

**Strategic and Critical Minerals Assessment**

**FY2015 Request: \$375,000**

**Reference No: 51052**

**AP/AL:** Appropriation

**Project Type:** Research / Studies / Planning

**Category:** Natural Resources

**Location:** Statewide

**House District:** Statewide (HD 1-40)

**Impact House District:** Statewide (HD 1-40)

**Contact:** Jean Davis

**Estimated Project Dates:** 07/01/2014 - 06/30/2019

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**Brief Summary and Statement of Need:**

This project provides geologic and geophysical data required to assess Alaska’s Strategic and Critical Minerals (SCM) potential. It will help the state address domestic need for these essential elements. Many areas of Alaska are geologically favorable for hosting SCMs, but the lack of basic geologic data deters mineral exploration in Alaska’s SCM-rich areas. Obtaining pertinent geologic data will encourage mineral exploration, advance the state’s knowledge of its mineral resources, promote informed state management decisions, and meets one of the division’s mission goals.

<b>Funding:</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>Total</b>
Gen Fund	\$375,000	\$1,000,000	\$2,500,000	\$500,000			\$4,375,000
<b>Total:</b>	<b>\$375,000</b>	<b>\$1,000,000</b>	<b>\$2,500,000</b>	<b>\$500,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,375,000</b>

<input type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input checked="" 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	0
<b>Totals:</b>	<b>0</b>	<b>0</b>

**Prior Funding History / Additional Information:**

Sec1 Ch16 SLA2013 P73 L5 18 \$2,500,000  
 Sec1 Ch17 SLA2012 P126 L4 160 \$2,730,000  
 Sec1 Ch5 SLA2011 P93 L12 46 \$498,000

**Project Description/Justification:**

**What is the issue or problem to be solved?**

Strategic and Critical Minerals (SCMs) are essential for our modern, technology based society. For example, platinum-group elements (PGEs) are extensively used in electronics and catalytic converters for vehicles. Rare Earth Elements (REEs) are necessary for military and high-technology applications, as well as clean/renewable-energy technologies such as wind turbines, solar panels, and batteries for electric vehicles. Current technology and system designs of U.S. defense systems depend heavily on REEs, for which there is a lack of effective non-REE substitutes.

The current U.S. Geological Survey (USGS) list of SCMs includes REEs, PGEs, antimony, barium, chromium, cobalt, fluorine, gallium, graphite, indium, niobium, rhenium, tantalum, titanium, tungsten, and yttrium. The U.S. is more than 70 percent dependent on imports for 13 of these 16 elements and elemental groups, and 100 percent dependent on imports for seven. This leaves the U.S. vulnerable to disruptions in the SCM supply chain, particularly from unreliable and adversarial trade

partners such as Russia and China. At least four bills are currently pending in the U.S. Congress to address the nationally important SCM issue. The Alaska Division of Geological and Geophysical Survey's (DGGS) Strategic and Critical Minerals Assessment project is in line with the Alaska Legislature's House Resolution (SLA10/House Resolve 11/HR16) urging Congress to advance development of new REE reserves in the U.S., and continued exploration for REE deposits in Alaska.

The DGGS Strategic and Critical Minerals Assessment project provides information critical for comprehensively assessing Alaska's statewide SCM potential. Many areas of Alaska are geologically permissible for hosting SCMs, but the lack of basic data statewide hinders evaluation of Alaska's SCM potential. Alaska has hundreds of known SCM occurrences, and millions of acres of selected or conveyed lands with the potential to contain SCMs, but the mineral-resource potential of these occurrences and lands is poorly understood; there has been no modern, systematic resource evaluation for SCMs in Alaska. The DGGS Strategic and Critical Minerals Assessment project is specifically designed to address this data and knowledge gap, as described below. By assessing Alaska's potential for SCMs, the State of Alaska will benefit from expanded mineral-industry investment in exploration and development and associated employment, better understand the natural resources of its lands for land-management purposes, and contribute to the nation's need for domestic supplies of these critically important elements.

**What is the scope of the project to be performed?**

This is the third year of a 5-year project to determine the potential of state lands for hosting SCM deposits. Planned work by DGGS throughout Alaska includes conducting geologic field work, obtaining appropriate data in the form of geophysical surveys, geologic mapping, geochemical analyses, and other scientific data, evaluating currently available and newly collected data, determining Alaska-specific SCM ore-deposit models, communicating the results of our work to the public, and publishing all of the data and results of our studies on the DGGS web site (free access).

