NBMG Nevada Mineral Industry 2016 Report

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Presentation at the:

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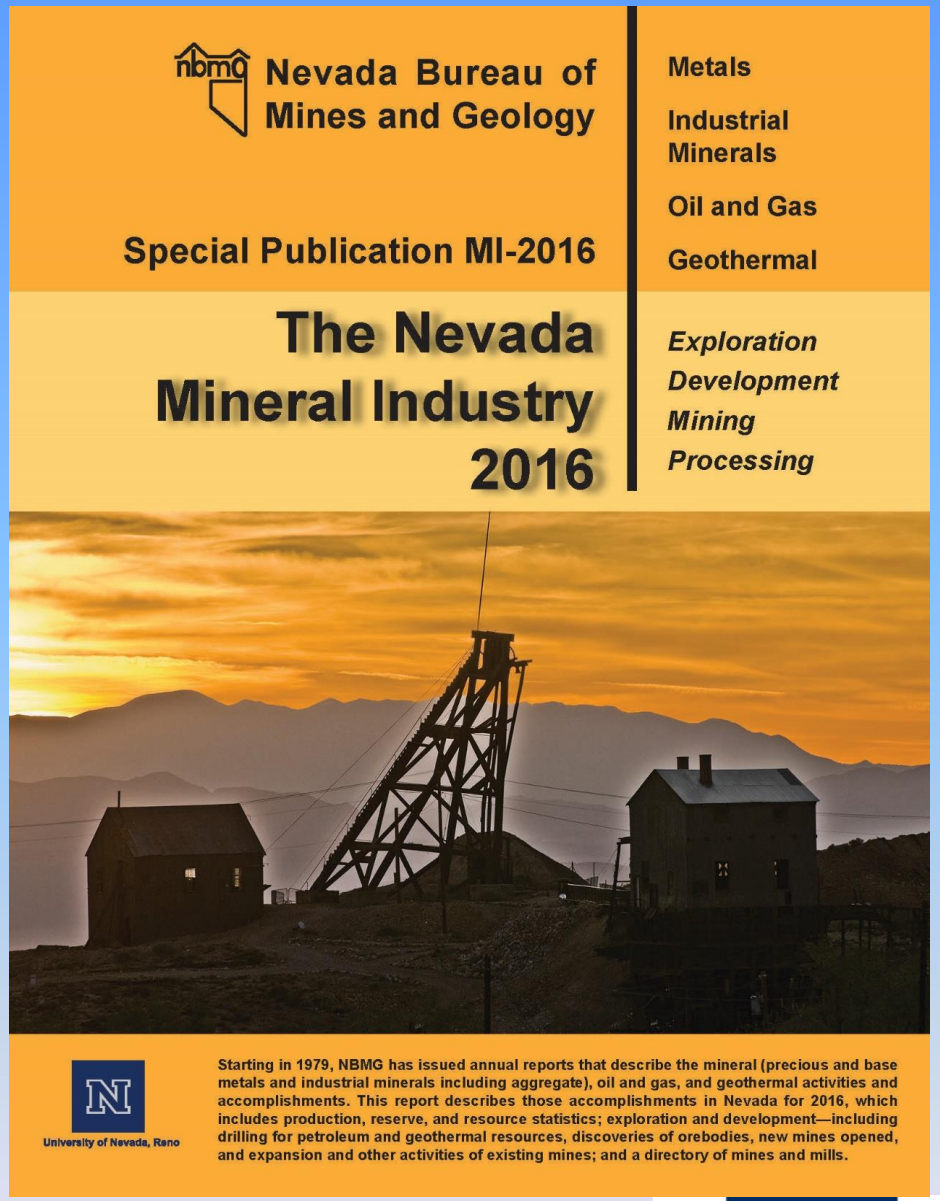
February 20th, 2018



