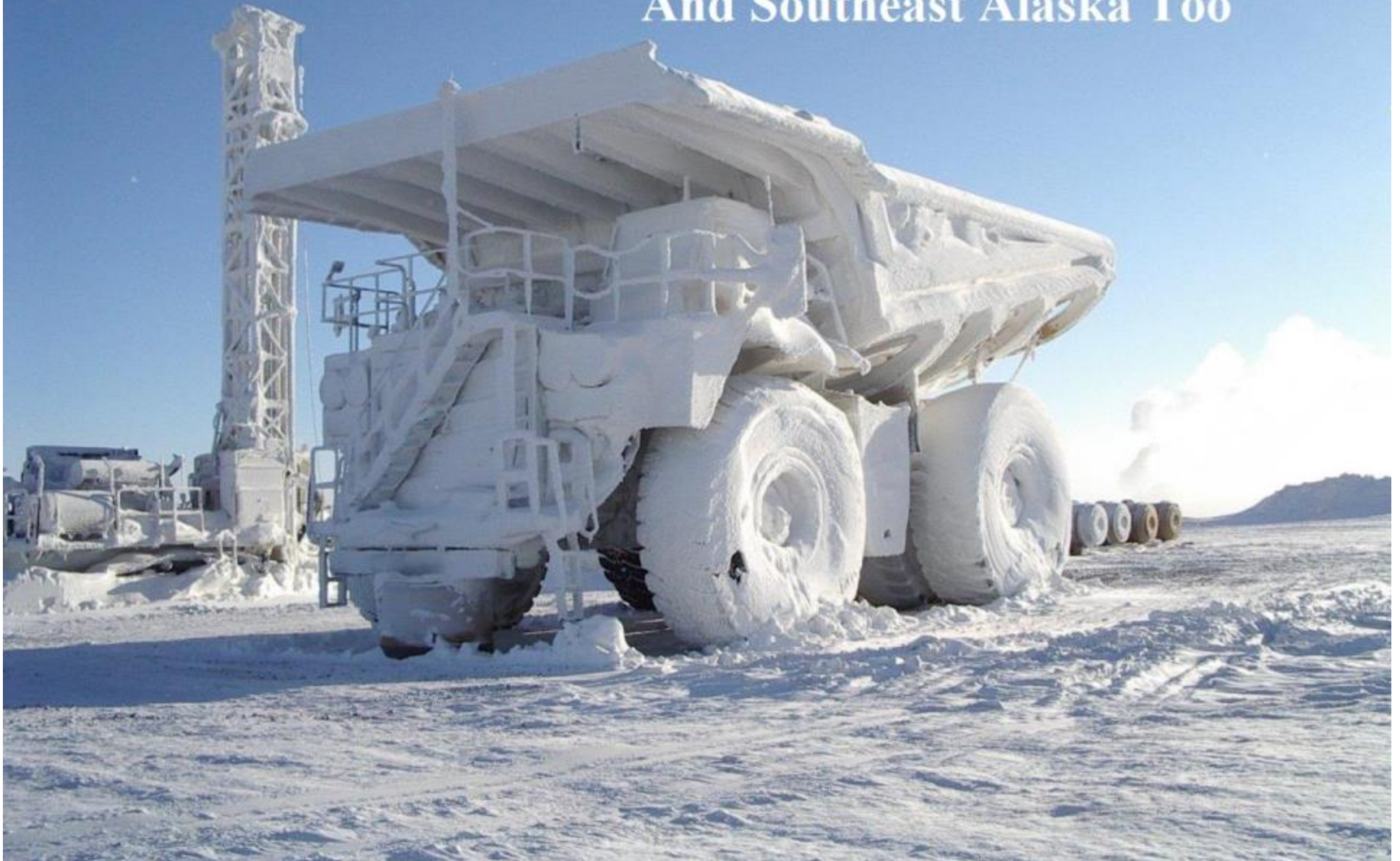
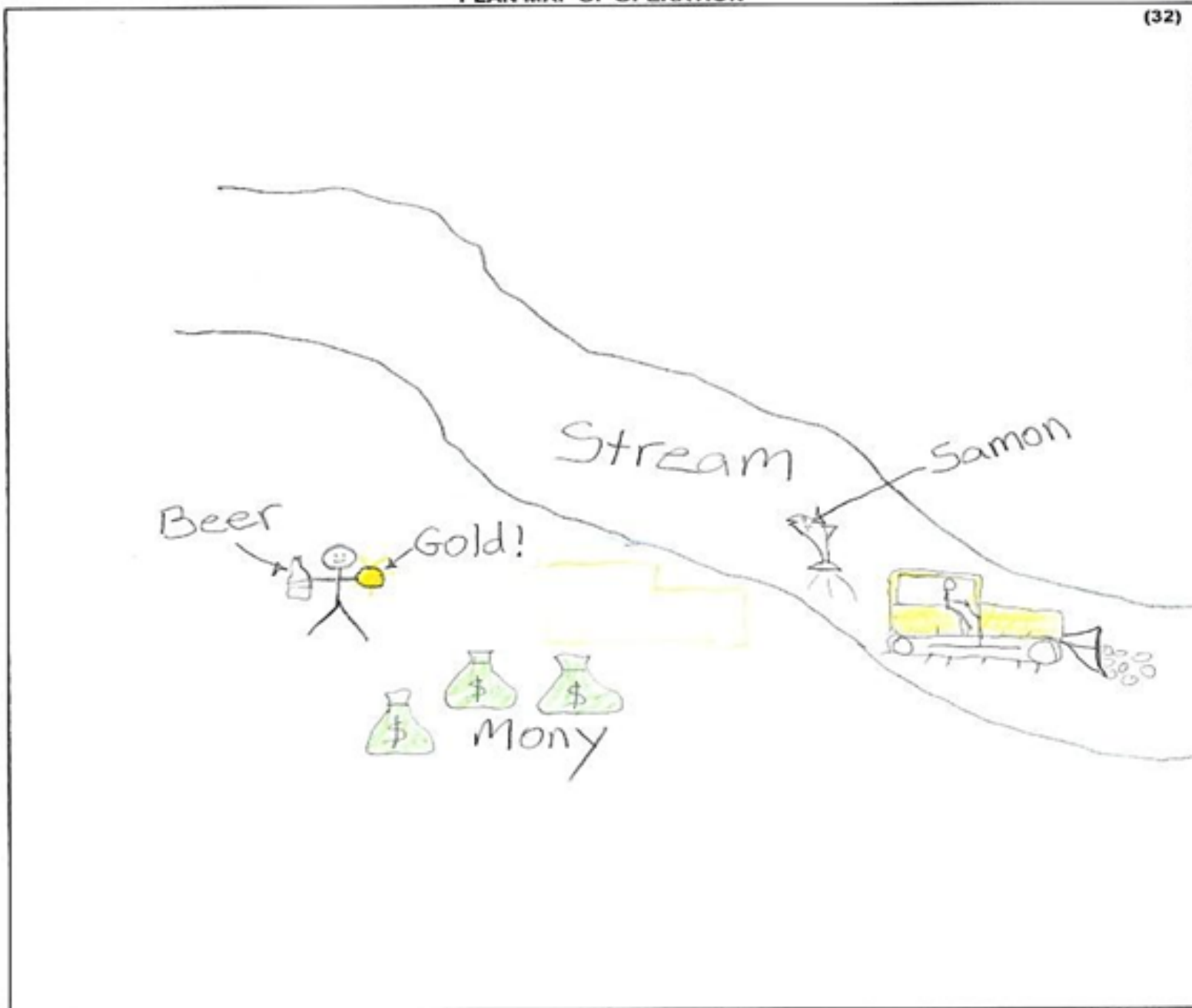


MINING IN THE FROZEN NORTH

And Southeast Alaska Too





(Attach Additional Sheets, Along With Detailed Explanations As Necessary)
PLEASE REVIEW THE SKETCH SHEET CHECKLIST TO ENSURE THAT ALL REQUIRED ITEMS ARE INCLUDED
INCOMPLETE SKETCH SHEETS WILL CAUSE THE ENTIRE APPLICATION TO BE RETURNED

Ain't it Cute?



