

**RECOMMENDATIONS
REPORT TO THE
GOVERNOR'S SUBCABINET ON
CLIMATE CHANGE**

**FROM THE
IMMEDIATE ACTION WORKGROUP**

Commissioner Hartig and Members of the Governor's Subcabinet on Climate Change:

The Immediate Action Workgroup is pleased to provide its recommendations regarding the actions and policies that should be taken in the next 12 –18 months to prevent loss of life and property in Alaska's communities that have been identified as those in greatest peril due to climate change phenomena.

What began as a series of scheduled meetings with representatives from state agencies, the U.S. Army Corps of Engineers, and community representatives, quickly evolved into a collaborative, cooperative working relationship with each participant providing useful information and ideas on innovative ways to expedite projects as well as practical, on-the-ground know-how.

We started by embracing the concept of *recipes for success*. What we found is - the recipes are complex, the ingredients numerous, and sometimes the chefs need to be the cooks and cooks, chefs. Our conceptual recipe for success follows here, with our list of ingredients following in the form of immediate action recommendations for specific community projects and then additional ingredients describing necessary and beneficial immediate policy and implementation actions to effectively address climate impacts, which we anticipate impacting many more Alaska communities.

Immediate Action Workgroup's Recipe for Success

Step 1: Begin by developing a collaborative organizational structure that can focus the combined capabilities of local, state, and federal stakeholders on the problems at hand. Identify what expertise is available; which organization has the authority, capability, and funding to lead the combined effort; and, identify where functional gaps exist that need to be filled. Local communities severely affected by climate change should be encouraged to establish a project coordinator position to interact with all other organizations and be an advocate for funding through grants and other means to implement needed evaluations and action plans.

Step 2: Discuss the nature and extent of the potential climate changes and create an applied approach to addressing significant impacts, as described in Step 3. A scenario analysis could compare community impacts with the full range of plausible future conditions (minor sea level rise to significant rise this century, continuation of historical storms to increased intensity of storms, gradual thawing of permafrost to quick melt of permafrost, historical trend of subsistence species populations to reduced availability of subsistence resources, etc.).

Step 3: Identify the communities at risk, timeframe, and the true needs to address climate change. Once, communities at risk are identified and the timeframe established before major damages/ losses occur, recognize that communities in jeopardy under all plausible scenarios warrant special consideration. Develop a methodology for prioritization of needs based on the risk to lives, health, infrastructure, homes, businesses, subsistence harvests, significant cultural attributes, and the quality of life. Villages with declining populations, which already cannot support continuation of vital services such as a school, would likely be a lower priority than those which are likely to sustain viable communities during the foreseeable future.

Next, determine the true needs of coastal communities subjected to climate change. Do they require additional land for population growth; are coastal storm damages increasing to potentially catastrophic levels; is melting permafrost destroying the foundation for structures at the community; will sufficient numbers of future subsistence resources be available to sustain the community at its current location; when will key facilities (airport, power, school, water supply, etc.) be lost so the community could not continue to function with dignity; and, is the community frequently needing emergency declarations to cope with impending disasters?

Step 4: Develop measures that meet the stated needs and combine those measures into alternative plans for comparison. Document the pros and cons of each alternative, obtain local input on community values, evaluate the environmental effects of each plan, and provide estimated costs for implementing each alternative. Determine the challenges of concurrent budgeting and meeting regulatory requirements where a collaborative effort with other agencies and organizations is proposed to implement the alternatives. Select the plan that provides the best overall balance to meet local needs and is cost effective, sustainable, engineeringly sound, and environmentally acceptable.

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NEAR TERM FOCUS FOR IMMEDIATE ACTION WORKGROUP

The Immediate Action Workgroup of the Governor's Executive Sub-cabinet on Climate Change was established to address known threats to communities caused by coastal erosion, thawing permafrost, flooding and fires.

Objective: Close a planning and execution gap identified by Governor Palin and Senator Stevens by creating a unifying mechanism to assist the communities of Newtok, Shishmaref, Kivalina, Unalakleet and Shaktoolik¹. These communities face imminent threats of loss of life, loss of infrastructure, loss of public and private property, or health epidemics as caused by coastal erosion, thawing permafrost and flooding.

