

# **Nevada Division of Minerals**

## ***2018 NEVADA MINERAL PRODUCTION AND 2019 EXPLORATION SURVEY***

### **NEVADA MINING ASSOCIATION BOARD MEETING**

**Reno, NV**

**July 11, 2019**

**Mike Visher, Deputy Administrator**



# Nevada Division of Minerals (NDOM)

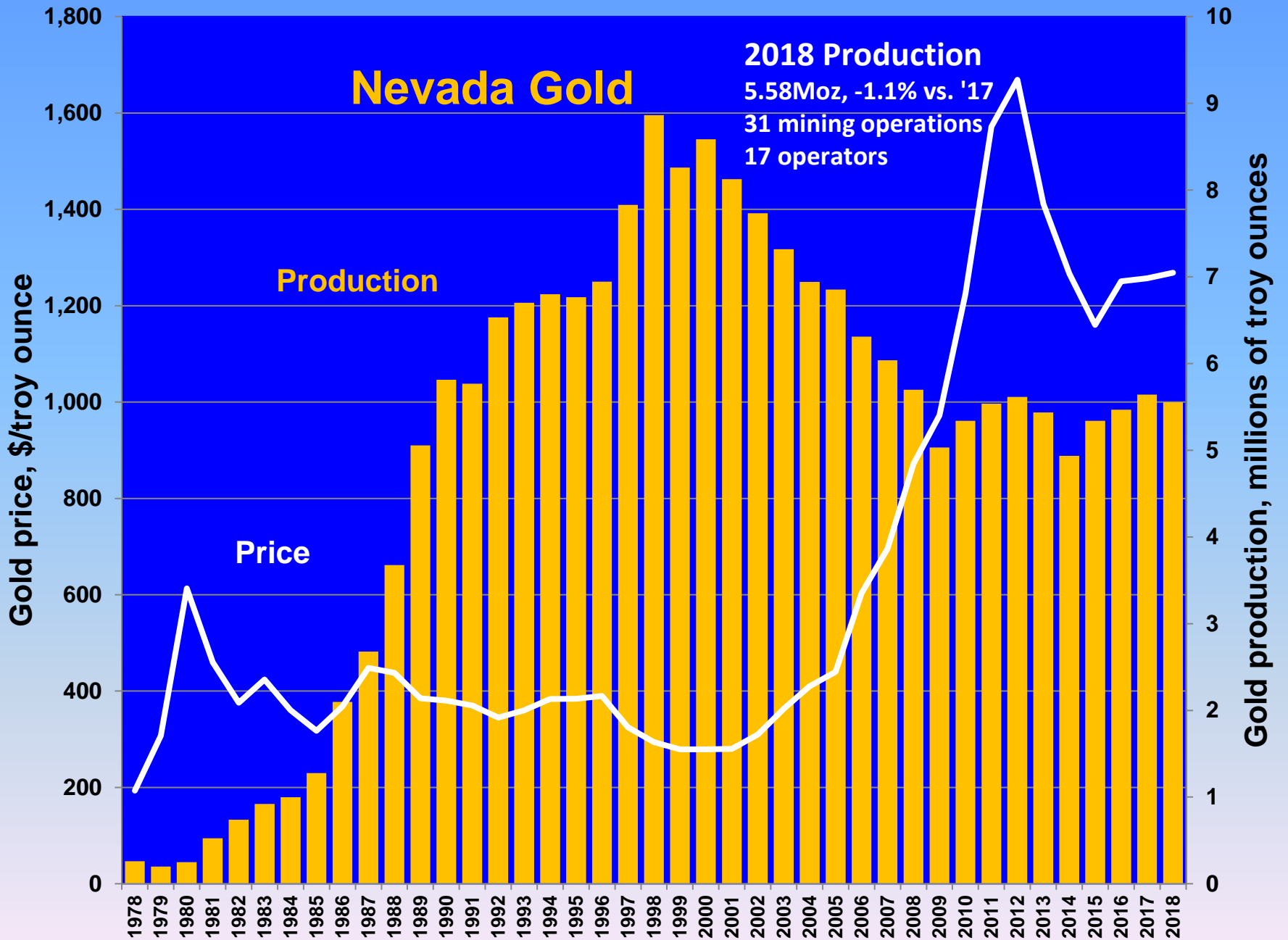
- **State Agency and part of the Commission on Mineral Resources (7 members appointed by Governor)**
- **Offices in Carson City (8 employees) and Las Vegas (3 employees)**
- **No general fund monies, all revenue from mining claim fees, fluid mineral permit fees, BLM and USFS grants, etc.**
- **What we do by statute:**
  - ❑ **NRS 513**
    - **Abandoned Mine Lands Program**
    - **Public information and minerals education**
    - **Annual mineral, geothermal and oil production reporting**
    - **Advise and recommend mineral policy to Governor and Legislature (*act as cooperating State agency on Federal Land withdrawal NEPA actions when requested*)**



# NDOM – what we do, by statute (cont'd)

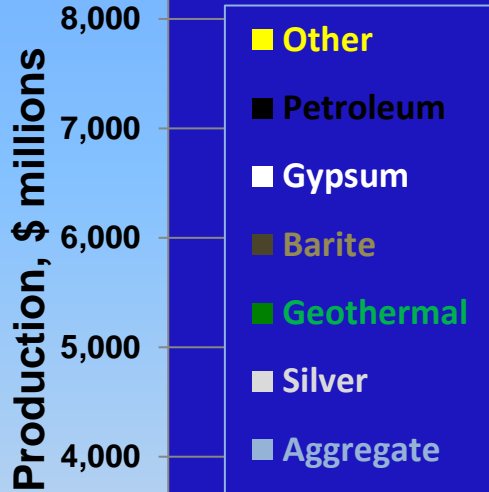
- **NRS 517: Mining Claims, Mill sites and Tunnel rights**
- **NRS 519A.290: State Reclamation Bond Pool**
- **NRS 522 Oil and Gas**
  - **Well permitting, drilling and completion compliance, conservation of the resource**
- **NRS 534A: Geothermal Resources**
  - **Well permitting, drilling and completion compliance**
- **NRS 534B: Dissolved Mineral Resource Exploration**
  - **Borehole approval, well permitting, drilling and completion compliance, protection of other fluid mineral resources**





# Nevada Mineral and Energy Production Values 1978 - 2018

\$8.4 Billion in 2018, same as 2017



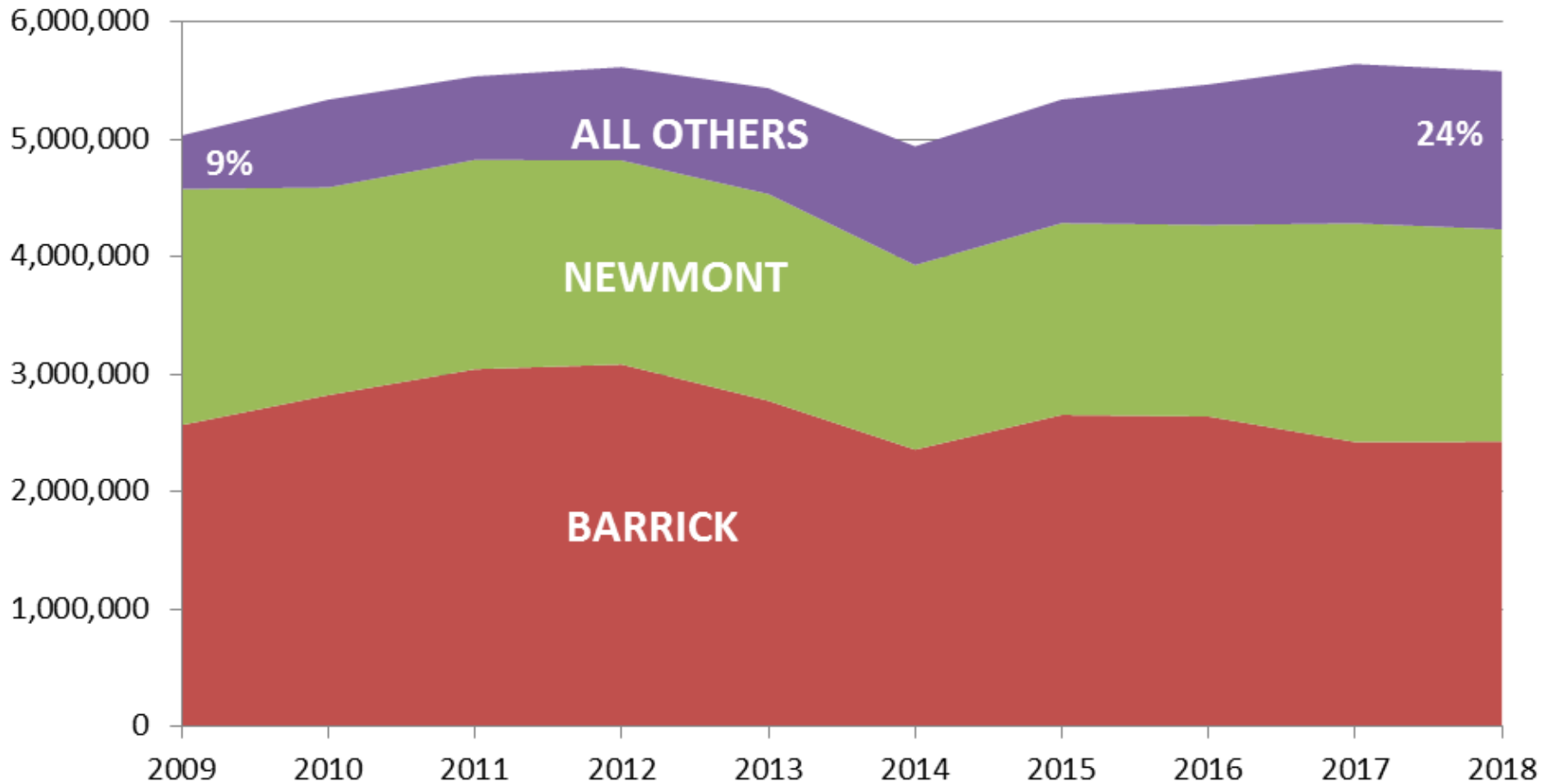
1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

# 2018 NEVADA METAL PRODUCTION

<b>2018 NEVADA METAL PRODUCTION, BY PRODUCER - Final</b>				
Ranked by gold production				
<b>Operator</b>	<b>Gold (ozs)</b>	<b>Silver (ozs)</b>	<b>Copper (lbs)</b>	<b>Moly (lbs)</b>
Barrick	2,425,512	105,360		
Newmont	1,808,484	1,107,493	32,102,979	
Kinross	660,100	820,042		
SSR Mining	205,161	4,315		
Jerritt Canyon Gold	145,064	NR		
Hecla (Klondex)	109,614	516,312		
Coeur	54,668	5,037,983		
Florida Canyon Mining (Alio Gold)	46,878	31,775		
KGHM International	38,990	171,679	112,552,787	459,959
Fiore Gold	37,403	NR		
Premier Gold (40% of S. Arturo)	20,980	NR		
Rawhide Mining	15,444	208,875		
Mineral Ridge Gold	7,497	3,444		
Ruby Hill Mining	4,648	3,584		
Borealis Mining	420	394		
Sunrise Minerals	268	150		
Geo-Nevada	14	NR		
New Gold Nevada	14	2		
<b>Totals</b>	<b>5,581,160</b>	<b>8,011,408</b>	<b>144,655,766</b>	<b>459,959</b>

# Production Breakdown – Barrick, Newmont and everyone else

## 2009 - 2018 Annual Gold Production in Nevada



# New Operation for 2019, #1: McEwen Mining – Gold Bar



- **Groundbreaking – November 2017**
- **First gold pour – February 2019**
- **Production target – 60,000 Au oz/yr**
- **Avg. Au grade - 1.0 g/t**
- **Current mine life – 7 years**



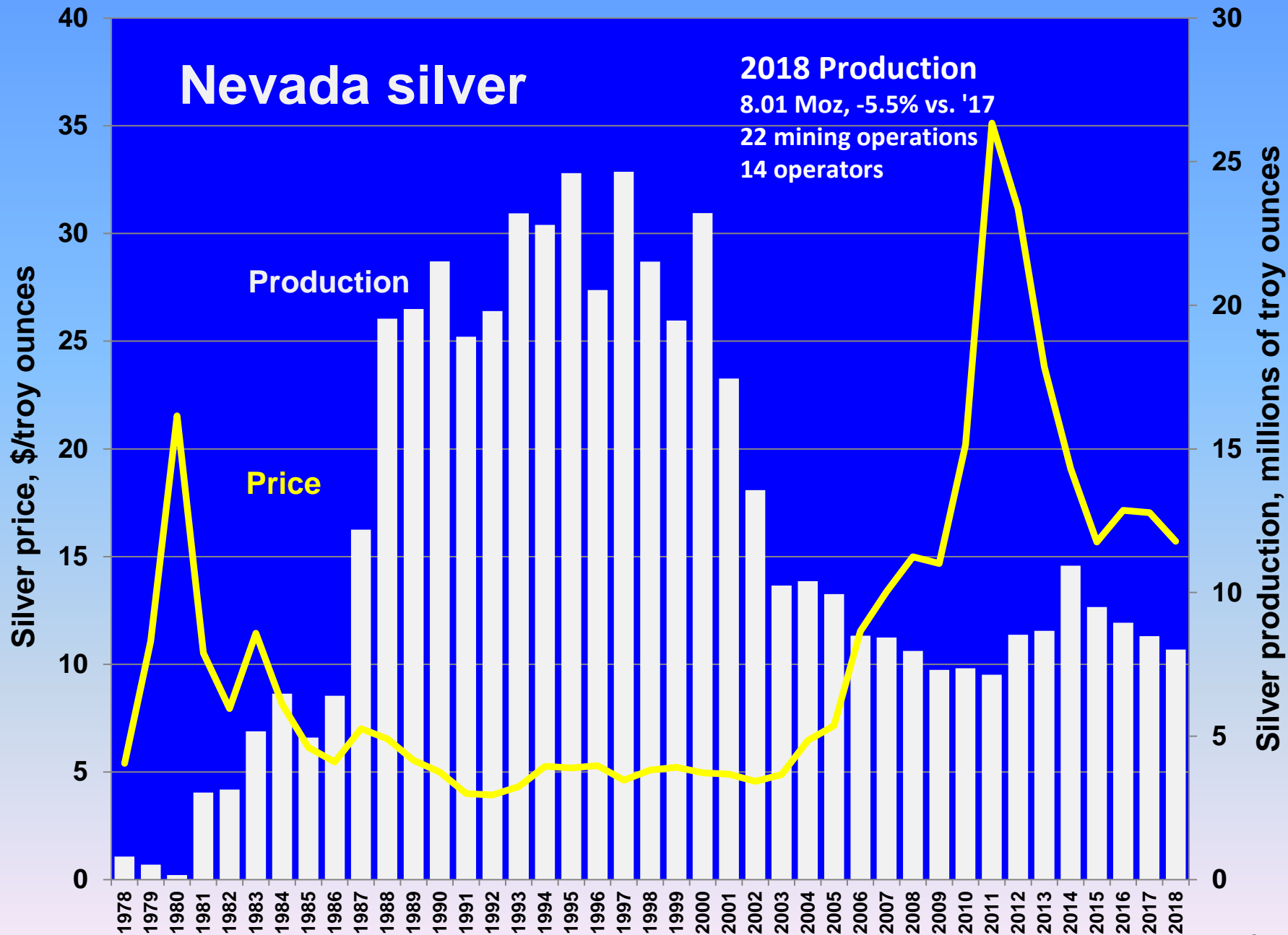
## New Operation for 2019, #2: Gold Resource Corp. – Isabella Pearl



- Groundbreaking – June 2018
- First gold pour – April 2019
- Production target – 40,000 Au oz/yr
- Avg. Au grade - 3.7 g/t
- Current mine life – 5 years

Isabella Pearl Project: First gold dore bar





# Nevada's only Primary Silver Mine: Coeur Rochester

Disseminated silver-gold deposit hosted in the Permian-Triassic Weaver and Rochester formations.