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However, the television industry will be upset that they made a little less profit this year and will most likely whine about it. Fact is, I am probably breaking the law by showing this presentation to you all, but I really don't care. The television

industry has really made my life difficult with these stupid shows, and this is my payback. As you will see and hear later in this presentation, the National Geographic Channel has even made money off of me and my family. What did we get out of it? Nothing! Just some ridicule from our friends and family. Heck, they didn't even

send us a copy of the episode. I had to download it from Amazon.com for three bucks, and then I couldn't even burn it onto a DVD!!! However, technology saved the day, and I was able to download a free piracy program and rip it so you all would be able to enjoy my fishing trip one afternoon. While the National Geographic

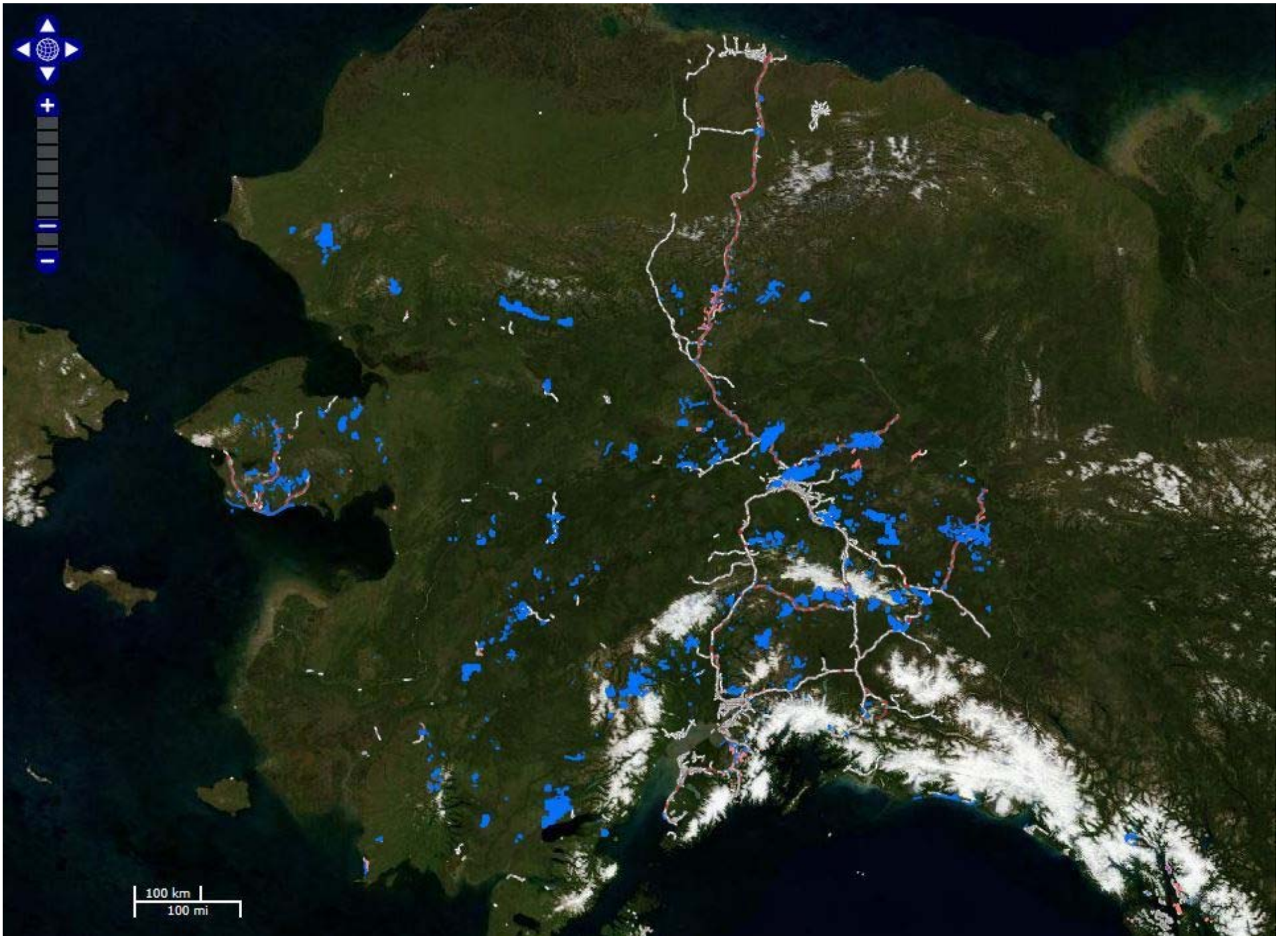
Channel made a big deal of it, and the show actually made it seem suspenseful, it was just a normal day on the water. We caught six Dungees and a Tanner, but the Tanner had Bitter Crab Disease, so we couldn't eat it. Blah blah blah blah blah blah blah blah Blah blah blah blah blah blah blah Blah blah blah blah blah blah blah Blah blah Blah blah blah blah blah Any infringement upon this copyright will immediately result in the seizure of all songs that you own, at which point they will be

transmogrified into Patsy Cline's greatest hits and will be played repetitively to you at the maximum volume allowable. If you happen to be a fan of Patsy Cline, it will instead be changed to Metallica. With that all said, please sit back and enjoy the rest of the presentation. Oh, and by the way... Heckling will not be tolerated.









Who Owns/Manages Alaska?

Private Ownership - 12.1%
46.2 Million Acres

State of Alaska - 24.1%
89.8 Million Acres

U.S. Government - 63.8%
238 Million Acres



Russian traders arrived in Alaska in the mid-1700's and established small, scattered trading posts and settlements. Alaska Natives (the Eskimo, Indian, and Aleut peoples) continued as the primary landowners during the period of Russian occupation. On October 18, 1867, Russia sold Alaska to the United States government. As a result, the federal government owned the Alaska Territory, approximately 373 million acres - about one-fifth the size of the rest of the U.S.



State of Alaska - 89.8 million acres

Under the terms of the Alaska Statehood Act of 1958, the federal government granted the new state 25% ownership of its land area. Approximately 133,350,000 acres were to be divided into three types of parcels:

- 1) Community - 400,000 acres
- 2) National Forest Community - 400,000 acres
- 3) General - 100,950,000 acres

Additional territorial parcels, for schools, cemetery and mental health trust lands, totaling 1.2 million acres were confirmed with statehood.

All grants combined gave the State of Alaska approximately 103 million acres. To date, 89.8 million acres has been granted, with the balance expected to be granted by 2018.

