the U.S. Army Corps of Engineers, Alaska Department of Community and Economic Development, the Federal Emergency Management Agency, the Alaska Division of Emergency Services, the National Park Service, the Alaska Native Health Consortium, the Bureau of Indian Affairs, the Bureau of Land Management, the Bering Straits Native Corporation, the Bering Straits Regional Housing Authority, the Alaska Village Electric Cooperative, Tel-Alaska, the Alaska Department of Transportation and Public Facilities, Housing and Urban Development, the Alaska Federation of Natives, the State House and Senate, and we have worked with our Alaska congressional delegation. Our experience has shown that there is a lack of continuity between the various federal and State programs and agencies. There is an extensive amount of executive branch interpretation. For the most part, we have found that none of the agencies have programs that cover the full range of our needs. Matching requirements, in many cases are exorbitant, precluding us from qualifying for assistance, as Shishmaref has no viable funding source.

Our community is heavily reliant on subsistence, as are most rural Alaska Native Communities. Our diet is based on the animals and plants found nearby. Relocation

of our community to an area away from our home territory would have a devastating impact on how we exist and who we are. Consolidation with another community is not acceptable, as it will cause extensive competition for subsistence foods, and depletion of natural resources. Our way of life is centered around subsistence; it is the driving force of our existence. This is illustrated by the scattering of Alaska Native Villages across the State.

The no action option for Shishmaref is the annihilation of our community by dissemination. We are a community tied together by family, common goals, values, and traditions. We are different from our neighbors. The community of Shishmaref has a long and proud history. We are unique, and need to be valued as a national treasure by the people of the United States. We deserve the attention and help of the American people and the federal government.

Our plight has attracted statewide, national, and international attention. To date, we have provided information to the following media organizations; regional media, AP Wire, Anchorage Daily News, KTUU Channel 2—Anchorage, Alaska Public Radio, The New York Times, People Magazine, The New Yorker Magazine, National Geographic, The Weather Channel, plus several international media groups from Canada, Britain, Japan, France, Germany, Norway, and the calls keep coming. The international press is particularly interested to know what the federal government is doing to help us.

Ongoing beach erosion and efforts to minimize its impact

The use of federal funds places a requirement for advance planning. This requirement precludes an immediate relocation as an intact community. Because of this, we anticipate that even an expedited relocation will take years to prepare for. In the meantime, we continue to seek assistance to provide shoreline protection for the immediate community. Our Strategic Relocation Plan for resettlement is anticipated to begin by 2009.

Kawerak, Inc. our regional non-profit tribal government consortium applied for and built on our behalf, a 450 foot armor rock gabion seawall. The funding came from the Indian Reservation Roads (IRR) program (23 U.S.C 200–204), which allows 100 percent federal funding. Nineteen villages that participate in Kawerak's program helped to fund our project, with funds identified for their benefit under the IRR program. The project was developed to protect the main street in the community and the road to the airport, at their locations closest to the threatened bluff. Five barges of rock were brought in from Cape Nome. Kawerak barged in heavy equipment and used local labor to build the project. The cost of the project was in excess of $2 million. Kawerak attempted to develop a cooperative project with the Army Corps of Engineers, but found that the Corps' programs would have used all funds as local match for federally required feasibility studies (a requirement under a majority of the Corps' programs). There was too great a risk that the Corps would find that the project was not in the best interest of the federal government. With the village's immediate plight, the decision was made for Kawerak to go forward to plan, design, and construct the 450 foot seawall. From the time of this decision, it took approximately 2 years to develop and build the project. Kawerak worked closely with Shishmaref, the Corps, the NRCS, and the Bureau of Indian Affairs in the development of the project.

We have been approved for a Section 14, Emergency Shoreline Protection Project with the Army Corps of Engineers. The project is to provide protection for the shoreline in front of our school, approximately 230 feet. The Section 14 has a $1 million federal cap and requires a 35 percent match. The State has committed to provide the local match for this project. We request that the federal government waive the local cost share requirements for Alaska Native Village projects associated with flooding and erosion.

In addition, Shishmaref has worked closely with the State to find additional funding to protect an additional 3,000 feet of the community. The legislature has put $2 million into appropriations, but the appropriation is not yet final. These funds are intended to provide for local match to Federal programs. However, we continue to have serious concerns that these funds would be required to go towards feasibility studies instead of construction. We recommend that federal programs designed to help communities at risk, must be redesigned by Congress to minimize burdensome planning requirements. The emphasis must be placed on funding actual construction. In addition, amendments to legislation must be written that considers the ability of a community to fund the local match, waiving the local match requirement should be allowable.

Disaster programs are designed to do cleanup after the emergency, rather then allocating funds for prevention. Both the State and federal agencies have told us they couldn't provide assistance until a "Disaster Declaration" has been made. The

declaration itself requires a dollar value for the damage. In our case, because no value is provided for the lost land, and because we have been able to tug homes out of harms way, we don't qualify. Alaska Native Villages don't have the infrastructure found elsewhere within the United States, therefore there is little value assessed when there are losses within Alaska's rural communities.

Lack of funding for immediate and future infrastructure needs

Shishmaref does not have modern water and sewer. The City hauls water to individual homes where there are interior storage tanks ranging in capacity from 32–200 gallons. Honey bucket haul systems (septic handling), with a capacity of 200 gallons, are located in front of every 2–4 homes. The City hauls these containers to the landfill 1.5 miles to the west end of the island. In 2002, shortly after the community voted to relocate, we learned that agencies who had previously identified infrastructure projects for Shishmaref would no longer provide us with assistance (new clinic, tank farm, water and sewer). We believe the decision made by funding agencies to either assist or not, needs to take into consideration the human impacts. We had passed an ordinance that required that all new construction must be moveable. Alaska Village Electric (AVEC) had designed our tank farm project so that it could be relocated, however, this was not acceptable to the funding agency, the Denali Commission. We prefer that the water and sewer project be reserved for our relocation site. Haphazard actions and decisions have far reaching negative social and economic impacts.

Currently, there is no infrastructure at the new site. We request assistance to build an emergency evacuation building at the Tin Creek Relocation Site. A structure that would be the command center and provide room for evacuation offices, clinic, school, and warehouse for emergency supplies, should the island have to be evacuated. Continued development of current basic essential health and sanitation needs must be done. The community needs a healthy environment.

