



# Alaska Critical Minerals Collaborative

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*Many Traditions One Alaska*



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# Agenda

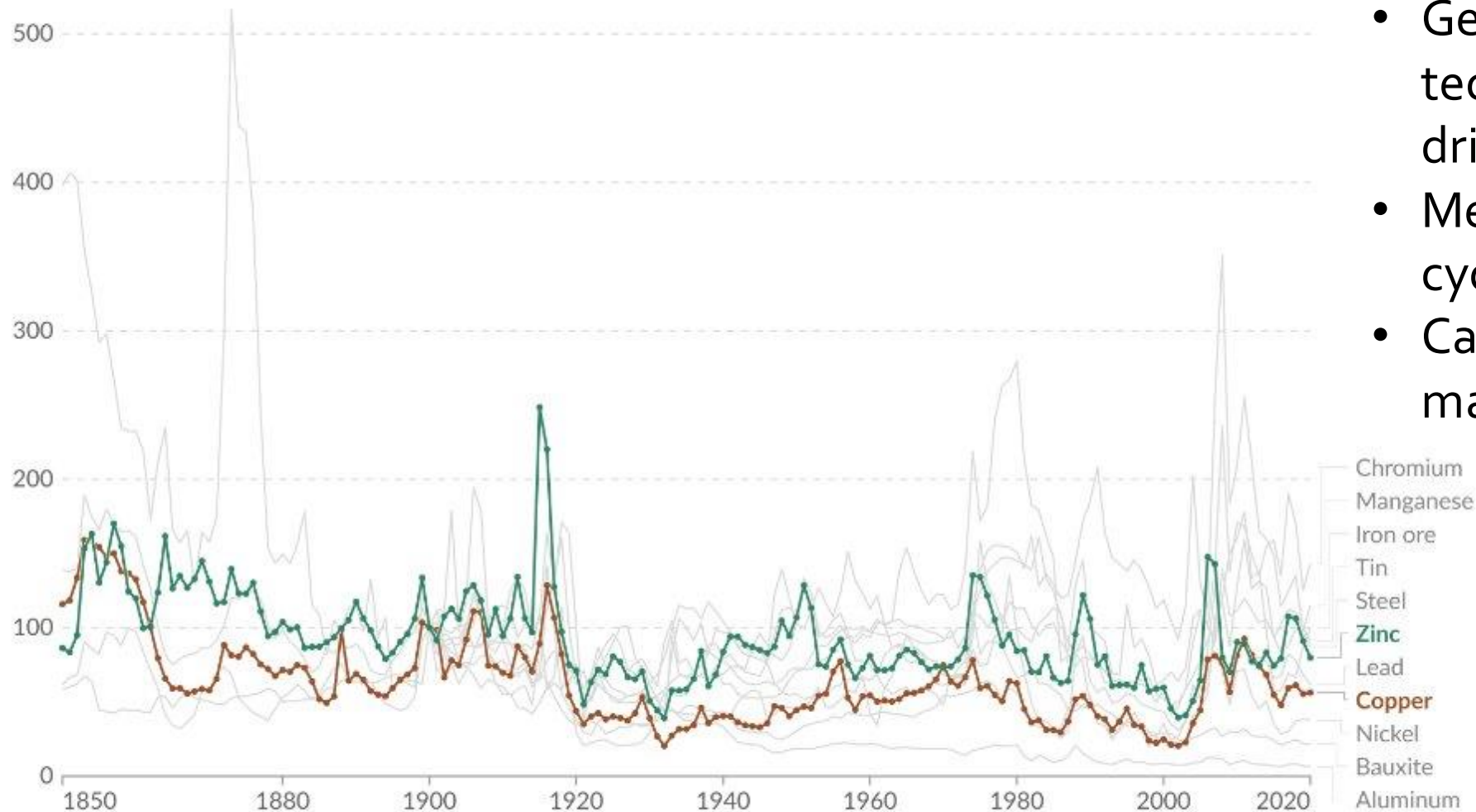
- Objective
  - UAF Alaska Critical Mineral Collaborative
  - Critical Minerals in Alaska
  - Industry-Academia-Gov't Coalition
  - Timeline of Legislative Actions
  - CM Opportunities in Alaska
  - Future Support for ACMC
  - Summary
- 



# Outside Controls We Must Work Within

## Real commodity price index, metals, 1850 to 2020

Real commodity price index across a range of metal resources, where prices are measured relative to the year 1900 (1900 = 100).