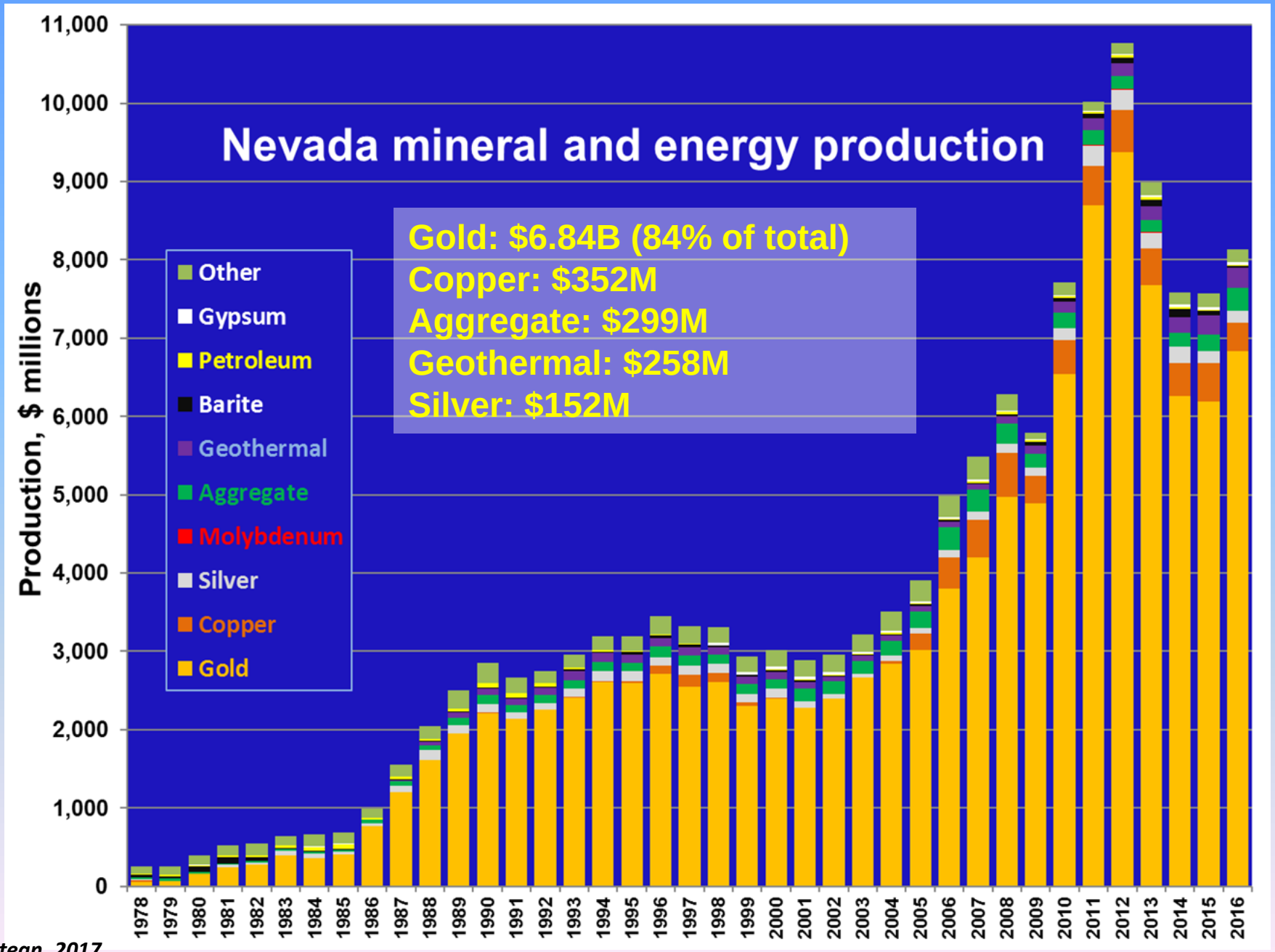
Nevada Bureau of Mines and Geology

University of Nevada, Reno

Finished Report on Time!

- Was completed on Nov 20, 2016
- Earliest release of MI Report since 2011
- Still, why is it 11.5 months after the end of 2016
- Takes a long time to research all the activities from the prior year
  - Results from 2016 trickle in all the to May 2017
  - Thorough approach in our reporting, more archival in approach rather than summarizing highlights
- Authors
  - Muntean: Overview chapter and coauthor on Metals chapters
  - David Davis: First author on Metals, Industrial Minerals, and Oil and Gas chapters
  - Bridgett Ayling: Geothermal chapter

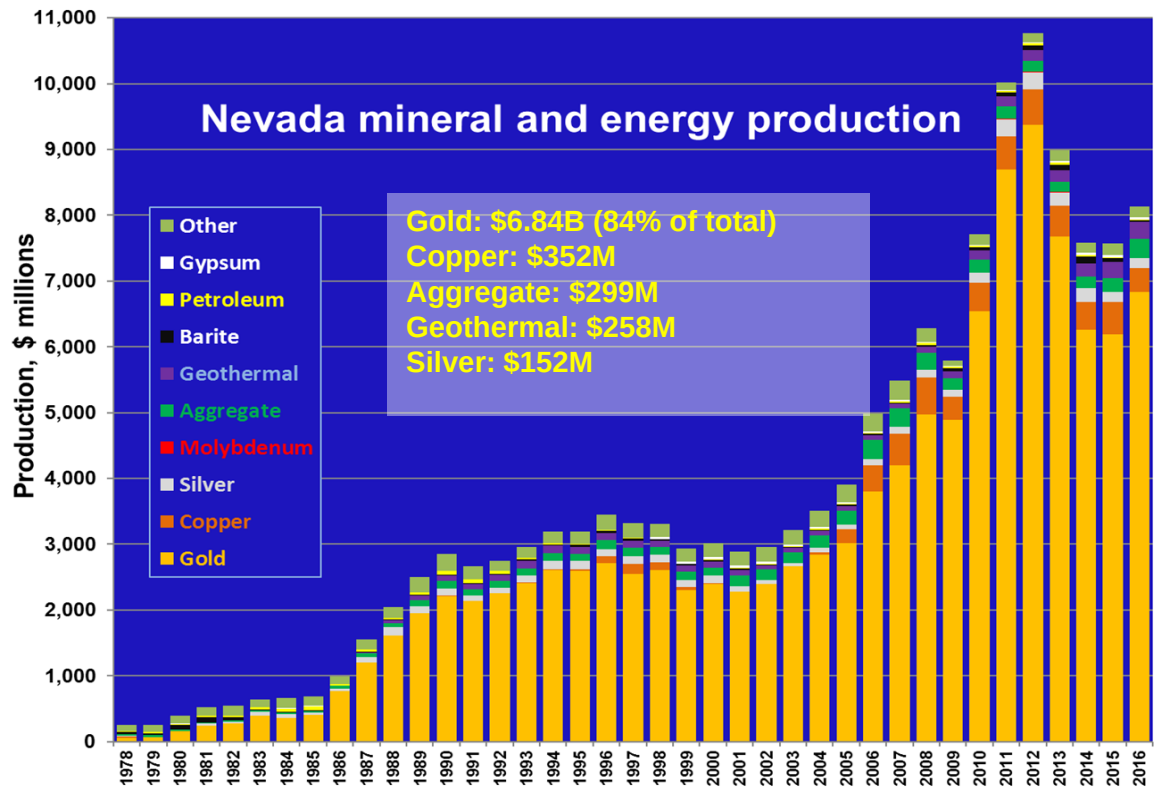
Value of Nevada's Mineral and Energy Production: $7.49B in 2016



Muntean, 2017

Value of Nevada's Mineral and Energy Production: $7.49B in 2016

- **Gold: Both production and value of production increased.**
- **Silver: Production dropped but value up due to price increase.**
- **Copper: Production and Value dropped significantly.**
- **Aggregate: Production down, but value way up.**
- **Geothermal: Up nearly 8% in both megawatt hours and value**
- **Petroleum: Production continued to decline, no exploration**
- **Barite: Tanked due to declining oil prices**



