

Nevada Division of Minerals

*UPDATE ON NEVADA MINERAL , GEOTHERMAL
AND OIL EXPLORATION AND PRODUCTION*

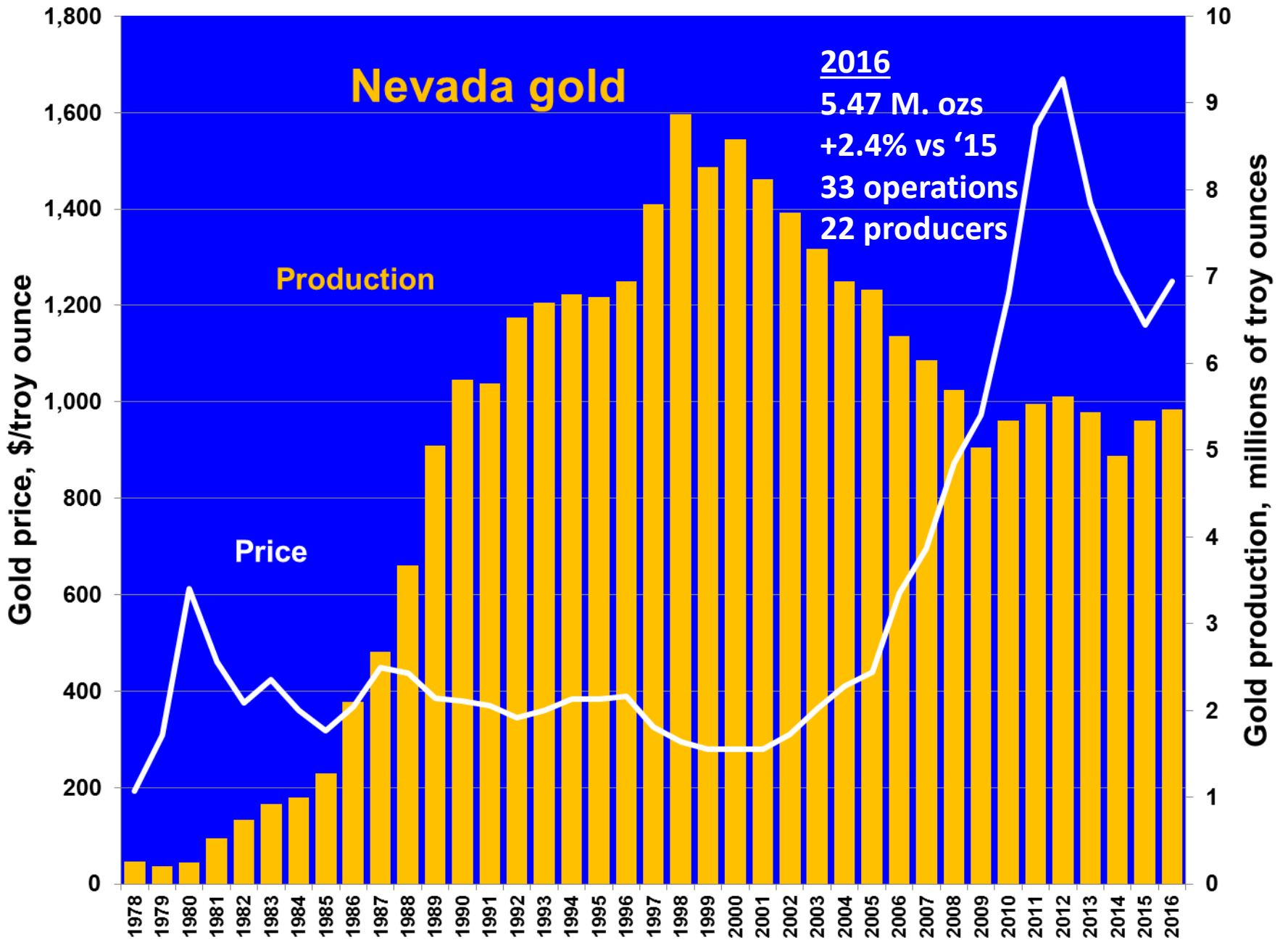
MALRI ANNUAL CONFERENCE

Reno, NV

March 15, 2018

Rich Perry, Administrator





Nevada silver

2016

8.89 M. ozs.

-6% vs '15

23 operations

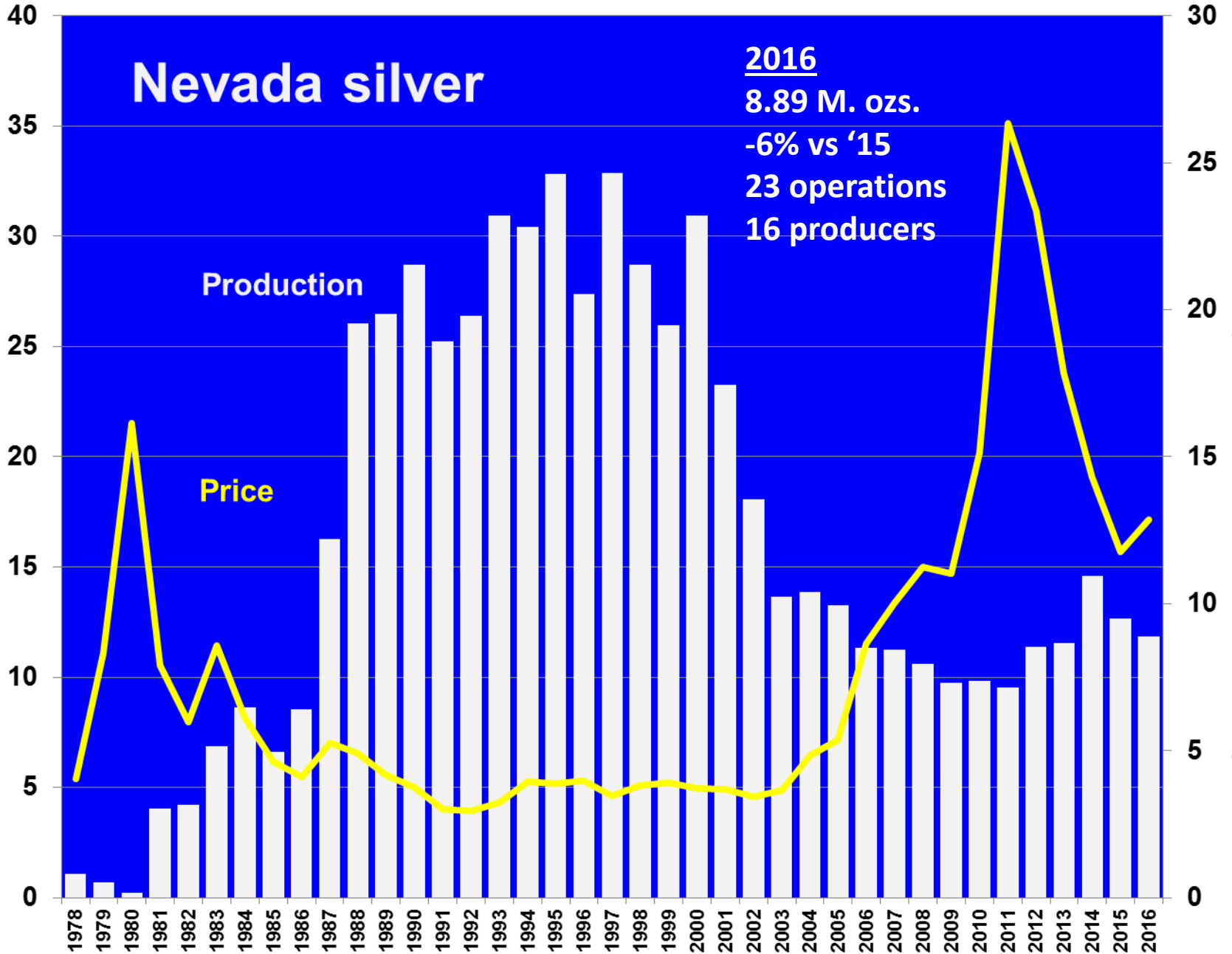
16 producers

Silver price, \$/troy ounces

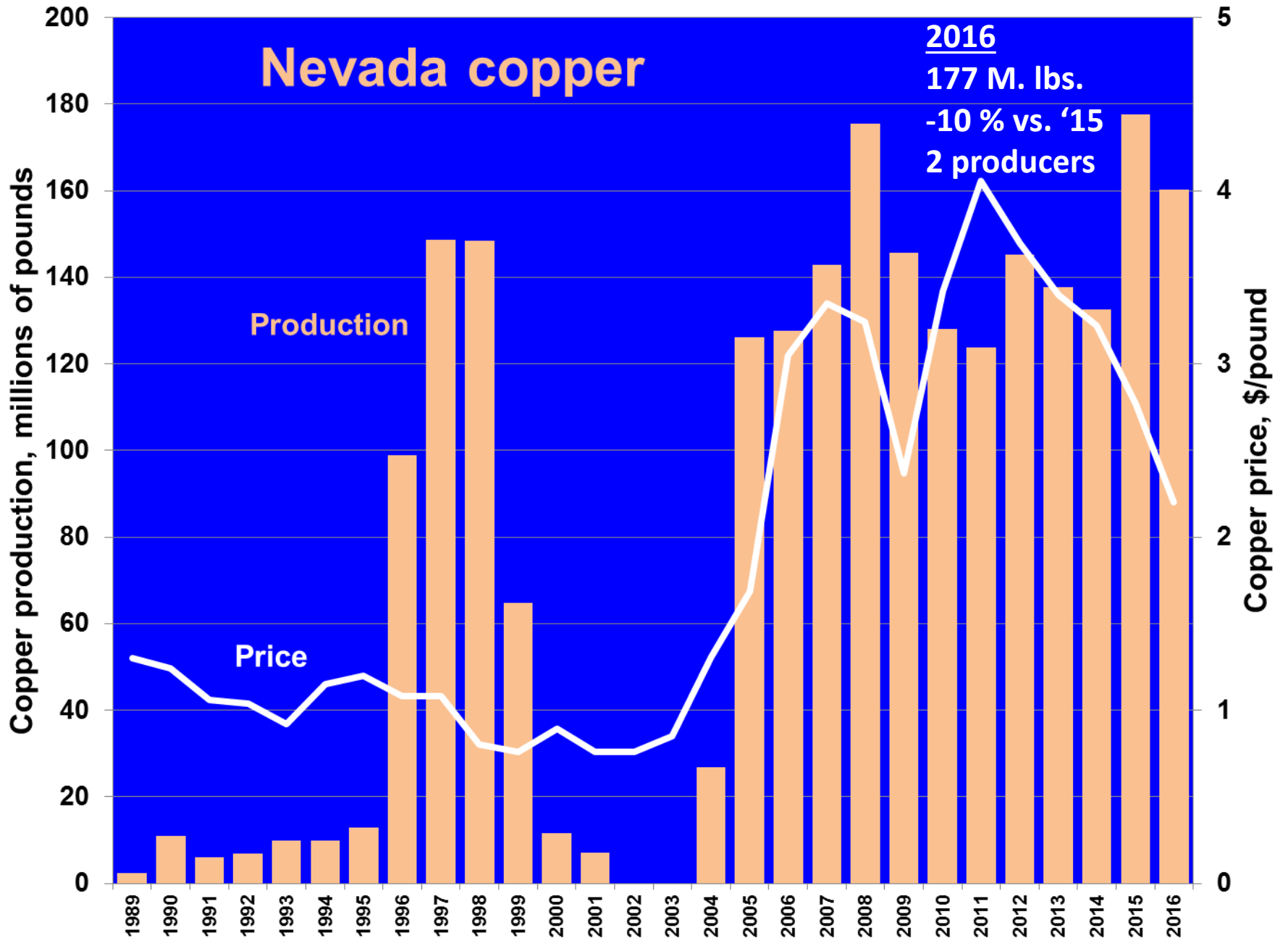
Production

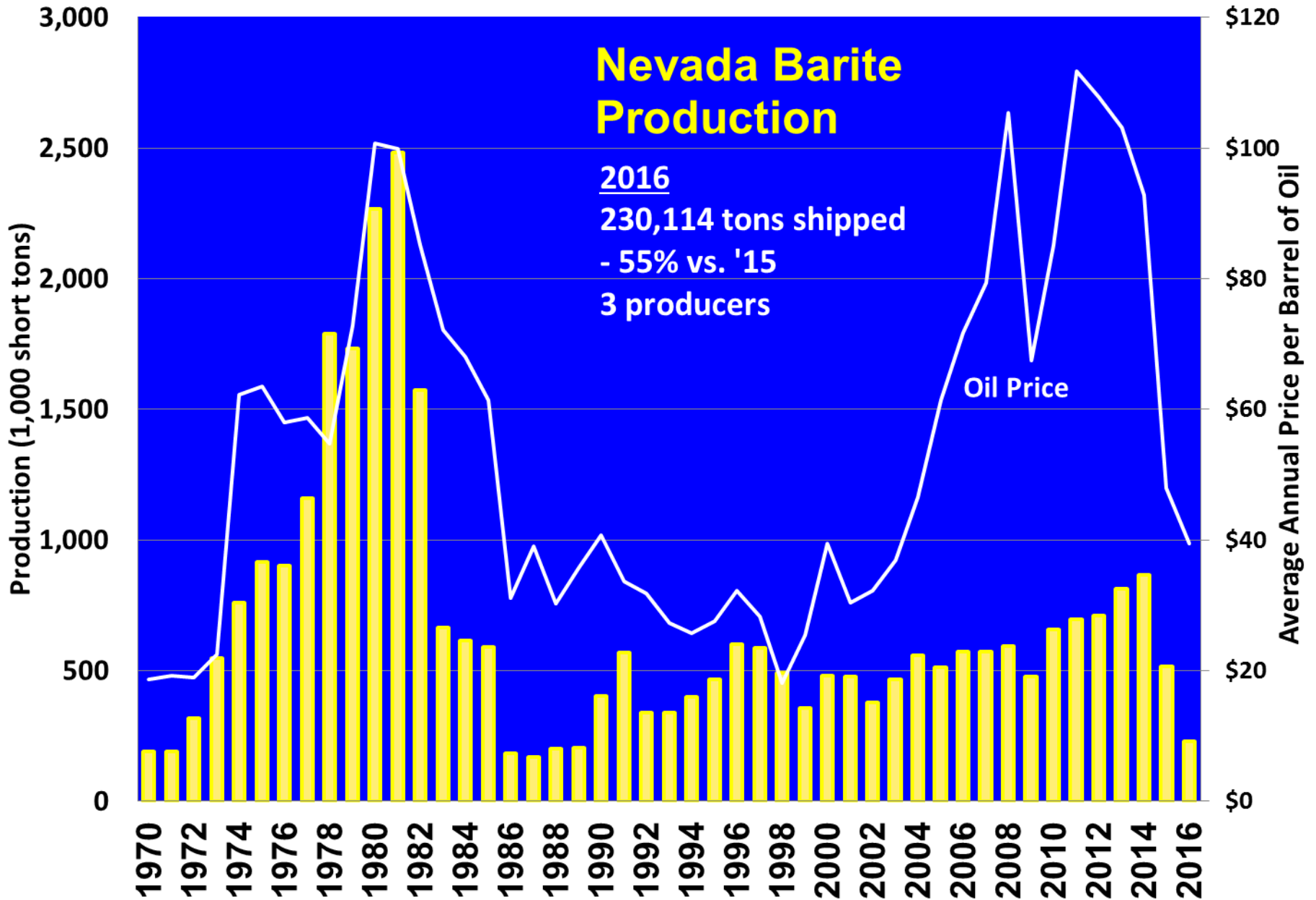
Price

Silver production, millions of troy ounces



