

# IMMEDIATE ACTION WORKGROUP

## RECOMMENDATIONS TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE



**MARCH 2009**

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

The Immediate Action Workgroup (IAWG) is pleased to provide its recommendations regarding the actions and policies that we believe should be implemented in 2009 and 2010. This is the second report provided to the Climate Change Subcabinet and follows up on recommendations and actions taken as a result of our April 17, 2008 report to the Subcabinet.

The IAWG has continued at the request of Commissioner Hartig, chairman of the Climate Change Subcabinet, to collaboratively examine the needs of communities that are under imminent threat from conditions that may be attributed to climate change phenomena.

The membership of the Immediate Action Workgroup has remained consistent from the previous year with one exception. Added to the IAWG is a representative from the National Oceanic and Atmospheric Administration, Amy Holman, Lead for NOAA's Alaska Regional Collaboration Team. Her participation has contributed greatly to our understanding of the data and research that is needed in the near future. The IAWG would likely benefit from additional agency participation. The spirit of cooperation and serious collaboration has infused our meetings and we believe resulted in meritorious recommendations for near-term actions by the Subcabinet and the State of Alaska.

Last year we described our recommendations in terms of a *recipe for success*. The members and others participating with the Immediate Action Workgroup have now worked together for over a year, both directly on the Immediate Action Workgroup's tasks and on leveraging resources and ideas resulting from the Workgroup's collaboration. From this experience, we are more certain about the value of this *recipe for success*. The ingredients are a diversity of resources. The recipe brings together organizations to address climate change issues and impacts. Therefore, we wish to repeat the recipe originally stated in last year's report.

### **Immediate Action Workgroup's Recipe for Success**

***Step 1: Begin by developing a collaborative organizational structure that can focus the combined capabilities of local, regional, state, and federal stakeholders on the problems at hand.*** Identify what expertise is available; which organization has the authority, capability, and potential funding to lead the combined effort; and, identify where functional gaps exist that need to be filled. Local communities severely affected by impacts most likely from 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.

Team work is essential. Relying on one agency to carry out the mission risks both waste and lack of action. These problems, which primarily affect small, isolated communities are difficult to address and because of this are easily ignored. Only through continual focus and intelligent decision making can we adequately address their problems.

***Step 2: Discuss the nature and extent of the potential climate change impacts 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 impacts.** 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 climate change impacts.** 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 in 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 disasters and 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, engineered soundly, and environmentally acceptable. Above all, be action oriented and recognize that communities need immediate action to address what is in some cases inevitable, severe impact to infrastructure and community well being.

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# NEAR TERM FOCUS FOR IMMEDIATE ACTION WORKGROUP

The Immediate Action Workgroup of the Governor's Executive Subcabinet 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 the Congressional delegation by creating a unifying mechanism to assist the communities of Newtok, Shishmaref, Kivalina, Koyukuk, Unalakleet, and Shaktoolik<sup>1</sup>. These communities face imminent threats of loss of life, loss of infrastructure, loss of public and private property, or health epidemics 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 percent 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 window to protect a community, enabling it 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.

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<sup>1</sup> The IAWG used the GAO 2004 report, which identified 9 highly threatened communities (Shishmaref, Newtok, Kivalina, Koyukuk, Unalakleet, Barrow, Bethel, Kaktovik, and Point Hope) to initially examine the nature of imminent threats at its November 6, 2007 meeting. Based upon the November 6 meeting and a November 19 / 20, 2007 Roundtable meeting conducted by then Senator Stevens, the IAWG focused its work with the communities of Shishmaref, Newtok, Kivalina, Koyukuk, Unalakleet and Shaktoolik.





# EXECUTIVE SUMMARY

## IMMEDIATE ACTION WORKGROUP: ACCOMPLISHMENTS AND RECOMMENDATIONS

This executive summary is a consolidated list of Accomplishments, Immediate Actions and required Strategic and Community Assistance Recommendation Policies and budget estimates developed by the Immediate Action Workgroup of the Governor's Alaska Climate Change Subcabinet. The policies have been expanded from last year's report to help identify a strategic approach for addressing climate change, which has a likelihood of impacting every community in Alaska. The policies have also been detailed by adding definitions and interpreting the meanings of terms used in various policy statements.

These collective recommendations represent an intensive collaborative effort undertaken in an open public forum to address the immediate needs of the State, with a specific focus on six communities in peril: Newtok, Shishmaref, Kivalina, Koyukuk, Unalakleet, and Shaktoolik. We have attempted to expand our focus beyond the six communities originally accepted as imminently threatened last year, and have determined the likelihood that additional communities are in need of assistance in coping with similar problems.

These recommendations will help the Subcabinet develop a State Climate Change Strategy. This executive summary can be used as a reference point, but should be read within the context of the entire report, which summarizes the state of the six communities in peril, immediate and near-term actions to protect them, along with the policies and implementation recommendations and accompanying rationale.

*These immediate actions combined with the policy recommendations were developed to serve as a template and model to assist other Alaska communities in an effective manner as they may become or are impacted by erosion and other natural hazards that seem to be increasing in number and severity.*

Detailed community descriptions can be found in the Community Profiles section beginning on page 13.



*Photo 1: Undercutting of river bank in Newtok. (Credit: Stanley Tom)*

## **ACCOMPLISHMENTS OF IMMEDIATE ACTION WORKGROUP: FY 08 SUPPLEMENTAL AND FY09 FUNDING**

The IAWG brings an important element to the State's response to the changing Arctic. Unlike other workgroups, the IAWG is tasked with advising the Governor's Climate Change Subcabinet and the Legislature on what actions are needed in the next 12 – 18 months to prevent disasters that would likely result in loss of human life and infrastructure. These potential disasters are most likely to impact small, remote villages and are easiest to see from that community level.

The IAWG was started under the leadership of Commissioner Hartig as a way to initiate actions without awaiting a lengthy planning and analysis phase by recognizing actions to be taken now, to minimize impacts affecting these remote communities sitting on the edge of the changing environment.

### **The IAWG used several tools:**

- A very preliminary list of the most impacted communities;
- A mission given by Commissioner Hartig;
- A small group of relevant and focused agencies;
- A determination to do something as we all agreed something was worth doing;
- An invitation to the communities and others to participate in identifying the solutions through local initiatives, ideas and effort; and
- Recognition of fiscal realities.

### **The process employed was innovative and included:**

- Meetings every two weeks;
- Focus on only 6 communities identified as imminently threatened;
- Identify actions that were needed to prevent loss of life and infrastructure;
- Determine resources – funding, information and coordination – needed to advance those actions;
- Recommend to Legislature and Administrative decision makers to take actions by applying resources to the most immediate needs;
- Learn lessons from the IAWG's experiences;
- Incorporate and encourage local initiatives;
- Keep focused and invite collaboration;
- Demonstrate results; and
- Don't foreclose options if at all possible.

**The key messages the IAWG would like to convey to the Subcabinet are:**

- The IAWG has been successful. This success is largely due to leveraging the State’s resources through coordination and collaboration with other State and Federal agencies, and with regional and community organizations.(See Accomplishments section page 27.
- The IAWG has not addressed or decided whether a community should relocate, as that is not within the authorization of the Workgroup and for each community, it is an issue that needs data, analysis and substantial coordination that is well beyond the IAWG’s scope.

**IAWG Guiding Principle:** *Immediate actions should preserve the widest range of options available to communities. To do this substantial coordination is needed to identify, collect and analyze data to make the most effective decisions for long-term viability and sustainability.*

- The IAWG has not defined nor relied on definitions of what climate change is, but rather has identified phenomena from which communities are being threatened and impacted. The likelihood these phenomena are from climate change is believed to be high.

**The key findings from the 2009 IAWG’s efforts are:**

- **Immediate recommended actions are to protect what we have** – including infrastructure and human life.
- Replace the IAWG, which is an ad-hoc body, with a formal, standing committee or workgroup embedded in the State’s administrative operations. This will ensure continued success of leveraging the State’s resources through coordination and collaboration with other State and Federal agencies, and with regional and community organizations.
- Many potentially affected communities have been identified (See Appendix A). This requires an analysis process to determine the seriousness of the potential impact and to then act in a methodical fashion to prevent loss of life and infrastructure and protect what is already in place. (See Policies 1 -4)
- Construction standards have long been to build bigger and stronger, but building resilient structures that can be relocated may be the more important principle to successfully meet the challenges that climate change brings.

**Summary of Accomplishments for  
Kivalina, Koyukuk, Newtok, Shaktoolik, Shishmaref and Unalakleet**

**Develop Suite of Emergency Plans and Training/Drills** (\$500,000 State leveraged \$100,000 Federal)

State resources were provided to the Alaska DHS&EM to work jointly with each community and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion. All community efforts are underway.

Funding was also provided to DNR/Division of Forestry for a Community Wildfire Protection Plan (CWPP) for Koyukuk, which will be accomplished by Division of Forestry in conjunction with the community, Tanana Chiefs Conference, Inc. and the Alaska Fire Service.

**Anticipated Completion of Suite of Emergency Plans for All Six Communities - Calendar Year End 2009.**

In addition, DHS&EM, based on its efforts from 2008 -09, has developed a sub-regional approach to create, train and conduct community drills for the suite of emergency management plans. It is now anticipated that this sub-

regional approach will reduce the cost by almost half of the initial appropriation in FY09. DHS&EM will focus its efforts on the Y-K Delta, Western and Northern Regions of Alaska.

### **Community Mitigation and Relocation Planning and Coordination**

DCCED/DCRA staff is working with local governments, whether City, Tribes or both in each of the communities to develop proposals for the community planning grants that addresses both the IAWG's recommended immediate actions for the communities, while striving to incorporate each of their specific needs.

- **Kivalina** – community planning needs to work through issues given that the Community has identified a site it wishes to move to, but that the USACE does not believe is an adequate site, e.g. it is underlain with permafrost which would require many feet of fill material to provide a good foundation for buildings and insulate the permafrost from thawing under the new village location.
- **Koyukuk** – community planning needs to work through confusion in the community and among agencies about what the options for the current community site are if relocation does occur. The community will also likely benefit from a planning effort that considers the three primary options communities have: staying in place -and what structural changes would need to happen to make that possible, migrating – having access to higher elevations of land and what infrastructure is needed to provide that opportunity so that when both private and public decisions are made options exist to ensure safety for both the investment and community members and if necessary – relocating, which is a longer-term, complex effort.
- **Newtok** – through the collaborative efforts of the Newtok Planning Group – which is a model for local community, state and federal partnerships to address complex issues – the community planning efforts have enabled the community to advance its already innovative successes by utilizing planning funds for:
  - The design of an evacuation shelter at Mertarvik as the Newtok Traditional Council hired the Cold Climate Housing Center;
  - Planning resources to conduct site suitability analysis and future community layout at the identified new community site of Mertarvik.
- **Shaktoolik** – community planning needs to address this community's highest threats, which is its precarious location when sea surges occur. The surges result in the community becoming an island, and then it is doubly threatened by storms throwing logs that are naturally beached on the shore at Shaktoolik. During this past year a reconnaissance study for an evacuation road was completed through the joint cooperative effort of the Shaktoolik community, Kawerak, and the Denali Commission. The State is being requested to fund \$500k, for a road design. Development of an evacuation shelter within the existing community is also being considered as a cost effective and near-term action
- **Shishmaref** – community planning needs to coordinate with the various organizations to effectively plan for the needs of an entire community. Here too, Shishmaref will likely benefit from a planning effort that considers the three primary options communities have: staying in place -and what structural changes would need to happen to make that possible, migrating – having access to higher land and what infrastructure is needed to provide that opportunity so that when both private and public decisions are made options exist to ensure safety for both the investment and community members, and if necessary – relocating, which is a longer-term, complex effort.
- **Unalakleet** – community planning needs to coordinate with the various organizations in Unalakleet. However, given the strength of the community, its support from Kawerak, DOT/PF and USACE projects that were being constructed and/or ready to bid, the community planning effort hasn't had the level of critical need as with the other 5 communities. However, Unalakleet has the same issues as Shaktoolik with storm surges – the community may become an island, or mostly an island and the threats of logs being thrown due to the storms is a deadly threat.

### **Anticipated Planning Grant Awards to All Communities – By Calendar Year End 2009.**

### **Reduce State Capital Budget Expenditures by Leveraging State Funding**

Last year the IAWG received advice from the USACE that State participation in erosion control projects for Alaska could improve funding from federal sources. USACE, as a member of the IAWG, commented that the strategy to align and coordinate state funding to receive Corps federal funds worked well. Moreover, the USACE-Alaska received at least \$40 million in a supplemental for Alaskan projects from a \$60 million fund for projects nationwide. This was in large part a result of a commitment of the State's funding to 35% of project costs.

- **Kivalina** – \$3.3 million from the State to the Northwest Arctic Borough leveraged \$12.5 million from USACE for revetments and another \$500,000 from USACE for design of additional revetment for Phase 1-Ocean-side revetment.
- **Koyukuk** – No State construction funds were appropriated in FY 2009. However the USACE has been conducting a feasibility study for the Community and the Community Planning Grant will help to coordinate this study with the Community's needs and ideas to protect its infrastructure and community members.
- **Newtok** – During the past year relationships between the community and DOD's Innovative Readiness Team Program (IRTP) has been established. This program offers military assets for community projects that are used as training opportunities for military units. With the FY10 recommended funding of \$2 million for materials, the IRT brings \$5 million of resources to help construct the evacuation shelter, and develop a materials site for roads and an airstrip. In FY09 DOT/PF received a combined state/federal funding of \$1.7 million for constructing the evacuation road
- **Shaktoolik** – No State construction funds were appropriated in FY 2009. However, Kawerak and the Denali Commission have completed a road reconnaissance study, which if funding from state is forthcoming would be leveraged 5-fold.
- **Shishmaref** – No State construction funds were appropriated in FY 2009. However, the USACE has been diligent and consistent in its efforts to design and construct revetment, and for FY 2010 \$3 million is recommended by the IAWG to fund revetment work in Shishmaref. In the past 2 years the USACE has provided \$11 million of construction and design work.
- **Unalakleet**– \$5 million in State funds was appropriated in FY 2009 to leverage an additional \$18.5 million from USACE to build necessary revetment structures. In addition, by coordinating with DOT/PF mobilization and demobilization costs were saved on this project as the project will use the heavy equipment already in the community.

### **ADOT/PF Preliminary Engineering & Early Coordination**

State resources were provided to ADOT/PF for early coordination and its participation with the USACE to design and develop shoreline protection measures. Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.

Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans will result from early coordination.

DOT/PF believes these activities may lead to reduced long-term capital construction costs as material sites closer to construction activities are identified and developed. Cost savings can be expected by reducing barging charges and increased competition to provide materials, such as armor rock for revetments.

Specifically for Newtok, ADOT/PF has been actively reviewing the USACE road design and provided appropriate design standards. The ADOT/PF Facilities Division is also serving as a reviewer for the evacuation building design.

## FY 10 FUNDING RECOMMENDATIONS

Communities	Description	Recommended Amount
For the NW and Western regions of Alaska that have suffered the most number of declared disasters over the last 30 years.	<p>Continue Developing Suite of Emergency Plans to ensure no loss of life during disasters.</p> <p>Conduct trainings, planning workshops on sub-regional basis, thereby reducing costs.</p>	<p style="text-align: center;">\$500,000 (Not in Governor's Budget)</p> <p>DHS&amp;EM will explore other funding opportunities, e.g. Denali Commission and CIAP for the most threatened regions in Alaska.</p>
Unidentified, but those Communities in Need of Planning to Prevent Loss of Infrastructure and/or Life	Alaska Climate Change Impact Mitigation Program – Community Planning DCCED/DCRA	<p style="text-align: center;">\$300,000 (\$300,000 in Governor's Budget)</p>
Unknown – Communities where USACE is actively addressing erosion and maybe flooding issues	DOT/PF Preliminary Engineering and Early Coordination	<p style="text-align: center;">\$500,000 (\$100,000 in Governor's Budget)</p>
Kivalina	DNR – DGGs Geologic and Hazardous Mapping to identify sites acceptable for evacuation road, site and identifying relocation sites.	<p style="text-align: center;">\$180,000</p> <p>Funded through Federal CIAP. Funds now available at DGGs, but hiring freeze precludes having human resource capacity needed to do the work.</p>
	Revetment work and community planning will continue from funds appropriated in FY 08 Supplemental and FY 09	\$0
Koyukuk	DOT/PF for Evacuation Road and Upgrade Existing Road. Conduct reconnaissance, engineering studies, preliminary engineering and environmental work and final design.	<p style="text-align: center;">\$800,000 (\$400,000 in Governor's Budget)</p>
Newtok	Material for evacuation shelter road from barge landing and building materials for evacuation shelter.	<p style="text-align: center;">\$2,000,000</p> <p>Leveraging more than \$5,000,000 from Federal agencies – IRT and USACE</p>

Communities	Description	Recommended Amount
Shaktoolik	State funding for partial funding of Evacuation Road design and engineering. This will leverage funds from Kawerak, Denali Commission and BIA.	\$500,000 (Not in Governor’s Budget) Leverages \$2,500,000 from other cooperating organizations
	Shaktoolik should request from Congress to be added to the Alaska Coastal Erosion Program under authority of Section 117.	IAWG reaffirms Shaktoolik should make this request.
	DNR – DGGGS Geologic and Hazardous Mapping to identify sites acceptable for evacuation road, site and identifying relocation sites.	\$180,000 Funded through Federal CIAP Program. Funds now available at DGGGS, but hiring freeze precludes having human resource capacity needed to do the work.
Shishmaref	Construction to complete the additional 550 feet of ocean-side rock revetment or protect the northeastern edge of the community including the sewage lagoon and washeteria. Another \$3,500,000 is needed for this section. USACE and others are working together to identify sources for this needed funding.	\$3,000,000 This leverages USACE \$500,000 for design of this section (Phase 3), and augments the \$10.5 million USACE has already expended for design and construction of 1,350 feet.
	Feasibility Studies and Hazardous and Geologic Mapping Studies are needed. Without the siting and design work of evacuation road, airport, port and other community infrastructure sites cannot be done.	No funding has been identified.
Unalakleet	Funding from FY09 from State and USACE should be sufficient to build the revetment. Coordination with community entities, USACE, DCCED, DOT/PF is needed.	IAWG affirms meetings to develop funding strategy should be scheduled. Unalakleet should take the lead to bring agencies together to develop a funding strategy.
	Old high school gym is scheduled to be torn down. It could be moved to higher ground and serve as an emergency evacuation community center	\$1,000,000 (Not in Governor’s Budget – funding request received after deadline.)

## Strategic and Community Assistance Recommendation Policies

The following summarizes IAWG's policy recommendations, which are further detailed in the Policy section of this report as well as in Appendix A. The IAWG has created working relationships that can help to advance these recommendations in a meaningful and cost-effective manner, which is why the IAWG is *recommending that the Subcabinet refer the next steps to advance these policies back to the IAWG*.

Based on the IAWG's 2009 efforts where we brought together information and data from various agencies to identify the next six communities in need of immediate action, we found:

- There is no consistency in criteria, timeline, weighting, data acquisition technique or analysis to determine if impacts are from climate change.
- No framework exists for the comprehensive identification, analysis, and dissemination of current data or the methodical acquisition of new research to support new policy options.
- Without new policy options state and federal agencies are severely limited in their ability to integrate or identify data, research, programs or projects necessary to mitigate or prevent impacts to communities.
- We were unable to, with confidence; identify the next six communities for immediate action.

The IAWG then combined these findings with what most in public service already know, and that is many capital projects need years of planning, engineering, design and time to identify complementary federal funding.

From this, the IAWG recommends:

- **An integrated, multi-agency and inter-governmental approach to effectively identify and address the needs of communities that are potentially in peril.**

The outcome and benefit of this integrated approach has:

- Significant potential to save money on public infrastructure, avoid costly delays, save funds through economies of scale and combining mobilization, mitigate the effects and costs of disaster relief and recovery.

**POLICY 1: ESTABLISH A STATEWIDE SYSTEM TO DOCUMENT, ASSESS, AND ANALYZE CURRENT AND PLANNED PUBLIC INFRASTRUCTURE IN ORDER TO PROTECT EXISTING AND FUTURE INVESTMENTS AND PREVENT THREATS TO LIFE IN AN UNCERTAIN ENVIRONMENT**

The Immediate Action Workgroup offers a model for a statewide system that integrates information from all state departments, local entities, and federal agencies on current and planned public infrastructure and capital projects in communities currently or potentially affected by climate change. This system will enable a more rapid identification of community needs and vulnerabilities, and more informed decisions on the future repair, retrofit, replacement, or relocation of critical infrastructure. Further, the IAWG believes, this statewide system will create a more cost-effective means to make decisions about public infrastructure needed to ensure community safety and economic viability.

**IAWG Recommended Action to Subcabinet:** Adopt Policy 1 and provide the IAWG with guidance to develop implementation options for this policy. At a minimum the guidance should instruct that options should include identifying benefits, challenges, and effective organizational structures for implementation. This integrated system



will create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance should also include melding the relevant Adaptation and Mitigation Advisory Groups' products with this statewide system to reach a desired outcome of integrated actions in order to address what seems to be increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective statewide system.

**POLICY 2: SUNSET THE IMMEDIATE ACTION WORKGROUP AND DIRECT THE RELEVANT STATE AGENCIES TO ESTABLISH AN INTERAGENCY COLLABORATION WITH EACH OTHER, ALONG WITH RELEVANT FEDERAL AGENCIES AND COMMUNITIES. THIS COLLABORATIVE REQUIRES REGULARLY SCHEDULED MEETINGS TO COORDINATE INFORMATION, PLANNING, EVALUATION AND DECISIONS ON PUBLIC INFRASTRUCTURE FOR THOSE COMMUNITIES IMPACTED BY CLIMATE CHANGE PHENOMENA.**

The Immediate Action Workgroup believes that the outcomes and results of its ad hoc collaborative efforts over the past year have been exceedingly useful and should be integrated into agencies' operational efforts. This policy recommendation should be viewed as an interim step to implementing Policy 1 above. Once Policy 1 is established as a strategic operational mechanism, then this Interagency Collaborative should be integrated, reformulated or discontinued, depending on the structure and needs of the statewide system.

**IAWG Recommended Action to Subcabinet:** Adopt Policy 2 and provide the IAWG with guidance to develop options to accommodate the transition described in Policy 2. At a minimum the guidance should instruct that options include identifying benefits, challenges, and effective organizational structures for implementation. This precursor to an integrated system will set the framework to create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance to the IAWG should also include melding the relevant Adaptation and Mitigation Advisory Groups' products into options for Policy 2. This would be in an effort to reach the desired outcome of taking integrated actions to address the increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective interagency collaborative while a statewide integrated system is being established.

**POLICY 3: ASSISTANCE TO COMMUNITIES IN PERIL MUST UTILIZE COMPREHENSIVE INTEGRATED PLANNING AND VIABLE, FUTURE-ORIENTED SOLUTIONS WITH FUNDING THAT ALLOWS FOR SUSTAINABILITY WHETHER THE COMMUNITY REMAINS IN PLACE, USES A MIGRATION STRATEGY OR NEEDS TO RELOCATE.**

The Immediate Action Workgroup believes that comprehensive integrated planning must be used to implement solutions for communities in peril. The planning process must integrate the expertise and resources available from the various state and federal agencies as well as community and regional stakeholders. Flexible funding streams should be sought; and may need to be created, to accommodate the needs associated with preserving the options available for protecting public infrastructure and preventing loss of life. These options range from staying in a community's current location, to a migration strategy, to full relocation. All of these options should integrate the concepts of sustainability into the design, location, and attributes of projects, and if relocating, into future settlements. (See IAWG Sustainability Considerations in Appendix B) Existing and new funding mechanisms for responding to climate change hazards should also provide for adaptation and mitigation measures. In seeking funds for adaptation and mitigation, an examination of current federal and State statutes needs to be conducted to identify

limitations in addressing these measures. The Stafford Act, for example, limits the ability of the State to deal effectively with communities in peril.

**IAWG Recommended Action to Subcabinet:** Adopt Policy 3 and provide the IAWG with guidance to develop implementation options for this policy. At a minimum the guidance should instruct that options should include identifying benefits, challenges, and effective organizational structures for implementation. This comprehensive planning system is a key component to create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance to the IAWG should also include melding the relevant Adaptation and Mitigation Advisory Groups' products with comprehensive integrated planning to reach a desired outcome of integrated actions in order to address what seems to be increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective comprehensive integrated planning system, which also must be a key component of the statewide system identified in Policy 1.

**POLICY 4: THE STATE OF ALASKA WILL LEAD A COORDINATING EFFORT TO DEVELOP A COMPREHENSIVE STATEWIDE DATA COLLECTION AND EVALUATION SYSTEM THAT PROVIDES FOUNDATIONAL INFORMATION FOR COMMUNITY AND BUSINESS DECISIONS AND SOLUTIONS LEADING TO EFFECTIVE RESPONSES AND ADAPTATION STRATEGIES TO ADDRESS CLIMATE CHANGE IMPACTS.**

Through the Subcabinet Climate Change Strategy process, various components of a statewide data collection and evaluation system have been identified, yet components need to be coordinated in order to understand and use the information effectively. The phenomena of climate-related impacts are not well understood and the impacts themselves are also uncertain. The State of Alaska, playing the coordinating role, will bring together state agencies, university resources, and federal and local stakeholders to develop an effective data collection and evaluation system. The likely outcomes of this effort will be to identify what data exists in order to build forward from existing data and maps; what format it is in and what technology is needed for the systems to "talk" with each other; what data is needed but missing; and what funding is needed to identify, collect, analyze and disseminate data in order to address impacts from climate change phenomena. Response strategies should be developed through adaptation impact analysis and modeling to identify near-term scenarios for options ranging from protecting what's in place, migration and full relocation.

**IAWG Recommended Action to Subcabinet:** Adopt Policy 4 and provide the IAWG with guidance to develop implementation options for this policy. At a minimum the guidance should instruct that options should include identifying benefits, challenges, and effective organizational structures for implementation. This comprehensive data system is another key component to create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance to the IAWG should also include melding the relevant Adaptation and Mitigation Advisory Groups' products with this statewide data collection and evaluation system to reach a desired outcome of integrated actions in order to address what seems to be increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective integrated data system. This system must also be a key component of the statewide system identified in Policy 1.

# COMMUNITY PROFILES

## COMMUNITY INFRASTRUCTURE INVESTMENT

The IAWG determined from the DCCED/DCRA – RAPIDS Database that the public infrastructure investment in the six communities for which the IAWG has focused a good deal of its efforts over the past year stands at \$293 million.

One of the IAWG's foundational principles is identify and recommend immediate actions that can be taken to protect the infrastructure and public investment that is already in place.

Based on this, the investment levels for the six communities are included here.

<b>Public Investment Based on Information from DCCED/DCRA RAPIDS Database</b>		
<b>Community</b>	<b>Years</b>	<b>Public Infrastructure Investment</b>
Kivalina	1992-2009	\$ 25,606,507
Koyukuk	1987-2009	\$ 27,213,704
Newtok	1985-2009	\$ 21,733,479
Shaktoolik	1988-2012	\$ 16,616,589
Shishmaref	1988-2011	\$ 56,096,483
Unalakleet	1989-2011	\$ 145,721,705
		\$ 292,988,467

# 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.



*Photo 2: Work crew at eroded shoreline in Kivalina.  
(Credit: Colleen Swan)*

## 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 "Kivualinagmut" 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.

Severe erosion and wind-driven ice damage have forced the community to explore options related to safety, mitigation and relocation. A federally-recognized tribe is located in the community -- the Native Village of Kivalina. The population of the community consists of 96.6 percent 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.

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 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. 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.



*Photo 3: Coastal storm threatens critical infrastructure in Kivalina. (Credit: Colleen Swan)*

# 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.



*Photo 4: Runway located in the floodplain in Koyukuk. (Credit Cynthia Pilot)*

## 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.

A federally-recognized tribe is located in the community -- the Koyukuk Native Village. The population of the community consists of 91.1 percent 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 percent, although 41.18 percent 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.

The community has experienced increased flooding from both the Yukon and Koyukuk Rivers and residents are considering moving to higher ground.

## **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.



# 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.



*Photo 5: Flooding during coastal storm in Newtok. (Credit: Stanley Tom)*

## 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 villages of Nelson Island and Newtok 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 Mertarvik, 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 Traditional Council. The population of the community consists of 96.9 percent 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 ADOT/PF has determined that it is too close to the airport. The community needs to relocate and rebuild facilities on Nelson Island in order to ensure its safety and way of life. 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. Newtok Health Clinic was recently completed by the Denali Commission. 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.



*Photo 6: Flooding during coastal storm in Newtok. (Credit: Stanley Tom)*

# 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. 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.



*Photo 7: Lot inundation at Shaktoolik. (Credit: Steve Ivanoff)*

## 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 current site is increasingly threatened by storms and ocean surges and residents are considering relocation to higher ground. 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 percent 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 from Nome, then lightered to shore. The community has no docking facilities.



*Photo 8: Log inundation at Shaktoolik. (Credit: Steve Ivanoff)*

# 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



Photo 9: Erosion near Shishmaref homes. (Credit: Brice Eningowuk )



Photo 10: Failed sea wall. (Credit: Brice Eningowuk)

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. The U.S. Army Corps of Engineers and the State of Alaska have cooperated in an effort to stabilize the shoreline. This effort is continuing.

A federally-recognized tribe is located in the community -- the Native Village of Shishmaref. The population of the community consists of 94.5 percent 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 percent, although 51.81 percent 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 percent 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 Miksrmaq 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.



*Photo 11: School teacher housing before rip rap revetment was installed. (Credit: Brice Eningowuk)*

# 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



Photo 12: Log inundation at Unalakleet. (Credit: Steve Ivanoff)

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 percent 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 salmon 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.



