Division of Geological & Geophysical Surveys

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ANNOTATED BIBLIOGRAPHY SERIES IN SUPPORT OF COASTAL COMMUNITY HAZARD PLANNING—NORTHWEST ALASKA

TELLER, ALASKA

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This annotated bibliography is part of a series created to facilitate access to documents useful for coastal geohazard evaluation and community planning in Northwest Alaska. Below is a comprehensive list of community-specific information sources, each with full bibliographic information and an informative-style annotation that highlights content pertaining to the community of Teller, Alaska. For a detailed description of the preparation and scope of this resource, please refer to this bibliography series' foreword. Any notable errors and/or omissions may be reported to the Coastal Hazards Program manager at the Alaska Division of Geological & Geophysical Surveys (DGGS).

Alaska Department of Commerce, Community & Economic Development (DCCED), accessed 2011, Division of Community & Regional Affairs (DCRA) Community Profiles [website]: State of Alaska Department of Commerce, Community & Economic Development.

http://www.commerce.state.ak.us/dca/profiles/profile-maps.htm

This website provides access to community profile maps for community-based planning. The maps are available in 24" by 36" and 30" by 42" formats. The Teller maps were created in 2004, 1996, and 1980 based on land surveys and/or interpretation of aerial imagery. Subsistence hunting grounds, habitat areas, community building,s and public facilities are delineated. Shoreline position and potential erosion zones are included in the map content. All maps have been sponsored by the Alaska Division of Community & Regional Affairs and contracted to local agencies for production.

Alaska Department of Natural Resources Division of Coastal and Ocean Management (DCOM), accessed February 2011, Alaska Coastal Management Program [website]: Alaska Department of Natural Resources Division of Coastal and Ocean Management.

http://alaskacoast.state.ak.us/Explore/Tour.html

This website outlines the Alaska Coastal Management Plans for each coastal district. It provides stewardship plans "to ensure a healthy and vibrant Alaskan coast that efficiently sustains long-term economic and environmental productivity."

Brigham-Grette, Julie, and Hopkins, David M., 1995, Emergent marine record and paleoclimate of the last interglaciation along the northwest Alaskan coast: Quaternary Research, vol. 43, p. 159–173.

This paper describes the stratigraphy of deposits of the last interglaciation in the Beringian region of Alaska and summarizes biostratigraphic information used to infer past water-mass and sea-ice conditions during substage 5e in the Bering Strait and southern Arctic Ocean. The Pelukian shoreline is delineated for the communities of Barrow, Wainwright, Teller, and Brevig Mission.

Brooks, Gene, *of* U.S. Coast Guard Seventeenth District, 2011, Arctic journal [electronic]: U.S. Department of Homeland Security, U.S. Coast Guard.

http://www.uscgalaska.com/go/doc/780/230836/

This journal entry discusses sea ice retrieval in the Arctic. For Teller, Alaska, the Sound normally would freeze by the beginning of October, but did not freeze until December 18th. This article discusses the challenges to the development of the Bering Strait as a large-scale shipping checkpoint, because of the lack of existing infrastructure. Environmental concerns such as coastal erosion and subsistence animal migration are also addressed. The Coast Guard will be a part of the effort to manage these issues, and are looking at ways in which their goals align with management.

Denali Commission, March 2011, Road and waterfront project selections, fiscal year 2006–2011: Denali Commission, 9 p.

This report contains an overview of all of the funding dispersed by the Denali Commission Transportation Program from 2006–2011. The document is organized by partner agency/project and includes a description of the project status. Teller was appropriated $75,000 in 2010 to complete a dust control project at the Teller airport. This project is currently in the design phase.

Hartig, Larry, *of* Alaska Department of Environmental Conservation & Governor's Climate Change Sub-Cabinet, October 2010, State of Alaska and State/Federal Executive Roundtable Activities Regarding the Arctic [presentation]: Anchorage, Alaska, Northern Waters Task Force, 53 p.

http://housemajority.org/coms/anw/pdfs/26/NWTF_Powerpoint_Hartig_01Oct10.pdf

This is a powerpoint presentation about the state and federal executive roundtable activities regarding the Arctic. The discussion includes hazards associated with declining Arctic sea ice extent, melting of permafrost, storm surges, and coastal erosion. Thirty-one villages are identified as imminently threatened: Barrow, Kivalina, Selawik, Allakaket, Hughes, Huslia, Shishmaref, Deering, Teller, Koyukuk, Nulato, Golovin, Shaktoolik, Unalakleet, Saint Michael, Kotlik, McGrath, Emmonak, Alakanuk, Chevak, Newtok, Nunapitchuk, Lime Village, Eyak (Cordova), Napakiak, Akiak, Chefornak, Kwigillingok, Dillingham, Clark's Point, and Port Heiden. Specific photos and engineering initiatives for four communitites are discussed, including: Kivalina, Shishmaref, Unalakleet, and Newtok.

