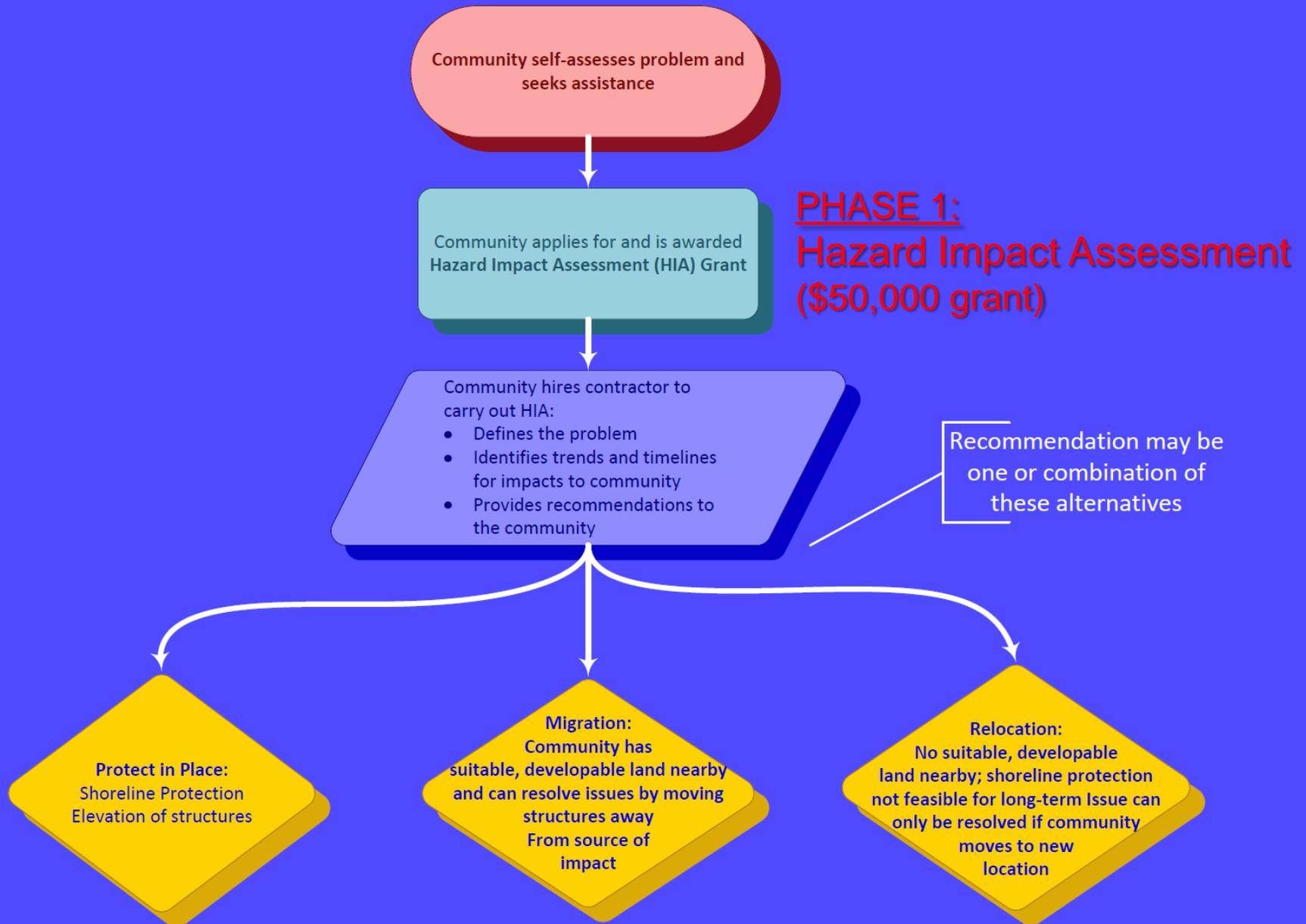


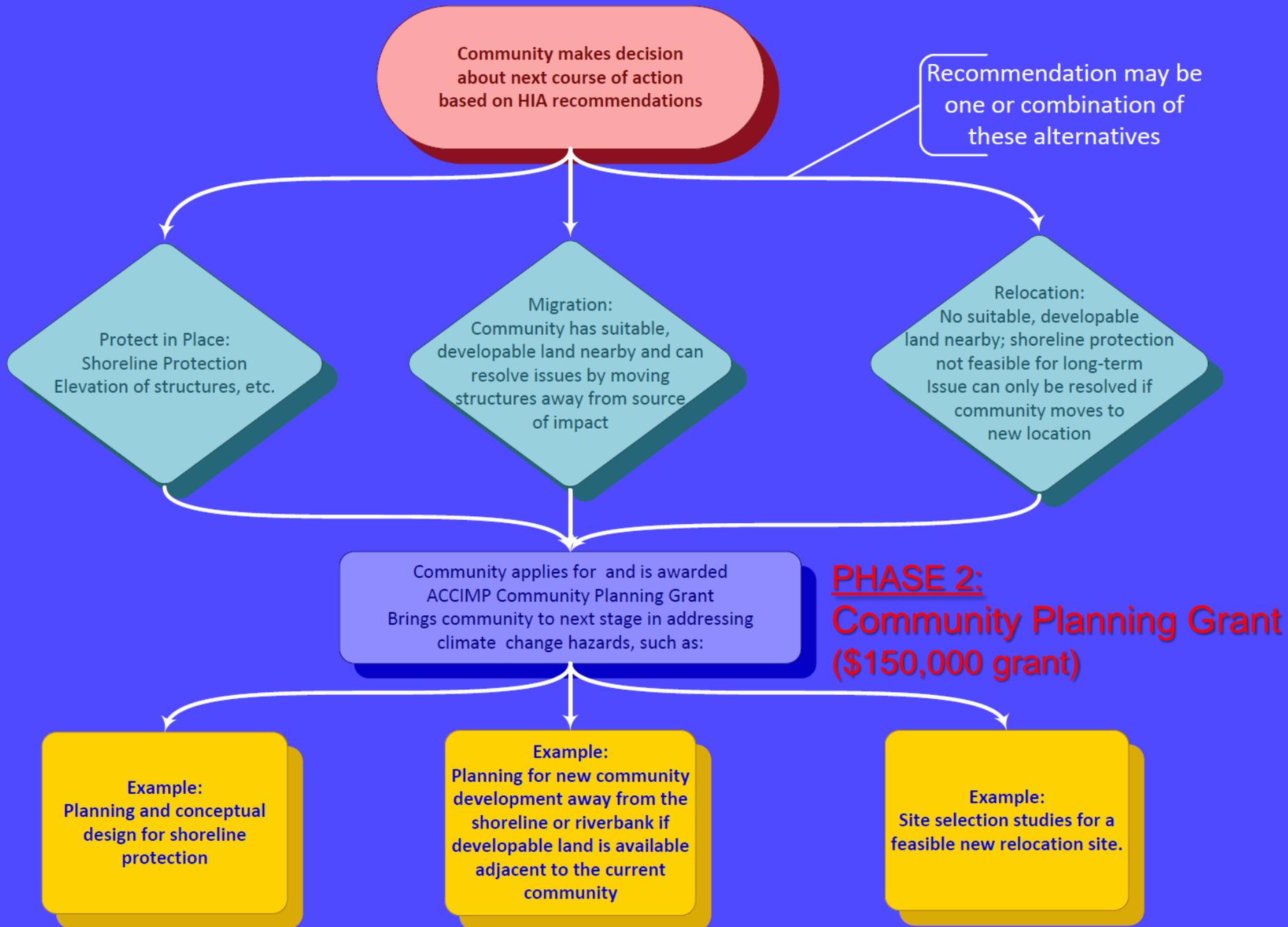


# Alaska Climate Change Impact Mitigation Program



# ACCIMP Process





# Communities That Have Received Community Planning Grants



# Newtok

- Village suffers from chronic erosion along riverbank. Between 1954 and 2001 village lost more than 4,000 feet of land to erosion. Current erosion rate approximately at 72-90 feet per year.
- Village now vulnerable to coastal storms and flooding due to erosion of critical land buffer
- In 2003, Village acquired land for new village site in Nelson Island through land exchange with U.S. Fish and Wildlife Service.

