ATTACHMENT 1: INTERIM MINERAL RESOURCE ASSESSMENT REPORT

SUSITNA-WATANA HYDRO

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Technical Memorandum
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Susitna-Watana Hydroelectric Project

Geology and Soils – Interim Mineral Resource Assessment Report

AEA11-022

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Glossary of Terms

Aliquot - A portion of a total amount of a solution or sample.

Batholith - A large emplacement of igneous intrusive rock that forms from cooled magma deep in the Earth's crust.

Dextral - Scientific term for relative direction, to the right.

Felsic - An adjective describing a rock or mineral that is rich in silicon, oxygen, aluminum, sodium and potassium. Most rocks or minerals are usually light in color.

ICP - Inductively Coupled Plasma, A prepared sample is digested with acid and analyzed by inductively coupled plasma-atomic emission spectrometry.

Mafic - An adjective describing a rock or mineral that is rich in magnesium and iron. Most mafic rocks or minerals are dark in color.

Riprap - Rock or other material used to armor shorelines, streambeds, bridge abutments and other shoreline structures against water or ice erosion.

Shreddy Biotite - Hydrothermal alteration product of biotite or hornblende as compared to magmatic or primary biotite.

Skarn - Rocks formed by mass and chemical transport and reactions between adjacent lithologies.

Transpressive - Occurs when a region of the Earth's crust experiences strike-slip shear and a component of shortening, resulting in oblique shear.

1. INTRODUCTION

The Alaska Energy Authority (AEA) proposes to develop and construct a major hydroelectric development, the Susitna-Watana Hydroelectric Project on the Susitna River in the Talkeetna Mountains of south-central Alaska, termed the 'Project' in this technical memorandum. AEA has selected MWH Americas Inc. (MWH) as the lead engineering firm to assist in the completion of engineering feasibility studies, including deriving the size and capacity of the major structures, developing the design to sufficient detail for verification of project development cost estimates, and defining the Project components and operation, so that related environmental studies can be completed in support of preliminary designs and submittal of the Federal Energy Regulatory Commission (FERC) License Application. MWH has contracted with Golder Associates Inc. (Golder) to provide geological services to support conceptual design studies for selection of a preferred dam type and optimization of project layout. This technical memorandum focuses on efforts to complete a mineral resource study and assessment of the Project area.

The Golder work was carried out under Task Order No. T10502190-99893-OM effective July 1, 2013, Master Consulting Services Subcontract dated March 1, 2011, between MWH and Golder.

1.1. Scope of Work

This study's intent was to define the mineral resources in the Project area. Registered mineral claims, areas of significant acid rock drainage (ARD), and wildlife mineral licks were also identified and studied. Data sources for the studies included the Alaska Resource Data File (ARDF) system, the Alaska Division of Geologic and Geophysical Surveys (DGGS), the United States Geological Survey (USGS), and the United States Bureau of Mines (USBM) databases. In addition to these data sources, interviews and consultations were conducted with Alaska Earth Sciences, the USGS and the Bureau of Land Management (BLM). Following the review and compilation of database information, a five day helicopter field reconnaissance, primarily an aerial survey, was conducted from August 26, 2013 through August 31, 2013 by Golder geologist Ryan Campbell and engineer Jeff Levison. Field operations were based out of Stephan Lake Lodge.

This memorandum concentrates on the five different study topics for the mineral assessment of the Project. The basis for this assessment is the area of interest (AOI), the proposed reservoir and all transportation and transmission corridors (Figure 1). The study objectives consist of:

- Identification and location of mineral resources based on geologic conditions present in the project area. Resources include metallic and industrial minerals, within the proposed dam site and reservoir areas as well as all potential access and transmission corridors.
- Catalog all registered State of Alaska and Federal mining claims including; location, ownership and size, within the AOI.

- Identification and locations of mineral or salt licks that could provide nutrients to wildlife and assess potential impact by the project.
- Identification and location of industrial minerals, specifically aggregate sources for sand and gravel that might be inundated by the reservoir, or be potential sources of construction material for the access road or transportation corridors.
- Identification and location of potentially significant sources of ARD found in the reservoir inundation area.

This is an interim report as ground access was limited to state and federal lands. For claims, prospects and mineral sites identified on Alaska Native Claims Settlement Act (ANCSA) lands, aerial observations were during fly-overs however, no landsings or ground access was undertaken. These restrictions hampered ground truthing of several identified mineral prospects and potential mineral sites, areas of ARD, construction material sites, and mineral lick sites.

2. REGIONAL GEOLOGY

The regional geology of the area contains very different and diverse assemblages of Paleozoic and Mesozoic tectonostratigraphic terranes. These terranes are defined as fault-bounded assemblages of crustal fragments that are characterized by a unique geologic history that differs markedly from that of adjacent terranes. Included in these terranes are oceanic and continental arcs, accretionary prisms, flysch basins, and large blocks of oceanic crustal rocks.

The two major terranes in the Talkeetna Mountains are the Wrangellia and Peninsular terranes (Figure 2). Wrangellia rocks were most likely created during the Pennsylvanian to the Jurassic somewhere near the equator and are comprised of many different rock types but the terrane itself is defined by late Triassic flood basalts. The Peninsular terrane also contains many different rocks types but is defined by the presence of a Jurassic andesitic arc assemblage along with Jurassic plutonic rocks. These terranes were well south of their current position by the Late Triassic and may have collided by the Middle or Late Triassic. Although still south of their current position during amalgamation, they most likely docked with the North America plate no later than the Mid Cretaceous. (Jones et al., 1987) Following accretion, oblique subduction helped move these terranes northward along the continental margins through strike-slip faults. During the Mid Cretaceous to Early Tertiary time, several plutons and volcanic assemblages helped stitch these terranes and other smaller terranes together onto their current position. Figure 2 shows the location of the various terranes within and adjacent to the area of study.

2.1. Cretaceous Mineral Belt

The Cretaceous Mineral Belt is a loosely defined mineral belt with very large geographic extent, stretching from as far south as the Aleutian Island Arc northward to Fairbanks. This belt contains many of Alaska's larger mines and prospects in the State and overlaps the area of study (Figure 3). The geologic time for this belt is from the Jurassic to Late Cretaceous-Early Tertiary with the most productive time period for mineralization being the Late Cretaceous-Early Tertiary.

Two large gold mines, Fort Knox and Nixon Fork, are within this mineral belt along with one of the largest prospects in the world, the Pebble Prospect. Seven other large prospects fall within this geographic region along with many smaller placer and hardrock lode mines and prospects. None of the mentioned mines and prospects are inside the project area. The closest prospect, MMG Exploration, is within 9 miles of the dam site, but the majority of the mines and major prospects are located hundreds of miles from the project area.

2.2. Talkeetna Mountains

Geographically the Talkeetna Mountains are located between the central Alaska Range, also known as the Hayes Range to the north, and the Chugach Mountains to the south. The central part of the range contains rugged and glaciated peaks with elevations ranging from approximately 6,000 to 9,000 feet. The remainder of the Talkeetna Mountains form broad rolling uplands with deeply incised river valleys. Timberline elevation in these uplands range from 2,300 to 3,000 feet in elevation.

The Talkeetna Mountains are part of a geologic area between the Aleutian volcanic island arc system and the continental crust of the North American plate. The Talkeetna Mountains are bounded by two currently active major, complex fault systems with dextral strike-slip and transpressive characteristics: the Denali fault to the north and the Castle Mountain fault to the south.

A major feature of the Talkeetna Mountains is the northeast-trending batholithic complex, ranging in age from Jurassic to Late Cretaceous-Early Tertiary. Aside from the two major dextral shear zones, most of the faults that cross the study area are northeast trending and parallel to the strike of rock units and the trend of the assemblage of terranes (Glen et al., 2007).

Rocks in the Talkeetna Mountains range from mafic to felsic meta-volcanic, with a range of intermediate compositions as well. Post- and syn-metamorphic plutonic rocks, quartz-diorite and other granitoids are also widespread. Exposed within the various accreted terranes in the Talkeetna Mountains are sedimentary and meta-sedimentary rocks such as limestones, marbles, argillites, shales, siltstones, phyllites, schists, and chert deposits (Hubbard et al., 2007).

3. CLAIMS-METALS

There are 84 State of Alaska mineral claims inside the AOI. There are 12 different owners to these claims; they range from 1 mineral claim up to 25 mineral claims under the same owner. Of these, 10 are 160-acre claims, 12 are 20-acre claims, and 62 are 40-acre claims. According to the Alaska Department of Natural Resources database, all the mineral claims in this area are active and all dues and fees are current at the time of this report. Figure 4 shows the location of the claims and Table 1 provides a summary of the ownership data.

Table 1. Claim Owners

Owner	Amount of Claims	Size of Claims	Distance to Dam-Miles
On-Line Exploration Svcs Inc	25	40 acres	27.5 N
Speakman, Gale	6	40 acres	35 N
Dilley, Rick	4	160 acres	21.8 NE
Grange, Thomas E	2	160 acres	20.5 N
Baker, Jamie	2	160 acres	20.5 N
Behm, David H	3	40 acres	17 NE
Turlak, Gene	3	40 acres	17 NE
Porterfield, Ben	4	160 acres	23.6 W
Johnson, Estate Of Durl Gene	7	20 acres	21.3 SE
Thomas, Daniel A	4	20 acres	21.3 SE
Bailey, James K	1	20 acres	8.7 SW
Bauer, Tod A	24	40 acres	35 W

3.1. Claims-Actively Mining

In the AOI, only one of the claim owners, Tod Bauer, is actively mining on a registered claim. He is also the operator of the Gold Creek Camp, one of three different camps used by field personnel during the 2013 Susitna-Watana Dam Project field season. He began placer mining on Gold Creek in 1986 and has since expanded his mining operations to Eldorado Creek, a small tributary of Gold Creek. Currently he has expanded his mining operation (Photo 1, Appendix A) to include the sale of riprap to the Alaska Railroad for use at their Gold Creek Bridge.

Because permission was not granted by the owners of the claims, all of the other claims were viewed by overflights. No recent activity on these claims was noticed during the reconnaissance. Not all claims are fly in only. Some claims appear accessible overland by four wheeler and other all-terrain vehicles.

3.2. Claims in the Reservoir

Two claim owners will be affected by the planned impoundment of the reservoir following construction of the proposed dam. These include the seven claims owned by the estate of Durl Gene Johnson and four claims held by Daniel Thomas. Both of these claim blocks are located near the confluence of Jay Creek and the Susitna River. Three small cabins are also located on these claims (Photo 2, Appendix A), although ownership and time of last occupancy are not known at this time.

3.3. Major Claimholders

Although not in the AOI, there are two major claim blocks very close to the dam site and reservoir corridor. The first major claim block is located approximately 9 miles directly south of the dam site and is over 140 square miles in area. The second major claim block is located approximately 20 miles northeast of the dam site in line with Watana Creek and is over 50 square miles in area. Both of these claim blocks are owned by MMG Exploration which is a subsidiary of China Minmetals Corporation (CMC). CMC is one of China's major multinational state-owned enterprises, the largest producer of coal and steel products in China. CMC has a business scope covering 28 nations and regions in the world.

MMG is currently (2013) actively exploring its claim block with both a ground field reconnaissance and drilling program. Both exploration efforts are helicopter supported.

4. MINERAL LICKS

A mineral lick is a natural mineral deposit where animals in nutrient-poor ecosystems can obtain essential mineral nutrients which provide the sodium, calcium, iron, phosphorus, and zinc required for bone, muscle, and other tissue growth. Moose, caribou, and other wildlife would be common mineral lick users.

