

IMMEDIATE ACTION WORKGROUP

RECOMMENDATIONS TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE



FEBRUARY 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 should be taken in 2009 and 2010 to prevent loss of life and property in Alaska's communities that are in greatest peril due to climate change phenomena. 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 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 addition of a representative from the National Oceanic and Atmospheric Administration, Amy Holman, Lead for NOAA's Alaska Regional Collaboration Team. Her participation has added greatly to our understanding of the data and research that is needed in the near future. Once again 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. **The future IAWG body will likely benefit if a few additional agencies participate. Please see Policy 2.**

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*, which identified the ingredients with the greatest ability to help accomplish the daunting task of bringing together a diversity of 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 due to 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.

Michael Black, State Co-Chair
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(not yet edited for 2009 Report)

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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 Shaktoolik¹. These communities face imminent threats of loss of life, loss of infrastructure, loss of public and private property, or health epidemics as caused by coastal erosion, thawing permafrost and flooding.

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

- **Conduct Workgroup meetings involving community leaders from the threatened villages to build a common understanding of the relative risks** in each community using the following four criteria which individually or collectively create an urgent situation:
 - Safety of life during a reasonably foreseeable storm or flood event;
 - Potential loss of infrastructure critical for community viability (school, fuel tanks, power plant, water / sewer provisions);
 - Health threats to the community as defined by CDC or the Health Department (disease, reoccurring illnesses, unusually high frequency of illnesses); and
 - Potential loss of 10 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.

¹ 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 associated 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 XX.



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, and that if delayed minimizing impacts would not be possible for 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 X)
- 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 - 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 proposal 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 engineeringly sound, e.g. is in a flood plain.
- **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 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 allowed the community to be able to advance its already innovative successes by utilizing planning funds for:
 - The design of an evacuation shelter as the Community of Newtok 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. This results in the community becoming an island, and then is doubly threatened by storms throwing logs that are naturally beached on the shore at Shaktoolik. During this past year a reconnaissance study was completed through the working relationships between the community, Kawarek, and the Denali Commission. Through this work, the local organizations have identified funding for the next step, which if the State funds what it is being requested to (\$500k) will be leveraged 5-fold.
- **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 Kawarek, 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

USACE, as a member of the IAWG, commented that the strategy to align and coordinate state funding to receive Corps federal funds worked well. Further, that USACE-Alaska received \$40mm in a supplemental, which was a majority of the funds appropriated for the entire nation. The 35% state-funding level was effective.

- **Kivalina** – \$3.3 million from State to Northwest Arctic Borough leveraged \$12.5 million from USACE for revetments. Another \$500,000 from USACE for design of additional revetment. 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 with DOD's Innovative Readiness Team has been established. With the FY10 recommended funding of \$2mm for materials, the IRT brings \$5mm of resources to help construct the evacuation shelter, and develop quarry for construction materials. In FY09 DOT/PF received a combined state/federal funding of \$1.7 mm 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 \$3mm is recommended by the IAWG to fund revetment work in Shishmaref. In the past 2 years the USACE has provided \$11mm of construction and design work.
- **Unalakleet**– \$5mm in State funds were appropriated in FY 2009 to leverage an additional \$8.5mm from USACE to build necessary revetment structures. In addition, by coordinating with DOT/PF mob and demob 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 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.

DOT/PF believes these activities may lead to 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.

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. These bullets should also be added under the ADOT/PF heading.

FY 10 FUNDING RECOMMENDATIONS

| Communities | Description | Recommended Amount |
|---|---|--|
| Unknown – but 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&EM will explore other funding opportunities, e.g. Denali Commission and CIAP for the most threatened regions in Alaska.</p> |
| Unknown – 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 (X) 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 | ???DOT/Kawerak? For material site development and producing rock for construction of barge staging area, and evacuation center road. | <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 to Congress to add it 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 these 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. Fluctuating fuel prices require a funding strategy. 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

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 and 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.

POLICY 1: ESTABLISH A STATEWIDE SYSTEM TO DOCUMENT, ASSESS, AND ANALYZE CURRENT AND PLANNED PUBLIC INFRASTRUCTURE 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 appoint XX as lead. Guidance for advancing Policy 1 should include requesting Commissioners whose agencies are participating in the IAWG, along with the OMB Director to meet and identify benefits, challenges, and most effective organizational structure for implementation. The guidance should include working with the Governor's Office, the Subcabinet and the Legislative Budget & Audit Committee to describe their findings and solicit input, questions and concerns that 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 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 the

IAWG should be integrated, reformulated or discontinued, depending on the structure and needs of the Statewide Office.

IAWG Recommended Action to Subcabinet: Adopt Policy 2 and appoint X as the lead agency to implement Policy 2. Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners whose senior executives have been participating in the IAWG, the Chair of the Legislative Budget & Audit Committee, the Denali Commission Co-Chairs, the Colonel for the USACE Alaska District, and the Regional NOAA director.

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 include guidance that the IAWG members lead this effort by working with the Governor's Office to develop an Executive Order to implement Policy 3. Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners whose senior executives have been participating in the IAWG, the Chair of the Legislative Budget & Audit Committee, the Denali Commission Co-Chairs, the Colonel for the USACE Alaska District, and the Regional NOAA Director.

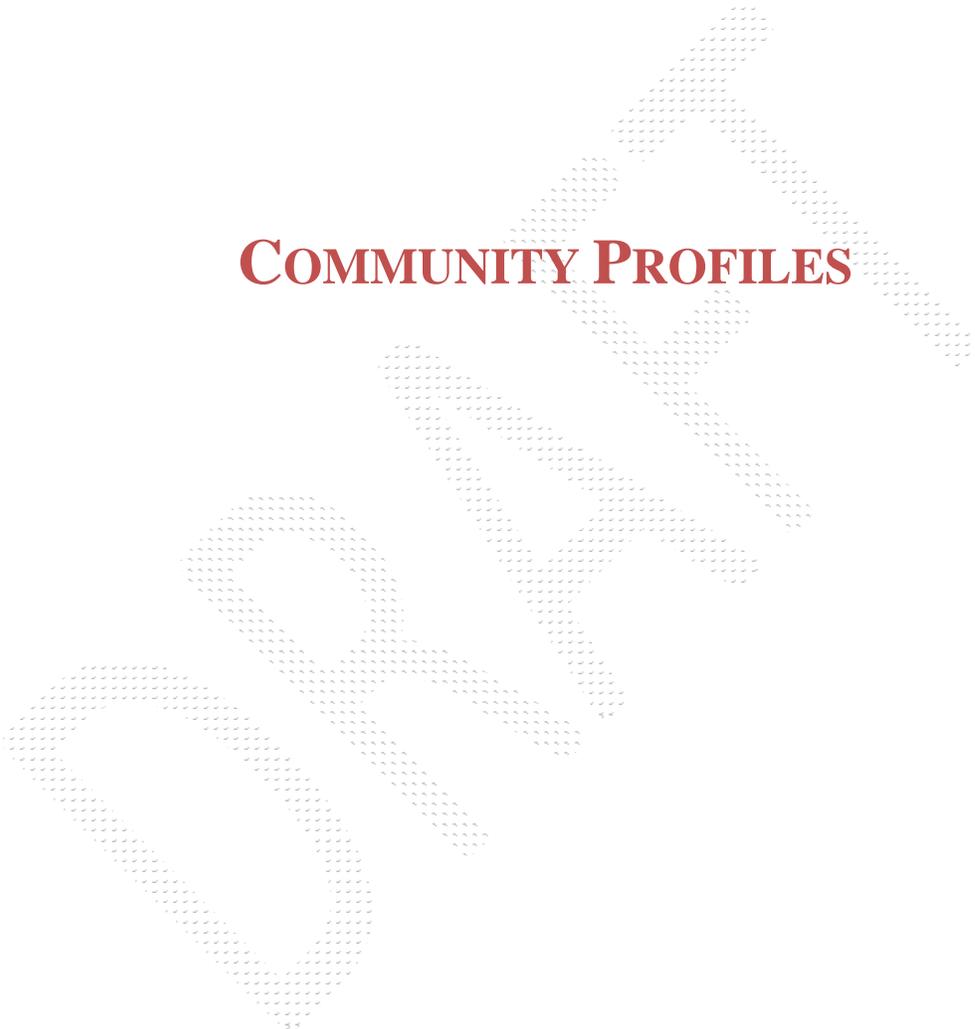
POLICY 4: THE STATE OF ALASKA WILL LEAD A COORDINATING EFFORT TO DEVELOP A COMPREHENSIVE STATEWIDE DATA COLLECTION AND EVALUATION SYSTEM THAT PROVIDES FOUNDATIONAL INFORMATION FOR COMMUNITY AND BUSINESS DECISIONS AND SOLUTIONS LEADING TO EFFECTIVE RESPONSES AND ADAPTATION STRATEGIES TO ADDRESS CLIMATE 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, 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 designate XXX to establish a small, yet knowledgeable workgroup to conceptualize and begin detailing the items identified. Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners and Federal Agency Directors and other organizational directors necessary to the success of this effort. The Immediate Action Workgroup should serve as a functional model with State and Federal Co-Chairs.





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.

| Public Investment Based on Information from DCCED/DCRA RAPIDS Database | | |
|---|--------------|---|
| Community | Years | Public Infrastructure Investment |
| Kivalina | 1992-2009 | \$ 25,606,507 |
| Koyukuk | 1987-2009 | \$ 27,213,704 |
| Newtok | 1985-2009 | \$ 21,733,479 |
| Shaktolik | 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. Due to severe erosion and wind-driven ice damage, the City intends to relocate to a new site 7.5 miles away. Relocation alternatives have been studied and a new site has been designed and engineered. A federally-recognized tribe is located in the community -- the Native Village of Kivalina. The population of the community consists of 96.6 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 (907-645-2141).

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

Economy and Transportation

Kivalina's economy depends on subsistence practices. Seal, walrus, whale, salmon, whitefish, and caribou are utilized. The school, City, Maniilaq Association, village council, airlines, and local stores provide year-round jobs. The Red Dog Mine also offers some employment. Six residents hold commercial fishing 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. The community has experienced severe flooding from both the Yukon and Koyukuk Rivers, and residents want to relocate. A federally-recognized tribe is located in the community -- the Koyukuk Native Village. The population of the community consists of 91.1 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.

