

Nevada Division of Minerals

2017 NEVADA MINERAL AND OGG PRODUCTION LITHIUM EXPLORATION ACTIVITY ABANDONED MINE HAZARD PUBLIC SAFETY PROGRAM NDOM OPEN-DATA WEB SITE

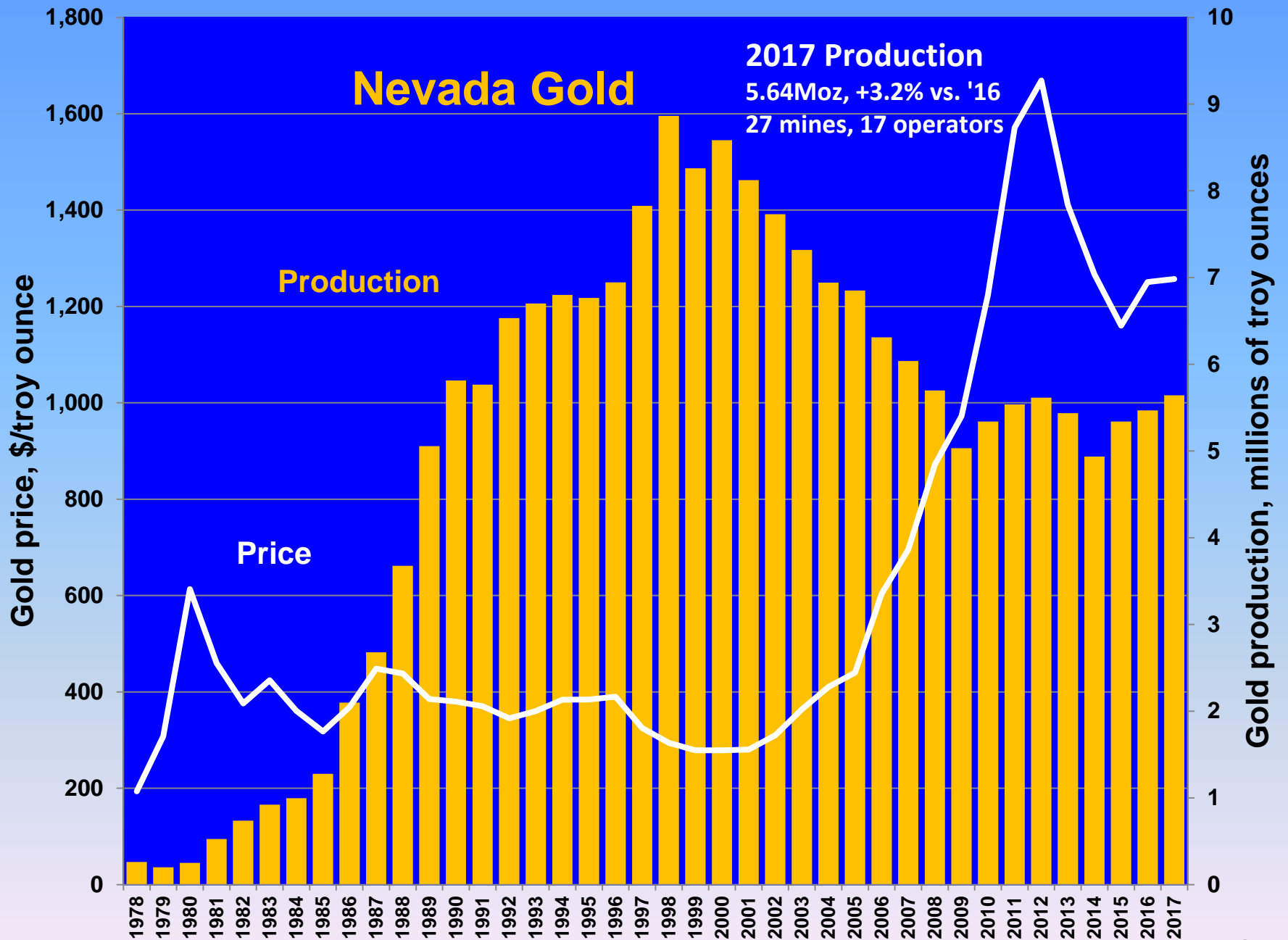
CFOA CONFERENCE

Minden, NV

September 12, 2018

Rich Perry, Administrator





PAN MINE PUT BACK INTO PRODUCTION BY FIORE GOLD



AFTER A FEASIBILITY STUDY WAS COMPLETED BY SRK WHICH RECOMMENDED CHANGES IN OPERATING AND SAMPLING PROCEDURES, AND A NEW RESOURCE-RESERVES ESTIMATE



Pan Mine Mineral Resource Estimate

Category	Tonnes (000s)	Grade (g/t)	Contained Metal (Au oz)
Measured	8,184	0.62	159,000
Indicated	19,091	0.45	275,000
Measured + Indicated	27,275	0.48	434,000
Inferred	5,144	0.45	72,000

15,652 OUNCES Au produced in 2017

From: NI 43-101 Updated Technical Report, SRK 7-7-2017

NEW OPERATION: TWIN CREEKS UNDERGROUND HUMBOLDT COUNTY

Newmont and SMD team celebrating first round



Twin Underground portal and yard,
March, 2018



PORTAL BETWEEN TWIN CREEKS VISTA SURFACE MINE

FIRST PRODUCTION AUGUST, 2017

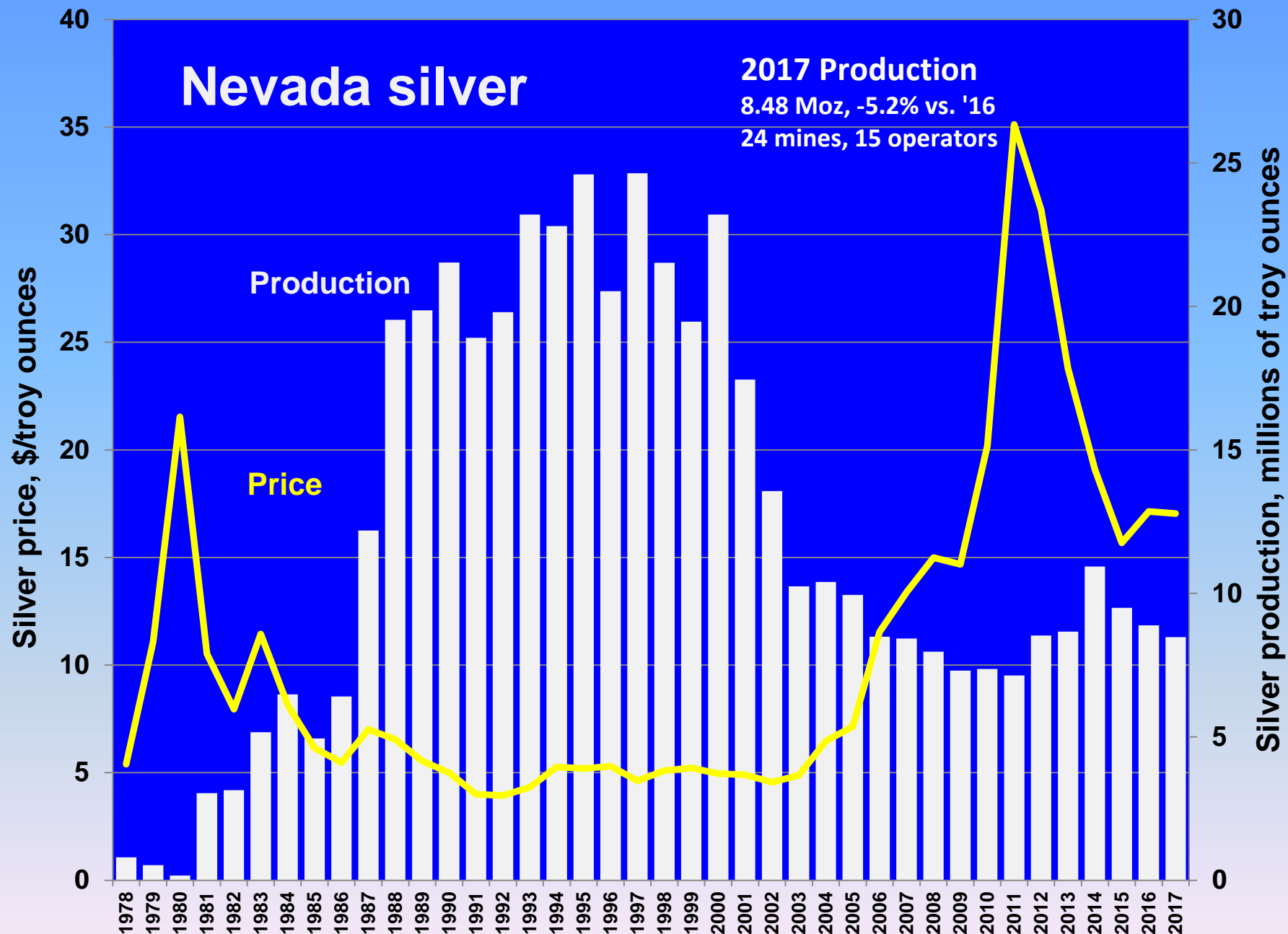
EXPECTED AVG ANNUAL GOLD PRODUCTION OF 30,000 TO 40,000 ANNUALLY

SOURCE: Newmont annual report, 2017

Photos courtesy of Newmont

New Operation for 2018: McEwan Mining's Gold Bar Mine, Eureka County



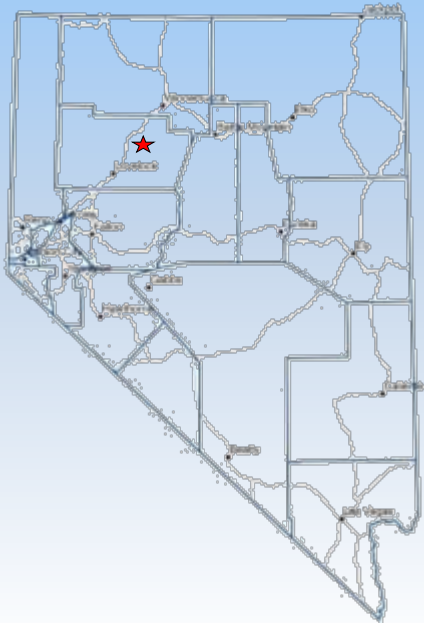


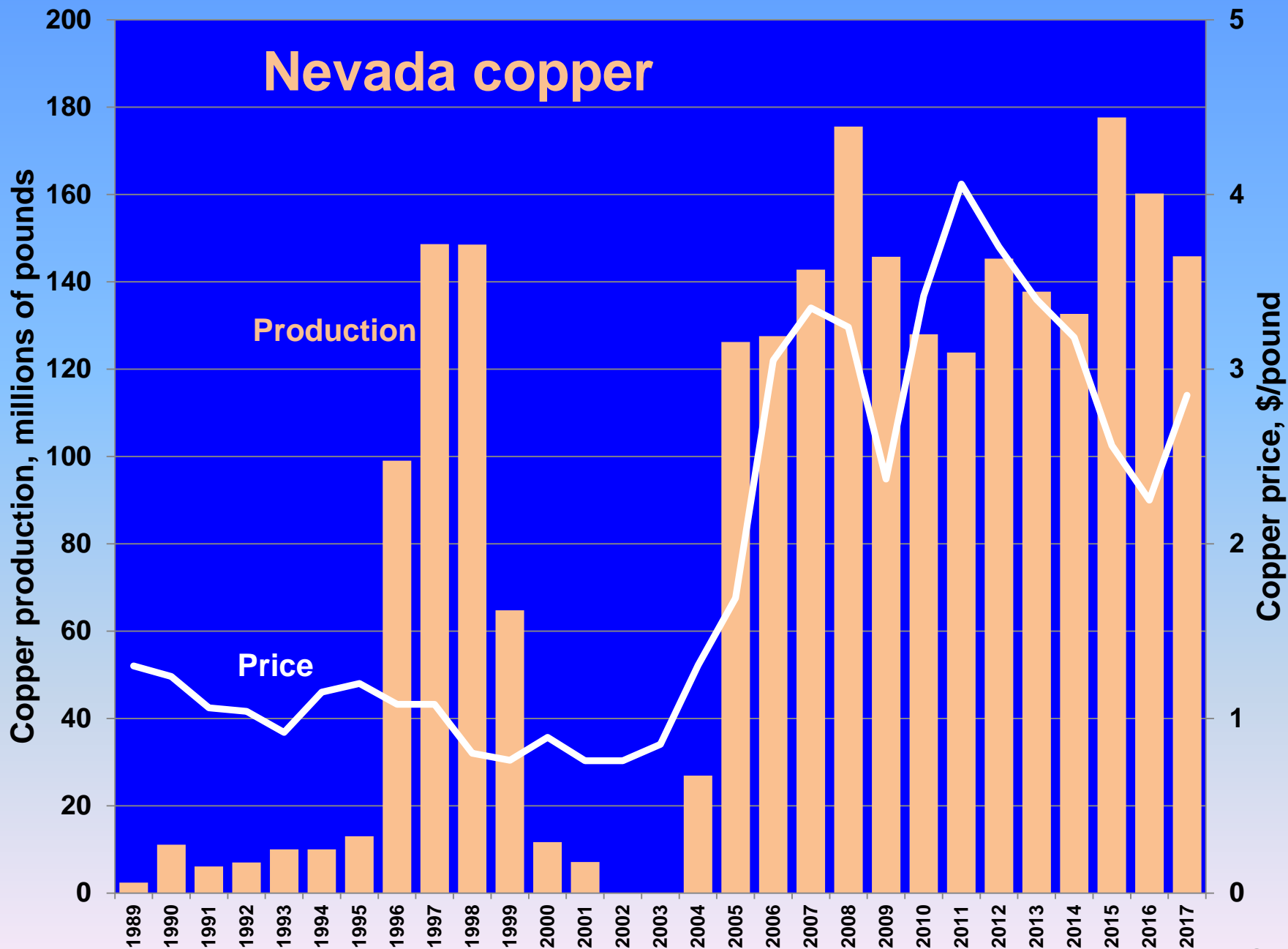
Nevada's only Primary Silver Mine: Coeur Rochester