*Photo 13: Remains of infrastructure at eroded shoreline in Unalakleet. (Credit Steve Ivanoff)*



# ACCOMPLISHMENTS



## ACCOMPLISHMENTS BY COMMUNITY

KIVALINA	
IAWG Recommendation and Agency Actions	Status
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>            State resources were provided to the Alaska DHS&amp;EM to work jointly with Kivalina and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p>	<p>Developing plans, trainings and drills will begin in February and will be completed by end of 2009.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>            DCCED/DCRA staff is working with both the City and Tribe to develop a proposal for a community planning grant that addresses the IAWG's recommended immediate actions for the community through the Alaska Climate Change Impact Mitigation Program.</p>	<p>Discussions and collaborations are in progress between DCRA and the City and Tribe of Kivalina. It's likely a community planning grant/contract will be in place in June 2009.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b>            State provided \$3.3 million to the Northwest Arctic Borough to begin construction of a revetment to protect vulnerable shoreline of community            USACE engineers obtained a supplemental appropriation from Congress in 2008 to complete the revetment protection of the Oceanside shoreline of Kivalina thereby securing the shore for a minimum of 15 years.</p>	<p><u>Phase 1</u>-Ocean-side revetment: USACE constructed 400 ft of revetment in 2008; 1200 in 2009. Cost: \$12.5 mm. NWAB will construct 400 ft with \$3.3mm.  <u>Phase 2 - Lagoon-side revetment</u>: USACE began design during the Winter 2009.</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b>            State resources were provided to ADOT/PF for early coordination and its participation with the USACE to design and development of shoreline protection measures.            Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.            Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans will result from early coordination.</p>	<p>See DOT's accomplishments later in this section.</p>

**KOYUKUK**

<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>                      State resources were provided to the Alaska DHS&amp;EM to work jointly with Koyukuk and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p> <p>Funding was also provided to DNR/Division of Forestry for a Community Wildfire Protection Plan (CWPP). Work on this project will be accomplished by Division of Forestry in conjunction with the community, Tanana Chiefs Conference, Inc. and the Alaska Fire Service. Project will identify fuel types in conjunction with community infrastructure to determine levels of risk. Fuel reduction projects will be designed and ranked for treatments. FY09 budget was \$25K for this project.</p>	<p>Developing plans, trainings and drills has been initiated and will be completed by end of 2009.</p> <p>Initial work is under-way with a Reimbursable Services Agreement (RSA) in place between DOF and DMVA. Community meetings will begin in February-09, risk assessment summer-09, draft plan fall-09, completion by spring 2010.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>                      DCCED/DCRA staff is working with Koyukuk to develop a proposal for a community planning grant that addresses the recommended immediate actions for the community through the Alaska Climate Change Impact Mitigation Program.</p>	<p>Discussions and collaborations are in progress between DCCED/DCRA and the Village of Koyukuk. It's likely a community planning grant/contract will be in place in June 2009.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b>                      FY 10 Governor's budget includes \$400k to DOT/PF to design village evacuation road to higher ground</p> <p>USACE and others are working with Koyukuk to complete an expedited erosion/flooding assessment and held two public meetings to discuss alternative plans and receive input. A draft feasibility report is currently being prepared but the community remains divided on the acceptability of identified alternative plans.</p>	<p>USACE has conducted and led a feasibility study on alternative flood damage reduction planning for the Village. DCCED/DCRA and others are now assisting the community in its review and identifying options and actions.</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b>                      State resources were provided to ADOT/PF for early coordination and its participation with the USACE.</p> <p>Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.</p> <p>Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans, will result from early coordination.</p>	<p>See DOT's accomplishments later in this section.</p>

<b>NEWTOK</b>	
<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>            State resources were provided to the Alaska DHS&amp;EM to work jointly with Newtok and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p>	<p>Developing plans, trainings and drills has been initiated and will be completed by end of 2009.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>            Newtok received a community planning grant through the DCCED/DCRA's new, legislatively created Alaska Climate Change Impact Mitigation Program.</p> <p>These funds are being used for:</p> <ul style="list-style-type: none"> <li>• The design of an evacuation shelter. The community hired the Cold Climate Housing Center;</li> <li>• Planning resources to conduct site suitability analysis and future community layout at the identified new community site- Mertarvik.</li> </ul>	<p>The Village of Newtok has a fully executed community planning grant for the preparation of a design analysis report and 35% design drawings for an emergency evacuation center that will be built at Mertarvik, on Nelson Island. Cold Climate Housing Research Center has been hired by the Village of Newtok to design a sustainable and energy efficient emergency shelter and carry out the project.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b></p> <ul style="list-style-type: none"> <li>- ADOT/PF received \$3.3 million from the State Legislature for Newtok. \$1.8 million of this appropriation is being combined with an \$800,000 grant from the Federal Economic Development Administration (EDA). DCCED is the grantee to EDA to build a barge landing and upland staging area to allow for landing of supplies, equipment and personnel at the Mertarvik site.</li> <li>- ADEC secured resources to drill and develop water well at the Mertarvik site.</li> <li>- AEA secured funds to build a fuel pipeline to allow fuel offloading from the Newtok River to fuel tanks at the generator site in Newtok</li> <li>- Commitment received from the Innovative Readiness Training Program in the U.S. Department of Defense to conduct a military training effort at Mertarvik with the intention of helping the community build roads, an emergency shelter and a quarry for material at Mertarvik.</li> <li>- Community members and the tribal council have financed and built 3 homes at Mertarvik.</li> </ul>	<p>Completed by July 2009. DCCED and DOT signed their project agreement 3/15/2008.</p> <p>Treated well water will be available by August 2009.</p> <p><b>To be completed in</b>            Spring/Summer 2009.</p> <p>\$2 million in Governor's FY2010 Budget for materials to construct evacuation shelter. \$5 million estimated for FY2011. Materials being contributed by federal IRT Program for roads, evacuation shelter and quarry development. IRT effort will</p>

**NEWTOK**

<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>- USACE prepared designs for the road from the barge landing to the proposed evacuation center at Mertarvik in cooperation with ADOT. Corps is working with the IRT to provide NEPA documentation, obtain a Coastal Zone Consistency Determination, and Water Quality Certification. This should help expedite processing of needed permits when it is determined which agency will provide funding and staff for construction support of the IRT building a base camp in 2009.</li> </ul>	<p>commence Summer 2009.</p> <p>USACE road design was completed by March 1, 2009.</p> <p>Corps signed a Project Partnering Agreement with the Newtok Tribal Council in Jan 09 to enable construction of a road and evacuation center at Mertarvik if/when Federal funding is received.</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b></p> <p>Newtok community and airport relocation alternatives (approx \$70k) and Mertarvik Barge Landing Project design (approx \$150k)</p> <p>ADOT/PF received state resources and used approximately \$70,000 to survey the Newtok/Mertarvik Village Relocation site and surrounding airport relocation alternatives. The DOT Contractor acquired aerial mapping utilizing existing photography previously acquired by the Army Corps of Engineers, which had been aerotriangulated, and by flying a new series of more detailed photography. Products included digital topography files at 5' contours, and 1 inch = 200 feet planimetric detail maps. These products will help with further evaluation of airport relocation alternatives for the community. The level of surveying provided will also help with actual design efforts for the airport, and will reduce the need for additional survey work during the design phase of the project. Approximately \$1.8 million is being used to help complete the Mertarvik Barge Landing Project design.</p> <p>Coordination has resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.</p> <p>Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans, will result from early coordination.</p>	<p>Barge landing project is scheduled for construction completion by July 15, 2009.</p> <p>See DOT accomplishments later in this section.</p>

**SHAKTOOLIK**

<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>                      State resources were provided to the Alaska DHS&amp;EM to work jointly with Shaktoolik and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p>	<p>Developing plans, trainings and drills has been initiated and will be completed by end of 2009.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>                      DCCED/DCRA staff is working with the Village of Shaktoolik to develop a proposal for a community planning grant that addresses IAWG’s recommended immediate actions for Shaktoolik through the Alaska Climate Change Impact Mitigation Program.</p>	<p>Discussions and collaborations are in progress between DCCED/DCRA and the Village of Shaktoolik. It’s likely a community planning grant/contract will be in place in June 2009.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b>                      Kawerak completed a preliminary design/reconnaissance report of the evacuation road and a route to a safe high ground site, and has identified multiple sources of funding for engineering and design for FY10.</p>	<p>In Dec. 2008, Kawerak with Denali Commission funding, completed a reconnaissance study for siting an evacuation road</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b>                      State resources were provided to ADOT/PF for early coordination and its participation with the USACE. The Corps initiated a shoreline protection study under Section 103 of its Continuing Authority Program to determine what alternatives would provide reasonable solutions to erosion and storm damage.                      Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.                      Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans will result from early coordination.</p>	<p>See DOT’s accomplishments later in this section.</p>

**SHISHMAREF**

<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>                      State resources were provided to the Alaska DHS&amp;EM to work jointly with Shishmaref and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p>	<p>Developing plans, trainings and drills has been initiated and will be completed by end of 2009.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>                      DCCED/DCRA staff is working with Shishmaref to develop a proposal for a community planning grant that addresses the IAWG’s recommended immediate actions for the community through the Alaska Climate Change Impact Mitigation Program.</p>	<p>Discussions and collaborations are in progress between DCRA and the City and Tribe of Shishmaref. It’s likely a community planning grant/contract will be in place in June 2009.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b>                      USACE engineers secured additional funding through the 2008 Federal Supplemental Appropriation from Congress for construction of rock revetments at \$10.5 mm.                      IAWG recommends a \$3 million request in FY10 Governor’s budget to begin construction of a revetment to protect the most vulnerable shoreline of community.                      USACE is also expending \$500k on design work for the additional revetment needed to protect the community. \$3 million for final phase of revetment in Governor’s Budget for FY10.</p>	<p><b>Phase 1:</b> 600 feet of rock revetment completed in Sep 08.  <b>Phase 2:</b> 750 feet of rock revetment under contract to be completed by Oct 09.  <b>Phase 3:</b> 550 feet of rock revetment under design in 2009; construction funding needed.  <b>Phase 4:</b> 1,225 feet to be surveyed in 2009; of this 325 feet will be new rock revetment and 900 feet will be raising existing revetments when funding is provided.                      Environmental studies were initiated for a programmatic EIS for community relocation with limited funding.</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b>                      State resources were provided to ADOT/PF for early coordination and its participation with the USACE to design and development of shoreline protection measures.                      Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.                      Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans, will result from early coordination.</p>	<p>Geotech data collection and analysis completed in 2008 for assessment to site evacuation/relocation road.                      See DOT’s accomplishments later in this section.</p>



**UNALAKLEET**

<b>IAWG Recommendation and Agency Actions</b>	<b>Status</b>
<p><b>Develop Suite of Emergency Plans and Training/Drills</b>                      State resources were provided to the Alaska DHS&amp;EM to work jointly with Unalakleet and prepare a suite of emergency plans including Emergency Operations, Community Evacuation and Hazard Mitigation, along with training, and conducting community drills to provide readiness in case of a disaster, most likely flooding and/or erosion.</p>	<p>Developing plans, trainings and drills will begin in February and will be completed by end of 2009.</p>
<p><b>Community Mitigation and Relocation Planning and Coordination</b>                      DCCED/DCRA staff is working with Unalakleet to develop a proposal for a community planning grant that addresses the IAWG’s recommended immediate actions for the community through the Alaska Climate Change Impact Mitigation Program.</p>	<p>Discussions and collaborations are in progress between DCCED/DCRA and the City and Village of Unalakleet. It’s likely a community planning grant/contract will be in place in June 2009.</p>
<p><b>Reduce State Capital Budget Expenditures by Leveraging Other Resources</b>                      \$5 million provided by the Alaska Legislature to the City of Unalakeet to build a section of a shoreline revetment designed by the Corps for a vulnerable portion of the beach                      USACE engineers obtained construction funding from the 2008 Supplemental Appropriation by Congress for a portion of the 1,500 foot rock revetment facing the ocean. This revetment is designed to provide long term protection for the Unalakleet waterfront                      ADOT/PF has secured resources from FAA to protect shoreline of the section of beach threatened by erosion adjacent to the airport.</p>	<p>USACE design work is complete and the construction contract is being advertised. Proposals were received Feb 20<sup>th</sup> and selection of a contractor is expected in April 2009. Construction could be completed in 2010 – if sufficient funds are available.                      Airport shoreline revetment completed.</p>
<p><b>ADOT/PF Preliminary Engineering &amp; Early Coordination</b>                      State resources were provided to ADOT/PF for early coordination and its participation with the USACE.                      Coordination resulted in working with community, DCCED and USACE to utilize existing data and identify missing data.                      Timely site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies, which all need to be conducted prior to developing erosion protection or relocation design plans will result from early coordination.</p>	<p>See DOT’s accomplishments later in this section.</p>

## ACCOMPLISHMENTS BY AGENCY

### **Division of Homeland Security & Emergency Management**

\$400,000 State funding and \$125,000 Federal funding

Based on the IAWG's April 17, 2008 Recommendations Report to the Governor's Subcabinet on Climate Change, the DHS&EM was funded to develop a suite of comprehensive emergency plans for the six communities in peril (Kivalina, Koyukuk, Newtok, Shaktoolik, Shishmaref, and Unalakleet). Each of the six communities will receive an emergency operations plan, continuity of operations plan, emergency evacuation plan, and the training to execute these plans. Since June 2008 DHS&EM representatives have made initial visits to each of the communities to develop a community planning team, initial hazard analysis, and a basic outline schedule on what is to come in the next year. Ecology & Environmental (E&E) was selected as the contractor to execute the comprehensive emergency planning. E&E has made their first string of visits to the communities. During these visits, members for the communities received ICS training, initial planning drafts, and community and emergency planning workgroup meetings were conducted. The contractor will be making a final visit at the end of Summer 2009/ Fall 2009, which will result in finalizing training, completed plans, and community adoption of the plans. The overall goal is to have comprehensive emergency plans for each of the 6 communities in peril by the Fall sea storm season of 2009.

Not only have the communities received ICS training and emergency plans, but they have been invited to DHS&EM tri-annual preparedness workshops with various themes ranging from before, during, and after a disaster, to creating a resilient community. Also during these workshops the communities are being exposed to the division SERC/LEPC (State Emergency Response Committee/ Local Emergency Planning Committee) meetings. Other workshops communities have attended include the Western Alaska Evacuation Workshop. This session brought communities from all over Western Alaska to work together on emergency planning issues, and mutual aid issues. The outcome of this training has helped the six communities in peril build better ties, relationships and communications with neighboring communities within their regions.

Since **Developing the Suite of Emergency Plans and Training/Drills began**, Alaskan communities are becoming more involved with hazard mitigation, emergency planning, response, and training in partnership with DHS&EM.

### **Alaska Department of Commerce Community and Economic Development –**

#### **Division of Community and Regional Affairs**

\$500,000

#### **Alaska Climate Change Impact Mitigation Program**

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 being administered by the Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs (DCRA).

The ACCIMP is being delivered through grants to meet specific objectives. The program initially directs the majority of grant funds at communities identified as imminently threatened by the Governor's Subcabinet on Climate Change, Immediate Action Workgroup (IAWG). These communities are Shishmaref, Kivalina, Newtok, Koyukuk, Unalakleet and Shaktoolik.

The ACCIMP is providing non-competitive funding to these communities for Community Planning Grants to address the recommendations for immediate actions made by the IAWG in its Recommendations Report to the

Governor's Subcabinet on Climate Change, April 17, 2008. Development of community planning and/or hazard impact assessment grants for the six communities named above is currently underway.

The balance of ACCIMP funds will be offered as competitive mini-grants to eligible communities for hazard impact assessments to identify climate change-related natural hazards such as erosion, flooding, storm surge, thawing permafrost, and wildfires, and to provide recommendations for further action by the community.

Solicitation for the competitive mini-grant program opened January 12, 2009 and ended February 16, 2009.

<p style="text-align: center;"><b>Alaska Department of Transportation &amp; Public Facilities</b> <b>Infrastructure and Erosion Control Design and Environmental Permitting</b> \$600,000</p>
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This funding is allowing the Department of Transportation and Public Facilities to begin early project coordination with the affected communities as well as other State and Federal Agencies. The US Army Corps of Engineers has conducted several studies regarding erosion control structures and other relocation options that the department needs to review and examine. The department also needs to begin to collect available engineering data and identify gaps in data for additional investigations.

Funding will also allow for preliminary engineering investigations to begin so that project development can move ahead in an orderly, timely, and efficient manner. Site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies will all need to be conducted prior to developing erosion protection or relocation design plans. Because all likely project scenarios will involve extensive environmental documentation and permitting, it is critical that the project development process start as early as possible.

**Work to Date:**

- Approximately \$70,000 used for a survey of the Newtok/Mertarvik Village Relocation site and surrounding airport relocation alternatives;
- Approximately \$150,000 for the Barge Landing Project design (both detailed in the Newtok Accomplishments); and
- Approximately \$240,000 has been allocated to the Northern Region to begin early coordination with the affected communities as well as other State and Federal Agencies. Preliminary engineering and data collection efforts are currently underway. Project deliverables include:
  - *Unalakleet Project Coordination with USACE, ADCCED, and Denali Commission*
  - *Electronic Resource Library, including index*
  - *Data Gap Identification and Collection Plan*
  - *U.S. Corp of Engineer Plan Reviews and Coordination*
  - *Agency Stakeholder Contact List*
  - *Permitting Agency Contact List*
  - *Coastal Erosion Power Point Presentation*
  - *Community meeting notes and Summaries*
  - *DCRA Website Coordination*
  - *Report identifying existing coastal processes and alternatives as related to sediment transport for the affected communities, including a sediment budget for the communities*
  - *Other preliminary tasks, such as collecting environmental, geotechnical, and survey data are also scheduled to be performed this spring/summer*

**Department of Natural Resources**  
**Statewide Update on Community Wildfire Protection Planning Efforts and Funding**

Appendix A also includes the list of communities with Community Wildfire Protection Plans (CWPP) completed or underway.

Funding for the completion of CWPP's has been sporadic and has come from several different sources and agencies. The Division of Forestry in conjunction with the Alaska Wildland Fire Coordination Group (AWFCG) has recognized the need for a National Fire Plan Coordinator position in Alaska to oversee the coordination, funding and implementation of the CWPP effort statewide. The agencies are working toward this goal, and in the meantime are completing work by utilizing various agency budgets and staff as time and funding permits.

The National Economic Stimulus Plan has allocations for Wildland Fire Management in both the House and Senate passed versions of the bill. While final funding levels will be established by the conference committee, significant funding will become available to complete new CWPPs and to implement hazard fuel reduction projects recommended by these plans. Funding will flow through established programs via the U.S. Forest Service, State and Private Forestry Programs to the State through the Division of Forestry.

In addition, under the Climate Change Subcabinet, both the Natural Systems Adaptation Technical Workgroup and the Forestry, Agricultural and Waste Mitigation Technical Workgroups have proposals for continuing CWPP work as part of their recommendations to their respective Advisory Groups.

**U.S. Army Corps of Engineers Planning, Design and Construction**

Funding for the Corps participation in IAWG identified projects in 2008 was provided by Congress from a Supplemental Appropriation (\$40m), the Alaska Coastal Erosion Program (\$5.4m), the Tribal Partnership Program (\$689k), and the Continuing Authorities Program (\$114k). This enabled construction contracts for rock revetment projects at Shishmaref, Kivalina and Unalakleet to be advertised and awarded at Shishmaref and Kivalina. Due to high initial bids at Unalakleet, the contract documents were revised and readvertised so construction proposals could be evaluated in March 09. Designs for additional phases of construction continued at Shishmaref, Kivalina, and Newtok under the Alaska Coastal Erosion program. Under the Tribal Partnership Program the Alaska Baseline Erosion report was drafted which evaluated the erosion risk at 179 communities and identified 26 Priority Action Communities. A final report is due in April 09. Studies were continued at Shaktoolik, Point Hope, Nome, Chefornek, Koyukuk, and Barrow regarding erosion and/or flooding problems.

**National Oceanic and Atmospheric Administration**

The National Oceanic and Atmospheric Administration is working with the IAWG to define priorities for the tide and water level stations, weather observations, geodetic control information and ice forecasting, called for in the IAWG April 2008 report.

In December 2008, the NOAA Alaska Regional Collaboration Team submitted a tide gauge priority list incorporating IAWG interests can be found at:

[http://www.ppi.noaa.gov/NOAA\\_ARCTic/docs/AKTideGaugePriority\\_ARCTic.pdf](http://www.ppi.noaa.gov/NOAA_ARCTic/docs/AKTideGaugePriority_ARCTic.pdf) This list will be used by the Center for Operational Oceanographic Products and Services to guide future deployments: The next step will be for the State to help NOAA identify facilities (e.g. pier) with communications and power in the priority areas where the gauges can be sited. The upcoming release of the National Wave Observation Plan will include

several new sites along the west coast, based on IAWG input, for buoys and other instrumentation. The plan will describe an ideal state and implementation of the proposed network will be affected by feasibility, availability of funding, and national prioritization.

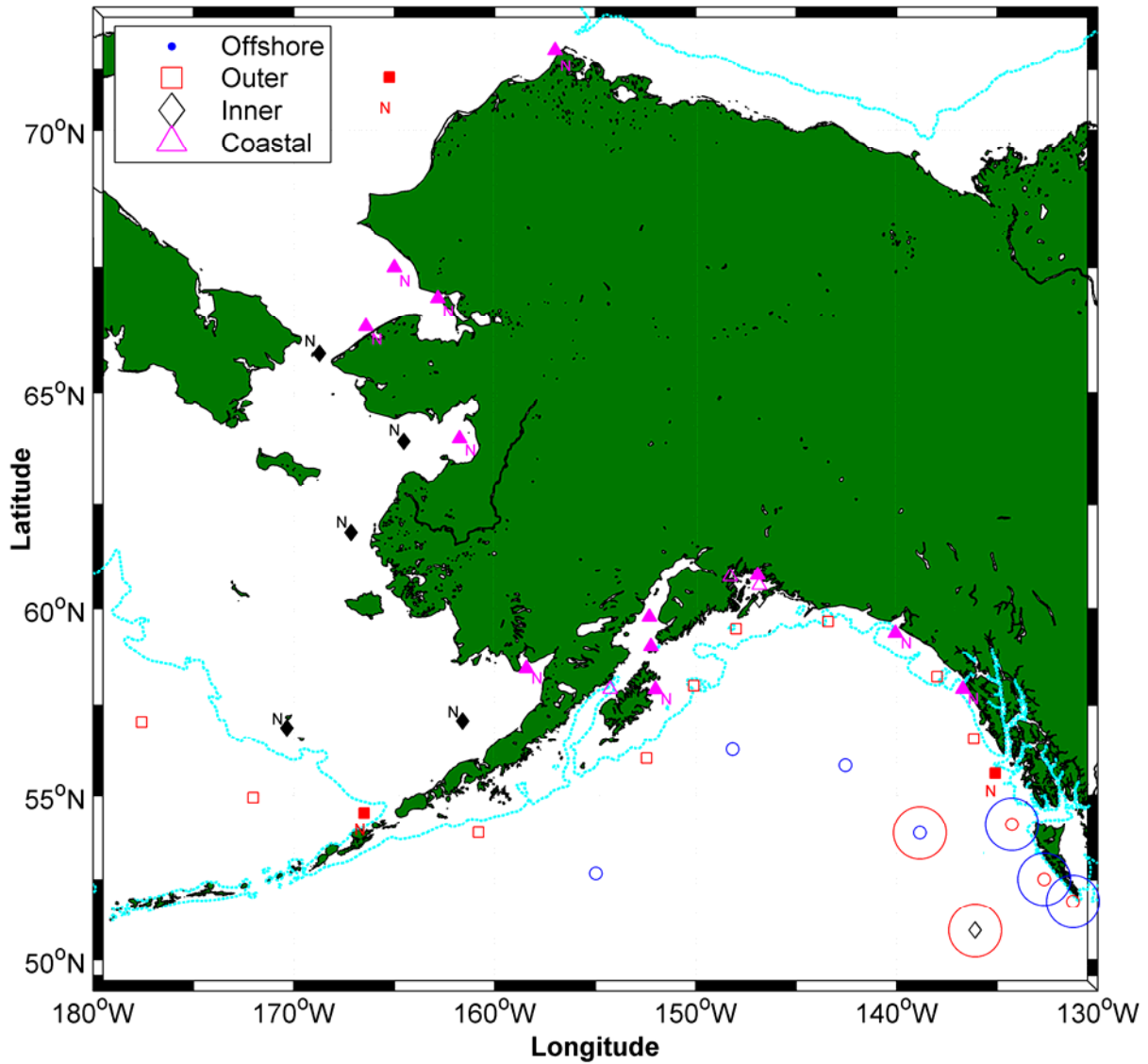
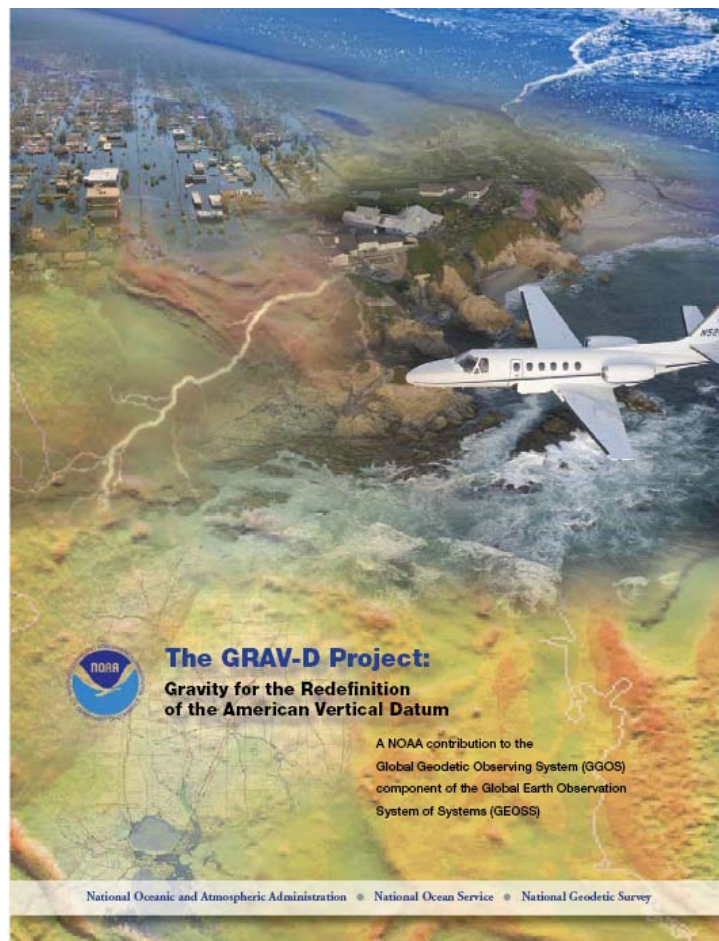


Figure 1: Proposed ideal locations of wave observing infrastructure - IAWG input influenced the addition and location of the new sites along the west coast



*Figure 2: Alaskan Littoral Regions (excluding the Aleutians) and Southern Alaska are the first two areas of the country to be addressed.*

Improved geodetic control will be achieved through the agency's "Gravity for the Re-definition of the American Vertical Datum" program which is awaiting appropriations. This program will reduce vertical positioning errors from ~2 meters to ~2 centimeters and will be complimented by the Alaska Statewide Digital Mapping Initiative.

Efforts are also underway to formally document the priorities for enhanced ice forecasting.

**IMMEDIATE ACTIONS  
FOR  
COMMUNITIES**





## 2009 Immediate Action Funding Recommendations

Community	Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>All Six Communities</b></p> <p>DHS&amp;EM is advancing these Emergency Plans in each of the six communities.</p> <p>It anticipates all 6 to be completed by calendar end 2009.</p>	<p><b>Develop Suite of Emergency Plans and Training/Drills</b> (Alaska DHS&amp;EM is lead) Emergency Operations, Community Evacuation, Hazard Mitigation Fire Management (Koyukuk only-DNR is lead)</p> <p>Purpose: Best chance to reduce loss of life and property when natural disasters occur.</p> <p>Coordinate with community planning projects to ensure dollars go as far as possible.</p>	<p><b>FY09 - \$400,000 appropriated in Capital Budget to DHS&amp;EM.</b> DHS&amp;EM RSA \$25,000 to DNR for Koyukuk Fire Management Plan. DHS&amp;EM will also provide \$100,000 federal funds match.</p> <p><b>State's Return on Investment:</b> DHS&amp;EM estimates for every \$1 spent on preparation, \$4 saved in response.</p>	<p><b>FY10 IAWG Budget Recommendation: \$500,000 (not included in Governor's Budget)</b></p> <p><b>IAWG continues to support this important and initial step to ensure preparedness for communities, and prevent harm to infrastructure. IAWG has identified over 150 communities as potentially in peril. See Appendix A.</b></p> <p><b>DHS&amp;EM will explore other funding opportunities, e.g. Denali Commission and CIAP for the most threatened regions in Alaska.</b></p>
<p><b>All Six Communities</b></p>	<p><b>Community Climate Change Mitigation and Relocation Planning</b> Funding for future relocation planning efforts for each community require coordination and resources both at the community and agency levels. Communities need funding and technical assistance to support/augment local capacities. Rational and collaborative planning needs to examine alternatives (e.g. shoreline</p>	<p><b>FY 08 Supplemental</b> - Initial funding was included in this Budget bill to develop relocation planning resources.</p> <p>IAWG 2009 Policy Recommendations addresses how to identify communities, assess and analyze their mitigation and relocation needs due to impacts likely caused by climate change phenomena.</p>	<p><b>FY10 IAWG Budget Recommendation: \$300,000 (\$300,000 included in Governor's Capital Budget)</b></p>

## 2009 Immediate Action Funding Recommendations

Community	Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
	<p>stabilization/protection vs. relocation) and identify the opportunities for implementation.</p> <p><b>Cost Effective:</b> When coordinated, Emergency Preparedness, Community Relocation and other community project planning and project developments have cost-effective results.</p>		
<b>All Six Communities</b>	<p><b>Reduce Capital Budget Expenditures</b></p> <ul style="list-style-type: none"> <li>- Through inter-agency and local coordination identify capital cost savings by aligning timing of projects requiring heavy equipment.</li> <li>- State should establish co-sponsorship funding to ensure Alaska attracts federal funds for its priority projects.</li> <li>- Find/develop Western Alaska rock source to reduce costs.</li> </ul> <p><b>35% Funding Co-Sponsorship:</b> Based on recommendations from former Senator Stevens at recent roundtables and other meetings.</p>	<p><b>Immediate and Near Term Capital Budget Estimates: Former Senator Ted Stevens suggested that the State should be prepared to match/augment federal funds with a target of 35% of erosion control and mitigation capital costs.<sup>2</sup></b></p> <p>This will ensure the highest likelihood that federal funds will be allocated to Alaska, given the competitive nature of these funds.</p>	<p><b>2009 - IAWG Reaffirms this recommendation of 35%, or at least at a level that encourages State-Federal partnership funding to protect existing communities and infrastructure from threats by climate related impacts.</b></p>

<sup>2</sup> March 24, 2008 Email from P. Opheen, USACE Alaska District: Water Resources Development Act of 1986: the following sections set the basis for the USACE cost sharing policies including in both the Planning Guidance Notebook and the Digest of Water Resources Policies and Authorities. Section 103 mandated cost sharing for construction of flood control and other purposes. Section 104 mandated cost sharing for feasibility studies, and preliminary engineering design (PED). It states in part that (para (a)(1)) "The Secretary shall not initiate any feasibility study for a water resources project after the date of enactment of this act unto; appropriate non-Federal interests agree, by contract to contribute 50 percent of the cost for such study...". It further states in paragraph (b) Planning and Engineering: "The Secretary shall not initiate any planning of engineering authorized by this Act for a water resources project until appropriate non-Federal interest agree, by contract to contribute 50 percent of the cost ...".

