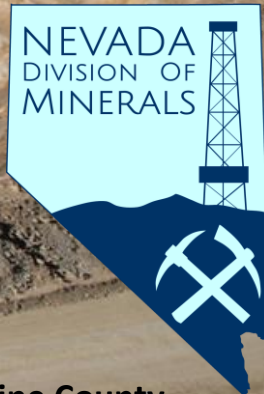


***Nevada's Mining Sector Outlook  
Mineral Production, Exploration, Energy Minerals,  
Potential Impacts, and Trends***

**Prospectors and Developers Association of Canada  
Toronto, Ontario  
March 5 – 8, 2023**

**Mike Visher, Administrator  
Nevada Division of Minerals**



**Bald Mountain Mine, White Pine County**

# Nevada Mining Summary

In 2021, Nevada mining employed >15,000 workers at an average salary of \$103,000 (\$49.52/hr)

Nevada produced 10% of all U.S. mineral production

Mines operate on less than ¼ of 1% of Nevada's 70,722,119 acres

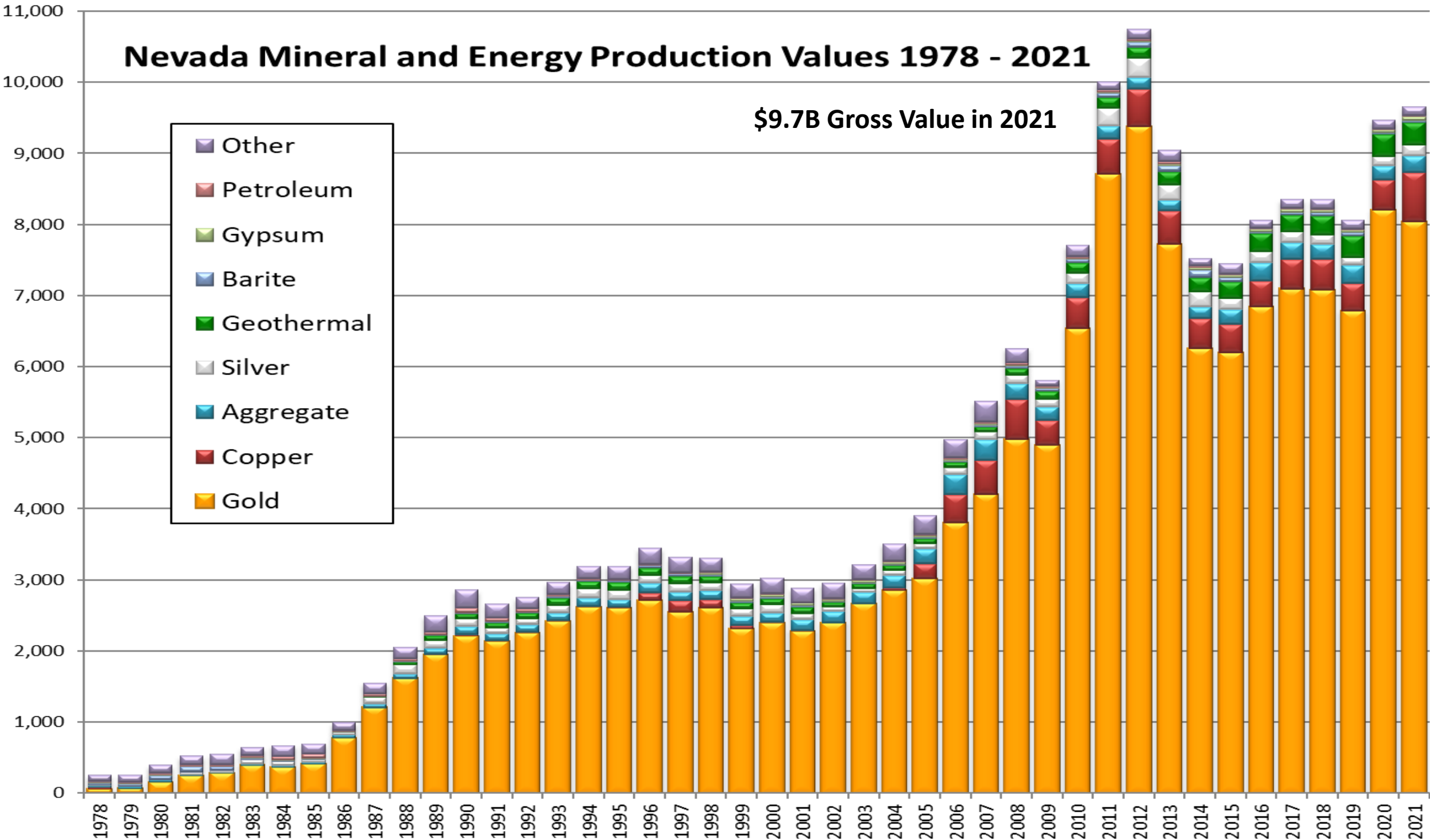
- In 2021, NV produced 77% of all US gold and ranked 5th in global production (behind China, Australia, Russia, and Canada)
- 20+ commodities are produced from ~150 mines in Nevada
- \$14B impact to Nevada's economy
- Nevada is ranked 3<sup>rd</sup> best mining jurisdiction based on Investment Attractiveness Index (Fraser Institute, 2021)
- Lots of interest in exploration for, and production of, critical minerals
- Permitted surface disturbance of exploration and mining smaller than Storey County

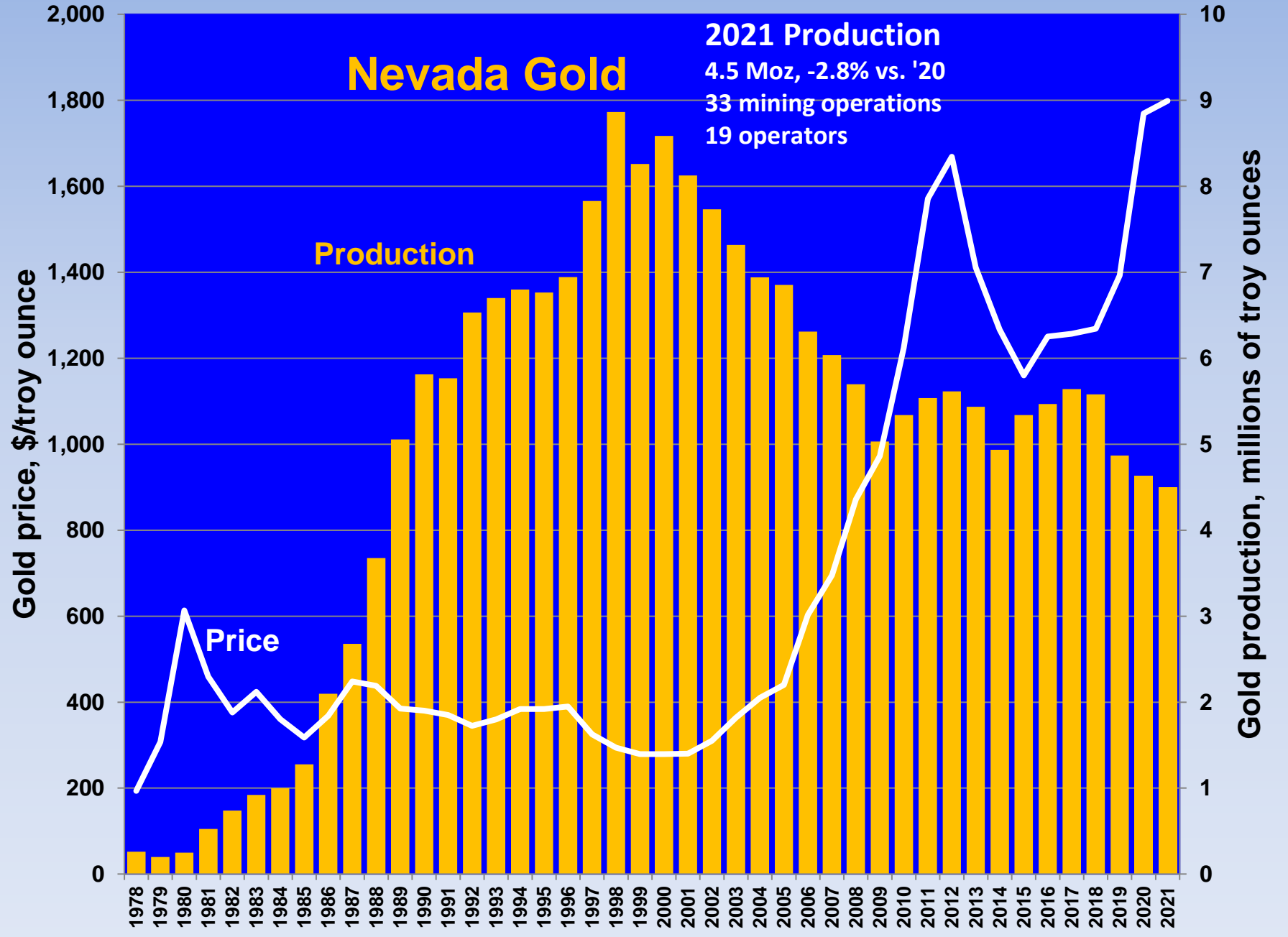
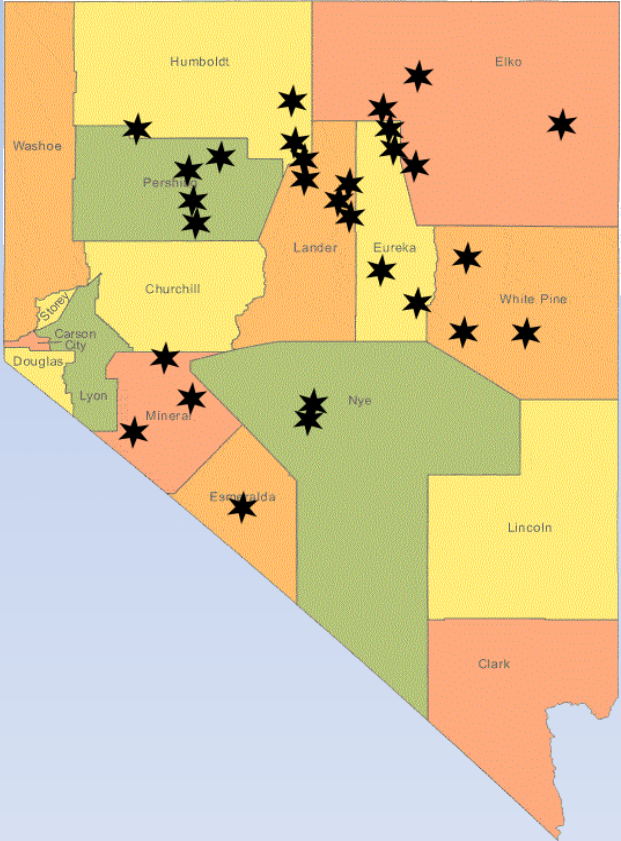
# Nevada Mineral and Energy Production Values 1978 - 2021

\$9.7B Gross Value in 2021

- Other
- Petroleum
- Gypsum
- Barite
- Geothermal
- Silver
- Aggregate
- Copper
- Gold

