

Climate Change in Alaska

West Coast Regional Managers' Meeting

San Francisco, CA

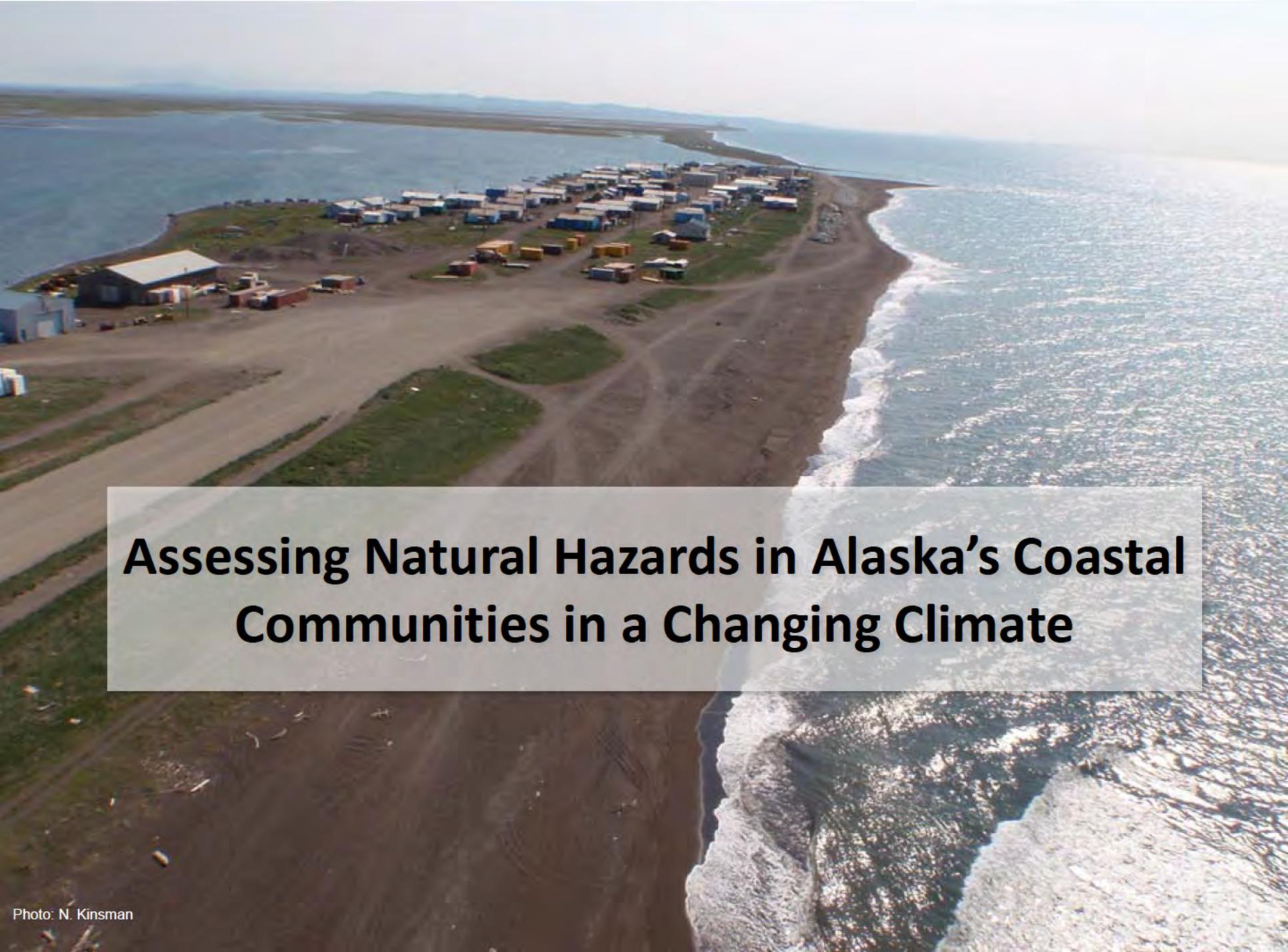
January 5-6, 2011

Presented by Kim Kruse

Alaska Coastal Management Program

Assessing Natural Hazards in Alaska's Coastal Communities in a Changing Climate



An aerial photograph of a coastal community in Alaska. The settlement is built on a narrow strip of land, with numerous small, colorful buildings (blue, yellow, and white) clustered together. A wide, dark sandy beach runs along the right side of the community, meeting the ocean. The water is a deep blue, with white foam from waves breaking against the shore. In the background, a large body of water, possibly a bay or inlet, is visible, surrounded by low-lying hills and mountains under a clear sky.

Assessing Natural Hazards in Alaska's Coastal Communities in a Changing Climate

Executive Order 238:

Scientific evidence shows many areas of Alaska are experiencing a warming trend. Many experts predict that Alaska, along with our northern latitude neighbors, will continue to warm at a faster pace than any other state, and the warming will continue for decades.

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As a result of this warming, coastal erosion, thawing permafrost, retreating sea ice, record forest fires, and other changes are affecting, and will continue to affect, the lifestyles and livelihoods of Alaskans.

Alaska needs a strategy to identify and mitigate potential impacts of climate change and to guide its efforts in evaluating and addressing known or suspected causes of climate change.

An aerial photograph of a coastal town, likely in Alaska, showing a cluster of buildings and a beach along the ocean. The town is situated on a narrow strip of land, with a large body of water to the left and the ocean to the right. The buildings are mostly small, rectangular structures, some with blue roofs. The beach is dark and sandy, with waves breaking onto it. The sky is clear and blue.

Executive order 238

....Climate change is not just an environmental issue.

It is also a social, cultural, and economic issue important to all Alaskans.....

Hazards and Alaska's Coastal Communities

- ✓ Natural hazards can cause casualties and severely damage property and infrastructure



- ✓ Changes in climate can modify or intensify natural processes that lead to hazards



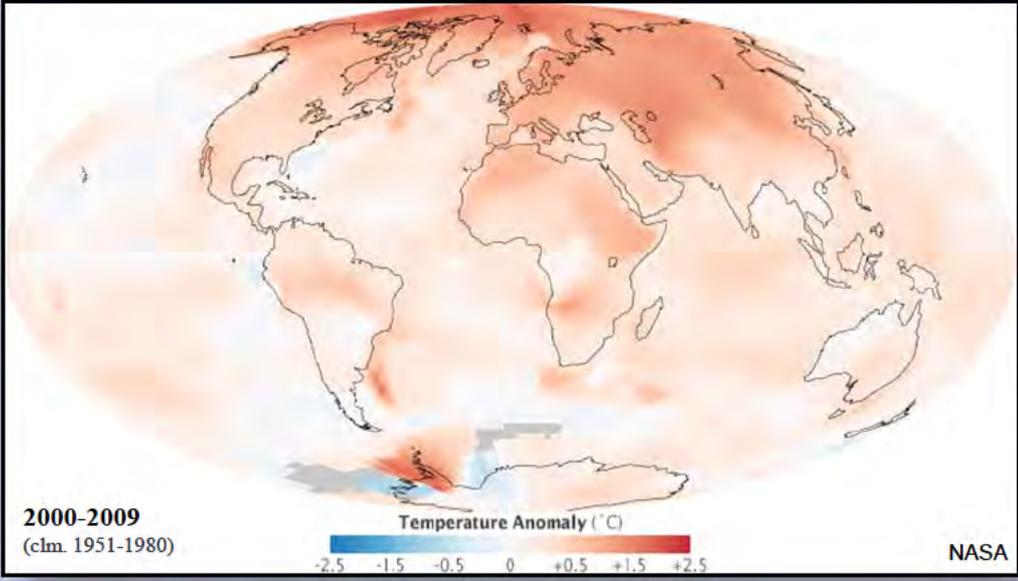
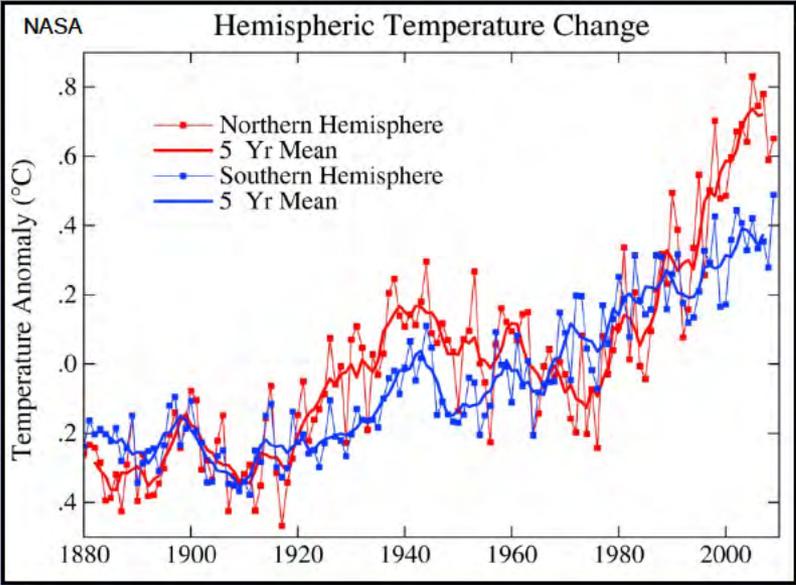
Hazards and Alaska's Coastal Communities