Although Senator Stevens has sponsored authorizing legislation to conduct coastal erosion projects for Alaskan Native Villages at 100 percent federal cost the authorization did not change budgetary policy or procedures, or the Administration's policies on mandating cost sharing for Civil Works studies, PED or construction. The budget guidance addresses non-budgetable (policy non-compliant) studies and projects by addressing them in what is known as increment 9 of the budget submission reflecting our capability to perform the work.

## 2009 Immediate Action Funding Recommendations

Community	Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
All Six Communities	<p><b>Preliminary Engineering and Early Coordination</b>                      Funding will allow for preliminary engineering investigations to begin so that project development can move ahead in an orderly, timely, and efficient manner. Site surveys, material source investigations, hazard mapping, geotechnical and hydrologic studies, and environmental documentation and permitting studies will all need to be conducted prior to developing erosion protection or relocation design plans. Because all likely project scenarios will involve extensive environmental documentation and permitting, it is critical that the project development process start as early as possible. Will also allow for early coordination between agencies and affected communities and a review of existing data, reports, and plans.</p>	<p><b>FY09 - \$600,000 appropriated in Capital Budget to ADOT</b></p> <p>USACE, ADOT, HS&amp;EM, DCCED have all identified Shishmaref, Kivalina, Shaktoolik and Unalakleet as of significant risk where - a phased and coordinated approach to project development is needed to ensure infrastructure and community-wide safety.</p>	<p><b>FY10 IAWG Budget Recommendation \$500,000 (\$100,000 included in Governor's Capital Budget)</b></p>
All Six Communities – and to Address What will Likely Become a Statewide Need	<p><b>Identify and Develop a Data Strategy</b> to support government, community and business decisions.</p> <p>IAWG 2009 Policy #4 further details its Data Collection and Coordination Strategy originally presented in its 2008 Report.</p>	<p><b>IAWG did not provide any budget estimates for this Strategy in FY 09.</b></p> <p><b>IAWG reaffirms its support for this important element.</b></p>	<p><b>FY 10 IAWG Budget Recommendation \$0</b></p> <p><b>Some funding for travel for community participants may be useful.</b></p>
All Six Communities	<p><b>Data Needed to Advance IAWG Recommendations</b></p> <ul style="list-style-type: none"> <li>- Data for developing emergency and other community plans. (EM is familiar with the data needed.)</li> <li>- Horizontal and vertical control data for establishing plans for relocation and evacuation routes based on what flood levels have</li> </ul>	<p>IAWG has been working with NOAA and providing input on priorities for data and informational needs in Alaska.</p> <p>Until a Data Strategy (interagency effort) is conducted, identifying and collecting the data needed will likely not be done in a systematic way to ensure projects can move forward as needed.</p>	<p><b>Some funds for data collection may be used through the various activities identified in IAWG Recommendations.</b></p>

## 2009 Immediate Action Funding Recommendations

Community	Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
	<p>historically happened - note there is good horizontal and vertical control data at the Red Dog Port which is directly applicable to Kivalina).</p> <ul style="list-style-type: none"> <li>- Weather observation stations should be established and tied into the current, closest data collection sites for monitoring weather-related storm data whether from ice jams, seasonal river rise, storms, storm surges or floods.</li> <li>- A template to develop a Continuity of Operations (COOP) Plan is available on DMVA/DHSEM's website</li> <li>- Yukon River Intertribal Watershed Council model may be useful too.</li> <li>- Integrate with Western Communities Evacuation Plan.               <ul style="list-style-type: none"> <li>-Work with NOAA to document ice forecasting requirements, and</li> <li>- To reduce vertical control errors from 2 m to 2 cm.</li> </ul> </li> </ul>		<p><b>IAWG recommends the state work with NOAA to 1) identify suitable locations for tide and water level stations in the IAWG's priority areas (see Appendix B) and 2) develop a viable implementation plan and schedule. These stations should include a meteorological sensor suite.</b></p> <p><b>IAWG recommends that the state support the appropriation of federal funds to implement the Gravity for the Re-definition of the American Vertical Datum program.</b></p>
<p><b>All Six Communities and to Address Statewide Need</b></p>	<p><b>IAWG Recommendations: Identify and conduct coordinated strategy.</b></p> <ul style="list-style-type: none"> <li>- Through inter-agency and local coordination identify cost savings, such as</li> <li>- Align timing of projects requiring heavy equipment.</li> <li>- State needs to establish a fund to ensure co-sponsorship is available if/when federal funds.</li> </ul>	<p><b>Described in Recommended Policy 1 and 2</b></p>	<p><b>No Budget Identified</b></p>

## 2009 Immediate Action Funding Recommendations

Community	Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
	<ul style="list-style-type: none"> <li>- Find/develop Western Alaska rock source to reduce costs.</li> <li>- Local coordination is needed to assist with planning efforts and project alignment.</li> <li>- Local capacity building and augmenting community's administrative capacity is required.</li> </ul>		

## KIVALINA

**Situation Description:** Ongoing erosion and flooding concerns have caused problems for a number of years. The recently installed seawall was ineffective at arresting erosion and was severely damaged with sections completely destroyed during the minor storm events of 2006. The USACE has an approved project for 3,300 linear feet of rip rap revetment with a current estimated cost of \$26 million. With the recent fluctuations in fuel costs this estimate is still likely low. The USACE constructed 400 ft of revetment in 2008 and plans to construct another 1200 ft in 2009, at a contract cost of \$12.5 million. The NW Arctic Borough intends to construct the last 400 ft in 2010. Erosion is threatening the waste storage containment area located at the dump site. This is a potential environmental catastrophe for the surrounding water bodies. It will contaminate the area where subsistence activities are still practiced i.e. fishing and storage of fish on the lagoon side of the island.

**Description of Immediate Need:** 2000 LF is needed to *provide interim protection* for critical structures and residences on the ocean-side of the island while long-term plans for Kivalina are worked through. Anticipated contract cost is \$16M<sup>3</sup>. USACE awarded 1,600 feet of revetment at a cost of \$12.5 million (400 ft constructed in 2008 and 1200 ft to be constructed in 2009). NW Arctic Borough intends to fund construction of the last 400 ft in 2010.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>Revetment/Erosion Control Project</b></p> <p><b>Near-term (next 18-24 months):</b> Construction of 2000 LF linear feet of rip rap revetment with a current estimated cost of \$16 M .to protect critical structures and residences on the ocean-side of the island where catastrophic erosion is taking place.</p> <p><b>Intermediate-term:</b> Construction of 1300 LF of rip rap revetment to provide interim protection to critical structures and residences at the lagoon side of the island. Estimated cost is \$10 M. Total anticipated revetment project is \$26 M. (protection for both ocean-side and lagoon-side of island).</p>	<p><b>FY09 - \$3.3 million appropriated in Capital Budget, to the NW Arctic Borough</b></p> <p>Phase 1: USACE – 400ft built in 2008 and 1200 ft in 2009. Another 400 ft (\$3.3 from NWAB) will be built in Summer 2010.</p> <p>Phase 2: Lagoon-side 1300 ft revetment: USACE began design during Winter 2009. Intermediate-term Estimated State Capital Funding needed – \$5.8 million.</p>	<p><b>FY10 – NWAB and USACE will complete Phase 1 with funds appropriated in FY09 timeframe.</b></p>

<sup>3</sup> The base bid for the project is \$3.9 M for constructing 400 LF of rock revetment, with a total cost of \$4.5 million. This contract includes four options to construct 400 LF each at approximately \$2.4 million each, if funds are received before Mar 09. A contractor mobilization cost of \$375,000 would also be required for the second year of construction.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>State of Alaska should serve as 3<sup>rd</sup> Party Reviewer for geologic aspects of USACE (Relocation) Assessment Reports</b> Alaska DGGS as lead.</p>	<p><b>FY09 Budget Estimate:</b> \$12,000<sup>4</sup>  DGGS was only able to conduct a preliminary in-house review of USACE reports; full review awaits. (Unable to complete due to staffing levels.)</p>	<p><b>Late FY 09/FY10 – IAWG recommends DGGS conduct using CIAP funding already in hand. Hiring freeze will be a hindrance to this action.</b></p>
<p><b>Relocation Feasibility Study</b> Geologic Mapping (Alaska DGGS as lead).</p>	<p><b>Budget Estimate:</b> \$180,000</p>	<p><b>Late FY09/FY10 - Funding for mapping approved through CIAP funds for 1 or 2 communities only. If hiring freeze lifted, study may begin in 2009.</b></p>
<p><b>Evacuation Road Feasibility Study:</b> NWAB and Denali Commission – leads</p>	<p>DGGS/Geologic Mapping is needed first</p>	

<sup>4</sup> This budget estimate is only for DGGS review of geologic aspects of the USCOE's relocation assessment reports. Broader, full review would involve many more participants and may not be appropriate for DGGS to lead. For review of all aspects, I suggest DCCED take the lead and draw on DGGS as well as other appropriate agencies. A larger budget estimate is needed if this is the intent. (Rod Combellick, DGGS edits to March 20, 2008 draft IAWG Recommendations Report).

## KOYUKUK

**Situation Description:** There are three types of serious threats/impacts facing Koyukuk –erosion, flooding, and fires. The entire village of Koyukuk lies within the floodplain of the Yukon River. Erosion occurs during anytime the river is open and specifically during high flow events on the Yukon River. These events happen throughout the year, including floods during spring breakup ice jam events; spring/ summer/fall significant rainfall events; wind, and permafrost melt at Koyukuk and upstream. These floods are often severe, inundating a majority of the Village and sometimes requiring evacuation of citizens to other villages. These problems have been persistent and serious enough – often flood warnings provide only a 2 hour window to evacuate – that the community has begun planning efforts to relocate themselves to higher ground above the floodplain of the Yukon River upon nearby Koyukuk Mountain.

**Overarching Problem:** No definite timeline or authorities for erosion control and/or relocation makes it difficult to plan for needed erosion control projects and relocation. It's difficult to coordinate and focus resources.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>FY10 Immediate Action</b> and capital budget recommendation is for DOT/PF to conduct Engineering Studies: reconnaissance study, preliminary engineering and environmental work, and final design for an evacuation road.</p> <p><b>Upgrade Existing Road:</b> Ensure road is passable during flooding.</p> <p>Tribal Administrator believes that riprap along the lower part of the road near the river is all that's needed. Portions of the airport were done in 2006.</p> <p><b>Review Feasibility/Options Report:</b> Koyukuk, DGGs, ADOT/PF, and DCCED should review the USACE Recommendations Report to provide feedback/reality check to the USACE Report was recently provided to Koyukuk community. USACE representatives travel to Koyukuk to meet with community.</p> <p>USACE draft report proposes relocation of the community to higher ground because 11 structures are at risk from erosion and most other structures are in the flood plain. <i>Regulatory issues identified to allow current community to remain as a fish camp or the like.</i></p> <p><b>Coordination Among:</b> Koyukuk, USACE, ADOT/PF, DCCED, DHS&amp;EM for preliminary engineering, planning, and funding strategy.</p>	<p><b>FY09 Capital Budget included funding for Feasibility Review.</b></p> <p>Coordination and reviews during FY08 &amp; FY09 were covered in FY08, FY08-Supplemental, or FY 09 Capital Budget (with Community Planning grants and DHS&amp;EM Emergency Planning/Training).</p>	<p><b>FY10 IAWG Budget Recommendation \$800,000 (\$400,000 included in Governor's Capital Budget)</b></p>



<b>Immediate Actions Identified to Prevent Loss of Life and Infrastructure</b>	<b>Past and Future Budget Notes</b>	<b>IAWG Action</b>
<p><b>Elevate Current Structures:</b> Koyukuk has identified this action as a means to prevent damage to infrastructure from floods. The community will work through existing organizations, such as Tanana Chiefs Conference, DCRA, AHFC, Interior Housing Authority to seek technical assistance and funding.</p>		<p><b>Provided Koyukuk with organizations and agencies to contact for assistance.</b></p>
<p><b>Build Evacuation/Emergency Center:</b> Ensure Koyukuk has an emergency shelter. Need to address issues in Feasibility Report and identify decisions acceptable to community and funders. <b>IAWG Comments:</b> Recommended actions/next steps for the Shelter have been provided to the Community by the USACE in the report identified in Project 2. If Koyukuk wants to move forward with the USACE recommendation, then studies (geological, etc.) need to be conducted to ensure the selected site is satisfactory.</p> <p>A project cooperation agreement will need to be signed between the community and the USACE. Recent experience with similar projects shows this is not a significant effort.</p> <p>A clear process for site assessment, etc. along with a funding strategy will need to be developed.</p> <p>Permitting and environmental coordination is ongoing. No significant issues have arisen for ESA, wetlands, or SHPO, though coordination will continue.</p>	<p><b>FY11 or Future Capital Budget: Evacuation Center Construction Estimate: \$4.5 million.</b></p>	

**NEWTOK**

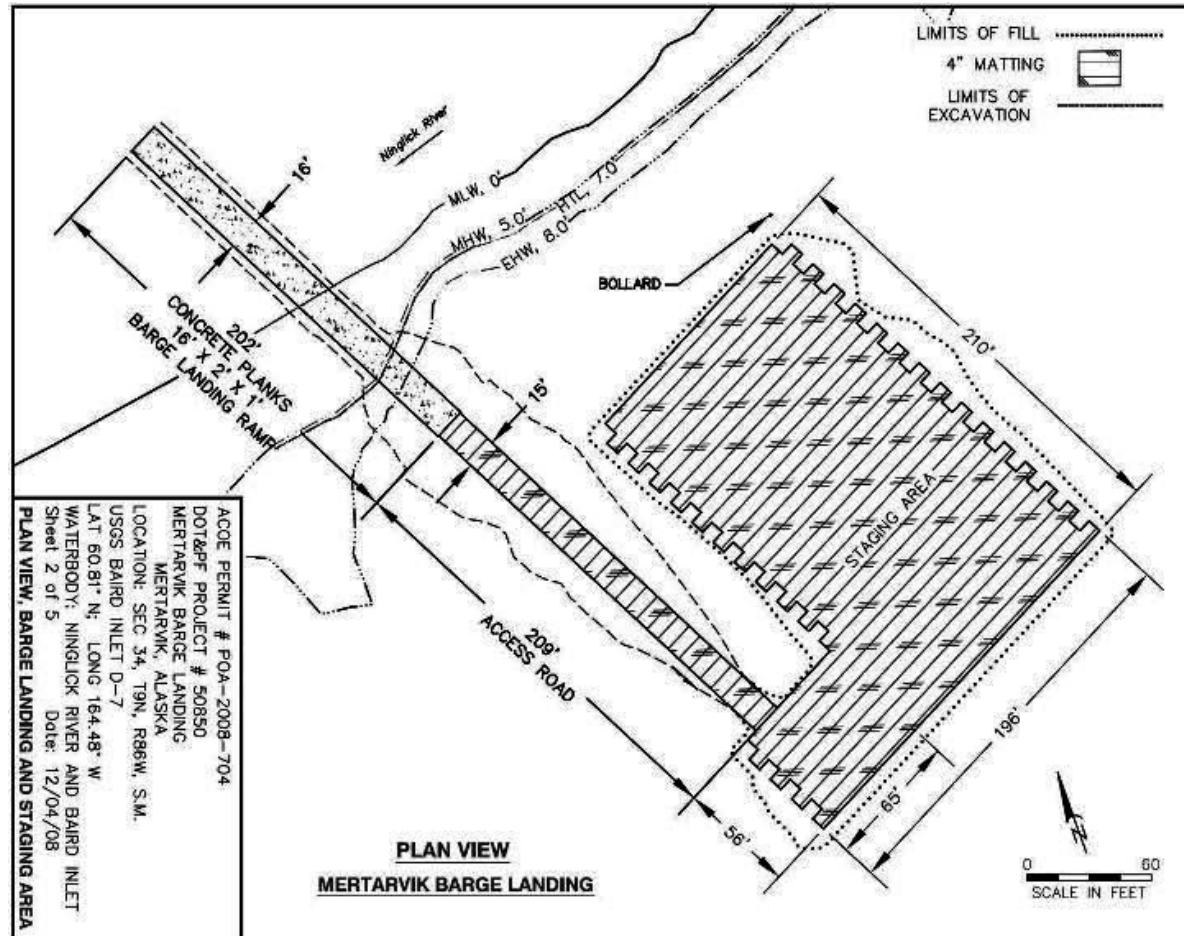
**Situation Description:** Newtok facilities – both public and private – have already been severely damaged by erosion and storm surge flooding due to lack of sea ice, and it’s anticipated that continued erosion and destruction of public and private facilities are imminent. Problems endemic to many rural Alaska communities, such as a lack of adequate drinking water and sanitary sewage disposal, have been worsened by the erosion and flooding.

**Overarching Problem:** No definite timeline or authorities for erosion control and/or relocation makes it difficult to plan for needed erosion control projects. It’s difficult to coordinate and focus resources without funding sources and timeline.

**USACE Status:** Designs are underway for the road from the barge landing to the evacuation center at the new town site for Newtok. USACE does not currently have funding to construct the road, which is estimated at \$15 million.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>Build Staging Area for Barge Landing</b> – Ensure ability to receive supplies.</p> <p><b>FY 10 Capital Budget</b> of \$2mm will develop material site and produce rock for <b>construction of barge staging area, evacuation center road</b>, and IRT camp facility construction staging area. Construction will be completed through an Innovative Readiness Training exercise, estimated at \$3.5-\$5 Million, beginning in summer 2009. In the 2009 construction season the barge landing and staging area will be completed at the Mertarvik site. A <b>fuel distribution header and pipe</b> will be built at the Newtok existing town site that will allow for barges to offload fuel to supply fuel for electrical generation. In 2009 the Innovative Readiness Training program in the Department of Defense has agreed to begin development of the Mertarvik site as a military training exercise. U.S. Navy has located an office at ADEC to coordinate this project.</p> <p><b>Build Road to Evacuation Site</b> – Ensure community has access to shelter (1.5 miles).</p> <p><b>Build Evacuation Center/Shelter</b> – Ensure community has an emergency shelter (approx 4,000 sq ft + 2,000 sq ft equipment shelter).</p>	<p><b>FY09 Capital Budget includes partial funding to DOT&amp;PF combined with an \$800k EDA grant to complete barge landing and staging area at Mertarvik by July 15, 2009.</b></p> <p>IRT Road project will be worked on from July 15-Sept. 1, 2009 with Newtok Project as its national top project.</p> <p>CCHRC design of evacuation shelter significantly reduced costs.</p> <p>FY08 Supplemental Capital Budget included \$279,000 coordination and planning funds for staging, landing, road and shelter.</p> <p><b>Coordination Among</b> Newtok, USACE, ADOT/PF, DCCED, and the Newtok Planning Group have determined what road standards are needed and how to leverage resources to build the road and shelter. USACE and Newtok Tribal Council entered into a Project Partnering Agreement in Jan 09. Coordination was expanded to Navy in FY2009 and it was determined that building the Evacuation Shelter</p>	<p><b>FY10 IAWG Budget Recommendation: \$2,000,000 (included in Governor’s Capital Budget- and will leverage Federal IRT funding of \$3.5-\$5 million.)</b></p> <p><b>FY 11 funding recommendation: \$5 million to develop quarry for materials use by IRT</b></p>

	can be used as a training exercise for IRT. ADEC-Village Safe Water completed new well at current site.	
<p><b>Airport Planning - Step 1 – Site Selection</b>          ADOT/PF recently received approval for a second year of wind and geotechnical studies by FAA. Four runway alternatives are being studied. Selection of a preferred alternative is expected by spring 2009.</p>	<p><b>IAWG Comment:</b> Scenarios should be identified for a new airport with various functionalities that can then be reflected in different cost structures.</p>	



Conceptual design of Mertarvik Barge Landing and Staging Area. ADOT/PF

## SHAKTOOLIK

**Situation Description:** The community is vulnerable to erosion when fall storms hit the sand and gravel spit upon which the community resides. There is no breakwater to protect the community from destructive waves from Norton Sound when storms come from the southwest. In severe storms, the community becomes an island. The beaches have historically been susceptible to damage and erosion from storm conditions, tidal surges, and from the sea ice conditions. Logs that float down the Yukon change from being protective to becoming destructive during storms surges. Several areas along the coastline used by the people in Shaktoolik are vulnerable to erosion and flooding during the storm season Over the past three floods natural barriers have eroded substantially.

**Overarching Problem:** No definite timeline or authorities for erosion control and/or relocation makes it difficult to plan for needed erosion control projects and relocation. It's difficult to coordinate and focus resources.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	IAWG Action
<p><b>Preliminary Relocation Site Assessment</b> for relocating village.  <b>Corps Section 103 Storm Damage Reduction Study</b>                      Initiated and progressing to evaluate protection of strategic locations in the community and the water supply.</p> <p><b>Evacuation Road – Approx 8.5 miles</b>  <b>Step 1:</b> FY 09: Reconnaissance Study, funded by Denali Commission (completed)  <b>Step 2:</b> FY 10: Road Design and Engineering                      The recon study is adequate to begin the permit process for coastal engineering.  <b>Step 3:</b> Unknown timing for Construction</p> <p><b>Coordination Among Shaktoolik, Kawerak, Federal, and State Agencies:</b> Funding, design, etc.</p>	<p>FY08 Supplemental included funds (estimate is \$150,000) for preliminary relocation site assessment. (DCRA Community Planning Grant – in 2009.)</p> <p>Land Exchange (12a) for identified relocation site is needed. Local Community, Village Corporation, and Regional (Kawerak) are working on this. GPS coordinates identified in 2008.</p> <p><b>Road Budget Estimate:</b> Reconnaissance Study estimates road design at \$3mm. Current commitments from Denali Commission for \$1mm, Kawerak for \$1mm, and BIA- IRR \$500k pending, high priority projects. Shaktoolik/Kawerak are requesting State for \$500k “match”.                      Funding should be pursued and coordinated to develop both the permits and road design, concurrently.</p>	<p><b>FY 10 IAWG Recommendation: \$500k from state to leverage other funding for design of Shaktoolik relocation road. (Not in Governor’s Capital Budget)</b></p> <p><b>Village of Shaktoolik needs to request Congress it be added to the Alaska Coastal Erosion Program under authority of Section 117.</b></p> <p><b>Examine shorter term solution of constructing evacuation shelter in existing community to allow safe shelter in case of flooding.</b></p>
<p><b>Hazard Mapping Study</b>                      Geologic Mapping (Alaska DGGS as lead)</p>	<p><b>DGGS Budget Estimate:</b> \$180,000</p> <p><b>USACE CAP limit:</b> \$3 million Federal with 35 % local match required for construction.                      Current funds: \$70,000 available for study.</p>	<p><b>FY10 IAWG Recommendation: ~\$180,000 DGGS will only be able to study 1 or 2 communities in 2009 due to funding. Hiring Freeze is a hurdle.</b></p>
<p><b>Cabins and 30kw Generator</b>                      Shaktoolik identified that Cabins built for emergency use.</p>	<p>Community is moving forward with this project for emergency housing along new Evacuation Road route.</p>	

## SHISHMAREF

**Situation Description:** Shishmaref has been threatened by erosion for many years with recent increases due to the lack of sea ice during the fall storm season. A partially completed USACE project is providing protection for portions of the shoreline.

**USACE Description of Need:** The washeteria and lagoon are not protected, but 750 LF is under contract by USACE to install by Oct 09. The length was determined by funds availability. USACE anticipates the contractor will mobilize for the Summer 2009 to complete that segment. This increment of rock revetment was awarded for \$10.5 million for construction cost, which would protect homes and a church. Another 550 feet of rock revetment for the northeastern area is under design and needed to protect the washeteria and the sewage lagoon at an estimated cost of \$7.75mm – funding is still needed. Revetment needs to be extended for the protection of the southern end of the Village by 325 ft and raise the other 900 existing ft – funding is needed.

**Overarching Problem:** No definite timeline or authorities for erosion control and/or relocation makes it difficult to plan for needed erosion control projects. It's difficult to coordinate and focus resources without funding sources and timeline.

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	Action Taken
<p><b>Funding Strategy Coordination:</b> Shishmaref, USACE, ADOT/PF, and DCCED</p> <p><b><u>Revetment/Beach Erosion Control Project</u></b>  <b>Phase 1: 600 feet of rock revetment completed in Sep 08.</b>  <b>Phase 2: 750 feet of rock revetment under contract to be completed by Oct 09.</b>  <b>Phase 3: 550 feet of rock revetment under design in 2009; construction funding needed.</b>  <b>Phase 4: 1,225 feet to be surveyed in 2009; of this 325 feet will be new rock revetment and 900 feet will be raising existing revetments when funding is provided.</b></p> <p>750 ft section will provide protection to the North shore including the washeteria and sewage lagoon. USACE construction contract: \$10.5 million for 750 ft.; \$25 million for remaining project.</p> <p><b>FY10 State/Federal Coordination:</b> USACE will provide revetment design (at a cost of \$500k) for Phase 3 of erosion control revetments. State may provide \$3 million for construction.</p>	<p><b>For FY08 &amp; FY09:</b> Coordination covered in current and/or FY08 Supplemental.</p> <p><b>As of April 2008: FY10 and FY11 Recommendation for Capital Budget</b> (Estimate) was \$8.5 million or 35% of \$25 million based on USACE estimates for revetment/erosion protection funding.</p> <p>USACE secured funding in 2008 Federal Supplemental.</p>	<p><b>FY 10 IAWG Recommendation: \$3 million (included in Governor's Capital Budget) and leverages USACE funding)</b></p> <p><b>The State identified \$3 million was needed to complete the additional 550 feet of Oceanside rock revetment to protect the northeastern edge of Shishmaref, including the sewage lagoon and washeteria.</b></p>

Immediate Actions Identified to Prevent Loss of Life and Infrastructure	Past and Future Budget Notes	Action Taken
<p><b><u>Relocation Planning – Road, Geologic Site, Airport and Port Site Master Plan, Community Planning</u></b></p> <p><b>Relocation Road Reconnaissance Assessment</b> (\$500k for assessment - Road from mainland) <b>Lead:</b> ADOT/PF and Shishmaref</p> <p><b>Shishmaref Relocation Feasibility Study</b> Tin Creek has been identified as the Community’s choice, but without Feasibility Study, a decision can’t be made whether it is a satisfactory relocation site.</p> <p><b>Community Relocation Planning</b> – Funded in 08/09 continuing effort</p> <p><b>New Airport Master Plan and Site Location for Port</b></p>	<p><b>Community Comment:</b> Potential Gravel Haul Road to new Airport. Geotech data (being done Mar-April 2008).</p> <p>The USACE has been approved to perform a feasibility study at full Federal expense to analyze the relocation options for the community of Shishmaref. No funds are currently available. NRCS did some site identification previously.</p> <p><i>Environmental studies were initiated for a programmatic EIS of community relocation with limited funding.</i></p> <p><b>IAWG Comments:</b> <b>Scenarios Needed</b> for A/P and Port should be identified for a new airport with various functionalities that can then be reflected in different cost structures.</p> <p><b>Coordination Needed:</b> Shishmaref – city, tribe school, DCCED/DCRA USACE, ADOT/PF Having local capacity and a coordinator is needed to assist with these planning efforts and projects at the local level – capacity and administrative capacity building.</p> <p><b>Completion Date:</b> Dates can’t be determined until funding source identified/authorized.</p>	<p><b>IAWG recommends community meetings and joint collaboration with state and federal agencies that can bring resources in terms of technical capability and funding to support these efforts.</b></p>

**UNALAKLEET**

**Situation Description:** Unalakleet is susceptible to erosion damages along various locations in the community. Particularly along an NRCS gabion revetment that has been damaged by storms. The recommended project is a 1,500 foot long rock revetment which would be constructed along the alignment of the existing NRCS gabion basket revetment. The NRCS project would be removed or covered by the USACE project. \$20-30 million is the most current estimate available. Another threat is the logs that float down the Yukon, in that they change from being protective to becoming destructive during storms surges.

**USACE Status:** Design for 1500 ft of rock revetment is complete and is being advertised for construction and proposals due by Feb 20, 2009.

**Overarching Problem:** No definite timeline or authorities for erosion control and /or relocation makes it difficult to plan for needed erosion control projects. Difficult to coordinate and focus resources without funding sources and timeline.

