

# U.S. Army Corps of Engineers Activities: Infrastructure and Coastal Erosion

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US Army Corps of Engineers  
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# State of Alaska Climate Change Subcabinet: Alaska District Engagement



Alaska District

- **Adaptation Advisory Group**

- Public Infrastructure Technical Working Group: addresses physical impacts of climate change on Alaska's built environment, including both publicly- and privately-owned infrastructure with public access

- **Immediate Action Working Group**

- One of two K/G's initiated in 2008-Shortly after subcabinet was created.
  - Intended to deal with most urgent coastal erosion affected communities until subcabinet was functional.
  - 2008 recommendation for state appropriations accepted.



# Public Infrastructure Technical Working Group



**Climate change in Alaska is creating the following potential impacts to public infrastructure, with significant regional variation:**

- Warming and thawing permafrost
- Increased storm surges, flooding, and erosion
- Decreased duration (cold season) and extent (warm season) of shore fast sea ice
- Increasing freeze/thaw cycles
- Changing wind and precipitation
- Increased storm frequencies and duration
- Increased fire risk



# Public Infrastructure Technical Working Group



Alaska District

## Overview of Public Infrastructure

### Policy Recommendations:

- Create a Coordinated and Accessible Statewide System for Key Data Collection, Analysis, and Monitoring
- Promote Improvements that Use the Current Best Practices
- Build to Last; Build Resiliency into Alaska's Public Infrastructure



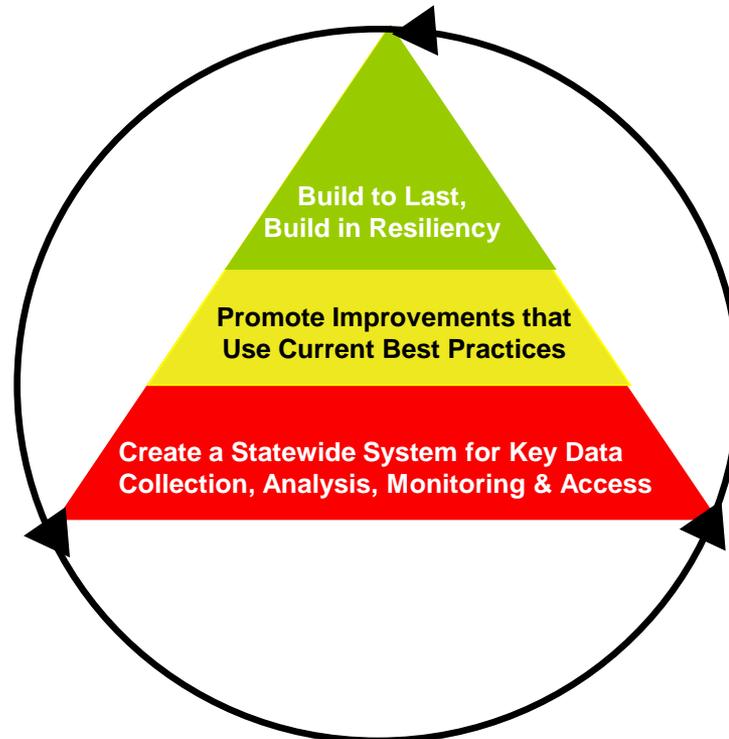
# Public Infrastructure Technical Working Group



The recommended adaptation options are designed as an integrated system. The three policies (in the triangle) build upon and support one another. Process of continued, routine communication and feedback is essential to adapt and refine actions taken over time.

Sustainable Infrastructure  
That supports communities  
In an uncertain environment

Performance  
Feedback



Integrated  
Coordinated  
Decision making

Updated key data analysis, aligned research and modeling outcomes



# Immediate Action Working Group



Alaska District

2003 GAO Report, *Alaska Native Villages, Most are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance*, focused on the following communities:

**Barrow**

Point Hope Erosion Protection

Barrow Erosion Protection

Kaktovik Erosion Protection

**Bethel**

Kivalina Erosion Protection

**Kaktovik**

Shishmaref Erosion Protection

**Kivalina**

Koyukuk Erosion Protection

Unalakleet Erosion Protection

**Point Hope**

**Unalakleet**

Newtok Storm Damage Reduction

**Koyukuk**

Bethel Bank Stabilization Extension & Erosion Protection

**Newtok**

**Shishmaref**





# Immediate Action Working Group



## Communities with most immediate needs:

### Kivalina

- ACOE completed 1,600 ft of rock revetment – Sep 2009
- ACOE completed 400 ft of rock revetment in 2010 using \$3.3M in State funds
- CIAP grant of \$180,000 used to further evaluate village relocation
- DNR-DGGS provided geologic and hazardous mapping for evacuation road

### Shishmaref

- Completed 1,500 ft of rock revetment through Sep 2009
- 625 ft remain to protect washeteria and lagoon – needs funds
- DCCED-ACCIMP grant of \$150,000 for Site Selection Feasibility Study