Mineral licks in the AOI consist of depressions where water collects and then evaporates depositing minerals on the rocks and soils. Mineral licks were located by air and recognized by the multiple game trails leading to the licks from all directions. In addition to the trails, an actively licking caribou was also seen in one of these areas (Photos 3 and 4, Appendix A). The following mineral licks were identified, all four lie outside the footprint of the proposed dam and reservoir, and are shown on Figure 5:

- Mineral lick 1 (ML1) is located just north of the Fog Lakes and 3.5 miles to the southeast of the dam site.
- ML2 is located in the northern part of the AOI along the proposed Denali corridor approximately 7 miles south of the Denali Highway and 28 miles north of the dam site.
- ML3 is located just to the east of Deadman Creek and approximately 4 miles to the southwest of Big Lake and 10 miles north of the dam site.
- ML4 is located to the east of Watana Creek and approximately 2 miles to the north of the reservoir.

In addition to the mineral licks identified above, there may be other areas not as yet identified in this report.

5. INDUSTRIAL MATERIALS-AGGREGATES

A reconnaissance-level study was performed to locate potential sources of construction aggregate material that might be considered for use during the construction of the project. Large volumes of material will be needed for construction are located relatively close to each of the sites identified herein. Reconnaissance mapping was performed within a one to two mile radius of the transportation and transmission corridors and any areas subject to inundation by the dam. Although past studies of record have been accomplished regarding both quarries and aggregates, this study avoided identifying mining sites in active flood plains unless the deposit would be inundated by the proposed reservoir. Gravel deposits in these areas consist of lateral moraines, ablation till, and deposits from fluvial environments. Descriptions of each type of deposit are provided below and the locations are shown on Figure 6. No samples at these sites were taken during this reconnaissance.

- Lateral Moraine - Parallel ridges of debris deposited along the sides of glaciers. Consists of unconsolidated gravel, sand, silt, with cobbles and boulders. Photo 5 (Appendix A).
- Ablation Till - Angular to subangular rocks of all sizes. Carried on or near the surface of the glacier and deposited as the glacier melted. Photo 6 and 7 (Appendix A).
- Fluvial - Rounded to subrounded rocks deposited by some form of moving water either recently or in the past. Usually devoid of finer grained material but has both sand and gravel. (Photos 8 and 9, Appendix A).

Tables 2 through 5 summarize the type of material observed at each site. Bulk volumes were estimated conservatively using the estimated area of each deposit and multiplying it by a depth of three feet, the limit of the hand probe used to measure depth. Distance from the dam site was measured from the approximate center point of each area.

Of the deposits described above, fluvial materials generally provide the most suitable sources for construction material as they tend to have the lowest fines content and are therefore less susceptible to settlement, frost-heaving, and erosion. Several sources were identified along the prospective access routes and in close proximity to the dam.

5.1. Denali Corridor

The Denali corridor connects the dam site area with the Denali Highway to the north. Three separate routes were picked in the large broad valley that makes up the extent of the corridor. Topography on this corridor also includes minor stream crossings, rolling hills, and alpine tundra and grasses for vegetation. Ten different areas of gravel deposits were mapped during the field effort, summarized in Table 2 and shown on Figure 6, which could provide some of the construction materials necessary to build the transportation and transmission corridors. Photo 10 (Appendix A) shows the extent of potential material sources at the Gravel 3 area.

Table 2. Types of Gravel Deposits, Denali Corridor

Name	Type	Volume-(cy)	Area of deposit -Acres	Distance from Dam-Miles	Latitude	Longitude
Gravel 1	Lateral Moraine	659,000	136	35.3 NE	63.321678	-148.306775
Gravel 2	Ablation Till	4,745,000	980	31.8 NE	63.249012	-148.170889
Gravel 3	Lateral Moraine	30,110,000	6,220	28.2 NE	63.179728	-148.086441
Gravel 4	Ablation Till	5,642,000	1,170	25 NE	63.161887	-148.268526
Gravel 5	Fluvial	4,399,000	908	23.2 NE	63.122992	-148.23693
Gravel 6	Ablation Till	3,740,000	773	18.9 N	63.067055	-148.298059
Gravel 7	Fluvial	1,821,000	376	14.5 N	63.000623	-148.302288
Gravel 8	Lateral Moraine	877,000	181	19 NE	63.030622	-148.14574
Gravel 9	Lateral Moraine	558,000	115	14.2 N	62.965308	-148.226397
Gravel 10	Ablation Till	52,817,000	10,900	9.8 N	62.927262	-148.339173

5.2. Gold Creek Corridor

The Gold Creek corridor traverses to the south of the Susitna River and connects the dam site area with the Alaska Railroad. Topography on this corridor includes significant elevation changes while crossing three separate river-cut canyons at Cheechako Creek, Chinook Creek, and an unnamed creek in between them (Photo 11, Appendix A). Almost the entire Gold Creek corridor is on ANCSA lands and therefore was only assessed from the air. Since access to these lands was not authorized, no landings were made along this corridor. Table 3 summarizes the types of gravel deposits noted along the Gold Creek corridor, and these locations are shown on Figure 6.

Table 3. Types of Gravel Deposits, Gold Creek Corridor

Name	Type	Volume-Yards^3	Area of deposit -Acres	Distance from Dam-Miles	Latitude	Longitude
Gravel 13	Ablation Till	838,000	173	23.2 W	62.806736	-149.271126
Gravel 14	Ablation Till	665,000	137	20.4 W	62.799132	-149.179805
Gravel 15	Ablation Till	570,000	117	16 W	62.780050	-149.034904
Gravel 16	Ablation Till	1,412,000	292	13.8 SW	62.744881	-148.943648
Gravel 17	Fluvial	235,000	48	8.4 SW	62.744210	-148.745275
Gravel 18	Ablation Till	2,626,000	543	3.4 S	62.773448	-148.566758

5.3. Chulitna Corridor

The Chulitna corridor traverses to the north of the Susitna River and connects the dam site area with the Indian River and the Parks Highway. Topography on this corridor includes gently rolling hills and minor stream crossings on the first half of the corridor. The western half of the corridor was heavily vegetated and included several major river crossings (Photo 12, Appendix A). The western half of the corridor was inside ANCSA lands and therefore was only assessed from the air. Landings were only made in the eastern half of the corridor. Table 4 summarizes the two locations of gravel deposits noted along the Chulitna corridor that are shown on Figure 6.

Table 4. Types of Gravel Deposits, Chulitna Corridor

Name	Type	Volume-Yards[3]	Area of deposit -Acres	Distance from Dam-Miles	Latitude	Longitude
Gravel 11	Ablation Till	57,427,000	11,870	7.9 NW	62.88809	-148.691599
Gravel 12	Ablation Till	3,506,000	724	23.7 W	62.912371	-149.258431

5.4. Watana Dam Reservoir Corridor

Previous investigations in the 1970's and 1980's of aggregate industrial materials, borrow and quarry materials, at and near the Watana dam site were directed to:

- Further investigate the quantity and material properties of borrow and quarry sources identified in previous studies, and
- Locate new potential source areas for those materials considered to have either insufficient reserves or questionable production feasibility.

Within these earlier investigations, a total of seven borrow sites and three quarry sites were identified as potential dam construction material sources. Since adequate quality and quantity of quarry rock are believed to be readily available adjacent to the dam sites, the quarry investigation was principally limited to general field reconnaissance to delineate boundaries of the quarry sites and to determine approximate reserve capacity.

The borrow investigations consisted of seismic refraction surveys; test pits; soil drilling using auger, casing advancer, and hammer drilling methods; geotechnical instrumentation; and laboratory testing of soil samples obtained during the field investigations, refer to MWH (2013) for specific results.

The 2013 field investigation of the Watana Dam Reservoir consisted of the delineation and field reconnaissance of gravel deposits located upstream of the dam site. Table 5 summarizes the types of gravel deposits noted along the Watana Dam Reservoir, and these locations are shown on Figure 6. All of these gravel sources are located in the reservoir impoundment.

Table 5. Types of Gravel Deposits, Watana Dam Reservoir Corridor

Name	Type	Volume-Yards^3	Area of deposit -Acres	Distance from Dam-Miles	Latitude	Longitude
Gravel 19	Fluvial	3,790,000	783	3.8 E	62.828355	-148.436072
Gravel 20	Fluvial	3,278,000	677	13.4 E	62.805977	-148.121637
Gravel 21	Fluvial	1,171,000	242	23.5 E	62.783814	-147.929928
Gravel 22	Fluvial	2,117,000	437	23.1 E	62.764755	-147.8031
Gravel 23	Fluvial	1,169,000	241	31.1 E	62.696733	-147.579094

6. PROSPECTS

All prospects, a prospect is defined as the location or probable location of a mineral deposit, were taken from the Alaska Resource Data File (ARDF), a comprehensive database of mineral prospects in Alaska. Precious, base, and rare earth metals are represented in this database. The prospects are mostly from historical data collected by USGS, BLM, and industry geologists and compiled by the USGS and are not identified with respect to ownership. The prospects are divided into two groups, those prospects visited during the 2013 field effort (Figure 7), and those prospects to be evaluated in the future (Figure 8). Appendix B contains laboratory results for the 51-element chemical analysis of samples collected at both placer prospects (Table B-1) and lode prospects (Table B-2).

In mining, the mine cut-off grade is the level of mineral in an ore body which it is not economically feasible to mine. The open pit method of mining is the most economical way of producing ore and is therefore the type of mining with lowest cut-off grades. Typical cut-off grades, given in parts per million (ppm) for an open pit mine are (http://www.mindat.org/):

- Au-Gold can be as low as 0.47 ppm
- Ag-Silver can be as low as 19.6 ppm
- Cu-Copper can be as low as 7,800 ppm

Other factors which influence mining development decisions are listed below:

- General economics - these include the depth and size of the ore body as well as metallurgy testing, percentage of the ore that can be extracted, and the specific ore to be mined.
- Accessibility – proximity to basic infrastructure and terrain/topography.
- Land access issues - these include permitting along with environmental and cultural sensitivities.

6.1. Placer Prospects

These prospects were located on creeks and rivers inside the AOI (Figure 7). Stream sediment samples were collected at each prospect. Each sample was taken from fine grained material located in a deposition zone of the river or creek. Select chemical analysis results are summarized in Table 6. The following placer deposits are described below from north to south:

- Placer Prospect 21 - This gold placer prospect is located on Seattle Creek, a northern draining, slow moving stream approximately 10-15 feet wide. Seattle Creek drains an area of faulted Mesozoic metasedimentary rocks, and Tertiary intrusive and extrusive rocks. Rocks in the area consist of a fine-grained metasandstone with iron staining along with a metagrano-diorite with aligned shreddy biotite, chlorite alteration and iron staining (Photo 13, Appendix A).
- Placer Prospect 41 - Located on small, slow moving creek flowing to the west from Big Lake. The alluvial deposits at this gold placer occurrence are underlain by greywacke, argillite, schist,

migmatite, and granodiorite. The granodiorite was unmineralized while visible magnetite was seen in quartz veins intruding the argillite and greywacke (Balen, 1990). (Photo 14, Appendix A).

- Placer Prospect 35 - A gold placer occurrence located in the upper part of Deadman Creek, which at this location is a wide, up to 50 feet, fast moving creek. The rocks in the vicinity of this placer occurrence are schist, migmatite, and granite and Upper Paleocene biotite granodiorite (Csejtey et al, 1978), (Photo 15, Appendix A).
- Placer Prospect 40 - A gold placer prospect located on Watana Creek and underlain by granodiorite, argillite and greywacke (Csejtey et al, 1978); and also porphyritic andesite and hydrothermal breccia. At this location Watana Creek is very fast moving with high banks of lacustrine sediment. The granodiorite is unmineralized with chlorite and clay alteration. The argillite and greywacke is iron stained with some quartz veining and visible magnetite (Photo 16, Appendix A). This prospect would be inundated by the reservoir.
- Placer Prospect 43 - This gold placer prospect is a small incised stream in Quaternary glacial (Balen, 1990) and alluvial deposits near the base of a large rocky knob. The stream was 6 to 7 feet wide in areas. The stream is slow moving with steep banks that lead to flatter ground covered in grasses (Photo 17, Appendix A).
- Placer Prospect 76 - Located on the upper extent of Kosina Creek just north of the confluence with Tsisi Creek. This stream is characterized by very fast moving water flowing over large cobbles and boulders and is up to 40 feet wide in some areas. This gold placer prospect is in alluvial gravel deposits that conceal a fault contact between Lower to Middle Jurassic amphibolite and Pennsylvanian and Lower Permian basaltic and andesitic metavolcanic rocks (Csejtey et al, 1978), (Photo 18, Appendix A).