**2018 Production:**  
**5,037,983 troy**  
**ounces of silver**  
**and 554,668 troy**  
**ounces of gold.**

Rochester celebrated 150 million  
ounces of silver production in 2017



# Nevada copper

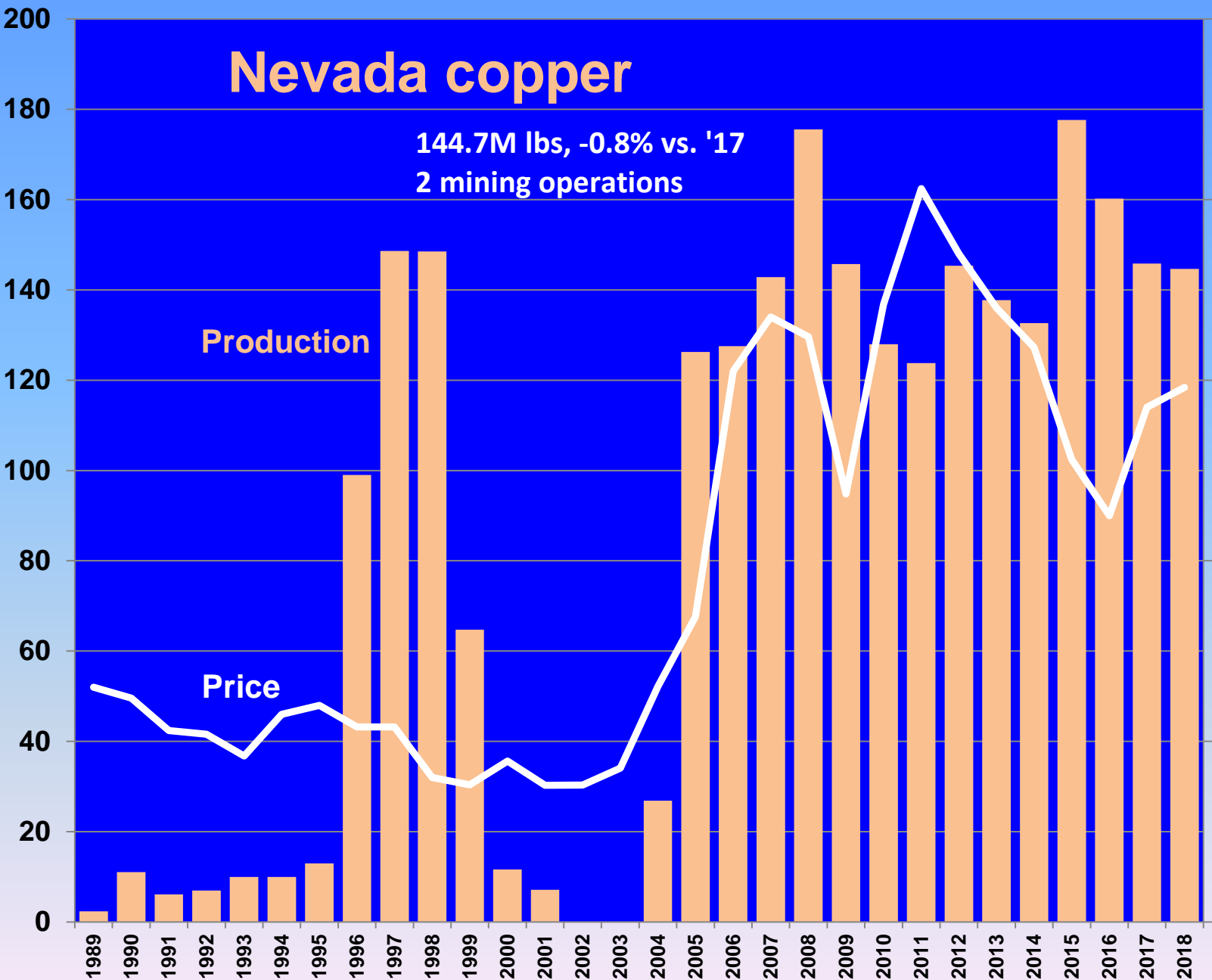
144.7M lbs, -0.8% vs. '17  
2 mining operations

Copper production, millions of pounds

Production

Price

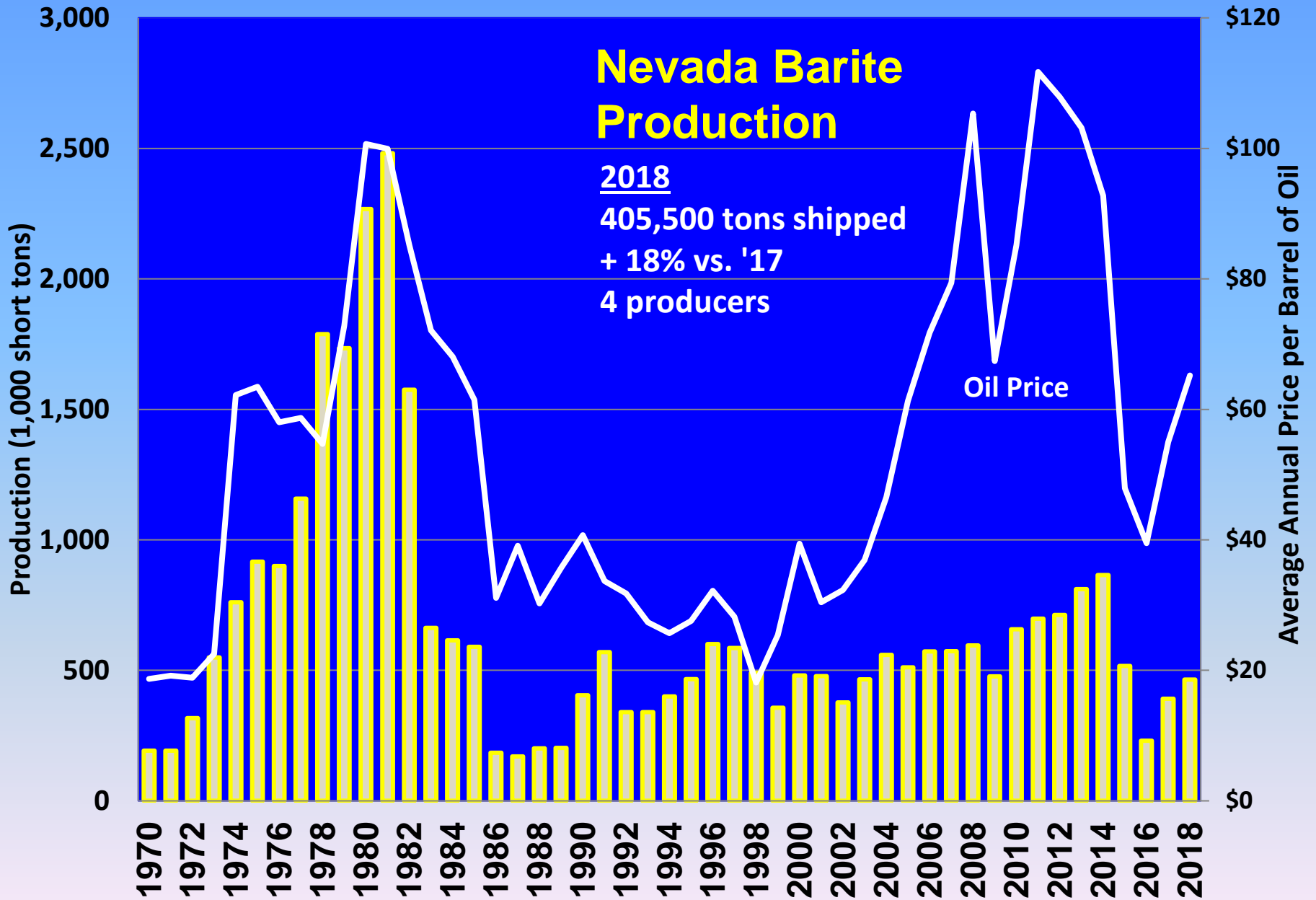
Copper price, \$/pound



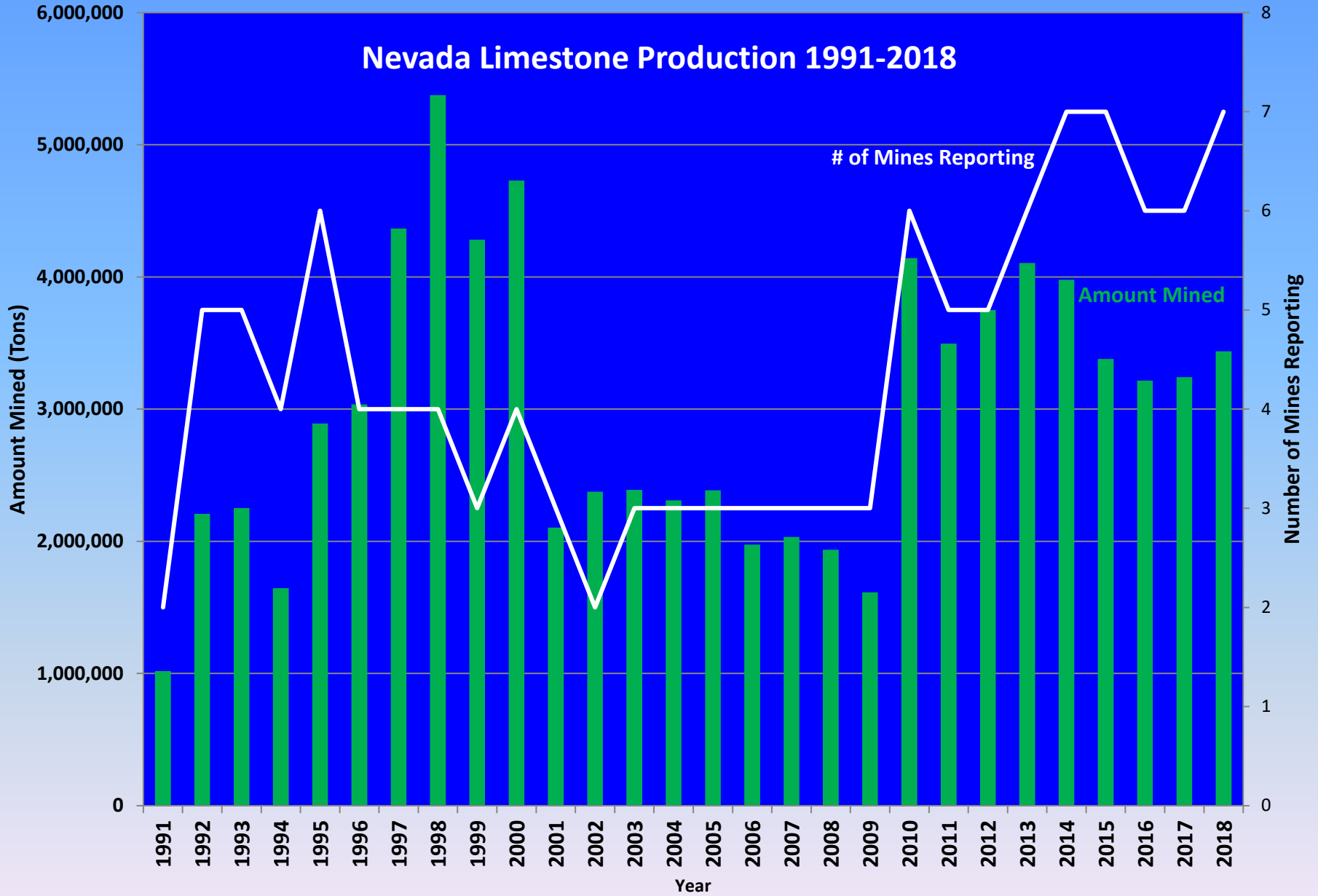
# New Operation for 2019, #3: Nevada Copper – Pumpkin Hollow

- Hybrid IOCG chalcopyrite-magnetite skarn
- 2 deposits with 5 billion contained pounds of Cu:
  - Deep, high-grade eastern deposit mineable underground
  - Shallower western deposit mineable open-pit
- Currently developing a 5,000 tpd underground mine on the eastern deposit with a concentrator
- Main shaft being extended to 2,147 feet
- First copper production planned for @Q4 2019
- The mine should employ ~300 people

