SB 69
Geothermal Resources
Senate Resources Committee

Presented by:
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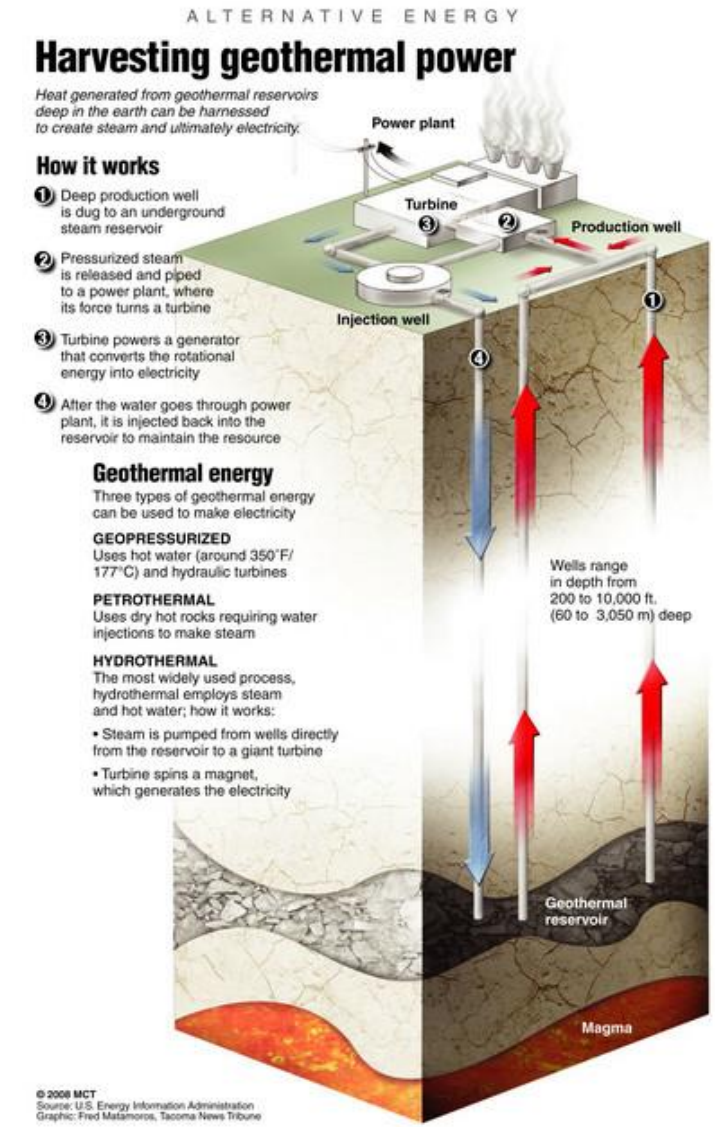
Outline

- **Division of Geological and Geophysical Surveys (DGGS): Fundamentals of Geothermal Systems**
- **Division of Oil and Gas (DOG): Overview of SB 69**
  - Purpose of SB 69
  - DNR geothermal leasing history
  - Sectional analysis summary
  - Sectional analysis key details
- **Supplemental**
  - DGGS: Examples of geothermal systems in Alaska
  - Drilling regulations

Fundamentals of Geothermal Systems

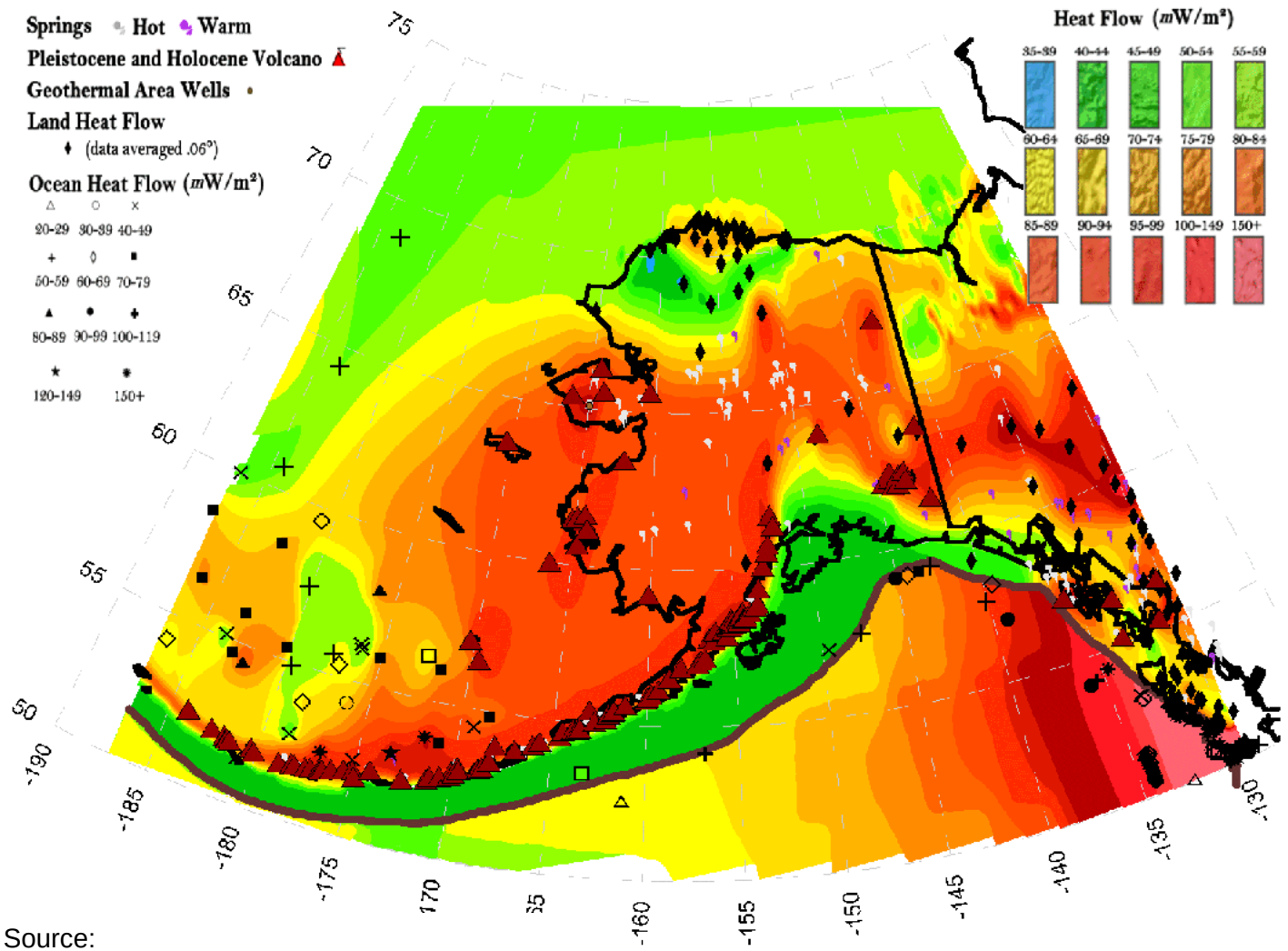
Melanie Werdon, Director
Division of Geological & Geophysical Surveys