We don't know the actual costs to relocate the village. We believe that much of the infrastructure that will be needed for the new location has been deferred from our current location. Because of this, the deferred infrastructure development that would have been needed on the island (roads, clinic, water and sewer, etc.) should be considered in the equation of calculating the costs for the relocation.

The need for state and federal multi-agency coordination

The process of relocating an entire community requires extensive interagency cooperation and coordination. There is currently no one agency stepping forward to take the lead. To be blunt, no agency's programs are designed for a project as complex as a full village relocation. Each agency has its realm of responsibility, and often there is a gap in responsibility program to program. We have reviewed the GAO report (GAO–04–142) completed in December 2003 and encourage you to consider their recommendations. We strongly agree that a coordinated effort to address issues caused by erosion and flooding of the threatened Alaska Native Villages is necessary. We believe that whichever agency is assigned to lead the effort, must be one that has proven itself to be proactive in addressing the needs of Alaska Native Villages.

The situation facing Shishmaref needs to be categorized as an emergency. Overly burdensome federal regulations must be eased. Many of the federal requirements drive up the costs. We believe that the relocation could be accomplished at a significantly reduced cost if the agencies were allowed to act under emergency exceptions, and if the agencies were not required to implement overly burdensome feasibility studies and cost benefit analysis. We are not requesting a lessening of the engineering or NEPA requirements but an approach that utilizes common sense.

The GAO report provides excellent recommendations to address the needs of Alaska Native Villages threatened by erosion and flooding. We urge Congress to take action based on their report. However, our situation is urgent, we are unlikely to survive until new Statutes, Regulations, or Policies can be developed and implemented. Because of this, we request that Shishmaref be identified as a demonstration project with maximum flexibility authorized, and that it be used to help determine what changes are needed in the Statutes, Regulations, and Policies overall.

Shishmaref does not have the necessary internal administrative capacity to facilitate such a massive effort without additional funding and technical assistance. Kawerak, Inc. provides staff support and facilitation to Shishmaref, but is limited primarily to the transportation components of the relocation. Shishmaref requests additional assistance from the federal government.

Conclusion

Shishmaref is where it is because of what the ocean, rivers, streams, and the land provide to us. If the land and water couldn't sustain us, we would have moved on

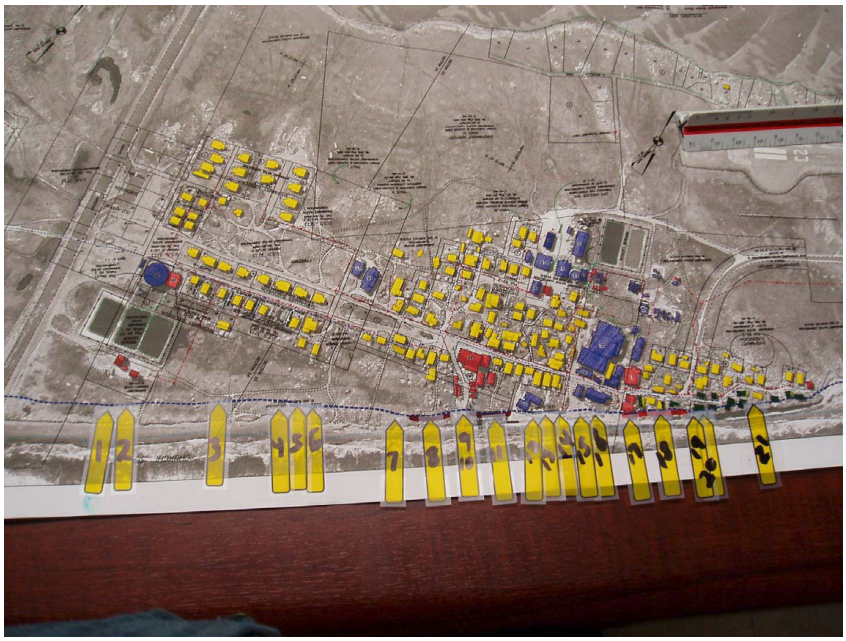
long ago. Subsistence is our economic base; why do you work if not to feed your families? Our grocery store is out there, in the water and on the land.

We are Shishmaref, we are Inupiaq Natives. Subsistence is our way of life, we are hunters and we are gatherers. Who and what we are is based on where we live and the way we live. We have been here for countless generations. We value our way of life, we value the environment as it sustains us; it provides for our very existence.

I have been very fortunate in my life; I have traveled to many places including the home of our federal government, Washington, D.C. I have seen our national treasures. Shishmaref too, is a national treasure. But, right now, we are barely holding on, as we watch the sea eat away at everything we, and you, have built.

We are a proud people, it is very difficult for us to ask for your assistance. But we do ask for it, for our very existence, for my people, please remember, that we are your people too, I am here today to ask for your help.

Thank you for this opportunity to testify before you today, and to share with you about my home, Shishmaref.



Shishmaref Measurements 06–14–04

1—Tannery Building
2—Cottage Building
3—Charlene Ningealook
4—Alfred Pootoogooluk
5—Archie Kiyutelluk
6—Jim/Janet Barr
7—Alvin Pootoogooluk Sr.
8—Bill Jones
9—East—Bulk Tank
10—West—Bulk Tank
11—Margie Ningealook
12—Winfred Obruk
13—Nora Kuzuguk
14—Jenny Kuzuguk
15—Red School
16—Blue School
17—Native Store Warehouse
18—Lloyd Kiyutelluk
19—Shelton Kokeok
20—Signa Kokeok
21—Nathan Weyiouanna