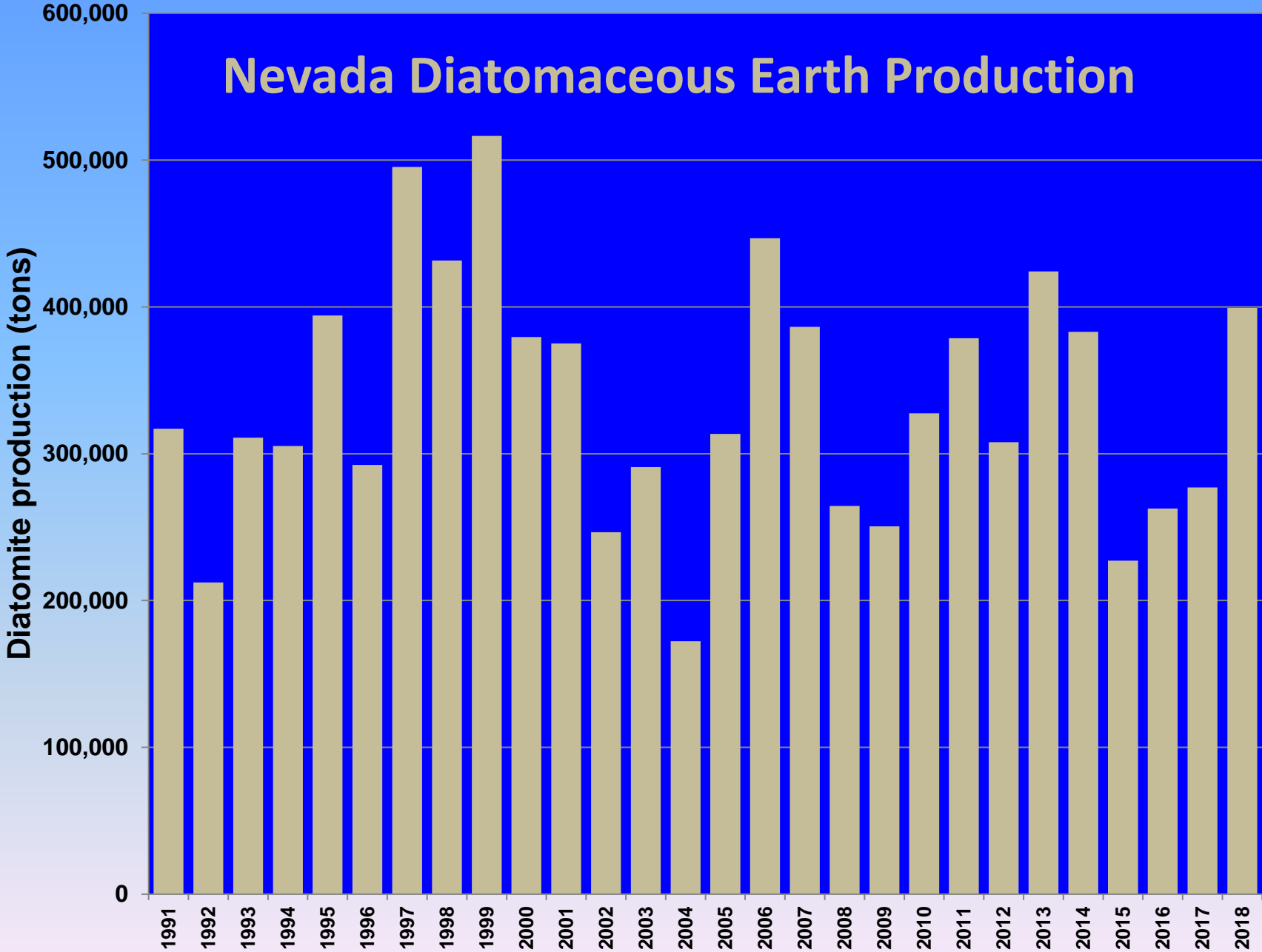




# Nevada Limestone Production 1991-2018



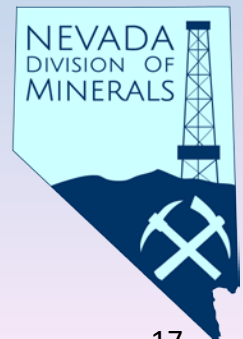
# Nevada Diatomaceous Earth Production



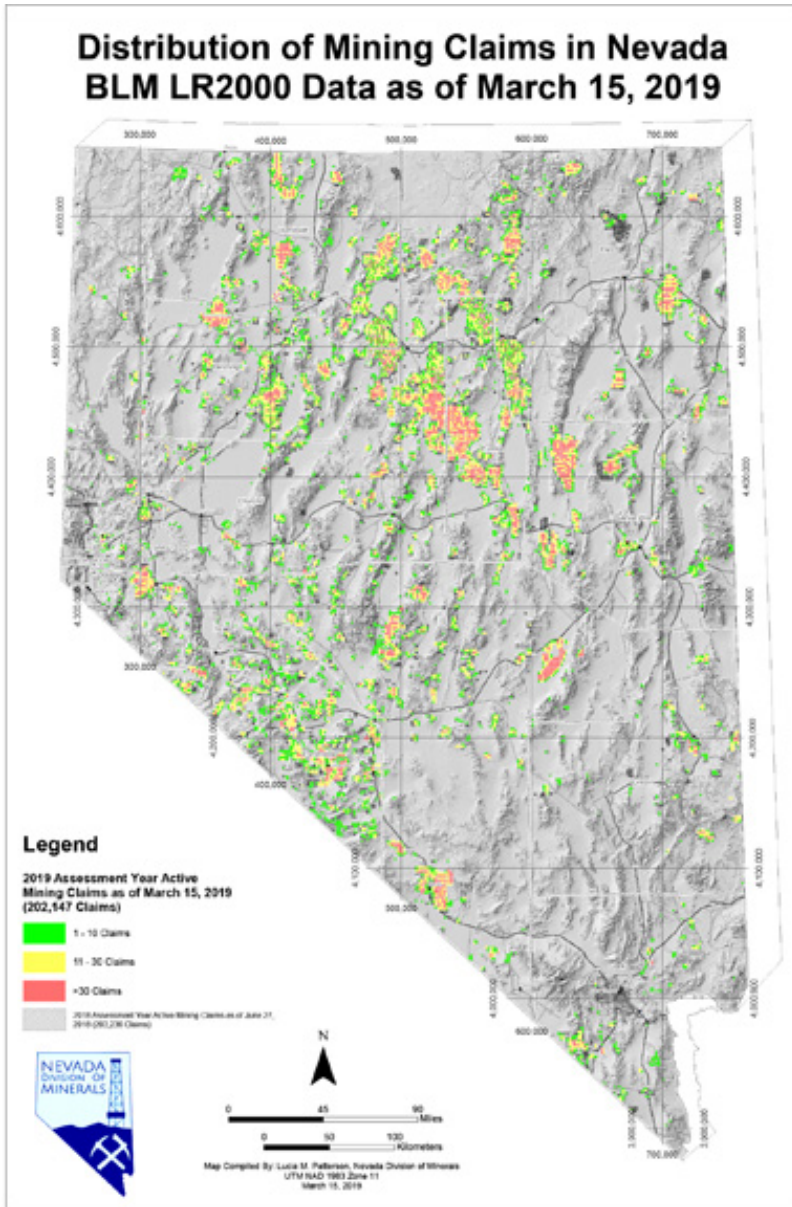


# Other Industrial Minerals Produced in 2018

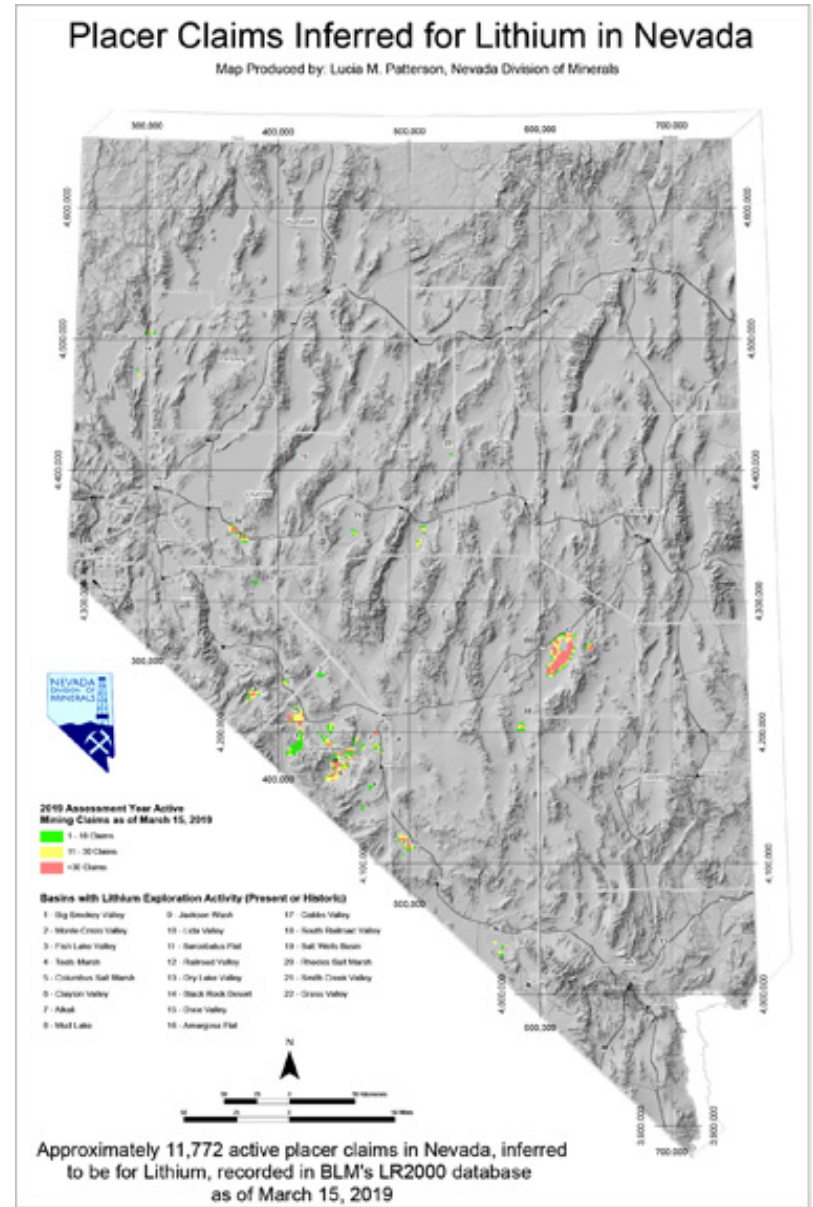
- 12,900,000 lbs of lithium carbonate
- 716,000 tons of silica sand
- 348,600 tons of magnesite
- 19,900 tons of salt
- 17,087 tons of perlite



202,147 Active Mining Claims in Nevada  
as of 3/15/2019,  
an increase of 0.4% from 2/22/2018

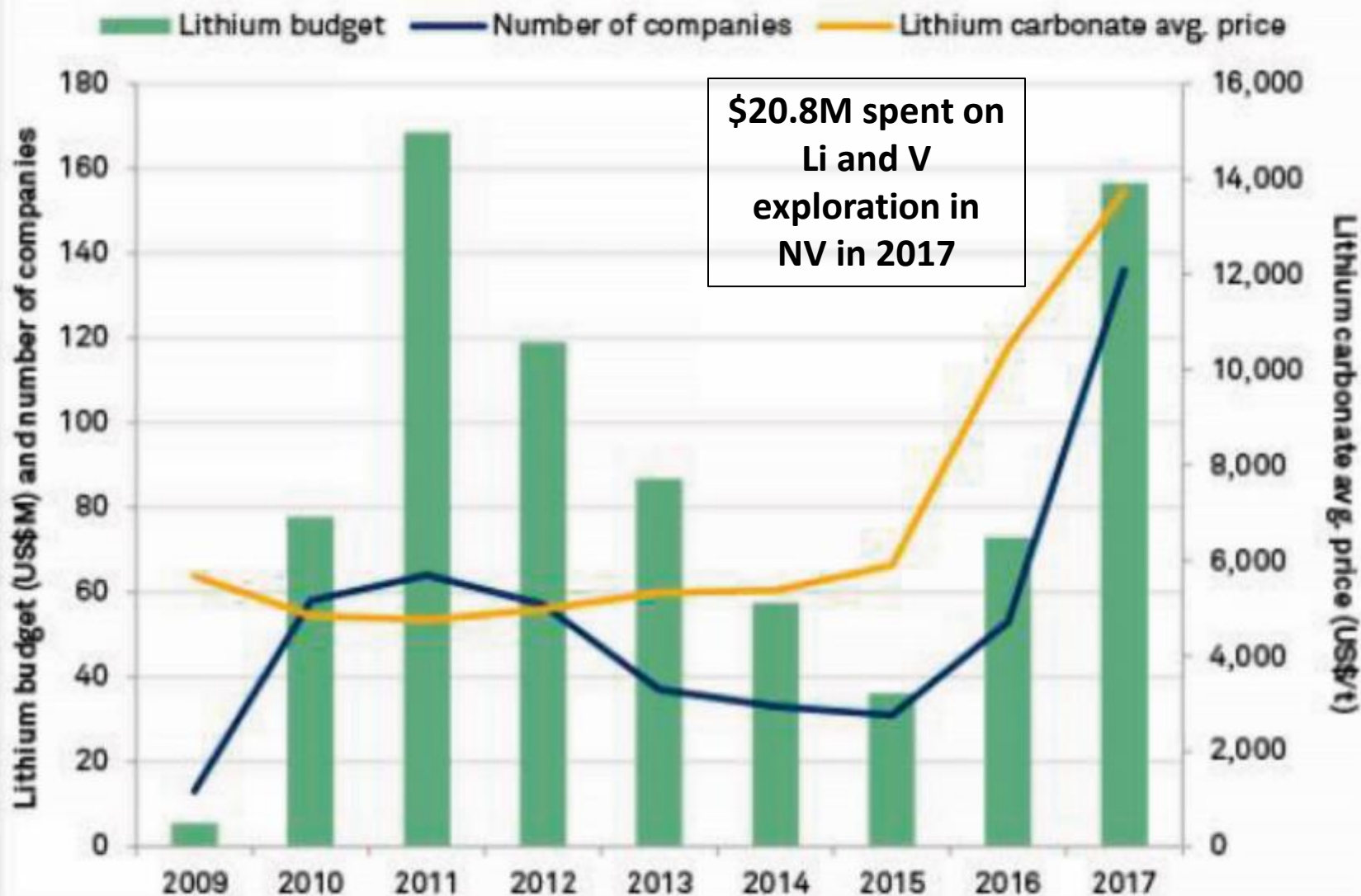


11,772 Inferred Lithium Placer Claims in Nevada as of 3/15/2019,  
a decrease of 5.8% from 2/22/2018