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

2017 Production:
4,713,574 troy
ounces of silver
and 51,051 troy
ounces of gold.

Rochester celebrated 150 million
ounces of silver production in 2017







Total District Production

1906 - 2014

>5 B lbs. Cu (avg. 1% Cu)

>3.5 M oz. Au



Remaining Reserves

2014 – 2020

112 Mt @ 0.43% Cu

0.006 opt Au

by-product Mo

2017 PRODUCTION:

118,411,099 lb Cu

37,897 ozs Au

Ruth Pit 2015



Robinson Nevada Mining Co.

NEWMONT'S PHOENIX MINE – Lander County

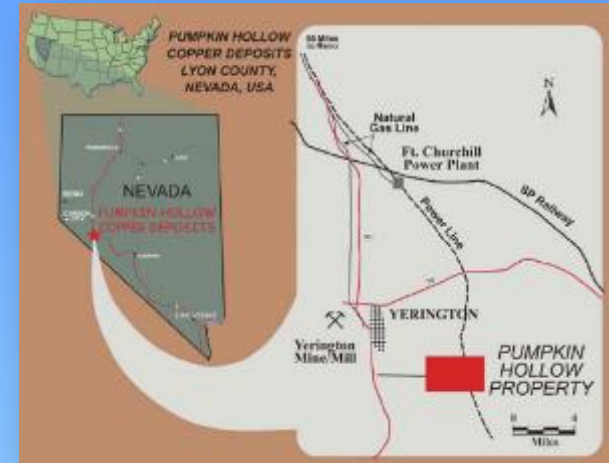


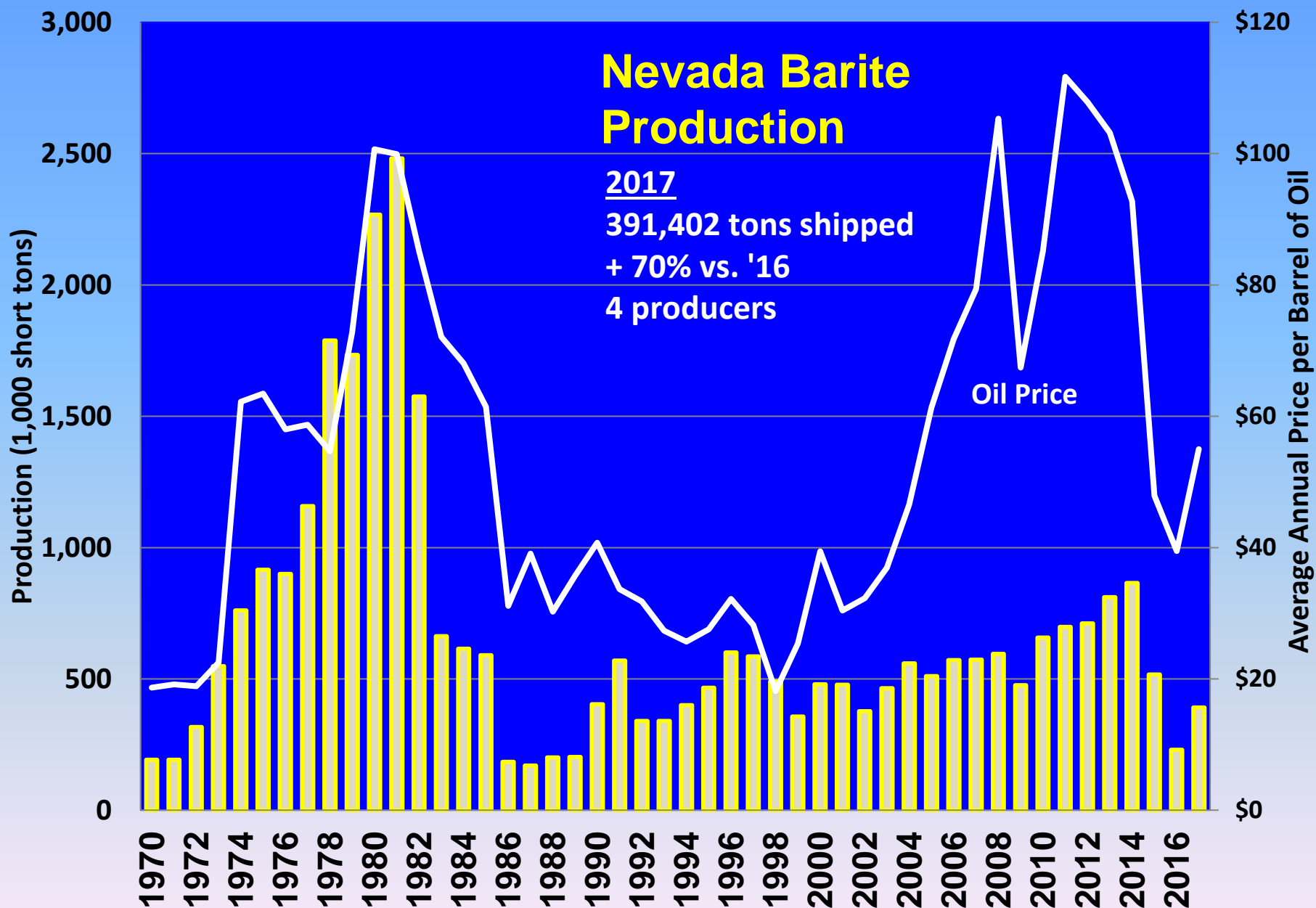
2017 Production:
41,806,950 lbs Cu
197,026 ozs Au
1,191,630 ozs Ag

Q4 2019: Nevada Copper: Pumpkin Hollow

Located 8 miles southeast of Yerington, Lyon County

- Located within the Yerington Copper District.
- 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 5000 tpd underground mine on the eastern deposit with a concentrator
- Main shaft being extended to 2,147 feet
- The mine should employ ~300 people



