



## APPENDIX 5: OTHER MAPPING, RISK ASSESSMENT AND RESILIENCE PLANNING RESOURCES IN ALASKA

### MAPPING EFFORTS

#### DCRA Community Profile Maps



Maps are a critical tool for developing community plans, planning infrastructure projects, and clarifying land title challenges that may impede economic development projects. In the late 1970's and early 1980's, DCRA community profiles were well-known and widely used. In many communities, they are still the most recent map.

Around 2001-2002, as discussions took place among representatives of state and federal agencies as part of the Denali Commission's governmental coordination

efforts, it was recognized: 1) well-planned infrastructure projects require “*current, complete, and accurate community maps*”; and 2) a considerable amount of money was being spent on mapping on a project-specific basis, with the resulting maps in some cases not licensed for other uses, not available to the public, or not covering a large enough area to be useful for other projects.

It was also recognized small and rural communities in the unorganized borough generally lack the financial capital and the technical expertise to develop new maps on their own. The IAID (Initiative for Accelerated Infrastructure Development) program was designed to provide technical assistance and matching funds to local partners for projects to develop new maps for groups of six to twelve communities. IAID recognizes the development of community profile maps need not create a new government program; rather, the mapping program should result from federal, state, regional and local government coordination. Consequently, agencies worked together to develop a set of mapping standards that would serve the needs of multiple users.

DCRA staff provides technical assistance to local partners in planning projects, in preparing an RFP and evaluating proposals to ensure the local partner is entering into a contract that will provide the desired products, and in monitoring the contractor's performance. The Denali Commission, Alaska Department of Transportation and Public Facilities, United States Department of Agriculture - Rural Development, and Alaska Department of Commerce, Community, and Economic Development have provided funds for matching grants to the local partners, to cover approximately half the cost of the mapping contract. By 2002, it was estimated that about 200 target communities needed comprehensive land use maps,



including incorporated and unincorporated communities. “Target community” was defined as a community with less than 1,500 in population and not in a borough with mapping capability. The objective of the program was to map communities that would otherwise have a very difficult time getting the funding for a community map. More recently, communities within rural boroughs have been mapped.

Community profile maps are based on rectified digital aerial photography, and display such mapping attributes as topography at two foot contour intervals, property boundaries, utilities, public and private improvements, easements, and additional land use information. They 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.

To date, every census area within Alaska’s Unorganized Borough has been mapped, with some or all communities receiving maps within these areas. In addition, a large number of the communities within Alaska’s rural boroughs have been mapped. Table 20, below, provides some examples of the partners that have funded Community Profile Maps.

The maps are available online in an interactive format at <http://dced.maps.arcgis.com/home/index.html>

**Table 20: Examples of Community Profile Mapping Partners**

Program Partner	Partner	Percent	Cumulative Percent
No Community Profile Mapping	70	43%	43%
Aleutian/Pribilof Islands Association	3	2%	45%
Aleutians East Borough	5	3%	48%
Association of Village Council Presidents	7	3%	52%
Bristol Bay Native Association	6	4%	56%
Coastal Villages Region Fund	11	8%	63%
Interior Region Housing Authority*	15	9%	72%
Kawerak, Inc.	15	9%	81%
Kodiak Island Housing Authority	5	3%	84%
Lake and Peninsula Borough	6	4%	88%
Tlingit-Haida Regional Housing Authority	10	6%	94%
Yukon Delta Fisheries Development Association	10	6%	100%
<b>Total</b>	<b>163</b>	<b>100%</b>	



## **MAPPING PROJECTS FUNDED THROUGH THE COASTAL IMPACT ASSISTANCE PROGRAM**

The Coastal Impact Assistance Program (CIAP) was authorized by the Energy Policy Act of 2005 (Public Law 109-58). Section 384 of the Act authorizes funds to be distributed to Outer Continental Shelf (OCS) oil and gas producing states to mitigate the impacts of OCS oil and gas activities.