Nevada copper

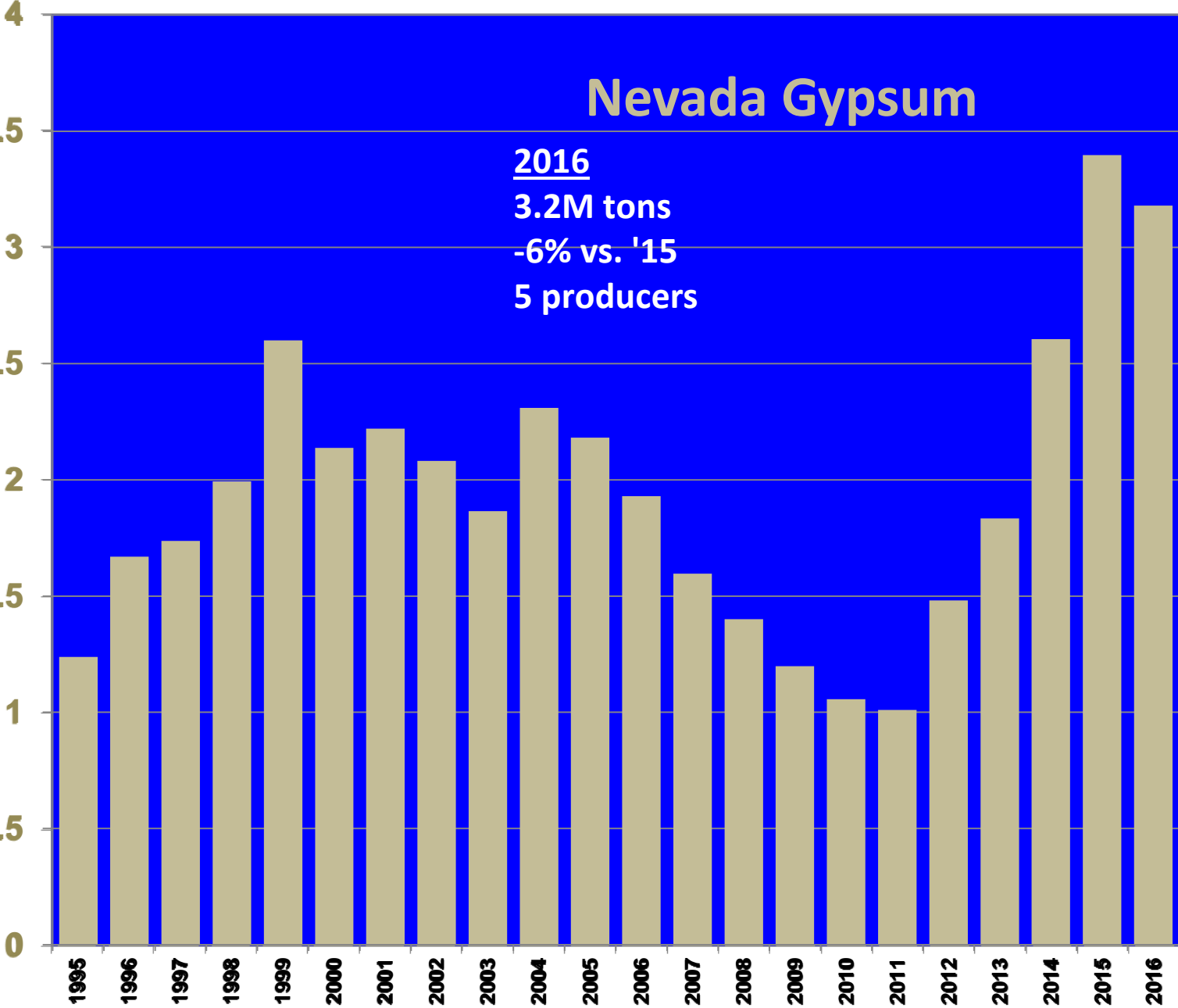




Nevada Gypsum

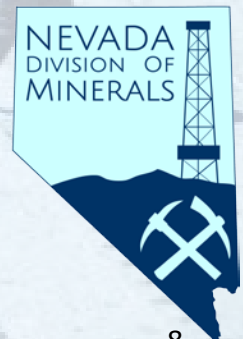
2016
3.2M tons
-6% vs. '15
5 producers

Gypsum production, millions of short tons



Other Industrial Minerals Produced, 2016

- 9,334,629 lbs of lithium compounds
- 110,000 tons of magnesium compounds
- 240,654 tons of diatomaceous earth
- 1,000,000 tons of silica products
- 19,110 tons of salt



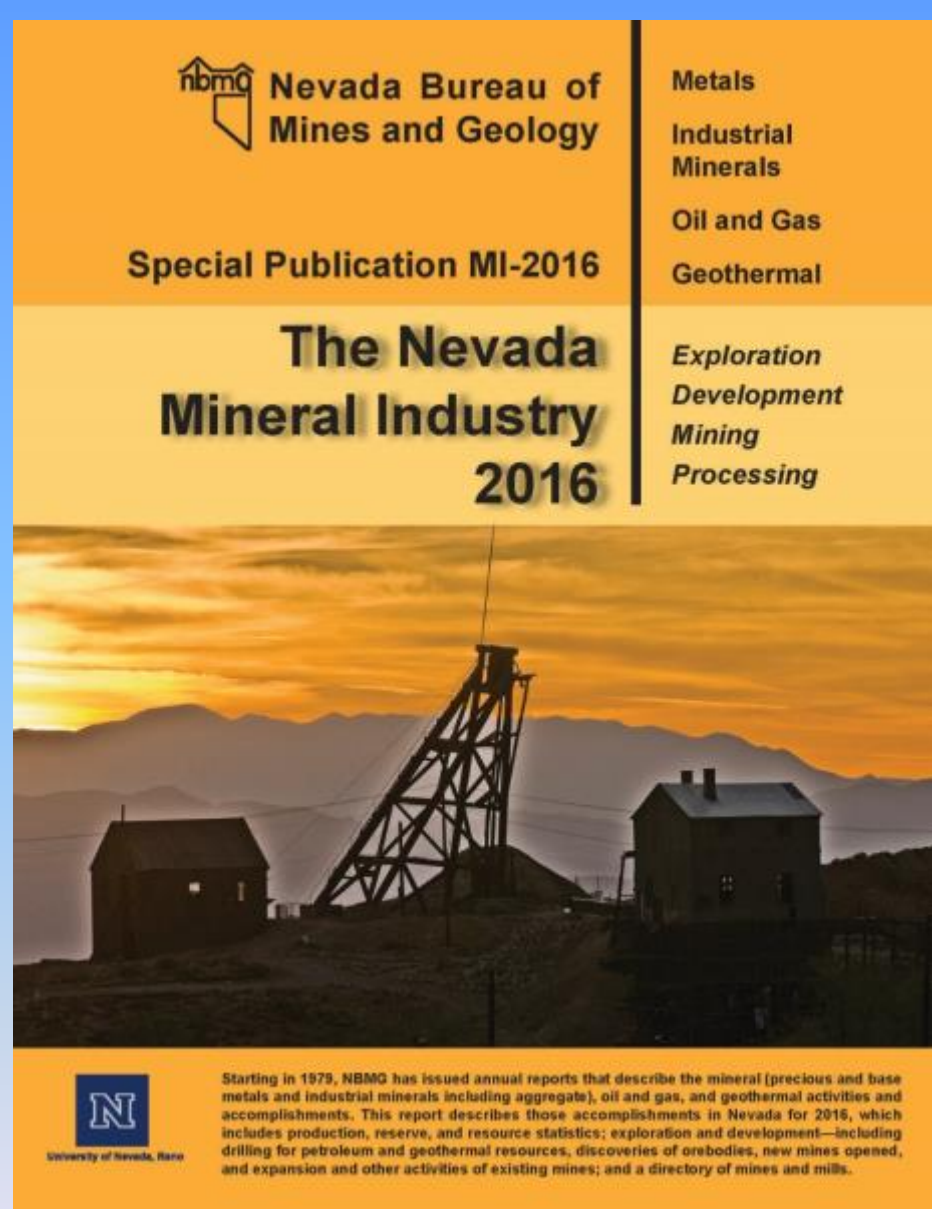
NBMG Nevada Mineral Industry 2016 Report