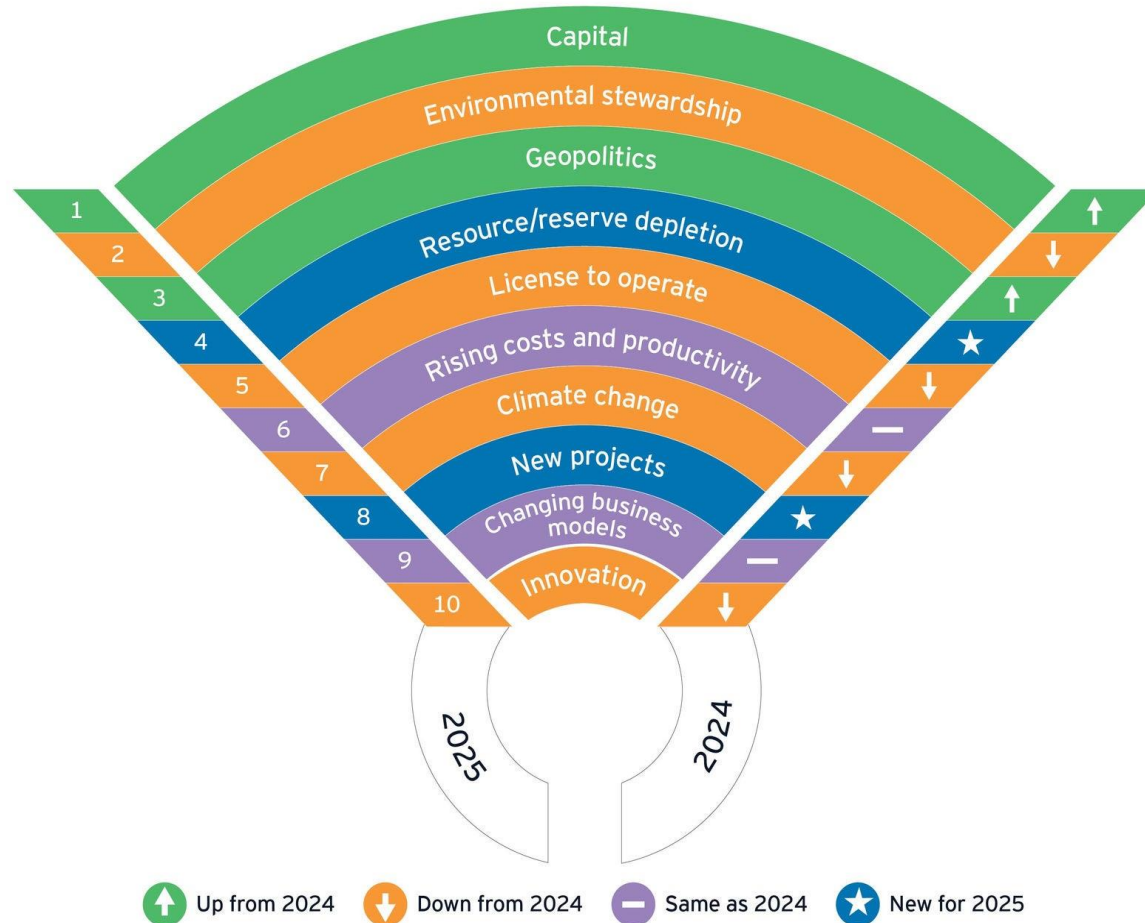
Data source: Jacks (2019)

ALASKA CRITICAL MINERALS  
COLLABORATIVE

OurWorldinData.org/fossil-fuels | CC BY

- Geopolitics and technology changes drive demand
- Metal markets are cyclic (6-10 yrs)
- Capital follows markets

# Ernst & Young Top 10 Risks to Mining



- Capital is a challenge
- Alaska embraces ESG
- AK has geologic potential
- Stable jurisdiction is desired
- New projects
- Long-term plan required
- Industry-Academia-Government coalition will have strength

# State of Alaska Funding to UA (\$7.5M): High-Level Outcomes Update

## Science and Engineering

- Advancing Mineral Exploration and Discovery
- New Methods of Mineral Characterization
- Enhancing Recovery and Extraction

## Workforce Development

- New Technologies in Underground Mine Training
- High School Mine Training, Safety, Operations Programs