Production Value, \$ millions





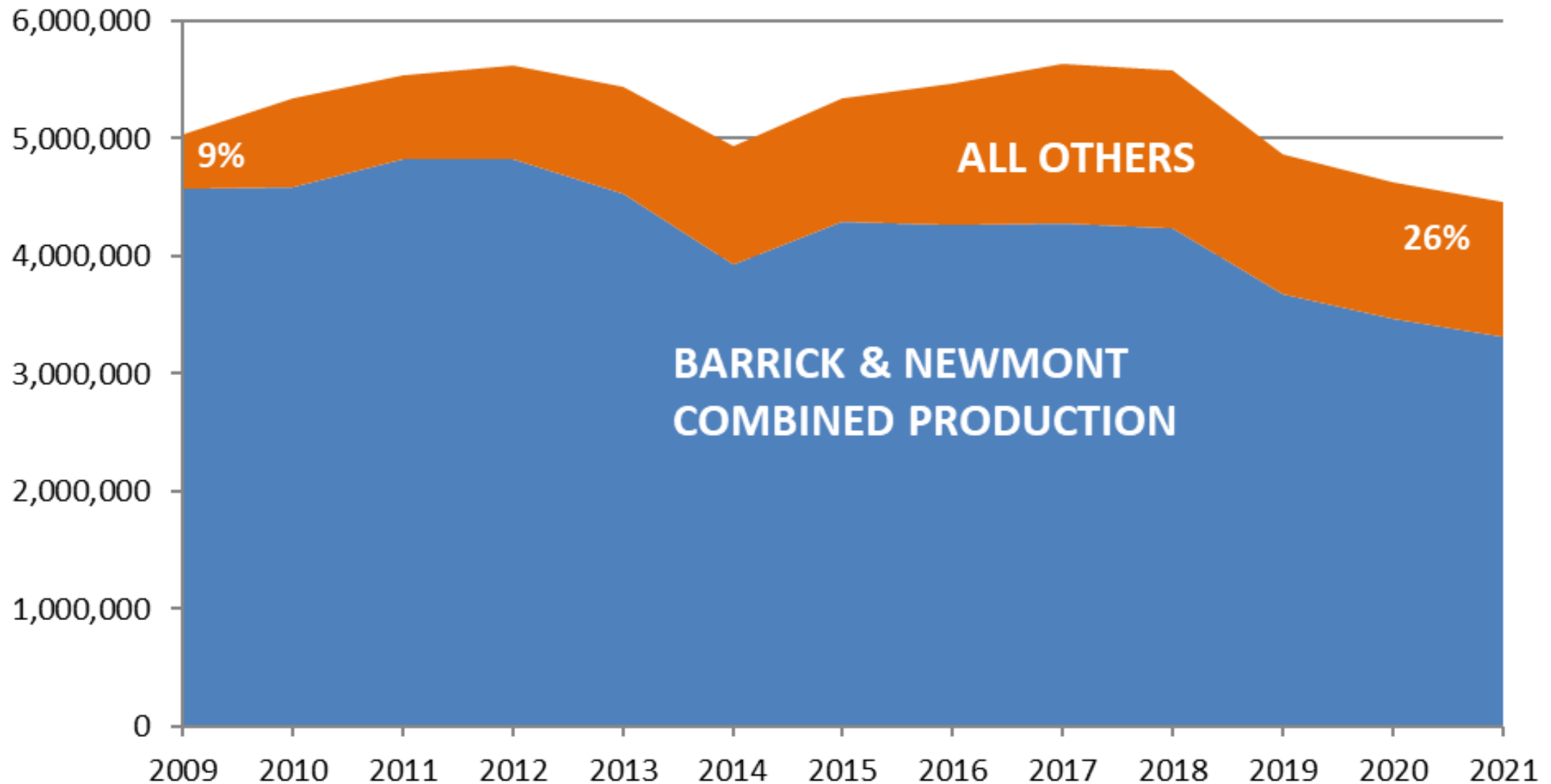
**2021 NEVADA METAL PRODUCTION, BY PRODUCER**

Ranked by gold production

<b>Operator</b>	<b>Gold (ozs)</b>	<b>Silver (ozs)</b>	<b>Copper (lbs)</b>	<b>Moly (lbs)</b>
<b>Nevada Gold Mines</b>	<b>3,354,029</b>	<b>1,600,225</b>	<b>36,736,179</b>	
<b>Kinross</b>	<b>450,567</b>	<b>808,072</b>		
<b>SSR Mining</b>	<b>235,282</b>	<b>4,285</b>		
<b>First Majestic Silver</b>	<b>98,303</b>	<b>1,809</b>		
<b>Hycroft Mining</b>	<b>56,045</b>	<b>397,546</b>		
<b>Florida Canyon Mining (Argonaut Gold)</b>	<b>51,175</b>	<b>27,681</b>		
<b>Walker Lane Minerals</b>	<b>46,459</b>	<b>44,551</b>		
<b>Calibre Gold</b>	<b>45,783</b>	<b>NR</b>		
<b>McEwen Mining</b>	<b>43,881</b>	<b>NR</b>		
<b>KGHM International</b>	<b>41,050</b>	<b>NR</b>	<b>123,700,000</b>	<b>240,000</b>
<b>Coeur</b>	<b>27,985</b>	<b>3,158,017</b>		
<b>Rawhide Mining</b>	<b>23,209</b>	<b>126,510</b>		
<b>i-80 Gold</b>	<b>17,442</b>	<b>3,500</b>		
<b>Gold Acquisition Corp.</b>	<b>5,388</b>	<b>12,773</b>		
<b>Borealis Mining</b>	<b>3,936</b>	<b>6,473</b>		
<b>Mineral Ridge Gold</b>	<b>1,827</b>	<b>1,154</b>		
<b>Nevada Copper</b>	<b>0</b>	<b>NR</b>	<b>3,296,515</b>	
<b>Geo-Nevada</b>	<b>3</b>	<b>4</b>		
<b>Hecla (Klondex)</b>	<b>0</b>	<b>26,214</b>		
<b>Totals</b>	<b>4,502,364</b>	<b>6,218,814</b>	<b>163,732,694</b>	<b>240,000</b>

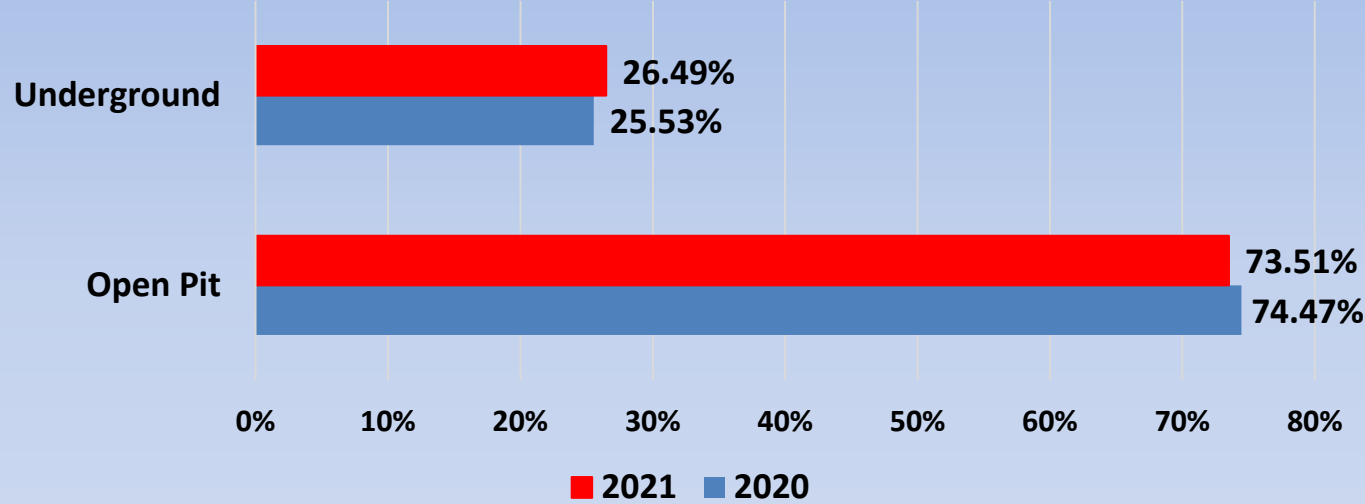
# Nevada Gold Mines Production Comparison