Hopkins, D.M., R.W. Rowland, R.E. Echols, and P.C. Valentine, 1974, An Anvilian (early Pleistocene) marine fauna from western Seward Peninsula, Alaska: Quaternary Research, vol. 4, p. 441–470.

This study uses the examinations of fossiliferous sediments surrounding Teller and Brevig Mission, Alaska, to determine the margin of the Anvilian transgression. The observations at these sites give insight into the history of sea level at this location.

Immediate Action Workgroup (IAWG), Michael Black and Patricia Opheen, eds., March 2009, Recommendations to the Governor's Subcabinet on Climate Change: Immediate Action Workgroup, 162 p.

The Immediate Action Workgroup was established to address known threats to Alaskan communities caused by coastal erosion, thawing permafrost, flooding, and fires. This report is a follow-up to the recommendations made in April 2008, and provides recommendations for actions and policies to be implemented in 2009 and 2010. Teller was identified as receiving agency actions from the Department of Community, Commerce & Economic Development (DCCED) and the Division of Emergency Management (EM). A flooding event was recorded for 1990.

Kawerak, Inc., for the Village of Teller and the Bering Strait Development Council, May 2008, Teller local economic development plan, 2006–2010: Nome, Alaska, Kawerak, Inc., 61 p.

This Local Economic Development Plan (LEDP) describes the economic development program of the Village of Teller and outlines the course of action over a five-year time period. The objective of this plan is to provide a mechanism to help coordinate the efforts of local governing bodies and individuals concerned with the economic development of Teller. This plan focuses on 13 priority development projects , two of which are directly related to coastal hazard planning.

The community would like to plan for construction of a seawall to protect residents and their property from yearly storm flooding. This would be a 1,500 foot sheet piling seawall, at a projected cost of approximately $500,000. Teller would also like to construct a boat harbor to provide protection and moorage for boats operating in the area. The current navigational conditions are identified as inefficient.

Mason, Owen K., and James W. Jordan, 2002, Minimal late Holocene sea level rise in the Chukchi Sea—Arctic insensitivity to global change?: Global and Planetary Changes, vol. 32, p. 13–23.

In this article, Mason and Jordan outline the apparent disconnect between late Holocene global sea-level rise and the moderate sea-level rise observed in Northwest Alaska. Radiocarbon ages taken from peat and storm deposits in Seward Peninsula lagoons allowed for the reconstruction of a sea-level curve spanning the last 6,000 years. The results indicate that sea level in Northwest Alaska has risen an average 0.3 mm per year compared to the global average of 1–2 mm per year. The authors suggest several hypotheses for these differing rates, including cold sea-surface temperatures (limited steric expansion), geoid variation, and/or the development of permafrost. Although observed rates of sea-level rise are moderate for the Chukchi Sea, the article cautions that the response of northern Alaska's coasts to future global climate change remains uncertain and requires continued investigation.

Petrie, Brent, November 2008, Application for renewable energy fund grant, Alaska Energy Authority, Teller, Alaska, wind feasibility analysis and conceptual design project: Alaska Village Electric Cooperative, 47 p.

This is the application for grant funding for the Renewable Energy Fund Grant from the Alaska Energy Authority for Teller, Alaska. According to the AEA Alaska high-resolution wind resource map, Teller is indicated as being a potential source of wind for energy needs (class 6 wind regime). The application asks for $117,610 for the determination of wind-resource suitability. The estimated possible displacement of diesel fuel for the communities of Teller and Brevig Mission amounts to $255,664 annually. This would provide energy for the 87 homes of Teller and the 76 homes of Brevig Mission.

Péwé, Troy L., David M. Hopkins, and Arthur H. Lachenbruch, *of* U.S. Geological Survey *for* U.S. Atomic Energy Commission, April 1958, Engineering geology bearing on harbor site selection along the northwest coast of Alaska from Nome to Point Barrow, U.S. Geological Survey Trace Elements Investigations Report no. 678, 57 p.

This report provides geologic and oceanographic information from previous investigations, aerial imagery, and reconnaissance fieldwork regarding the optimal location of a deep-water harbor. The harbor was to be constructed with the use of modern nuclear explosives and located at a point along the northwest coast of Alaska between Nome and Point Barrow. The project was not undertaken.