Table 6. Selected Chemical Analysis of Placer Prospect Samples

Prospect	Au (ppm)	Ag (ppm)	Cu (ppm)
21	0.003	0.09	20.4
41	0.002	0.1	21.1
35	<0.001	0.03	7.6
40	0.104	0.04	15.2
43	0.005	0.03	24.6
76	0.004	0.01	11.2

6.2. Lode Prospects

These prospects are from areas identified as potential sites for mineral deposits by the ARDF. High grade rock and/or representative rock samples were collected for analysis at each of these sites. Each rock sample was analyzed for lithology, alteration, and mineralization along with chemical analysis. The following lode prospects are shown on Figure 7.

6.2.1. Mount Watana Area

- Lode Prospect 44 - Located on the east side of Watana Mountain in Paleozoic iron-stained, siliceous argillite. (Csejtey et al, 1978) This prospect is located in a mountainous region with small alpine scrub vegetation. No rock outcrops were observed at this location. Talus grab samples of representative rocks were collected (Photo 19, Appendix A). The sample point is described as follows:
  - Lithology - Argillite
  - Alteration - Siliceous flooding and iron staining
  - Mineralization - No visible sulfides but remnant pyrite was found
- Lode Prospect 62 - Located on the west flank of Watana Mountain, the topography includes steep exposures, unstable talus slopes, and deep canyons. The rocks at this occurrence are upper Paleozoic sedimentary rocks that are altered to garnet-pyroxene-chalcopyrite-calcite-pyrite skarn; locally there is intercalated dark red weathering pyritic chert and limestone. (Csejtey et al, 1978) Two high grade outcrop samples were collected (Photo 20 of Sample Point 62A, Photo 21 of Sample Point 62B; Appendix A). The sampling points are described as follows:

  Sample point 62A
  - Lithology - Argillite, found in large layered outcrop of both argillite and fossilized limestone
  - Alteration - Siliceous flooding and iron staining
  - Mineralization - None observed

  Sample point 62B
  - Lithology - Metabasalt underlain by argillite layers
  - Alteration - Chlorite
  - Mineralization - Visible trace pyrite
- Lode Prospect 26 - Located 6 miles northwest of Mount Watana, the topography includes steep exposures and unstable talus slopes. This occurrence is in metabasalt of the Triassic, Nikolai Greenstone consisting of quartz veins that contain malachite. (Csejtey et al, 1978) Two high grade outcrop samples were collected (Photo 22, Appendix A). The sample points are described as follows:

  Sample Point 26A
  - Lithology - Metabasalt
  - Alteration - Chlorite and epidote alteration
  - Mineralization - No visible mineralization found in this sample

  Sample Point 26B

- Lithology - Chlorite or greenschist
- Alteration - Chlorite and epidote alteration
- Mineralization - Trace malachite found in small quartz veins

6.2.2. Jay Creek Area

- Lode Prospect 45 – The sample point is located on steep slopes of an unnamed mountain north of the Susitna River in between Jay and Watana Creeks. The rocks in the area are Upper Triassic basaltic metavolcanic rocks interbedded with argillite and limestone or marble. (Balen, 1990) A circumnavigation of the mountain revealed no signs of mineralization. A representative outcrop sample was collected (Photo 23, Appendix A). The sample point is described as follows:
  - Lithology - Metabasalt
  - Alteration - Weak iron staining and chlorite alteration
  - Mineralization - No visible mineralization found in this sample
- Lode Prospect 49 – The sample point is located on the north bank of the Susitna River approximately one mile upstream from the Jay Creek confluence. This occurrence consists of minor chalcopyrite and pyrite in a small quartz vein that cuts mafic metavolcanic rocks of Paleozoic age. (Cobb, Csejtey, 1980) A high grade sample was taken on a 100-foot-tall outcrop (Photo 24, Appendix A). This prospect would be inundated by the reservoir. The sample point is described as follows:
  - Lithology - Biotite chlorite schist
  - Alteration - Calcite, chlorite and weak iron staining
  - Mineralization - Visible pyrite up to 1%
- Lode Prospect 50 – The sample point is located approximately 3 miles directly west of Sample Point 45 in a topologically similar area. The rocks in the vicinity of this occurrence are metavolcanic rocks, chlorite schist, and sericite schist. (Csejtey et al, 1978) A high grade outcrop sample was taken (Photo 25, Appendix A). The sample point is described as follows:
  - Lithology - Chlorite schist
  - Alteration - Strong chlorite alteration along with weak iron staining.
  - Mineralization - Trace pyrite and malachite found in discreet quartz veins
- Lode Prospect 53 – The sample points are located approximately one mile west of Jay Creek and south of Sample Points 50 and 56 on a ridge that faces towards Jay Creek. The deposit at this prospect consists of north-south oriented, pyrite-, pyrrhotite-, and bornite-bearing shear zones up to 7 feet wide, in andesitic metavolcanic rocks. (Csejtey et al, 1978) The shear zones are exposed over 150 feet and run perpendicular to the ridge. Two high grade outcrop samples were taken 100 feet apart along the ridge (Photo 26 of Sample Point 53A, Photo 27 of Sample Point 53B; Appendix A). The sample points are described as follows:

53 A and B

- Lithology – Porphyritic, may be andesite, but too altered to discern
- Alteration - Strong iron staining and chlorite alteration
- Mineralization - Visible pyrite, up to 1%, trace bornite and possible chalcopyrite

- Lode Prospect 56 - The sample point is located approximately 4 miles directly west of Sample Point 50 in a topologically similar area. The rocks in the vicinity of this occurrence are chlorite schist, greenstone, and foliated granite. (Csejtey et al, 1978) Reconnaissance of the area did not reveal any outcrop to be sampled, therefore a representative talus grab sample was taken (Photo 28, Appendix A). The sample point is described as follows:
  - Lithology - Chlorite schist with quartz veins
  - Alteration - Weak iron staining and chlorite alteration
  - Mineralization - No mineralization found in this sample

6.2.3. Chulitna Corridor Area

- Lode Prospect 32 – The sample point is located approximately 8 miles east of Tsusena Creek in an area of gently rolling hills and a surficial deposit of ablation till. This occurrence consists of disseminated pyrite in fine-grained schist, adjacent to a Tertiary granitic intrusion. (Csejtey et al, 1978) Because no outcrop was observed in the area, a representative talus grab sample was collected (Photo 29, Appendix A). The sample point is described as follows:
  - Lithology - Biotite schist with garnets, intrusive rocks in the area
  - Alteration - Weak iron staining, garnets may be alteration products
  - Mineralization - No visible mineralization found in this sample

Table 7. Selected Chemical Analysis of Lode Prospects Samples

Prospect	Au (ppm)	Ag (ppm)	Cu (ppm)
44	0.023	0.15	49.1
62a	0.002	0.58	45.2
62b	0.01	0.09	94.8
26a	0.009	0.52	1180
26b	0.006	0.27	622
45	0.004	0.12	90.8
49	0.002	0.02	5.5
50	0.004	0.03	4.7
53a	0.002	0.04	51.7
53b	0.003	0.02	23.2
56	0.002	0.01	7.7
32	0.003	0.14	81.1

7. SAMPLE ANALYSIS AND PROCEDURES

7.1. Rock Samples

Two separate rock sampling methods were employed during the 2013 field season. The first method was representative grab samples of outcrops or talus fields. Representative grab samples were collected where rock was exposed for sampling. The samples were representative of the in situ bedrock at each sample site. There are no known factors that could result in a bias in the resultant data.

The second method of rock sampling was a high grade sampling procedure. This procedure is used to gather information to identify any significant higher grade intervals within a lower grade intersection. It is an important tool to help narrow down possible sites for further exploration. The high grade samples were collected where rock was exposed for sampling. Considerations for sampling include amount of sulfides or ore minerals, color, lithology, veining, and alteration. Each high grade sample is one individual rock sample as opposed to multiple rock samples placed into a sample bag. Factors that could result in bias include misinterpretation of sulfides or ore minerals.

The sample site data was recorded with a handheld GPS field unit. A representative or high grade sample was placed in a labeled sample bag and taken to the Stephan Lake Lodge work camp each evening. Each sample was labeled as high grade or representative grab sample.

The samples were inventoried and placed in shipping bags for shipment to the laboratory for analysis. All samples were stored in a secure area. The samples were transported to Anchorage by Golder personnel and shipped via truck directly to ALS Chemex Laboratories in Fairbanks, Alaska.

These samples were analyzed at ALS Chemex Laboratories. The samples were dried in ovens that are controlled to a maximum temperature of 60°C. Rock samples were split off to 250 grams and pulverized to at least 85% passing 75 microns or better. The 75 micron fraction was split. One aliquot was analyzed for gold using a 30 gram fire assay method, while the second aliquot, 50 grams, was subjected to a four-acid leach and analyzed for a 51-element ICP package.

7.2. Stream Sediment Samples

Samples were taken from low velocity depositional environments where minus 20 mesh sized sediments were targeted.

The samples were inventoried, dried, and placed in shipping bags for shipment to the laboratory for analysis. All samples were stored in a secure area. The samples were transported to Anchorage by Golder personnel and shipped via truck directly to ALS Chemex Laboratories.

These samples were analyzed at ALS Chemex Laboratories of Fairbanks, Alaska. Soil samples were dried in ovens that are controlled to a maximum temperature of 60^{o}C, sieved to 180 microns (-80 mesh) and both fractions were retained. A 30 gram sample weight was subjected to fire assay method and the remainder was subjected to Aqua Regia digestion and analyzed for gold and a 51-element ICP package.

7.3. Locations

Hand-held GPS instruments were used to field locate points of interest. We generally consider hand-held GPS instrument accuracy to be about ±30 feet on the horizontal scale depending on satellite coverage and reception.

8. POTENTIAL AREAS OF ACID ROCK DRAINAGE

The ARD reconnaissance in the AOI was limited to the reservoir corridor and areas affected by the inundation of water attributed to the construction of the dam. Most areas identified were inside ANCSA lands or were deemed inaccessible at this time because of their location and safety concerns. Although unable to collect and analyze samples, six different areas of ARD were identified in the field as potential targets (Figure 9) and noted for further investigation (Photos 30-32, Appendix A) including sites at Watana Creek, Vee Canyon Shear Zone, and Vee Canyon.

ARD refers to the acidic water that is created when sulfide minerals are exposed to air and water and, through a natural chemical reaction, produce sulfuric acid. ARD has the potential to introduce acidity and dissolved metals into water, which can be harmful to fish and aquatic life.

ARD formation occurs naturally where sulfide minerals are exposed to the atmosphere and the rate of ARD production depends on a number of factors listed below:

- Surface area of sulfide minerals exposed: Increasing the surface area of sulphide minerals exposed to air and water increases sulphide oxidation and ARD formation.
- Type of minerals present: Not all sulfide minerals are oxidized at the same rate, and neutralization by other minerals present may occur, which could slow the production of ARD.
- Amount of oxygen present: Sulfide minerals oxidize more quickly where there is more oxygen available. As a result, ARD formation rates are higher where the sulphides are exposed to air than where they are buried under soil or water.
- Amount of water available: Cycles of wetting and drying accelerate ARD formation by dissolving and removing oxidation products, leaving a fresh mineral surface for oxidation. In addition, greater volumes of ARD are often produced in wetter areas where there is more water available for reaction.
- Temperature: Pyrite oxidation occurs most quickly at a temperature around 85°F.
- Microorganisms present: Some microorganisms are able to accelerate ARD production.