John Muntean

Economic Geologist / Director
of CREG

Nevada Bureau of
Mines and Geology
University of Nevada Reno

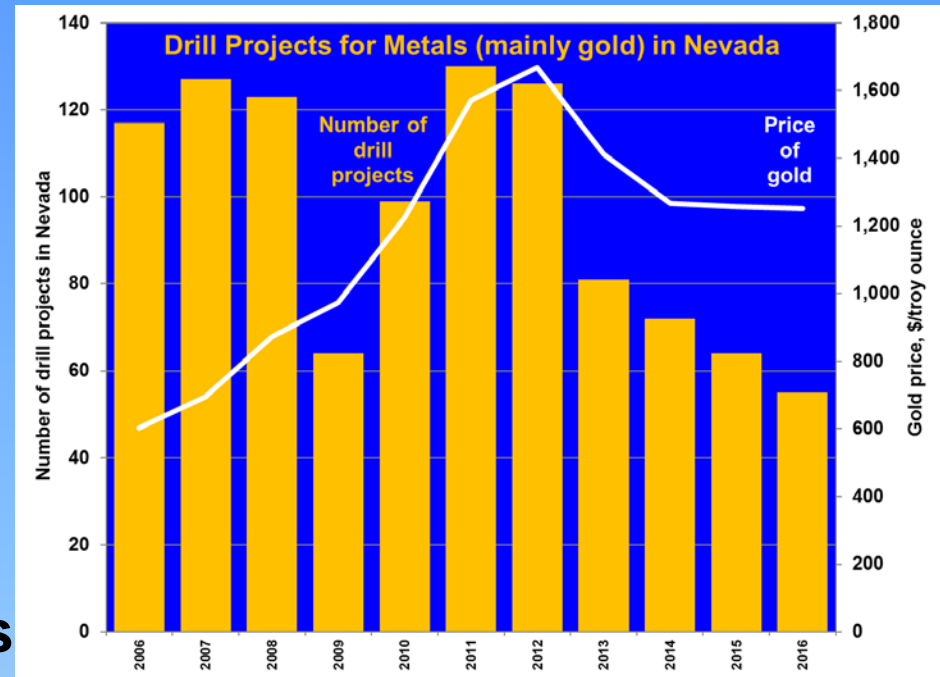
Presentation at the:
**Nevada Commission on
Mineral Resources Meeting**
February 20th, 2018



University of Nevada, Reno

Drilling Projects Decreased again in 2016

- 55 projects drilled in 2016, lowest since we started recording in 2006
- 50 or the 55 known drill projects were drilled for gold