Rodney P. Kinney Associates, Inc., and Kawerak Transportation Program, *for* Teller Traditional Council, March 2007, Teller long-range transportation plan: Teller, Alaska, Teller Traditional Council, Indian Reservation Roads Program no. E04480-TELLER, 18 p.

This plan outlines transportation priorities for the community of Teller and its surrounding boundaries, as well as the planning for using funding from Tribal Shares monies allocated by the Bureau of Indian Affairs Indian Reservation Roads Program. The prioritized list of long-term transportation road projects is as follows:

1. *Upgrade the community streets of Teller with the appropriate surface material and dust control additive (total estimate of $5 million).*
2. *Construct proposed community streets in Teller with the appropriate surface material and dust control additive (total estimate of $3 million).*
3. *Construct proposed subsistence and economic routes (total estimate $373 million).*
4. *Upgrade already inventoried community streets: Lakeside Drive (estimated $660,000), Landfill Road (estimated $920,000), and Bypass Road (estimated $860,000).*
5. *Upgrade already inventoried streets in Coyote Creek Subdivision: BIA Route 62, Ptarmigan Street, Koweluk Street, Moose Street, and Rabbit Street (total estimate of $2 million).*
6. *Construction upgrades to marine facilities such as boat landings, harbors, ports, barge landings, and breakwater structures, both at the original village site and the new housing location (total estimate $14 million).*
7. *Construct snow fencing along community routes to protect routes and reduce maintenance (total estimate $200,000 per mile).*
8. *Provide route staking, navigational upgrades, and signage to inventory routes to improve safety during winter travel, prevent disorientation, and aid in rescue operations (total estimate $100,000 per mile).*

This list was developed for community needs over the next 20 years. The goal of this transportation plan is to ensure that the improvements and development of roads allow convenient and safe movement throughout Teller's road system.

Sallenger, Asbury H., Jr., 1983, Measurements of debris-line elevations and beach profiles following a major storm—Northern Bering Sea coast of Alaska: U.S. Geological Survey Open-File Report 83-394, 12 p.

From introduction: "During November 1974, a severe storm occurred in the Bering Sea; winds gusted to greater than 100 km/hr and barometric pressure dropped 34 mb. Combined storm surge and wave runup reached as high as 5 m along the northern Bering Sea coast of Alaska. Shortly after the storm, the northern Bering Sea froze. Following breakup in 1975 and during the ice-free season of 1976, we surveyed beach profiles and elevations of debris-lines at stations around the northern Bering Sea coast of Alaska. In this open-file report, these data are used to show the approximate magnitude of combined storm surge and wave runup in the study area."

Sallenger, Asbury H., Jr., and John R. Dingler, September 1978, Coastal processes and morphology of the Bering Sea coast of Alaska: Menlo Park, California, U.S. Geological Survey, Research Unit No. 431, 66 p.

The research outlined in this paper was done to characterize the regional physical environment of the Bering Sea coast of Alaska to prepare for potential oil and gas development and subsequent hazards to infrastructure and environment. The net direction of longshore transport, coastal morphology, and reconnaissance-based beach morphology and sediment characteristics were used as indicators. Measurements were taken along the Bering Sea coast of debris-line elevations reached during the 1974 Bering Sea storm. Coastal change was measured in 1976–1977 near Nome using nearshore coastal profiling and aerial photography. Wave characteristics and sea level variations were also measured to check the validity of the wave model used. The specific objective of the research was to develop a coastal set-back line beyond which petroleum development would not occur.

Simpson, J.J., January 1984, Final report, Task Force on Erosion Control: Alaska Department of Transportation & Public Facilities, project no. R-30023, 101 p.

The Erosion Control Task Force was appointed to investigate and inventory potential erosion problems on a state-wide basis, to prioritize the erosion problem sites by severity and need, and to provide preliminary design plans where immediate remedial action is required. Sites were rated based on public safety, public property, private property, time of projected loss, ability to move, approximate replacement value, and economic value. Projected costs of erosion protection measures were analyzed and total $16,802,300 for all projects. This report outlines specific engineering projects to reduce effects of coastal and riverine erosion for Alaskan communities.

Erosion at Teller has been dominated by storm tides on the side of Port Clarence, threatening the sewage lagoon. The sheet piled and barrel walls currently in place has been pulled toward the beach by wave action. The recommendation is made to use infilling of the existing wall, and to extend the sheet pile wall to connect with the barrel walls. Materials used should be the same size as the existing beach, as to avoid eddying and undercutting.

Tetra Tech *for* Immediate Action Workgroup: Advisory Group of the Governor's Climate Change Sub-Cabinet, June 2010, Imperiled community water resources analysis: Anchorage, Alaska, Tetra Tech, 47 p.