# Not Just Gold: Worldwide Lithium Exploration Boom

## Lithium exploration budgets, 2009-2017

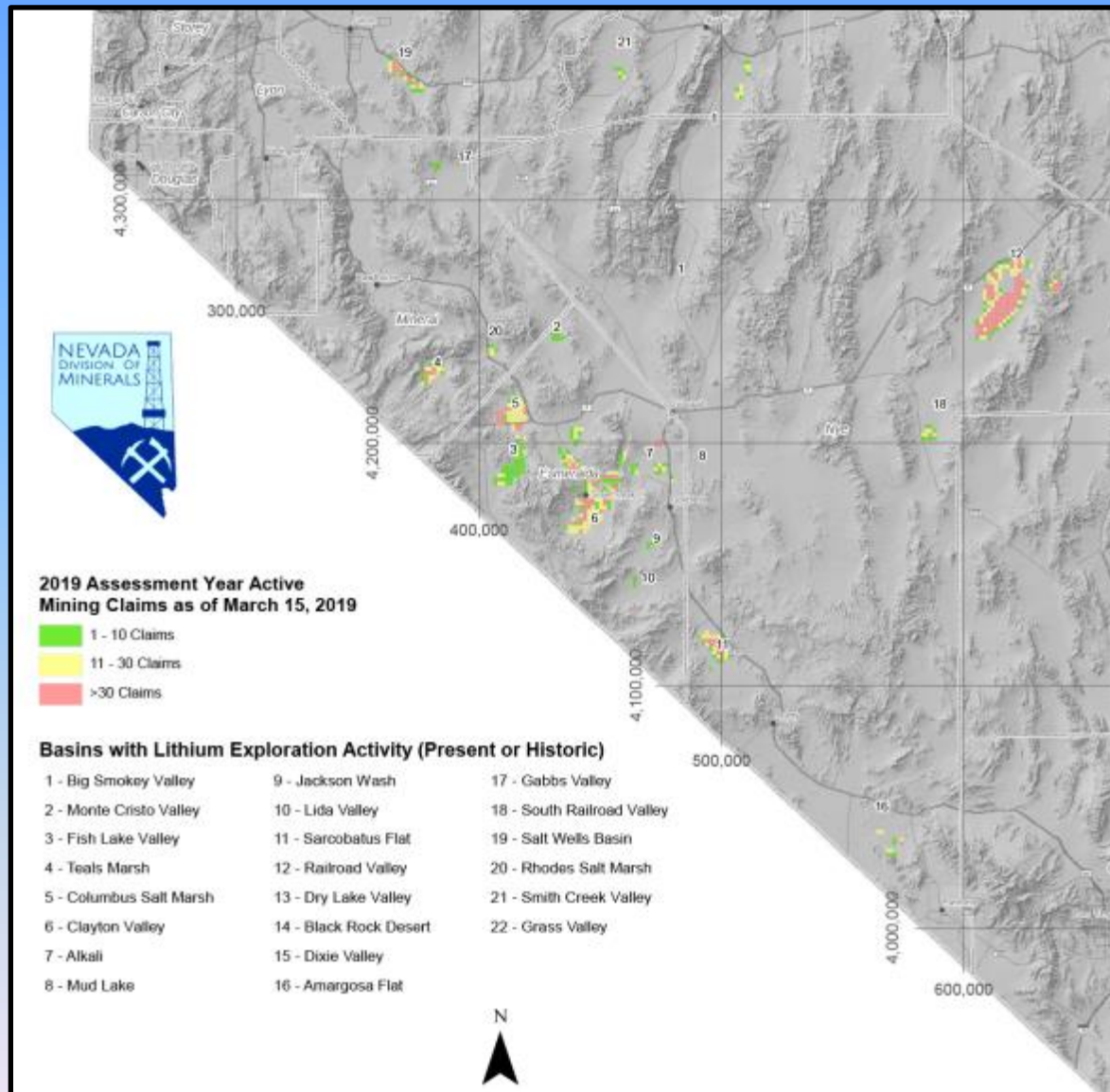


Data as of Oct. 30, 2017.

Source: S&P Global Market Intelligence

# Lithium Brine Exploration Activity

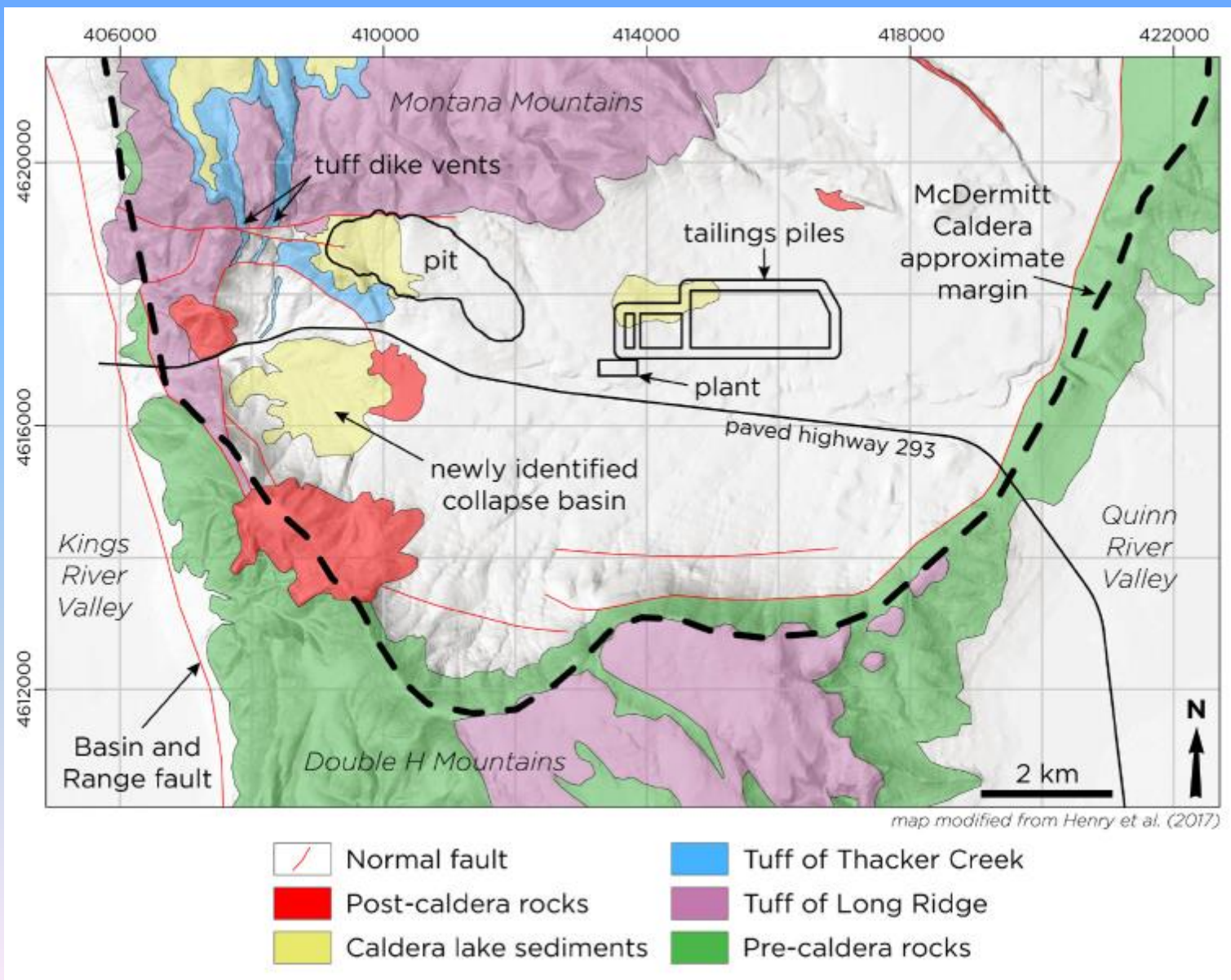
- >11,700 claims staked in playas
- 20 different hydrographic basins
- NRS 534B: Exploration for dissolved minerals **requires** interaction with NDOM
- Borehole – NOI and approval, but no fee
- Well – Permit with \$1,000 fee
- 6 NOIs and 6 permits approved to date
- Field inspections
- Good coordination with BLM FO personnel



# Lithium Clay Projects

- **Exploration regulations same as hard rock**
  - **Notice or plan-level under BLM**
  - **No permitting of boreholes needed as no water pumped**
- **Mine permitting same as any mining project**
  - **On Federal lands, BLM or USFS lead agency**
  - **On Private lands, NDEP-BMRR is lead agency**
- **Two projects which have done PFS reports, metallurgical studies, and proposed flowsheets:**
  - **Lithium Americas - Thacker Pass Project in Humboldt County**
  - **ioneer Ltd. - Rhyolite Ridge Project in Esmeralda County**

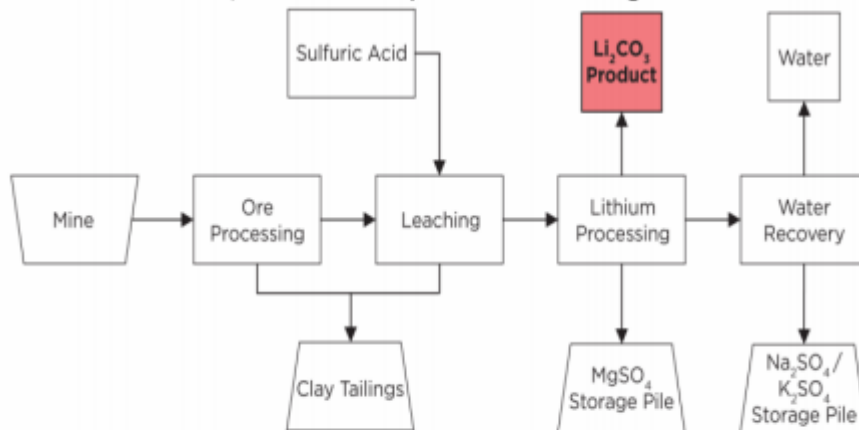
# Lithium Americas – Thacker Pass Project



# Lithium Americas – Thacker Pass Project

## PLANT

- Process is comprised of 3 functional areas: Ore Preparation & Leaching, Sulfuric Acid Plant, & Lithium Processing Plant
- No new process technology, only traditional chemical processing equipment used in unique ways, specific to the LNC extraction process:
  - Tanks (stirred reactors)
  - Vacuum Belt Filters
  - Single and Double-Effect Crystallizers
  - Double Contact / Double Absorption Sulfur-Burning Acid Plant



- Reserves – 3.1M tonnes LCE at 2,358 ppm Li
- Strip ratio – 1.6:1
- Mine life – 46 years
- Processing time - <24 hours
- Lithium recovery – 83%
- Pilot plant operational in Reno
- Final Mine PoO to be submitted to BLM later this year

# ioneer's Rhyolite Ridge Project



## Project overview



**A searlesite resource that is different to other sedimentary lithium deposits - it is suitable for a simple acid leach process**