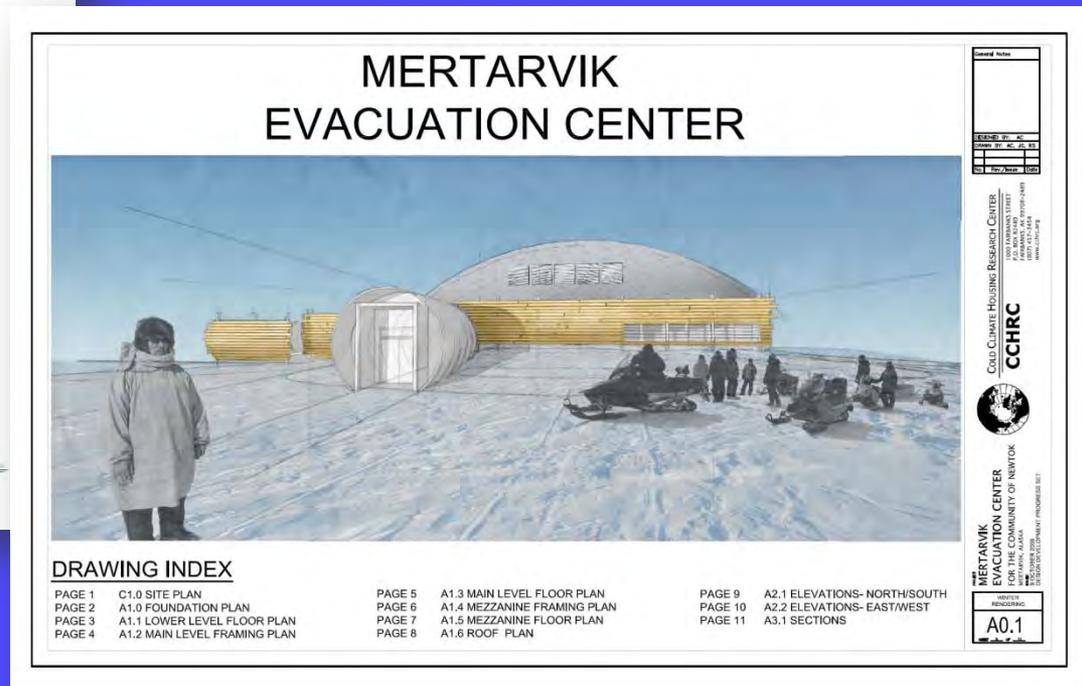
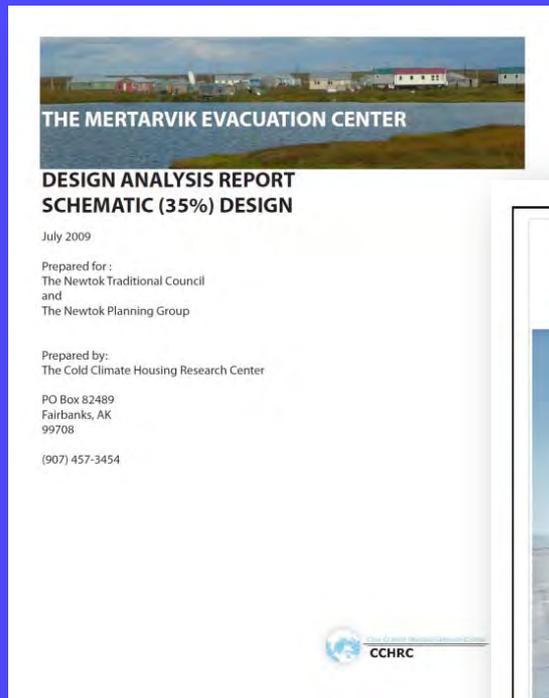