Current estimated beach line:
Measurement edge to building →
PHomes moved 2002 □

SHISHMAREF EROSION MEASUREMENTS 2001–2004

Location	Distance from Edge Fall 2001	July 1, 2002	Loss	November 11, 2003	Loss	November 25, 2003	Loss	June 14, 2004	Loss
Tannery:									
Tannery Bldg	124	122.5	1.5	118	4.5	118	0	117	1
Cottage Industry	64	61	3	57	4	57	0	54	3
Houses:									
Charlene Ningealook	300	300	0	258	42	255	3	250	5
Alfred Pootoogooluk	205	205	0	201	4	200	1	195	5
Archie Kiyutelluk	200	200	0	188	12	172	16	172	0
Jim/Janet Barr	190	190	0	144	46	144	0	144	0
Alvin Pootoogooluk Sr	195	195	0	195	0	195	0	195	0
Bill Jones	90	90	0	72	18	66	6	58	8
Bulk Tanks:									
East	65	65	0	57	8	31	26	30	1
West	69	69	0	61	8	25	36	24	1
Houses:									
Margie Ningealook	105	104	1	86	18	60	26	60	0
Winfred Obruk	105	94	11	67	27	67	0	67	0
Nora Kuzuguk	100	89	11	67	22	58	9	52	6
Jenny Kuzuguk	100	89	11	75	14	66	9	53	13
Red School	72	66	6	42	24	20	22	16	4
Blue School	47.5	38	9.5	17	21	17	0	17	0
Native Store: Warehouse	50	50	0	.....	50	.....	0	.....	0
Houses:									
Lloyd Kiyutelluk	66	66	0	61	5	57	4	43	14
Shelton Kokeok	55	55	0	32	23	31	1	21	10
Signa Kokeok	117	117	0	91	26	90	1	80	10
Nathan Weyiouanna	65.5	65.5	0	13	53	5	8	1	4

Looking west from center of town

Teachers quarters

Center of town beach front

Center of town looking east

Homes and drying racks

West end permafrost exposed and melting

Final work Kawerak Seawall Project—450 feet

Chairman STEVENS. Mr. Rexford.

STATEMENT OF FRANKLIN REXFORD, TRIBAL ADMINISTRATOR, NATIVE VILLAGE OF KAKTOVIK

Mr. REXFORD. Thank you, Mr. Chairman, members of the committee. Thank you very much for giving Kaktovik the opportunity to give you at least an oral understanding of the things that are happening there in Kaktovik as far as erosion is concerned.

I just want to touch on three things that are affecting the people of Kaktovik. We are working with the Department of Defense. The Air Force is working to protect the landfill that has been capped that was used since 1947 by the military, and this is a serious situation that we are finding that needs improvement. We want to continue working with the Air Force on the restoration advisory committee or restoration advisory board with the Air Force.

The other project that we are working on at this time with the North Slope Borough is the FAA master plan on the airport relocation. The location has not been selected yet, but we are just commencing a government-to-government relation with the FAA that just started this past week. We also are working on a government-to-government relation with the Department of Defense to work on the various—couple of issues that really affect our people.

My name is Franklin Rexford. I'm the Tribal Administrator of the Native Village of Kaktovik. I was born and raised in Kaktovik. I have been outside for higher education. I've been working with the Native Village since 1970. I've grown up and seen that our coastline has been affected.

In 1914 several Canadian archaeologists and anthropologists excavated numerous cabins and graves, and I'm glad that they took the ones on the runway. In 1914 there were 76 things that were excavated with over 3,000 specimens saved in Canada. I was going to say that those at least have been saved—the military, when they built a runway, built it on the barrier island there. So we are fortunate the Canadian explorers to excavate and at least save a few specimens.

In conjunction with that, there is an island called Airy (ph) Island. It's a point where it's called "a place to go listen." It's a local treasure or historical treasure and has not been logged under the U.S. historical sites and places. We are sitting here and we're worrying about the artifacts and archaeology and our history on that part.

But one important thing is the landfill. We know that the military in 1947 came to Barter Island and started a landfill. It's right on the bluff. They built about three or four berms to try to prevent—in front of the landfill where the gravel is gathering, it's about half a mile further away from where they wanted the gravel to build up because of the landfill that's there. God knows what's in there; PCB, lead paint, all kinds of stuff that the military dumped and it's right on the bluff.

So they built these berms, building up gravel at another location. What they should have done is put it a little bit further west of the landfill and probably could have put a lot more gravel or more protection for the landfill. So that's our concern, because that landfill is about 300 yards from where we land or butcher our whales.

We're allowed—we're a whaling community, and the west side of where we butcher our whales there's all the debris and stuff, garbage collecting along the beach. So that is a very serious situation we want to continue working with and maybe provide more funding to cap our—dig up all that garbage and get rid of that. It's just going to keep happening. The stuff that they have now is working, but it's being damaged every year.

So the military has spent several hundred, maybe millions of dollars trying to protect that landfill. The airport, you heard—got written testimony on the airport from the FAA on the Kaktovik hub. The airport is owned by the military. It's leased by the Borough where they operate and lease the airport, but it's prone to flooding every year now. You can see that every year. But the runway has to be closed down 2 or 3 days of the year because of the weather.

We've seen the stuff that they put on the honeycombs and the 55-gallon barrels, those are rotting out, and they really need to close that down. We are working with the FAA to relocate the airport. The villages were moved in 1947 when the military came in and in 1964, so we were fortunate we moved in 1964, otherwise our houses and infrastructure would probably be falling off like Shishmaref or Kivalina or other places.

So we're fortunate on that end. But our runway and landfill are the two most serious impacts to our village as far as health is concerned. The landfill is very serious and the FAA is working with the village to try and find the most economical place to build an airport.

In light of that, I'll just summarize that there are three islands that I am concerned about. I'm concerned about the airport relocation, the landfill with the military, and our local historical treasures that haven't been made up with historical sites and places like Point Hope has. So with that—Senator Murkowski asked for words on the Corps of Engineers.

We are working with the folks there. We are fortunate to work with the Department of Defense Restoration Advisory Board, we've worked with the Corps and the DEC and the people of Kaktovik. So we're watching the cleanup and we're keeping an eye on the landfill and we're concerned about the runway.

Thank you very much.

Chairman STEVENS. Thank you very much. The water on the runway is coming from the ocean, from the Arctic Ocean?

Mr. REXFORD. Yes. There is a barrier island north of the runway, but there's a channel where with the storm surge we get the strong west winds and it floods the east end of the runway.

Chairman STEVENS. And that's still under lease from the Air Force?

Mr. REXFORD. Yes. The military people own the runway.

Chairman STEVENS. Who built the landfill?