Alaska was one of six states eligible to receive CIAP funding. Of the \$79,407,444 in CIAP funds allocated to Alaska, 65% of the total allocation went to the State of Alaska, and the remaining 35% went to Coastal Political Subdivisions (CPS) of the State, boroughs located within 200 nautical miles of OCS activity. There are eight CPSs in Alaska, six which participate in the NFIP: Municipality of Anchorage, Bristol Bay Borough, Kenai Peninsula borough, Kodiak Island Borough, Lake and Peninsula Borough, Matanuska-Susitna Borough, North Slope Borough, and Northwest Arctic Borough.

A number of mapping projects were conducted using Alaska's CIAP funds. Many of these projects have the potential to interface with FEMA Risk MAP projects and products:

### ***Aerial Photography/Satellite Imagery of the Kenai Peninsula Borough***

This project resulted in high-resolution satellite imagery and digital maps of the Kenai Peninsula Borough coastline up to 1,000 ft. elevation. The imagery was combined with base map data, elevation models, and other existing data layers to produce maps on paper and has been posted on the Kenai Peninsula Borough's Internet map service. Map data is accessible to everyone via the Web. Paper maps have been made available upon request to the public and other governmental agencies. Raw image data is available to contributing participants named in the contract for image acquisition. New image data has proven to be a good fit for the recently acquired LIDAR elevation model. New imagery is useful for other purposes, such as for updating the Borough's Emergency Services Map Books.

### ***Floodplain Development Survey Benchmarks – Kenai Peninsula Borough***

This project identified areas in which additional care must be taken in the placement of structures to avoid potential damage to habitat. Flood prone areas along the Anchor River and the portion of the Kenai River within the Cooper Landing area were surveyed and nine permanent vertical control survey benchmark stations with detailed location descriptions were physically placed for each of the identified project areas.



### ***Stream Channel and Elevation Modeling in the Seward Bear Creek Flood Service Area***

This project acquired tools and data and developed modeling of stream channels, channel migration zones, flood prone infrastructure, natural features and base elevations within certain watershed sections of the Seward Bear Creek Flood Service Area (SBCFSA). The project communicates risk and landscape evolution (Geomorphology) beyond a simple one-dimensional flood model used by FEMA's National Flood Insurance Program. To accomplish this, channel migration zones within the SBCFSA were identified. Flood prone infrastructure was documented and Bed Load Transport was quantified in relation to Flood Flow. Using the high resolution topographic data, various stages of flood flow have been incorporated into the various high resolution topographic datasets and illustrate channel and flood changes over time to the decision makers and the general public. The following was accomplished through this project:

- 32 square miles of LiDAR derived digital elevation modeling and digital terrain modeling for use and analysis through GIS and modeling software.
- Stream Channel Change Detection Illustrate channel and flood changes over time on 5 streams and 20 miles of channel in the study area.
- Acquisition of a digital photometric system to allow for in-house analysis of stream channels pre and post flood events.
- Analysis of existing paired ortho-photography of stream channels pre-1985, post-1985 and post 1996 flood events.

### ***Protecting Flood Prone Alluvial Areas in the Seward Bear Creek Flood Service Area***

This project provides the preliminary scoping and feasibility study for determining the development potential of a 900-acre upland feature that is considered one of the most likely areas to support relocation of existing human activities occurring in flood prone alluvial and wetland areas around Seward. The study project pays special attention to the positive impact of removing septic systems from the floodways and floodplains to mitigate damage to salmon habitat. Removal/ relocation of private development from the alluvium allows for improved watershed management and reclamation of coastal areas. This project explored the suitability of Blueberry Hill to accept a shift of private development out of the alluvium.

The project considered potential primary access, secondary routes, community water & sewer systems, and development density in relation to localized topography, soils, bed rock, and natural hazards. Analyses of secondary considerations such as available borrow types and permitting requirements was included in the project.



### ***Ortho-rectified Imagery and LiDAR of the Matanuska-Susitna Borough Coastal***

CIAP funds were used to cover the costs of acquisition of high quality 1-meter, or better, pixel resolution ortho-rectified imagery and/or LiDAR elevation data of the higher developed regions of the coastal zone within the Matanuska-Susitna Borough. Approximately 1510 square miles were covered through CIAP funds. Additional funding from the Matanuska-Susitna Borough, the U.S. Geological Survey, the U.S. Army Corps of Engineers (an additional \$1.8 million in funding) was allocated to the project, which amounts to about 2770 square miles of coverage.

