HOW TO ADDRESS ENVIRONMENTAL IMPACTS TO COMMUNITY INFRASTRUCTURE **MEASURING CHANGE**

Alaska Tribal Conference for Environmental Managers APRIL 30, 2019 JACQUELYN OVERBECK

Erosion at Port Heiden, photo taken by John Christensen, Native Village of Port Heiden Facebook Page.

ALASKA SEA ICE & PERMAFROST: IMPLICATIONS ON FLOODING & EROSION

Alaska Water Level Watch



Coastal Storm Hits Western Alaska. In February.

February is not a normal time of year for coastal storms to be flooding western Alaska. With another year of record low sea ice extents in the Bering Sea (NSIDC, 2019), however, the coast remains vulnerable to low-pressure systems moving across the ocean

The Washington Post

Democracy Dies in Darkness

Capital Weather Gang

Alaska's summer heat has been 'basically off the charts'

Scientists say climate change is pushing Alaska's weather "into reco territory."





TIME

As Temperatures in the Region Hit Record Highs

By Davis Hovey, KNOM - Nome - October 28, 2019

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SUBSCRIBE

Chukchi Sea ice coverage reaches record low

'Crazy' and 'scary': Dramatic ocean warming off Alaska raises concerns for hunters and wildlife

Author: Alex DeMarban 🧿 Updated: June 25 🛗 Published June 25



But this early November, the main pack ice is still some 400 miles away.



IMAGE: RICK THOMAN / ALASKA CENTER FOR CLIMATE ASSESSMENT AND POLICY

rgency delivery of fuel by other une had melted dramatically, Point Hope. (Photo by Eleanor K

ALASKA DGGS COASTAL HAZARDS MAPPING

Dept. Natural Resources, Division of Geological & Geophysical Surveys

Our mission: Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020).

Coastal Hazards Program

Mapping, Monitoring, and Modeling Coastal Flood and Erosion Hazards



ADDRESSING ENVIRONMENTAL CHANGE

How do DGGS activities translate into addressing environmental change?

Local Hazard Mitigation Plans Technical Assistance on Engineering Projects Tailored Data Products

Flood/erosion Impact Documentation Statewide Tools & Data

Better Situational Awareness from State and Federal Agencies

Reducing the Cost of Future Projects

Community Planning

Access to Grants

Erosion at Port Heiden, photo taken by John Christensen.



LOCAL HAZARD MITIGATION PLANS



OME POPULAR GEOLOGY MAPS & DATA PUBLICATIONS GEOLOGIC MATERIALS CENTER ABOUT US

State of Alaska / Natural Resources / Geological & Geophysical Surveys / Geologic Hazards / Coastal Hazards

Kotlik Shoreline & Water Level Monitoring

A time-lapse camera and tide staff were installed in 2017 at Kotlik to monitor both shoreline change and flooding. Installation was funded by Alaska Institute for Justice and Alaska Ocean Observing System, continued monitoring is being completed by the Native Village of Bill Moore's Slough.

Water levels have been reported on the Alaska Water Level Watch Facebook page. Shoreline monitoring has been conducted using a tape measure from stakes installed and surveyed by DGGS. These measurements have been taken at three locations along the river bank, including sites named: ANTHC Yard, Chris's Site, and AC Hardware.





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http://dggs.alaska.gov/hazards/coastal/monitoring.html

Updates were just made to DGGS website for Kotlik, Kwigillingok, and Quinhagak. Others still to come in 2020.

Erosion Monitoring at Kotlik



Date

Measuring and monitoring flooding and erosion has long been mentioned in local hazard mitigation plans as a first step, however, has not been pursued by any other state or federal agency. DGGS provides data to update these plans which can lead to defining mitigation projects that are fundable by FEMA and other federal agencies.

TECHNICAL ASSISTANCE ON ENGINEERING PROJECTS

Engineering firms often have to start at square one when designing mitigation solutions for communities. DGGS works to improve baseline datasets to reduce the barrier to entry for these design projects.

