Kotlik Community Profile

Figure 1: The Kotlik Riverfront, 2009.
Division of Community and Regional Affairs Community Photo Library

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Location

The village of Kotlik is located at the north of the Yukon Delta in western Alaska, sited along the east bank of Kotlik Slough at the confluence of the Kotlik and Little Kotlik Rivers. This area is part of the greater Yukon-Kuskokwim Delta, the vast river delta where the Yukon and Kuskokwim Rivers empty into the Bering Sea and lies within the Yukon-Delta National Wildlife Refuge. Kotlik is 35 miles northeast of Emmonak, 165 air miles northwest of Bethel and 460 miles from Anchorage. (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2019) (Himes-Cornell, et al., 2013)

Climate

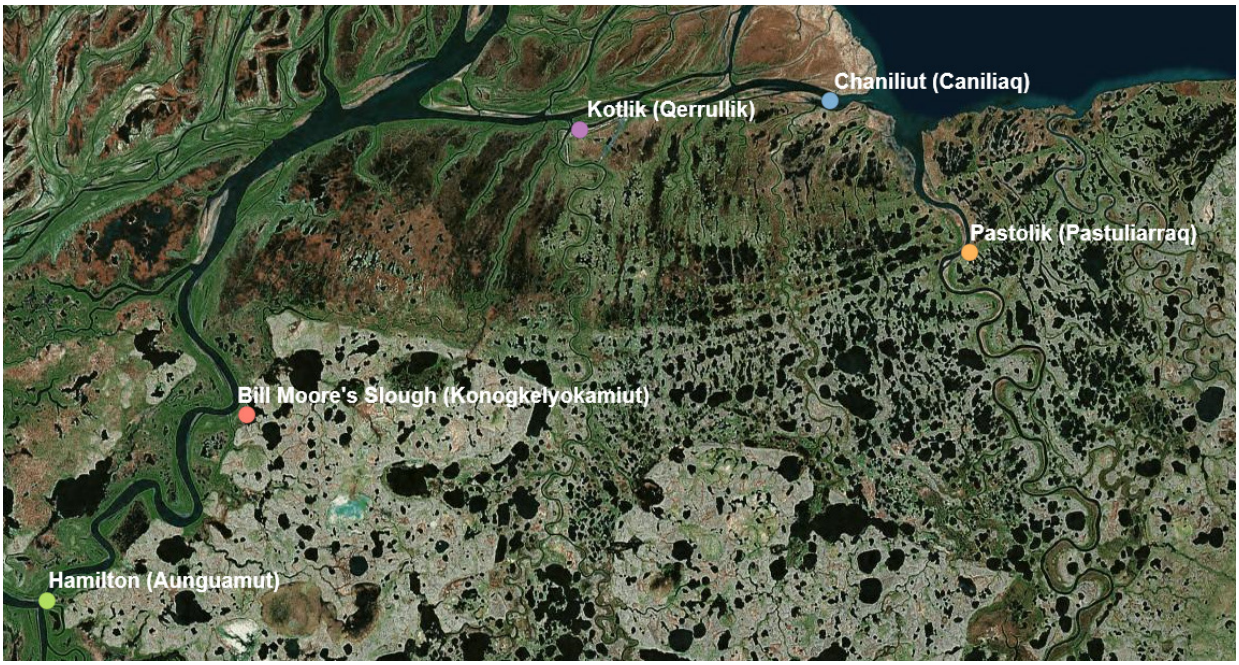
Kotlik falls within the transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers. High winds and poor visibility are common during fall and winter. Norton Sound and the Yukon are ice-free from mid-June through October. (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2019)

History

While the indigenous people of the Yukon Delta moved seasonally throughout the area near Kotlik (Griffin, 1996), the Kotlik site was first settled as a Russian trading post in 1850, probably due to its proximity to commercial activities on the Yukon River. (Dall 1870:234 and Nelson 1882:662 as cited in Griffin). A Russian Orthodox church and cemetery were established at the site prior to 1867. (Kotlik Tribal Council, 2010) In his travels through the area in 1867, Dall described a Russian house and barabara[1] at the Kotlik site. (Dall, 1870) In 1879, Nelson described the Kotlik site as the fur-trading station for Pastolik [*Pastuliarraq*][2] and the Yukon Delta, where Kamkof, a man of Yup'ik and Russian ancestry lived. (Nelson, 1882) When the 1880 census was taken a year later, 8 residents were recorded at the site. (U.S. Census Bureau) Ten years later, Kotlik had a population of 31 people. (U.S. Census Bureau)

The oldest and largest village nearby, Pastolik, was largely abandoned after the 1918 influenza epidemic when most of the residents moved to Chaniliut [*Caniliaq*]. (Griffin, 1996)

Figure 2: Location of Kotlik and Associated Communities



Map created by Division of Community and Regional Affairs staff at http://dcced.maps.arcgis.com/home/index.html using USGS Mapping Coordinates

[1] A traditional, main or communal dwelling of the indigenous people of the area, usually semi-subterranean and built with sod or turf

[2] Before Russian contact, Pastolik was an important center where people from the shores of Bering Strait, Sledge and King Islands, northwest Alaska, the southern coast of Norton Sound, the lower Yukon River, and occasional Athapaskans from the interior, would gather to trade (Zagoskin, 1967 and VanStone, 1979 as cited in Griffin, 1996). Pastolik is about 10.5 miles from Kotlik by river travel (the Kotlik river, Apoon Pass and Pastolik River).

By the 1950s, Chaniliut was the largest settlement in the area, with about 100 residents. Kotlik and Hamilton each had 44 and 43 residents respectively, and Bill Moore's Slough and Pastolik each had three or four families in residence.

Figure 3: Homes in Chaniliut, September 1949

Photo: George A. Morlander Photographs, University of Alaska, Fairbanks Archives

In the early 1950s, a severe fall storm brought ice-bearing, storm surge flooding into Chaniliut, damaging the trading post and homes. This flood event influenced the decision to select the Kotlik site for construction of a new Bureau of Indian Affairs school in 1959, which in turn influenced the development of Kotlik as the village it is today. (Himes-Cornell, et al., 2013) The school was completed in 1960 but did not open until 1961 after Chaniliut residents moved their homes and possessions to Kotlik. (Fienup-Riordan, 2012) Development of the village continued through the 1960s as residents of the nearby villages of Hamilton, Bill Moore's Slough and Pastolik also moved to the Kotlik site. (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2019) In 1970, the Alaska State Housing Authority completed the construction of 17 homes in Kotlik.[3] (Haynes, 1974)

[3] On page 34 of his dissertation, Haynes provides a table of 35 villages, including Kotlik, in which the Alaska State Housing Authority built new homes between 1969-1972.

Culture

The people of Kotlik are primarily of Yup'ik ancestry. Some residents are also descendants of Russian traders that settled in the area in the 1800s and married Yup'ik women. (Kotlik Tribal Council, 2010) (Himes-Cornell, et al., 2013) Most residents practice a traditional subsistence lifestyle. *[See also section on Economy, page 9]*. Traditional clothing and arts and crafts products are made from subsistence-caught species.

The community holds several potlatches each year to which residents of nearby villages are invited. Yup'ik dancing and sharing of gifts and stories take place.

Kotlik Potlatch Drummers

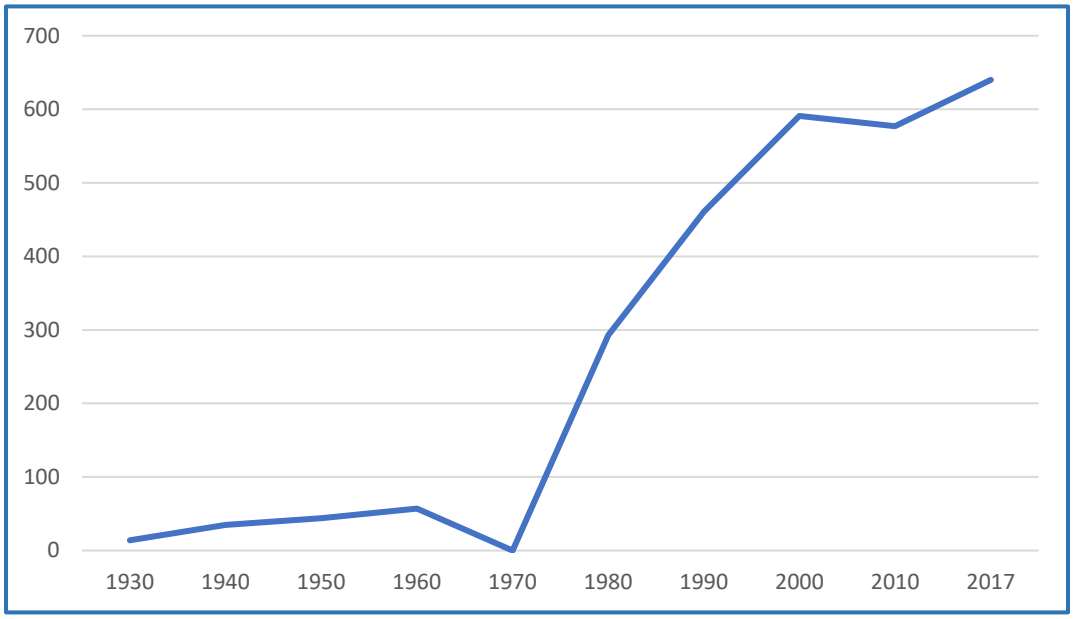
The highlight of this event is the introduction and initiation of young dancers whose traditional Yup'ik names (a name taken at birth after a deceased community member) are announced and acknowledged by the community. During this presentation, gifts are given to the surviving relatives and friends of the deceased. This special honor pays tribute to the dead and provides a way of healing for the surviving members. (Kotlik Tribal Council, 2010)

Yup'ik dancing in Kotlik on Christmas Day, *Photo: Alvin Aketachunak*

Demographic Profile

Kotlik's 2017 population certified by the Commissioner of the Alaska Department of Commerce, Community, and Economic Development was 640 people. (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2019) The community's population has experienced an overall increase since 1970, reflecting the relocation of the communities of Bill Moore's Slough, Chaniliut, Hamilton and Pastolik to Kotlik.

Figure 4: Kotlik Population, 1930 -2017



According to the American Community Survey (ACS) Estimate for 2017, most Kotlik residents identify themselves as American Indian and Alaska Native (96.8%), along with 1.9% White residents, 0.3% Black or African American residents, 1.0% individual identifying with two or more races (Black or African American and American Indian and Alaska Native). The median age was 21.7 years with 41.4% of the population under the age of 18.

Homes in Kotlik are more crowded than the national average. The average owner-occupied household in Kotlik size was 4.67 people, compared to the national average of 2.7 people. The estimated total number of households in Kotlik increased from 128 in 2010, to 156 occupied housing units in 2017. Of the total occupied housing units, 69.9% were owner-occupied, 30.1% were renter-occupied and 13.8% were vacant or used only seasonally.

The majority of housing stock in Kotlik is 20 years or older, with 67.5% of homes 30 years or older. 62% of occupied homes lacked complete plumbing facilities and 45% lacked complete kitchen facilities.

Median household income was $41,667, with 44.2% of the community living below the poverty level. (U.S. Census Bureau, n.d.)