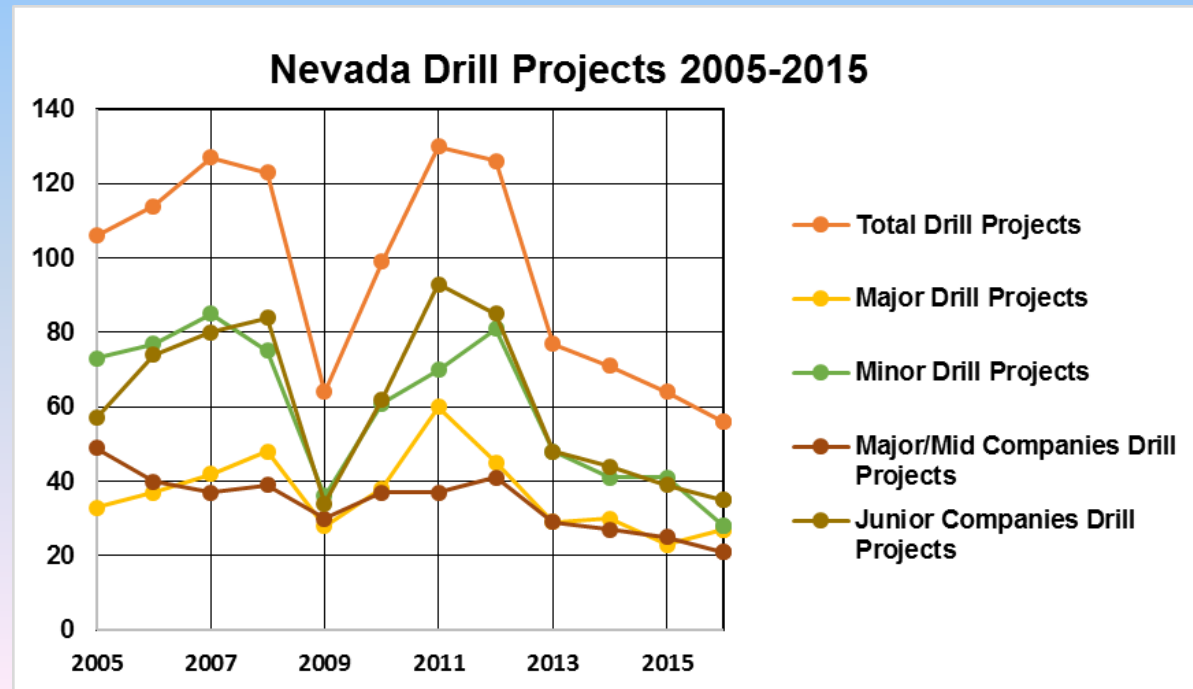


Notable Non-Gold Projects

Copper: Yerington

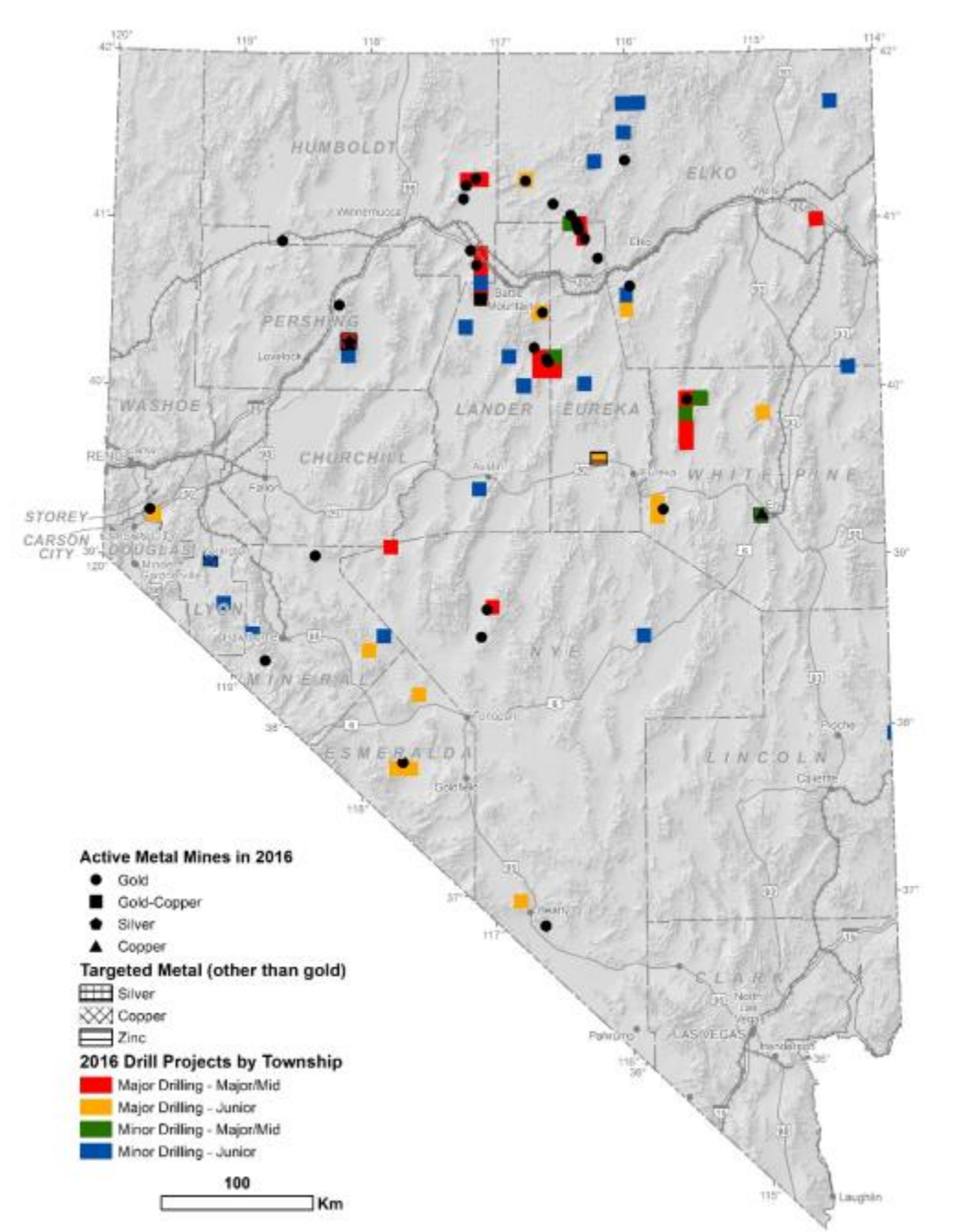
Silver: East Rochester

Zinc: Lone Mountain

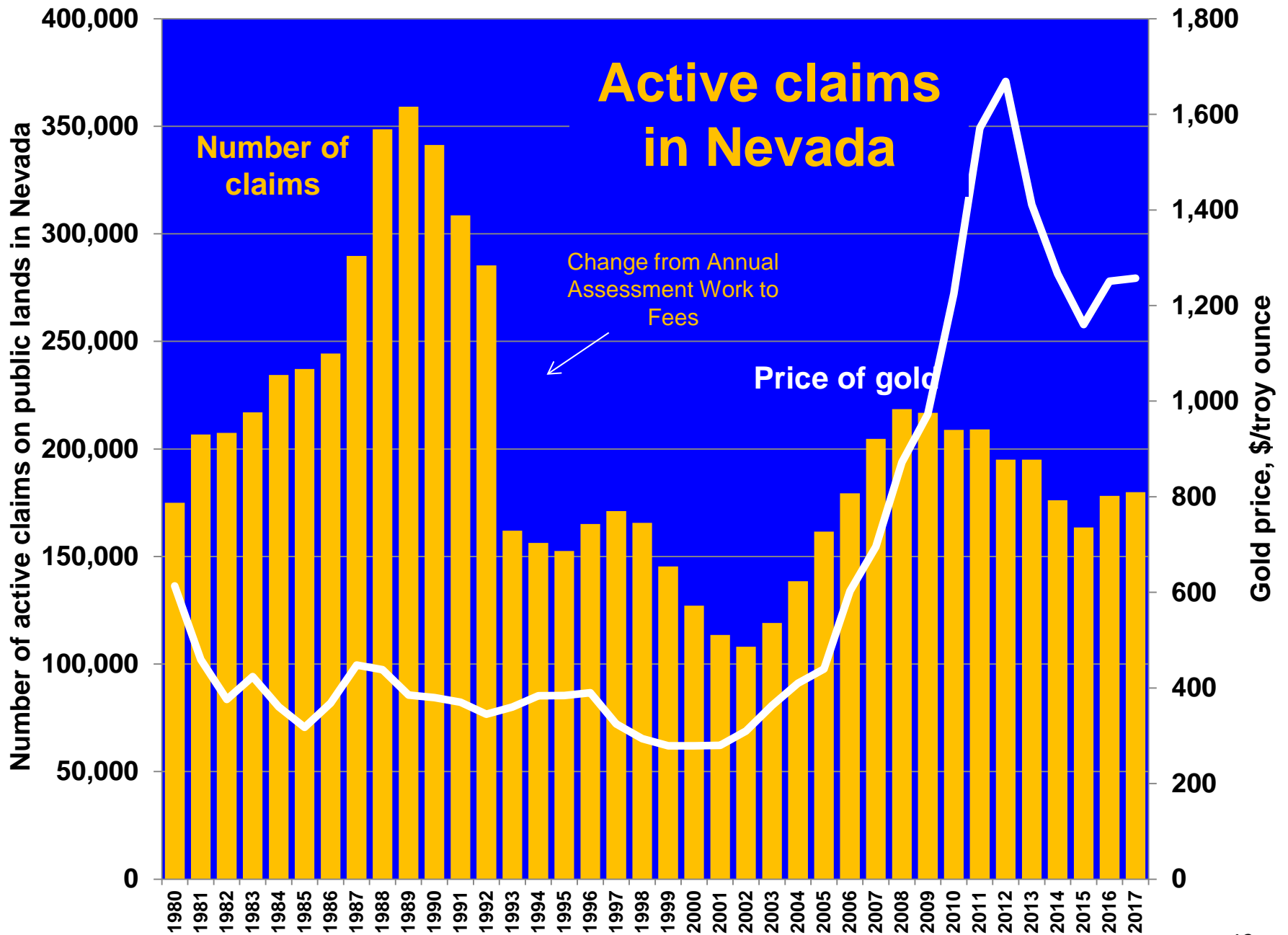


Locations of 2016 Drill Projects for Metals (mainly gold)

- Goal is to put all the data from 2006 to 2016 into a web map service.
- Click on a township and get entries from the MI reports.

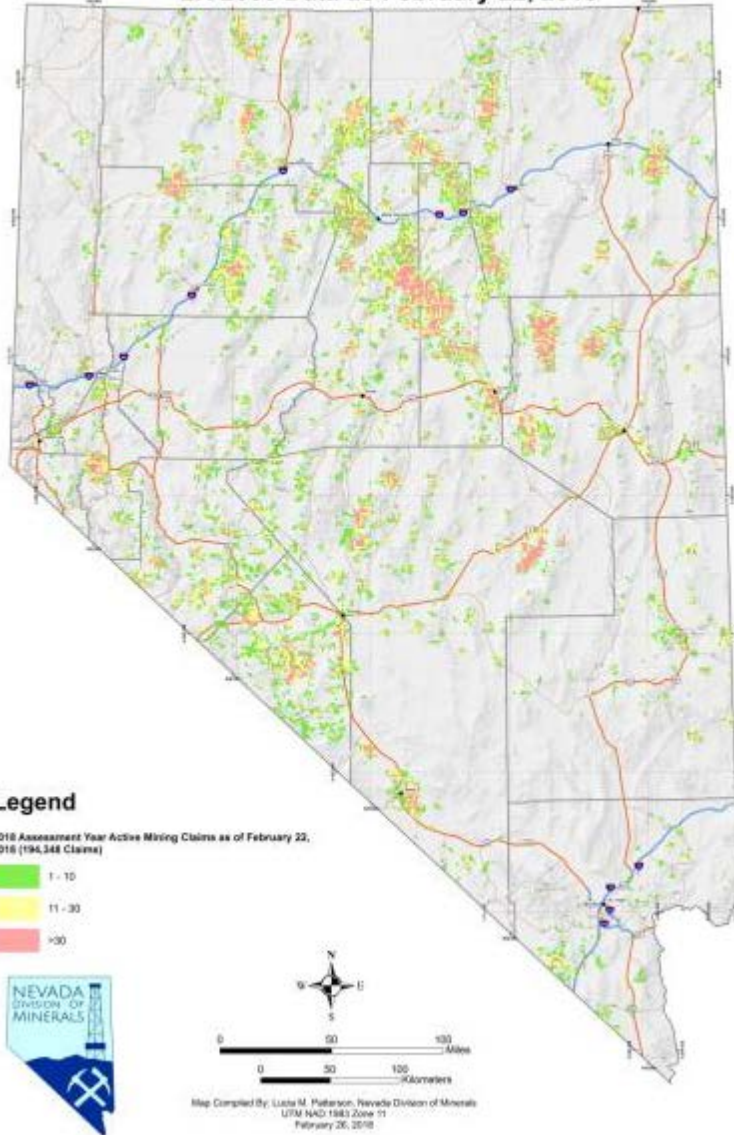


Davis and Muntean, 2017



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

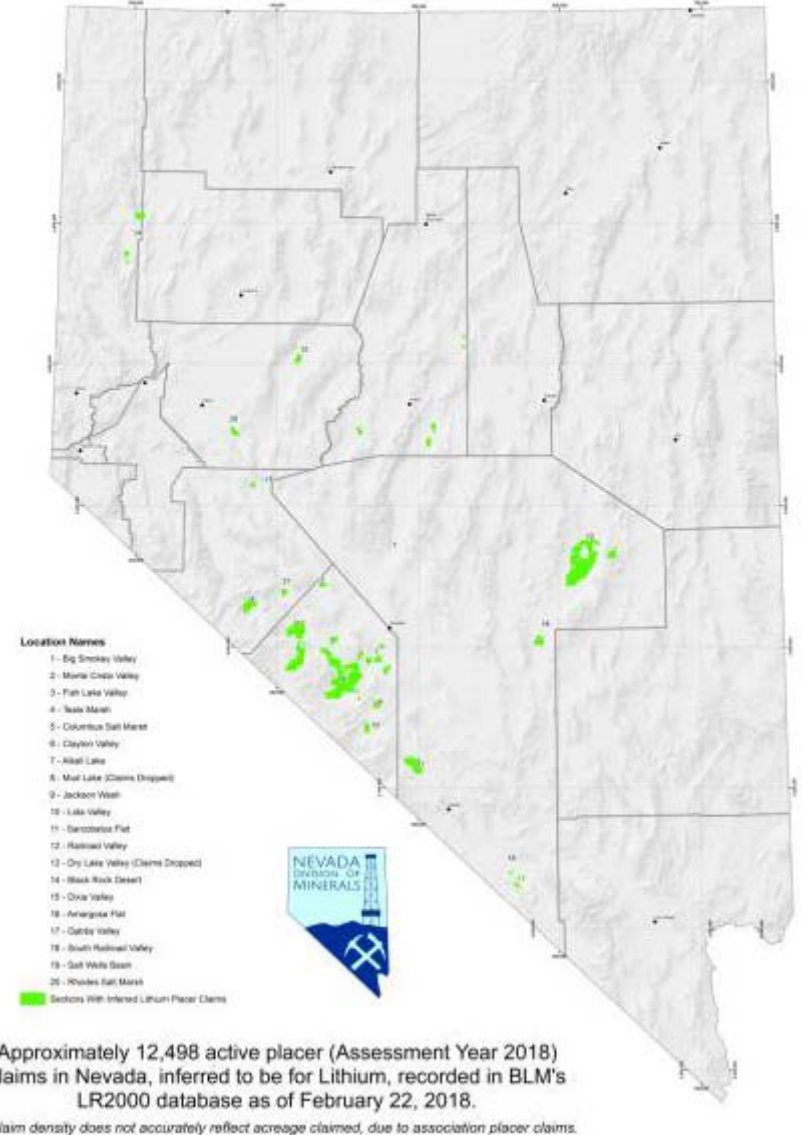
Distribution of Mining Claims in Nevada
LR 2000 Data as February 22, 2018



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

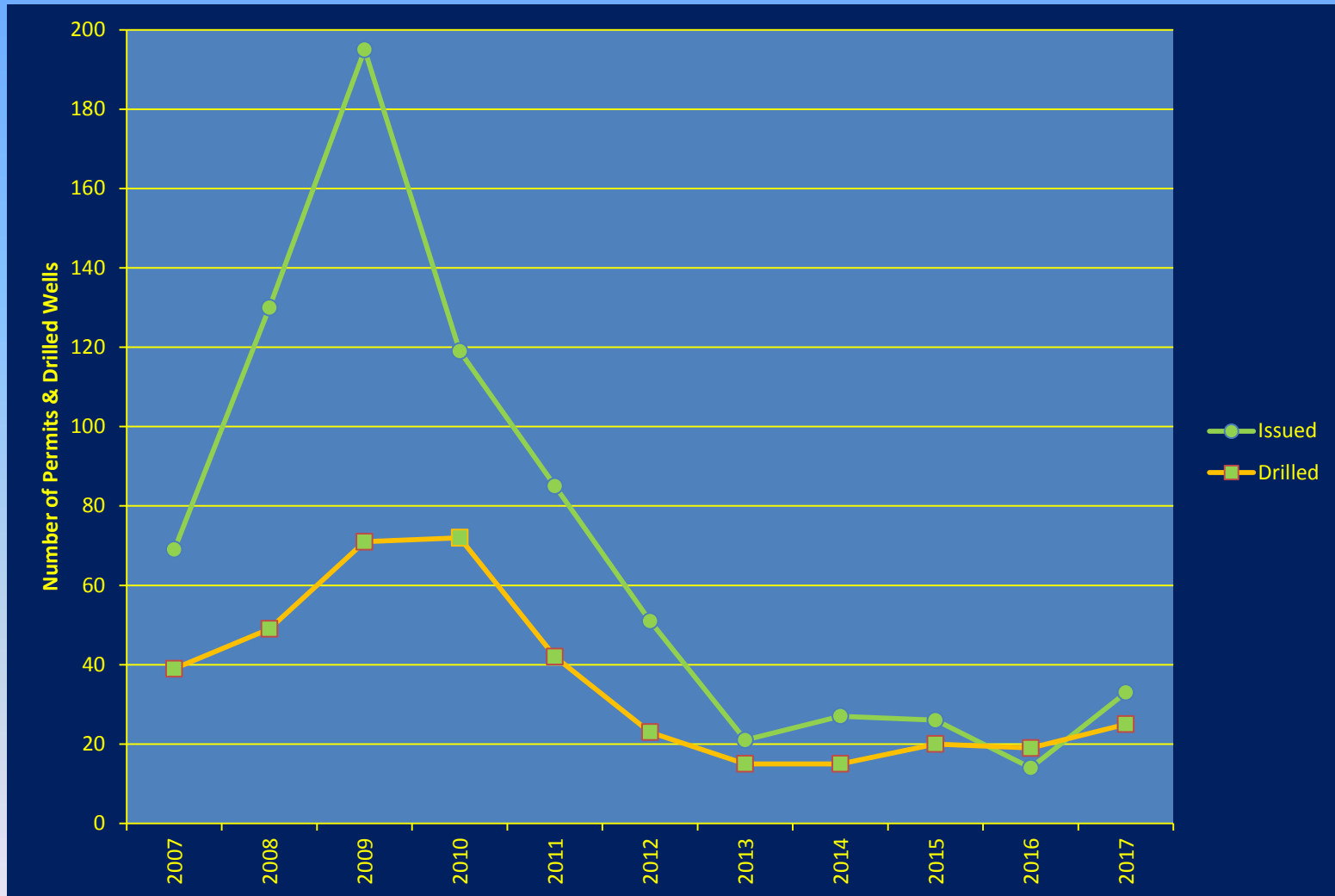


GEOHERMAL PERMITS ISSUED - WELLS DRILLED

Permit Type	Issued	Drilled	Issued	Drilled	Issued	Drilled	Issued	Drilled
	2014	2014	2015	2015	2016	2016	2017	2017
Geothermal - Ind Production	5	5	10	7	9	10	5	3
Geothermal - Ind Inj	2	2	1	2	3	1	4	4
Geothermal - Obs	10	3	1	1	2	4	3	1
Geothermal - TG	---	---	5	5	---	---	20	15
Geothermal - Com	---	---	---	---	---	---	---	---
Geothermal - Dom	8 ¹	4	8 ²	5	---	4	2	2
Geothermal - Project Area	1	---	1	---	---	---	1	---
Geothermal - Total	27	15	26	20	14	19	35	25

¹Includes 4 wells previously drilled and completed; ²Includes 2 wells previously drilled.