## 2009 - 2021 Annual Gold Production in Nevada

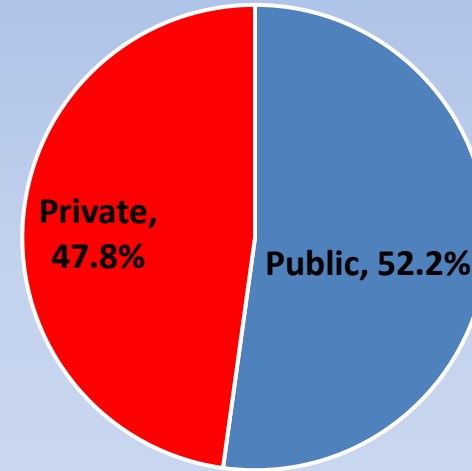


# Nevada Gold Production Statistics

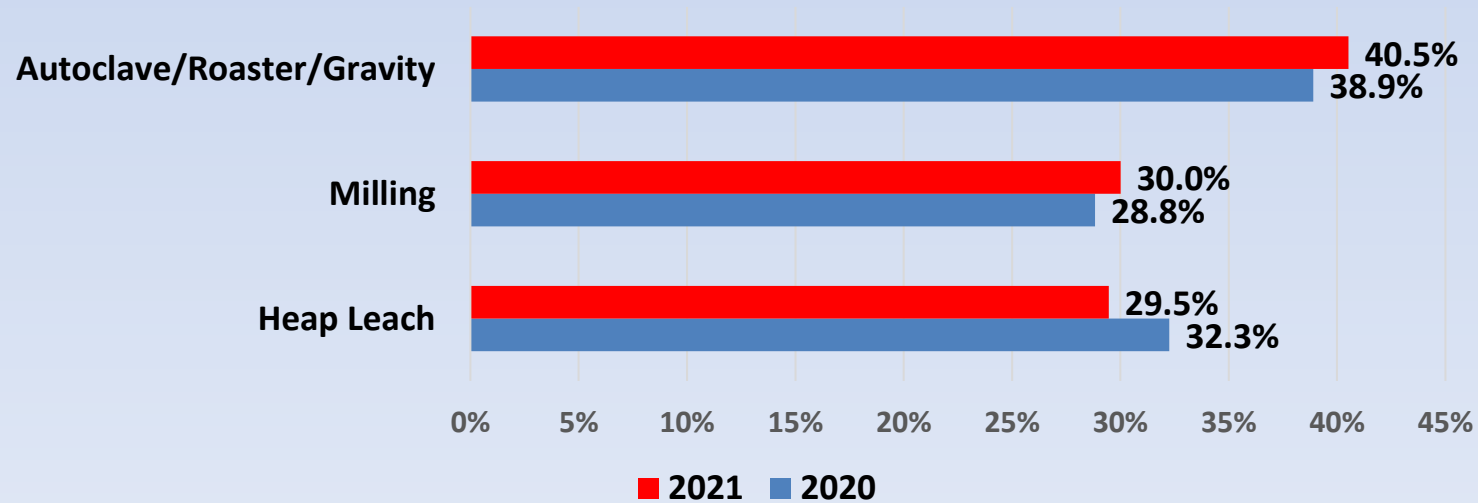
## Au % by Mine Type

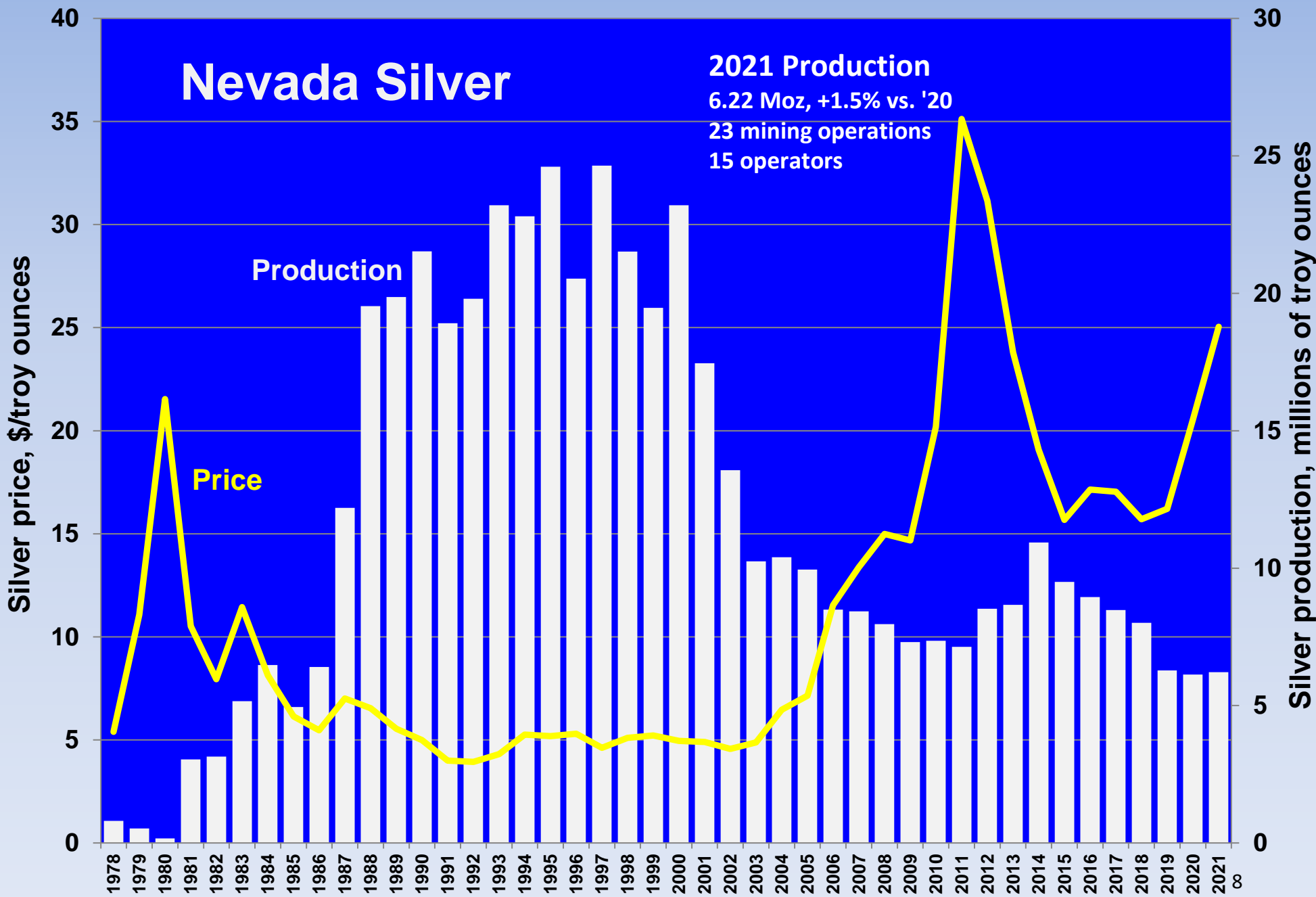


## 2021 Au % By Land Ownership



## % Au by Process (2020 vs. 2021)







# Nevada Copper

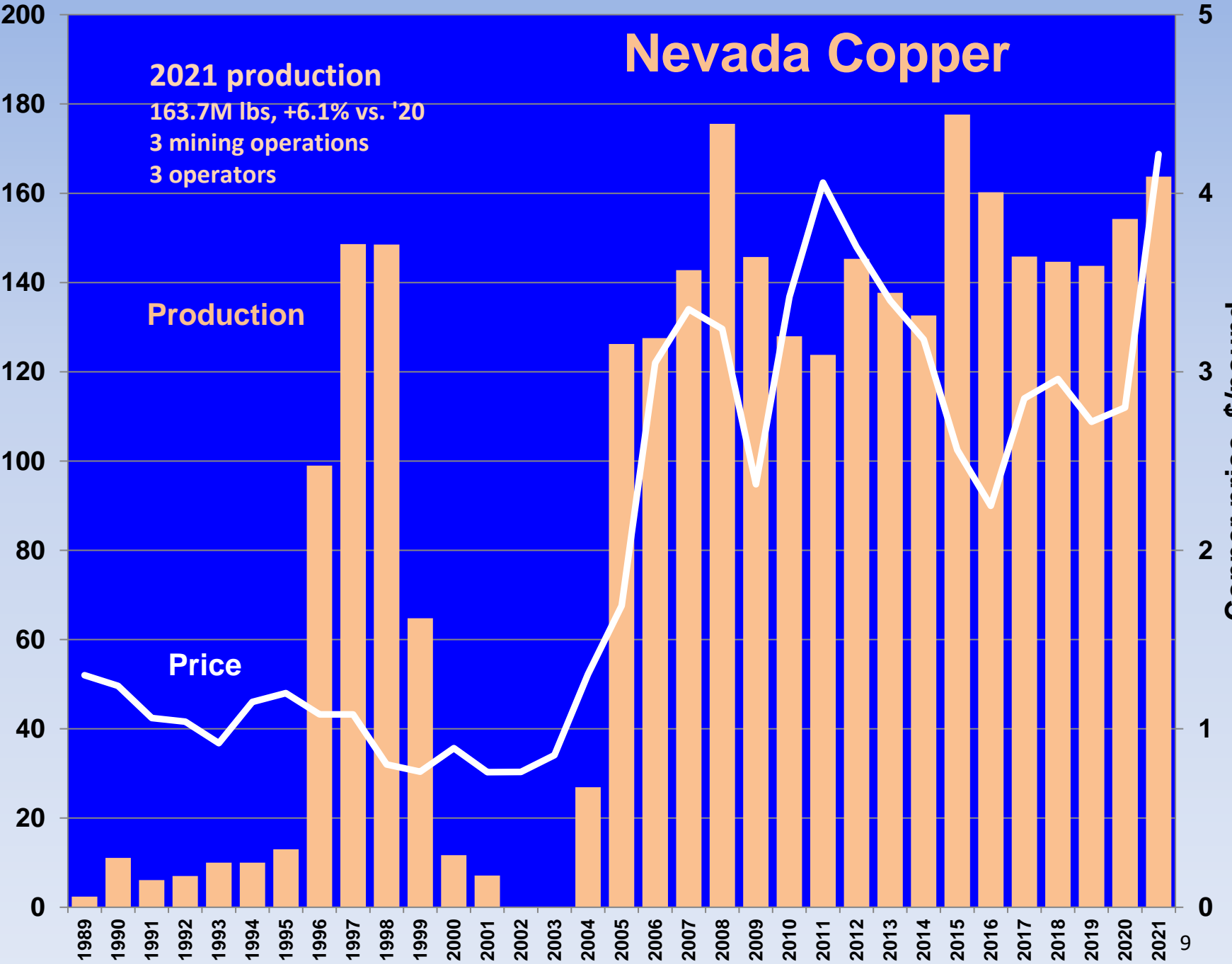
**2021 production**  
 163.7M lbs, +6.1% vs. '20  
 3 mining operations  
 3 operators

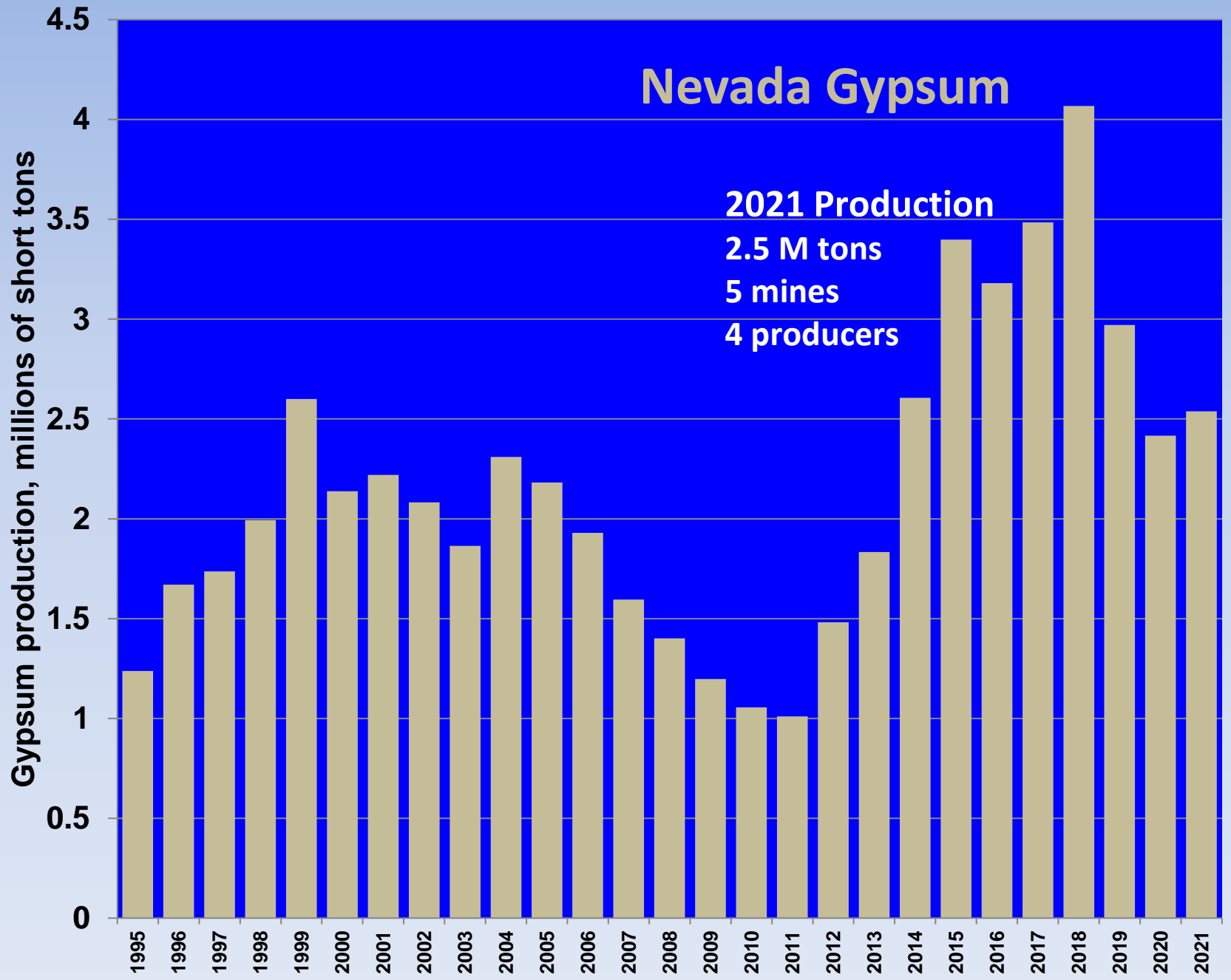
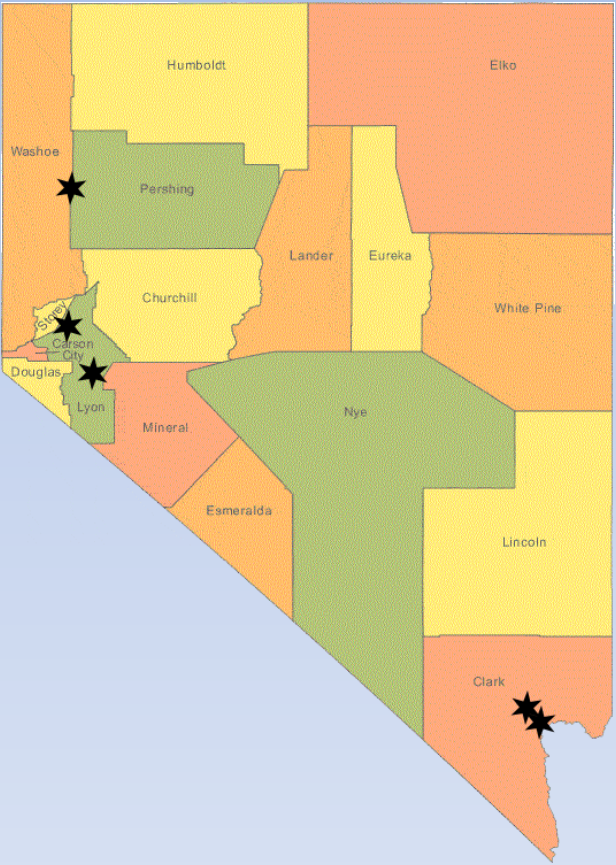
Copper production, millions of pounds