Economy

Like many rural Alaskan communities, Kotlik has a mixed cash-subsistence economy. Most residents practice a traditional subsistence lifestyle that includes hunting, fishing, trapping and gathering. Subsistence harvests include marine mammal species (beluga whale, seals and occasionally walrus), caribou, moose, migratory and resident birds, and various fin-fish species. Fur-bearing mammals such as mink, otter, beaver, muskrat, fox and to a lesser extent the lynx, wolverine and wolf are trapped. (Himes-Cornell, et al., 2013) (Kotlik Tribal Council, 2010)

Cash is used to invest in the tools (snow machines, all-terrain vehicles, motorized skiffs, fuel, weapons) for subsistence hunting, fishing, trapping and gathering. Cash is derived from government jobs, seasonal construction jobs, and to a lesser extent commercial fishing. Government jobs are provided through the City, federal agencies, federally-funded tribal entities, and the school. Local jobs are available at the Kotlik School, the Kotlik City, the two stores, the Tank Farm, the Village Corporation office, Clinic, Head Start, the three tribal councils and the U.S. Postal Service.

Several jobs are provided by the Alaska Rural Utilities Cooperative (ARUC)[4] and Alaska Village Electric Cooperative (AVEC).[5] Seasonal construction jobs are provided by new housing and community facilities. Income is also derived from the sale of traditional clothing and arts and crafts products made from subsistence-caught species. (Himes-Cornell, et al., 2013) (Kotlik Tribal Council, 2010)

Several Kotlik residents earn income from commercial fishing for herring in Norton Sound and salmon in the Yukon River. The residents that hold commercial fishing permits often employ one or two helpers. Some residents also work at salmon processing plants in Emmonak, St Mary's, Marshall or Anchorage. A few younger residents participate in the “High Seas” fishery with the Yukon Delta Fisheries Development Association's (YDFDA), a Community Development Quota corporation. [6] In 2003, Kwik’pak Fisheries[7] started a “buy and fly” salmon operation. (Kotlik Tribal Council, 2010) (City of Kotlik, 2013)

[4] The Alaska Rural Utility Collaborative (ARUC) is a statewide program that partners with communities to manage, operate and maintain water/sewer systems in rural Alaska.
[5] The Alaska Village Electric Cooperative, Inc. (AVEC) is a non-profit electric utility serving residents in 58 locations throughout rural Alaska. AVEC is owned by those it serves.
[6] The Community Development Quota (CDQ) program allocates a portion of the annual fish harvest of certain commercial species directly to coalitions of villages, which, because of geographic isolation and limited access to sources of income, have had limited economic opportunities. Six coalitions of villages (CDQ groups) have been established: Aleutian Pribilof Island Community Development Association, Bristol Bay Economic Development Corporation, Central Bering Sea Fishermen's Association, Coastal Villages Region Fund, Norton Sound Economic Development Corporation, and Yukon Delta Fisheries Development Association.
[7] Kwik’Pak Fisheries, a subsidiary of YDFDA, is a community-based organization that improves the regional economy through local employment, training, and educational opportunities. Their work includes commercial fishing and buying operations and support for many small businesses in villages along the river.

Governance

Tribal Government

Because the tribal communities of Hamilton and Bill Moore's Slough relocated to Kotlik in the 1960s with the construction of a new school, Kotlik is the location of three Federally-Recognized tribes: The Village of Kotlik, the Native Village of Hamilton and the Village of Bill Moore's Slough. The former settlements of Hamilton and Bill Moore's Slough are now seasonal subsistence camps which are accessed by boat or floatplane. The governing bodies of the three tribes are as follows:

- ### Kotlik Tribal Council
  The Village of Kotlik has 637 enrolled tribal members, the largest of the three tribal governments in Kotlik, and is governed by a 5-member tribal council, the Kotlik Tribal Council (KTC) which maintains an office in Kotlik. The KTC operates many programs and services in Kotlik including: Tribal Enrollment, Native American Housing and Self Determination Act, Indian General Assistance Program, Indian Child Welfare Act, Temporary Aide for Needy Families, Bingo, and Clinic Maintenance and Janitorial.

- ### Hamilton Tribal Council
  Native Village of Hamilton has 29 enrolled tribal members and is governed by a 5-member tribal council, Hamilton Tribal Council, which maintains an office in Kotlik.

- ### Native Village of Bill Moore Slough Elder's Council
  The Native Village of Bill Moore's Slough has 109 enrolled tribal members and is governed by a 5-member tribal council, the Native Village of Bill Moore's Slough Elder's Council which maintains an office in Kotlik. (Kotlik Tribal Council, 2010)

Municipal Government

In 1970, Kotlik incorporated as a second-class city. The City of Kotlik has a seven- member city council that meets twice a month. Regular city council elections are held in October. The city owns the electric utility and washeteria. City officials include a mayor, vice mayor, clerk, two health aides (for the Kotlik clinic) and a police chief. A two percent sales tax is levied. The City of Kotlik is located within Alaska's Unorganized Borough and is part of the Kusilvak Census Area.

Alaska Division of Community and Regional Affairs (DCRA) local government assistance staff provide ongoing technical assistance to City of Kotlik staff in the areas of financial management (QuickBooks), taxes, elections, fuel ordering and land management.

Alaska Native Claims Settlement Act (ANCSA) Village Corporations

Kotlik's ANCSA village corporation, the Kotlik Yup'ik Corporation (KYC), incorporated one year after the passage of ANCSA in 1971.[8] With 220 shareholders, KYC has a land entitlement of 115,200 acres. Under the provisions of ANCSA, Bill Moore's Slough and Hamilton were allowed to form their own village corporations, Nunapiglluaq Corporation and Kongnikilnomiut Yuita Corporation, respectively. The Kotlik Yup'ik Enterprise, a subsidiary of KYC, has two businesses: the Kotlik Laufkak (village corporation store) and Kotlik Tank Farm. (Kotlik Tribal Council, 2010) All three village corporations are within the legal boundary of Calista Regional Corporation.

Intertribal Court

The Kotlik Inter-Tribal Court was formalized upon adoption of tribal ordinances in 2003. Tribal court judges are entrusted to protect the wellbeing of the community, especially children. They are uniquely positioned to improve the justice system in rural communities and thus are expected to observe high ethical standards. (Kotlik Tribal Council, 2010)

Regional Organizations

Association of Village Council Presidents (AVCP)

AVCP is one of the 12 original Alaska Native 501(c)(3) nonprofit organizations established by the federal government in 1964. AVCP is comprised of 56 villages and 45 village corporations. It serves its member tribes by providing, at their request, a variety of social service, human development and culturally relevant programs that promote tribal self-determination and self-governance and works to protect tribal culture and traditions.

Yukon-Kuskokwim Health Corporation (YKHC)

The YKHC is the regional healthcare provider authorized by 58 tribes to negotiate with the Indian Health Service. The YKHC system consists of a hospital in Bethel, five sub-regional clinics (Aniak, Emmonak, Hooper Bay, St. Mary's and Toksook Bay), and 47 village clinics. YKHC is responsible for training and employing community health aides in Kotlik to provide acute and chronic health services with telecommunication assistance from Bethel-based physicians. (Kotlik Tribal Council, 2010)

[8] The Alaska Native Claims Settlement Act (ANCSA) of 1971 was intended to settle long-standing issues surrounding aboriginal land claims of Alaska Natives and establish clear title so Congress could authorize the development of the Prudhoe Bay oil field and the Trans-Alaska Pipeline. In exchange for giving up Native land claims, approximately one-ninth of the state's land plus $962.5 million were distributed to more than 200 for-profit Alaska Native village corporations, in addition to 13 for-profit Alaska Native regional corporations. Kotlik's three village corporations are among the 200 village corporations established by ANCSA. All three are located within the jurisdictional boundary of the Calista Corporation, one of the 13 regional corporations established by ANCSA.

Infrastructure and Facilities

Transportation Infrastructure

Kotlik is considered a remote Alaskan community, accessible only by sir and water travel.

– Boardwalks and Trails

There is no road access to Kotlik. Boardwalks are used in the community for pedestrian and small vehicles. A flooding event in 2013 damaged many of the town's boardwalks, but most have since been repaired with FEMA funding. Local residents use snowmobiles and small all-terrain vehicles for travel during the winter.

– River Access

Due to its location along the Kotlik River with easy access by large riverboats and barges, Kotlik became one of the larger ports and commercial centers of the lower Yukon River. Bulk fuel and heavy cargo are brought in seasonally by barge. Residents use the river for commercial and private travel. Local residents travel in privately owned boats during the summer.

Kotlik does not have a designated barge landing. The barge typically drops off freight near the tank farm unless they are directed to another site. The community also lacks a boat harbor, so residents tie their river boats and skiffs along the riverbank. (Kotlik Tribal Council, 2010)

– Airport

Air transportation of passengers, cargo, and mail is provided via the state-owned 4,422' long by 100' wide gravel airstrip which was constructed in 2002. (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2019)

Utility Infrastructure

– Bulk Fuel Storage

The Consolidated Bulk Fuel Tank Farm was built in 2000-2001 as a cooperative effort between the Kotlik Yup'ik Corporation (KYC), City of Kotlik, Kotlik Tribal Council (KTC), Alaska Industrial Development and Export Authority, and Alaska Energy Authority. KYC owns four 48,000-gallon tanks and is the local commercial fuel supplier that is about 250 feet from the river. The City owns five 48,000-gallon tanks. An underground distribution pipe extends approximately 5,200 feet from the tank farm to an intermediate tank at the Power Generation Plant. (Kotlik Tribal Council, 2010)

There are four former bulk fuel storage sites identified as known Contaminated Sites, three of which were active in 2012:

- The former Kotlik Yup'ik Corporation Bulk Fuel Tank Farm is located adjacent to the new consolidated tank farm. The six fuel tanks from this site have been removed, but contaminated soil from tanks remains on site. In 2012, this was a known Contaminated Site

(File ID 2423.38.006) with Active status. This site is approximately 250 feet from the Kotlik River bank. (Alaska Department of Environmental Conservation, 2012)

- The old Alaska Commercial Company Store and Tanks are the site of a diesel fuel spill in 1994 from the store's day tanks, which were still operational at the time. The contamination from the spill was declared 'Cleanup Complete' under Contaminated Site (File ID 2423.38.003) in 2012. The tanks had been removed as of a 2012 site visit, but the building still remained. Large portions of earth have eroded right next to the building. The site is less than 10 feet from the Kotlik River. (Alaska Department of Environmental Conservation, 2012)
- The Kotlik Electric Former Tank Farm is a known Contaminated Site (File ID 2423.38.002). It was the site of an approximately 7,000-gallon diesel fuel spill in 1993 with an estimated 1,000 gallons remaining after the initial cleanup. The tanks at this site have been removed and work is ongoing. The site is 445 feet from the Kotlik River. (Alaska Department of Environmental Conservation, 2012)
- Lower Yukon School District Former Tank Farm is a known Contaminated Site (File ID 2423.38.005) with the status of Active in 2012. There were six 8,000-gallon fuel tanks on this site that were removed between 2001-2006; however the liner and old wood boards remained at the site in 2012. Sheen was noted on the surface water to the south of the property along some creosote logs. The tank farm site has silty soil and is located in the middle of town approximately 50 feet from the actively-eroding bank of the Kotlik River. (Alaska Department of Environmental Conservation, 2012)

– Power Generation Plant

The Power Generation Plant was built in 2002 and is owned by the City of Kotlik. The plant has two 275 kw generators and two 420 kw generators. Funding for the $2.06 million-dollar project was provided jointly by the Denali Commission, Environmental Protection Agency (EPA), and the State of Alaska. The plant has single and three-phase capability. In 010, electricity was provided by Kotlik Electric Service at a rate of $0.40/kw residential and $0.60/kw commercial. The State of Alaska Power Cost Equalization program provides a subsidy to residential users. (Kotlik Tribal Council, 2010)

