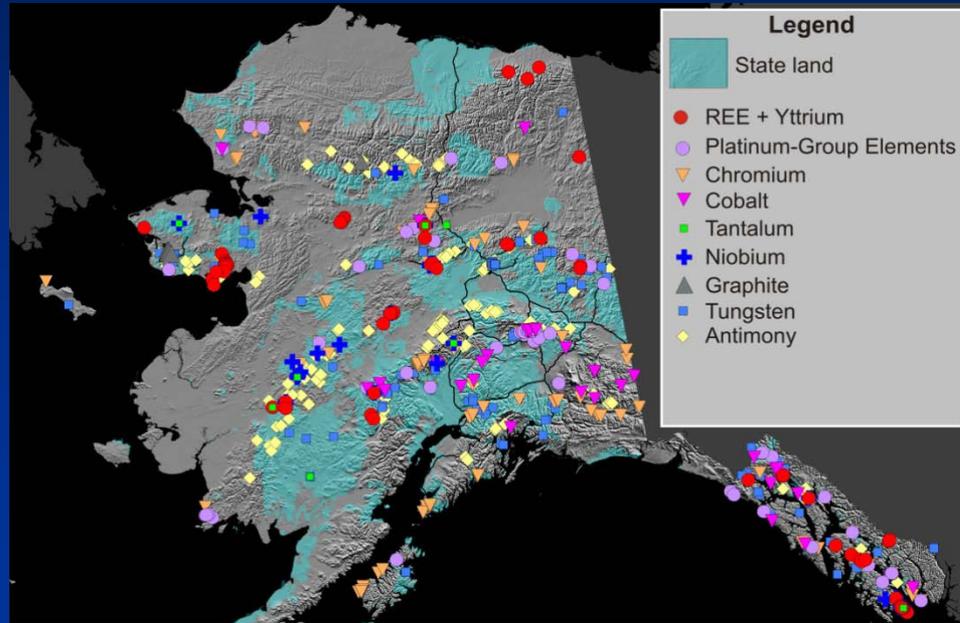


Department of Natural Resources
Division of Geological & Geophysical Surveys

Alaska Strategic & Critical Minerals Potential and Assessment



Bob Swenson

State Geologist & Director
Alaska Division of Geological
& Geophysical Surveys

Strategic & Critical Minerals
Summit

Fairbanks, AK 11/30/2012

Current USGS List of Strategic & Critical Minerals

USGS (Long 2009; Long and others 2010)

Antimony

Barite

Chromite

Cobalt

Fluorite

Gallium

Graphite

Indium

Platinum Group Elements (PGE)

Rare Earth Elements (REE)

Rhenium

Tantalum

Titanium

Tungsten

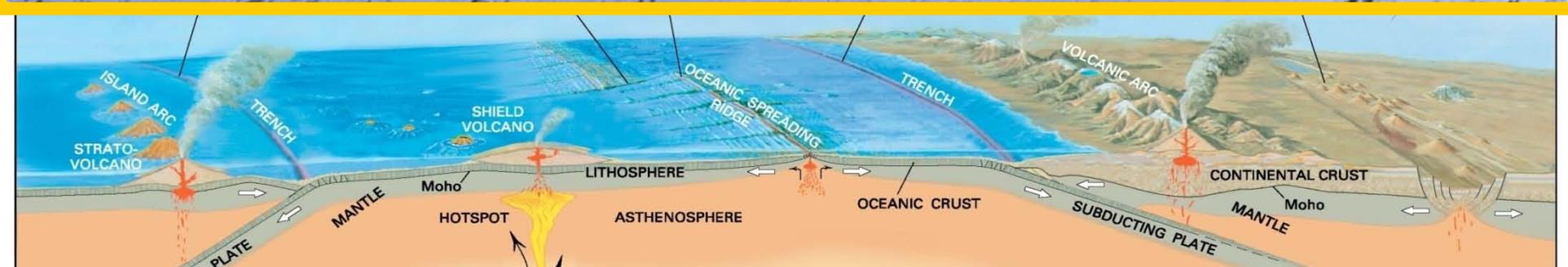
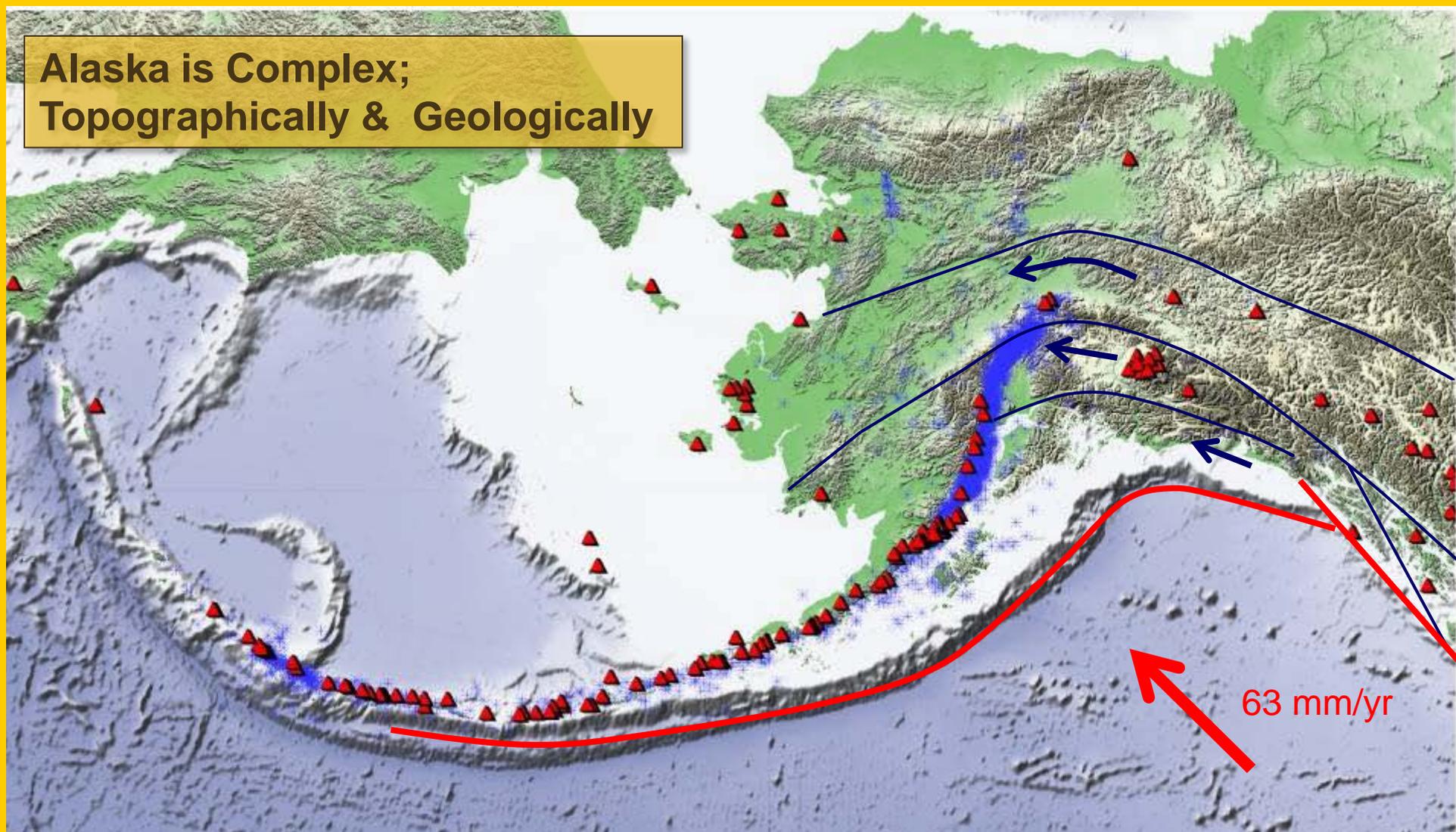
Yttrium

Niobium

- **This list will change over time**
- **Merely a subset of Alaska Mineral Potential**