### Unalakleet

- ACOE completed 670 ft of rock revetment in 2010
- Design completed for additional 810 ft
- State appropriated \$5 million in 2008 and \$1.7 million FY 2011 (July 2010)
- ACOE preparing project partnering agreement to finish revetment

### Newtok

- Innovative Readiness Training (IRT) Group built base camp near barge landing
- IRT built ACOE/ADOT designed barge landing to Evacuation Center in 2010
- IRT planning to construct foundation for Evacuation Center summer 2011



# Immediate Action Working Group



Alaska District

## Communities with most immediate needs:

### Shaktoolik

- ACOE obtained accurate survey datum
- ACOE/Denali Commission preparing flood inundation map for the village
- ACOE initiated shore protection study
- Community considering elevated road for evacuation
- Rehabilitation of school, might serve as evacuation center

### Golovin

- Initiated shore protection study
- Considering elevating road to reduce flood risks
- Currently evaluating economics and costs
- Next step: cost shared feasibility study

### Koyukuk

- DCRA-ACCIMP funded preliminary evacuation shelter concept design
- Koyukuk has developed updated community profile map

# Kivalina Erosion Protection



# Shishmaref Erosion Protection

— October 2004 Debris Line

Corps Authorized Project Area

Corps Phase I (625 ft.)  
Completed Aug 08  
2005 City Project

2005 Corps Project

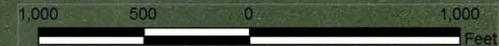
2003 Kawerak  
Project

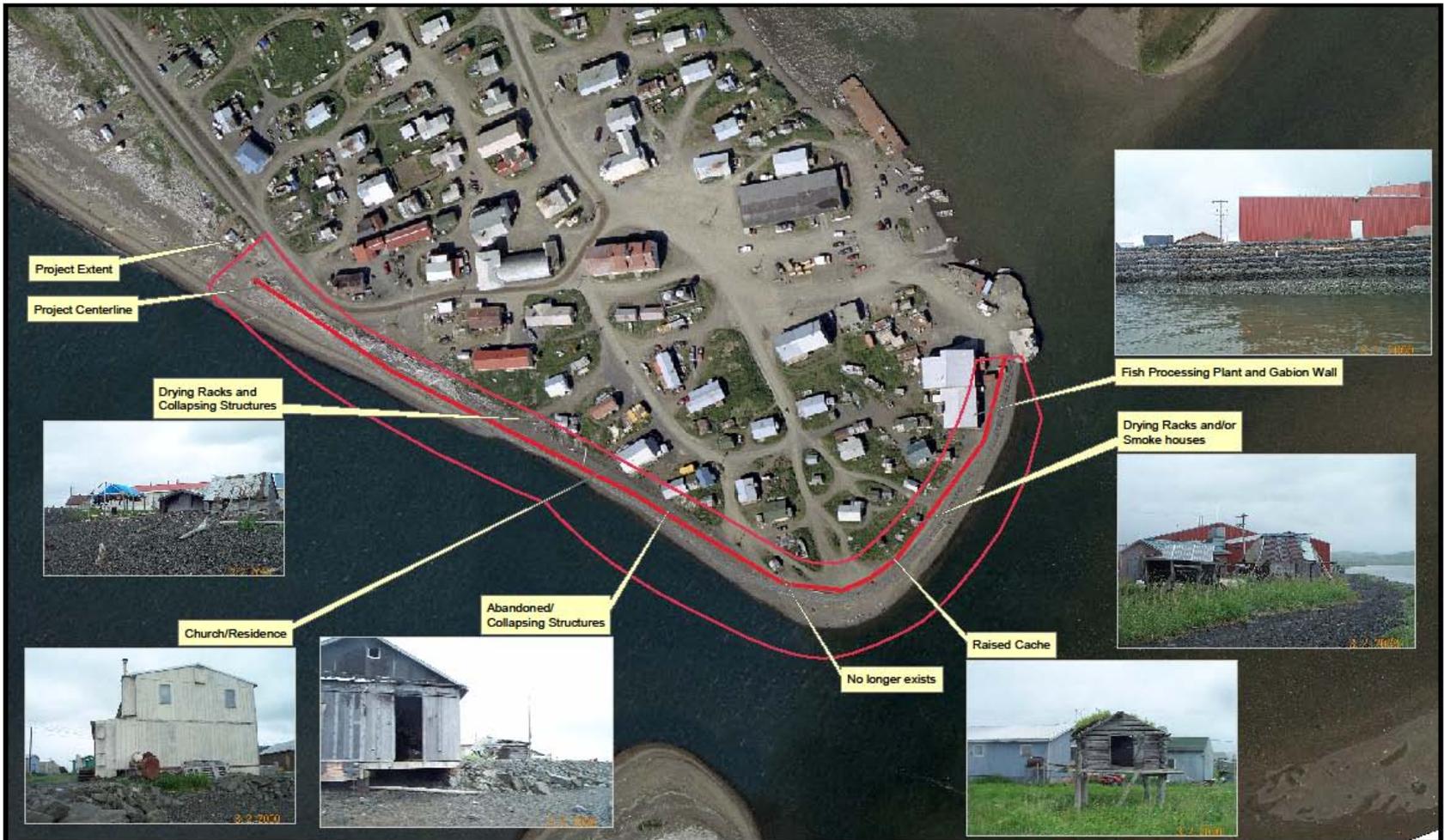
Corps Phase III (550 ft.)  
Awaiting Agreement  
and Funds