Facilities, Utilities, Schools, and Health Care

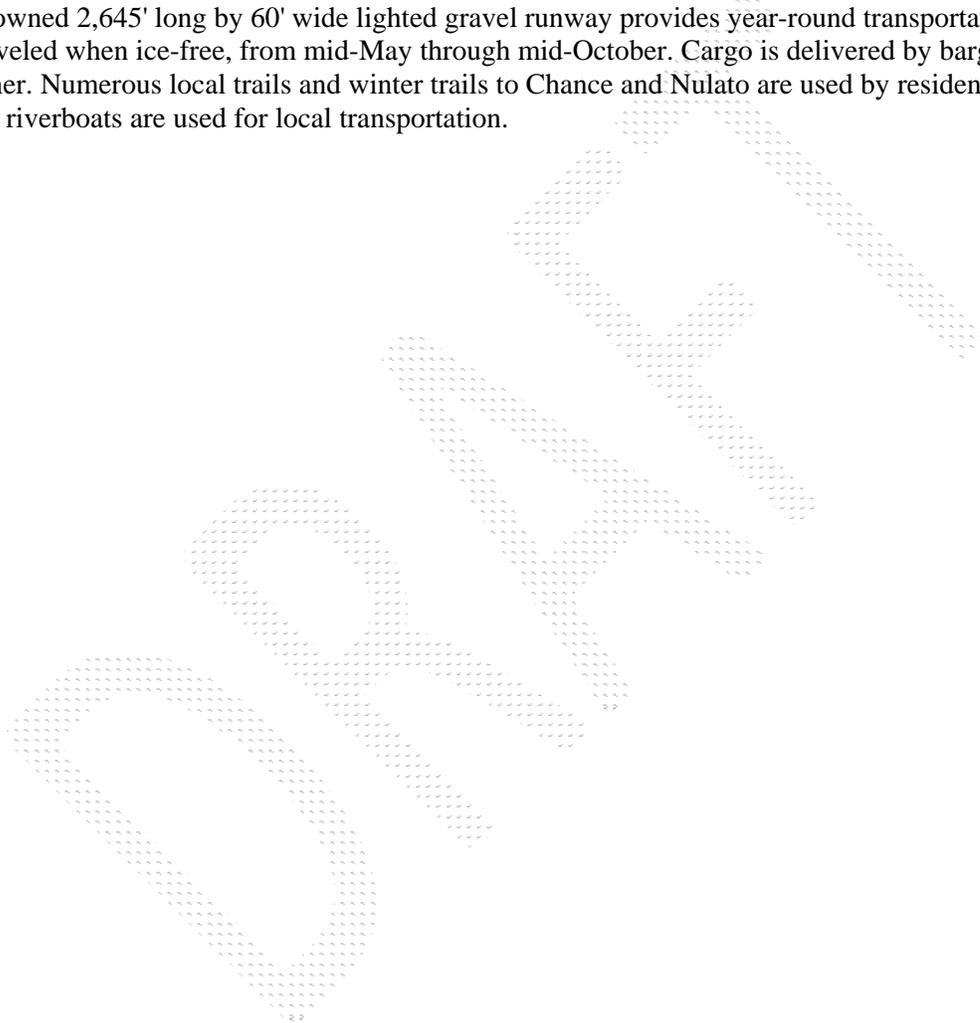
The City provides treated well water at the washeteria. Households are not plumbed, and residents use honeybuckets. The school and washeteria use City water, with sewage disposal into a lagoon. As of May 2003 seven households are on the flush/haul system. The landfill is newly-completed. Electricity 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 five villages are known as Qaluyaarmiut, or "dip net people." Only intermittent outside contact occurred until the 1920s. In the 1950s the Territorial Guard found volunteers from Newtok while they were traveling to Bethel. Tuberculosis was a major health problem during this period. In the late 1950s, the village was relocated from Old Kealavik ten miles away to its present location to escape flooding. A school was built in 1958, although high school students were required to travel to Bethel, St. Mary's, Sitka or Anchorage for their education. This was often their first exposure to the outside, and students returned with a good knowledge of the English language and culture. A high school was constructed in Newtok in the 1980s. A City was incorporated in 1976, but it was dissolved on Jan. 28, 1997. Due to severe erosion, the village wants to relocate to a new site called 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 wants to relocate and rebuild facilities on Nelson Island. A community Master Plan is being developed. Electricity is provided by Unqusrag Power Company. There is one school located in the community, attended by 107 students. Local hospitals or health clinics include Newtok Health Clinic. Newtok is classified as an isolated village, it is found in EMS Region 7A in the Yukon/Kuskokwim Region. Emergency Services have coastal and air access. Emergency service is provided by a health aide.

Economy and Transportation

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



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 and 0.0 sq. miles of water. Shaktoolik has a subarctic climate with maritime influences when Norton Sound is ice-free, usually from May to October. Summer temperatures average 47 to 62; winter temperatures average -4 to 11. Extremes from -50 to 87 have been recorded. Average annual precipitation is 14 inches, including 43 inches of snowfall.



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 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.



Photo 9: Home falling over eroded bank in Shishmaref. (Credit: Tony Weyiouanna)

History, Culture, and Demographics

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

additional homes were relocated in 2002. Other storms have continued to erode the shoreline, an average of 3 to 5 feet per year on the north shore. In July 2002, residents voted to relocate the



Photo 10: Shoreline erosion during coastal storm in Shishmaref. (Credit: Tony Weyiouanna)

community.

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 Miksruaq 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: Shoreline erosion at Shishmaref. (Credit: Tony Weyiouanna)

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 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>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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>Reduce State Capital Budget Expenditures by Leveraging Other Resources 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>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 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

| IAWG Recommendation and Agency Actions | Status |
|--|---|
| <p>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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>Reduce State Capital Budget Expenditures by Leveraging Other Resources FY 10 Governor's budget includes \$800k to DOT/PF to design village evacuation road to higher ground</p> <p>USACE and others are working with Koyukuk completed 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>ADOT/PF Preliminary Engineering & Early Coordination 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> |

| NEWTOK | |
|---|--|
| IAWG Recommendation and Agency Actions | Status |
| <p>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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"> • The design of an evacuation shelter. The community hired the Cold Climate Housing Center; • Planning resources to conduct site suitability analysis and future community layout at the identified new community site- Mertarvik. | <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>Reduce State Capital Budget Expenditures by Leveraging Other Resources</p> <ul style="list-style-type: none"> - ADOT/PF received \$1.7 million from the State Legislature and the Federal Economic Development Administration (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. - ADEC secured resources to drill and develop a water well at the Mertarvik. - 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 - 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. - Community members and the tribal council have financed and built 3 homes at Mertarvik. | <p>Completed by July 2009. DCCED and DOT signed their project agreement 3/15/2008.</p> <p style="color: blue; font-weight: bold;">?</p> <p style="color: blue; font-weight: bold;">To be completed in Spring/Summer 2009.</p> <p style="color: blue; font-weight: bold;">\$2 million in Governor's FY2010 Budget for materials to construct evacuation shelter. \$5 million estimated for FY2011 IRT materials for quarry development. IRT effort will commence Summer 2009.</p> |

NEWTOK

| IAWG Recommendation and Agency Actions | Status |
|--|---|
| <ul style="list-style-type: none"> - USACE prepared designs for the road from the barge landing to the proposed evacuation center at Mertarvik in cooperation with ADOT. Corps is working to acquire permits for IRT to build their base camp in 2009. | <p>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>ADOT/PF Preliminary Engineering & Early Coordination</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 \$150,000 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>Project is scheduled for construction completion by July 15, 2009.</p> <p>See DOT accomplishments later in this section.</p> |

SHAKTOOLIK

| IAWG Recommendation and Agency Actions | Status |
|--|--|
| <p>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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>Reduce State Capital Budget Expenditures by Leveraging Other Resources 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>ADOT/PF Preliminary Engineering & Early Coordination 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

| IAWG Recommendation and Agency Actions | Status |
|---|--|
| <p>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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>Reduce State Capital Budget Expenditures by Leveraging Other Resources 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.</p> | <p>Phase 1: 600 feet of rock revetment completed in Sep 08. Phase 2: 750 feet of rock revetment under contract to be completed by Oct 09. Phase 3: 550 feet of rock revetment under design in 2009; construction funding needed. 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.</p> <p>Environmental studies were initiated for a programmatic EIS for community relocation with limited funding.</p> |
| <p>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 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.</p> <p>See DOT’s accomplishments later in this section.</p> |

UNALAKLEET

| IAWG Recommendation and Agency Actions | Status |
|--|---|
| <p>Develop Suite of Emergency Plans and Training/Drills State resources were provided to the Alaska DHS&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>Community Mitigation and Relocation Planning and Coordination 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>Reduce State Capital Budget Expenditures by Leveraging Other Resources \$5 million provided by the Alaska Legislature to the City of Unalakleet 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 are due Feb 20th. Construction could be completed in 2010 – if sufficient funds are available. Airport shoreline revetment completed.</p> |
| <p>ADOT/PF Preliminary Engineering & Early Coordination 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.

Alaska Department of Transportation & Public Facilities
Infrastructure and Erosion Control Design and Environmental Permitting
\$600,000

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.

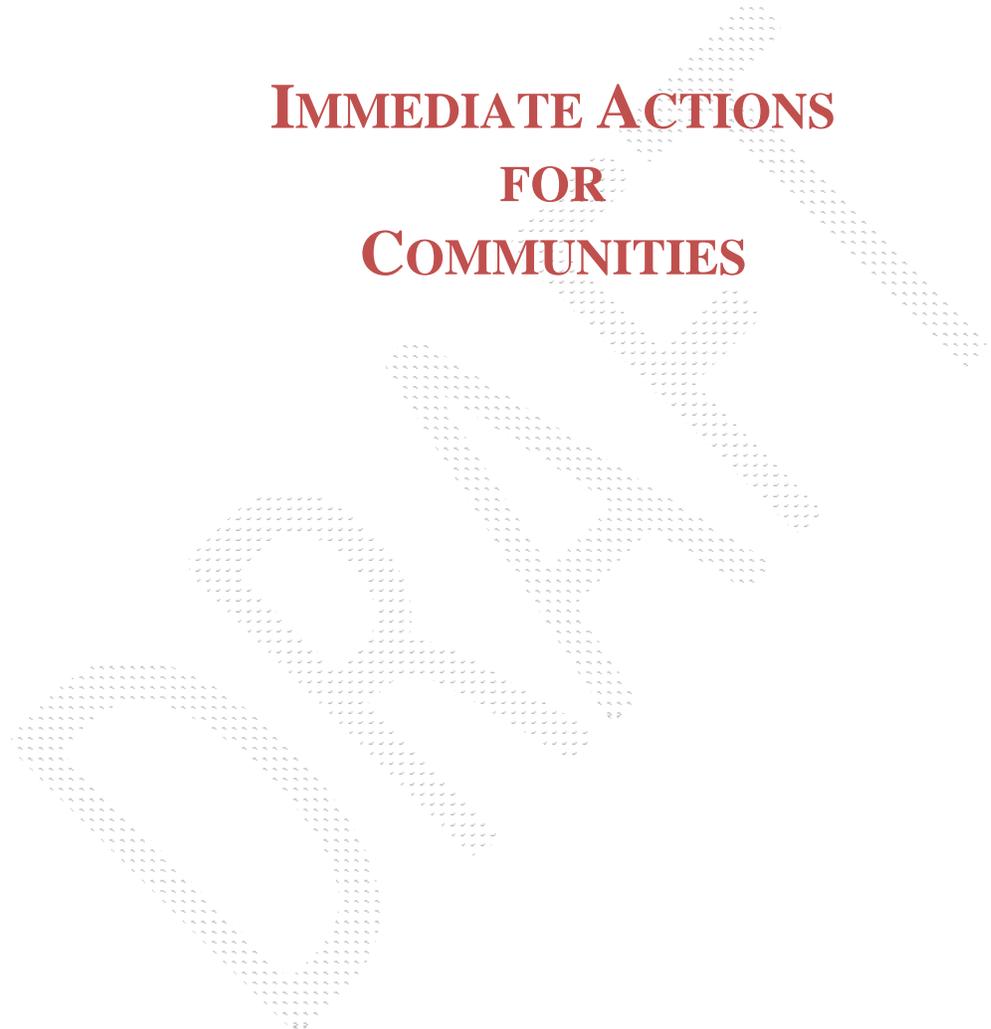
U.S. Army Corps of Engineers Planning, Design and Construction