– Water and Sewer Plant

Kotlik's 1,920 square foot water treatment plant was constructed in 1998, with a normal occupancy of 1 person. In 2015, the number of hours of operation for this building averaged 4 hours per day, considering all seven days of the week. The Kotlik Water Treatment Plant serves as the water distribution center for the residents of the community and also houses the sewer system components. (Alaska Native Tribal Health Consortium, 2015) Households located in the main village are connected to the system while households located across the Kotlik River are not. Residents across the river haul treated water from the washeteria, collect rainwater, melt ice, and haul honey buckets to containers. (Kotlik Tribal Council, 2010)

Water is pumped into the water treatment plant from a raw water intake located in the Kotlik River approximately 450 ft. from the building. The water is pumped through an open-air filtration system where it receives a number of chemical injections before entering the 100,000-gallon water storage tank. Kotlik was impacted by a flood in the fall of 2013 that destroyed many of the existing utilidors. (Alaska Native Tribal Health Consortium, 2015)

Kotlik's above-ground sewage collection system features two vacuum sewer pumps which are used to collect all the sewage from throughout the vacuum sewer system. (Alaska Native Tribal Health Consortium, 2015)

– Washeteria

The washeteria was constructed circa 1982. Residents are able to access coin operated washers, dryers, showers and saunas. The interior has been renovated several times and the pilings have been settling into the ground however building shifting is becoming increasingly problematic. (Kotlik Tribal Council, 2010)

– Landfill

Kotlik has a 4.5-acre open landfill which dates back to the 1970's. Located one mile upstream from the village, the landfill is 15 feet from the Kvichvauk Pass which flows into the Yukon River. The site is only accessible by boat in the summer and snowmobile or ATV in the winter and is inaccessible during times of break-up and freeze-up. Two part-time operators run the landfill. An excavator is used to drive waste across the river each winter for landfill maintenance and trash consolidation. Waste must be pushed back several times a year to prevent it from washing into the river. The area between the landfill and river is eroding and the site floods in the spring and fall. In 2010, it was reported that approximately 117 households, 2 commercial stores and 23 local organizations use the landfill to dispose of their solid waste which at that time was reaching maximum capacity. (Alaska Department of Environmental Conservation, 2012) (Kotlik Tribal Council, 2010)

In 1998, the City exchanged five acres of municipal land for 6.41 acres of Kotlik Yupik Corporation lands. The Bill Moore's Slough Elders Council was appointed in 2006 as the lead entity to pursue funding for a new landfill since they were actively pursuing grants for a burn box grant and a Solid Waste Management Plan. (Kotlik Tribal Council, 2010)

Health and Public Safety Infrastructure

– Kotlik Clinic

The Yukon-Kuskokwim Health Corporation maintains a village clinic in Kotlik that is staffed by two Community Health Aids who provide acute, chronic, emergent, and preventative services to Kotlik residents.

– Public Safety Building

Kotlik's public safety building was constructed in 1989 through a grant from the State of Alaska. The building is less than 600 square feet, containing an office, bathroom and three holding cells.

In 2010, the Kotlik Community Development Plan reported that the facility lacked space for visiting troopers or for storing search and rescue equipment and was in poor condition. (Kotlik Tribal Council, 2010)

– National Guard Armory

The National Guard Armory was built circa 1968. The 1,340 square foot facility has undergone several repairs and code upgrades overtime. The site of this building is a known Contaminated Site (File ID 2423.38.001) with Active status. It has petroleum contaminated soil dating back to 1997. There were 11 cubic yards of contaminated soil removed and treated off-site in 2007. Some contaminated soil remains at the site and additional work is ongoing. This site is located approximately 250 feet from the Kotlik River and is subject to flooding. (Kotlik Tribal Council, 2010) (Alaska Department of Environmental Conservation, 2012)

– Fire Hall

Kotlik received Project Code Red[9] firefighting equipment in 2003 through funding by the Denali Commission. The Project Code Red storage unit contains firefighting supplies and materials which can be hand carried or transported by ATV to the scene of a fire.

Local Government Offices

– City of Kotlik Office

The Kotlik Municipal building was built circa 1975. The total square footage is 2,400.

– Kotlik Tribal Council Office

The Kotlik Tribal Office was built in 1999. The total square footage is 780.

– Hamilton Tribal Council Office

The Hamilton Tribal Office maintains an office in Kotlik.

– Native Village of Bill Moore Slough Elder's Council Office

The Native Village of Bill Moore's Slough Elder's Council maintains an office in Kotlik which is identified as building 27 on Community Profile Map Sheet 2 on page 20.

[9] Project Code Red was established to assist rural Alaskan communities who share many challenges to developing effective fire prevention and suppression programs, including the great distance between most villages and the isolation these distances create. The equipment provided includes four cartridge-type 20-pound fire extinguishers, two compressed-air cartridge three-gallon compressed-air foam extinguishers, a 30-gallon compressed-air foam extinguisher, a portable pump, a gated-wye, and 400 feet of 11/2-inch hose. The equipment also includes an ice auger for drilling into lake ice for water, hard suction, and a strainer. Foam concentrate, dry-chemical powder, nozzles, fire helmets, rechargeable flashlights, and gloves complete the equipment list. The equipment is carried on two enclosed trailers that can be easily pulled by hand, snow machines, or ATVs. The trailers can be equipped with optional skis during winter operation. The two trailers are housed in an insulated shipping container that has been wired with an electric heater and lights. (Dick, 2003)

Educational and Other Youth Facilities

– Kotlik School

The Kotlik School was built in 2002. It is owned by the State of Alaska and operated by the Lower Yukon School District. The total square footage is 40,047.

– Old High School

The old high school was built circa 1977. Upon completion of the Kotlik School, the old high school was abated of hazardous material. All asbestos containing materials and other hazards were properly removed and disposed of. The windows were boarded up to prevent vandalism. The heating units are old and should be replaced.

– Head Start Building

The current Head Start facility was built in the 1970s. The total square footage is 1,656.

– Youth Center

The Kotlik Teen Center was constructed in the early 1980s and although the building has undergone several revisions, its dilapidating state constitutes a safety hazard.

Other Public Infrastructure

– Post Office

The post office was built circa 2000. The 2,240 square foot facility is maintained and operated by the U.S. Postal Service.

– Community Hall

The community hall was constructed around 1978 and later expanded through four separate additions. The building was destroyed by a fire in March 2018.

– City Shop

The city shop was formerly the Kotlik's first electrical generation plant (1982). The total square footage is 2,880. The Shop is now used to repair snowmobiles and ATV's and other general uses.

Religious Institutions

– Assembly of God Church

The Assembly of God Church was constructed in the 1970's. (Kotlik Tribal Council, 2010)

– St. Joseph Catholic Church

The St. Joseph Catholic Church was built in the mid-1960s when Kotlik first settled as a village. In 2010, the building was reported as aging maximum with insufficient capacity for most funerals, weddings and holiday events. The church is owned by the Roman Catholic Diocese of Fairbanks. (Kotlik Tribal Council, 2010)

Critical Infrastructure with Building Key to Kotlik Community Profile Maps

Table 1: Critical Facilities in Kotlik with Community Profile Map Key on the following page is taken from the ***2013 City of Kotlik Local Hazard Mitigation Plan, Table 6-3 Kotlik Critical Facilities*** (City of Kotlik, 2013) prepared by the Alaska Division of Homeland Security and Emergency Management (DHSEM).

Using FEMA's HAZUS MH application, DHSEM input data on these critical facilities to conduct a conservative exposure-level analysis to assess the risks of identified hazards. The original table was derived from the **State of Alaska's Critical Facility Inventory** and locally-obtained GPS coordinate data to identify critical facilities in relation to the exposure and vulnerability of potential hazards. This data was then used to develop a vulnerability assessment for those hazards where GIS-based hazard mapping information was available.

Two new columns have been added to the table to align critical facility locations with DCRA's Community Profile Maps[10] for Kotlik (pages 19 -21). Where possible, the building keys of profile maps 1 and 2 have been added to the corresponding infrastructure in the table (the last two columns – DCRA Profile Map and DCRA Building Key). For infrastructure not included in the profile map building keys, the best estimate of the location on the profile maps (1-3) is provided.

[10] Since the late 1970s, DCRA has prepared community profiles for Alaskan communities which included community maps. In 2002, the Initiative for Accelerated Infrastructure Development (IAID) Program was launched as a partnership between DCRA, the Denali commission and several state and federal agencies to develop publicly available maps for rural communities in order to support well-planned infrastructure development.

Today, DCRA community profile maps are developed for Alaskan communities with less than 1,500 population who have limited mapping capability. The maps are based on rectified digital aerial photography which display mapping attributes such as topography at two-foot contour intervals, land use, land ownership, property boundaries, utilities, public and private improvements, easements, areas subject to flooding and erosion, and additional land use information. Each profile includes maps at two scales. One map focuses on the developed area of a community and the other map focuses on the area surrounding the community.

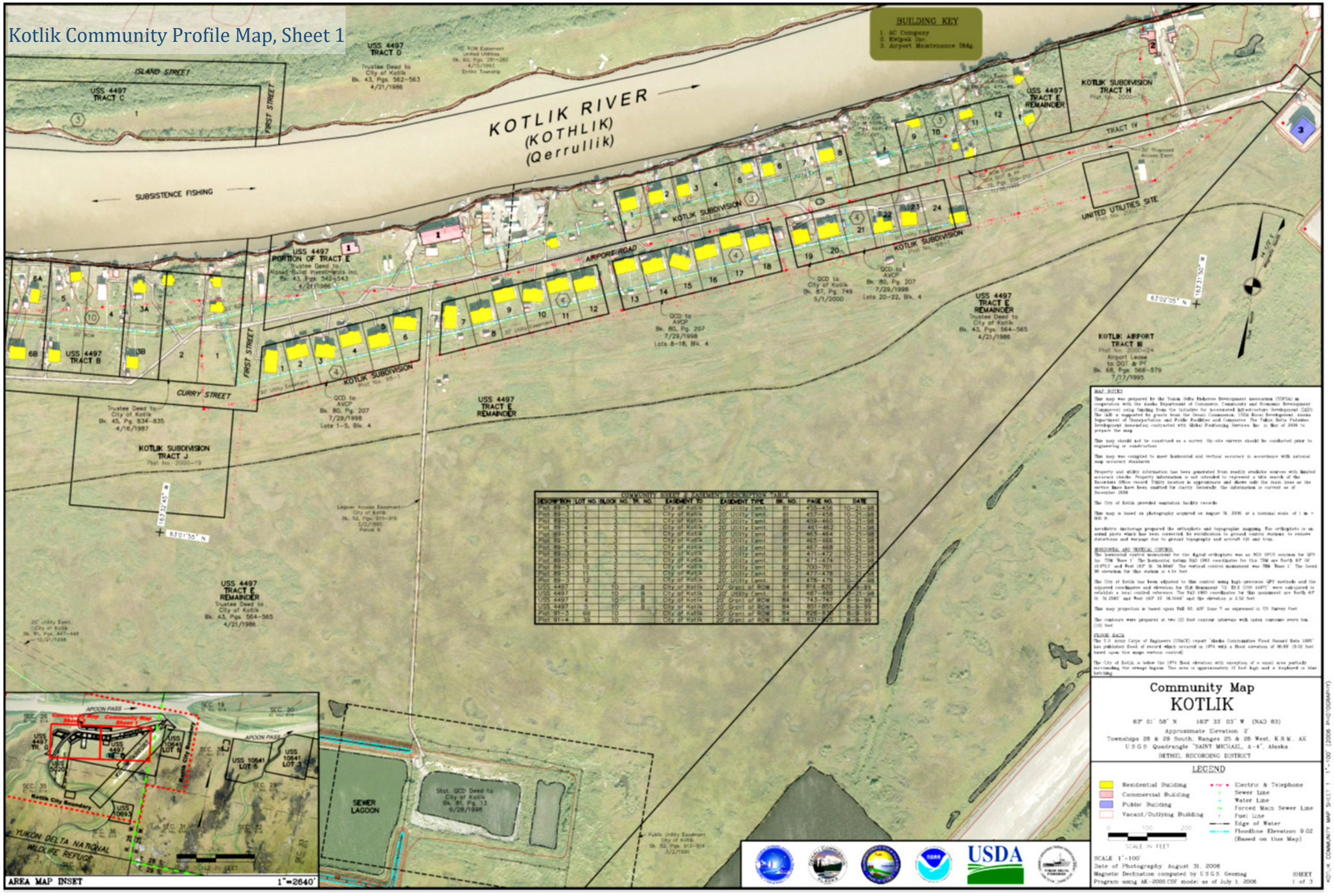
DCRA's Community Profile Maps are widely used as base maps for GIS applications, and have also been used for hazard mitigation planning, community planning, flood inundation mapping, and identification of land uses and environmentally-sensitive areas.