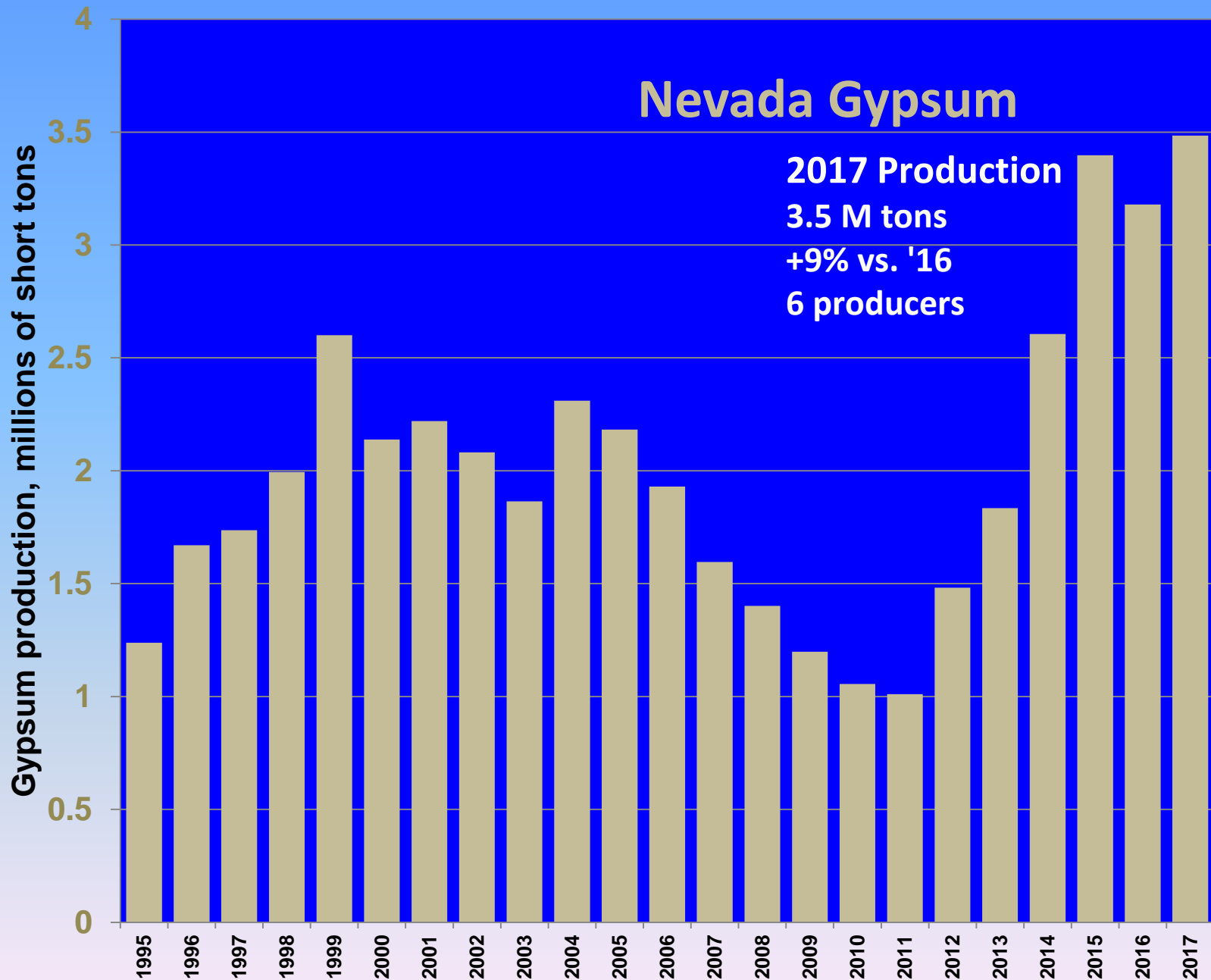


Nevada's Barite Producers

**NEVADA'S BARITE
PRODUCTION
IS FROM STRATIFORM
BEDDED DEPOSITS IN THE
ORDOVICIAN-DEVONIAN.**

- **3 MINES OPERATED IN
2017**
- **3 PROCESSING PLANTS**

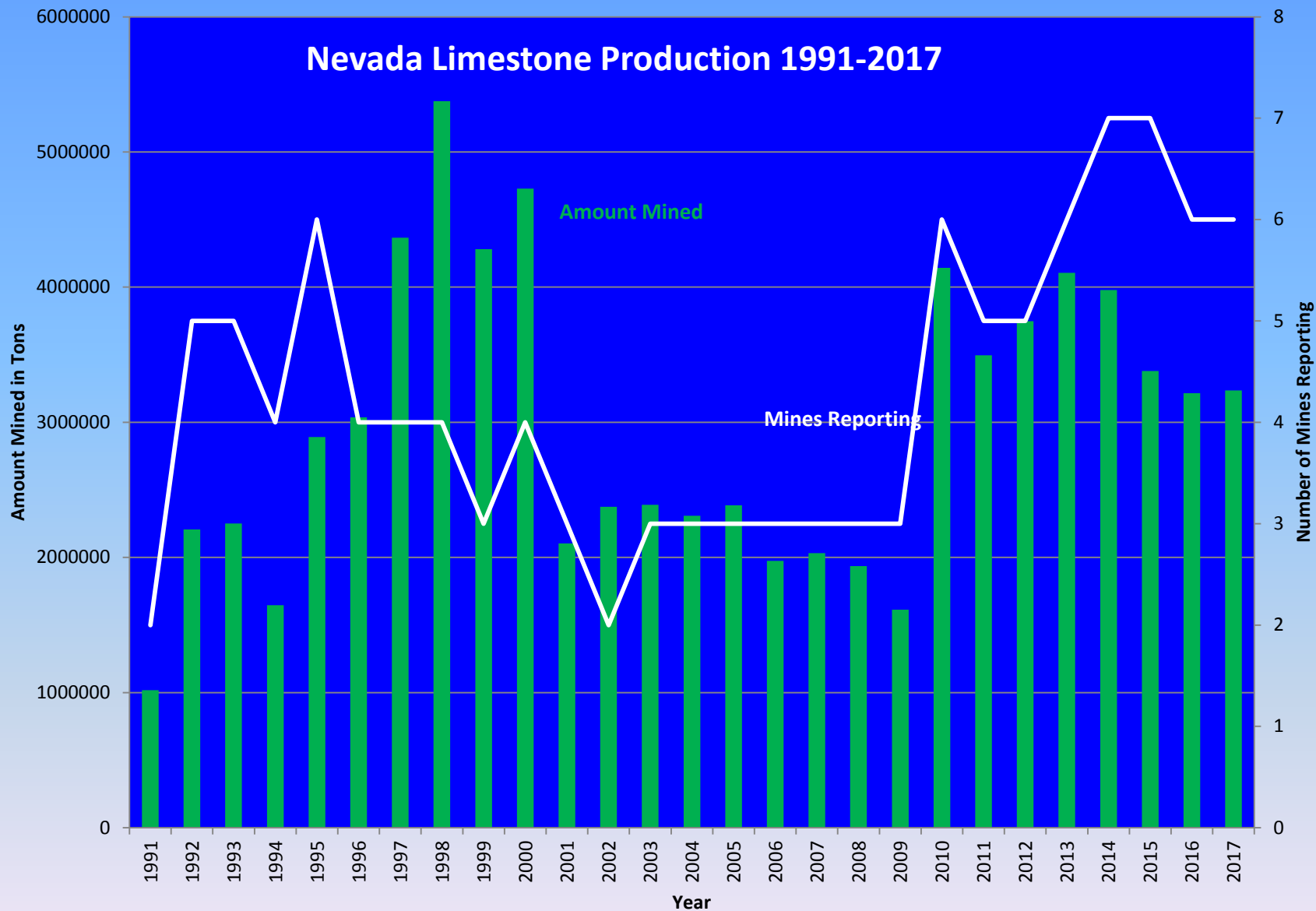




EMPIRE GYPSUM MINE RE-OPENS

- Empire Mining Company purchased the mine from US Gypsum in 2016
- Produces gypsum for agricultural and fertilizer use
- Processed 588,000 tons of gypsum in 2017
- 50 direct employees and 5 employees by contractors





APEX LIME - LHOIST NORTH AMERICA, CLARK COUNTY

20 Miles NE of Las Vegas



2 ORES MINED:

- High-Calcium lime from the Crystal Pass member of the Devonian Sultan Limestone
- Dolomitic lime from the Bullion dolomite member of the Mississippian Monte Cristo Limestone



LHOIST PRODUCES 3 PRODUCTS AT APEX:

- High purity lime (95-97% CaO) used in environmental & metallurgical applications
 - Type-S hydrated dolomitic lime used in construction
 - Crushed limestone used in gas scrubbing
-
- 100+ year ore reserve
-
- Expanded to four operating calcining kilns
-
- Rail and truck delivery from plant
-
- 2017 : 1.25 M. tons



Nevada Diatomaceous Earth Production

Diatomite production, millions of short tons

600,000

500,000

400,000

300,000

200,000

100,000

0

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

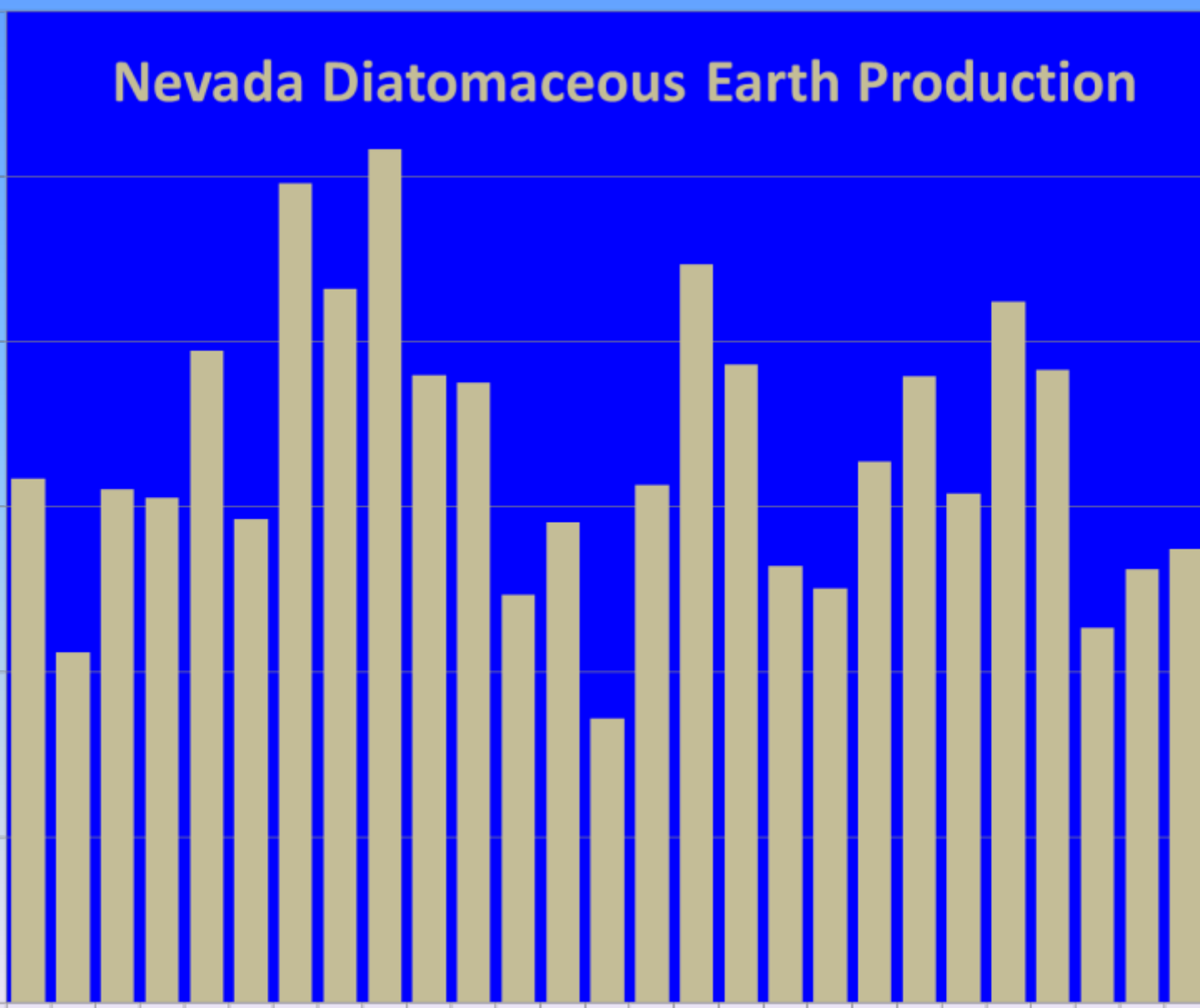
2013

2014

2015

2016

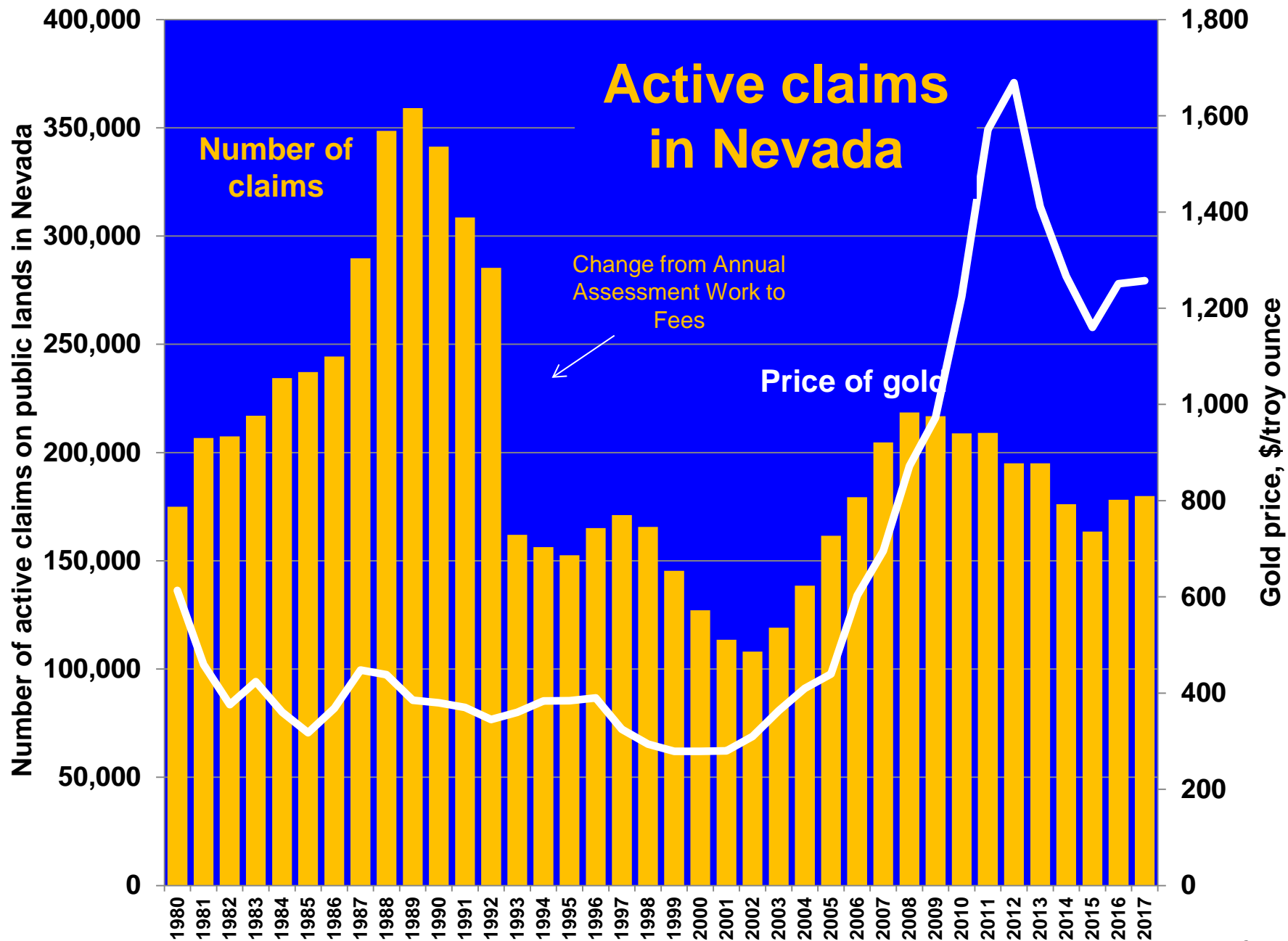
2017



Other Industrial Minerals Produced, 2017

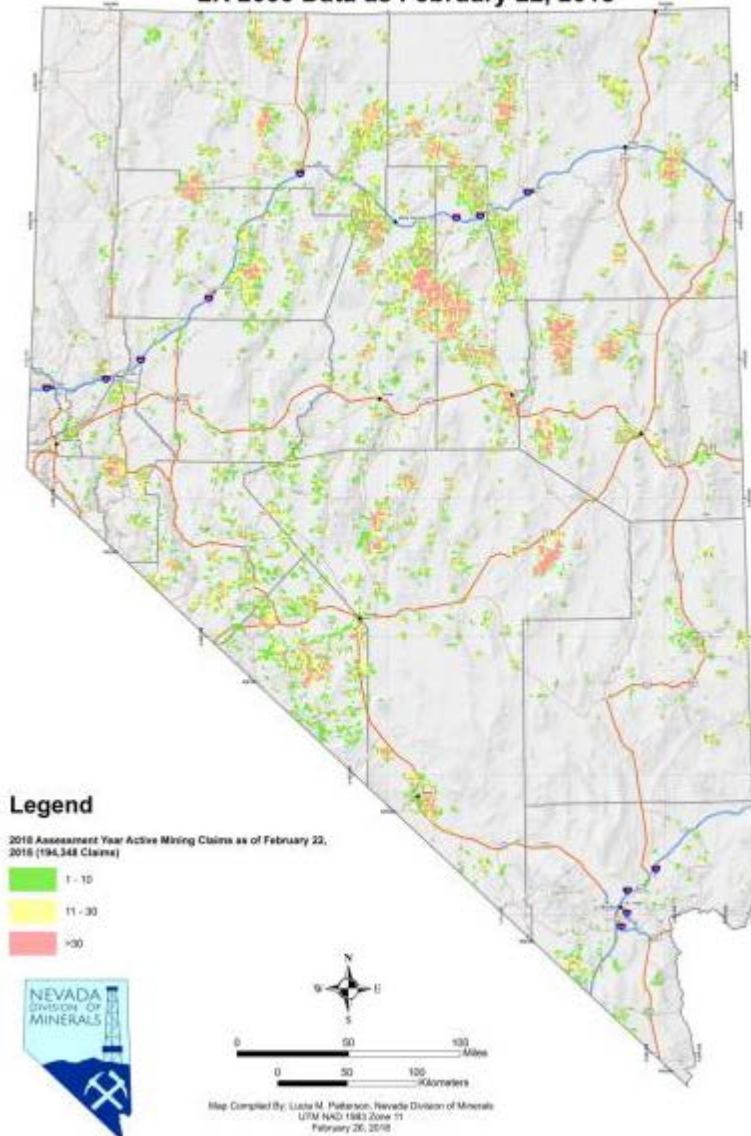
- 10,233,000 lbs of lithium compounds
- 112,634 tons of magnesium oxide
- 727,088 tons of silica sand
- 24,855 tons of salt
- 2,530 tons of perlite