**What results will be achieved or products produced?**

Mineral resources comprise a major part of Alaska's economic assets. The location and size of these resources are largely unknown, yet that knowledge is key to orderly development of the state and maintenance of a stable economy. The State of Alaska cannot efficiently manage or develop assets that are unknown and not quantified. The benefits of a thorough mineral-resource-information database include: 1) Enhancing community and local government economies and revenue opportunities; 2) Stimulating private-sector exploration and competitive development of Alaska's mineral resources; 3) Developing transportation corridors and infrastructures, which always requires cost justification based on prior knowledge of resources; and 4) Developing long-term decisions on management of state-interest lands.

Specifically, the Strategic and Critical Minerals Assessment project will achieve the following important end results:

- The State of Alaska will develop a better understanding of SCM resources on state lands to help with land-management decisions.
- Data generated will be useful for attracting mineral exploration companies to Alaska, which is competing with other countries to attract industry investment dollars.

The project will likely catalyze private sector investment and job generation at a level that far

surpasses the cost of the SCM Assessment project. Jobs for the Alaskan public are created both as a direct result of the project's execution and as a result of the knowledge generated during the project about Alaska's SCM resources. During execution of the project, immediate jobs are created in the private sector in the form of helicopter, logistical, lodging, analytical, and various small contracts. Jobs are also generated in the private sector from the typical increase in exploration dollars spent and in the number of mining claims staked. Significant job creation by the mineral exploration industry is expected, both immediately upon release of this project's data, and for many years into the future.

The true economic benefits in terms of future job generation or revenue for the state from this project are impossible to predict. Although mineral development is a high-risk enterprise, there is a good probability that one or more of the prospects identified with the help of data generated by this project will become major mines and return the amount of the state's investment many times over.

- Leverages private sector funds in the form of donations of private industry and native corporation data to support this project.
- Specific products produced include airborne geophysical surveys, geologic maps and reports, geochemical datasets to assist and attract mineral exploration, and numerous publications and presentations for public/industry outreach.
- Encourages exploration for SCMs, which is the first step in reestablishment of the U.S SCM supply chain, which may lead to creation of additional domestic jobs in the mining, refining, alloying, and technology manufacturing industries, and
- Reduces U.S. vulnerability to disruptions in SCM supply and enhances national security.

#### **How does this project contribute to the division and/or department mission?**

The Strategic and Critical Minerals Assessment project addresses the statutorily mandated mission of the DGGs to: "Conduct geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources...and...such other surveys and investigations as will advance the knowledge of the geology of the state" (AS 41.08.020). Conducting geologic field work, and obtaining relevant geologic data on SCMs in Alaska, will directly promote informed state management decisions, spur mineral industry exploration, and will advanced the state's knowledge of its geologic resources.

#### **Why is this project needed now – What is the impact of remaining status quo?**

The Strategic and Critical Minerals Assessment project is needed now to address U.S. domestic needs for these essential elements, which are often unexpectedly subject to supply restrictions. For example, up until December 2010, the U.S. had no functional domestic rare earth element (REE) supply chain. The U.S. was nearly 100 percent dependent on imports of REEs and REE-bearing manufactured goods, primarily from China, which controls the REE market. China is rapidly building its' high-technology industry to create domestic jobs, and is restricting export of REEs to reduce global competition and to leverage its supplies of REEs to force companies to move to China to have access to REEs. China's future export policies are unpredictable, but they are expected to favor China's domestic interests, needs, and economic development. In the next five years, the expected REE production from China (and other international sources) is predicted to be insufficient for worldwide demand. This presents national security concerns for the U.S., whose military heavily relies on REE-based technology, and diminishes its ability to be the world's high-technology leader. In recognition of the importance of REEs, in August of 2012, the U.S. Department of Defense

contracted a mineralogical and metallurgical study of the Bokan Mountain property in Southeast Alaska, which contains significant heavy-REE reserves.

In addition to REEs, similar reliance on imports and supply-demand imbalances are likely for the other SCMs as well. It takes many years for the mineral industry to explore for, identify, investigate, permit, and develop mineral resources. Without new SCM exploration and discoveries now, the U.S. may have difficulty obtaining the SCMs it needs in the near future. Alaska's statewide potential for hosting other SCM deposits is largely unknown and needs to be assessed.