### ***City and Borough of Juneau Habitat Mapping and Analysis Project***

The City and Borough of Juneau (CBJ) acquired natural color and infrared aerial photography to map streams and wetlands in areas with the highest potential for development. A combination of color and infrared aerial photography was the most efficient way to acquire information on wetlands and streams over large areas, and to map these areas at the level of individual property boundaries. In Phase Two, the wetland and stream mapping efforts utilized separate methods to address the specific issues associated with each habitat type.

- **Stream mapping:** For the stream mapping effort, CBJ staff worked closely with the Alaska Department of Fish and Game (ADF&G) to mark the salmon-bearing limits of these streams to determine exactly where the 50-foot no-development setback applies. ADF&G has formally supported this project. The CBJ worked through the formal approval process with the local Planning Commission and Assembly to adopt these new maps into the CBJ Land Use Code. This is an essential step to ensure that the stream maps may be legally used for enforcement of the setback.
  
- **Wetland mapping:** For the wetland mapping effort, CBJ, in cooperation with an inter-agency task force, determined the most appropriate methodology for wetland scientific analysis. This is an important step because in order for the project to be acceptable to permitting agencies it must be valid according to current science. After the methodology was determined, CBJ hired a consultant to do extensive, “on-the-ground” field analysis of the wetland parcels identified through aerial photography to determine the specific functions of identified wetland units. This functional analysis was used to rank high-value (Category A and B) and low-value (Category C and D) wetlands. This followed the highly-regarded categorization approach used in the original 1992 management plan. CBJ worked through the formal approval process with the Planning Commission and Assembly to adopt these wetland maps with categories and supporting functional analysis into the CBJ Land Use Code, as with the stream maps.



### ***Kodiak Island Borough Mapping of Coastal and Marine Resources:***

This project accomplished the following:

- Maps were converted in the revised Kodiak Island Borough Coastal Management Plan into shape files, which were added to the borough's GIS and subsequently published online along with the narrative plan information.
- A large format borough wide map was created for public display at borough offices. The maps include coastal resource information on all communities and shoreline areas of the borough.
- A large format color map was created for each one of the five incorporated communities within the Kodiak Island Borough for display at the city hall of each respective community.
- Coastal and marine resources were integrated as a layer of information contained in the KIB GIS, which made the information available to the public via the Internet through the borough's web pages.

### ***ShoreZone Mapping Project***

ShoreZone is a coastal habitat mapping and classification system in which georeferenced aerial imagery is collected specifically for the interpretation and integration of geological and biological features of the intertidal zone and nearshore environment.

In this project, research was conducted on biological resources and geological features of the Alaska shoreline using the ShoreZone Inventory methodology pioneered by Coastal and Ocean Resources, Inc. (CORI), of Sidney, British Columbia. ShoreZone inventory of a designated shoreline is conducted in two phases:

- The first phase, imaging, involved aircraft and on-board science crew and was conducted in a very brief window of time determined by hours of daylight, tide cycle, and weather.
- The second phase, interpretation (the mapping component, with associated production of spatial and other data) was conducted over a period of months.

To date, approximately 50% of the 44,500 miles of Alaskan coastline has been flown and imaged. The ultimate goal is to develop ShoreZone imagery and mapping of the entire Alaska coastline. CIAP funding was used to image and map at least 8,000 kilometers (km) of coastline not yet completed.

Research and practical applications of ShoreZone coastal mapping data and imagery include: natural resource planning and environmental hazard mitigation (e.g. by resource managers in evaluating project impacts); linking habitat use and life history strategy of nearshore fish and other intertidal organisms; habitat capability modeling (e.g. predicting the spread of invasive species); providing regional framework for site-specific shore station surveys; and public use for recreation, education, and outreach, and as a tool for developers during the project planning phase.

Other applications include using ShoreZone to model areas sensitive to climate change, and as a tool to support future oil remediation efforts and oil spill response planning, as well as restoration activities, such as possible herring intervention programs like moving spawn to rearing areas.