(Fraser Institute, 2012)

8.1. ARD Site Characteristics

ARD 1-This site is found along the steep west bank of Watana Creek. The site is approximately 150 feet in width and 100 feet high. It is located approximately 9 miles to the east of the dam site in shear zone of basaltic metavolcanic rocks. (See photo 30, Appendix A)

ARD 2-This site is found along the northern bank of the Susitna River and may be connected structurally to the shear zone located at ARD 1. It is approximately 200 feet wide and 80 to 100 feet in height. It is located approximately 9 miles to the east of the dam site and less than 1 mile to the south of ARD 1 in a shear zone of basaltic metavolcanic rocks. (Photo 31, Appendix A)

ARD 3 and 4-Both of these sites are found in Vee Canyon of the Susitna River, approximately 35 miles east of the dam site, and are most likely connected structurally. ARD 3 is located on the north side of the canyon while ARD 4 is on the south side. Both are found in a shear zone of mixed group of metamorphic rocks, mainly greenschist, amphibolite and gneiss. (Photo 32 and 33, Appendix A)

ARD 5- This site is found along the north side of a steeply banked creek, 1.5 miles wide and 300 feet tall, along the Gold Creek Corridor, approximately 4.5 miles south of the dam site. It is located in a volcanic sequence of rocks containing andesite and basalt flows along with areas of stocks and dikes. (Photo 34, Appendix A)

ARD 6- This site is found along the north side of the Susitna River in between Watana Creek and Jay Creek and approximately 18 miles to the east of the dam site. It consists of a series of six to seven smaller shear zones located in volcanic rocks interbedded with volcanic breccia and metamorphosed sedimentary rocks. (Photo 35, Appendix A)

9. RECOMMENDATIONS

Access restrictions to ANCSA lands and areas deemed inaccessible due to safety concerns prohibited a complete reconnaissance to all sites, therefore this is an interim report that should be considered preliminary until these sites can be accessed and assessed in the future. Thus , additional work needs to be done in order to have a more complete understanding of the mineral and construction material potential of areas covered in the AOI. Below is a list of recommended study topics for future work:

1. Complete field reconnaissance near those claims and prospects that were not visited in 2013 due to land access restrictions or safety concerns.

2. Procure selected samples for testing of rock that could potentially produce ARD but which could not be accessed in 2013.

3. Delineation of gravel resources. This may include terrain unit analysis, geologic mapping and possible subsurface investigations in the future to determine extent and type of gravel resources and suitability as a construction material source.

4. Claims visited in 2013 should be visited in the future and checked for recent activity. Check the State of Alaska mining claim website to determine if no new claims were registered during the 2013/2014 season.

5. Regarding aggregate sources along corridors, conduct additional investigations once the preferred alternative is selected.

10. USE OF REPORT

This interim report was prepared for the exclusive use of AEA and MWH to document the mineral resource study and assessment of the Project area as part of the engineering feasibility and licensing of the Susitna-Watana Project. If there are significant changes in the nature, design, or location of the facilities, we should be notified so that we may review our recommendations in light of the proposed changes and provide a written modification or verification of the changes.

The work program followed the standard of care expected of professionals undertaking similar work in the State of Alaska under similar conditions. No warranty expressed or implied is made.

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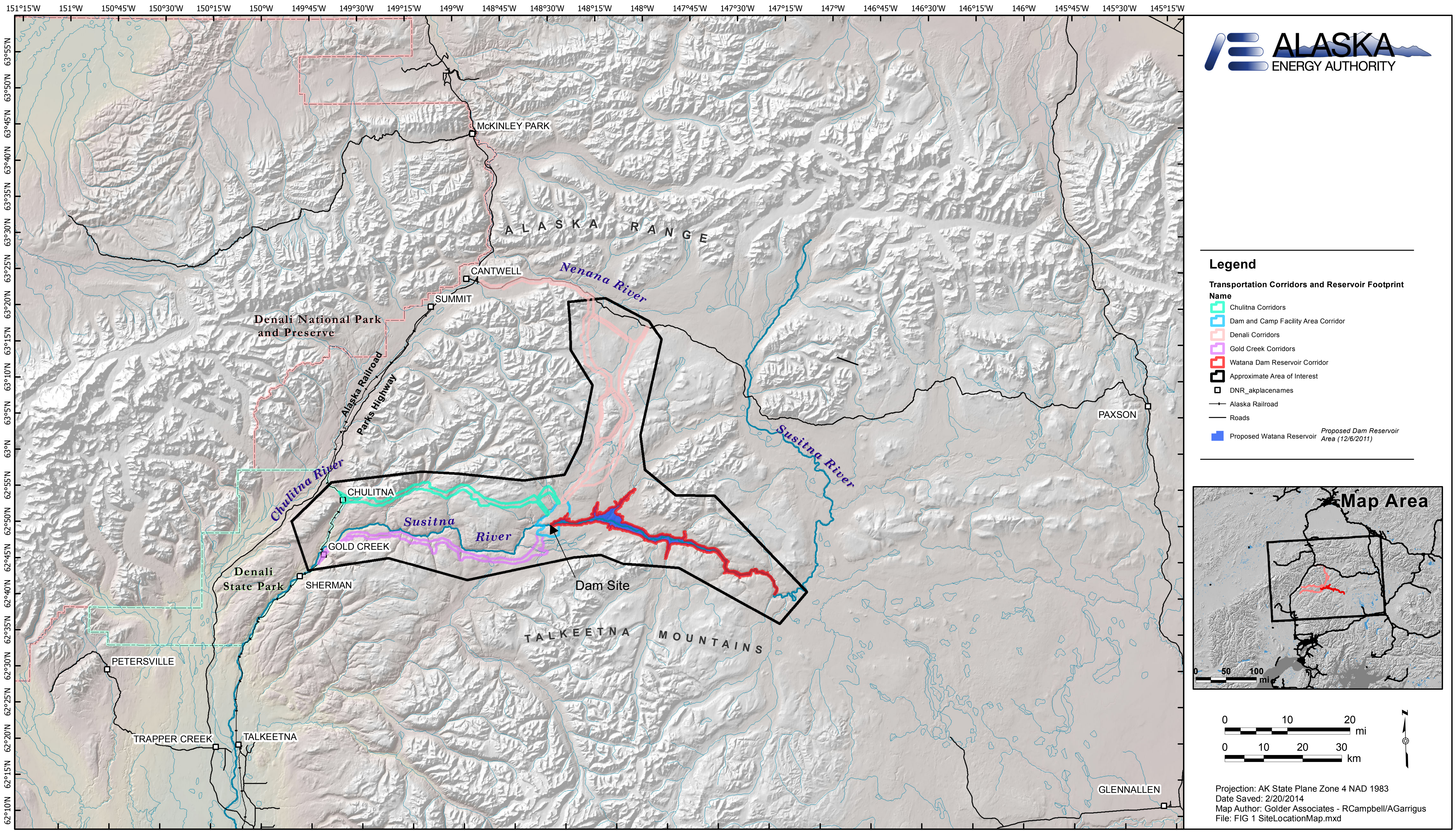
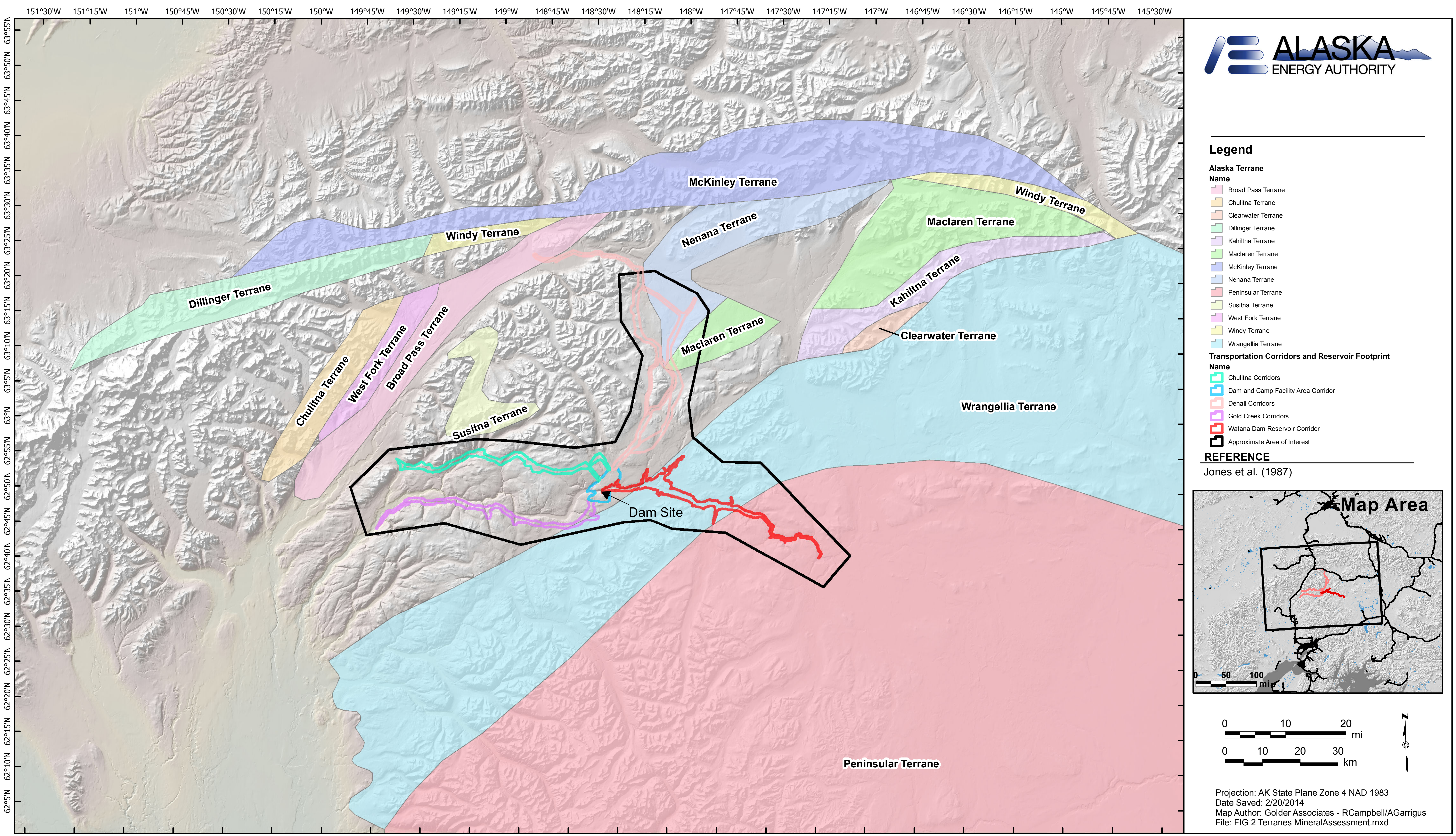
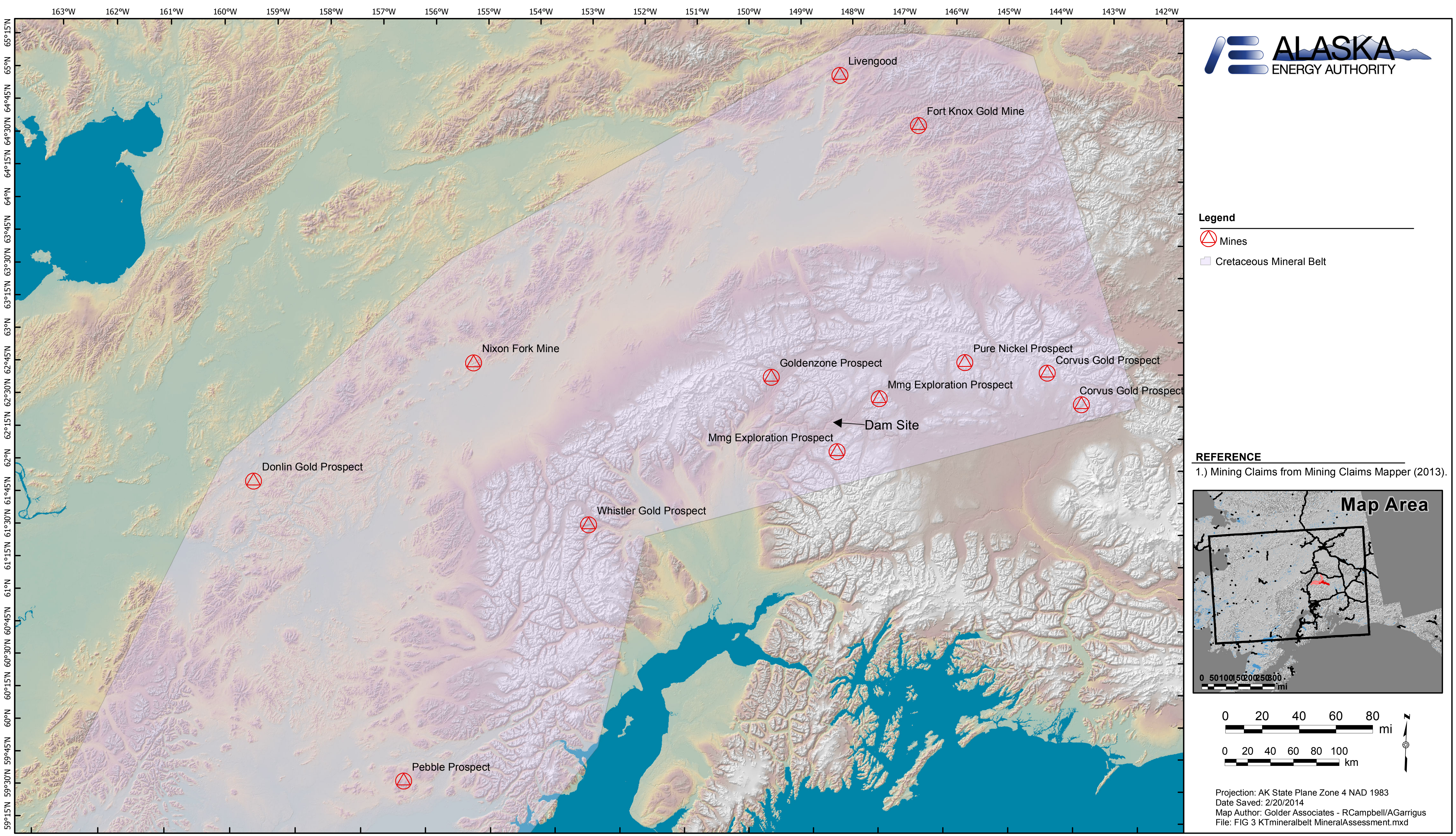
FIGURES