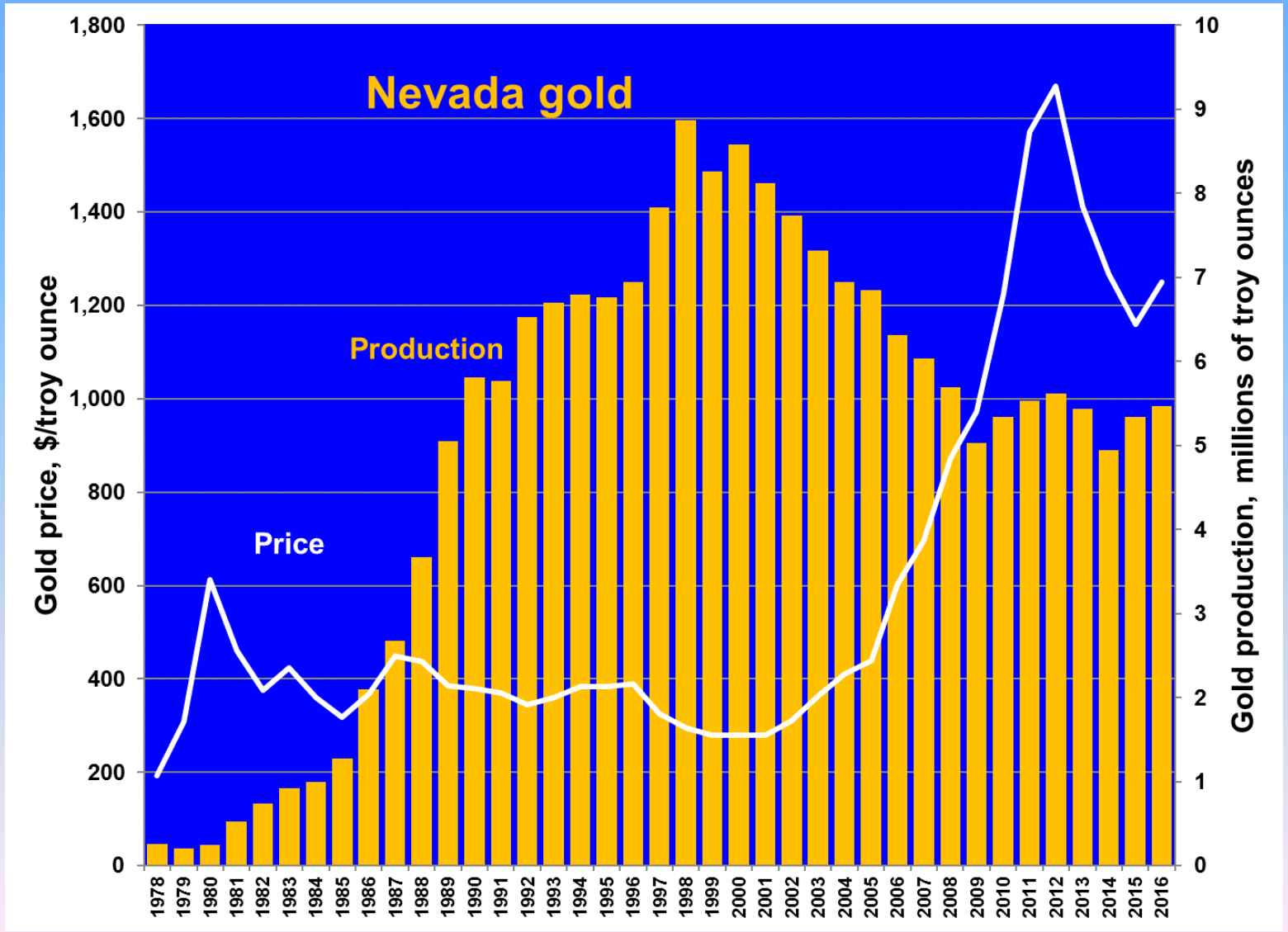
Muntean, 2017

Nevada Gold Production

1998 Peak: 8.87 Moz

2016: 5.47 Moz, 2.4% increase from 2015

2016: Copper and Silver Production dropped 10% and 6%, respectively



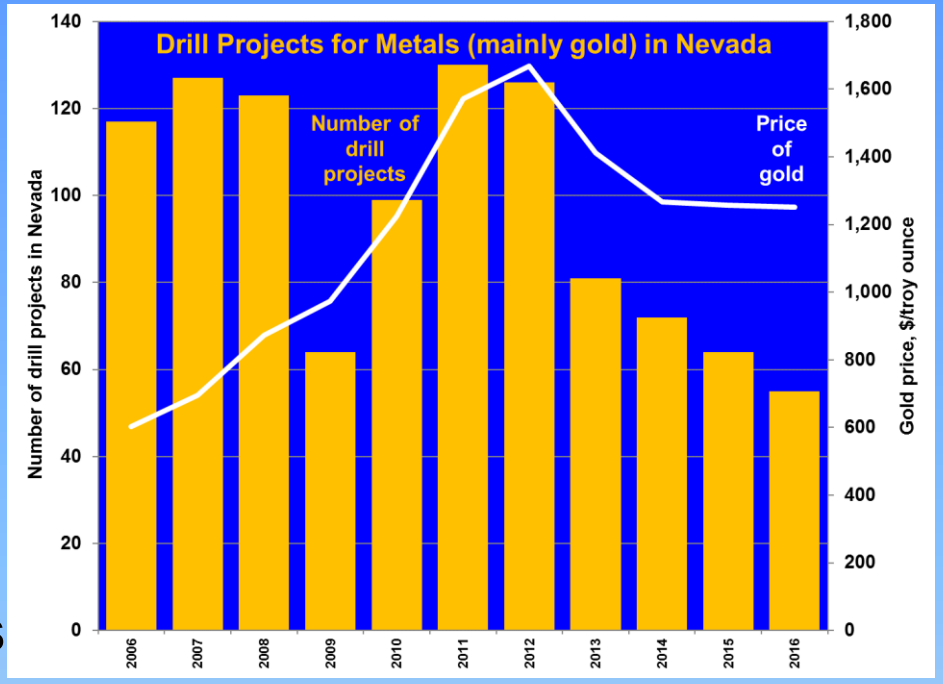
Muntean, 2017

Metals Exploration: Gold Projects

- **Barrick's Cortez Hills and Goldrush (underground)**
- **Kinross acquired Bald Mountain from Barrick and Barrick's 50% share of Round Mountain, spending $110M on capital expenditures and $13M on exploration**