ANCSA Native Corporation (Private)
39.3 million acres

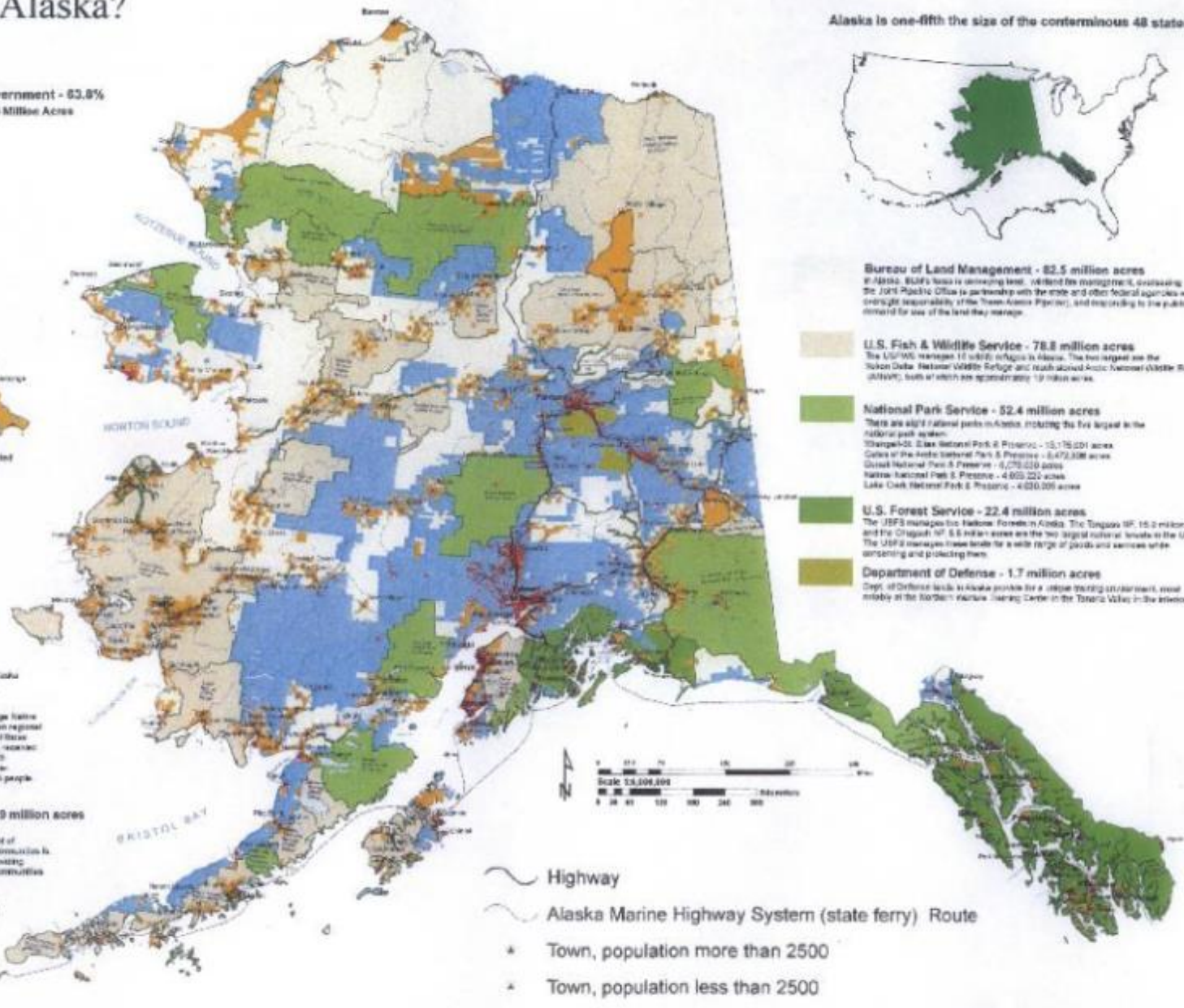
On December 18, 1971, P. L. 92-203, the Alaska Native Claims Settlement Act, was signed into law. The purpose of ANCSA was to recognize the territory which Alaska Natives could acquire title to their lands. This claim had been established by more than 100 years since the United States purchased Alaska from Russia in 1867.

Native lands are private lands. ANCSA mandated the creation of regional and village native corporations to manage 44 million acres and payment of one billion dollars. Thirteen regional corporations were created for the distribution of ANCSA land and money. Twelve of these states, in addition to 10 village corporations, the Thulecoyupuk corporation, based in Seattle, received a cash settlement only. 224 village corporations, of 20 or more residents, shared 29 million acres. The remaining acres, which include national parks and existing national parks, were left to find their way to small villages of less than 25 people. To date, 36.3 million acres have been transferred to ANCSA corporations.

Non-ANCSA Private & Local Government - 5.9 million acres

Land in private ownership (other than Native lands) comprises less than one percent of the total land in Alaska. Much of the land held by development around Alaska's communities is, or will be, privately owned. Private land development means people are able to provide places to live, work, shop and recreate. It also provides a tax base for cities and communities to help support public services.

Because local governments in Alaska have historical methods of transferring land, the private ownership, land currently held by them is grouped into the category:



Alaska is one-fifth the size of the conterminous 48 states



Bureau of Land Management - 82.5 million acres
In Alaska, BLM's focus is on managing land, wildlife and riparian habitat, overseeing the 10th Pacific Office in partnership with the state and other federal agencies and through responsibility of the Trust Assets Program, and responding to the public interest for use of the land they manage.

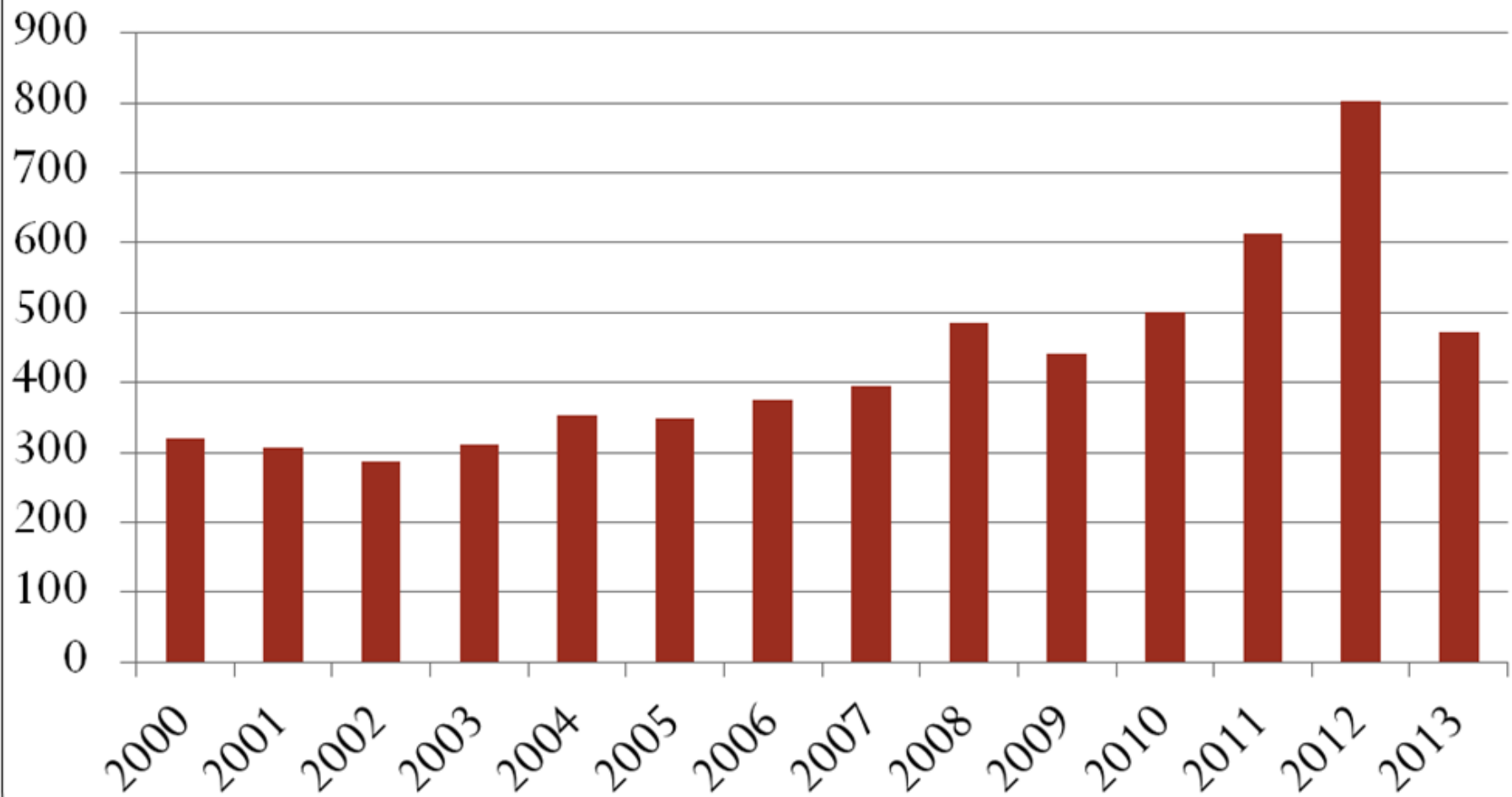
U.S. Fish & Wildlife Service - 78.8 million acres
The USFWS manages 10 wildlife refuges in Alaska. The two largest are the Yukon Delta National Wildlife Refuge and the rich coastal Arctic National Wildlife Refuge, both of which are approximately 19 million acres.