## Social and Economic

- Permitting Process and Timelines
- Environmental Compliance
- CM Metal Markets

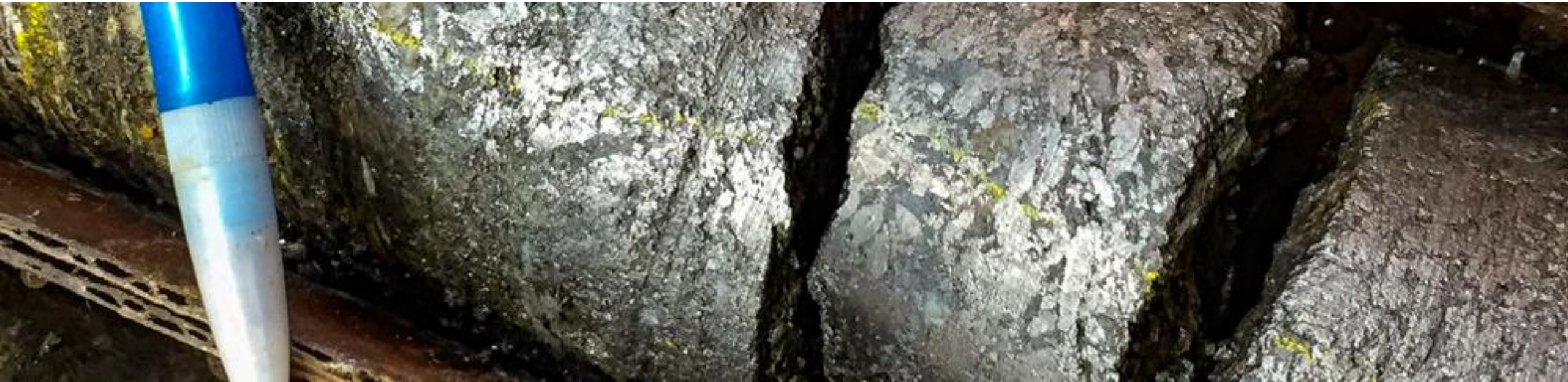
## Sustainability

- Formation of ACMC
- Other State and Federal funding
  - DOE CORE-CM (funded)
  - DOE ARP Ae (funded)
  - NSF Engine (pending)

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# What is the ACMC?

The Alaska Critical Minerals Collaborative (ACMC) is a University of Alaska initiative that facilitates research and collaboration across the UA system between industry, government, and other academic partners. SOA funding inspired its formation.



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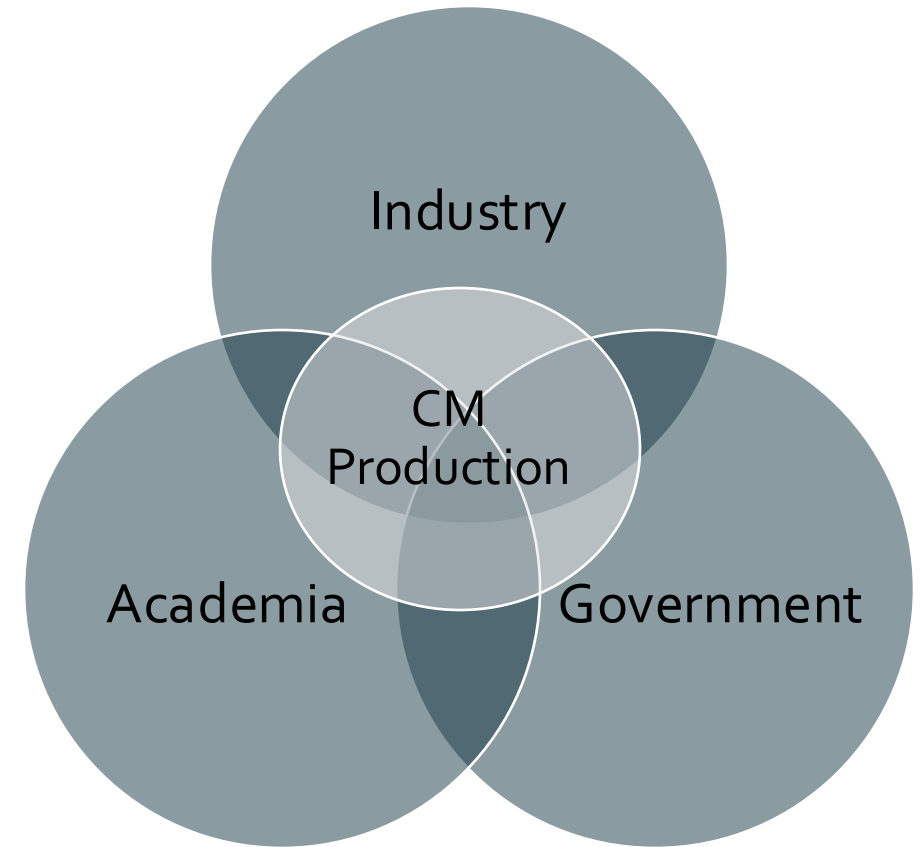
# Vision and Mission

## Vision

Be a globally recognized research and educational organization that positions Alaska as a domestic and international leader in the critical minerals space.