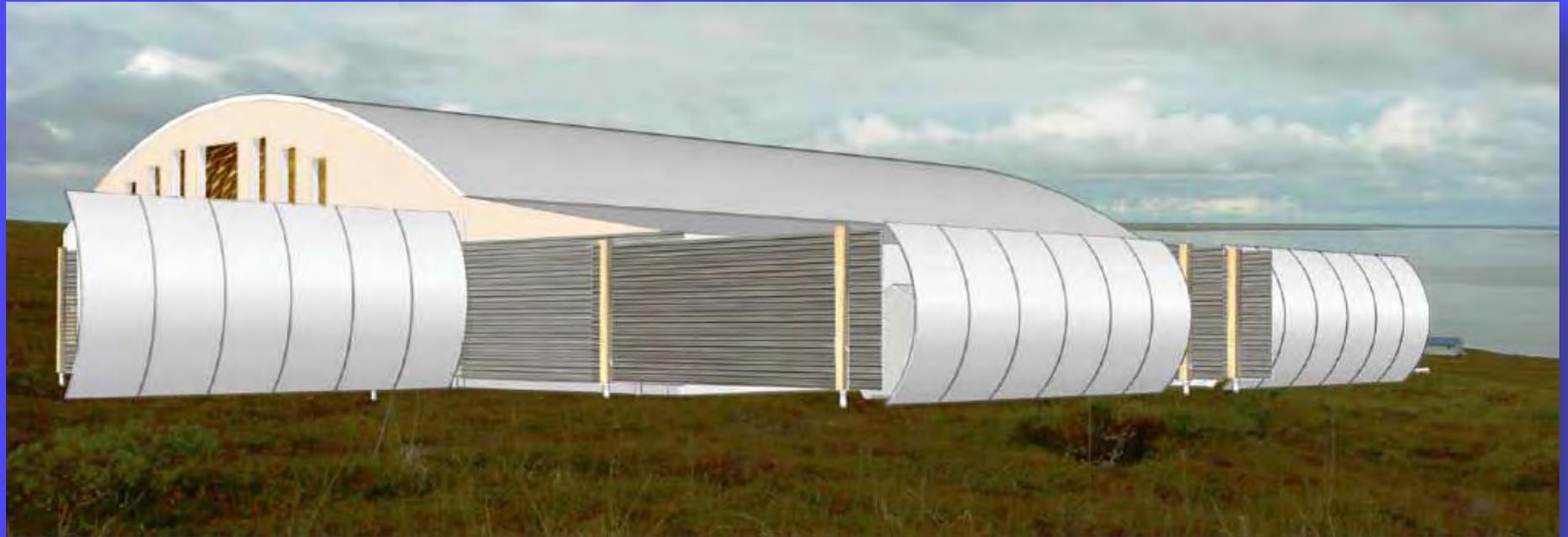
Photo: Stanley Tom

# Mertarvik Evacuation Center

## Design Analysis Report & 35% Design Drawings

Newtok Traditional Council hired Cold Climate Housing Research Center to prepare conceptual design of an evacuation shelter at the community's relocation site.





Completion of the conceptual design resulted in a legislative funding recommendation for final design and construction of the building.



Construction of the Mertarvik Evacuation Shelter will begin in summer 2011.





# Kivalina

- Barrier island is both overcrowded and shrinking from chronic erosion -- no further room for expansion
- Fall storm surges create annual coastal flooding and beach erosion on seaside of island
- Right combination of storm events could flood entire village
- Corps of Engineers has constructed rock revetment system to protect community while plans are made to address overcrowding – i.e. relocation?



# Kivalina Consensus Building Project

## Kivalina Consensus Building Project Final Project Report

July 2010



*Prepared by  
Glenn Gray and Associates  
for the  
City of Kivalina*

This report is funded by the Alaska Climate Change Impact Mitigation Program which was established by Alaska's Twenty Fifth Legislature. The preparation of this report is funded by a grant from the Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs. The views expressed herein are those of the author and do not necessarily reflect the views of the State of Alaska or any of its sub-agencies.