<b>Immediate Actions Identified to Prevent Loss of Life and Infrastructure</b>	<b>Past and Future Budget Notes</b>	<b>Action Taken</b>
<p>USACE has completed design work and is evaluating contractor proposals for a construction contract. Construction is scheduled for completion in 2010 if sufficient funds are available.</p> <p><b>FY10 Unalakleet identified the opportunity to move Old School Gym to higher ground for use as an Emergency Shelter.</b> – Assessing sites for higher ground evacuation identified as immediate need in 2008 along with design and location of evacuation road (and shelter).</p> <p><b>Gym Move Capital Budget Estimate is \$1mm</b> Cost estimates were identified after Governor’s Budget was submitted to Legislature.</p>	<p><b>FY 09 Capital Budget funding of \$5mm obtained for revetment and erosion control project and leveraged USACE funds from Congressional Supplemental</b> (35% of \$13.5 million project), and coordinate this project with ADOT/PF’s 2008 Airport Erosion control project.</p> <p>Construction completed in 2010 if sufficient funds available.</p> <p>2008 funding was critical if take advantage of heavy equipment in 2009 season that will already be in place for ADOT/PF – Airport projects.</p> <p>Estimated cost savings: Based on discussions throughout the IAWG process, cost savings could be substantial if the same heavy equipment is used for multiple projects, thereby minimizing mobilization/demobilization costs. Based on input from ADOT/PF and USACE, the most effective means to achieve cost savings will be to synchronize state and federal projects so they can be jointly advertised but awarded separately.</p> <p>Local Street Projects cost benefits using equip while in place – forego additional mob/de-mobilization costs.</p>	<p><b>IAWG Recommendation: Need funding strategy to ensure erosion/revetment project is done in 2009/2010. (Unalakleet/DCCED/USACE.)</b></p> <p><b>FY10 IAWG recommendation: Community should pursue funding for Gym Move with the Legislature and Alaska Delegation. Estimated budget is \$1million</b></p>





# **POLICIES**



## Strategic and Community Assistance Recommendation Policies

Last year, the IAWG recommended policies to advance comprehensive integrated planning and a comprehensive statewide data collection and evaluation system. In this 2009 report, we carry those recommendations forward as Policy Recommendations 3 & 4, and include additional detail to them, which the IAWG believes will help to effectively initiate and implement those policies.

IAWG adds two new policy recommendations, and because they are more strategic and overarching in nature, those policies are identified as Policies 1 & 2. Policy 1 addresses how Alaska could create an integrated system of information, analysis and evaluation to make cost-effective decisions on public infrastructure, and Policy 2 addresses the role of the Immediate Action Workgroup and helps to advance Policy 1.

IAWG's policy recommendations, for which the justification is further detailed in [Appendix A](#), are described in this section. The IAWG has created working relationships that can help to advance these recommendations in a meaningful and cost-effective manner, which is why the IAWG is *recommending that the Subcabinet refer the next steps to advance these policies back to the IAWG*.

One of the anticipated outcomes of the IAWG's 2009 efforts was to identify the "next six" communities in need of immediate action, due to impacts from climate change phenomena.

Climate change phenomena have been identified as:

- Lack of sea ice
- Change in extent of sea ice
- Timing of sea ice
- Increased effects of storm surges unbuffered by shorefast ice
- Erosion due to flooding or permafrost melt
- Flooding
- Permafrost melt
- Wild fires

The various IAWG participating agencies were able to identify over 150 communities of concern based on their mission-specific programs. ***However, not one agency had analyzed their actions, nor responded to community needs based on climate change.***

Based on the IAWG's 2009 efforts where we brought together information and data from various agencies to identify the next six communities in need of immediate action, we found:

- There is no consistency in criteria, timeline, weighting, data acquisition technique or analysis to determine if impacts are from climate change.
- No framework exists for the comprehensive identification, analysis, and dissemination of current data or the methodical acquisition of new research to support new policy options.
- Without new policy options state and federal agencies are severely limited in their ability to integrate or identify data, research, programs or projects necessary to mitigate or prevent impacts to communities.
- We were unable to, with confidence, identify the next six communities for immediate action.

- Many state and federal agencies and academia are researching potential projects, programs and research efforts to assist communities that are impacted, or potentially impacted by climate change phenomena. However, each agency is working from differing sets of assumptions, approaches and timelines.
- State and federal agencies are severely limited by this lack of integration for data, research, and program or project development.
- This environment of uncertainty increases the risk of many communities of facing extreme risks from the unknown effects of natural disasters.
- The traditional “stove-piped” approach of creating and managing government programs ensures a narrow, myopic view of community needs and places the individual programs in competition for approval and funding.
- This segregated approach increases the uncertainty of funding but decreases the potential for meaningful and comprehensive assistance.
- The State of Alaska, just as the federal government, plans for and manages programs primarily through individual departments. The priorities are set usually during budget formulation for the next budget cycle. However, many capital projects need years of planning for engineering study and design and for the identification of federal funding. These funding decisions occur for each individual agency and often are without consideration of other state or federal projects that may be in potential conflict for the same community or region.

From these findings, the IAWG recommends:

- **An integrated, multi-agency and inter-governmental approach to effectively identify and address the needs of communities that are potentially in peril.**

The outcome and benefit of this integrated approach has:

- Significant potential to save money on public infrastructure, avoid costly delays, save funds through economies of scale and combining mobilization, mitigate the effects and costs of disaster relief and recovery.

**POLICY 1: ESTABLISH A STATEWIDE SYSTEM TO DOCUMENT, ASSESS, AND ANALYZE CURRENT AND PLANNED PUBLIC INFRASTRUCTURE IN ORDER TO PROTECT EXISTING AND FUTURE INVESTMENTS AND PREVENT THREATS TO LIFE IN AN UNCERTAIN ENVIRONMENT**

The Immediate Action Workgroup offers a model for a statewide system that integrates information from all state departments, local entities, and federal agencies on current and planned public infrastructure and capital projects in communities currently or potentially affected by climate change. This system will enable a more rapid identification of community needs and vulnerabilities, and more informed decisions on the future repair, retrofit, replacement, or relocation of critical infrastructure. Further, the IAWG believes, this statewide system will create a more cost-effective means to make decisions about public infrastructure needed to ensure community safety and economic viability.

**1) A statewide system to make timely and cost effective decisions for both the public and private sectors must include:**

- a. Identifying all data on public and critical infrastructure from:
  - i. State agencies
  - ii. Federal agencies
  - iii. Denali Commission
  - iv. Local governmental entities, including tribal entities
  - v. Non-governmental organizations
  - vi. Private sector
  - vii. Academia
- b. Consolidating and linking together data to:
  - i. Enable queries for agencies and communities
  - ii. Improve quality of data and databases
- c. Analyzing data to:
  - i. Identify and fill gaps in data
  - ii. Determine status and capability of current infrastructure
  - iii. Determine useful life and future plans for repair, renovate, retrofit, replacement, or relocation
  - iv. Determine vulnerabilities to climate/weather and other environmental/economic factors
  - v. Identify all funding and budget streams
  - vi. Identify conflicts between agency plans
  - vii. Resolve conflicts for timely implementation
- d. Integrating policy to:
  - i. Improve policy coordination between agencies – timing, impacts, integration
  - ii. Determine effects of proposed policies
  - iii. Test assumptions of climate, economic trends and strategic directions
  - iv. Determine effects of non-state policies and budgets
  - v. Update analyses for new data information
    1. Weather patterns/flood plains/mapping
    2. Economic assumptions
    3. Changes in demographics
  - vi. Document out-year O&M costs
  - vii. Calculate life cycle costs
  - viii. Contribute data to budget formulation

**2) A statewide system to make timely and cost effective decisions for both the public and private sectors must be based on a collaborative decision making model that consistently includes:**

- a. Key stakeholders
- b. Identified timelines and outcomes
- c. Streamlined process to minimize unnecessary effort and transaction costs of developing and carrying out the statewide system

**3) A statewide system to make timely and cost effective decisions for both the public and private sectors must be based on an organizational structure that likely possesses the following characteristics:**

- a. Executive order to establish and create structure
- b. Senior State Executive as manager
- c. Small staff

- d. Non-centralized and non-bureaucratic system
- e. Implementation (planning and building capital projects) is through existing agencies/authorities
- f. Monitor to make sure things progress in proper order
- g. Identify and integrate new opportunities, such as the likelihood of cap and trade
- h. Identify and integrate old challenges, such as timely processing of permits and integrating sustainability into communities and economies in remote Villages

**Rationale:**

- The number of communities potentially impacted by climate change phenomena is growing
- The locations of these communities are spread across the entire state of Alaska.
- The ability to identify which community or piece of infrastructure is most at risk cannot effectively be done given current procedures that are not linked and coordinated.
- Coordinating and linking procedures, organizational structures and leveraging budgets will be most effective if a collaborative approach is used to identify, assess, and make and implement decisions.

**Implementation – Initial Steps**

**IAWG Recommended Action to Subcabinet:** Adopt Policy 1 and provide the IAWG with guidance to develop implementation options for this policy. At a minimum the guidance should instruct that options should include identifying benefits, challenges, and effective organizational structures for implementation. This integrated system will create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance should also include melding the relevant Adaptation and Mitigation Advisory Groups’ products with this statewide system to reach a desired outcome of integrated actions in order to address what seems to be increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective statewide system.

**POLICY 2: SUNSET THE IMMEDIATE ACTION WORKGROUP AND DIRECT THE RELEVANT STATE AGENCIES TO ESTABLISH AN INTERAGENCY COLLABORATIVE WITH EACH OTHER, ALONG WITH RELEVANT FEDERAL AGENCIES AND COMMUNITIES. THIS COLLABORATION REQUIRES REGULARLY SCHEDULED MEETINGS TO COORDINATE INFORMATION, PLANNING, EVALUATION AND DECISIONS ON PUBLIC INFRASTRUCTURE FOR THOSE COMMUNITIES IMPACTED BY CLIMATE CHANGE PHENOMENA.**

The Immediate Action Workgroup believes that the outcomes and results of its ad hoc collaborative efforts over the past year have been exceedingly useful and should be integrated into agencies’ operational efforts. This policy recommendation should be viewed as an interim step to implementing Policy 1 above. Once Policy 1 is established as a strategic operational mechanism, then the IAWG should be integrated, reformulated or discontinued, depending on the structure and needs of the statewide system.

### **Implementation – Initial Steps**

**IAWG Recommended Action to Subcabinet:** Adopt Policy 2 and provide the IAWG with guidance to develop options to accommodate the transition described in Policy 2. At a minimum the guidance should instruct that options include identifying benefits, challenges, and effective organizational structures for implementation. This precursor to an integrated system will set the framework to create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance to the IAWG should also include melding the relevant Adaptation and Mitigation Advisory Groups' products into options for Policy 2. This would be in an effort to reach the desired outcome of taking integrated actions to address the increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective interagency collaborative while a statewide integrated system is being established.

**POLICY 3: ASSISTANCE TO COMMUNITIES IN PERIL MUST UTILIZE COMPREHENSIVE INTEGRATED PLANNING AND VIABLE, FUTURE-ORIENTED SOLUTIONS WITH FUNDING THAT ALLOWS FOR SUSTAINABILITY WHETHER THE COMMUNITY REMAINS IN PLACE, USES A MIGRATION STRATEGY OR NEEDS TO RELOCATE.**

The Immediate Action Workgroup believes that comprehensive integrated planning must be used to develop and implement solutions for communities in peril. The planning process must integrate the expertise and resources available from many state and federal agencies working with community and regional stakeholders. Flexible funding streams should be sought; and may need to be created, to accommodate the needs associated with preserving the options available for protecting public infrastructure and preventing loss of life. These options range from staying in a community's current location, to a migration strategy, to full relocation. All of these options should integrate the concepts of sustainability into the design, location, and attributes of projects, and if relocating, into future settlements. Existing and new funding mechanisms for responding to climate change hazards should also provide for adaptation and mitigation measures. In seeking funds for adaptation and mitigation, an examination of current federal and State statutes needs to be conducted to identify limitations in addressing these measures. The Stafford Act, for example, limits the ability of the State to deal effectively with communities in peril.

### **Implementation – Initial Steps**

- **IAWG Recommended Action to Subcabinet:** Adopt Policy 3 and include guidance to the IAWG to develop more detailed implementation options in coordination with the appropriate stakeholders

**Five major actions are necessary to address and advance assistance to communities in peril. Each of the five includes a description of the action, rationale and implementation steps for each action.**

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#### **1) Comprehensive Integrated Planning must include:**

- a. Suite of Community Emergency Planning Efforts.
  - i. Community Evacuation Plans.
  - ii. Community Emergency Operation Plans.
  - iii. Hazard Mapping, Hazard Analysis, and Mitigation Plans.

- iv. Preparedness Activities to include outreach, training, and exercises.
- b. Community Wildfire Protection Plans for communities at significant risk of wildfire.
- c. Expansion of Comprehensive Community Plans to encompass strategic options to address and mitigate climate change impacts of stay in place, migrate and if necessary, relocation
- d. Community-based decision making approach will ensure continued focus to achieve the necessary end result.
- e. Local, Regional, Tribal, State, and Federal partnerships.
- f. Strategies that address incorporated and unincorporated community eligibility for the National Flood Insurance Program (NFIP), which likely require statutory changes by the State of Alaska.
- g. Enhancement and expansion of DCCED/DCRA's partnership with the Alaska Coastal Management Program (ACMP) to enable more effective assistance to the communities in peril and at significant risk.
- h. A strategy to consolidate various programmatic and grant reporting requirements into a single format that reinforces comprehensive integrated planning.
- i. A strategy to collect and utilize needed data and to develop data where gaps exist, including sustainability principles and strategies. (See Policy 2).

**Implementation actions:**

- Inclusion of native villages, tribal governments, and other land owners in collaboration with agencies during the planning process provides a wide range of benefits from broad-based community support and commitment to specifics such as land relocation issues. Communities take the lead and receive significant support from state and federal entities.
- Ease the administrative burden on remote communities by establishing a shared web-based system as an initial step toward consolidating program and grant reporting requirements into a single format.
- Identify coordinating and participating agencies and develop necessary Memoranda of Agreement (MOAs).

**Rationale:**

- Comprehensive planning has multiple benefits identified throughout this document. Comprehensive planning increases the ability to address complicated land exchanges involving multiple parties with permitting such as complying with NEPA requirements. NEPA requires the review of the effects of all federal, federally-assisted, and federally-licensed actions at any proposed new village site, including, but not limited to: Estate permits, endangered species, coastal consistency, essential fish habitat, and a host of other regulations and requirements recognizing agencies with funding or potential projects. Increased collaboration should focus on solutions such as a Programmatic EIS that can be developed which addresses many of the general issues involved in a proposed relocation. Once a lead agency is identified for NEPA some of the challenges the lead federal agency may encounter include, and can be most effectively addressed through coordination and cooperation, are:
  - Identification of coordinating and participating agencies and development of necessary Memoranda of Agreement (MOAs).
  - Identification of funding to undertake a NEPA analysis if such funding is not in the current project budget.



- Waiting for a disaster event that forces relocation will result in unnecessary risks to life/safety and extraordinarily complex response/relocation/recovery.
- Foundational plans (flood plain mapping, orthographic and geologic mapping, hazard mitigation planning, community and regional emergency and evacuation plans) are critical building blocks for comprehensive community relocation planning. Only through integration of these plans can we characterize possible relocation sites, identify hazards, and locate potential construction materials resources
- Adoption of a formal State Hazard Mitigation Program integrated with federal hazard mitigation programs would help protect current investments in communities and preserve the options during the decision making process for possible relocation.
- Preparedness activities provide opportunities for communities to test and modify plans in non-emergency situations.
- A Comprehensive Community Relocation Plan is essential to informed planning for communities in peril and is anticipated to significantly reduce costs compared to disaster-related response costs coupled with non-comprehensive approaches to mitigation and relocation.
- The full costs of not relocating a community in peril, e.g. erosion control at a current site and repair/replacement of essential public facilities should be considered when developing relocation policies and priorities. This analysis should also review projected costs based on different timeframes to relocate. This can provide policy makers as well as taxpayers better information from which to consider cost effective alternative.
- Unincorporated communities are not currently eligible for the National Flood Insurance Program (NFIP) and the State must address this issue. Under existing statutes, the Legislature has responsibility for land-use issues for unincorporated areas of the state. Therefore DCCED and the Department of Public Safety, Division of Fire and Life Safety should develop recommendations and implementation strategies for the Legislature to consider, that addresses incorporated and unincorporated community eligibility in the NFIP.
- Imperiled communities are overwhelmed with the level of paperwork and documentation required by various agencies for grant and regulatory and other compliance. Alaska's small remote villages have the capability but lack the staff to handle this onerous documentation and reporting requirement for each funding stream.. It would greatly help viability and functionality of a remote village if funding agencies could, wherever possible, collaborate and provide integrated report/documentation that could serve the purpose of all funding agencies.
- Obtaining and administering government funds can be a challenge for small communities. Local capacity limitations place many rural communities at a competitive funding disadvantage. Because there is no dedicated funding source for erosion and/or relocation, imminently threatened communities must rely upon existing programs to meet erosion/relocation needs, yet few have the expertise to identify, write, secure and administer grants.

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## 2) **Flexible Funding Streams must accomplish:**

- a. Analysis of projected costs of all viable relocation alternatives, including the costs of remaining in place
- b. Emergency, hazardous and evacuation plans for communities in peril to prevent loss of life when a natural disaster occurs

- c. A means of prioritizing project funding from many sources for many communities for the most effective results. This includes providing capacity building opportunities in communities by funding local training or consulting efforts, where needs have been identified.
- d. State funding to attract federal funds.
- e. Sufficient full-time employee positions for state agencies taking a lead or participative role to address expanded agency functions.

### **Implementation Actions:**

- Develop investment guidelines and priorities to address critical infrastructure for communities-in-peril. Guidelines should include an assessment to identify critical needs, similar to the DCCED RUBA program. Guidelines must consider the need to swiftly respond to emerging changes in climate, hazards, and research.
- State appropriations must be synchronized with federal appropriations to better position our coastal erosion needs in the federal process. State appropriations should be distributed through a grant process consistent with the Policy recommendation in paragraph 3. DCCED should be the coordinating agency. Distribution of funds the first year will come with a requirement to identify the Immediate Actions scope, schedule and budget prior to the release of funds for any construction contracts.
- Identify funding to undertake a NEPA analysis if such funding is not in the current project budget. Funding sources, such as through AHFC, encompass new construction but not funds to rehabilitate a damaged structure or one that needs to be moved out of imminent danger, even when the costs of doing so may be substantially less than replacement (e.g., less than \$20,000 to save a home). A funding mechanism is needed to stage structures, to stabilize and move infrastructure in imminent danger before the damage is inflicted. Identifying secondary and preventative protections can be accomplished through agency coordination with the community. However, specific assessment tools are lacking as are the entities most appropriate to apply them. These must be identified and applied in a coordinated and site specific effort. The tool(s) should identify at-risk facilities appropriate to move and the means to decide on exact relocation measures – how to move, where to move, whether to elevate or relocate away from threat.
  - Roles and Responsibilities: Each responsible agency must identify barriers to making coordinated decisions on infrastructure investments in threatened and newly designated communities (relocation sites). This process should identify needs to revise existing policies, statutes, and regulations or to create new ones to effectively address communities-in-peril and optimize the current community efforts to keep moving forward in the process.
  - Community in Peril: Newtok finds itself in a Catch-22, or a no-win, situation. Plans to relocate, combined with the imminent threat of flooding and erosion, has rendered Newtok ineligible for capital funding for improvements to existing infrastructure (e.g., water and sewer, bulk fuel tanks, power plant, and clinic) to meet needs at the current village until the relocation is complete or substantially complete. The ability to divert designated resources to the new village site is hampered by policies that create barriers to investment in non-existent communities.
- Any upgraded facilities or new facilities must be protected against imminent environmental threats, such as flooding and erosion, consistent with [Administrative Order No. 175](#).

**Rationale:**

- Current funding streams neither require nor enable comprehensive analysis of comparative costs, of critical path for construction, or identifying potential conflicts with other projects..
- This long-term problem cannot be addressed with short-term personnel.
- Recent changes to Section 117 of the Consolidated Appropriations Act of 2005, PL 108-447, Division C - Energy and Water Development Appropriations Act, 2005, were intended to streamline the ability of the Secretary of the Army to react to situations in Alaska, but the change only reduced the 15 year cycle to a 2 year cycle. This act states in part as follows:  
“SEC. 117. Notwithstanding any other provision of law, the Secretary of the Army is authorized to carry out, at full Federal expense, structural and non-structural projects for storm damage prevention and reduction, coastal erosion, and ice and glacial damage in Alaska, including relocation of affected communities and construction of replacement facilities.” However, even with this streamlined authority, without state appropriations federal funds alone will likely not be made at a level to meet immediate needs.
- AO224 potentially presents investment barriers for possible new locations sites. Other standards and requirements also present barriers to investment in new developing communities. For example, ADOT/PF policy suggests that emerging communities have a minimum of twenty-five residents, a post office, and a school before a project will be considered by the Project Evaluation Board. In addition, there is a minimum population requirement of twenty-five children for construction of a new school. Under these guidelines, the deferment of infrastructure investment can be expected to create hardships on relocating communities. Because village relocation is likely to be an incremental process, there will be populations at both locations (the current village and the new village site) and needs must be met concurrently.
- If a disaster affects any community in peril before it is improved or relocated, there is a serious risk to safety of life. Also there will be extraordinarily costs for response and recovery. Further, the state and federal disaster statutes require that all other possibilities be exhausted before relocation is considered.

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3) **Formulate a strategy to implement the Sustainable Community Relocation policy.** The strategy must define the process for addressing the specific needs of a community and the broader needs of a region. Specifically, the strategy must result in a work plan based on principles of sustainability and articulate cooperative working relationships through the specific assignment of roles and responsibilities across agencies, communities, and others along with resources, data and other information needs.

- a. DCCED will serve as the overall coordinating agency to formulate and implement the strategy.
- b. DMVA will serve as the lead agency for the Suite of Community Emergency Planning Efforts.
- c. DNR will serve as the lead agency for Community Wildfire Protection Plans.
- d. DNR will serve as the lead agency for geologic mapping and geologic hazards evaluation.
- e. DCCED will serve as the coordinating agency for the Expansion of Comprehensive Community Plans to encompass Relocation.
- f. DCCED will serve as the coordinating agency to develop and coordinate mechanisms that support community-based decision making.
- g. DCCED will serve as the coordinating agency for coordinating and formalizing Local/Regional, Tribal, State, and Federal partnerships.
- h. DCCED and the Department of Public Safety, Division of Fire and Life Safety will serve as the coordinating agencies to develop recommendations and implementation strategies that address incorporated and unincorporated community eligibility in the National Flood Insurance Program.

**Implementation actions:**

- Utilize Denali Commission or similar MOU methodology to help address needed collaboration.
- Relocation sustainability community principles shall include:
  - Economic viability including:
    - Renewable / alternative energy technologies, green building design and land use planning
    - Guidelines for ensuring sustainability, including ICLEI Global Sustainability principals and cultural sustainability
    - Guidelines for prioritizing strategies and associated funding streams for erosion and relocation, including mitigation and the alleviation of hazards in proposed location
- Develop a clearing house type function, including planning and technical assistance that will help jump start the process.

**Rationale:**

- Wherever possible, existing strategies and plans should be used after examination and determined to be effective in the uncertain environment of climate change. Immediately begin a coordinated system to identify potential resources and actions. Through regular meetings of government agencies and stakeholders, we can confidently identify, update deconflict, and integrate projects and funding sources from federal, state and regional/local sources to effectively address the most vulnerable needs. The IAWG recommends using as a model the Denali Commission's MOU process for this process.
- The IAWG believes that DCCED should be the lead coordinating agency for relocation assistance. This is consistent with the current authority of DCCED. While there is no formally designated state lead on coordinating relocation assistance, there is considerable authority for a state lead to coordinate ongoing activities and policies on specific hazards such as erosion. This authority has been vested in DCCED through:
  - administrative Order 175, which designates the former Department of Community & Regional Affairs (now DCCED) to be the State's lead on coordinating capital investments where there is a potential for flood and erosion damage.
  - AO231 and AO239 both direct DCCED to be the State's coordinating agency to propose long-term solutions to on-going erosion issues.

Other authorities identify DCCED as the State's lead coordinating agency:

- DCCED's Division of Community and Regional Affairs is the State agency, which Article 10, Section 14 of the Alaska Constitution mandates be "...established by law in the executive branch of the state government to advise and assist local governments."
- DCCED serves as the Governor's appointed state coordinating agency for the National Flood Insurance Program and the Flood Mitigation Assistance Program (Alaska Administrative Order No. 175).
- DCCED has statutory mandates for Planning Assistance for Development and Maintenance of District Coastal Management Plans (AS 44.33.781. This authority directs DCCED to provide a program of research, training and technical assistance to coastal resource districts within the Alaska Coastal Management Program (ACMP).

- Enhancement and expansion of DCCED/DCRA’s partnership with the Alaska Coastal Management Program (ACMP) will enable more effective assistance to those communities in peril and at significant risk due to erosion. Most of the communities currently identified as communities in peril are coastal communities.
- It is appropriate to broaden DCCED planning roles to include the process of examining the need for, deciding on, and coordination relocation. As the lead agency, DCCED will assist the community (or community efforts) by providing guidance on where to get assistance, how to access resources, and to bring all the players together – which by working together the agencies and communities will then leverage resources for emergency preparedness, community infrastructure – including housing, education, health, environmental and related needs. Designating a lead coordinating agency does not preclude each agency from using its authorities and expertise and moving its projects forward for which it is responsible.
- A Relocation policy will provide non-profit organizations and NGO’s such as Engineers Without Borders a better sense of how they can play an effective role and augment resources.

**4) Develop statutes for Statewide Programs, with dedicated funding assurances, to mitigate hazards to enhance community viability and sustainability.**

- a. Statewide Hazards Analysis and Risk Mitigation Program through DMVA
- b. Statewide collection of field data on hazards in priority areas lacking information through DNR
- c. Statewide Vulnerability Assessment Program through DMVA

**Implementation actions:**

- DMVA shall develop recommendations for a Statewide Program to proactively address mitigation hazards that is not contingent, directly or indirectly, on the declaration of a federal disaster upon which current funding streams are based.
- Identify local rock and gravel sources for western Alaska communities in peril that will support infrastructure construction at relocation sites.

**Rationale:**

- Well-formulated state statutes will provide clear guidance and support, with associated funding, for ongoing, comprehensive programs. The recent federal funding trend of pre-designating funds for various states has reduced the amount of funds available to states, thus increasing the competitiveness for such funds and decreasing the likelihood of receiving any significant needed mitigation funding.
- Identification of local sources for rock and gravel is integral to any relocation planning and will significantly impact viable community alternatives.

**5) Identify and call for required changes to federal statutes, such as the Stafford Act, that would enhance Alaska’s ability to deal effectively with communities in peril and other communities with significant risk.**

**Implementation actions:**

- Designated state agencies shall develop similar recommendations for changes to existing federal legislation and seek support from appropriate national organizations.

- DMVA shall develop recommendations for changes to the Stafford Act and seek direct support from NEMA (National Emergency Management Association) and its member states.
- The Legislature should support needed changes in federal law through a legislative resolution.
- The Alaska Municipal League should support needed changes in federal law through a supporting AML Resolution.

**Rationale:**

- Federal competitive mitigation grants rely on a cost-benefit analysis detrimental to the realities of Alaska. Alaskan projects often benefit a small population but at high costs. This results in Alaskan projects being considered of lower national priority. In addition, the cost-benefit analysis does not include the consequence of not mitigating a known hazard. Any investment in hazard mitigation will save many times the investment when the disaster occurs. The Immediate Action Workgroup believes that an effective mitigation and prevention strategy and associated funding, will significantly reduce the risk to public safety and the costs of recovering from any climate or weather disaster. The Stafford Act is written for responding to an actual or imminent disaster. It was not envisioned to be used when the disaster is inevitable as is now the case with changing sea ice, melting permafrost and extreme variations in weather. These inevitable disasters can be identified by DHS&EM and appropriately addressed through the National Emergency Management Association legislative process with companion support from Alaska’s congressional delegation. Direct action from the Alaska Legislature and the Alaska Municipal League, through personal companion efforts and through resolutions, would strengthen efforts to seek needed changes.

**POLICY 4: THE STATE OF ALASKA WILL LEAD A COORDINATING EFFORT TO DEVELOP A COMPREHENSIVE STATEWIDE DATA COLLECTION AND EVALUATION SYSTEM THAT PROVIDES FOUNDATIONAL INFORMATION FOR COMMUNITY AND BUSINESS DECISIONS AND SOLUTIONS LEADING TO EFFECTIVE RESPONSES AND ADAPTATION STRATEGIES TO ADDRESS CLIMATE CHANGE IMPACTS.**

Through the Subcabinet Climate Change Strategy process, various components of a statewide data collection and evaluation system have been identified, yet components need to be coordinated in order to understand and use the information effectively. The phenomena of climate-related impacts are not well understood and the impacts themselves are also uncertain. The State of Alaska, playing the coordinating role, will bring together state agencies, university resources, and federal and local stakeholders to develop an effective data collection and evaluation system. The likely outcomes of this effort will be to identify what data exists in order to build forward from existing data and maps; what format it is in and what technology is needed for the systems to “talk” with each other; what data is needed but missing; and what funding is needed to identify, collect, analyze and disseminate data in order to address impacts from climate change phenomena. Response strategies should be developed through adaptation impact analysis and modeling to identify near-term scenarios for options ranging from protecting what’s in place, migration and full relocation.

**Implementation – Initial Steps**

**IAWG Recommended Action to Subcabinet:** Adopt Policy 4 and provide the IAWG with guidance to develop implementation options for this policy. At a minimum the guidance should instruct that options

should include identifying benefits, challenges, and effective organizational structures for implementation. This comprehensive data system is another key component to create the knowledge base from which informed decisions can be made to set priorities and allocate resources. The guidance to the IAWG should also include melding the relevant Adaptation and Mitigation Advisory Groups' products with this statewide data collection and evaluation system to reach a desired outcome of integrated actions in order to address what seems to be increasing impacts due to climate change phenomena. The IAWG should work with others throughout the state and federal agencies to develop options, request input, questions and concerns that will need to be addressed in order to create an effective integrated data system. This system must also be a key component of the statewide system identified in Policy 1.

**1) A State led coordinated approach, which results in a comprehensive data collection and evaluation system must ensure data is identified, collected, analyzed, and available to users and policy makers. This coordinating effort is a foundational step to develop a comprehensive system and should:**

- a. Identify suites of data and indicators needed to support policy and strategy decisions for government, communities and businesses.
- b. Catalog currently available data, archived data mapping and/or GIS products (ref DCRA Community Maps) and entities collecting the data that reflect community infrastructure and ownership, site characteristics, known risks and changes in environmental conditions.
- c. Provide data from information outside of existing main databases to gather information such as snow accumulations, wildlife populations, energy usage, permafrost temps, geophysical data on glaciers.
- d. Identify what collaborative MOUs among data custodians and data collectors exists and are needed.
- e. Identify processes for collection of field and local data where lacking and potential costs and timetables.
- f. Ensure data includes cultural and traditional knowledge and recognizes the confidentiality of historical sites and proprietary rights of cultural artifacts.
- g. Identify gaps in data and determine how gaps should be prioritized for funding in order to develop a comprehensive statewide database. An example of a data gap is the current need for reliable flood hazard determination data including high water marks of record, detailed analysis of the flood plain, and base flood elevations.
- h. Identify how to establish a central data access website that links collaborators and data collectors/custodians and enables ready access to current information in both electronic and paper formats.
- i. Identify options to integrate analysis and modeling with data collection efforts and databases to provide the necessary interpretations to inform decision making.