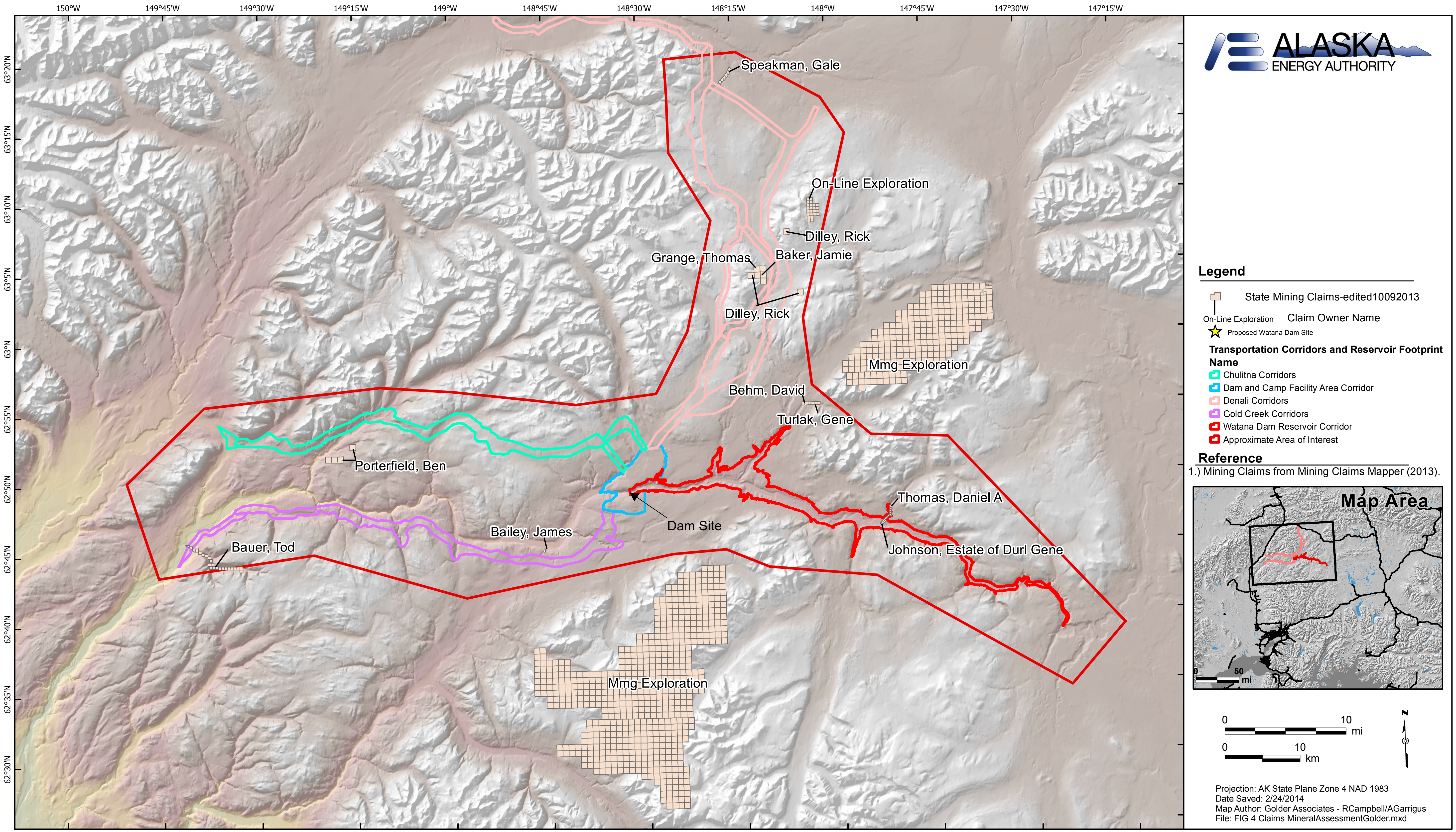
LOCATION PLAN
FIGURE 1



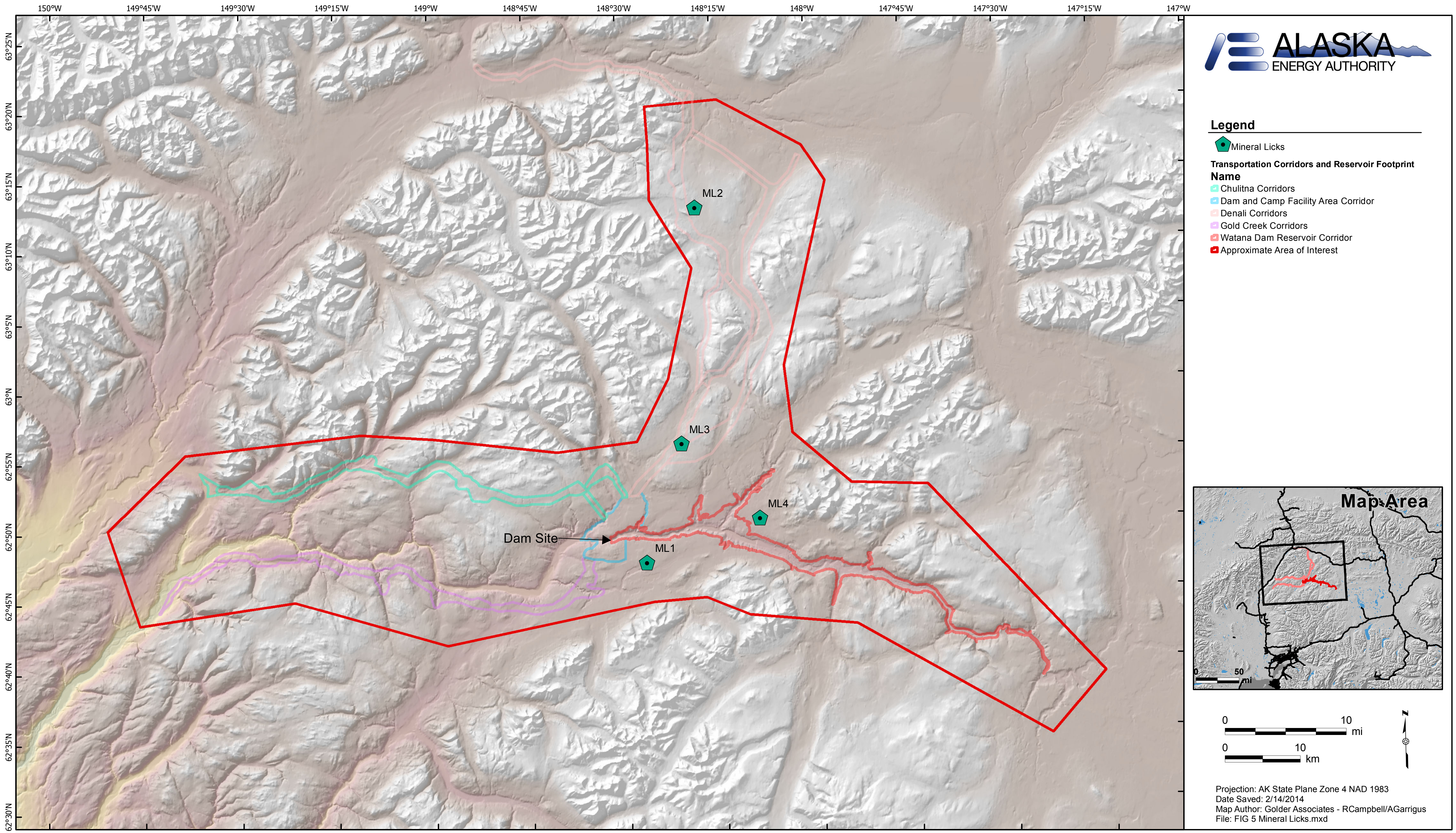
ALASKA GEOLOGIC TERRANES
FIGURE 2



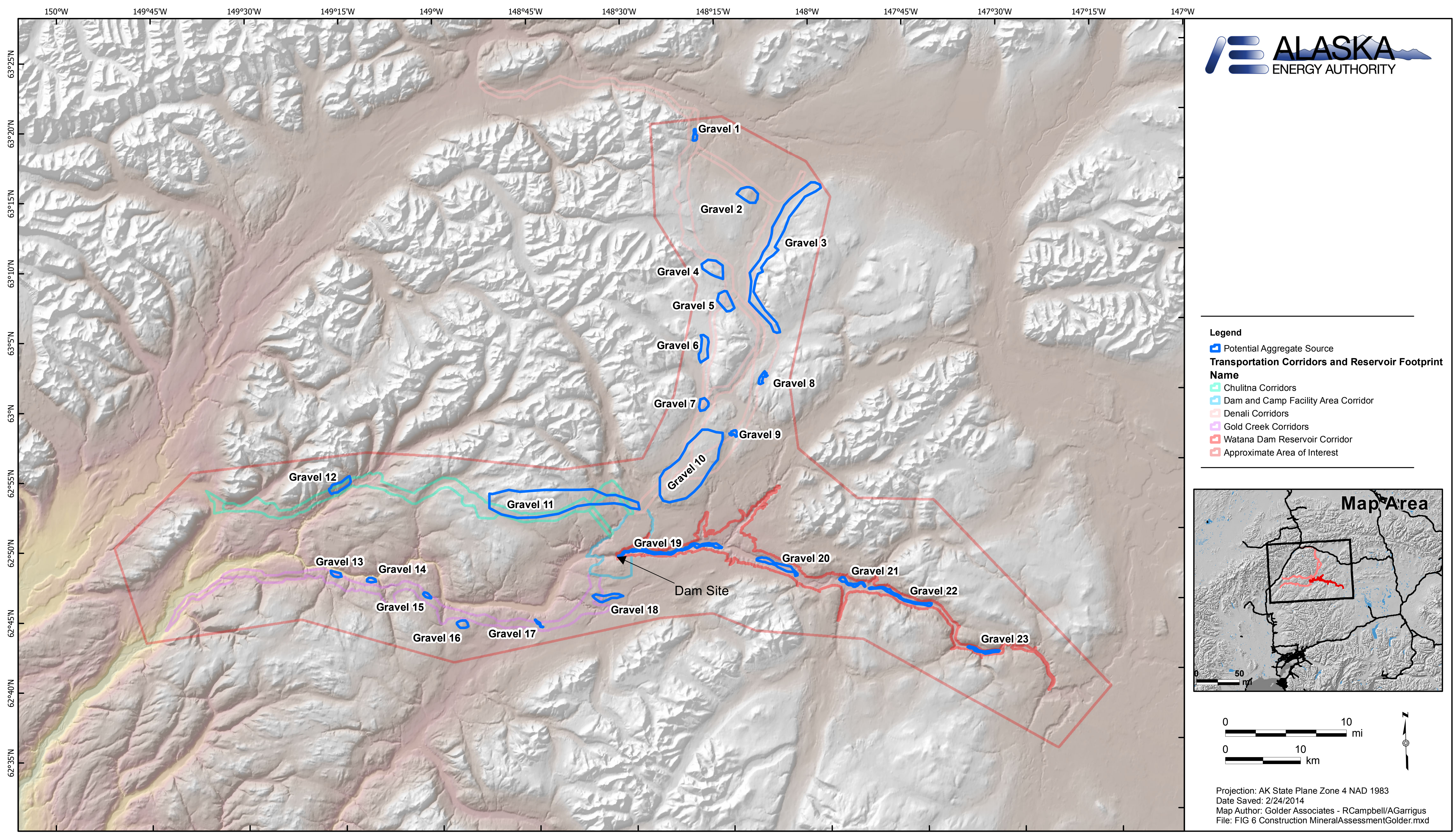
CRETACEOUS MINERAL BELT
FIGURE 3



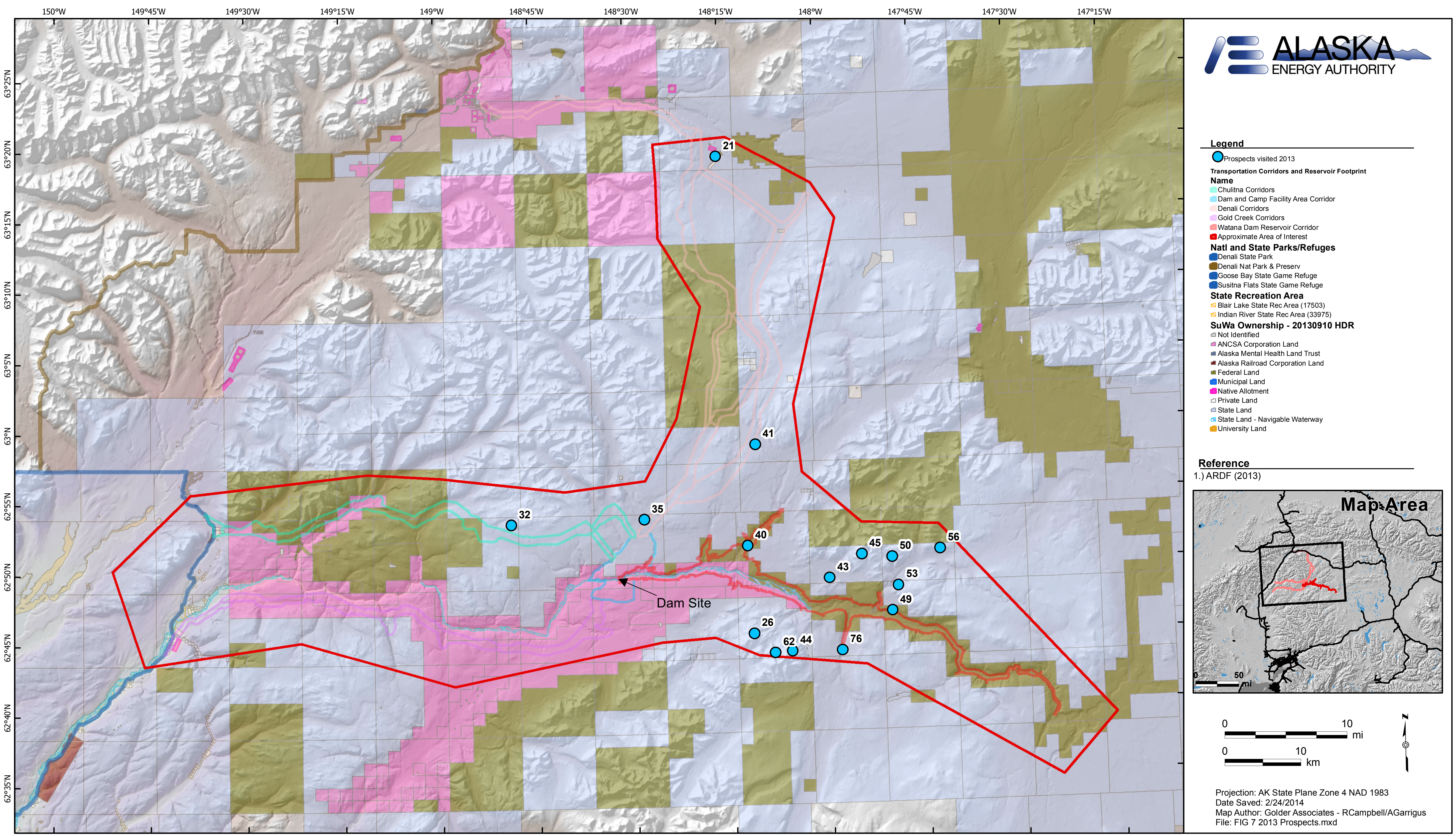
STATE MINING CLAIMS
FIGURE 4



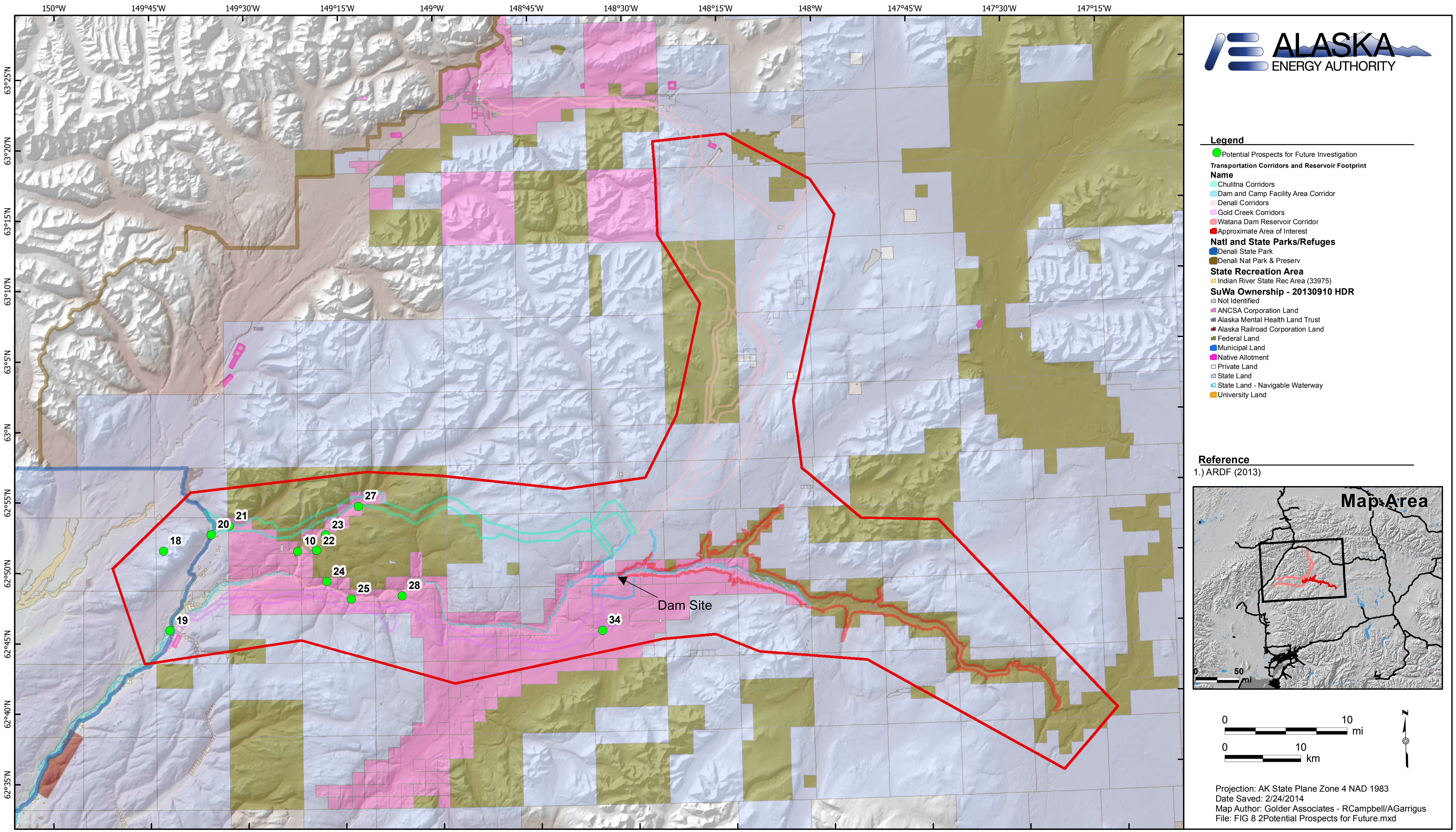
MINERAL LICKS
FIGURE 5



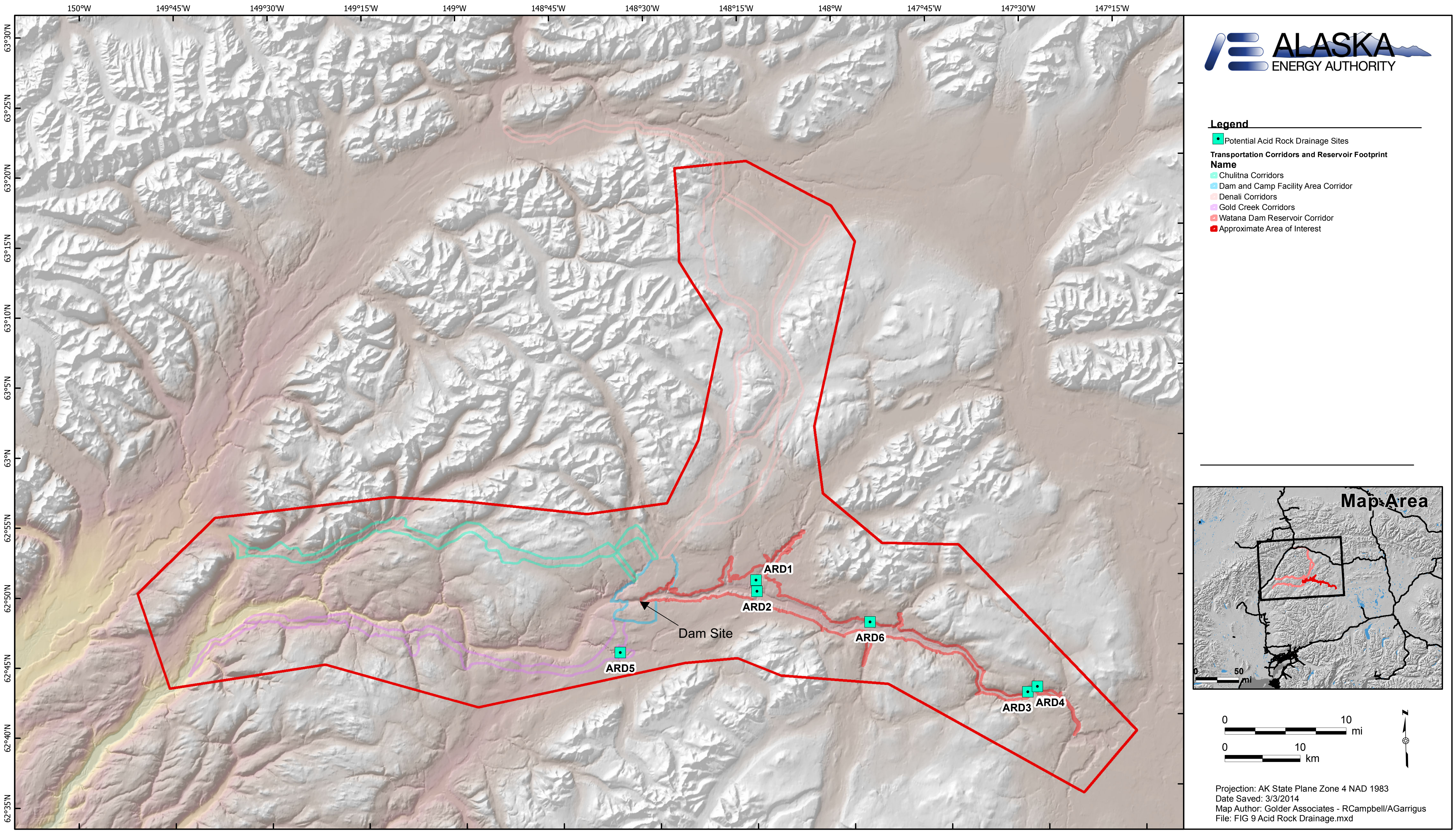
POTENTIAL AGGREGATE SOURCES
FIGURE 6



PLACER AND LODE PROSPECTS VISITED IN 2013 FIELD SEASON
FIGURE 7



POTENTIAL PROSPECTS FOR FUTURE INVESTIGATION
FIGURE 8



POTENTIAL ACID ROCK DRAINAGE SITES
FIGURE 9

APPENDIX A
SELECT SITE PHOTOGRAPHS

Photos - Claims and Mineral Licks

PHOTO 1 Blasting and mining site for Tod Bauer.	
PHOTO 2 Old Cabins in Jay Creek.	

PHOTO 3 Mineral lick showing multiple trails.	
PHOTO 4 Mineral lick with caribou actively licking.	