Photo: Sally Russell Cox

Outlines steps the community will take to respond to threats of natural hazards including erosion, flooding and storm surge.

A full community planning grant project will be developed from this effort.



Photo: Glenn Gray and Associates



Photo: Glenn Gray and Associates

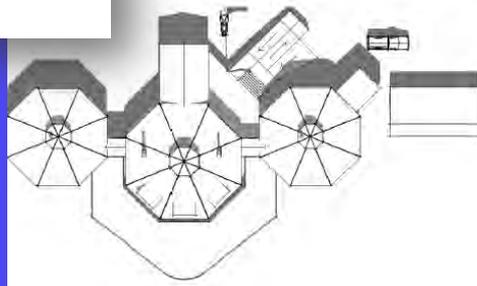
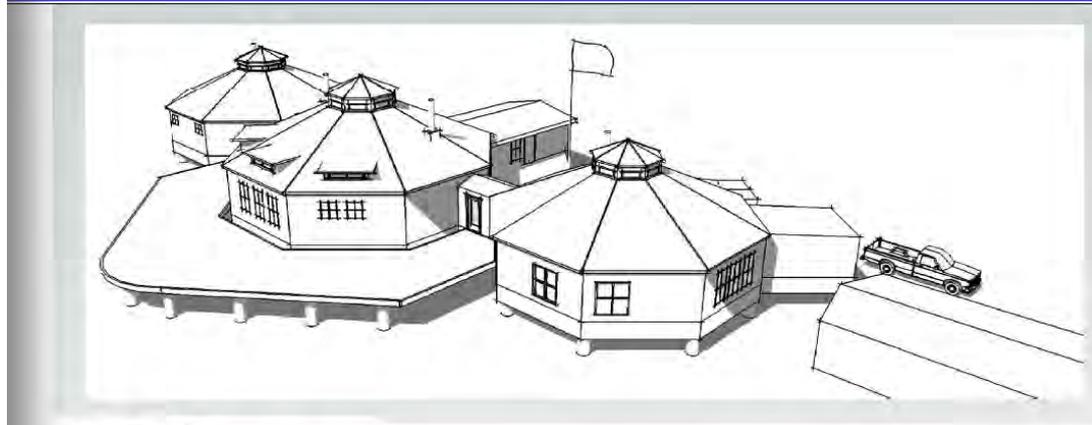
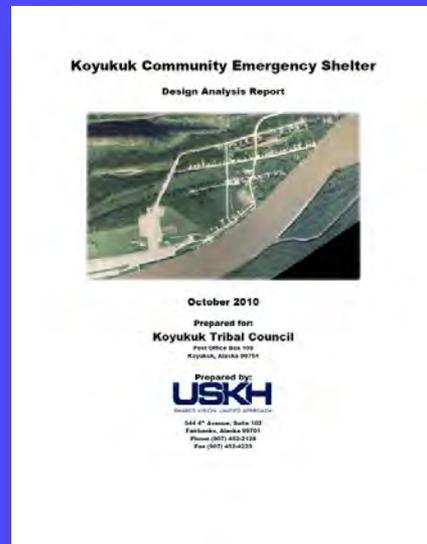
# Koyukuk

- Entire village is built within floodplain of Koyukuk River
- Threatened seasonally by wildfire, ice dams, and flooding/erosion resulting from ice dams
- Community eventually plans to move to higher ground at nearby Koyukuk Mountain



# Koyukuk Community Emergency Shelter

- Proposed to provide shelter for community during flood events
- Will serve as command post and “safe house” accessible to community
- Facilitates evacuations, provides temporary housing, and enables return of residents to their homes in safe manner