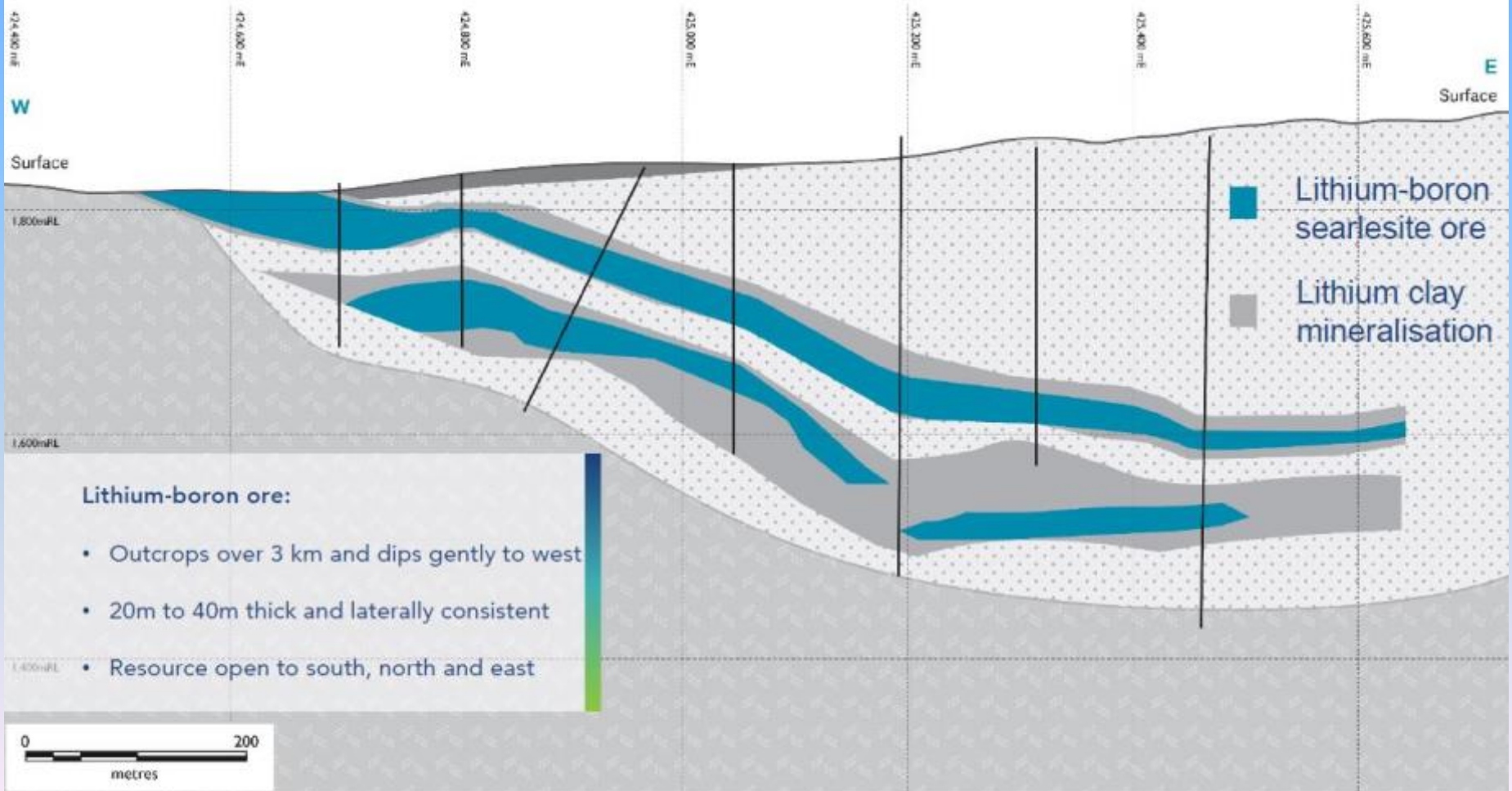


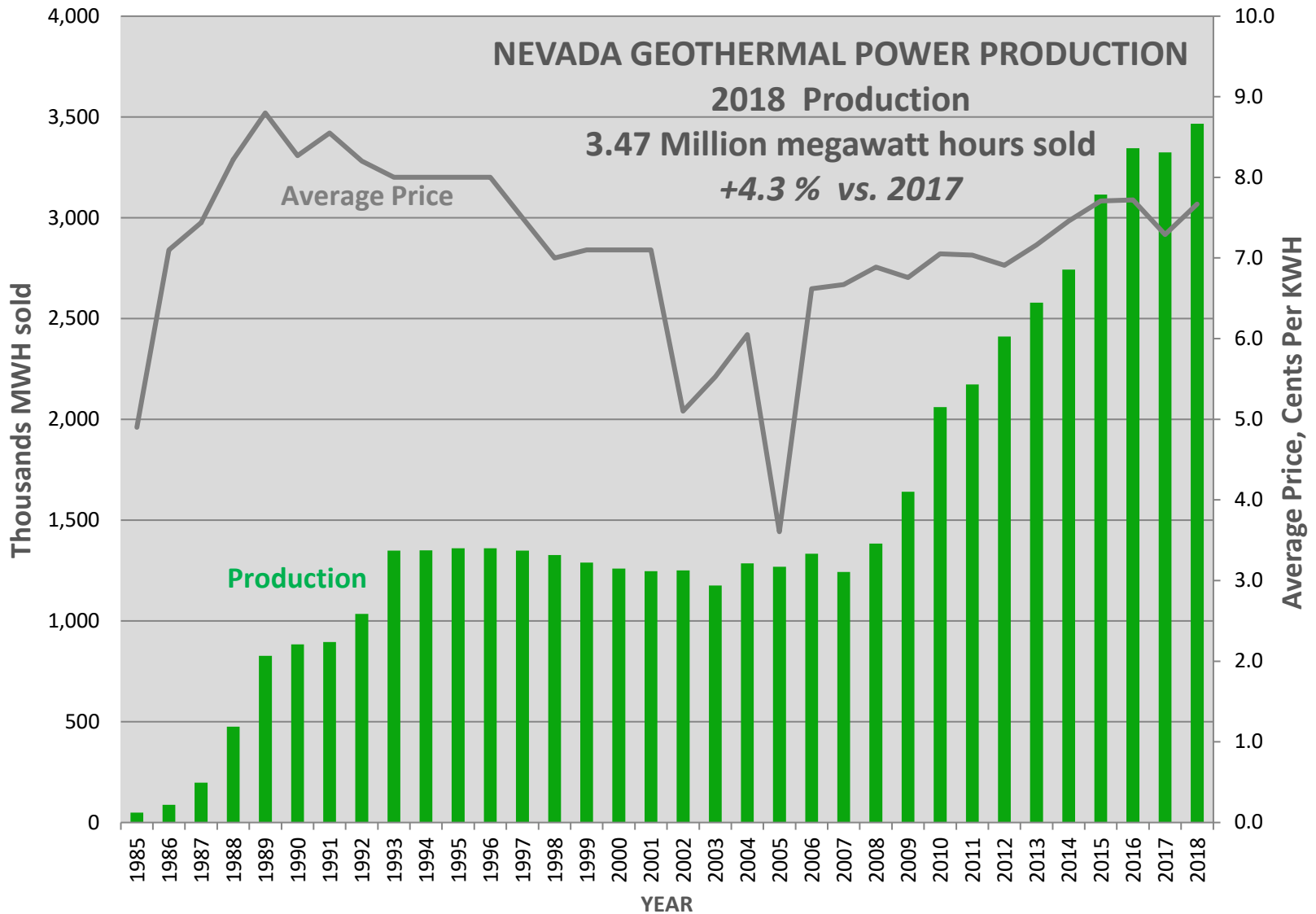
- Total Resource<sup>1</sup> of 4.1 million tonnes lithium carbonate & 10.9 million tonnes boric acid
- Including 121 million tonnes of lithium-boron ore containing:
  - 1.1 million tonnes lithium carbonate
  - 8.6 million tonnes boric acid
- Lithium only clay mineralisation to be stockpiled



# ioneer's Rhyolite Ridge Project

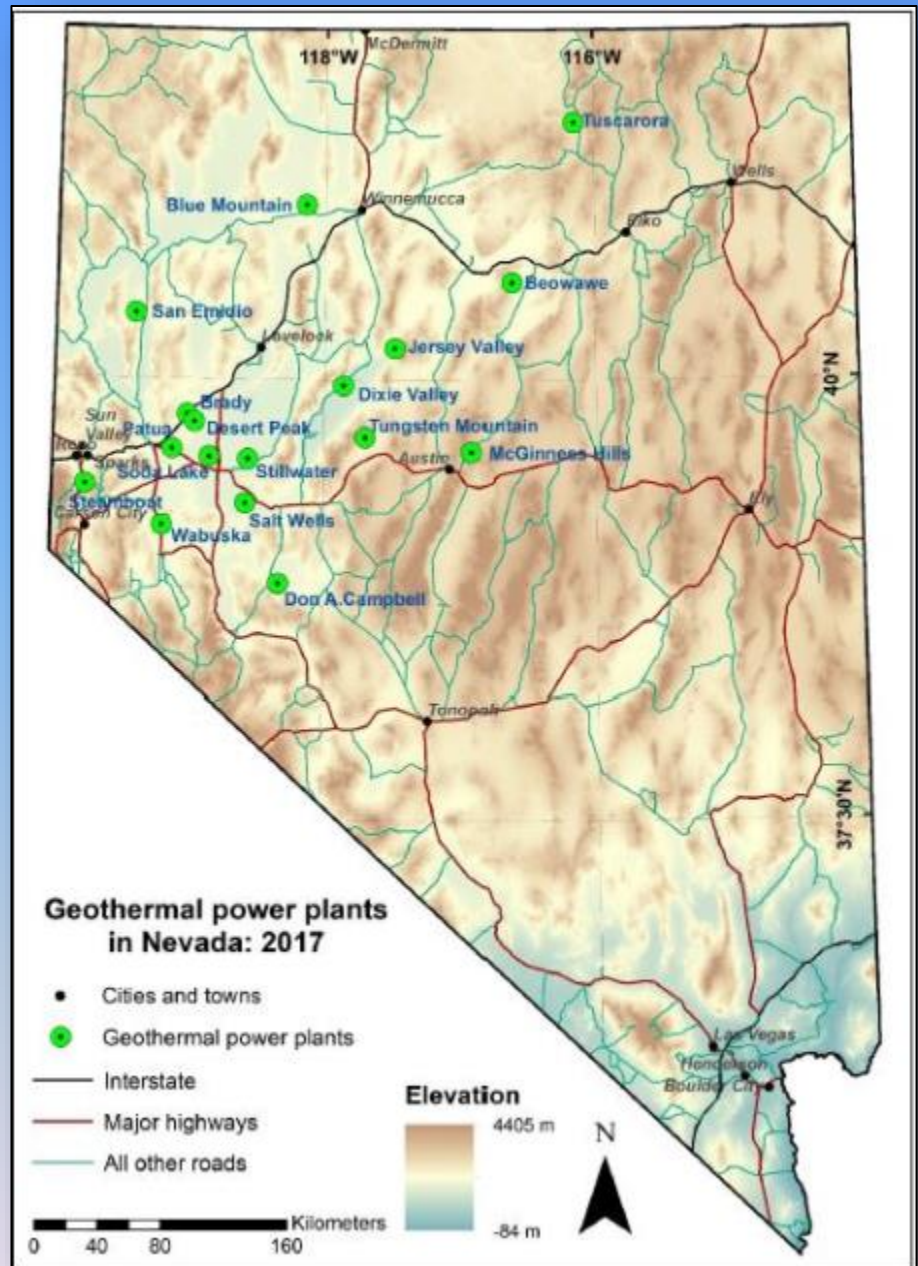
## Rhyolite Ridge cross section



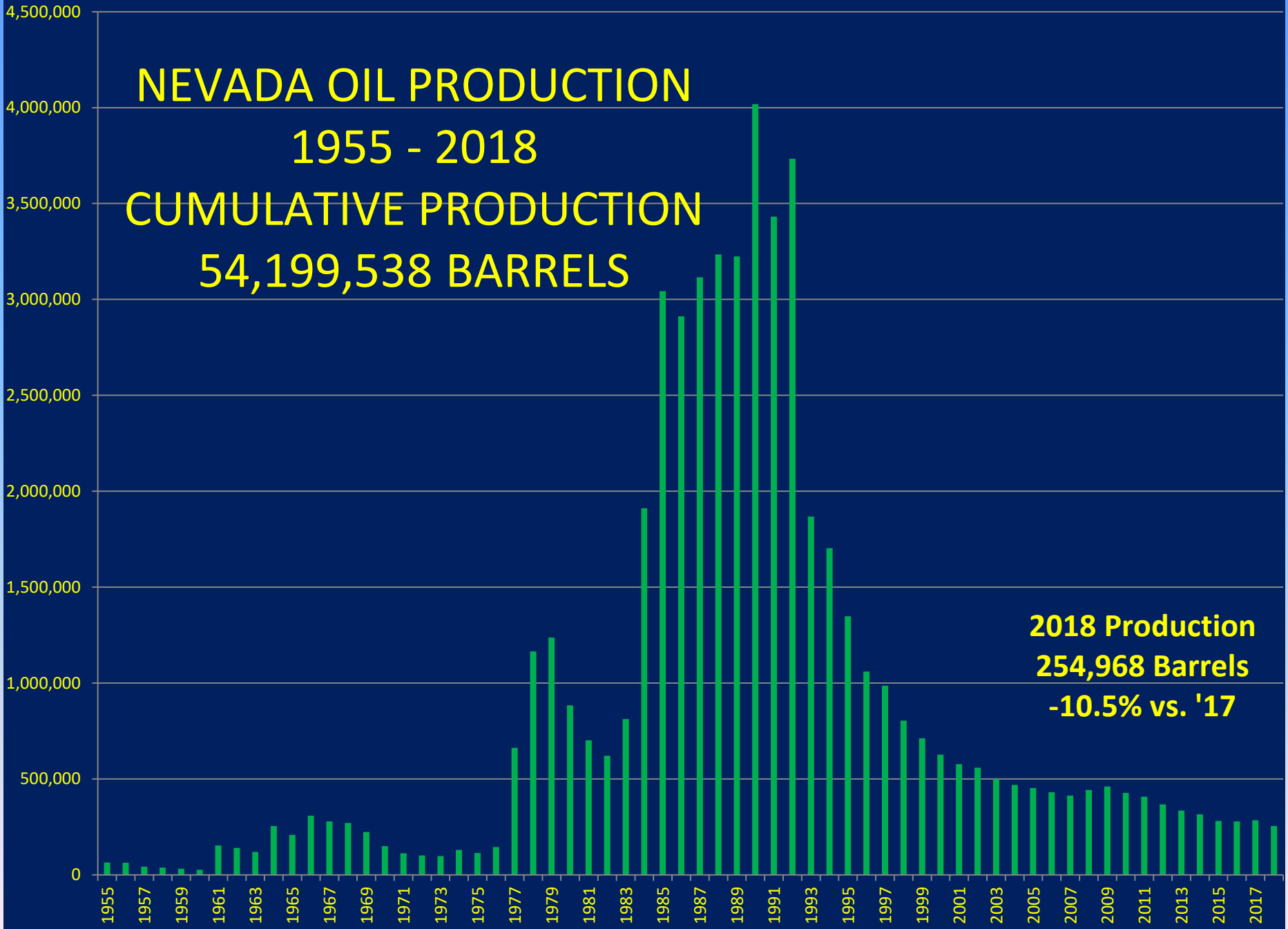


# Geothermal Operators

- There are currently 17 geothermal fields in Nevada being operated by 6 operators:
  - **Ormat Nevada**: Steamboat, McGinness Hills, Brady, Desert Peak, Wild Rose (Don Campbell), Jersey Valley, Tuscarora, and Tungsten Mountain, San Emidio
  - **Terra-Gen**: Dixie Valley and Beowawe
  - **Cyrq Energy**: Soda Lake and Patua
  - **Enel North America**: Stillwater and Salt Wells
  - **Nevada Geothermal**: Blue Mountain
  - **Whitegrass Geothermal**: Wabuska
- 459 permitted commercial and industrial wells
- 60% on private property
- >334,000 acres in authorized BLM leases