194,348 Active Mining Claims in Nevada
as of 2/22/2018 an increase of 9.1% from
January, 2017

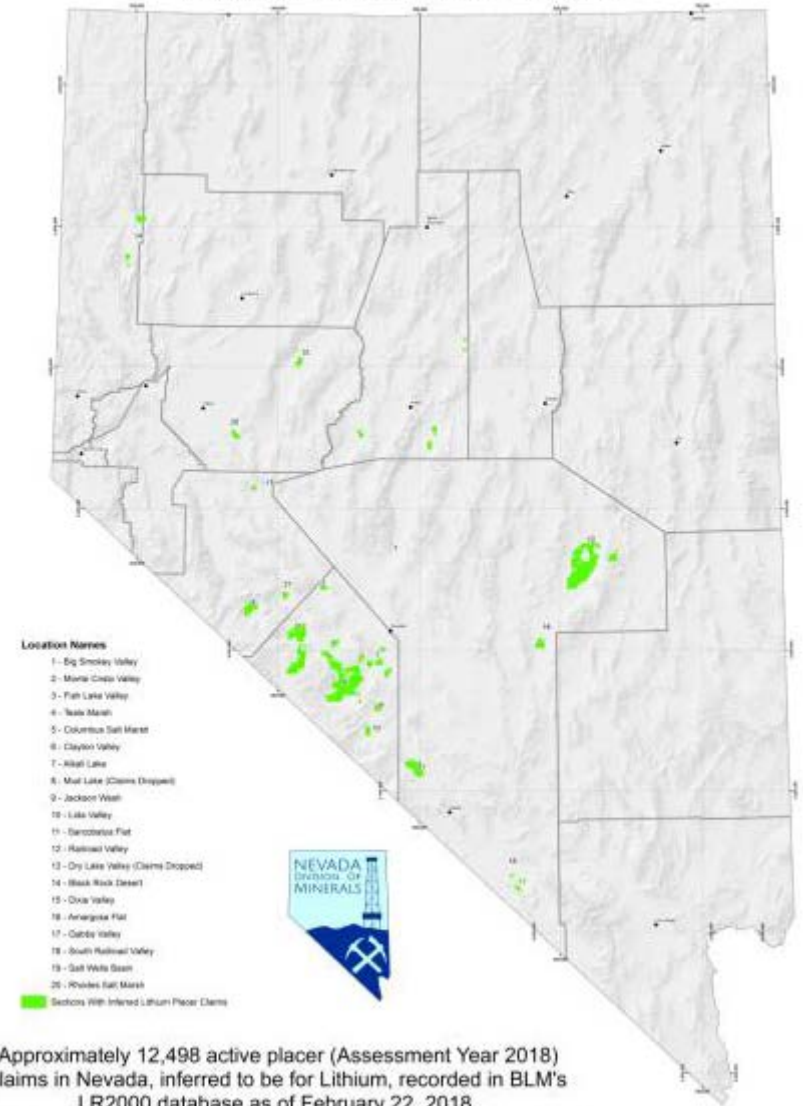
Distribution of Mining Claims in Nevada
LR 2000 Data as February 22, 2018



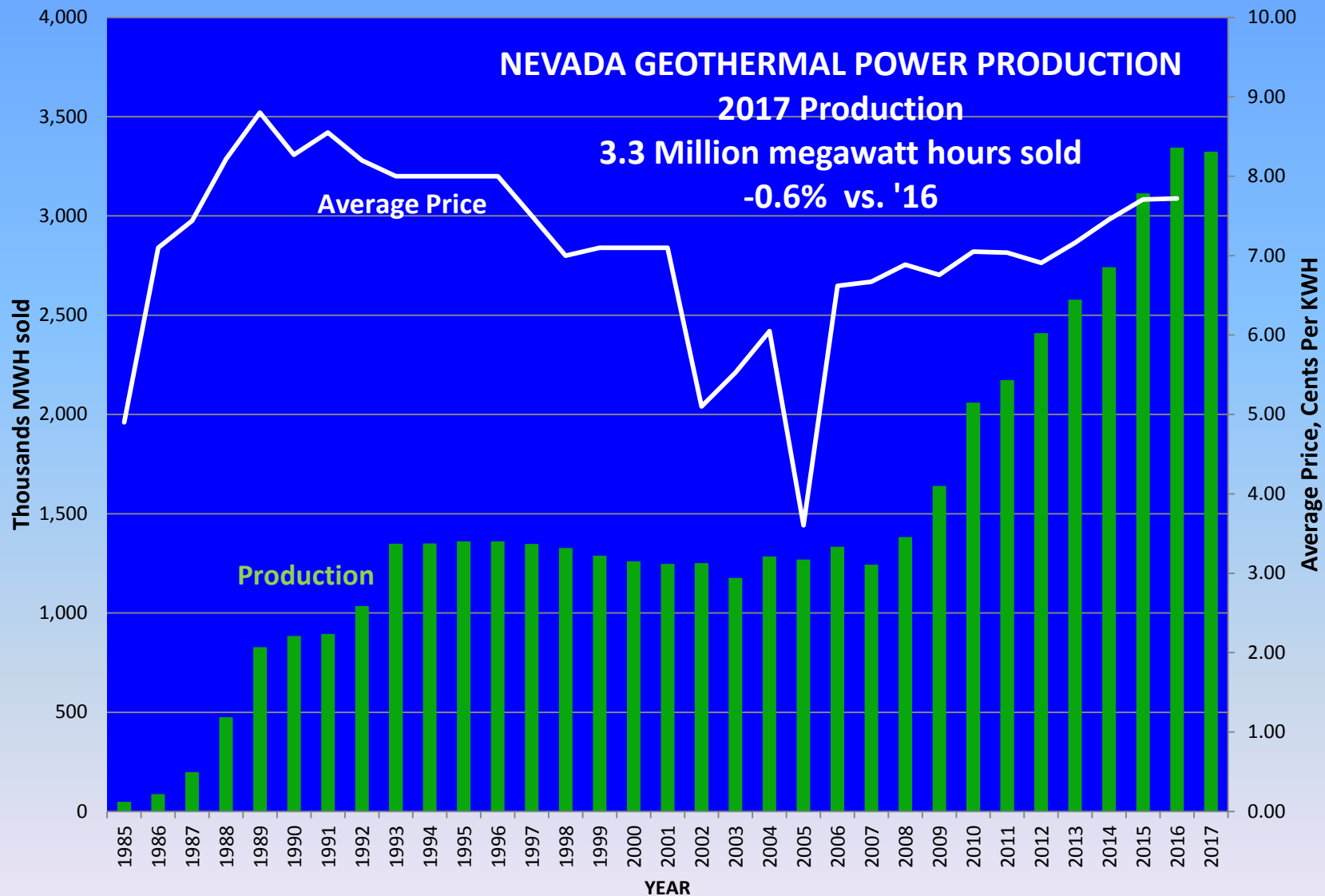
12,498 Inferred Lithium Placer Claims in Nevada
as of 2/22/2018 a decrease of
5.7% from January, 2017

Inferred Active Lithium Placer Claims in Nevada

Map Produced by: Lucia M. Patterson, Nevada Division of Minerals



Claim density does not accurately reflect acreage claimed, due to association placer claims.



NEW GEOTHERMAL FIELD AND PLANT: ORMAT TUNGSTEN MOUNTAIN Churchill County

- 22 MW OUTPUT
- 4 PROD WELLS
- On-Line October, 2017



Ormat Technologies Inc: McGinness Hills

Located in Lander County northeast of Austin
Largest Geothermal Field in Nevada

General

- First explored for gold in the 1980's due to exposure of high-sulfidation and low-sulfidation hydrothermal alteration products
- In 2004 Newcrest Resources encountered hot water during exploration drilling
- Each 300 meter exploration hole punctured the sinter cap and intercepted near-boiling waters

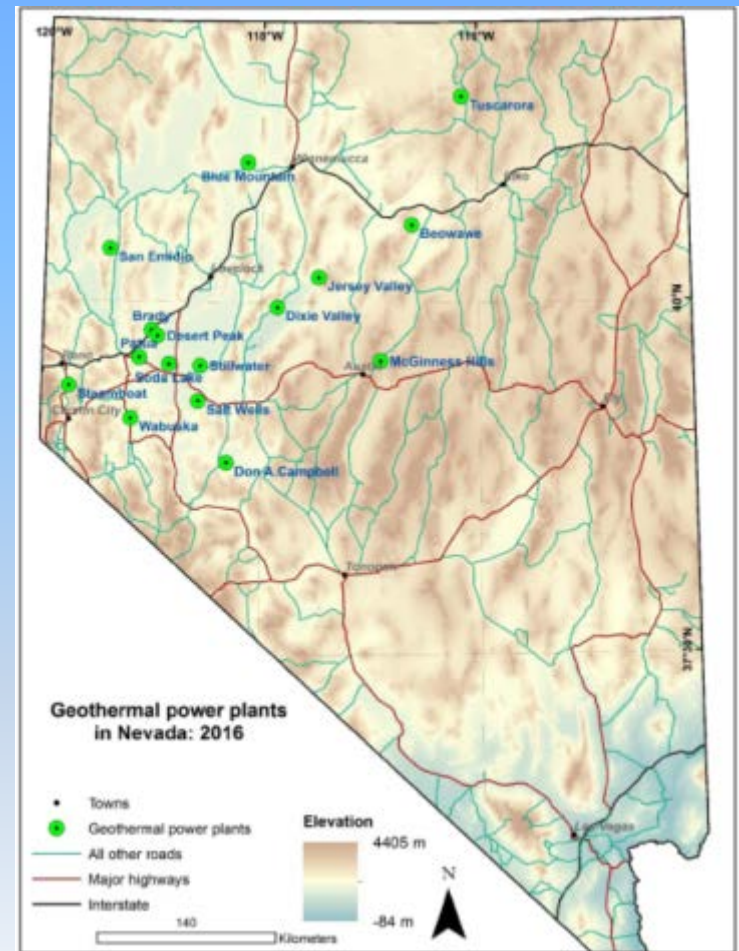


- Geysering action was observed in one hole
- Ormat leased the McGinness Hills Property in 2009
- Phase I at 30 MW (2012)
- Phase 2 increase to 72 MW (2015)
- Phase 3 increase to 120 MW (late 2018)

Geothermal Operators

There are currently seventeen geothermal fields in Nevada being operated by five operators:

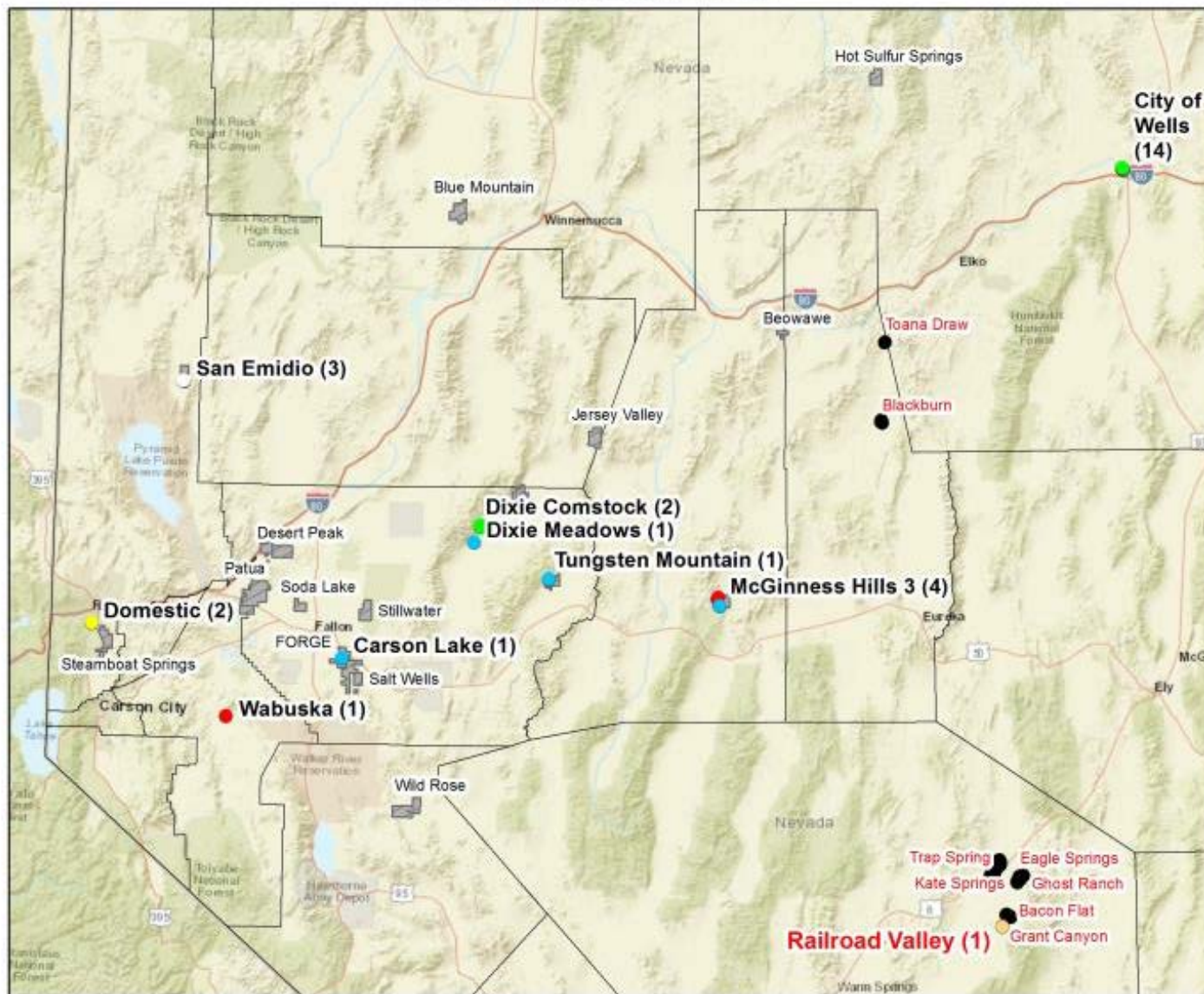
- **Ormat Nevada:** Steamboat, McGinness Hills, Brady, Desert Peak, Wild Rose (Don Campbell), Jersey Valley, Tuscarora, and Tungsten Mountain.
- **Terra-Gen:** Dixie Valley and Beowawe.
- **Cyrq Energy:** Soda Lake and Patua
- **Enel North America:** Stillwater and Salt Wells.
- **Homestretch Geothermal / Star Peak Geothermal:** Wabuska



From: NBMG MI-2016

Oil, Gas & Geothermal Drilling Activity 2017

Totals Wells Drilled: 29 Geothermal, 1 Oil



Wells Drilled in 2018

Field	Operator	Well Type
GEO THERMAL		
Cameron Lake	ORNI 16 LLC	Industrial - Injection
Dice Cornstock	Ormat Nevada	Temperature Gradient
Dice Cornstock	Ormat Nevada	Temperature Gradient
Dice Meadows	ORNI 32 LLC	Industrial - Injection
Domestic	Domestic	Domestic
Domestic	Domestic	Domestic
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Temperature Gradient
Elio	City of Wells	Observation
McGinness Hills #3	ORNI 41 LLC	Industrial - Production
McGinness Hills #3	ORNI 41 LLC	Industrial - Production
McGinness Hills #3	ORNI 41 LLC	Industrial - Production
McGinness Hills #3	ORNI 41 LLC	Industrial - Injection
San Emilio	USG Nevada	Observation
San Emilio	USG Nevada	Observation
San Emilio	USG Nevada	Observation
Tungsten Mountain	ORNI 43 LLC	Industrial - Injection
Wabuska	Homestretch Geothermal	Industrial - Production
OIL AND GAS		
Railroad Valley	True Energy	Production

Nevada has produced oil since 1954

from Paleozoic and Mesozoic host rocks

64 wells pumped in 2016



**Oil
production
well,
Railroad
Valley, Nye
County**

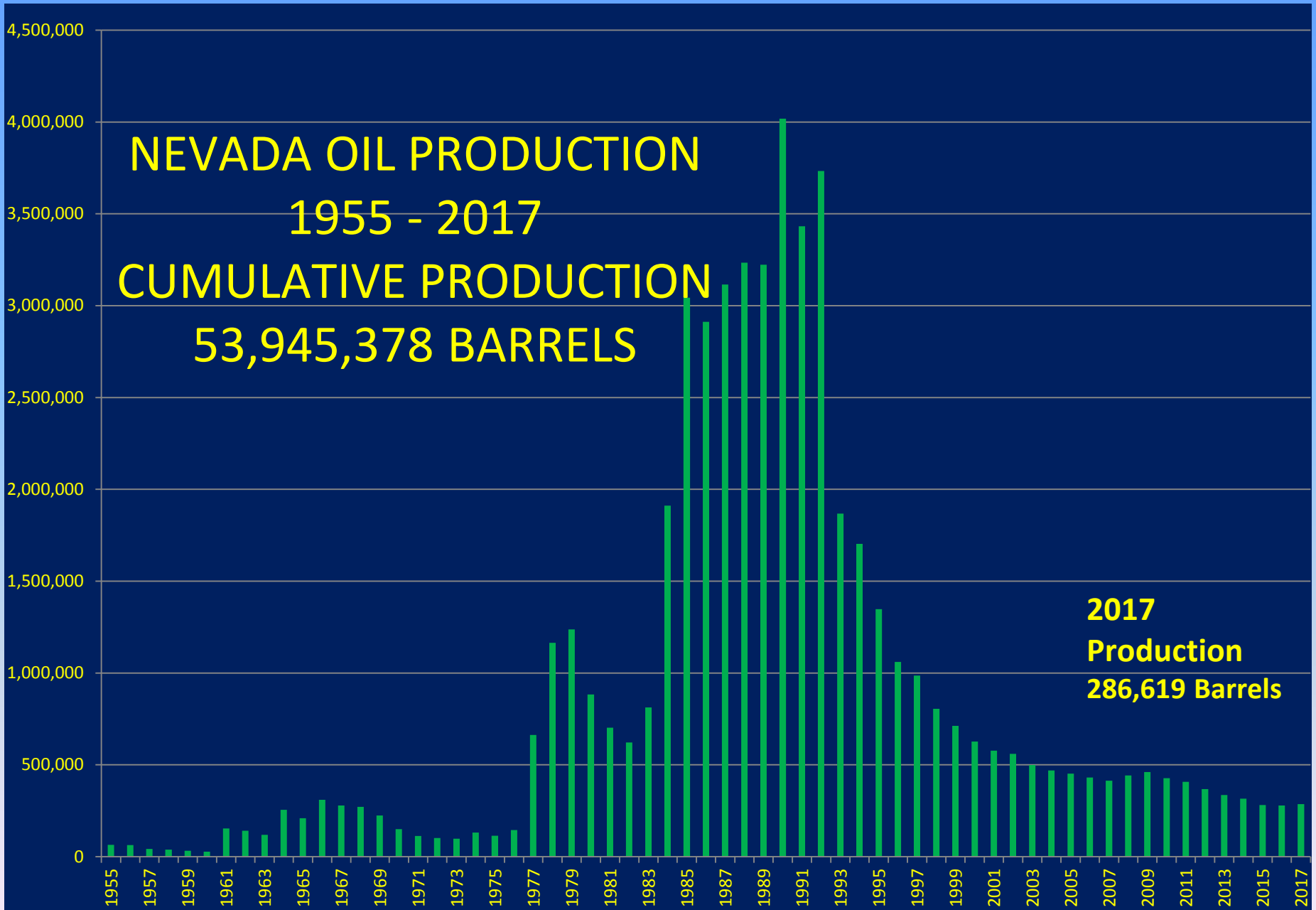


**Foreland oil
refinery,
Railroad
Valley, Nye
County**



NEVADA OIL PRODUCTION
1955 - 2017
CUMULATIVE PRODUCTION
53,945,378 BARRELS

2017
Production
286,619 Barrels



SOME FACTS ABOUT OIL LEASING IN NEVADA

- **99% of historic production is on Federal leases**
- **Anyone can file an “expression of interest” (EOI) to BLM for certain lands to be included in a competitive lease sale. There is no fee for this.**
- **BLM conducts on-line competitive lease sales quarterly, after environmental review.**
- **A lease allows for exploration, but actual permits to drill are required from both BLM and NDOM. Nevada is a dual-permitting State by Statute and MOU.**

SOME FACTS ON HYDRAULIC FRACTURING IN NEVADA

- Nevada Developed comprehensive regulations for Hydraulic Fracturing in Nevada in 2013-14.
- Nevada regulations are some of the most stringent in the US for protection of groundwater.
- The BLM has not adopted regulations for HF
- Operators must adhere to more stringent Nevada regulations when drilling on Federal (and non-Federal) lands in Nevada.
- Six wells were hydraulically fractured in NV, all in 2014: 4 in Elko County, 1 in Nye, 1 in Eureka
- HF Chemical disclosures and details can be found on <https://fracfocus.org/>

Where do Fluid Mineral Leasing Revenues go?

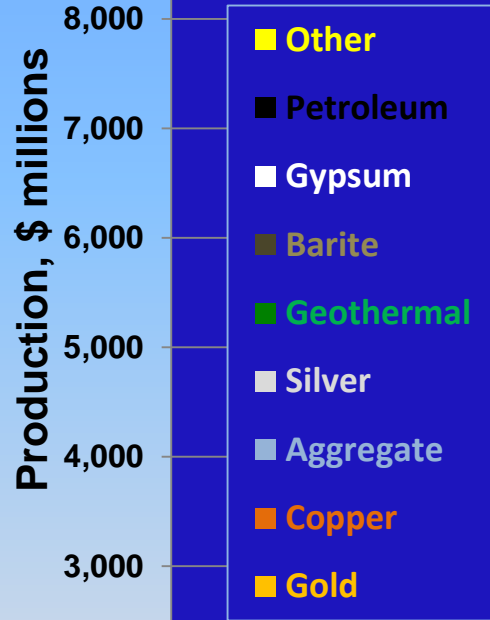
- See the production and revenues by County at: <https://www.onrr.gov/>

NRS 328.450-.470

Disposition of Revenue
Received by State From
Lease on Federal Lands

State of Nevada - 2017	3,850,164.97
Churchill	521,710.63
Elko County	24,697.69
Esmeralda County	38,510.65
Eureka County	13,474.79
Humboldt County	46,478.91
Lander County	303,731.34
Lyon County	9,391.41
Mineral County	153,707.60
Nye County	159.84
Pershing County	34,669.23
Washoe County	72,609.68
White Pine County	933.57

Nevada Mineral and Energy Production Values 1979 - 2017



The Biggest Export From Every State in 2017

U.S. Exports by Origin (Values in Millions of Dollars)



Article & Sources:

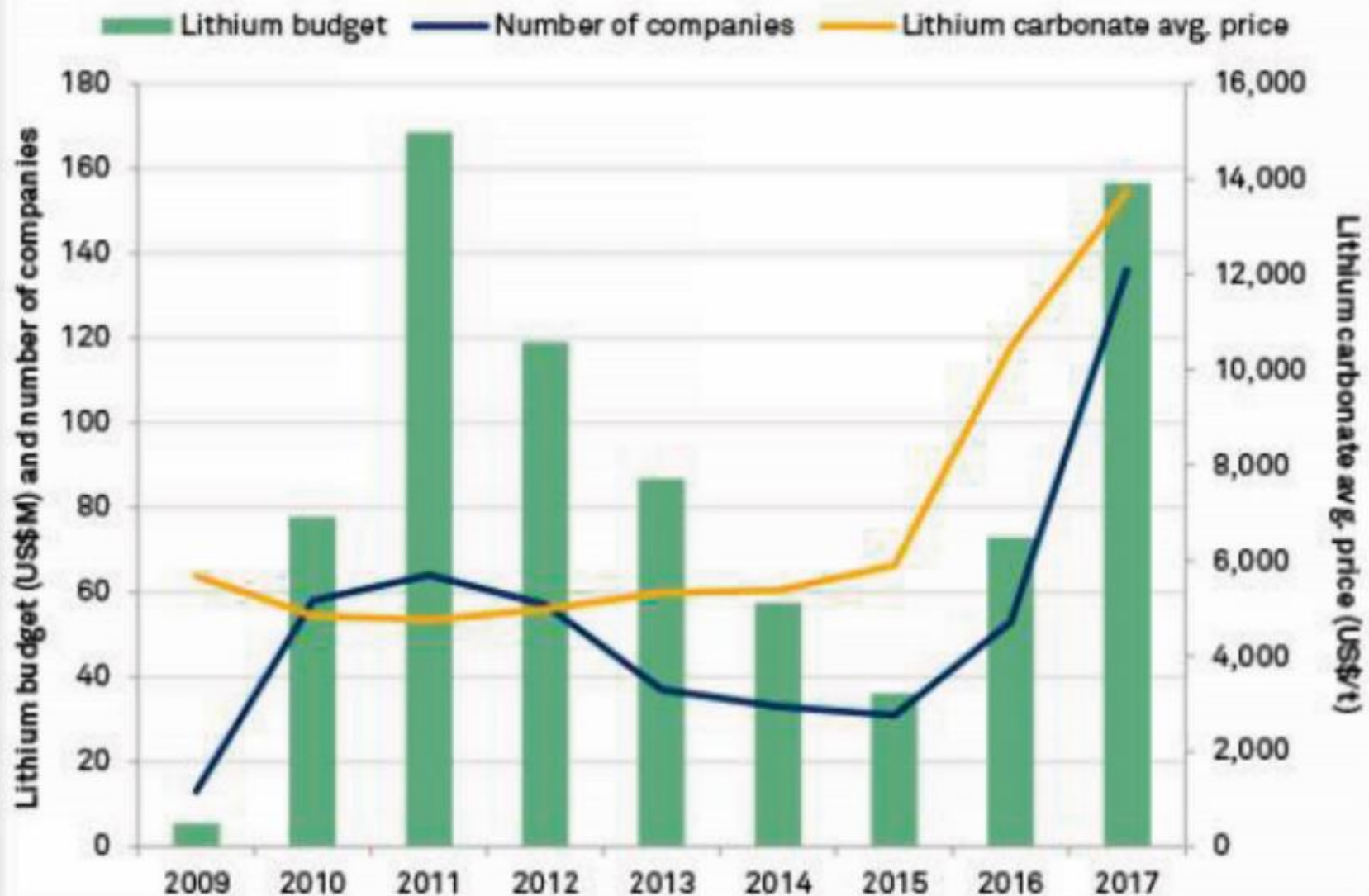
<https://howmuch.net/articles/biggest-export-from-each-state>

<https://www.census.gov/foreign-trade/statistics/state/data/index.html>

howmuch.net

Not Just Gold: Worldwide Lithium Exploration Boom

Lithium exploration budgets, 2009-2017



Data as of Oct. 30, 2017.

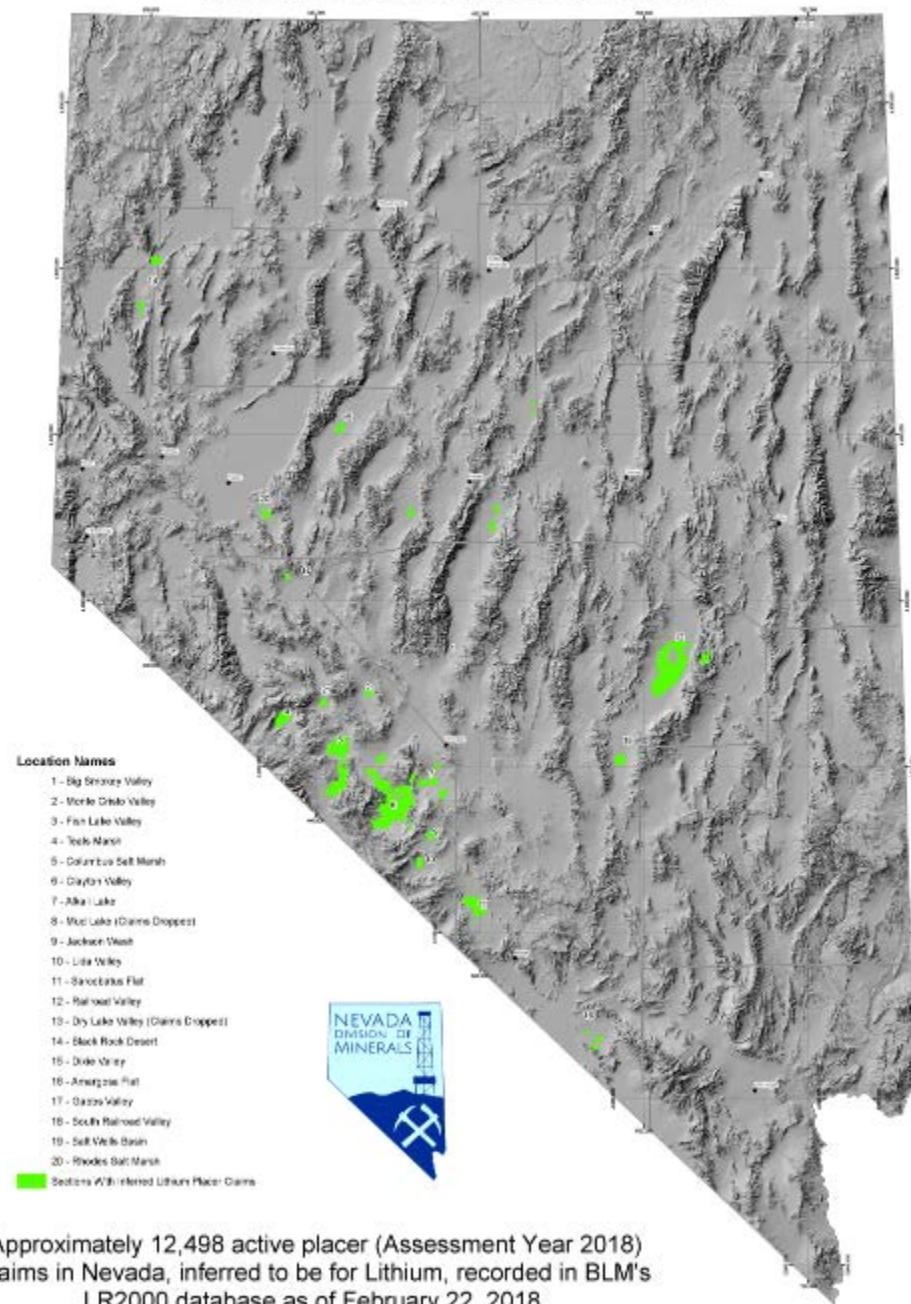
Source: S&P Global Market Intelligence

LITHIUM EXPLORATION ACTIVITY IN NEVADA

- Lithium targets:
 - **Brines**: in playas, locatable on Federal land with placer claims
 - **Clays**: sediment-hosted, locatable on Federal lands with lode claims.

Inferred Active Lithium Placer Claims in Nevada

Map Produced by: Lucia M. Patterson, Nevada Division of Minerals



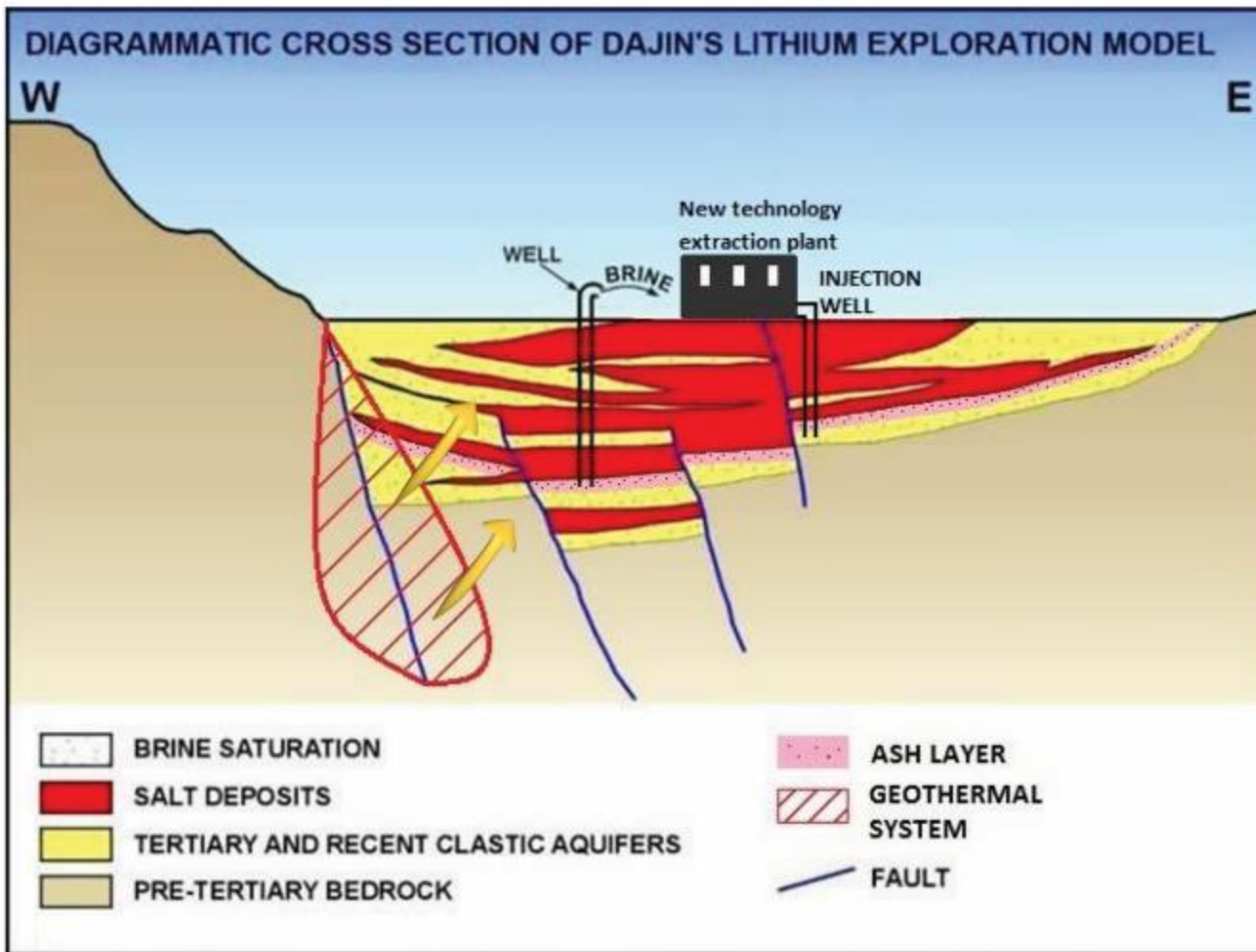
Approximately 12,498 active placer (Assessment Year 2018) claims in Nevada, inferred to be for Lithium, recorded in BLM's LR2000 database as of February 22, 2018.

Claim density does not accurately reflect acreage claimed, due to association placer claims.

Lithium Brine Production and Exploration in NV

- **Nevada has the only operating lithium mine in the U.S. – located in Clayton Valley, Esmeralda County**
 - Operated since 1967, employs 85 people
 - Produces lithium carbonate
 - Uses surface evaporation ponds to concentrate lithium pumped from brine aquifers in valley
- **Geologic Model for a lithium brine deposit:**
 - Salar deposits – a salt flat that may represent the basin of a salt lake
 - Accumulations of saline groundwater that are enriched in dissolved lithium.
 - Exploration by drilling and sampling of brine aquifers

Dajin Resources: Brine Exploration Model



- Brines form in arid closed basins.
- Volcanism and geothermal waters important.
- Large diameters wells drilled.
- Brines with Lithium concentration pumped from the subsurface.
- Direct extraction technologies removes Lithium in under 24 hours.
- Spent brine is re-injected.