# Shaktoolik

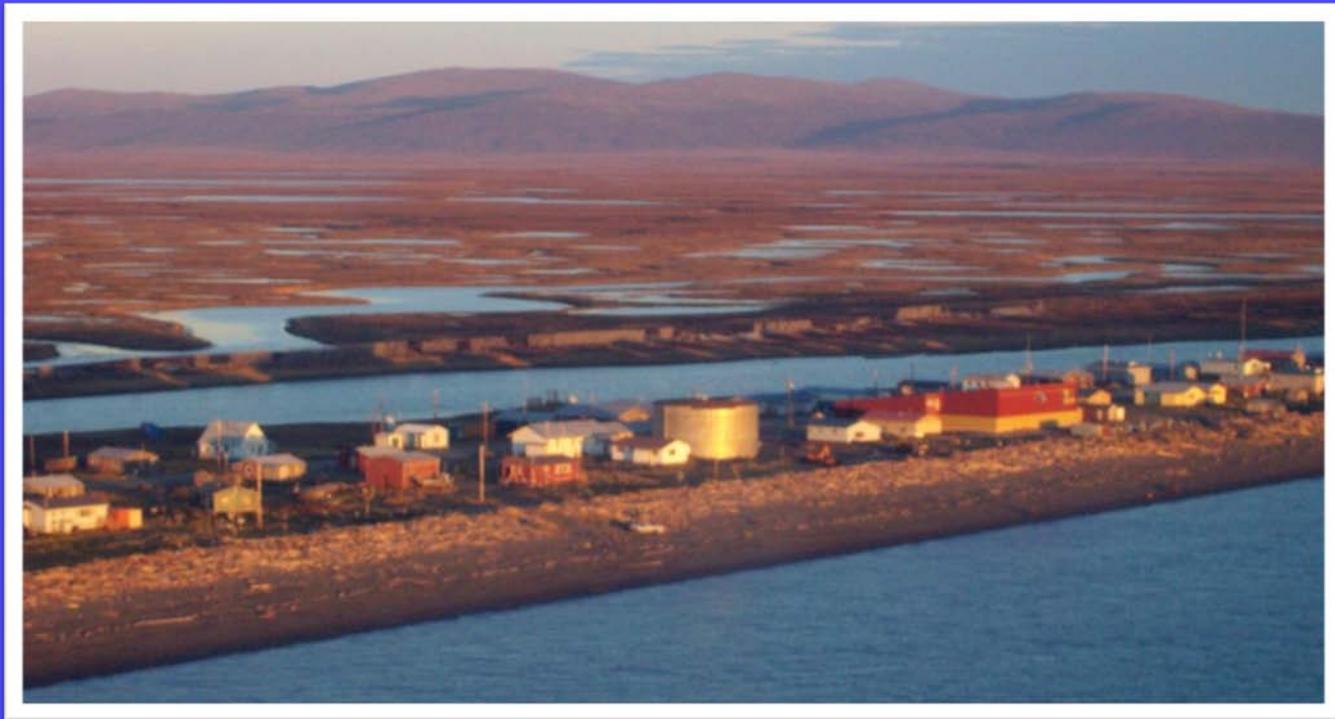
- Berm between village and the beach is composed largely of naturally deposited driftwood logs
- Village becomes an island during storm surges, and then it is additionally threatened by ocean waves throwing these logs into town



Photo: Steve Ivanoff

# Shaktoolik Evacuation Shelter Design Analysis Report

- Shaktoolik has selected a consulting team that will develop the conceptual design of an evacuation shelter in the current community
- Community is awaiting results of a hazard analysis to determine where evacuation shelter should be located in community and whether relocation is a recommended option for the community