Plan of Action: The Immediate Action Workgroup will do the following:

- Conduct Workgroup meetings involving community leaders from the threatened villages to build a common understanding of the relative risks in each community using the following four criteria which individually or collectively create an urgent situation:
 - Safety of life during a reasonably foreseeable storm or flood event;
 - Potential loss of infrastructure critical for community viability (school, fuel tanks, power plant, water / sewer provisions);
 - Health threats to the community as defined by CDC or the Health Department (disease, reoccurring illnesses, unusually high frequency of illnesses); and
 - Potential loss of 10% or more of residential dwellings.
- Prioritize projects or actions to mitigate the community's most urgent risks through protecting or relocating threatened buildings and structures, affecting an emergency evacuation plan, or to address present or imminent health threats.
- Prepare recommendations for an oversight planning body and its authorities to provide successful coordination between each of these communities and all appropriate state and federal agencies to ensure the successful completion of projects or other actions identified by this effort.
- If warranted, make recommendations on the scope of additional assessments of protective seawall designs for the purpose of examining whether particular engineering designs may be successful in 1) providing a time window of protection for a community so as to enable the community to develop a multi-year relocation plan; or 2) provide long term protection of the community such that a relocation may not be necessary in the foreseeable future.
- Identify and propose changes to laws and policies (state and federal) that currently impede the ability of agencies to timely execute appropriate actions necessary for imminent threat circumstances in these and other communities.

¹ The Workgroup has used the GAO 2004 report which identified 9 highly threatened communities (Shishmaref, Newtok, Kivalina, Koyukuk, Unalakleet, Barrow, Bethel, Kaktovik and Point Hope) for its November 6 meeting to further examine the nature of imminent threats. Based upon the November 6 meeting and a November 19 / 20 Roundtable meeting conducted by Senator Stevens, the Workgroup will focus its work with the communities of Shishmaref, Newtok, Kivalina, Unalakleet and Shaktoolik.

EXECUTIVE SUMMARY

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COMMUNITY PROFILES

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KIVALINA

Location and Climate

Kivalina is at the tip of an 8-mile barrier reef located between the Chukchi Sea and Kivalina River. It lies 80 air miles northwest of Kotzebue. The community lies at approximately 67.726940° North Latitude and -164.533330° (West) Longitude. (Sec. 21, T027N, R026W, Kateel River Meridian.) Kivalina is located in the Kotzebue Recording District. The area encompasses 1.9 sq. miles of land and 2.0 sq. miles of water. Kivalina lies in the transitional climate zone which is characterized by long, cold winters and cool summers. The average low temperature during January is -15; the average high during July is 57. Temperature extremes have been measured from -54 to 85. Snowfall averages 57 inches, with 8.6 inches of precipitation per year. The Chukchi Sea is ice-free and open to boat traffic from mid-June to the first of November.

History, Culture and Demographics

Kivalina has long been a stopping-off place for seasonal travelers between arctic coastal areas and Kotzebue Sound communities. It is the only village in the region where people hunt the bowhead whale. At one time, the village was located at the north end of the Kivalina Lagoon. It was reported as "Kivalinagmut" in 1847 by Lt. Zagoskin of the Russian Navy. Lt. G.M. Stoney of the U.S. Navy reported the village as "Kuveleek" in 1885. A post office was established in 1940. An airstrip was built in 1960. Kivalina incorporated as a City in 1969. During the 1970s, new houses, a new school and an electric system were constructed in the village. Prior to 1976, high school students from Noatak would attend school in Kivalina, and board with local families. Due to severe erosion and wind-driven ice damage, the City intends to relocate to a new site 7.5 miles away. Relocation alternatives have been studied and a new site has been designed and engineered. A federally-recognized tribe is located in the community -- the Native Village of Kivalina. The population of the community consists of 96.6% Alaska Native or part Native. Kivalina is a traditional Inupiat Eskimo village. Subsistence activities, including whaling, provide most food sources. The sale or importation of alcohol is banned in the village. During the 2000 U.S. Census, total housing units numbered 80, and vacant housing units numbered 2. U.S. Census data for Year 2000 showed 82 residents as employed. The unemployment rate at that time was 25.45 percent, although 65.11 percent of all adults were not in the work force. The median household income was \$30,833, per capita income was \$8,360, and 26.4 percent of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Wells have proven unsuccessful in Kivalina. Water is drawn from the Wulik River via a 3-mile surface transmission line, and is stored in a 700,000-gallon raw water tank. It is then treated and stored in a 500,000-gallon steel tank. Water is hauled by residents from this tank. One-third of residents have tanks which provide running water for the kitchen, but homes are not fully plumbed. The school and clinic have individual water and sewer systems. Residents haul their own honeybuckets to bunkers. A new landfill and honeybucket disposal site were recently completed. A Master Plan is underway to examine sanitation alternatives at the new community site. Electricity is provided by AVEC. There is one school located in the community, attended by 127 students. Local hospitals or health clinics include Kivalina Clinic (907-645-2141).