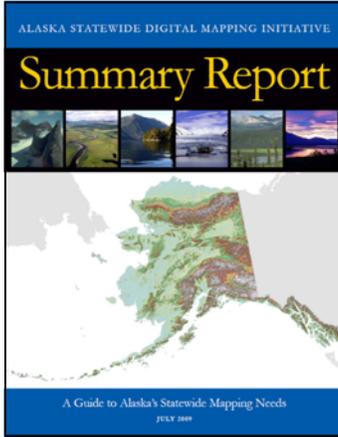
### ***Geohazard Evaluation and Geologic Mapping for Coastal Communities***

The Division of Geological & Geophysical Surveys (DGGS) collected the necessary field data to produce and publish surficial and engineering-geologic/hazards maps of Alaskan coastal communities, prioritized in consultation with the Alaska Division of Community and Regional Affairs, Alaska Coastal Management Program staff, the U.S. Army Corps of Engineers (COE), the Denali Commission, and affected coastal districts. The maps identified local natural hazards that must be considered in the siting, design, construction, and operations of development projects to ensure protection of the coastal area.

Mapping was completed at local and/or regional scales needed to address specific local problems and to understand and evaluate the larger geologic context of the area. The engineering-geologic/hazards maps were published in GIS format with standard metadata and will delineate areas where natural hazards such as erosion, slope instability, active faults, flooding, and earthquake effects should be considered at a more detailed level to fully evaluate construction risk and to ensure that the coastal areas are not damaged by planned and proposed development. Project work was coordinated with current U.S. Geological Survey coastal studies to ensure there is no duplication of effort.

### ***Community Mapping for Southeast Alaska***

Through this project, DCRA provided community profile maps for small coastal communities in southeast Alaska that have not had new maps in more than twenty years. The following communities are anticipated to be included in this project: Tenakee Springs, Pelican, Gustavus, Port Protection, Whale Pass, Naukati Bay, Hollis, Coffman Cove, Thorne Bay, Hyder, Metlakatla, and Port Alexander.



### ALASKA STATEWIDE DIGITAL MAPPING INITIATIVE

The primary goal of the Alaska Statewide Digital Mapping Initiative (SDMI) is to acquire new and better maps statewide for Alaska and to make existing map products more easily available.

Alaska is the last state in the union to procure a modern statewide digital base map system of uniform resolution and accuracy in both a geographic and procedural context that offers contiguous statewide coverage. Such a map would support data sharing and the accurate analysis of the data thereby promoting intelligent resource allocations and planning for the benefit of all Alaskans. In limited stove-piped departmental roles Alaska has demonstrated it can deploy advanced Geospatial Information

Systems (GIS). However, it is the undeniable absence of a useful statewide base map that inhibits Alaska's full migration to a more efficient and cost effective method of business. The fact is: Alaska has realized a small fraction of its potential efficiencies and cost savings in this regard. Often times, geospatial data is acquired and utilized on a project driven, departmentally specific basis, which does not benefit the much broader user group. Currently, data exists in departmental silos and is often duplicated and when shared among users it is done so on a limited basis. Therefore, users often end up repurchasing and recreating similar data needs. Furthermore, value added products and services that could and should be derived from a single source statewide base map in a digital or paper context are not produced and their constructive effects upon governmental efficiency and public safety go largely unrealized.

Alaska does not have an adequate digital base map. The SDMI seeks to remedy this situation. The SDMI program will ultimately provide an accurate, current, seamless, statewide base map, made available over the internet, through open standards, free of charge to all. The target basemap is a statewide ortho-image, controlled by an appropriately scaled elevation model and ground control as required.

The SDMI's activities include: planning, public access, data acquisition and stakeholder relations. The SDMI is a cooperative state program endorsed by the Governor and implemented by the University of Alaska (UA) and State of Alaska Departments of Natural Resources (DNR); Military and Veteran's Affairs (DMVA); Public Transportation and Public Facility (DOTPF); Environmental Conservation (DEC); Fish and Game (DFG); and Commerce, Community, and Economic Development (DCCED).

The SDMI works in partnership with Federal, local, industry and non-profit partners. To date, that partnership has come primarily in the form of the contribution of imagery and elevation data for



Alaska valued at more than \$10 million. Please see the list of data contributors for a more detailed look at our generous partners.

