

**Geologic Hazards Associated with Climate Change Phase 1 FY2009 Request: \$330,000**  
**Reference No: 45257**

**AP/AL:** Appropriation **Project Type:** Planning  
**Category:** Natural Resources  
**Location:** Statewide **Contact:** Leta Simons  
**House District:** Statewide (HD 1-40) **Contact Phone:** (907)465-2400  
**Estimated Project Dates:** 07/01/2008 - 06/30/2012

**Brief Summary and Statement of Need:**

DGGS proposes a focused effort to prioritize, map, and publish geologic-hazards information related to climate change that will be useful for planning, mitigation, and emergency response. Products would include maps showing characteristics such as permafrost-rich ground, potentially unstable slopes, shores prone to erosion, and areas at risk for flooding. The project addresses the DGGS statutory mission (AS 41.08.020) to determine "...the potential geologic hazards to buildings, roads, bridges, and other installations and structures," and the division's target end result to "provide timely delivery of geological and geophysical information to support...pre-disaster hazard mitigation for continued economic growth."

<b>Funding:</b>	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	Total
Gen Fund	\$330,000	\$350,000	\$350,000	\$350,000			\$1,380,000
<b>Total:</b>	\$330,000	\$350,000	\$350,000	\$350,000	\$0	\$0	\$1,380,000

<input type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input checked="" type="checkbox"/> Phased - new	<input type="checkbox"/> Phased - underway	<input type="checkbox"/> On-Going
0% = Minimum State Match % Required		<input type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill	

**Operating & Maintenance Costs:**

	<u>Amount</u>	<u>Staff</u>
Project Development:	0	0
Ongoing Operating:	0	0
One-Time Startup:	0	
<b>Totals:</b>	<b>0</b>	<b>0</b>

**Additional Information / Prior Funding History:**

New Project - No Prior History

**Project Description/Justification:**

Alaska's high latitude makes it particularly sensitive to the effects of a changing global climate. This sensitivity has led such widely-read national publications as USA Today to call Alaska the 'poster state' for climate concerns. These climate changes will have a direct effect on Alaskan communities and infrastructure, as well as on the livelihoods and lifestyles of Alaskan citizens, through increased geological hazards such as coastal and riverbank erosion, flooding, and thawing permafrost. Studies have shown that permafrost near the current southern margin of its extent is degrading, and that a northward shift of hundreds of kilometers is anticipated in this boundary if climatic warming trends continue. In recognition of the need to begin preparing for these changes, the governor has already established a sub-cabinet to develop a climate change strategy for Alaska. It is important that the State preserve the health and safety of Alaska's people by being prepared for potential emergency situations resulting from geologic hazards that are affected or amplified by climate change, and to perform the necessary sound science to identify high risk areas where proactive mitigation efforts will be needed and useful. This new data will also be critical to identify areas where design structure and proper, informed planning can alleviate the need for future mitigation.

As early as 1998, the Bering Sea Impact Study (BESIS) evaluated the economic impact and consequences of global climate change on Alaska's infrastructure as part of the U.S. National Assessment and concluded that "much of the damage to infrastructure ... —roads, transportation, etc.—could be avoided through adequate planning and public policy."

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Infrastructure includes not only roads, air strips, railroads, and communication lines, but also all built and engineered structures within the state such as the multi-billion oil-related construction on the North Slope and the buildings and facilities that comprise local communities. Infrastructure is costly to construct and, since it can be damaged by natural and man-made processes, it must be maintained in order to function properly. Infrastructure is critical to the state economy, and the economic consequences of infrastructure failure are immense.

The Division of Geological and Geophysical Surveys (DGGS) is proposing a focused effort to prioritize, map, and publish geologic-hazards information that will be used for proactive planning, mitigation, and emergency response in high-risk communities and developing areas. This effort will be performed in collaboration with relevant outside organizations that may include the University of Alaska Department of Mining and Geological Engineering, the Federal Emergency Management Agency (FEMA), the Alaska Coastal and Ocean Management Plan (ACMP), and the U.S. Army Corps of Engineers (COE), and will provide valuable information to allow planners and design engineers to minimize the economic impacts and public safety risks associated with geologic hazards.