Kivalina is classified as an isolated village, it is found in EMS Region 4A in the Maniilaq Association Region. Emergency Services have coastal and air access. Emergency service is provided by volunteers and a health aide

Economy and Transportation

Kivalina's economy depends on subsistence practices. Seal, walrus, whale, salmon, whitefish and caribou are utilized. The school, City, Maniilaq Association, village council, airlines and local stores provide year-round jobs. The Red Dog Mine also offers some employment. Six residents hold commercial fishing

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permits. Native carvings and jewelry are produced from ivory and caribou hooves. The community is interested in developing an Arts and Crafts Center that could be readily moved to the new community site.

The major means of transportation into the community are plane and barge. The community needs a road to the proposed new community site, 7.5 miles away. A State-owned 3,000' long by 60' wide gravel airstrip serves daily flights from Kotzebue. Crowley Marine Services barges goods from Kotzebue during July and August. Small boats, ATVs and snowmachines are used for local travel. Two main hunting trails follow the Kivalina and Wulik Rivers.

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KOYUKUK

Location and Climate

Koyukuk is located on the Yukon River near the mouth of the Koyukuk River, 30 miles west of Galena and 290 air miles west of Fairbanks. It lies adjacent to the Koyukuk National Wildlife Refuge and the Innoko National Wildlife Refuge. The community lies at approximately 64.880930° North Latitude and -157.701030° (West) Longitude. (Sec. 17, T007S, R006E, Kateel River Meridian.) Koyukuk is located in the Nulato Recording District. The area encompasses 6.2 sq. miles of land and 0.1 sq. miles of water. The area experiences a cold, continental climate with extreme temperature differences. The average daily high temperature during July is in the low 70s; the average daily low temperature during January ranges from 10 to below zero. Sustained temperatures of -40 degrees are common during winter. Extreme temperatures have been measured from -64 to 92. Annual precipitation is 13 inches, with 60 inches of snowfall annually. The River is ice-free from mid-May through mid-October.

History, Culture and Demographics

The Koyukon Athabascans traditionally had spring, summer, fall, and winter camps, and moved as the wild game migrated. There were 12 summer fish camps located on the Yukon River between the Koyukuk River and the Nowitna River. Friendships and trading between the Koyukon and Inupiat Eskimos of the Kobuk area has occurred for generations. A Russian trading post was established at nearby Nulato in 1838. A smallpox epidemic, the first of several major epidemics, struck the Koyukon in 1839. A military telegraph line was constructed along the north side of the Yukon around 1867, and Koyukuk became the site of a telegraph station. A trading post opened around 1880, just before the gold rush of 1884-85. The population of Koyukuk at this time was approximately 150. Missionary activity was intense along the Yukon, and a Roman Catholic Mission and school opened downriver in Nulato in 1887. A post office operated from 1898 to 1900. Steamboats on the Yukon, which supplied gold prospectors, peaked in 1900 with 46 boats in operation. A measles epidemic and food shortages during 1900 tragically reduced the Native population by one-third. Gold seekers left the Yukon after 1906, but other mining activity, such as the Galena lead mines, began operating in 1919. The first school was constructed in 1939. After the school was built, families began to live at Koyukuk year-round. The City was incorporated in 1973. The community has experienced severe flooding from both the Yukon and Koyukuk Rivers, and residents want to relocate. A federally-recognized tribe is located in the community -- the Koyukuk Native Village. The population of the community consists of 91.1% Alaska Native or part Native. Residents are primarily Koyukon Athabascans with a subsistence lifestyle. During the 2000 U.S. Census, total housing units numbered 55, and vacant housing units numbered 16. Vacant housing units used only seasonally numbered 16. U.S. Census data for Year 2000 showed 40 residents as employed. The unemployment rate at that time was 23.08 %, although 41.18 % of all adults were not in the work force. The median household income was \$19,375, per capita income was \$11,342, and 35.11 percent of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