Table 1: Critical Facilities in Kotlik with Community Profile Map Key

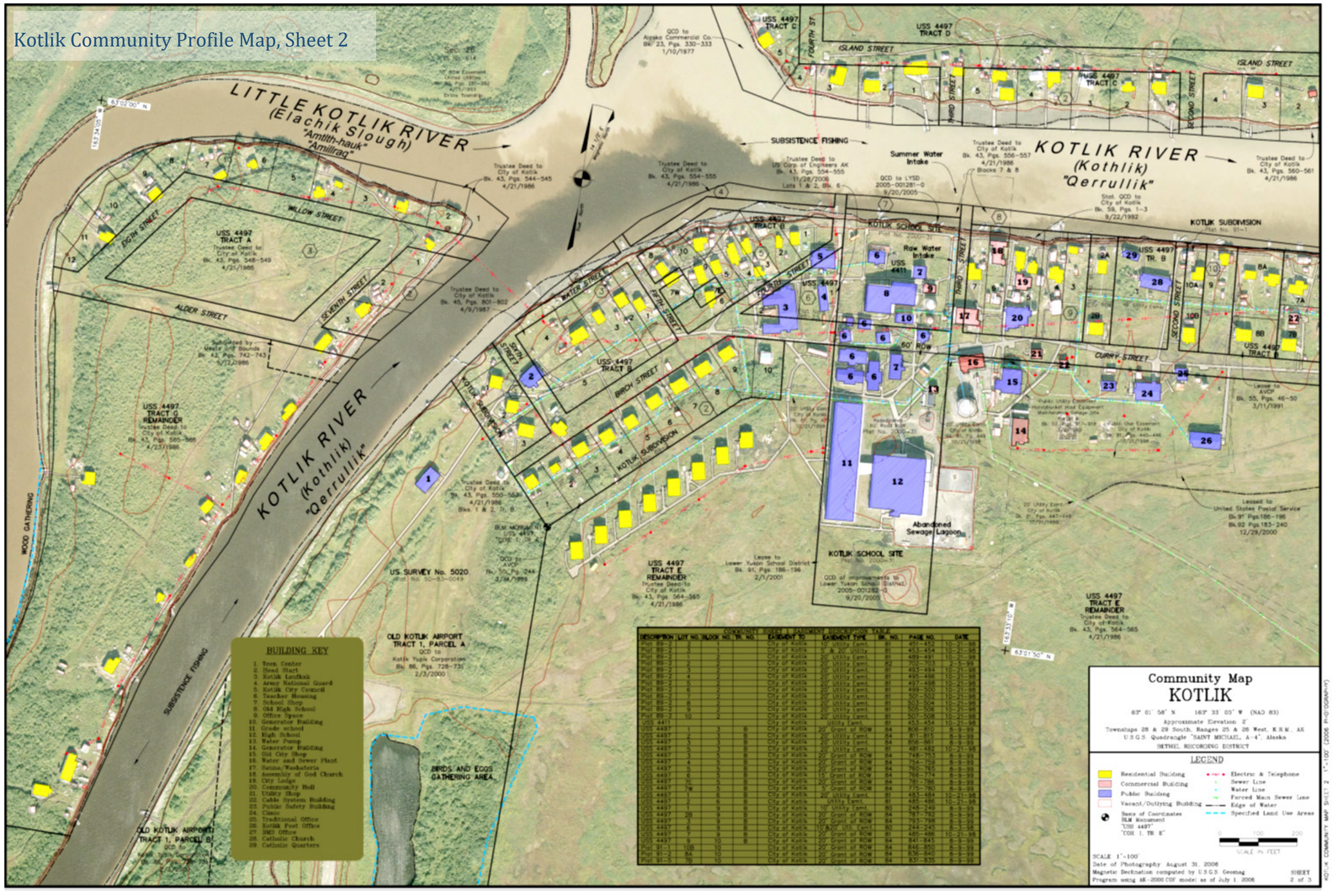
Facility Name	Facility Type	Latitude	Longitude	DCRA Profile Map	DCRA Building Key
New Airport	Airport	63.03017	-163.53136	3	Tracts I-III
Cemetery (new)	Cemetery			2	Tract B, Lot 10
Cemetery (old)	Cemetery2				
Assembly of God	Church	63.03408	-163.55146	2	18. Assembly of God Church
Catholic Church	Church	63.03407	-163.54897	2	28. Catholic Church
Community Center	Community Hall	63.03368	-163.551	2	20. Community Hall
Fire Station	Fire Station	63.03329	0		
Fuel Storage SE of Power Plant	Fuel Storage Tanks (>500 gal)	63.03296	-163.54993		
Kotlik Yupik Corp Fuel Farm	Fuel Storage Tanks (>500 gal)	63.03727	-163.52921	3	Tract H
Kotlik Yupik Corp Fuel Farm (2)	Fuel Storage Tanks (>500 gal)			3	Tract H
Kotlik Yupik Corp Fuel Farm (3)	Fuel Storage Tanks (>500 gal)			3	Tract H
Kotlik Yupik Corp Fuel Farm (4)	Fuel Storage Tanks (>500 gal)			3	Tract H
Utility Fuel Tank (1)	Fuel Storage Tanks (>500 gal)			3	Tract H
Utility Fuel Tank (2)	Fuel Storage Tanks (>500 gal)			3	Tract H
Utility Fuel Tank (3)	Fuel Storage Tanks (>500 gal)			3	Tract H
Utility Fuel Tank (5)	Fuel Storage Tanks (>500 gal)			3	Tract H
Utility Fuel Tank (4)	Fuel Storage Tanks (>500 gal)			3	Tract H
Electric Plant/generator (New)	Generator			2	14. Generator Building
School generator	Generator	63.03353	-163.55272	2	10. Generator Building
Health Clinic	Hospital/Clinic/ER	63.0333	-163.54879	2	24. Clinic
Municipal Landfill	Landfill/Incinerator	63.03978	-163.56027	3	SE of Kvichvauk Pass (NW on map)
Armory	National Guard	63.03357	-163.55403	2	4. Army National Guard
City Office	Offices	63.03384	-163.55414	2	5. Kotlik City Council
Police Department	Police Station			2	23. Public Safety Building
Post Office	Post Office	63.03384	-163.55414	2	26. Kotlik Post Office
Power Plant	Power Generation Facility	63.03322	-163.55092	2	14. Generator Building
Washeteria	Reservoir/Water Supply	63.03423	-163.56599	2	17. Sauna/Washeteria
Water Plant	Reservoir/Water Supply	63.03365	-163.55232	2	16. Water and Sewer Plant
Water Tank	Reservoir/Water Supply			2	South of 16. Water and Sewer Plant
Cable Building	Satellite			2	22. Cable System Building
Head Start Pre-school	School	63.03268	-163.55823	2	2. Head Start
LYSD School (Elementary & High)	School	63.03408	-163.55238	2	11. Grade School + 12. High School
City Sewage Lagoon	Sewage Lagoon	63.03225	-163.55172	1	Sewage Lagoon
Sanitation Garage	Sewage Lagoon			2	East of 14. Generator building
A.C. Store Complex	Store	63.03511	-163.53982	1	1. AC Company
City Lodge/Hotel	Store	63.03392	-163.551	2	19. City Lodge
Laufkak	Store	63.03345	-163.55456	2	3. Kotlik Laufkak
Duplex (1)	Teachers Quarters			2	6. Teacher Housing
Duplex (2)	Teachers Quarters			2	6. Teacher Housing
Duplex (3)	Teachers Quarters			2	6. Teacher Housing
Principal's House	Teachers Quarters			2	6. Teacher Housing
Teacher Housing (1)	Teachers Quarters	63.0332	-163.55343	2	6. Teacher Housing
Teachers Housing (2)	Teachers Quarters			2	6. Teacher Housing
Teachers Housing (3)	Teachers Quarters			2	6. Teacher Housing
United Utilities Telephone	Telephone	63.03379	-163.55105	1	United Utilities Site

Table 2 Sources: ***2013 City of Kotlik Local Hazard Mitigation Plan,*** Table 6-3 Kotlik Critical Facilities (City of Kotlik, 2013) and ***DCRA Community Profile Maps, Kotlik, Sheets 1-3*** (Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, 2006)

