

Strategic

Management Plans

Shishmaref, Shaktoolik, Kivalina

Impacts of Climate Change on Alaska

Alaska is often referred to as the *“canary in the coal mine”* for climate change. As the only state in the nation with an Arctic region, the impacts of a changing climate are already evident.

Impacts of Climate Change on Alaska

Over the past 60 years, Alaska has warmed *more than twice as rapidly* as the rest of the United States, with state-wide average annual air temperature increasing by nearly 3°F and average winter temperature by 5.5°F, with substantial year-to-year and regional variability.

Total Change in Mean Seasonal and Annual Temperature (°F), 1949 - 2013

Region	Location	Winter	Spring	Summer	Autumn	Annual
Arctic	Barrow	7.0	4.8	3.7	5.3	5.2
Interior	Bettles	6.4	3.6	1.8	1.5	3.3
	Fairbanks	6.6	3.0	2.5	0.1	3.0
West Coast	Delta Junction	8.8	2.7	1.3	0.1	3.1
	McGrath	7.0	3.9	2.6	1.3	3.7
	Kotzebue	6.0	1.1	2.8	1.9	3.0
	Nome	3.6	2.4	2.4	0.5	2.2
	Bethel	6.0	3.2	1.8	0.0	2.8
	King Salmon	7.6	3.3	1.2	0.5	3.2
	St Paul	-0.2	0.6	2.1	1.0	0.9
Southcentral	Cold Bay	1.2	0.7	1.5	0.9	1.1
	Talkeetna	8.9	4.7	2.9	2.5	4.7
	Gulkana	7.8	1.8	1.0	0.0	2.6
	Anchorage	5.2	3.0	1.1	1.3	2.7
	Homer	6.0	2.9	2.8	1.6	3.3
Southeast	Kodiak	1.1	1.6	1.2	-0.4	0.8
	Yakutat	5.5	2.6	2.1	0.6	2.6
	Juneau	6.7	2.5	2.0	1.1	3.0
	Annette	3.8	2.1	1.7	0.3	1.9
Average		5.5	2.7	2.0	1.1	2.8

Reduction in Arctic Sea Ice

The extent and thickness of arctic sea ice has decreased significantly since 1979.

In the past, this ice has provided a “buffer” to the impacts of sea storms on coastal communities.

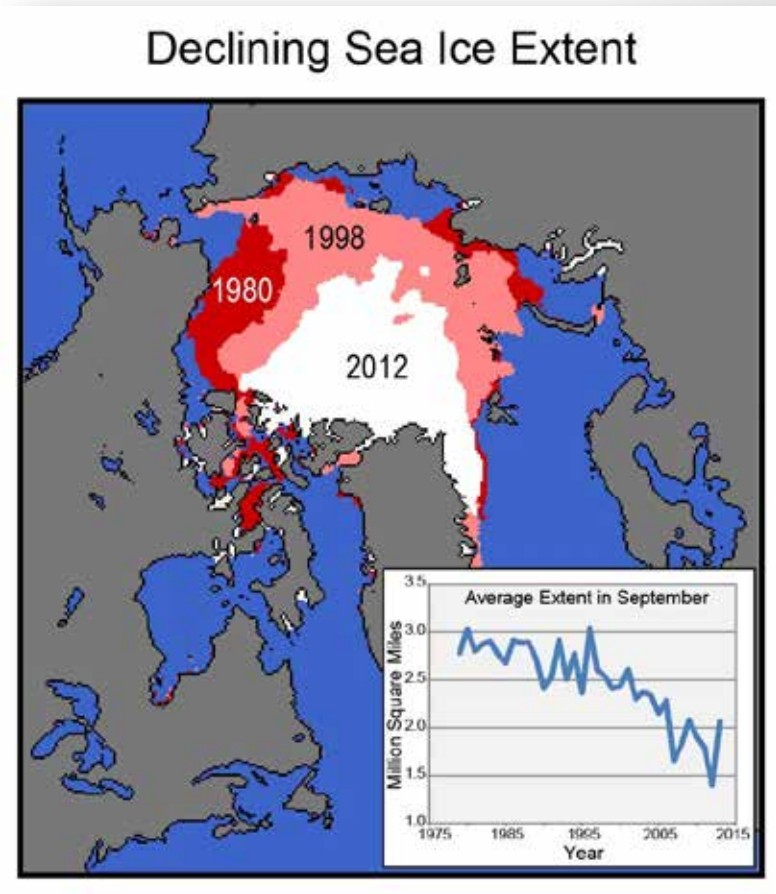


Figure source: NSIDC 2012; Data from Fetterer et al. 2013

Reduction in Arctic Sea Ice

As a result, coastal communities are much more vulnerable to the impacts of coastal sea storms and related storm surges, flooding and erosion.