The SDMI has engaged stakeholders extensively. A comprehensive user survey was executed in 200X with very broad community participation. Two, multi-day workshops were attended by a diverse and representative group of stakeholders. More details can be found at these event and documents pages:

- User Survey (180+ respondents)
- Alaska DEM Workshop (100+ attendees)
- Alaska Ortho-Imagery Workshop (60+ attendees)
- SDMI Planning Activities

The SDMI hired a consulting team from HDR Alaska, Inc and I-cubed to perform planning activities to inform Alaska statewide mapping. Their analysis resulted in publication of the following reports:

- User Survey Report
- Ground Control Report
- Existing High-Resolution Imagery and DEM data for Alaska Report
- Final Summary Recommendations Report

## GRAVITY FOR THE REDEFINITION OF THE AMERICAN VERTICAL DATUM (GRAV-D)

GRAV-D is a proposal by the National Geodetic Survey to re-define the vertical datum of the US by 2021. The gravity-based vertical datum resulting from this project will be accurate at the 2 cm level for much of the country. The proposal is official policy for NGS and is included in the NGS 10 year plan. The project is currently underway and actively collecting gravity data across the United States and its holdings.

The GRAV-D project consists of three major efforts:

**A high-resolution "snapshot" of gravity in the US:** This is a predominantly airborne campaign, to be accomplished around 2017 and at a cost of ~39 Million dollars. The highest priority targets are: Alaska, Puerto Rico and the Virgin Islands, the Gulf Coast, the Great Lakes, and Hawaii (some portions of which have already been completed). The coastline of the continental US and the American island holdings are also of high priority.

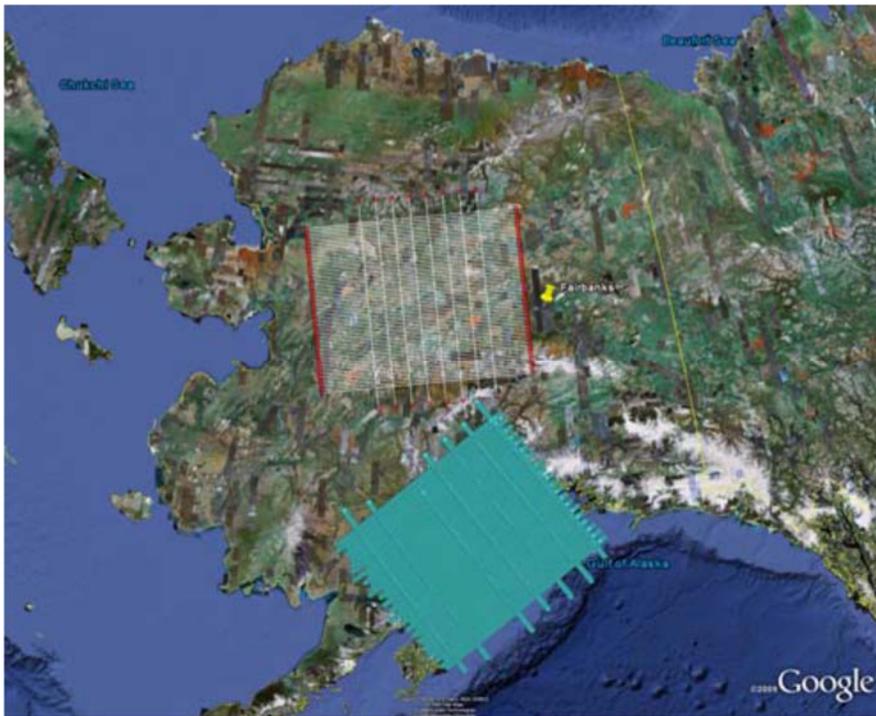
**A low-resolution "movie" of gravity changes:** This is primarily a terrestrial campaign and will mostly encompass episodic re-visits of absolute gravity sites, attempting to monitor geographically dependent changes to gravity over time. This will allow time dependent geoid modeling and thus time dependent orthometric height monitoring through GNSS technology.



Regional partnership surveys: NGS seeks to collaborate with local (governmental, commercial, and academic) partners throughout the GRAV-D project. Partners that are willing to support airborne or terrestrial surveys or to monitor local variations in the gravity field are a critical component of GRAV-D.