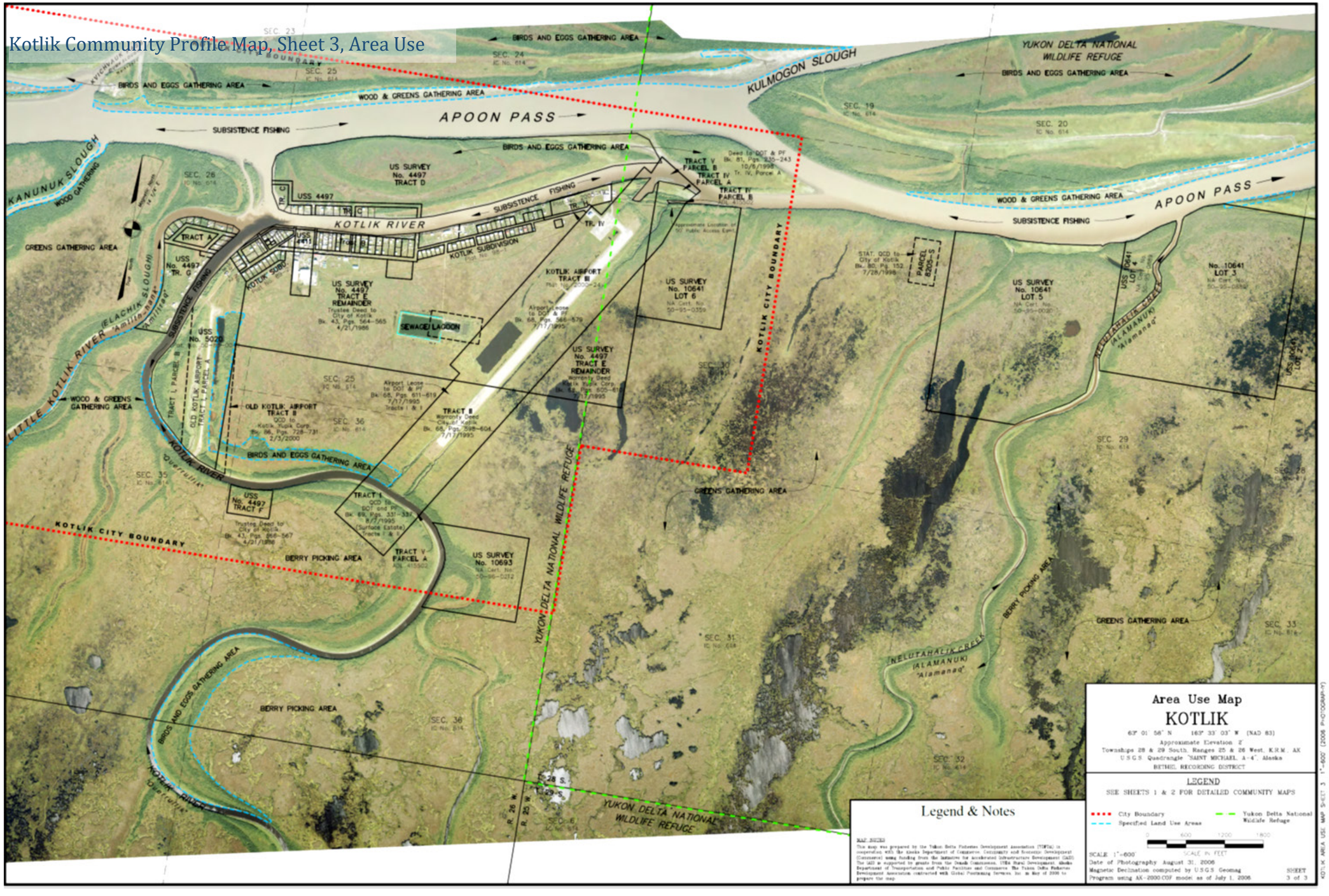
Kotlik Community Profile Map, Sheet 1



Kotlik Community Profile Map, Sheet 2



Kotlik Community Profile Map, Sheet 3, Area Use



Natural Hazards

The 2013 City of Kotlik Local Hazard Mitigation Plan (HMP) identified flood, severe weather, erosion, earthquake and wildland fire as hazards that should be profiled in the HMP, although no significant documentation was available on the impacts of earthquake and wildland fire in Kotlik. The HMP found that ground failure (permafrost, subsidence), tsunami/seiche and volcano hazards did not exist for Kotlik, however an October 2018 report prepared by the Alaska Native Tribal Health Consortium states that Kotlik is threatened by permafrost degradation. (Alaska Native Tribal Health Consortium, October 2018)

At the writing of this Community Profile, Kotlik is undergoing an update of its HMP and these natural hazards are being reassessed.

Flood

Due to its location at the confluence of the Kotlik and Little Kotlik Rivers, Kotlik has experienced relatively frequent flooding since its settlement in the 1960s. In 1974, the community experienced a record rainfall flood which inundated the entire village with four feet of water; in 1987, a flood resulted from stream overflow and inundated the village to a depth of two feet; in 1989, a 50-year flood led to the evacuation of 58 people and $195,000 in damage to 16 homes; and in 1992, the level of water rose two feet above the average first floor of affected homes, 108 people were evacuated, and 23 homes suffered damages totaling $1.9 million. (Himes-Cornell, et al., 2013)

The National Weather Service's Alaska-Pacific River Forecast Center maintains River Notes on Alaskan riverine events. The following events were recorded for Kotlik in 2017.

- On December 19, 2017, Kotlik experienced a winter storm with low visibility from December 18 to December 19. Southerly winds blowing between 50 to 55 knots led to high waters. The water went back down but returned on December 20 with the high tide.
- On November 22, 2017, Kotlik's environmental coordinator reported a surge that was similar to a November 11-12th event. The surge only filled up low lying areas. SW-W winds not too strong. No impacts to community. River ice came up high but stayed intact. Estimated the water went about 2 feet higher than normal (high tide level). (National Weather Service, 2019)
- October 11, 2017, October 9-11, minor flooding occurred in Kotlik. The tide came up a little above the bank on the airport side of town. On October 9, the river was about level with the bank. Flood levels reached about four feet. Kotlik experienced high tide but no high winds during the minor flooding and storm event. Minor damaged occurred when flood waters reached boardwalks in front of resident's home. (National Weather Service, 2019)

More recently, a decrease in the extent of sea ice in the Bering Sea is making communities like Kotlik more vulnerable to storms and flooding.

In early 2019, milder temperatures and sustained south to southeast winds greatly reduced overall Bering Sea ice extent and created persistent areas of open water or low concentration ice on the north side of St. Lawrence Island, southern and eastern Norton Sound, the northern Seward Peninsula coast and southern Kotzebue Sound. On February 11-12, 2019, a strong winter storm across the northern Bering Sea and into northwest Alaska producing widespread wind gusts in excess of 50 mph over much of the region. With all the open water, these strong winds produced a storm surge that backed up into the Yukon River and produced flooding in Kotlik. (Thoman, 2019)

Community members first noticed flooding around midnight on February 11th and the water continued to rise into the early hours of February 12th. Flood water rose between four and eight feet. Although snow in the village prevented the community from being badly flooded, six homes suffered foundation and insulation damage. The Kotlik tank farm, which is an area of oil or gas storage tanks, and some private property (boats and snow machines) also had damage. (Alaska Native Tribal Health Consortium Center for Environmentally Threatened Communities, 2019)

Figure 5: Unusual Flooding in February in Kotlik. Photo: Philomena Keyes, LEO Network

Severe Storms and Weather Events

Kotlik has been impacted by severe storms and weather events since its settlement:

- In November 1974, a series of storms impacting western Alaska led to significant coastal flooding in Kotlik.
- In 1989, a presidentially-declared disaster was declared when record-breaking cold temperatures as low as -85 degrees Fahrenheit impacted communities throughout the state.
- In 2000, a presidentially-declared disaster was declared when high impact weather events affected large portions of the state, including Kotlik
- In 2006, a large storm producing hurricane force winds and heavy rains led to severe flooding and wind damage and threats to life
- In November 2011, the National Weather Service warned of "a rapidly intensifying storm…expected to be an extremely powerful and dangerous storm…one of the worst on record."

The 2013 City of Kotlik Hazard Mitigation Plan reported that impact to the community resulting from a severe winter storm is negligible because structures and infrastructure have largely been constructed to withstand annual occurrences of severe winter storms. As a result, the plan concluded there is a small potential for injuries, less than 10 percent of property would be damaged, quality of life would be degraded to a minor degree, and the shutdown of critical facilities and services would occur for less than 24 hours. High winds resulting from a severe winter storm would pose the greatest risk as they can produce blizzard conditions and dangerous wind chills. Additionally, high winds have the potential to reach hurricane speed which winds may damage community facilities and infrastructure. (City of Kotlik, 2013)

With the recent trend of reduced Bering Sea ice, communities near the west coast of Alaska have become more vulnerable to winter storms and the impacts to Kotlik may increase in the future.

Table 2 on the following pages provides an overview of storm and disaster events in Kotlik from 1974-2019.

Table 2: Storm and Disaster Events in Kotlik, Alaska, 1974-2019

Date	State No.	Fed No.	Name	Disaster Type	Level	Status	Source
2/11-12/2019	N/A	N/A	Winter Storm Flooding	Flooding of 6 homes	Local	Non-Declared	4, 5, 6
3/27/2018	N/A	N/A	Community Building Fire	Fire – Building Fire	Local	Non-Declared	1,7
11/3/2017			Yukon Delta Winter Storm	Storm - Fall Storm, Sea Storm/Surge	Local	Denied	1
10/12/2017	N/A	N/A		Loss/Disruption of Critical Lifelines - Water and Wastewater	Local	Non-Declared	1
8/18/2016	AK-16-259	N/A	2016 Kotlik Fire Disaster	Fire - Building Fire	State	Declared	1, 2, 3
11/9/2013	13-S-244	DR-4162	2013 November Storm Disaster	Storm - Fall Storm, Sea Storm/Surge; Alaska Severe Storms, Straight-line Winds, and Flooding	Federal	Declared	1, 2, 3
12/22/2011	12-236	DR-4050	2011 West Coast Storm	Hurricane force winds exceeding 85 mph, high tidal ranges, and strong sea surges up to 10-ft above mean sea level	Federal	Declared	2, 3
5/6/2009	09-227	DR-1843	2009 Spring Flood	Flood - Spring/Breakup (Mar/May)	Federal	Declared	1, 2
1/1/2009	N/A	N/A		Loss/Impact to Critical Infrastructure - Economic/Business	Local	Non-Declared	1
10/14/2006	07-221	DR-1669	2006 October Southern Sea Storm	Hurricane force winds, heavy rains resulting in severe flooding and wind damage	Federal	Declared	2, 3
1/2005	N/A	N/A	Storm Surge Flooding	Water remained in low-lying areas of town for about 6-7 hours	Local	Undeclared	8
10/18/2004	05-211	DR-1571	2004 Bering Strait Sea Storm	Storm - Fall Storm, Sea Storm/Surge	Federal	Declared	1, 3, 6
2/17/2000	00-191	DR-1316	Alaska Winter Storms and Avalanches	High impact weather events throughout state	Federal	Declared	2, 3

Date	State No.	Fed No.	Name	Disaster Type	Level	Status	Source
1992	N/A	N/A	Flood	Water rose 2 feet above average first floor of affected homes. 108 people were evacuated; 23 homes damaged totaling $1.9 million	Local	Undeclared	8
1989	N/A	N/A	50-Year Flood	58 people had to be evacuated; $195,000 damage to 16 homes	Local	Undeclared	8
1/28/1989	83	DR-00826	Omega Block Disaster	Record-breaking cold spell, with temperatures as low as -85 degrees	Federal	Declared	2, 3
1987	N/A	N/A	Stream Overflow Flood	Entire village inundated with 2 feet of water	Local	Undeclared	8
9/1/1982	16	N/A	Severe Windstorms	Storm - High Winds	State	Declared	1
1974	N/A	N/A	Record Rainfall and Flooding	Entire village inundated with 4 feet of water	Local	Undeclared	8

Sources listed in Column 8, above.

1. (Alaska Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management, State Emergency Operations Center, 2008-2018)
2. (City of Kotlik, 2013)
3. (Alaska Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management, 2018)
4. (Shallenburger, 2019)
5. (Joling, 2019)
6. (Alaska Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management, State Emergency Operations Center, 2019)
7. (Hollander, 2018)
8. (Himes-Cornell, et al., 2013)
9. (National Weather Service, 2019)

Erosion

Kotlik's location also makes the village susceptible to bank erosion along the Kotlik River waterfront. Erosion of the Kotlik River has been actively occurring each year since at least the early 1980s as evidenced funding provided by the State of Alaska and the US Army Corps of Engineers in the 1980s for an erosion control study, a coastal erosion study, a preliminary design and assessment and more the one million dollars in appropriations for erosion control.

Kotlik's erosion is caused by several forces, including naturally-occurring fluctuations in water flows and levels, flooding, ice jams, spring break up, and wave action from boat wakes and wind. The semi-annual thaw-freeze cycle weakens the soil structure of the river bank, which is then eroded by ice abrasion, waves, and occasional high tides from Norton Sound. Additionally, foot traffic destroys vegetation and prevents the establishment of new vegetation which makes the riverbank more vulnerable to erosion forces. (R&M Consultants, Inc., 1986) (City of Kotlik, 2013) (Himes-Cornell, et al., 2013)

Development in Kotlik is along the south bank of the Kotlik River, on the north bank of the Kotlik River on East Island, and on the peninsula (i.e. West Island) between the Kotlik and Little Kotlik Rivers. All development in these areas is susceptible to erosion.

