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

KWIGILLINGOK, 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 Kwigillingok, 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 Kwigillingok maps were created in 2004 based on land surveys and/or interpretation of aerial imagery. Subsistence hunting grounds, habitat areas, community buildings, 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."

Barber, Terry L., Donald W. Holland, and Dan Pavey, eds., December 1995, Geotechnical report, Kwigillingok airport: Alaska Department of Transportation & Public Facilities (DOT&PF), no. AIP 3-02-0165-01/60118, 32 p.

This project includes the plans for expansion of the existing runway at Kwigillingok airport, using subsurface exploration test borings. The Yukon–Kuskokwim Delta is underlain primarily by poorly drained, interbedded marine and terrestrial deltaic and eolian deposits, with typical soils including surface organics over layered organics, organic silts, and silts. Generally higher ground in the area is frozen and lower thawed. The vegetation is generally sphagnum moss over frozen ground and sedge grass in the lower thawed and drained areas. Water level in the slough is dependent on the changes in tidal action and seasonal variations of precipitation. Surface water was encountered within 2 feet of the ground surface. Details of soils in the bore sites by location are available in this report.

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

This report contains a description of all funding dispersed by the Denali Commission Transportation Program from 2006–2011. The document is organized by project and includes completion status. Kwigillingok was awarded $150,000 and $125,000 in 2009 and 2011 for the design and completion of an ATV trail.

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 forfour4 communitites are discussed, including: Kivalina, Shishmaref, Unalakleet, and Newtok.

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 (in which Kwigillingok was not mentioned), and provides recommendations of actions and policies to be implemented in 2009 and 2010. Kwigillingok was mentioned as receiving agency actions from the Department of Commerce, Community, & Economic Development and the Division of Emergency Management for a variety of community projects. Recorded events of flooding for the community were during 1979 and 1990.

Interior Rivers RC&D Council, *with* Alaska Department of Commerce, Community, & Economic Development, Division of Community Advocacy, 2004, Kwigillingok airport improvements—Historic test hole locations [map]: Interior Rivers RC&D Council, 1 p.

This map is an orthophoto that shows test hole locations for soils around the Kwigillingok airport. The comments on the map are based on 1994 drilling results from holes drilled to a 10 foot depth.

Lower Kuskokwim Economic Development Council, June 2006, Lower Kuskokwim Economic Development Council comprehensive economic development strategy and area plan: Lower Kuskokwim Economic Development Council, Bethel, AK, 28 p.

This report presents an economic development strategy by the Lower Kuskokwim Economic Development Council (LKEDC). The purpose of this report is to identify a more stable and diversified economy, assist in creating employment opportunities, improve local economic conditions, and act as a catalyst for guiding and coordinating the efforts of individuals and organizations concerned with sustainable economic and natural resource development in the region. The main areas of economic development are the promotion of fisheries resources, tourism and infrastructure development, job development, and the coordination of LKEDC services to local residents. Specific communication efforts, opportunities, and goals are listed for each subject, including watershed management.

Maynard and Partch, 1984, Capital improvements program briefing paper Yukon–Kuskokwim needs assessment and regional plan: Alaska Department of Community & Regional Affairs (DCRA),79 p.

This report identifies the multi-year capital improvement needs for 50 communities in the Yukon–Kuskokwim Region. The region was chosen for study because of the rapid change from subsistence to cash-based economy. The capital improvements are summarized in tables for each community and are at a scale that will bring substantial benefits to the region.

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 statewide 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 totaling $16,802,300 for all projects. This report outlines specific engineering projects to reduce the effects of coastal and riverine erosion for communities throughout Alaska.

Kwigillingok was found to have 1750 ft of the community subject to 1.4 ft of erosion per year. The community is set back from the riverside so is estimated to have erosion problems within 25 years. Storm surge, however, brings potential flooding hazards to the community. This report suggests constructing a gravel berm with a seeding to control for this hazard.