National Park Service - 52.4 million acres
There are eight national parks in Alaska, including the five largest in the national park system:
Denali National Park & Preserve - 13,175,000 acres
Cape Krusenstern National Park & Preserve - 8,472,000 acres
Gulkana National Park & Preserve - 6,270,000 acres
Katmai National Park & Preserve - 4,000,000 acres
Lake Clark National Park & Preserve - 4,000,000 acres

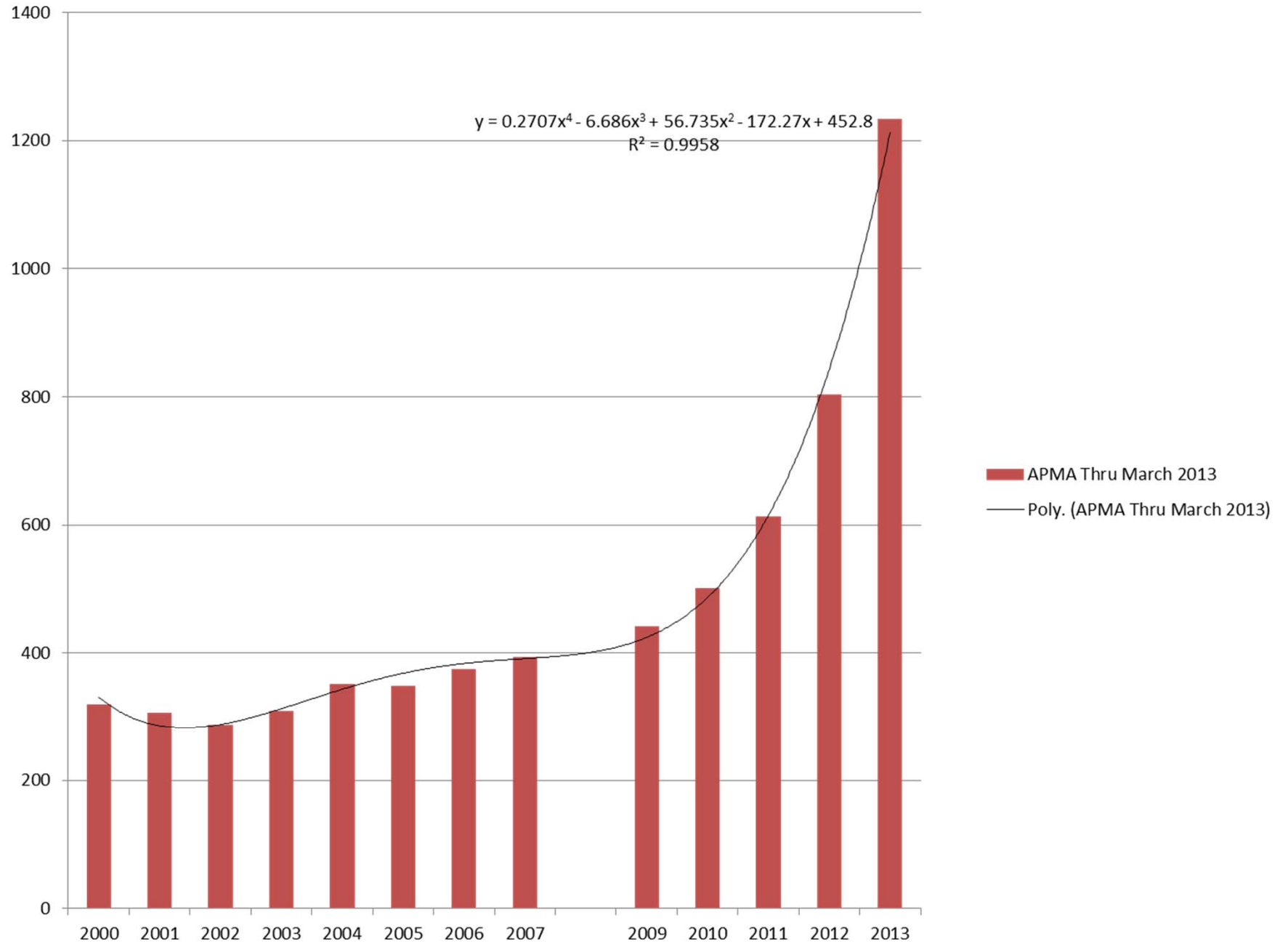
U.S. Forest Service - 22.4 million acres
The USFS manages five National Forests in Alaska. The Tongass NF, 16.2 million acres and the Chugach NF, 6.2 million acres are the two largest national forests in the U.S. The USFS manages these lands for a wide range of goods and services while conserving and protecting them.

Department of Defense - 1.7 million acres
Dept. of Defense lands in Alaska provide for a unique training environment, most notably at the Northern Warfare Training Center in the Totemik Valley in the interior.