The **2009 Alaska Baseline Erosion Assessment** conducted by the US Army Corps of Engineers identified Kotlik as a "Priority Action Community", indicated that Kotlik should be considered for immediate action by either initiating an evaluation of potential solutions or continuing with ongoing efforts to manage erosion. (US Army Corps of Engineers Alaska District, 2009) It was estimated that Kotlik had lost 3 feet of riverbank annually over the past 10 years, with erosion events in 2002, 2003, and 2005. *[See Linear Extent of Erosion Figures, pages 30-31]* The Erosion Information Paper prepared on Kotlik noted that the community had moved the riverside boardwalk inland three times over the past six years and that outbuildings, sheds, food storage areas, drying racks, smokehouses, the AC retail store, utility poles, and public buildings were threatened by erosion. The paper noted the 2007 Kotlik Hazard Mitigation Plan indicated that nearly 60 percent of the community was at risk from erosion, including critical facilities already listed, the Municipal landfill, non-critical facilities, and residential structures. (US Army Corps of Engineers, Alaska District, 2008)

In 2016, the Natural Resources Conservation Services (NRCS) made a site visit to Kotlik as part of its Emergency Watershed Program. NRCS determined that there was clearly an on-going erosion problem in Kotlik, although the erosion rates were relatively low: a comparison of historic imagery and maps of the area indicated the average erosion rate was approximately two feet per year. Because threatened homes are built parallel to and within close proximity to the river bank, there is very little land buffer and the erosion is threatening many structures. NRCS found that approximately 40 homes were threatened by erosion, of which a few structures were in the process of being lost to erosion and at least one home which had been

moved away from the eroding bank by the owner *[See NRCS Photo Showing Erosion Extent 1951-2016 in Kotlik, page 29].* (Oatley & Maroney, 2016)

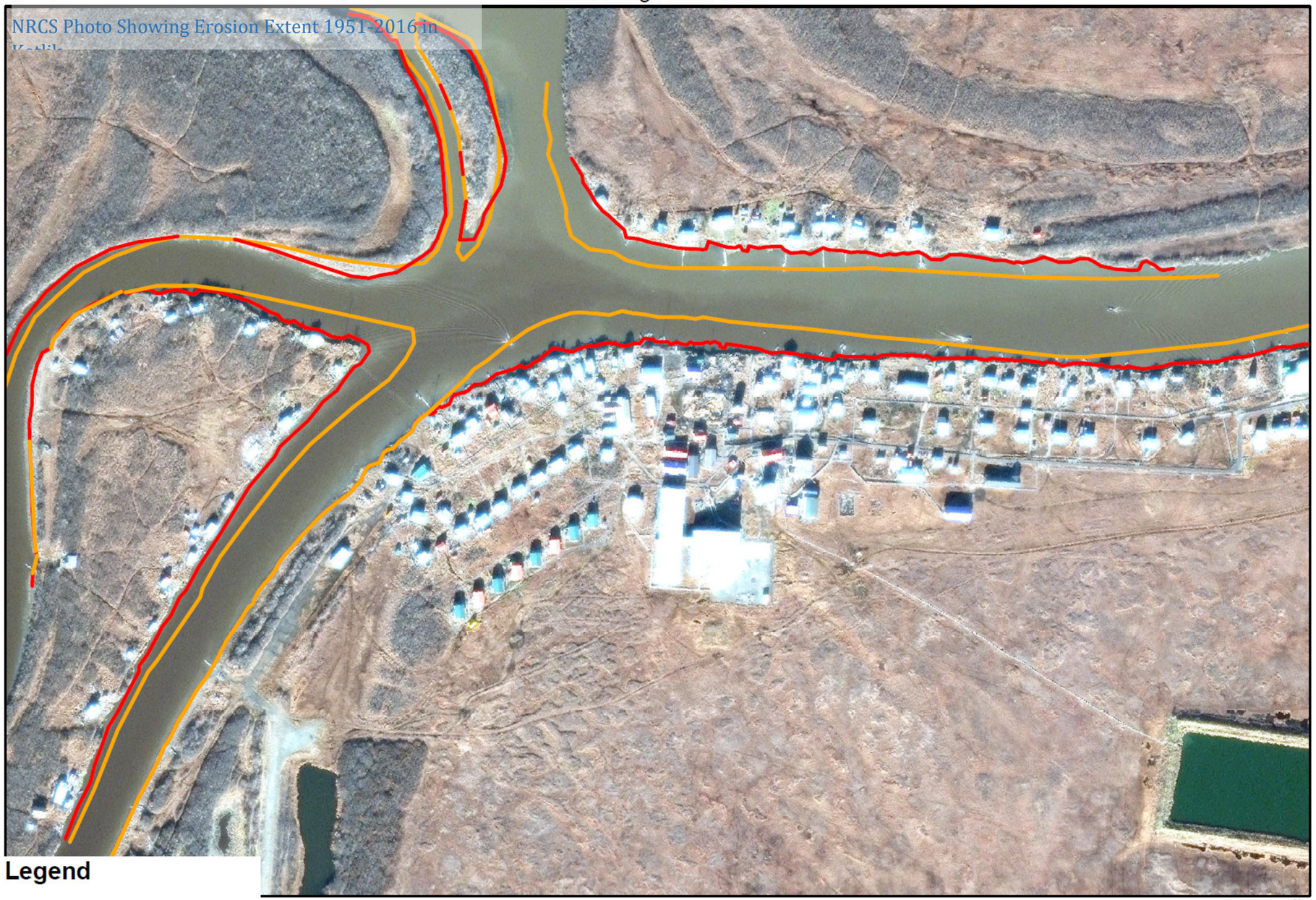
In 2018, Kotlik was identified as highly vulnerable to erosion among 187 rural Alaskan communities evaluated in a Statewide Threat Assessment of flooding, erosion and permafrost degradation threats. Kotlik was also one of 13 highly vulnerable communities for all hazard threats in aggregate. (US Army Corps of Engineers, Alaska District, University of Alaska Fairbanks Institute of Northern Engineering, 2018)

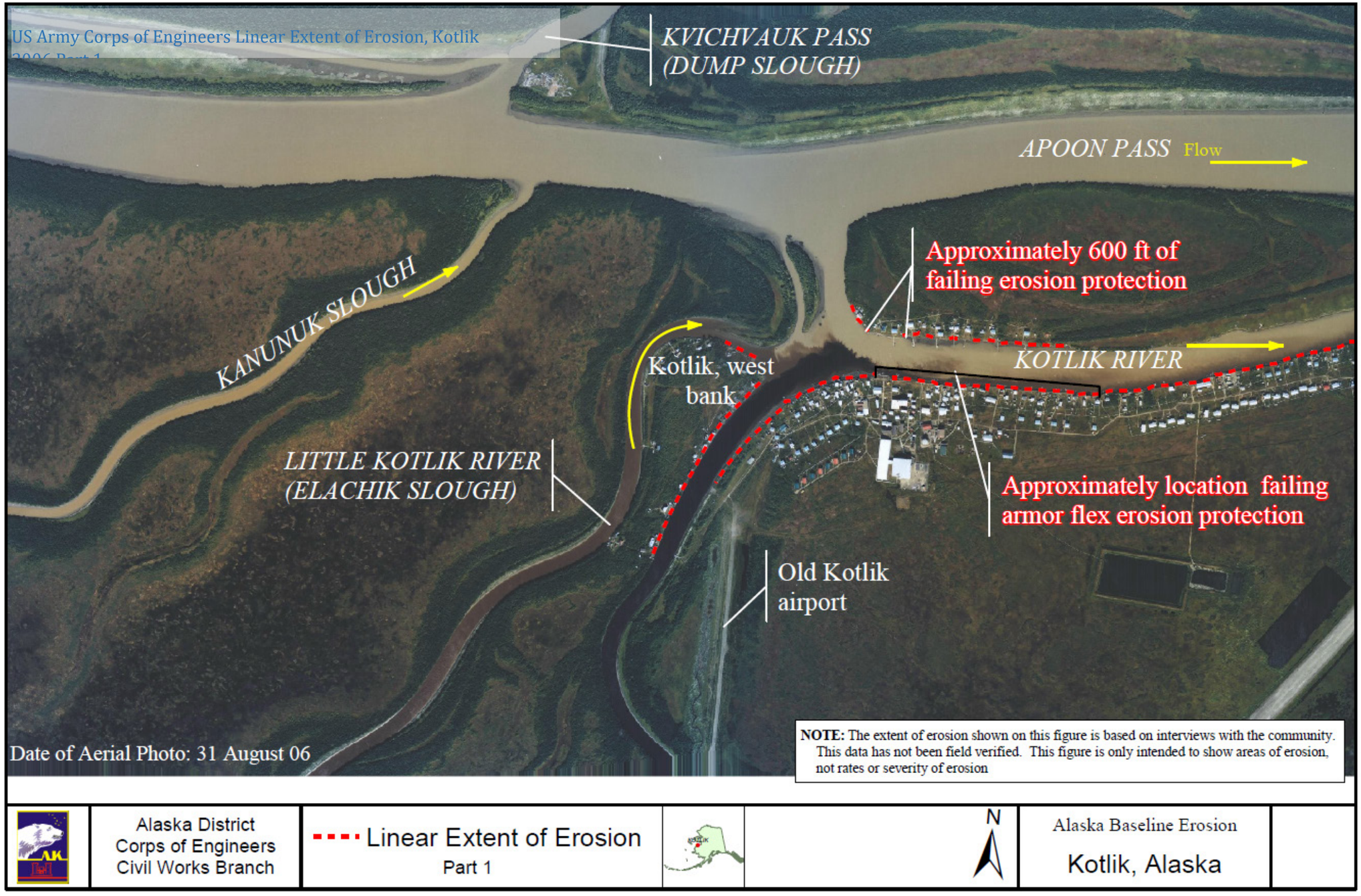
Figure 6: Erosion of the Kotlik River Bank in 2011. **Photo:** DCRA Photo Library

Field Office: NORTHERN HUB OFFICE
Agency: USDA/NRCS

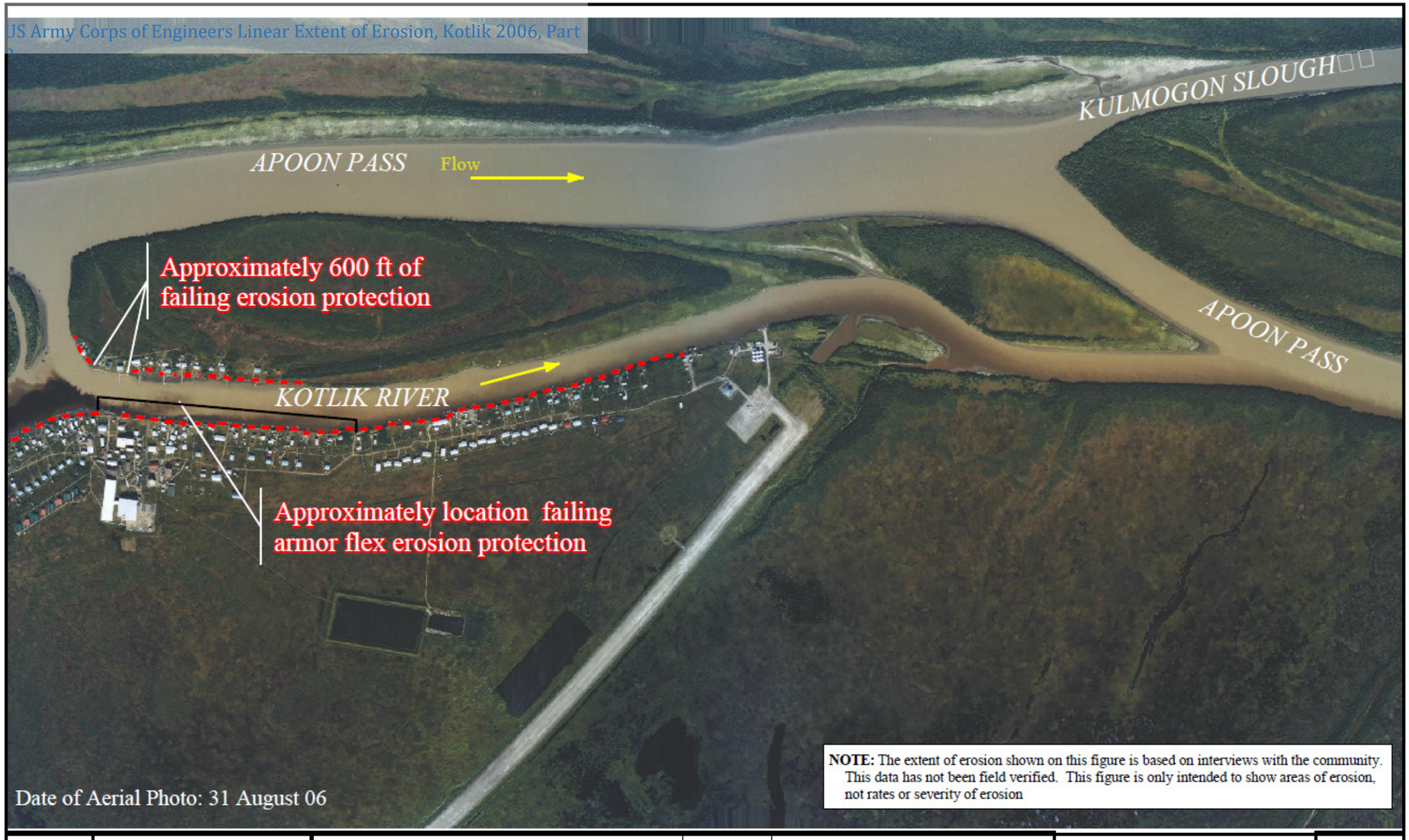
Kotlik, AK EWP Assement - 2016
Aerial Image from 1951