The Native Village of Shaktoolik requested DGGS make measurements to the communities' storm berm after a storm in August. DGGS was able to travel on-site, measure the change using a drone and GPS, and provide an estimate of the total volume of erosion for engineering plans.





Erosion of berm fronting Shaktoolik (red) Area of erosion: 110,000 sq. ft Amount of erosion: 350,000 cubic ft



Community decision making happens differently in every Alaska community. If you have a specific question or would like to present erosion or flood data in a specific forum, DGGS can provide that data to you.

DGGS has been monitoring erosion & flooding at Golovin since 2012 and provides regular updates upon request from the Chinik Eskimo Community.



Table 1. Summary of measured erosion at Profile 1			
Timeline	Amount of Erosion Landward	Number of Storms Documented above MHHW	Percent of Erosion 2012-2019
2012 -2019	29.1 feet	7	-
2017 - 2018	1.9 feet	1	7%
2018 - 2019	13.8 feet	2	47%



STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES ON OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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Shorelines represent the land water interface. Shorelines were delineated from historical orthoimagery collected between 1951 and 2019. The measured distance between shorelines was used to determine the rate of shoreline change at shore perpendicular cross-shore transects using the Digital Shoreline Analysis System developed by the U.S. Geological Survey. The shoreline envelope is the distance between the two farthest shorelines along a shore perpendicular transect. The shoreline envelope is colored by the shoreline change rate (meters/year and feet/year). Hot colors represent erosion, cool colors represent accretion

Projection: NAD83 UTM Zone 3N Orthoimagery available from elevation.alaska.gov

DOCUMENTATION FOR DISASTERS

Many flood disasters have not been declared because there was no scientific proof the event occurred and incurred impacts. DGGS maintains coastal monitoring equipment and community monitoring networks that collect data regarding disastrous events, and can provide the data to you to include in a declaration.

Flood documentation at Kotlik through Alaska Water Level Watch Facebook page. Posted by Harold Okitkun

We also check LEO Network & NWS storm reports!



October 13, 2017



November 13, 2017



May 2, 2018



November 22, 2017

November 9, 2018



February 12, 2019



March 26, 2019 https://www.facebook.com/AlaskaWaterLevelWatch/



October 6, 2019

STATEWIDE TOOLS & DATA

Baseline data and map tools can be very expensive and difficult to fund from a local level. DGGS advocates to state and federal agencies in regard to collecting data that improves our ability to provide flood and erosion map information. Even if your community doesn't engage with us, it may be on the map for data collection.

Coastal Flood Mapping, 2020

- Includes Golovin and Hooper Bay.
- By completing maps for these two communities, we will have the methods to create them for others.



STATEWIDE TOOLS & DATA



This work is a part of the Coastal Infrastructure Erosion Vulnerability Assessment project funded by the Denail Commission Environmentally Threatened Communities Grant Program. Data used to conduct the analysis were paid for by the State of Alaska and the Federal Emergency Management Agency in the 2018 update to the Alaska State Hazard Mitigation Plan.

Coastal Erosion Mapping, 2020

- Includes most western and northern Alaska communities;
- Available early 2020 in pdf 8.5 x 11 format.
- Funded by the Denali Commission and State of Alaska.

STATE OF ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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website: dggs.alaska.gov

STATEWIDE TOOLS & DATA

Coastal Infrastructure Impact Mapping, 2021, continuation of erosion mapping project, funded by the Denali Commission



HOW TO FOLLOW UP & ENGAGE

- Send your email to the coastal hazards program (CHP), and we can add to a contact list for when statewide data and tools are released.
- When you see a need for coastal flood or erosion data or mapping in your community, reach out to CHP.
- Join Alaska Water Level Watch both for Facebook and annual meetings on updates.
- Encourage university students from your community to apply for student internships with CHP.
- Discuss possible funding opportunity collaborations for community specific projects.
 - CHP regularly submits projects to FEMA in their Cooperative Technical Partner program to develop community-specific risk data and tools.
 - CHP collaborates with tribes on BIA Tribal Resilience Grants.

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