Corps Phase II (750 ft.)  
Contract Award Sep 2008  
Constructed in 2009

2006 HESCO Bastions  
(Covered by Corps Phase 1 Project)

Corps Phase IV (1225 feet)  
Includes Improvements to  
2003 Kawerak and 2005 City Project





Fish Processing Plant and Gabion Wall



Drying Racks and/or Smoke houses



Drying Racks and Collapsing Structures



Raised Cache



Church/Residence



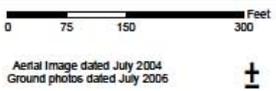
Church/Residence

No longer exists

**Anticipated Project Extents**



Alaska District  
Corps of Engineers  
Civil Works Branch



Alaska Baseline Erosion  
Unalakleet, Alaska



Aerial of Newtok.



# Alaska Baseline Erosion Assessment



## **A Baseline Erosion Assessment multi-agency committee, made up of key Federal, State, Tribal, and local stakeholders:**

- Assembled a list of communities with an erosion problem.
- Sent out letters and questionnaires to Federal, State, Tribal, regional Native Corporations, and local officials to listed communities. A total of 178 communities were identified as having erosion problems.
- Developed 12 Detailed Erosion Assessments and 166 Erosion Information Papers to assess and rate individual community risk.



Alaska District

# In Summary

- **Addressing Alaska erosion important and challenging**
- **Climate change trends must be evaluated**
- **Out of the box (multiple players) planning required: significant coordination necessary**
- **Lack resources to address vast majority of critical needs for all erosion activities**

# QUESTIONS?

**Trish Opheen**

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**Alaska District**

**U.S. Army Corps of Engineers**



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# Back-Up Slides

- PI TWG

# Public Infrastructure Technical Working Group

## APPENDIX B. LIST OF ACRONYMS

- **AAG** Adaptation Advisory Group
- **ABI** Alaska Bureau of Investigation
- **ACCAP** Alaska Center for Climate Assessment and Policy
- **ACCKN** Alaska Climate Change Knowledge Network
- **ACE** Air convection embankment
- **ACIA** Arctic Climate Impact Assessment
- **ACIAC** Alaska Climate Impact Assessment Commission
- **ACRC** Alaska Climate Research Center
- **ADCCED** Alaska Department of Commerce, Community, and Economic Development
- **ADEC** Alaska Department of Environmental Conservation
- **ADEED** Alaska Department of Education and Early Development
- **ADF&G** Alaska Department of Fish and Game
- **ADHSS** Alaska Department of Health and Social Services
- **ADMVA** Alaska Department of Military and Veterans Affairs
- **ADNR** Alaska Department of Natural Resources
- **ADOT&PFO** Alaska Department of Transportation and Public Facilities
- **AEDIS** Engineering Design Information System
- **AFS** Alaska Fire Service
- **AHRS** Alaska Heritage Resources Survey
- **AIDEA** Alaska Industrial Development and Export Authority
- **AIWFMP** Alaska Interagency Wildland Fire Management Plan
- **AISWG** Alaska Invasive Species Working Group
- **AML** Alaska Municipal League
- **ANILCA** Alaska National Interest Lands of Conservation Act
- **ANTHC** Alaska Native Tribal Health Consortium
- **AOGCM** Atmosphere-Ocean General Circulation Model
- **AOOS** Alaska Ocean Observing System
- **ARRA** American Recovery and Reinvestment Act
- **AST** Alaska State Troopers
- **AVCP** Association of Village Council Presidents Regional Housing Authority
- **AWFCG** Alaska Wildlife Fire Coordinating Group
- **AWRVI** Arctic Water Resources Vulnerability Index
- **BIA** Bureau of Indian Affairs
- **BLM** Bureau of Land Management
- **BST** Bituminous surface treatment
- **BVS** Bureau of Vital Statistics
- **CCH** Center for Climate and Health
- **CES** Cooperative Extension Service
- **CDC** Centers for Disease Control (and Prevention)
- **CEQ** Council on Environmental Quality
- **CHIE** Community Health Impact Evaluation
- **CIP** Capital Improvement Project
- **CT** Common Themes
- **CNIPM** Alaska Committee on Noxious and Invasive Plant Management
- **CVRF** Coastal Villages Region Fund
- **CWPP** Community Wildfire Protection Plans
- **DCOM** Division of Coastal and Ocean Resources
- **DCRA** Division of Community and Regional Affairs

Alaska Department of Environmental Conservation  
page B-1 <http://www.climatechange.alaska.gov>  
Appendix B: Acronyms – Draft Final Report January  
27, 2010