Kivalina

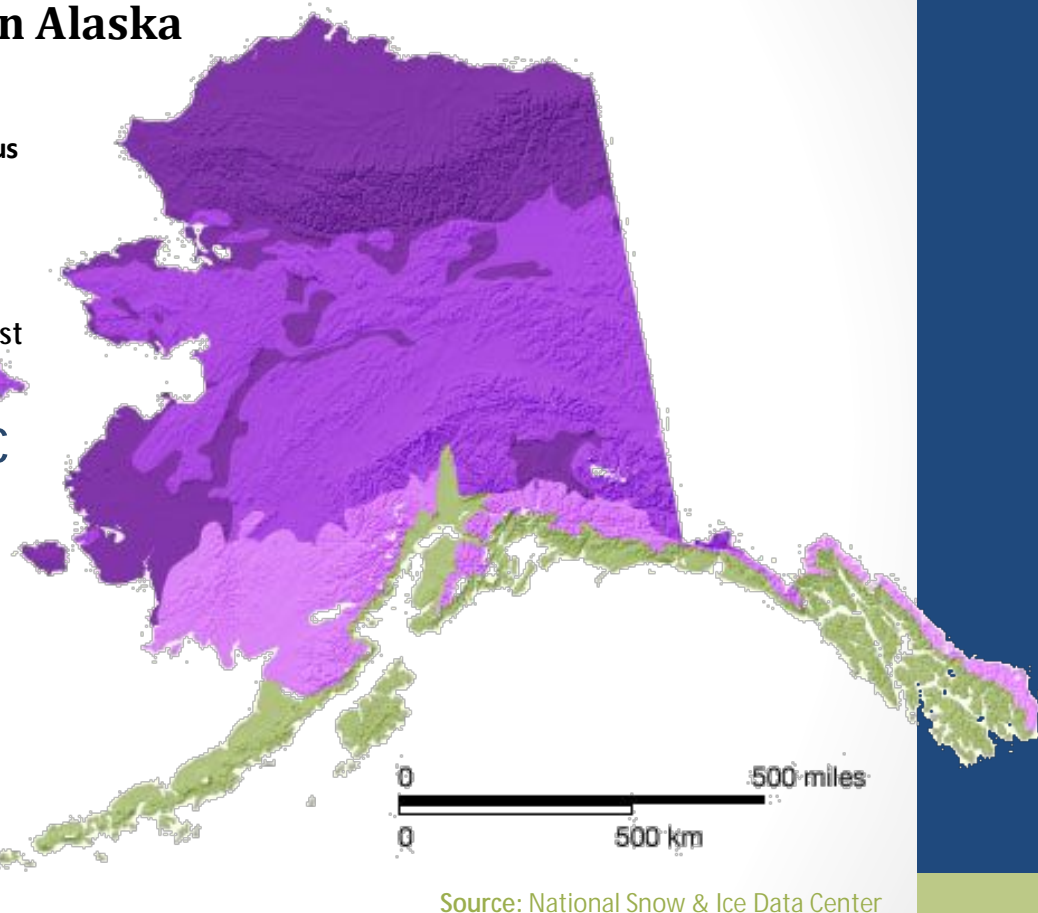
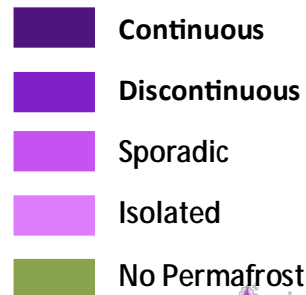


Shishmaref



Thawing Permafrost

Permafrost in Alaska



Source: National Snow & Ice Data Center

- 80% of land in Alaska is underlain by permafrost.
- Permafrost near Alaska's Arctic coast has warmed $4^{\circ}\text{F} - 5^{\circ}\text{F}$ at 65 foot depth since the late 1970s and $6^{\circ}\text{F} \text{ to } 8^{\circ}\text{F}$ at 3.3 foot depth since the mid-1980s.
- Thaw is already occurring in interior and southern Alaska, where permafrost temperatures are near the thaw point.