The City provides treated well water at the washeteria. Households are not plumbed, and residents use honeybuckets. The school and washeteria use City water, with sewage disposal into a lagoon. As of May 2003 seven households are on the flush/haul system. The landfill is newly-completed. Electricity is provided by City of Koyukuk. There is one school located in the community, attended by 22 students. Local hospitals or health clinics include Koyukuk Health Clinic. Koyukuk is classified as an isolated village, it is found in EMS Region 1C in the Central Region. Emergency Services have river and air access, and are within 30 minutes of a higher-level satellite health care facility. Emergency service is provided by volunteers and a health aide.

Economy and Transportation

There are few full-time jobs in the community; the city, tribe, clinic, school and store provide the only year-round employment. BLM fire fighting, construction work, and other seasonal jobs often conflict with subsistence opportunities. Two residents hold commercial fishing permits. Trapping and beadwork supplement incomes. Subsistence foods include salmon, whitefish, moose, waterfowl and berries.

The State-owned 2,645' long by 60' wide lighted gravel runway provides year-round transportation. The river is heavily traveled when ice-free, from mid-May through mid-October. Cargo is delivered by barge about four times each summer. Numerous local trails and winter trails to Chance and Nulato are used by residents. Snowmachines, ATVs and riverboats are used for local transportation.

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NEWTOK

Location and Climate

Newtok is on the Ninglick River north of Nelson Island in the Yukon-Kuskokwim Delta Region. It is 94 miles northwest of Bethel. The community lies at approximately 60.942780° North Latitude and - 164.629440° (West) Longitude. (Sec. 24, T010N, R087W, Seward Meridian.) Newtok is located in the Bethel Recording District. The area encompasses 1.0 sq. miles of land and 0.1 sq. miles of water. Newtok is located in a marine climate. Average precipitation is 17 inches, with annual snowfall of 22 inches. Summer temperatures range from 42 to 59, winter temperatures are 2 to 19.

History, Culture and Demographics

The people of Newtok share a heritage with Nelson Island communities; their ancestors have lived on the Bering Sea coast for at least 2,000 years. The people from the five villages are known as Qaluyaarmiut, or "dip net people." Only intermittent outside contact occurred until the 1920s. In the 1950s the Territorial Guard found volunteers from Newtok while they were traveling to Bethel. Tuberculosis was a major health problem during this period. In the late 1950s, the village was relocated from Old Kealavik ten miles away to its present location to escape flooding. A school was built in 1958, although high school students were required to travel to Bethel, St. Mary's, Sitka or Anchorage for their education. This was often their first exposure to the outside, and students returned with a good knowledge of the English language and culture. A high school was constructed in Newtok in the 1980s. A City was incorporated in 1976, but it was dissolved on Jan. 28, 1997. Due to severe erosion, the village wants to relocate to a new site called Taqikcaq, approximately 5 miles away on Nelson Island. In November 2003, the 108th Congress passed S. 924, allowing the village to relocate to Nelson Island, authorizing an exchange of lands between the U.S. Fish and Wildlife Service and the Newtok Native Corporation, allowing the relocation.

A federally-recognized tribe is located in the community -- the Newtok Village Council. The population of the community consists of 96.9% Alaska Native or part Native. Newtok is a traditional Yup'ik Eskimo village, with an active subsistence lifestyle. Relative isolation from outside influences has enabled the area to retain its traditions and customs; more so than other parts of Alaska. The sale or importation of alcohol is banned in the village. During the 2000 U.S. Census, total housing units numbered 67, and vacant housing units numbered 4. U.S. Census data for Year 2000 showed 101 residents as employed. The unemployment rate at that time was 24.63 percent, although 52.13 percent of all adults were not in the work force. The median household income was \$32,188, per capita income was \$9,514, and 30.99 percent of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Water is pumped from a lake into a water treatment plant, then hauled from a storage tank. In winter, melted ice is used when water in the storage tank runs dry or freezes. Households are not plumbed, and honeybuckets are used. A washeteria is available. The health clinic uses flush/haul tanks and the schools have individual wells. Refuse collection is provided, and a new landfill has been completed, but DOT has determined that it is too close to the airport. The community wants to relocate and rebuild facilities on Nelson Island. A community Master Plan is being developed. Electricity is provided by Unqusrag Power Company. There is one school located in the community, attended by 107 students. Local hospitals or health clinics include Newtok Health Clinic. Newtok is classified as an isolated village, it is found in EMS Region 7A in the Yukon/Kuskokwim Region. Emergency Services have coastal and air access. Emergency service is provided by a health aide.