Stickney, A. 1984, Coastal ecology and wild resource use in the central Bering Sea area: Hooper Bay and Kwigillingok: Alaska Department of Fish & Game Division of Subsistence (DOS), technical paper no. 85, 370 p.

This report contains descriptive accounts of hunting, fishing, trapping, and gathering of wild resources in two coastal communities of the Yukon–Kuskokwim Delta. The report examines the effects of ecological and environmental conditions on subsistence activities. Kwigillingok is a coastal plain community situated on generally low and flat land. The myriad lakes and ponds in this area are drained by rivers and sloughs that are short and shallow. The coastline is bordered by extensive tidal flats and dotted by a few sandbar islands.

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 within 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)*

The water infrastructure risks are unknown for Kwigillingok; however, there are potential risks of flooding from coastal storm surge. Kwigillingok was evaluated in less detail than the main communities of the report because of the need for additional information.

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 most recent flood event in Kwigillingok was recorded during November 1979, caused by storm surge in the Kuskokwim Bay.

U.S. Army Corps of Engineers, January 2009, Community erosion assessment, Kwigillingok, Alaska: U.S. Army Corps of Engineers, Alaska District, 8 p.

This report identifies erosion problems and gives solutions for Kwigillingok, Alaska. Kwigillingok is subject to episodic erosion by the Quillingok River, primarily during spring breakup and the fall storm season. Areas of concern regarding erosion are the airport, because of a rapidly changing drainage system, and locations along the river. Economic damages have been calculated for a 50-year period based on projected erosion interval lines. Expected damages have been split into six categories: land, residential, structures, commercial structures, public structures, infrastructure, and environmental hazards. Approximately 20 percent of the expected damages are expected to occur within the first 10 years of the 50-year projection period. Total erosion damages over the 50-year period amount to approximately $30.5 million. Potential solutions provided include construction of a riprap revetment in two bends of the river at a cost of $26.7 million.

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. This report has recognized Kwigillingok as one of 26 priority action communities having erosion issues.

The erosion at Kwigillingok has been identified as occurring primarily during fall storms. Permafrost thaw and increased soil pore pressure are responsible for saturating the soil, making it unstable and erodible. The erosion is affecting residential properties, the fishery structures, and the barge landing.

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-040895T, 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 that include:

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

Kwigillingok was recognized as one of 31 villages imminently threatened by erosion and flooding.

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. Kwigillingok was recognized as one of the 184 Alaska Native Villages affected by flooding and erosion.

Waller, Roger M., September 1955, Ground-water reconnaissance in five Eskimo villages in the lower Kuskokwim–Yukon River area, Alaska: Juneau, Alaska Department of Health Section of Sanitation and Engineering (DHSSE), 11 p.

This is a report on a reconnaissance study outlining the feasibility of obtaining groundwater supplies for Kwethluk, Hooper Bay, Chevak, Tununak, and Kwigillingok. At the time of publication, there had been no development of groundwater sources in the areas of these communities. The findings are summarized by community and are based on a brief field investigation of surficial geology and the topography of each village. Included are summaries of existing water resources, permafrost extents, community accounts of any attempted well drillings, and cautions against areas of saltwater intrusion.

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 climate data to develop a surge forecast regression equation.

The offshore shape of the sea floor in the lower Kuskokwim and Bristol Bay area is identified as conducive to the formation and enhancement of storm surges. One storm surge, in 1979, was recorded for Kwigillingok.

Wise, James L., Lynn D. Leslie, and Joseph C. Labelle, Samuel F. Powel, ed., *for* U.S. Department of Transportation U.S. Coast Guard Office of Engineering & Development, October 1987, An oceanographic and climatological atlas of Bristol Bay: Anchorage, Alaska, Arctic Environmental Information and Data Center, University of Alaska, report no. CG-D-13-88, 185 p.

This report was written in the case that an oil spill would occur in Bristol Bay, Alaska. Detailed sections are included for oceanography, meteorology, climatology, and ice information. The environmental conditions summarized are meant to help on-the-scene emergency coordinators with possible direction and magnitude to which an oil spill would flow, if one were to occur.