Copper price, \$/pound

**Production**

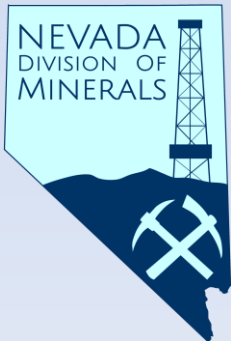
**Price**





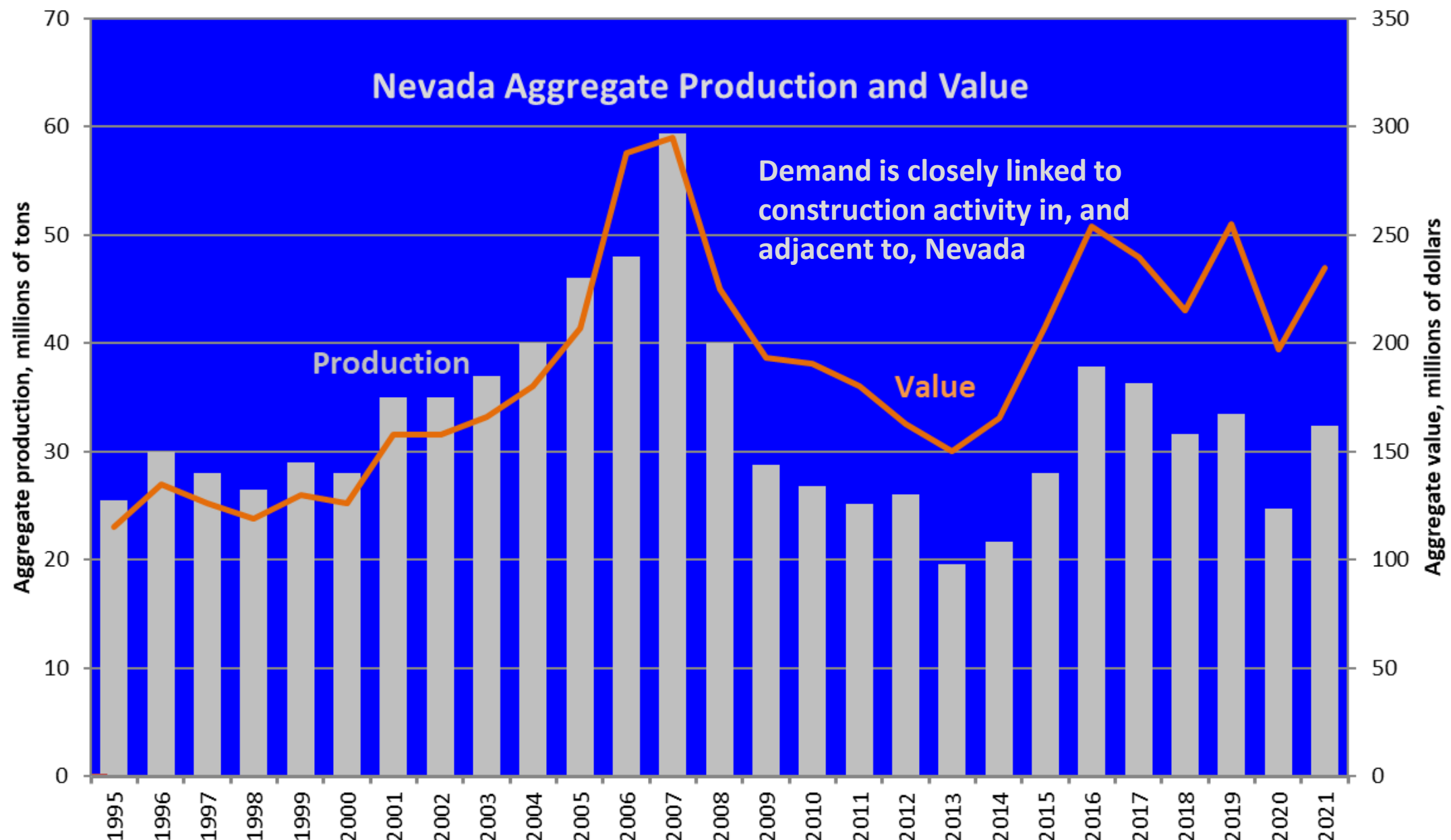
# Other Industrial Minerals Produced in 2021

- 12,700,000 lbs of lithium compounds
- 658,000 tons of silica sand
- 129,000 tons of magnesium compounds
- 306,000 tons of diatomite
- 240,000 pounds of molybdenite
- 16,000 tons of salt
- 3,700 tons of perlite
- ~200,000 tons of specialty clays

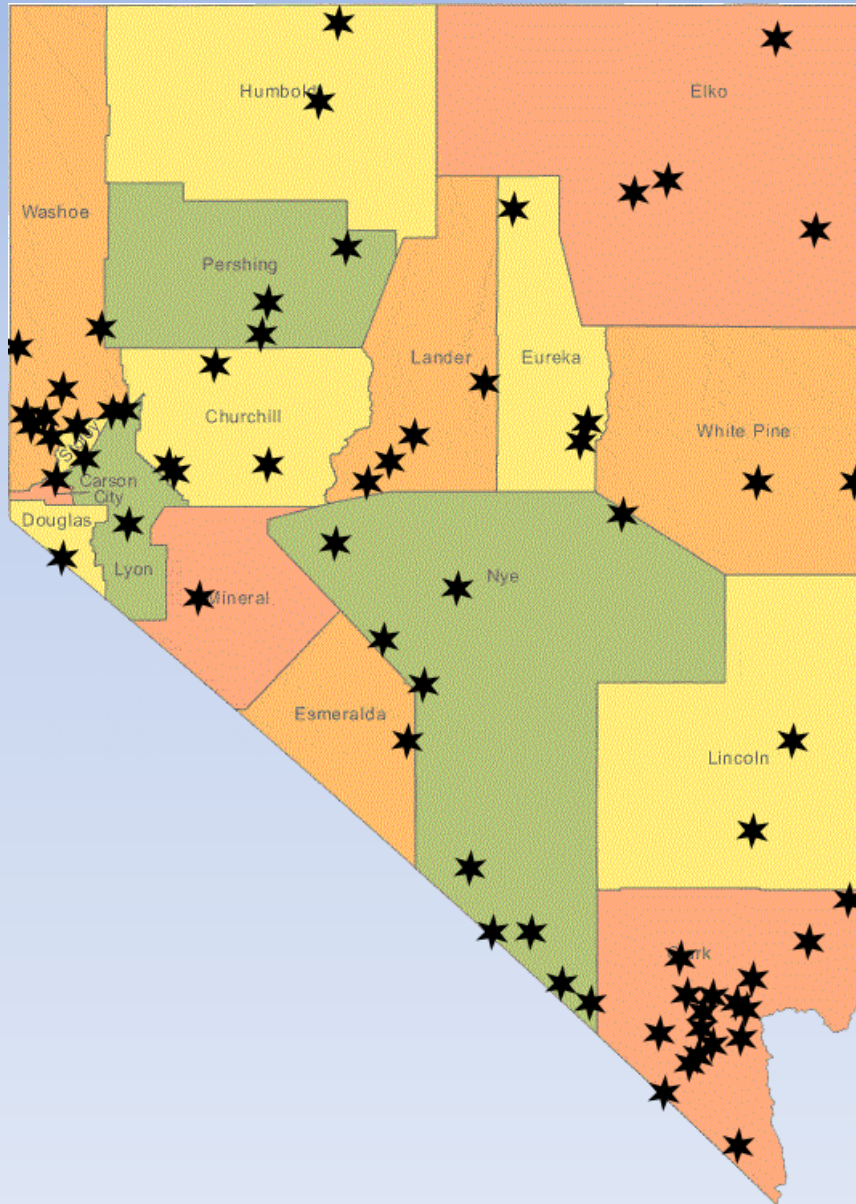


# Nevada Aggregate





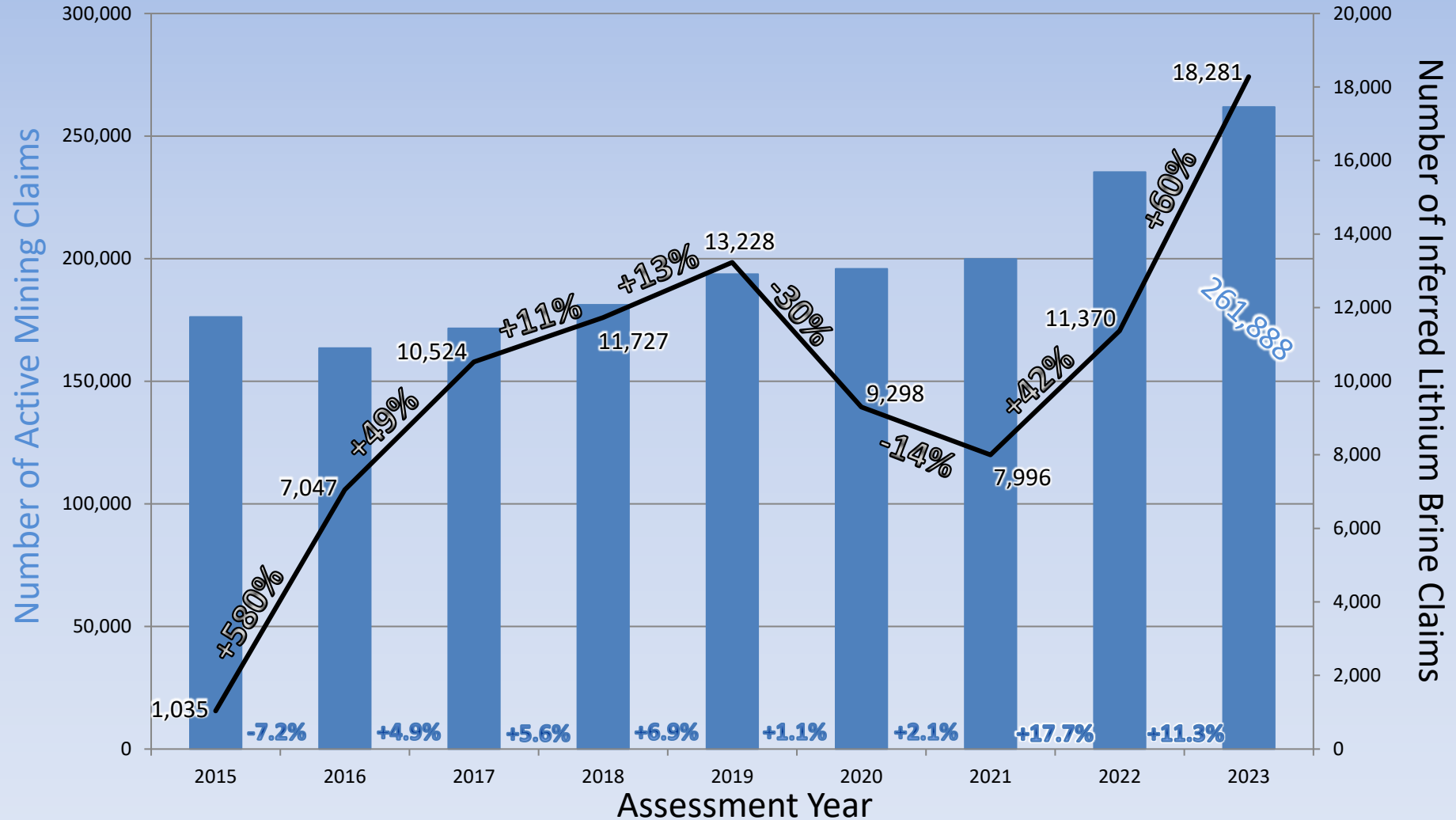
# Nevada Aggregates



- 4<sup>th</sup> highest valued commodity in NV
- Includes:
  - Crushed rock
  - Sand and gravel
- Used primarily for construction but also for landscaping material and products
- 100s of former and current borrow pits
  - NDOT and county road maintenance
- BLM Mineral Materials sales of \$10M in FY20
- Unlike most commodities, cost is determined largely by distance needed to transport
- Creates NIMBY challenges in urban areas