Alaska is Complex; Topographically & Geologically



Geologic Terrains in Alaska

Regions of Primary Mineral Occurrence

Base Metals

- Cu, Pb, Zn, Mo
- ± Au, Ag,

Precious Metals

- Au, Ag
- ± Sb

Strategic Minerals

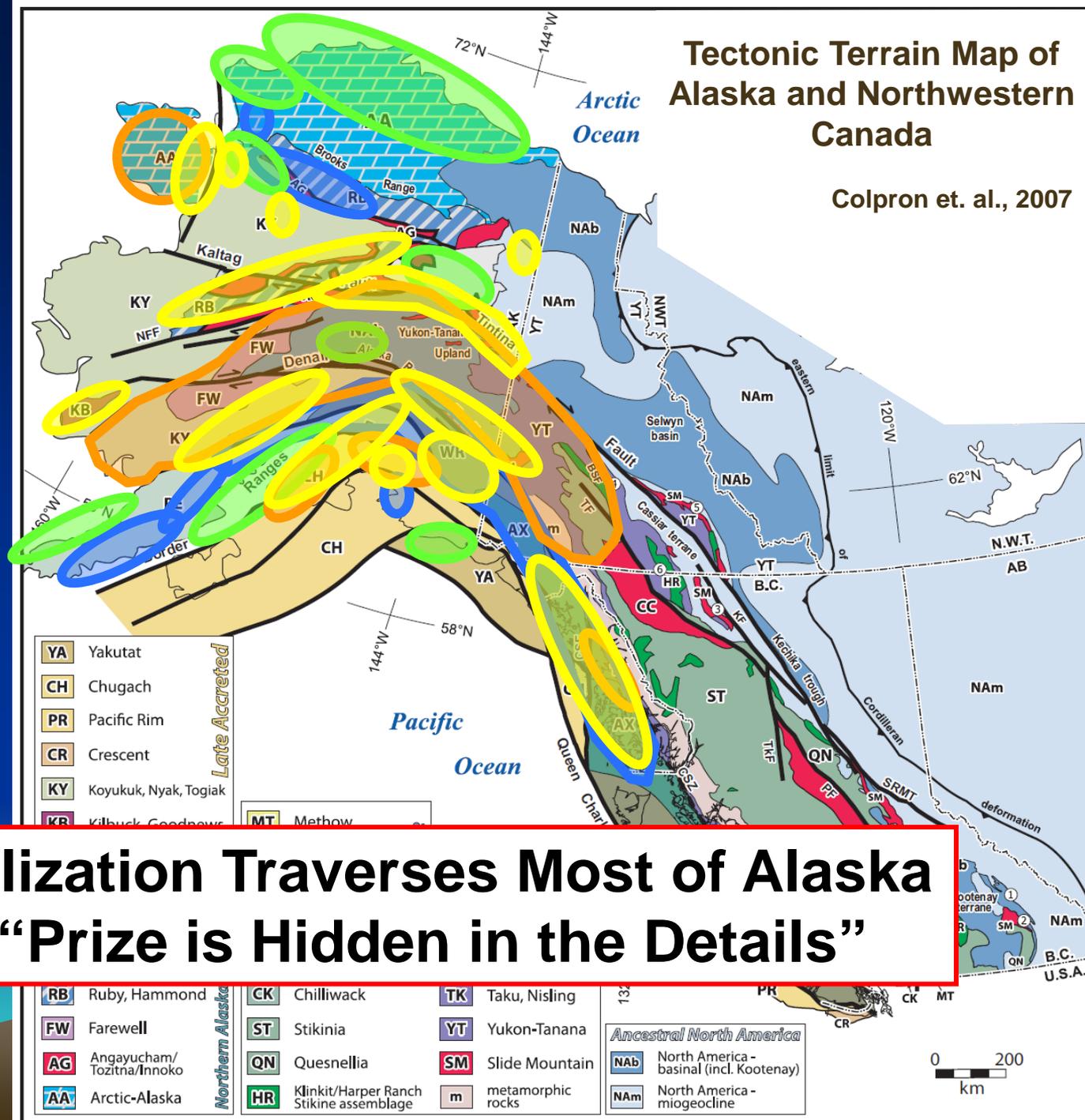
- PGE, REE, Graphite, In, Nb, Ta, Ge

Coal, Oil, and Gas

- Conventional & Unconventional Energy Resources

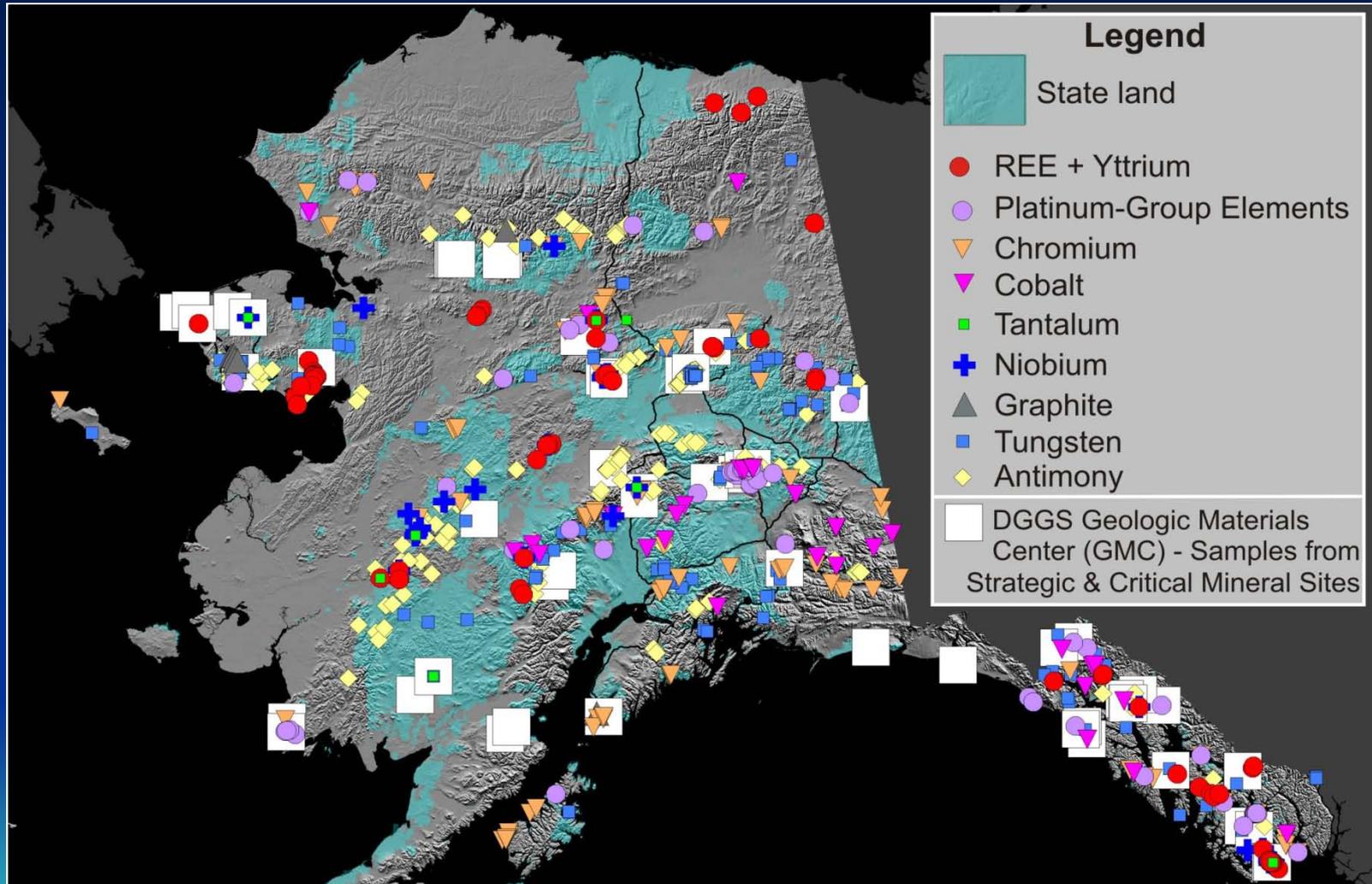
Tectonic Terrain Map of Alaska and Northwestern Canada