Fundamental Ingredients of Useable Geothermal Energy



- Elevated geothermal gradient
- Porosity and permeability for the migration of fluids
- Surface access
- Sufficiently large thermal system
- Customers for energy

Heat Flow in Alaska



Source:
SMU Geothermal Map of Alaska, 2004

Most of Alaska is thought to have slightly elevated heat flow (red). However, only very localized areas will have all the ingredients for cost-effective geothermal energy use.

Introduction to Geothermal Resources

- Geothermal heat, where technically and economically accessible, is an excellent form of sustainable energy
- Hydrothermal systems are the most common form of energy extraction from geothermal heat
- Complex geologic parameters necessary for a viable geothermal resource, all present at one location, is rare
- Alaska contains many potential geothermal resources
- New technologies that will expand geothermal development into less favorable geology are on the horizon

Fiscal Note: New DGGS Geologist 4

- **Enables DGGS to restart its geothermal program. The new geologist would:**
  - Coordinate with agencies and industry to publish new geologic data to further development of Alaska's geothermal energy resources
  - Maintain and update geologic data on Alaska's geothermal systems in a geothermal database
  - Attract federal funds to characterize Alaska's geothermal systems and resources
  - Monitor developments in geothermal systems technology
  - Conduct geologic investigations of Alaska's geothermal systems
  - Publish geologic maps, reports and data on Alaska geothermal systems
  - Advise DNR and other state agencies on the state's geothermal resources
  - Support DNR's geothermal leasing program
  - Support and supply information to explorers and developers of Alaska's geothermal resources
  - Support and advise DNR Commissioner's Office and Governor's Office on geothermal policy
- **$190.0 UGF initial cost FY2025**

Overview of SB 69

Sean Clifton, Policy & Program Specialist
Division of Oil & Gas

Purpose of SB 69

Modernize Alaska's geothermal exploration program

- Greater potential for providing affordable, renewable energy to rural communities and remote natural resource extraction projects
- Promote clean energy industry job creation

Align geothermal licensing with the oil and gas exploration license program, thereby increasing feasibility for companies to develop resources

- More time for a company to identify and prove resource to convert to leases
- Conversion to leases based on completion of work commitment and submission of exploration plan instead of proving discovery of commercial resource
- Doubles maximum acreage allowed for exploration
- Repeals rental/royalty modification after 20 years of production, providing stability and predictability for investors in geothermal energy projects

Reform definitions for geothermal resources and fluids to account for technological advancements in the geothermal industry

DNR Geothermal Leasing/Permitting History

Present	**Mount Spurr** Two leases in the Mount Spurr area, issued as permits in 2021 and converted to leases in 2023. **Augustine Island** Prospecting permit in the southern part of the volcanic island issued in 2022. A second permit for extended areas around that area has been awarded in January 2024.
2013	**Augustine Island** 26 tracts were offered. Only one tract was leased to a private individual and no exploration work was conducted as a result of that lease sale.
2008	**Mount Spurr** 16 tracts were leased to Ormat and one private individual. Ormat purchased 15 leases in the 2008 sale and drilled on southern flank of volcano. They didn't find adequate temperatures in wells to pursue the project. The State has the data available on the Division of Oil & Gas website.
1986	**Mount Spurr** On June 24, 1986, DNR offered 2,640 acres in two tracts. Both tracts received bids. The lease for Tract 1 expired in 1996, and the lease for Tract 2 was terminated in 1990.
1983	**Mount Spurr** DNR held its first geothermal lease sale in the Mount Spurr area on May 17, 1983. 10,240 acres in 16 tracts were offered in Competitive Geothermal Lease Sale 1. One tract received a bid. The lease for that tract was terminated in 1992.

Leasing Under Current Law

Application and call for competing proposals

- If competing proposals ► competitive lease sale
- If no competing interest ► issue prospecting permit with *two-year* time limit
  - This bill replaces two-year permits with five-year licenses modelled after our modern oil and gas exploration licensing program.
  - Conversion to lease
    - Permit (current): “showing of a discovery of geothermal resources in commercial quantities”
    - License (bill): after work commitment is met

Both processes require Best Interest Finding and public input opportunity prior to award of permit, license, or lease

Royalties are set by AS 38.05.181(g): 1.75% of gross revenue for the first 10 years of production, then 3.5% of gross revenue after 10 years