- ✓ Numerous threatened communities in Alaska are currently involved in mitigation or adaptation efforts in response to natural hazards



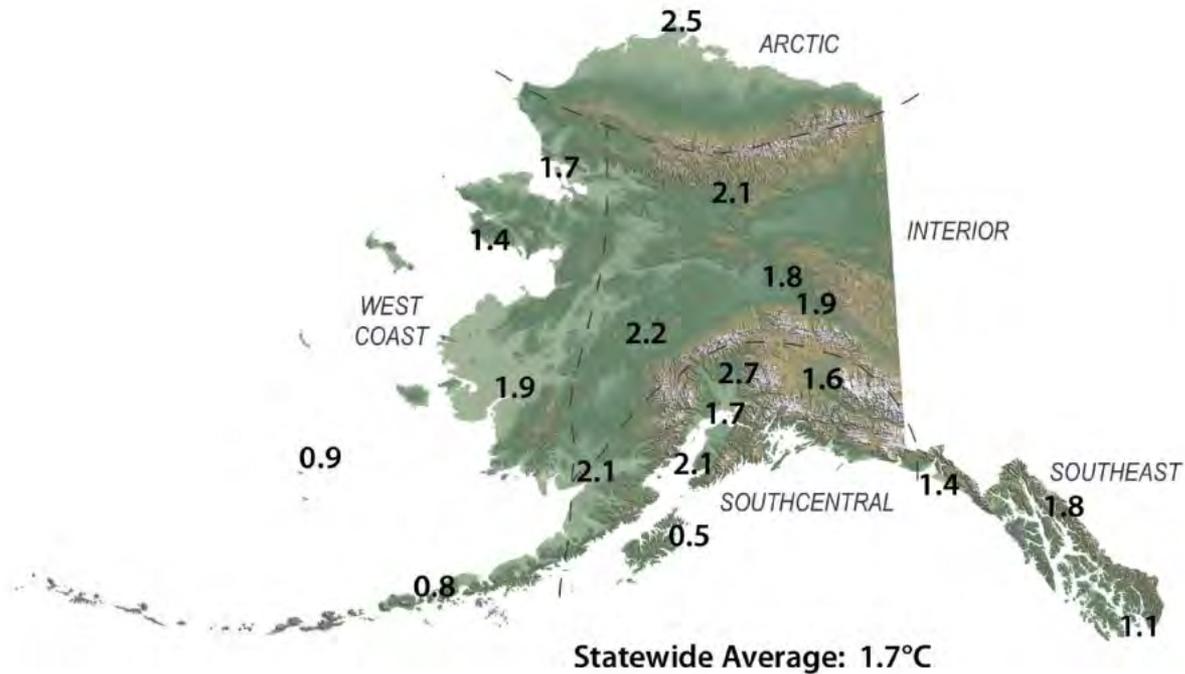
- ✓ Informed community decision making requires accurate and up-to-date baseline geoscience data

Changes in Climate



Changes in Climate

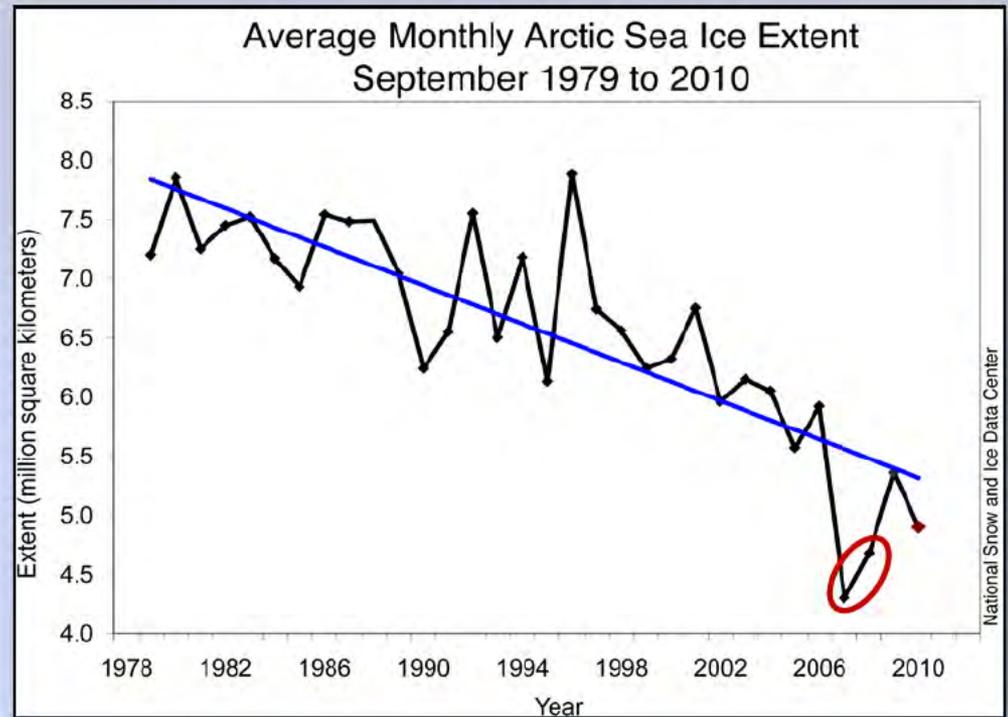
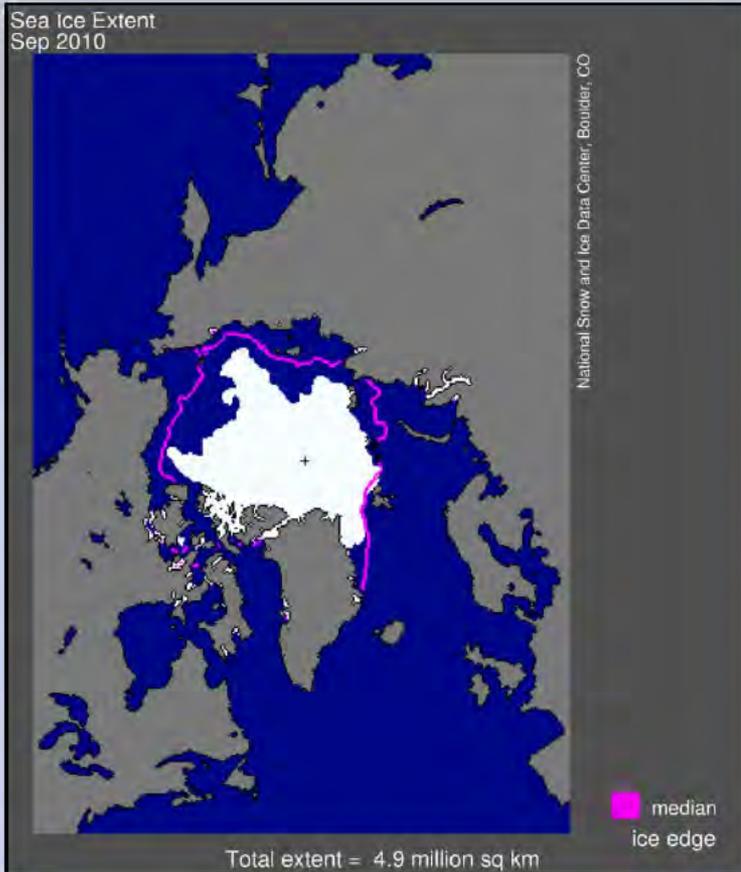
Total Change in Mean Annual Temperature (°C), 1949 - 2009