Colpron et. al., 2007

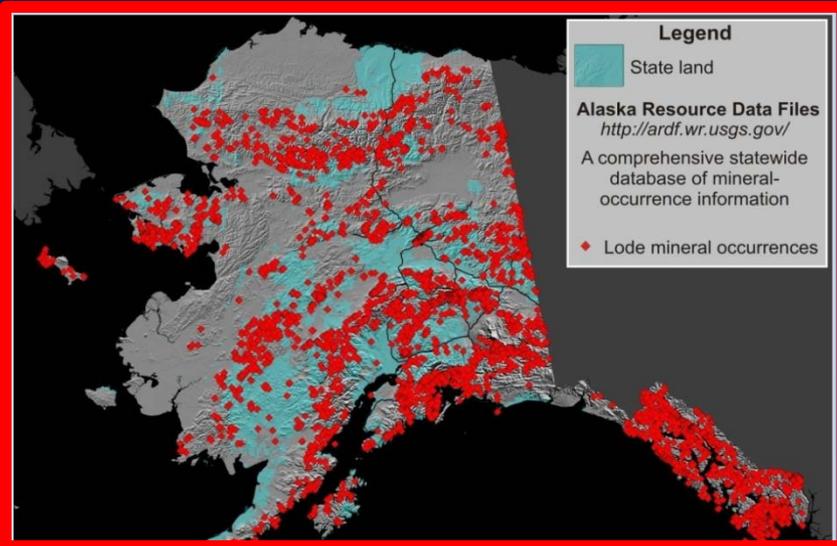


Mineralization Traverses Most of Alaska
The "Prize is Hidden in the Details"

Alaska's Strategic & Critical Minerals Assessment



Existing Data Sets and Studies



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AKGeology.info

This page provides a collection of multi-agency links pertaining to mineral exploration, geology, and land records in Alaska. [View complete list.](#)

- Land records
- Maps and publications
- Geology and data
- Libraries and archives
- Payments and compliance

Funding for the development of this page and many of the linked services was provided by the Federal Minerals Data and Information Rescue in Alaska (MDIRA) program. The primary objective of the MDIRA program was to ensure that all available Alaska minerals-related data are preserved in a safe and readily accessible format for potential users. In addition to this page, DGGS maintains several other MDIRA funded online data repositories.

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Alaska Geologic Data Index (AGDI)

gold

Search | More Options

Search Results

Showing 1000 | Displaying 2001 - 3000 of 7904 | Previous | 1 2 3 4 | Next | Sort by: Best Match | Print | Reset

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Publications Search

Browse

- DGGS** - Alaska Division of Geological & Geophysical Surveys reports, maps, and geospatial datasets
- MIRL** - A nearly comprehensive listing of publications released by the University of Alaska Fairbanks, Mineral Industry Research Laboratory
- USBM** - Selected U.S. Bureau of Mines reports. DGGS is actively accessioning this collection. New reports will be added as they become available to us.
- USGS** - Alaska related U.S. Geological Survey publications. The collection is not complete but includes most of the pertinent documents published prior to 2002.

Other search options

- Quadrangle
- WebGeochem: DGGS Geochemical Sample Analysis Search
- Guide to Geologic Hazards in Alaska

Advanced Search

The keyword search does not check the contents of a publication. Successful search results based on keywords are dependent upon the publication's associated keywords, which are indicated by the author. [Need HELP?](#)

Title

Author

Keyword(s)

Publication Number

Publication Year

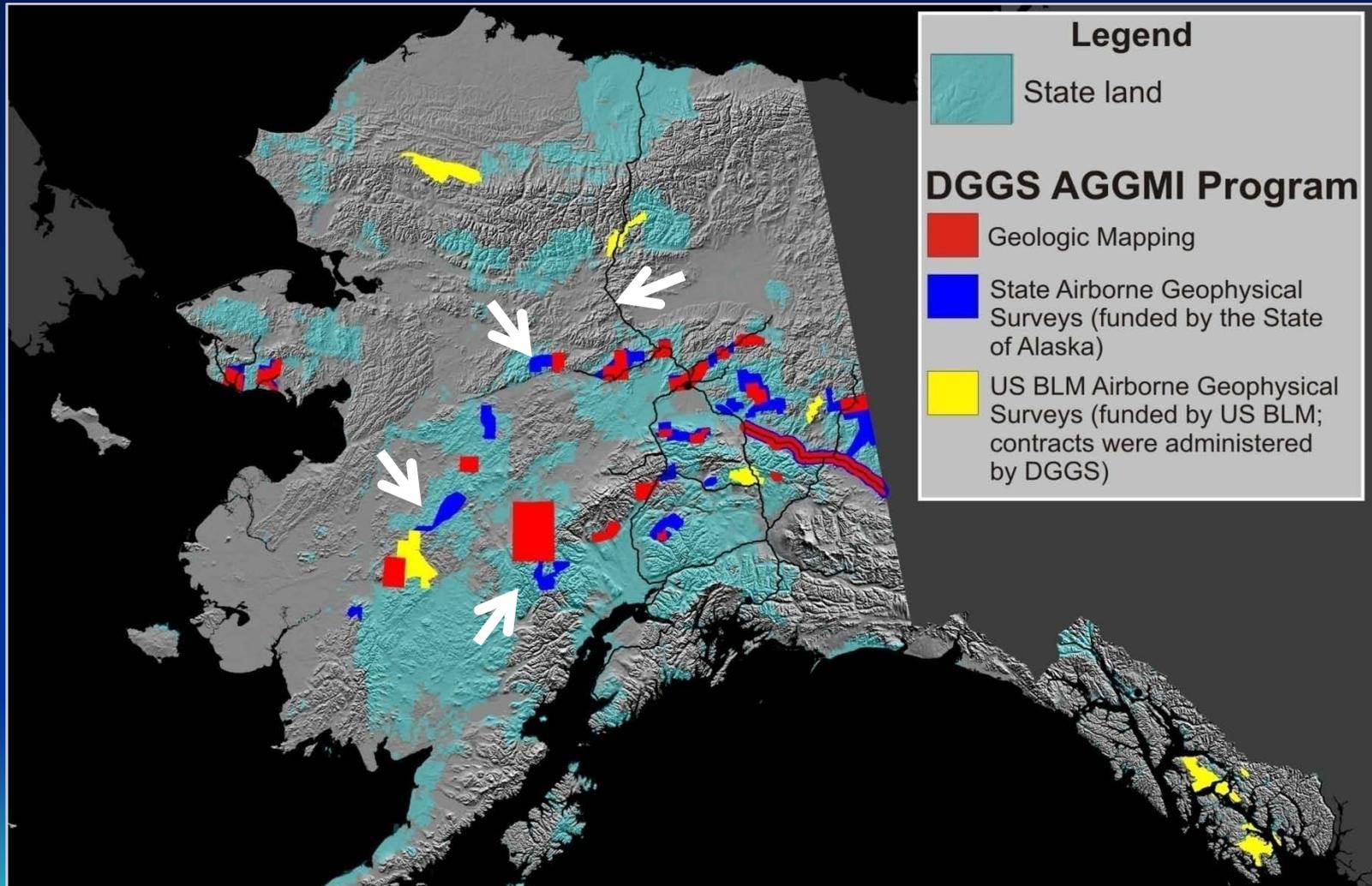
Keyword options

Quadrangle

Search Pubs | Reset Fields

From Work Performed by: DGGS, USGS, USBM, BLM, University, & Industry

DGGS Airborne Geophysical/Geological Mineral Inventory (AGGMI) Program:



New DGGS Farewell Geophysical Survey

Rare-Earth Elements

Mafic/Ultramafic-related Cu,
Ni, PGE

Epithermal/Hot Springs

Plutonic-related gold

-Hypabyssal

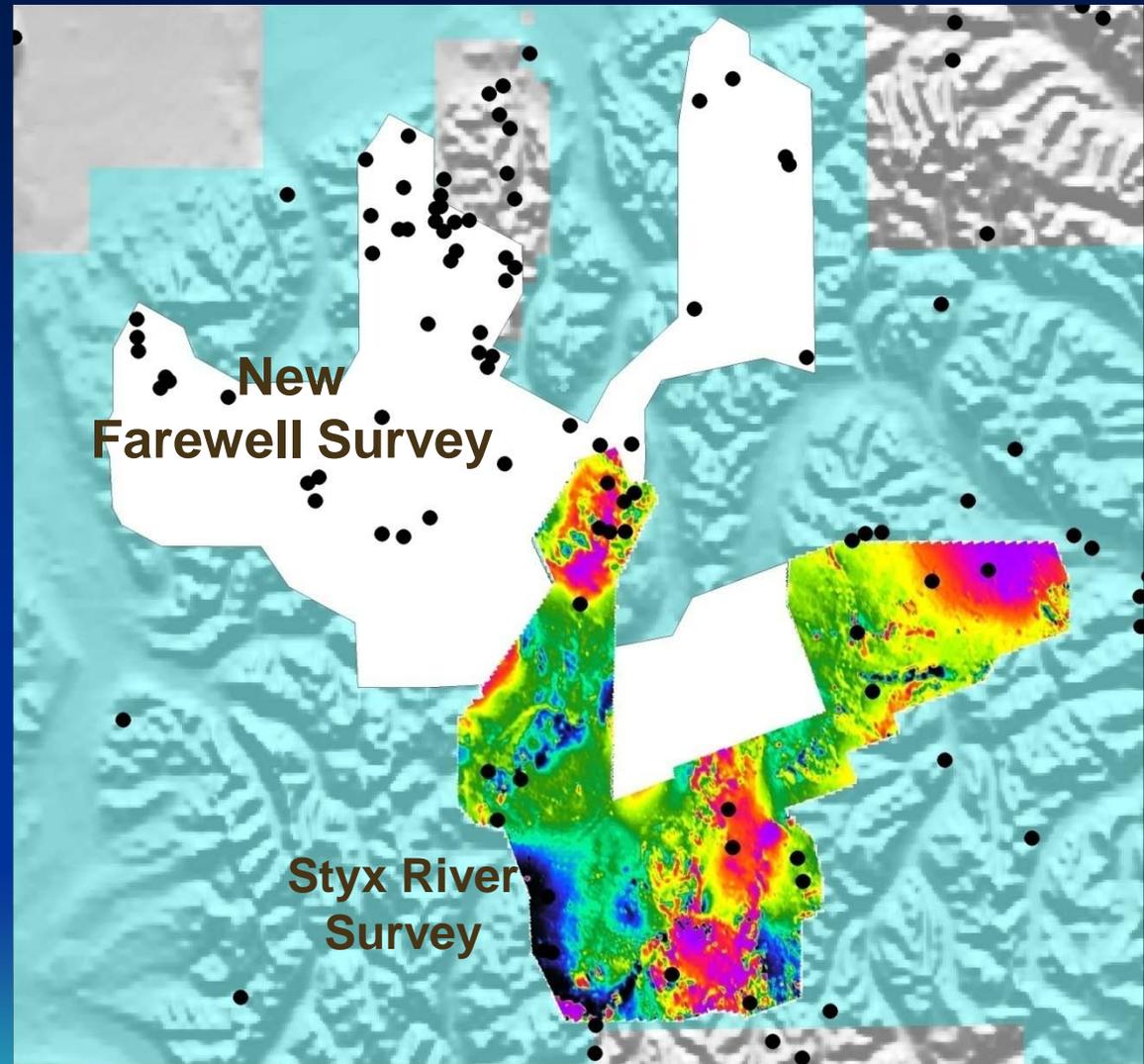
-Porphyry Cu \pm Mo \pm Au

-Skarn

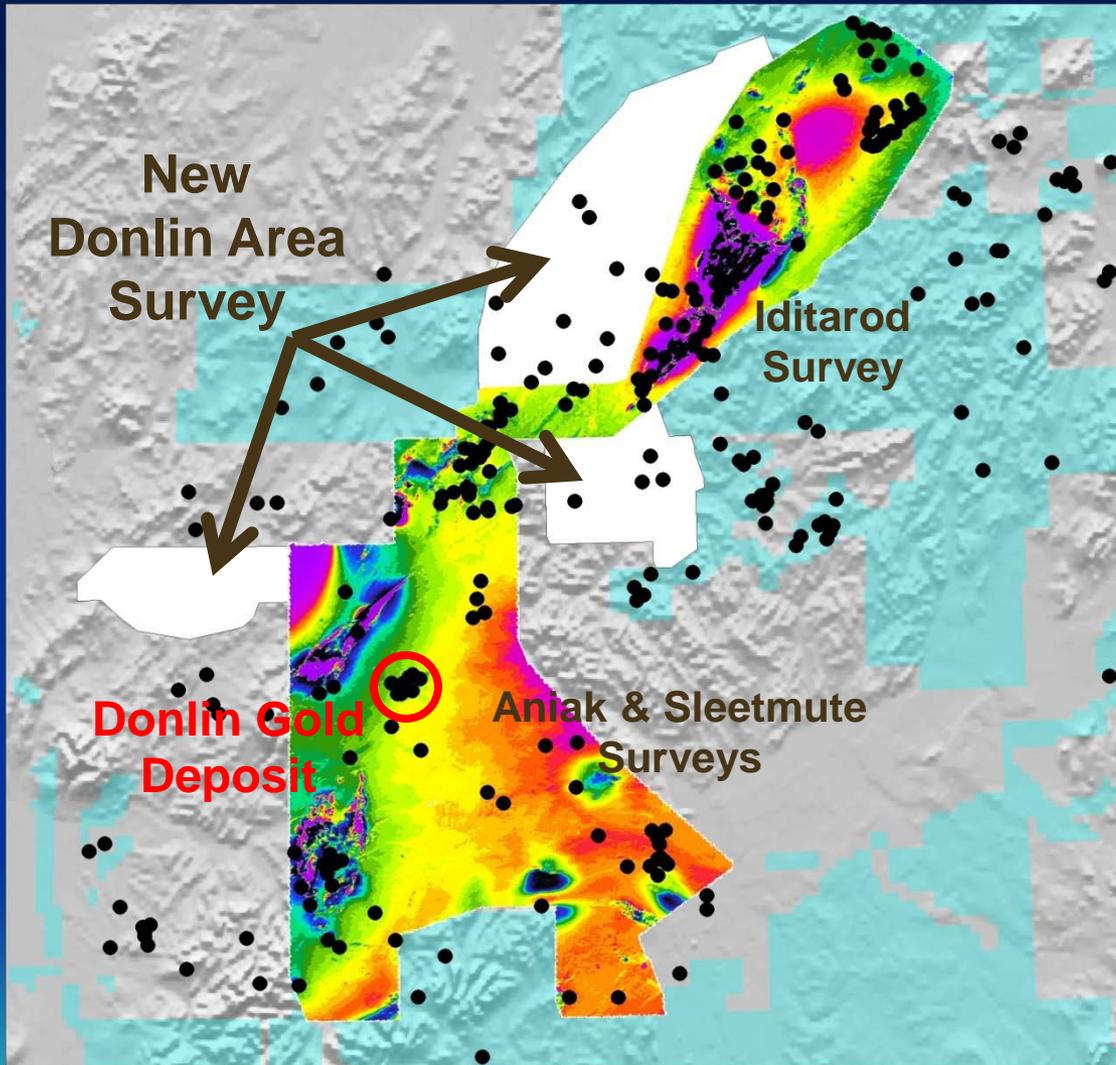
Polymetallic veins of
uncertain origin

Sediment-hosted base metals

Placer gold



New Donlin-Area Geophysical Survey



Epithermal/Hot Springs

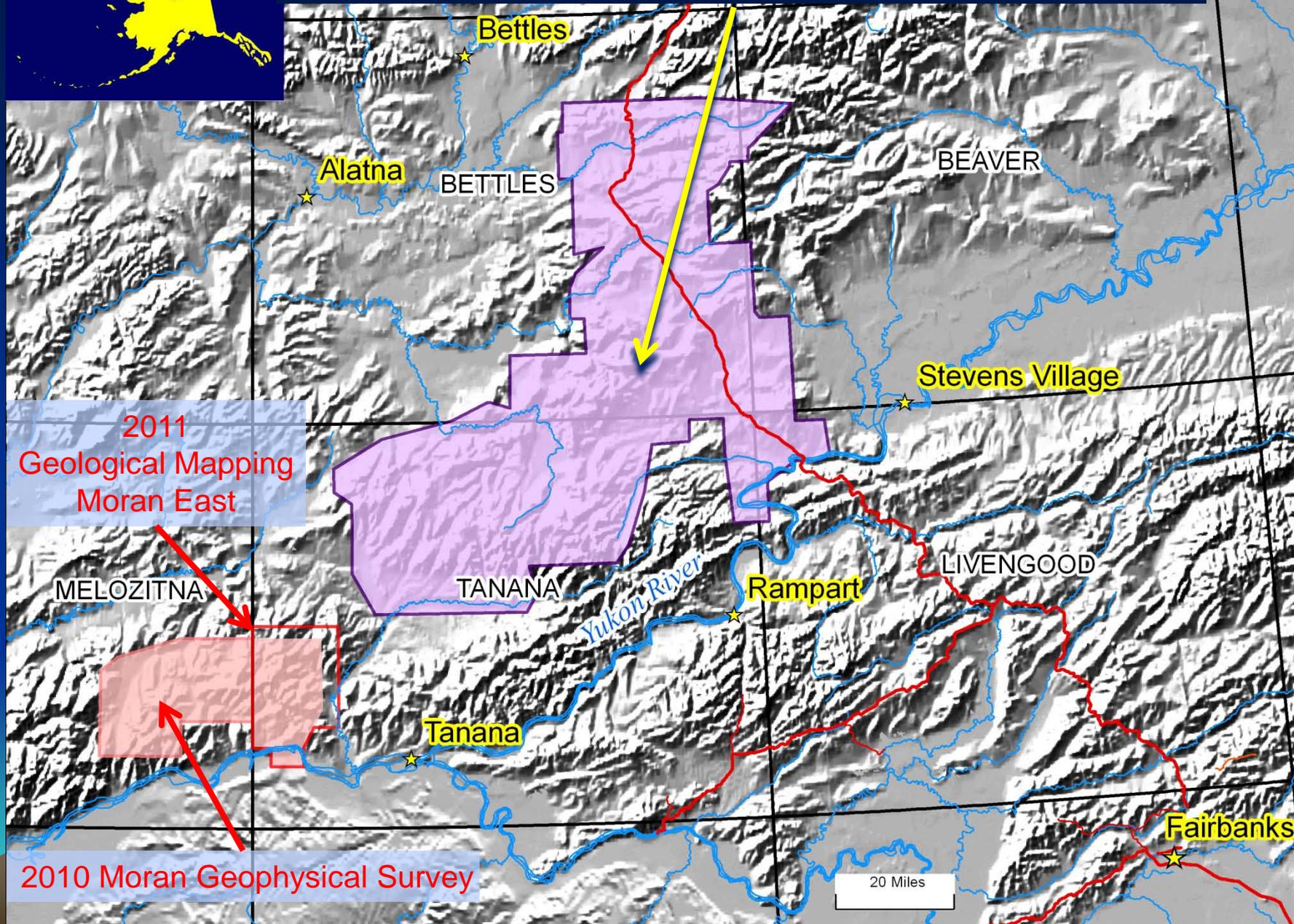
Plutonic-related gold
-Hypabyssal
-Plutonic
-Hornfels/Skarn