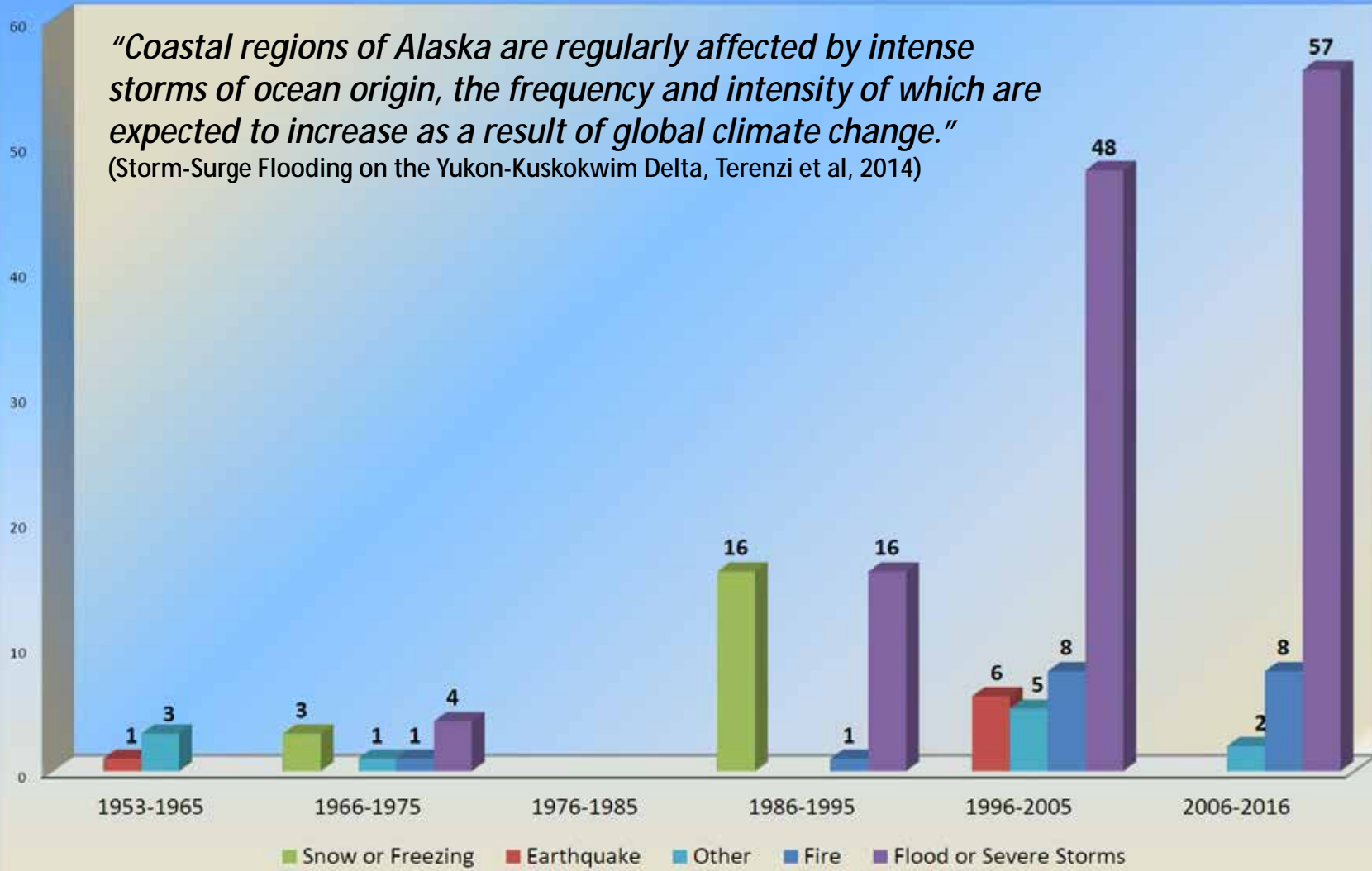
Thawing Permafrost

Ice - rich permafrost layer thaws when exposed to warmer river/sea water, leaving a “shelf” with no support.



Alaska State and Federally Declared Disasters, 1953-2016

“Coastal regions of Alaska are regularly affected by intense storms of ocean origin, the frequency and intensity of which are expected to increase as a result of global climate change.”
(Storm-Surge Flooding on the Yukon-Kuskokwim Delta, Terenzi et al, 2014)





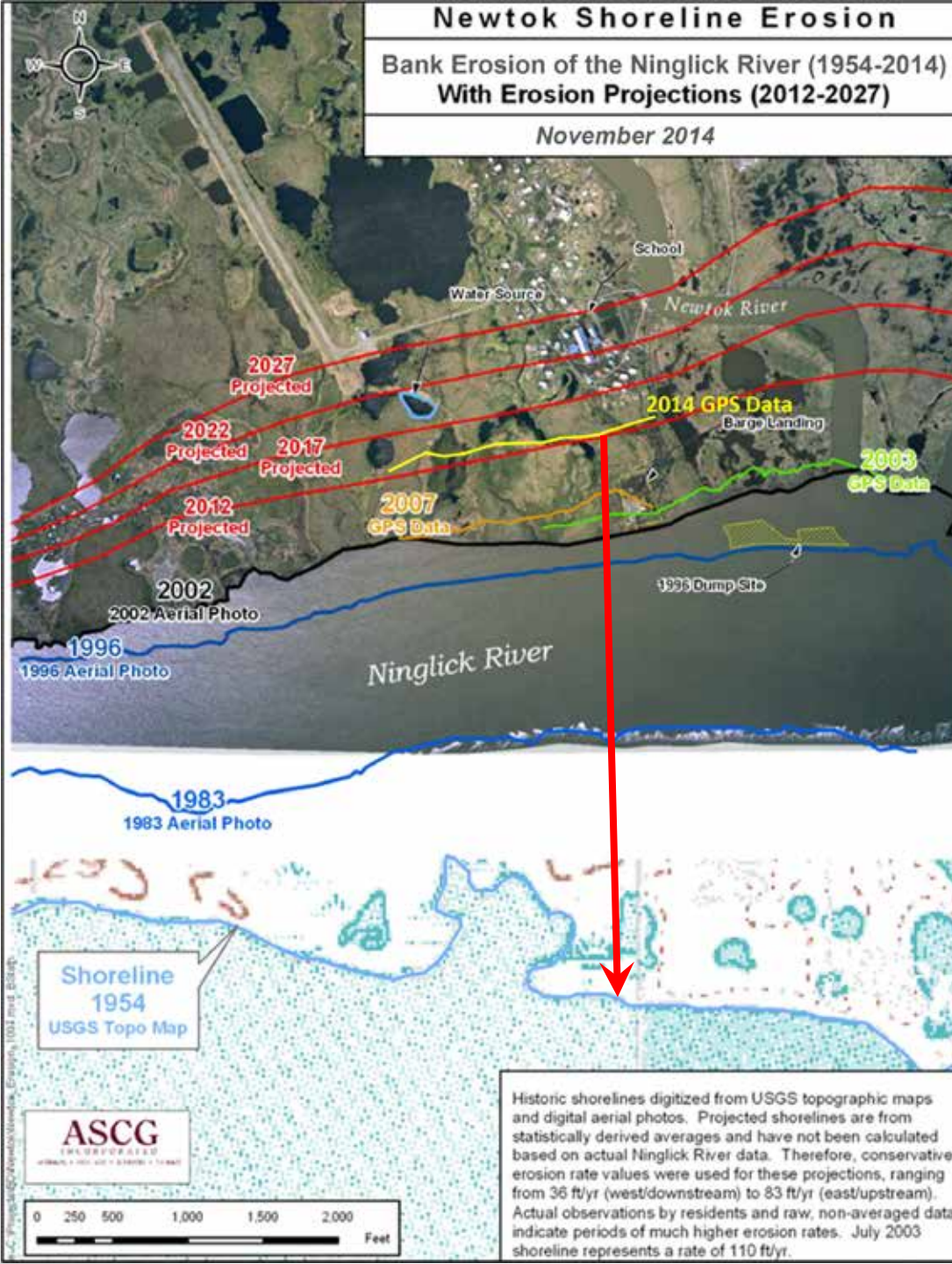




Newtok Shoreline Erosion

Bank Erosion of the Ninglick River (1954-2014)
With Erosion Projections (2012-2027)

November 2014



“Not that long ago the water was far from our village and could not be easily seen from our homes. Today the weather is changing and is slowly taking away our village. Our boardwalks are warped, some of our buildings tilt, the land is sinking and falling away, and the water is close to our homes. The infrastructure that supports our village is compromised and affecting the health and well-being of our community members, especially our children.”
Newtok Resident, from Mertarvik Strategic Management Plan

Newtok Shoreline Retreat, 2006 to 2014



“The Ninglick River is eroding toward Newtok at an average rate of 72 feet per year. The maximum yearly observed rate of erosion is 300 feet per year. At that rate, the Ninglick River would reach the community school by about 2017. The school is the largest and most important structure in the community. Its loss would severely impact the function and continued existence of the community.”