Alaska Climate Research Center

Geophysical Institute, University of Alaska Fairbanks

Changes in Sea-ice

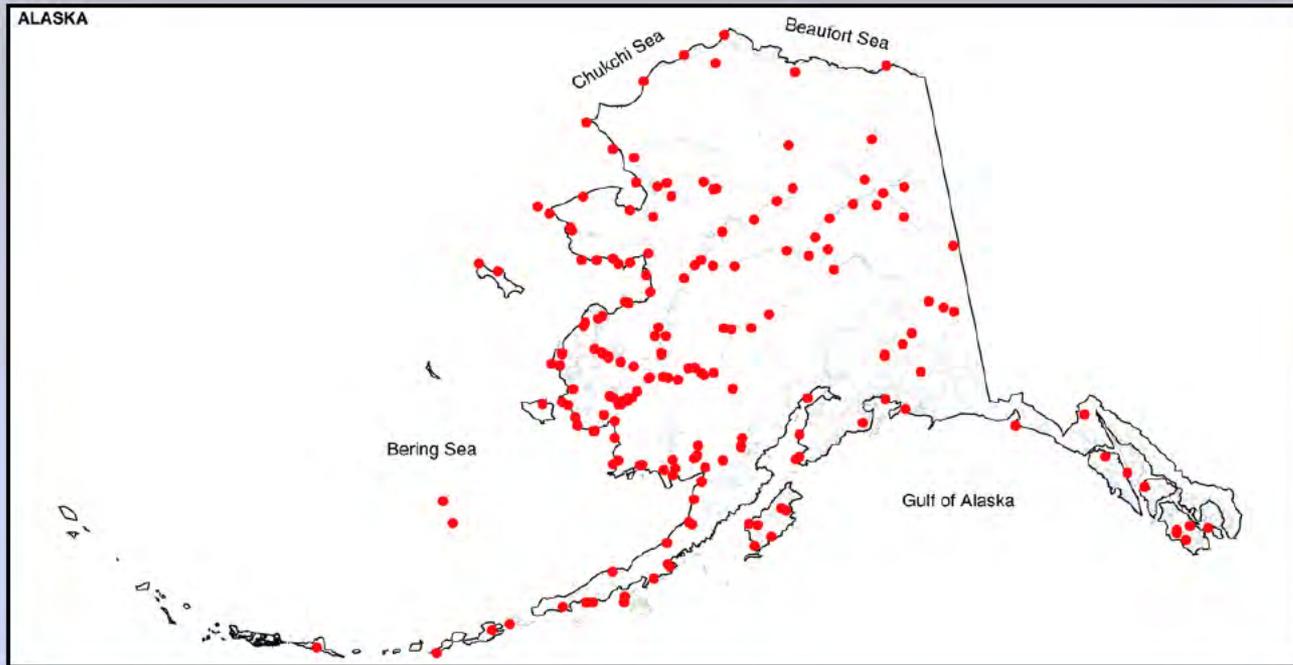


Environmental Change and Alaska's Landscape

Changes in geomorphic processes



Background: Hazards and AK's Coastal Communities



Locations of
184 Native
villages
affected by
flooding and
erosion (GAO
Report, 2004)

Timeline:

GAO Report –
2004

USACE Report –
2006

IAWG Report -
2008

IAWG's highest priority communities:

- Kivalina*
- Koyukuk
- Newtok

- Shaktolik*
- Shishmaref*
- Unalakleet*

Process vs. Hazard?

Natural Processes



Natural Hazards



- ✓ *Hazard*: an exposure to a natural geophysical process that adversely affects people, property, or infrastructure
- ✓ *Risk*: the likelihood of this occurring

*How do we define
risk/hazards?*

How do we assess hazards?

How do we assess hazards?

Geohazard Evaluation and Geologic Mapping for Coastal Communities

Alaska Division of Geological & Geophysical Survey

Geohazard Evaluation and Geologic Mapping for Coastal Communities

Alaska Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS)

Funding: Coastal Impact Assistance Program (CIAP)

Federal Statemap funding

State CIP

Kivalina – pilot project

9 communities in all

Geohazard Evaluation and Geologic Mapping for Coastal Communities

Funding:

Coastal Impact Assistance Program (CIAP)

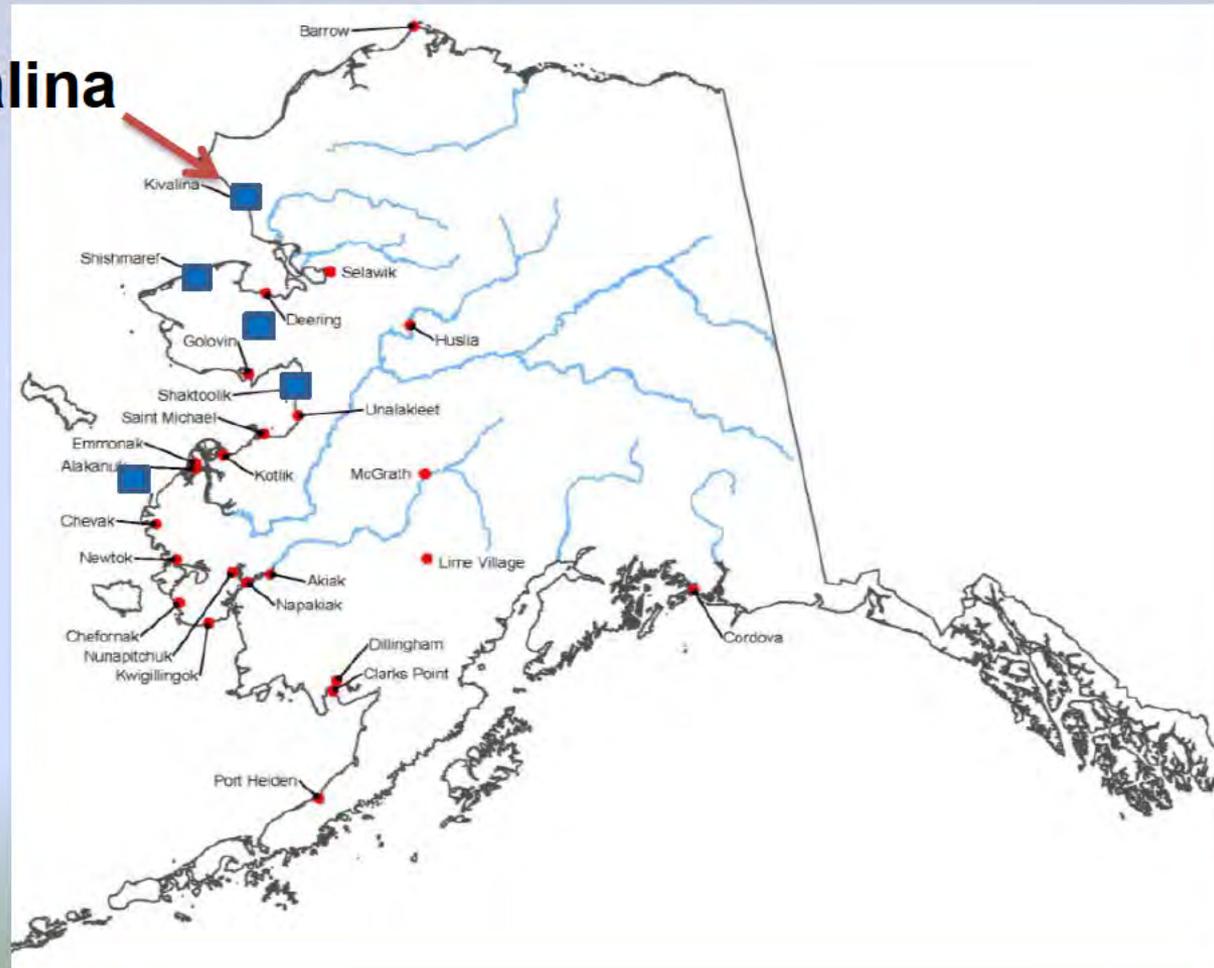
Federal Statemap Program

State CIP

IAWG priorities:

- Kivalina
- Shaktoolik
- Shishmaref
- Unalakleet
- Newtok
- Koyukuk

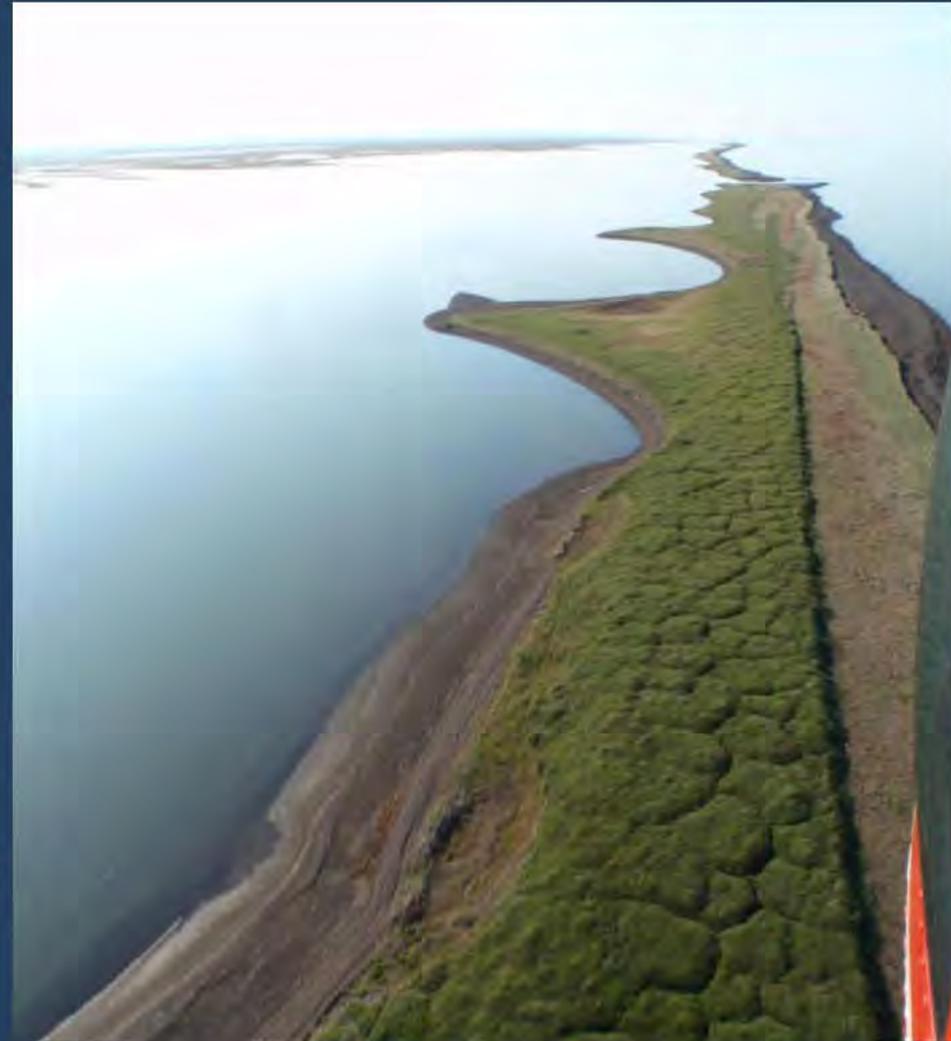
Kivalina

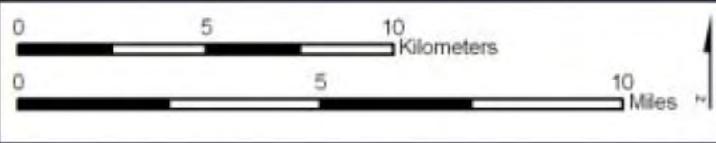


Geohazard Evaluation and Geologic Mapping for Coastal Communities

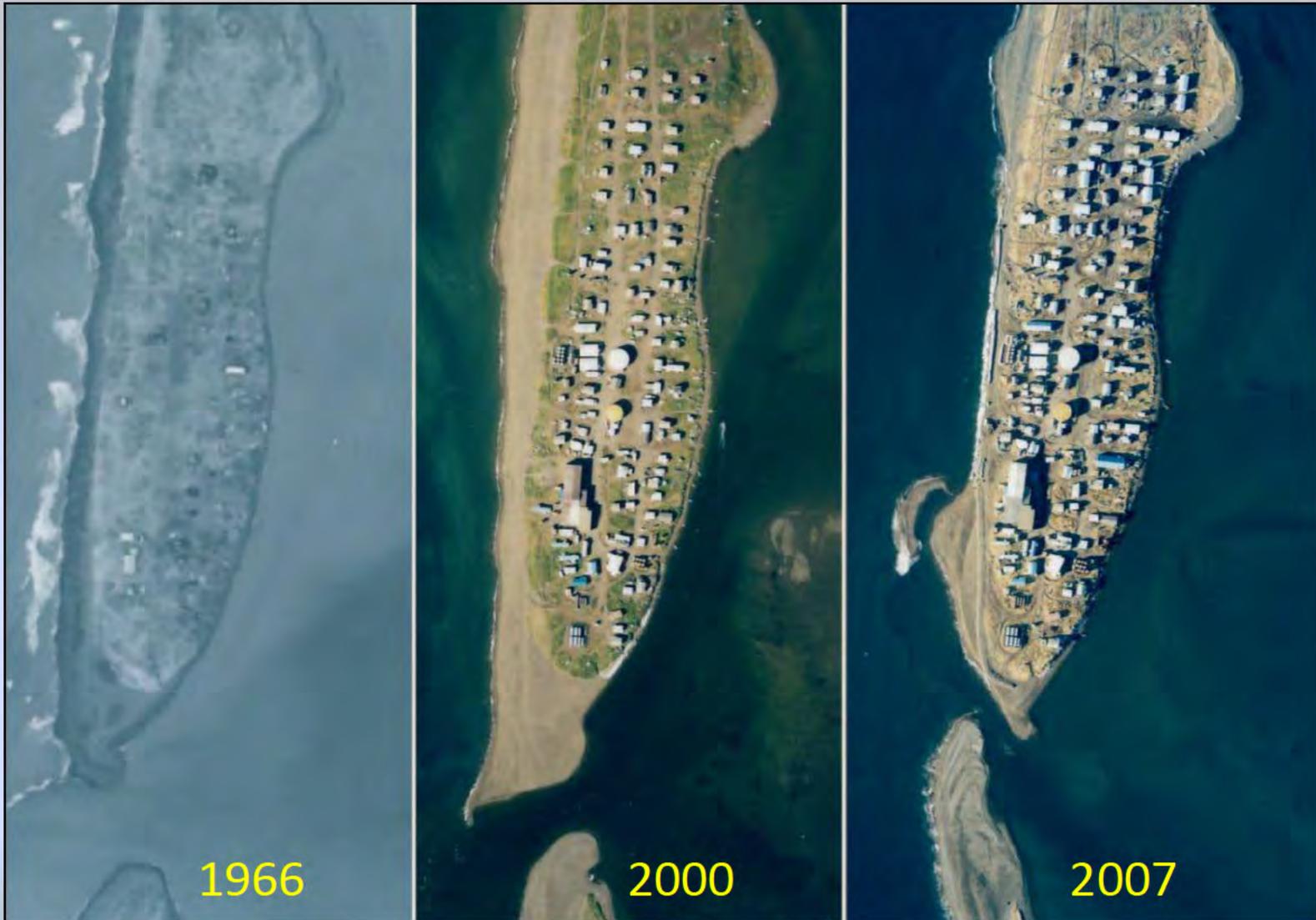
Original Objectives

- Map the surficial geology and develop a geomorphic framework that can be used to understand the active earth processes affecting the village of Kivalina and the surrounding area
- Map the bedrock geology at a reconnaissance level sufficient to evaluate the lithologies for general engineering characteristics
- Develop information matrices and derive maps that describe:
 - the general engineering properties of bedrock and unconsolidated geologic units in the map area
 - Identify and map potential geologic hazards
 - flooding, erosion, thawing permafrost and slope instability





Kivalina

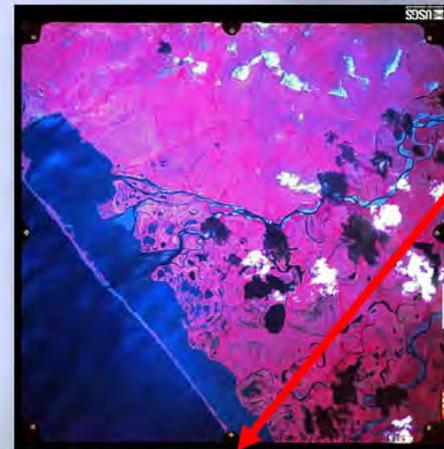


Shoreline protection OR relocation?

Hazards Assessments

Data and methods

- Field-based
 - Baseline assessments
 - *In situ* measurements, ground validation, and mapping
- Remote Sensing
 - Baseline Assessments
 - Requires the application of historic and modern integrative earth observation techniques with large coverage areas and repeat imaging
 - Change detection/Monitoring:
 - Requires repeat airborne and/or spaceborne remote sensing for regular and rapid observation and assessment