Polymetallic veins of uncertain origin

Mafic/Ultramafic-related Cr, Ni

Placer gold

Ray Mountains Assessment

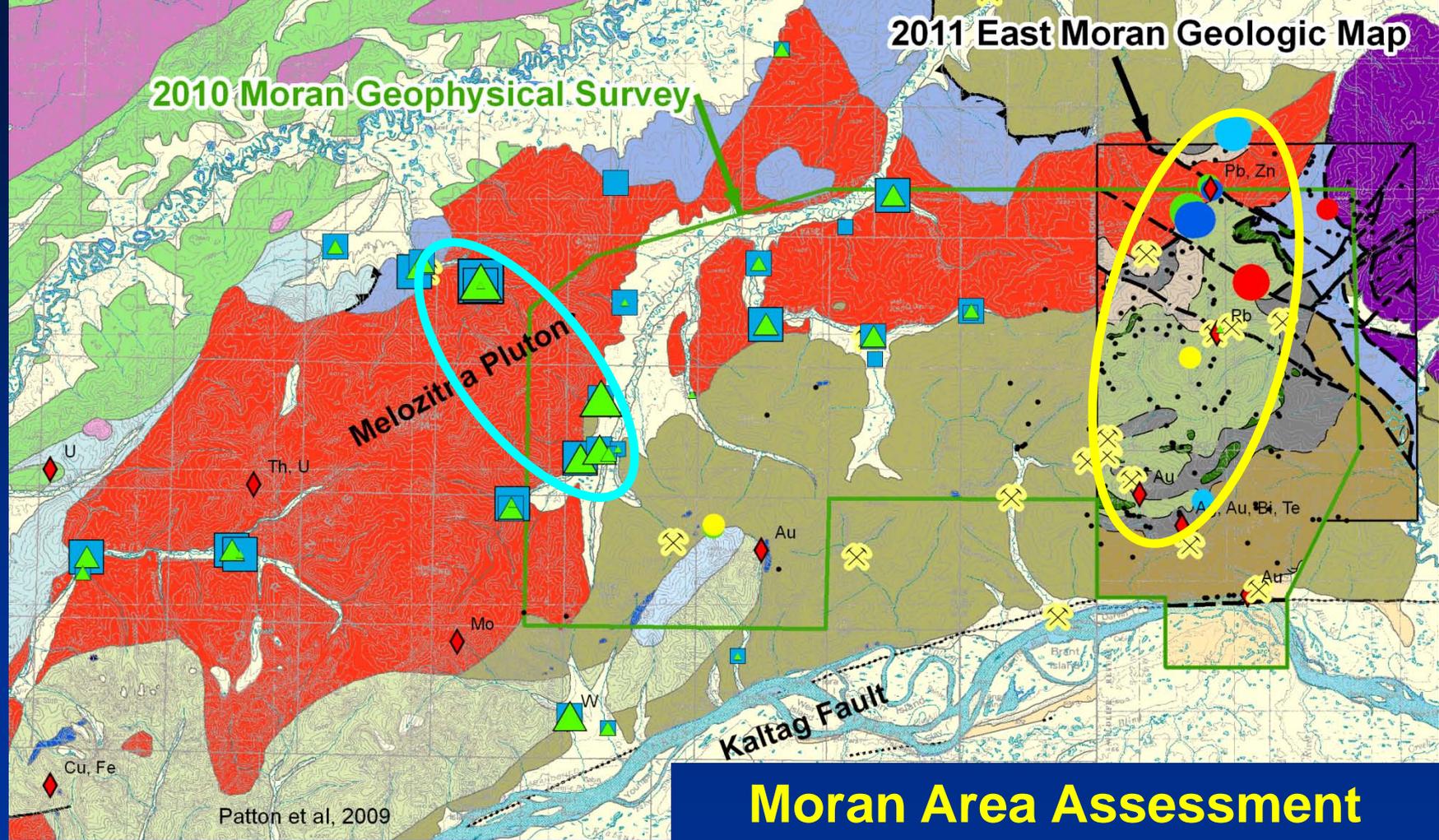


2011
Geological Mapping
Moran East

2010 Moran Geophysical Survey

2011 East Moran Geologic Map

2010 Moran Geophysical Survey



Patton et al, 2009

Moran Area Assessment

ARDF Mineral Localities	2011 West Moran REE Recon DGGs RDF 2012-3	2011 East Moran Rock Geochemistry DGGs RDF 2011- 4																														
<ul style="list-style-type: none"> ◆ Lode Occurrences ⊗ Placer Au ± Sn 	<table border="0"> <tr> <td>Total REE (ppm) Pan Concentrate</td> <td>Total REE (ppm) Stream Sediment</td> </tr> <tr> <td>▲ < 842</td> <td>■ < 130</td> </tr> <tr> <td>▲ 842 - 2422</td> <td>■ 130 - 367</td> </tr> <tr> <td>▲ 2422 - 3866</td> <td>■ 367 - 644</td> </tr> <tr> <td>▲ 3866 - 7727</td> <td>■ 644 - 1123</td> </tr> <tr> <td>▲ 7727 - 28850</td> <td>■ 1123 - 4141</td> </tr> </table>	Total REE (ppm) Pan Concentrate	Total REE (ppm) Stream Sediment	▲ < 842	■ < 130	▲ 842 - 2422	■ 130 - 367	▲ 2422 - 3866	■ 367 - 644	▲ 3866 - 7727	■ 644 - 1123	▲ 7727 - 28850	■ 1123 - 4141	<table border="0"> <tr> <td>Au (ppm)</td> <td>Sn (ppm)</td> <td>Pb (ppm)</td> </tr> <tr> <td>● 0.1 - 1.0</td> <td>● 101 - 500</td> <td>● 801 - 2300</td> </tr> <tr> <td>● 1.0 - 22.3</td> <td>● 501 - 743</td> <td>● 2301 - 8760</td> </tr> <tr> <td>As (ppm)</td> <td>W (ppm)</td> <td>Zn (ppm)</td> </tr> <tr> <td>● 1001 - 10000</td> <td>● 281 - 760</td> <td>● 1001 - 5000</td> </tr> <tr> <td>● 10000 - 18050</td> <td>● 761 - 8960</td> <td>● 5001 - 49700</td> </tr> </table>	Au (ppm)	Sn (ppm)	Pb (ppm)	● 0.1 - 1.0	● 101 - 500	● 801 - 2300	● 1.0 - 22.3	● 501 - 743	● 2301 - 8760	As (ppm)	W (ppm)	Zn (ppm)	● 1001 - 10000	● 281 - 760	● 1001 - 5000	● 10000 - 18050	● 761 - 8960	● 5001 - 49700
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● 1001 - 10000	● 281 - 760	● 1001 - 5000																														
● 10000 - 18050	● 761 - 8960	● 5001 - 49700																														