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, Chefornak, 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 ice forecasting, weather observations, tide and water level stations, and geodetic control information called for in the April 2008 report. The agency has developed a new tide gauge priority list reflecting IAWG interests that will guide future deployments: http://www.ppi.noaa.gov/NOAA_ARCTic/docs/AKTideGaugePriority_ARCTic.pdf

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>All Six Communities</p> <p>DHS&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>Develop Suite of Emergency Plans and Training/Drills (Alaska DHS&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>FY09 - \$400,000 appropriated in Capital Budget to DHS&EM. DHS&EM RSA \$25,000 to DNR for Koyukuk Fire Management Plan. DHS&EM will also provide \$100,000 federal funds match.</p> <p>State's Return on Investment: DHS&EM estimates for every \$1 spent on preparation, \$4 saved in response.</p> | <p>FY10 IAWG Budget Recommendation: \$500,000 (not included in Governor's Budget)</p> <p>IAWG continues to support this important and initial step to ensure preparedness for communities, and prevent harm to infrastructure. IAWG has identified over 90 communities as potentially in peril. See Appendix A.</p> <p>DHS&EM will explore other funding opportunities, e.g. Denali Commission and CIAP for the most threatened regions in Alaska.</p> |
| <p>All Six Communities</p> | <p>Community Climate Change Mitigation and Relocation Planning 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>FY 08 Supplemental - 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>FY10 IAWG Budget Recommendation: \$300,000 (X included in Governor's Capital Budget)</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>Training/Workshop to orient communities, agency personnel and contractors to the recommended collaborative community planning process. (? include this blurb on training/?)</p> <p>Cost Effective: When coordinated, Emergency Preparedness, Community Relocation and other community project planning and project developments have cost-effective results.</p> | | |
| All Six Communities | <p>Reduce Capital Budget Expenditures</p> <ul style="list-style-type: none"> - Through inter-agency and local coordination identify capital cost savings by aligning timing of projects requiring heavy equipment. - State should establish co-sponsorship funding to ensure Alaska attracts federal funds for its priority projects. - Find/develop Western Alaska rock source to reduce costs. <p>35% Funding Co-Sponsorship: Based on</p> | <p>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.²</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>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.</p> |

² 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 |
|--|---|--|---|
| | recommendations from former Senator Stevens at recent roundtables and other meetings. | | |
| All Six Communities | <p>Preliminary Engineering and Early Coordination</p> <p>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>FY09 - \$600,000 appropriated in Capital Budget to ADOT</p> <p>USACE, ADOT, HS&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>FY10 IAWG Budget Recommendation \$500,000 (\$100,000 included in Governor's Capital Budget)</p> |
| All Six Communities – and to Address What will Likely Become a Statewide Need | <p>Identify and Develop a Data Strategy 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>IAWG did not provide any budget estimates for this Strategy in FY 09.</p> <p>IAWG reaffirms its support for this important element.</p> | <p>FY 10 IAWG Budget Recommendation \$0</p> <p>Some funding for travel for community participants may be useful.</p> |
| All Six Communities | <p>Data Needed to Advance IAWG Recommendations</p> <ul style="list-style-type: none"> - Data for developing emergency and other community plans. (EM is familiar with the data needed.) - Horizontal and vertical control data for | <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</p> | <p>No Budget Recommendation at this time. What about NOAA/UAA?</p> <p>Some funds for data</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>establishing plans for relocation and evacuation routes based on what flood levels have 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"> - 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. - A template to develop plan is available on DMVA/DHSEM's website - Yukon River Intertribal Watershed Council model may be useful too. - Integrate with Western Communities Evacuation Plan. | <p>needed will likely not be done in a systematic way to ensure projects can move forward as needed.</p> | <p>collection may be used through the various activities identified in IAWG Recommendations.</p> |
| <p>All Six Communities and to Address Statewide Need</p> | <p>IAWG Recommendations: Identify and conduct coordinated strategy.</p> <ul style="list-style-type: none"> - Through inter-agency and local coordination identify cost savings, such as - Align timing of projects requiring heavy equipment. - State needs to establish a fund to ensure co-sponsorship is available if/when federal funds. - Find/develop Western Alaska rock source to reduce costs. - Local coordination is needed to assist with planning efforts and project alignment. - Local capacity building and augmenting community's administrative capacity is required. | <p>Described in Recommended Policy 1 and 2</p> | <p>No Budget Identified</p> |

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 \$16M³. 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>Revetment/Erosion Control Project</p> <p>Near-term (next 18-24 months): 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>Intermediate-term: 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>FY09 - \$3.3 million appropriated in Capital Budget, to the NW Arctic Borough</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.</p> <p>Carl – are more funds needed from State? Intermediate-term Estimated Capital Budget – \$9.1 million (35% of \$26 million)</p> | <p>FY10 – NWAB and USACE will complete Phase 1 with funds appropriated in FY09 timeframe.</p> |

³ 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>State of Alaska should serve as 3rd Party Reviewer for geologic aspects of USACE (Relocation) Assessment Reports Alaska DGGGS as lead.</p> | <p>FY09 Budget Estimate: \$12,000⁴ DGGGS 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>Late FY 09/FY10 – IAWG recommends DGGGS conduct using CIAP funding already in hand. Hiring freeze will be a hindrance to this action.</p> |
| <p>Relocation Feasibility Study Geologic Mapping (Alaska DGGGS as lead).</p> | <p>Budget Estimate: \$180,000</p> | <p>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.</p> |
| <p>Evacuation Road Feasibility Study: NWAB and Denali Commission - leads</p> | <p>DGGGS/Geologic Mapping is needed first</p> | |

⁴ This budget estimate is only for DGGGS 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 DGGGS to lead. For review of all aspects, I suggest DCCED take the lead and draw on DGGGS as well as other appropriate agencies. A larger budget estimate is needed if this is the intent. (Rod Combellick, DGGGS 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>FY10 Immediate Action 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>Upgrade Existing Road: 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>Review Feasibility/Options Report: Koyukuk, DGGGS, 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>Coordination Among: Koyukuk, USACE, ADOT/PF, DCCED, DHS&EM for preliminary engineering, planning, and funding strategy.</p> | <p>FY09 Capital Budget included funding for Feasibility Review.</p> <p>Coordination and reviews during FY08 & FY09 were covered in FY08, FY08-Supplemental, or FY 09 Capital Budget (with Community Planning grants and DHS&EM Emergency Planning/Training).</p> | <p>FY10 IAWG Budget Recommendation \$800,000 (\$400,000 included in Governor's Capital Budget)</p> |

| Immediate Actions Identified to Prevent Loss of Life and Infrastructure | Past and Future Budget Notes | IAWG Action |
|--|--|---|
| <p>Elevate Current Structures: 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>Provided Koyukuk with organizations and agencies to contact for assistance.</p> |
| <p>Build Evacuation/Emergency Center: Ensure Koyukuk has an emergency shelter. Need to address issues in Feasibility Report and identify decisions acceptable to community and funders. IAWG Comments: 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>FY11 or Future Capital Budget: Evacuation Center Construction Estimate: \$4.5 million.</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>Build Staging Area for Barge Landing – Ensure ability to receive supplies.</p> <p>FY 10 Capital Budget of \$2mm will develop material site and produce rock for construction of barge staging area, evacuation center road, 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 fuel distribution header and pipe 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>Build Road to Evacuation Site – Ensure community has access to shelter (1.5 miles).</p> <p>Build Evacuation Center/Shelter – Ensure community has an emergency shelter (approx 4,000 sq ft + 2,000 sq ft equipment shelter).</p> | <p>FY09 Capital Budget included partial funding for construction for \$XX.</p> <p>FY08 Supplemental Capital Budget included \$279,000 coordination and planning funds for staging, landing, road and shelter.</p> <p>Coordination Among 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 can be used as a training exercise for IRT.</p> <p>ADEC-Village Safe Water completed new well at current site.</p> | <p>FY10 IAWG Budget Recommendation: \$2,000,000 (included in Governor’s Capital Budget- and will leverage Federal IRT funding of \$3.5-\$5 million.)</p> <p>FY10 Federal Supplemental (?) Budget recommendation: \$5 million for materials for IRT quarry development (SRC)?</p> |
| <p>Airport Planning - Step 1 – Site Selection 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>IAWG Comment: Scenarios should be identified for a new airport with various functionalities that can then be reflected in different cost structures.</p> | |

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>Preliminary Relocation Site Assessment for relocating village. Corps Section 103 Storm Damage Reduction Study Initiated and progressing to evaluate protection of strategic locations in the community and the water supply.</p> <p>Evacuation Road – Approx 8.5 miles Step 1: FY 09: Reconnaissance Study, funded by Denali Commission (completed) Step 2: FY 10: Road Design and Engineering The recon study is adequate to begin the permit process for coastal engineering. Step 3: Unknown timing for Construction</p> <p>Coordination Among Shaktoolik, Kawerak, Federal, and State Agencies: 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>Road Budget Estimate: Reconnaissance Study estimates road design at \$3mm. Current commitments from Denali Cmsn 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>FY 10 IAWG Recommendation: \$500k from state to leverage other funding for design of Shaktoolik relocation road. (Not in Governor’s Capital Budget)</p> <p>Village of Shaktoolik needs to request to Congress to add it to the Alaska Coastal Erosion Program under authority of Section 117.</p> |
| <p>Hazard Mapping Study Geologic Mapping (Alaska DGGS as lead)</p> | <p>DGGS Budget Estimate: \$180,000</p> <p>USACE CAP limit: \$3 million Federal with 35 % local match required for construction. Current funds: \$70,000 available for study.</p> | <p>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.</p> |
| <p>Cabins and 30kw Generator 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>Funding Strategy Coordination: Shishmaref, USACE, ADOT/PF, and DCCED</p> <p>Revetment/Beach Erosion Control Project Phase 1: 600 feet of rock revetment completed in Sep 08. Phase 2: 750 feet of rock revetment under contract to be completed by Oct 09. Phase 3: 550 feet of rock revetment under design in 2009; construction funding needed. 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.</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>FY10 State/Federal Coordination: 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>For FY08 & FY09: Coordination covered in current and/or FY08 Supplemental.</p> <p>As of April 2008: FY10 and FY11 Recommendation for Capital Budget (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>FY 10 IAWG Recommendation: \$3 million (included in Governor's Capital Budget) and leverages USACE funding)</p> <p>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.</p> |

| Immediate Actions Identified to Prevent Loss of Life and Infrastructure | Past and Future Budget Notes | Action Taken |
|--|---|--|
| <p><u>Relocation Planning – Road, Geologic Site, Airport and Port Site Master Plan, Community Planning</u></p> <p>Relocation Road Reconnaissance Assessment (\$500k for assessment - Road from mainland) Lead: ADOT/PF and Shishmaref</p> <p>Shishmaref Relocation Feasibility Study 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>Community Relocation Planning – Funded in 08/09 continuing effort</p> <p>New Airport Master Plan and Site Location for Port</p> | <p>Community Comment: 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>IAWG Comments: Scenarios Needed 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>Coordination Needed: 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>Completion Date: Dates can’t be determined until funding source identified/authorized.</p> | <p>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.</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.

