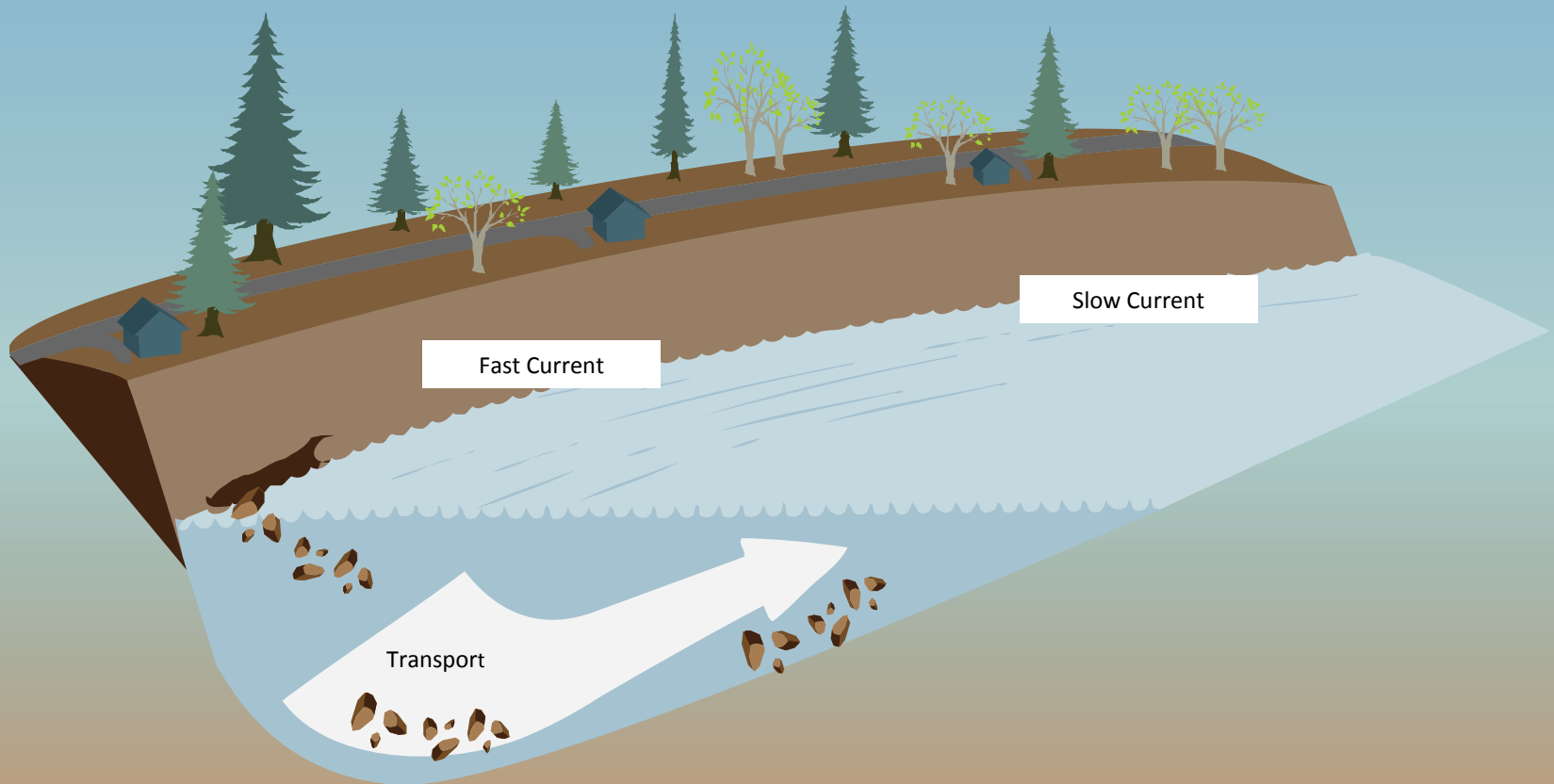


Understanding and Evaluating Erosion Problems



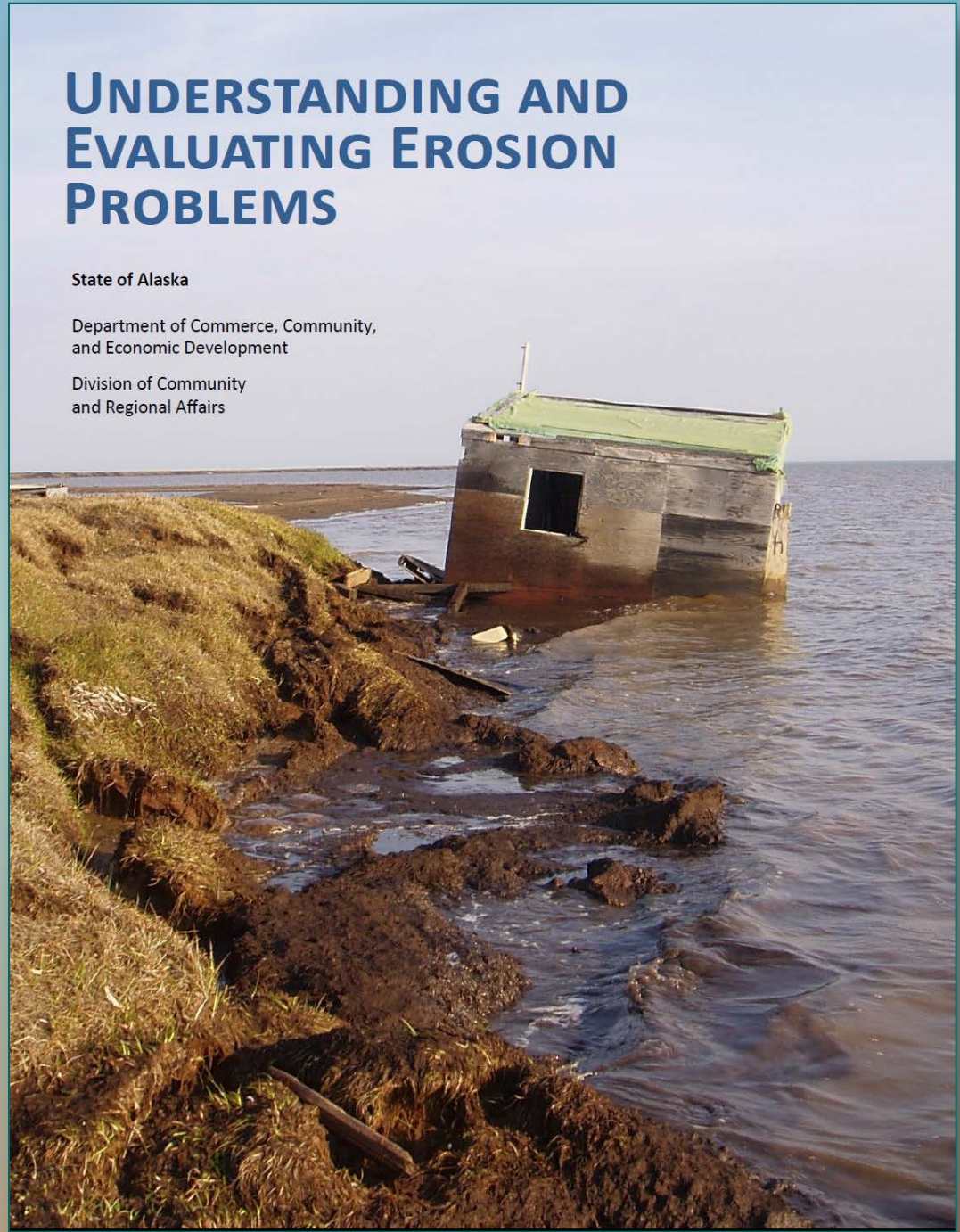
- Helps Alaskan communities and property owners understand and evaluate erosion problems and alternative solutions.
- The more you understand about factors contributing to community erosion problems, *the better able you will be to monitor, describe, seek assistance for, and make decisions about local erosion issues.*