Mr. REXFORD. The military. With the airport, if they're going to relocate, they have to move the landfill 2 miles away from the airport and where they selected is near the beach.

Chairman STEVENS. The landfill you're talking about is the one that was built by the Air Force?

Mr. REXFORD. Yes, built by the military and it's closing.

Chairman STEVENS. Mr. Tom, you're one of the areas that's listed as being critical by the GAO.

Mr. TOM. Yes, sir.

Chairman STEVENS. And are you working with the Corps now on a plan?

Mr. TOM. Yes, sir.

Chairman STEVENS. You indicated you have a background for relocation report.

Mr. TOM. Yes, we do.

Chairman STEVENS. You prepared that?

Mr. TOM. Yes, I did, with the BIA's help. I knew it had to be done to prove the Newtok—the erosion impact. The village vote—we selected five sites and we discussed them for about 20 years, and now we had our last vote back in August 2003. The majority voted for Nelson Island.

Chairman STEVENS. This answers one of the questions that Senator Burns had about the location with regard to the bluff.

Can you tell us on this where is the site for the new—the new site for the village?

Mr. TOM. It's on Nelson Island, on the peak of Nelson Island. In this map you can't see it, but it's—you can see the river here. Nelson is about here (indicating). It's about 45 miles from this existing to Nelson Island.

Chairman STEVENS. Is the community in agreement about that site for relocation?

Mr. TOM. I didn't hear you, sir.

Chairman STEVENS. Has the community agreed to that site for relocation?

Mr. TOM. Yes, we have. We have the vote. The people voted on the back of the page and we have all the agencies. We used the public-involved survey questionnaires, and we have a—we answered questions on the site that they selected. The majority selected the Nelson Island. And we have the counts on the back of the page, too, with the ASAG report.

Chairman STEVENS. This shows that the 1996 dump site is actually totally inundated now?

Mr. TOM. It's gone. It was already impacted. Back in 1996 it was the city dump, but we had to relocate it right across the river.

Chairman STEVENS. You tell me it's on the other side of the Noatak River now?

Mr. TOM. I think it is, but it's not the Noatak. We call it the Nitlik River. We used a 1964 map. You can see the 1964 map right here. There's the line right there, all the way to the present day. In 2003 the land is not being impacted and by 2006 it will be gone. It's going already. We just lost 20 feet this summer.

Chairman STEVENS. This Nitlik River, is that a river, literally?

Mr. TOM. Yes, sir, it's a river. The Nitlik is a river. The Bering Sea is this way, the west side.

Chairman STEVENS. I thought you were on the beach.

Mr. TOM. No, we're not on the beach. We're on the mainland close to the inlet.

Chairman STEVENS. When we take our trip next year, we'll come out and take a look at that. You have indicated that you believe the existing land will be impacted—is being impacted now and will be gone by 2006, right?

Mr. TOM. Yes, sir, that's my observation.

Chairman STEVENS. The barge landing is right there at the edge of the river?

Mr. TOM. Yes, it's right there. You can see the barge landing now. It's getting impacted right now, and it's already halfway, and this summer we lost 20 feet.

Chairman STEVENS. Well, that's a staggering progression that's predicted for your area.

Mr. TOM. We figure the erosion impact—it will be sooner than these figures because of the south wind.

Chairman STEVENS. How are you going to avoid future erosion if you move where you say you want to move?

Mr. TOM. The mainland is connected to Nelson Island. From here it's pretty close. We have to move this in the wintertime to cross the Nitlik River.

Chairman STEVENS. How many people in your village now?

Mr. TOM. Right now we have about 430.

Chairman STEVENS. All right. Thank you very much.

Mr. Adams, I appreciate your statement, also. I understand your circumstance. Kivalina also is one of those listed by the Corps. We might revisit those four villages next year on our field trip. We have to go back into session and we have conventions, so we can't do it this year.

Thank you, Ms. Eningowuk. Thank you for coming. As you know, I have been to Shishmaref and seen your situation twice. I think it's a staggering problem that you also have. We'll come to visit you also. Meanwhile, we'll try to see what we can do to get some of the changes that you discussed.

Mr. Rexford, you have a different problem. You have Department of Defense assets at your disposal. I think we'll see if we can't get them to take care of that runway, fix that runway. We do thank you very much.

Any questions, Senators?

Senator SUNUNU. I have none.

Senator BURNS. I wrote down a note. If you're not teaching, Mr. Adams, what are you doing?

Mr. ADAMS. Hunting.

Senator BURNS. Good choice. Thank you.

Chairman STEVENS. Thank you very much. We do appreciate it and I think the very lucid testimony follows up on the study done by the GAO. We appreciate you taking the time to come and explain it to us in person. Very good.

We'll now turn to a request that was made to us by HESCO to have a presentation, while some of the village people are here, of the plan that they have undertaken and they have experience with here in the States.

Let me ask Dr. Suhayda to present his testimony now. Doctor.

STATEMENT OF DR. JOSEPH SUHAYDA, HYDRAULIC ENGINEERS, HESCO BASTION USA, LLC, HAMMOND, LOUISIANA

Dr. SUHAYDA. Thank you very much, Mr. Chairman, members of the committee.

My name is Joe Suhayda, and I'm pleased to have the opportunity to testify before you today on behalf of HESCO Bastion USA, a Louisiana-based manufacturer of a proven erosion-and flood-control product.

In my testimony today I will briefly describe house patented HESCO Concertainers can provide cost-effective solutions to many of your erosion and flooding problems that have been referred to previously. I will also describe specific projects for two locations, Shishmaref and Point Hope, for which we have developed conceptual plans to provide immediate relief for communities with the help of our partners in Alaska on this project, Alaska Erosion Control.

A little background. I'm a coastal engineer and I have about 30 years of experience working on coastal issues, particularly coastal erosion and flooding in Louisiana. Early in my career I actually did work in Alaska at Point Lay, Barrow and Pingok Island.

I have been working to try to develop solutions to problems that are occurring with regard to coastal erosion and flood control that address the issues of small communities. In Louisiana we have several situations where we have communities larger than, but not dissimilar to many of the village communities in Alaska. The solutions for these types of communities need to be considered to be in a different situation than the technology that would be used to, say, deal with New Orleans or the Mississippi River or something like that.