(estimated cost \$20 to \$30 million – doesn't align with 13.5 mm = 35%)

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.

| Immediate Actions Identified to Prevent Loss of Life and Infrastructure | Past and Future Budget Notes | Action Taken |
|--|---|--|
| <p>USACE has completed design work and is advertising for a construction contract. Construction is scheduled for completion in 2010 if sufficient funds are available.</p> <p>FY10 Unalakleet identified the opportunity to move Old School Gym to higher ground for use as an Emergency Shelter. – Assessing sites for higher ground evacuation identified as immediate need in 2008 along with design and location of evacuation road (and shelter).</p> <p>Gym Move Capital Budget Estimate is \$1mm Cost estimates were identified after Governor's Budget was submitted to Legislature.</p> | <p>FY 09 Capital Budget funding of \$5mm obtained for revetment and erosion control project and leveraged USACE funds from Congressional Supplemental (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/demob costs.</p> | <p>IAWG Recommendation: Need funding strategy to ensure erosion/revetment project is done in 2009/2010. (Unalakleet/DCCED/USACE.)</p> <p>FY10 IAWG recommendation: Community should pursue funding for Gym Move with the Legislature and Alaska Delegation. Estimated budget is \$1mm.</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.

POLICY 1: ESTABLISH A STATEWIDE SYSTEM TO DOCUMENT, ASSESS, AND ANALYZE CURRENT AND PLANNED PUBLIC INFRASTRUCTURE 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 appoint XX as lead.

- Guidance from Subcabinet for advancing Policy 1 should include requesting Commissioners whose agencies are participating in the IAWG, along with the OMB Director to meet and identify benefits, challenges, and most effective organizational structure for implementation.
 - The guidance should include working with the Governor’s Office, the Subcabinet and the Legislative Budget & Audit Committee to describe their findings and request input, questions and concerns that 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 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 the IAWG should be integrated, reformulated or discontinued, depending on the structure and needs of the Statewide Office.

Implementation – Initial Steps

- **IAWG Recommended Action to Subcabinet:** Adopt Policy 2 and appoint X as the lead agency to implement Policy 2.
- Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners whose senior executives have been participating in the IAWG, the Chair of the Legislative Budget & Audit Committee, the Denali Commission Co-Chairs, the Colonel for the USACE Alaska District, and the Regional NOAA director.
 - Additional agency and community representatives should be considered, such as Bureau of Indian Affairs, School Districts, and a Native Regional Non-profit.

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. 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 that the IAWG members lead this effort by working with the Governor's Office to develop an Executive Order to implement Policy 3.
- Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners whose senior executives have been participating in the IAWG, the Chair of the Legislative Budget & Audit Committee, the Denali Commission Co-Chairs, the Colonel for the USACE Alaska District, and the Regional NOAA Director.

What follows are five major actions identified as necessary to address and advance assistance to communities in peril. Each of the five include a description of the action, rationale and implementation steps for each action.

1) Comprehensive Integrated Planning must include:

- a. Suite of Community Emergency Planning Efforts.
 - i. Community Evacuation Plans.
 - ii. Community Emergency Operation Plans.
 - iii. Geologic Mapping, Hazard Analysis, and Risk 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. In addition to other identified benefits, comprehensive planning increases the ability to address complicated land exchanges often with multiple parties involved and 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 (Geologic Mapping, Mitigation, Evacuation, & Emergency Plans) are critical building blocks for comprehensive community relocation planning, and can characterize possible relocation sites, identify hazards, and locate potential construction materials resources
- Under the federal 2003 Healthy Forest Restoration Act, communities at risk of wildfire are required to develop a Community Wildfire Protection Plan, a collaborative effort between wildfire suppression agencies, federal, state and local governments, community groups, and individuals, that includes risk assessment and a wildfire mitigation plan..
- Adoption of a formal State Mitigation Program would align with Comprehensive Community Relocation Planning to provide a mechanism to help deal with communities in peril.
- Preparedness activities provide opportunities for communities to test and modify plans in non-emergent 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 life cycle cost 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.
- Decisions regarding a community's future must be built on community support that derives from collaborative, comprehensive analysis of options and associated costs. This includes utilizing already existing work and efforts, which will likely require agencies to do some homework to fully understand the optimum starting point. A consistent focus to achieve the desired sustainable community vision will ensure that plans, studies, and individual projects are not an end in and of themselves, but necessary pieces of a complex project. Agencies should provide communities the best possible information in a timely manner for informed decision-making.
- Comprehensive community planning relies on local needs and resources, tribal inputs and associated rights and responsibilities, and statutory, regulatory and programmatic issues at the State and Federal level. Success cannot be achieved without collaborative partnerships throughout the planning and implementation processes.
- Alaska Native Village and Tribal lands are unique and pose a special set of complex issues when considering community relocations. The State needs to recognize this resource and closely work with Villages and tribes and other land owners to ensure their land issues are appropriately integrated and addressed in a timely way within the community planning process.
- State and Federal Governments must work together cohesively along with the community to develop solutions. Ongoing partnerships will ensure the most effective use of resources and attaining desired end results.
- 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 it's further recommended that DCCED and the Department of Public Safety, Division of Fire and Life Safety 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.

Comment/Example: 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.

- Even when the local capacity and resources of a village are adequate under normal conditions, coping with erosion and flooding places community resources and capacity under tremendous pressure. The

situation is compounded when the community attempts to relocate. Most rural communities have limited administrative and technical staff to work with multiple state and federal agencies on relocation activities, while also attempting to maintain basic community services.

2) **Flexible Funding Streams must mandate:**

- a. Analysis of projected costs of all viable relocation alternatives, including not relocating
- b. Emergency, hazardous and evacuation plans for communities in peril to prevent loss of life when a natural disaster occurs
- c. ***Prioritized funding for communities in peril*** and a method to prioritize project funding among the communities. This needs to include providing capacity building opportunities in communities by funding local training or consulting efforts, where needs have been identified.
- d. State co-sponsorship 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.
- f. Sufficient full-time employee positions for state agencies taking a lead or participative role to address expanded agency functions
- g. ***Based on U.S. Army Corps of Engineers recommendations and DOT/PF review, the state should plan for a 5-year appropriation plan with annual appropriations predicated upon development of budgets and project timelines during the first year of funding consistent with the recommendation in 2c)*** above regarding prioritization. USACE’s initial recommendation is funding up to 35 percent of estimated erosion control and mitigation capital costs, which is about \$30 million annually. This will allow interim measures to be taken to protect communities in peril while beginning implementation of longer term adaptation/ mitigation solutions. A “block grant” structure would provide administrative efficiencies.
- h. Rapid response capabilities to release and distribute funds quickly.

Implementation Actions:

- Develop investment guidelines, and designate funding for priority measures including fast-tracked needs to address critical infrastructure for communities-in-peril. Guidelines should include an assessment to identify critical needs, similar to the DCCED RUBA program. An expedited funding process should be able to meet the critical needs since current funding sources are extremely limited in their ability to fast-track projects. This remains true even with the recent changes to the federal Energy and Water Development Appropriation Act of 2005.
- Annual state appropriation will be synchronized with federal appropriations to better position our coastal erosion needs in the federal process; the distribution of the state appropriations will be handled in a grant-like process consistent with the Policy recommendation in paragraph 3, with DCCED as 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.
 - **Current status:** Funding sources, such as through AHFC, encompass new construction, 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).

- **Required changes:** The funding to stage structures, to stabilize and move infrastructures that are in imminent danger, is needed. **Identifying** secondary and preventative protections can be accomplished through agency coordination with the community. However, specific assessment tools or “recipes,” and the entities most appropriate to apply them 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 shall be charged with identifying barriers to making infrastructure investments in threatened and newly designated communities (relocation sites). This process should result in identifying additional policy, statutory, and **regulatory** changes required 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.
- Investment guidelines shall include changes to AO #224 in light of the serious erosion and likely relocation of several communities. [State of Alaska Administrative Order No. 224](#) provides an example of this conflict through the establishment of the following investment guidelines:
 - Absence of imminent environmental threat: New facilities will be protected against imminent environmental threats, such as flooding and erosion, consistent with [Administrative Order No. 175](#).
 - Needs of existing communities have priority: Priority will be given to the infrastructure needs of existing **communities** before consideration of proposals to create new communities, unless there is a congressionally directed relocation of an existing community.

Rationale:

- Current funding streams neither require nor allow comprehensive analysis of comparative costs.
- This long-term problem cannot be addressed with short-term personnel.
- The approach for annual state funding for the next five years is supportive of the challenges faced in the federal appropriation process when there is not state participation; requiring budgets and schedules before beginning construction assures we progressively refine the immediate action requirements as we go through the five years of effort. Funding levels higher than recommended could be useful but this pace allows for collaboration, community input, and economies with other agencies to occur while making progress.
- Funding in the form of a State Block Grant that can be allocate to any community in peril project is desirable but may be impractical. If funding continues to be made by the Alaska Legislature specific to certain communities, the work of the subcabinet must be effectively communicated to Legislative leaders and the Administration.
- 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. The Consolidated Appropriations Act of 2005, PL 108-447, Division C - Energy and Water Development Appropriations Act, 2005 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 presents serious 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.
- A disaster event that forces relocation results in unnecessary risks to life/safety and extraordinarily complex response/relocation/recovery, which carries associated and significant increased costs.
- Criteria for defining and funding communities in peril should provide consistency while still allowing for flexible strategies unique to each community. A Statewide Mitigation Program allows a proactive approach independent of Federal funding or a Federal disaster declaration.

-
- 3) **Formulate a strategy to implement the Sustainable Community Relocation policy.** The strategy must define the process for addressing a community's specific needs. Specifically, the strategy must result in a work plan based on principles of sustainability and articulates 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, proven existing strategies should be utilized. Immediately, begin a coordinated system to identify possible resources and actions through a coordinated approach. By scheduling quarterly or semi-annual meetings we can then confidently identify, update and coordinate projects and funding sources from federal, state and regional/local sources to effectively address the most vulnerable needs. Recommend utilizing the Denali Commission’s MOU process for this immediate need, which is currently in development and has proven effective in the past.
- Wherever possible, proven existing strategies should be utilized. Immediately, begin a coordinated system to identify possible resources and actions through a coordinated approach. By scheduling quarterly or semi-annual meetings we can then confidently identify, update and coordinate projects and funding sources from federal, state and regional/local sources to effectively address the most vulnerable needs. Recommend utilizing the Denali Commission’s MOU process for this immediate need, which is currently in development and has proven effective in the past.
- Designating DCCED as the lead coordinating agency for relocation assistance is consistent with the authority DCCED currently has in regard to Alaska’s communities. 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 to address erosion, which is why relocation is necessary. 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.
- And, while a pure Comprehensive Community Plan as discussed in traditional planner circles is not being advocated, a modified Comprehensive Plan that includes analysis of relocation sites would be a significant integrated planning step forward. Thus, it is appropriate to broaden DCCED planning roles to include relocation. The purpose of the lead agency is to 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.
- Sample Action: 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 statutes relating to mitigation require onerous cost-benefit analysis which does not really address the Alaska situation. In addition, the cost-benefit analysis does not include the consequence of not providing preventative assistance. It's believed by the Immediate Action Workgroup members that only through a preventative assistance strategy and associated funding, that significant cost savings can be achieved. Needed changes in the Stafford Act 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, 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 designate XXX to establish a small, yet knowledgeable workgroup to conceptualize and begin detailing the items identified.