5 Miles

Ray Mountains Assessment



Total REE values -ppm

- 0 - 423
- ◆ 424 - 584
- ◆ 745 - 906
- ◆ 906 - 1067
- ◆ 1067 - 1700

Lead

Pb_ppm

- ▲ -1 - 676
- ▲ 677 - 2450
- ▲ 2451 - 5850
- ▲ 5851 - 13100
- ▲ 13101 - 23900

Zinc

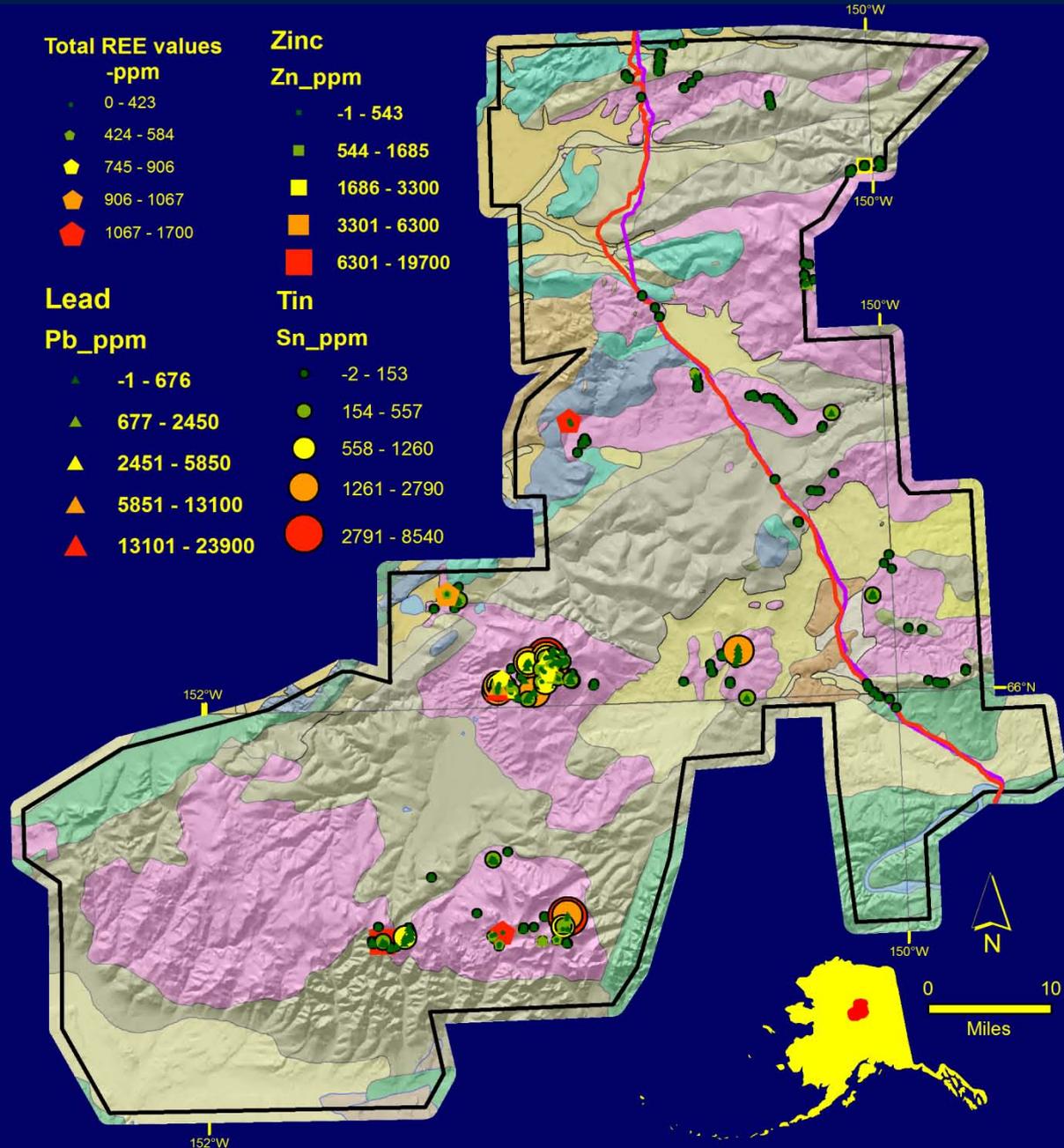
Zn_ppm

- -1 - 543