Newtok Shoreline, July 16, 2016



Newtok Planning Group



Participants in Newtok Planning Group

Native Village of Newtok

- Newtok Village Council
- Newtok Native Corporation

State of Alaska

- Alaska Department of Commerce, Community, and Economic Development – *group coordinator*
- Alaska Department of Environmental Conservation (DEC)/Village Safe Water Program
- Alaska Department of Transportation and Public Facilities
- Alaska Department of Military and Veterans Affairs/Division of Homeland Security and Emergency Management
- Alaska Department of Education and Early Development
- Alaska Department of Health and Social Services
- Alaska Industrial Development and Export Authority/Alaska Energy Authority
- Alaska Governor's Office
- Alaska Legislative Representatives

Federal

- U.S. Army Corps of Engineers, Alaska District
- U.S. Department of Commerce, Economic Development Administration
- U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration
- U.S. Dept. of Defense, Innovative Readiness Training Program
- U.S. Dept. of Agriculture, Rural Development
- U.S. Dep. of Agriculture, Natural Resources Conservation Services
- U.S Department of Housing and Urban Development
- U.S. Department of the Interior, Bureau of Indian Affairs
- U.S Department of Transportation, Federal Aviation Administration
- U.S. Environmental Protection Agency
- Denali Commission
- Alaska Congressional Delegation Representatives

Regional Organizations

- Association of Village Council Presidents, Regional Housing Authority
- Alaska Native Tribal Health Consortium
- Coastal Villages Region Fund
- Lower Kuskokwim School District
- Rural Alaska Community Action Program
- Yukon-Kuskokwim Health Corporation



Partnering with the Village of Newtok since 2006

- Community-driven
- Voluntary
- Regular meetings and agency project updates provide for enhanced communication among community and agencies
- Collaboration has resulted in cost-savings and leveraging of resources
- Better coordination of work
- Reduced conflicts in project timelines and construction windows

Mertarvik Strategic Management Plan

Sets a common vision for relocating the village of Newtok to relocation site on Nelson Island.



MERTARVIK

**Nunaullemteggun ikayuqulluta tamamta,
assirluta aknirtenritellerkamtenun,
nuggtarllemtenun ciunerkamteni**

*a community that builds together
for the safe and healthy future of Newtok*




Preliminary Relocation Report :: Newtok to Mertarvik

ISSUED FOR REVIEW by the Community of Newtok and the Newtok Planning Group, June 2011
Developed by Agence/Beck Consulting with PDC Engineers and USOH Inc. in collaboration with NPG members Sally Sorrell Cox and Greg Phego.

Strategic Management Plan

Newtok to Mertarvik

March 2012



MERTARVIK

**Nunaullemteggun ikayuqulluta tamamta,
assirluta aknirtenritellerkamtenun,
nuggtarllemtenun ciunerkamteni**

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for the safe and healthy future of Newtok*

Maligtaquyarat (Guiding Principles)

The relocation of Newtok will be defined by our Yup'ik way of life. Our Guiding Principles are:

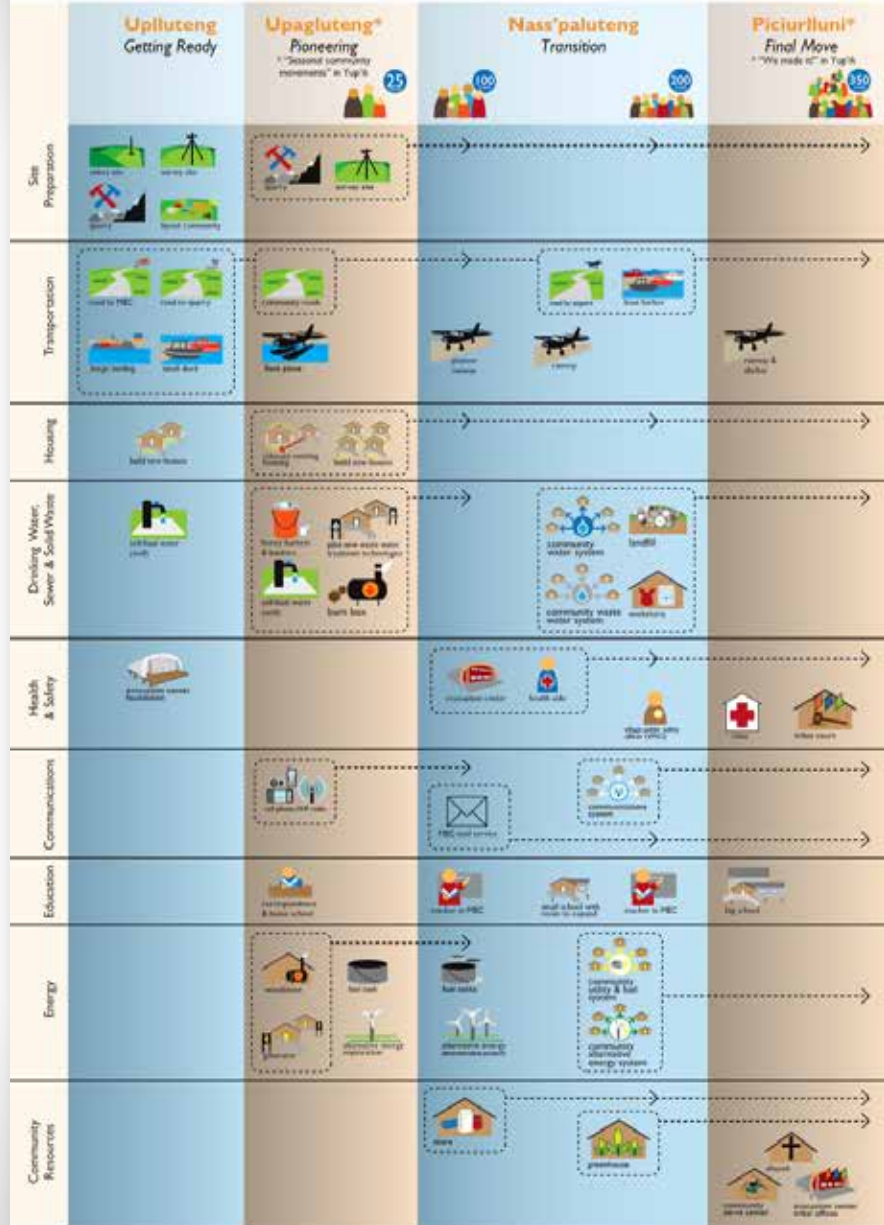
- Remain a distinct, unique community – our own community.
- Stay focused on our vision by taking small steps forward each day.
- Make decisions openly and as a community and look to elders for guidance.
- Build a healthy future for our youth.
- Our voice comes first – we have first and final say in making decisions and defining priorities, by implementing nation-building principles and working with our partners.¹
- Share with and learn from our partners.
- No matter how long it takes, we will work together to provide support to our people in both Mertarvik and Newtok.
- Development should:
 - Reflect our cultural traditions.
 - Nurture our spiritual and physical well-being.
 - Respect and enhance the environment.
 - Be designed with local input from start to finish.
 - Be affordable for our people.
 - Hire community members first.
 - Use what we have first and use available funds wisely.
- Look for projects that build on our talents and strengthen our economy.

Mertarvik Relocation Plan



MERTARVIK

Munuuqarviggetteq Saqqutitaa taarsuutit, taarsuutit
 Akkuaqutit/taarsuutit, taarsuutit/taarsuutit akkuaqutit
 a community that builds together for the safe and healthy lives of Inuit



Strategic Focus Areas

Site Preparation



1. Fund, develop townsite plan
2. Fund, carry out survey
3. Resolve land ownership questions
4. Determine lot allocation strategy
5. Construct pioneer roads
6. Establish basic housing development rules
7. Develop quarry resource

Building Capacity



1. Identify partnership team
2. Define MCDC role, strengthen functions
3. Assess needed skills, create training plan
4. Assess regional demand for rock/gravel
5. Build relationships with foundations

Emergency Response + Public Health



1. Redesign MEC if necessary
2. Hire MEC construction manager and crew
3. Develop, implement MEC funding strategy
4. Identify health professional pioneer
5. Complete MEC vertical construction
6. Develop long-term plan for clinic

Housing



1. Complete site preparation tasks
2. Conduct housing survey
3. Develop a housing strategy
4. Relocate houses
5. Implement housing programs
6. Research housing energy technologies

Drinking Water + Sanitation



1. Identify practical system alternatives
2. Evaluate + select alternatives
3. Develop business plan
4. Pursue funding for design + construction

= project initiation = project maintenance

	2012		2013		2014	
	winter/spring	summer/fall	winter/spring	summer/fall	winter/spring	summer/fall
Site Preparation						
Building Capacity						
Emergency Response + Public Health						
Housing						
Drinking Water + Sanitation						