UNDERSTANDING AND EVALUATING EROSION PROBLEMS

State of Alaska

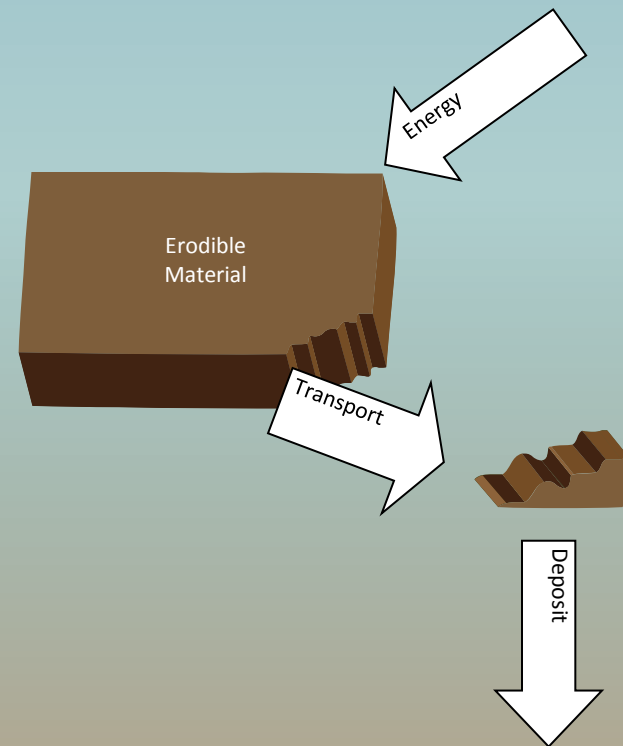
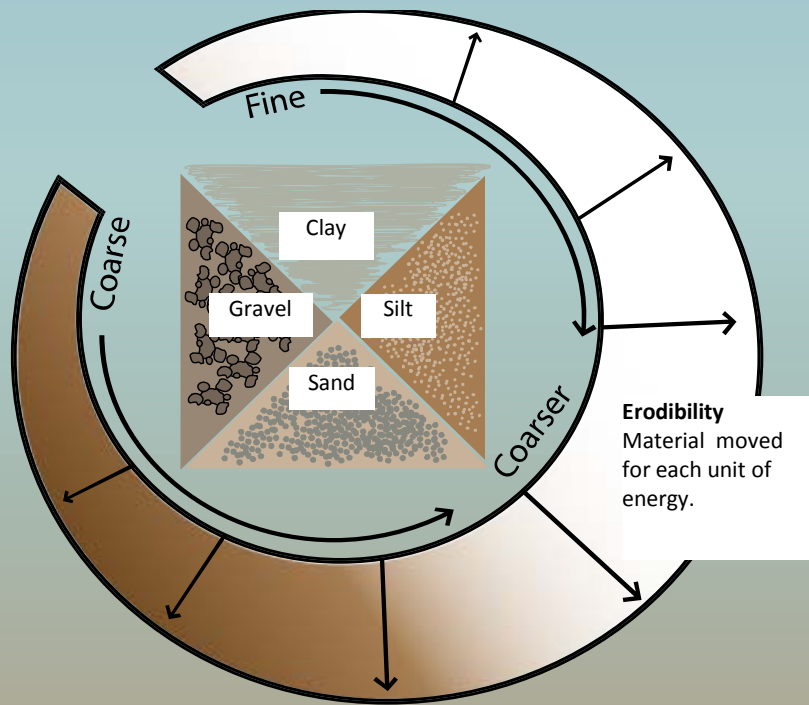
Department of Commerce, Community,
and Economic Development

Division of Community
and Regional Affairs



Understanding Erosion

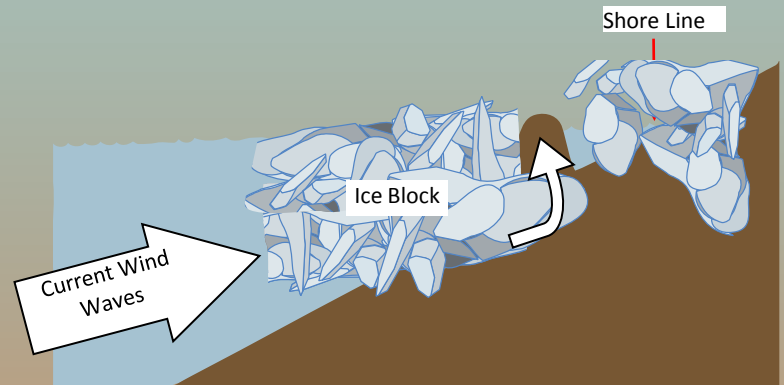
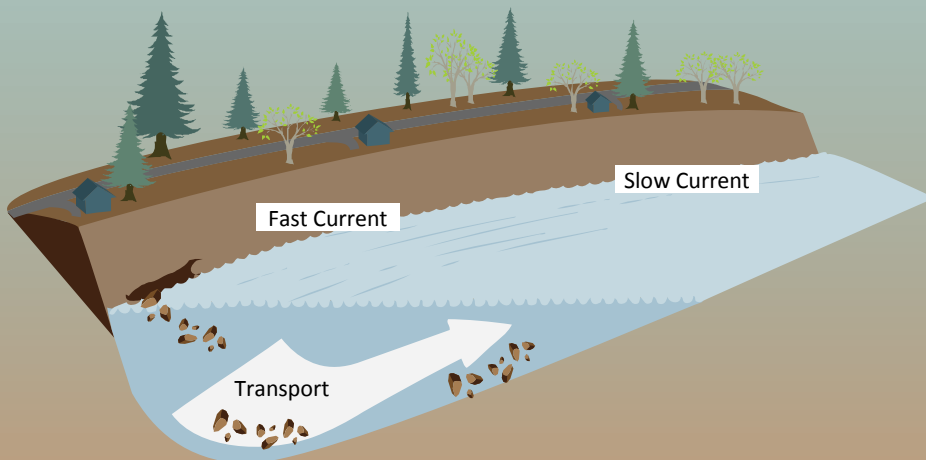
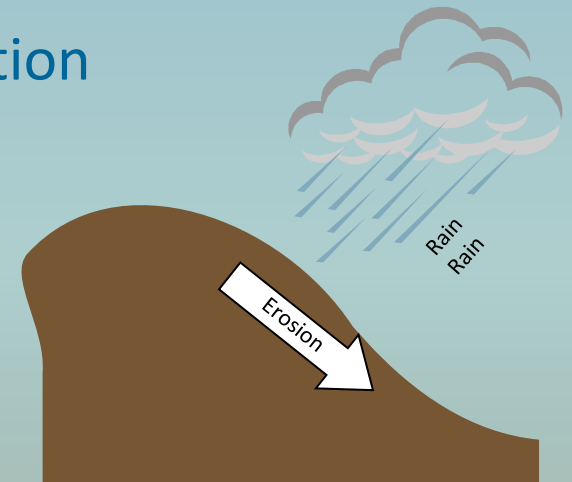
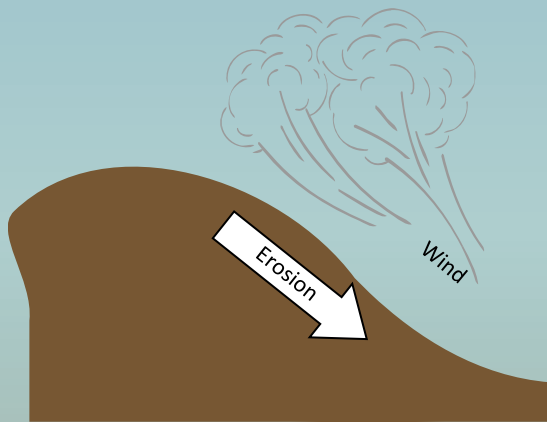
Erodible Materials



Understanding Erosion

Sources of Energy

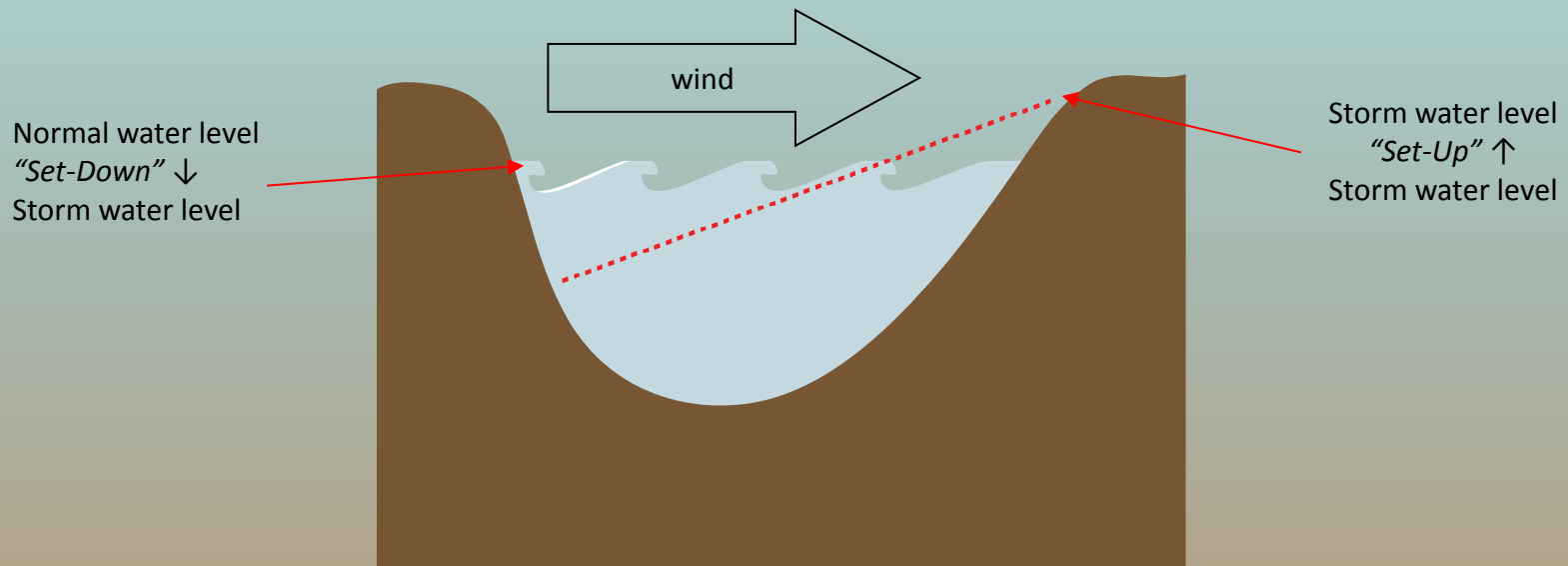
- Waves
- Currents
- Ice
- Heat
- Wind
- Precipitation
- Seepage