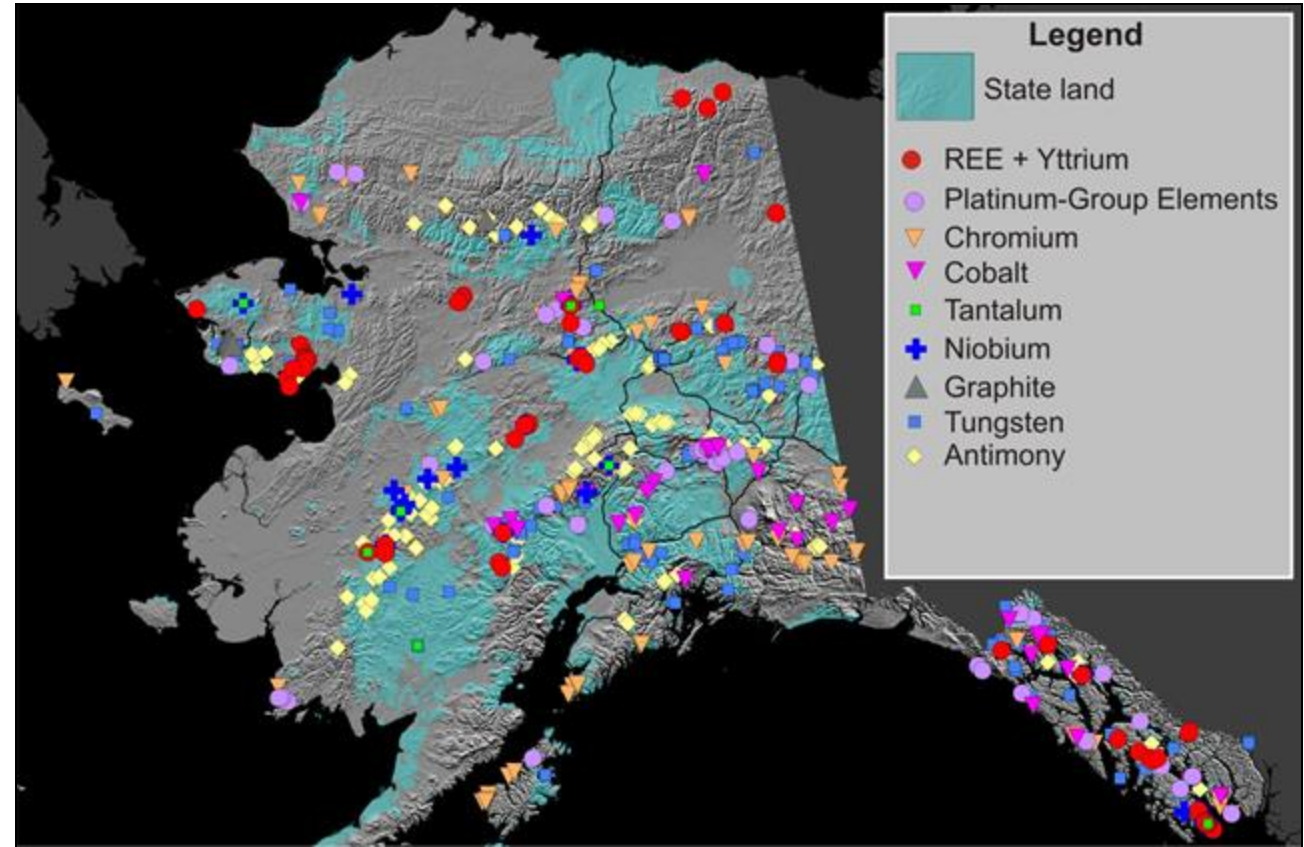
## Mission

Advance interdisciplinary critical minerals and materials research, education, technology and partnerships to discover and produce critical mineral resources.



# Critical Minerals in Alaska

- Most producing mines have an end of life in the next 4-10 years.
- Alaska depends on minerals for economic prosperity and opportunity.
- 49 of the 50 CMs are in Alaska
- Opportunity for enhanced extraction from existing mines and increased production.
- Source of jobs in rural Alaska.
- Support for local and regional governments.