- **Other notable projects:**
  - **Gold Standard Ventures: Railroad-Pinion project (Dark Star)**
  - **Columbus Gold: Eastside**
  - **Premier Gold Mines: Cove**

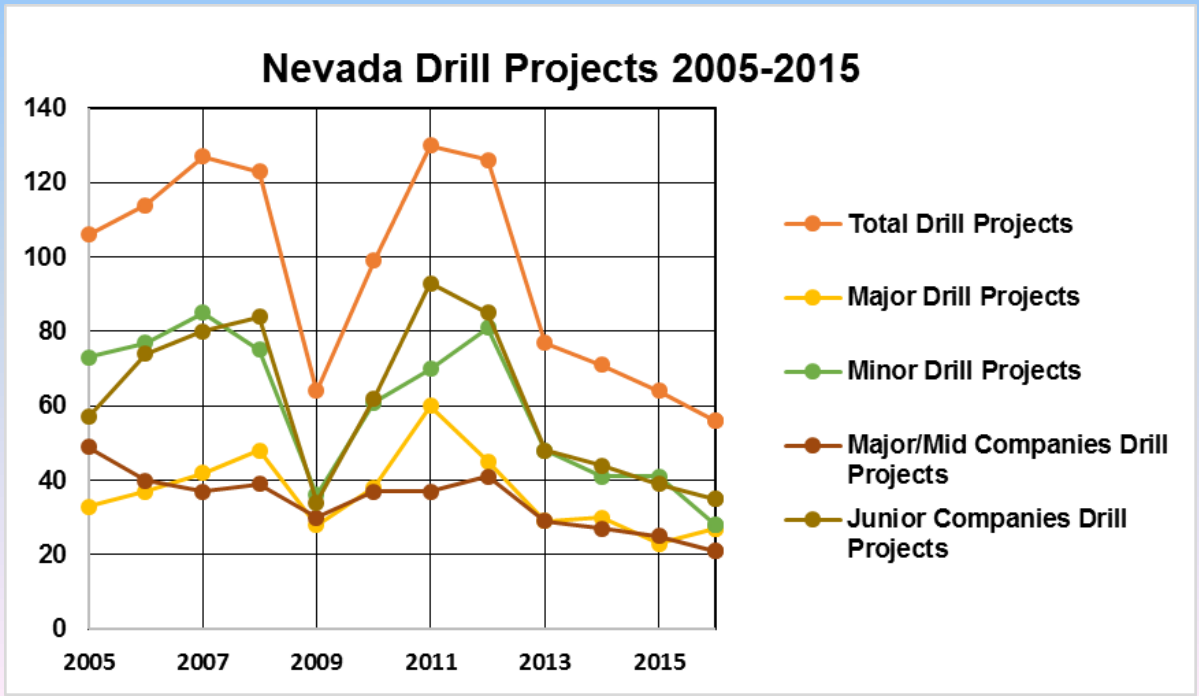
Drilling Projects Decreased again in 2016

- 55 projects drilled in 2017, lowest since we started recording in 2006
- 50 or the 55 known drill projects were drilled for gold