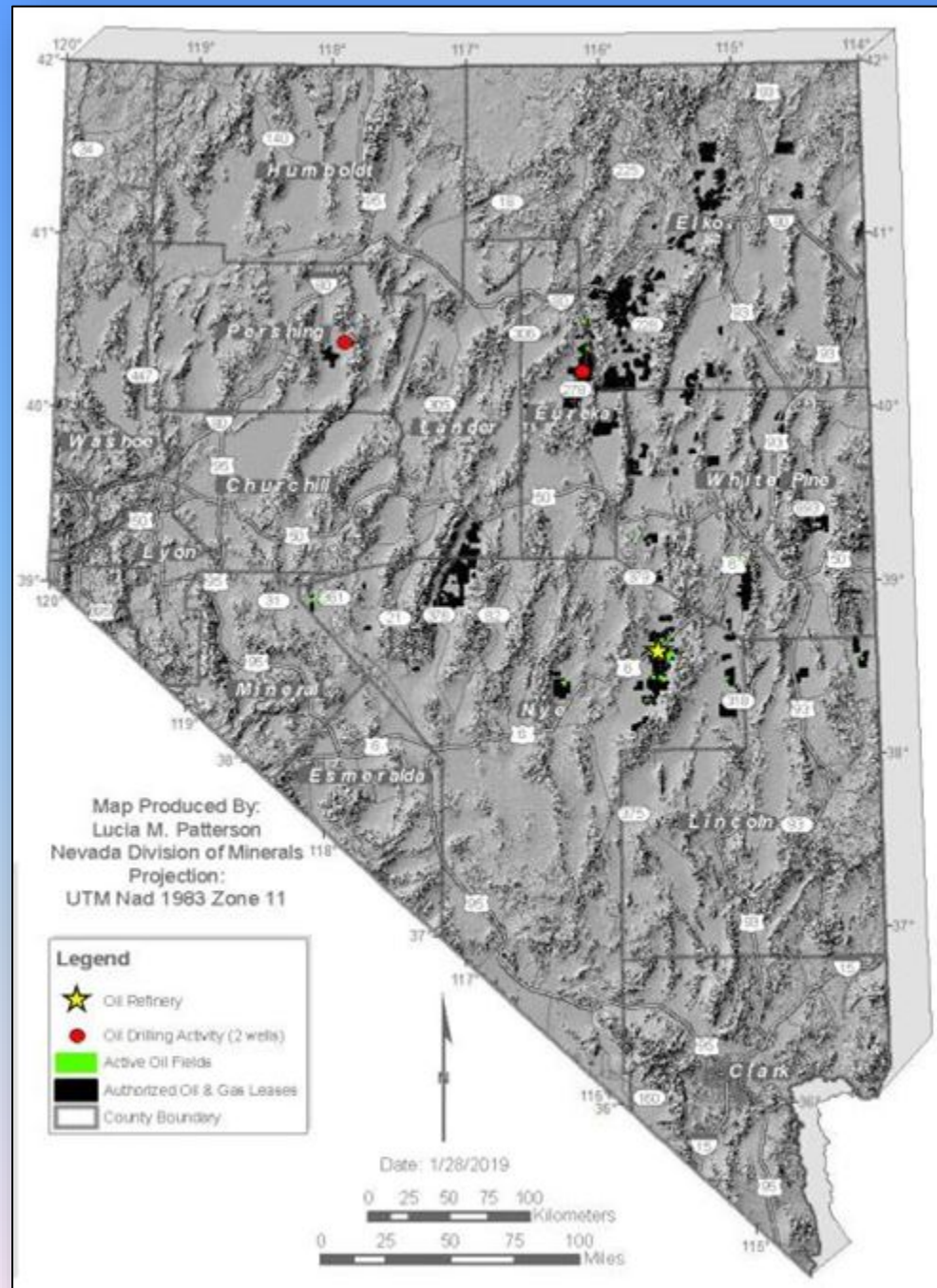
# NEVADA OIL PRODUCTION 1955 - 2018 CUMULATIVE PRODUCTION 54,199,538 BARRELS



**2018 Production  
254,968 Barrels  
-10.5% vs. '17**

# 2018 Nevada Oil Activity

- 5 oil producers:
  - Makoil
  - Grant Canyon
  - Kirkwood
  - Western General
  - Tomera Ranch
- 60 producing wells in 10 fields
- 119 permitted oil wells
- 99% on Federal land
- 194 authorized oil leases totaling 337,000 acres
- 3 new drilling permits issued in 2018



# Nevada Mineral Industry 2017 Report

John Muntean

Economic Geologist / Director  
of CREG

Nevada Bureau of  
Mines and Geology  
University of Nevada Reno



Special Publication MI-2017

The Nevada  
Mineral Industry  
2017

Metals  
Industrial  
Minerals  
Oil and Gas  
Geothermal

Exploration  
Development  
Mining  
Processing



University of Nevada, Reno

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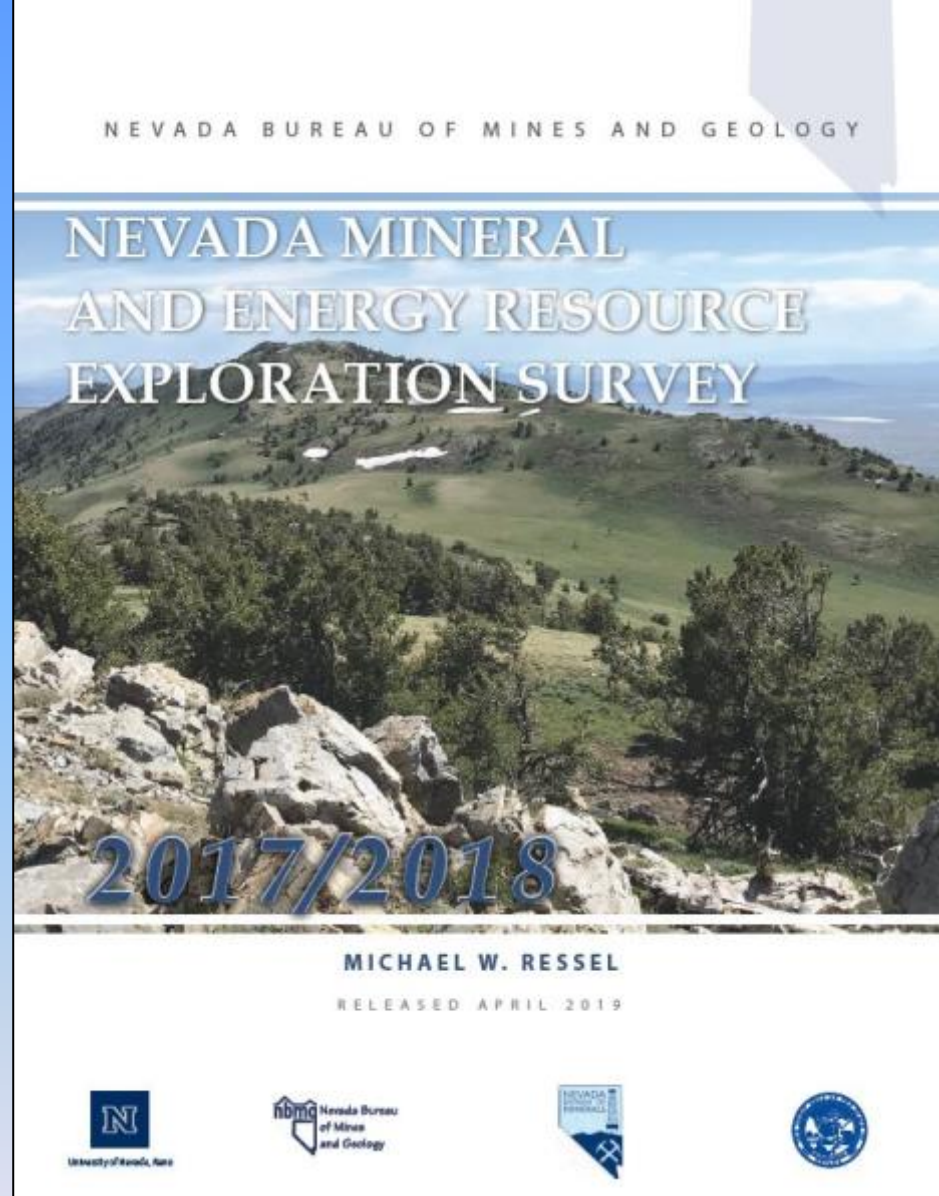
Starting in 1979, NBMG has issued annual reports that describe the mineral (precious and base metals and industrial minerals including aggregate), oil and gas, and geothermal activities and accomplishments. This report describes those accomplishments in Nevada for 2017, which includes production, reserve, and resource statistics; exploration and development—including drilling for petroleum and geothermal resources; discoveries of orebodies, new mines opened, and expansion and other activities of existing mines; and a directory of mines and mills.



University of Nevada, Reno

# Nevada Mineral and Energy Resource Exploration Survey 2017/2018

Mike Ressel  
Economic Geologist  
Nevada Bureau of  
Mines and Geology  
University of Nevada Reno



*2018 expenditures on NV  
exploration totaled \$461M*



University of Nevada, Reno

# 2019 Nevada Exploration Survey

Administered online December 2018 through January 2019

<https://goo.gl/forms/duGYtbSuNovc5z3J2>

Designed to:

- assess the minerals and energy exploration climate in 2017 and 2018
- estimate exploration's impact on Nevada's economy, including direct costs and labor

## 2019 Nevada Mineral and Energy Resources Exploration Survey

The Nevada Bureau of Mines and Geology is conducting a survey of Nevada exploration activities on behalf of the Nevada Division of Minerals. The role that exploration plays in Nevada's natural resource industries and its overall economy is not well understood by Nevada's legislators and citizens. Please fill out the survey as it will help quantify the impact of exploration on the economy and jobs in Nevada. The amount of money your company spent on Nevada exploration and the number of people you employed in your Nevada exploration activities are the two most critical items to include. The information you provide may help ensure governmental policies that affect exploration are carefully evaluated.

Information from individual surveys will remain strictly confidential - that is, no information on individual companies or individuals will be published in any form. Our goal is to provide Nevada legislators with accurate information on total exploration expenditures and employment in time for the start of the next legislative session in February 2019. Please do not hesitate to contact me if you have any questions. Also, please forward this information and the survey link should there be a more appropriate person to answer survey questions: <https://goo.gl/forms/MTV0OLF6MR0SXjIX2>

Thank you very much for participating.

Mike Ressel, Ph.D.  
Research Economic Geologist/Assistant Professor  
Nevada Bureau of Mines and Geology  
University of Nevada, Reno  
Phone: 775-682-7844  
E-mail: [mressel@unr.edu](mailto:mressel@unr.edu)

### Email address \*

Valid email address

This form is collecting email addresses. [Change settings](#)

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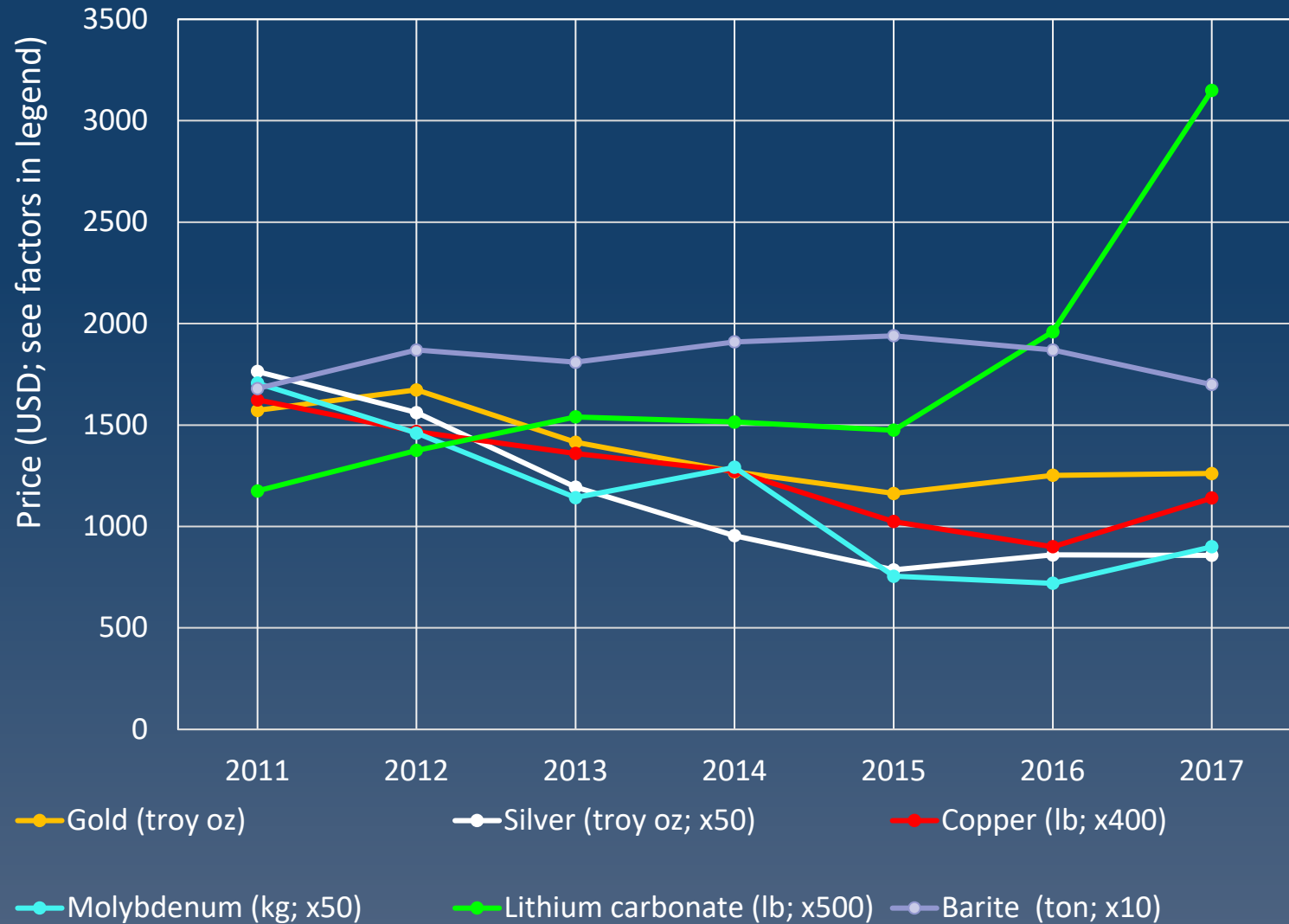




# Research and Survey

- Compiled a list of 315 companies operating or recently operating in Nevada
- Received online responses from 125 companies
- Received additional “no exploration conducted” responses from 23 companies
- Researched expenditures on 24 non-responding companies
- Obtained expenditure data for 172 companies

# Average Commodity Prices



# Nevada Exploration Expenditures\*

- 2018 Reported Expenditures: \$461 M (n=172)
- 2017 Reported Expenditures: \$351 M (n=172)