# Industry-Academia-Gov't Coalition



Federal and State legislatures have momentum around CM and domestic mineral production (e.g. EOs)



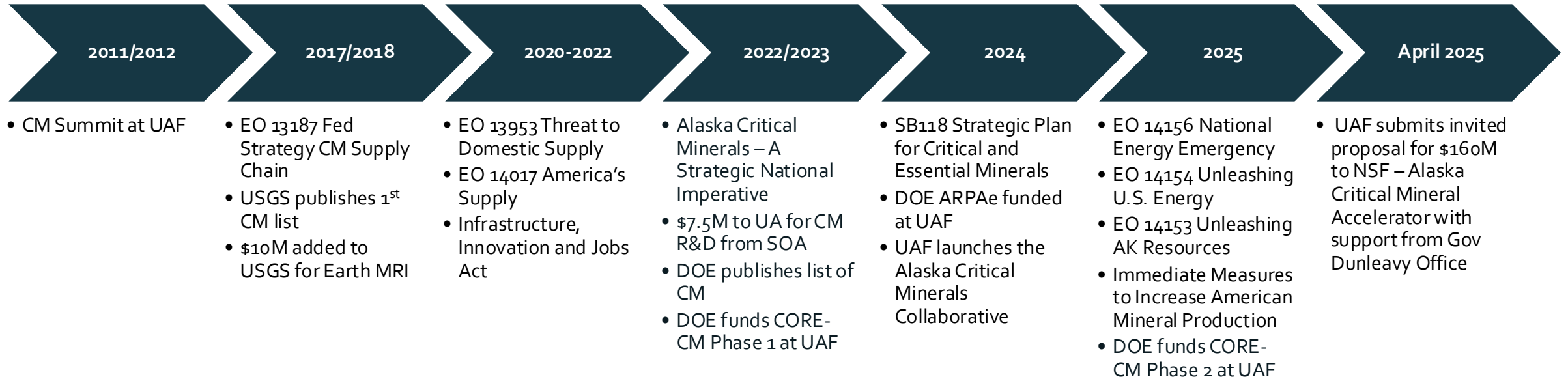
Improved and Cutting-Edge Use-Inspired R&D can be a reality for Alaska



Attract additional investment

- Industry-Academia-Gov't coalitions are central to advancing:
  - Exploration and Discovery
  - Extraction
  - Production
- **ACMC will serve as the hub and will help propel Alaska into the mining future**

# State and Federal Timeline – CM Progress



# Opportunities

1

SHORT TERM

Red Dog Mine (Zn-Ge)  
Pogo Mine (Bi-Te)  
Greens Creek Mine (Zn)

2

MID TERM

Graphite 1 (C)  
Ambler (Cu-Zn)  
Johnson (Cu-Zn)

3

LONG TERM

Lost River (Sn-F-Li-Ta)  
Bornite (Cu-Co)  
Nikolai (Ni-PGE)  
Palmer (Zn-Ba)

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# Future Support for ACMC

- 1) National Science Foundation Engine Opportunity = **\$160M** over 10 years from NSF
- 2) Engine Partner in kind Contributions = **\$300M** in first 2 years followed by additional \$
- 3) Alaska State Legislature Sustaining Support = **\$3M/year (\$30M)** planned request beginning FY 27