SECTIONAL SUMMARY

Section (Agency)	Summary
1 (AOGCC)	Grants Alaska Oil & Gas Conservation Commission (AOGCC) authority to pursue primacy of Class V injections wells for geothermal energy
2 (AOGCC)	Removes unnecessary reference to AS 41.06 from AS 31.05.030(m) (*see* Section 10)
3 (DNR)	Changes *permits* to *licenses;* adds exemption for geothermal resources intended for domestic, noncommercial, or small-scale industrial use (*same as* Section 11); removes preferential rights clause (inappropriate for commercial development of State resources)
4 (DNR)	Changes *permit* to *license;* extends term of licenses (formerly *permits*) from two to five years; replaces lease conversion requirement of *commercial discovery* and *development plan* with *work commitment* and *exploration plan*
5 (DNR)	Changes *permit* to *license*
6 (DNR)	Changes *permits* to *licenses;* increases maximum acreage from 51,200 to 100,000; moves rental fees to be set by regulation
7 (DNR)	Amends AS 38.05.181(f) to grant leases for 10 years, with opportunity for a five-year extension, with standard indefinite extension by production Repeals opportunity for DNR commissioner to modify rent and royalty rates after 20 years of production
8 (DNR)	Adds three new subsections AS 38.05.181(*i–k*) to modernize unitization statute for geothermal leases to match the model used for oil & gas
9 (DNR)	Replaces AS 38.05.965(6) definition of *geothermal resources* (*same as* Section 14)
10 (AOGCC)	Amends AS 41.06.020(e), clarifies that AS 41.06 does not limit DNR's authority over geothermal resource management on state land
11 (AOGCC)	New subsection AS 41.06.020(f) adds exemption for geothermal resources intended for domestic, noncommercial, or small-scale industrial use (*see* Section 3)
12 (AOGCC)	Adds new subsection AS 41.06.057 to provide for penalties for violations of geothermal statutes (like oil & gas AS 31.05.150)
13 (AOGCC)	Amends AS 41.06.060(4) definition of *geothermal fluid* to remove temperature references and better conform with other changes in this bill
14 (AOGCC)	Replaces AS 41.06.060(5) definition of *geothermal resources* (*same as* Section 9)
15 (AOGCC)	Repeals AS 41.06.005(b) and AS 41.06.030, since geothermal units are managed by DNR
16–20 (AOGCC/DNR)	General provisions for applicability and effective dates, including applicability for prospecting permits issued or currently being processed

Sections 3–6: Permits to Licenses

- **Provisions in these sections replace “permit” with “license.”**
- **Within DOG, “permits” are for surface use authorizations. For subsurface, “licenses” and “leases” are issued.**
- **Adopting the exploration licensing program for geothermal resource management conforms with existing processes for oil and gas.**
- **Section 17 allows for conversion of existing permits to licenses.**

Section 3: Private Use Exemption

- **New language:**

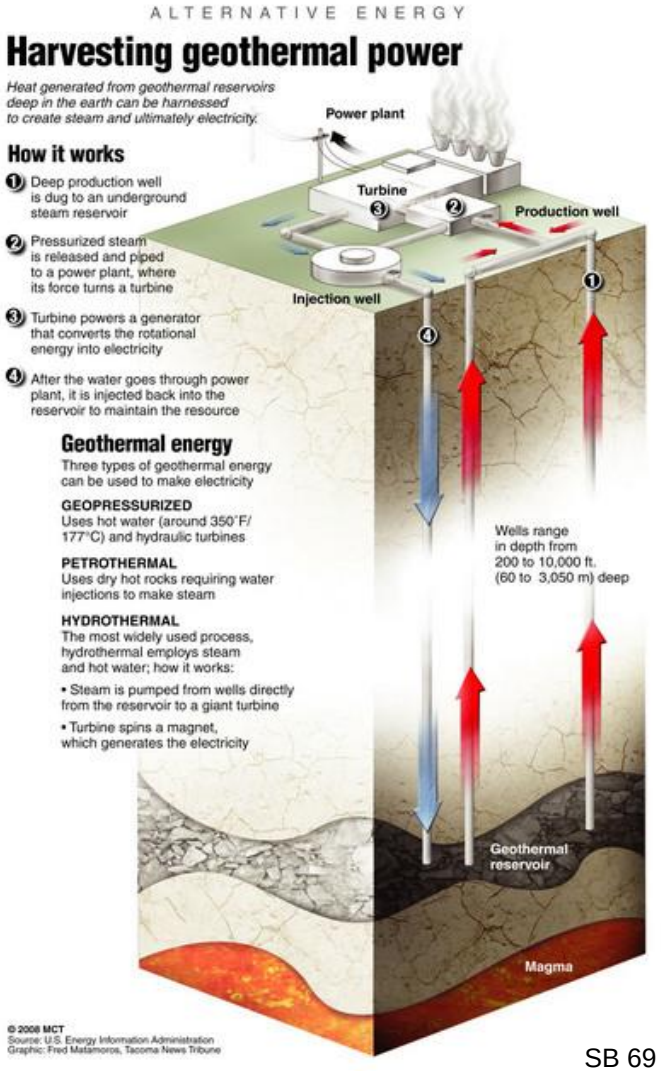
  A prospecting license or lease is not required under this section to explore for, develop, or use geothermal resources if the geothermal resource is intended for domestic, noncommercial, or small-scale industrial use.

- **Intent:**
  - Clarify that domestic users of ground source heat pumps don't need an authorization from DNR
  - Encourage the use of geothermal energy to provide affordable energy in non-utility scale applications