NGS Gravity for the Redefinition of the American Vertical Datum (GRAV-D) airborne team transitioned to Anchorage, AK from Fairbanks for its final week (ending November 15) for the 2010 calendar year. The Department of the Interiors Bureau of Land Management aircraft employed by the team was in scheduled maintenance in Anchorage, and by moving operations to Anchorage; NGS was able to capitalize on additional flight days. After New Years, the GRAV-D team will continue operations in January and February from McClellan Field in Sacramento, CA with survey work in central and northern California until Alaska warms up sufficiently to resume the GRAV-D airborne effort there.

**Figure 8: GRAV-D Surveys Flown in Alaska**





## HAZARD ASSESSMENT IN ALASKA

### *Alaska Baseline Erosion Assessment*

The U.S. Army Corps of Engineers, Alaska District (USACE), conducted a Baseline Erosion Assessment (BEA) to coordinate, plan, and prioritize appropriate responses to erosion throughout Alaska. The study, begun in April 2005 and completed in March 2009, was specifically funded by the U.S. Congress. After conducting the study, the Corps prepared a technical report intended to help Federal, State, Tribal, and local stakeholders to develop strategies and plans for addressing erosion issues in Alaska.

Through a process of stakeholder meetings, review of previous reports, and extensive correspondence with communities,<sup>1</sup> 178 Alaska communities were found to have reported erosion problems. After subsequent investigation, the Corps designated 26 communities “Priority Action Communities”—indicating that they should be considered for immediate action by either initiating an evaluation of potential solutions or continuing with ongoing efforts to manage erosion. See Table 25, below). Sixty-nine communities, where erosion problems are present but not significant enough to require immediate action, were designated “Monitor Conditions Communities.” (See Table 26, next page). Eighty-three communities where minimal erosion-related damages were reported or would not be expected in the foreseeable future were designated “Minimal Erosion Communities.”

**Table 22: BEA Priority Action Communities**

Akiak	Emmonak*	Newtok
Alakanuk	Golovin	Nunapitchuk
Barrow	Huslia	Port Heiden
Chefornak	Kivalina*	Saint Michael
Chevak	Kotlik	Selawik
Clark’s Point	Kwigillingok	Shaktoolik
Cordova/Eyak	Lime Village	Shishmaref*
Deering	McGrath	Unalakleet*
Dillingham	Napakiak	

*\*NFIP-participating communities*

Each Priority Action Community has reported serious erosion that is threatening the viability of the community, or, in some cases, significant resources are being expended to minimize those threats. The erosion issues in these communities warrant immediate and substantial Federal, State, or other intervention. In some cases, action is needed to continue funding for projects that are underway and funded by Federal, State, Tribal, and/or local entities. For others, it is urgent that a team visit the community to assess erosion issues and needs thoroughly.

<sup>1</sup> The term “community” is meant to include both the town and the federally recognized Tribe located near that town. In instances when the intent is to specifically identify the incorporated town/city/village or the federally recognized Tribe, the distinction is made.



A topic that arose frequently during the BEA study is that flooding is as great a problem as erosion in some communities. The BEA assesses erosion but includes a conclusion that an assessment of flooding issues in Alaska is needed.

**Table 23: BEA Monitor Conditions Communities**

Alatna	Galena	Noatak
Aleknagik	Gulkana	Nome
Aniaka	Haines	Nuiqsut
Atmautluak	Homer	Old Harbor
Bethel	Hooper Bay	Oscarville
Big Delta	Hughes	Ouzinkie
Brevig Mission	Igiugig	Pile Bay-Williamsport
Buckland	Iliamna	Pilot Point
Butte	Kaktovik	Point Hope
Central Kenai	Kalskaga	Port Graham
Chignik Lagoon	Kipnuk	Russian Mission
Chiniak	Kongiganak	Savoonga
Circle	Kotzebue	Seward
Circle View-Stampede Estates	Koyukuk	Shageluk
Delta Junction	Kwethluka	Soldotna
Diomedes	Levelock	South Naknek
Eagle Lower	Lower Kalskag	Sutton-Alpine
Eek	McCarthy	Tuntutuliaka
Egegik	Mekoryuk	Tununak
Elim	Nanwalek	Upper Kalskaga
Evansville	Nelson Lagoon	Valdez
False Pass	Nenana	Venetie
Fort Yukon	Nightmute	Wales



A Minimal Erosion Community has erosion impacts that are not considered serious and are not affecting the viability of the community. At this time, erosion does not appear to warrant Federal, State, or other intervention.

