Community Responses to Natural Hazard Threats

Sally Russell Cox
Bureau of Indian Affairs Providers Conference
December 5, 2019
"Actions taken to help communities ... cope with changing climate conditions."

UNFCC (United Nations Framework Convention on Climate Change)

Focus: Environmental threats associated with a changing climate

Increased Resilience

"...[A]ctions taken to reduce or eliminate long term risk to people and property from natural disasters."

FEMA

Focus: All natural hazards

Hazard Mitigation

Climate Change Adaptation vs Hazard Mitigation
Responding to Natural Hazard Threats

Protection-in-Place
- Shoreline protection measures and other controls to prevent/minimize the effects of coastal or riverine threats
- Allows the community to remain in its current location

Migration
- Gradually moving property and development away from hazard-prone areas
- Community must have suitable, developable land nearby

Relocation
- Moving entire community to entirely different location not vulnerable to natural hazards
- Usually considered only after determination that other methods of dealing with hazard threats would not be feasible
Community Understanding of Risk
- Hazard Identification
- Community-Based Monitoring
- Science + Engineering Studies
- Risk Assessments
  - Informed Community Ready to Make Decisions to Reduce Risk/Adapt

Planning: Local Decisions to take Action to Adapt/Reduce Risk
- Strategic Adaptation Planning
- Hazard Mitigation Planning
- Inter-Agency Planning Groups
  - Identification + Prioritization of Strategic Actions
  - Identification of Resources
  - Development of Timeline

Implementation: Carrying Out Strategic Actions to Achieve Resilience
- Inter-Agency Partnerships to support Implementation (Funding, Technical Assistance)
  - Implementation of Strategic Actions (Protect-in-Place, Migrate Infrastructure, Relocation, Adaptive Technology)

The Path to Resilience
Community Understanding of Risk

Community-Based Monitoring
Community Understanding of Risk

Integration of local knowledge with Science/Engineering Studies
Community Understanding of Risk
- Hazard Identification
- Community-Based Monitoring
- Science + Engineering Studies
- Risk Assessments
- Informed Community Ready to Make Decisions to Reduce Risk/Adapt

Planning: Local Decisions to take Action to Adapt/Reduce Risk
- Strategic Adaptation Planning
- Hazard Mitigation Planning
- Inter-Agency Planning Groups
- Identification + Prioritization of Strategic Actions
- Identification of Resources
- Development of Timeline

Implementation: Carrying Out Strategic Actions to Achieve Resilience
- Inter-Agency Partnerships to support Implementation (Funding, Technical Assistance)
- Implementation of Strategic Actions (Protect-in-Place, Migrate Infrastructure, Relocation, Adaptive Technology)

The Path to Resilience
Shishmaref residents prioritized their top hazard issues and values at a Community Gathering, based on community surveys, interviews and classroom exercises.
Vision

Our community is a safe and resilient community. We will increase resilience while respecting our traditional values and be a community where existing and future generations want to live.

Issues

Progressive erosion threatens buildings, homes and infrastructure in our community.

Goals

Prevent damage or loss of property to riverine erosion resulting from high water events and thawing permafrost.

Objectives

By 2023 at least 80 percent of buildings, homes and infrastructure in our community be moved away from the eroding riverbank.

Strategic Actions

(Adaptation Measures)

1) Identify suitable land in community to move buildings, homes and infrastructure.
2) Conduct survey of buildings, homes and infrastructure to determine what can be safely moved.
3) Secure funding to relocate structures or buyout properties and rebuild in new location.
Identifying and Prioritizing Strategic Actions

Inter-Agency Planning Groups provide assistance to community members as they identify and prioritize strategic actions. Agencies can provide technical expertise and advise the community on funding opportunities to implement strategic actions.
Identifying and Prioritizing Strategic Actions

1. Identification of Issues  
2. Strategic Focus Areas  
3. Preliminary Planning Schedule  
4. Work Breakdown Structure  
5. Identification of Imminent and Critical Action Items  
6. Strategic Management Plan

Year 1

Year 2
Community Understanding of Risk

- Hazard Identification
- Community-Based Monitoring
- Science + Engineering Studies
- Risk Assessments

- Informed Community Ready to Make Decisions to Reduce Risk/Adapt

Planning: Local Decisions to take Action to Adapt/Reduce Risk

- Strategic Adaptation Planning
- Hazard Mitigation Planning
- Inter-Agency Planning Groups

- Identification + Prioritization of Strategic Actions
- Identification of Resources
- Development of Timeline

Implementation: Carrying Out Strategic Actions to Achieve Resilience

- Inter-Agency Partnerships to support Implementation (Funding, Technical Assistance)

- Implementation of Strategic Actions (Protect-in-Place, Migrate Infrastructure, Relocation, Adaptive Technology)

The Path to Resilience
IMPLEMENTATION: Working toward Resilience

Photo: Jeffery Charles, Newtok
PROTECTION-IN-PLACE

- Shoreline protection measures and other controls to prevent or minimize the effects of coastal or riverine threats

- Allows the community to remain in its current location
Shaktoolik hired a contractor to develop a concept-level design for an elevated structure which will provide shelter for the community during emergencies, principally during storm surges, but also in other extreme weather events and serve other non-emergency functions.
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
Gabion Sea Wall at Tununak
Kivalina Rock Revetment
Earthen Berm built by Shaktoolik Community
Directs new development to higher ground, away from impacts of erosion, flooding, and storm surge.
• Developed community criteria for a relocation site
• Evaluated candidate relocation sites
• Identified at least one relocation site with broad community support and reasonable constructability
• Identified initial next steps for pioneer development
• Informed community’s decision to relocate
Mertarvik, Newtok’s New Village Site
Adaptive Technology

Infrastructure and Facilities that work best in the place we call home

Bringing together the old and the new
Looking Back to Look Forward
Homes to Withstand an Environment that Floods
Greenland Mobile Shelter on Skis

https://inhabitat.com/rob-sweeres-sledge-project-is-a-tiny-space-age-mobile-shelter-on-skis/
Houseboats, “Floating Homes” in Yellowknife, Canada
Houseboats, “Floating Homes” in Yellowknife, Canada
What Ideas Do You Have?
Sally Russell Cox
Community Resilience Programs
Division of Community and Regional Affairs
Alaska Department of Commerce, Community, and Economic Development
550 West 7th Ave, Suite 1640
Anchorage, Alaska 99501
Phone: (907) 269-4588
Fax: (907) 269-4066
sally.cox@alaska.gov