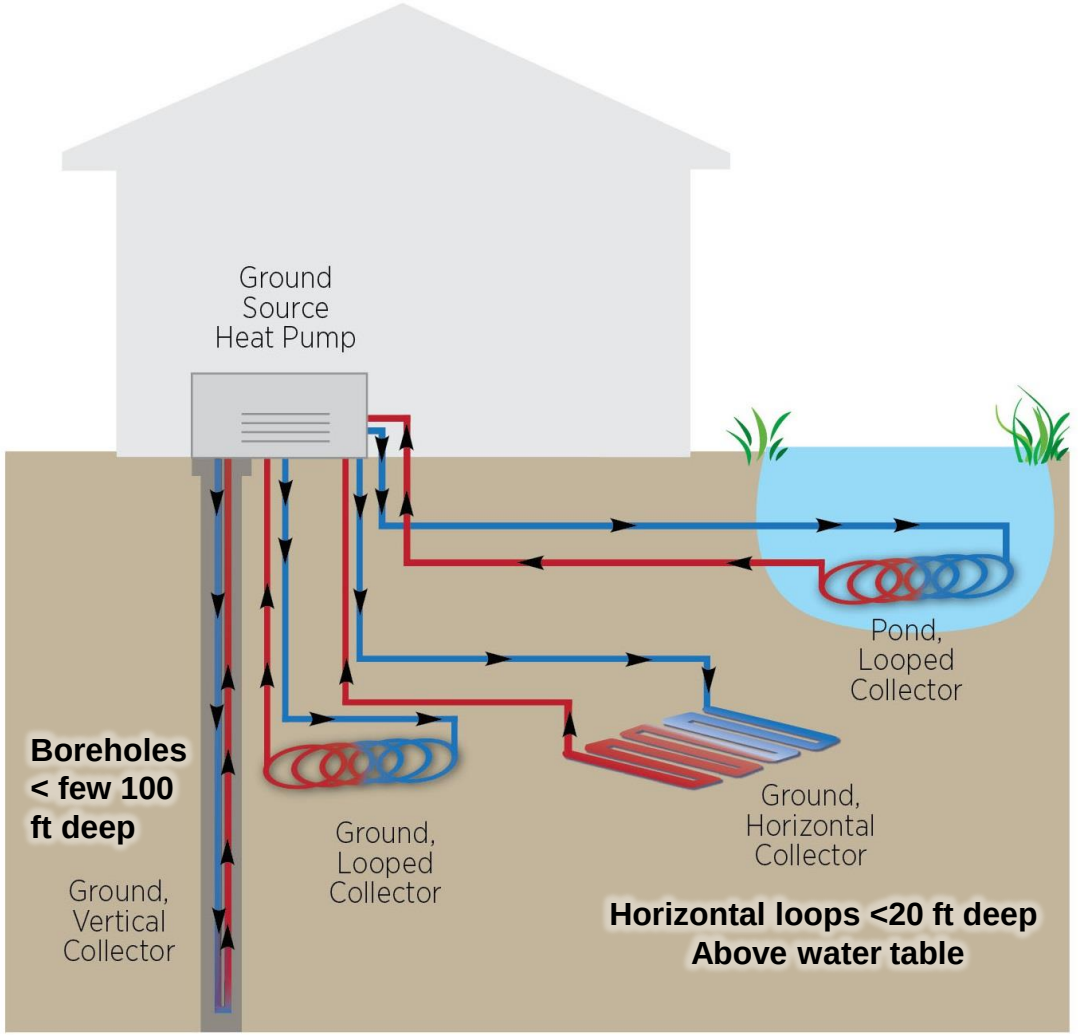
Commercial Geothermal Power Plants vs Non-Commercial Systems

Commercial power plants: wells thousands of feet deep tapping hot, non-potable water

- ***Deep subsurface vs near-surface systems separated by 1000s of feet***
- ***Vertical communication unlikely***



Non-commercial systems: heat pumps/loops above water table or wells less than a few hundred feet deep



Section 3: Preferential Rights

- **Current statute grants preferential rights to a surface owner to apply for a geothermal prospecting permit once notice is received of an existing application**
  - Inappropriate for a surface owner to have a preferential right to the *State's* mineral estate
- **Surface owners may still pursue *domestic* geothermal developments for their own uses**
  - Need well permits from AOGCC if hazards may exist
  - Need environmental review or permits from agencies such as Department of Environmental Conservation, Fish & Game, DNR Division of Mining Land & Water, or federal agencies
  - Examples of permitting requirements are detailed in a supplemental slide
- **Geothermal licenses and leases are *not* surface use authorizations**
  - They only provide the exclusive right to explore for and develop the subsurface resources
  - Public notice is a part of the license issuance process and surface owners can participate
  - Surface use authorizations require public notice *and* direct notice to any affected surface owners

Sections 4 & 7: Terms & work Commitment

- **Changes prospecting *permit* to *license* and increases term from 2 to 5 years**
  - Creates greater opportunity for success of noncompetitive geothermal program
- **Conversion to noncompetitive lease through completion of agreed upon work commitment**
  - Current process for oil and gas exploration license
    - Commitment expressed in dollar figure
    - Annual reporting and performance assessments are required
- **Amends AS 38.05.181(f) for geothermal leases**
  - Geothermal leases last for 10 years, with opportunity for a five-year extension, and standard indefinite extension by production
  - Repeals opportunity for DNR commissioner to renegotiate rental and royalty rates for geothermal leases after 20 years of production

Section 6: Acreage Limit & Rent

- **Maximum acreage a lessee may hold increases from 51,200 to 100,000 acres**
  - Geothermal systems can underlie very large areas
  - Enables explorers to more effectively delineate resource
- **Rental fees to be set by regulation instead of statute**
  - Enables DOG to be nimbler in response to market changes

Sections 9, 13, & 14: Geothermal Resources Definition

“Geothermal resources” means the natural heat of the earth; the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat; and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth; but excluding oil, hydrocarbon gases, or other hydrocarbon substances.

“geothermal fluid" means liquids, brines, water, gases, or steam naturally or artificially present in a geothermal system; “geothermal fluid” does not include oil, hydrocarbon gases, or other hydrocarbon substances;”

- Modern definition for geothermal resources
- Not limited by temperature because current technology enables development of cooler geothermal systems
- Ensures all the State’s mineral estate resources are captured in definition
- Distinguishes geothermal fluids from hydrocarbon resources
- Same definition being applied to both DNR & AOGCC statutes

Minerals or Gasses

- **Why this is an issue**
  - In some places, minerals such as lithium are being extracted from geothermal fluids as part of the production system
  - Helium and hydrogen are sometimes present in geothermal fluids and could also be produced
  - These are all valuable resources and production should be encouraged
- **What happens if these resources are produced**
  - The geothermal lease grants access to the State's subsurface, so no additional lease or permit is required
  - Minerals and gasses, except hydrocarbons, are considered part of the geothermal fluid, so a separate royalty for produced minerals or gasses would not be assessed beyond the geothermal lease

QUESTIONS?