Chairman STEVENS. Doctor, we've got to give up this room at 12 noon. Could we ask you to tell us what you've got and tell us how this might work in Alaska?

Dr. SUHAYDA. I will do that. What I have here is a miniature version of what's called the Concertainer. If you just take a look at it for a minute, what we have is a wire cage or basket. We've got an elongated rectangle. It has interior partitions of the wire.

Chairman STEVENS. In actual dimensions, how big is that?

Dr. SUHAYDA. This could be manufactured from 2-foot squares to 3 foot, up to 7-foot squares. They can be made in lengths up to eight units long. So one of these is referred to as a Concertainer. The wire mesh is steel-coated with a zinc-aluminum galvanization alloy. The 3-inch mesh has a life of about 40 years. On this particular example I have a polypropylene liner that is placed on the periphery of it, and that liner is to allow you to put native local materials into these cubes and contain them such that we then have a structure that is rigid and heavy enough to hold itself down.

Chairman STEVENS. Do you have any vertical poles to hold it?

Dr. SUHAYDA. Not necessary, no, sir. What can be done if it's a situation where the forces are large enough is we can put another layer of these units, tie them together. Because of this spiral here at the junctions of the cubes, you can connect two units together or several units together. We can also put another unit on top of this one.

You can actually build big structures, but they're integrated structures. There's little disconnects between any of the units.

We're looking at different materials now to put in here that would be appropriate for the Arctic environment; some of the polypropylene products would not be. When it comes to the advantages of this product, it's shipped in a collapsed form. If you go out to a site, what you do—and this can be done by hand—even for a 7-foot unit, is fold the units out, connect them up, and then either with shovels or light equipment, take local materials; it could be

sand, gravel, or rock, stabilized material—or in the extreme, if required, concrete—and fill these baskets up. What you end up with then is a structure that's of the appropriate height and geometry to deal with the specific problem that you have.

Chairman STEVENS. Don't you have to make the—like your example—don't you have to make the clip square?

Dr. SUHAYDA. For this particular example, which is in the United Kingdom, and I'd like to go to the slides now. What we have here was an erosion problem that is similar to many of the locations in the Bering Sea. The solution here was to place the Concertainers at the base of the cliff and then build upward. These actually are filled with concrete. We're dealing with the northeast coast of England with a lot of wave action. Other locations would use other types of materials.

If you notice here, there's this building—they actually built a wall up here such that the surface area above the wall could be used, that is, you actually reclaim some of that area.

Could I have the next slide? The major use today of the HESCO Concertainer units is in military applications to provide blast and munitions protection. The Concertainer was developed——

Chairman STEVENS. We saw those. Let's get to the flood control.

Dr. SUHAYDA. Yes, sir. We have in Louisiana some flood control applications. I just want to show you that they are, again, applicable not to a Corps of Engineers' scale of project, but much smaller.

Here's a situation where we have a small—what was done was a keyway was cut, removed a surface organic material. They laid the units out, interconnected them by hand, and then with a small Bobcat or front-end loader filled them up with sand. We end up with now having raised this about 4 feet at about one-third of the cost that it would have been for an alternative design.

Chairman STEVENS. What's it cost for 1,000 feet, 8 feet tall?

Dr. SUHAYDA. I can give you costs for the materials, that is the Concertainers. Now, the local fill material, obviously if it's available freely, that would reduce the cost. Construction labor is also an issue. We can give you a cost per foot. It ranges, for a 4-foot unit—if you could get away with one 4-foot unit—less than $50 a foot.

If you have to put two or three units together to build it up into a bigger pyramid type structure, it will run $100 or maybe a couple hundred dollars a foot for a very big unit. Again, this would just be materials cost in terms of the Concertainer, not the fill material and not the labor.

An example of a little larger structure 7 feet high, which was two 4-foot units with a 3-foot unit on top of that was for the east Jefferson hurricane protection levee for the city——

Chairman STEVENS. Have you tried any of that in the Arctic yet?

Dr. SUHAYDA. Not yet, sir, we're hoping to do that.

Next slide. Well, what happened is that we became aware of some of the issues and problems in Alaska with regard to coastal erosion through a newspaper article. That piqued our interest as to whether we could find applications here in Alaska. So at the beginning of this year we had several people come up to Alaska, again, it was with Alaska Erosion Control, met with several of the

villages. At that point it's a fact-finding mission to learn more about what the issues are.

You were gracious enough to meet with a person from HESCO and encouraged us to continue. At this point we have met with eight of the nine villages that are on the GAO critical communities list.

What I would like to do is talk about our capabilities to support two projects this summer with regard to the materials. I'm using the examples here of Shishmaref and Point Hope. There could be other locations. One is a coastal erosion problem and the other is a flood problem.

In Shishmaref there's about a 2,000-foot segment there that needs to be addressed. What we can do is make materials available at Shishmaref by the end of the month that should be sufficient to support any design that would be done, such that if the design engineering and construction capabilities are sufficient at the site, we could actually get something done before the winter freeze-up occurs.

Our role in this is to provide the materials, provide support with regard to the engineering techniques and construction techniques, but to not do either the engineering or the construction. Obviously, the expertise is here in the State. We can make the material available to allow a period of about 2 to 3 months for construction and engineering. That's about the best we can do for this year.

Next slide. This is Point Hope. You've got a flooding problem along with others. There are, as I have shown you before, designs and configurations that act very effectively as flood barriers that can be as high as 4 feet or 7 feet that are relatively easy to construct. The engineering required for that situation would be much less than it would be for Shishmaref. I think, again, we could provide enough material to support some type of flood-abatement project given that the engineering and construction, of course, would be needed.

Chairman STEVENS. What would be the estimate of the cost of each of those projects?

Dr. SUHAYDA. I can give you a materials cost. I figured it out. As I said, we're talking about somewhere between $50 for a single unit up to maybe a couple hundred dollars a foot if you wanted to put more Concertainers. If you wanted to go to a very elaborate structure obviously with more components, more Concertainers, and the per foot cost is just going to be proportional to how many units we use.

I'd like to just sum up, if I could. What we were hoping to do is provide you with a way of extending the impact of any funding that's available for projects. For example, if you have $1 million and a traditional design would allow you to build 300 feet, we're hoping to provide you with options to build 600 feet or 900 feet that would meet the same performance and engineering type theory of the original design. We can do that because there are some inherent advantages to this structure.