AHAP

Kivalina

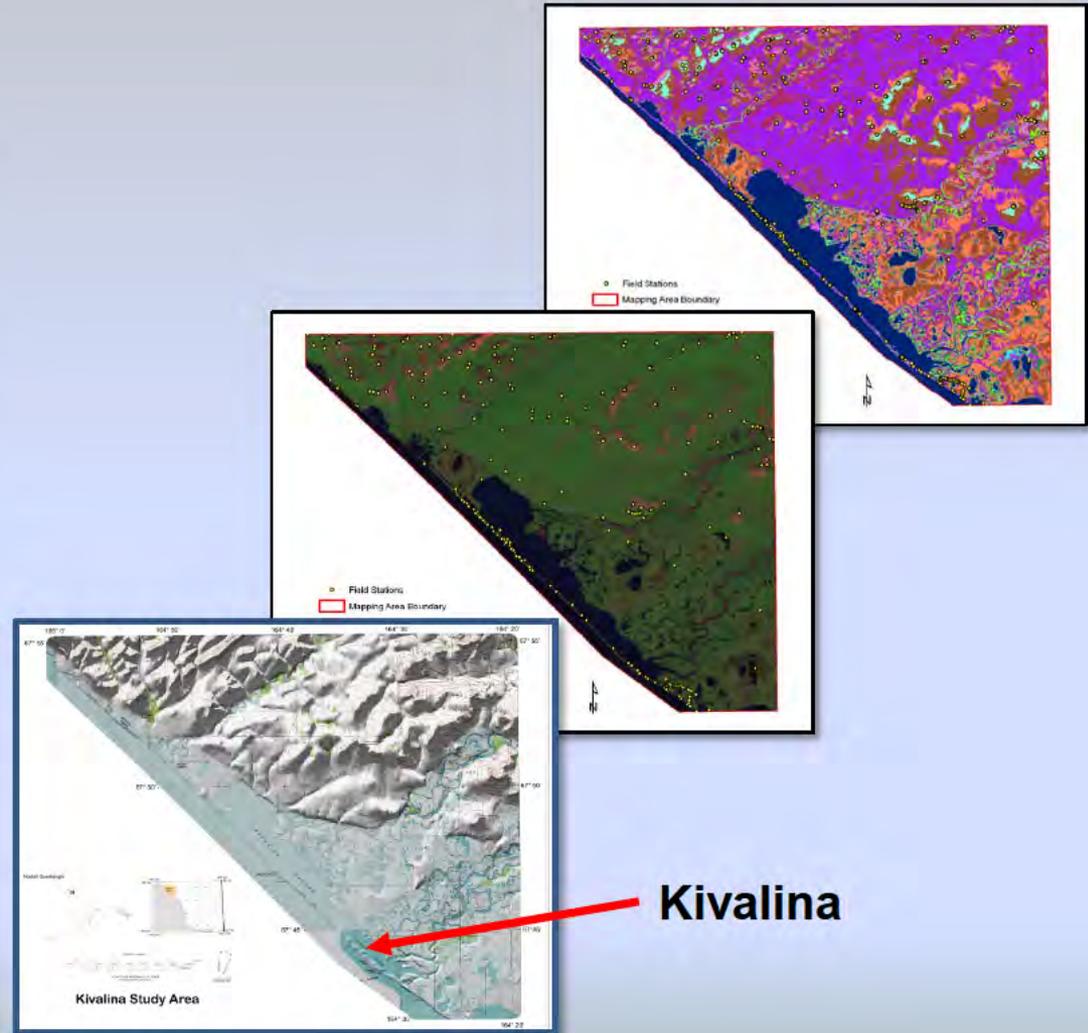


WorldView

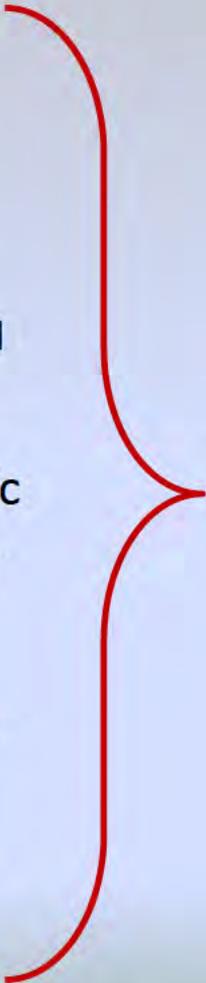
Hazards Assessments

Evaluation and Analysis

- Identify dominant physical processes
 - past landscape modifications and recent changes
 - frequency and magnitude
- Determine type, nature, and extent of unconsolidated deposits and bedrock
 - susceptibility to erosion and mass wasting
 - suitability for construction materials
- Identify and assess existing hazards
 - Potential hazards?
 - Climate change?



Benefits of Hazards Assessments

- Establish a collection of baseline data (legacy)
 - Provide valuable scientific information about hazards
 - Existence, changes, and potential
 - Promote public awareness of hazards and educate the public about specific hazards in their area
 - Provide critical information to decision-makers for use in community planning and risk management
- 
- ✓ builds capacity at all levels
 - ✓ helps communities mitigate or adapt to the impacts of hazards





Storm-wave erosion at Kivalina



Kivalina Erosion Control Efforts

Kivalina





Melting Permafrost

Shoreline protection efforts have “bought time” for Shishmaref and Kivalina.



Shoreline protection at Shishmaref

Photo courtesy of US Army Corps of Engineers, Alaska District

Kivalina Seawall



Welcome to Newtok



Erosion protection measures are not an option for Newtok.

Studies conducted since 1983 have concluded that there is no permanent and cost-effective alternative for remaining at the current site.

Village relocation is the community's only option.

US Army Corps
of Engineers



Water Source



2027

2022

2017

2012

2007

2003

2002

1996

Barge Landing



1996 Dump Site

Ninglick River

1983

ASCG, Inc.



Landfill lost in 1996. New landfill access by boat at high tides only.



**Barge landing lost 2005.
No cost-effective way to deliver
building materials.**



August 2006

Difficulties delivering fuel



Fuel barge

**Fuel Barge grounded
for three days in
Newtok River
April 2006**

Water source threatened in next five years



Photo courtesy of Stanley Tom, September 2005



Copyright © Jennifer Payne, Alaska Division of Community Advocacy, July 2006

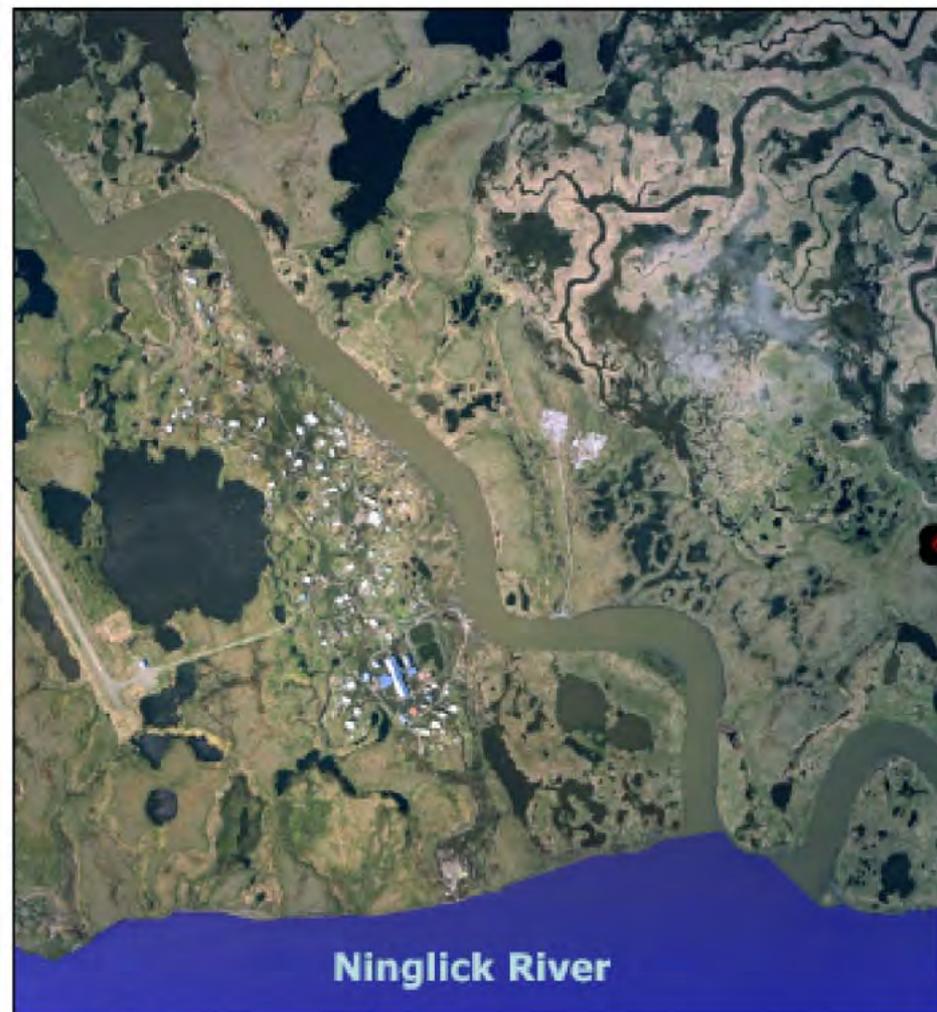


Newtok

land buffer lost

Captured bend in Newtok
River

Ninglick River

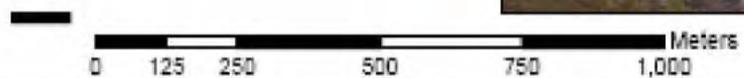


Newtok Flood - September 22, 2005

These maps show the extent of a flood which occurred at Newtok on September 22, 2005. The floodwaters completely encircled the village, effectively making it an island for several days. Several houses were only connected to the village via temporarily floating boardwalks.

The data seen here were gathered during a visit to Newtok on March 9, 2006. Residents indicated on aerial photos the extent of flooding around and within their village.

© IEN-CWEN-CW-ERW\Nscor\Newtok\Newtok_Flood.mxd





June 10, 1983



July 4, 1996

Source: Newtok Background for Relocation Report

These photos show the extent of erosion over a thirteen-year period

February 2006 Flooding

Residents observe more frequent and more severe flooding





Newtok – A Model for Other Communities

Newtok Planning Group

- ❖ Working group formed in May 2006
- ❖ Composed of representatives from State and Federal agencies
- ❖ Collaborative effort to assist village of Newtok in relocation efforts
- ❖ Meeting monthly in order to keep agencies apprised of activities
- ❖ Website provides clearinghouse for reports, studies and Newtok Planning Group (NPG) updates

Newtok Planning Group

State of Alaska > Commerce > Community Advocacy > Newtok Planning Group

The Newtok Planning Group was formed in May 2006 when representatives from State and Federal agencies began meeting to coordinate assistance to the village of Newtok in its relocation to the new village site of Mertarvik on Nelson Island.



Mertarvik Spring. In the Yupik language, Mertarvik means "getting water from the spring"

Next Meeting
To Be Announced

Meeting Minutes/Agendas
Menu

Newtok Planning Group Documents
Menu

Reports, Studies, Maps, and Aerial Photos
Menu

Field Trip Photos
Menu



Barge delivery of BIA Housing Improvement Program packages to Mertarvik



Flying over Mertarvik near the spring and the temporary barge ramp

For more information, please contact:
Sally Russell Cox, Planner
Division of Community Advocacy
907 269-4598
sally_cox@commerce.state.ak.us



Quick Links...