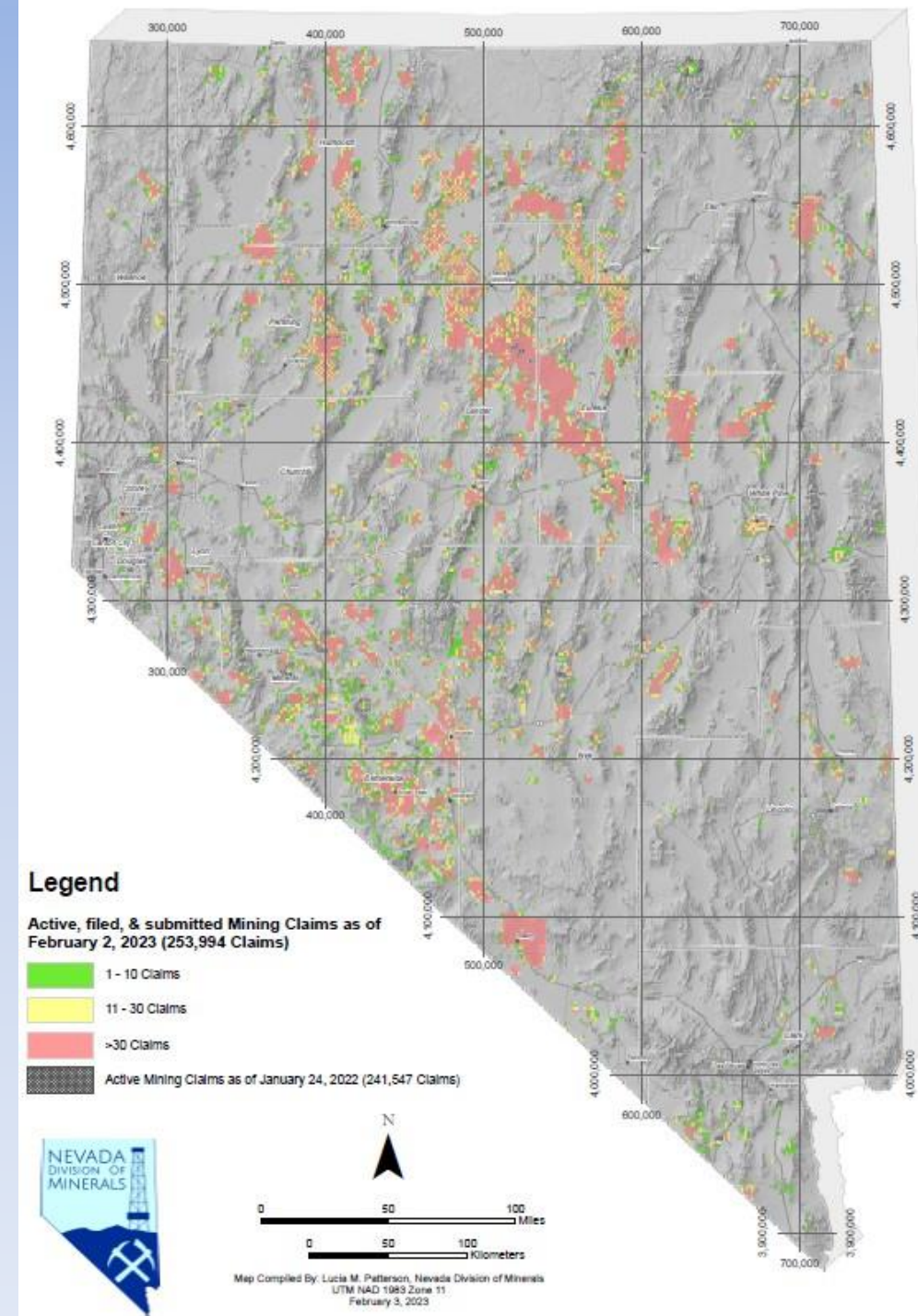
# Unpatented Mining Claims By Year



NDOM has been gathering active claim data from LR2000/MLRS at the end of October for the last nine years. The purpose of this graph is to show claims data and statistics from the same snapshot in time.

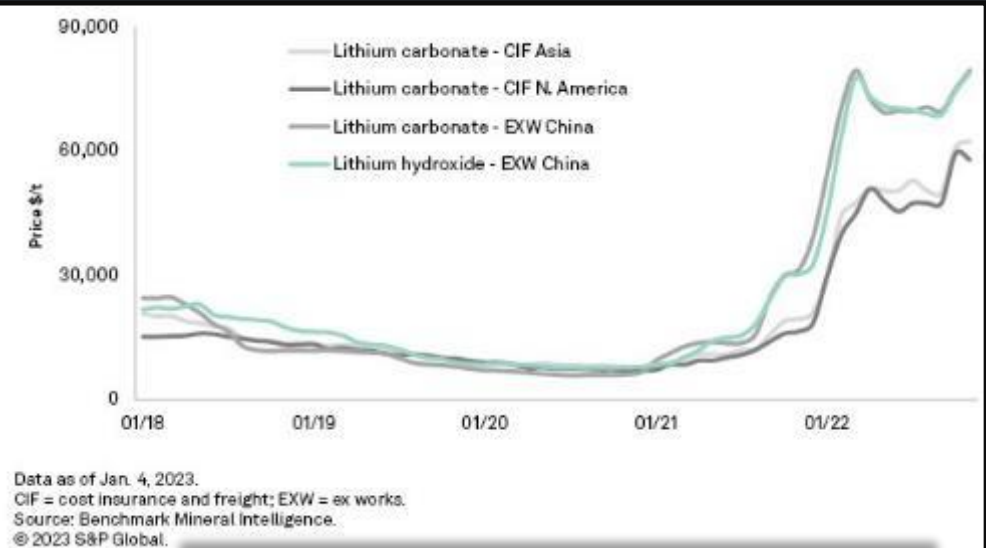
# NEVADA MINING CLAIMS

- 253,994 Active Mining Claims in Nevada as of 2/2/2023
- Increase of 3.5% from March 2022
- >50% of all US mining claims
- Annual maintenance payments of \$165/claim to BLM and \$12/claim to county recorder
  - ~\$39M to BLM (2021 AY)
  - ~\$2.8M to Nevada counties
- The trend in claims is an indicator for exploration interest and largely the price of gold
- >\$643M spent on exploration in NV in 2019 and 2020
- 47% increase in number of placer claims for lithium brine YOY





# Lithium Price, Demand, and US Prospects



## NEVADA THE LITHIUM STATE

Lithium Deposits\* in the U.S.

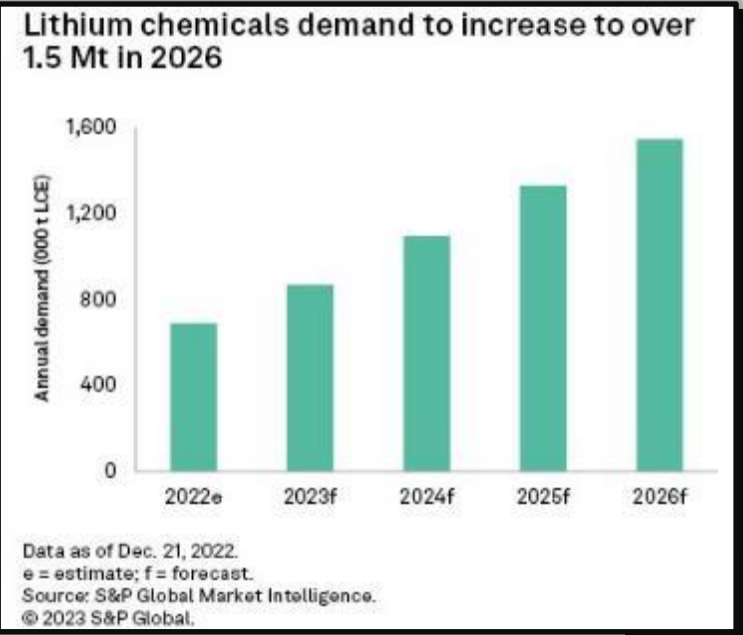
Source: USGS

\*Map shows deposits containing >15,000 tonnes of lithium.

Deposit tonnage, tonnes of lithium

- >1,000,000
- 500,001 - 1,000,000
- 100,001 - 500,000
- 50,001 - 100,000
- 15,000 - 50,000

Nevada is the only source of lithium production in the U.S., with two of the country's largest deposits.



Thacker Pass, a highly prospective, pre-feasibility study stage open-pit lithium mining project, is located in **Kings Valley**.

Albemarle, the world's third-largest lithium mining company, operates America's only lithium-producing mine in **Clayton Valley**.