Understanding Erosion

Factors that can Increase or Accelerate Erosion

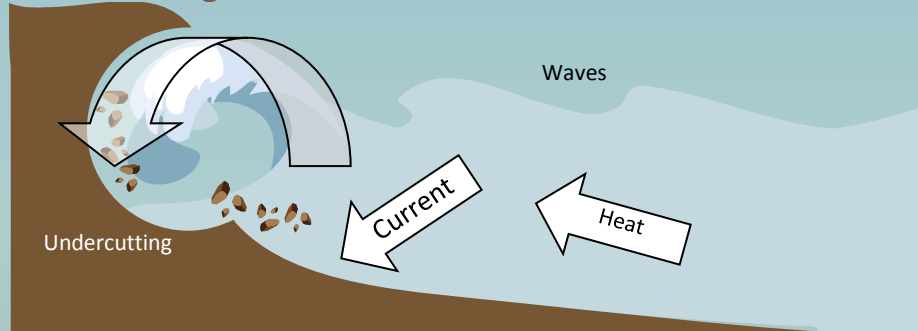
- Tides
- Storm Surge
- Flooding



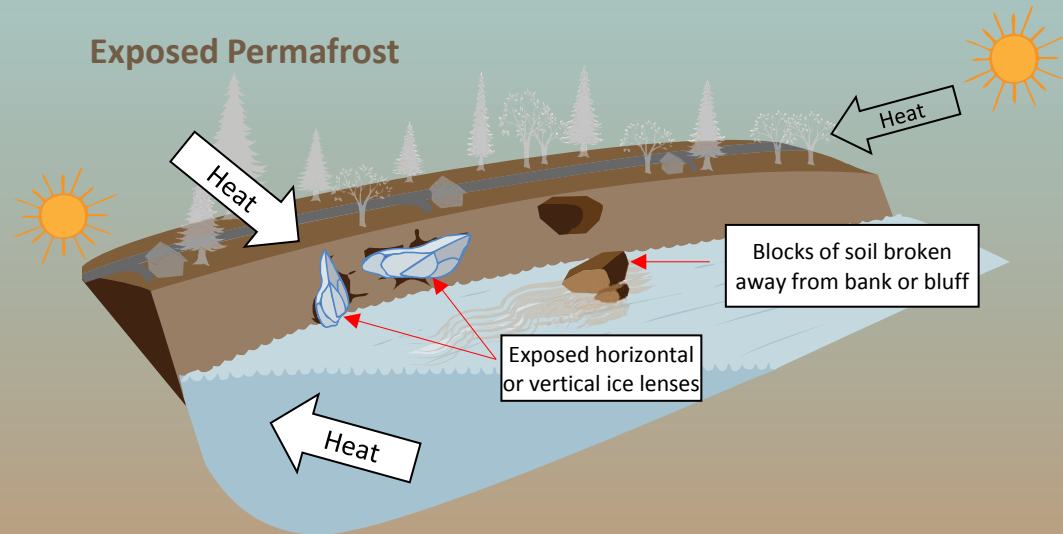
Understanding Erosion

Symptoms of Erosion

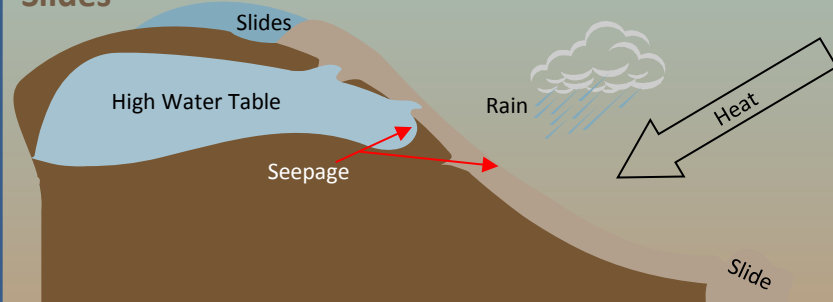
Undercutting



Exposed Permafrost



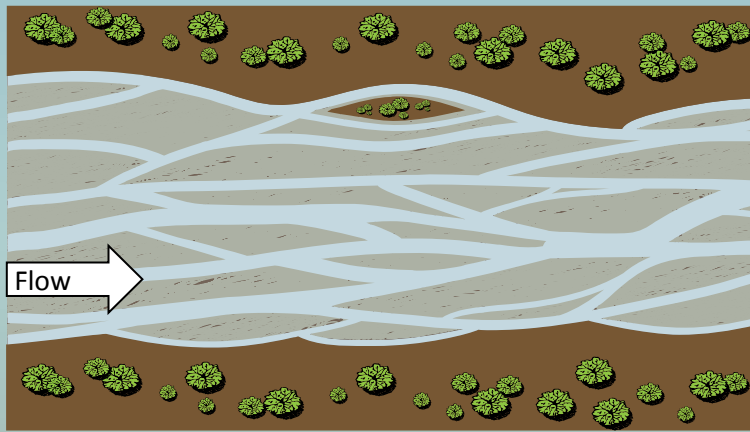
Slides



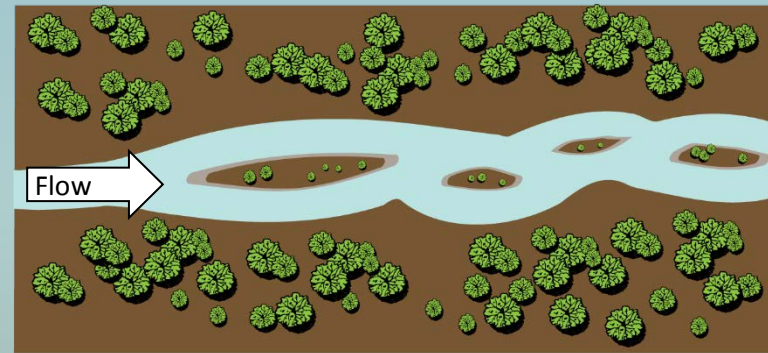
Understanding Erosion

River and Shoreline Configurations

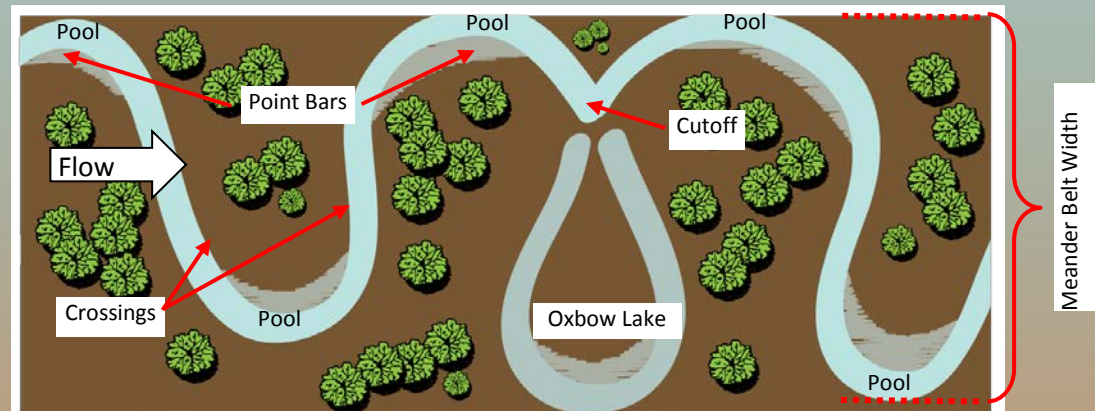
Braided River



Split Chanel River

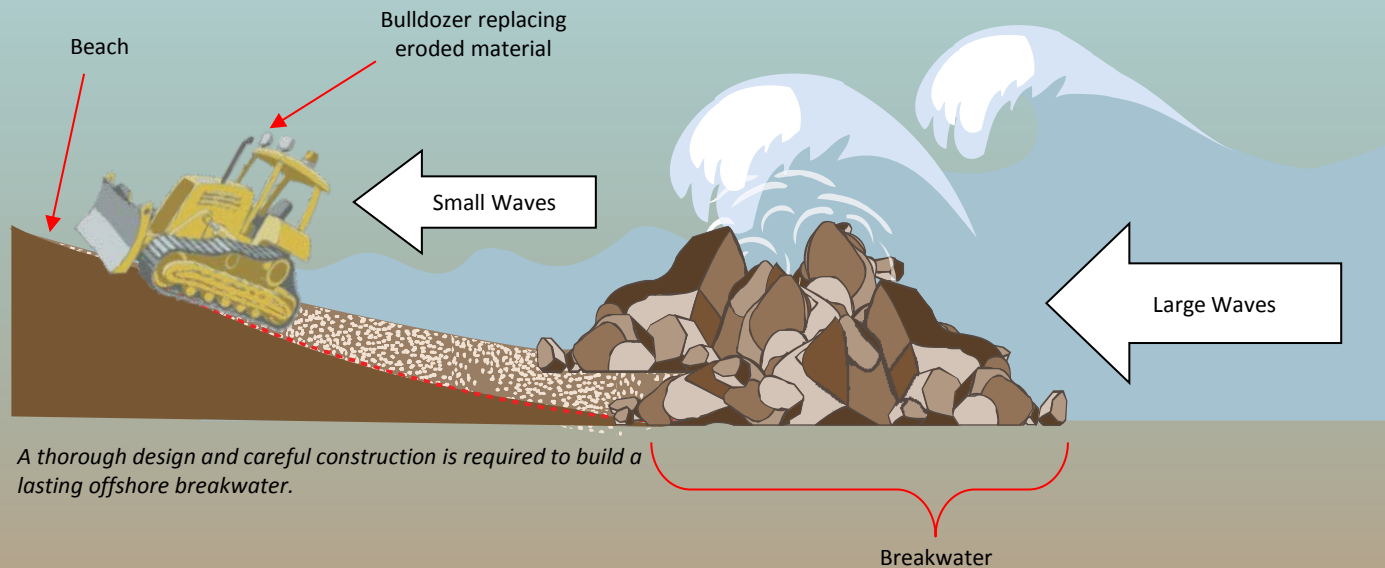