- 544 - 1685
- 1686 - 3300
- 3301 - 6300
- 6301 - 19700

Tin

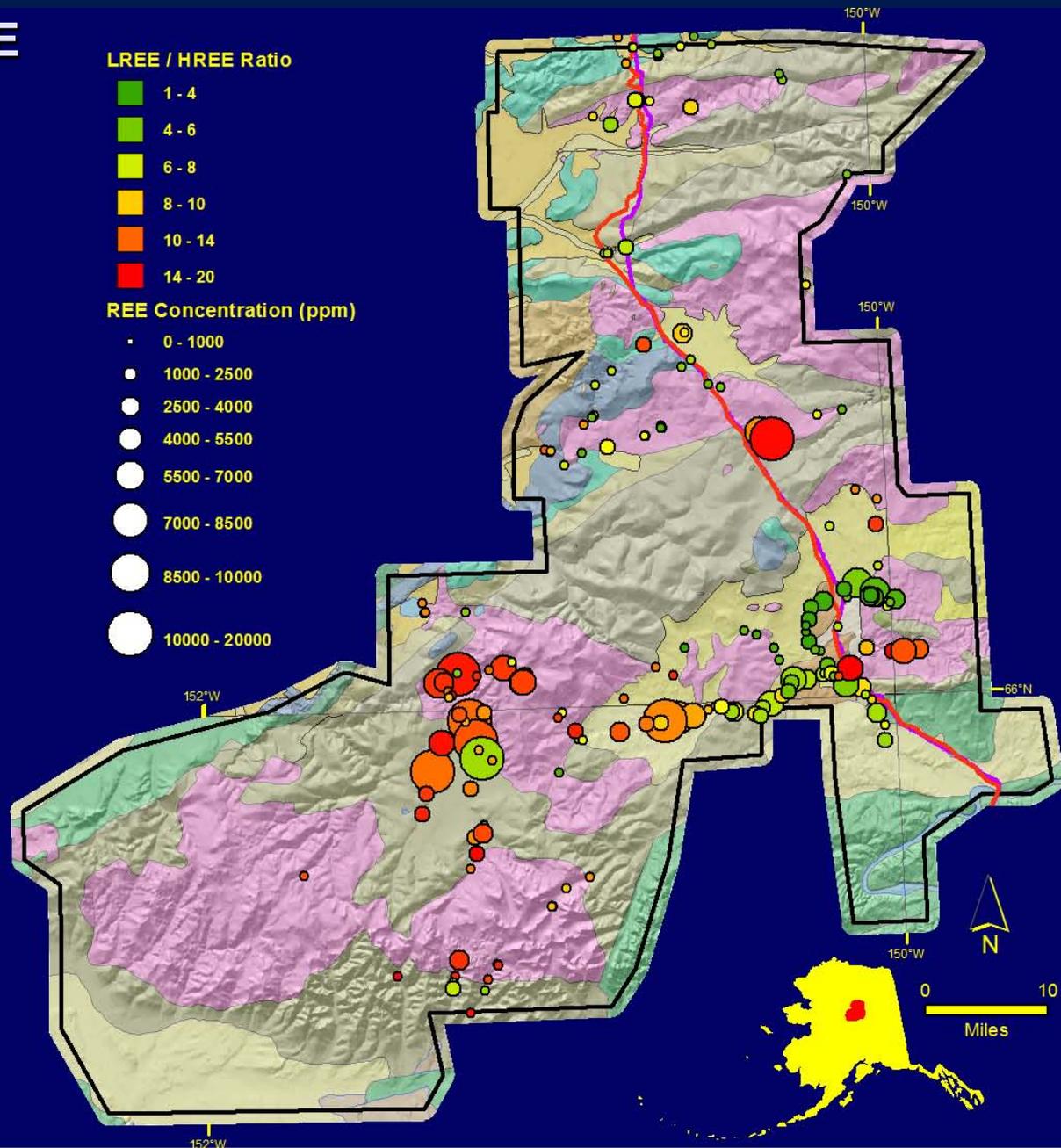
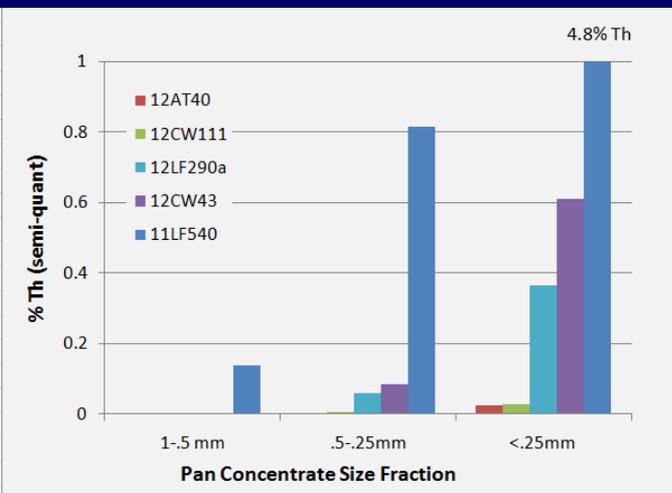
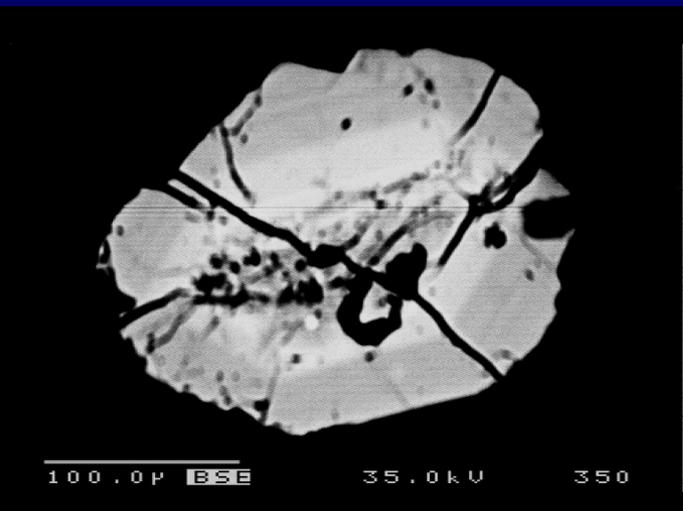
Sn_ppm

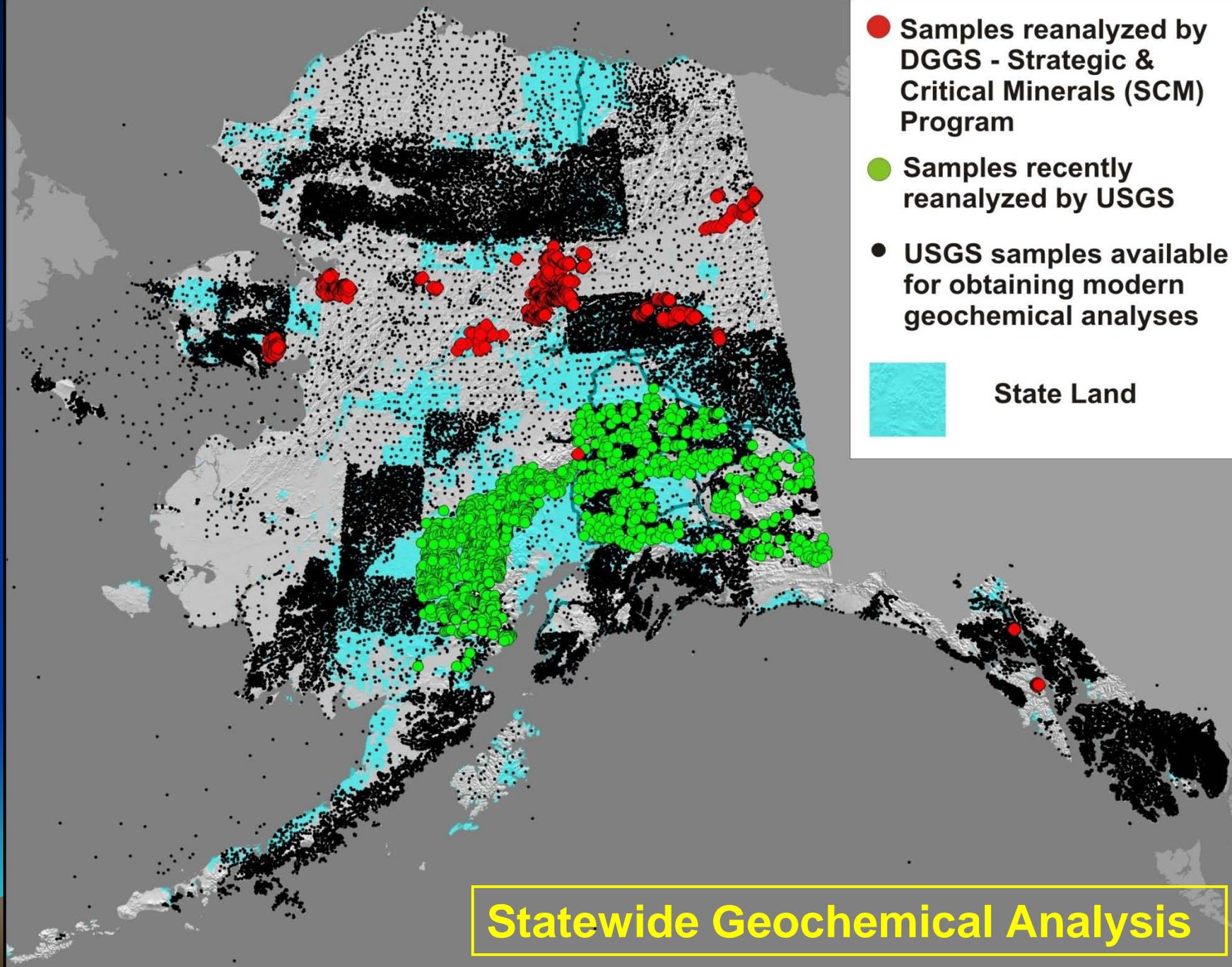
- -2 - 153
- 154 - 557
- 558 - 1260
- 1261 - 2790
- 2791 - 8540