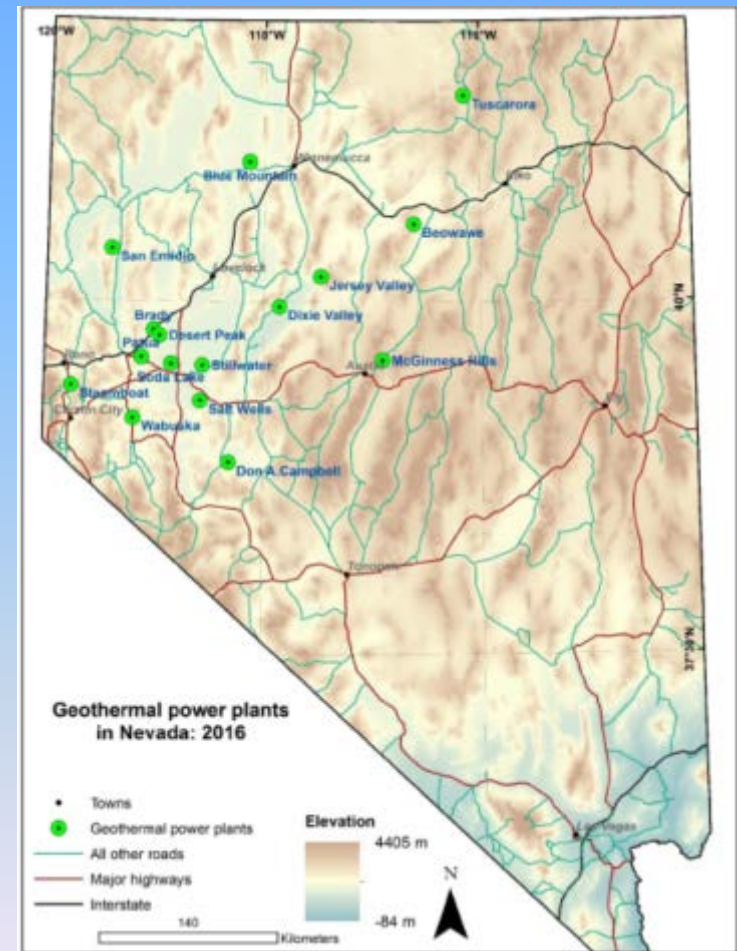
PERMIT ACTIVITY VS WELLS DRILLED: 2007-2017



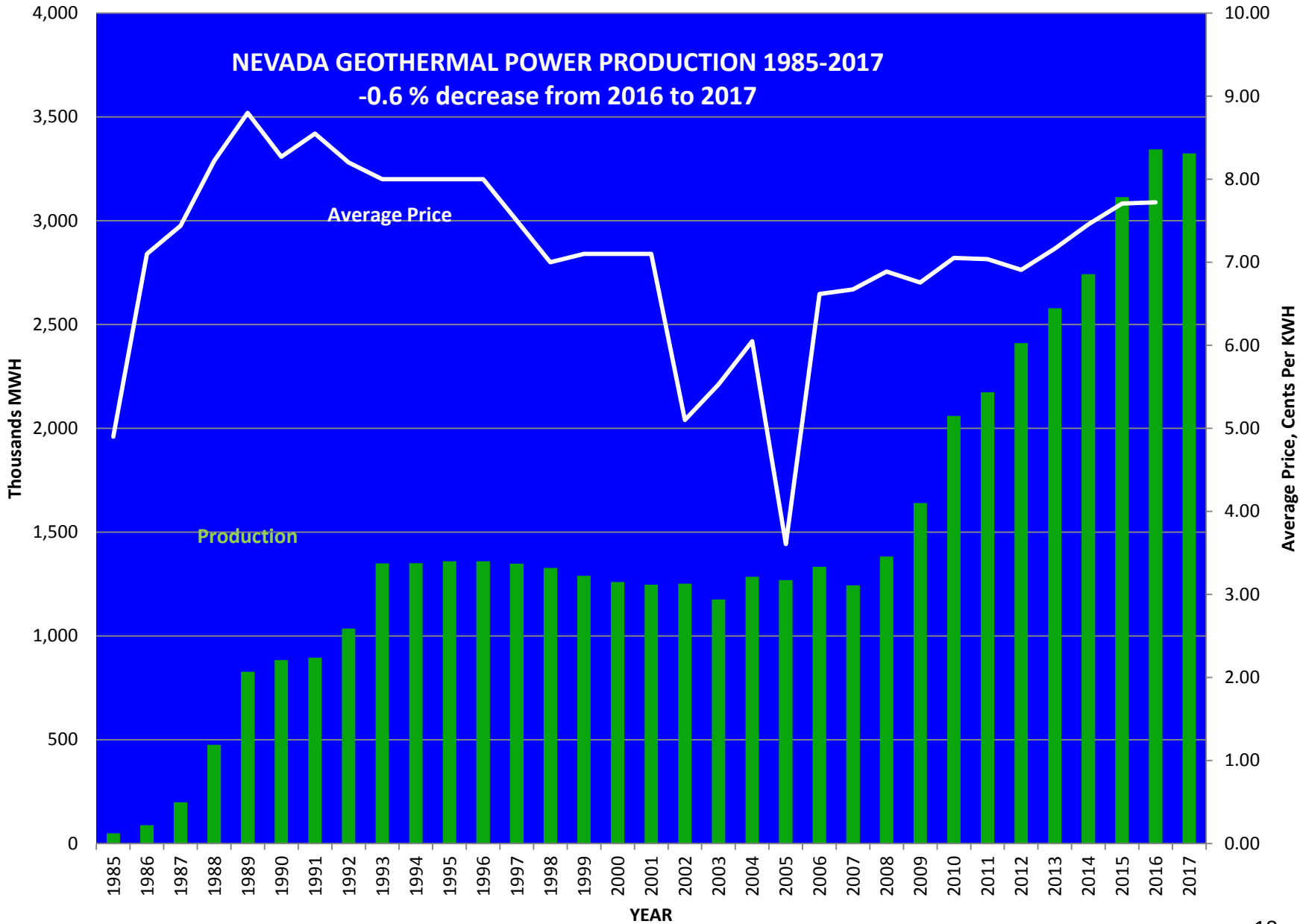
Geothermal Operators

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

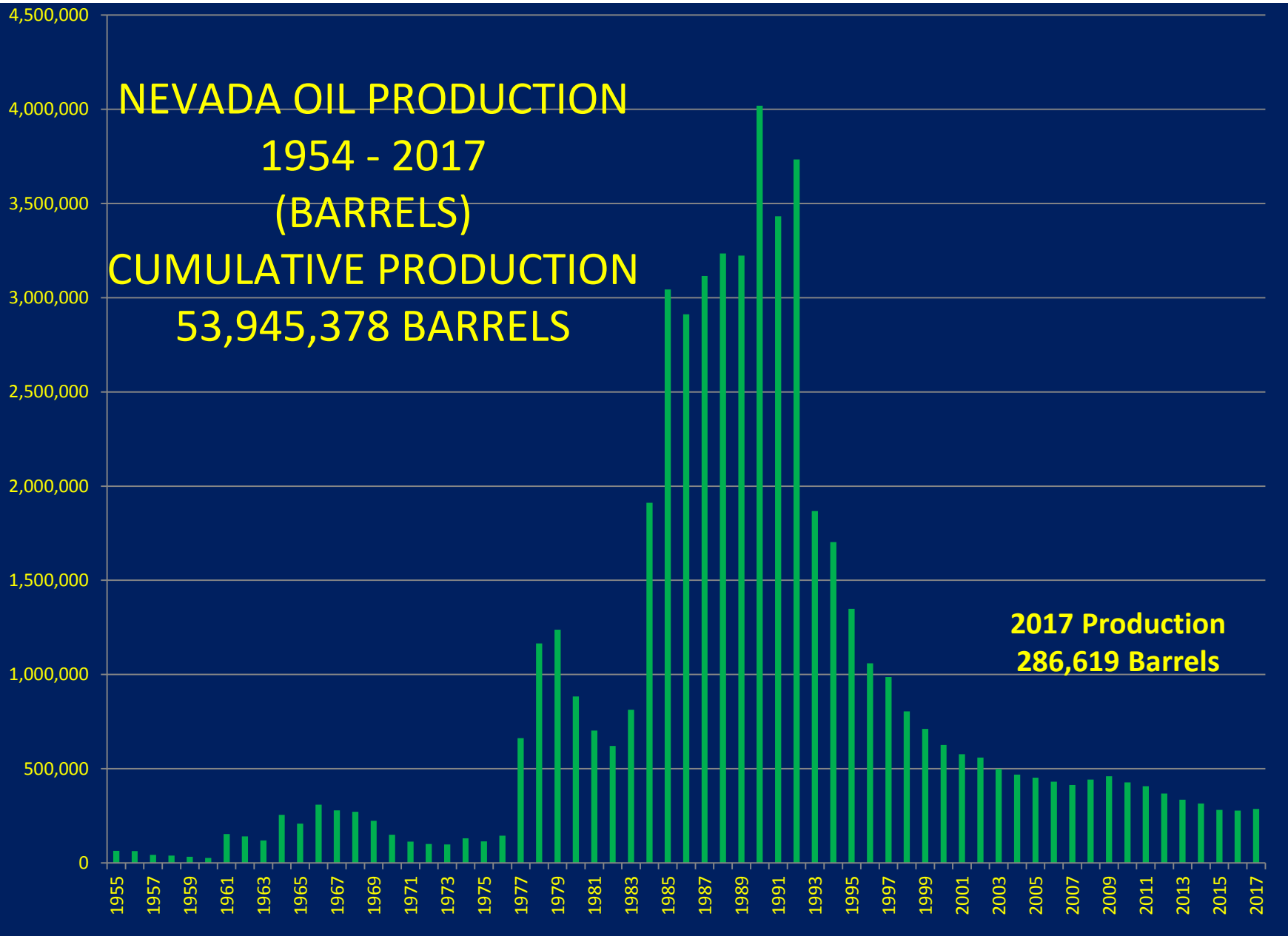
- **Ormat Nevada**: Steamboat, McGinness Hills, Brady, Desert Peak, Wild Rose (Don Campbell), Jersey Valley, Tuscarora, and Tungsten Mountain.
- **Terra-Gen**: Dixie Valley and Beowawe.
- **Cyrq Energy**: Soda Lake and Patua
- **Enel North America**: Stillwater and Salt Wells.
- **US Geothermal**: San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



From: NBMG MI-2016



NEVADA OIL PRODUCTION
1954 - 2017
(BARRELS)
CUMULATIVE PRODUCTION
53,945,378 BARRELS



2017 Production
286,619 Barrels

Not Just Gold: Worldwide Lithium Exploration Boom

Lithium exploration budgets, 2009-2017



Data as of Oct. 30, 2017.