Leveraging State funding by 15x



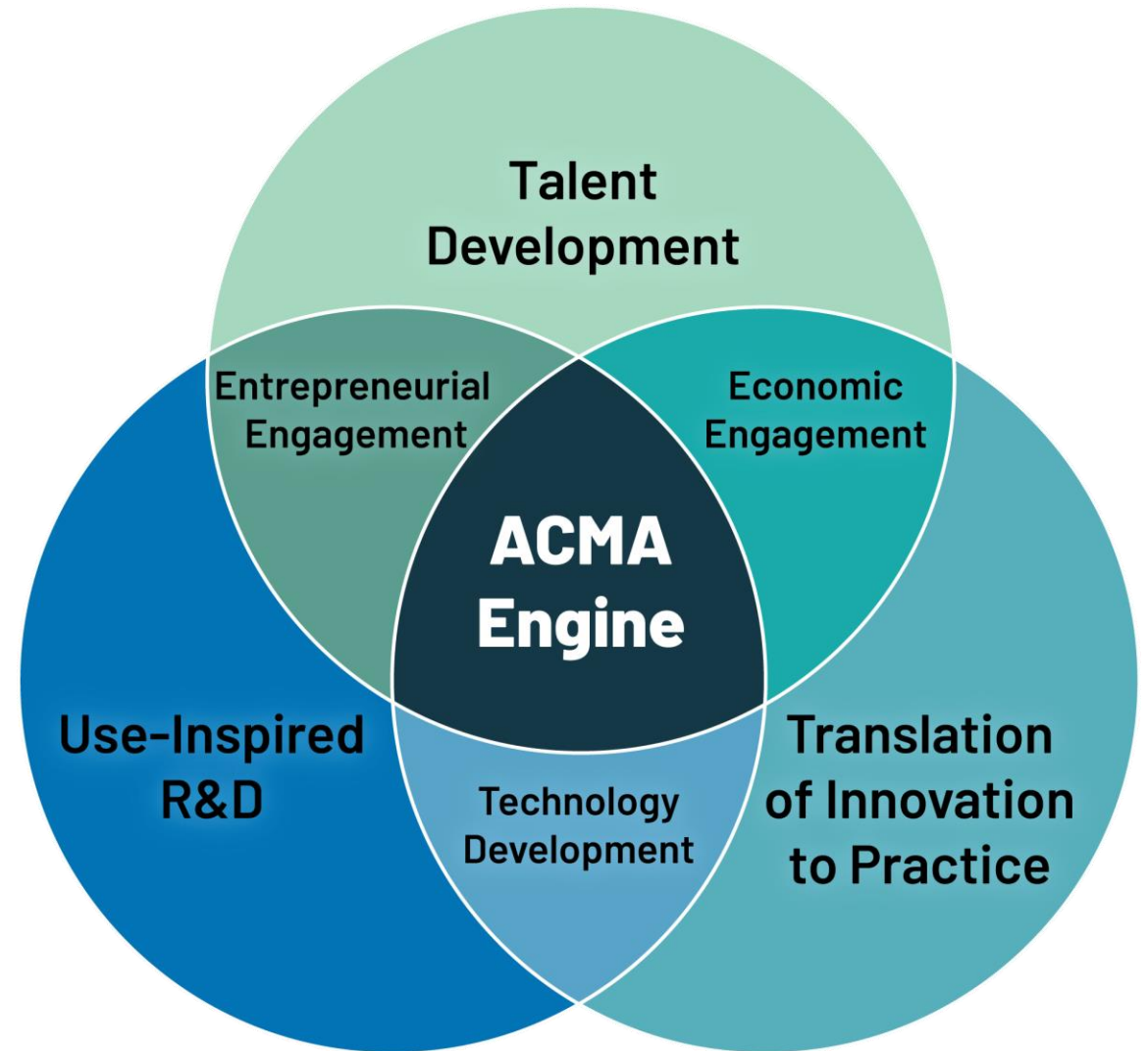
# NSF Engine: Alaska Critical Mineral Accelerator

## Pillars

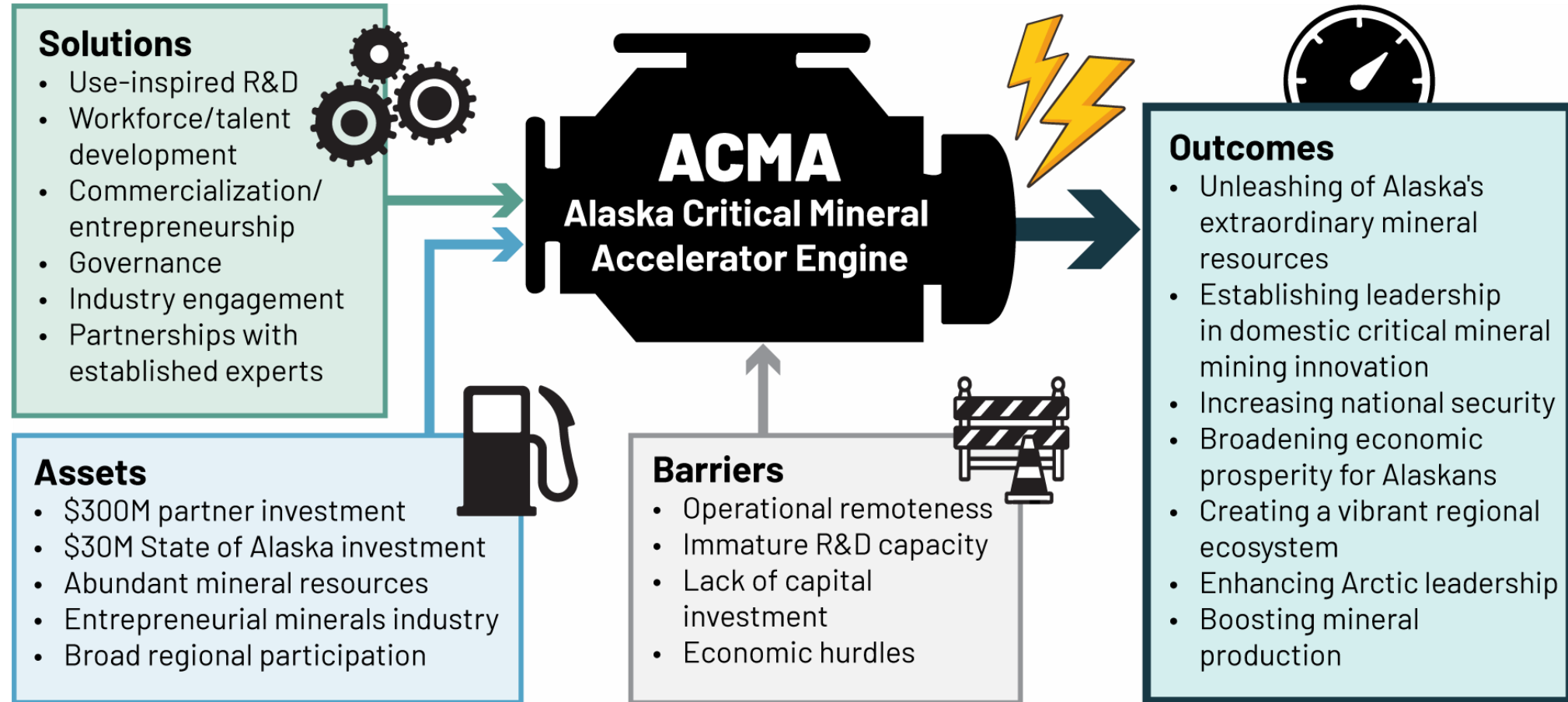
- 1) Use-Inspired R&D
- 2) Talent/Workforce Development
- 3) Translation of Innovation to Practice