The present lack of geologic knowledge about strategic and critical minerals in Alaska is a formidable impediment to long-range planning for both the mineral industry and the State of Alaska. The lack of SCM-resource knowledge discourages private-sector investment in Alaska, and instead favors capital allocation to other areas of the world where comprehensive mineral-resource assessments exist or are being actively generated. Major mining companies rely on government-supplied exploration-scale (1:63,360) geological maps, and geophysical and geochemical surveys, to design and implement their exploration programs. Mining companies expect at least this level of effort from any government that seriously desires mineral industry investment. If the industry invests its exploration dollars elsewhere, the state will lose job-generation opportunities and future state revenues from mine production.

**What accomplishments have been achieved with prior year funding?**

- Compiled Historic and Obtained New SCM-Related Data:
- Contracted for a 1,400-square-mile SCM-related airborne geophysical survey in south-central Alaska. Coordinated with mineral industry to leverage state funds; acquired additional square miles, paid for by industry, with agreement for future publication of this data by DGGs.
- Completed acquisition of 807-square miles of a 1,045-square-mile SCM-related airborne geophysical survey data in southwest Alaska (initiated in 2012; completed in 2013 due to weather).
- Conducted 2,600-square-miles of reconnaissance field checking, geochemical sampling, and gravity (geophysical) surveys in the Wrangellia Terrane, south-central Alaska, which is highly prospective for copper, nickel, and PGEs. Identified area for detailed geologic mapping in FY2014.
- Compiled historic geochemical data for U.S. Bureau of Mines samples from Alaska (ongoing).
- Initiated cooperative project with USGS to geochemically reanalyze USGS samples from Alaska in FY2014, and to conduct a statewide evaluation of Alaska's SCMs potential.
- Accepted 2 industry donations of SCM-related data, and facilitating publication of this data (on-going).
- SCM Collaborations, Publications, and Public Outreach:
- Developed cooperative projects with the USGS and University of Alaska Fairbanks.
- Supported a graduate student's REE-related research on state-selected land prospective for SCM in Interior Alaska (on-going).
- Gave presentation at the Strategic and Critical Minerals Summit in Fairbanks, November 30, 2012.
- Disseminated information on Alaska's SCM potential in presentations and at the DGGs booth at numerous state, national, and international conferences.
- Provided progress briefings, as requested, to the DNR Commissioner's and Governor's

offices.

- Published 238-square miles of a 1,045-square-mile SCM-related geophysical survey in southwest Alaska.
- Published 2 new geochemical databases, related to a 3,500-square-mile field project to evaluate the REE potential of Interior Alaska, through the DGGs WebGeochem digital database, enabling free, public online distribution.

**Specific Spending Detail:**

<u>LINE ITEM</u>	<u>DOLLAR AMOUNT</u>	<u>DESCRIPTION</u>
Personal Services	\$ 190,000	Partial support for existing permanent staff, and full support for non-permanent employees (per year)
Travel	\$ 2,000	Field work and meetings (per year)
Services	\$ 155,000	Field work and contract services; contract staff, geophysical surveys, field logistical services, scientific analyses, misc. contracts (per year)
Commodities	\$ 28,000	Helicopter fuel, field and office supplies (per year) and computers, software licenses
<b>Project Total</b>	<b>\$375,000</b>	

**Personal Services Detail:**

Number of new position(s) :  Type of Position(s): PFT   NP  NP

Number of existing position(s):  Type of Position(s): PFT   P  NP

- (10-2046) Geological Scientist I, Fairbanks (partial funding)
- (10-2083) Geological Scientist I, Fairbanks (partial funding)
- (10-2122) Geologist IV, Fairbanks (partial funding)
- (10-2008) Geologist III, Fairbanks (partial funding)
- (10-2064) Geologist III, Fairbanks (partial funding)
- (10-2224) Geologist V, Fairbanks (partial funding)
- (10-N12001) LTNP Geologist I, Fairbanks (partial funding)
- (10-N11030) LTNP Geologist I, Fairbanks (partial funding)
- (10-N13094) LTNP Geologist IV, Fairbanks (partial funding)