[The statement follows:]

PREPARED STATEMENT OF DR. JOSEPH SUHAYDA

INTRODUCTION

Mr. Chairman, Senator Murkowski, Governor Murkowski and Members of the Committee, my name is Joseph Suhayda. I am pleased to have the opportunity to testify before you today on behalf of HESCO Bastion USA, LLC, a Louisiana based manufacturer of a proven erosion control product.

In my testimony today I will briefly describe how patented HESCO Concertainers® can provide cost effective solutions to many of the erosion and flooding problems that have been previously described. I will also describe specific projects for two locations, Shishmaref and Point Hope, for which we have developed conceptual plans to provide immediate relief for communities with the help of our partners in Alaska, Alaska Erosion Control, LLC.

I am a coastal engineer and have had over 30 years experience dealing with coastal issues, particularly coastal erosion and flooding in Louisiana. Early in my career I did research on the North Slope of Alaska; at Point Lay, Barrow and Pingok Island. Louisiana, like Alaska, has been experiencing severe coastal erosion and flooding. For the last thirty years I have been working to develop solutions to these problems at Louisiana State University and as a consultant to several federal and state agencies.

The primary means for addressing coastal wetland loss problems in Louisiana is the Coastal Wetland Planning Protection and Restoration Act, a shared federal and state program. Working with CWPPRA, or the Breaux Act as it is referred to in Louisiana, I have developed an appreciation for the importance of developing cost effective solutions for the erosion problems of small communities. I became involved with HESCO because it presented the first opportunity I was aware of to develop viable cost effective solutions to erosion and flooding problems not only in Louisiana but nationwide as well.

HESCO AND HESCO PRODUCTS

To draw your attention to the unique and often hard to describe HESCO system, I have brought a miniature of one of the HESCO Concertainers®. The Concertainer® is a rectangular or cubic basket composed of wire and lined with a geotextile fabric. The panels are heavily galvanized wire mesh with a zinc-aluminum alloy and have a functional life of 38 years. The geotextile fabric is typically polypropylene, however, it can be any of a variety of materials suited to the particular environment of the project site.

The units are shipped to the project site in a folded configuration and then quickly unfolded along the prepared route of the structure. The Concertainers® are filled with native materials using light construction equipment or even shovels. Units of various sizes are stacked in order to achieve an overall structure for the desired width and height. A typical coastal erosion prevention structure is shown in Figure 1.

The HESCO Concertainer® was invented in England as an erosion and flood control product. The first erosion project done by HESCO UK was installed in 1989 and HESCO UK has established a reputation over the last 15 years of successfully preventing land erosion and coastal flooding worldwide.

HESCO Concertainers® are being used extensively by the U.S. Military in Iraq and all over the globe to build structures which protect our troops, as shown in Figure 2. As you have probably seen on the news, the military application is to build blast and munitions absorbent walls that provide troop protection. The photo in Figure 2 was taken earlier this year in Iraq. This security application has become the main market for the HESCO product.

Although HESCO UK has been working successfully with the United States military, the product has not seen much use as it was originally designed: erosion or flood control. To support this use, HESCO UK licensed the product to be manufactured in the United States. HESCO Bastion USA, LLC was opened on February 4, 2003 in Hammond, Louisiana. Because of the enormous erosion and flooding problems that occur in that region, HESCO USA has gained valuable experience in responding to the needs in the Gulf Coast states. Our interest and scope of capabilities has now expanded from Louisiana to Florida and California, and now with the help of Alaska Erosion Control, here in Alaska.

The Concertainers® have been used in several locations in Louisiana. Figure 3 shows the placement of two 4 foot high units in Jefferson Parish, Louisiana. The Concertainers® replaced a failed sand bag structure and completed a critical component of the hurricane protection levee system surrounding the city of New Orleans.

Figure 4 shows the addition of Concertainers® to the top of the South Lafourche levee system in Raceland, Louisiana. This addition provided a cost effective incremental improvement to the existing levee system that was in need of being raised, but due to the costs associated with a prior product, improvements had been delayed. HESCO was able to come in and complete the project at a fraction of the original project's estimated cost. HESCO has been recently tested as a rapid response flood barrier by The Army Corps of Engineers at their Waterways Experiment Station (WES) in Vicksburg, MS. After a month-long series of lab and field tests, indications are that HESCO passed all the tests, but we are awaiting the official results from the Corps.

The product is unique in that it has an almost universal application due to the flexibility of the design and its ability to adapt to local needs and conditions. Examples of this universality include successfully completed projects ranging from flood control, bank stabilization, mudslide prevention and port security. Based upon this proven record of success I believe that the Concertainer® can provide a solution to many of the erosion and flooding problems occurring in Alaska.

HESCO ALASKA

HESCO learned of the erosion and flooding problems in Alaska in September 2003, and with Alaska Erosion Control, conducted several reconnaissance visits to Alaskan villages in 2003 and 2004. After these initial visits, we met with you, Chairman Stevens, to discuss our findings and solicit your advice as to how to best make HESCO available in Alaska.

At your urging, Mr. Chairman, HESCO and Alaska Erosion Control have since visited eight of the nine critical villages in the December 2003 GAO report. We can now offer our assessment of what we can do to immediately help address the problems.

Based on these visits and after assessing the viability of utilizing HESCO in the eight villages, we have decided in this presentation to focus on two of the villages where we feel we can be most helpful in the immediate future. These two sites reflect the two general types of problems being faced by many communities; flooding and erosion.

The first location we address is Shishmaref. Figure 4 shows the nature of the problem. The coast is eroding at a severe rate and Shishmaref needs erosion control to save over about 2,300 feet of shoreline. Our preliminary design is shown in panel B and consists of several Concertainers® stacked into an erosion barrier that would armor the shoreface. The placement and height of the wall will be determined in the final design. Again, the advantage of HESCO is that the design utilizes local materials and equipment.