## Activities

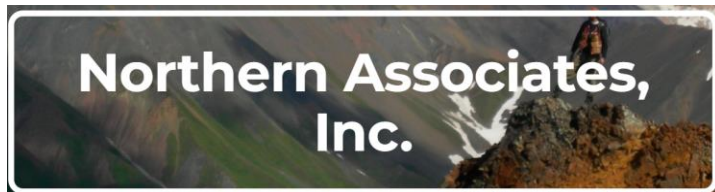
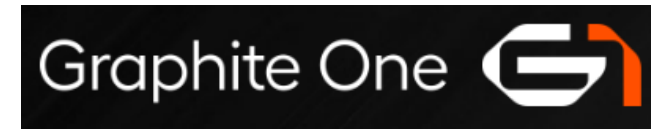
- 1) Technology Development
- 2) Economic Engagement
- 3) Entrepreneurial Engagement



# NSF Engine: Alaska Critical Mineral Accelerator



# Examples of Partners in the ACMA (full list available)



# Take Aways

- UA/ACMC is positioned to be the hub for critical minerals innovation in Alaska/U.S./Arctic
  - Work together to form a strong industry-academia-government coalition
  - Capitalize on the AK and U.S. momentum around critical minerals to increase production in AK
  - Ultimately to benefit future generations!
- 





# Thank you



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# Extra Example Slides



# SOA CM Funding to UA - \$7.5M

## Example Outcomes

### EXPLORATION AND DISCOVERY

- Advancing remote sensing approaches and technologies to identify mineralization
- Applying novel watershed geochemical exploration for concealed mineralization

### CHARACTERIZATION

- New ore deposit model for Bokan REE
- Identification of REEs at Tofty
- Environmental water quality monitoring

### RECOVERY

- Advancing R&D of bioextraction of REEs from coal



# SOA CM Funding to UA - \$7.5M

## Example Outcomes

### WORKFORCE DEVELOPMENT

- Advancing underground mine training with new technologies and equipment
  - Coeur and Hecla
- New program to train high school students in SE Alaska in diesel mechanics, mining occupations and operations, mine safety, basic welding, etc.
- Research faculty and staff hired in CM areas

### SOCIAL AND ECONOMIC

- ISER studies on environmental, permitting and timelines of discovery to production

### SUSTAINABILITY

- Established the ACMC
- Coalition building across State/Fed agencies and other universities
- Applying for large Federal funding opportunities

# SOA Funding – INE

- New ICP-MS Laser Ablation system and Microwave-assisted digestion system installed and operational
- Completed round-robin analyses
- Completed projects for water quality monitoring, REEs in coal, trace elements in rock samples
- Continuing to expand methods to fit researchers' needs

Contact – Piper Kramer  
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# INE Critical Minerals Activities Cont.

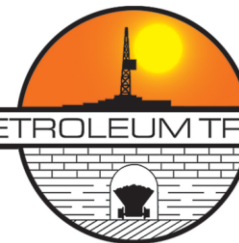
- Working with industry to evaluate water environmental analytical support
- Updated mining industry lab is expected March 2025.
- Duckering 125 - new crusher is in place, air ducting upgrade in process and power source to be connected, removing unused equipment and fixtures in preparation for additional new equipment.