- Alaska Coastal Management
- Grants Section
- Financial Assistance to Communities
- Floodplain Management
- Land Management and Mapping
- Local Boundary Commission
- Local Government Assistance
- Planning and Land Management Section
- Rural Utility Business Advisor
- State Assessor/Property Tax info

Of Interest...

- Alaska Community Database
- Alaska Economic Information System
- Business Plans Resources
- Calendar of Events
- Capital Project Database
- Community Funding Database
- Community Maps
- Community Photo Library
- Economic Development Resource Guide
- Local Government Online (LOGON)
- MCD Online System
- Plans Library
- Publications
- Related Links

NEWTOK PLANNING GROUP PARTICIPANTS

Native Village of Newtok

Newtok Traditional Council (NTC)
Newtok Native Corporation (NNC)

State

Alaska Department of Commerce, Community, and Economic Development (DCCED), Division of Community Advocacy
Alaska Industrial Development and Export Authority (AIDEA)/Alaska Energy Authority (AEA)
Alaska Department of Environmental Conservation/Village Safe Water Program (VSW)
Alaska Department of Transportation and Public Facilities (DOT/PF)
Alaska Department of Military and Veterans Affairs/Division of Homeland Security and Emergency Management (DHS&EM)
Alaska Department of Education and Early Development (DEED)
Alaska Department of Health and Social Services (DHSS)
Governor's Office

Federal

U.S. Army Corps of Engineers (USACE), Alaska District
U.S. Department of Commerce, Economic Development Administration (EDA)
U.S. Department of Agriculture, Rural Development
U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)
U.S. Department of Housing and Urban Development (HUD)
U.S. Department of the Interior, Bureau of Indian Affairs (BIA)
U.S. Department of Transportation, Federal Aviation Administration (FAA).
U.S. Environmental Protection Agency (EPA)
Senator Lisa Murkowski's Office
Denali Commission

Regional & Non-profit Organizations

Association of Village Council Presidents (AVCP), Housing Improvement Program (HIP)
Coastal Villages Region Fund (CVRF)
Lower Kuskokwim School District (LKSD)
Rural Alaska Community Action Program (RurAL CAP)
Yukon-Kuskokwim Health Corporation

Two Primary Tracks:

- ❖ Fast tracking some efforts to address community's *short-term needs*
- ❖ Seeking funding for comprehensive relocation planning effort, including overall project management

Steps To Get There:

- ❖ **Identification/Assessment of the resources agencies can provide to community:** participating agencies asked to complete questionnaire.
- ❖ **Work session to develop a schedule:** will provide a framework until funding for strategic management plan and other comprehensive relocation planning components is acquired
- ❖ **Development of RFP for Strategic Management Plan (Village Safe Water):** will provide *strategy* for comprehensive relocation effort.

Recent efforts:

- ❖ Prepared, on behalf of Newtok Traditional Council, a grant application for Investment Assistance to the Economic Development Administration (EDA).
- ❖ Provided technical assistance to the Newtok Traditional Council in its application for a Mini-Grant for the development of a community layout plan for the new village site.

EDA Investment Assistance Grant

Form ED 900A (Rev. 04/06)
OMB Control No. 0610-0004
Expires 04/30/2009



ECONOMIC DEVELOPMENT ADMINISTRATION

APPLICATION FOR INVESTMENT ASSISTANCE

The Application for Investment Assistance (application) is used to request financial assistance for programs administered by the Economic Development Administration (EDA) under the Public Works and Economic Development Act of 1965, as amended (42 U.S.C. 3121 et seq.). The application contains general requirements and instructions which apply to all EDA programs. Additional requirements and instructions applicable to specific EDA programs are included in separate program-specific supplements to this application.

	Page
PWEDA Section 201 (CFDA No. 11.300) Public Works and Economic Development Program	3
PWEDA Section 203 (CFDA No. 11.302) Planning Program	5
PWEDA Section 207 (CFDA No. 11.303) National, Local and University Center Technical Assistance Program	7
PWEDA Section 207 (CFDA No. 11.303) Research and Evaluation Program	10
PWEDA Section 209 (CFDA No. 11.307) Economic Adjustment Assistance Program	

Mini-Grant

Mini-Grant Program FY 2007 Application (Insert 9/1/06)

Submission Details: Send an ORIGINAL and duplicate to: Jo E. Grove, Grant Manager, Department of Commerce, Community and Economic Development, Division of Community Advocacy, 211 Clemens Street, Fairbanks, AK 99701. All Applications must be RECEIVED in the Fairbanks Office no later than 4:00 PM on Friday, July 21, 2006.

For a copy of an application form and the FAQ on program eligibility, scoring criteria and other requirements or to discuss project/program requirements, go to <http://www.commerce.state.ak.us/ogov/grants/mini-grant.htm> or contact: J.E. Grove @ 907-461-2717 or j.e.grove@commerce.state.ak.us

(Insert information or provide information on a separate sheet of paper using the same format.)

Name of Applicant Newtok Traditional Council

Name of Community(ies) to benefit Newtok, Alaska

Joint Applicant (if any) None

Applicant Entity Type (check one)

City of Borough

Non-Profit Organization

Non-Profit Tribal Government

*Note: For-Profit Organizations and For-Profit Tribal Governments are not eligible applicants.

Title of Project Tukikchik Conceptual Community Layout Plan

Applicant Contact Person Stanley Tom, Tribal Liaison

Mailing Address P.O. Box 5545, Newtok Alaska 99559

E-mail Address stanley_tom2003@yahoo.com

Telephone & FAX numbers (907) 237-2216 FAX (907) 237-2428

Applicant IRS tax identification number 92-0074328

Distressed Community? DCCED Certified Population of Community to be served:
Yes No 316

Proposed Budget

Mini-Grant Request \$26,682.00

+ Cash Match \$25,000* (Funding not awarded yet)

+ In-Kind Contributions \$

= TOTAL Project Cost \$51,682.00

Certification
To the best of my knowledge, the representations in this application are true.

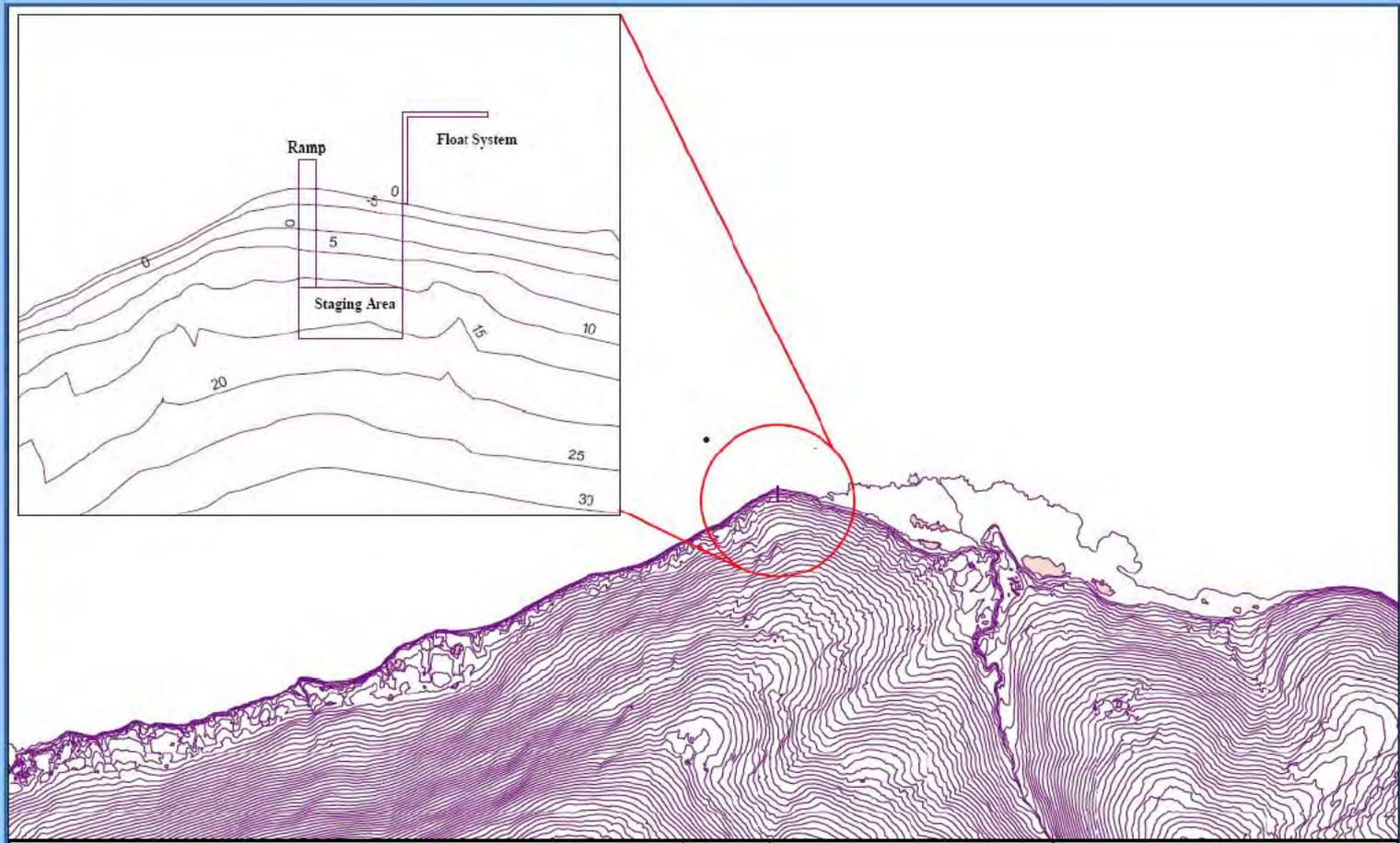
Signature of person authorized to sign on behalf of the applicant
Moses Carl, President