Relocation Activities at Mertarvik, 2006 - 2016

2006

2007

2008

2009

2010

2011

2012

2013

2014

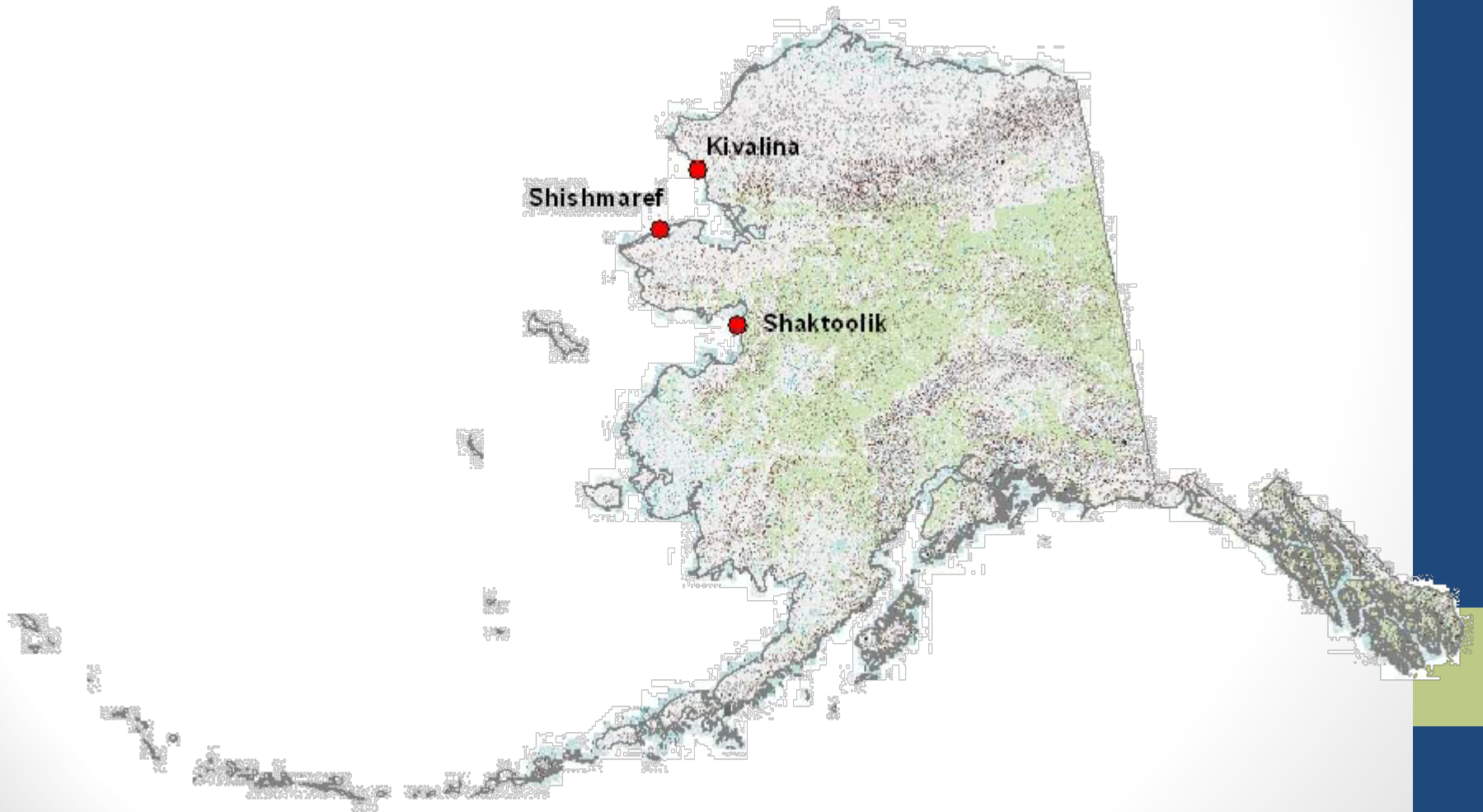
2015

2016

- **Newtok Planning Group (NPG)** formed
 - DCCED awarded EDA grant for **Mertarvik Barge Landing Facility**
 - Newtok residents build **3 BIA homes**
- **Geotechnical studies** to inform design/construction of **Barge Landing, Access Road, Evacuation Center, Airport**
 - **First Water Well** drilled at Mertarvik
- **NPG MEMBERS** negotiate with Department of Defense Innovative Readiness Training Program (**IRT**) to assist with relocation
 - **2008 Mertarvik Community Layout Plan** complete
 - **Evacuation Center EA & FONSI** complete
 - **Geotechnical studies** to inform Airport and Quarry development
 - **USACE Geotechnical Report** completed
- **Mertarvik Barge Landing Facility** complete
 - **IRT arrive** at Mertarvik
 - **Mertarvik Evacuation Center (MEC)** schematic design complete
 - **DOT/PF Geotechnical Report** complete for Airport Location & Quarry Development
- **MEC Construction Documents** complete
 - **Mertarvik Quarry Mining Plan** complete
- Construction begins on **Mertarvik Access Road**
 - **MEC foundation** constructed
 - **MEC Water Well and Septic System** complete
 - **Mertarvik Quarry** blasted/opened
 - **Mertarvik Community Layout 2011 Update** complete
 - **Mertarvik Relocation Report** complete
- **Mertarvik Access Road** construction complete
 - Newtok residents build **3 SIP homes**
 - **Mertarvik Strategic Management Plan** complete
 - **Mertarvik Waterfront Development Study** complete
- **SWA Hut and Davis Hut** constructed
 - **IRT 5-year commitment to Mertarvik** complete
- **Mertarvik Airport Layout Plan** complete
- **Mertarvik Paper Plat and 2015 Community Layout** update complete
 - Hazard Mitigation Grant Program application submitted to FEMA for **12-Home Relocation Project**
 - FEMA Approves **Phase 1 of 12-Home Relocation Project**
 - **Newtok Tribal Hazard Mitigation Plan Update** completed
- **Newtok Relocation Project - Environmental Assessment Scoping** is complete
 - **Newtok Environmental Site Inventory & Assessment** complete
 - **Mertarvik Evacuation Center Assessment and Construction Feasibility Study** complete
 - **Mertarvik Housing Master Plan** begins



Alaska Community Coastal Protection Project



Objective

- To increase community sustainability and resilience to the impacts of natural hazards.

Essential Components

- Strong community leadership
- Agency support and collaboration
- Careful, effective planning

Strong Community Leadership

- Community grant for full-time Community Coordinator to:
 - Represent community at interagency working group meetings
 - Work with project staff, inter-agency group, and planning contractor on resiliency plan
 - Advocate for funding to carry out resiliency plan
- DCRA provides technical assistance and other support to Community Coordinator

Agency Support and Collaboration

- Organization of interagency working groups (state/federal agencies and regional organizations):
- Coordinated assistance to community to identify and achieve resilience actions, based on conventional funding channels of agencies
- Benefits include:
 - leveraging of resources
 - better coordination of work
 - reduced conflicts in project timelines and construction windows



Careful, Effective Planning

Comprehensive Strategic Management Plan:

- Contractor hired to work with community and inter-agency working group to develop strategic management plan -- “blueprint” for how the community and agencies will proceed over the next 10 – 20 years to accomplish the community’s recommended actions.
- Plan is community-driven, with technical support provided by agencies:
 - Sequencing of activities and projects to implement plan
 - Potential funding sources; identification of critical funding cycles and opportunities
 - Identification of potential resource-leveraging opportunities among agencies
 - Identification of construction windows