Economy and Transportation

The school, clinic, village services, and commercial fishing provide employment. Subsistence activities and trapping supplement income. Twenty-seven residents hold commercial fishing permits. A State-owned 2,202' long by 35' wide gravel airstrip provides chartered or private air access year-round; major improvements are under construction. A seaplane base is also available. Boats, skiffs and snowmachines are used for local transportation and subsistence activities. Winter trails are marked to Chevak (50 mi.), Tununak, Toksook Bay, Nightmute and Manaryarapiaq (33.8 mi.) Barges deliver cargo during the summer months.

SHAKTOOLIK

Location and Climate

Shaktoolik is located on the east shore of Norton Sound. It lies 125 miles east of Nome and 33 miles north of Unalakleet. The community lies at approximately 64.333890° North Latitude and -161.153890° (West) Longitude. (Sec. 23, T013S, R013W, Kateel River Meridian.) Shaktoolik is located in the Cape Nome Recording District. The area encompasses 1.1 sq. miles of land and 0.0 sq. miles of water. Shaktoolik has a subarctic climate with maritime influences when Norton Sound is ice-free, usually from May to October. Summer temperatures average 47 to 62; winter temperatures average -4 to 11. Extremes from -50 to 87 have been recorded. Average annual precipitation is 14 inches, including 43 inches of snowfall.

History, Culture and Demographics

Shaktoolik was the first and southernmost Malemiut settlement on Norton Sound, occupied as early as 1839. Twelve miles northeast, on Cape Denbigh, is "Iyatayet," a site that is 6,000 to 8,000 years old. Reindeer herds were managed in the Shaktoolik area around 1905. The village was originally located six miles up the Shaktoolik River, and moved to the mouth of the River in 1933. This site was prone to severe storms and winds, however, and the village relocated to its present, more sheltered location in 1967. The City was incorporated in 1969.

A federally-recognized tribe is located in the community -- the Native Village of Shaktoolik. The population of the community consists of 94.8% Alaska Native or part Native. It is a Malemiut Eskimo village with a fishing and subsistence lifestyle. The sale or importation of alcohol is banned in the village. During the 2000 U.S. Census, total housing units numbered 66, and vacant housing units numbered 6. Vacant housing units used only seasonally numbered 1. U.S. Census data for Year 2000 showed 68 residents as employed. The unemployment rate at that time was 27.66 percent, although 56.69 percent of all adults were not in the work force. The median household income was \$31,875, per capita income was \$10,491, and 6.09 percent of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Water is pumped three miles from the Togoomenik River to the pumphouse, where it is treated and stored in a 848,000-gallon insulated tank adjacent to the washeteria. A piped water and sewage collection system serves most homes. Seventy-five percent of households have complete plumbing and kitchen facilities. The school is connected to City water, and has received funding to develop a sewage treatment system to serve the entire community. The City burns refuse in an incinerator. The landfill needs to be relocated; the current site is not permitted. Electricity is provided by AVEC. There is one school located in the community, attended by 57 students. Local hospitals or health clinics include Shaktoolik Clinic. Shaktoolik is classified as an isolated village, it is found in EMS Region 5A in the Norton Sound Region. Emergency Services have coastal and air access. Emergency service is provided by a health aide.

Economy and Transportation

The Shaktoolik economy is based on subsistence, supplemented by part-time wage earnings. Thirty-three residents hold commercial fishing permits. Development of a new fish processing facility is a village priority. Reindeer herding also provides income and meat. Fish, crab, moose, beluga whale, caribou, seal, rabbit, geese, cranes, ducks, ptarmigan, berries, greens and roots are also primary food sources.

Shaktoolik is primarily accessible by air and sea. A State-owned 4,000' long by 75' wide gravel airstrip is available. The Alex Sookiayak Memorial Airstrip allows for regular service from Nome. Summer travel is by 4-wheel ATV, motorbike, truck and boat; winter travel is by snowmachine and dog team. Cargo is barged to Nome, then lightered to shore. The community has no docking facilities.