Meandering River



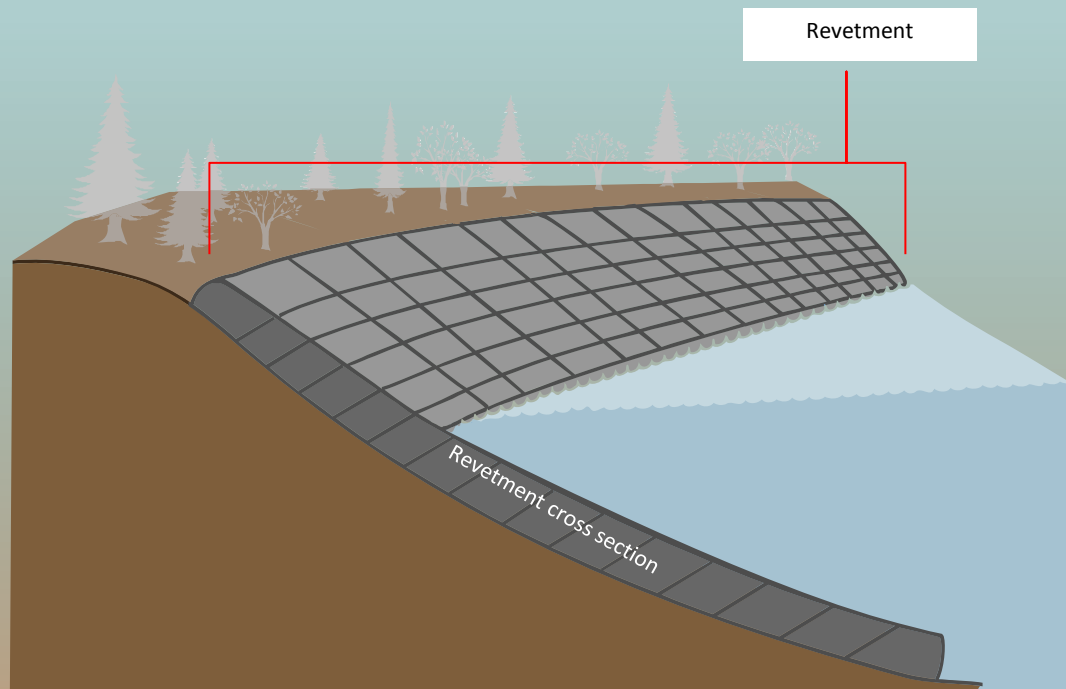
Principles and Means of Controlling Erosion

Suppress or Diminish the Energy Source



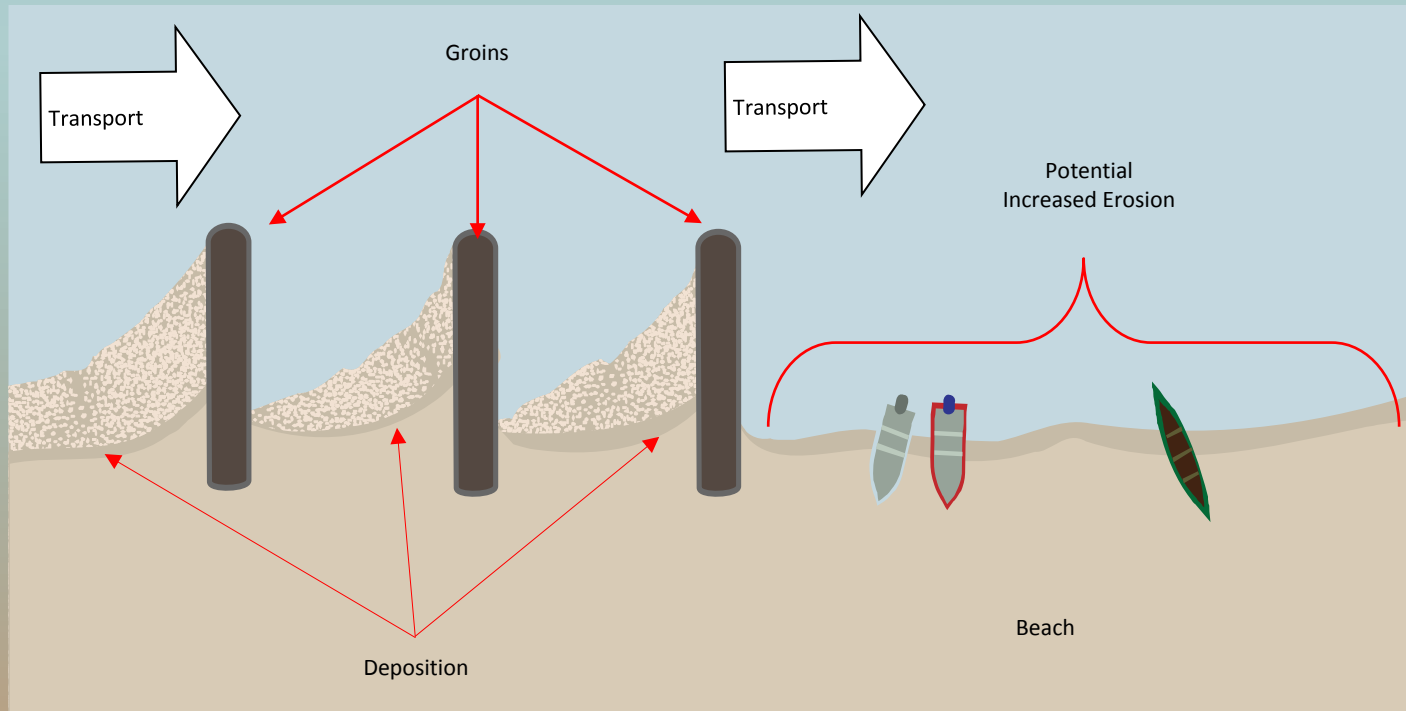
Principles and Means of Controlling Erosion

*Protect or Shield
the Erodible Material*



Principles and Means of Controlling Erosion

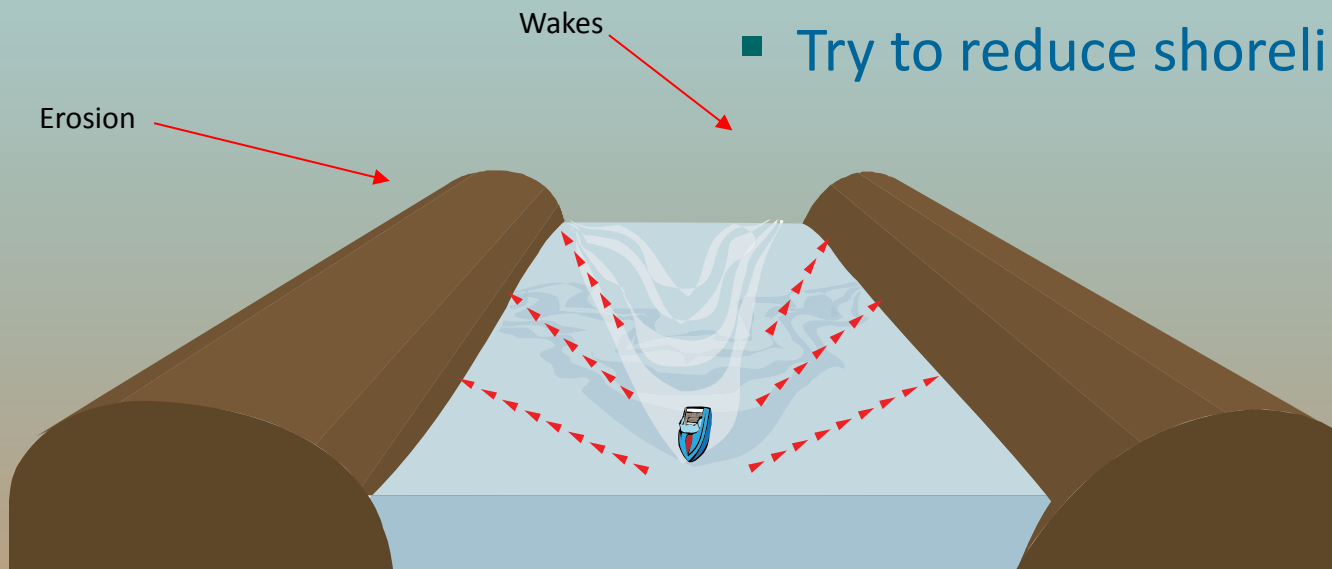
Cause a New Beach to be Formed



Principles and Means of Controlling Erosion

Minimize/Reduce Erosion-Causing Activities

- Decrease boat speeds
- Maintain shoreline vegetation
- Try to reduce shoreline traffic