# Shishmaref

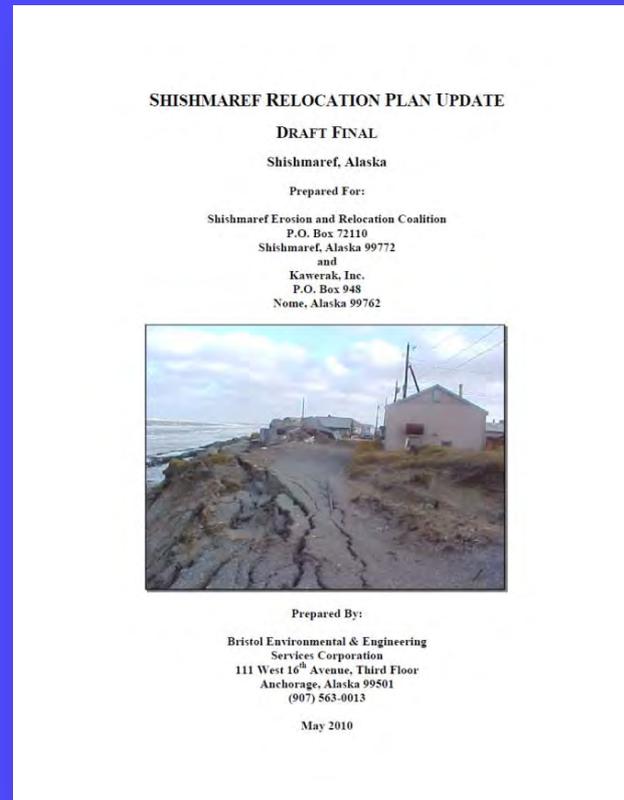
- Located on barrier island in the Chukchi Sea experiencing thawing permafrost and chronic erosion
- Village loses average 20 - 50 feet of land during severe fall storms (up to 125 feet at one time) -- considerable loss for island no wider than one-quarter mile
- Seawall has been built to protect community as a temporary measure (Corps and Kawerak funding)



Photo: Shishmaref Relocation Coalition

# Shishmaref Site Selection Feasibility Study

- Kawerak recently completed update to relocation plan which identifies criteria for potential relocation sites
- Community planning grant will use this as basis to identify and evaluate alternative relocation sites and select and preferred alternative



# Unalakleet

- Community experiences coastal/riverine flooding and shoreline erosion
- Eroded land deposited at mouth of river poses serious problem for barge passage; Unalakleet serves as a subregional hub for several villages that rely on harbor and fish processing plant for commercial fishing businesses



# Foothills Master Plan and Subdivision Design Project

Unalakleet is developing a master plan for the Foothills Subdivision which will direct new development to higher ground, away from impacts of erosion, flooding, and storm surge.



Photo: Sally Russell Cox

# Communities Receiving Hazard Impact Assessment Grants

## Complete or Near Complete:

- Atmautluak
- Kipnuk

## Just Beginning:

- Elim
- Nightmute
- Nelson Lagoon
- Quinhagak



# Kipnuk

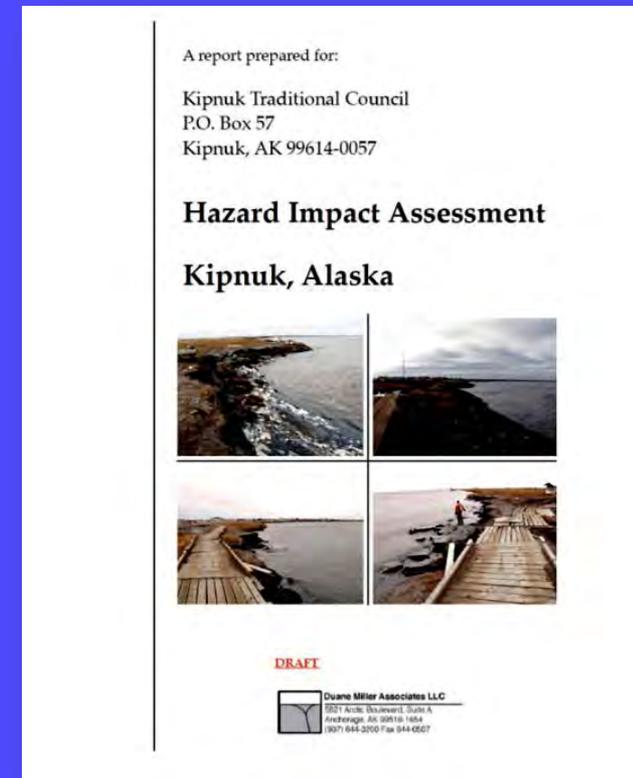
- Erosion of Kiguklik River, mostly during fall storms
- Seasonal flooding and storm surges causing over-topping of sewage lagoon, dispersal of fuel
- Thawing permafrost causing subsidence - loss of foundation support, threatening structures