SHISHMAREF

Location and Climate

Shishmaref is located on Sarichef Island, in the Chukchi Sea, just north of Bering Strait. Shishmaref is five miles from the mainland, 126 miles north of Nome and 100 miles southwest of Kotzebue. The village is surrounded by the 2.6 million-acre Bering Land Bridge National Reserve. It is part of the Beringian National Heritage Park, endorsed by Presidents Bush and Gorbachev in 1990. The community lies at approximately 66.256670° North Latitude and -166.071940° (West) Longitude. (Sec. 23, T010N, R035W, Kateel River Meridian.) Shishmaref is located in the Cape Nome Recording District. The area encompasses 2.8 sq. miles of land and 4.5 sq. miles of water. The area experiences a transitional climate between the frozen arctic and the continental Interior. Summers can be foggy, with average temperatures ranging from 47 to 54; winter temperatures average -12 to 2. Average annual precipitation is about 8 inches, including 33 inches of snow. The Chukchi Sea is frozen from mid-November through mid-June.

History, Culture and Demographics

The original Eskimo name for the island is "Kigiktaq." In 1816, Lt. Otto Von Kotzebue named the inlet "Shishmarev," after a member of his crew. Excavations at "Keekiktuk" by archaeologists around 1821 provided evidence of Eskimo habitation from several centuries ago. Shishmaref has an excellent harbor, and around 1900 it became a supply center for gold mining activities to the south. The village was named after the Inlet and a post office was established in 1901. The City government was incorporated in 1969. During October 1997, a severe storm eroded over 30 feet of the north shore, requiring 14 homes and the National Guard Armory to be relocated. Five additional homes were relocated in 2002. Other storms have continued to erode the shoreline, an average of 3 to 5 feet per year on the north shore. In July 2002, residents voted to relocate the community.

A federally-recognized tribe is located in the community -- the Native Village of Shishmaref. The population of the community consists of 94.5% Alaska Native or part Native. It is a traditional Inupiat Eskimo village with a fishing and subsistence lifestyle. The sale or importation of alcohol is banned. During the 2000 U.S. Census, total housing units numbered 148, and vacant housing units numbered 6. Vacant housing units used only seasonally numbered 4. U.S. Census data for Year 2000 showed 173 residents as employed. The unemployment rate at that time was 16.43%, although 51.81% of all adults were not in the work force. The median household income was \$30,714, per capita income was \$10,487, and 16.27% of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Water is derived from a surface source, is treated and stored in a new tank. Shishmaref is undergoing major improvements, with the construction of a flush/haul system and household plumbing. Nineteen HUD homes have been completed, and 71 homes remain to be served. The new system provides water delivery, but the unserved homes continue to haul water. Honeybuckets and the new flush tanks are hauled by the City. The school, clinic, Friendship Center, City Hall and fire hall are connected to a sewage lagoon. A new landfill is planned for the City; an access road is under construction. Electricity is provided by AVEC. There is one school located in the community, attended by 173 students. Local hospitals or health clinics include Katherine Miksrvaq Olanna Health Clinic. The clinic is a qualified Emergency Care Center. Shishmaref is classified as an isolated village, it is found in EMS Region 5A in the Norton Sound Region. Emergency Services have coastal and air access. Emergency service is provided by a health aide. Auxiliary health care is provided by the City Volunteer Fire Department/Emergency Services.

Economy and Transportation

The Shishmaref economy is based on subsistence supplemented by part-time wage earnings. Two residents hold a commercial fishing permit. Year-round jobs are limited. Villagers rely on fish, walrus, seal, polar bear, rabbit, and other subsistence foods. Two reindeer herds are managed from here. Reindeer skins are tanned locally, and meat is available at the village store. The Friendship Center, a cultural center and carving facility, was recently completed for local artisans.

Shishmaref's primary link to the rest of Alaska is by air. A State-owned 5,000' long by 70' wide paved runway is available. Charter and freight services are available from Nome. Most people own boats for trips to the mainland.