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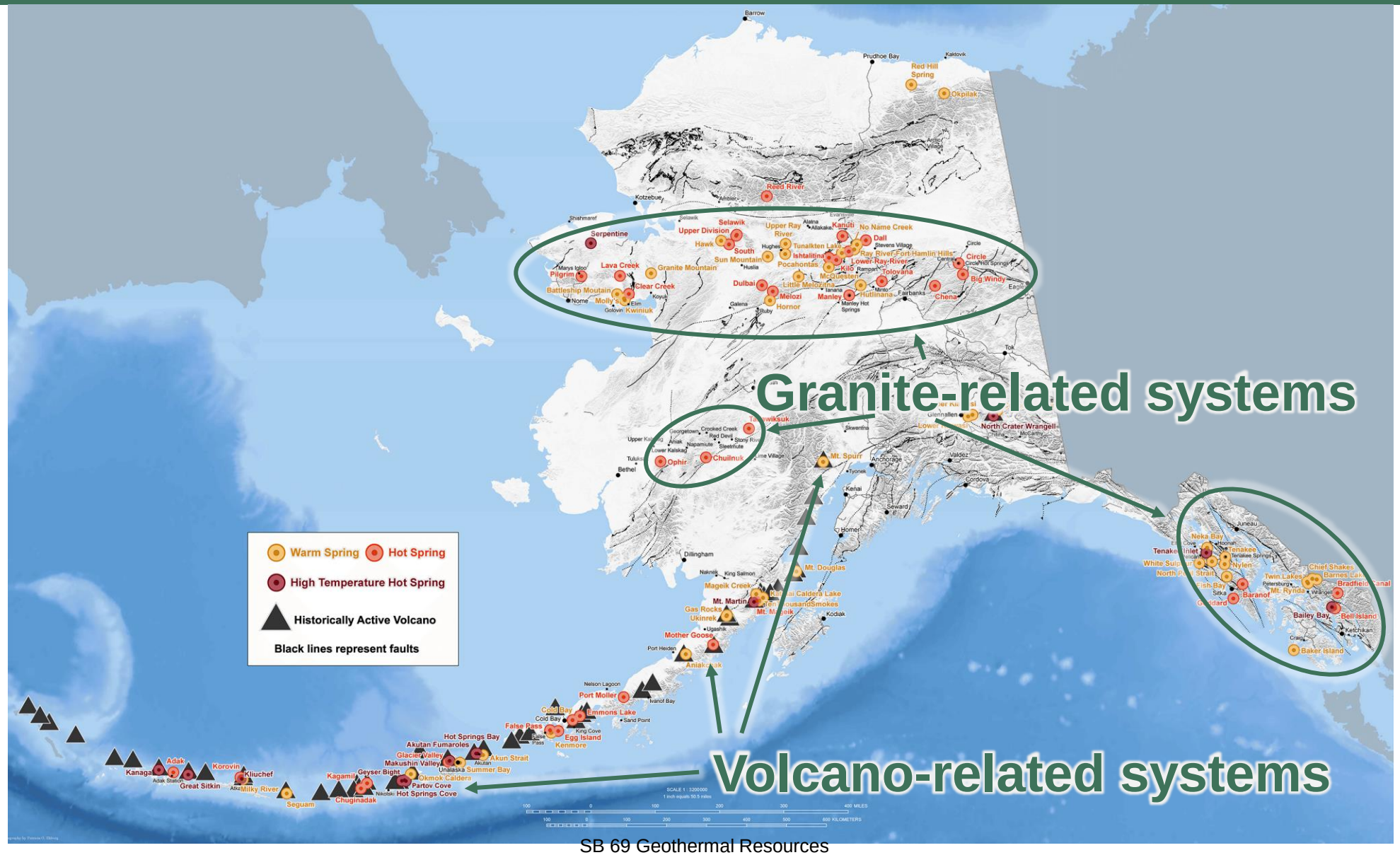
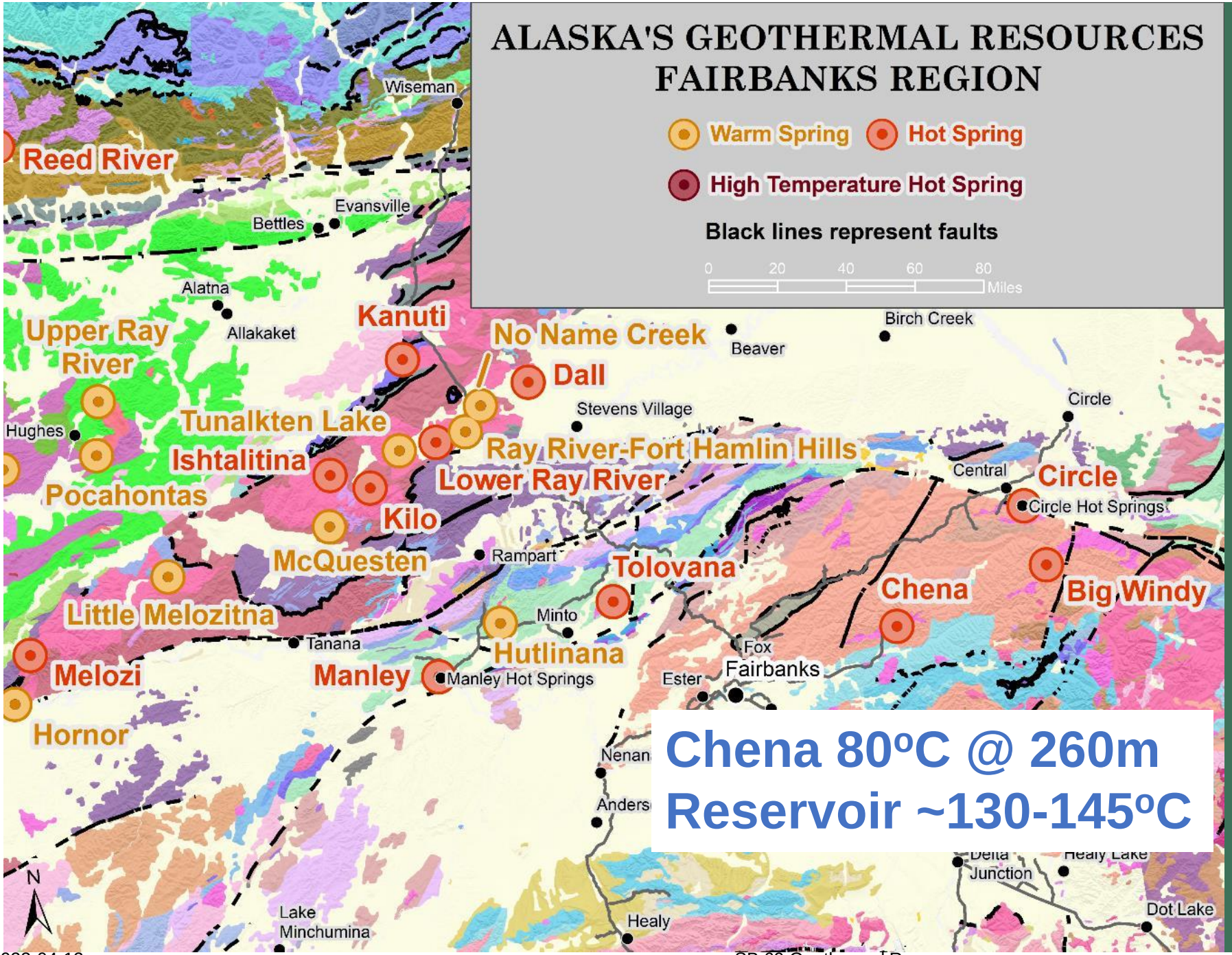
SUPPLEMENTAL INFORMATION

