Division of Geological & Geophysical Surveys

MISCELLANEOUS PUBLICATION 147F

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

HOOPER BAY, ALASKA

Prepared by Jacquelyn Smith and Nicole Kinsman
November 2011

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 Hooper Bay, 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 Hooper Bay maps were created in 2007, 1994, and 1979 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."

Albert, Simon, *of* Native Village of Paimiut, 2010, Hooper Bay flood risks to human health—Alaska Native Tribal Health Consortium Community Environmental Demonstration Grant Program and U.S. Environmental Protection Agency Alaska Tribal Multi-Media Grant, 2 p.

This pamphlet provides an overview of a project designed to evaluate the level of threat that frequent flooding poses to human health in Hooper Bay. A flood risk map is under development to improve future planning efforts for the community. The researchers indicated that further information is necessary for evaluation of flood hazards in this community, including measurements of the speed and extent of erosion being inflicted on the barrier dunes protecting the village. This project was funded by the Alaska Native Tribal Health Consortium (ANTHC) through the Community Environmental Demonstration Grant Program and the Alaska Tribal Multi-Media Grant from the United States Environmental Protection Agency (EPA).

Alix, Claire, 2005, Deciphering the impact of change on the driftwood cycle—Contribution to the study of human use of wood in the Arctic: Global and Planetary Change, vol. 47, p. 83–98.

In this article, the author describes the quantity, quality, and geographic distribution of driftwood associated with specific climatic and ecological conditions in arctic Alaska. The conditions favorable to driftwood production are linked to the abundance of building materials available for use by indigenous populations. The environmental factors involved in driftwood travel include flooding, storm patterns, ocean surface currents, wind, and ice, all of which may undergo changes linked to global climate patterns. The author discusses regional variables affecting driftwood travel as well as the availability of this material on beaches throughout the entire arctic. Radiocarbon dating of driftwood and recorded interviews with elders were used to document driftwood distribution and composition within the study area.

Blier, Warren, Stanley Keefe, Wilson A. Shaffer, and Sung C. Kim, December 1997, Storm surges in the region of western Alaska: Monthly Weather Review, vol. 125, p. 3094–3108.

The authors describe the relationship between storm surges in Alaska and extratropical cyclones. They have identified Norton Sound and the Bering Sea as the two regions most vulnerable to cyclone-linked coastal flooding. A statistical storm surge model was developed to provide advanced warning to coastal villages, however, the author highlights that a more accurate model would be necessary to utilize this warning system as a hazard mitigation strategy. The installation of storm surge gauges would also be required for this warning system to be used successfully.

Brabets, Timothy P., Bronwen Wang, and Robert H. Meade, 2000, Environmental and hydrologic overview of the Yukon River basin, Alaska and Canada: U.S. Geological Survey (USGS), Anchorage, Alaska, Water-Resources Investigations Report 99-4204, 114 p.

This compilation report of the environmental and hydrological conditions of the Yukon River basin includes summaries of the following characteristics by region: physiography, climate, geology, land cover, soils, permafrost, surface water, sediment, and water quality. The focus of the report is on surface water characteristics only and it was produced to facilitate the design of an improved water quality sampling program. The report contents are limited by the number of available recording stations with consistent historical data.

Chapman, Raymond S., Sung-Chan Kim, and David J. Mark *for* U.S. Army Corps of Engineers, Alaska District, 2009, Storm damage and flooding evaluation, storm-induced water level prediction study for the western coast of Alaska: Vicksburg, Mississippi, U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, 92 p.

Technical assistance was provided by the U.S. Army Engineer Research and Development Center, Coastal & Hydraulics Laboratory in assessing storm-generated regional water levels and currents at selected sites of ongoing and potential COE projects along the western coast of Alaska. The purpose of this study was to develop frequency-of-occurrence relationships for storm-generated water levels at 17 communities along the western coast of Alaska. Storm wind, pressure, ice, and surge data were generated for each of the areas, and the bathymetry was updated. Fifty-two storm event simulations were performed and a database of water levels versus return period was developed for each site.