Annual Placer Mining Applications



Annual Placer Mining Applications



Annual Placer Mining Applications

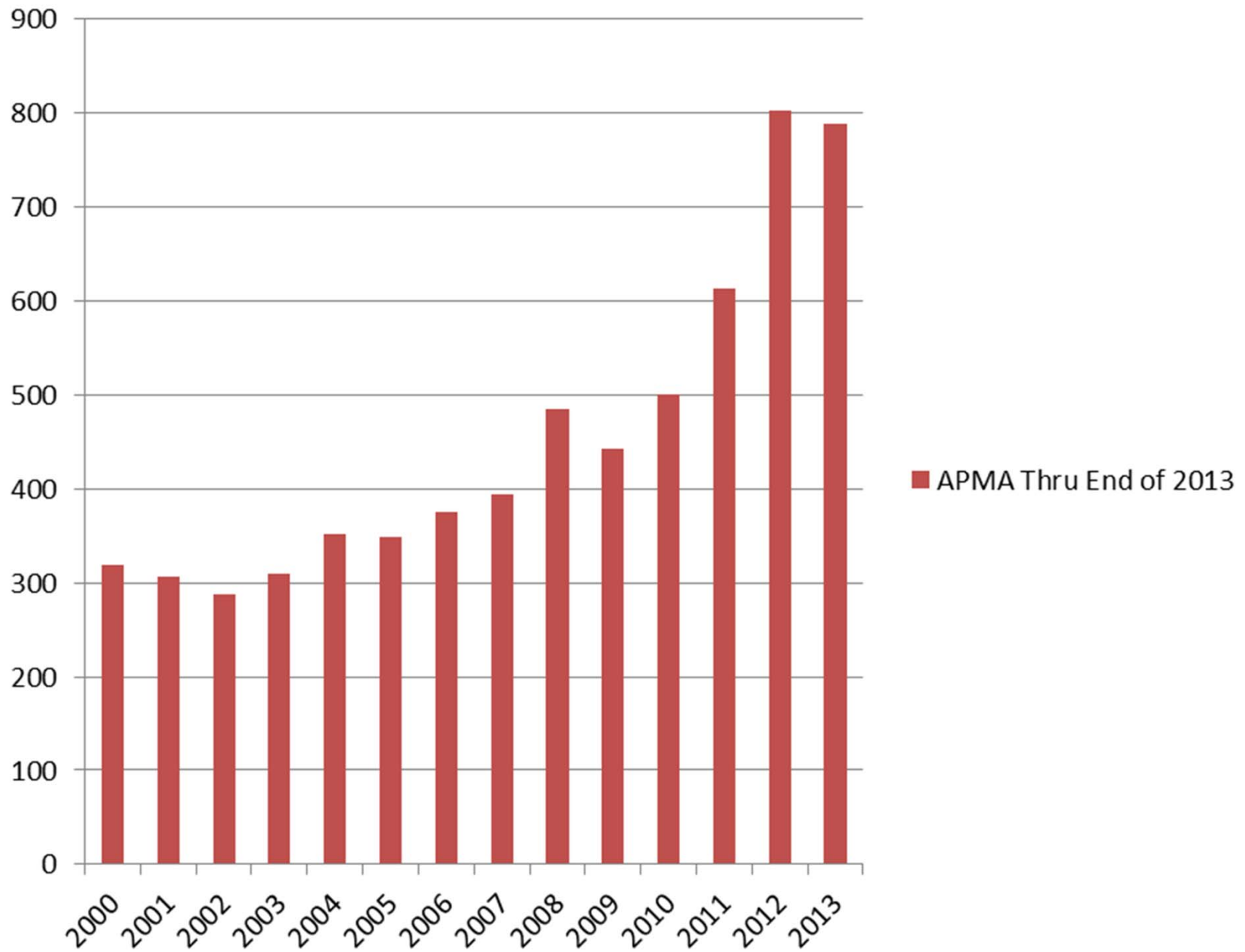




























Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image IBCAO

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CISWI Rule for Small Remote Incinerators



CISWI Limits for Small Rural Incinerators

• Unit ^a	Old Limit	New Limit
• HCl (ppmv)	300	200
• CO (ppmv)	64	13
• Pb (ppmv)	2.1	2
• Cd (mg/dscm)	0.95	0.67
• Hg (mg/dscm)	0.0053	0.0035
• PM (mg/dscm)	270	270
• DioxinTEQ (ng/dscm)	180	31
• NO _x (ppmv)	190	170
• SO ₂ (ppmv)	150	1.2

• ^a All emission limits are expressed as concentrations corrected to 7 percent O₂



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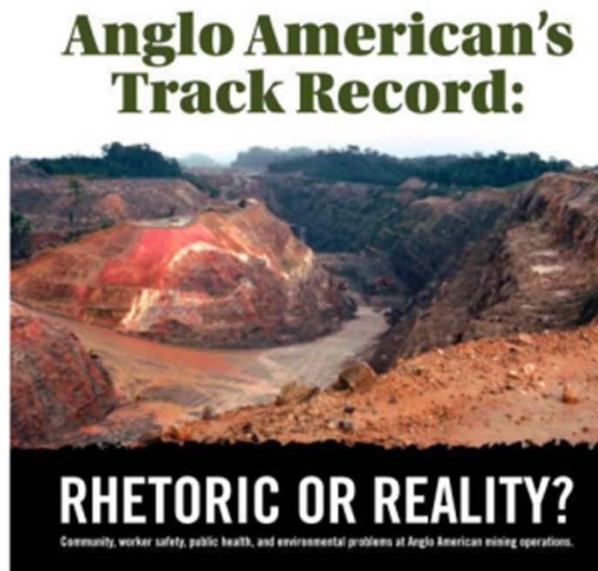
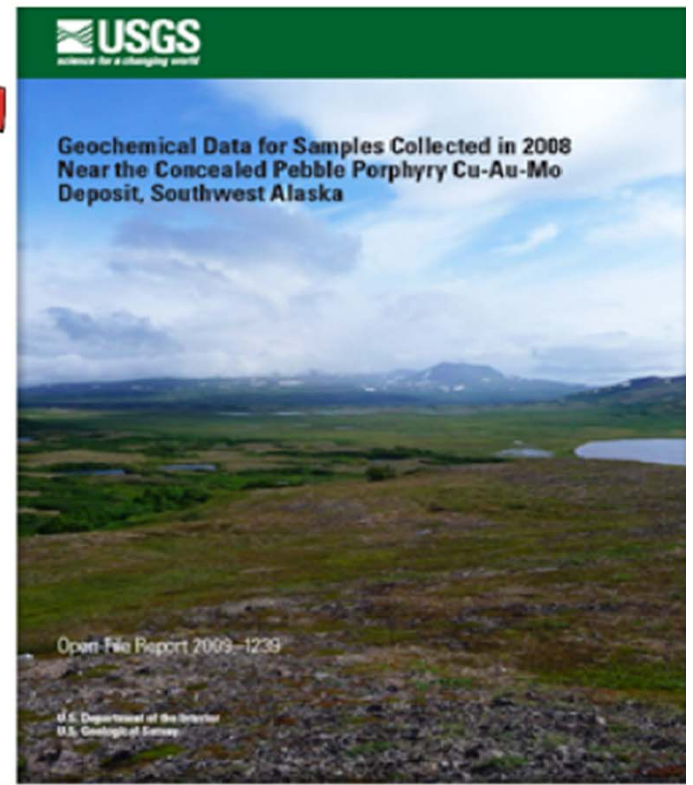
1000 m
2000 ft











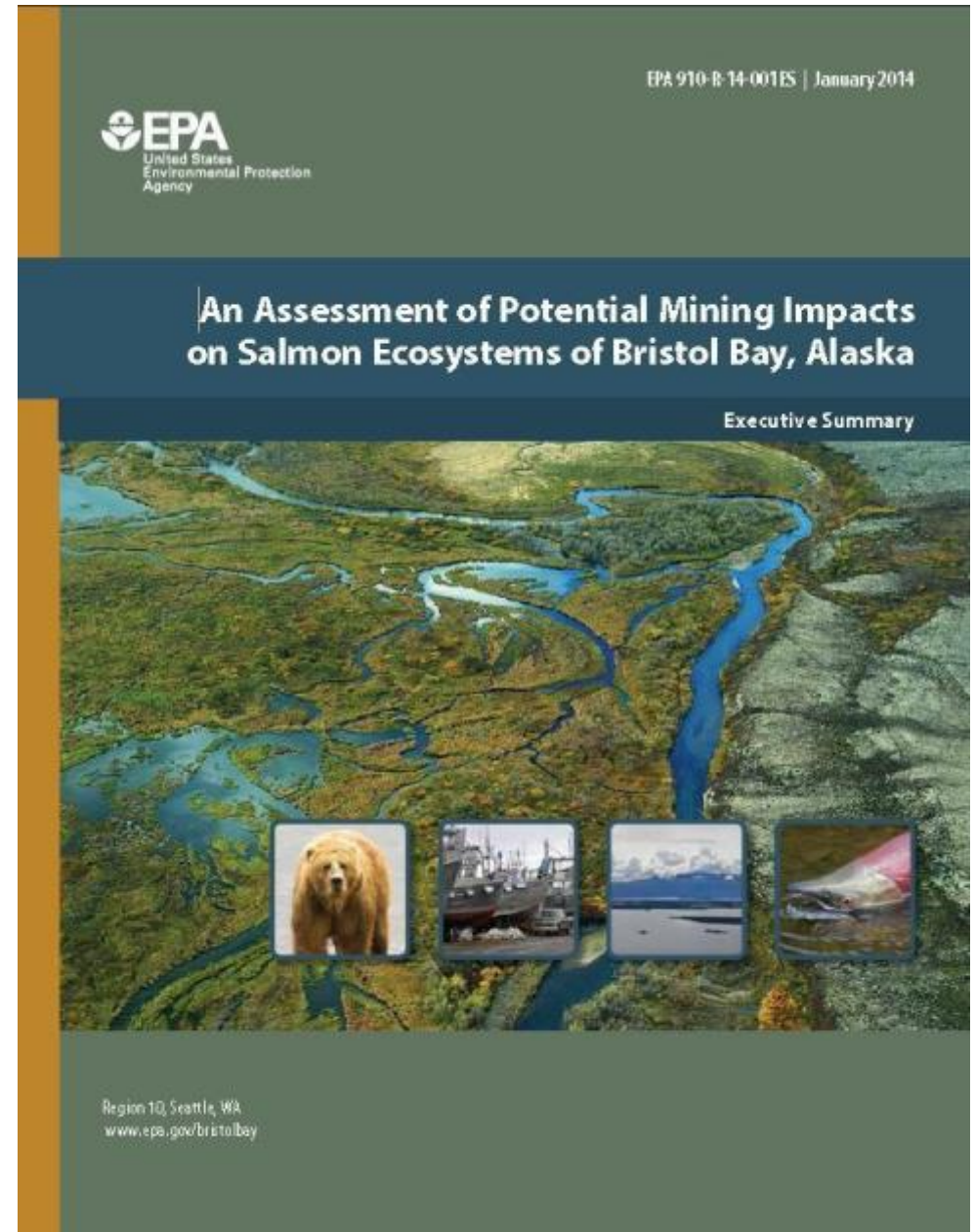
Bristol Bay Watershed Assessment (BBWA)