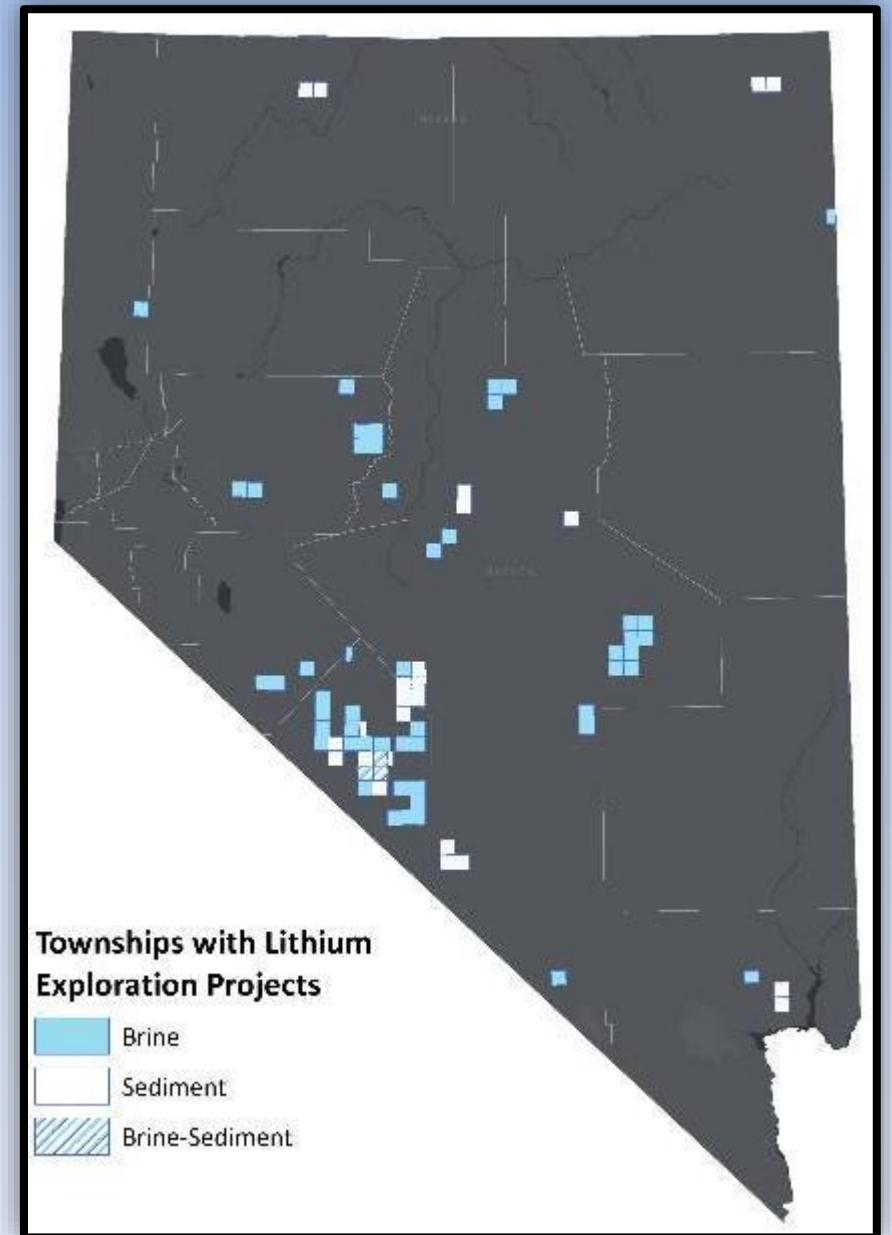
US Magnesium began producing lithium in 2020

500 Kilometers

# Lithium Exploration in Nevada

(as of November 2022)

- > 44 companies in various stages of exploration; ~35,000 mining claims (~13% of total mining claims in NV)
- 28 current authorized or pending lithium notices, 10 in 2022 alone
  - Compared to 254 for Au and Ag
- 2 Exploration and 8 Mining Plans for lithium
  - Compared to 134 mining plans for Au and Ag
- 18,281 placer claims for lithium, +47% YOY
- ~30 different companies involved in Clayton Valley alone, through numerous joint ventures and/or agreements
- ~26 lithium in sediment projects (open pit)
- ~35 lithium brine projects
- Advancements in Direct Lithium Extraction (DLE) are critical to the future of lithium brine production in Nevada
- A total of 47 Dissolved Mineral Resource Exploration (DMRE) Notices and 17 Well permits approved by NDOM
- 25 Notices and 9 Well Permits in 2022 alone



# What Are Clean Energy Minerals?

- High profile (loud) minerals:
  - Cobalt, Copper, Lithium, Nickel, Rare Earth Elements (REEs)
- Lower profile (quiet) minerals:
  - Aluminum, Arsenic, Boron, Cadmium, Chromium, Gallium, Germanium, Graphite, Hafnium, Indium, Iridium, Lead, Magnesium, Manganese, Molybdenum, Niobium, Platinum, Selenium, Silicon, Silver, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zinc, Zirconium

# How Are These Minerals Used?

## Clean energy technologies require a wide range of minerals and metals

Clean energy technologies – from wind turbines and solar panels, to electric vehicles and battery storage – require a wide range of minerals<sup>1</sup> and metals. The type and volume of mineral needs vary widely across the spectrum of clean energy technologies, and even within a certain technology (e.g. EV battery chemistries).

### Critical mineral needs for clean energy technologies

	Copper	Cobalt	Nickel	Lithium	REEs	Chromium	Zinc	PGMs	Aluminium
Solar PV	●	●	●	●	●	●	●	●	●
Wind	●	●	●	●	●	●	●	●	●
Hydro	●	●	●	●	●	●	●	●	●
CSP	●	●	●	●	●	●	●	●	●
Bioenergy	●	●	●	●	●	●	●	●	●
Geothermal	●	●	●	●	●	●	●	●	●
Nuclear	●	●	●	●	●	●	●	●	●
Electricity networks	●	●	●	●	●	●	●	●	●
EVs and battery storage	●	●	●	●	●	●	●	●	●
Hydrogen	●	●	●	●	●	●	●	●	●

Relative importance of minerals for a particular clean energy technology:

High: ●

Moderate: ●

Low: ●

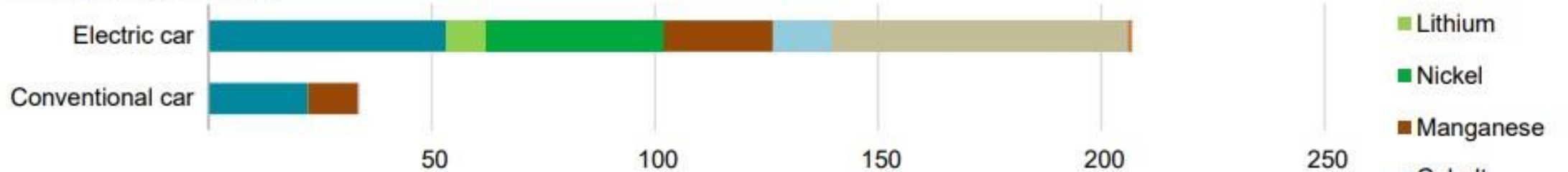
Shading indicates the relative importance of minerals for a particular clean energy technology, which are discussed in their respective sections in this chapter. CSP = concentrating solar power; REEs = rare earth elements; PGM = platinum group metals. \* In this report, aluminium demand is assessed for electricity networks only and is not included in the aggregate demand projections.

# How Much Is Needed Per Technology?

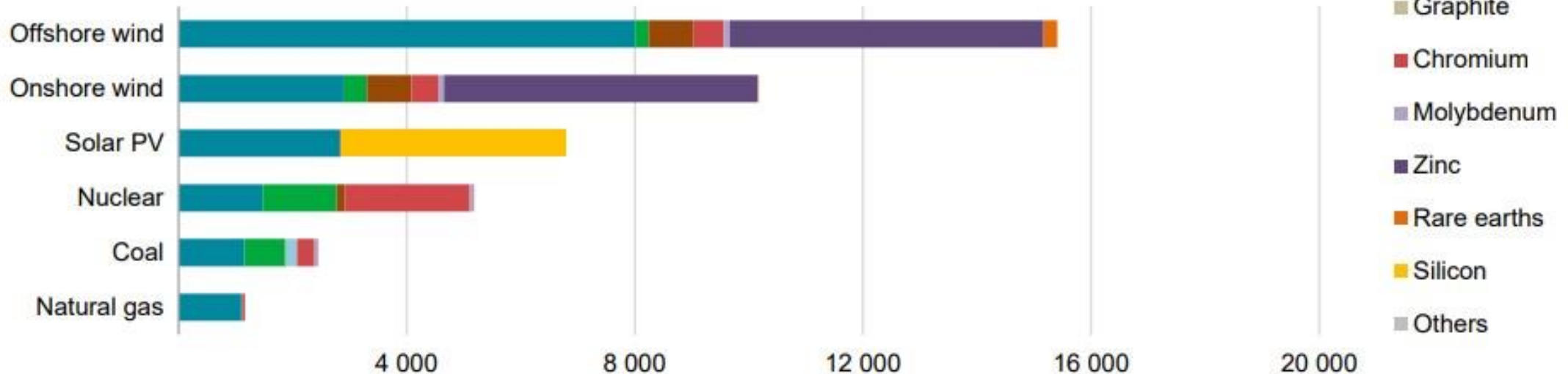
The rapid deployment of clean energy technologies as part of energy transitions implies a significant increase in demand for minerals

Minerals used in selected clean energy technologies

## Transport (kg/vehicle)



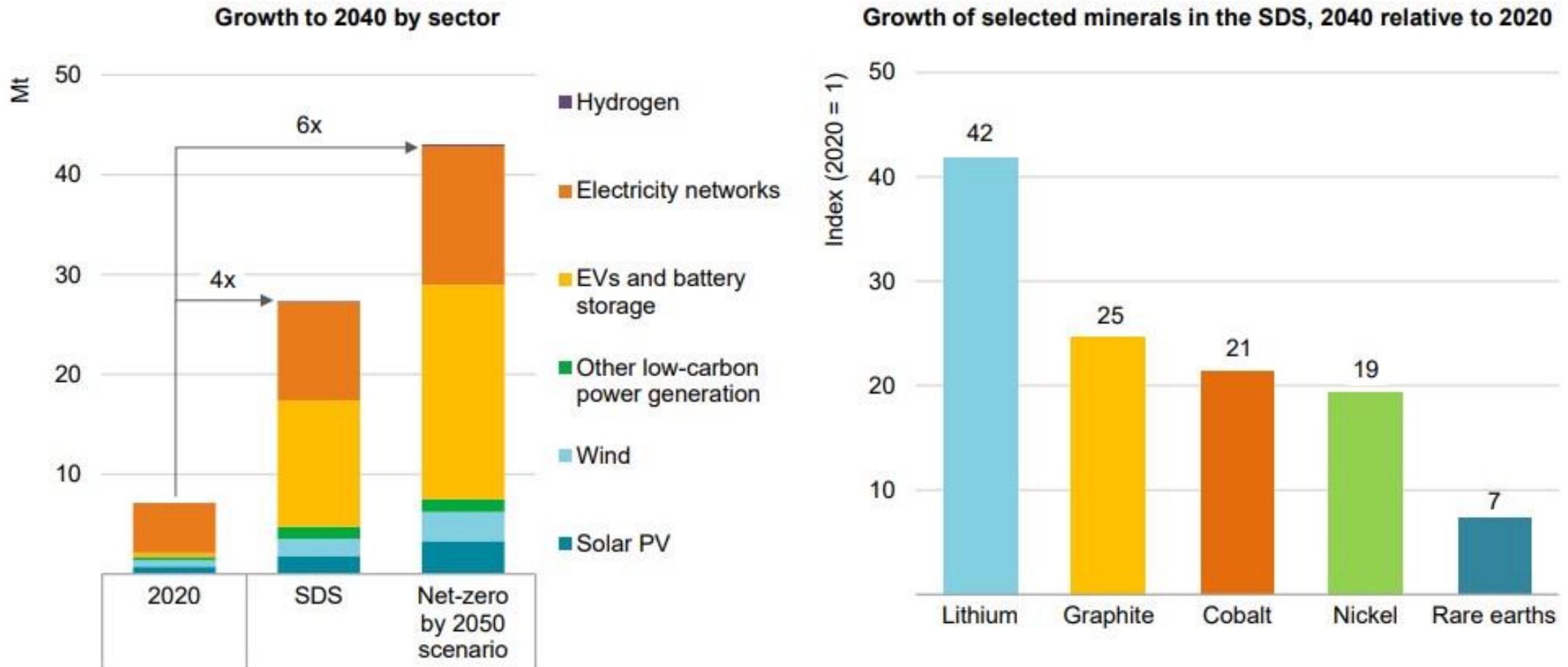
## Power generation (kg/MW)



# Unprecedented Demand For Key Minerals

Mineral demand for clean energy technologies would rise by at least four times by 2040 to meet climate goals, with particularly high growth for EV-related minerals