Chikita, Kazuhisa A., Richard Kemnitz, and Ryuji Kumai, 2002, Characteristics of sediment discharge in the subarctic Yukon River, Alaska: Catena, vol. 48, p. 235–253.

The authors describe the construction of a physical model of sediment discharge from the Yukon River. The study uses the results of observations made in 1999 to characterize temporal patterns in the volume of sediment discharged by the Yukon River. The results of this study reveal that peak sediment discharge did not coincide with peak water discharge. The peak sediment discharge was linked to glacier-melt from summer to autumn, while peak water discharge was linked to snowmelt in the spring.

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

This report contains a description of all of the funding dispersed by the Denali Commission Transportation Program from 2006–2011. The document is organized by project and includes completion status.

Hooper Bay was awarded $32,925 in 2008 for subsistence ATV road planning. Between 2007 and 2008 $414,531 was awarded for an Alaska Village Electric Cooperative (AVEC) wind turbine access road. An additional $134,647 was awarded through the Association of Village Council Presidents in 2011 for community streets. As of March 2011, both the road planning and wind turbine access road projects have been completed, while the community streets project was under construction.

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 Hooper Bay was not mentioned), and provides recommendations of actions and policies to be implemented in 2009 and 2010.

Hooper Bay has been recognized as receiving agency activity for a variety of community projects from the Alaska Department of Commerce, Community and Economic Development (DCCED), the Division of Emergency Management (DEM), and the Department of Transportation & Public Facilities (DOT&PF). The airport at Hooper Bay has undergone one major project in the past 15 years and several smaller projects within the last 5 years, both funded by the Airport Improvement Program (AIP) and the Alaska General Fund (GF). Between 1978 and 2008 the document identifies two floods affecting Hooper Bay that have resulted in the declaration of a state disaster, one in 1979 and the other in 2004.

Jorgenson, Torre, and Craig Ely, 2001, Topography and flooding of coastal ecosystems on the Yukon–Kuskokwim Delta, Alaska—Implications for sea-level rise: Journal of Coastal Research, vol. 17, no. 1, p. 124–136.

This study includes the comparison of vegetation, sedimentation, and annual peak flooding conditions at varying elevations within coastal ecosystems on the Yukon–Kuskokwinm Delta. These relationships were then used to evaluate which coastal ecosystems are most susceptible to tidal inundation from sea-level rise. The study site was located along the Kashunuk River and Angyoyaravak Bay, directly southeast of Hooper Bay.

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, Alaska, 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 and 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.

Northern Technical Services Van Gulik and Associates, July 1982, Hooper Bay reconnaissance study of energy requirements and alternatives: Northern Technical Services Van Gulik and Associates, vol. 8, 50 p.

The authors of this report examine ways of reducing energy costs in Hooper Bay; included in the report is a physical description and a list of available maps for the area.

Oswalt, Wendell, *of* University of Alaska, College, Alaska, July 1951, The origin of driftwood at Hooper Bay, Alaska: Tree-Ring Bulletin, vol. 18, no. 1, p. 6–8.

The author of this study sought to identify the origin of spruce trees deposited on the coastline adjacent to the village of Hooper Bay. Fourteen samples were compared to wood samples from around the region and other possible source locations. The origins of each of the trees are discussed, all that could be identified based on tree ring sequences were associated with regions within Alaska. The author suggests that similar driftwood origin studies may supply information about ocean current force, speed, and direction.

Purdue University, 2009, Monitoring beach erosion at Hooper Bay, Alaska: Purdue University, 3 p.

This unpublished article outlines the work being conducted by researchers at Purdue University to monitor seasonal and annual processes that drive beach modification in Hooper Bay. The monitoring system that was developed relies heavily on the involvement of local residents. The Hooper Bay Surveyors, a group of local environmental specialists, were trained in the use of surveying tools and methods to record topographic beach changes during the year and to quantify the effects of storms on shoreline movement.