Understanding and Defining Your Problem

Energy Source Identification

COMMUNITY EROSION OBSERVATION RECORD

Sketch of Overhead View

Sketch Checklist

- ☐ Eroding shoreline
- ☐ Properties to be protected
- ☐ Measured or estimated distances
- ☐ Islands, bars, opposite bank
- ☐ Direction of current
- ☐ Direction of ice movement
- ☐ North direction indicated
- ☐ Normal wind direction
- ☐ Strong wind direction
- ☐ Happens _____ times in _____ years
- ☐ Known limits offloading
- ☐ Happens _____ times in _____ years
- ☐ Location of side view sketch shown on other sheet
- ☒ River shape as seen from the air:
 - ☐ Braided
 - ☐ Split
 - ☐ Meandering
 - ☐ Sinuous
 - ☐ Straight

Energy Source Identification

WAVES - Eroding shoreline is exposed to:

- ☐ Big waves → How often? _____ times per year. How big? $\approx$ _____ feet.
- ☐ Boat waves → How often? _____ times per week. How big? $\approx$ _____ feet.
- ☐ Small waves
- ☐ No waves

CURRENT - Eroding shoreline is exposed to:

- ☐ Fast current → _____ feet in _____ seconds
- ☐ Slow current → _____ feet in seconds
- ☐ Current direction changes with wind direction
- ☐ No current

ICE - Eroding shoreline is exposed to:

- ☐ Ice blocks → How big? _____ feet thick x _____ feet wide x _____ feet long
- ☐ No ice frozen

HEAT - Eroding shoreline is:

- ☐ Always frozen with lenses of ice
- ☐ Always Frozen with no ice visible
- ☐ Frozen in winter but not summer
- ☐ Never frozen

WIND - Eroding shoreline is exposed to:

- ☐ Strong winds that make air dusty
- ☐ Strong winds that are not dusty
- ☐ No wind or light winds

PRECIPITATION - Eroding shoreline is exposed to:

- ☐ Strong wind-driven rain or hail
- ☐ Heavy rain or hail
- ☐ Light to moderate rain

SEEPAGE - Eroding shoreline usually has:

- ☐ Water seeping out of bank or bluff
- ☐ Wet bank or bluff
- ☐ Dry bank or bluff

Assessment of Energy Sources

Assessment of Energy Sources

- ### Sketch Checklist

- ☐ Shape of eroding
- ☐ Properties to be protected
- ☐ Measured or estimated distances
- ☐ Height of bluff or bank
- ☐ Normal water level
- ☐ Floodwater level
- ☐ Beach, if any
- ☐ Bottom slope below
- ☒ Soil types:
 - ☐ Frozen
 - ☐ Unfrozen
 - ☐ Gravel sized (G)
 - ☐ Sand sized (S)
 - ☐ Silt sized (L)
 - ☐ Clay sized (C)
 - ☐ Mixed sizes (show mix)

		Energy Sources Identified by Erosion Symptoms						
		Waves	Current	Ice	Heat	Wind	Precipitation	Seepage
Energy Sources Identified Directly	Slides	○	○	■	□	■	○	○
	Undercutting	■	■	■	○	■	■	■
	Scarps	■	■	■	■	■	■	■
	Ice Exposure	○	○	■	■	■	○	○
	Root Exposure	■	■	■	○	○	○	○
	Ice Gouging	■	■	■	○	○	○	○
		■	■	■	○	○	○	○
		■	■	■	○	○	○	○

Seeking Assistance

Technical Assistance

TECHNICAL ASSISTANCE

Depending on the situation, several agencies may assist you with your erosion problem:

Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs (DCRA): DCRA helps communities reduce losses and damage from flooding and erosion. DCRA can provide technical assistance on community planning, floodplain management, hazard impact assessments, community migration and relocation, and grant opportunities. DCRA's funding assistance for erosion issues is summarized in the section on Funding Assistance.

Alaska Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM): DHS&EM responds to state disaster declarations dealing with erosion and flooding when local communities request assistance. The situation must be a life-threatening, immediate problem. DHS&EM's funding assistance for erosion issues is summarized in the section on Funding Assistance.

Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS): DGGS conducts geological and geophysical studies to determine potential geologic hazards to buildings, roads, bridges, and other installations and structures, and maintains quick response capability to deploy geological field teams in the immediate aftermath of major geohazard events to describe and document the nature, extent and severity of geologic impacts such as significant erosion.

Alaska Department of Transportation and Public Facilities (DOT&PF): DOT&PF will help when a road, airport, or other public transportation facility is in danger.

US Army Corps of Engineers (USACE): USACE can help you utilize their publications to develop preliminary designs. They can help with construction if you qualify for federal funding. Several of the USACE funding programs are summarized in the section on Funding Assistance.

US Department of Agriculture, Natural Resources Conservation Service (NRCS): NRCS can provide technical assistance on improving private lands and their management, and maintaining and improving wildlife and fish habitat. NRCS's funding assistance for erosion issues is summarized in the section on Funding Assistance.

US Environmental Protection Program, Indian Environmental General Assistance Program (IGAP): EPA Tribal Coordinators can provide technical assistance with grant writing and grant opportunities for addressing erosion issues. EPA's IGAP funding assistance for erosion issues is summarized in the section on Funding Assistance.

National Oceanic and Atmospheric Administration (NOAA) especially for storm surges and open ocean erosion (they are not just oceans and flooding). National Ocean Service: <http://oceanservice.noaa.gov/hazards/natural-hazards/>

Ocean and Coastal Resource Management :
http://coastalmanagement.noaa.gov/initiatives/shoreline_resources.html

In addition to the agencies listed above, a private consultant can help with all phases of the project including problem assessment, detailed design, and construction.

Seeking Assistance

Funding Assistance

FUNDING ASSISTANCE

Some potential sources of funding to address your erosion problem are as follows:

USACE

Section 103 of the 1962 River and Harbor Act: allows for the study, adoption, and construction of small shoreline erosion protection projects without specific authorization by Congress. A project is accepted for construction only after detailed study clearly shows its engineering feasibility, environmental acceptability, and economic justification. This program requires a 35% non-federal match.

Section 14 of the 1946 Flood Control Act: allows the USACE to plan and construct emergency streambank and shoreline protection projects to protect highways, highway bridge approaches, and public facilities. This program also requires a 35% non-federal match.

Section 22 of the Water Resources Development Act of 1974 (Planning Assistance to States Program): allows the USACE to assist the states, local governments, and other non-federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. This program requires a 50% non-federal match.

Section 111 of the River and Harbor Act of 1968: Allows the USACE to mitigate shoreline erosion damage caused by federal navigation projects.

DHS&EM

Hazard Mitigation Grant Program (HGMP): Funds provided by the Federal Emergency Management Agency (FEMA) and administered by DHS&EM to states and Indian tribal governments to assist communities in implementing long-term measures that substantially reduce the risks of future damage, hardship, loss, or suffering in an area devastated by a disaster.

Requirements for HGMP funding are that the community has a Local Hazard Mitigation Plan, there is a Federal Disaster Declaration in Alaska, the project is shown to be cost-effective, and the state or local government provides a 25% non-federal match.

Pre-Disaster Mitigation (PDM) Program: Funds provided by FEMA and administered by DHS&EM to states, territories, Indian tribal governments, and communities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. Requirements for PDM funding are that the community has a Local Hazard Mitigation Plan, the project meets cost-benefit analysis and cost-effective requirements; and that the state or local government provide a 25% match (10 % or more for a small and impoverished community.)

DCRA

Flood Mitigation Assistance (FMA) Program: Funds provided by FEMA and administered by DCRA to communities for (1) development of flood risk mitigation plans or (2) activities described in approved plans to reduce the risk of flood damage to structures covered under the National Flood Insurance Program, such as elevation, acquisition, and relocation of buildings. Erosion related to flooding can be addressed through this funding. Requirements for FMA funding are that the community participates in the National Flood Insurance Program (NFIP); has a FEMA-approved Flood Risk Mitigation Plan (unless grant is for development of such a plan); the project meets cost-effectiveness requirements; and the state or community provides a non-federal match.

Repetitive Flood Claims (RFC) Program: Funds provided by FEMA and administered by DCRA to reduce flood damage to individual properties for which one or more claim payments for losses have been made under flood insurance coverage and that will result in the greatest savings to the NFIP in the shortest period of time. Some erosion issues related to flooding may be addressed through RFC funding. Requirements for RFC funding are that the community participates in the National Flood Insurance Program (NFIP), has a FEMA-approved Flood Risk Mitigation Plan (at the discretion of the FEMA director), the project meets cost-effectiveness requirements, and that there is a lack of capacity by the community to manage FMA grant activity or an inability to meet FMA match requirements,

Severe Repetitive Loss (SRL) Program: Funds provided by FEMA and administered by DCRA to mitigate flood damage to residential properties covered under a National Flood Insurance Program flood insurance policy that have had either (1) four or more flood-related insurance claims payments that each exceeded \$5,000 and cumulatively exceeded \$20,000 or (2) at least two flood-related insurance claims payments that cumulatively exceed the value of the property. In both instances, at least two of the claims must be within 10 years of each other. Requirements for SRL funding are that the community participates in the NFIP, has a FEMA-approved Flood Risk Mitigation Plan; the project meets cost-effectiveness requirements, and the state or community provide a non-federal match.