The second location we are to address is Point Hope. Figure 5 shows the nature of the problem. The community is located on a low lying barrier island and is subject to periodic flooding from the sea. Point Hope needs a flood protection system. Our conceptual design would consist of several Concertainer® units stacked into a flood barrier that would surround any of the threatened areas. The placement and height of the wall will be determined in the final design. Again, the design takes advantage of local materials and equipment. We hope to install it this year, weather and paperwork permitting.

These projects represent only two of many Alaskan projects we believe can be addressed with HESCO products. Not all of the problems faced by the Native Alaska Villages will be solved using HESCO. However, we believe we can provide a cost effective option to solve many of the critical erosion and flooding problems.

SUMMARY

There are numerous advantages of HESCO products. First, is the simplicity of installing the product. Second is the use of indigenous materials to fill the Concertainers® and the use of local machinery and labor to provide this service. The third advantage is the cost advantage that HESCO's product provides is the use of light construction equipment. With proper training "tech transfer" can occur allowing local project planners and engineers to design solutions, and local labor to conduct installation and maintenance of future projects. HESCO and Alaska Erosion Control would continue to provide technical support.

HESCO Concertainers® are a cost effective option to address many of the erosion problems that have been discussed during these hearings. Our approach is to utilize local resources including local people, equipment and materials. Based upon this approach, we believe we have the best method to maximize the chance of completing at least one of the two projects, if not both, discussed previously during this season.

Thank you again Senator Stevens for inviting me to testify here today. I hope to answer any questions you may have.

Chairman STEVENS. Senators, do you have any questions?

Senator SUNUNU. The existence of that polypropylene shell, doesn't that increase the force of a tide or any current on the structure?

Dr. SUHAYDA. Well, it doesn't increase it. It does prevent or control the movement of the sediment. We don't want fine sand, for example, to leach out. That's why we need something that contains fine material. Obviously, the measurement size could be adjusted. It doesn't really influence the magnitude of the forces.

Senator BURNS. That's the way we build some corner posts in Montana for our fences.

Dr. SUHAYDA. I'd just like to conclude by thanking you very much for this opportunity to testify. If there are any more questions, I would be glad to take them.

Chairman STEVENS. Would you consider those temporary barriers or permanent barriers?

Dr. SUHAYDA. No, it's designed to be permanent. I mean, this is not something that you would plan to remove. Now, it's not impossible to remove them. In fact, in certain cases they have been removed. But, no, this is a permanent structure.

Chairman STEVENS. Do you think that you could prevent the intrusion of the water on the airport there at Point Hope? Have you visited there?

Dr. SUHAYDA. I'm telling you that we've done projects where that has been engineered. We had a recent test by the Corps of Engineers exactly for that purpose, to look at the ability of one 4-foot high unit to resist flood waters. I don't want to preempt the Corps' final report, but in my opinion it passed all those tests. So I believe, yes, sir, we've got a product that if properly designed and constructed would do that.

ADDITIONAL SUBMITTED STATEMENTS

Chairman STEVENS. The committee has received statements from the Northwest Arctic Borough and Matanuska-Susitna Borough which will be placed in the record at this point.

[The statements follow:]

PREPARED STATEMENT OF THOMAS K. BOLEN, PUBLIC SERVICES DIRECTOR, NORTHWEST ARCTIC BOROUGH

Thank you for the opportunity to testify on this important topic today. Shoreline erosion is a fact of life that many Alaskans have lived with, day in and day out, for many years. In northwest Alaska, we have several communities that suffer the impacts of shoreline erosion, but none quite so perilously as the community of Kivalina.

Northwest Arctic Borough is the regional (like a county) form of government serving an area the size of the state of Indiana. Borough government has been working with the people of Kivalina for the past 15 years on the issue of planning the relocation of this coastal community which has been continuously threatened by shoreline erosion and inundation by water and ice. The study efforts have been a cooperative venture by the U.S. Army Corps of Engineers, the Northwest Arctic Borough, the City of Kivalina, and the Native Village of Kivalina. The cost of this study and planning work has been shared equally by the federal government and the local partners.

Although Kivalina's location was probably a great choice of a place to put a subsistence fishing, whaling, or seal hunting camp, many years ago, it is agreed by all

who have seen Kivalina first hand that it is not a suitable site for a modern community in need of room to grow and lacking the infrastructure necessary to bring it into the 21st century. Kivalina residents dwell on a narrow barrier island facing the Chukchi Sea to the west and the Kivalina Lagoon to the east. Erosion and flooding occur from both directions under differing weather conditions. Kivalina residents haul water to their homes in plastic buckets and haul sewage and other wastes from their homes in other plastic buckets. These conditions continue today because state and federal funding agencies are prohibited from funding infrastructure improvements due to the threat of erosion and inundation.

Residents of Kivalina cannot evacuate their barrier island easily or quickly. To do so would require boarding many small planes, or readying and launching many small boats. Neither of these options are usually available during the severe storm conditions which would usually bring high water. Kivalina is a catastrophe waiting to happen. As the Emergency Manager for Northwest Arctic Borough, I have constant concerns for the welfare of Kivalina residents.

This community is in dire need of an affordable alternate site, and of critical importance initially is a means of access to an alternate site. To date, except for the ice trails of winter, there has never been any access to alternate sites. Kivalina residents have never had Spring, Summer, or Fall access to any alternative site which could stimulate organized or individual relocation. It is therefore no small wonder that after 15 years of study, planning, and designing, that Kivalina residents are still trapped on their barrier island.

The Northwest Arctic Borough has always supported Kivalina's desire to relocate, and continues to work to bring about successful relocation. The Borough and Kivalina residents are grateful to Senator Stevens and his congressional allies for making study money available to investigate this issue. We urge that more funding is needed to address making relocation happen for Alaskan residents, like those in Kivalina, who find themselves socially, economically, physically, and spiritually pinned down by the forces of Mother Nature. As Moses said to the Pharaoh, "let my people go." We must find a way to build access to the promised land and set Kivalina residents free.

PREPARED STATEMENT OF JOHN DUFFY, BOROUGH MANAGER, MATANUSKA-SUSITNA BOROUGH

I am writing to you today to present the testimony of the Matanuska-Susitna Borough regarding erosion problems.