FIRST DMRE WELL BEING DRILLED UNDER NEW REGULATIONS SIERRA LITHIUM, COLUMBUS SALT MARSH, ESMERALDA COUNTY

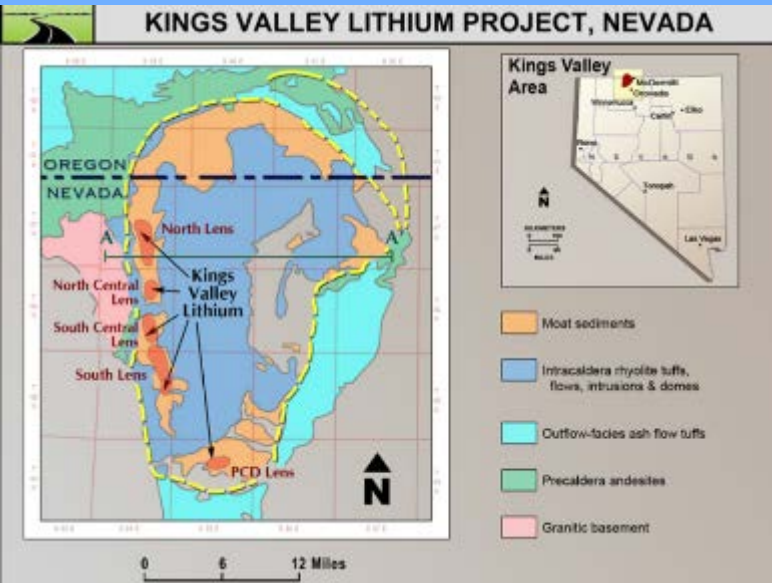


Photo taken March, 2018

Lithium Americas: Kings Valley

100 km north-northwest of Winnemucca, NV and 40 km west-northwest of Orovada, NV

Lithium/Organoclay Drilling Additive Supplier



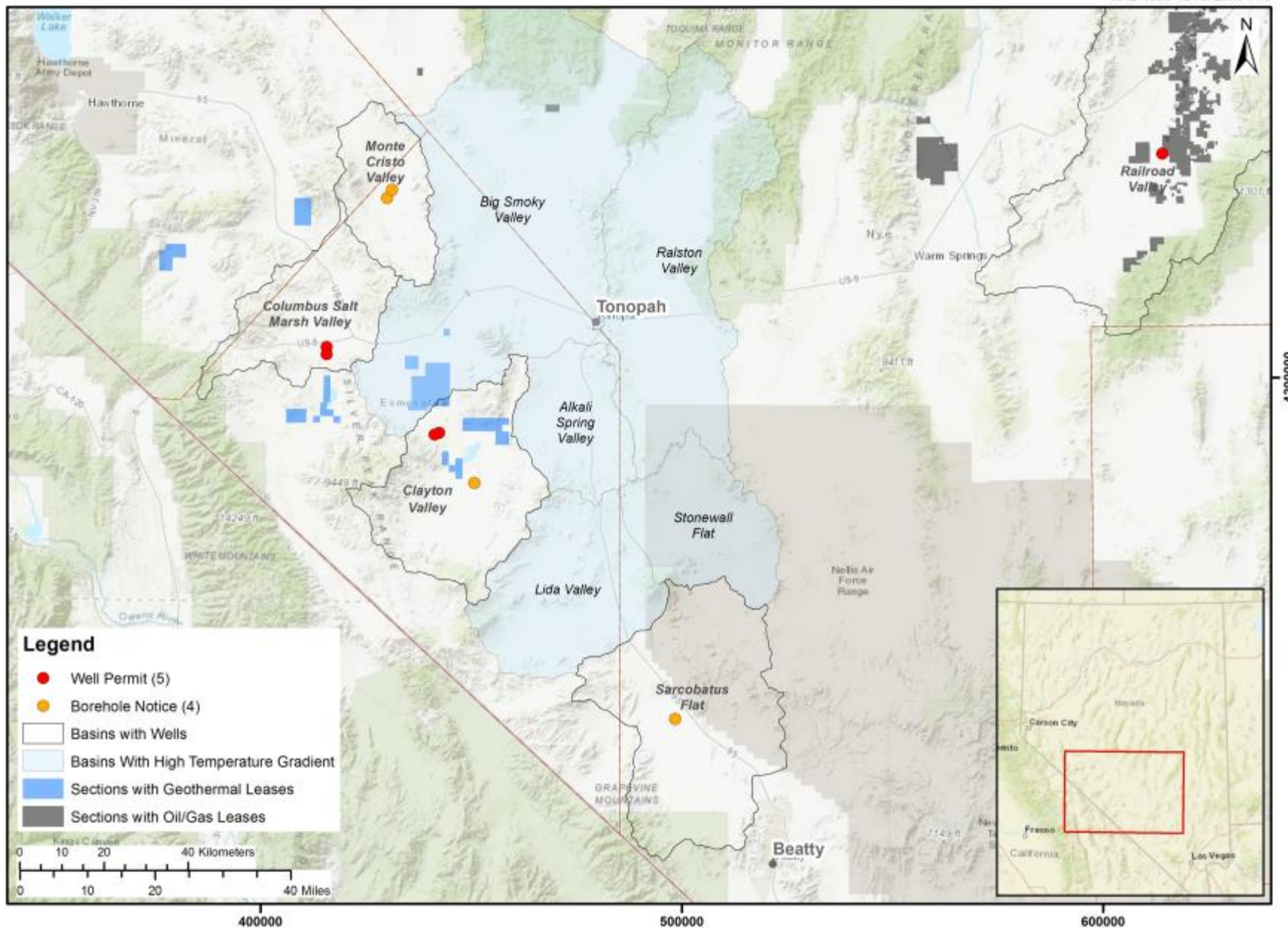
- Hectorite clay deposit in the moat deposits of the McDermitt Caldera
- It is a near surface clay exposure that is right next to a major highway
- Hectorite is an effective additive to drilling muds and has emerged as the enabling mineral with thermal stability superior to bentonite clays to perform in challenging environments i.e. High Pressure & High Temperature
- Developing process to remove the Li from clay.

High Purity Hectorite Clay



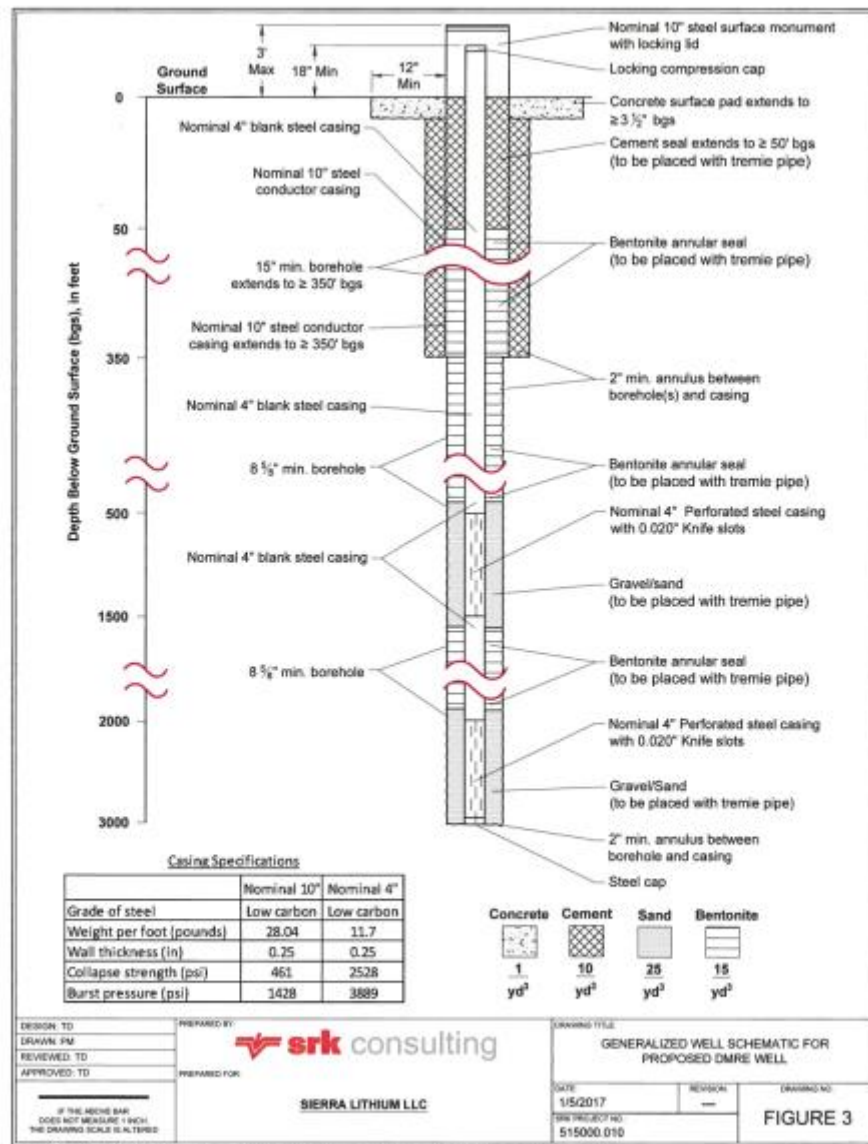
DMRE Well Permits and Borehole Notices

NAD 1983 - UTM Zone 11N

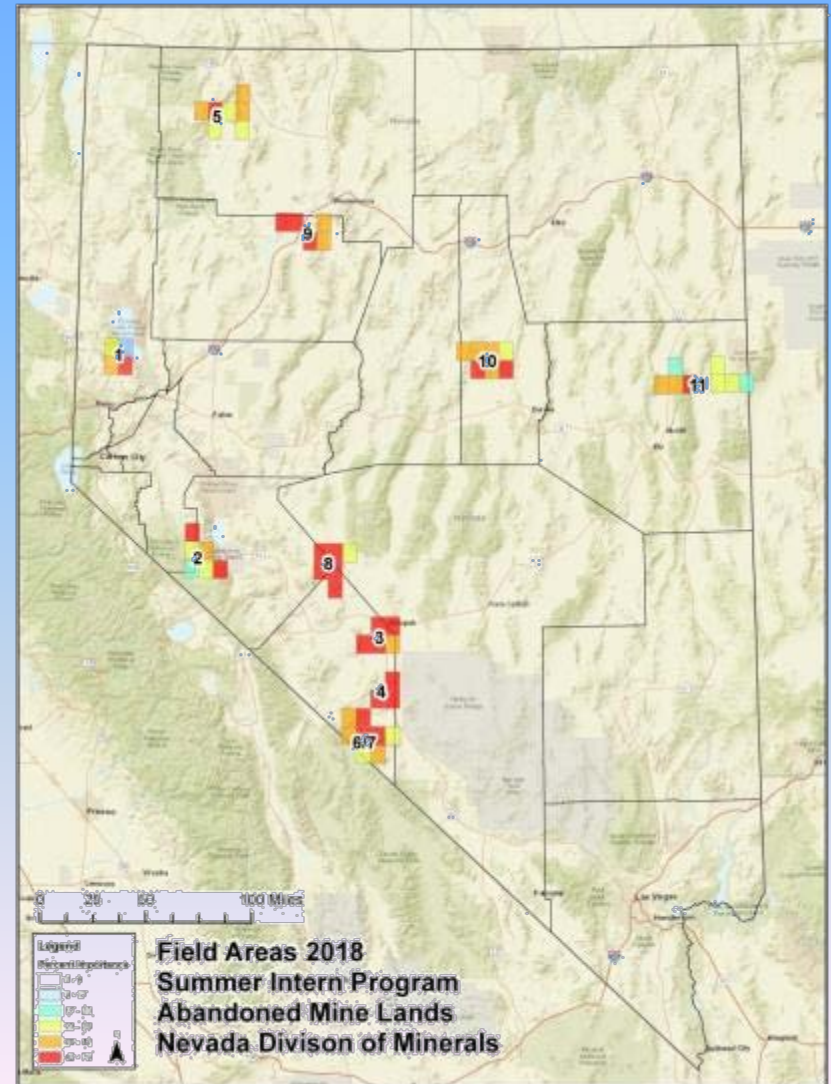
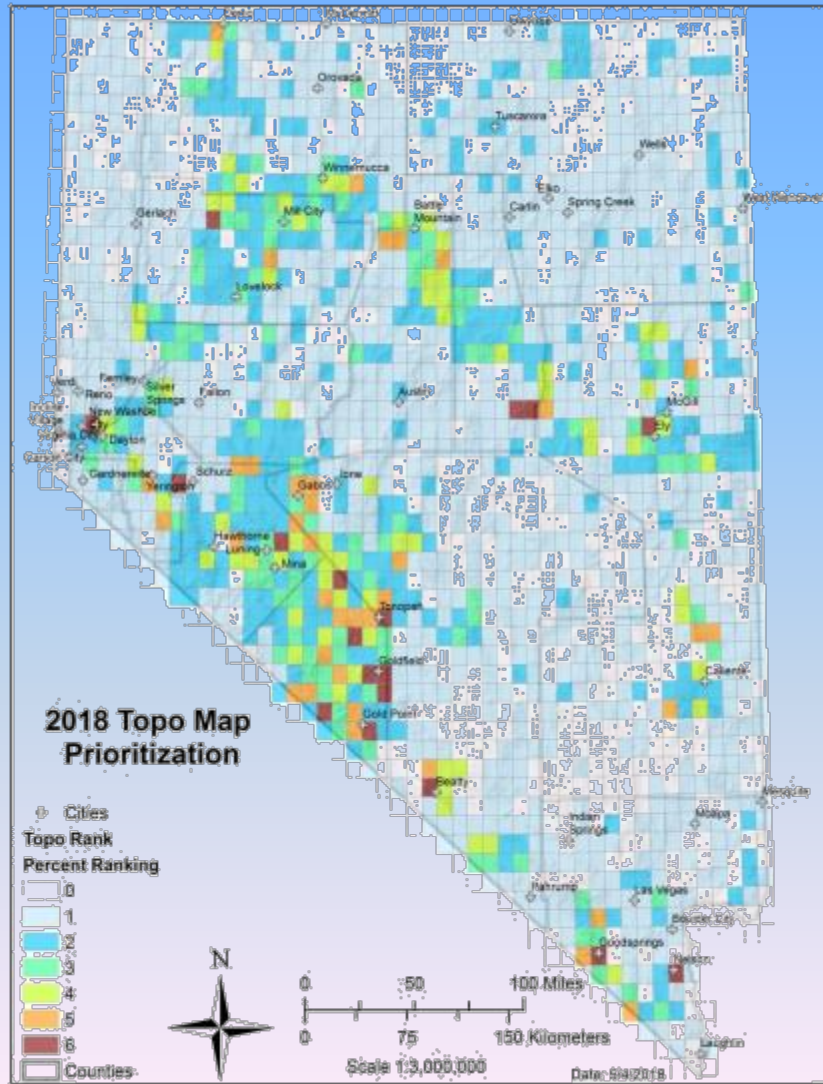
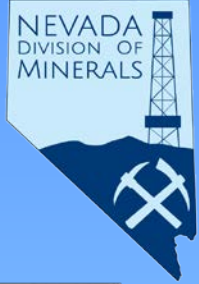