Schmid, Tom, and Harvey D. Douthit; Robert A. Campbell, ed., 2005, Hooper Bay airport improvements reconnaissance study: Alaska Department of Transportation & Public Facilities (DOT&PF), Anchorage, Alaska, project no. 57419, 33 p.

In this report, the airport at Hooper Bay is considered likely to experience a major failure within the next 7–10 years; the report explores alternatives for improvements to the Hooper Bay Airport. The estimated cost of airport relocation is $24,319,274, which would move the airport facilities to higher ground, outside the floodplain. The specific design requirements are included, as well as current geological/geotechnical information.

Sediment transport along the beachfront of the airport is described as being dominated by southern movement. At the time of this report, the northern end of the runway was functioning as a groin, trapping this along-shore movement. Aerial photography from 1951 to 1994 was used to estimate beach erosion rates at an average of 3 feet per year; 2 feet per year after 1968, and 8 feet per year after 1968. These rates suggest that the airport in its current location has a 10-year lifespan. In order to ensure a 50-year lifespan for the structure, the report states that the airport would need to be relocated.

Stickney, A. 1984, Coastal ecology and wild resource use in the central Bering Sea area: Hooper Bay and Kwigillingok: Alaska Department of Fish and 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. Hooper Bay is one of the two communities described in terms of its climate, topography, ocean currents and sea ice, and community setting. Subsistence practices and environmental constraints are described in detail and mapped for each season.

Thorsteinson, Lyman K., Paul R. Becker, and David A. Hale, 1989, The Yukon Delta —A synthesis of information: National Oceanic and Atmospheric Administration (NOAA), Anchorage, Alaska, OCS study no. MMS 89-0081, 89 p.

This document contains a synthesis of physical and ecological information about the Yukon–Kuskokwim River Delta. "[Since 1974], the Outer Continental Shelf Environmental Assessment Program has administered oceanographic research to characterize the environmental components and processes of the Alaskan Outer Continental Shelf." This research, once primarily based on oil and gas exploration, has provoked interest about the importance of the physical and biological habitats of the delta.

The physical environment is described in terms of geomorphology, hydrology, bathymetry, sedimentology, coastal circulation, hydrography, and environmental sensitivity mapping. The biological environment is described in terms of primary productivity, invertebrates, fisheries, avifauna, and mammals.

Areas of research highlighted as in need of further exploration are ice-edge effects, prevailing sea ice movements to the southwest, and subsurface northwesterly transport of Norton Sound water masses. If oil and gas exploration develops, more work must be conducted to determine the effects that this activity would have on the estuarine habitat.

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 reported flood event in Hooper Bay occurred during November 1991 and the community is listed as not participating in the National Flood Insurance Program.

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 Hooper Bay as being subject to erosion issues; Hooper Bay was identified as one of 69 communities where the monitoring of erosion conditions is actively ongoing.

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.*

Hooper Bay is mentioned as one of 33 Alaska Native villages with a FEMA-approved disaster mitigation plan.

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. Hooper Bay 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: Alaska Department of Health Section of Sanitation and Engineering (DHSSE), Juneau, Alaska, 11 p.

This is a report on a reconnaissance study outlining the feasibility of obtaining ground-water supplies for Kwethluk, Hooper Bay, Chevak, Tununak, and Kwigillingok. At the time of publication, there had been no development of ground water 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.*

Walters, L., and M. Cushing, 1995, Community profile—Hooper Bay: Alaska Department of Community and Regional Affairs (DCRA), 19 p.

This profile includes information on the community's status in the following areas: Facilities, U.S. Census, economy and employment, schools, rural businesses, contacts, municipal officials, municipal finances, rural grants, and ANCSA land status.

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. Storm profiles specific to Hooper Bay are recorded for 1978 and 1979.