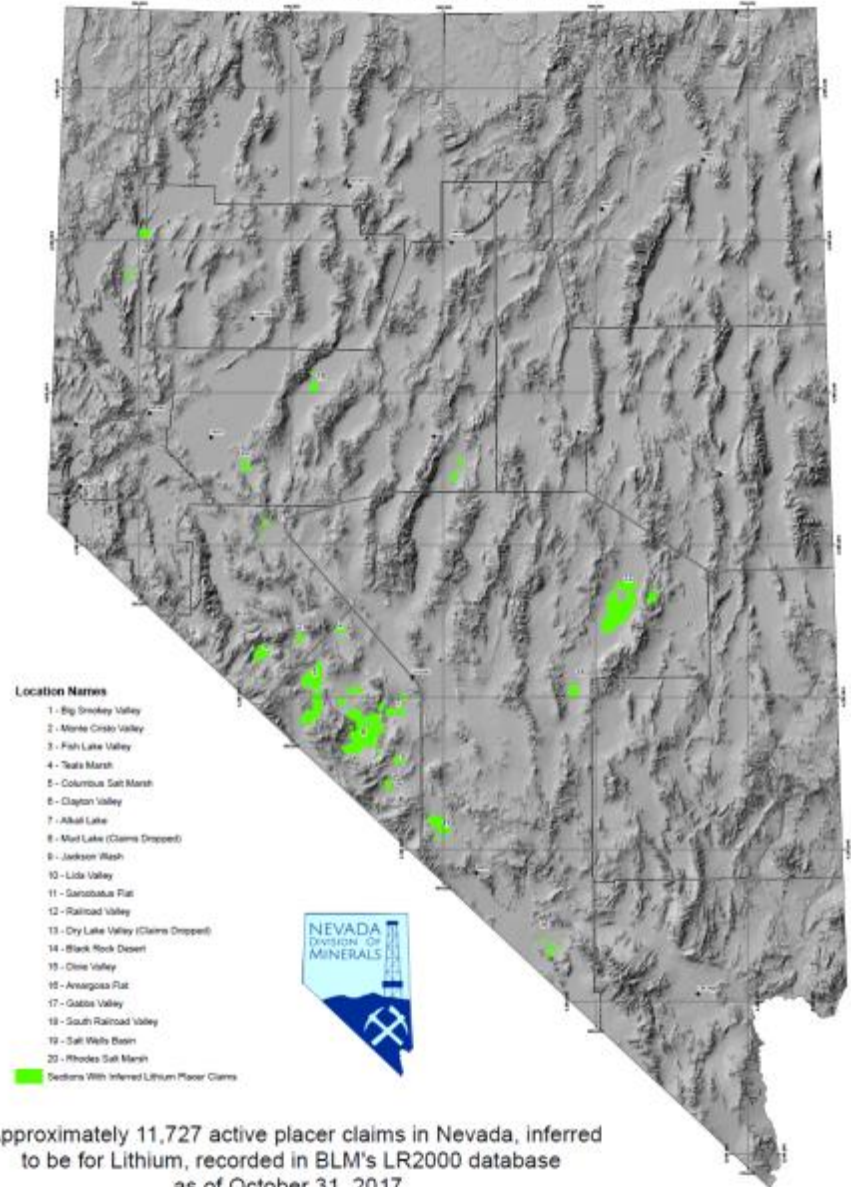
Source: S&P Global Market Intelligence

DISSOLVED MINERAL RESOURCE EXPLORATION PROGRAM UPDATE NWRA 2/27/18

- Statute from 2017 session
- NRS/NAC 534B
- Addresses sampling of brines in exploration boreholes and wells
- Replaces NDWR MM well waivers
- NDEP, NDWR and NDOM jointly developed regs.
- Regulations must be approved by Commission on Mineral Resources
- Statute became effective 1/1/2018

Inferred Active Lithium Placer Claims in Nevada

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



Approximately 11,727 active placer claims in Nevada, inferred to be for Lithium, recorded in BLM's LR2000 database as of October 31, 2017.

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

Lithium in the 1872 Mining Law



- Is a locatable mineral on Federal land under the general Mining law
- Placer claims are used to locate potential lithium brine deposits
- Lode claims are used to locate potential lithium clay deposits



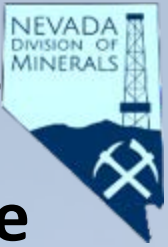
What is in the statute ?

- Defines a “dissolve mineral exploration borehole”, and allows for sampling of water in exploration boreholes .
- Defines “dissolved mineral resource exploration well”, and enables an application process by NDOM
- DMRE approved well permits have 2 year limits, renewable for another 2 years
- Defines a “dissolved mineral resource exploration project” as a notice or plan-level approved project on Federal lands (claims), or a defined project area on non-federal lands.
- Requires a Nevada licensed water well driller to drill DMRE boreholes and wells.



What is in the Statute?

- **NDOM Administrator or State Engineer may call a public hearing if they deem necessary to gather facts.**
- **Allows for up to 5 acre-feet of water to be pumped for testing per project (not annually). > 5 acre-feet requires a water right from NDWR.**
- **Must comply with NRS 445A for discharges during pump tests**
- **Does not change the appropriation procedures in NRS/NAC 533, 534**
- **Allows for application fee for wells and fines for violations**



What is in the Draft Regulations ?

- **Boreholes: notice of intent form required , no fee**
- **DMRE wells: permitting process, application fee**
- **Well design approval required: casing, seals, etc.**
- **Consultation with NDOM triggered when proposing boreholes or wells within “areas with limitations”**
- **Setbacks from existing oil, geothermal or water wells.**
- **No limit on number or boreholes or wells, but total pumping for sampling is limited to < 5 AF**
- **Plugging logs required for boreholes and wells**
- **Reclamation bonding of Federal land through BLM**

Nevada Division of Minerals Open Data Site

Nevada Division of Minerals

Open Data Site

Mission: To encourage and assist in the responsible exploration for, and the production of, minerals, oil, gas, and geothermal energy which are economically beneficial to the state. This is the Nevada Division of Minerals' public platform for exploring and downloading our open data.

Disclaimer

The Nevada Division of Minerals (NDOM) hereby assumes no responsibility for errors or omissions, its warranty is made by NDOM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, no part of the act of distribution by contractors, partners, or licensees, nor liability for individual or aggregate data use with other data. In no event shall NDOM be liable for any damages of any kind, including, but not limited to, any loss of profits arising out of the use or reliance on this data.

Pages


Visit one of our pages to view interactive maps and download data, view our site or any of the photos below and click on links for the options.

- Interactive Map of Nevada
- Active Mining Camps in Nevada
- Nevada Public Lands Issues
- Nevada Open Data Website

Dissolved Mineral Resource Exploration

To access the Oil, Gas, and Geothermal Resources and Groundwater Basins with High Temperature Gradients Map

[Click here](#)




Upcoming Events/Meetings/Public Hearings:

Meetings, events, and public hearings are your opportunity to stay informed and to be heard. We also have an open house after the minerals production and exploration communities.

Upcoming:

- Sediment Society of Nevada Monthly Meetings
- Nevada Petroleum and Geothermal Society Monthly Meetings



The Commission on Mineral Resources Quarterly Meeting

Contact Information (Questions/Comments/Suggestions)

Impatterson@minerals.nv.gov

Copyright 2017 Nevada Division of Minerals

About

- Open Data
- Documentation
- State Open Data Community

NDOM Open Data Site

- Public interface data repository available for download or interactive viewing
- A practical response to high volumes of data requests and limited staff

First DMRE Well Permit Approved Jan. 10th



STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 | Fax (775) 684-7052
<http://minerals.nv.gov>

Date Received <u>1-10-2018</u>
County <u>Esmeralda</u>
NDOM Permit Number <u>W0001</u>
FOR DIVISION USE ONLY

DISSOLVED MINERAL RESOURCE EXPLORATION WELL PERMIT APPLICATION

Applicant/Operator Name Sierra Lithium LLC
Street Address 4755 Caughlin Parkway
City Reno State/Prov. Nevada
Country USA Zip Code 89519

hereby makes application for a dissolved mineral resource exploration well permit.

(if applicant is a corporation, show state and date of incorporation; if a partnership, list names of partners.)

Sierra Lithium LLC is a domestic Limited Liability Company incorporated in the State of Nevada on October 31, 2016.

This application is for a: New Exploration Well Borehole to Well Conversion
 Permit extension (NDOM Permit # _____) (indicate below any changes to original permit)

Applicant is: Land Owner Lease/Claim Holder

Land Status:

Federal (BLM, USFS, etc...)

Mining Claim: NMC# 1138145

Project Name: Columbus Salt Marsh Valley Exploration Project (CB-1) NVN# 95705

Non Federal

APN#: _____ Land Owner: _____

Bond Type: _____ Issued by: _____

Amount: _____ Number: _____

Groundwater Basin Name and Number Columbus Salt Marsh Valley - 118 Area With Limitations? Y N

(Well proposed to be drilled within areas with limitations may require Blowout Prevention Equipment, per NAC 534B)

Location of Well:

County: Esmeralda

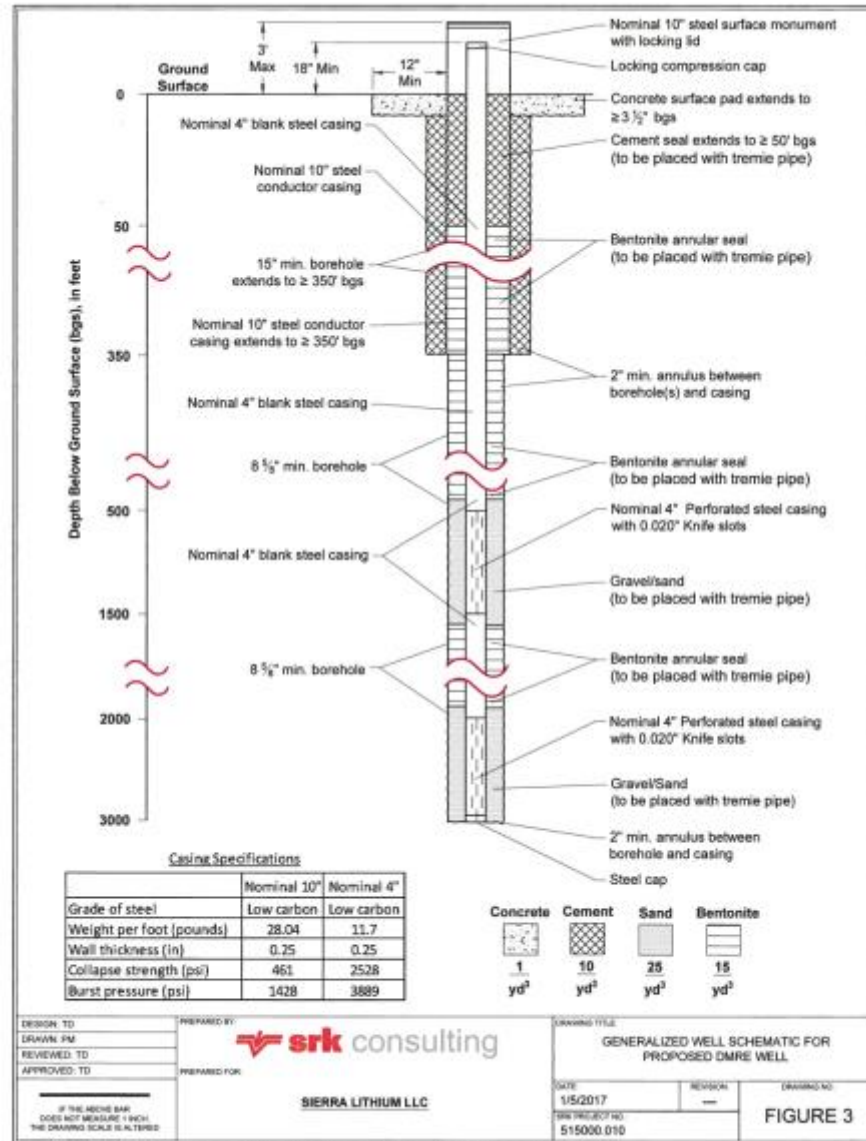
SW 1/4 of the SE 1/4 of 22 Sec., Township 02 N S, Range 36 E

UTM East: 415759.58 or Longitude: _____

UTM North: 4207298.86 or Latitude: _____

NAD83 WGS84 M.D.B. & M.