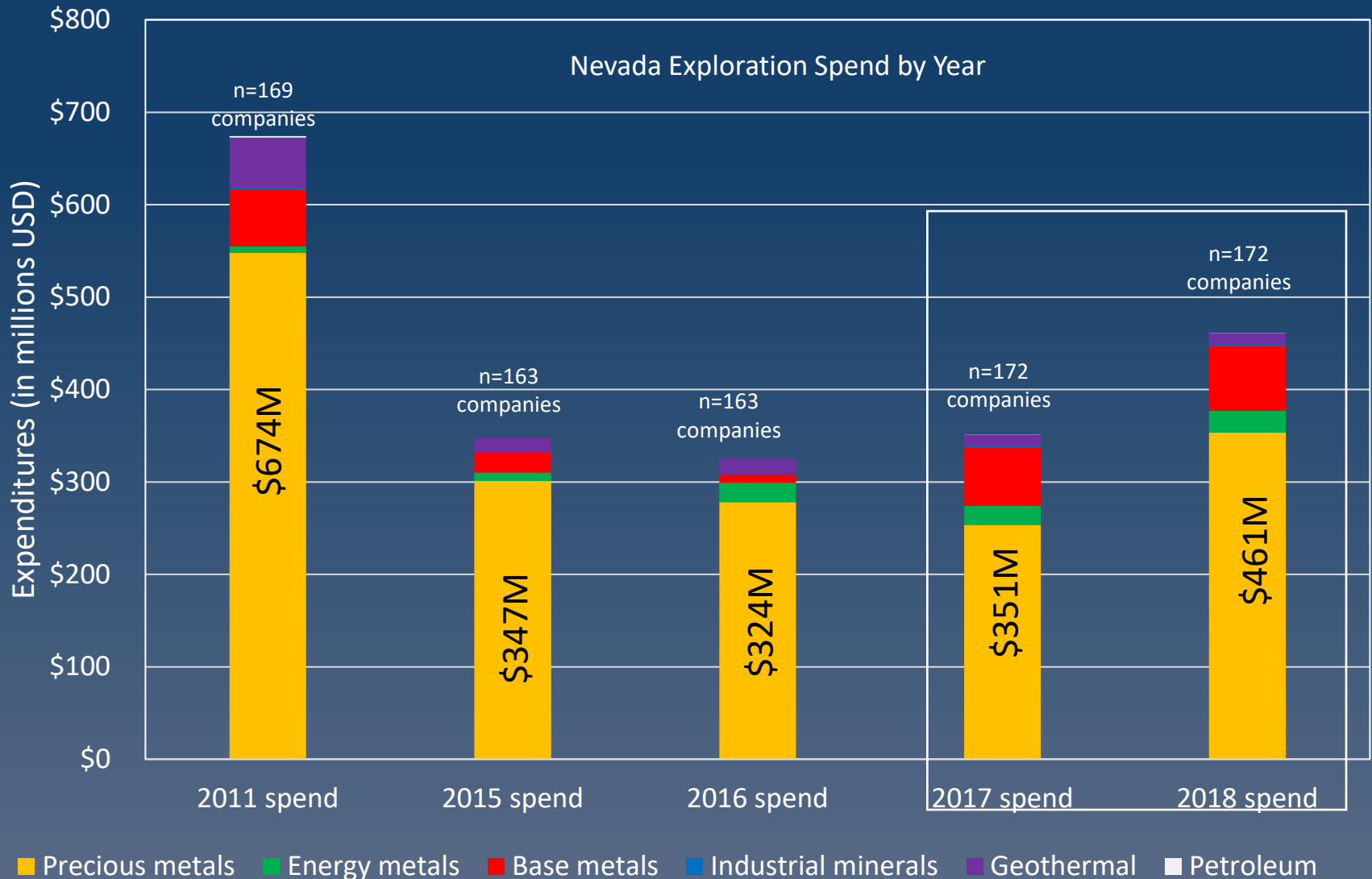
## BY COMPARISON:

- 2016 Expenditures = \$325 M (n = 163)
- 2011 Expenditures = \$675 M (n=169)
- 2017 to 2018 increase: Nevada: 31%, Global\*\*: 18%

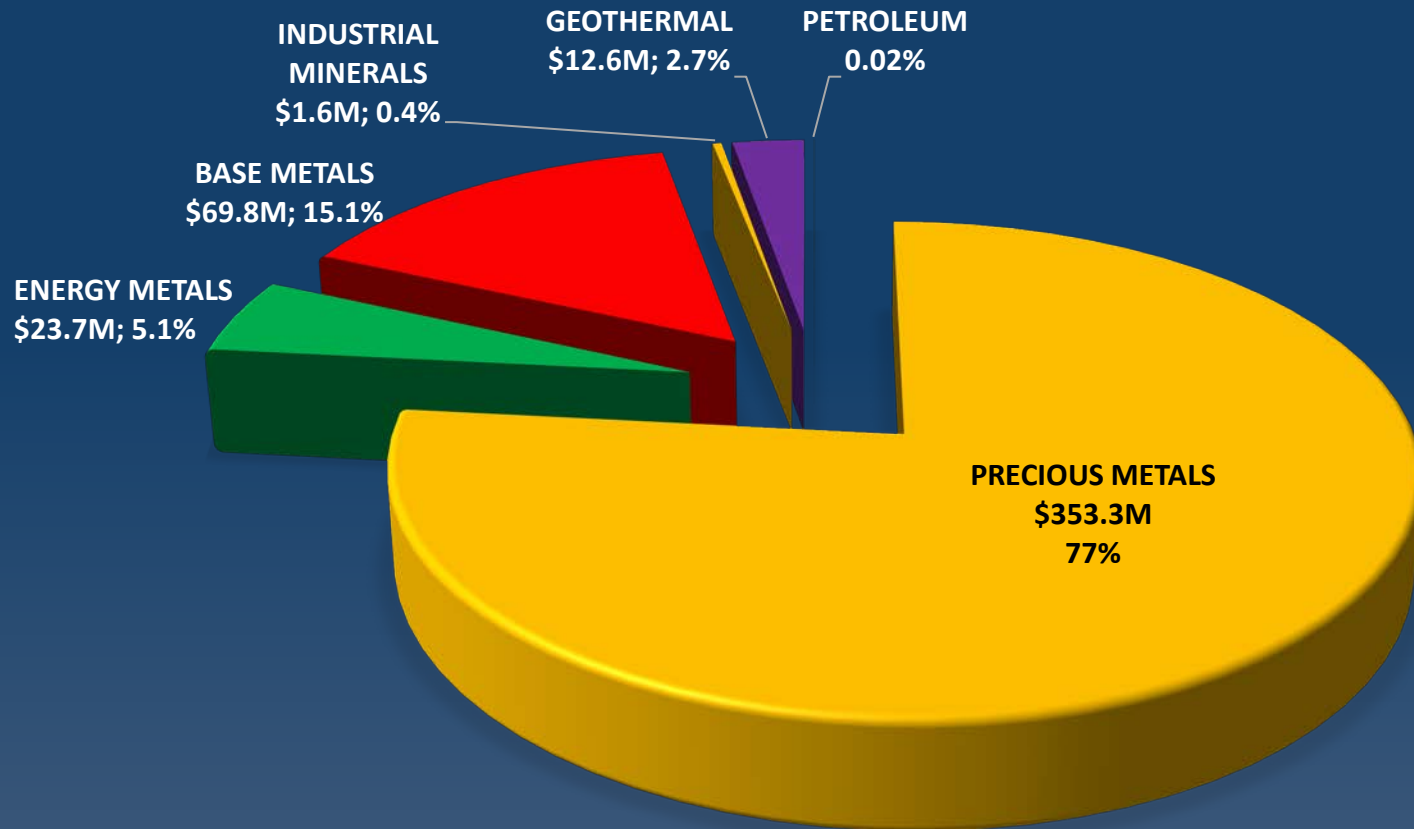
\* Minimum expenditures based on partial pool of companies reporting

\*\* Data from Global Market Intelligence summary report, 2019

# Minimum Exploration Expenditures 2011 and 2015 through 2018

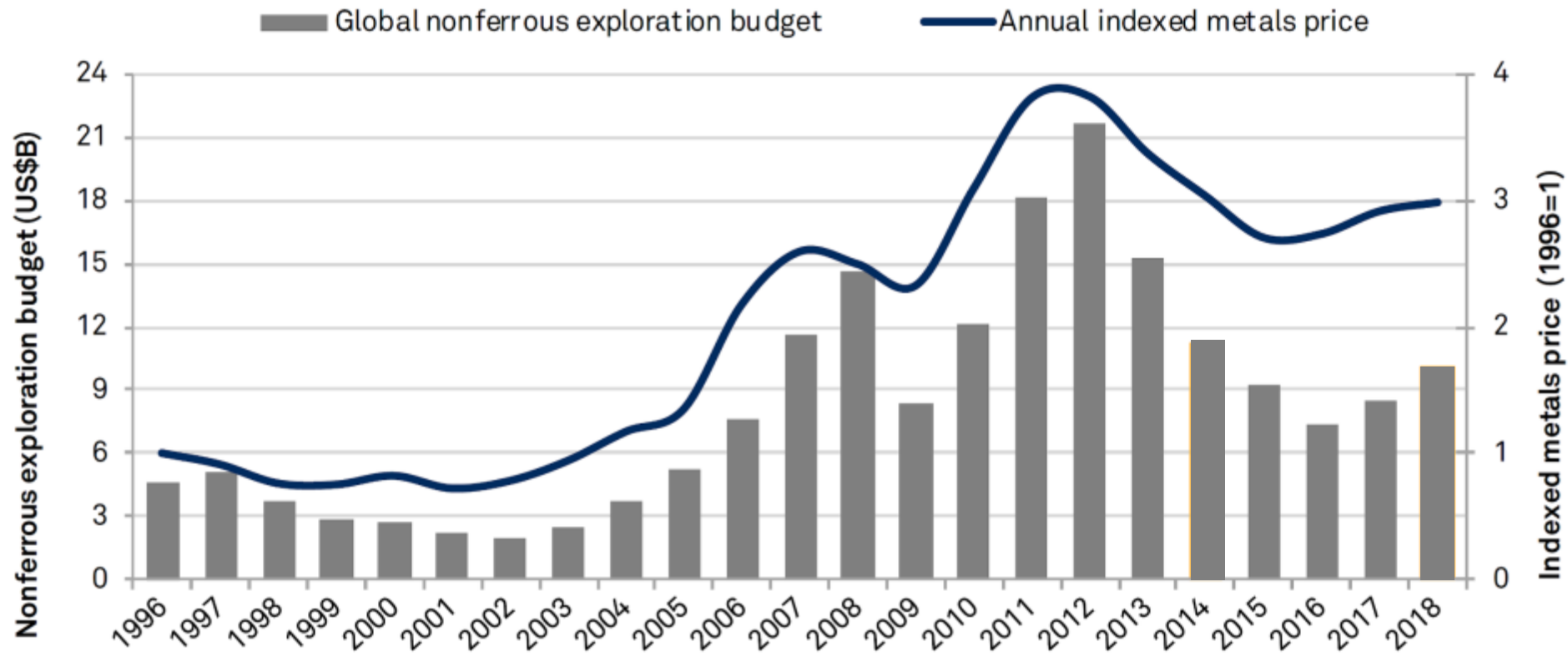


# Breakdown of 2018 Nevada Exploration Spending



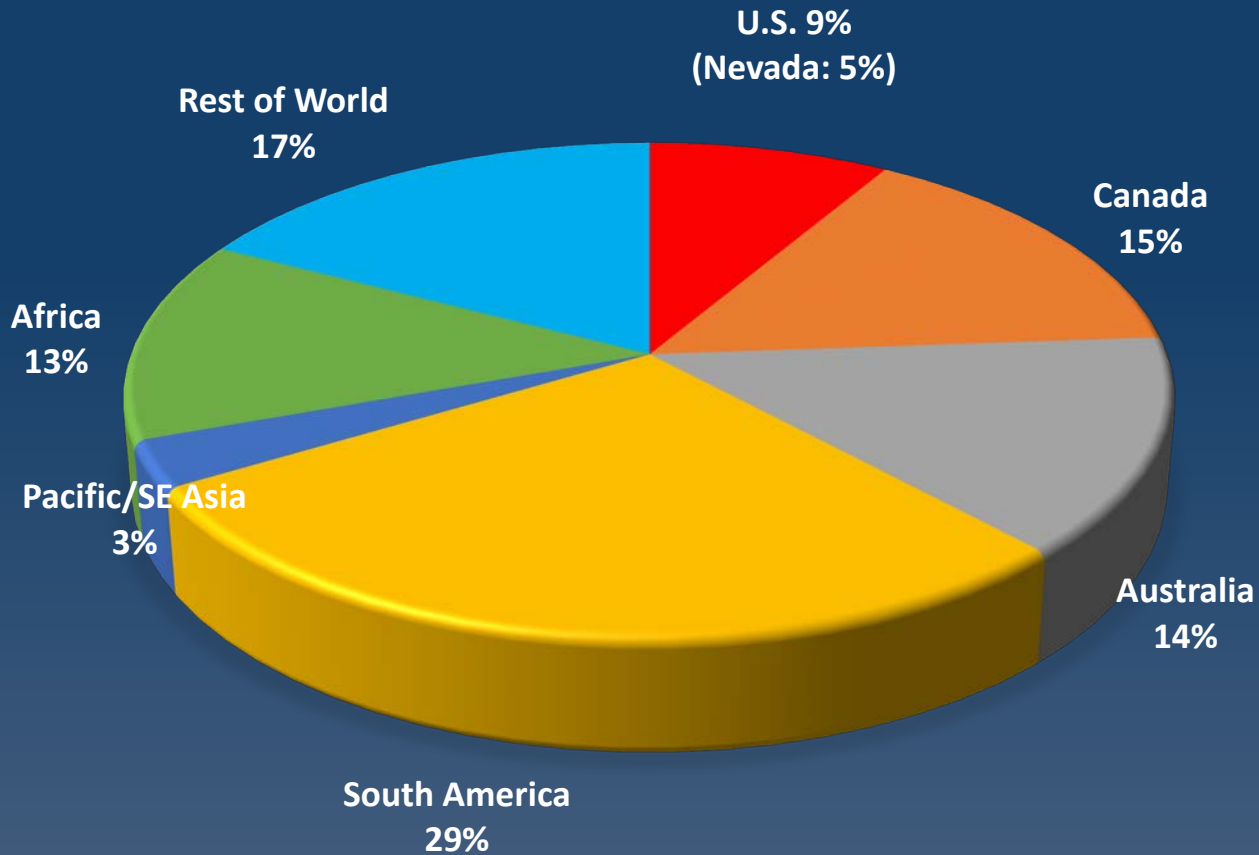
- \$461M spent
- 32% increase YOY increase
- 42% increase since 2016 'bottom'
- But, 32% below peak spending in 2011