## Funded research projects:

- Alkali Activation of Alaskan Coal Ashes for Sustainable Construction - A Feasibility Study
- Recovery of REEs from Coal Fly Ash Using Super Critical Fluid
- Phase 2 CORE-CM

# Workforce Development – MAPTS

- Purchased a specialized underground mine truck for the Delta Mine Training Center
- Collaborating with Coeur Alaska Kensington, Hecla Greens Creek and Sandvik to acquire a mining simulator to train drivers of underground mining equipment
- New program to train high school students in SE Alaska with classes in diesel mechanics, mining occupations and operations, mine safety, basic welding, and more.



# DOE - CORE-CM

Assess, identify, and prioritize sites for detailed investigation in Region 8 based on resource potential, feasibility, and strategic importance.

Engage communities in the work and educate an early-career workforce. These efforts are crucial in identifying future infrastructure investments. This will involve building a strong coalition of partners across R8 and neighboring areas to support resource development.



| Team Member                                         | Federal Share      | Nonfederal Share   | Total              |
|-----------------------------------------------------|--------------------|--------------------|--------------------|
| University of Alaska                                |                    |                    |                    |
| University of Alaska Fairbanks                      | \$2,656,957        | \$862,409          | \$3,519,366        |
| University of Alaska Anchorage                      | \$585,639          | -                  | \$585,639          |
| Alaska Division of Geologic & Geophysical Surveys   | \$1,274,934        | \$318,388          | \$1,593,322        |
| Oregon Department of Geology and Mineral Industries | \$1,830,088        | \$362,611          | \$2,192,699        |
| Oregon State University                             | \$754,655          | \$190,937          | \$945,592          |
| University of Utah                                  | \$342,425          | \$85,606           | \$428,031          |
| Maverick BioMetals                                  | \$55,302           | \$55,050           | \$110,352          |
| <b>Total</b>                                        | <b>\$7,500,000</b> | <b>\$1,875,001</b> | <b>\$9,375,001</b> |

\$7.5M Phase 2 of 3-phase project

\$4.5M to Alaska

\$3M to rest of Region 8

Contact – Brent Sheets, UAF

# Exploration to Production

|                    | Exploration |                                   | Prefeasibility |                               | Feasibility      |                            | Permitting/<br>Design |                  | Construction           |
|--------------------|-------------|-----------------------------------|----------------|-------------------------------|------------------|----------------------------|-----------------------|------------------|------------------------|
| Resource           | Inferred    | Positive Order of Magnitude Study | Indicated      | Positive Prefeasibility Study | Measured         | Positive Feasibility Study | Measured              | Decision to Mine | 2-3 years<br>\$100's M |
| Reserves           | Assumed     |                                   | Probable       |                               | Proven/Prob.     |                            | Proven                |                  |                        |
| Mine               | Sketch      |                                   | Preliminary    |                               | Firm             |                            | Final                 |                  |                        |
| Processing         | Assumed     |                                   | Options        |                               | Selected         |                            | Optimized             |                  |                        |
| Market             | Assumed     |                                   | Options        |                               | Letter of Intent |                            | Agreement             |                  |                        |
| Environment Impact | Concept     |                                   | Approximate    |                               | Near Complete    |                            | Completed             |                  |                        |
| EIS                | Conceptual  |                                   | Scoped         |                               | Approved         |                            |                       |                  |                        |
| Closure Plan       | Concept     |                                   | Preliminary    |                               | Advanced         |                            | Final                 |                  |                        |
| Permits            | Assumed     |                                   | Identified     |                               | Applied for      |                            | Granted               |                  |                        |
| Community          | Fatal Flaws |                                   | Issues         |                               | Negotiations     |                            | Agreement             |                  |                        |
| Project Schedule   | Assumed     |                                   | Approximate    |                               | Firm             |                            | Final                 |                  |                        |
| Cost Estimate      | ±30%        |                                   | 15-25%         |                               | ±15%             |                            | ±5%                   |                  |                        |
| Economics          | Est. ±30%   |                                   | Probable ±15%  |                               | Firm ±15%        |                            | Finalized             |                  |                        |
| Finance            | Assumed     |                                   | Options        |                               | Negotiations     |                            | In place              |                  |                        |
| Time               | A few years |                                   | 1-2 years      |                               | A few years      |                            | ???                   |                  |                        |
| Cost of Stage      | \$5-10M     |                                   | \$10-30M       |                               | \$30 – 100M      |                            | \$5-10M               |                  |                        |

Industry-Academia-Gov't Coalition Works to Increase Production 