Sierra Lithium LLC CB-1 Exploration Well Schematic



First DMRE Borehole NOI Feb. 1



STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 | Fax (775) 684-7052
<http://minerals.nv.gov>

Date Received:
2-1-18
Approved By:
[Signature]
Date Approved:
2-2-18
NDOM NOI#: 10001

NOTICE OF INTENT TO DRILL DISSOLVED MINERAL RESOURCE EXPLORATION BOREHOLE

Note: one form per borehole, to be submitted at least five (5) days prior to drilling

Today's Date: 2/01/2018 Intended Start Date: 2/05/2018

Operator Name: Mathers Lithium Corp.
Operator Address: 1470-701 West Georgia Street, Vancouver, British Columbia V7Y 1C6, Canada
Email Address: blbconsult@gmail.com

Groundwater Basin Name and Number: Clayton Valley, NV - 143 Area of Limitations?
 Yes No

Federal Lands - BLM NVN Number N-95118 3809(NVB0200)
or

Non-Federal Lands
Land owner's name: _____
APN Number: _____
Address: _____

Drilling Method: Mud Rotary Rev Circ Air Core
 Sonic Other _____

Diameter (inches): 6 Anticipated Final Depth (feet): 1000 feet

Location: NE of the 1/4 SE 1/4, Sec 32 T2 N S R 40 E

County: Esmeralda

Global Positioning System (GPS) coordinates and datum for borehole:

Universal Transverse Mercator (UTM) or Geographic Coordinate System (decimal degrees)
UTM East: -450815 or Longitude: _____
UTM North: -4175005 or Latitude: _____
 NAD 83 WGS 84

Drilling Company Name: Harris Exploration Drilling
On-site Driller's Name: Pat Harris
On-site Driller's License Number: NV 2554

RECEIVED

FEB 01 2018

Submit completed form to: (email) ndom@minerals.nv.gov or (fax) 775-684-7052 **DIVISION OF MINERALS**

--- No Fee Required ---

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





Programs

[Abandoned Mine Lands \(AML\)](#)

[Bond Pool \(Reclamation\)](#)

Dissolved Mineral Resource Exploration (DMRE)

- Approved Notices
- Filed Permit Applications
- Approved Permits
- Filed Drilling Reports
- Filed Plugging Reports
- Summary Flow Reports

[Education and Outreach](#)

[Geothermal](#)

[Mining](#)

[Oil & Gas](#)

▶ DISSOLVED MINERAL RESOURCE EXPLORATION (DMRE)

Assembly Bill 52 of the 2017 session was signed into law in June, 2017. The purpose of this legislation is to define a permitting path for dissolved mineral exploration, including lithium brines, and to develop regulations to ensure exploration drilling for dissolved minerals is protective of groundwater, as well as oil and geothermal resources. The legislation authorizes regulation by the Division beginning on January 1, 2018. The Division of Minerals is now accepting applications for Dissolved Mineral Resource Exploration (DMRE) wells and notices of intent for DMRE exploration boreholes. All forms for the program are located below, can be picked up at the Division office, or mailed to the public upon request.

The Division of Water Resources (NDWR), Division of Environmental Protection (NDEP) and Division of Minerals (NDOM) are jointly developing regulations for dissolved mineral resource exploration boreholes and wells. A public workshop was held on December 21, 2017 to accept comments on the draft regulations and edits are being made to the regulation draft. These regulations have not yet been considered for adoption by the Commission on Mineral Resources. The date of the adoption hearing before the Commission will be posted on the Division of Minerals web site and the State of Nevada Public Notice site at: <https://notice.nv.gov/>.

- Assembly Bill 52
- DRAFT NAC 534B Regulations-11-29-17
- Oil, Gas, and Geothermal Resources and Groundwater Basins with High Temperature Gradients - DRAFT Areas with Limitations Map

Dissolved Mineral Resource Exploration Regulation Adoption Hearing

- Not yet scheduled

Areas with Limitations Interactive Map

This map is to be utilized in order to determine if a proposed dissolved mineral resource exploration well is located within a boundary designated by the Division as an "area with limitations" pursuant to NAC 534B.

- Areas with Limitations Interactive Map Viewer

Dissolved Mineral Resource Exploration Forms

- Notice of Intent to Drill DMRE Borehole
- DMRE Well Permit Application
- DMRE Well Driller's Report
- DMRE Borehole or Well Driller's Plugging Report
- DMRE BOPE Test Form
- Quarterly Flow Report for DMRE Well
- DMRE Well Surety Bond

Dissolved Mineral Resource Exploration Contact

Lowell Price
Fluid Minerals Program Manager
lprice@minerals.nv.gov

Statute & Regulations

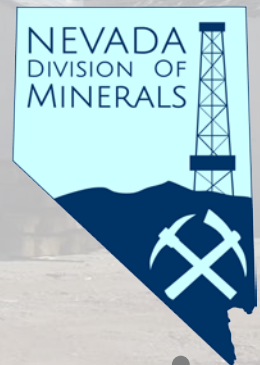
NRS (A.B. 52 - not yet codified)

NAC (under development, expected Jan 2018)



ABANDONED MINE LANDS PUBLIC SAFETY PROGRAM

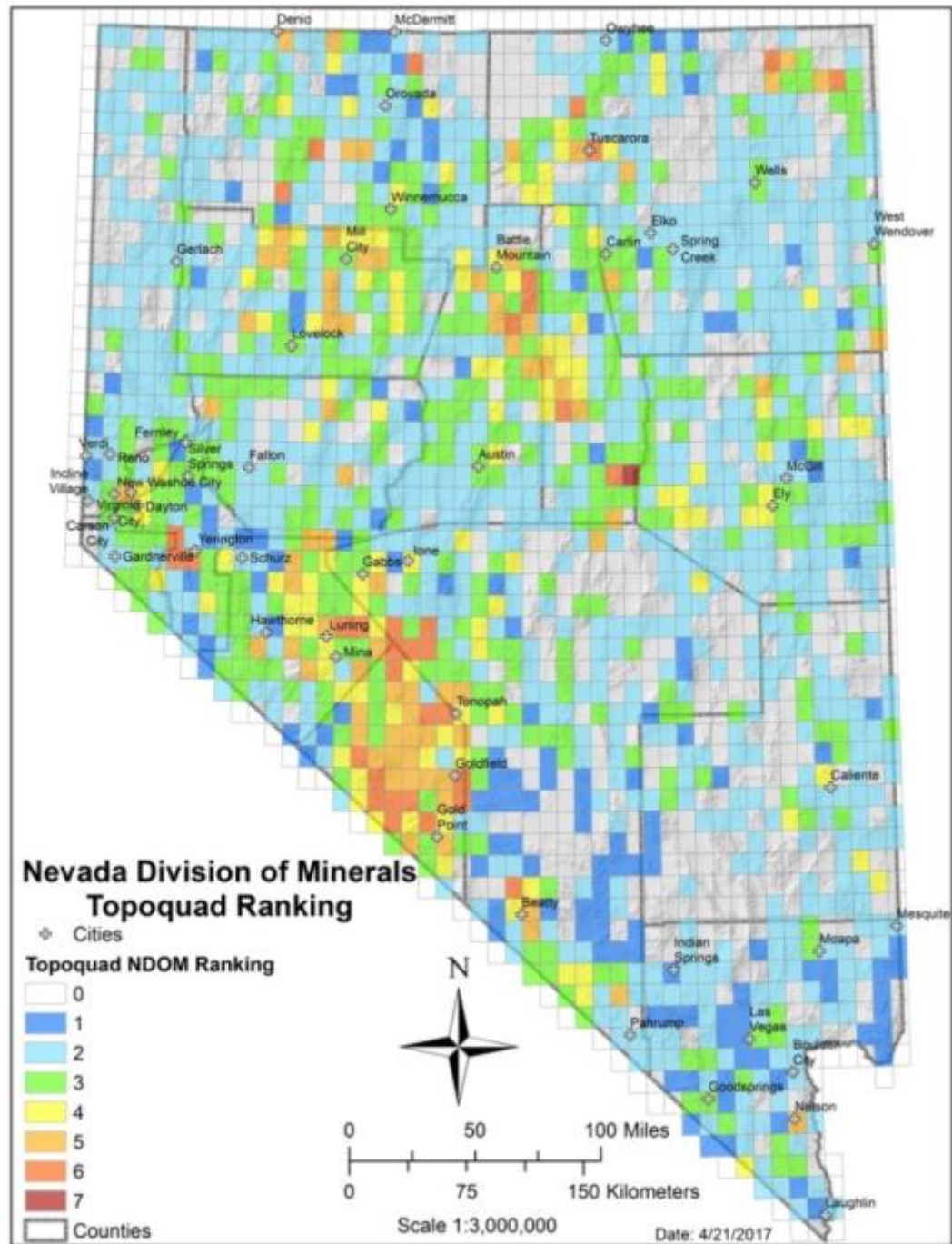
- Created the Abandoned Mine Lands Program in 1987
- Regulated by NRS 513 and NAC 513
- Funded by claim fees
- Four program activities mandated:
 - Statewide Inventory of Sites
 - Securing of Hazardous Mines
 - Public Awareness Campaign
 - Annually Notify County Commissions





NDOM AML PROGRAM

**EACH YEAR HAZARD
AREAS ARE
PRIORITIZED FOR FIELD
WORK BASED ON A
RATING SYSTEM
FOR DEGREE OF
DANGER AND
ACCESSIBILITY**



Over 20,000 Hazards Inventoried

- Since program inception in 1987, 21,855 abandoned mine hazards logged and 17,050 have been secured.