**Implementation action:**

- Establish a small, yet knowledgeable workgroup to conceptualize and begin detailing the above items, with co-chairs from state and federal agencies. The Immediate Action Workgroup could serve as a functional model for this effort.
- Utilize the work and outcomes on data collection and an evaluation system from the efforts under the auspices of the Subcabinet, bringing together the information identified above into a central distribution node/link
- As data sources are added, augment the existing information with the areas not just identified, but described in 1 above.

- Create recommendations along with rationale, budget projections, and identify cooperative agreements (MOU or MOA) to strengthen the comprehensiveness and applicability of the data products.

**Rationale:**

- Alaska’s communities in peril face complex issues that can only be effectively addressed by understanding factors surrounding the range of options from protecting what’s in place, supporting migration and potential for full relocation. These factors and options are also relevant for business decisions and planning for their futures. The viability and sustainability of communities and businesses hinges on the availability of accurate, comprehensive data that potentially relates to their at-risk circumstances.
- Significant knowledge building is required to identify a system that incorporates the items listed in 1 above with data bases and products developed to date (including community, flood plain, fire, and permafrost maps). It is imperative that those who have authorities to collect and those who need to use this data work together, in a collaborative manner, to design a collection, analysis and dissemination/application system if it is to be effective.
- The number of potentially affected communities impacted by climate change phenomena will grow and will require a systems approach if the State of Alaska is to effectively address the increased needs for each community on a prioritized basis.
- A coordinated approach will create more useful information for state, community and business decision makers to use:
  - With a higher degree of confidence to effectively make investment and budgeting decisions for the community at risk, and
  - For expediting permits.

**Potential outcomes:**

- 1) A blueprint, clearinghouse or prototype site to establish a web-based system as an integral step toward development of a statewide collection and evaluation system.
- 2) A State lead coordinating agency or university will be identified along with resources needed to incorporate and disseminate an effective data collection and evaluation system. Recommendations on the following items shall be made to the Subcabinet:
  - a. MOUs that are needed with appropriate state and federal agencies and other collaborating entities.
  - b. An evaluation system to include comprehensive community planning products and establish a priority system for regions of the state that encompasses communities and businesses in peril from risks either common to or unique within the region (wildfires, glacial retreat and avalanches, ice jams and river floods, and coastal inundation).
  - c. Flexibility in funding, including receipt of federal funds and in kind local support for the lead agency and other organizations that actively engage in identification, collection, analysis and dissemination with this management tool to:
    - Support dissemination of the data to available users and policy makers.
    - Prioritize projects that address identified gaps in existing data.
    - Support collection and presentation of new field data to fill identified gaps in priority areas.
    - Align data priorities with priority communities in peril for monitoring trends in risk,
    - Provide sufficient data to identify, on a statewide basis, those communities with significant risk but not in immediate risks. Some of these data needs have been identified by the IAWG,



- such as mapping and geologic data needs. Data needs have also been identified by the IAWG by focusing on the changes likely occurring due to climate change: increased wildfires, storm surges, lack of sea ice, flooding, and melting permafrost.
- d. Obtain funding for this comprehensive system by considering opportunities within existing grant and additional funding sources to conduct data-related research. Analyze current funding streams for requesting additional supports through a state supplemental /capital budget request, should other sources of funding not prove viable.

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2) **Encourage local communities to take leadership in addressing their unique situations by conducting a climate change assessment and developing locally implementable response strategies through current adaptation impact modeling to identify near-term climate change impacts for both protecting in-place and sustainability relocation scenarios:**

- a. Encourage Alaska communities to use the ICLEI model, or other multi-step climate impact planning models, which focuses on a review of scientific data to identify expected climate change impacts and opportunities a community should expect and develop a set of responses/actions to possible changes.

**Implementation actions:**

- Work with the Alaska Municipal League and Regional For-Profits and Non-Profits who in turn will work with their communities to identify near-term climate change impacts and ensure community's plans accommodate new monitoring and research data. The "milestones community planning model", such as the ICLEI method, has been used to identify emerging impacts and opportunities and develop a set of responses that can be incorporated into local plans.
  - An ICLEI method of community milestone planning should be established in immediate or near-term actions to allow new climate change impacts or opportunities to be factored into the relocation or protect- in- place plan.

**Rationale:**

- The effects of near- term climate changes impacts (as opposed to immediate threats) are not fully identified at this time or adequately documented in existing data products. Further research and data collection into physical and cultural changes will present additional elements to be incorporated into adaptation and relocation plans during various stages of implementation.



# APPENDICES



## **APPENDIX A**

# **THE CASE FOR STRATEGIC INTEGRATION: WHY IAWG RECOMMENDED POLICES ARE NEEDED**



## IAWG RECOMMENDED POLICES ARE NEEDED

This section provides background and findings to explain why the set of IAWG recommended policies are needed. The IAWG has created working relationships that can help to advance these recommendations in a meaningful and cost-effective manner.

### **Background**

One of the anticipated outcomes of the IAWG's 2009 efforts was to identify the "next six" communities in need of immediate action, due to impacts from climate change phenomena.

Climate change phenomena have been identified as:

- Lack of sea ice
- Change in extent of sea ice
- Timing of sea ice
- Increased effects of storm surges unbuffered by shorefast ice
- Erosion due to flooding or permafrost melt
- Flooding
- Permafrost melt
- Wild fires

This next six would then be in addition to the first six identified, which of course are:

- Kivalina
- Koyukuk
- Newtok
- Shaktoolik
- Shishmaref
- Unalakleet

In order to identify the "next six" the IAWG brought together information from the various member agencies participating in the IAWG, plus the U.S. Governmental Accountability Office, which to some measure, through Congressional interest, brought attention to Alaska's communities potentially in peril due to impacts resulting from climate change phenomena.

The various agencies were able to identify communities of concern for the IAWG based on each agency's mission specific programs. ***However, not one agency had analyzed their actions, nor responding to community needs based on climate change.***

It's useful to restate that the **IAWG did not define climate change**, but rather identified and based its recommended actions on impacts to communities likely resulting from ***climate change phenomena***.

### **Findings**

*By bringing together information from participating agencies, the IAWG found:*

- The ability to clearly identify and define impacts as resulting from climate change is difficult because:
  - Data are inadequate to analyze and distinguish between normal weather and climate variability or to determine how the current trends will continue to affect Alaskan communities.
  - No framework exists for the comprehensive identification, analysis, and dissemination of current data or the methodical acquisition of new research to support new policy options.
- *IAWG Policy 4 specifically identifies next steps to address this.*

- Many state and federal agencies and academia are researching potential projects, programs and research efforts to assist communities that are impacted, or potentially impacted by climate change phenomena. However, each agency is working from differing sets of assumptions, approaches and timelines.
  - The IAWG has compiled a list of more than 150 communities identified by one or more agencies as potentially impacted by climate change phenomena. There is no consistency in criteria, timeline, weighting, data acquisition technique or analysis. (see pages 85 - 89)
  
- State and federal agencies are severely limited by this lack of integration for data, research, and program or project development. Therefore, this environment of uncertainty increases the risk of many communities of facing extreme risks from the unknown effects of natural disasters. The traditional “stove-piped” approach of creating and managing government programs ensures a narrow, myopic view of community needs and places the individual programs in competition for approval and funding. This segregated approach increases the uncertainty of funding but decreases the potential for meaningful and comprehensive assistance.
  
- The State of Alaska, just as the federal government, plans for and manages programs primarily through individual departments. The priorities are set usually during budget formulation for the next budget cycle. However, many capital projects need years of planning for engineering study and design and for the identification of federal funding. These funding decisions occur for each individual agency and often are without consideration of other state or federal projects that may be in potential conflict for the same community or region.
  - An integrated, multi-agency and inter-governmental approach is needed to effectively identify and address the needs of communities that are potentially in peril.
  - This integrated approach has significant potential to save money on public infrastructure, avoid costly delays, save funds through economies of scale and combining mobilization, mitigate the effects and costs of disaster relief and recovery.
    - *IAWG Policy 1 specifically identifies next steps to address this.*
    - *IAWG Policy 3 is integral to Policy 1, but is such a key component, that the IAWG created a separate Policy Recommendation for integrated, collaborative planning to align timing of activities, funding and other resources, which likely reduce costs.*
  
- An integrated, multi-agency and intergovernmental approach using existing government databases, agencies, and programs will take effort to design and implement. However, the State of Alaska can expect immediate improvements in productivity, planning, and public confidence from collaboration.
  - An interim, but not ad hoc, IAWG must be authorized to create a framework for increased continued collaboration among relevant agencies and academia.
    - *IAWG Policy 2 specifically identifies next steps to address this.*



In this appendix, you'll find:

- **Summary** of characteristics or criteria each organization used to identify actions for communities based on each agency's programs and missions.
- Compiled list of where agencies are actively providing assistance to communities either due to disasters, potential disasters or preventing disasters.
- Each agency's detailed characteristics or criteria used to identify whether to act or provide assistance to a community. These appear in the following order:
  - U.S. Government Accountability Office (GAO)
  - U.S. Corps of Engineers (USACE)
  - Alaska Dept. of Commerce, Community and Economic Development (DCCED)
  - Dept. of Military and Veterans Affairs – Division of Homeland Security & Emergency Management (EM)
  - Alaska Dept. of Transportation and Public Facilities (DOT)
  - Alaska Dept. of Natural Resources – Division of Forestry (DNR)

## SUMMARY OF CRITERIA AGENCIES HAVE USED TO RESPOND OR IDENTIFY COMMUNITY NEEDS

### **IAWG – 2008 Recommendation Report: 6 communities identified**

- Communities were identified in GAO’s Previous Report and/or at 11/07 Climate Change/AML meeting
- Life/safety risk during storm/flood events
- Loss of critical infrastructure
- Public health threats
- Loss of 10% or more of residential dwellings

### **GAO – Current Community Relocation Assessment: 15 communities identified**

- Communities Self-Identified
- Or other agencies recommended them to GAO –
- Response to US Senate directive to identify
- and make recommendations for communities facing significant erosion or flooding impacts
- Not based on analysis of impact due to climate change phenomena
- Community wants to relocate in whole or in part to address flooding and erosion issues

### **USACE – Communities Impacted by Erosion Only (Not Flooding): 21 communities identified**

- Critical Infrastructure at Risk (for example, Schools, Utilities, Transportation)
- Cultural Importance
- Subsistence and Shoreline Use
- Environmental Hazard (EX: Landfills, Sewer Lines, Sewage Lagoons, Fuel Tanks)
- Human Health and Safety
- Housing and Population Affected
- Housing in Parallel

### **DCCED – Potential that a community faces significant impacts due to climate change phenomena in the next 18 – 24 months, based on the following criteria: 32 communities identified**

- Life/safety risk during storm/flood events
- Loss of critical infrastructure
- Public health threats
- Loss of 10% or more of residential dwellings

### **Emergency Management: 119 communities identified**

- Number of communities named in stated disaster declarations for flooding, storm surge, and other water events since 1978. The communities are group by river system or coastal area.
- Potential threats to safety or life
- Existing public infrastructure threatened by weather or climate hazards

### **DOT/PF: 60 communities identified**

- Those communities in which DOT/PF believes climate change phenomena has to a high degree necessitated proposed, partial and recently completed projects

### **DNR- Division of Forestry : 40 communities identified**

Actions based on funding for and identification of communities which would benefit from Community Wildlands Prevention Planning (CWPPs).

## AGENCY RESPONSES TO A RANGE OF COMMUNITY NEEDS

Agency Actions Are Unrelated to Each Other

INFORMATION REFLECTS WHERE AGENCY ACTIVITIES ARE OCCURRING

	Community	GAO	USACE	DCCED	EM	ADOT	DNR
1	Akiak			X	X		
2	Alatna	X			X		
3	Allakaket	X			X		X
4	Alakanuk			X	X		
5	Anchor Point/Happy Valley/Nikolaevsk						X
6	Anchorage,Rainbow, Indian, Bird Creek, Girdwood, Portage, Eagle River, Chugiak, Ekultna				X		X
7	Angoon				X		
8	Aniak				X		
9	Anvik				X		
10	Atmautluak			X			
11	Barrow		X			X	
12	Bear Creek/Seward/Lowell Point						X
13	Beaver						X
14	Bethel				X		
15	Bettles				X		
16	Bristol Bay Borough				X		
17	Buckland			X	X		
18	Chefornak	X	X	X	X		
19	Chevak		X		X		
20	Chignik				X		
21	Chilkat				X		
22	Chitna						X
23	Circle				X		
24	Clarks Point		X		X		
25	Coldfoot					X	
26	Cooper Landing						X
27	Copper Center				X		
28	Copper River				X		
29	Cordova				X		
30	Craig				X		
31	Crooked Creek				X		
32	Deering		X	X			

	Community	GAO	USACE	DCCED	EM	ADOT	DNR
33	Delta Junction				X		
34	Denali Borough				X		
35	Dillingham		X		X		
36	Diamond Ridge/Fritz Creek/Fox River						X
37	Diomedea			X	X		
38	Dry Creek						X
39	Eagle				X		
40	Eagle Village				X		
41	Ekwok				X		
42	Elfin Cove				X		
43	Elim	X			X		
44	Emmonak		X	X	X	X	
45	Endicott Mountains				X		
46	Eyak				X		
47	Evansville/Bettles						X
48	FNSB: Fairbanks, North Pole, College, Fox, Salcha, Ester				X		X
49	Fort Yukon				X		
50	Funny River						X
51	Galena				X	X	X
52	Gambell					X	
53	Glennallen				X		X
54	Golovin	X	X	X	X	X	
55	Goodnews Bay				X		
56	Grayling				X		
57	Haines				X		
58	Halibut Cove & Vicinity						X
59	Holy Cross				X		
60	Homer /Kachemak				X		X
61	Hoonah				X		
62	Hooper Bay			X	X	X	
63	Hope/Sunrise/Summit						X
64	Horseshoe Lake						X
65	Hughes	X			X		
66	Huslia	X	X				
67	Iliamna				X		
68	Juneau				X		

	Community	GAO	USACE	DCCED	EM	ADOT	DNR
69	Kachemak Silo				X		
70	Kake				X		
71	Kaktovik				X		
72	Kalifornsky/Kasilof/Cohoe/Clam Glutch						X
73	Kaltag				X		
74	Karluk				X		
75	Kasaan				X		
76	Kenai				X		X
77	Kenai Borough				X		
78	Kasaan				X		
79	Kongiganak			X	X		
80	Kivalina	X	X	X	X	X	
81	Kipnuk	X			X		
82	Klawock				X		
83	Kobuk				X		
84	Kodiak				X		
85	Koliganek				X		
86	Kotlik		X	X			
87	Kotzebue				X	X	
88	Koyukuk	X		X	X	X	X
89	Kwethluk			X	X		
90	Kwigillingok			X	X		
91	Lake & Pen Borough				X		
92	Little Diomedede			X		X	
93	Lime Village		X		X		
94	Mat Su Borough				X		
95	McCarthy, Kennicott, Fireweed Mountain				X		X
96	McGrath		X	X	X		X
97	Mentasta						X
98	Metlakatla				X		
99	Moose Pass, Crown Point, Primrose						X
100	Naknek				X		
101	Nanwalek						X
102	Napakiak			X	X		
103	Napaskiak			X	X		
104	Nelson Lagoon			X			
105	Nenana				X		

	Community	GAO	USACE	DCCED	EM	ADOT	DNR
106	Newhalen				X		
107	Noatak					X	
108	Nome				X	X	
109	Newtok	X	X	X	X	X	
110	Nightmute			X		X	
111	Nikisiki,Salamatof,Grey Cliffs						X
112	Nilichick,Nilichick Forties						X
113	North Slope Borough				X	X	
114	Northway				X		
115	Nulato	X				X	
116	Nunam Iqua		X	X	X	X	
117	Nunapitchuk			X	X		
118	Pedro Bay				X		
119	Pelican				X		
120	Pilot Station				X		
121	Pitka's Point				X		
122	Platinum				X		
123	Port Graham				X		X
124	Point Hope					X	
125	Port Heiden		X				
126	Quinhagak				X		
127	Red Devil				X		
128	Russian Mission				X		
129	Ruby						X
130	Saint Michael		X		X		
131	Salcha				X		
132	Scammon Bay				X		
133	Seldovia						X
134	Selawik		X			X	
135	Seward			X	X		
136	Shageluk				X	X	
137	Shaktolik	X	X	X	X	X	
138	Sitka				X		
139	Skagway				X		
140	Soldotna,Ridgeway						X
141	Solomon and Safety Sound					X	
142	Shishmaref	X	X	X	X	X	

	<b>Community</b>	<b>GAO</b>	<b>USACE</b>	<b>DCCED</b>	<b>EM</b>	<b>ADOT</b>	<b>DNR</b>
143	Sleetmute				X		
144	Sterling						X
145	Stevens Village						X
146	Strelna						X
147	Tanacross						X
148	Teller			X	X		
149	Tenakee Springs				X		
150	Togiak				X		
151	Tok						X
152	Toksook				X		
153	Tuntutuliak			X	X		
154	Tununak				X		
155	Tyonek/Beluga						X
156	Unalaska				X		
157	Unalakleet	X	X	X		X	
158	Valdez				X		
159	Venetie						X
160	Wainwright				X		
161	Wales			X			
162	Wasilla, Palmer, Butte, Sutton, Chickaloon, Knik, Big Lake, Houston, Willow, Talkeetna, Trapper Creek, Petersville						X
163	Whittier				X		
164	Willow Creek				X		
165	Wiseman				X		
166	Wrangell				X		

## INFORMATION ON GAO ENGAGEMENT

**Engagement subject:** Alaska Native Village Relocation Efforts

**Source for the work:** GAO is conducting this work in response to a request made by the Senate Subcommittee on Disaster Recovery, Committee on Homeland Security and Governmental Affairs

**Objective/key questions:** This is an update to GAO's December 2003 study, *Alaska Native Villages: Most are Affected by Flooding and Erosion, Few Qualify for Federal Assistance* (GAO-04-142). Key questions are: (Q1) What flooding and erosion threats do Alaska Native villages currently face? (Q2) What federal and state programs are available to assist villages facing potential disasters? (Q3) What is the status of efforts to assist relocating villages? (Q4) How do federal programs provide and prioritize assistance to threatened villages?

**Status:** GAO has visited seven villages and spoken with various federal, state, and local government agencies. We have completed the design phase of our work and are currently conducting field work to address our key questions. We expect to have a completed report by mid-May 2009.

**Villages visited:** Alatna, Allakaket, Kivalina, Koyukuk, Shaktoolik, Shishmaref, and Unalakleet.

**Other villages of interest:** Chefornak, Elim, Golovin, Hughes, Huslia, Kipnuk, Newtok, and Nulato.

**Agencies contacted:** Departments of Agriculture; Defense's Army Corp of Engineers; Health and Human Service's Indian Health Service; Homeland Security's Federal Emergency Management Agency; Housing and Urban Development; the Interior's Bureau of Indian Affairs, Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service; and Transportation's Federal Aviation Administration. We have also spoken to officials from the Denali Commission, the Bering Strait Housing Authority, the Maniilaq Association, the Tanana Chiefs Conference, Kawerak, the Northwest Arctic Borough, and the State of Alaska's Department of Environmental Conservation, Department of Commerce, Community, and Economic Development, and Division of Homeland Security and Emergency Management.

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## **USACE Criteria for Assessing Community Needs**

### *Assigning Response Priorities for Erosion and Flooding in Alaskan Communities*

#### **Overview**

There is a heightened awareness that many Alaskan communities are suffering from erosion and flooding impacts. When looking to identify those in most need, certain criteria can be utilized to differentiate between the issues in each community. Appropriate criteria for differentiating between communities need to focus upon the characteristics that make up a community. Remote Alaska villages typically are largely native, have a significant interest in culture and tradition, rely heavily upon air and water transportation, have economies that are more based in subsistence/trade/barter than upon the exchange of money for goods and services, and typically do not have the ability to internally raising funds to support develop or maintenance of facilities, infrastructure, or measures for protection against natural phenomenon.

#### **Criteria and Factors**

Criteria for assigning priority typically will have one or two factors influencing the criteria's magnitude of concern. Single factor criteria are ones that are general descriptors i.e. Does the community have the ability to pay for a project? A two factor criteria is influenced by two measures i.e. How severely is development being damaged and what is the timeline for the damage?

#### **Developing Criteria and Rankings**

No single person should believe they can make the determinations of what criteria are to be used, how to scale the criteria, how to weight the criteria, or assigning values for criteria for items being ranked. A typical approach to develop these items is to assemble an "expert panel" of individuals from the area of expertise needed. These experts are typically not policy makers or agency executives. These individuals are those who work most closely to the actual problems and are integrally involved in formulating, describing, and developing solutions.

#### **Alaska Baseline Erosion Risk Criteria Workshop**

A workshop was held at Alaska District to develop the risk criteria for which the communities can be assessed.

A focus of discussion at the workshop was the identification of Evaluation Factors for scoring the relative Severity of Expected Erosion Damages across communities. After initial brainstorming and screening, a list of Evaluation Factors was identified for further consideration for ranking communities based upon the level of information available in the ABEA Erosion Information Papers (EIPs). Relative weights were identified for each factor. The identified factors and weights are presented in Table 1.

<b>Evaluation Factor</b>	<b>Relative Weight</b>
Infrastructure (School, Utilities, Transportation, Critical)	3
Life Safety	3
Subsistence and Shoreline Use Being Limited	2
Setting/Geographic Location	1
Time Until Damage	3
Population	1
Housing In Parallel	2
Environmental Hazard	3
Cultural Importance	1
Percent Of Affected (Numbers of Structure/People)	2
Commercial/Public/Store/Church/Community Infrastructure	2

*Source: Meeting Minutes provided to Tetra Tech by Melanie Harrop, 1/23/08.*

Further consideration of the identified factors following the meeting resulted in the following recommendations:

- 1) “Population” and “Percent of Affected” be combined into one category: “Housing and Population Affected” – these categories seem to be similar and may have the effect of doubling the weight for the impact on housing.
- 2) “Time until Damage” be removed as a Severity of Damage Evaluation Factor and instead by rated and multiplied by the Severity of Damage Score for each community as a more appropriate way of scoring the relative Erosion Risk at each community. (See Section 3).
- 3) Several of the headings have suggested editorial changes

Table 2 presents the suggested changes to the identified Evaluation Criteria.

**Table 2 – Suggested Revisions to Identified Evaluation Factors**

<b>Evaluation Factor</b>	<b>Relative Weight</b>
Critical Infrastructure (for example, School, Utilities, Transportation)	3
Human Health and Safety	3
Subsistence and Shoreline Use	2
Community Setting/Community Geographic Location	1
<del>Time Until Damage</del>	<del>3</del>
Housing and Population Affected	1
Housing in Parallel	2
Environmental Hazard (for example, Landfills, Sewer Lines, Sewage Lagoons, Fuel Tanks)	3
Cultural Importance	1
<del>Percent Of Affected (Numbers of Structure/People)</del>	<del>2</del>
Commercial/Public/Store/Church/Community Infrastructure	2

### **Incorporation of Risk Consideration into Methodology**

There are various definitions of risk. The Corps of Engineer's report Beyond Expected Value: Making Decisions under Risk and Uncertainty (USACE, IWR Report 02-R-4 (Dick Males); September 2002) provides the following simplistic definition of risk and uncertainty:

*“Risk is the chance of something bad happening. Uncertainty is a characteristic of a situation in which a number of possibilities exist but we do not know which of them will occur. Uncertainty exists because of natural variability and knowledge gaps.”*

The entire BEA study is a risk analysis (examination of erosion risk) across communities throughout the state. Due to the number of communities with potential problems, Alaska District is proceeding with the study in an iterative manner to systematically assess the relative risk across communities and prioritize follow-on detailed study activity on those communities at the highest perceived risk first.

Risk analysis as applied to the Corps Civil Works problems can be viewed as having three components:

- Risk assessment;
- Risk communication; and
- Risk management.

In Risk Analysis and Risk Informed Decision Making: An Overview (USACE; Planning Ahead, Volume 10, Issue 10 (Brian Harper/David Moser) November, 2007), these three components are described as follows:

- Risk assessment is a systematic process for quantifying and describing the nature, likelihood, and magnitude of risk associated with a situation, action, or event. The assessment includes consideration of relevant uncertainties.
- Risk management is the process used to identify, evaluate, select, implement, monitor and modify actions taken to alter levels of risk. The goal of risk management is scientifically sound, cost-effective, integrated actions that reduce risks while taking into account economic, environmental, social, cultural, ethical, political and legal considerations.
- Risk communication is the open, two-way exchange of information and opinion about hazards and risks leading to a better understanding of the risks and better risk management decisions.

The prioritization exercise which is the topic of this memo is a form of risk assessment where the *Severity of Damage* ratings estimate the relative nature and magnitude of erosion risk in each community and the *Time Until Damage* ratings estimate the likelihood/timing of the expected event. Together, these two factors can provide the basis for prioritizing communities for further evaluation. The following relationship is recommended:

$$\textit{Erosion Risk Ranking} = \textit{Severity of Damage Score} * \textit{Time until Damage Score}$$

Risk assessment should also explicitly consider the uncertainties that are inherent to our estimates of the *Severity of Damage* and *Time until Damage*. Based on the preliminary level of data (in many cases anecdotal, subjective descriptions) available for the EIP's, the largest source of uncertainty for both scale ratings is likely information gaps (for example; no data available, overly general information available, or uncertainty in reliability of available data).

During the rating of “Time until Damage” for each community, a rating of the relative confidence in the score also be recorded. This allows explicit consideration of the uncertainty in the ratings by providing another layer of information (For example, “We think Community X has a rating of 20 however because of uncertainty in our estimate of Time until Damage, its rating could range from a 15 to a 25. This information is useful for informing the prioritization decision making process and allows for flexibility in selecting communities for further study.

**Severity of Damage Evaluation Factor Rating Criteria:**

Through research by the PDT, input from the workshop, and recommendations by Tetra Tech, a consultant to the Corps assisting on the Baseline Erosion Assessment, the following criteria have been developed. Tetra Tech compiled these thoughts and with their additional insight, submitted the following criteria. These are now the proposed that will be utilized in assessing the risk for each community. Table 3 documents these criteria.

**USACE**

**Table 3 – Draft Rating Criteria for Severity of Damage Evaluation Factors**

Evaluation Factor	Weight	Scoring Criteria	
Critical Infrastructure (for example, School, Utilities, Transportation)	3	Low Impact (1)	<ul style="list-style-type: none"> <li>• One item of critical community infrastructure at risk</li> <li>• Loss of infrastructure would not result in loss of community sustainability</li> <li>• Damage could be repaired or alternative service restored in less than 1 month</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• More than one item of critical community infrastructure at risk</li> <li>• Loss would not result in loss of community sustainability</li> <li>• Damage could be repaired or alternative service restored between 1 and 6 months</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• More than one item of critical community infrastructure at risk</li> <li>• Loss would impact community sustainability</li> <li>• Repaired or establishment of alternative service would take more than 6 months</li> </ul>
Human Health and Safety	3	Low Impact (1)	<ul style="list-style-type: none"> <li>• Situations that would cause life safety concerns or negatively affect ability to provide emergency services are not likely</li> <li>• Ingress/egress to/from community not at risk</li> <li>• Community has ability to mitigate or avoid life safety concerns</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• Only rare events would threaten life safety</li> <li>• Access to or from community by land or airport threatened</li> <li>• Quick and easy access to emergency services is available</li> </ul>

Human Health and Safety (continued)		High Impact (3)	<ul style="list-style-type: none"> <li>• Erosion damage is expected to result in human health and safety concerns</li> <li>• Critical health/safety services facility at risk</li> <li>• Portions or all of the population cut-off from emergency services</li> <li>• Air &amp;/or road access at great risk or impassable to all or a portion of community</li> </ul>
Subsistence and Shoreline Use	2	Low Impact (1)	<ul style="list-style-type: none"> <li>• Minor and temporary interruptions that are a nuisance but made up in same year</li> <li>• Damage could be repaired locally, for example regarding boat launch access each spring</li> <li>• Access is altered but not of substantial consequence or inconvenience</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• Frequent loss or disruption of access to subsistence or damage to important shoreline uses</li> <li>• Structural mitigation of risk practicable solution but may disrupt high value traditional use and access areas</li> <li>• Critical habitat &amp;/or use areas mild to moderately threatened; traditional practices inconvenienced but not disrupted</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• Interruptions sever enough to impact supply on a continual basis</li> <li>• Critical habitat &amp;/or use areas severely threatened; traditional practices limited to focus on survival</li> <li>• Structural mitigation of risk possible but may eliminate or harm vital subsistence/shoreline use area</li> </ul>

Community Setting/Community Geographic Location	1	Low Impact (1)	<ul style="list-style-type: none"> <li>• Land is readily available in erosion free zones for new development or relocations</li> <li>• Soils, hydrology/hydraulic conditions not conducive to erosion; aggregate resources available locally if erosion protective measures needed</li> <li>• Land use controls in place and/or safe land area between shoreline and development exists</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• Lands in erosion free zones are limited, precluding new development or relocations into safe areas</li> <li>• Soils and hydrologic/hydraulic conditions conducive to erosion</li> <li>• Limited distance between shoreline and development but safe zones available and some local resources to assist with mitigating problem</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• High erosion rates and flooding</li> <li>• Poor soils conducive to erosion, permafrost melt possible added impact</li> <li>• No or limited safe land areas to move structures; community on barrier islands or spit</li> <li>• Community is hub of goods/services supporting other communities in region/sub-region</li> </ul>
Housing and Population Affected	1	Low Impact (1)	<ul style="list-style-type: none"> <li>• Less than 10 % of population/housing affected</li> <li>• Alternative housing available</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• 10 to 25% of population/housing affected</li> <li>• Alternative housing available but limited</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• Over 25% of population/housing</li> <li>• Limited to no alternative housing available</li> </ul>

Housing in Parallel	2	Low Impact (1)	<ul style="list-style-type: none"> <li>Only a few waterfront structures and limited associated infrastructure at risk (one time loss)</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>Multiple Rows of structures parallel to waterfront and limited associated infrastructure improvements are at risk (expected future recurrence of damages)</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>Multiple Rows of structures parallel to waterfront and extensive associated infrastructure improvements are at risk (higher level of expected future recurrence of damages)</li> </ul>
Environmental Hazard (for example, Landfills, Sewer Lines, Sewage Lagoons, Fuel Tanks)	3	Low Impact (1)	<ul style="list-style-type: none"> <li>Minor issue that can be easily addressed at the time of damage</li> <li>Impact can be addressed locally</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>Moderate environmental effect that will require limited intervention by an external agency for a limited period of time</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>Large issue that will require extensive intervention by one or more external agencies for an extended period of time</li> <li>Damage or loss will impact the entire population or high % of population, such as contaminated water supply</li> <li>If erosion causes environmental impact that has long term impacts &amp;/or impacts to other communities or region may suffer (such as hazardous substances, fuel facilities or landfills eroding into an anadromous stream)</li> </ul>
Cultural Importance	1	Low Impact (1)	<ul style="list-style-type: none"> <li>Minor or temporary disruption in cultural/traditional activities with no lingering negative impacts</li> <li>Minimal expected damage to known cultural and historic resources</li> </ul>



Cultural Importance (continued)		Medium Impact (2)	<ul style="list-style-type: none"> <li>• Intervention required for community to continue with cultural/traditional activities</li> <li>• Some cultural resources are lost, but rarely occurs without appropriate records being taken to catalog what resources have been lost.</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• Cultural resource being lost at a high rate with little or no ability to catalog and record what is being lost.</li> <li>• Traditional practices are being abandoned to focus solely on life-safety and survival.</li> </ul>
Commercial/Non-Residential	2	Low Impact (1)	<ul style="list-style-type: none"> <li>• Impacts have no or little affect on overall community cash flow</li> <li>• Little and only temporary impact to a community's ability to operate their commercial facilities with minor interruptions</li> <li>• Little or no exterior financial support is necessary to re-establish full capacity</li> </ul>
		Medium Impact (2)	<ul style="list-style-type: none"> <li>• Impacts have moderate impact on overall community cash flow</li> <li>• Impacts to a community's commercial infrastructure will require significant external assistance to come back to full capacity</li> <li>• Loss of commercial infrastructure can be handled at an alternative site or location (such as a 2<sup>nd</sup> local store, or other commercial/public dock facilities)</li> </ul>
		High Impact (3)	<ul style="list-style-type: none"> <li>• Impacts have severe, dramatic affect on cash flow of a community</li> <li>• The ability to operate the commercial sector for the community is severely impacted</li> <li>• Loss of commercial infrastructure will impact entire community (such as loss of a single store, with no replacement facilities); or ability to gather materials or have goods and services brought in is no longer possible (i.e. a commercial dock is destroyed with no replacement or alternate facilities)</li> </ul>

**Revised Strawman Matrix**

Following the workshop, Tetra Tech prepared a prioritization ranking framework that incorporates the risk assessment factors described in the recommendations in this memorandum. The framework is presented in Table 4 and provided as an electronic file (Excel spreadsheet) under separate cover.