Ray Mountains Assessment

Pan Concentrate -- REE





Strategic & Critical Minerals (SCM) Assessment

Summary of Assessment Milestones to date:

- 3,500-square-mile field project in the Ray Mountains-Dalton Highway
- 2,075-square-mile SCM-related airborne geophysical surveys
- Compiled historic geochemical data for more than 5,387 analyses
- Donations of 2 privately held SCM-related databases
- Modern geochemical analyses for 1,209 historic U.S.B.M samples
- Comprehensive geochemical sampling in the Western Moran area
 - Documented new gold-REE bearing stream drainages
- Discovered new lode gold occurrence near William Henry Bay, SE Alaska
- MOU with USGS for modern chemical analyses of sample databases
- Supporting graduate thesis work at UAF
- Evaluating State-selected land for SCM potential
- Scanning and making historic databases and reports available online



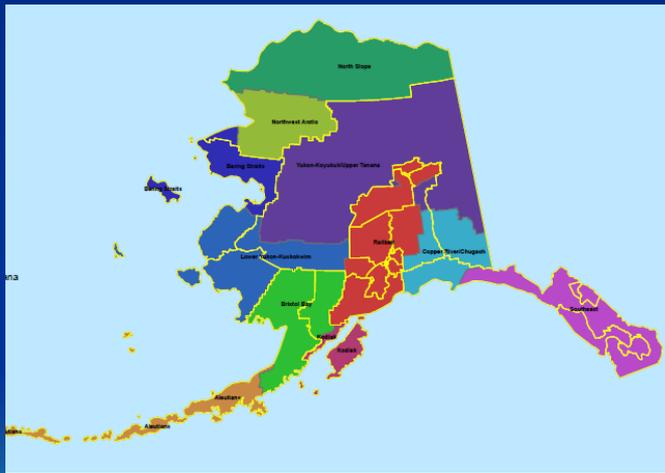
Strategic & Critical Minerals (SCM) Assessment

Future Work Plans:

- ✓ Continue focus in areas of mineral entry and highest potential
- ✓ Perform high resolution geologic mapping and geochemical sampling
- ✓ Acquire and distribute high-resolution geophysics
- ✓ Continue compiling digital database of all available information
- ✓ Finalize modern geochemical analyses of archived samples
- ✓ Publish results and make all data available on the web (free access)

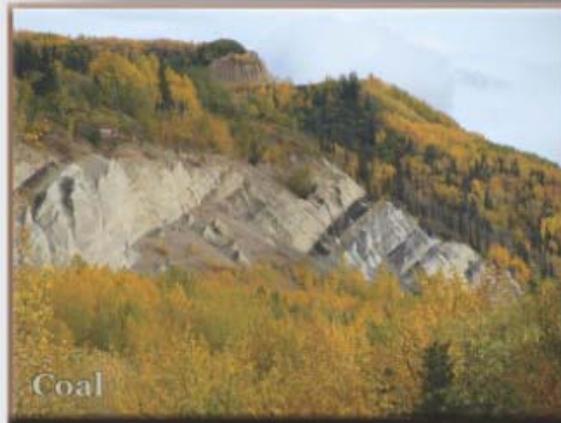


Summary of available information on fossil fuel and geothermal energy in Alaska



Available for Download

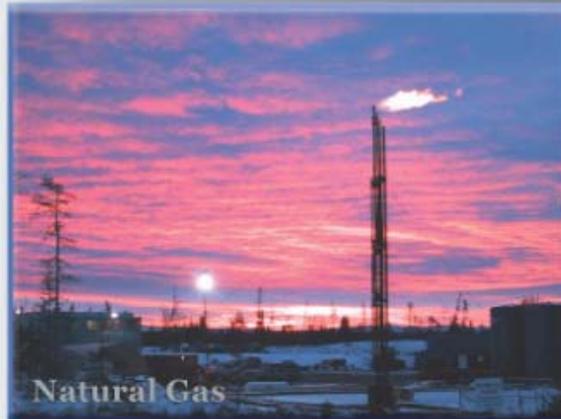
www.dggs.alaska.gov



Coal



Geothermal



Natural Gas

FOSSIL FUEL AND GEOTHERMAL ENERGY SOURCES FOR LOCAL USE IN ALASKA: Summary of Available Information

edited by
Robert F. Swenson
Marwan A. Wartes
David L. LePain
James G. Clough

Special Report 66

Published by

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS

2012

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Geologic Reports



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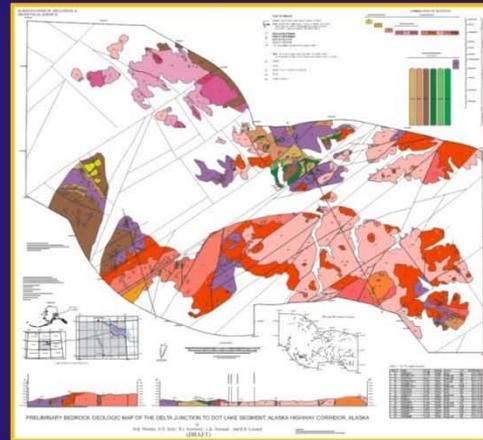
Publications Search Web Page

A screenshot of the 'Advanced Publications Search' web page. The page features a search form with fields for Title, Author, Publication Number, Keyword(s), and Quadrangle. It also includes filters for Publishing Agency, Publication Year, and Range of Years. The 'Quadrangle' dropdown menu is open, showing options like 'Adak', 'Afgnak', 'Alaska General', and 'Alaska Statewide'. The page footer contains contact information for the Division of Geological & Geophysical Surveys.

WebGeochem Search Page

A screenshot of the 'WebGeochem: DGGS Geochemical Sample Analysis Search' web page. It features a multi-step search process. Step 1 involves selecting a sample type (e.g., 'other rock', 'drill core'). Step 2 involves selecting an analysis type (e.g., 'trace element', 'major oxide'). Step 3 involves selecting a project (e.g., 'Salcha River-Pogo'). The page includes a 'Submit' button and a 'User's Guide' link. A warning message at the bottom states: 'ATTENTION! Pop-up blockers must be disabled in order to view this site properly. Click here to learn how.'

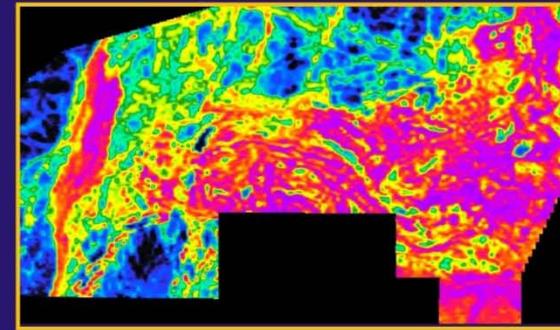
Geologic Maps



Geochemistry

A screenshot of a geochemistry data table. The table has multiple columns representing different elements and isotopes, such as 'C13', 'C14', 'C15', 'C16', 'C17', 'C18', 'C19', 'C20', 'C21', 'C22', 'C23', 'C24', 'C25', 'C26', 'C27', 'C28', 'C29', 'C30', 'C31', 'C32', 'C33', 'C34', 'C35', 'C36', 'C37', 'C38', 'C39', 'C40', 'C41', 'C42', 'C43', 'C44', 'C45', 'C46', 'C47', 'C48', 'C49', 'C50', 'C51', 'C52', 'C53', 'C54', 'C55', 'C56', 'C57', 'C58', 'C59', 'C60', 'C61', 'C62', 'C63', 'C64', 'C65', 'C66', 'C67', 'C68', 'C69', 'C70', 'C71', 'C72', 'C73', 'C74', 'C75', 'C76', 'C77', 'C78', 'C79', 'C80', 'C81', 'C82', 'C83', 'C84', 'C85', 'C86', 'C87', 'C88', 'C89', 'C90', 'C91', 'C92', 'C93', 'C94', 'C95', 'C96', 'C97', 'C98', 'C99', 'C100'. The table contains numerical data for each element across various samples.

Geophysical Surveys



Commitment