Seeking Assistance

Funding Assistance

Alaska Climate Change Impact Mitigation Program (ACCIMP): The ACCIMP provides grants for Hazard Impact Assessments and Community Adaptation to address the impacts of erosion, flooding, thawing permafrost, and other impacts of climate change.

- Hazard Impact Assessment (HIA) Grants provide funding to communities to hire a contractor to identify, define, assess impacts to the community. The HIA provides recommendations to the community for the next steps to be taken to address the hazard impacts.
- Community Planning Grants are provided to communities who have undergone HIA's. The Community Planning grant is intended to help the community address one or more of the recommendations from the HIA, such as protest-in-place, migration, or relocation strategies.

NRCS

Watershed Surveys and Planning Program: Depending upon federal appropriations, this program can provide funding for surveys and plans to protect watersheds from damage caused by erosion, floodwater, sediment, and to conserve and develop water and land resources. Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and nonstructural measures to solve resource problems.

Watershed Protection and Flood Prevention Program: Provides funding for projects that control erosion and prevent flooding. Limited to watersheds that are less than 250,000 acres.

Emergency Watershed Protection Program: Provides assistance where there is some imminent threat—usually from erosion caused by river flooding.

Conservation Technical Assistance Program: Provides technical assistance to communities and individuals to solve natural resource problems, including reducing erosion, improving air and water quality, and maintaining or restoring wetlands and habitat.

FEMA

(See DHS&EM and DCRA for additional FEMA-funded programs administered through the State of Alaska Public Assistance Program) Provides aid to state government agencies; local governments; Indian tribes, authorized tribal organizations, and Alaska Native villages; and private nonprofit organizations or institutions that provide certain services otherwise performed by a government agency. Assistance is provided for projects such as debris removal; emergency protective measures to preserve life and property; and the repair and replacement of damaged structures, such as buildings, utilities, roads and bridges, recreational facilities, and water-control facilities (e.g., dikes and levees). This funding requires that there be a Federal Disaster Declaration and cost share (match) from the State or applicant.

Individuals and Households Program: This program provides for the necessary expenses and serious needs of disaster victims that cannot be met through insurance or low-interest Small Business Administration loans. FEMA provides temporary housing assistance to individuals whose homes are unlivable because of a disaster. Other available services include unemployment compensation and crisis counseling to help relieve any grieving, stress, or mental health problems caused or aggravated by the disaster or its aftermath. FEMA can cover a percentage of the medical, dental, and funeral expenses that are incurred as a result of a disaster. This funding requires that there be a Federal Disaster Declaration. Funding provides temporary assistance for primary residences only.

IGAP

General Assistance Program (GAP) Grant: GAP grants are available to Tribes or Intertribal consortiums and can address erosion issues related to solid or hazardous waste.

US Department of Housing and Urban Development

Community Development Block Grant Program: Administered by the State of Alaska Department of Commerce, Community, and Economic Development (*see above*).

Indian Community Development Block Grant (ICDBG) Program: The ICDBG program can provide funding for recipients that may be able to address erosion issues for housing rehabilitation, land acquisition to support new housing construction, and under limited circumstances, new housing construction.

Community Facilities: Infrastructure construction, e.g., roads, water and sewer facilities; and, single or multipurpose community buildings.

Native American Housing Assistance Self-Determination Act of 1996: Provides grants and technical assistance to Indian tribes and Alaska Native villages to develop affordable housing for low-income families. The funds may also be used to move homes that are threatened by flooding and erosion.

Imminent Threats Grants Program: Provides funding to alleviate or remove imminent threats to health or safety for nonrecurring events.

Native American Housing Assistance Self-Determination Act of 1996: Provides grants and technical assistance to Indian tribes and Alaska Native villages to develop affordable housing for low-income families. The funds may also be used to move homes that are threatened by flooding and erosion.

Imminent Threats Grants Program: Provides funding to alleviate or remove imminent threats to health or safety for nonrecurring events.

Seeking Assistance

Funding Assistance

Individuals and Households Program: This program provides for the necessary expenses and serious needs of disaster victims that cannot be met through insurance or low-interest Small Business Administration loans. FEMA provides temporary housing assistance to individuals whose homes are unlivable because of a disaster. Other available services include unemployment compensation and crisis counseling to help relieve any grieving, stress, or mental health problems caused or aggravated by the disaster or its aftermath. FEMA can cover a percentage of the medical, dental, and funeral expenses that are incurred as a result of a disaster. This funding requires that there be a Federal Disaster Declaration. Funding provides temporary assistance for primary residences only.

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Imminent Threats Grants Program: Provides funding to alleviate or remove imminent threats to health or safety for nonrecurring events.

US Department of Commerce, Economic Development Administration

Economic Adjustment Program: Provides assistance to protect and develop the economies of communities. This assistance could involve building erosion or flood control structures to protect village commercial structures, such as canneries.

US Department of the Interior, Bureau of Indian Affairs

Road Maintenance Program: Provides funding for maintaining and repairing roads, culverts, and airstrips to provide a foundation for economic development.

Housing Improvement Program: Provides grants and technical assistance to replace substandard housing, including housing that is threatened, damaged, or lost due to erosion or flooding.

US Department of Transportation

Federal Aviation Administration, Alaska Region Airports Division: Provides funding to improve airport infrastructure—including those threatened by flooding and erosion. May fund relocation of an airport if necessitated by community relocation, provided the airport is in the National Plan of Integrated Airport System and meets agency design standards. However, the community must be relocated before the new airport is built.

Federal Highway Administration: Provides funding through the State of Alaska for roads, pedestrian facilities, and snowmobile trails. Funding may be available to assist villages with improving or repairing roads and boardwalks impacted by flooding and erosion.

Permitting Assistance

Finally, you should be aware of permits that may be required before project construction can begin. Agencies to consult include:

- Alaska Department of Environmental Conservation
- Alaska Department of Fish and Game
- Alaska Department of Natural Resources, Division of Mining, Land, and Water
- US Army Corps of Engineers

Appendices 1-3

Appendix 1. Example Problem

COMMUNITY EROSION OBSERVATION RECORD

Sketch Checklist

- ☒ Eroding shoreline
- ☒ Properties to be protected
- ☒ Measured or estimated distances
- ☒ Islands, bars, opposite bank
- ☒ Direction of current
- ☒ Direction of ice movement
- ☒ North direction indicated
- ☒ Normal wind direction
- ☒ Strong wind direction
- ☐ Happens 12 times in 1 years
- ☐ Known limits of flooding none
- ☐ Happens times in years
- ☒ Location of side view sketch shown on other sheet
- ☒ River shape as seen from the air:
 - ☐ Braided
 - ☐ Split
 - ☒ Meandering
 - ☐ Sinuous
 - ☐ Straight

Energy Source Identification

WAVES - Eroding shoreline is exposed to:

- ☒ Big waves → How often? 12 times per year. How big? 2 feet.
- ☐ Boat waves → How often? times per week. How big? feet.
- ☐ Small waves
- ☐ No waves

CURRENT - Eroding shoreline is exposed to:

- ☐ Fast current → feet in seconds
- ☒ Slow current → 10 feet in 5 seconds
- ☐ Current direction changes with wind direction
- ☐ No current

ICE - Eroding shoreline is exposed to:

- ☐ Ice blocks → How big? feet thick x feet wide x feet long
- ☒ No ice blocks. The ice is far from shore when it moves

HEAT - Eroding shoreline is:

- ☐ Always frozen with lenses of ice
- ☐ Always frozen with no ice visible
- ☒ Frozen in winter but not summer
- ☐ Never frozen

PRECIPITATION - Eroding shoreline is exposed to:

- ☒ Strong wind-driven rain or hail
- ☐ Heavy rain or hail
- ☐ Light to moderate rain

WIND - Eroding shoreline is exposed to:

- ☐ Strong winds that make air dusty
- ☒ Strong winds that are not dusty
- ☐ No wind or light winds

SEEPAGE - Eroding shoreline usually has:

- ☐ Water seeping out of bank or bluff
- ☒ Wet bank or bluff
- ☐ Dry bank or bluff

Appendices 1-3

Appendix 2. Information Sources

Appendix 2: Information Sources

**Alaska Department of Commerce, Community, and Economic Development
Division of Community and Regional Affairs**
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501
Phone: 907-269-4501
<http://commerce.alaska.gov/dcra/>

**Alaska Department of Military and Veterans Affairs
Division of Homeland Security and Emergency Management**
P. O. Box 5750
Ft. Richardson, AK 99505-5750
Phone: 907-428-7000 FAX: 907-428-7009
<http://ready.alaska.gov/>

**Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys**
3354 College Road, Fairbanks, AK 99709
Phone: 907-451-5000 Fax: 907-451-5050
<http://www.dggs.dnr.state.ak.us/>

**Alaska Department of Transportation and Public Facilities
Statewide Design & Engineering Services**
3132 Channel Dr.
P.O. Box 112500
Juneau, AK 99811-2500
Phone: 907-465-2960 Fax: 907-465-2460
<http://www.dot.state.ak.us/stwddes/>

**U.S. Army Corps of Engineers, Alaska District
Alaska Baseline Erosion Assessment**
P.O. Box 6898
Anchorage, AK 99506-0898
Phone: 907-753-5694
Alaska.Erosion.POA@usace.army.mil
<http://www.poa.usace.army.mil>