Notable Non-Gold Projects

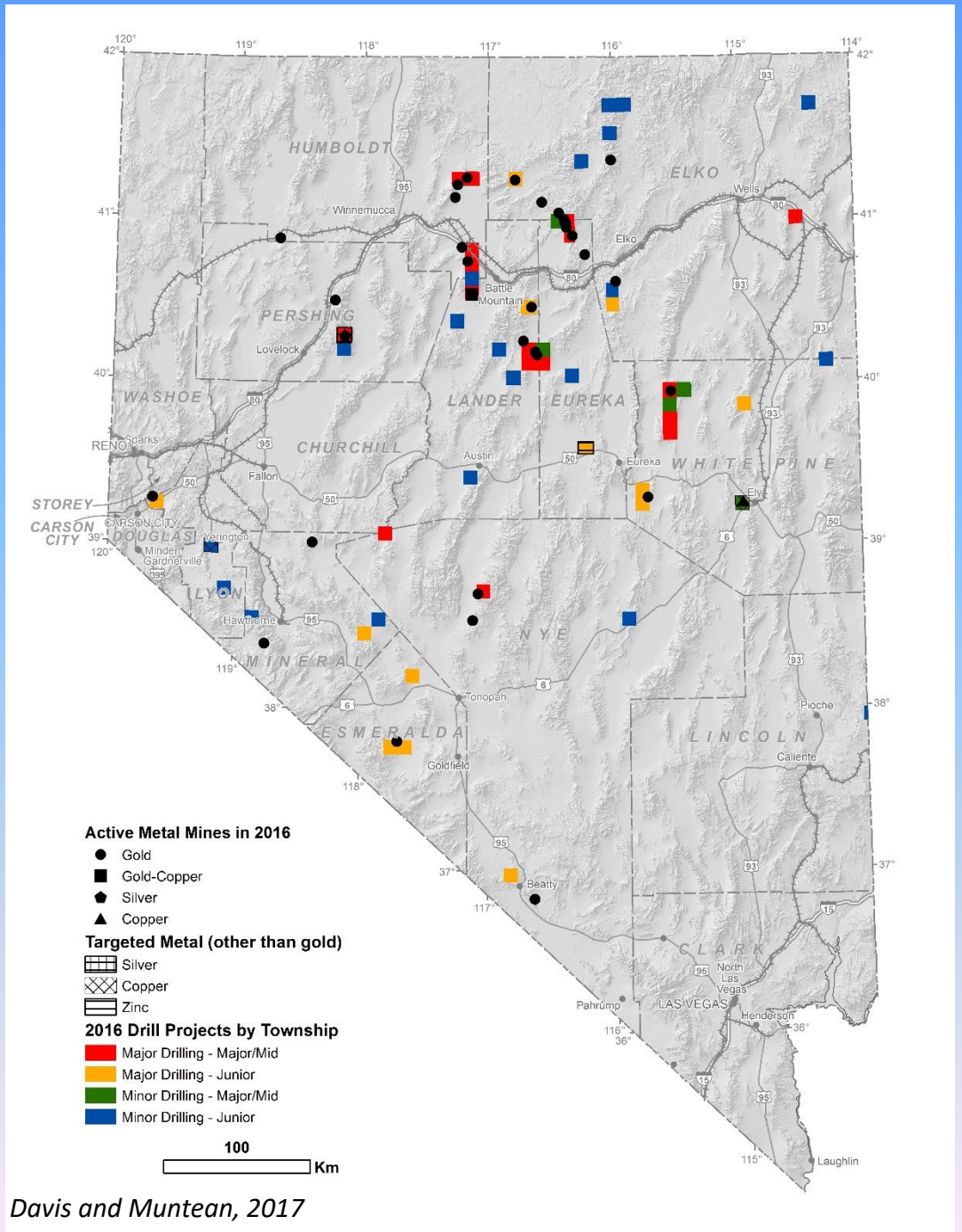
Copper: Yerington
Silver: East Rochester
Zinc: Lone Mountain



Muntean, 2017; Davis and Muntean, 2017

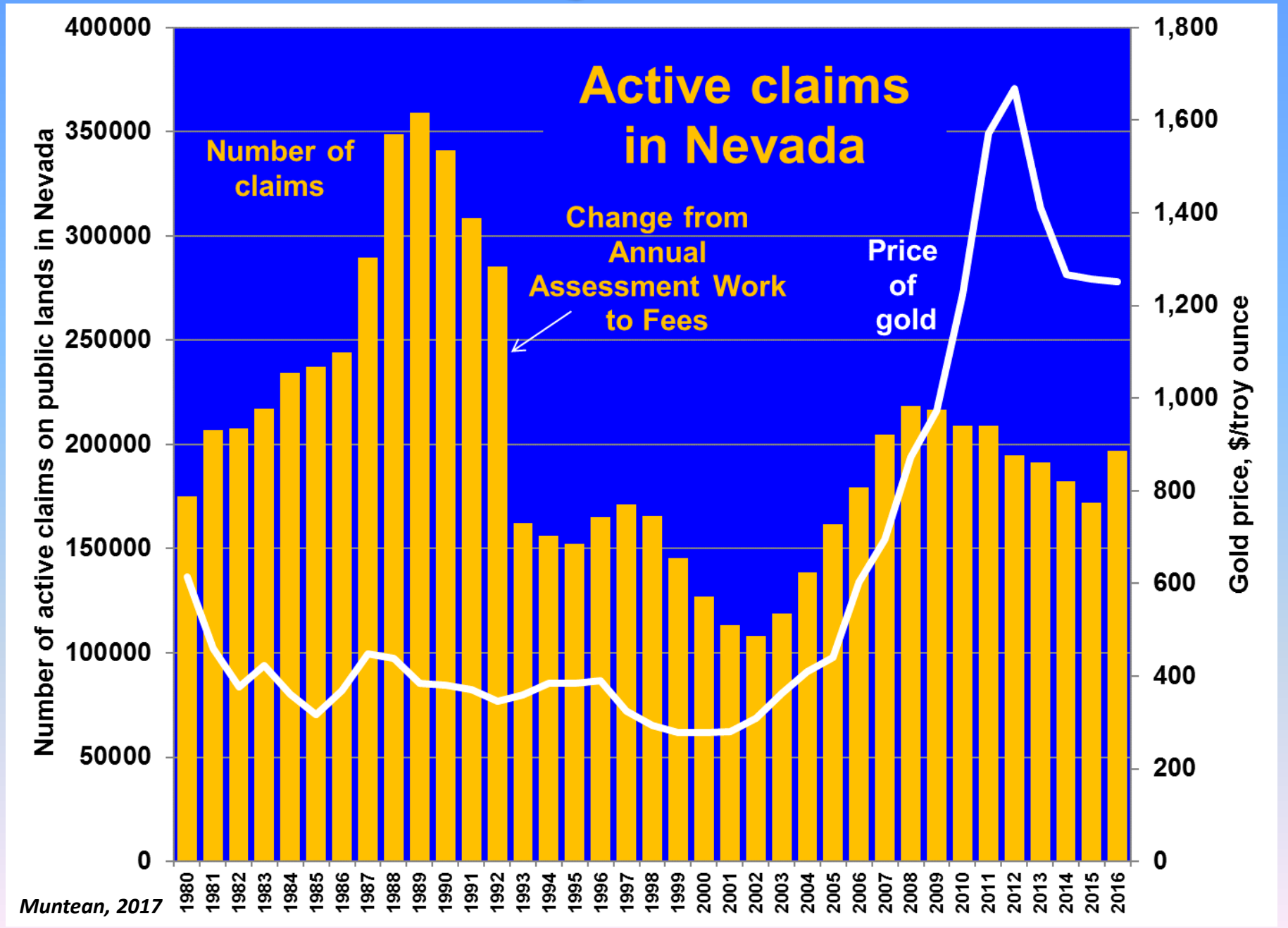
Locations of 2016 Drill Projects for Metals (mainly gold)