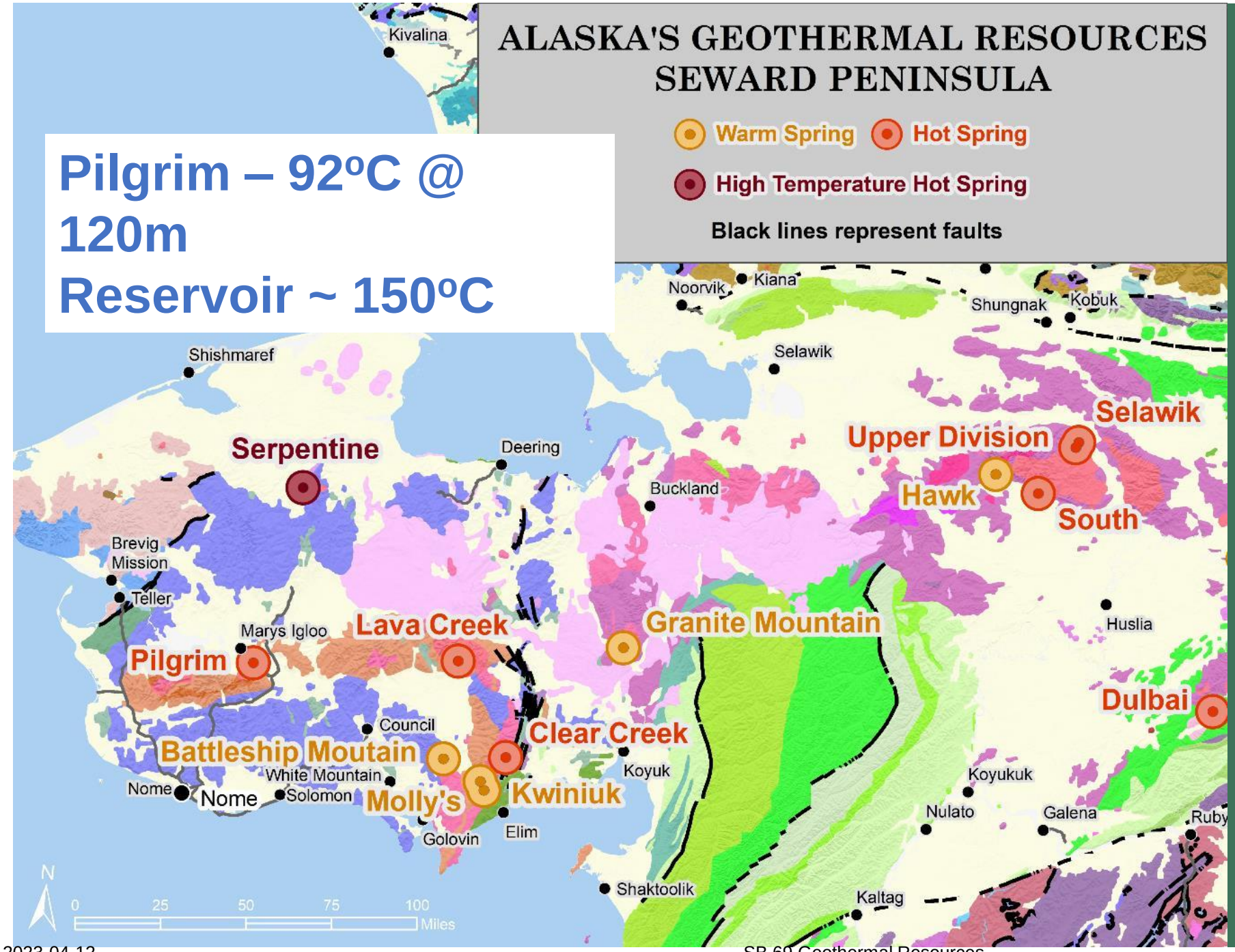
Geothermal Systems of Alaska



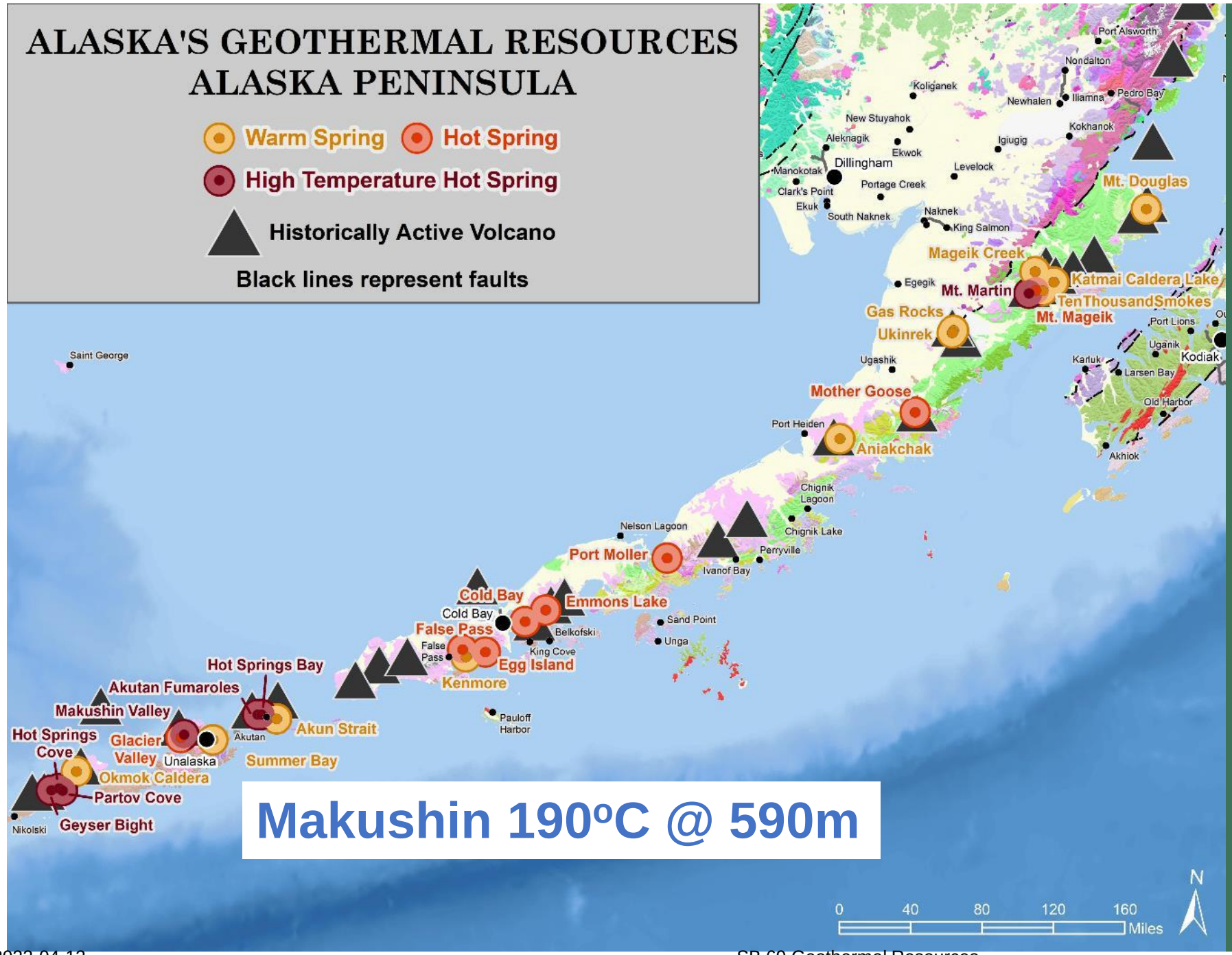


Chena 80°C @ 260m
Reservoir ~130-145°C

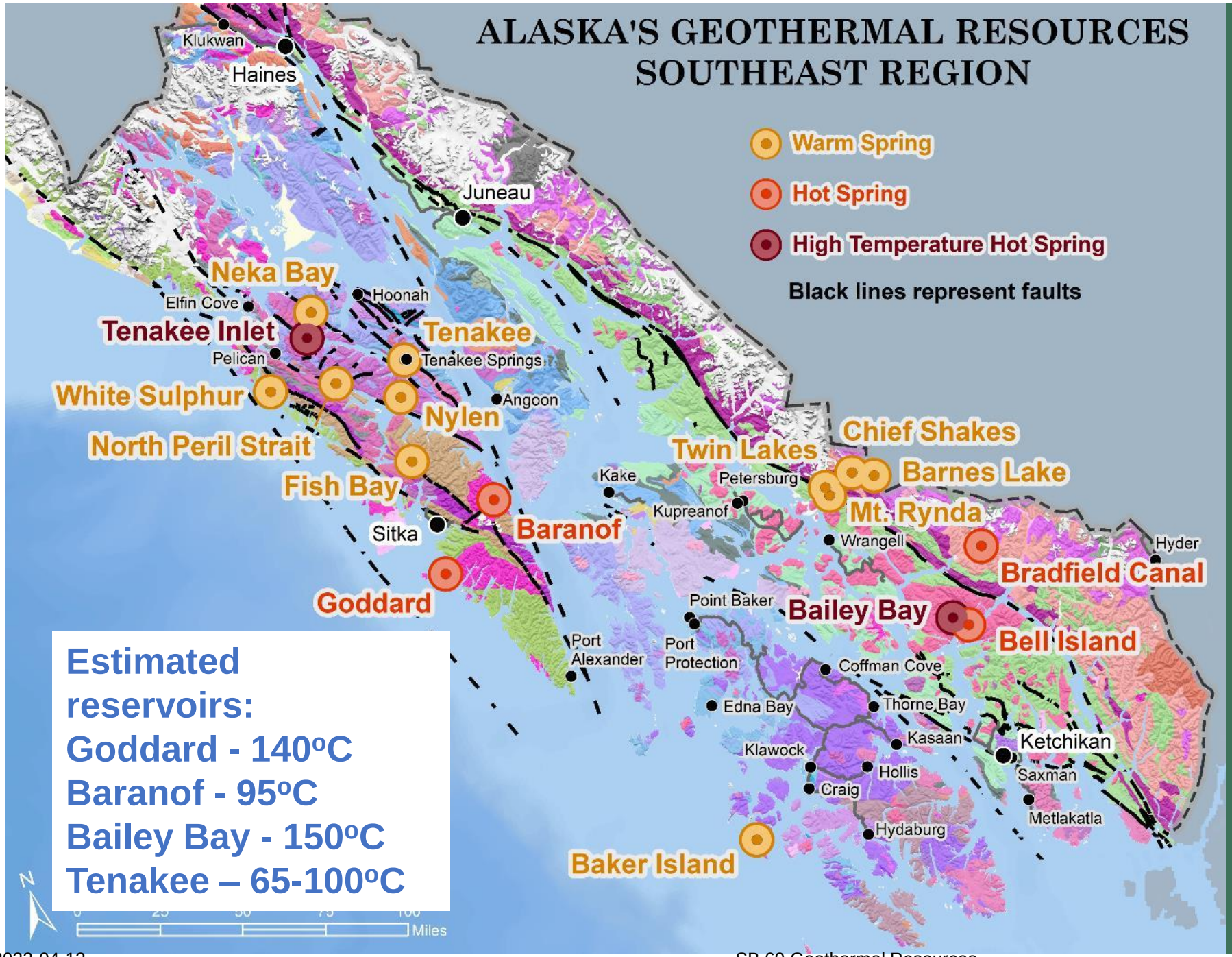
Geothermal Systems: Fairbanks Region



Geothermal Systems: Seward Peninsula Region



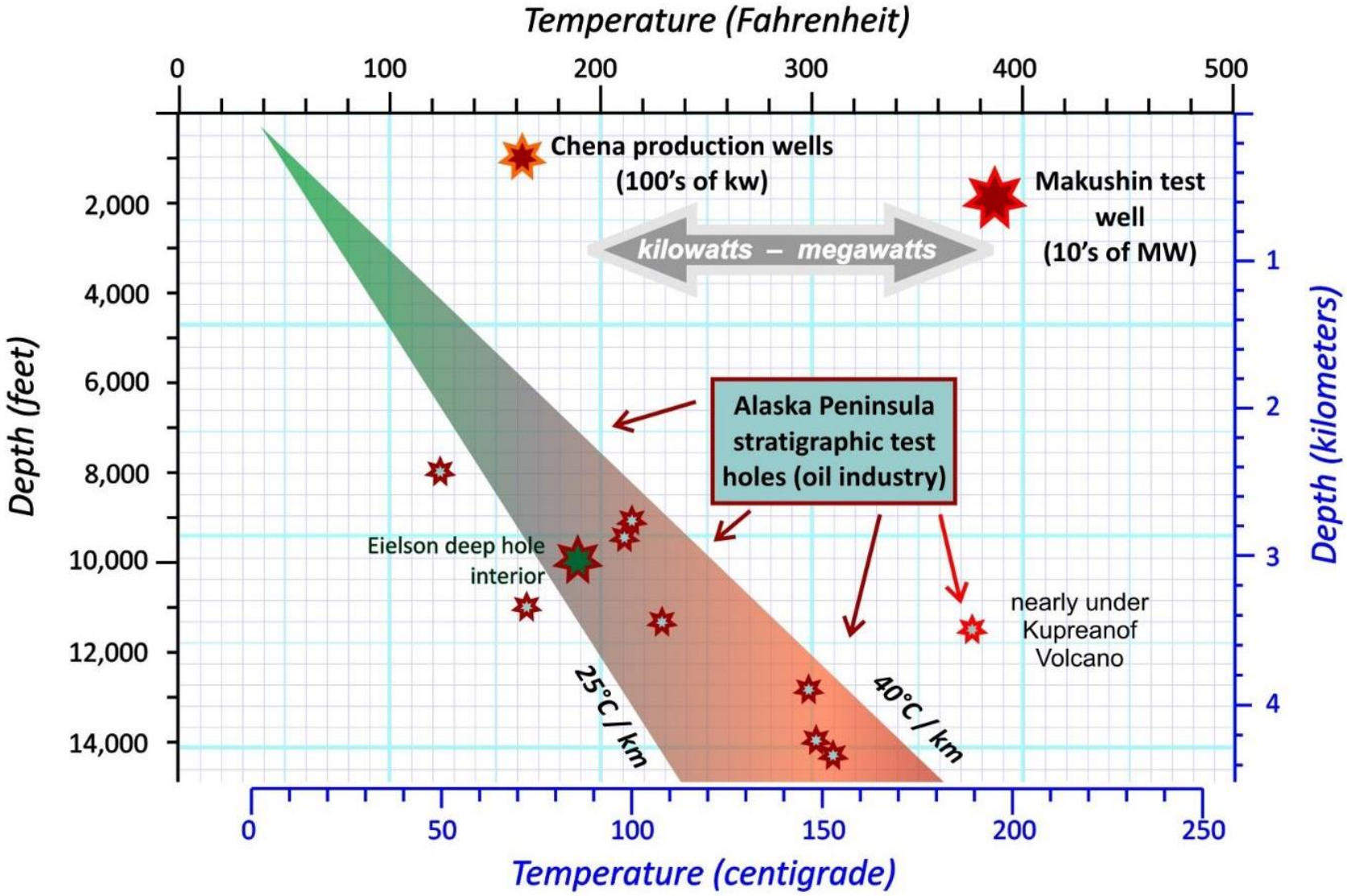
Geothermal Systems: Alaska Peninsula Region



Estimated reservoirs:
Goddard - 140°C
Baranof - 95°C
Bailey Bay - 150°C
Tenakee – 65-100°C

Geothermal Systems: Southeast Region

Geothermal Gradients



Drilling regulations

Division of Oil & Gas (DOG)

- Licenses or leases for access to the resource (subsurface use)
- Surface-use permitting (pads, facilities, and infrastructure) in support of exploration and development

Alaska Oil & Gas Conservation Commission (AOGCC)

- Ensures prevention of waste, protects correlative rights, improves ultimate recovery, and protects underground freshwater aquifers
- Issues of permits to drill wells is AOGCC's jurisdiction
- Jurisdiction over geothermal triggered by temperature (>120 °C) or commerciality. *New definition ignores temperature*
- Domestic, noncommercial, or small-scale industrial geothermal well not under AOGCC authority
- Exception: if well *may encounter geothermal resources, fluid, or water of enough heat/pressure to threaten life/health*

Department of Environmental Conservation (DEC)

- If the incidental discharge enters surface water, need Alaska Pollutant Discharge Elimination System (APDES) permit
- DEC Division of Water has permitted geothermal discharges using Plan Review in Lieu of Permit
- Engineering Support and Plan Review (ESPR) conducts plan reviews for smaller systems in municipality (heating or cooling pumps at UAA, U-med district, hatchery, etc.)
- DEC issues permits for *hydrostatic testing, including flushing and aquifer pump testing*
  - General permit AKG003000 provides for coverage of land disposal or discharge to surface water
  - One geothermal-related authorization, issued in 2015 for the Akutan Geothermal Project

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