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UNALAKLEET

Location and Climate

Unalakleet is located on Norton Sound at the mouth of the Unalakleet River, 148 miles southeast of Nome and 395 miles northwest of Anchorage. The community lies at approximately 63.873060° North Latitude and -160.788060° (West) Longitude. (Sec. 03, T019S, R011W, Kateel River Meridian.) Unalakleet is located in the Cape Nome Recording District. The area encompasses 2.9 sq. miles of land and 2.3 sq. miles of water. Unalakleet has a subarctic climate with considerable maritime influences when Norton Sound is ice-free, usually from May to October. Winters are cold and dry. Average summer temperatures range 47 to 62; winter temperatures average -4 to 11. Extremes have been measured from -50 to 87. Precipitation averages 14 inches annually, with 41 inches of snow.

History, Culture and Demographics

Archaeologists have dated house remnants along the beach ridge from 200 B.C. to 300 A.D. The name Unalakleet means "from the southern side." Unalakleet has long been a major trade center as the terminus for the Kaltag Portage, an important winter travel route connecting to the Yukon River. Indians on the upper river were considered "professional" traders who had a monopoly on the Indian-Eskimo trade across the Kaltag Portage. The Russian-American Company built a post here in the 1830s. In 1898, reindeer herders from Lapland were brought to Unalakleet to establish sound herding practices. In 1901, the Army Signal Corps built over 605 miles of telegraph line from St. Michael to Unalakleet, over the Portage to Kaltag and Fort Gibbon. The City was incorporated in 1974.

A federally-recognized tribe is located in the community -- the Native Village of Unalakleet. The population of the community consists of 87.7% Alaska Native or part Native. Unalakleet has a history of diverse cultures and trade activity. The local economy is the most active in Norton Sound, along with a traditional Unaligmiut Eskimo subsistence lifestyle. Fish, seal, caribou, moose and bear are utilized. The sale of alcohol is prohibited in the community, although importation and possession are allowed. During the 2000 U.S. Census, total housing units numbered 242, and vacant housing units numbered 18. Vacant housing units used only seasonally numbered 6. U.S. Census data for Year 2000 showed 258 residents as employed. The unemployment rate at that time was 14.57 percent, although 48.61 percent of all adults were not in the work force. The median household income was \$42,083, per capita income was \$15,845, and 11.04 percent of residents were living below the poverty level.

Facilities, Utilities, Schools and Health Care

Water is derived from an infiltration gallery on Powers Creek, is treated and stored in a million-gallon steel tank. The water source is not sufficient during extremely cold weather, and a feasibility study is underway. One hundred ninety households are connected to the piped water and sewer system and have complete plumbing. Only two households haul water and honeybuckets. Residents haul refuse to the baler facility for transportation to the landfill. Refuse collection is available for commercial customers. Matanuska Electric Association owns and operates the electrical system in Unalakleet, through the Unalakleet Valley Electric Cooperative. Electricity is provided by Unalakleet Valley Electric Cooperative. There is one school located in the community, attended by 210 students. Local hospitals or health clinics include Euksavik Clinic. The clinic is a qualified Emergency Care Center. Unalakleet is classified as an isolated town/Sub-Regional Center, it is found in EMS Region 5A in the Norton Sound Region. Emergency Services have river and air access. Emergency service is provided by volunteers and a health aide.

Economy and Transportation

Both commercial fishing for herring, herring roe and subsistence activities are major components of Unalakleet's economy. One hundred nine residents hold commercial fishing permits. Norton Sound Economic Development Council operates a fish processing plant. Government and school positions are relatively numerous. Tourism is becoming increasingly important; there is world-class silver fishing in the area.

Unalakleet has a State-owned 6,004' long by 150' wide gravel runway which recently underwent major improvements; and a gravel strip that is 2,000' long and 80' wide. There are regular flights to Anchorage. Cargo is lightered from Nome; there is a dock. Local overland travel is mainly by ATVs, snowmachines and dogsleds in winter.

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IMMEDIATE ACTIONS FOR COMMUNITIES (MATRICES)

(3/4/08 DRAFT – SEE SEPARATE DOCUMENTS/ELECTRONIC FILES)

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RECOMMENDATIONS ON POLICY AND RESEARCH

(3/4/08 DRAFT – SEE SEPARATE DOCUMENT/ELECTRONIC FILE)

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APPENDIX A

IAW Members and Community Participants

IAW Members

Mike Black, Co-Chair (DCCED)
Trish Opheen Co-Chair (USACE)
Luke Hopkins (AML)
Bob Pawlowski (AFDF– Legislative Climate Change Representative)
John Madden (MVA)
Chris Maish (DNR)
Mike Coffee (DOT/PF)
George Canelos (Denali Commission)