Date: 1/4/2017




US Army Corps of Engineers Linear Extent of Erosion, Kotlik
2006 Part 1
KVICHVAUK PASS
(DUMP SLOUGH)
APOON PASS
Flow
Approximately 600 ft of
failing erosion protection
KANUNUK SLOUGH
Kotlik, west
bank
KOTLIK RIVER
LITTLE KOTLIK RIVER
(ELACHIK SLOUGH)
Approximately location failing
armor flex erosion protection
Old Kotlik
airport
Date of Aerial Photo: 31 August 06
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, not rates or severity of erosion
Alaska District
Corps of Engineers
Civil Works Branch
Linear Extent of Erosion
Part 1
N
Alaska Baseline Erosion
Kotlik, Alaska

US Army Corps of Engineers Linear Extent of Erosion, Kotlik 2006, Part 2



Permafrost Degradation

Permafrost and periglacial hazards are caused by the effects of changing perennially frozen soil, rock, or sediment (known as permafrost) and the landscape processes that result from extreme seasonal freezing and thawing. Permafrost degradation causes buildings and infrastructure to shift due to ground sinking and upheaval, and high ground water thawing the permafrost. (Alaska Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management, 2018)

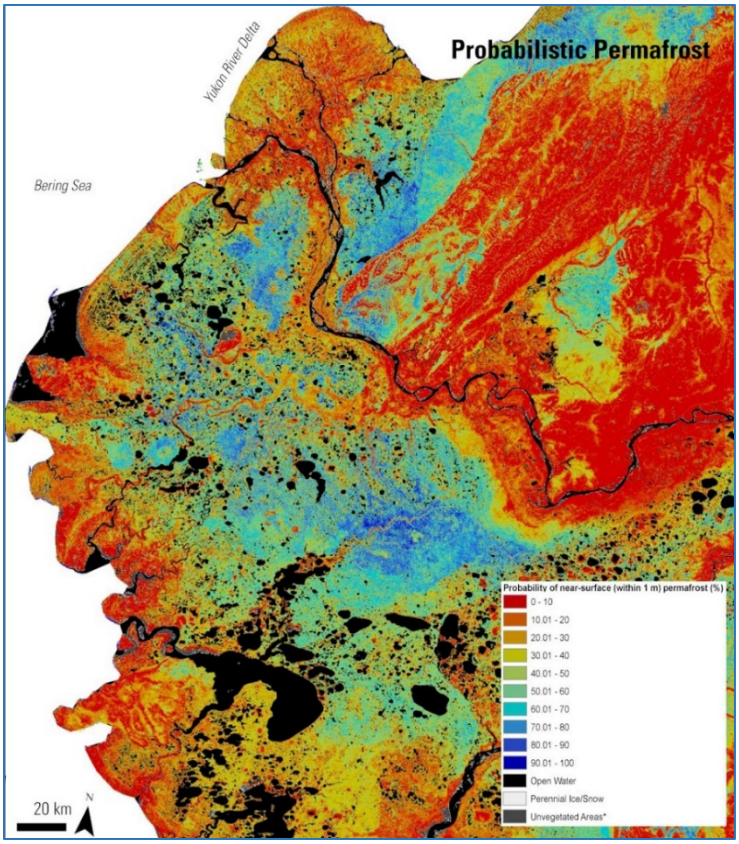
While the 2013 City of Kotlik Local Hazard Mitigation Plan (HMP) found that ground failure (permafrost, subsidence) hazards did not exist for Kotlik, an October 2018 report prepared by the Alaska Native Tribal Health Consortium reported that Kotlik is threatened by permafrost degradation. (Alaska Native Tribal Health Consortium, October 2018)

In 2008, University of Alaska Fairbanks permafrost scientist Kenji Yoshikawa drilled a permafrost monitoring hole at Kotlik near the school and found there was no permafrost below the active layer, (Rozell, 2008) indicating that the permafrost is thawing and the active layer deepening in Kotlik.

In a 2014 study, researchers produced a probabilistic map of near-surface (within 1 meter of the Earth's surface) permafrost distribution within the Yukon River Basin of Alaska. The image on the right is the modeled probabilistic permafrost map of near-surface permafrost distributions. This map shows the percentages of near-surface permafrost with low probabilities (0% to 40%) in warm colors (red, orange, yellow) and higher probabilities (50%-100%) in cooler colors (greens and blues). (Beckendorf, Wylie, & Pastick, 2014)

Loss of permafrost can lead to ground subsidence and loss of structural bearing capacity which can damage community infrastructure.

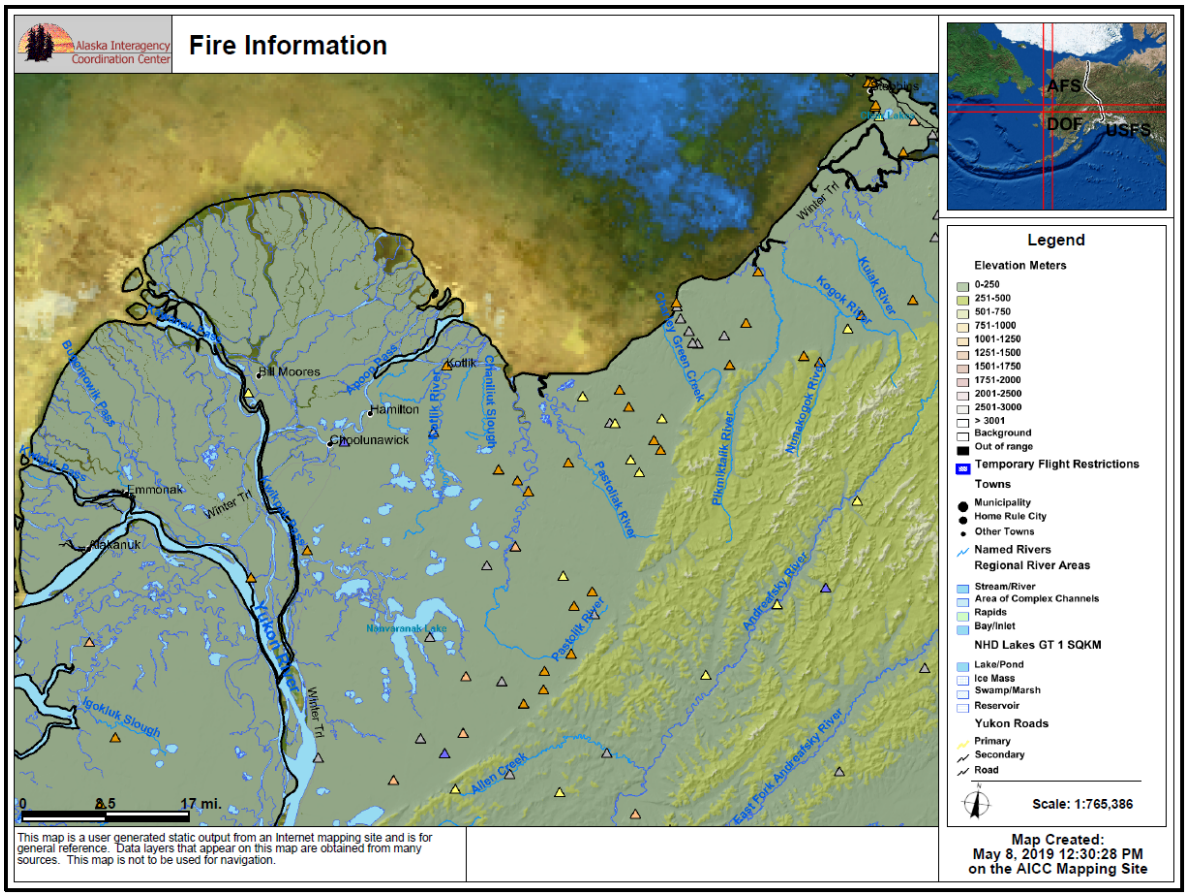
Figure 7: Probabilistic Map of Near-Surface Permafrost Distribution in the Yukon River Basin



Wildland Fire

The 2013 City of Kotlik Local Hazard Mitigation Plan found that Kotlik is highly vulnerable to the effects of wildland fire because the entire population and all critical and non-critical facilities are likely to be affected by wildland fire events. The plan found that, given the history of wildland fires near Kotlik, it is possible future wildland fire events will occur around Kotlik. Although conditions in Kotlik are generally wet, the possibility of a dry season combined with high winds could lead to a catastrophic wildland fire event. (City of Kotlik, 2013)

Since 1939, a number of significant fire events have occurred within 60 miles of Kotlik, including near the Kotlik River, at the Pastolik site, near the Pastolik River and near the Pastoliak River. (See map below). (Alaska Interagency Coordination Center, n.d.)