20,000th Logging



17,000th Securing



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



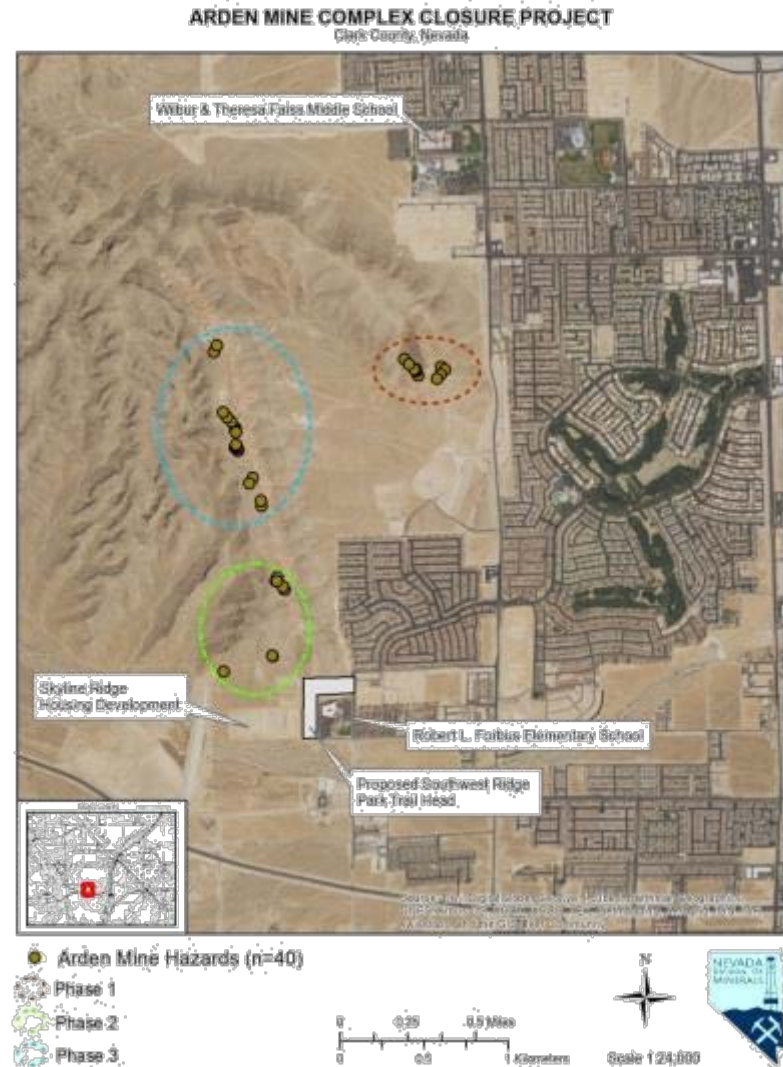
Monte Cristo

- 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

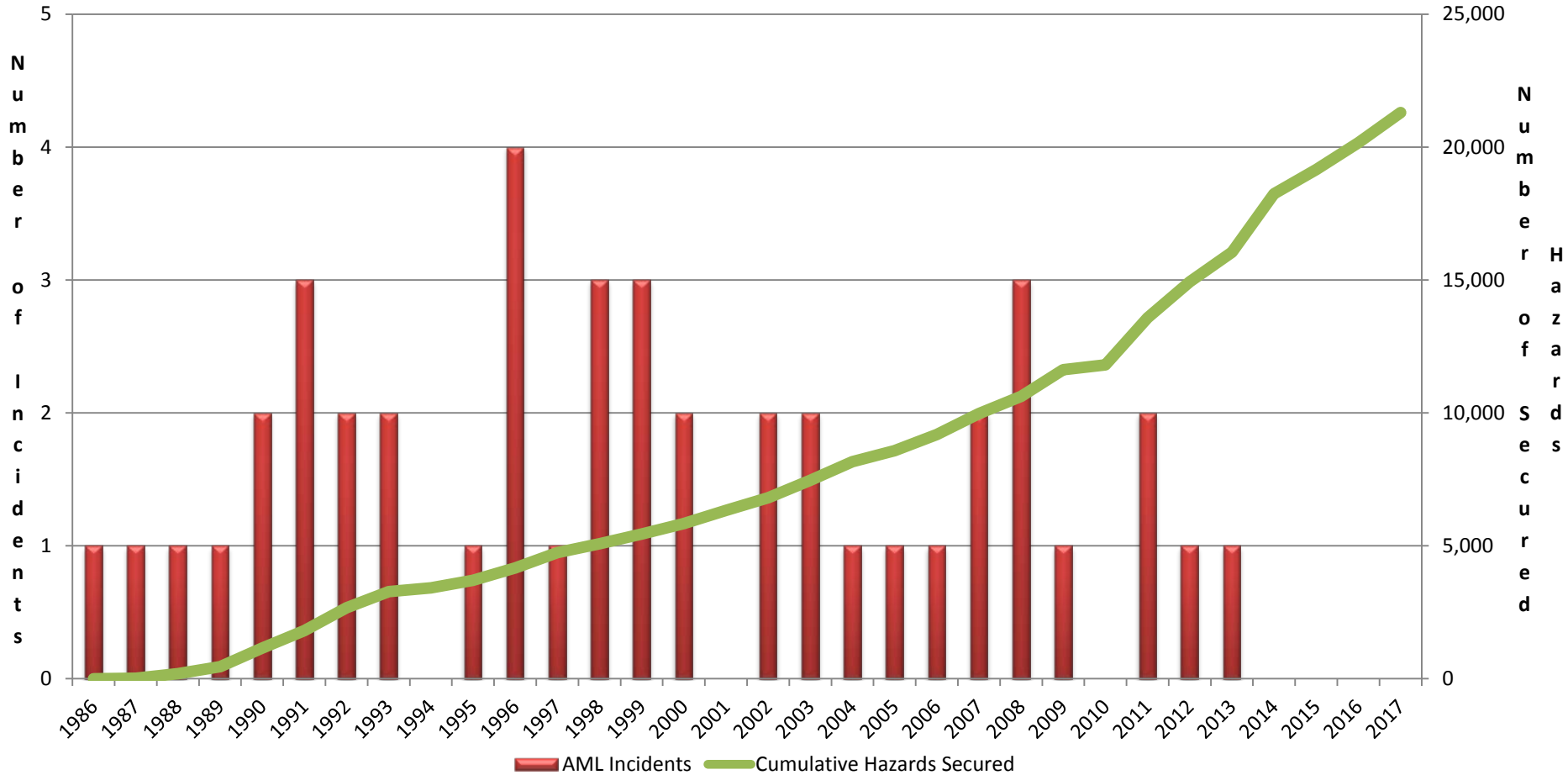


2018 Planned Closure Work

- Arden
 - Clark County
 - 40 Backfills
 - Partnered with Clark County Real Property
- Gold Butte National Monument
 - Clark County
 - 18 BCC's
 - 24 Backfill/PUFs
 - Partnered with Clark County Desert Conservation and the Gold Butte National Monument managers (BLM)
- Broken Hills
 - Mineral/Nye Counties
 - 18 BCC's
 - 22 Backfill/PUFs
 - Partnered with the BLM
- Goodsprings/Nelson/Searchlight
 - Clark County
 - 8-12 BCC's
 - Partnered with Clark County Desert Conservation and the BLM
- Sand Mountain
 - 58 total hazards
 - Partnered with the BLM



Reported AML Incidents vs. Cumulative Hazards Secured



POSITIVE RESULTS: SECURING AND PUBLIC EDUCATION EFFORTS HAVE RESULTED IN “NO REPORTABLE ACCIDENTS OR INJURIES” AT AML FEATURES FOR PAST 3 YEARS.

CONCERN: INCREASING VANDALISM OF FENCING AND GATES REQUIRES RE-VISITS FOR MAINTENANCE

MINERALS EDUCATION - 2017

- **345 PRESENTATIONS, DELIVERED TO 13,466 ATTENDEES**
 - 305 K-12 CLASSROOM PRESENTATIONS
 - 33 PRESENTATIONS ON NEVADA MINING & OIL/GAS/GEOTHERMAL PRODUCTION TO CIVIC GROUPS, CLUBS AND ORGANIZATIONS
 - 1 MEDIA PRESENTATION
 - 176 PRESENTATIONS IN NORTHERN NEVADA, 255 IN SOUTHERN NEVADA
- **TRANSFERRED A FIELD SPECIALIST POSITION TO LV OFFICE**
 - Established position to meet demand for K-12 classroom education



Kindergartener examining
a rock collection



MINERALS EDUCATION

• CALL US FOR A PRESENTATION FOR CLASSROOMS, CIVIC OR PROFESSIONAL GROUPS

- Classroom: minerals & rocks, geology, mining, abandoned mine safety
- K-12 career day events
- Civic group & trade associations: Nevada mineral production, geothermal/oil/gas production

1st Grade, Bead Mining

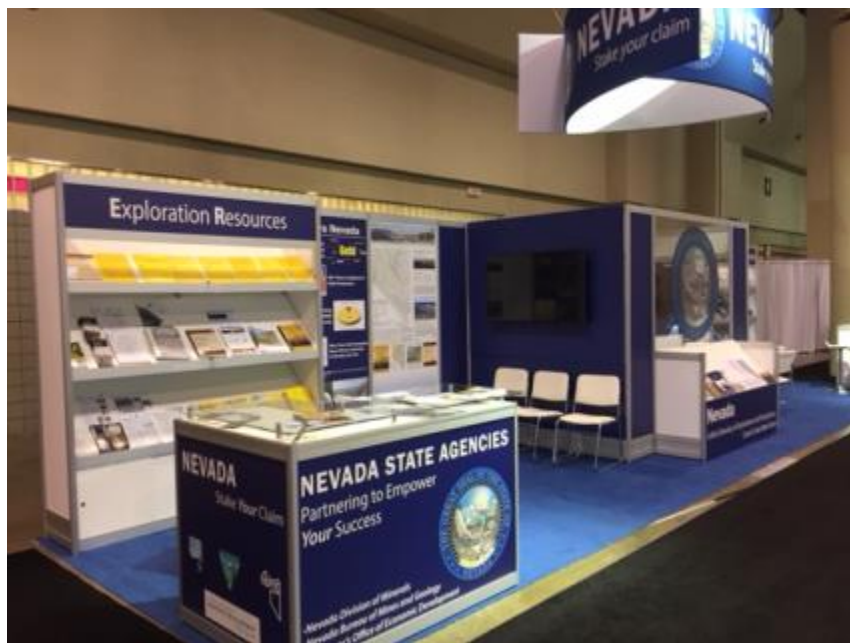




NEVADA PDAC REPRESENTATION

March 4-7, 2018

NV Frasier ranking up in 2017, to 3rd place.
Lots of visitors, group fielded many questions



A Collaborative effort between NDOM, NBMG, BLM, NMA, GSN and GOED



State of Nevada Commission on Mineral Resources Division of Minerals



NV.gov

[Agencies](#) [Jobs](#) [About Nevada](#)

Google Custom Search



ADA Americans with Disabilities Act

[HOME](#) [ABOUT US](#) [COMMISSION](#) [PROGRAMS](#) [NEWS](#) [FAQS](#) [CONTACT US](#)



CMR: Commission on Mineral Resources visits ACG Materials' Adams Claim Mine, Lyon County, December 2017.



Current Information

- [Dissolved Mineral Resources regulation update](#)
- [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](#)

Programs



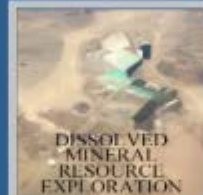
OIL AND GAS



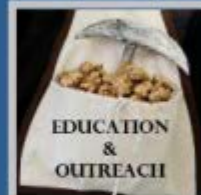
ABANDONED MINE LANDS



BOND POOL



DISSOLVED MINERAL RESOURCE EXPLORATION



EDUCATION & OUTREACH



GEO THERMAL