Focuses on a “hypothetical” mine, but mentions “Pebble” 96 times

Uses an assumed mine that could never be permitted in Alaska

An obvious prelude to a 404(c) preemptive permit veto

No mine plan has ever been submitted

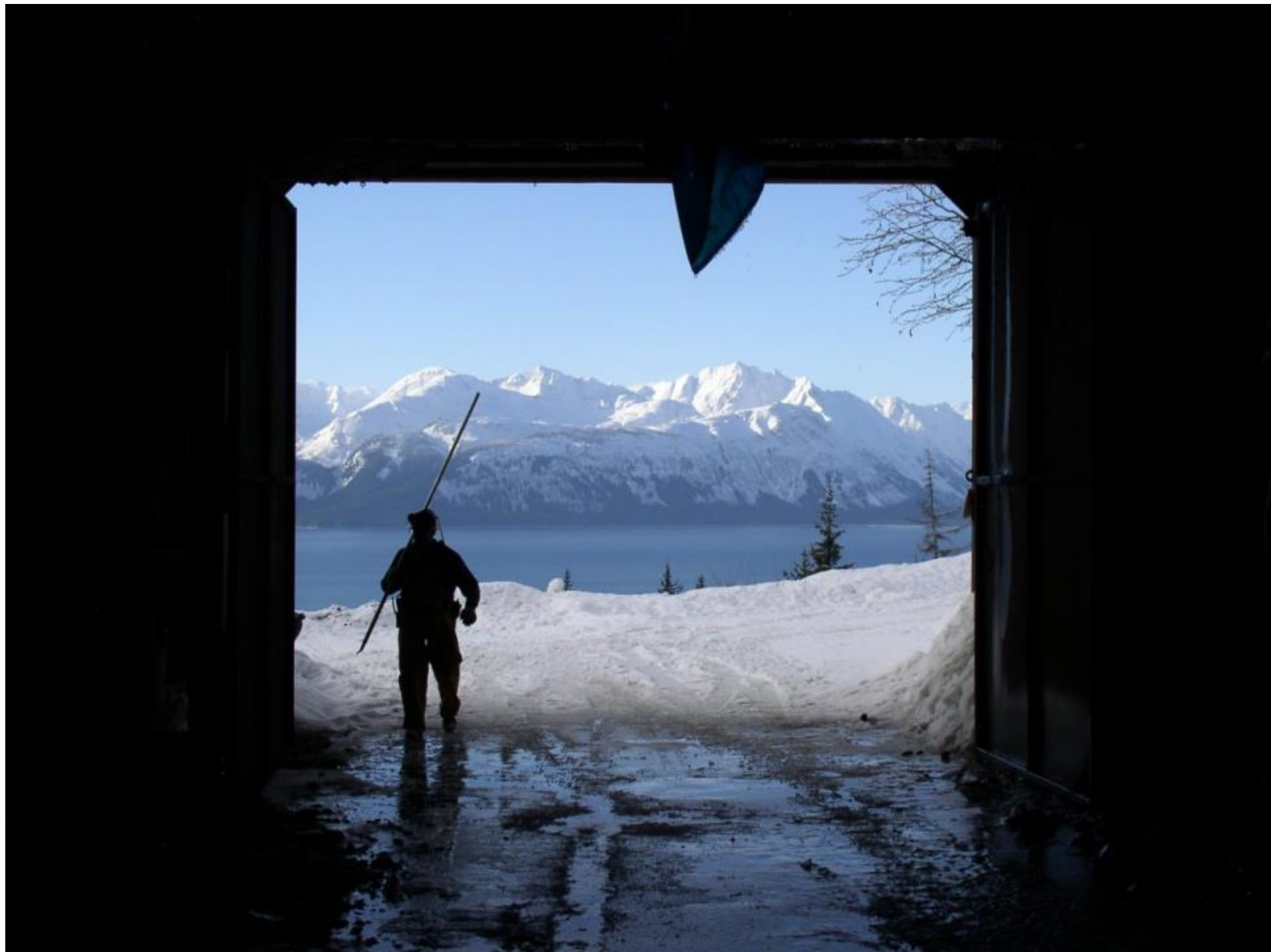




Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Lower Slate Lake

- “In issuing a permit for a gold mine, the Army Corps of Engineers considered the mine’s chemically processed, toxic mine waste to be “fill material” under the Clean Water Act, bypassing strict EPA limits for this type of pollution. As a result, millions of tons of mine waste will be dumped into a pristine sub-alpine lake in Southeast Alaska, killing all fish and aquatic life in the lake”.⁽¹⁾

⁽¹⁾ earthjustice.org



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Greens Creek Mine

Image © 2014 DigitalGlobe
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Challenges We Face