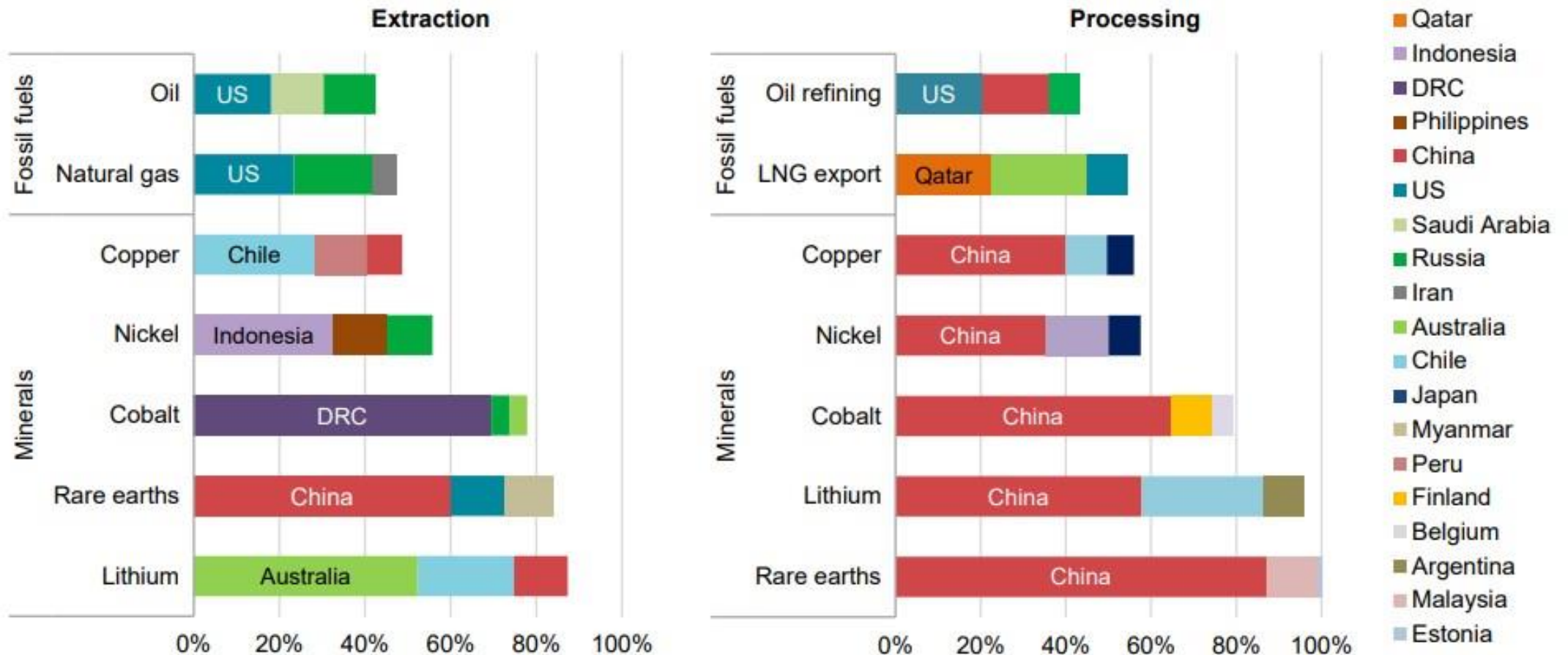
Mineral demand for clean energy technologies by scenario



# Where Are These Key Minerals Produced?

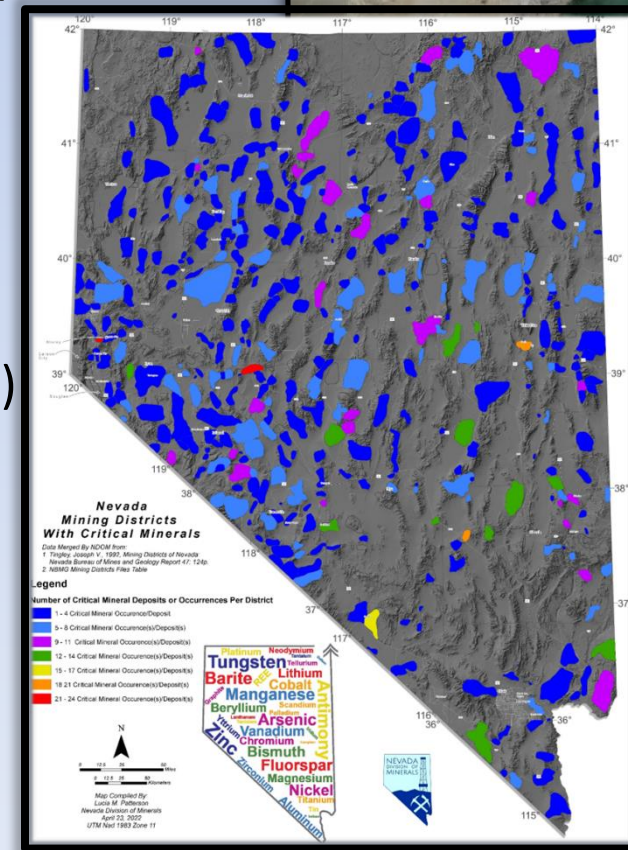
Production of many energy transition minerals today is more geographically concentrated than that of oil or natural gas

Share of top three producing countries in production of selected minerals and fossil fuels, 2019



# What Is Nevada's Role In Clean Energy Minerals?

- The lithium brine deposit model and associated solar evaporation mining process started here – Silver Peak Mine, 1966
  - It was “exported” to Chile in the 1970s; the Lithium Triangle (Argentina, Bolivia, and Chile) now account for more than 78% of global brine production and 75% of current global resources.
- Nevada is well endowed with mineral resources with a long history of mining and supportive infrastructure
- Nevada leads the nation in hard rock mining and how it is regulated, ensuring best management practices
- Global mining companies factoring Environmental, Social, and Governance (ESG) considerations are favoring mature regulatory jurisdictions (e.g., Canada, Australia, Northern Europe, and the US)
- Nevada consistently ranks in the top 5 global jurisdictions for Mining Investment Attractiveness by the Fraser Institute
- 33 of the 50 USGS (2022) Critical Minerals occur in Nevada
- Nevada ranks #1 in the world on the count of critical mineral occurrences per acre





# MINERALS ESSENTIAL TO ADVANCED ENERGY TECHNOLOGY



**INFRASTRUCTURE**  
Copper, Iron Ore,  
Molybdenum



**PUBLIC TRANSIT**  
Aluminum, Titanium,  
Magnesium



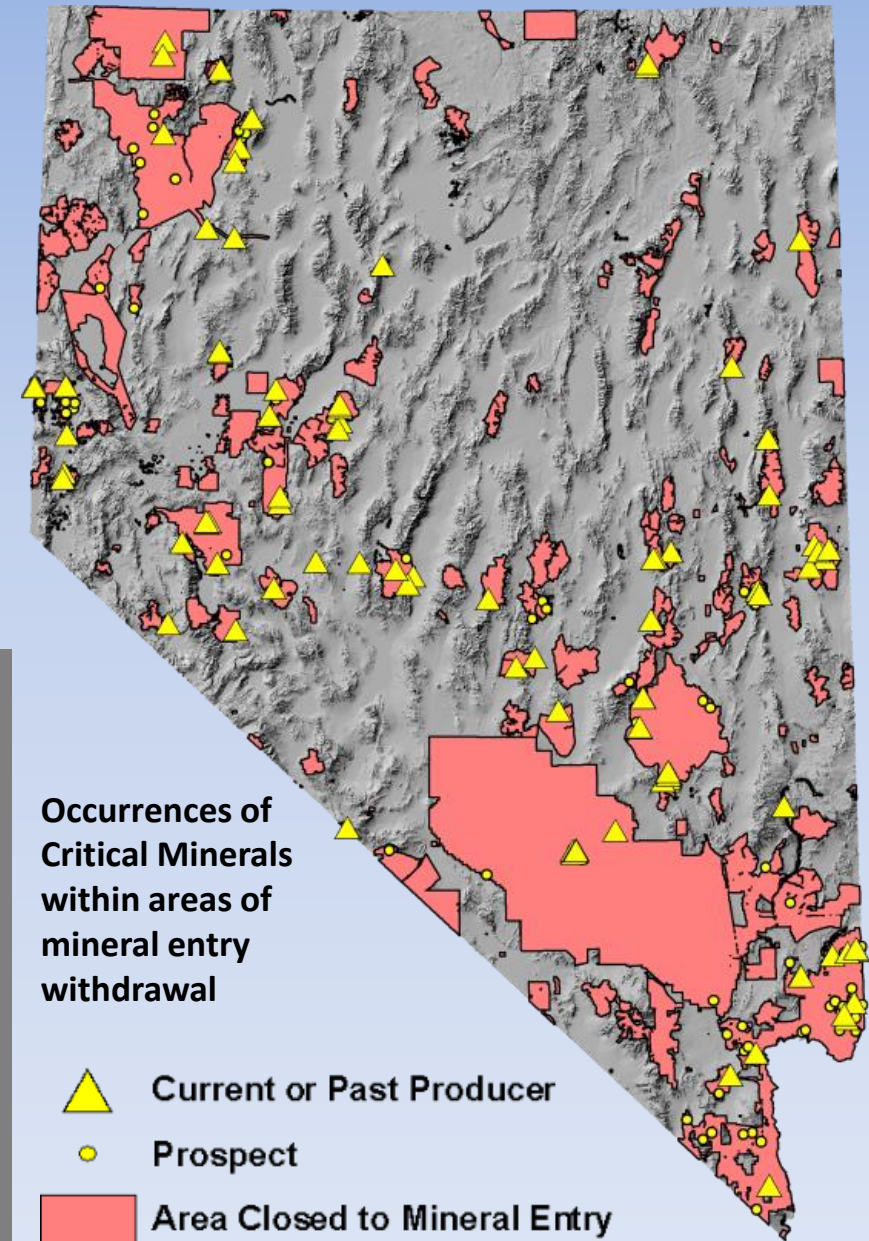
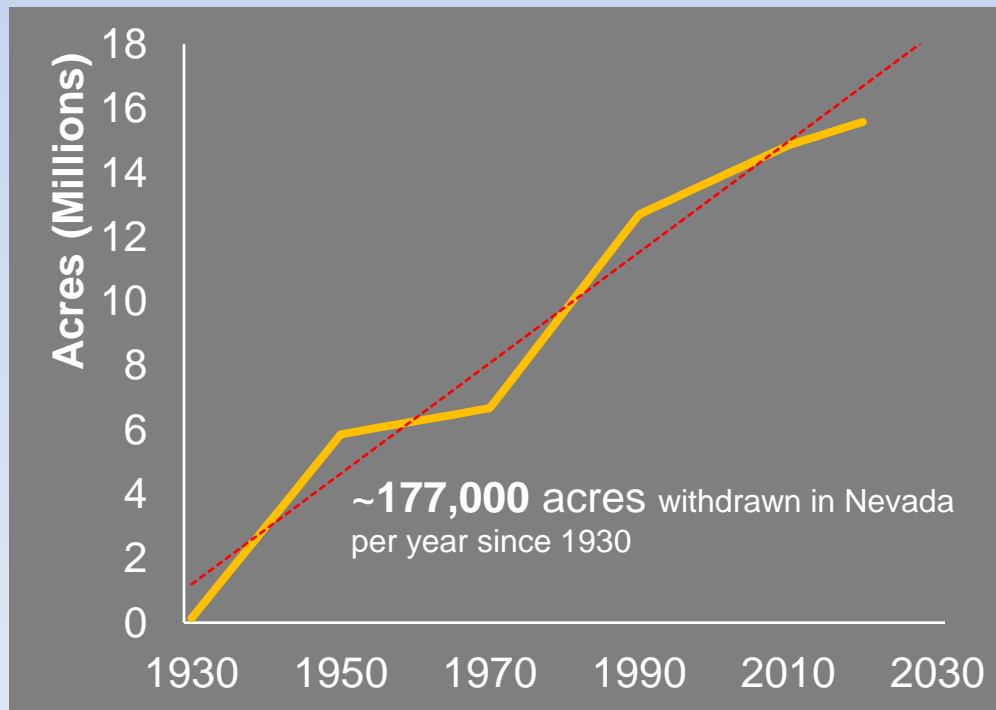
**AUTOMOBILES/  
ELECTRIC VEHICLES**  
Copper, Nickel, Lithium,  
Cobalt