**Table 24: BEA Minimal Erosion Communities**

Akhiok	Gustavus	Perryville
Akiachak	Holy Cross	Point Lay
Allakaket	Hyder	Port Alsworth
Ambler	Ivanof Bay	Port Lions
Anchor Point	Juneau-Douglas	Portage
Angoon	Kaltag	Red Devil
Anvik	Karluk	Saint Paul
Bettles	Kiana	Salcha
Birch Creek	King Cove	Sand Point
Cantwell	King Island	Sitka
Chalkyitsik	Kokhanok	Skagway
Chignik Bay	Koyuk	Skwentna
Chignik Lake	Larsen Bay	Sleetmute
Chistochina	Manley Hot Springs	Stebbins
Chitna	Mary's Igloo	Susitna
Chuathbaluk	Metlakatla	Talkeetna
Coldfoot	Municipality of Anchorage	Tazlina
Copper Center	Napaskiak	Teller
Council	New Stuyahok	Togiak
Crooked Creek	Ninilchik	Toksook Bay
Ekuk	Nondalton	Ugashik
Ekwok	Noorvik	Upper Chena
Fairbanks	Northway	Wainwright
Fox	Northway Village	Wasilla
Gakona	Nulato	Willow
Gambell	Nunam Iqua	Wiseman
Girdwood	Palmer	Yakutat
Grayling	Pedro Bay	



### HAZARD IMPACT ASSESSMENTS - ALASKA CLIMATE CHANGE IMPACT MITIGATION PROGRAM (ACCIMP)

The ACCIMP provides grants for Hazard Impact Assessments to address the impacts of erosion, flooding, thawing permafrost and other impacts of climate change. Hazard Impact Assessment (HIA) Grants provide funding to communities to hire a contractor to identify, define, assess impacts to the community. The HIA provides recommendations to the community for the next steps to be taken to address the hazard impacts.

### IMPERILED COMMUNITIES WATER RESOURCES ANALYSIS

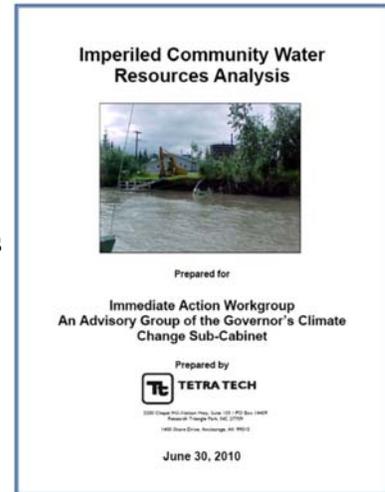
In 2009, the Immediate Action Work Group of the Governor’s Subcabinet on Climate Change (IAWG) identified six critically imperiled Alaskan communities along with recommended immediate actions to assist these communities.

During this same time period, a statewide baseline erosion assessment was also completed by the Alaska District of the U.S. Army Corps of Engineers which indicated that an additional 17 communities deserved priority action status with respect to coastal and riverine erosion threats.

The Imperiled Communities Water Resources Analysis endeavored to assess and evaluate the climate-related risks to water resources and water/wastewater infrastructure, as needed to prioritize imperiled communities that need assistance. The analysis involved a screening-level assessment of potentially imperiled communities based upon documented and/or anecdotal climate-related threats to water resources and water/wastewater infrastructure, such as flooding and saltwater intrusion, loss of surface water supplies (permafrost lakes draining), erosion of critical infrastructure or surface water resources leading to sedimentation of potable water sources, and other potential impacts.

The analysis included an initial cursory evaluation of the climate-related risks (primarily flooding and erosion) associated with 214 communities eligible for funding by the Alaska Department of Environmental Conservation (ADEC) Village Safe Water (VSW) Program.

From this broad master list of communities, 26 communities were initially identified and designated as the study group. An additional 44 communities were also identified as having potential climate risks to water resources and water/wastewater infrastructure, but either initially had lower perceived threats or required additional information to more confidently assess those risks. The analysis was limited to second class cities and unincorporated villages managed by tribal councils and did not extend to first class cities.