# Kipnuk Hazard Impact Assessment

Recommendations will provide basis for Community Planning Grant

- Shoreline protection to reduce rate of riverbank erosion, such as sheet piles, rip-rap, seawall, and river course modification
- Elevate structures above flood levels. Use of appropriate foundations such as pile or triodetic foundations to address permafrost degradation
- Adopt building code setting minimum floor height for new structures
- Install flood warning system including monitoring component to collect data for forecasting severity of storm surges
- Construct levee system to protect village from flooding
- Insulated pads to elevate the relative ground surface



# Atmautluak

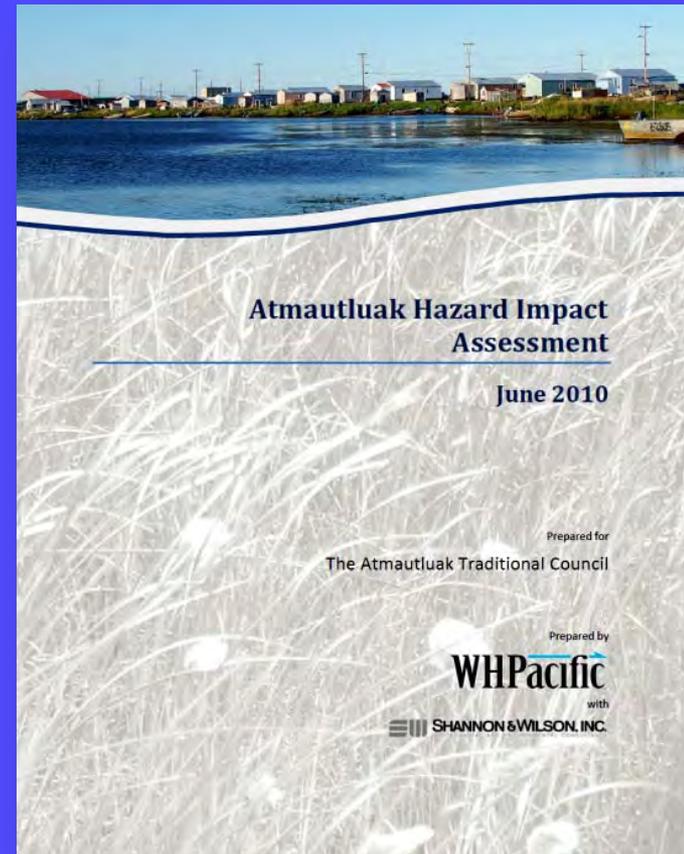
- Erosion caused by thawing permafrost and ice jams
- Flooding caused by ice jamming of Pitmiktakik River
- Thawing permafrost impacting village roads, utility infrastructure (telephone, electrical and fuel lines)



# Atmautluak Hazard Impact Assessment

Recommendations will provide basis for Community Planning Grant

- Conduct hydrological study to quantify recurrence intervals of floods and to evaluate alternatives to reduce bank erosion
- Adopt requirement that future projects install thermistors to document changes in the active layer
- Monitor erosion through bank migration study (aerial photographs and physical measurements)
- Raise fuel lines off ground to reduce susceptibility to subsidence and subsequent corrosion
- Prepare community land use plan to identify preferred locations for new housing or other community facilities or infrastructure
- Prepare community surface drainage plan to drain surface water into nearby lakes and rivers
- Move or replace structures in danger from riverine erosion



# Thank you!

Sally Russell Cox, Planner

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<http://www.commerce.state.ak.us/dcra/planning/accimp/ACCIMP.htm>