Existing geologic-hazards evaluations for Alaska are very sparse and/or incomplete, and any assessment of hazard potential will require substantial new geologic mapping and targeted study. This is an immense undertaking for a state the size of Alaska, and a key element of the project will be to prioritize areas based on their likelihood of imminent risk from climate-related hazards. This prioritization will facilitate a systemized and efficient approach to achieving the ultimate goal of a statewide hazards assessment of high-risk communities.

Phase I of the proposed project (year 1) will include project planning, needs assessment, prioritization of communities in consultation with appropriate agencies and local governments, data gathering from published sources, and mapping in one or more communities. Phase II (years 2 through 4) will include publication of Year 1 map products, and mapping and publication of map products for additional selected communities according to the established prioritization criteria.

Staffing of this project will include a DGGS project manager, one or more additional existing DGGS geologists (part time), and a student intern. The project will make use of contract geologists as needed from the private sector and University of Alaska faculty from the departments of Geology and Geophysics, and Mining and Geological Engineering.

DGGS will collect the necessary field data to produce and publish peer-reviewed surficial and geologic-hazards maps and reports of high-risk Alaskan communities, prioritized in consultation with ACMP staff and coastal districts, FEMA, COE, and local governments. Maps may include proposed community relocation sites. Mapping will be completed at local and/or regional scales as needed to address specific local problems and to understand and evaluate the larger geologic context. The geologic-hazards maps will be published in digital GIS format in conformance with national standards and will delineate areas where potential natural hazards such as erosion, slope instability, flooding, and thawing permafrost should be considered at a more detailed level to fully evaluate risk for any given use.

The proposed scope of this project is based in part on the 2004 report of the U.S. General Accounting Office (GAO), which concluded that 184 of 213 Alaskan communities were at some level of risk from flooding and erosion. Of these communities, approximately 139 are in areas affected by permafrost. Using a conservative estimate that one-quarter of the communities may be at the highest risk from climate-related effects, we project that up to 45 communities may be in need of near-term geologic-hazards evaluation. Many of these communities have few residents, so we will maximize the value of State funds by initially targeting those with the highest populations. We anticipate being able to assess 2-3 communities during the first year as we develop a working methodology, and will then apply this methodology to assessing additional communities during ensuing project years according to priority. The cost of evaluating each community will vary widely according to location, size, and character of landscape. Once a working methodology has been established, however, we will be able to estimate such costs and thus project future work plans. Mapping efforts will continue through FY2010 and FY2011, with final analysis and publication of final community maps and reports to be completed in FY2012.

The project addresses the DGGS statutory mission (AS 41.08.020) to determine "...the potential geologic hazards to buildings, roads, bridges, and other installations and structures." It also addresses the division's target end result to "provide timely delivery of geological and geophysical information to support...pre-disaster hazard mitigation for continued economic growth."

**Why is this Project Needed Now?:**

Climate change is taking place now, and Alaskan communities are already feeling its effects in the form of flooding, erosion, and thawing permafrost. Shishmaref and Kivalina are just two of many communities faced with the challenge of either adapting to or mitigating these effects, or relocating to safer areas, and there are many more communities that will be dealing with similar issues in the future as the landscape continues to change. Rather than simply reacting to emergencies as they happen, the sooner these potential hazards are mapped and understood, the sooner planners can begin to prepare proactively for the possible consequences of change.

**Specific Spending Detail:**

<u>LINE ITEM</u>	<u>DOLLAR AMOUNT</u>	<u>DESCRIPTION (text)</u>
Personal Services	\$ 75,000	Partial funding for existing geologists and a student intern
Travel	\$ 45,000	Travel/per diem for field work, monitoring of geologic contracts
Services	\$ 200,000	Contract geologists, laboratory analyses, helicopters, computers
Commodities	\$ 10,000	Office supplies, field supplies

**Project Support:**

Alaska Coastal Management Program, U.S. Army Corps of Engineers, FEMA, University of Alaska, individual communities and citizens at risk due to climate-change geohazards, Department of Transportation and Public Facilities, environmental organizations, oil and gas industry, engineering community, geological consulting community, and Native corporations in the project areas.

**Project Opposition:**

No opposition anticipated.