This report summarizes climate-related threats to water and wastewater infrastructure in Alaskan communities including those at risk from flooding, saltwater intrusion, loss of surface water supply, erosion, and sedimentation of the source region. The primary objectives of the analysis were to:

1. *Identify and select study group communities whose water infrastructure is threatened*
2. *Collect information on the threatened water infrastructure for the study group communities*
3. *Analyze information to determine the climate-related impacts to study group community water infrastructure (p. 2).*

Teller was one of 25 communities identified as likely to face climate-change-related impacts to water infrastructure. The sewage lagoon was reported as being at risk from coastal flooding. A general community profile is available in the report that outlines the socioeconomic, geologic, and climatic setting, provides an overview of the existing water resources in the community, and summarizes a brief history of documented historical impacts to existing water infrastructure.

U.S. Army Corps of Engineers, accessed 2011, Civil works floodplain management services [website]: U.S. Army Corps of Engineers, Alaska District.

http://www.poa.usace.army.mil/en/cw/fld_haz/floodplain_index.htm

This website provides flood-hazard data for communities throughout Alaska. A link is provided to a flood-hazard-specific bibliography, maintained by the U.S. Army Corps of Engineers. The last flood event for Teller was reported in 1974. Comments about other flooding events and relative flood elevations are also on this site.

U.S. Army Corps of Engineers, March 2009, Study findings and technical report—Alaska baseline erosion assessment: Elmendorf Air Force Base, Alaska, U.S. Army Corps of Engineers, Alaska District, 68 p.

http://www.poa.usace.army.mil/AKE/Home.html

This statewide assessment was conducted by the U.S. Army Corps of Engineers to coordinate, plan, and prioritize responses to erosion throughout Alaska. The report has designated 178 communities as having erosion issues, including Teller.

U.S. Government Accountability Office (GAO), June 2009, Report to congressional requestors—Alaska Native villages, limited progress has been made on relocating villages threatened by flooding and erosion: U.S. General Accountability Office Report GAO-0408T, 53 p.

http://www.gao.gov/products/GAO-09-551

This report is a follow-up to the 2003 GAO report on flooding and erosion in Alaska Native villages, and was completed to identify concerns due to climate change that have increased the urgency of federal and state efforts. The GAO developed recommendations for Congress include:

1. *A flooding assessment to augment the erosion assessment completed by the Army Corps of Engineers.*
2. *An amendment to federal legislation so that 64 more villages may be eligible for grants.*
3. *Designating a federal entity to oversee and coordinate village relocation efforts.*

This report recognizes Teller as one of 31 villages facing imminent threats from flooding and erosion. Teller was included as one of the villages in this report based on conversations with Kawerak, Inc., and the Bering Straits Regional Housing Authority. Teller was declared a sea storm disaster area in 2004. Current mitigation of flooding and erosion issues involves building new homes at a higher elevation about 2 miles from the current community site.

U.S. Government Accounting Office (GAO), 2003 [2004], Alaska Native villages—Most are affected by flooding and erosion, but few qualify for federal assistance: U.S. General Accounting Office Report GAO-04-142, 82 p.

http://www.gao.gov/products/GAO-04-142

This study was conducted to provide recommendations to Congress that would improve how state and federal agencies respond to flooding and erosion in Alaska. This was done by:

1. *Determining the extent to which these villages were affected.*
2. *Identifying federal and state flooding and erosion programs.*
3. *Determining the current status of efforts to respond to flooding and erosion in nine villages.*
4. *Identifying alternatives that Congress may wish to consider when providing assistance for flooding and erosion (from "Highlights" section).*

The recommendations provide alternatives to current actions taken during flooding and erosion responses by including federal agencies and the Denali Commission. The adoption of policies by the Denali Commission would guide investments in infrastructure for Alaska Native villages affected by flooding and erosion. Teller is identified as one of 184 Alaska Native villages affected by flooding and erosion.

Wise, James L., Albert L. Comiskey, and Richard Becker, 1981, Storm surge climatology and forecasting in Alaska: Anchorage, Alaska, Arctic Environmental Information and Data Center, University of Alaska, 26 p.

The objective of this study was to improve the quality of life and the security of property in coastal areas susceptible to flooding by enhancing the decision-making process for human activities and development. This study compiles historical climatological data to develop a surge forecast regression equation.

The Seward Peninsula, Norton Sound, and Lower Yukon area is identified as having the greatest frequency of reported storms. Four storms were documented for Teller and used for this study during the dates of 1973, 1974, 1975, and 1978.