**U. S. Department of Agriculture
Natural Resources Conservation Service (NRCS)**
Alaska State Office
800 West Evergreen Avenue, Suite 100
Palmer, Alaska 99645-6539
Phone: 907-761-7760
<http://www.ak.nrcs.usda.gov/>

**U.S. Department of Commerce
Economic Development Administration**
Alaska Regional Office
510 L Street, Suite 444
Anchorage, AK 99501
Phone: 907-271-2271
<http://www.eda.gov/>

**U.S. Environmental Protection Agency
Alaska Operations Office**
222 W. Seventh Avenue, #19
Anchorage, AK 99513-7588
Phone: 907-271-5083
<http://www.epa.gov/aboutepa/states/ak.html>

Appendices 1-3

Appendix 3. Helpful Publications

Help Yourself: A brochure prepared by the USACE in 1978 with a discussion of the critical erosion problems and alternative methods of shore protection. Available on the U.S. Government Printing Office's website at:
<http://goo.gl/yPQyq>

Low Cost Shore Protection: A brochure prepared by the USACE in 1981 that presents low cost ways for the shoreline property owner to control or slow down erosion. Available on the USACE Coastal and Hydraulics Laboratory website at:
<http://goo.gl/6kpVs>

Low Cost Shore Protection: Property Owner's Guide: A report prepared by the USACE that gives detailed information on low cost shore protection. Available on the USACE Coastal and Hydraulics Laboratory website at:
<http://goo.gl/2fVfh>

Promoting Generations of Self-Reliance: Stories and Examples of Tribal Adaptation to Change: This new publication by EPA Region X's IGAP Program suggests three components for communities to consider when planning for, implementing, and evaluating long-term climate change adaptation goals. Available on the Alaska Center for Climate Assessment & Policy's website at:
<http://goo.gl/Vilk9>

Soil Erosion Fact Sheets: A series of 7 factsheets prepared by the New South Wales, Australia Department of Primary Industries to help property owners address erosion issues. The factsheets include: Types of Erosion, Indicators of Erosion, Monitoring Erosion, Groundcover, Gully Erosion, Roads and Tracks, and Planning your Erosion Project.
<http://goo.gl/gx3OI>

Erosion Control Technical Guide: A technical guide prepared by the California Department of Transportation that offers tools to aid the decision-making process in designing sustainable erosion controls on project sites. Soil, water and vegetation must all be considered to achieve successful, self-sufficient erosion control at a project site.
<http://goo.gl/SZL7p>

Citizen's Guide to Erosion and Sediment Control: Prepared by the Loudoun County, Virginia Department of Building and Development, this brochure provides general information about erosion and sediment control and how it can affect water quality, wetlands, wildlife and natural vegetation.
<http://goo.gl/LyHkj>

On the Coast: A guide promoting an understanding of coastal processes and good stewardship of coastal property on the Kenai Peninsula: River Center, Soldotna 2010, Coastal Erosion Responses for Alaska in a Changing Climate, Alaska Sea Grant 2011

Glossary

Alternate Ground Bars - Sediment deposition formed opposite of wandering *thalwegs*.

Anabranching (or Split Channel) River - A channel type with numerous stable islands which divide the flow of the river into two channels.

Bluff - A steep *headland*, promontory, riverbank, or cliff.

Breakwater - An offshore structure or partition that protects the shoreline against damaging wave action by causing the wave to break at the structure instead of on the shore.

Braided River - A channel type that contains two or a network of connecting channels separated by gravel bars.

Currents - A body of water or air moving in a definite direction, especially through a surrounding body of water or air in which there is less movement.

Diurnal Tide - A high tide and a low tide that each occur once during the day.

Erodible Materials - Particles which vary in texture, size, and susceptibility to *erosion* based on their resistance to energy.

Erosion - Any process, natural or man-made, by which material is removed from one location and deposited in another.

Floodplain - An area of land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge.

Groin - A structure built approximately perpendicular to the shoreline that traps sediment as it is transported along the beach, thus helping to expand existing shorelines and slow the *erosion process*.

Headland - A point of land that extends into a body of water and is an important feature with respect to wave erosion.

Ice Lenses - Large layers of ice in *permafrost*. They are formed when moisture, diffused within soil or rock, accumulates in a localized zone.

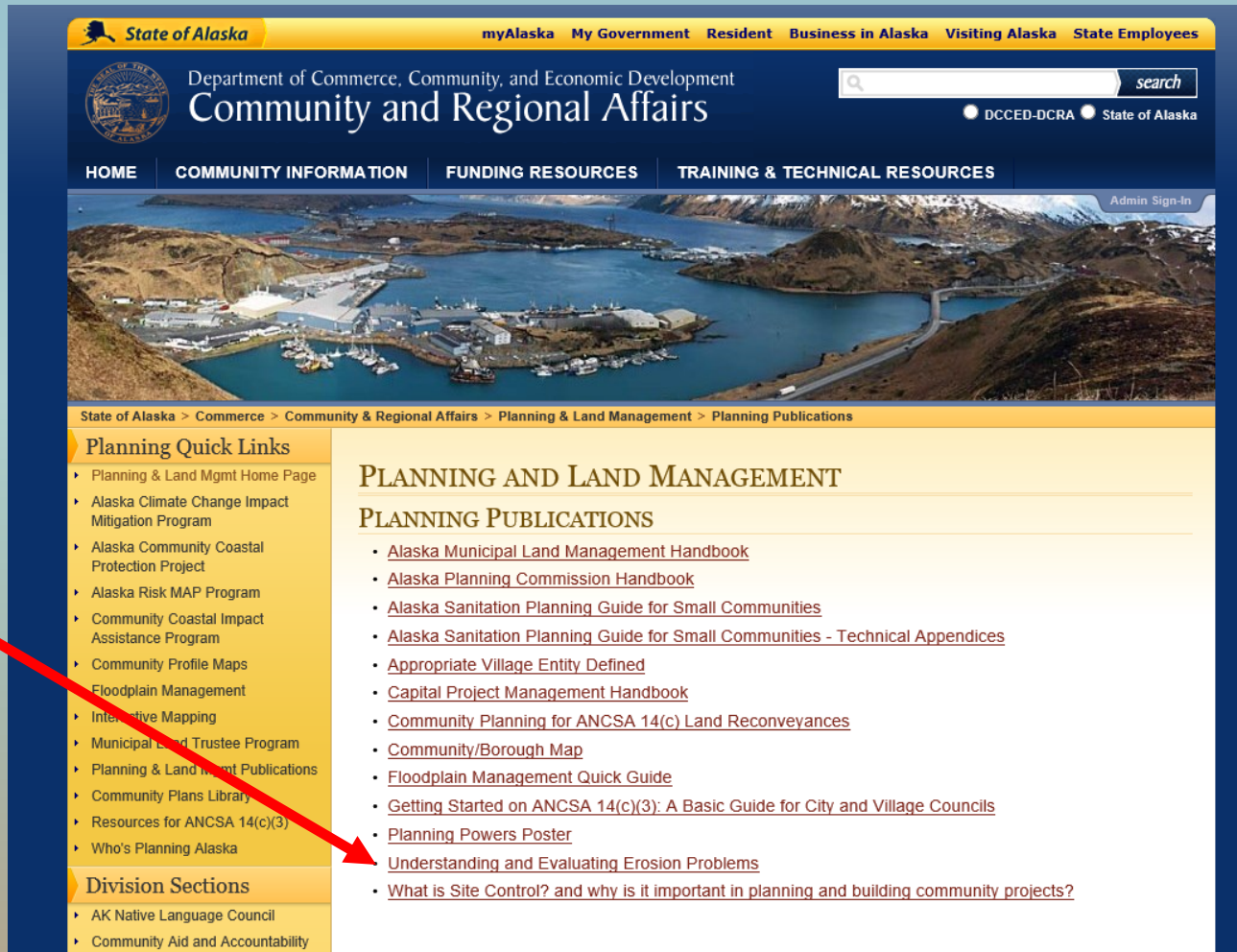
Insulation - A natural or man-made material used on frozen ground to help diminish the amount of heat that is absorbed by the soil, thus preventing thaw.

Meandering River - A channel type that typically contains only one channel, and winds back and forth within the *floodplain*.

Migration - Gradually moving property and development away from erosion prone areas. In order to successfully migrate, a community needs suitable, developable land nearby.