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Shaktoolik



Kivalina

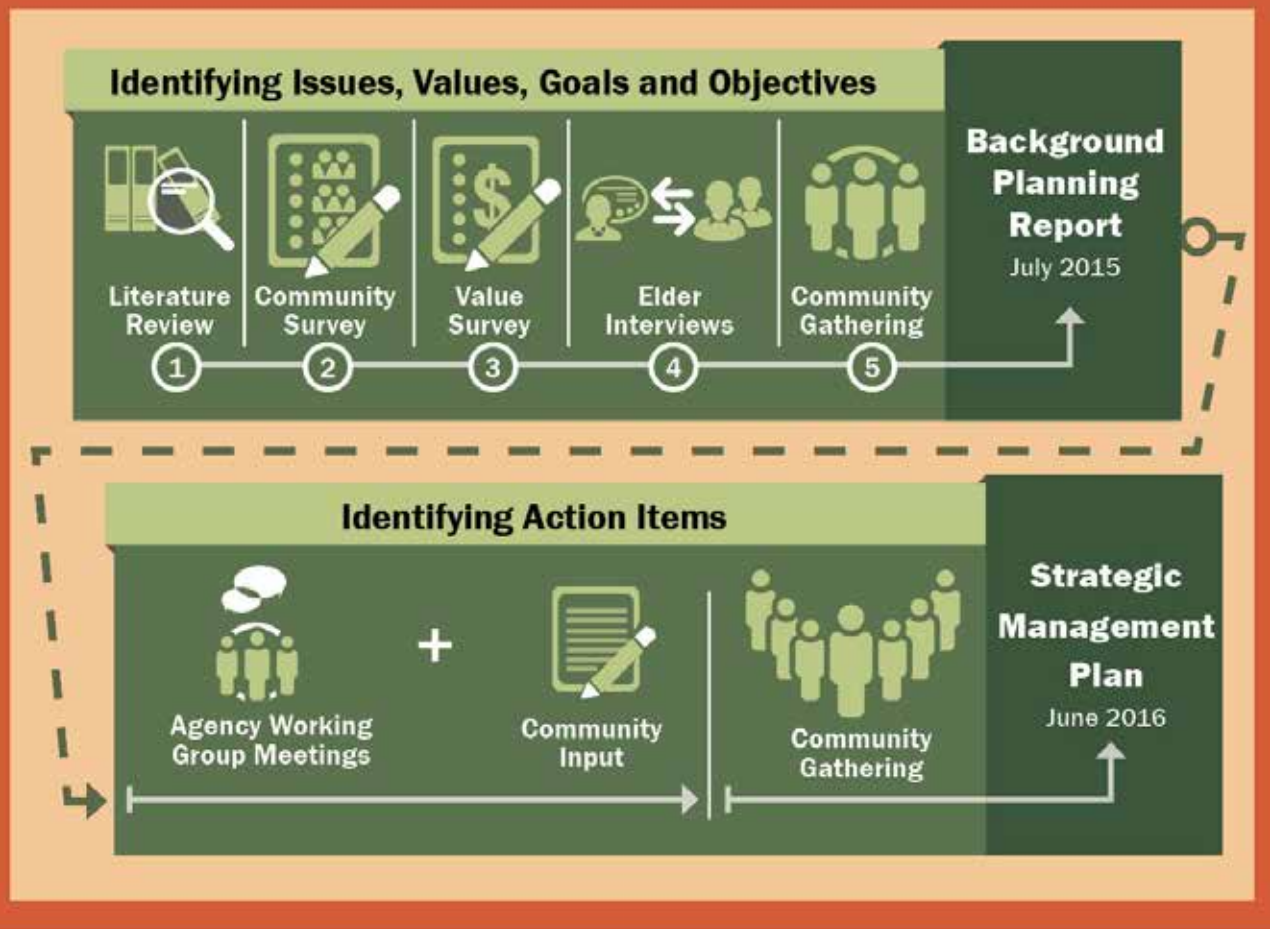


Resiliency Relationships



Planning Process

Working with the community through the community coordinator



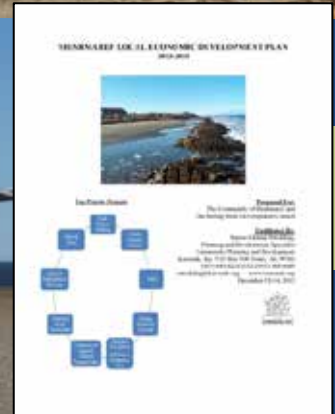
Vision & Guiding Principles



Strategic Action Plan Process



Issue Identification



Strategic Focus Areas

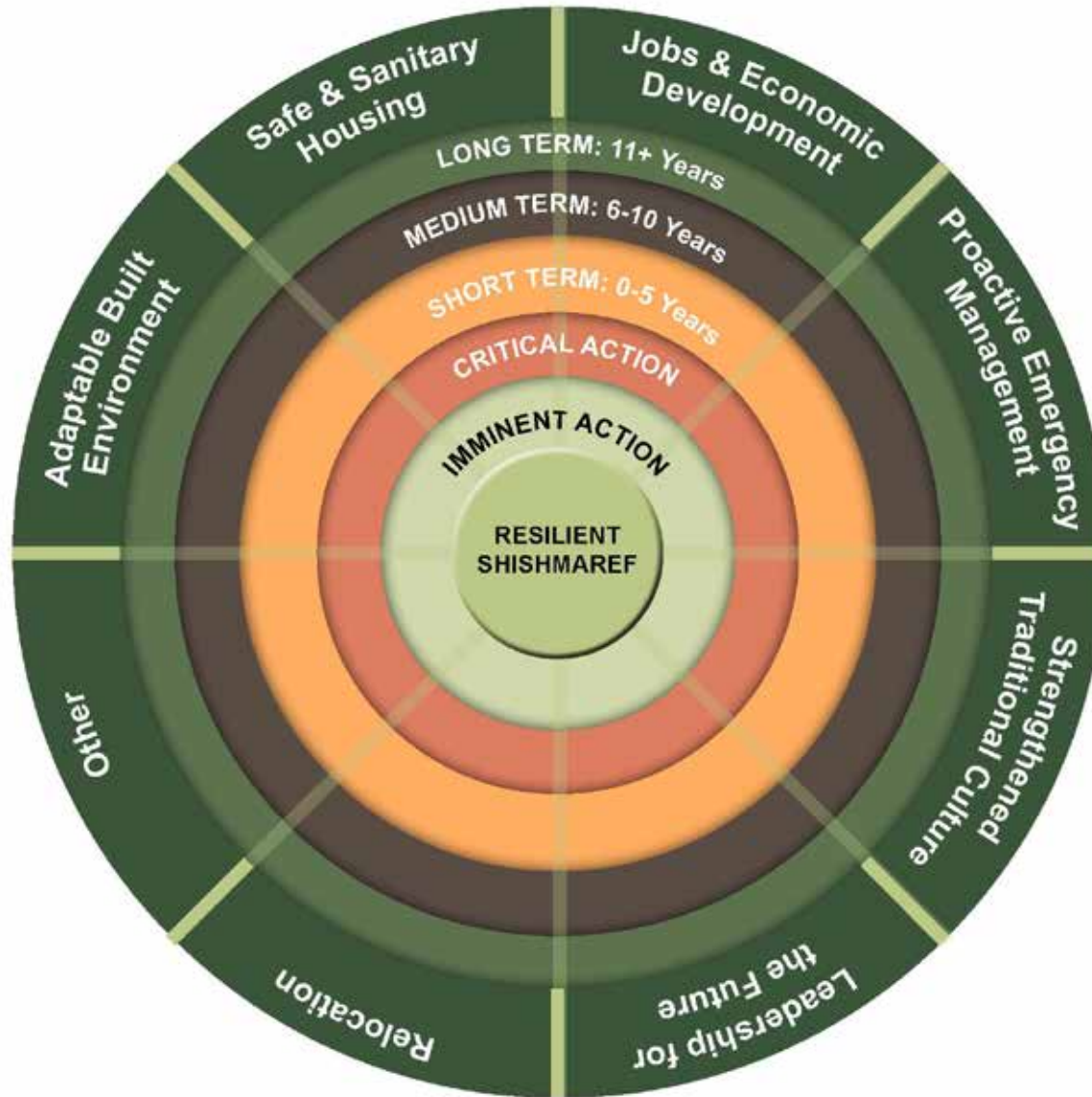
- Adaptable Built Environment
- Safe and Healthy Housing
- Jobs and Economic Development
- Proactive Emergency Management
- Strengthened Traditional Culture
- Leadership for the Future
- Relocation
- Other

Preliminary Planning Schedule

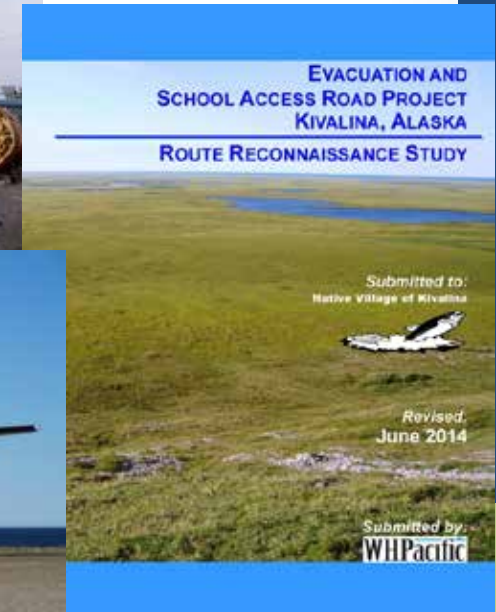
Shishmaref Strategic Management Plan – Preliminary Planning Schedule

Strategic Focus Area	Short-Term Action Items (0-5 years)	Medium Term Action Items (6-10 years)	Long Term Action Items (11+years)
Infrastructure	Maintain existing seawall	Additional Heavy Equipment	Extend/upgrade seawall
	Utility Assessment	Airport Erosion Protection	
	Energy audit	Rainwater capture and reuse program	
	Rainwater capture and reuse program	Extend/upgrade seawall	
	Water source protection ordinance	School upgrades*	
	Water/Sewer improvements*	Health clinic expansion*	
	Additional water tank*		
	Fuel tank assessment		
	Dust suppression program		
	Honey bucket ordinance/regulations		
	Water/wastewater Preliminary Engineering Report		
	Development of Gravel Source		
	Wind feasibility study		
	Road improvements		
	Complete Teacher Housing		
	Hydrology Study		
	Extend/upgrade seawall		
	Acquire additional heavy equipment		
	Complete teacher housing project		
	Washeteria expansion*		
	Update transportation plan		
	Replace fuel tanks (depending on outcome of assessment)		
	Water/Sewer upgrades*		
	Airport improvements*		
	New landfill*		
	Additional snow removal equipment		
Street lighting*			
Additional community buildings (multi-purpose building, cultural			

Strategic Action Plan



Imminent and Critical Actions



Next Steps

The next steps for the implementation of the SMP are:

- Accountability
- Monitoring
- Support
- Communication
- Sharing
- Celebration

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- Accountability
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Lessons Learned

- Have community leadership attend working group meetings in person
- Ensure the right people participate in working group meeting
- Maintain interest of all agencies
- Build on existing information
- Retain a community coordinator
- Ensure diverse community participation
- Have plan/process to deal with existing projects
- Establish Peer to Peer opportunities
- Don't wait for perfection
- Need short-term and long-term solutions