

Preliminary North Shore & Siglauq Alternatives for Point Hope, Alaska

November 16, 2021

Outline

• Introduction

- Grant Project Overview
- Project Timeline
- Identified Community Priorities

North Shore Erosion

- Shoreline Change
- Key Local Knowledge Obtained
- Current North Shore Coastal Protection
- Preliminary North Shore Alternatives

• Siglauq Stability

- Community Feedback
- Factors to contend with
- Location Change?
- Inland Siglauq Sites?
- Potential Design Features





National Fish and Wildlife Foundation Grant Project

• Project Goal

• Utilize existing relationships and data collection to develop conceptual designs to increase the coastal resilience of Point Hope by addressing one or more community priorities

Project Objective

 Produce three conceptual designs that address a community priority and improve the coastal resilience of Point Hope that are feasible, permittable, and constructable and have the potential to secure additional funding

Project Team

- City of Point Hope
- Agviq Environmental Services (AES)
- EA Engineering, Science, and Technology, Inc., PBC (EA)

Project Partners

- Tikigaq Corporation
- North Slope Borough
- US Army Corp of Engineers Engineer Research and Development Center
 - Engineering with Nature
 - Coastal and Hydraulics Laboratory
 - Cold Regions Research and Engineering Laboratory



Project Timeline





Identified Community Priorities



• Major threat: Dynamic beach, steep beach profiles, unconsolidated gravel, and energetic wave environment limits the size of vessels that can be deployed



Today's Goals

- Present potential alternatives to address the two community priorities
 - Preserve cultural and historic sites including siglauqs
 - Maintain and improve functionality of siglauqs
- Receive feedback to better inform the project as we progress
 - What are we missing?
 - What else could work?
 - Share personal experiences that may improve alternatives
 - What priority do you think is most important? Or least important?
- Begin to consider evaluation criteria
 - Does the alternative...
 - address a community priority (i.e. reduces erosion)?
 - benefit the community?
 - supports fish and wildlife habitat?
 - Is the alternative...
 - functional?
 - maintainable?
 - constructable?
 - permittable?
 - fundable?





Addressing North Shore Erosion to Preserve Cultural and Historic Sites

Chris Small

Shoreline Change, 1950-2019



Key Local Knowledge Obtained

Cannot afford to use anymore gravel from the spit for the sandbags The sea use to freeze up in late August, happens later in the fall now Mother nature will win regarding the north shore erosion, can only slow it down

The sea use to freeze up in late August, happens later in the fall now

The waves get really large when a strong northwest wind hits

Ice cellars and graves have been washed away this past year Observed north shore erosion and south shore accretion of a lifetime



Current North Shore Coastal Protection



Preliminary North Shore Alternatives

- Alternative 1 Artificial Dune Creation with Beach Nourishment
- Alternative 2 Dynamic Revetment (Rock/Cobble Berm)
- Alternative 3 Dynamic Revetment with Artificial Dune Creation
- Alternative 4 Dynamic Revetment with Pilot Ice Cellar Dune
- Alternative 5 Cobble Motor Concept
- Alternative 6 Traditional Riprap Revetment

Alternative 1 – Artificial Dune Creation with Beach Nourishment

Alternative 2 – Dynamic Revetment

Alternative 3 – Dynamic Revetment with Artificial Dune Creation

Alternative 4 – Dynamic Revetment with Pilot Ice Cellar Dune

Alternative 5 – Cobble Motor Concept

Alternative 6 – Traditional Riprap Revetment

Comments or Questions on North Shore Alternatives

Maintain and Improve Functionality of Siglauqs

Ellen Jessup McDermott

Community Feedback

- 100+ years old
- No successful new siglauqs
- Meat ferments too quickly
- Proper maintenance
- Fresh water from above and below
- No gravel
- Bad air

Factors to contend with

Change Location?

Con

Dependent on success of coastal protection effort

Pro

Current location is only location with successful cellars

Families and individuals maintain ownership over their traditional cellars

Build ice cellars in new location such as along 7-Mile Road or elsewhere

Ice cellars

location

remain in current

Few locations with suitable grainsize May not be close to town or sea Ice cellars have failed near Inlet due to bad air and flooding New location not threatened by erosion May be accessible from Inlet, future road expansion

AIR FLOOD THAW EROSION

Inland Siglauq Sites?

- **Topographic high point best** •
- Land ownership/leasing? •
- Wetland permitting requirements •

Native Village Of Point Hope (Umiaq 2011)

Tikigaq (Umiaq 2011)

Native Allotment (SDMS)

POINT HOPE, ALASKA FUTURE REGIONAL LAND USE Map 27, 2017 **Comprehensive Plan**

Example Solution - Kaktovik Ice Cellar

- 8 passive thermosyphons with CO₂
- Managed by community foundation
- Shared by multiple captains
- NSB helped build
- Storage for single whale completed 2017
- Still empty; planned 2020 expansion
- * ~\$120,000 –Exxon donation
- Temperature maintained ~20 °F

Potential Design Features

Increased insulation

Cheap materials, manmade (foam) and natural (sod)

Building over opening

Helps keep cellar cool and gutters shed water

Fresh air line

Improves air quality and keeps cellar cool; vent closed in summer

Deeper

Protect from future warming

Thermosyphons

Passive and non-toxic

Meat benches

Additional flood protection

Potential Design Features

Impermeable geomembrane

Pump

Natural insulation for shaft

Prevents infiltration from top but may increase humidity

Active pump in case of emergencies

Mud, like that used by Cold Climate Housing Research Center pilot home No VOCs or pollution risk

Thank You! Questions/Comments?

27