DISSOLVED MINERAL RESOURCE EXPLORATION REGULATIONS

- A.B. 52 from 2017 session
- Will be Chapter 534B
- Addresses sampling of brines in exploration boreholes and wells
- Replaces NDWR MM well waivers
- NDEP, NDWR and NDOM jointly developed regs.
- Statute became effective 1/1/2018
- Regulations approved by Commission on Mineral Resources 4/27/18
- 5 DMRE wells have been issued permits



AML Program - 2018 Ranking



Hard Closure Projects - 210 closures in 2017

- **Backfills**



- **Bat Compatible Closures**



- **Polyurethane Foam Plugs**



2017 Emergency Closures

Carnation

- A Jeep was parked on the road when the back right tire collapsed into a “ballroom” style working below and almost took the Jeep with it
- Hazard was fenced and road closed the following day after being reported
- 14 hazards in the immediate area were closed, including five wildlife compatible closures, for \$46,038.68



Monte Cristo

- A collapse of a “ballroom” style working along a the Virginia City Grand Prix race route.
- NDOM staff and County Firefighter constructed a fence the same day it was reported.
- Site was backfilled for \$3,000



Arden Mine Closure Project – Clark County

Las Vegas 1984

Las Vegas 2017



Location and Proximity to Population



Arden Mine Closure, East Knob area, April 2018



Arden Mine Closure, Ridge Area, April, 2018



Arden Mine Closure, East knob final slope, April 2018



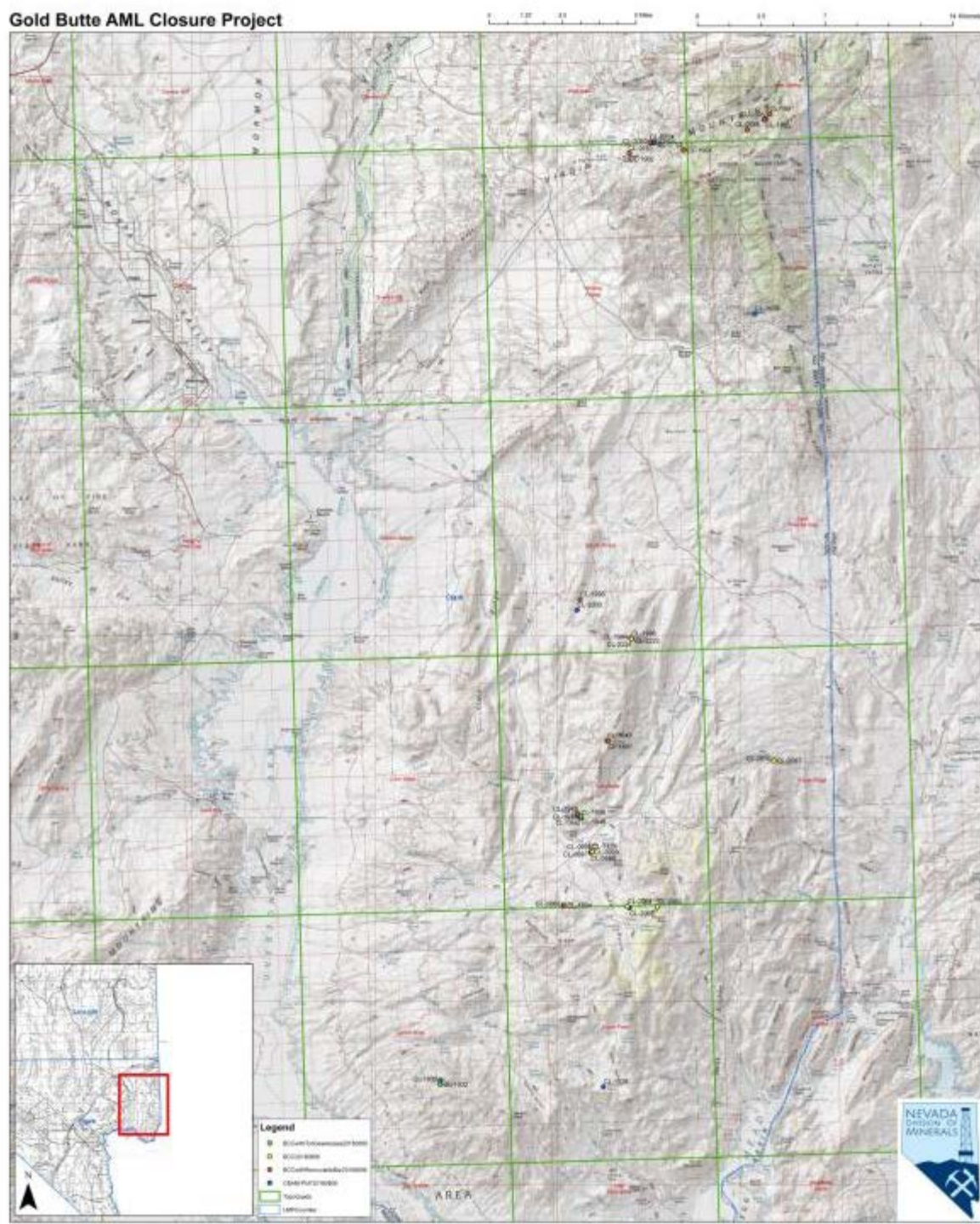
Cooperative effort between Clark County and the NDOM

Broken Hills

- Mineral & Nye Counties
- 40 hazards
- Multiple stopes over 40' long x 20' wide x 150' deep and vehicle access only feet away
- Public (family with small children) seen using the ladder on the headframe and entering the mine
- 19 Bat Compatible Closures
- Total cost of \$155,072.33



- Clark County
- 42 hazards within the entire Gold Butte National Monument
 - Managed by LV BLM
- Interlocal contract with Clark County Desert Conservation
 - \$193,000 total funding available
 - \$150,000 obligated to the Gold Butte Project
 - Must be used for wildlife compatible closures only in Clark County
 - 18 hazards determined to have significant wildlife habitat
 - 3 hazards including tortoise habitat
- Anticipated construction 9/10/2018 – 10/31/2018
- Project estimate \$220,000



Future Closure Projects

- Gunmetal Mine
 - Mineral County
 - 10 Hazards
- Nevada Eagle
 - Esmeralda County
 - 43 Hazards
- Double O
 - Humboldt County
 - 81 Hazards
- Walker River State Park
 - Lyon & Mineral Counties
 - 107 Hazards
- VC Grand Prix
 - Lyon & Storey Counties
 - 21 Hazards
- Mullen Pass
 - Washoe County
 - 30 Hazards
- Como
 - Lyon County
 - 26

NRS 517: Mining Claim, Mill Sites and Tunnel Rights

Division Web
Site:
<http://minerals.nv.gov>

All 14 types of
Certificates and
Notices are
form-fillable
on-line for
Printing.

The screenshot shows the official website of the Nevada Division of Minerals. The header includes the state seal, the agency name, and navigation links. A search bar and a print button are also present. The main content area is divided into a left sidebar with a 'Programs' menu and a central 'MINING CLAIMS' section. The sidebar lists various programs like Abandoned Mine Lands, Bond Pool, and Dissolved Mineral Resource Exploration. The central section provides detailed information about mining claims, including a paragraph about the BLM's rule streamlining regulations and a list of links for locating, recording, and maintaining claims. A right sidebar contains additional links related to mining claims, such as 'Filing Mining Claims', 'BLM Mining Claim Links', and 'County Mining Claim Links'.

State of Nevada
Commission on Mineral Resources
Division of Minerals

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Programs

- Abandoned Mine Lands (AML)
- Bond Pool (Reclamation)
- Dissolved Mineral Resource Exploration (DMRE)
- Education and Outreach
- Geothermal

Mining

- Forms and Publications
- Claims
- Mining Fraud and Investment
- Stock Certificates
- Excellence in Mine Reclamation
- Links

Oil & Gas

MINING CLAIMS

Filing or maintaining mining claims in Nevada? This page has the information you need to help in the process.

Locating, Recording, and Maintaining Mining Claims or Sites

Department of the Interior, Bureau of Land Management (BLM) 43 CFR Parts 3710, 3730, 3810, 3820, 3830–3840, and 3850 [WO–620–1430–00–24 1A] RIN 1004–AD31: The BLM published this rule to streamline the regulations on locating, filing, and maintaining mining claims or sites by consolidating provisions that were scattered in various portions of Groups 3700 and 3800 into ten consecutive parts placing the provisions in logical order, clarifying conflicting language, eliminating duplication, and removing obsolete provisions. These revisions are part of BLM's overall effort to rewrite regulations in plain language to make them easier for the public to use and understand and to provide better customer service. This final rule is effective November 24, 2003. A complete copy of the final changes has been posted in the link below. View the CFRs in their entirety on the [U.S. Government Publishing Office website under Public Lands: Interior](#).

- [Final Rule: Locating, Recording, and Maintaining Mining Claims or Sites](#)

New Mining Claim Forms

Please refer to the following forms for New Claims on public land in Nevada:

- [Certificate of Location Lode Mining Claim](#)
- [Certificate of Location Mill Site](#)
- [Certificate of Location Mill Site Located by Aliquot Part of Rectangular Survey](#)
- [Certificate of Location Placer Mining Claim](#)

Filing Mining Claims

- [43 CFR Parts 3710, 3730, et al. Locating, Recording, and Maintaining Mining Claims or Sites: Final Rule](#)
- [Mining Claim Filing Requirements in Nevada](#)
- [Clarification Of Fees For Recording Of Mining Documents 7/1/2016](#)
- [Mining Claim Procedures for Nevada Prospectors and Miners](#)
- [State and Federal Permit Required Before Mining or Milling Can Begin](#)

BLM Mining Claim Links

- [BLM Locatable Minerals](#)
- [BLM Mining Claim Fees](#)
- [BLM Electronic Forms \(see Fluid and Solid Minerals, Mining Claims section\)](#)
- [BLM Cadastral Survey](#)
- [Placer Claim Staking Forum \(2018\)](#)

County Mining Claim Links

- [Recorder's Association of Nevada](#)

Thank You for collecting the fees that make this program work!

- NRS 513.094 = \$4 per claim filing for operation of the abandoned mine land program
- NRS 517.185 = \$6 per filing for operation of the Commission and Division
- Call us or direct people to us if we can help answer questions on claims, the AML Program, mine production numbers, oil or geothermal wells and production, or need an educational presentation on any of these topics.