# Global Metals Exploration Expenditures



Nevada spending consistent with global trends

# 2018 Global Exploration Spending

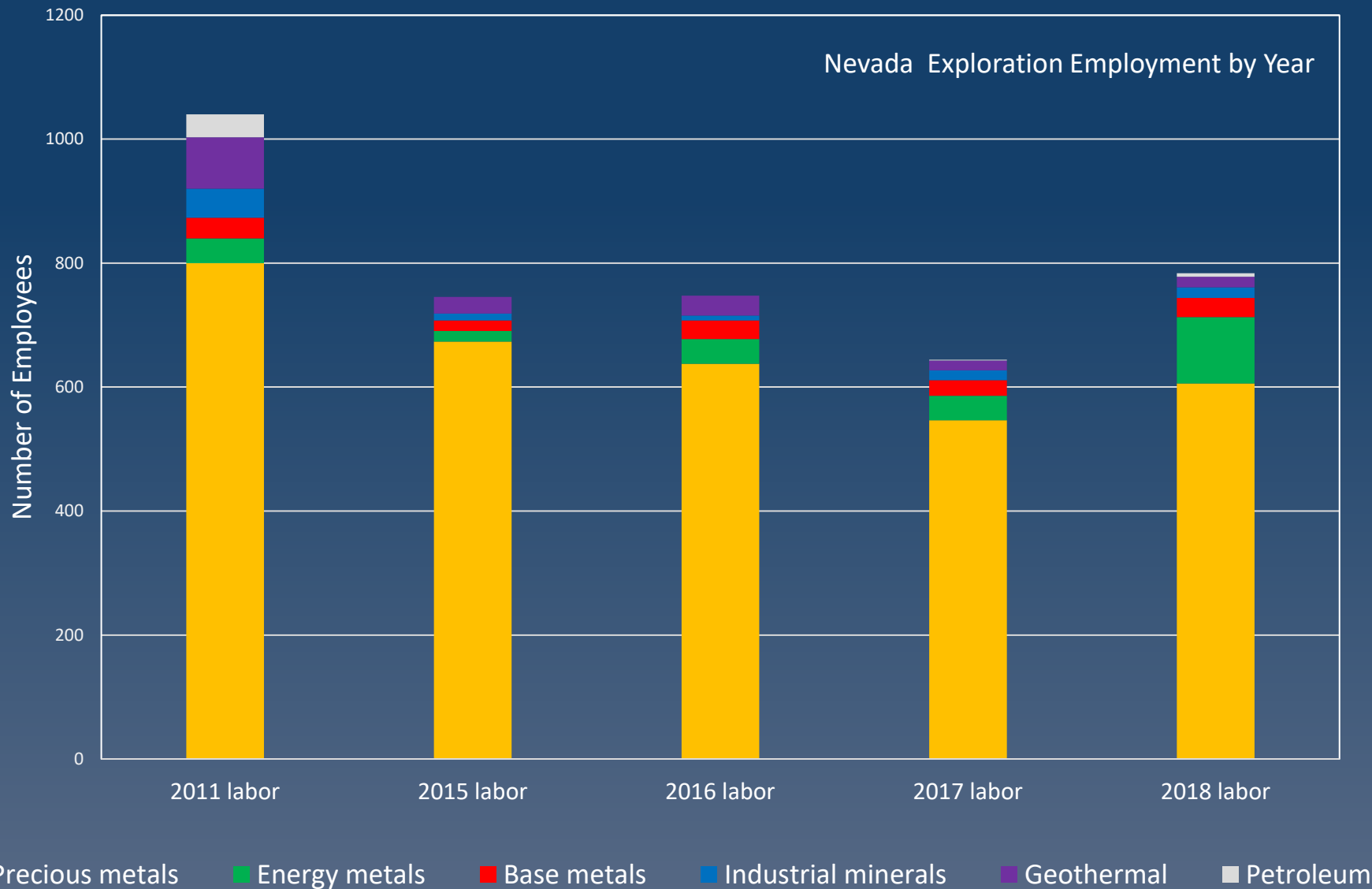


Survey of 3,300+ companies by Global Market Intelligence

\$10.1B USD (all non-ferrous minerals)

Nevada comprised about 54% of U.S. spending

# Direct Exploration Employment 2011, and 2015 through 2018





# Expenditures by Exploration Type

*2018:*

Grass Roots/Generative:	39%
Resource & Mine Expansions:	61%

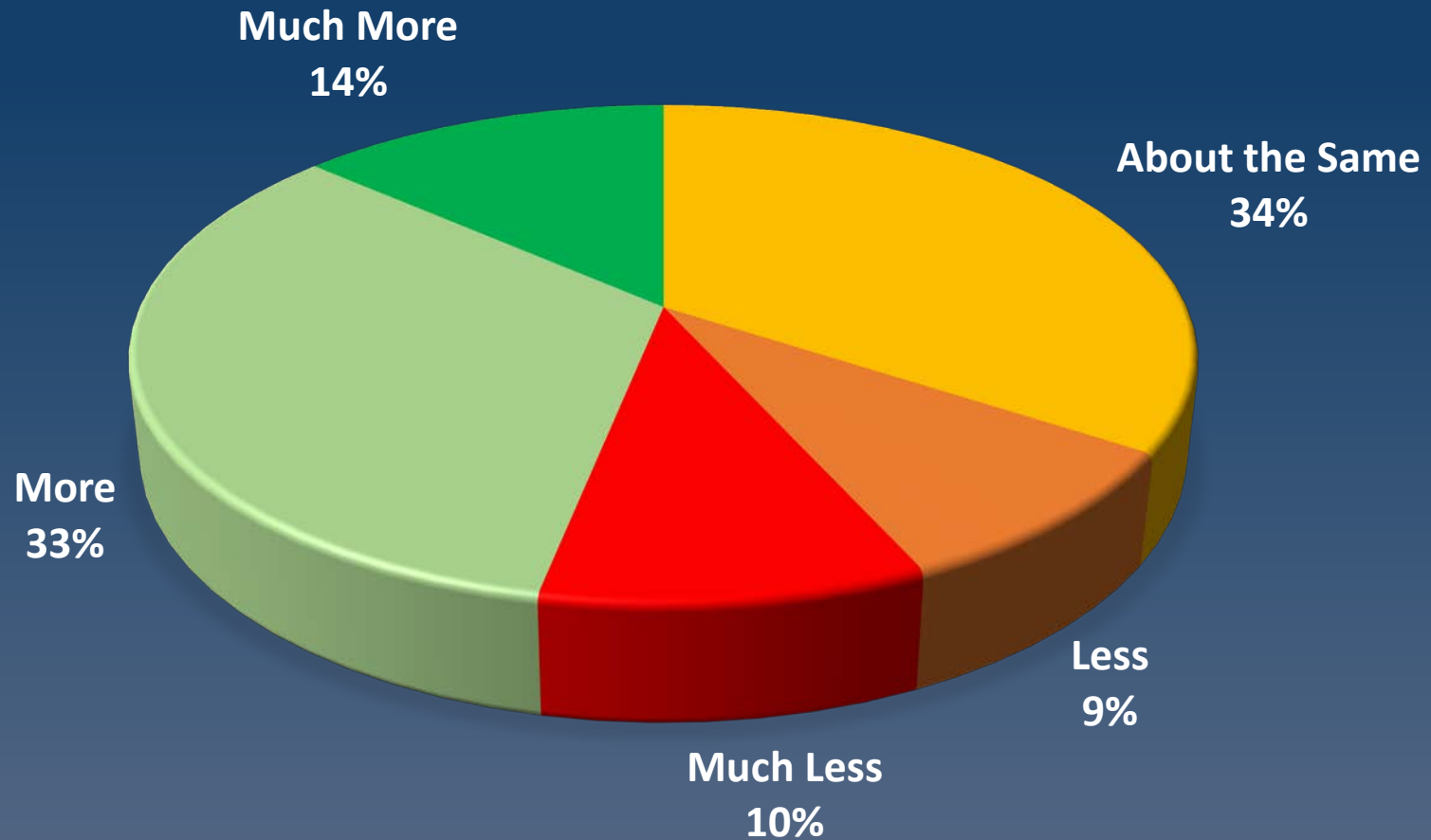
2011

Grass Roots/Generative:	33%
Mine Expansion:	67%

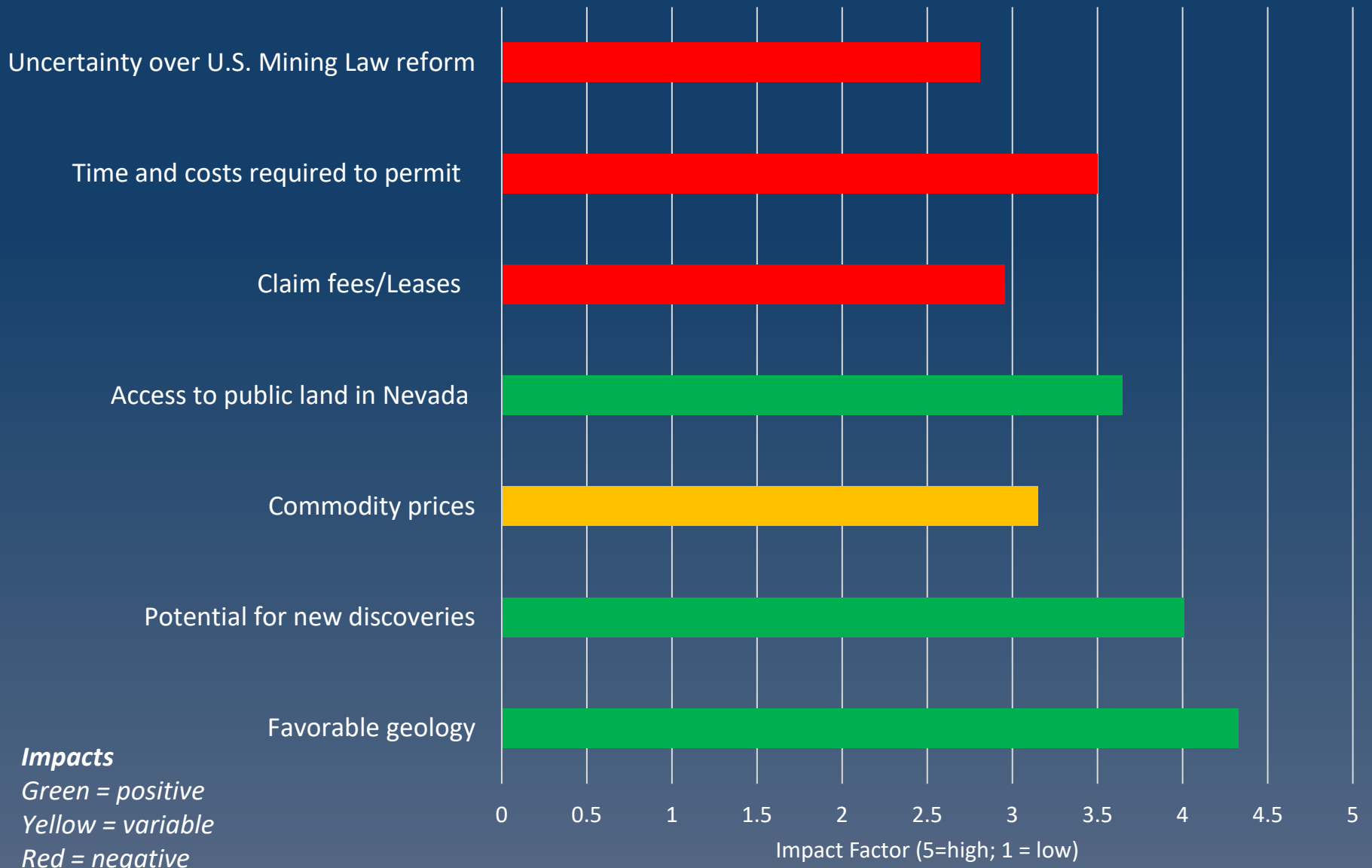
Percentages calculated on a cumulative cash basis

# 2019 Exploration Outlook

RESPONSES TO THE QUESTION: COMPARED TO 2018, DO YOU EXPECT YOUR COMPANY TO SPEND MORE OR LESS IN 2019 ON NEVADA EXPLORATION?



# Nevada Exploration Impact Factors





# Comments from Nevada Explorers

What issues negatively impact your efforts the most?

- Time and Cost to Permit 33 responses
- Sage grouse, other land withdrawals 12 responses
- High claim fees 8 responses
- Uncertainty over mining law reform 6 responses
- Environmental regulations 3 responses
- Water regulations 3 response

# Questions?

 State of Nevada  
Commission on Mineral Resources  
Division of Minerals


 NV<sup>DMR</sup> Agencies Jobs About Nevada

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AML: Division of Minerals complete AML hard closures at the Arden Mine near Las Vegas, Nevada, April 26, 2019.

### Current Information

- ▶ Dissolved Mineral Resources permitting page
- ▶ 2017 Nevada Excellence in Mine Reclamation Award
- ▶ 2015/2016 NV Mineral and Energy Resource Exploration Survey (NBMG)
- ▶ Recent Presentations
- ▶ Information Related to Proposed Land Use Plans and Withdrawals

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### Public Workshop(s) and Hearings(s)

- Dissolved Mineral Resource Exploration Regulation Adoption Hearing
- Response to Summary Comments on Proposed Regulations, April 25, 2018

### Employment Announcement(s)

- None at this time.
- How To Apply for a State Job

### Education Workshop(s)

- 34th Annual Northern Nevada Earth Science Education Workshop 2018
  - July 17 and 18, 2018
  - Tentative Location: Wooster High School, Reno, Nevada.
  - Register at:
    - Direct Link: (Website Registration URL Pending)
    - NVMA Link from their Mineral Education Workshops page: <https://www.nevadamining.org/mineral-education-workshops/>

### Important Links

- Nevada Division of Minerals Open Data Site-GIS files
- State and Federal Permits Required Before Mining or Milling Can Begin - February 2015
- NDOM YouTube Channel
- NDOM Request for Public Records form
- Nevada Bureau of Mines and Geology

### Programs