Convey this action to the Governor, the Director of the Office of Management & Budget, the relevant Commissioners and Federal Agency Directors and other organizational directors necessary to the success

of this effort. The Immediate Action Workgroup should serve as a functional model with State and Federal Co-Chairs.

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, 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. Identify what collaborative MOUs among data custodians and data collectors exists and are needed.
- d. Identify processes for collection of field and local data where lacking and potential costs and timetables.
- e. Ensure data includes cultural and traditional knowledge.
- f. 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.
- g. 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.
- h. 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 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.

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 relocation scenarios:**

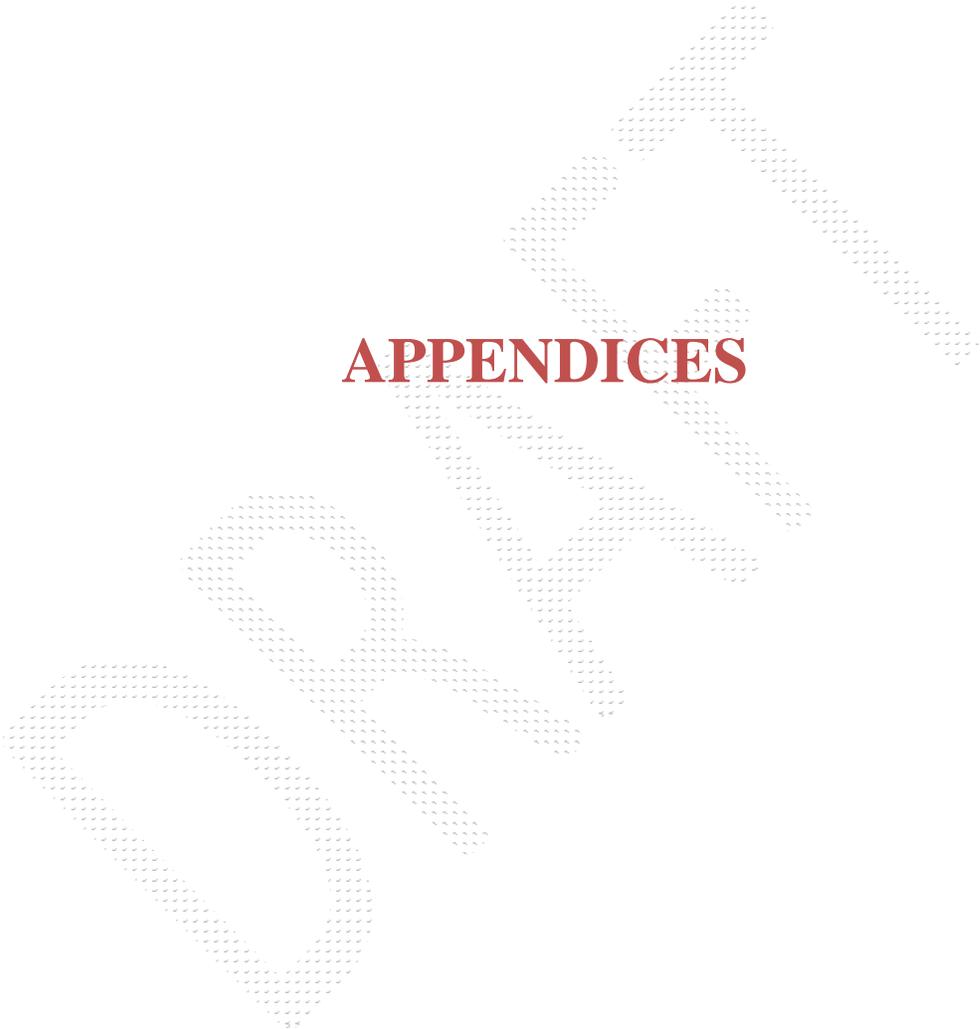
- a. Encourage Alaska communities to use the ICLEI model, or other multi-step climate impact planning models, which focuses on a review of scientific data to identify expected climate change impacts and opportunities a community should expect and develop a set of responses/actions to possible changes.

Implementation actions:

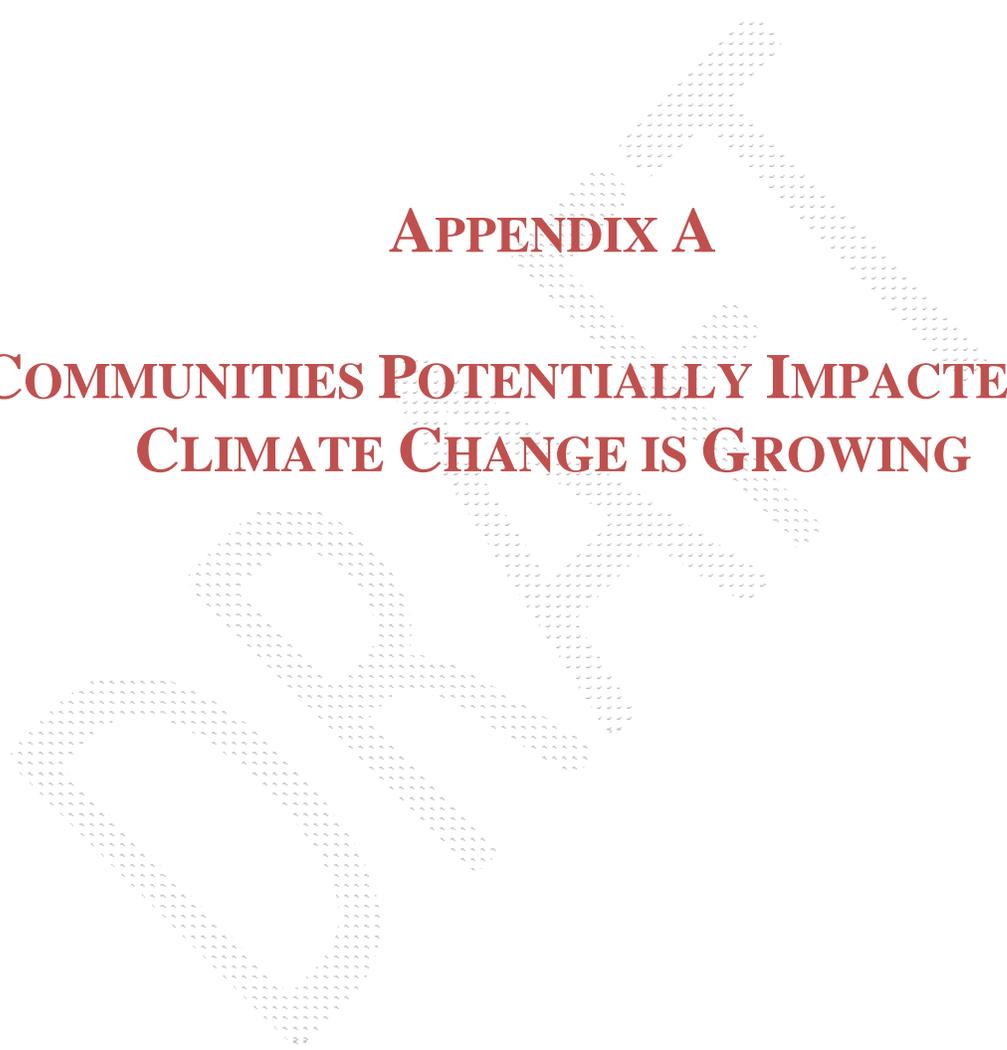
- Work with the Alaska Municipal League and Regional For-Profits and Non-Profits who in turn will work with their communities to identify near-term climate change impacts and ensure community's plans accommodate new monitoring and research data. The "milestones community planning model", such as the 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

**COMMUNITIES POTENTIALLY IMPACTED BY
CLIMATE CHANGE IS GROWING**

THE NUMBER OF COMMUNITIES POTENTIALLY IMPACTED BY CLIMATE CHANGE IS GROWING

This section provides the rationale for the number of communities the IAWG has identified as potentially in peril due to climate change phenomena.

First, IAWG has merely compiled this list of communities potentially in peril by collecting information from IAWG participating organizations, other significant organizations such as the U.S. General Accounting Office and community regional organizations like Kawerak and Alaska Village Council Presidents.

Second, to clarify, IAWG did not analyze whether or not these communities meet standards or criteria of a “community in peril” due to impacts from climate change phenomena (lack of sea ice, increased storm surges, erosion due to flooding or permafrost melt, wild fires).

Third, IAWG recognized that such a standard or process to analyze whether a community is in peril due to impacts likely caused from climate change, but such a process does not exist.

Fourth, this lead IAWG to create Policy 1 Recommendation calling for a strategic approach to identifying communities and projects and implementation of identified projects.

In this section, you’ll find:

- **Summary** of characteristics or criteria each organization used to identify a community as potentially in peril.
- Compiled list of communities potentially in peril, organized by identifying agency
- Characteristics or criteria each organization used to identify a community as potentially in peril. This information appears in the following order:
 - U.S. General Accounting 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 USED TO IDENTIFY POTENTIALLY IMPACTED COMMUNITIES FROM CLIMATE CHANGE

| IAWG – 2008 Recommendation Report | GAO – Current Community Relocation Assessment | USACE – Communities Impacted by Erosion Only (Not Flooding) | DCCED | Emergency Management | DOT/PF | DNR |
|--|---|--|--|---|---|---|
| Communities were identified in GAO’s <u>Previous Report</u> and/or at 11/07 Climate Change/AML meeting | Communities Self-Identified Or other agencies recommended them to GAO – | Critical Infrastructure at Risk (for example, School, Utilities, Transportation) | Based on Responses from Email sent to Field Personnel and input from Communities | Safety of Life | Those communities in Western/NW Alaska with proposed, partial and recently completed projects | Based on funding for and identification of communities which would benefit from Community Wildlands Prevention Planning (CWPPs) |
| Risk to life | Response to US Senate directive to identify and make recommendations for communities facing significant erosion or flooding impacts | Cultural Importance | | Protect public infrastructure - what’s already in place | | |
| | | Subsistence and Shoreline Use | | | | |
| Risk to public infrastructure | Not based on analysis of impact due to climate change phenomena | Environmental Hazard (EX: Landfills, Sewer Lines, Sewage Lagoons, Fuel Tanks) | | Number of disasters a community and the broader region (e.g. river system) has experienced over the last 30 years | | |
| Risk to private infrastructure | Community wants to relocate in whole or in part to address flooding and erosion issues | Human Health and Safety | | | | |
| Could identify doable action sin 12-18 months | | Housing and Population Affected | | | | |
| | | Housing in Parellel | | | | |