Earthquake

The 2013 City of Kotlik Local Hazard Mitigation Plan found that while the entire geographic area of Alaska is prone to the effects of an earthquake, Kotlik is located in an area that is less active than others in the state. Based on Kotlik's geographic location, earthquake probability models indicate it is unlikely that an earthquake would be centered in an area near Kotlik, although the effects of earthquakes centered elsewhere would be felt in Kotlik. (City of Kotlik, 2013)

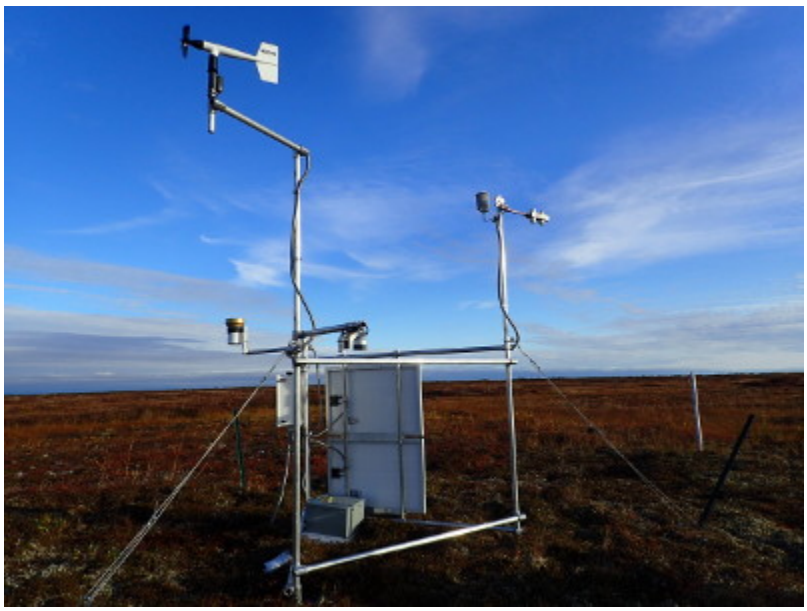
Environmental Monitoring in Kotlik

General Environmental Monitoring

The Local Environmental Observer (LEO) Network is a network of local environmental observers and topic experts who apply traditional knowledge, western science and technology to document significant, unusual or unprecedented environmental events in Alaskan communities. Local observers in Kotlik have posted observations on the LEO Network regarding unusual flooding, sea mammals and fish. (Alaska Native Tribal Health Consortium Center for Climate and Health, 2012)

Weather Monitoring

The Exchange for Local Observations and Knowledge of the Arctic (Eloka) partners with Indigenous communities in the Arctic to create online products that facilitate the collection, preservation, exchange, and use of local observations and Indigenous Knowledge of the Arctic. (National Snow and Ice Data Center, 2017) Part of Eloka, the **Cillaput *"Our Weather"* Project** is a collaboration between USGS, US Forest Service, the Yukon River Inter-Tribal Watershed Council, the Chevak Traditional Council, and the Bureau of Indian Affairs. Through this effort, weather stations are monitoring current weather conditions in the villages of Chevak and Kotlik. The weather stations have been installed as part of the ***Landscape Change on the Outer Yukon-Kuskokwim Delta Project***. **The Kotlik Station** measures air temperature, Relative humidity, Barometric pressure, wind speed, wind direction, incoming solar radiation, snow depth, surface temperature, soil temperature, and rainfall. (Chevak Traditional Council, the U.S. Geological Survey, and the U.S. Forest Service., 2017)



Yukon-Kuskokwim Delta Weather Station Network

Erosion Monitoring

In 2017, the Alaska Division of Geological and Geophysical Surveys (DGGS) initiated local erosion monitoring in Kotlik using time-lapse cameras and vertical stakes. The time-lapse camera is installed facing the eroding river bank where stakes have been driven from which erosion can be measured from the photographs. Local staff take measurements of the distance between the shoreline and stakes at regular intervals (monthly during summer and fall) to quality- control the photo-collected measurements.

Flood Monitoring

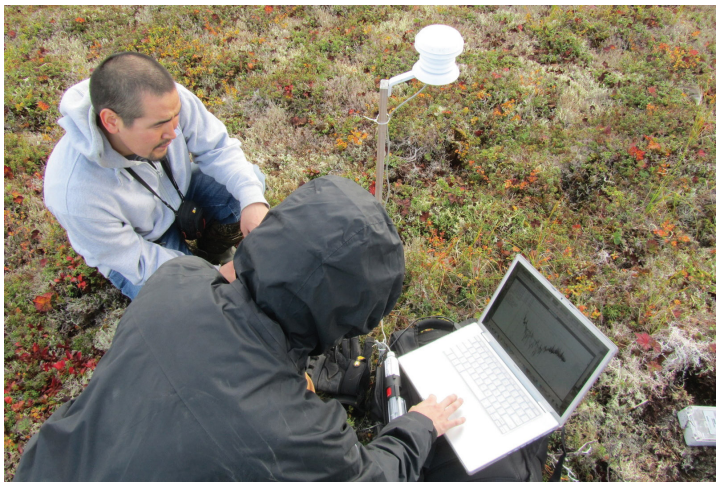
DGGS also installed a tide staff on a local power pole at a low-lying elevation to enable the measurement of flood elevations for future storms. Installation of the tide staff was completed using funding from the Alaska Ocean Observing System.

Permafrost Monitoring

In 2009, the US Geological Survey and the Yukon River Inter-Tribal Watershed Council initiated a cooperative effort called the **Active Layer Network.** The active layer is the layer of soil above the permafrost that thaws during the summer months and freezes again in the autumn. By measuring the depth of the active layer in late summer at the time of maximum thaw, scientists are able to better understand the effects of a warming climate on permafrost. (US Geological Survey, 2011)

The goal of the first two years of this effort was to install the first active layer monitoring network for the entire Yukon River Basin and to determine the feasibility of sustaining and evolving the network within the Yukon River Basin. From 2009 to 2010, the project Active Layer Network grid sites were installed in a number of communities including a **Kotlik Grid**. (Global Climate Observing System, 2014)

Several studies have indicated that permafrost is thawing, and the active layer is deepening. This was evidenced in Kotlik when in 2008, University of Alaska Fairbanks permafrost scientist Kenji Yoshikawa drilled a permafrost monitoring hole at Kotlik near the school and found there was no permafrost below the active layer. (Rozell, 2008)



Photo, right: *Brett Uhle (front), USGS, and Victor Tonuchuk Jr. (back), Environmental Coordinator for the Kotlik Traditional Council, download air temperature data at the Active Layer Network site near Kotlik.* **Source: USGS**

Current and Proposed Efforts to Address Environmental Threats in Kotlik

As a near-term solution to address structures threatened by erosion, Kotlik is considering the old airport site as a place to relocate threatened homes, pending a land-suitability feasibility study. The land is currently owned by the Kotlik Yupik Corporation, who had the land surveyed and subdivided for private use. Some of the options considered for these properties are that lots could be provided to Kotlik Yupik Corporation shareholders at a minimal price and other lots could be made available to other Kotlik residents by transfer or purchase.

The Kotlik Tribal Council submitted requests in 2016 and 2018 to the Natural Resources Conservation Service (NRCS) Emergency Watershed Protection Program (EWP). In order for NRCS to assist Kotlik, a qualifying event (storm, flood, accelerated erosion) must occur, the community must make a written request within 60 days of the event to NRCS for EWP assistance, and a site must be ready to relocate the threatened structures to. (Maroney, 2019)

In September 2018, ANTHC made a site visit to Kotlik to survey homes threatened by erosion, assess the risk to the residents and to understand what the community's priorities were regarding the erosion threat. The findings from this visit were compiled in a report, ***Options for Near-Term Infrastructure Protection Kotlik, Alaska October 2018.*** ANTHC estimated that 120 structures are currently threatened, including approximately 47 homes. Based on the community's identified priorities, ANTHC made the following recommendations:

1. **Relocate homes threatened by erosion:** ANTHC recommended relocating threatened homes to the old airport site, an effort that would include site preparation, designing boardwalk access to the site, extending electrical distribution to the site, and moving structurally-sound, threatened homes to the site, or replacing those that were not.
2. **Implement protection to stop or decrease erosion rates:** ANTHC recommended a managed-retreat strategy due to the high cost of a structural solution
3. **Identify the safest site for long-term relocation:** ANTHC noted that analysis of this priority is outside of the scope of their effort, however they would support Kotlik's efforts to gather information regarding the risks and the feasibility of relocating to another site.
4. **Determine the impacts of erosion to the community's landfill and identify an appropriate way to protect the facility:** ANTHC recommended bank stabilization at the current landfill site. (Alaska Native Tribal Health Consortium, October 2018)

Based on ANTHC's recommendations, the Denali Commission is in the process of finalizing a grant to Kotlik to complete the designs for a subdivision at the old airstrip, an access boardwalk to the site, a skid system and to develop a methodology to move threatened structures.

Table 3 on the following page summarizes some of the current and proposed projects to address environmental threats in Kotlik.

Table 3: Current and Proposed Efforts to Address Environmental Threats in Kotlik

STATUS	PROJECT TITLE	DESCRIPTION	FUNDER	REQUESTOR	COST
In Progress	Native Village of Kotlik Coastal Adaptation Assessment Grant	This funding will develop an Adaptation Assessment which will identify important components of the community and determine the risk of harm. It will hire a part-time Project Coordinator to take the lead and form a planning team that meets regularly and works through the steps outlined in the U.S. Climate Resilience Toolkit, seeks technical assistance as needed and implements the completed assessment plan.	Bureau of Indian Affairs Tribal Resilience Program	Kotlik Village Council	$ 83,875
In Progress	Coastal Infrastructure Erosion Vulnerability Assessment	Use existing information to develop linear erosion projections and analyze the temporal impacts of erosion on community infrastructure for 45 communities (including Kotlik) located on the western coast of Alaska.	Denali Commission	Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS)	$ 226,000
In Progress	Kotlik Subdivision and Access Boardwalk Design	This award will complete the civil site design for a new subdivision at the old airstrip and the design of an access boardwalk to the site. It will also include the design of a skid system and development of a home relocation methodology that can be implemented locally to move threatened structures.	Denali Commission	Kotlik Village Council	$ 197,000
In Progress	Kotlik Hazard Mitigation Plan	Updates the City of Kotlik Hazard Mitigation Plan which expired December 5, 2018. The new plan will be multi-jurisdictional - it ill be adopted by both the City and the Tribe	State of Alaska Department of Military and Veteran's Affairs, Division of Homeland Security and Emergency Management through a grant from the Federal Emergency Management Agency (FEMA)	City of Kotlik and Native Village of Kotlik	N/A
Proposed	Facilitating Coastal Storm Decision Support at Kotlik, Alaska	This proposal seeks to establish an authoritative tidal datum at Kotlik, Alaska so agencies that provide floodplain services will be given a greater capacity to extend storm forecasting, flood risk mapping, and community planning to Kotlik.	U.S. Army Corps of Engineers (USACE) Flood Plain Management Services	Alaska Silver Jackets	
Proposed	Cost-Benefit Analysis for Whole Community Protection-In-Place versus Relocation	Using all projected environmental impacts through 2100, conduct a benefit-cost analysis for whole community protection-in-place versus relocation.	USACE Planning Assistance to States Program (PAS)	Kotlik Village Council	$ 455,000
Proposed	Relocation Site Selection Study	The Kotlik Village Council requested that the USACE, in collaboration with the community, identify a safe from flooding, erosion, and permafrost degradation through the year 2100 where the entire Kotlik community can relocate. As part of this request, the Kotlik village Council requested that the USACE: 1. Collaborate with State of Alaska Coastal Hazards Program and the National Geodetic Survey to ensure flooding analyses utilize the best available sea-level change data. 2. Collaborate with Two Bears Environmental Consulting to utilize their downscaled climate modeling data developed for the Yukon-Kuskokwim Delta. 3. After a safe site is identified, conduct surveying and platting at the new site.	USACE PAS	Kotlik Village Council	Part of $455,000 above

STATUS	PROJECT TITLE	DESCRIPTION	FUNDER	REQUESTOR	COST
Proposed	Geodetically-Referenced Tidal Datums	Collect short-term water level data to produce geodetically referenced tidal datums to NOAA CO-OPS (CO-OPS) specifications and including CO-OPS costs for incorporating data into CO-OPS systems. Geodetically referenced tidal datums will provide the conversion between ocean and land that is necessary to project return interval type flooding events on local elevation models. By collecting to CO-OPS specifications, the data will also be usable for future sea level rise projections and as output locations for storm surge forecast models which will benefit the community beyond the scope of this project.	USACE PAS	Kotlik Village Council	Part of $455,000 above
Proposed	Community Building Relocation	The Kotlik Village Council requested that the Natural Resource Conservation Service investigate a possible Emergency Watershed Program project due to erosion of the banks of Apoon Pass (as well as other nearby slough channels). In order for NRCS to assist Kotlik, a qualifying event (storm, flood, accelerated erosion) occurs, the community must make a written request within 60 days of the event to NRCS for emergency Watershed Program Assistance and a site must be ready to relocate the threatened structures to.	US Department of Agriculture, Natural Resource Conservation Service, Emergency Watershed Program	Kotlik Village Council	N/A

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