Community Participants

Stanley Tom, Newtok Co-Chair Relocation Committee
David Albert, Newtok IGAP Coordinator

Enoch Adams, Kivalina – Northwest Arctic Borough
Janet Mitchell, City of Kivalina
Colleen Swan, Tribal Village of Kivalina
Bobby Schaefer, Northwest Arctic Borough

Frank Myomick, St Michaels –Kawarek Transporation Planner

Tony Weyionanna Sr., Shishmaref, Co-Chair Relocation Committee
Stanley Taktoo
Howard Weyionanna
Lucy Eningowuk COUNCIL FOLKS?
Johnson Eningowuk
Darleen Turner

Cindy Pilot, Tribal Administrator Koyukuk
Steve Ivanoff, Kawarek Transporation Planner
Simon Bekoalok, Shaktoolik Tribal President
Eugene Asicksik, former Mayor Shaktoolik
Rhonda Asicksik, resident Shaktoolik
Robert Keith, Coastal Villages Region Fund

Public and Agency Participants

Tom Chapple – DEC Air Quality Director
Kolena Momberger - DEC
Sally Russell-Cox – DCCED
Taunnie Boothby – DCCED/DCRA
Allison Butler (UAF-PhD Student)
Jamilia George – DCCED/Denali Commission
Elizabeth Marino (UAF-PhD Student)
George Coyle (DHS& EM)
Jeff Malcolm (USGAO)
David Kang (DHS & EM)

Robin Bronen (UAF-PhD Student)
John Woodward
Krag Johnsen (Denali Commission)
Larry Hartig (Chair of Sub-Cabinet-DEC)
Dave Andrews (DHS & EM)
Carl Borash (USACE)
Rod Combellick (DNR)
Rebecca Schaeffer (HDR)
Peter Briggs (Corvus Design)
Victoria Hykes
Christy Miller Tetra Tech
Judy Gottlieb (NPS)

Facilitator

Margaret (Meg) King (UAA)

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APPENDIX B

IAW Meeting Schedule and Proposed Agenda Items

January 8, 2008

- Review Immediate Actions by each Community
- Identify IAW Tasks to Accomplish and Timeline

January 18 , 2008

- Update on Next Steps from Jan 8th Meeting (Co-Chairs)
- Briefing on Existing Mitigation Programs and How to Use Them
(John Madden, Director Division of Homeland Security and Emergency Management)
Summary of State Disasters Over Past 30 Years
(John Madden, Director Division of Homeland Security and Emergency Management)
- Current and Proposed Projects Status Overview on Communities Reviewed in the GAO report and for Kivalina, Shishmaref, Shaktoolik, Unalakleet, Newtok, and Koyukuk (Patricia Opheen, Chief, Engineering Division, Alaska - US Army Corps of Engineers)
- Relocating Communities in a Sustainable Way (Allison Butler, UAF PhD Candidate)
 - Identify other communities around the world, Characteristics of relocating sustainably - making communities more self sufficient, etc.
- Discussion on type of information needed for each of the Immediate Action projects:
 - What are the key “ingredients” to detail recommendations (recipe) on what will make projects successful,
 - What needs to be done for each project,
 - What should be done in the near term (now – 18months),
 - What resources are needed,
 - Identify resources

January 31, 2008

- Review Proposed Immediate Action Projects from each Community
- IAW Members Agree/Determine which proposed Immediate Action Projects will be advanced for recommendation
- Identify specifics about each Immediate Action Project
 - What’s needed for each project/create “recipe”
 - Identify approach for each immediate action project
 - Identify critical path for each
- Identify tasks and needed policies to create “recipes”

February 12, 2008

- Review with each community proposed immediate actions and projects and revise as needed

February 19, 2008

- Review and revise policy and research recommendations developed from earlier IAW meetings and discussions

March 4, 2008

- Review first draft of IAW Recommendations Report
 - Refine/Approve Immediate Community Actions and Projects
 - Review and Refine Policy and Research Recommendations
 - Report Out from Alaska Legislative Special Committee on Climate Change
(Robert Pawlowski, Legislative Committee Member – if report available)

March 20, 2008

- IAW Recommendations Briefing to Commissioner Hartig, Chair Governor's Sub-Cabinet on Climate Change

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