Printed Name and Title _____ Date _____

FY07 Mini-Grant Application
9/1/06-Page 1 of 7

EDA awarded DCA, in co-application with Newtok Traditional Council, a grant of \$800,000 for design and construction of a Multi-Use Marine Support Facility. ADOT/PF is providing \$200,000 local match.

- Barge Ramp
- Dock
- Upland Staging Area

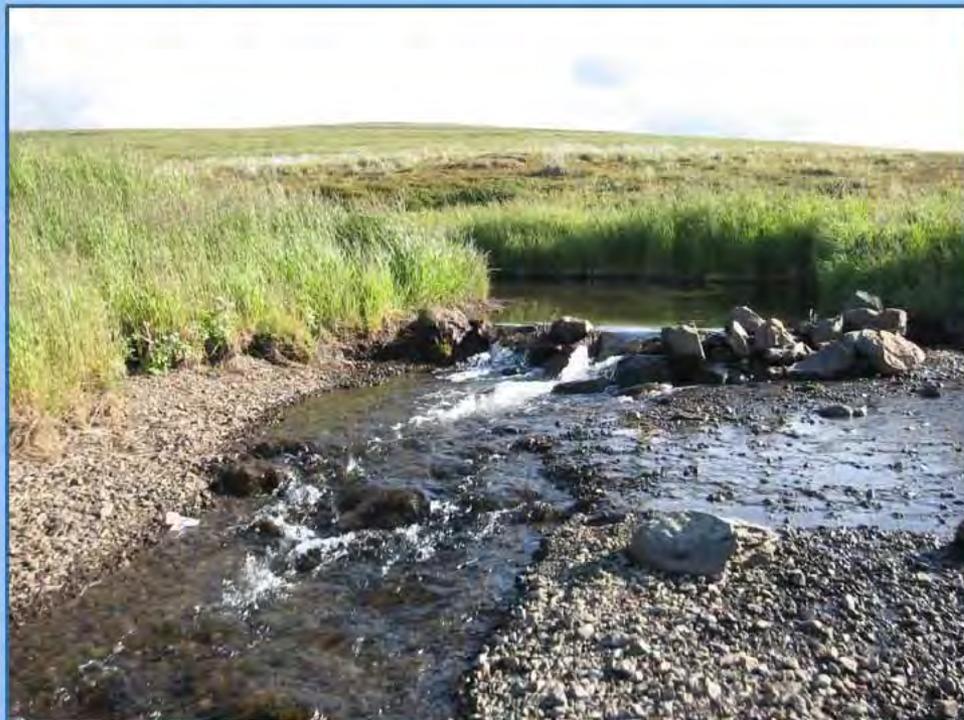


❖ *Will provide critical support to the delivery of equipment and materials for construction of the new village site. Currently developing RFP.*