COMMUNITIES POTENTIALLY IMPACTED BY CLIMATE CHANGE PHENOMENA

| | Community | GAO | USACE | DCCED | EM | ADOT | DNR |
|----|--|-----|-------|-------|----|------|-----|
| 1 | Akiak | | | X | | | |
| 2 | Alatna | X | | | | | |
| 3 | Allakaket | 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 |
| 7 | Atmautluak | | | X | | | |
| 8 | Barrow | | X | | | X | |
| 9 | Bear Creek/Seward/Lowell Point | | | | | | X |
| 10 | Beaver | | | | | | X |
| 11 | Buckland | | | X | | | |
| 12 | Chefornak | X | X | X | | | |
| 13 | Chevak | | X | | | | |
| 14 | Chitna | | | | | | X |
| 15 | Clarks Point | | X | | | | |
| 16 | Coldfoot | | | | | X | |
| 17 | Cooper Landing | | | | | | X |
| 18 | Deering | | X | X | | | |
| 19 | Dillingham | | X | | | | |
| 20 | Diamond Ridge/Fritz Creek/Fox River | | | | | | X |
| 21 | Diomedede | | | X | | | |
| 22 | Dry Creek | | | | | | X |
| 23 | Elim | X | | | | | |
| 24 | Emmonak | | X | X | X | X | |
| 25 | Evansville/Bettles | | | | | | X |
| 26 | FNSB: Fairbanks, North Pole, College, Fox, Salcha, Ester | | | | | | X |
| 27 | Funny River | | | | | | X |
| 28 | Galena | | | | | X | X |
| 29 | Gambell | | | | | X | |
| 30 | Glennallen | | | | | | X |
| 31 | Golovin | X | X | X | | X | |
| 32 | Halibut Cove & Vicinity | | | | | | X |

| | Community | GAO | USACE | DCCED | EM | ADOT | DNR |
|----|---------------------------------------|------------|--------------|--------------|-----------|-------------|------------|
| 33 | Homer /Kachemak | | | | | | X |
| 34 | Hooper Bay | | | X | | X | |
| 35 | Hope/Sunrise/Summit | | | | | | X |
| 36 | Horseshoe Lake | | | | | | X |
| 37 | Hughes | X | | | | | |
| 38 | Huslia | X | X | | | | |
| 39 | Kalifornsky/Kasilof/Cohoe/Clam Glutch | | | | | | X |
| 40 | Kenai | | | | | | X |
| 41 | Kongiganak | | | X | | | |
| 42 | Kivalina | X | X | X | X | X | |
| 43 | Kipnuk | X | | | | | |
| 44 | Kotlik | | X | X | | | |
| 45 | Kotzebue | | | | | X | |
| 46 | Koyukuk | X | | X | X | X | X |
| 47 | Kwethluk | | | X | | | |
| 48 | Kwigillingok | | | X | | | |
| 49 | Little Diomedea | | | X | | X | |
| 50 | Lime Village | | X | | | | |
| 51 | McCarthy, Kennicott,Fireweed Mountain | | | | | | X |
| 52 | McGrath | | X | X | | | X |
| 53 | Mentasta | | | | | | X |
| 54 | Moose Pass, Crown Point, Primrose | | | | | | X |
| 55 | Nanwalek | | | | | | X |
| 56 | Napakiak | | | X | | | |
| 35 | Napaskiak | | | X | | | |
| 57 | Nelson Lagoon | | | X | | | |
| 58 | Noatak | | | | | X | |
| 59 | Nome | | | | | X | |
| 60 | Newtok | X | X | X | X | X | |
| 61 | Nightmute | | | X | | X | |
| 62 | Nikisiki,Salamatof,Grey Cliffs | | | | | | X |
| 63 | Nilichick,Nilichick Forties | | | | | | X |
| 64 | North Slope Borough | | | | | X | |
| 65 | Nulato | X | | | | X | |
| 66 | Nunam Iqua | | X | X | | X | |
| 67 | Nunapitchuk | | | X | | | |
| 68 | Port Graham | | | | | | X |

| | Community | GAO | USACE | DCCED | EM | ADOT | DNR |
|----|--|------------|--------------|--------------|-----------|-------------|------------|
| 69 | Point Hope | | | | | X | |
| 70 | Port Heiden | | X | | | | |
| 71 | Ruby | | | | | | X |
| 72 | Saint Michael | | X | | | | |
| 73 | Seldovia | | | | | | X |
| 74 | Selawik | | X | | | X | |
| 75 | Seward | | | X | | | |
| 76 | Shageluk | | | | | X | |
| 77 | Shaktolik | X | X | X | | X | |
| 78 | Soldotna,Ridgeway | | | | | | X |
| 79 | Solomon and Safety Sound | | | | | X | |
| 80 | Shishmaref | X | X | X | | X | |
| 81 | Sterling | | | | | | X |
| 82 | Stevens Village | | | | | | X |
| 83 | Strelna | | | | | | X |
| 84 | Tanacross | | | | | | X |
| 85 | Teller | | | X | | | |
| 86 | Tok | | | | | | X |
| 87 | Tuntutuliak | | | X | | | |
| 88 | Tyonek/Beluga | | | | | | X |
| 89 | Unalakleet | X | X | X | | X | |
| 90 | Venetie | | | | | | X |
| 91 | Wales | | | X | | | |
| 92 | Wasilla, Palmer, Butte, Sutton, Chickaloon, Knik, Big Lake, Houston, Willow, Talkeetna, Trapper Creek, Petersville | | | | | | 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.

GAO contacts:

Jeffery Malcolm, Assistant Director, (202) 512-6536 (phone), (202) 512-8354 (fax), MalcolmJ@gao.gov
Brad Dobbins, Analyst-In-Charge, (415) 904-2278 (phone), (415) 904-2111 (fax), DobbinsB@gao.gov
Allen Chan, Senior Analyst, (415) 904-2263 (phone), (415) 904-2111 (fax), ChanA@gao.gov

Insert PDF USACE Criteria for Assessing Community Needs



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

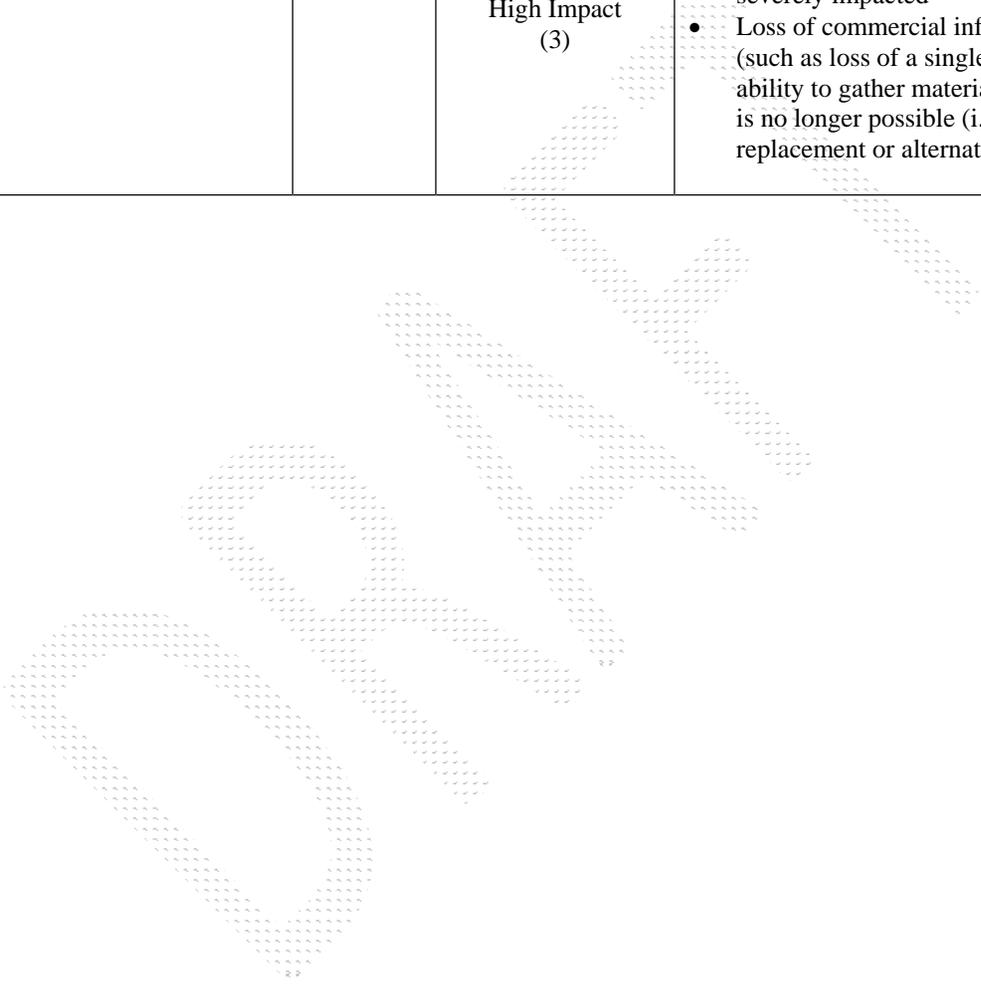
| | | | |
|-------------------------------|---|----------------------|---|
| | | High Impact (3) | <ul style="list-style-type: none"> • Erosion damage is expected to result in human health and safety concerns • Critical health/safety services facility at risk • Portions or all of the population cut-off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

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

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

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

| | | | |
|--|--|----------------------------|--|
| | | <p>High Impact (3)</p> | <ul style="list-style-type: none"> • Impacts have severe, dramatic affect on cash flow of a community • The ability to operate the commercial sector for the community is severely impacted • 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) |
|--|--|----------------------------|--|



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 and 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



**SUMMARY OF ALASKAN FLOOD DISASTERS
1978-2008**

SORTED BY REGION, COMMUNITY AND YEAR

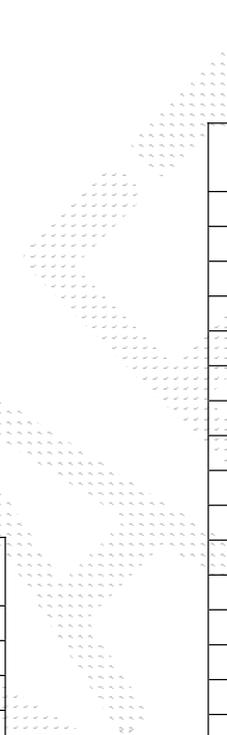
COMPILED BY

**ALASKA DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT
NOVEMBER 2008**

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

| Region | Communities | Flooding Events |
|-----------------------|-------------|-----------------|
| 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 |
| Total | 119 | 228 |



| Year | Flooding Events |
|--------------|-----------------|
| 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 |
| Total | 228 |

| Yukon River | |
|--------------------|----------------------|
| 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 |

| Yukon River | |
|--------------------|---|
| 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 |

| Koyukuk River | |
|----------------------|--------------|
| Alatna | 1994 |
| Allakaket | 1994 |
| Bettles | 1994 |
| Hughes | 1994 |
| Koyukok | 2001 2006 |
| Wiseman | 1994 |

| Koyukuk River | |
|----------------------|---|
| 1994 | Alatna Allakaket Bettles Hughes Wiseman |
| 2001 | Koyukok |
| 2006 | Koyukok |

| Kuskokwim River | |
|------------------------|--|
| 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 |

| Kuskokwim | |
|------------------|---|
| 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 |

| Bristol Bay | |
|---------------------|----------------------|
| Bristol Bay Borough | 2005 |
| Clark's Point | 2005 |
| Dillingham | 1980 2000 2005 |
| Ekwok | 2002 |
| Koliganek | 1991 |

| Bristol Bay | |
|--------------------|--|
| 1980 | Dillingham |
| 1991 | Koliganek |
| 2000 | Dillingham |
| 2002 | Ekwok |
| 2005 | Bristol Bay Borough Clark's Point Dillingham |

| Aleutians & Peninsula | |
|----------------------------------|----------------------|
| Chignik | 2000 2002 |
| Lake & Pen Borough | 2000 2003 2005 |
| Naknek | 2003 |
| Unalaska | 1985 |