- **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.**
- **NBMG currently has a search for a Geoscience database manager (100% state supported)**



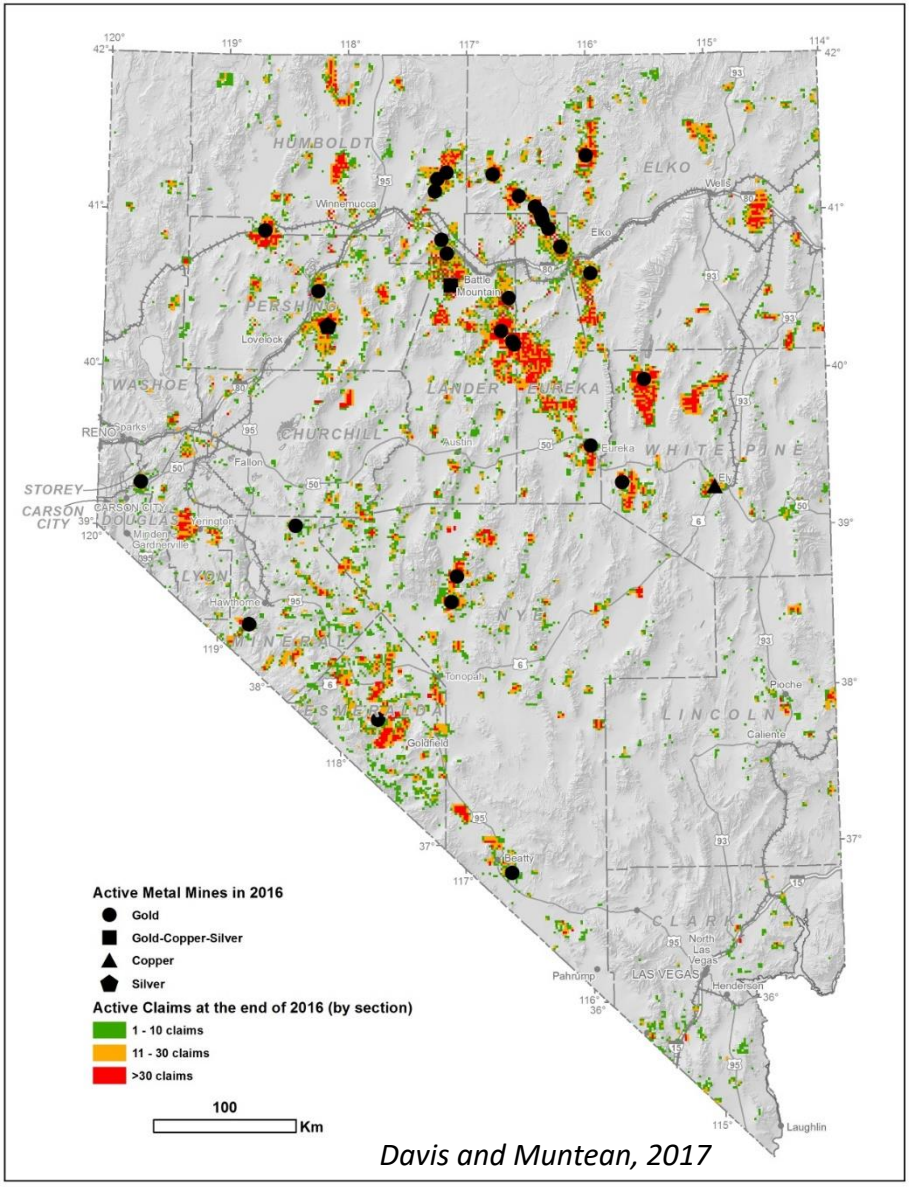
Davis and Muntean, 2017

Active Mining Claims in Nevada



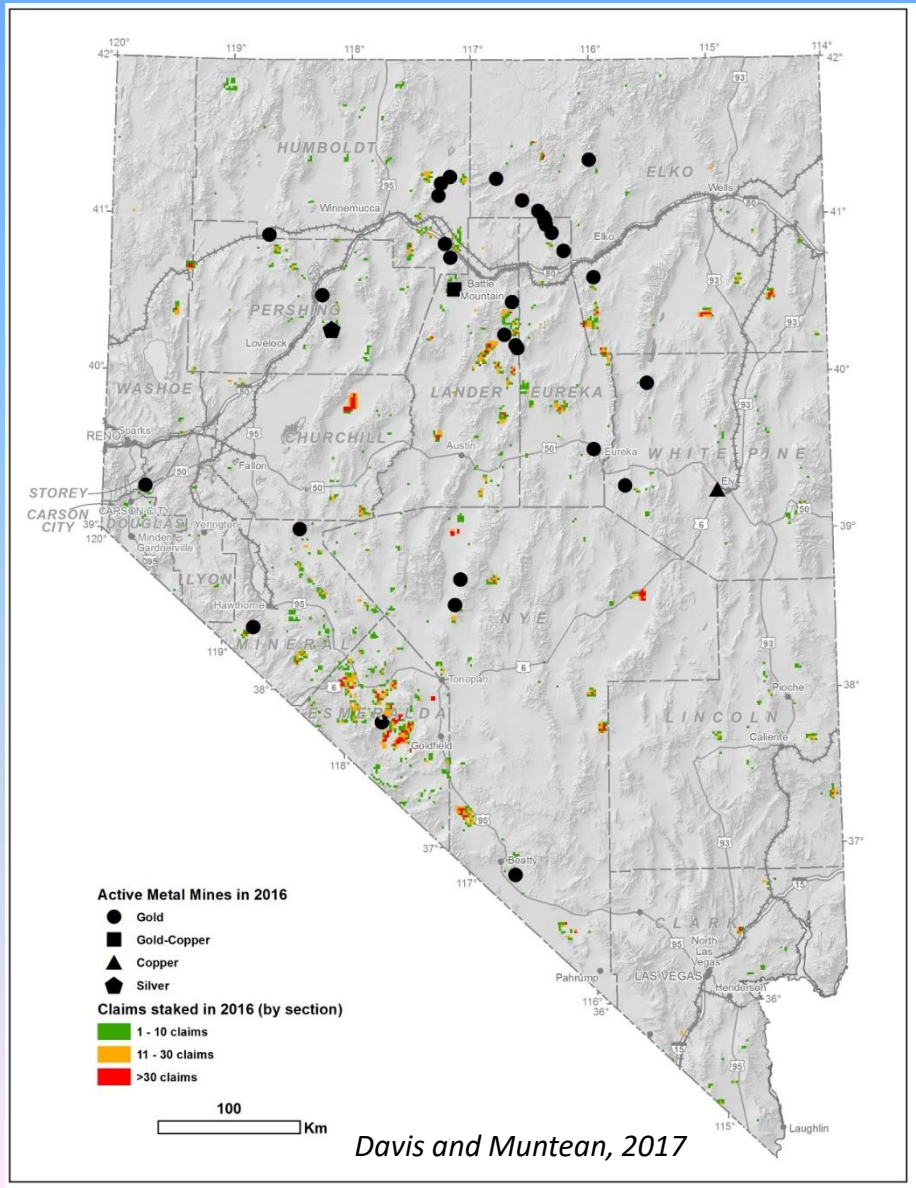
Muntean, 2017

197,043 Active Mining Claims in Nevada at end of 2016, 4.7% increase from 2015