Permafrost 101

Sky

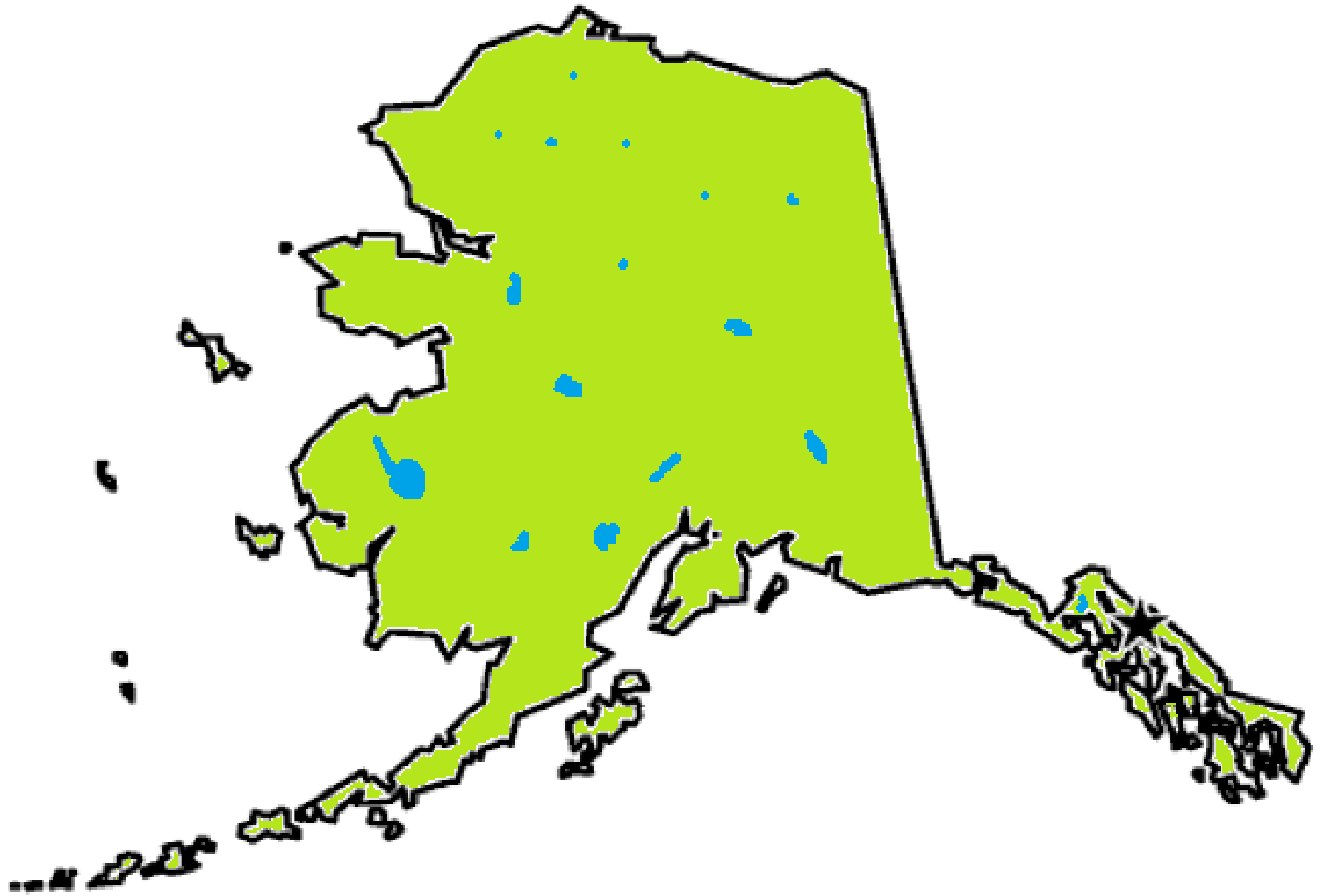
Active Layer - Thaws in the summer, freezes during the winter

Permafrost - Permanently frozen year round

Thawed year round

Issues the State of Alaska Faces

- Wetlands
- Permafrost/climate
- Cost estimation
- The EPA!!!!!!