The Matanuska-Susitna Borough encompasses an area approximately the size of the state of Pennsylvania. The Borough has one of the fastest growing populations in the United States, increasing from 44,260 in 1986 to over 66,000 in 2004, and is ranked as the 47th fastest growing "county" in the country. The Borough has about 75 miles of saltwater shore and over 10,000 miles of inland shore line.

The Matanuska-Susitna Borough is characterized by high mountains dropping to fertile valleys, where most residents live. Thousands of streams and dozens of rivers course through the Borough providing some of the most important habitat and recreational areas in the state. There are currently over 3,500 individual parcels designated as creek or river frontage.

An additional 9,700 parcels are listed as lake frontage. Many of these parcels are also affected by erosion issues. Unfortunately these numbers underestimate the risk because millions of acres containing thousands of miles of rivers and creeks remain in large ownership blocks. These lands are being subdivided and developed at an ever increasing rate.

The borough suffers from repetitive and substantial flooding which is causing more damage and risk to public health and property as our population and development density increases. While the history of flooding in the Borough is incomplete due to the remote nature of the area, many damaging floods have occurred in just the last fifty years (1955, 1959, 1969, 1971, 1973, 1975, 1986, 1992, and 1995). It is important to note that much of the damage to property and structures caused by these flood events resulted from erosion rather than high water levels. In addition, the damage from erosion occurs much more frequently than flood damage.

Due to the nature of the rivers and streams in our Borough the risk from erosion and flooding is not described or predicted through the traditional concept of the 100 year flood plain study. To prevent this damage and loss the Borough needs better tools to predict these erosion risks.

One of the biggest obstacles to preventing damage along our waterways is the fact that many of the rivers and streams in the Borough are braided and meandering, or steep and fast moving. Both types of watercourses travel predominantly through

alluvial and glacially deposited soils and gravel which are easily displaced even by non-floodwater velocities. This characteristic results in frequent and very prevalent erosion and undercutting as the streams change course and cut new channels. The damage can be quite dramatic with undercut bluffs dropping hundreds of feet and shore lands cutting more than sixty feet per day into uplands along thousands of feet of the shore.

This characteristic of our watercourses is common to braided and meandering streams and is not necessarily a function of the flood stage. The erosion and undercutting occurs more frequently than flooding and can be more devastating than flooding because the dramatic change in topography often makes reconstruction or redevelopment impossible. Several blocks of the original town site of Talkeetna are now lost to the waters of the Susitna River. Whole blocks of subdivisions have similarly been eroded into the Matanuska River. Homes have fallen into the Matanuska River as recently as 1992. Some homes and buildings have been relocated as the river or stream advanced. The Borough has condemned some structures to facilitate removal. Many cabins and structures have fallen into numerous other streams and rivers over the years. Currently major roads such as the Glenn Highway and Parks Highway, as well as the Alaska Railroad and major electrical utility lines, are continually threatened by undercutting from these and other watercourses.

Structural mitigation measures such as shore armor, levies and dikes are used to reduce damage. The borough and the state have repeatedly been forced to conduct emergency stopgap efforts to temporarily stave off quickly developing imminent threats to homes and roads. Unfortunately, the shear volume and relentless actions of the water flow defeats these structures in a remarkably short time unless they are frequently repaired at great expense.

The constantly changing course of the streams makes it impossible to map the floodway with any predictive certainty, rendering Flood Insurance Rate Maps almost useless. The meandering characteristics of the alluvial rivers also quickly outdate any detailed mapping effort using conventional backwater analysis. Inaccurate Flood Insurance Rate Maps result in inaccurate decisions about flood and erosion risk for planners and developers. Uncertainty makes it more difficult to adopt and implement meaningful land use and development plans and regulations.

Viewing the area likely to be traversed by the meandering river as a "Meander Belt" allows a more meaningful basis to develop hazard analysis and mitigation plans. The meander belt analysis requires adequate tools for recognizing both the vertical and horizontal boundaries of areas likely to be impacted by water volume, water velocity, erosion and sediment deposition over a specified time frame. Using this information, local, state and federal government officials can make the most accurate and cost effective decisions for preventing loss of property and risk to public safety. High risk areas can be more easily avoided and development can be more efficiently designed to maximize profit, as well as, public value, in the feasible area.

The borough lacks methodology, resources and information for developing the necessary new models to predict and assess risk of riverine meander belts. Even basic historic water volume and flow data does not exist for many of our water courses. Watershed data and traditional flood hazard data is incomplete or outdated, where it does exist.

Having wrestled with the problem of erosion for many years we have considered several alternatives to address the problem. The damage arising from the unusual circumstances not routinely encountered in flood situations elsewhere requires rejection of traditional 100 year flood plain concepts. It is our opinion that a new concept is needed to arrive at realistic mitigation measures.

The Borough therefore respectfully requests that Congress authorize the development of methodology to predict the 30, 60, and 100 year erosion meander belts with associated flood hazard areas of the water courses in the Matanuska-Susitna Borough, particularly in the areas where development pressure is highest, and to revise National Flood Insurance Rate Map panels accordingly. To this end, we request the creation of a demonstration project that would result in the following products: completion of a comprehensive watershed study of the Borough; establishment of a comprehensive network of flow meters in the more significant streams and rivers; study of those watercourses resulting in a new flood and erosion hazard study for the Borough; identification of 30, 60, and 100 year erosion meander belts; and identification of best management practices and guidelines to protect property from erosion.

We believe that the following watercourses should be included within the demonstration project: Susitna River, Matanuska River, Knik River, Little Susitna River, Willow Creek, Deshka River (Kroto Creek), Kahiltna River, Skwenta River, Yentna River, Alexander Creek, Talkeetna River, and Chulitna River.

With the information obtained through this demonstration project, the Borough will have much better tools available to protect property and the safety, health and

welfare of its residents. Moreover, the information will be readily transferable to other communities and municipalities in Alaska.

The Matanuska-Susitna Borough thanks the Committee for its attention to this serious matter. If there is more information that we may provide, please do not hesitate to contact me at (907) 745–9689.

CONCLUSION OF HEARINGS

Chairman STEVENS. Okay. Thanks very much. We appreciate you coming up.

This will conclude our hearing.

[Whereupon, at 12:02 p.m., Wednesday, June 30, the hearings were concluded, and the committee was recessed, to reconvene subject to the call of the Chair.]

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