The spreadsheet file would allow the District to enter accepted scoring values for each Evaluation Factor in Table 3 from drop down lists, apply user defined weights (currently set to those in Table 3), select accepted scoring values for Time until Damage, and select accepted values for Confidence in Time until Damage estimates. The spreadsheet calculates a Damage Score based upon the Evaluation Factors and their respective weights, and calculates Community Ranking Scores with uncertainty based upon user selected confidence in the Time until Damage rating. (Note that the scores shown in Table 4 are for example only and do not reflect scores developed for any specific communities.)

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<p><b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b></p>		<p><b>Community 1</b></p>	<p><b>Community 2</b></p>	<p><b>Community 3</b></p>	<p><b>Community 4</b></p>	<p><b>Community 5</b></p>	<p><b>Community 6</b></p>	<p><b>Community 7</b></p>	<p><b>Community 8</b></p>	<p><b>Community 9</b></p>	<p><b>Community 10</b></p>	<p><b>Community 11</b></p>	<p><b>Community 12</b></p>
<p><b>SEVERITY OF DAMAGE:</b></p>													
<p><b>Critical Infrastructure (for example, School, Utilities, Transportation)</b></p>	<p><b>(1) LOW IMPACT:</b>  <ul style="list-style-type: none"> <li>• One item of critical community infrastructure at risk</li> <li>• Loss of infrastructure would not result in loss of community sustainability</li> <li>• Damage could be repaired or alternative service restored in less than 1 month</li> </ul> </p>												
	<p><b>(2) MEDIUM IMPACT:</b>  <ul style="list-style-type: none"> <li>• More than one item of critical community infrastructure at risk</li> <li>• Loss would not result in loss of community sustainability</li> <li>• Damage could be repaired or alternative service restored between 1 and 6 months</li> </ul> </p>	0	1	1	1	1	1	2	2	2	3	3	3
	<p><b>(3) HIGH IMPACT:</b>  <ul style="list-style-type: none"> <li>• More than one item of critical community infrastructure at risk</li> <li>• Loss would impact community sustainability</li> <li>• Repaired or establishment of alternative service would take more than 6 months</li> </ul> </p>												

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b>		<b>Community 1</b>	<b>Community 2</b>	<b>Community 3</b>	<b>Community 4</b>	<b>Community 5</b>	<b>Community 6</b>	<b>Community 7</b>	<b>Community 8</b>	<b>Community 9</b>	<b>Community 10</b>	<b>Community 11</b>	<b>Community 12</b>
<b>Human Health and Safety</b>	<b>(1) LOW IMPACT:</b> <ul style="list-style-type: none"> <li>• Situations that would cause life safety concerns or negatively affect ability to provide emergency services are not likely</li> <li>• Ingress/egress to/from community not at risk</li> <li>• Community has ability to mitigate or avoid life safety concerns</li> </ul>	0	1	1	1	1	1	2	2	2	3	3	3
	<b>(2) MEDIUM IMPACT:</b> <ul style="list-style-type: none"> <li>• Only rare events would threaten life safety</li> <li>• Access to or from community by land or airport threatened</li> <li>• Quick and easy access to emergency services is available</li> </ul>												
	<b>(3) HIGH IMPACT:</b> <ul style="list-style-type: none"> <li>• Erosion damage is expected to result in human health and safety concerns</li> <li>• Critical health/safety services facility at risk</li> <li>• Portions or all of the population cut-off from emergency services</li> <li>• Air &amp;/or road access at great risk or impassable to all or a portion of community</li> </ul>												

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<p align="center"><b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b></p>		<p align="center"><b>Community 1</b></p>	<p align="center"><b>Community 2</b></p>	<p align="center"><b>Community 3</b></p>	<p align="center"><b>Community 4</b></p>	<p align="center"><b>Community 5</b></p>	<p align="center"><b>Community 6</b></p>	<p align="center"><b>Community 7</b></p>	<p align="center"><b>Community 8</b></p>	<p align="center"><b>Community 9</b></p>	<p align="center"><b>Community 10</b></p>	<p align="center"><b>Community 11</b></p>	<p align="center"><b>Community 12</b></p>
<p align="center"><b>Subsistence and Shoreline Use</b></p>	<p><b>(1) LOW IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Minor and temporary interruptions that are a nuisance but made up in same year</li> <li>• Damage could be repaired locally, for example regarding boat launch access each spring</li> <li>• Access is altered but not of substantial consequence or inconvenience</li> </ul>												
	<p><b>(2) MEDIUM IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Frequent loss or disruption of access to subsistence or damage to important shoreline uses</li> <li>• Structural mitigation of risk practicable solution but may disrupt high value traditional use and access areas</li> <li>• Critical habitat &amp;/or use areas mild to moderately threatened; traditional practices inconvenienced but not disrupted</li> </ul>	<p align="center">0</p>	<p align="center">1</p>	<p align="center">1</p>	<p align="center">1</p>	<p align="center">1</p>	<p align="center">1</p>	<p align="center">2</p>	<p align="center">2</p>	<p align="center">2</p>	<p align="center">3</p>	<p align="center">3</p>	<p align="center">3</p>
	<p><b>(3) HIGH IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Interruptions severe enough to impact supply on a continual basis</li> <li>• Critical habitat &amp;/or use areas severely threatened; traditional practices limited Structural mitigation of risk possible but may eliminate or harm vital subsistence/shoreline use area</li> </ul>												

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b>		<b>Community 1</b>	<b>Community 2</b>	<b>Community 3</b>	<b>Community 4</b>	<b>Community 5</b>	<b>Community 6</b>	<b>Community 7</b>	<b>Community 8</b>	<b>Community 9</b>	<b>Community 10</b>	<b>Community 11</b>	<b>Community 12</b>
<b>Community Setting/Community Geographic Location</b>	<b>(1) LOW IMPACT:</b> <ul style="list-style-type: none"> <li>• Land is readily available in erosion free zones for new development or relocations</li> <li>• Soils, hydrology/hydraulic conditions not conducive to erosion; aggregate resources available locally if erosion protective measures needed</li> <li>• Land use controls in place and/or safe land area between shoreline and development exists</li> </ul>												
	<b>(2) MEDIUM IMPACT:</b> <ul style="list-style-type: none"> <li>• Lands in erosion free zones are limited, precluding new development or relocations into safe areas</li> <li>• Soils and hydrologic/hydraulic conditions conducive to erosion</li> <li>• Limited distance between shoreline and development but safe zones available and some local resources to assist with mitigating problem</li> </ul>	0	1	1	1	1	1	2	2	2	3	3	3
	<b>(3) HIGH IMPACT:</b> <ul style="list-style-type: none"> <li>• High erosion rates and flooding</li> <li>• Poor soils conducive to erosion, permafrost melt possible added impact</li> <li>• No or limited safe land areas to move structures; community on barrier islands or spit</li> <li>• Community is hub of goods/services supporting other communities in region/sub-region</li> </ul>												
<b>Housing and Population Affected</b>	<b>(1) LOW IMPACT:</b> <ul style="list-style-type: none"> <li>• Less than 10 % of population/housing affected</li> <li>• Alternative housing available</li> </ul>	0	1	1	1	1	1	2	2	2	3	3	3

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b>		<b>Community 1</b>	<b>Community 2</b>	<b>Community 3</b>	<b>Community 4</b>	<b>Community 5</b>	<b>Community 6</b>	<b>Community 7</b>	<b>Community 8</b>	<b>Community 9</b>	<b>Community 10</b>	<b>Community 11</b>	<b>Community 12</b>
	<p><b>(2) MEDIUM IMPACT:</b>  <ul style="list-style-type: none"> <li>• 10 to 25% of population/housing affected</li> <li>• Alternative housing available but limited</li> </ul> </p> <p><b>(3) HIGH IMPACT:</b>  <ul style="list-style-type: none"> <li>• Over 25% of population/housing</li> <li>• Limited to no alternative housing available</li> </ul> </p>												
<b>Housing in Parallel</b>	<p><b>(1) LOW IMPACT:</b>  <ul style="list-style-type: none"> <li>• Only a few waterfront structures and limited associated infrastructure at risk (one time loss)</li> </ul> </p> <p><b>(2) MEDIUM IMPACT:</b>  <ul style="list-style-type: none"> <li>• Multiple Rows of structures parallel to waterfront and limited associated infrastructure improvements are at risk (expected future recurrence of damages)</li> </ul> </p> <p><b>(3) HIGH IMPACT:</b>  <ul style="list-style-type: none"> <li>• Multiple Rows of structures parallel to waterfront and extensive associated infrastructure improvements are at risk (higher level of expected future recurrence of damages)</li> </ul> </p>	0	1	1	1	1	1	2	2	2	3	3	3
<b>Environmental Hazard</b>	<p><b>(1) LOW IMPACT:</b>  <ul style="list-style-type: none"> <li>• Minor issue that can be easily addressed at the time of damage</li> <li>• Impact can be addressed locally</li> </ul> </p>	0	1	1	1	1	1	2	2	2	3	3	3

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<p align="center"><b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b></p>		Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
	<p><b>(2) MEDIUM IMPACT:</b>  <ul style="list-style-type: none"> <li>• Moderate environmental effect that will require limited intervention by an external agency for a limited period of time</li> </ul> </p> <hr/> <p><b>(3) HIGH IMPACT:</b>  <ul style="list-style-type: none"> <li>• Large issue that will require extensive intervention by one or more external agencies for an extended period of time</li> <li>• Damage or loss will impact the entire population or high % of population, such as contaminated water supply</li> <li>• If erosion causes environmental impact that has long term impacts &amp;/or impacts to other communities or region may suffer (such as hazardous substances, fuel facilities or landfills eroding into an anadromous stream)</li> </ul> </p>												
<p><b>Cultural Importance</b></p>	<p><b>(1) LOW IMPACT:</b>  <ul style="list-style-type: none"> <li>• Minor or temporary disruption in cultural/traditional activities with no lingering negative impacts</li> <li>• Minimal expected damage to known cultural and historic resources</li> </ul> </p>	0	1	1	1	1	1	2	2	2	3	3	3



**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b>		<b>Community 1</b>	<b>Community 2</b>	<b>Community 3</b>	<b>Community 4</b>	<b>Community 5</b>	<b>Community 6</b>	<b>Community 7</b>	<b>Community 8</b>	<b>Community 9</b>	<b>Community 10</b>	<b>Community 11</b>	<b>Community 12</b>
	<p><b>(2) MEDIUM IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Intervention required for community to continue with cultural/traditional activities</li> <li>• Some cultural resources are lost, but rarely occurs without appropriate records being taken to catalog what resources have been lost.</li> </ul> <p><b>(3) HIGH IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Cultural resource being lost at a high rate with little or no ability to catalog and record what is being lost.</li> <li>• Traditional practices are being abandoned to focus solely on life-safety and survival.</li> </ul>												
<p><b>Commercial/ Non-Residential</b></p>	<p><b>(1) LOW IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Impacts have no or little affect on overall community cash flow</li> <li>• Little and only temporary impact to a community's ability to operate their commercial facilities with minor interruptions</li> <li>• Little or no exterior financial support is necessary to re-establish full capacity</li> </ul> <p><b>(2) MEDIUM IMPACT:</b></p> <ul style="list-style-type: none"> <li>• Impacts have moderate impact on overall community cash flow</li> <li>• Impacts to a community's commercial infrastructure will require significant external assistance to come back to full capacity</li> <li>• Loss of commercial infrastructure can be handled at an alternative site or location</li> </ul>	<p>0</p>	<p>1</p>	<p>1</p>	<p>1</p>	<p>1</p>	<p>1</p>	<p>2</p>	<p>2</p>	<p>2</p>	<p>3</p>	<p>3</p>	<p>3</p>

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

<b>SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS</b>		<b>Community 1</b>	<b>Community 2</b>	<b>Community 3</b>	<b>Community 4</b>	<b>Community 5</b>	<b>Community 6</b>	<b>Community 7</b>	<b>Community 8</b>	<b>Community 9</b>	<b>Community 10</b>	<b>Community 11</b>	<b>Community 12</b>
	<i>(such as a 2nd local store, or other commercial/public dock facilities)</i>												
	<b>(3) HIGH IMPACT:</b> <ul style="list-style-type: none"> <li>• Impacts have severe, dramatic affect on cash flow of a community</li> <li>• The ability to operate the commercial sector for the community is severely impacted</li> <li>• Loss of commercial infrastructure will impact entire community (such as loss of a single store, with no replacement facilities); or ability to gather materials or have goods and services brought in is no longer possible (i.e. a commercial dock is destroyed with no replacement or alternate facilities)</li> </ul>												
<b>DAMAGE SCORE:</b>		<b>0</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>36</b>	<b>36</b>	<b>36</b>	<b>54</b>	<b>54</b>	<b>54</b>
<b>TIME UNTIL DAMAGE:</b>													
<b>TIME UNTIL DAMAGE RATING</b>	<u>Enter One of Following Values or Select from Drop Down List:</u> <b>3 for Short Term (1 to 10 Years)</b> <b>2 for Mid Term (10 to 20 years)</b> <b>1 for Long Term (20 years and beyond)</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>

**.TABLE 4 - DRAFT COMMUNITY RANKING METHODOLOGY**

SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFORMATION IN EIPS		Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
		<b>CONFIDENCE IN TIME UNTIL DAMAGE RATING</b>	<i>Enter Closest of following Values or Select from Drop Down List: 25% Confidence Rating (Hunch) 50% Confidence Rating (Educated Guess) 75% Confidence Rating (Think so) 100% Confidence Rating (Sure)</i>	25%	25%	50%	75%	100%	25%	25%	75%	100%	25%
<b>COMMUNITY RANKING SCORES:</b>													
<b>COMMUNITY RANKING SCORE:</b>		0	36	36	36	36	54	36	72	108	54	108	162
<b>CONFIDENCE RANGE LOW:</b>		0.0	22.5	27.0	31.5	36.0	40.5	36.0	63.0	108.0	54.0	94.5	162.0
<b>CONFIDENCE RANGE HIGH:</b>		0.0	49.5	45.0	40.5	36.0	54.0	63.0	81.0	108.0	94.5	121.5	162.0



## DCCED/DCRA CRITERIA

DCCED/DCRA sent the following email to Field Personnel requesting assistance to identify communities they believed met the IAWG's criteria for communities potentially impacted from climate change phenomena.

**From:** Boothby, Taunnie L (CED)

**Sent:** Friday, December 05, 2008 4:27 PM

**To:** Mello, Christopher P (AIDEA); Magee, Gregory L (DEC); Ruby, Scott (CED)

**Cc:** Jollie, Tara L (CED); Black, Michael L (CED); Cox, Sally A (CED); McKay, Peter J (CED); St Amour, Ruth R (CED)

**Subject:** Requesting your assistance on behalf of Deputy Commissioner Mike Black and DCRA Tara Jollie

Good Afternoon,

On behalf of Deputy Commissioner Mike Black and DCRA Director Tara Jollie, we are asking for your recommendations of communities that may need immediate action to prevent loss of life, health or great property damage. This list will be compiled for dialogue during the Immediate Action Workgroup of the Governor's Climate Change Subcabinet.

We are requesting this input because you are the subject matter expert in your fields and your vast knowledge of the communities across the State. This experience is vital to the discussion and we appreciate your time.

Below is a brief summary of what has happened and what the criteria to consider when recommending communities.

On April 17, 2008, the Immediate Action Workgroup (IAWG) released their final report and recommendations to the Governor's Subcabinet on Climate Change for the initial six communities experiencing climate change related affects, namely Kivalina, Koyukuk, Newtok, Shaktoolik, Shishmaref, and Unalakleet.

Currently the IAWG are collecting a list of additional communities for discussion purposes on a potential second round of communities.

DCRA has determined our mission statement for this task to be the following:

Identify the next set of communities facing the most significant impacts due to climate change in the next 18 – 24 months, based on the following criteria:

- (1) Life/safety risk during storm/flood events
- (2) Loss of critical infrastructure
- (3) Public health threats
- (4) Loss of 10% or more of residential dwellings

Communities recommended to date:

Akiak

Alakanuk

Atmautluak

Chefornak

Diomedé

Golovin

Kotlik

Kwethluk

Kwigillingok

Little Diomedé

Napakiak

Nelson Lagoon

This list is not an inclusive list of communities affected by Climate Change.

We are asking for your recommendations of communities based on the DCRA mission statement for this task. Please provide your input via e-mail to [taunnie.boothby@alaska.gov](mailto:taunnie.boothby@alaska.gov) and [tara.jollie@alaska.gov](mailto:tara.jollie@alaska.gov) by close of business Dec 12, 2008.

Thank you,  
Taunnie L. Boothby, CFM  
State NFIP Coordinator/Floodplain Management Programs  
DCCED/Division of Community and Regional Affairs  
Phone: 907-269-4583; E-mail: [taunnie.boothby@alaska.gov](mailto:taunnie.boothby@alaska.gov)

**ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT**  
**COMPILED IN NOVEMBER 2008**  
**SUMMARY OF ALASKAN FLOOD DISASTERS**  
**1978-2008**  
**SORTED BY REGION, COMMUNITY AND YEAR**

This summary includes only the communities and flooding events resulting in a state disaster declaration. The same event often affects several communities, sometimes widely separated. Flooding events result from:

- Rainfall
- Ice jam
- Storm surge
- Wind driven waves
- Snow melt
- Rising ground water

<b>Region</b>	<b>Communities</b>	<b>Flooding Events</b>
Yukon	13	17
Koyukuk	6	7
Kuskokwim	11	32
Bristol Bay	5	7
Aleutians & Peninsula	4	7
West Coast	22	43
Northwest	10	20
North Slope	4	4
Interior	6	15
Southcentral	14	33
Kenai PB	6	11
Kodiak	2	7
Southeast	16	25
<b>Total</b>	<b>119</b>	<b>228</b>

<b>Year</b>	<b>Flooding Events</b>
1978	4
1979	15
1980	5
1981	1
1982	2
1983	3
1984	7
1985	15
1986	4
1987	3
1988	5
1989	8
1990	10
1991	14
1992	5
1993	1
1994	10
1995	14
1996	0
1997	4
1998	4
1999	0
2000	16
2001	2
2002	19
2003	6
2004	7
2005	23
2006	16
2007	0
2008	5
<b>Total</b>	<b>228</b>

<b>Yukon River</b>	
Anvik	1985 1991
Circle	1989
Eagle	1992
Eagle Village	1992
Fort Yukon	1982 1989
Galena	1991 1992 1994
Grayling	1991
Holy Cross	1991
Kaltag	1988
Pilot Station	1985
Pitka's Point	1985
Russian Mission	1982
Shageluk (Innoko)	1991

<b>Yukon River</b>	
1982	Fort Yukon Russian Mission
1985	Anvik Pilot Station Pitka's Point
1988	Kaltag
1989	Circle Fort Yukon
1991	Anvik Grayling Holy Cross Shageluk Galena
1992	Eagle Village Eagle Galena
1994	Galena

<b>Koyukuk River</b>	
Alatna	1994
Allakaket	1994
Bettles	1994
Hughes	1994
Koyukok	2001 2006
Wiseman	1994

<b>Koyukuk River</b>	
1994	Alatna Allakaket Bettles Hughes Wiseman
2001	Koyukok
2006	Koyukok



<b>Kuskokwim River</b>	
Akiak	1995
Aniak	1983 1987 1991 1995 2002
Bethel	1985 1990 1995 2006
Crooked Creek	1985 1988 2002
Lime Village (Stony R)	2002
McGrath	1985 1990 1991 1993 2002 2005
Napakiak	1986 1988 1990 2005
Nunapitchuk	1990
Red Devil	1985 1991 2002
Sleetmute	1985 1987 2002
Tuntutuliak	1990

<b>Kuskokwim</b>	
1983	Aniak
1985	Bethel Crooked Creek McGrath Red Devil Sleetmute
1986	Napakiak
1987	Sleetmute Aniak
1988	Crooked Creek Napakiak
1990	Bethel Mcgrath Napakiak Nunapitchuk Tuntutuliak
1991	Aniak McGrath Red Devil
1993	McGrath
1995	Akiak Aniak Bethel
2002	Aniak Crooked Crook Lime Village (Stony R) McGrath Red Devil Sleetmute
2005	McGrath Napakiak
2006	Bethel

<b>Bristol Bay</b>	
Bristol Bay Borough	2005
Clark's Point	2005
Dillingham	1980 2000 2005
Ekwok	2002
Koliganek	1991

<b>Bristol Bay</b>	
1980	Dillingham
1991	Koliganek
2000	Dillingham
2002	Ekwok
2005	Bristol Bay Borough Clark's Point Dillingham

<b>Aleutians &amp; Peninsula</b>	
Chignik	2000 2002
Lake & Pen Borough	2000 2003 2005
Naknek	2003
Unalaska	1985

<b>Aleutians &amp; Peninsula</b>	
1985	Unalaska
2000	Chignik Lake & Peninsula
2002	Chignik
2003	Lake & Peninsula Naknek
2005	Lake & Peninsula

<b>West Coast</b>	
Alakanuk	1984 1991 1995 2002 2005 2006
Chefornak	1979
Chevak	2004
Emmonak	1984 1985 1991 1995 2002 2005 2006
Goodnews Bay	1979 2004
Hooper Bay	1979 2004
Kipnuk	1979 1983
Kongiganak	1979 2006
Kwethluk	1995 2002 2006
Kwigillingok	1979 1990
Napaskiak	1995
Newtok	1979 2005
Nunam Iqua	1979
Platinum	1979
Quinhagak	1979 2005
Scammon Bay	1979
Shaktoolik	2005
St. Michael	2005
Togiak	1979
Toksook Bay	1979
Tununak	1979
Unalakleet	2003 2005

<b>West Coast</b>	
1979	Chefornak Goodnews Bay Hooper Bay Kipnuk Kongiganak Kwigillingok Newtok Nunam Iqua Platinum Quinhagak Scammon Bay Togiak Toksook Bay Tununak
1983	Kipnuk
1984	Alakanuk Emmonak
1985	Emmonak
1990	Kwigillingok
1991	Alakanuk Emmonak
1995	Alakanuk Emmonak Kwethluk Napaskiak
2002	Alakanuk Emmonak Kwethluk
2003	Unalakleet
2004	Chevak Goodnews Bay Hooper Bay
2005	Alakanuk Emmonak Newtok Quinhagak St. Michael Shaktoolik Unalakleet
2006	Alakanut Emmonak Kongiganak Kwethluk

<b>Northwest</b>	
Buckland	1985 1987
Diomedes	1990 2004
Elim	2004 2005
Golovin	2004 2005
Kivalina	2006
Kobuk	1985 1990
Kotzebue	1990
Nome	2003 2005
Shishmaref	1988 1997 2001 2002 2005
Teller	1990

<b>Northwest</b>	
1985	Buckland Kobuk
1987	Buckland
1988	Shishmaref
1990	Diomedes Kobuk Kotzebue Teller
1997	Shishmaref
2001	Shishmaref
2002	Shishmaref
2003	Nome
2004	Diomedes Elim Golovin
2005	Elim Golovin Nome Shishmaref
2006	Kivalina

<b>North Slope</b>	
Endicott Mountains	1998
Kaktovik	2008
North Slope Borough	1989
Wainwright	2008

<b>North Slope</b>	
1989	North Slope Borough
1998	Endicott Mountains
2008	Kaktovik Wainwright

<b>Interior</b>	
Delta Junction	1994 2000 2006
Denali Borough	2006
Fairbanks NSB	1989 1991 1992 1997 2000 2002 2008
Nenana	2008
Northway	1997
Salcha	2002 2008

<b>Interior</b>	
1989	North Star Borough
1991	North Star Borough
1992	North Star Borough
1994	Delta Junction
1997	North Star Borough Northway
2000	Delta Junction North Star Borough
2002	Salcha North Star Borough
2006	Delta Junction Denali Borough
2008	North Star Borough Nenana Salcha

<b>Southcentral</b>	
Anchorage	1978 1980 1989 1995 2000
Copper Center	1980
Copper River	1985 1997 2006
Cordova	1983 1985 1986 1995 2000 2006
Eyak	2006
Glennallen	1989
Iliamna	2000
Mat Su Borough	1980 1986 1991 1994 1995 2000 2006
McCarthy	2006
Newhalen	2000
Pedro Bay	2003
Seward	1989
Whittier	1995 2000
Valdez	2000 2006

<b>Southcentral</b>	
1978	Anchorage
1980	Anchorage Copper Center Mat Su Borough
1983	Cordova
1985	Copper River Cordova
1986	Cordova Mat Su Borough
1989	Anchorage Glennallen Seward
1991	Mat Su Borough
1994	Mat Su Borough
1995	Anchorage Cordova Mat Su Borough Whittier
1997	Copper River
2000	Anchorage Cordova Iliamna Mat Su Borough Newhalen Valdez Whittier
2003	Pedro Bay
2006	Copper River Cordova Mat Su Borough Eyak McCarthy Valdez

<b>Kenai Peninsula</b>	
Homer	2000 2002
Kachemak Silo	2002
Kenai	1995 2000
Kenai Borough	1981 1986 2002 2006
Port Graham	2002
Willow Creek	1979

<b>Kodiak</b>	
Karluk	1978
Kodiak	1980 1991 1992 2000 2002 2003

<b>Southeast</b>	
Angoon	1984
Chilkat	1998
Craig	1978
Elfin Cove	1995
Haines	1985 1988 1998 2005
Hoonah	2005
Juneau	1984 1998 2005
Kake	1984 2000
Kasaan	2004
Klawock	1989
Metlakatla	1994
Pelican	1995 2005
Sitka	1984 2005
Skagway	1994 2005
Tenakee Springs	1984
Wrangell	1978

<b>Kenai Peninsula</b>	
1979	Willow Creek
1981	Kenai Borough
1986	Kenai Borough
1995	Kenai
2000	Homer Kenai
2002	Homer Kachemak Silo Kenai Borough Port Graham
2006	Kenai Borough

<b>Kodiak</b>	
1978	Karluk
1980	Kodiak
1991	Kodiak
1992	Kodiak
2000	Kodiak
2002	Kodiak
2003	Kodiak

<b>Southeast</b>	
1978	Craig Wrangell
1984	Angoon Juneau Kake Sitka Tenakee Springs
1985	Haines
1988	Haines
1989	Klawock
1994	Metlakatla Skagway
1995	Elfin Cove Pelican
1998	Chilkat Haines Juneau
2000	Kake
2004	Kasaan
2005	Haines Hoonah Juneau Pelican Sitka Skagway

## Alaska DOT&PF - Erosion Control Projects: 1998 – 20099

### Used to Identify Communities Potentially Impacted by Climate Change Updated 12/3/2008

In addition to the projects listed below, ADOT & PF addresses permafrost warming/melting on every road in the interior. Major routes include the Alaska Highway, Glenn Highway, Tok Cutoff, Richardson Highway, Parks Highway, Elliott Highway, Dalton Highway, Denali Highway, and the Edgerton Highway. Northern Region Maintenance and Operations spends approximately \$10M per year on combating warming/melting permafrost. This is the funding level provided and does not reflect ADOT&PF's estimate of need.