Readily available information for the study group was collected using a combination of professional staff interviews, and reviews of online databases, written reports, community maps, and other information.

Relevant information for each study group community was summarized in community profiles that document the climate-related risks to water resources and water/wastewater infrastructure across the following risk factors, which were loosely based on established IAWG community ranking methodology:

Based on this analysis, the following study group of 25 communities was identified as likely to face near-term climate change related impacts to their water and wastewater infrastructure.

Alakanuk	Emmonak	Quinhagak
Aniak	Fort Yukon	Saint Michael
Atmautlauk	Golovin	Selawik
Brevig Mission	Gulkana	Stebbins
Buckland	Hughes	Teller
Chalkyitsik	Huslia	Venetie
Chignik Lagoon	McGrath	Wales
Deering	Nelson Lagoon	
Diomede	Noatak	

The analysis was intended to serve as an initial step in identifying and prioritizing at-risk communities, rather than a definitive assessment. These initial community-specific characterizations should be refined through an iterative process where necessary additional information is collected and reviewed, and vetted with more analysis.

Recommendations are provided to help collect better data, measure local climate impacts, refine assessments, prioritize communities for action, and develop mitigation plans, where applicable. Specific recommendations include:

1. Supplementing this analysis with more detailed analysis
2. Collecting additional hydrologic data
3. Increasing permafrost monitoring
4. Adopting prevention and adaptation strategies for managing water and wastewater assets
5. Mitigating landfill and tank farm risk
6. Implementing relevant Adaption Advisory Group recommendations to the Governor's Climate Change Subcabinet



### RESILIENCE PLANNING IN ALASKA

#### *Community Planning Grants - Alaska Climate Change Impact Mitigation Program*

In 2007, the State of Alaska Climate Change Sub Cabinet was established in the Alaska Governor's Office. Soon thereafter, a working group of this

In response to this issue, in 2008, Alaska's Twenty Fifth Legislature established the Alaska Climate Change Impact Mitigation Program (ACCIMP) with funding to address the immediate planning needs of communities imminently threatened by climate change-related impacts such as erosion, flooding, storm surge, and thawing permafrost. The ACCIMP is administered by the Alaska Department of Commerce, Community, and Economic Development, Division of Community & Regional Affairs (DCRA).

The program initially directs the majority of grant funds at specific communities identified as imminently threatened by the Governor's Subcabinet on Climate Change, Immediate Action Workgroup (IAW). The majority of Alaska Climate Change Impact Mitigation Program (ACCIMP) funds are directed to specific communities identified as imminently threatened by the Governor's Subcabinet on Climate Change, Immediate Action Workgroup (IAW). These communities are Shishmaref, Kivalina, Newtok, Koyukuk, Unalakleet and Shaktoolik.

The ACCIMP provides non-competitive funding to the six imminently threatened communities for Community Planning Grants to address the recommendations for immediate actions made by the IAW in its Recommendations Report to the Governor's Subcabinet on Climate Change, April 17, 2008. Based on the scope of the community planning project, communities are eligible for grants of up to \$150,000.

#### *Alaska Community Coastal Protection Project*

The Alaska Community Coastal Protection Project was carried out by DCRA through a grant from the Alaska Coastal Impact Assistance Program. The project focused on Project focuses on three of the most imminently threatened villages in Western Alaska: the communities of Kivalina, Shaktoolik and Shishmaref. The objective of the project has been to increase community resilience and sustainability to the impacts of natural hazards threatening these communities while protecting the natural coastal environment. The project is based on the premise that careful planning, agency collaboration and strong community leadership are essential to successfully addressing the needs of imperiled communities.

Community resilience is increased through three measures:

- **Interagency Collaborative Support Structure:** Using a collaborative model similar to the Newtok Planning Group, DCRA has establish interagency planning work groups for each the three communities. community with the implementation of the strategic actions from each plan.
- **Local Capacity Building:** Funding was provided to each community to establish a full-time community coordinator (two years) who served as an advocate for funding through grants and other means to implement needed evaluations and action plans.
- **Comprehensive Strategic Management Plan:** A strategic management plan which for each community which provides the "blueprint" for how the community, working with agencies, will increase community resilience through prioritized strategic actions.