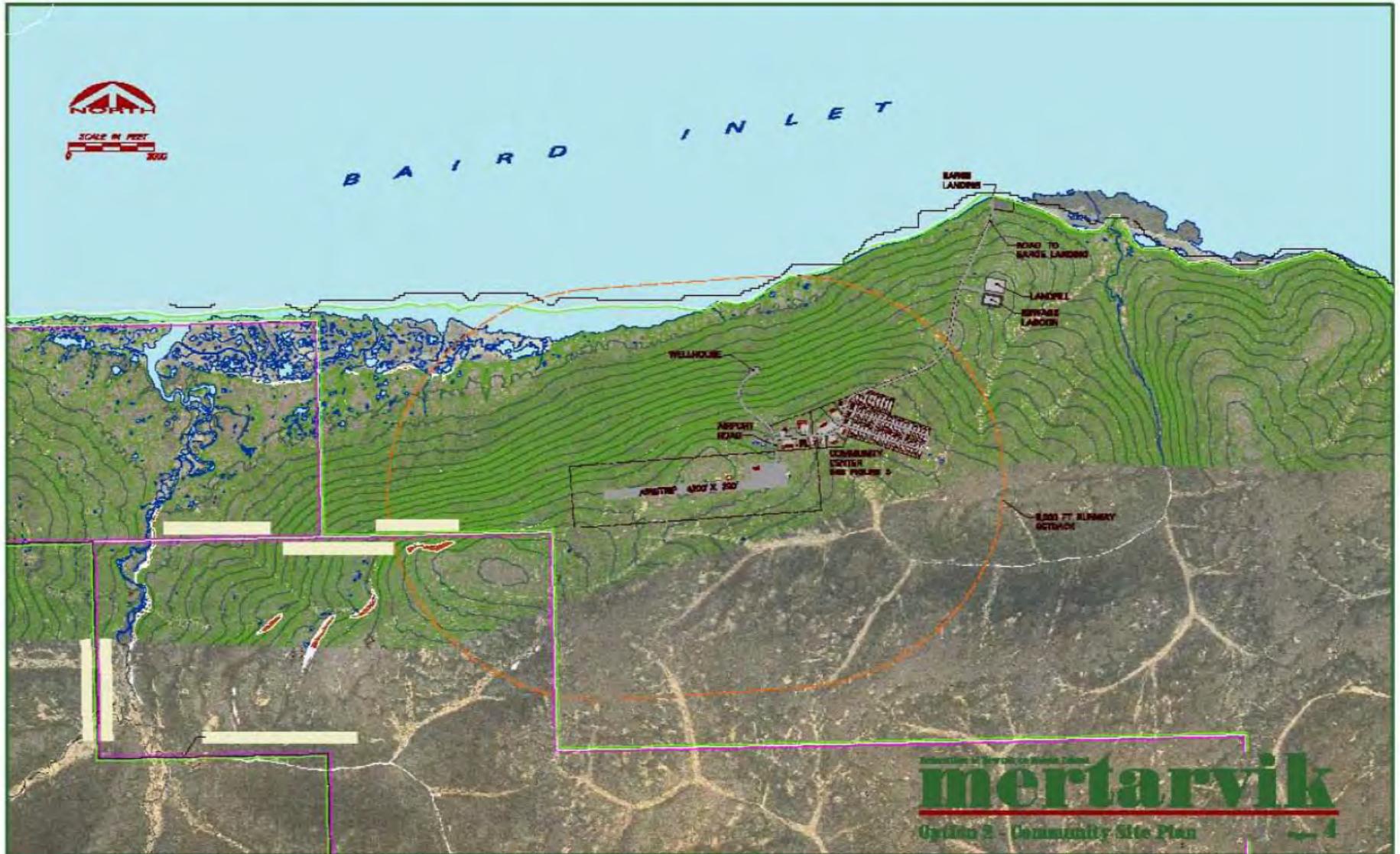
Concept Drawings by ADOT&PF

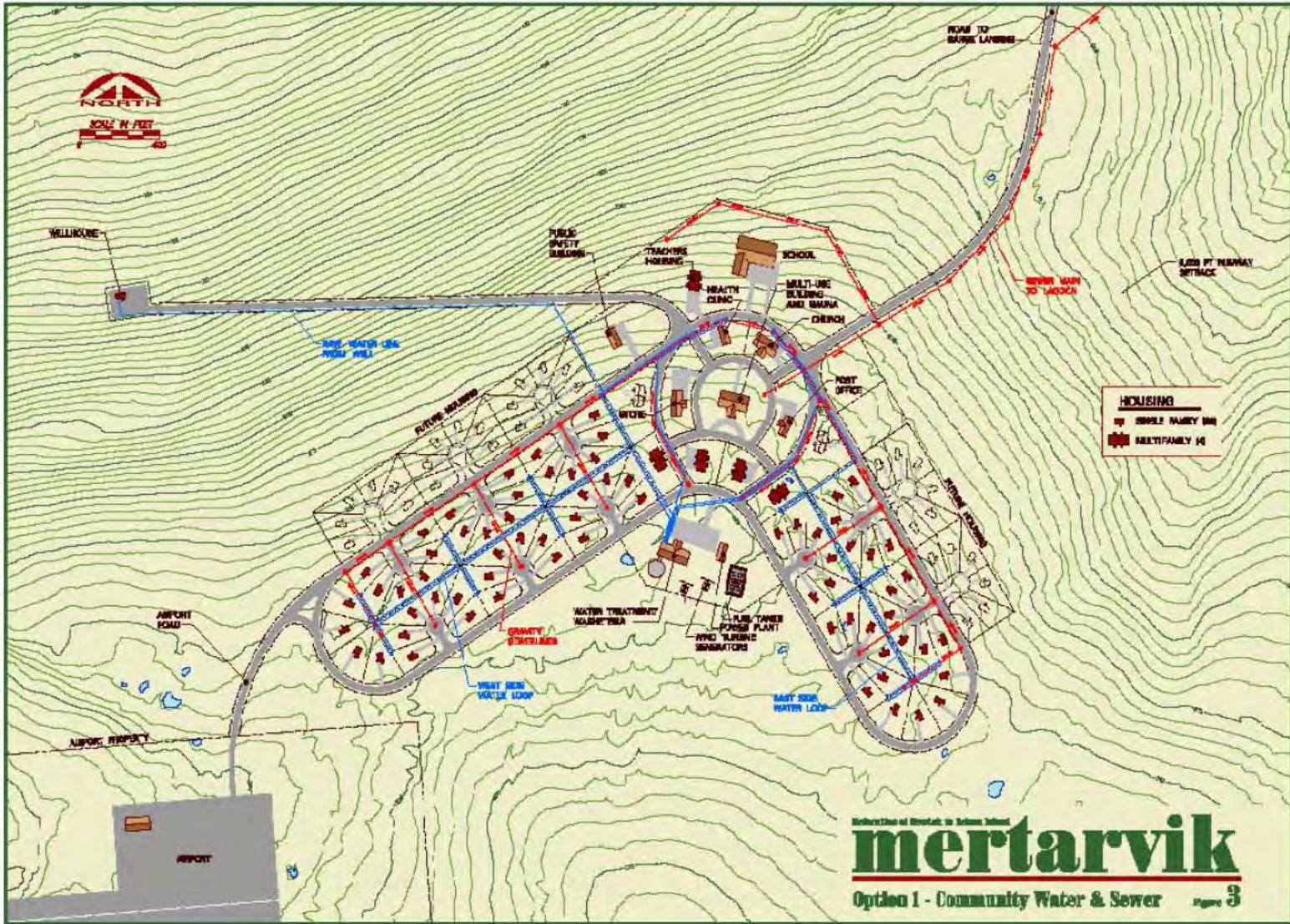
- ❖ Newtok Traditional Council was awarded a Mini-Grant (funded by Denali Commission and administered by DCA) of \$26,682 for development of a community layout plan for new village site.
- ❖ Community layout plan will guide the efficient and orderly development of Mertarvik.
- ❖ Based on preliminary layout for water/sewer funded by Village Safe Water



Mertarvik Spring

Concept Plan for Mertarvik





HOUSING
 ■ SINGLE FAMILY DW
 ■ MULTIFAMILY 14

Delivery of Bureau of Indian Affairs (BIA) Housing Improvement Program (HIP) home packages



Members of the community disassembled and off-loaded the three housing packages at the Mertarvik site in September





Members of the Newtok community
construct the new homes





Wind studies for airport



Investment in New Site

- ADMINISTRATIVE ORDER NO. 224
 - Sustainability
- “...Needs of existing communities have priority
 - Priority will be given to the infrastructure needs of existing communities before consideration of proposals to create new communities, unless there is a congressionally directed relocation of an existing community. This Order takes effect immediately. ...”

**Fiscal Year 2005 Consolidated Appropriations, Section 117,
P.L. 108-447**

*SEC. 117. Notwithstanding any other provision of law, the Secretary of the Army is authorized to carry out, at full Federal expense, structural and non-structural projects for storm damage prevention and reduction, coastal erosion, and ice and glacial damage in Alaska, **including relocation of affected communities and construction of replacement facilities.***

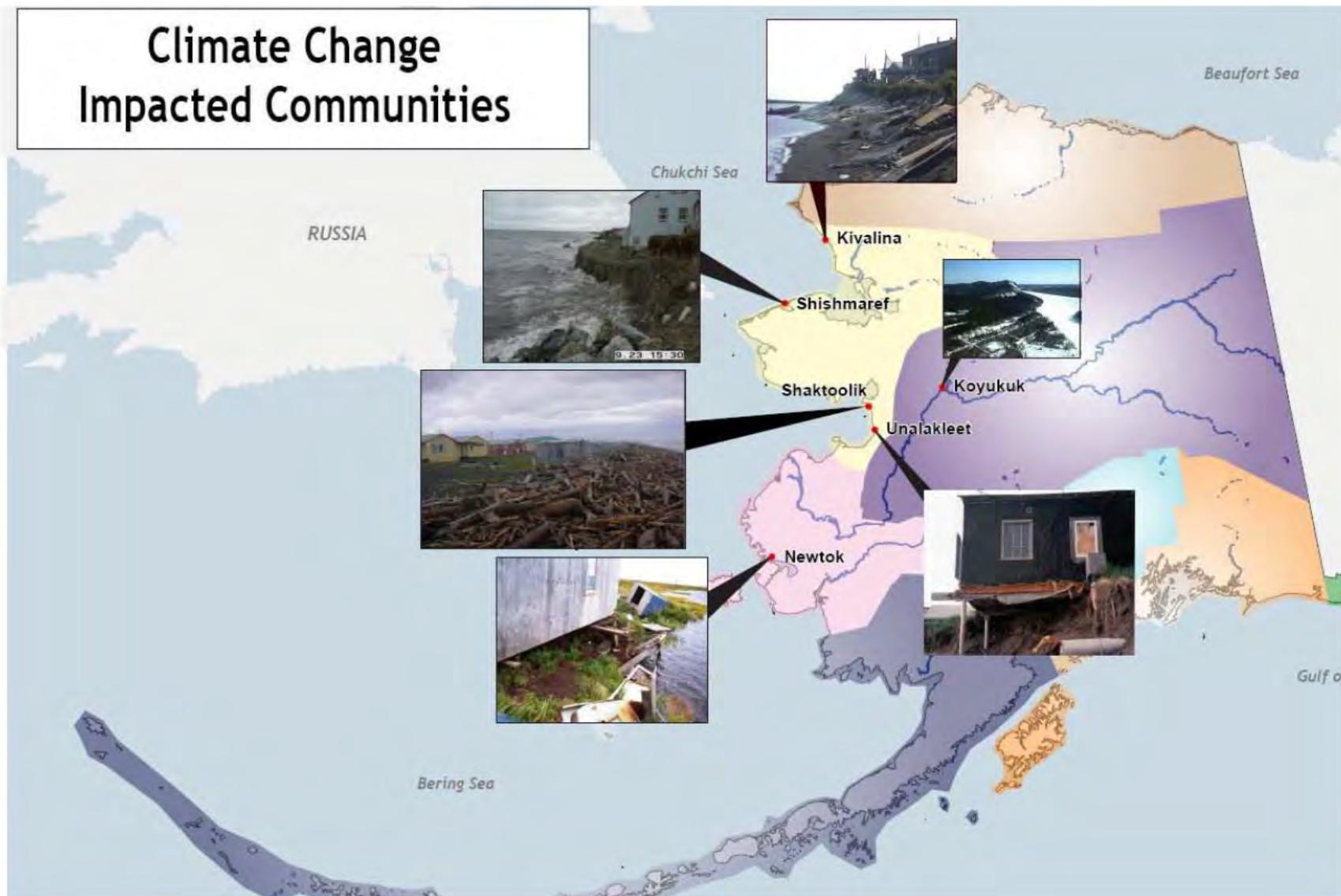
Congressional direction is found on page 41, Senate Report 109-84, for the Energy and Water Development Appropriations Act, 2006, P.L. 109-103.

*The Committee has provided \$2,400,000 for Alaska Coastal Erosion. The following communities are eligible recipients of these funds: **Kivalina, Newtok, Shishmaref, Koyukuk, Barrow, Kaktovik, Point Hope, Unalakleet, and Bethel.** Section 117 of Public Law 108-447 will apply to this project.*

Tribal Partnership Program.—The conferees *acknowledge the serious impacts of coastal erosion and flooding due to continued climate change in Alaska.* The conference expects the Corps to continue its work in this area and has included a total of \$4,000,000, of which \$2,000,000 is to combat erosion in Alaska.



Climate Change Impacted Communities



Contributors

- Department of Natural Resources/DCOM
- Department of Natural Resources/ DGGS
- Department of Commerce, Community and Economic Development/DCRA

- Sally Russell Cox
- Gabriel Wolken
- De Anne Stevens
- Matthew Balazs
- Trent Hubbard
- Nicole Kinsman
- Orson Smith
- Kandy Krejci
- Glenn Gray
- Simone Montayne
- Sylvia Kreel

Moving Newtok



Executive order 238

....Climate change is not just an environmental issue.

It is also a social, cultural, and economic issue important to all Alaskans.....

Contact Information

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Alaska Coastal Management
Program

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907.269-7473