| Aleutians & Peninsula | |
|----------------------------------|-----------------------------|
| 1985 | Unalaska |
| 2000 | Chignik Lake & Peninsula |
| 2002 | Chignik |
| 2003 | Lake & Peninsula Naknek |
| 2005 | Lake & Peninsula |

| West Coast | |
|-------------------|--|
| 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 |

| West Coast | |
|-------------------|---|
| 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 |

| Northwest | |
|------------------|--------------------------------------|
| Buckland | 1985 1987 |
| Diomede | 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 |

| Northwest | |
|------------------|--|
| 1985 | Buckland Kobuk |
| 1987 | Buckland |
| 1988 | Shishmaref |
| 1990 | Diomede Kobuk Kotzebue Teller |
| 1997 | Shishmaref |
| 2001 | Shishmaref |
| 2002 | Shishmaref |
| 2003 | Nome |
| 2004 | Diomede Elim Golovin |
| 2005 | Elim Golovin Nome Shishmaref |
| 2006 | Kivalina |

| North Slope | |
|---------------------|------|
| Endicott Mountains | 1998 |
| Kaktovik | 2008 |
| North Slope Borough | 1989 |
| Wainwright | 2008 |

| North Slope | |
|--------------------|------------------------|
| 1989 | North Slope Borough |
| 1998 | Endicott Mountains |
| 2008 | Kaktovik Wainwright |

| Interior | |
|-----------------|--|
| Delta Junction | 1994 2000 2006 |
| Denali Borough | 2006 |
| Fairbanks NSB | 1989 1991 1992 1997 2000 2002 2008 |
| Nenana | 2008 |
| Northway | 1997 |
| Salcha | 2002 2008 |

| Interior | |
|-----------------|--|
| 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 |

| Southcentral | |
|---------------------|------|
| 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 |

| Southcentral | |
|---------------------|---------------------------------|
| 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 | |

| Kenai Peninsula | |
|------------------------|------------------------------|
| Homer | 2000 2002 |
| Kachemak Silo | 2002 |
| Kenai | 1995 2000 |
| Kenai Borough | 1981 1986 2002 2006 |
| Port Graham | 2002 |
| Willow Creek | 1979 |

| Kodiak | |
|---------------|--|
| Karluk | 1978 |
| Kodiak | 1980 1991 1992 2000 2002 2003 |

| Southeast | |
|------------------|------------------------------|
| 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 |

| Kenai Peninsula | |
|------------------------|--|
| 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 |

| Kodiak | |
|---------------|--------|
| 1978 | Karluk |
| 1980 | Kodiak |
| 1991 | Kodiak |
| 1992 | Kodiak |
| 2000 | Kodiak |
| 2002 | Kodiak |
| 2003 | Kodiak |

| Southeast | |
|------------------|---|
| 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 - Northern Region - Erosion Control Projects –
Used to Identify Communities Potentially Impacted by Climate Change
Updated 12/3/2008**

| <i>Current Design Projects</i> | Funding Source | Project # | Description |
|--|-----------------------|------------------|--|
| Barrow Arctic Research Center Road | FHWA | 76970 | Relocate access road to Research Center due to erosion of Stevenson Street. |
| Coldfoot Airport Erosion Control | FAA | 60851 | Protect the Coldfoot airport and access road from imminent erosion by the Koyukuk River. |
| Emmonak Airport Rehabilitation - Stage II | FAA | 62641 | Included in the scope of the Airport Project is to Relocate the existing powerline to the Airport due to River Erosion |
| Emmonak Flood Permanent Repairs Airport/Clinic Road | FHWA | 62754 | Repair damage to airport access road caused by recent flooding. |
| Galena Campion Road Erosion Protection | 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. |
| Gambell Evacuation Road | FHWA | 62973 | Repair and extend road used for evacuation of village during annual coastal floods from large westerly storms. |
| Hughes Airport Improvements | FAA | 60245 | Address the current flood threat to the facility by raising the grade of the airport and relocating the apron, and possible relocation. |
| Kivalina Airport Permanent Repairs | 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. |
| Kotzebue Roads - Shore Avenue | FHWA | 60788 | Reconstruct Shore Avenue to provide erosion protection from storms and long-shore currents. |
| Little Diomed Helipad Improvements | FAA | 61470 | Repair ice scour damage to helipad embankment, repair lighting damage from Storm Events. |
| Noatak Airport Relocation | FAA | 61478 | Airport Relocation due to erosion by the Noatak River |

**Alaska DOT&PF - Northern Region - Erosion Control Projects –
Used to Identify Communities Potentially Impacted by Climate Change
Updated 12/3/2008**

| <i>Current Design Projects</i> | Funding Source | Project # | Description |
|--|-----------------------|------------------|--|
| Nome Council Permanent Repairs | 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. |
| North Slope Borough Road Improvements | FHWA | 76972 | Relocate access road connection to Cake Eater Road due to erosion of Stevenson Street. |
| Nulato Airport Road | None | | Project includes armoring embankment and raising grade to stop flooding and erosion by the Yukon River. |
| Nunam Iqua Airport Rehabilitation | 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. |
| Point Hope Evacuation Road Extension | FHWA | 76968 | Construct an evacuation road extension to an elevation above flood levels. |
| Point Hope Evacuation Road Rehabilitation | FHWA | 76966 | Rehabilitate and raise grade of road used for evacuation of village from storm surge and flooding. |
| Shageluk Airport Access Road Improvements | FHWA | 62171 | Raise roadbed or realign to minimize impact of flooding by Innoko River. |
| Shishmaref Airport Masterplan | FAA | | Masterplan activities evaluating airport relocation options related to Community relocation. |
| Shishmaref Relocation Road | 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. |
| | | | |

**Alaska DOT&PF - Northern Region - Erosion Control Projects –
Used to Identify Communities Potentially Impacted by Climate Change
Updated 12/3/2008**

| <i>Current Design Projects</i> | Funding Source | Project # | Description |
|--|-----------------------|------------------|--|
| <i>Active Projects with Additional Funding Needs</i> | | Project # | Description |
| Gambell Evacuation Road | | 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. |
| Kivalina Airport Permanent Repairs | | 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. |
| Kotzebue Roads - Shore Avenue | | 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. |
| Point Hope Evacuation Road Extension | | 76968 | Current Cost estimates indicate there is not enough funding to construct the evacuation road to the length requested by the community. |
| Shishmaref Relocation Road/Airport Masterplan | | 76776 | Currently DOT&PF is funded to prepare a Reconnaissance Study and perform masterplan studies. No funding for construction has been identified. |
| Nome Council Road | | | FHWA ER funded project will not permanently protect the airport from erosion damage. Additional needs include grade raises/slope protection. |
| | | | |

**Alaska DOT&PF - Northern Region - Erosion Control Projects –
Used to Identify Communities Potentially Impacted by Climate Change
Updated 12/3/2008**

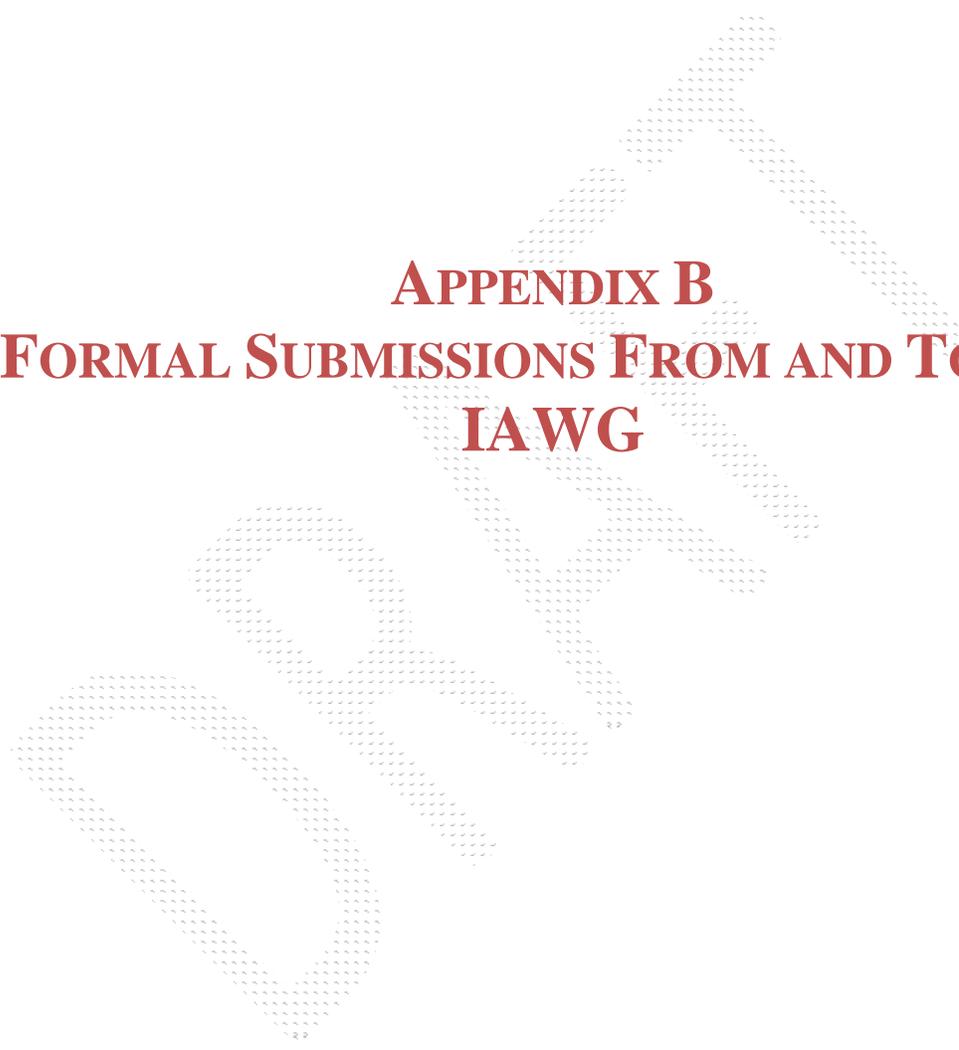
| <i>Current Design Projects</i> | Funding Source | Project # | Description |
|--|-----------------------|------------------|---|
| <i>Projects Recently Completed</i> | | | |
| Koyukuk Airport Improvements | | | Completed Airport Improvements to increase airport elevation above 100 year flood levels. |
| Shaktoolik Airport Permanent Repairs | | | Completed Airport Repairs to the Safety Area and Nav Aids due to the 2005 Bering Sea Storm flooding. |
| Unalakleet Beach Road Permanent Repairs | | | Constructed repairs and a new hardened rock structure along the Beach Road that was damaged in the 2005 Bering Sea Storm. |
| Solomon and Safety Sound Waysides Permanent Repairs | | | 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. |

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

| Number | Lead Agency(s) | CWPP Name | CWPP Status | Estimated Cost | Communities included in CWPP |
|---------------|-----------------------|---------------------------------------|--------------------|-----------------------|--|
| 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

| Number | Lead Agency(s) | CWPP Name | CWPP Status | Estimated Cost | Communities included in CWPP |
|---------------|-----------------------|--------------------------------|--------------------|-----------------------|---------------------------------------|
| 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



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 Cphen 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 Hofman 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 Diomedea;
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 – Metavik.