<i>Proposed or Current Design Projects</i>	<b>Funding Source</b>	<b>Project #</b>	<b>Description</b>
<b>Barrow Arctic Research Center Road</b>	FHWA	76970	Relocate access road to Research Center due to erosion of Stevenson Street.
<b>Chignik Bay Airport</b>	CIAP		Airport Access Culvert Replacement
<b>Chignik Lagoon Runway Repairs</b>	GF/CIAP		Proposed project
<b>Coldfoot Airport Erosion Control</b>	FAA	60851	Protect the Coldfoot airport and access road from imminent erosion by the Koyukuk River.
<b>Emmonak Airport Rehabilitation - Stage II</b>	FAA	62641	Included in the scope of the Airport Project is to Relocate the existing powerline to the Airport due to River Erosion
<b>Emmonak Flood Permanent Repairs Airport/Clinic Road</b>	FHWA	62754	Repair damage to airport access road caused by recent flooding.
<b>Galena Campion Road Erosion Protection</b>	FHWA	61653	Relocate a portion of Campion Road to avoid erosion of approximately 2 miles of the existing alignment that is threatened by the Yukon River.
<b>Gambell Evacuation Road</b>	FHWA	62973	Repair and extend road used for evacuation of village during annual coastal floods from large westerly storms.
<b>Glenn Highway Erosion MP 62.4</b>	GF		Proposed
<b>Glenn Hwy Realignment MP 78</b>	GF		Proposed
<b>Hughes Airport Improvements</b>	FAA	60245	Address the current flood threat to the facility by raising the grade of the airport and relocating the apron, and possible relocation.
<b>Kivalina Airport Permanent Repairs</b>	FEMA	76926	Repair eroded side slopes and safety area at the airport eroded during 2005 Bering Sea Storm. Protect the most severely damaged portion of the side slopes with a stone revetment.
<b>Kotzebue Roads - Shore Avenue</b>	FHWA	60788	Reconstruct Shore Avenue to provide erosion protection from storms and long-shore currents.

<i>Proposed or Current Design Projects</i>	<b>Funding Source</b>	<b>Project #</b>	<b>Description</b>
<b>Little Diomed Helipad Improvements</b>	FAA	61470	Repair ice scour damage to helipad embankment, repair lighting damage from Storm Events.
<b>Nanwalek Airport</b>	AIP		
<b>Newtok/Mertarvik</b>	GF		
<b>Noatak Airport Relocation</b>	FAA	61478	Airport Relocation due to erosion by the Noatak River
<b>Nome Council Permanent Repairs</b>	FHWA		This project is currently in Construction to repair damages to the Nome Council Road due to the 2005 Bering Sea Storm. A hardened rock structure is being constructed in selected areas to aid in future protection of the road.
<b>North Slope Borough Road Improvements</b>	FHWA	76972	Relocate access road connection to Cake Eater Road due to erosion of Stevenson Street.
<b>Nulato Airport Road</b>	None		Project includes armoring embankment and raising grade to stop flooding and erosion by the Yukon River.
<b>Nunam Iqua Airport Rehabilitation</b>	FAA		Part of the scope of this project is to Construct a road to the airport to eliminate the Boardwalk Access. Currently, the boardwalks are damaged from flooding from both fall storms, and spring ice jam events, and have to be repaired. This project will Construct a road above flood levels to the airport.
<b>Parks Highway Erosion Protection MP 72</b>	CIAP		Willow Creek – Proposed
<b>Point Hope Evacuation Road Extension</b>	FHWA	76968	Construct an evacuation road extension to an elevation above flood levels.
<b>Point Hope Evacuation Road Rehabilitation</b>	FHWA	76966	Rehabilitate and raise grade of road used for evacuation of village from storm surge and flooding.
<b>Portage Glacier Highway</b>	CIAP		Erosion Protection – Proposed
<b>Quigillingok Airport</b>	GF		Currently addressing land acquisition issues
<b>Seward Highway Culvert Replacement</b>	CIAP		Proposed
<b>Shageluk Airport Access Road Improvements</b>	FHWA	62171	Raise roadbed or realign to minimize impact of flooding by Innoko River.
<b>Shishmaref Airport Masterplan</b>	FAA		Masterplan activities evaluating airport relocation options related to Community relocation.
<b>Shishmaref Relocation Road</b>	FHWA	76776	Reconnaissance study to construct road to access Ear Mountain Material source for material to relocate Shishmaref village due to severe erosion from storms.
<b>Sterling Highway Realignment MP 153.2</b>	FHWA		Proposed



<i>Active Projects Needing Additional Funding</i>	<b>Funding Source</b>	<b>Project #</b>	<b>Description</b>
<b>Gambell Evacuation Road</b>		62973	Current Cost estimates indicate there is not enough funding to complete road to far side of the island. The community has requested additional funding for the project, and DOT&PF is considering the request.
<b>Kivalina Airport Permanent Repairs</b>		76926	The engineer's estimate for the rip rap revetment along the taxiway of the airport is considerably higher than initial FEMA estimates. DOT&PF currently has a request to FEMA for the additional funding, but we are unsure if FEMA will approve the request.
<b>Kotzebue Roads - Shore Avenue</b>		60788	This project is currently designed with an additive alternate to provide a hardened rock structure along the first 1000' of the project, North of Lake Street. Depending on how the bids come in this additive may or may not be awarded. The city has also identified an area of erosion concerns North of the Shore Avenue project limits along the beach.
<b>Point Hope Evacuation Road Extension</b>		76968	Current Cost estimates indicate there is not enough funding to construct the evacuation road to the length requested by the community.
<b>Shishmaref Relocation Road/Airport Masterplan</b>		76776	Currently DOT&PF is funded to prepare a Reconnaissance Study and perform masterplan studies. No funding for construction has been identified.
<b>Nome Council Road</b>			FHWA ER funded project will not permanently protect the airport from erosion damage. Additional needs include grade raises/slope protection.

<i>Projects Completed</i>	<b>Funding Source</b>	<b>Project #</b>	<b>Description</b>
<b>Chignik Airport Access Road</b>	FHWA		Shore Protection
<b>False Pass Airport</b>	AIP		Replaced 1/3 of Runway (10 years ago)
<b>Girdwood Airport Erosion Protection</b>	AIP Surface Maintenance		Surface maintenance effort
<b>Homer – Burbank Culvert</b>	GF		Constructed by Maintenance
<b>Homer Spit Fishing Lagoon</b>	FHWA		Dynamically stable beach/beach nourishment project
<b>Homer Spit Road and Trail shore protection</b>	FHWA		Construction Complete
<b>Hooper Bay Airport</b>	AIP/GF		15 years ago – major project; smaller projects within last 5 years
<b>Hyder</b>	GF/FHWA		Completed several erosion projects
<b>Kivalina Airport</b>	FEMA		Shore Protection
<b>Kodiak – Pasagshak Road</b>	FHWA		Shore protection – constructed
<b>Kodiak Ferry Terminal</b>	FHWA		Shore Protection
<b>Koyukuk Airport Improvements</b>			Completed Airport Improvements to increase airport elevation above 100 year flood levels.
<b>Ninilchik Access Road</b>	GF		Shore Protection – Maintenance
<b>Platinum Airport</b>	AIP		Erosion issues – FY 09 Construction
<b>Sand Point Runway Armor Stone</b>	GF		
<b>Shaktoolik Airport Permanent Repairs</b>			Completed Airport Repairs to the Safety Area and Nav Aids due to the 2005 Bering Sea Storm flooding.
<b>Skagway</b>	FHWA		Completed Tiaya River Erosion Control Project
<b>Solomon and Safety Sound Waysides Permanent Repairs</b>			Both waysides were damaged during the 2005 Bering Sea Storm event. The Boardwalks were repaired and replaced where needed, and roads and parking areas were repaired.
<b>Unalakleet Beach Road Permanent Repairs</b>			Constructed repairs and a new hardened rock structure along the Beach Road that was damaged in the 2005 Bering Sea Storm.
<b>Unalakleet Airport Access Road</b>	FHWA		Dynamically stable beach/berm breakwater project – constructed
<b>Unalaska Airport</b>	GF		Constructed
<b>Unalaska Airport</b>	GF		Corrected a big erosion issue in last 5 years
<b>Unalaska East Point and Ballyhoo Road</b>	FHWA		Shore protection – completed

**Department of Natural Resources – Division of Forestry – Community Wildlands Protection Plans**

<b>Number</b>	<b>Lead Agency(s)</b>	<b>CWPP Name</b>	<b>CWPP Status</b>	<b>Estimated Cost</b>	<b>Communities included in CWPP</b>
1	FNSB, DOF	Fairbanks North Star Borough	Complete	\$40,000	Fairbanks, North Pole, College, Fox, Salcha, Ester
2	MSB, DOF, Local	Horseshoe Lake	Complete	Unknown	Horseshoe Lake
3	MSB	Matanuska- Susitna Borough	Complete	Unknown	Wasilla, Palmer, Butte, Sutton, Chickaloon, Knik, Big Lake, Houston, Willow, Talkeetna, Trapper Creek, Petersville
4	Muni of Anchorage	Municipality of Anchorage	Complete	Unknown	Anchorage, Rainbow, Indian, Bird Creek, Girdwood, Portage, Eagle River, Chugiak, Ekulna
5	DOF, Local	Chitna	Complete	Unknown	Chitna
6	KPB, DOF, Local	Anchor Point/Happy Valley/Nikolaevsk	Complete	\$20,000	Anchor Point, Happy Valley, Nikolaevsk
7	KPB, DOF, Local	Cooper Landing	Complete	\$20,000	Cooper Landing
8	KPB, DOF	Diamond Ridge/Fritz Creek/Fox River	Complete	\$20,000	Diamond Ridge, Fritz Creek, Fox River
9	KPB, DOF	Funny River	In Progress	\$20,000	Funny River
10	KPB, DOF	Halibut Cove & Vicinity	Complete	\$20,000	Halibut Cove & Vicinity
11	KPB, DOF	Homer /Kachemak	Complete	\$20,000	Homer, Kachemak
12	KPB, DOF	Hope/Sunrise/Summit	Complete	\$20,000	Hope, Sunrise, Summit
13	KPB, DOF	Kalifornsky/Kasilof/Cohoe/Clam Glutch	Complete	\$20,000	Kalifornsky, Kasilof, Cohoe, Clam Glutch
14	KPB, DOF	Kenai	Complete	\$20,000	Kenai
15	KPB, DOF	Moose Pass/Crown Point/Primrose	Complete	\$20,000	Moose Pass, Crown Point, Primrose
16	KPB, DOF	Nawalek	Complete	\$20,000	Nawalek
17	KPB, DOF	Nilichick/Nilichick Forties	Complete	\$20,000	Nilichick, Nilichick Forties
18	KPB, DOF	Nikisiki/Salamatof/Grey Cliffs	Complete	\$20,000	Nikisiki, Salamatof, Grey Cliffs
19	KPB, DOF	Port Graham	Complete	\$20,000	Port Graham
20	KPB, DOF	Soldotna/Ridgeway	In Progress	\$20,000	Soldotna, Ridgeway
21	KPB, DOF	Seldovia	Complete	\$20,000	Seldovia

**Department of Natural Resources – Division of Forestry – Community Wildlands Protection Plans**

<b>Number</b>	<b>Lead Agency(s)</b>	<b>CWPP Name</b>	<b>CWPP Status</b>	<b>Estimated Cost</b>	<b>Communities included in CWPP</b>
22	KPB, DOF	Bear Creek/Seward/Lowell Point	In Progress	\$20,000	Bear Creek,Seward,Lowell Point
23	KPB, DOF	Sterling	In Progress	\$20,000	Sterling
24	KPB, DOF	Tyonek/Beluga	In Progress	\$20,000	Tyonek/Beluga
25	USFWS	Allakaket	Complete	Unknown	Allakaket
26	USFWS	Ruby	Complete	Unknown	Ruby
27	USFWS	Beaver	Complete	Unknown	Beaver
28	USFWS	Venetie	In progress	Unknown	Venetie
29	USFWS	Galena	Complete	Unknown	Galena
30	USFWS	Stevens Village	Complete	Unknown	Stevens Village
31	USFWS	Evansville/Bettles	Complete	Unknown	Evansville,Bettles
32	DOF, Local	Mentasta	Planned	\$20,000	Mentasta
33	DOF, Local	Dry Creek	Planned	\$20,000	Dry Creek
34	DOF, Local	Glennallen	Complete	\$20,000	Glennallen
35	DOF, Local	Strelna	Complete	\$20,000	Strelna
36	DOF, Local	Tanacross	Planned	\$20,00	Tanacross
37	DOF, Local	Tok	Complete	Unknown	Tok
38	DOF, Local	Koyukuk	Planned	\$25,000	Koyukuk
39	DOF,BLM,Local	McGrath	In Progress	Unknown	McGrath
40	DOF,local	McCarthy	In Progress	\$20,000	McCarthy, Kennicott,Fireweed Mountain

**APPENDIX B**  
**FORMAL SUBMISSIONS FROM AND TO THE**  
**IAWG**





STATE OF ALASKA  
DEPARTMENT OF  
**COMMERCE**  
COMMUNITY AND  
ECONOMIC DEVELOPMENT  
Office of the Commissioner

*Sarah Palin, Governor*  
*Emil Notti, Commissioner*

December 11, 2008

Mr. John H. Dunnigan  
Assistant Administrator for Ocean Services & Coastal Management  
NOAA  
1305 East-West Highway  
Silver Spring, MD 20910

Dear Mr. Dunnigan:

The State of Alaska has embarked on an ambitious and timely process of examining the issues, approaches and solutions to the impacts of a warming arctic environment. As part of that effort, the Governor has appointed members of her cabinet to serve as her Climate Change Sub-cabinet advisory body. The chair of the Sub-cabinet is Commissioner Larry Hartig of the Department of Environmental Conservation. Subsequently, Commissioner Hartig established an Immediate Action Work Group to identify actions and policy development the work group feels is necessary in the immediate future. I serve as State co-chair while Patricia Opheen of the Corps of Engineers serves as the federal co-chair of the work group. Although we have a very limited membership, we are extremely pleased that Amy Holman of your organization has consented to serve on our work group.

On behalf of the State of Alaska and the Immediate Action Work Group of the Governor's Sub-cabinet for Climate Change, I commend NOAA for participating in our efforts. I also am excited that NOAA is seeking additional data on the weather, sea level heights and tidal ranges of Alaska's oceans. Lack of data on tides and weather patterns on the Alaskan coastlines is a substantial barrier to understanding what changes may be occurring in relation to climate change phenomena.

It is our understanding that NOAA plans to establish new tidal gauges and meteorological monitoring sites along Alaska's coast. The Immediate Action Work Group called for additional tide and water level stations in our April 2008 recommendations report to the Governor. Our top ten priority areas for placement of these stations (including meteorological instrument packages) are:

1. Bering Straits- Wales or Little Diomede;
2. Norton Sound – Unalakleet ;
3. Kuskokwim Bay – Platinum;
4. Arctic Ocean – Barrow;
5. Bristol Bay – Dillingham;
6. St Lawrence Island – Savoonga or Gambell;
7. Bering Sea – Hooper Bay or Scammon Bay;
8. Alaska Peninsula – Nelson Lagoon;
9. Cape Lisburne;
10. Nelson Island – Metarvik.

350 W. 7th Avenue, Suite 1770, Anchorage, Alaska 99501-3510  
Telephone: (907) 269-8100 Fax: (907) 269-8125 Text Telephone: (907) 465-5437  
Website: <http://www.commerce.state.ak.us/>

1



STATE OF ALASKA  
DEPARTMENT OF  
**COMMERCE**  
COMMUNITY AND  
ECONOMIC DEVELOPMENT

*Sarah Palin, Governor*  
*Emil Swaff, Commissioner*

Office of the Commissioner

Thank you for considering our opinion on this very important data-gathering effort. If we can be of further service, please contact me at the number listed below or by email at [Michael.Black@alaska.gov](mailto:Michael.Black@alaska.gov).

Sincerely,

Michael L. Black  
Deputy Commissioner

Cc: Michael W Szabados  
Director, NOS Center for Operational Oceanographic Products and Services

CAPT Steven R. Barnum  
Director, Office of Coastal Survey  
NOAA Commerce and Transportation Goal Team Lead



TO: Tessa Rinner, Director of Programs, Denali Commission

Date: January 9, 2009

RE: **Immediate Action Workgroup (IAWG) Comments to FY 2009 Commission Work Plan**

Comments prepared by: Jamilia George, State Co-Chair Representative to the Denali Commission

The Immediate Action Workgroup is a jointly chaired state-federal working group formed to make recommendations on projects, policies and goals that can be initiated or accomplished in a 12 – 18 month period (January 2009 – July 2010), for communities facing imminent threats of loss of life, loss of infrastructure, loss of public and private property or health epidemics due in-part to a changing climate.

IAWG members include DCCED, NOAA, USACE, DEC, DOT, DHS&EM, Denali Commission, ANTHC and others. All meetings are public and many rural community leaders participate in person and by teleconference. Deputy Commissioner Mike Black (DCCED) and Trish Opheen (USACE) are co-chairs.

Members identified 3 reports as highly relevant in reaching consensus on policy, project and budget recommendations for rural infrastructure: USACE – Baseline Erosion Assessment; Military & Veterans Affairs 30 Year Review of Disasters in Alaska; and the GAO Revised Report on Relocating Alaska Rural Communities. Central to the decision making process is the ability of rural communities to effectively identify known risks and hazards. In this regard, hazard mitigation planning on a regional level is critical. Funding for such planning is limited at both the state and federal level under current administrative and congressional regulations.

**The Denali Commission FY 2009 Work Plan and revised policies and procedures recognize the importance of regional planning, support and strategy to sustainable infrastructure and community vitality.** The IAWG believes that the Work Plan as drafted should include the opportunity for rural communities to apply for funding of Regional Hazard Mitigation Plans. The IAWG members understand the Commission's support of regional planning to be a necessary component to the decision-making process for funding infrastructure investment at the Commission. The IAWG therefore requests that the Work Plan be amended to include a modest but reasonable pool of funds **for purposes of establishing Regional Hazard Mitigation planning. It is the recommendation of the IAWG that \$1,000,000. for Fiscal Year 2009 be included in the Work Plan for this purpose.**

For further information supporting the above comments and request, please contact Deputy Commissioner Mike Black (DCCED), Trish Opheen (USACE) or John Madden (DHS & EM).

December 3, 2008

To: Governor's Sub-Cabinet on Climate Change  
From: The Interagency Hydrology Committee for Alaska  
Subject: Hydrology Needs for Alaska

The Interagency Hydrology Committee for Alaska (IHCA) is an organization of technical specialists working for Federal, State, borough, and local governments and Federally recognized tribes, who coordinate the collection and interpretation of data related to water resources and climate throughout the State of Alaska.

As you are well aware, climate change, particularly current warming trends in the high latitudes, is leading to changes in Alaska's freshwater, estuarine, and marine environments. One of the best measures of the rate and magnitude of change, and perhaps the most impacted natural resource in terms of both timing and quantity changes, is in fact water volume and associated characteristics. For example, rivers and lakes freeze over later in the year and become ice-free earlier in the year, permafrost is thawing, and precipitation patterns are changing. Agencies and communities in Alaska have become increasingly aware of the emerging and potential effects of climate change. However, the authorities charged with protecting the public safety and managing natural resources in the best public interest require appropriate information and tools to take specific actions in response to and preparation for changing environments.

IHCA has developed the following list of topics that are especially important to detecting, quantifying, and adapting to climate-driven change and recommend that research and monitoring in support of state and local needs be encouraged and supported with the highest priority:

- Extent of permafrost and the effects of changing permafrost on subsurface hydrology, aquifer yield, and lake draining or formation;
- Baseline flow and water volume conditions of rivers and lakes versus changing spatial and temporal hydrologic patterns, such as changes in seasonality, flood magnitude, and drought severity;
- The spatial and seasonal distribution, timing, intensity, and state of precipitation;
- Freeze-up, break-up, ice thickness, and ice jams on lakes and rivers;
- Extent of glacier mass changes, the contribution of glacier melt to streamflow, and frequency of outburst floods;
- Geologic and geotechnical trends related to active layer detachments, mass wasting, and sloughing;
- Avalanche timing, prevalence, and trends;
- Socio-economic cost to address changing conditions of water availability and quality;
- Erosion and sediment transport effects resulting from changes in runoff patterns;
- Short and long term planning for water supply, demand, and support infrastructure to mitigate emerging and anticipated environmental change.

IHCA will be happy to provide additional details, including specific agency projects and outstanding needs that will benefit from the hydroclimatic research listed here. We are also happy to provide technical support to your group upon request.

Sincerely,



Steven A. Frenzel  
Chair, Interagency Hydrology Committee for Alaska

# DEFINITIONS FOR IAWG

## MITIGATION AND ADAPTATION

As stated in the Arctic Climate Impact Assessment, “The science suggests that responding to this challenge will require two sets of actions; one, *mitigation*, to slow the speed and amount of future climate change by reducing greenhouse gas emissions; and the other, *adaptation*, to attempt to limit adverse impacts by becoming more resilient to the climate changes that will occur while society pursues the first set of actions,” (ACIA, 2004). It is important to note that mitigation in the context of the Alaska Department of Military & Veterans’ Affairs and FEMA, is consistent with adaptation in improving infrastructure to minimize damage from natural disaster events. (Final Commission Report, Alaska Climate Impact Assessment Commission, March 17, 2008).

## SUSTAINABILITY

### World Commission on Environment and Development

Sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Bruntland Report, WECD, 1987- broad, most commonly accepted definition, as set out by the World Commission on Environment and Development (WCED)

### EPA Sustainable Infrastructure Initiative

Looking forward, EPA wants to promote practices that encourage utilities and their customers to address existing needs so that future generations will not be left to address the approaching wave of infrastructure needs that will result from aging infrastructure.

## SEA ICE

*Defined by World Meteorological Organization in numerous terms:*  
[http://www.aari.nw.ru/gdsidb/XML/sea\\_ice\\_nomenclature.html](http://www.aari.nw.ru/gdsidb/XML/sea_ice_nomenclature.html)

*For purpose of our work, refer to landfast sea ice:* <http://mms.gina.alaska.edu/supp/Definition.pdf>

Excerpt: Numerous definitions of landfast ice exist in the literature, which consider to different extents all the processes that occur in the nearshore zone in the presence of sea ice. According to Weaver (1951) “fast ice or landfast ice is the young coastal ice which, in stationary sheets, builds seaward from the shore of landmasses ... by being more or less attached to the shore, or by being otherwise confined”. The World Meteorological Organization (1970) defines fast ice as “Sea ice which remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, or over shoals, or between grounded icebergs”. Stringer *et al.* (1978) define the fast ice zone as “the area generally shoreward of the 20m isobath with quite stable ice much of the year” and only include ice contiguous with the shore. Barry *et al.* (1979) list three criteria that can distinguish landfast ice from other forms of sea ice: “(i) the ice remains relatively immobile near the shore for a specified time interval; (ii) the ice extends from the coast as a continuous sheet; (iii) the ice is grounded or forms a continuous sheet which is bounded at the seaward edge by an intermittent or nearly continuous zone of grounded ridges”.

Furthermore, according to the WMO, sea ice can be classified as either landfast ice or pack ice, while Weaver describes drift ice as a third category, which is “transitory between the fast ice and the polar pack ice”. Similarly, Stringer *et al.* define a category for ice in the shear zone between the landfast ice and pack. (AK-03-06, MMS-71707), Mahoney, et.al.

## ARCTIC

The **Arctic** is the area around the [earth's North Pole](#). The Arctic includes parts of [Russia](#), [Alaska](#), [Canada](#), [Greenland](#), [Lapland](#) and [Svalbard](#) as well as the [Arctic Ocean](#). The 10°C (50°F) July [isotherm](#) is commonly used to define the border of the Arctic region.

From: <http://www.knowledgerush.com/kr/encyclopedia/Arctic/>



## **RIVERINE**

FLOOD - A flow beyond the carrying capacity of a channel.

EROSION - The wearing away of land by the action of natural forces. On a river the carrying away of material by wave action or flow of water.

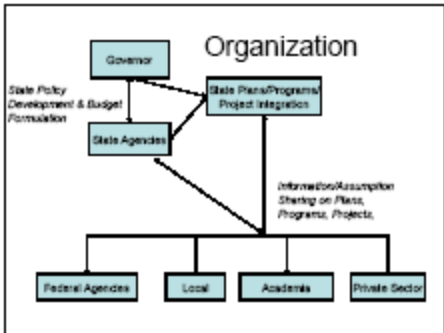
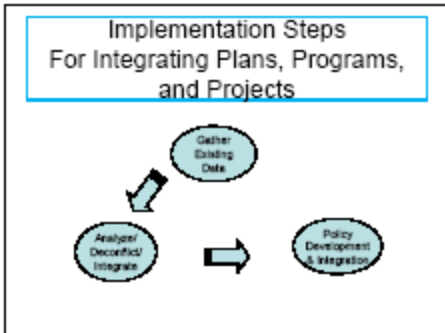
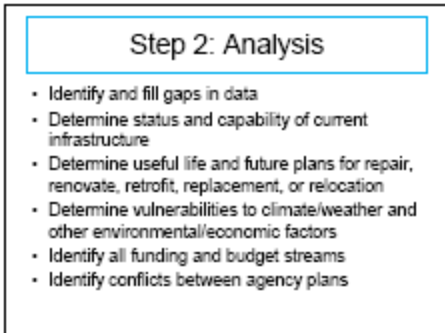
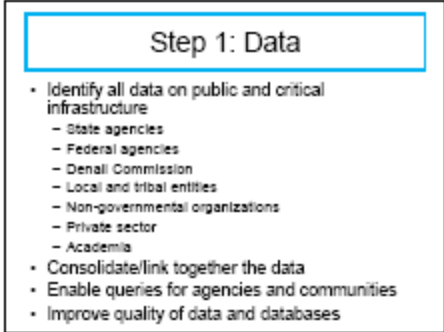
## **COASTAL**

FLOOD - A water level above the highest estimated tide.

EROSION - The wearing away of land by the action of natural forces. On a beach, the carrying away of beach material by wave action, tidal currents, and littoral currents.

Erosion/Deposition is an ongoing natural process, not a unique event, often times increased during flooding.

Flooding is a unique natural event, the boundaries of which can be influenced by the extent of erosion.



## IAWG Sustainability Considerations

The common idea for sustainability uses the Brundtland Commission definition of sustainable development to view a community's present needs:

*“without compromising the ability of future generations [in a rural community] to meet their own needs”.*

Alaska's Small Communities Could be Sustainable – viable in the near term - to the extent they are resilient to interrelated vulnerabilities presented by climatic/ecological changes.

Larger communities face a very different scale of sustainability issues. National or international economic forces impacting financial conditions increase sensitivity within a community. These forces originate outside of the immediate locale such as energy and resource extraction operations.

A Sustainable Community is Able to Respond to Climate Impacts and to Become Resilient.

Local government can be organized in many ways to achieve this: as a conventional city/local government, tribal entity or it may rely on a traditional town hall or congregational meeting structure.

Minimum Level of Population.

What is likely needed is for the community to have a minimum level of population to continue basic functions of:

- education,
- economic structure
- public safety,
- community water / sewer,
- management of the waste stream, and
- cohesive culture and social presence.

Additionally, an intrinsic part of sustainability requires directly linking a community's viability to the costs of energy and transportation, which frequently are based on factors not directly associated with a minimum population level. A viable community, whether it remains in its location, or if migration or relocation occurs requires:

- viable connections to transportation systems, and
- affordable and appropriate energy.

Protect in Place.

Critical to a community's sustainability is its population. If people relocate to larger urban centers, sometimes called out migration, the remaining community may be reduced to a level that cannot maintain needed services and infrastructure. To insure that this out migration does not lead to the original community's loss of culture and social presence, it is important that the community prepare and plan to “protect in place” and evaluate possible contingencies including a relocation plan.

Weighted Sustainability Index.

The question being asked in some arenas is whether and at what point a community should be considered for climate impact responses. A weighted sustainability index should be used to determine when climactic influences impacting a small community are strong enough to warrant a response. Small communities could be very sustainable while others may be critically impacted.

This index could include:

- economic measurements,
- current energy usage and viable energy alternatives,
- access to subsistence resources,
- population change, along with
- available municipal, private, state and federal programs.

The local weighting factors for a community's relocation would depend on:

- estimating present and future time tables, programs and costs (all to be determined),
- ecological/climatic change modeling of impacts and opportunities
- consideration of all stakeholders' interests.



**IAWG Recommendation to Review Funding Structure for Public Infrastructure O&M  
And Protect Public Infrastructure Investment and Prevent Loss of Life**

The Immediate Action Workgroup identified, as we believe the Subcabinet and the PI - TWIG have also recognized, that maintenance of the State's infrastructure is a critical immediate action to prevent loss of life and infrastructure due to impacts from climate change phenomena.

The IAWG also recognized that the policy issues to address budgeting for maintenance is beyond the scope of its work, but identified it as a significant item warranting the immediate action to encourage and support your efforts to advance changes in policy.

The *guiding principles* supporting the IAWG's recommendation to the Subcabinet and PI-TWIG are:

- Protecting Alaska's infrastructure investment that is already in place is an immediate need.
- Authorization and funding of an Infrastructure Maintenance Capital Fund, if well-structured would be an effective tool:
  - Use revenue sharing model
  - Use prioritization mechanism to identify projects
    - Coordinate plans for capital projects in a given community for cost-effectiveness
    - Utilized by both State and Local entities
      - When local is the lead, supported with engineering and professional assistance by State (ADOT) or Federal (USACE)

The IAWG's rationale and ideas for policy changes on maintaining infrastructure investment follow.

**Effective and sustainable shore-protection structures must be an integral part of the state's climate change adaptation strategy and must be supported by a long-term maintenance funding program.**

- The State of Alaska has vital national and state interest in the stability and behavior of coastal structures around its coastline, to ensure public safety – for both life and infrastructure investments and for the economic health of many coastal communities.
- The dominant coastal structure between Alaskan ports, harbors, navigation channels and the sea are rubble mounds. These include breakwaters, revetments, jetties, and groins. Other types of structures are common and include seawalls, piers, and bluff protection.
  - They are used for protecting harbors, wave reduction within harbors, retaining sediment, protecting navigation waterways, shoreline protection, and bluff protection.
- The purpose of maintenance is to ensure the long-term viability of public infrastructure investment, public safety and economic health by:
  - Protecting harbors and inlets that are important commercial and military navigation links
  - Protecting shore-based infrastructure
  - Providing beach and shoreline stability control
  - Stabilizing navigation channels
  - Protecting navigation, coastal communities, roadways, bridges, etc.
  - Providing flood protection
  - Providing recreational activities

While most navigation structures are federally owned and maintained, most shore-protection structures are locally owned and maintained, yet funded by the State.