Download from DCRA's Website

<http://commerce.state.ak.us/dnn/dcra/PlanningLandManagement/PlanningPublications.aspx>



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Department of Commerce, Community, and Economic Development
Community and Regional Affairs

HOME COMMUNITY INFORMATION FUNDING RESOURCES TRAINING & TECHNICAL RESOURCES

Admin Sign-In

State of Alaska > Commerce > Community & Regional Affairs > Planning & Land Management > Planning Publications

Planning Quick Links

- Planning & Land Mgmt Home Page
- Alaska Climate Change Impact Mitigation Program
- Alaska Community Coastal Protection Project
- Alaska Risk MAP Program
- Community Coastal Impact Assistance Program
- Community Profile Maps
- Floodplain Management
- Interactive Mapping
- Municipal Land Trustee Program
- Planning & Land Mgmt Publications
- Community Plans Library
- Resources for ANCSA 14(c)(3)
- Who's Planning Alaska

Division Sections

- AK Native Language Council
- Community Aid and Accountability

PLANNING AND LAND MANAGEMENT

PLANNING PUBLICATIONS

- [Alaska Municipal Land Management Handbook](#)
- [Alaska Planning Commission Handbook](#)
- [Alaska Sanitation Planning Guide for Small Communities](#)
- [Alaska Sanitation Planning Guide for Small Communities - Technical Appendices](#)
- [Appropriate Village Entity Defined](#)
- [Capital Project Management Handbook](#)
- [Community Planning for ANCSA 14\(c\) Land Reconveyances](#)
- [Community/Borough Map](#)
- [Floodplain Management Quick Guide](#)
- [Getting Started on ANCSA 14\(c\)\(3\): A Basic Guide for City and Village Councils](#)
- [Planning Powers Poster](#)
- [Understanding and Evaluating Erosion Problems](#)
- [What is Site Control? and why is it important in planning and building community projects?](#)

<http://commerce.state.ak.us/dnn/Portals/4/pub/Understanding&EvaluatingErosionPub.pdf>



Alaska Climate Change Impact Mitigation Program

Intended to address the needs of addressing the needs of communities imminently threatened by shoreline erosion and flooding, permafrost thaw and other climate-change related natural hazards.

Implemented through two funding sources

Hazard Impact Assessments:

- Identify and document climate change-related hazards
- Analyze hazard trends and future impacts to community
- Recommend solutions to mitigate impacts of local natural hazards, taking into account financial considerations

Community Adaptation Planning Grants:

- Based on recommendations of Hazard Impact Assessment
- Brings community to next stage in addressing hazards

Communities receiving Hazard Impact Assessment Grants



Kipnuk Hazard Impact Assessment

Recommendations will provide basis for Community Planning Grant

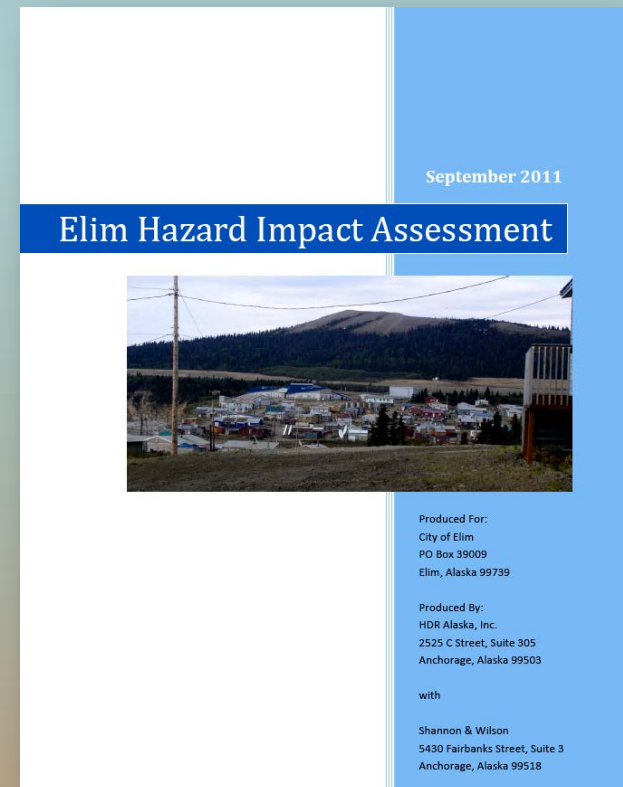
- Shoreline protection to reduce rate of riverbank erosion, such as sheet piles, rip-rap, seawall, and river course modification
- Elevate structures above flood levels. Use of appropriate foundations such as pile or triodetic foundations to address permafrost degradation
- Adopt building code setting 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



Elim Hazard Impact Assessment

Recommendations will provide basis for Community Planning Grant

- Wildfire fuel removal to reduce potential for wildfire
- Periodic monitoring of the cliff face
- Monitoring and documenting the rate of beach erosion
- Relocate the water source area or increase storage capacity
- Protection of wastewater disposal system
- Bridge replacement over Elim Creek to address icing and flooding
- Culvert evaluation throughout community
- Develop community land use plan and establish development standards
- Establish setback requirement preventing new development from being built too close to shoreline or known flooding areas.
- Move structures inland at Moses Point fish camp when a storm is approaching or sea level rises



Communities receiving Community Adaptation Planning Grants



* Kipnuk just started a Community Adaption Planning Grant
and Atmautluak will be starting one in the near future

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

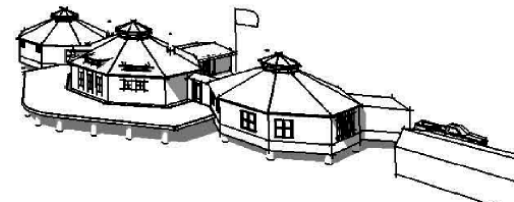
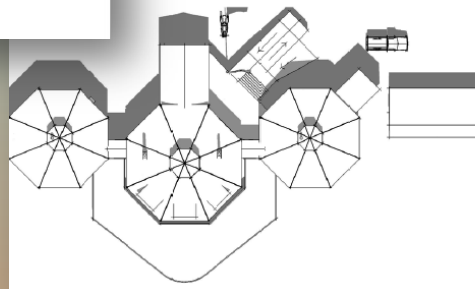
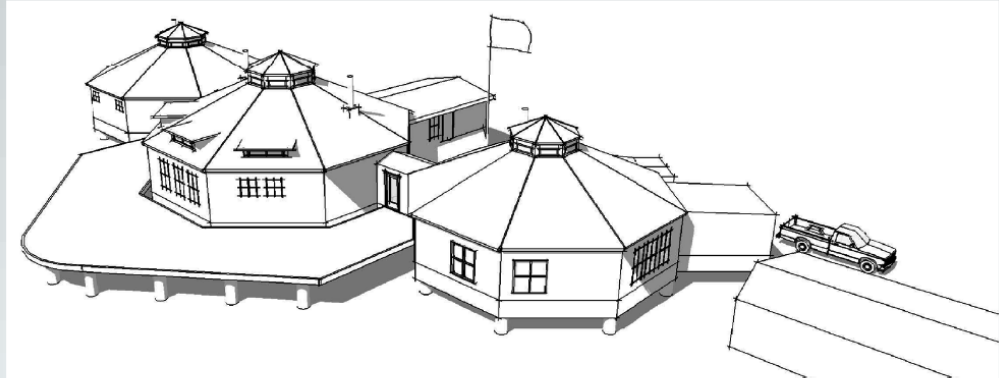
Koyukuk Community Emergency Shelter Design Analysis Report



October 2010

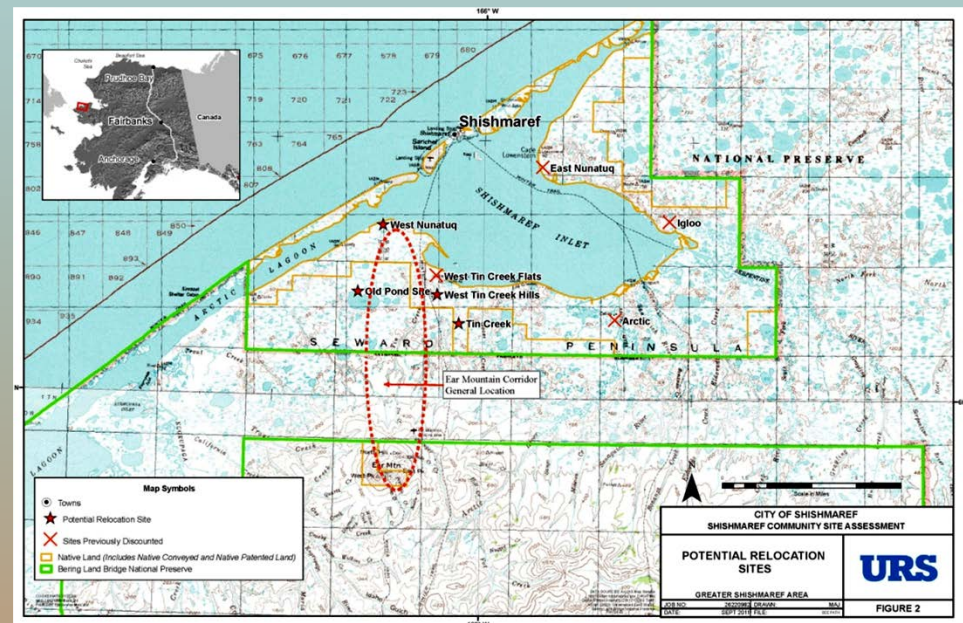
Prepared for:
Koyukuk Tribal Council
Post Office Box 100
Koyukuk, Alaska 99754

Prepared by:
USKH
SHARED VISION. UNITED APPROACH.
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701
Phone (907) 452-2128
Fax (907) 452-0225



Shishmaref Community Relocation Site Selection Feasibility Study

- Community has hired consulting firm (URS Corporation) to:
 - work with community to organize and review prior relocation studies
 - reconfirm community values and technical considerations for site selection criteria
 - evaluate remaining candidate sites and need for any new sites
 - identify at least one relocation site with broad community support and reasonable constructability
 - identify initial next steps for pioneer development.



Thank You!

Sally Russell Cox

Alaska Department of Commerce, Community and Economic
Development

Division of Community and Regional Affairs

550 West 7th Avenue, Suite 1640

Anchorage, Alaska 99508

907-269-4588

sally.cox@alaska.gov