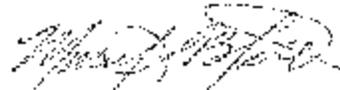


STATE OF ALASKA
DEPARTMENT OF
COMMERCE
COMMUNITY AND
ECONOMIC DEVELOPMENT
Office of the Commissioner

Michael L. Black, Governor
Paula J. Danvers, 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.

Sincerely,



Michael L. Black
Deputy Commissioner

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

CAPT Steven R. Bamann
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 extreme 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;
- Base-line 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 geomorphological trends related to active layer detachments, mass wasting, and sloughing;
- Avalanche timing, prevalence, and trends;
- Socio-economic costs 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. Frazee
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

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 “transitional 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.

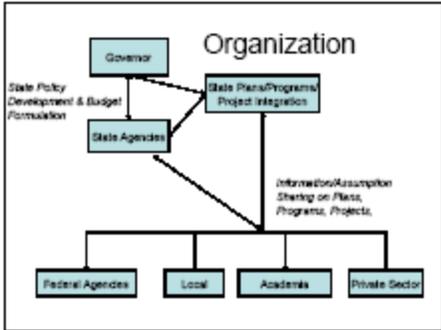
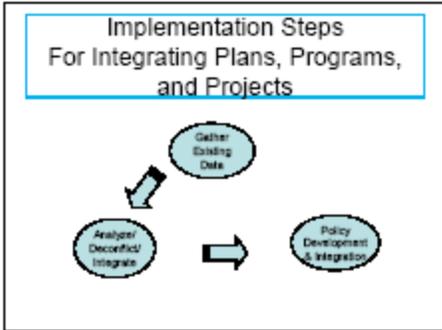
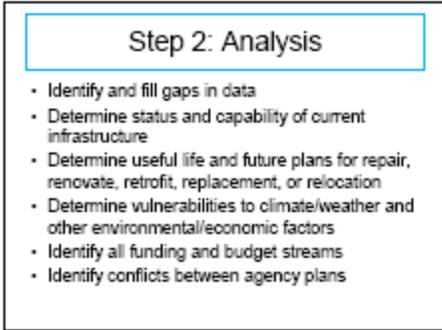
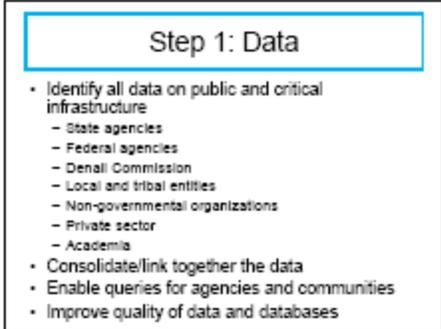
COASTAL

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
To 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:

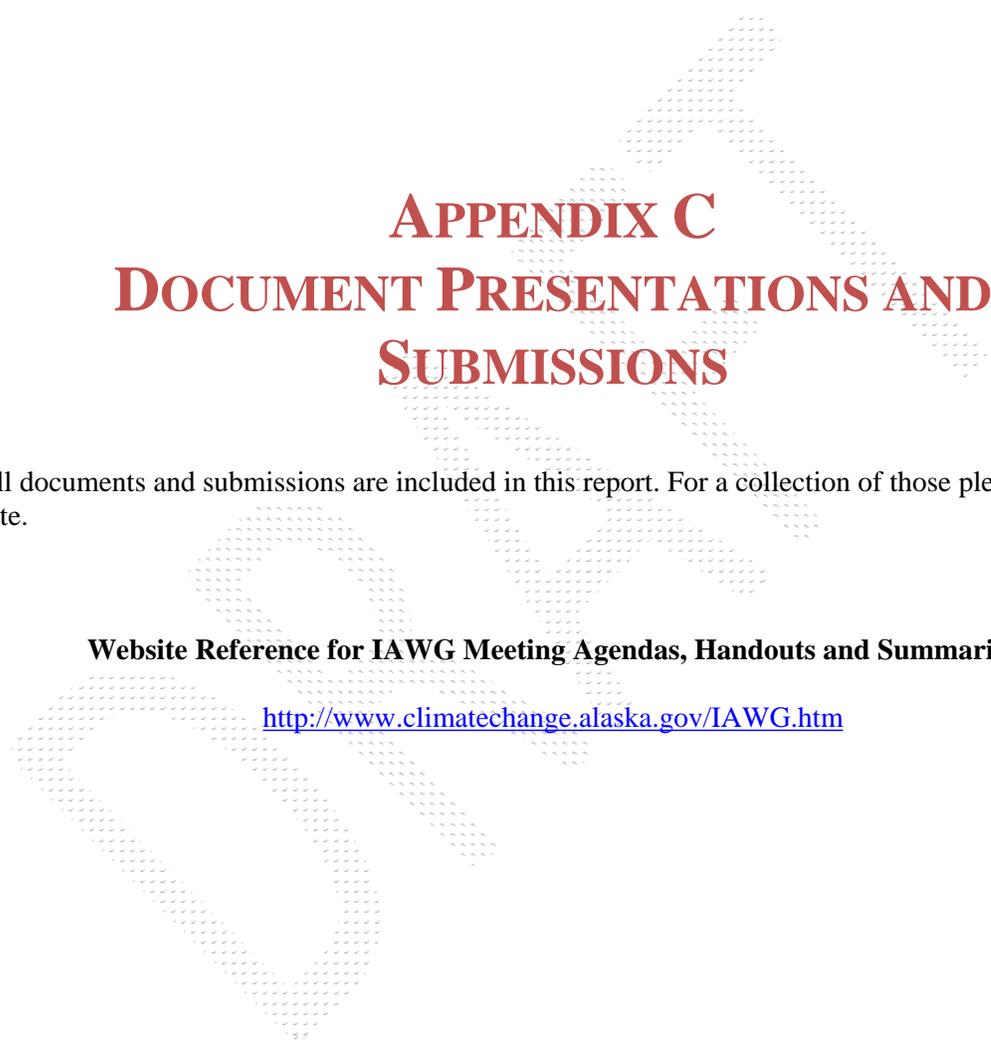
- Regular preventative maintenance efforts can substantially reduce risks, save lives and property, and reduce full replacement costs and can extend the life of investment for 50 or more years.
- Reducing the design and construction costs of coastal structures by employing risk, life-cycle, and reliability 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

Not all documents and submissions are included in this report. For a collection of those please go to the website.

Website Reference for IAWG Meeting Agendas, Handouts and Summaries

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

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/

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 your 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.

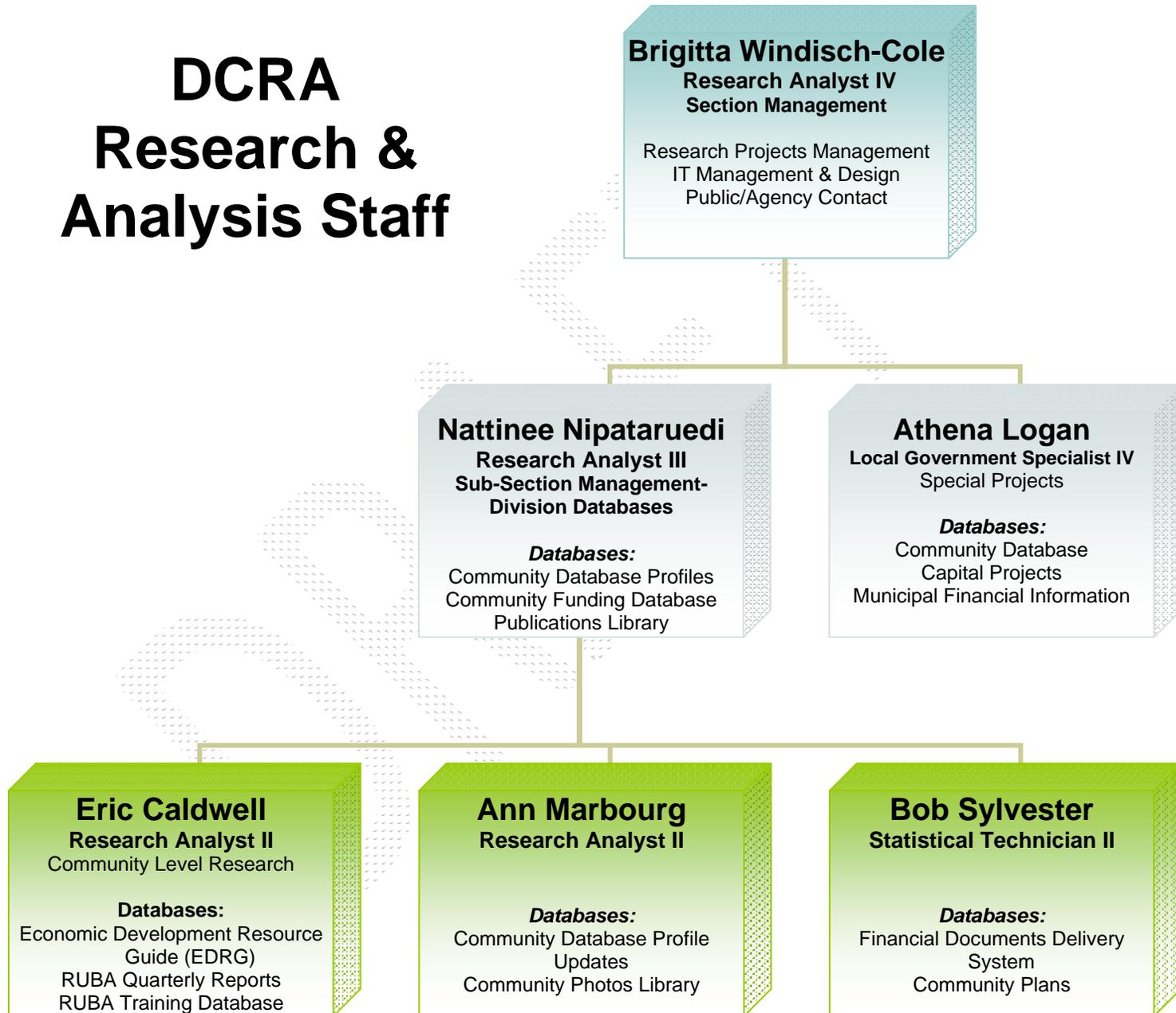
Community Funding Database – contains information on past and current funding to communities administered by the Division of Community and Regional Affairs, such as Mini-Grants, CDBG, Legislative Grant, etc. **(Note: this does not include any projects that were funded through another Department or Division)**

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



CIAP Handouts from 12-22???

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.alaska.gov) 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, Newtok Co-Chair Relocation Committee
David Albert, Newtok IGAP Coordinator

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

Esther 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

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 Sookiyak, **Shaktoolik ???**
Toby Anungazuk, Jr., Golovin
Jack Fagerstrom, Golovin

Public and Agency Participants

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

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

Joel Scheraga (US EPA, Director Global Change Research)
Dan White (UAF)
David Kang (DHS&EM)
Andy Jones (DHS&EM)

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

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

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

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

Rod Combellick (DNR- DGGS)
Deanna Stevens (DNR -DGGS)
Sylvia Kreel (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)
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 Consulting Groups

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

Facilitator

Margaret (Meg) King (MJ King & Associates)

IAWG Meeting Schedule and Topics: 2008-09

| | |
|-------------------|---|
| 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 |
| | Homework – Identify Community Projects in next 12 – 18 months |
| | Homework - Identify new priority Communities in peril (beyond the 6) |
| | CIAP Presentation (S. Kreeel – 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 | Final 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 |