**RENEWABLE ENERGY**  
Gold, Silver, Zinc

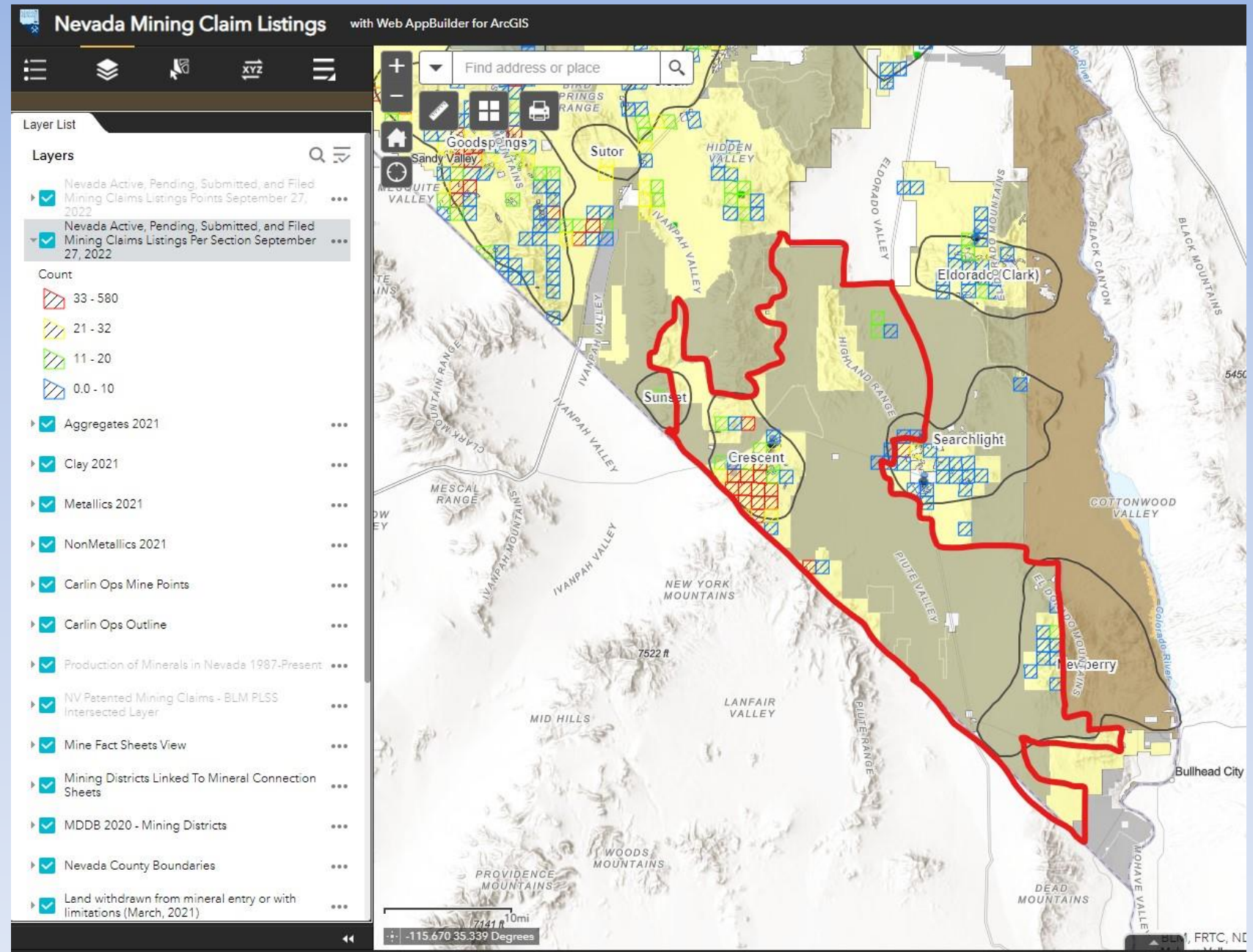
➤ Renewed exploration in NV for cobalt, copper, graphite, lithium, nickel, REE, tungsten, vanadium, and zinc while conservation efforts continue to remove land from development.

➤ Nevada is uniquely positioned to lead the US in transitioning away from fossil fuels *so long as* federal land is available for the environmentally responsible extraction of the commodities needed to electrify the nation.



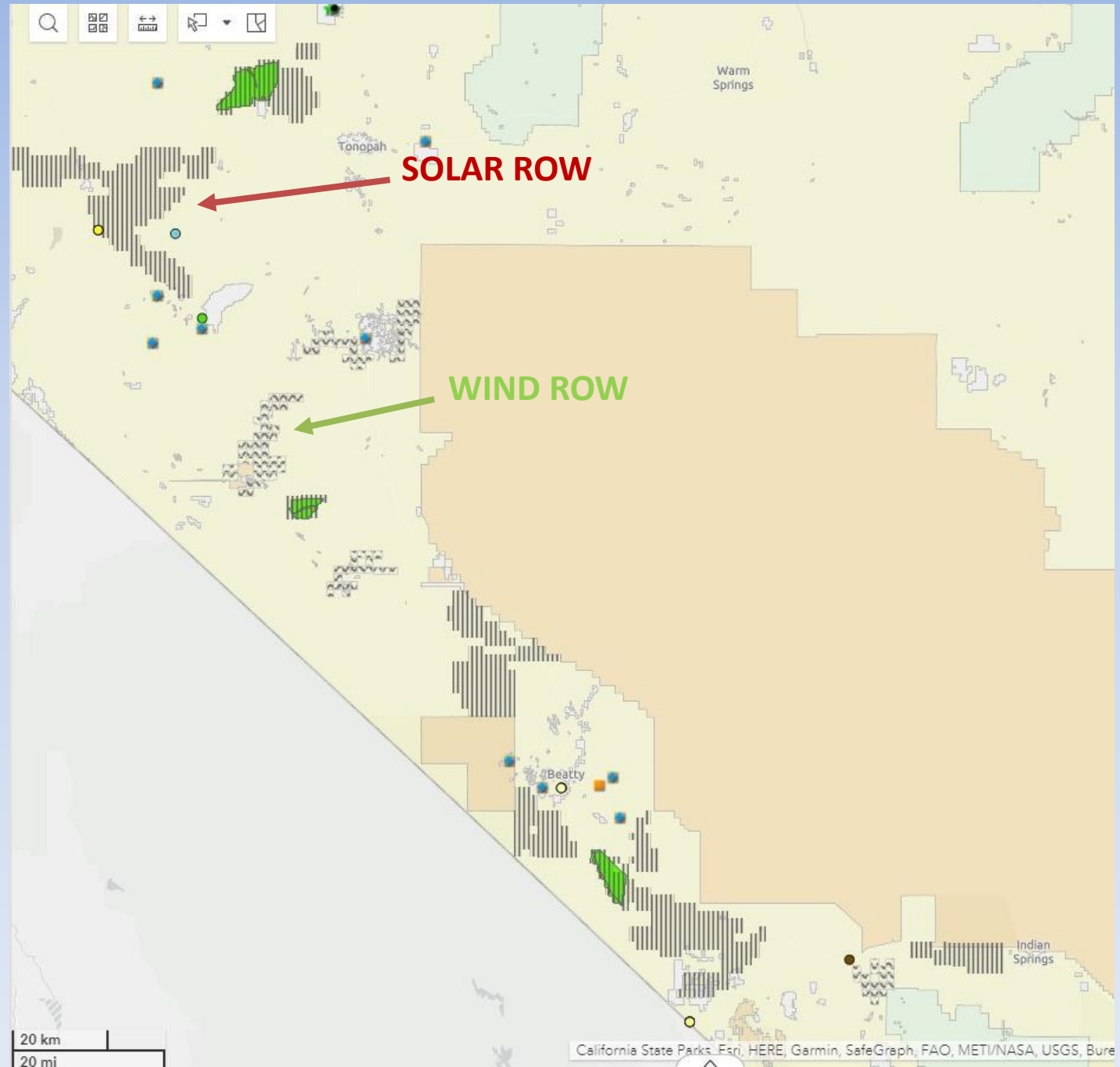
# LAND WITHDRAWALS

- Proposed Avi Kwa Ame National Monument
- H.R. 6751 (Sponsored by Rep. Titus)
- ~445,000 acres
- Expands existing Piute-Eldorado ACEC
- 516 mining claims at risk, 347 by two companies with REE projects
- 3,668 historic and current mining claims
- Sum of all federal mining fees = \$3,211,810



# RIGHT-OF-WAY (ROW)

- A land withdrawal in disguise?
- Current BLM **Wind ROW**  
(auth./pend./test/grant/lease)  
= **187,888 acres**
- Current BLM **Solar ROW**  
(auth./pend./test/grant/lease)  
= **481,141 acres**
- For comparison, sum of BLM  
**Mining Notices and Plans**  
(auth./pend.) = **228,048 acres**



# Concluding Comments

- **Copper is #2 in gross value and increasing**
  - **Limitation is lack of downstream smelting and refining**
  - **Electric vehicles vs. gas require 5-8X more copper**
- **Industrial mineral production in NV likely to increase as it is easier to put into operation than in other western states**
- **Increase in # of projects being permitted largely due to increased gold price but also in relation to increased demand for commodities needed for renewable energy and batteries (Co, Li, Ni, V, Zn)**
- **Competition for workers will result in changes to workplace, schedules, benefits, and \$\$\$**
- **Permitting timelines increasing due to insufficient human resources necessary to handle increased volume; locatables, solar, geothermal, oil are all experiencing an upswing**
- **Escalation in investor and consumer interest on the value of environmental, social and corporate governance (ESG) regarding sourcing and mining of commodities**

# For More Info:

- Agency Homepage:  
[minerals.nv.gov](http://minerals.nv.gov)
- “Mining” program page
  - Production summaries and stats
  - Numerous free publications and maps
- “Current Information”
  - Links to 20 Distance Learning Educational Videos
  - Recent Presentations
- “Important Links - Open Data Site”
  - Interactive web mapping application to display and download information related to the minerals industry.
  - Location of mining claims, current and historical exploration activity and mineral production.
  - Public lands issues
  - New “C.H.I.M.E.” page, all claims in western US, current and historic

Commission ▾ Programs ▾ Data News FAQs ▾ Contact Us

Welcome to the Division of Minerals & the Commission on Mineral Resources

Current Information

2022 Nevada Excellence in Mine Reclamation Award presented to KG Mining (Bald Mountain), Inc.

Release of New Jimmy King - King of Bad Ideas Video

Distance Learning - Educational Videos

Recent Presentations page

Information Related to Proposed Land Use Plans and Withdrawals

Division of Minerals staff conducted a career day and minerals education presentation to the fourth grade classrooms at Eva G. Simmons Elementary School, Las Vegas. (10/5/2022)