**The cost of replacing existing coastal protection infrastructure investment is high, and the cost of responding to a disaster is exorbitant. The State of Alaska needs to improve the means and methods for reducing these costs. It can do this by:**

- Regular preventative maintenance efforts can substantially reduce risks, save lives and property, and reduce full replacement costs and can extend the life of investment for 50 or more years.
- Reducing the design and construction costs of coastal structures by employing risk, life-cycle, and reliability analysis techniques in both planning and design studies in order to develop more efficient designs.

**Alaska has aging infrastructure requiring maintenance:**

- Most of these structures were originally built in the early 1900's and have been extended and rehabilitated many times.
- Maintenance of existing inlets becomes more important each year as ship traffic and ship drafts increase.
- As the inlet-protecting jetties erode, dredging costs can increase at an alarming rate. In addition, maintenance of existing revetments and other shoreline structures is becoming more important with increasing coastal population.
- As a result, inspection, repair, and rehabilitation of existing structures represents a large part of coastal rubble-mound work within the state while new construction of this class of structure represents a diminishing fraction of the projects.

**Challenges and suggestions for changes to an Infrastructure Maintenance Policy:**

- State builds, and then a community is responsible for maintenance.
  - How does a community get funding to maintain?
  - How is infrastructure inspected?
    - ADOT isn't sure of what the infrastructure inventory is
      - ADOT needs an inventory of what is out there. DCRA-Rapids Database has been identified as the preferred inventory database
    - ADOT isn't sure of the condition of infrastructure and doesn't have funding for inspections
      - Problems are discovered when there is an emergency or almost emergency situation and a community alerts DOT about a problem
- Create an Infrastructure Maintenance Capital Fund for ADOT and local governments to draw on to:
  - Conduct inspections for infrastructure and facilities, and allow ADOT or others to maintain in a timely manner  
Examples: Beach nourishment—5 years is a standard maintenance timeframe.
  - Funds could be used for design work, upgrade riprap structures and rock revetments to replace the rock decreasing the amount of decay.
    - Develop a mechanism to prioritize projects; some ideas are:
      - Eligible for funds if a community had a certain type of structure—or possibly expand (revetment or beach nourishment)
      - Local—would need guidance from USACE or ADOT—to ensure appropriate work being conducted – to maintain life of structure.
      - When local government is responsible for—maybe factor into a revenue sharing formula, or perhaps based on Legislative districts, capital matching grants. (ex: —\$1500 per mile for road maintenance; will need p/ft rock revetment formula to fund local projects)

**APPENDIX C**  
**DOCUMENT PRESENTATIONS AND**  
**SUBMISSIONS**



## DOCUMENT PRESENTATIONS AND SUBMISSIONS

This section includes only some of the handouts and presentation materials presented at the IAWG meetings. All materials can be found at the **IAWG Website**:

<http://www.climatechange.alaska.gov/IAWG.htm>

- **For Each IAWG Meeting Listed in Appendix D:**
  - Agendas
  - Meeting Summaries
  - Working Drafts Which Became Sections of this IAWG Recommendations Report
  - Public Meeting Notices
  
- **Presentations by Alaska Dept. of Transportation and Public Facilities:**
  - Infrastructure and Erosion Control, Beach Nourishments Efforts
  - Shore Protection, Nourish or Armor?
  
- **Presentation by Dept. of Commerce, Community & Economic Development**
  - Community Databases Managed by Division of Community & Regional Affairs:
    - 10 Databases – see page 1XX of this report for descriptions
  
- **Presentation by Dept. of Natural Resources – Division of Coastal and Ocean Management**
  - Coastal Impact Assessment Program (CIAP)
    - Additional materials complementing those in this report, starting on page 1XX
  
- **August 28, 2008 Status and Progress Presentations by IAWG Member Agencies**
  - Six Communities in Peril, Division of Homeland Security & Emergency
  - Management Status of Project Actions for IAW Alaskan Communities, US Army Corps of Engineers
  - Community Projects, Dept. of Transportation and Public Facilities
  - Alaska Climate Change Impact Mitigation Program, Dept. of Commerce
  - Update on Denali Commission projects in threatened communities
  
- **Website Link - Presentation by ArcticNet a Network of the Canadian Centres Of Excellence**

A joint program of the Natural Sciences and Engineering Research Council of Canada, the Social Sciences and Humanities Research Council of Canada, the Canadian Institutes of Health Research and Industry Canada. The Centres mission is to mobilize research and commercialization to build a healthier, more advanced, more competitive and more prosperous Canada.
  
- **Documents:**
  - Baseline Erosion Assessment by U.S. Army Corps of Engineers  
(will be posted in early April 2009)
  - Shaktoolik Route (Evacuation Road) Reconnaissance Study
  - Golovin - Multi-Hazard Mitigation Plan

**From:** Bobby Schaeffer [mailto:bschaeffer@nwabor.org]  
**Sent:** Tuesday, December 23, 2008 4:14 PM  
**To:** MARGARET KING  
**Subject:** RE: IAWG 12/22 Agenda and 12/5 Meeting Notes

Marge,

I did listen in on most of today's tele. I just wanted to inform you and the IAWG that the village of Deering has been dealing with their erosion problem for quite some time. In fact, I recently received their Capitol Projects request and first on their list of priorities is Phase 3 of their beach erosion protection project. I worry about them as when you go there in the summer, frequent strong storms have eroded the beach line very close to the homes. In fact, one more large storm and some of these homes will fall into the sea. The village has been quite passive about the issue as they have worked directly with the legislators who represent this election district for funding for erosion control. Since the State is taking the lead in identifying villages facing serious erosion problems, and will ultimately find the resources to mitigate the problem, I do think they do need to get on the State list.

## DATA RESOURCE GUIDE

### Division of Community and Regional Affairs

[www.commerce.state.ak.us/dcra/](http://www.commerce.state.ak.us/dcra/)

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**[Alaska Community Database](#)** – contains community profiles for more than 390 places in Alaska, the majority of which are communities. An interactive database provides a wide range of community-based information and data for planning, policy-making and technical assistance decisions.

**[Alaska Community Directory](#)** – current information on community officials and contacts. The online system is updated throughout the year,

**[Community Maps](#)** – online versions of the community profiles maps. These maps include information on these maps includes, but is not limited to: land status; platted boundaries; land use (for example, public, commercial and residential improvements, boat haul-out areas, etc.); topography; latitude and longitude points (for emergency response purposes); sensitive and natural hazard areas; as-built information.

**[Municipal Finances](#)** – The information in this database is derived from certified financial statements and financial audits that are submitted annually by municipalities. DCRA staff review the audits and certified financial statements and enter the information into the database to allow further analysis. DCRA has compiled this information since 1985. Only the latest information is shown on the Community Profiles page. However, if you want Municipal Finance data for earlier years you can contact Research and Analysis staff with you request.

**[Capital Projects Database](#)** – information on capital projects administered by over 20 State and federal agencies. Information includes project descriptions, funding levels and project status for over 20,000 capital projects past and present.

**[Economic Development Resource Guide \(EDRG\)](#)** – is designed to bring together in one place an inventory of programs and services that can provide economic development assistance to Alaska communities and businesses.

**[Community Funding Database](#)** – contains information on past and current funding to communities administered by the Division of Community and Regional Affairs, such as Mini-Grants, CDBG, Legislative Grant, etc. **(Note: this does not include any projects that were funded through another Department or Division)**

**[Financial Documents Delivery System](#)** – Online copies of municipal budgets and financial statements submitted to the Division. Municipal budgets date back to FY2000. The year-end financial statements date back to FY1998 and consist of either an audit or city-prepared financial statement certified as true and complete by the local governing body.

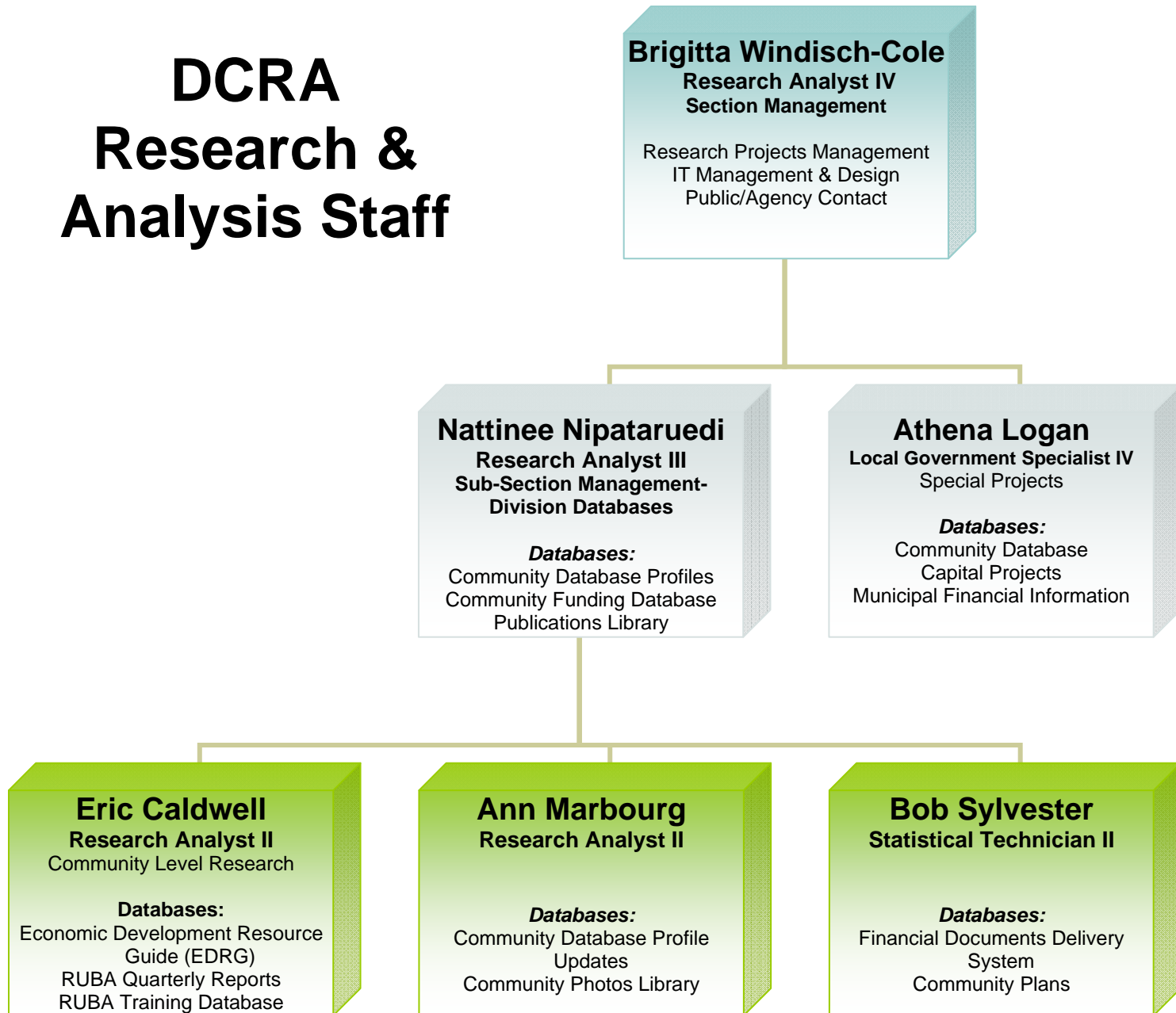
**[Community Plans Library](#)** – houses an assortment of plans for communities. Documents include, community plans, comprehensive plans, and more.

**[Community Photo Library](#)** – contains community photos submitted by staff and the public





# DCRA Research & Analysis Staff





## COASTAL IMPACT ASSISTANCE PROGRAM

The Energy Policy Act of 2005 (Public Law 109-58) was signed into law by President Bush on August 8, 2005. Section 384 of the Act establishes the Coastal Impact Assistance Program (CIAP) which 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.

Under the CIAP, the Secretary of the Interior is authorized to distribute to producing

- States, and
- Coastal political subdivisions (CPS's)

\$250 million for each of the Federal fiscal years (FY) 2007 through 2010. This money will be shared among Alabama, Alaska, California, Louisiana, Mississippi, and Texas and will be allocated to each producing state based upon allocation formulas prescribed by the Act. Further, the CIAP allocates money to the eligible CPS's of the states identified above.

Pursuant to the Act, a producing state or CPS shall use all amounts received under this section for one or more of the following five authorized uses:

### **Authorized Uses:**

1. Projects and activities for the conservation, protection, or restoration of coastal areas, including wetland.
2. Mitigation of damage to fish, wildlife, or natural resources.
3. Planning assistance and the administrative costs of complying with CIAP.
4. Implementation of a federally-approved marine, coastal or comprehensive conservation management plan.
5. Mitigation of the impact of OCS activities through funding of onshore infrastructure projects and public service needs.

### **CIAP Contacts**

Ms. Sylvia Kreel  
Alaska Dept. of Natural Resources  
Division of Coastal and Ocean Management  
302 Gold Street, Suite 202  
PO Box 111030  
Juneau, AK 99811-1030  
MS 1030/JNU  
(907) 465-3177/ (907) 465-3075 (fax)  
[sylvia.kreel@alaska.gov](mailto:sylvia.kreel@alaska.gov)

Mr. David Johnston  
MMS Regional CIAP Representative  
Minerals Management Service  
Alaska OCS Region  
3801 Centerpoint Drive, Suite 500  
Anchorage, Alaska 99503  
(907) 334-5273  
[David.Johnston@mms.gov](mailto:David.Johnston@mms.gov)

## **IAWG Comments on CIAP**

Only Authorized Uses 3 and 5 above apply to the Immediate Action Workgroup's efforts.

Of this,

- Authorized Use 3: Planning assistance and the administrative costs of complying with CIAP - has been funded annually, while
- Authorized Use 5: Mitigation of the impact of OCS activities through funding of onshore infrastructure projects and public service needs has never been funded.

Yet, Authorized Use 5 could be valuable in developing projects that address immediate needs, including evacuation roads at Point Hope, Kivalina, etc. Shaktoolik and Shishmaref could be included but is only allowed funding under the State, while other authorizations are allowed for Coastal Political Subdivisions.

## COASTAL IMPACT ASSISTANCE PROGRAM

Section 384 of the Energy Policy Act of 2005 established the Coastal Impact Assistance Program (CIAP). The Act authorizes the U.S. Department of Interior, Minerals Management Service to distributed \$250 million annually for the years 2007 through 2010 to Outer Continental Shelf (OCS) oil and gas producing states and coastal political subdivisions (CPSs) to mitigate the impacts of OCS oil and gas activities.

Per a formula prescribed by the Act, Alaska's eight eligible CPSs will receive a combined total of 35 percent of Alaska's allocation. The remaining 65 percent is allocated directly to the state.

In 2007 and 2008 Alaska was allocated 1 % of the national CIAP funds. Due to the recent Chukchi Lease Sale, MMS has projected that Alaska's allocation will increase to be between 12% and 17 % of the national CIAP allocation in 2009 and 2010. MMS will announce final allocation in April 2009.

The tables below show the annual and total projected CIAP allocations to the state and the CPSs for both the high and low estimates.

### Allocation Directly to State (65% of total to state)

	Total	2007	2008	2009	2010
Low end (12% of total federal funds for 2009 and 2010)	40,982,500.00	1,576,250.00	1,576,250.00	18,915,000.00	18,915,000.00
High end (17% of total federal funds for 2009 and 2010)	56,745,000.00	1,576,250.00	1,576,250.00	26,796,250.00	26,796,250.00

### Allocation Directly to CPSs - Low end (35 % of total to state)

	Total	2007	2008	2009	2010
Municipality of Anchorage	3,581,586.76	137,767.88	137,767.88	1,653,025.50	1,653,025.50
Bristol Bay Borough	17,627.72	665.86	665.86	8,148.00	8,148.00
Kenai Peninsula Borough	1,544,770.72	59,435.36	59,435.36	712,950.00	712,950.00
Kodiak Island Borough	1,902,235.04	73,170.52	73,170.52	877,947.00	877,947.00
Lake & Peninsula Borough	898,096.08	34,518.54	34,518.54	414,529.50	414,529.50
Matanuska-Susitna Borough	816,488.30	31,399.15	31,399.15	376,845.00	376,845.00
North Slope Borough	7,187,406.52	276,448.76	276,448.76	3,317,254.50	3,317,254.50
Northwest Arctic Borough	6,119,288.86	235,343.93	235,343.93	2,824,300.50	2,824,300.50
<b>Total</b>	<b>22,067,500.00</b>	<b>848,750.00</b>	<b>848,750.00</b>	<b>10,185,000.00</b>	<b>10,185,000.00</b>

### Allocation Directly to CPSs - High end (35 % of total to state)

	Total	2007	2008	2009	2010
Municipality of Anchorage	4,959,108.00	137,767.88	137,767.88	2,341,786.12	2,341,786.12
Bristol Bay Borough	24,417.72	665.86	665.86	11,543.00	11,543.00
Kenai Peninsula Borough	2,138,895.72	59,435.36	59,435.36	1,010,012.50	1,010,012.50
Kodiak Island Borough	2,633,857.54	73,170.52	73,170.52	1,243,758.25	1,243,758.25
Lake & Peninsula Borough	1,243,537.32	34,518.54	34,518.54	587,250.12	587,250.12
Matanuska-Susitna Borough	1,130,525.80	31,399.15	31,399.15	533,863.75	533,863.75
North Slope Borough	9,951,785.28	276,448.76	276,448.76	4,699,443.88	4,699,443.88
Northwest Arctic Borough	8,472,872.62	235,343.93	235,343.93	4,001,092.38	4,001,092.38
<b>Total</b>	<b>30,555,000.00</b>	<b>848,750.00</b>	<b>848,750.00</b>	<b>14,428,750.00</b>	<b>14,428,750.00</b>

DNR/Division of Coastal and Ocean Management  
July 2008



**TO:** IAWG Members  
**FROM:** Steve Weaver, ANTHC  
**DATE:** 10/29 – 11/3/08 (Series of emails to M. King)

I've tried to capture my thinking about climate change data and effectively using that data by creating 3 tools: (1) [Community Planning Strategy - on page 2](#); (2) [Key Data Points – on page 3](#), and (3) [Community Vulnerability Assessment Tool – described below](#).

Together these tools summarize a conceptual climate change adaptation strategy of (1) local empowerment and (2) providing understandable and actionable data that can be integrated into on-going community planning.

**Link to Funding:** I think this kind of framework is essential to an incremental relocation strategy where we are trying to *fund most of adaptation infrastructure expenses thru the existing traditional funding framework*. Virtually all current public works projects started as a local constituent legislative request or funding agency application.

To effectively use existing capital project processes will require communities to anticipate the impact of climate change and identify climate change infrastructure projects as high priority.

I originally put these concept papers together to show ANTHC staff how our climate change project might fit in to the big picture.

ANTHC is beginning work on a Community Vulnerability Assessment (CVA) tool (Tool 3).

The vulnerability tool would be a platform to list key data points and use that as a basis for establishing relative vulnerability. The outcome of the assessment would be a reference point integrated into overall community planning and a basis for application for climate change impact project funding.

[This is why we hope to partner with the IAWG/Climate Change Effort so a consensus on what the "key indicators" are can be built and a broader acceptance of the tool facilitated.](#)

I think the CVA tool could potentially include a conceptual community planning strategy as an appendix. How it can be utilized to facilitate better community planning and document and support an application for climate change adaptation project funding would make it a more useful tool.

[We have the project funded, and are now looking for working partners.](#)

[Our plan is to:](#)

- [Write a draft community vulnerability assessment tool \(CVA\)\\*, then](#)
- [Test it in at least one rural Alaska Native community, preferably where ANTHC has a funded sanitation project – likely an ANTHC in-house vs. contractor implemented project](#)
- [Our intent is that the outcome product will be structured to be better aligned and suited to a broad application base.](#)
- [Develop a detailed work plan or schedule of completion in place – with a '09 outcome.](#)

[We believe this is “ground floor” opportunity.](#)

If anyone, the IAWG, or individual agencies, are interested in working with us, please let me know.

**Date:** October 14, 2008  
**From:** Steven M. Weaver, P.E. - ANTHC  
**Subject:** An Adaptation Strategy to Prepare for Climate change in Alaska (version2)

My recommendation for the primary theme for a statewide adaptation strategy is: local empowerment. By that I mean give local leaders the information, the tools and the opportunity to incorporate climate change adaptation in to their current community plans. The goal is to inspire and inform residents to maximize the opportunity for orderly transition.

Climate change adaptation can be most effective not as a separate report or initiative, but as an integral component of all community planning and improvement. To accomplish that goal it seems to me that five basic deliverables are needed:

- (1) A central systematic source of current environmental data from which local authorities and design professionals know “what is” and how “what is” has been changing. I am thinking an internet portal and custodial agency to index and link existing sites, identify the data gaps and organize the requests to fill those gaps. This site could include a new “Environmental Atlas” to replace the one published by the University of Alaska in 1984.
- (2) A statewide set of climate zone profiles summarizing the environmental changes expected based on the best science. The definition of the “best science” needs to be established and consistently used/systematically updated on a statewide basis.
- (3) Local vulnerability assessment tool
  - a. Town site vulnerability & monitoring requirements
  - b. Infrastructure component vulnerability
  - c. Economic impacts
  - d. Natural environment impacts (e.g. permafrost changes, and animal & plant migration, etc )
- (4) Local adaptation information and prioritization tool
  - a. Relocation and incremental relocation strategies
  - b. Life cycle infrastructure replacement/relocation/strengthening strategies
  - c. Community land use/expansion strategies
  - d. Economic change/opportunity
  - e. Example community/personal behaviors and activities that can make a difference
- (5) A statewide information framework to register vulnerability assessments, share successful adaptation projects/outcomes, classify threat levels, organize coordinated responses, and resource prioritization & allocation methodologies.



Climate Zone Profile

PROJECTION YEARS

	10	50	100
Sea level rise & potential for event intensity change			
Land temperature change			
Water temperature change			
Air temperature change			
Precipitation change & event intensity change			
Changes in months of the year with ice cover			

NOTES: (1) This is a survey of climate change expectations based on the best science currently available. It is developed based on empirical data collection, modeling and scientific analysis. The purpose of this information is to assist Alaska's community leaders with community planning to better adapt to our changing environment. This data is periodically updated see [www.climatechange.\\_\\_\\_\\_\\_](http://www.climatechange._____) for most current information.

(2) This data could also be displayed in a series of maps - the goal is to identify key data needed to do effective aligned community planning and then display it in a way that is useable and actionable by local leaders and industry professionals.



**APPENDIX D**

**COMMUNITY PARTICIPANTS**  
**AND**  
**IAWG MEETING SCHEDULE AND**  
**AGENDA ITEMS**

## **IAWG MEMBERS AND COMMUNITY PARTICIPANTS**

### IAWG Members

Mike Black, Co-Chair (DCCED)  
Trish Opheen, Co-Chair (USACE)  
Amy Holman (NOAA)  
Luke Hopkins (AML)  
Bob Pawlowski (Legislative Budget & Audit Committee Representative)  
John Madden (DMVA/DHS&EM)  
Chris Maisch (ADNR - Forestry)  
Mike Coffey (ADOT/PF – Maintenance & Operations)  
George Cannelos (Denali Commission)  
Larry Hartig (Chair Climate Change Subcabinet and ADEC Commissioner)

### Community Participants

Stanley Tom, Tribal Administrator Newtok Traditional Council  
David Albert, Newtok IGAP Coordinator  
Margaret Nicholson

Steve Oomittuk, Mayor - Point Hope  
Christine Amaktoolik, Elim

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

Frank Myomick, St Michaels–Kawerak Transportation Planner  
Robert Iyatunguk  
Ester Iyatunguk  
Howard Weyiouanna, Sr.- Member of SERC, member of the City of Shishmaref and the  
Native Village of Shishmaref  
Brice Eningowuk, Shishmaref Kawerak Transportation Planner  
Curtis Nayokpuk  
Karla Nayokpuk  
Fred Eningowuk  
Stanley Taktoo

Cindy Pilot, Tribal Administrator Koyukuk

John Alvis, Kawerak Transportation Engineer  
Jeanette Pomrenke, Kawerak  
Sterling Gologergen, Kawerak  
Steve Ivanoff, Unalakleet - Kawerak Transportation Planner

Roberta Chavez (Alaska Village Council of Presidents)  
Erin Harman, Tanana Chiefs Conference

Michael Sookiayak, Shaktoolik

Toby Anungazuk, Jr., Golovin  
Jack Fagerstrom, Golovin

Public and Agency Participants

Karen Rehfield (Alaska OMB/Denali Commission)  
Rhonda McBride (State of Alaska)

Tara Jollie (DCCED/DCRA Director)  
Sally Russell Cox (DCCED/DCRA)  
Erik O'Brien (DCCED/DCRA)  
Athena Logan (DCCED/DCRA)  
Taunnie Boothby (DCCED/DCRA)

Carl Borash (USACE)  
Bruce Sexauer (USACE)  
Melanie Harrop (USACE)  
Guy McConnell (USACE)

David Kang (DHS&EM)  
Andy Jones (DHS&EM)

Krag Johnsen (Denali Commission)  
Jamilia George (Executive Branch Representative to Denali Commission)

Kolena Momberger (ADEC)  
Greg Magee (ADEC)  
Jackie Poston (ADEC)  
Susan McNeil (ADEC)

Carven Scott (NOAA/NWS)  
Joel Scheraga (US EPA, Director Global Change Research)  
Dan White (UAF)

Clint Adler (ADOT/PF)  
Ryan Anderson (ADOT/PF)  
Mike Lushkin (ADOT/PF)  
Ruth Carter (ADOT/PF)  
Cindie Little (ADOT/PF)

Dave Johnston (MMS)  
Denny Lassuy (North Slope Science Initiative)  
Judy Jacobs (USF&WS)

Rod Combellick (DNR- DGGS)  
Deanna Stevens (DNR -DGGS)  
Sylvia Kreeel (DNR-DCOM)

Jeff Malcolm (US GAO)  
Brad Dobbins (US GAO)  
Allen Chan (US GAO)  
Steve Weaver (ANTHC)

### Interested Citizens

Darcy Dugan (Yale/Girdwood)  
Stefan Milkowski (Fairbanks- Independent Reporter)  
Jordon Marshall (Rasmuson Foundation)  
David Rogers (Juneau)  
Allison Butler (UAF-PhD Student)  
Elizabeth Marino (UAS-PhD Student)  
Robin Bronen (UAF-PhD Student)

Nate Oberlee (Oasis Environmental)  
Cory Black (Oasis Environmental)  
Karl Ohls  
John Woodward

### Climate Change Consultants

Vivian Melde, Ecology & Environment  
Margit Hentschel, Walsh Environmental  
Barbara Sheinberg (Sheinberg & Associates)  
Indra Arriaga (Info-Insights)  
Randy Freed (ICF)

### Facilitator

Margaret (Meg) King (MJ King & Associates)

## IAWG Meeting Schedule and Topics: 2008-09

August 27, 2008	Review IAWG Mission
	Agency Updates including Flood Protection and Planning
	Potential Budget Needs
	National Commission on Energy
October 28, 2008	Framing the IAWG's 2008-09 efforts
	Strategy, timeline and topics
	Policy, funding and other suggestions to effectively meet IAWG's mission
	Detailed discussion notes
November 10, 2008	GAO Draft Report Overview
	EM – 30 Year Hazards Report Overview
	Advance IAWG Policy #2 Data Needs and ANTHC input for RNWG Guidance
	Identify: Budget/OMB Submission Dates /Subcabinet Meeting Dates/Approval on IAWG Policy Recommendations
	Revisit IAWG Membership
	Budget Placeholder Templates for State CIP and Ops Budgets and process/responsibility for getting placeholder in
	Determine how to prioritize other communities for IAWG's efforts: e.g. are others involved, e.g. Regional-health, Native/Village Corps; How vulnerable is a community? (take away homework)
November 24, 2008	Revise and Update Community Projects and Goals for Initial 6 Communities
	Complete Prioritization/Criteria for other communities (11/10 homework)
	Identify Projects and Goals for New Communities
	Mini-Grants – Identify system that transitions mini-grant projects into Program
	Identify New Funding and/or coordination of funding
December 5, 2008	Identify means to advance Policies 1 & 2 from 4/17/08 Report
	Augment Policies 1 & 2 and determine if additional policy recommendations are needed/what can be agreed upon.
	NOAA Opportunities – How to integrates State's needs into NOAA projects
	Review/Refine Projects and Goals for 6 initial and new communities and identify who can provide budget/cost projections
	Create Table of Contents for Draft Report

December 22, 2008	Homework – Identify Community Projects in next 12 – 18 months
	Homework - Identify new priority Communities in peril (beyond the 6)
	CIAP Presentation (S. Kreel – DNR/D. Johnston - MMS)
	Follow – up: Policies 1&2 from 2008 and new potential policies
	NOAA request for additional IAWG input (Lidar)
	First Draft of Recommendations Report – Continue to refine items from previous meetings
January 6, 2009	New Policy on Strategy for addressing/preventing emergencies/IA
	Detailing 2008 Policies 1&2 and identify other potential new policies
	Other states have an Emergency Preparedness Fund – discussion if IAWG wants to make a recommendation
	Characterizing (new) communities and projects not already identified in 4/17/08 – actions in next 12 – 18 months
	CIAP Proposals – Next Steps
	Discussion on Recommendations Report
January 27, 2009	Report Discussion– Recommended projects, budgets, coordination and policies to Subcabinet
	Discussion – Alaska Forum on the Environment – Coordinating IAWG Presentations
	ADOT – Coastal Erosion Efforts and Techniques
	Depicting Strategy Recommendations
	O&M Policy Recommendations
	IAWG Presentation at Subcabinet
February 23, 2009	Review Final Draft IAWG Recommendation Report