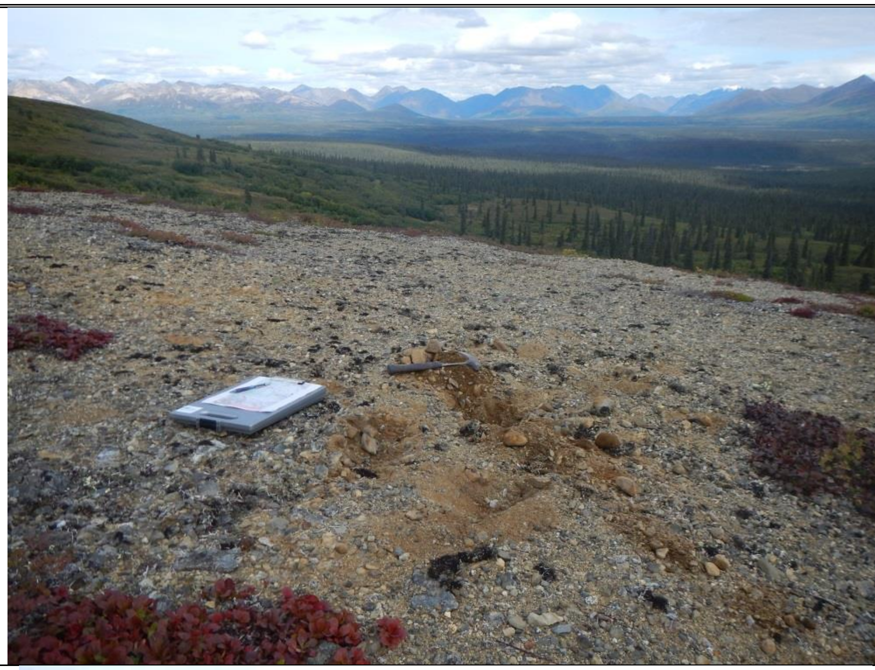
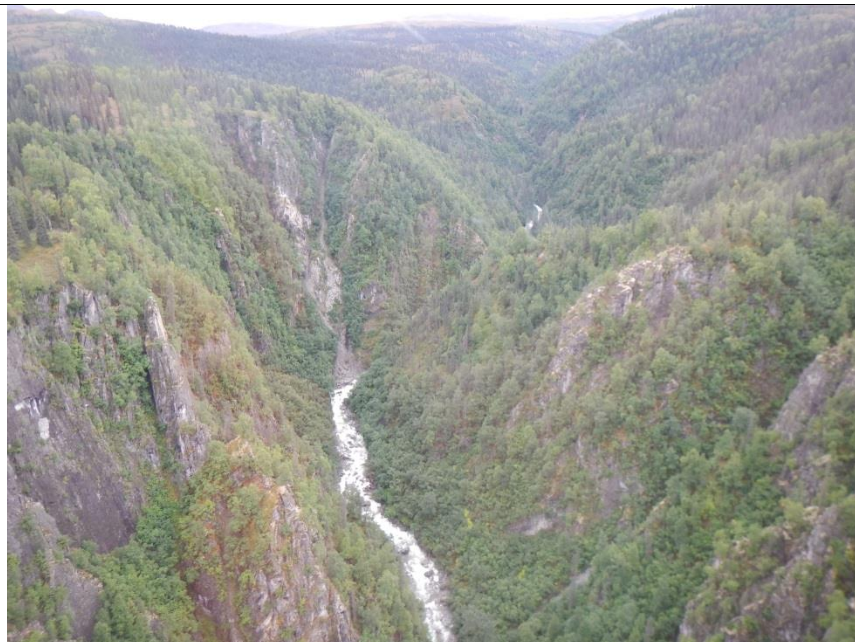
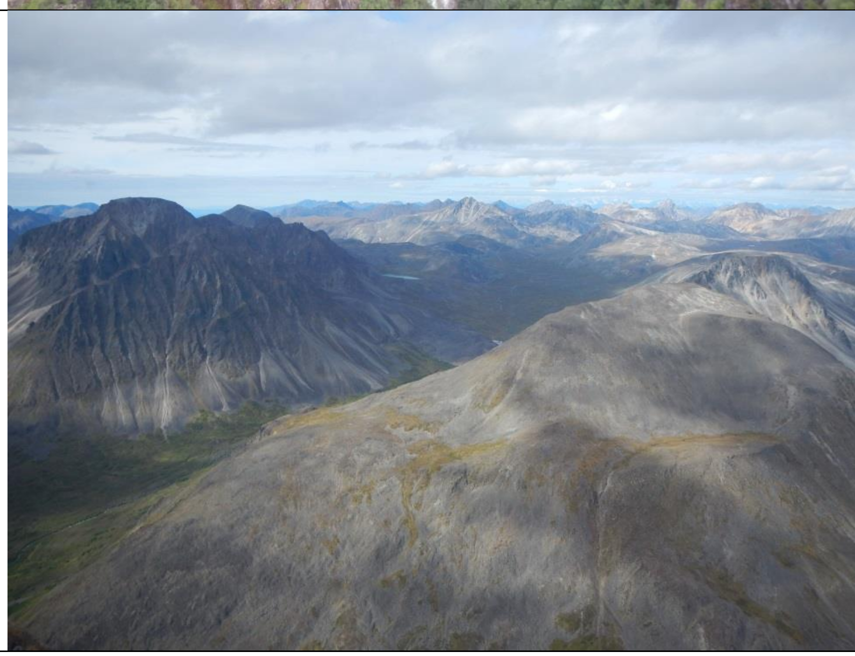
Photos - Construction Materials	
PHOTO 5 Gravel 1 site photo, typical of lateral moraine deposit.	
PHOTO 6 Gravel 11 site, close up of typical ablation till deposit.	

PHOTO 7 Gravel 16 site photo, typical ablation till deposit.	
PHOTO 8 Gravel 19 site photo, typical fluvial environment deposit in the Susitna River. Looking east or upstream.	

PHOTO 9 Gravel 19 site fluvial deposit with sand.	
PHOTO 10 Gravel 3 site, extent of potential material sources. Looking north.	

PHOTO 11 Canyon at Cheechako Creek on the Gold Creek Corridor. Looking south.	
PHOTO 12 Portage Creek from air.	

Photos - Placer Prospects	
PHOTO 13 Placer Prospect 21 - Seattle Creek placer deposit prospect.	