Ice Wedges

Sky

Active Layer - Thaws in the summer, freezes during the winter

Permafrost - Permanently frozen year round

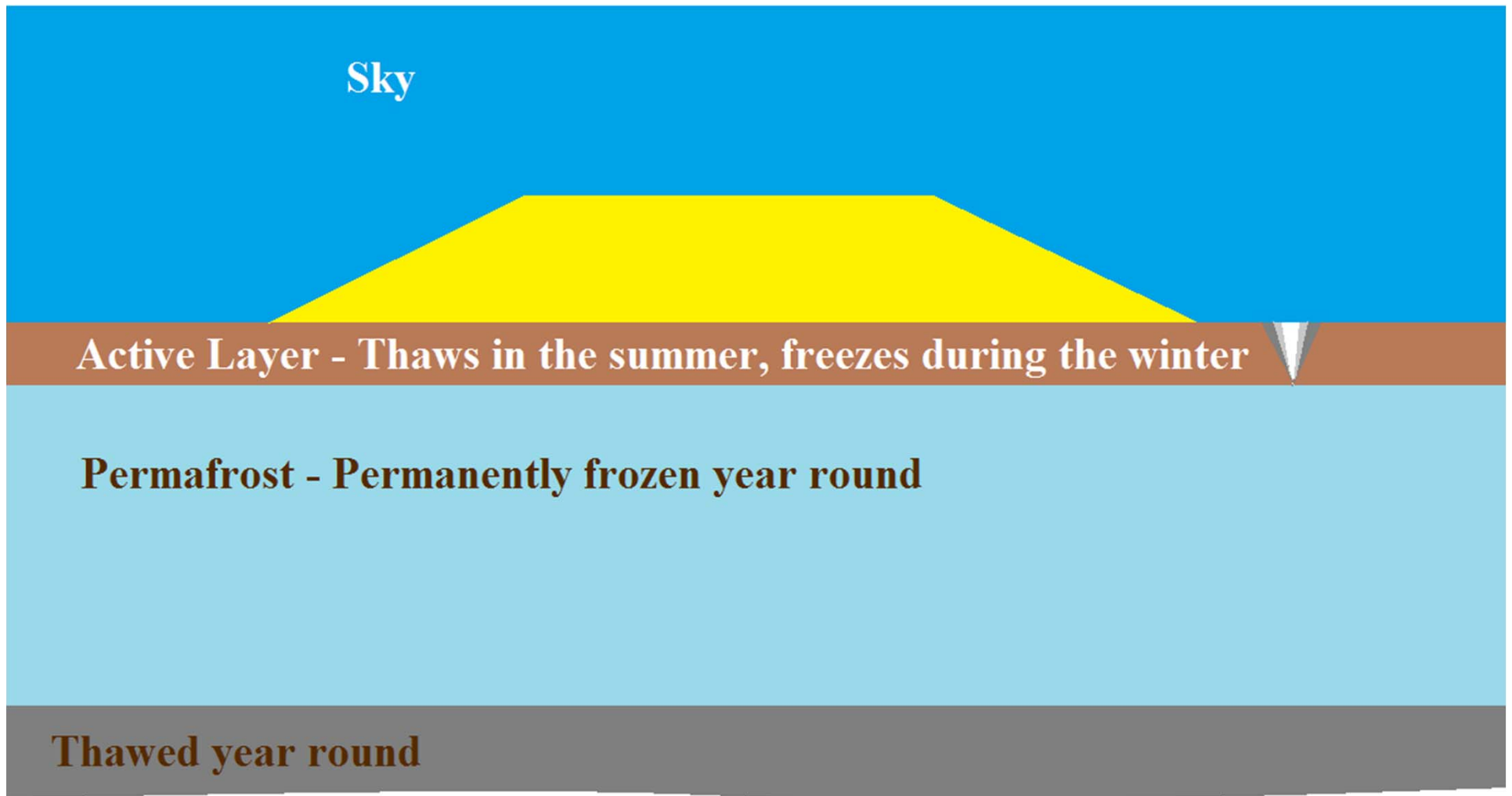
Thawed year round



Imago © 2014 DigitalGlobe

Google earth

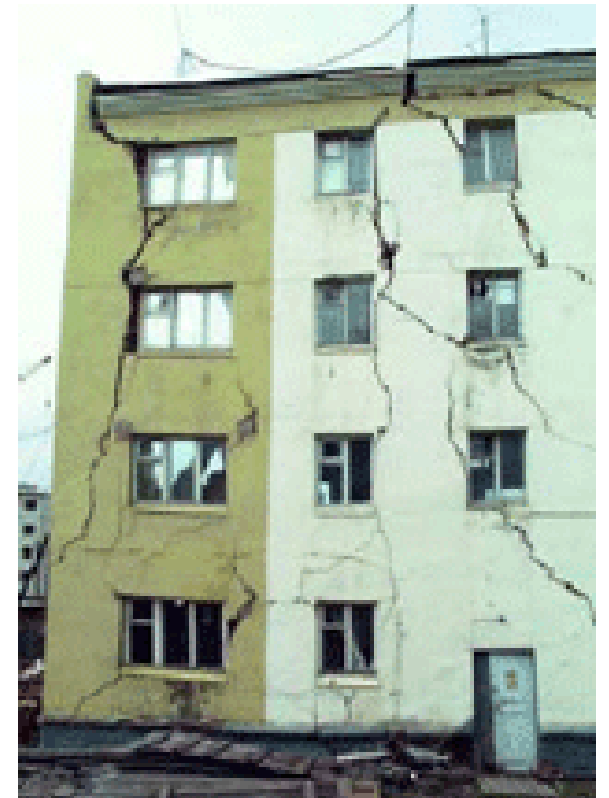
Tailings on Permafrost



Permafrost Tailings



Permafrost



Cost Estimation

	Labor	Equipment	Materials & Capital	Totals
Other Cost Items	\$4,964,302	\$15,537,055	\$18,275,185	\$38,776,542

Add Item Clear Items

Delete Item

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Other Cost Items Calculated Elsewhere

	Description (required)	ID Code	Facility Type	Quantity	Units	Total Capital Cost \$	Material Unit Cost \$	Labor Unit Cost \$	Equipment/ Operating Unit Cost \$	Cost Type (select)	Total Cost \$
1	Lime purchase for short-lag disposal		Waste Mgmt & Dispos	5,674	tons		\$226.00			A. Earthwork	\$1,282,324
2	Internal mill infrastructure demolition		Equipment Removal	3,672	hrs			\$395.79	\$163.38	D. Facility & Equipm	\$2,053,272
3	Post-closure cover maintenance - Tailings		Tailings Impoundmen	350	acres* yrs		\$1,067.40	\$240.83	\$158.86	E. Monitoring	\$513,479
4	Outfall pipeline and facilities maintenance		Water Treatment - Ot	3	ls				\$513,000.00	E. Monitoring	\$1,539,000
5	Various waste disposal		Waste Mgmt & Dispos	1	ls				\$703,673.66	C. Water Managem	\$703,674
6	Bridge Demolition		Site Facilities - Struc	5	ls		\$0.00	\$97,830.71	\$71,239.00	D. Facility & Equipm	\$845,349
7	Monitoring		Monitoring/Regulator	2			\$7,181,096.15			E. Monitoring	\$14,362,192
8	Marine demo		Equipment Removal	2			\$329,178.03	\$254,799.17	\$245,586.33	D. Facility & Equipm	\$1,659,127
9	Decontamination		Equipment Removal	2			\$0.00	\$302,060.87	\$33,239.80	C. Water Managem	\$670,601
10	Removal of miscellaneous linear items (1 backhoe+2 laborers)		Equipment Removal	428	hrs			\$157.68	\$42.41	D. Facility & Equipm	\$65,639
11	Utilization of underground equipment for disposal		UG Mine	2				\$513,034.58	\$884,174.90	A. Earthwork	\$2,794,419
12	Small crossings over Zinc and Greens Creek bridge locations		Other Facilities	345	sf		\$66.50	\$110.57	\$14.70	F. Construction Mg	\$66,161
13	Excavator for residual and short-lag material		Waste Rock Dump	2,538	hrs			\$56.49	\$95.53	A. Earthwork	\$385,827
14	Reconfiguration pumps and pipes		H2O Treat Sys Const	486	hrs	\$100,000		\$169.91	\$29.40	C. Water Managem	\$196,867
15	Demolish WTP		H2O Treat Sys Const	2	ls			\$16,704.93	\$14,399.70	D. Facility & Equipm	\$62,209
16	New pond (I) lining - liner 1		Ponds	100,357	sf		\$0.43	\$1.06	\$0.20	C. Water Managem	\$169,603
17	New pond (I) lining - liner 2		Ponds	123,523	sf		\$0.43	\$1.06	\$0.20	C. Water Managem	\$208,754
18	New pond (II) lining - liner 1		Ponds	75,648	sf		\$0.43	\$1.06	\$0.20	C. Water Managem	\$127,845
19	New pond (II) lining - liner 2		Ponds	74,738	sf		\$0.43	\$1.06	\$0.20	C. Water Managem	\$126,307
20	Mob - Y1		Equipment Removal	1	ea				\$151,537.80	Mob/Demob	\$151,538
21	Mob - Y2		Equipment Removal	1	ea				\$146,983.80	Mob/Demob	\$146,984
22	Mob - Y3		Equipment Removal	1	ea				\$141,422.40	Mob/Demob	\$141,422
23	Mob - Y10		Equipment Removal	1	ea				\$14,076.00	Mob/Demob	\$14,076
24	Mob - Y100		Equipment Removal	1	ea				\$65,011.80	Mob/Demob	\$65,012
25	Road repair at Year 100		Access Road	36	hrs			\$58.38	\$69.76	A. Earthwork	\$4,613
26	Remove log bridges		Other Facilities	160	hrs			\$211.95	\$139.57	D. Facility & Equipm	\$56,243
27	WTP operation		Water Treatment - Co	1			\$939,846.30		*****	C. Water Managem	\$9,969,004
28	WTP refurbishment - year 25		Water Treatment - Co	1		\$125,000				C. Water Managem	\$125,000
29	WTP refurbishment - year 50		Water Treatment - Co	1		\$125,000				C. Water Managem	\$125,000
30	WTP refurbishment - year 75		Water Treatment - Co	1		\$125,000				C. Water Managem	\$125,000
						\$475,000	\$17,800,185	\$4,964,302	\$15,537,055		\$38,776,542

Indirect Costs.....

$$\begin{aligned}
 0 &= Q_{11}^{78} - \frac{a_2^4}{a_1^4} Q_{22}^{78} - \frac{a_3^2}{a_1^2} Q_{31}^{78} - \frac{a_2^2 a_3^2}{a_1^4} Q_{23}^{78} \\
 &\stackrel{a}{=} P_{11}^{78} - P_{22}^{78} - \frac{a_3^2}{a_1^2} (P_{31}^{78} - P_{23}^{78}) - 2 \frac{a_3^2}{a_1^4} A_3 \left(\frac{17}{3} a_1^2 S_3 + a_3^2 S_5 \right) \\
 &= \alpha_{11}^{78} - \alpha_{22}^{78} - \frac{a_3^2}{a_1^2} (\alpha_{31}^{78} - \alpha_{23}^{78}) - 2 \frac{a_3^2}{a_1^4} A_3 \left(\frac{17}{3} a_1^2 S_3 + a_3^2 S_5 \right) \\
 &\quad + \sum_{i=3}^5 S_i \left[(u_{11}^{(i)} - u_{22}^{(i)}) - \frac{a_3^2}{a_1^2} (u_{31}^{(i)} - u_{23}^{(i)}) \right] \\
 &= -2 \frac{a_3^2}{a_1^4} A_3 \left(\frac{17}{3} a_1^2 S_3 + a_3^2 S_5 \right) \\
 &\quad + (a_1^2 A_{111} + 6a_3^2 A_{113} - 7a_3^2 A_{1113}) \left(\frac{17}{3} a_1^2 S_3 + a_3^2 S_5 \right). \quad (16) = \mathbf{50\%}
 \end{aligned}$$

Questions?

David Wilfong – Alaska Department of Natural Resources – Juneau Mining Section

Northern Latitudes Reclamation Conference, workshop and tours. Summer/fall 2015

Free whale watching trips for attendees of this conference😊

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Email: david.wilfong@alaska.gov