

ALASKA BASELINE EROSION ASSESSMENT

U.S. Army Corps of Engineers Alaska District

Erosion Information Paper - Gambell, Alaska

Current as of February 15, 2008

Community Information

Gambell (GAM-bull a.k.a. Sivuqaq), population 643, is on the Northwest Cape of Saint Lawrence Island in the Bering Sea, 200 miles southwest of Nome, and 36 miles from the Chukotsk Peninsula, Siberia. The community is incorporated as a 2nd class city in the unorganized borough. The beach and coastline are used for boating, snow machining, ATV access, barge access, boat storage, hunting, fishing, processing catch, beachcombing, cultural and social events, and driftwood collecting.

Description of Erosion Problem

Gambell is periodically eroded along the north and west shorelines, primarily storm-generated waves. The community is on a gravel spit which may be struck by 25 to 30-foot storm waves and surges. The gravel on the spit is being moved constantly from the west beach. Less than half of this is formed at the north beach again. Gravel is easily moved by waves, along with the strong currents. Melting permafrost, late forming coastal ice, and shoreline ice jams also reportedly contribute to coastline erosion. The erosion rate is approximately 5 to 10 feet per year. The erosion area includes the coastline in front the community along the north and west beaches.

The 1986 *Gambell Coastal Erosion Study* performed by R&M Consultants for the Corps reported major storm surge floods in 1946, 1969, 1972, and 1978 with the maximum storm surge estimated at around 20 feet. Differing local erosion rate estimates were provided to the researchers, with one estimate at 7-15 feet per year, and another estimate at 20-40 feet per year. R&M reported a more conservative erosion rate estimate of 2 feet per year based on the physical evidence. The community feels that the average rate of beach erosion is evident to be higher than what R&M stated and believes the appropriate rate of erosion would be 10-15 feet per year.

Potential Damages

Structures and facilities between 100 feet and 500 feet from the eroding shoreline on the west side of the community include teacher housings, residences, fuel tanks, food storage structures, a retail store, a boat launch, boat storage, boat repair structures, utility poles, power lines, sewage lagoons, sites of significant cultural and archeological value, several public buildings, the airport runway and airport facilities, and new wind turbines.

According to the R&M study, estimated costs for relocating the airport and constructing erosion control measures along the west shoreline would be between \$400,000 and \$500,000 per year. R&M concluded that neither of these measures would be cost effective because it would be 33 to 65 years before erosion would impact the airport runway. The community expressed concern in

February 2008 about potential for near-term erosion to the airport runway and facilities. A sheet pile wall has been installed near the runway as a coastal erosion protection measure. The Bureau of Indian Affairs funded the construction of a 4.5-mile evacuation road for the community in 2001.

The one area, not show on the diagram, is the small strip of land that facilitates the airport runway between the Bering Sea and Troutman Lake. Fall storms can generate 30-40 foot waves that surges over the runway and into Troutman Lake. The potential danger to community members is to be cut off due to flooding from the Emergency Evacuation Road and the possibility of damaging the runway. The community does not agree with the R&M study suggesting 33-65 years before erosion could impact the runway. Erosion of the beach gravel at the waterline is a constant concern, especially to the runway.

Photos and Diagrams

A photo of Gambell provided by community is attached. A diagram depicting the linear extent of erosion is attached.

References

Community Economic Development. 2003. *Community Strategic Development Plan for Gambell, 2004-2009*, prepared for Community of Gambell and Kawerak, by Community Economic Development, Northwest Planning and Grants.

Environmental Services Ltd. 1980. Gambell, web access:

http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

Foster. 1982. Letter to Senator Frank Murkowski from Michael R. Foster, December 13, 1982.

USACE. 1986. Coastal Erosion Study. Alaska District, U.S. Army Corps of Engineers.

USACE. 1990. *Gambell, AK Section 103 Reconnaissance Study.* Alaska District, U.S. Army Corps of Engineers.

USACE. 2008. *Alaska Community Erosion Survey, OMB approved number 07100001*, expires September 30, 2009 completed by Branson Tunigiyan, native village council of Gambell general manager, on February 1, and by Bruce Boolwon, president Sivuqaq, Inc., Savoonga native corporation on February 15, 2008.

Additional Information

This information paper, as well as those for other communities, can be accessed on the internet at <u>www.alaskaerosion.com</u>. For more information please contact the Corps of Engineers, project manager at (907) 753-5694 or email <u>Alaska.Erosion.POA@usace.army.mil</u>



Photo 1: Aerial view of Gambell, from Community Strategic Development Plan published in 2003.

BERING SEA

NORTHEAST CAPE

Erosion occurs along airport off aerial photo coverage

TROUTMAN LAKE (NAVVOOK LAKE)

not rates or severity of erosion

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Date of Aerial Photo: 14 June 05



Alaska District Corps of Engineers Civil Works Branch

Linear Extent of Erosion





NOTE: The extent of erosion shown on this figure is based on interviews with the community. This data has not been field verified. This figure is only intended to show areas of erosion,

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