PHOTO 14 Placer Prospect 41 - Big Lake stream placer prospect.	

PHOTO 15 Placer Prospect 35 - Deadman Creek placer prospect.	
PHOTO 16 Placer Prospect 40-Upper Watana placer prospect	

PHOTO 17 Placer Prospect 43 - Small incised stream placer prospect.	
PHOTO 18 Placer Prospect 76 - Upper Kosina placer prospect.	

Photos - Lode Prospects

PHOTO 19

Lode Prospect 44 - Showing sample site.

PHOTO 20

Lode Prospect 62A - Large layered outcrop of iron stained argillite. Looking north.

PHOTO 21

Lode Prospect 62B - Metabasalt on top of argillite/limestone layers. Looking south.

PHOTO 22

Lode Prospect 26 - Metabasalt of Nikolai Greenstone. Looking east.

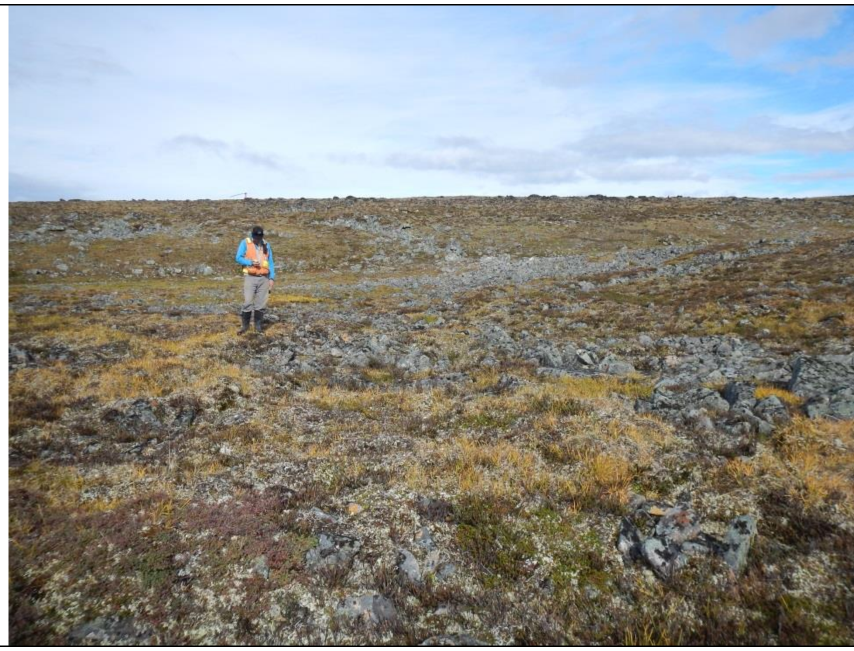
PHOTO 23 Lode Prospect 45 - Sampling location on steeper slope in upper right of picture. Looking west.	
PHOTO 24 Lode Prospect 49 - Sampling outcrop. Looking north.	

PHOTO 25 Lode Prospect 50-Sampling location on ridge, looking south.	
PHOTO 26 Lode Prospect 53A - Shear zones. Looking north.	

PHOTO 27 Lode Prospect 53B - Sampling outcrop. Looking north.	
PHOTO 28 Lode Prospect 56-Talus slope sampling location. Looking north.	

PHOTO 29

Lode Prospect 32 - Sample site. Looking north.



Photos – Acid Rock Drainage	
PHOTO 30 ARD 1-Typical acid rock drainage in Watana Creek.	
PHOTO 31 ARD 2-Acid rock drainage site along Susitna River.	

PHOTO 32 ARD 3-Acid rock drainage site in Vee Canyon.	
PHOTO 33 ARD 4-Acid rock drainage site in Vee Canyon.	

Photos – Acid Rock Drainage	
PHOTO 34 ARD 5-Typical acid rock drainage along the Gold Creek Corridor	
PHOTO 35 ARD 6-Acid rock drainage site in between Jay and Watana Creeks, shear zone.	

APPENDIX B
LABORATORY RESULTS FOR 51-ELEMENT CHEMICAL ANALYSES

Table B-1: Summary of 51-Element Chemical Analysis of Placer Prospects

SAMPLE ID	WEI-21	Au-ICP21	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Recvd Wt.	Au	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg
	kg	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%
21H	0.95	0.003	0.09	0.99	8	<0.2	<10	130	0.21	0.07	0.54	0.25	21	7.3	23	1.25	20.4	1.6	3.49	0.06	0.03	0.02	0.015	0.12	10.5	15.1	0.45
35	0.88	<0.001	0.03	0.72	4.2	<0.2	<10	100	0.13	0.07	0.41	0.17	53.6	4.6	12	0.8	7.6	1.53	2.93	0.08	<0.02	0.01	0.013	0.1	28.2	15.2	0.26
40	0.94	0.104	0.04	1	5.6	<0.2	<10	80	0.11	0.03	0.8	0.11	13.75	6.1	18	0.42	15.2	1.63	2.96	0.06	0.11	0.01	0.011	0.07	7.1	7.6	0.43
41	0.64	0.002	0.1	1.85	22.1	<0.2	<10	200	0.27	0.1	0.71	0.51	25.5	8.8	22	1.38	21.1	2.94	5.41	0.07	0.02	0.04	0.024	0.16	12.4	25.1	0.47
43	0.9	0.005	0.03	1.4	5.9	<0.2	<10	110	0.13	0.04	0.83	0.14	10.3	10.3	32	0.44	24.6	2.31	3.89	0.06	0.07	0.01	0.015	0.04	5	8.1	0.68
76	0.82	0.004	0.01	0.63	3.8	<0.2	<10	80	<0.05	0.03	0.46	0.03	6.18	6.2	27	0.2	11.2	5.71	4.32	0.06	<0.02	<0.01	0.005	0.06	2.9	3.6	0.25

Sample Results Continued

SAMPLE ID	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
21H	340	0.52	0.03	0.59	19.3	990	4.3	10.7	0.001	0.02	1.03	2.6	0.7	0.3	34.6	<0.01	0.02	2.8	0.065	0.12	0.89	32	1	7.07	50	1.2
35	485	0.67	0.02	1.39	6.4	1010	1.8	7.8	<0.001	0.02	0.45	1.9	0.8	0.4	26.1	<0.01	0.01	10.9	0.097	0.08	2.15	29	0.12	8.15	39	0.5
40	232	0.24	0.04	0.3	11.4	870	1.7	4.2	0.001	0.04	0.31	2.6	0.5	0.2	41.6	<0.01	0.01	1.5	0.097	0.05	0.4	44	0.06	5.74	32	3.9
41	621	2.33	0.05	1.65	12	1610	4.5	14.6	0.002	0.13	0.56	3.1	2.1	0.6	56.8	<0.01	0.04	1	0.138	0.18	4.46	61	0.16	9.74	104	0.7
43	311	0.3	0.03	0.61	21.2	750	2.2	3.3	0.001	0.02	0.51	4	0.5	0.2	30.1	<0.01	0.01	0.8	0.115	0.04	0.29	58	0.09	6.03	40	3.1
76	280	0.26	0.03	0.19	5.2	950	1.1	2.8	<0.001	0.02	0.58	1.5	0.2	<0.2	40.9	<0.01	0.01	0.4	0.051	0.02	0.23	178	<0.05	3.28	26	0.5

Notes:

Chemical analysis performed by ALS Chemex Laboratories, Fairbanks, Alaska.

Certificate Comments: ME-MS41:Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).

Table B-2: Summary of 51-Element Chemical Analysis of Lode Prospects

SAMPLE ID	WEI-21	Au-ICP21	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Recvd Wt.	Au	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg
	kg	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%
26a	1.13	0.009	0.52	0.33	3.9	<0.2	<10	10	0.09	0.02	9.25	0.08	2.85	1.1	31	1.39	1180	0.28	0.66	<0.05	0.06	0.01	0.01	0.24	0.9	0.5	0.05
26b	1.52	0.006	0.27	4.28	6.2	<0.2	<10	10	0.38	0.02	6.98	0.1	10.35	17	45	<0.05	622	3.42	16.7	0.36	0.67	<0.01	0.024	<0.01	4	3.8	0.74
32	1.41	0.003	0.14	3.4	11.7	<0.2	<10	220	0.2	0.14	0.11	0.06	17.3	27.7	105	4.64	81.1	5.94	17.2	0.16	0.02	<0.01	0.073	2.47	7.6	73.7	2.03
41	1.3	0.005	0.16	1.29	9.4	<0.2	<10	210	0.38	0.2	0.14	0.74	5.39	10.8	6	0.93	41.5	2.37	3.72	<0.05	<0.02	<0.01	0.041	0.25	2.5	24.1	0.45
44	1.2	0.023	0.15	2.55	712	<0.2	<10	70	0.14	1.46	0.72	0.7	3.79	27.6	138	0.24	49.1	4.32	5.53	0.09	0.26	<0.01	0.016	0.01	2	9	2.05
45	1.19	0.004	0.12	3.21	29.1	<0.2	<10	90	<0.05	0.04	0.65	0.12	0.56	36.7	228	0.08	90.8	4.5	6.19	<0.05	0.06	<0.01	0.008	0.03	0.2	12.2	3.23
49	1.42	0.002	0.02	0.76	25.4	<0.2	<10	90	0.05	0.05	0.24	0.02	9.59	2.4	5	0.35	5.5	1.37	2.33	<0.05	0.02	<0.01	<0.005	0.37	4.1	2.2	0.26
50	1.21	0.004	0.03	2.32	67.5	<0.2	<10	10	0.09	0.14	1.18	0.05	0.67	24.3	26	0.08	4.7	3.07	5.08	0.16	0.1	<0.01	0.01	0.01	0.3	11.2	2.17
53a	1.26	0.002	0.04	3.21	7.2	<0.2	<10	<10	0.08	0.04	0.46	0.04	2.42	18.8	5	<0.05	51.7	7.21	8.19	0.14	0.18	<0.01	0.008	<0.01	1	8.9	2.05
53b	1.23	0.003	0.02	1.72	13.3	<0.2	<10	10	0.07	0.06	0.52	0.03	9.84	25.7	5	<0.05	23.2	3.77	4.48	0.12	0.17	<0.01	0.027	0.01	5.6	3.9	0.79
56	1.1	0.002	0.01	1.9	6	<0.2	<10	60	0.08	0.02	0.43	0.2	6.91	15	30	0.08	7.7	3.52	3.58	<0.05	0.02	<0.01	0.012	0.09	3.4	9	1.34
62a	1.34	0.002	0.58	0.55	6.9	<0.2	<10	170	0.19	0.13	0.71	0.03	12.3	7.5	26	<0.05	45.2	1.58	2.57	<0.05	0.25	<0.01	<0.005	0.1	6.3	1.4	0.15
62b	1.37	0.01	0.09	2.67	2	<0.2	<10	10	<0.05	0.02	2.52	0.04	0.81	19.6	10	0.06	94.8	3.31	5.63	0.12	0.06	<0.01	0.008	0.01	0.4	5.5	1.74

Sample Results Continued

SAMPLE ID	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
26a	232	0.24	0.01	0.05	3.8	210	0.3	6.3	0.013	0.01	0.32	2.5	0.3	<0.2	30.5	<0.01	0.01	<0.2	0.079	0.03	<0.05	19	0.46	8.77	<2	1.3
26b	389	0.42	0.01	0.27	35.5	480	1.2	0.1	<0.001	0.01	0.12	7.9	0.5	0.7	51.5	0.01	0.01	0.4	0.48	<0.02	0.17	172	0.07	10.2	26	32.4
32	1240	0.72	0.07	0.28	65.5	430	1.7	113.5	0.001	0.2	0.05	22.9	0.8	1.2	5.9	<0.01	0.1	2.9	0.481	0.76	1.37	245	0.21	4.89	156	<0.5
41	222	2.95	0.04	<0.05	26.7	440	2.1	11.9	0.022	1.04	0.98	5.3	3	<0.2	17.1	<0.01	0.13	1	0.006	0.33	1.19	22	<0.05	4.06	94	0.5
44	588	0.57	0.04	0.09	66.7	180	3.8	1	0.001	0.03	1.66	12.8	0.9	<0.2	7.6	<0.01	0.02	0.2	0.191	0.03	0.11	95	0.06	5.07	65	9.3
45	660	0.07	0.04	<0.05	156	120	0.5	0.9	<0.001	0.01	0.13	4.5	0.3	<0.2	9.6	<0.01	0.01	<0.2	0.116	0.02	<0.05	84	<0.05	3.3	48	1.9
49	209	0.19	0.07	0.23	1	170	0.5	10.9	<0.001	<0.01	0.11	1.4	<0.2	<0.2	9.3	<0.01	0.01	1.7	0.087	0.03	0.26	12	<0.05	6.75	22	<0.5
50	775	0.14	0.02	<0.05	16.4	160	3.2	0.4	<0.001	<0.01	0.68	9.4	<0.2	<0.2	82.8	<0.01	0.01	<0.2	0.138	<0.02	<0.05	89	0.06	4.93	28	2.4
53a	709	0.49	0.03	0.06	3	180	0.9	0.2	<0.001	0.08	0.13	7.3	<0.2	1	30	<0.01	0.06	1.1	0.19	<0.02	0.27	172	2.68	3.07	39	3.3
53b	315	0.14	0.04	0.34	1.4	140	0.9	0.2	<0.001	0.03	0.14	4.2	0.3	2	38.6	0.01	0.02	1.5	0.142	<0.02	0.92	38	2.45	6.37	21	4.4
56	806	0.21	0.04	<0.05	10.9	150	2.1	2.4	<0.001	<0.01	0.08	6.7	<0.2	<0.2	5.9	<0.01	0.02	0.3	0.014	0.02	0.06	67	0.07	3.77	42	0.5
62a	35	0.56	0.04	1.19	27	280	2.4	2.1	0.006	0.77	0.19	3.8	4	0.2	14.7	<0.01	0.07	1	0.163	<0.02	0.25	38	0.41	7.24	12	7.4
62b	416	0.18	0.05	<0.05	37.2	140	0.5	0.3	0.001	0.01	0.07	3.4	<0.2	<0.2	16.1	<0.01	0.05	<0.2	0.076	<0.02	<0.05	83	0.08	4.05	35	1.9

Notes:

Chemical analysis performed by ALS Chemex Laboratories, Fairbanks, Alaska.

Certificate Comments: ME-MS41:Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).

Sample ID 41: Sample is from Placer Prospect 41 and should not be considered part of the Lode Chemical Analysis. Mistakenly submitted by field geologist.