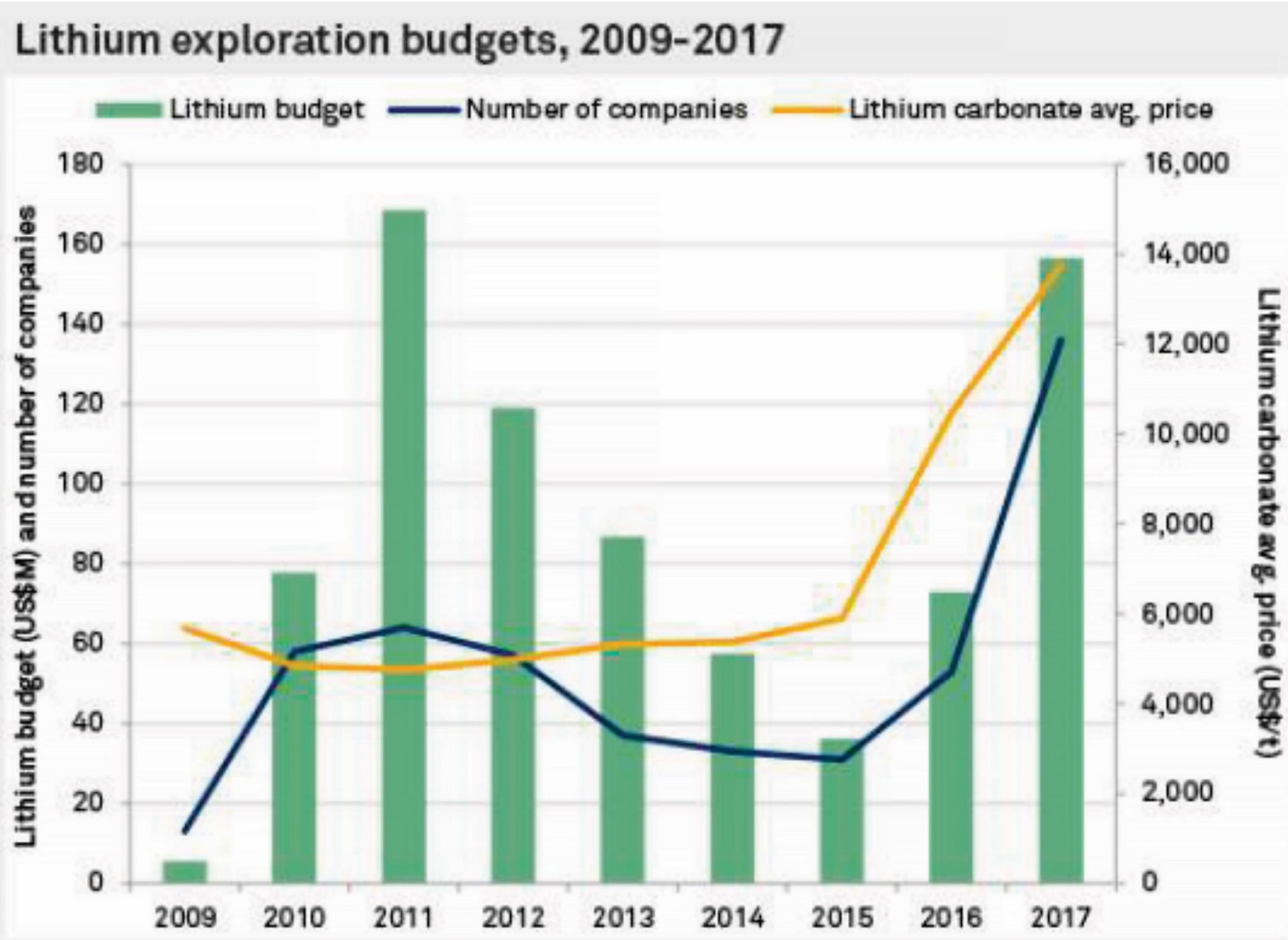
Davis and Muntean, 2017

19,040 Claims Located in Nevada in 2016: ~54% were for Lithium



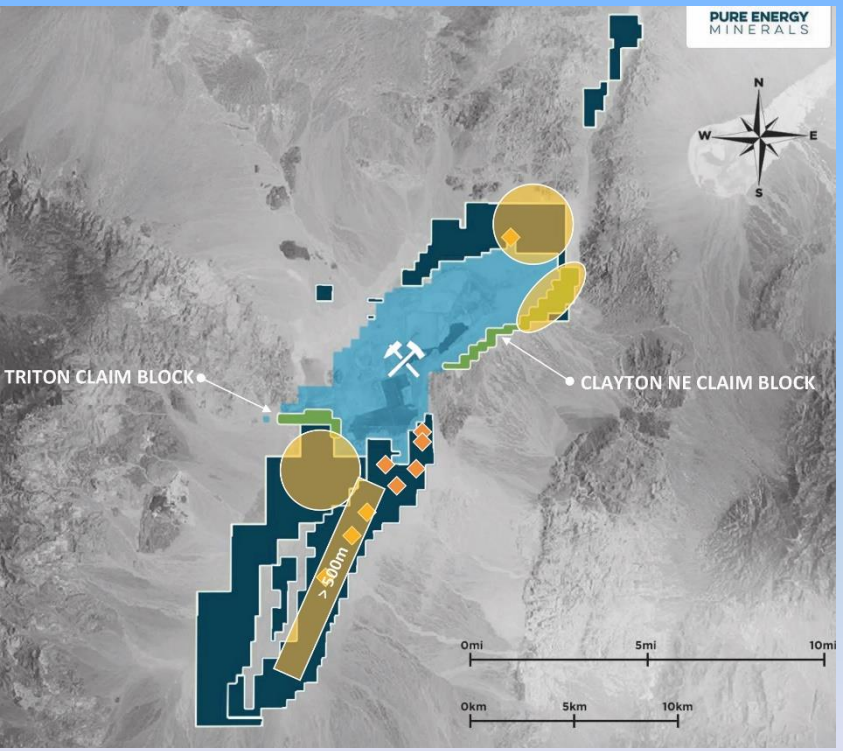
Davis and Muntean, 2017

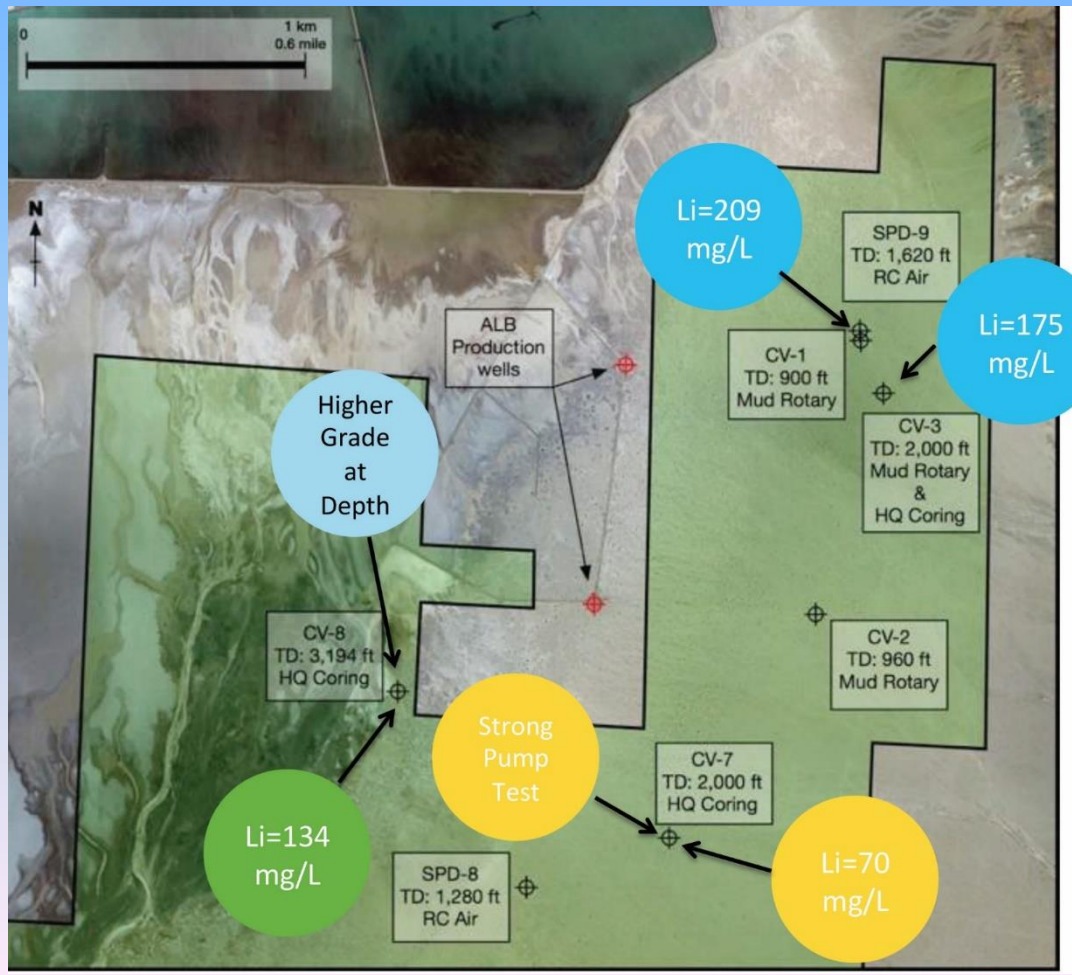
Not Just Gold: Worldwide Lithium Exploration Boom



Clayton Valley (Pure Energy Minerals)

- **Lithium in Brine Resource: 218,000 metric tonnes of Lithium Carbonate equivalent**
- **Average Lithium Grade: 123 mg/L**
- **Good chemistry: Mg/Li = 2.9, 1,536 mg/L avg Ca, SO_4^{2-}/Li of 18.2**
- **New recovery process: No evaporation ponds, real time recovery involving removing of cations, solvent extraction, electrolysis, and ion exchange**

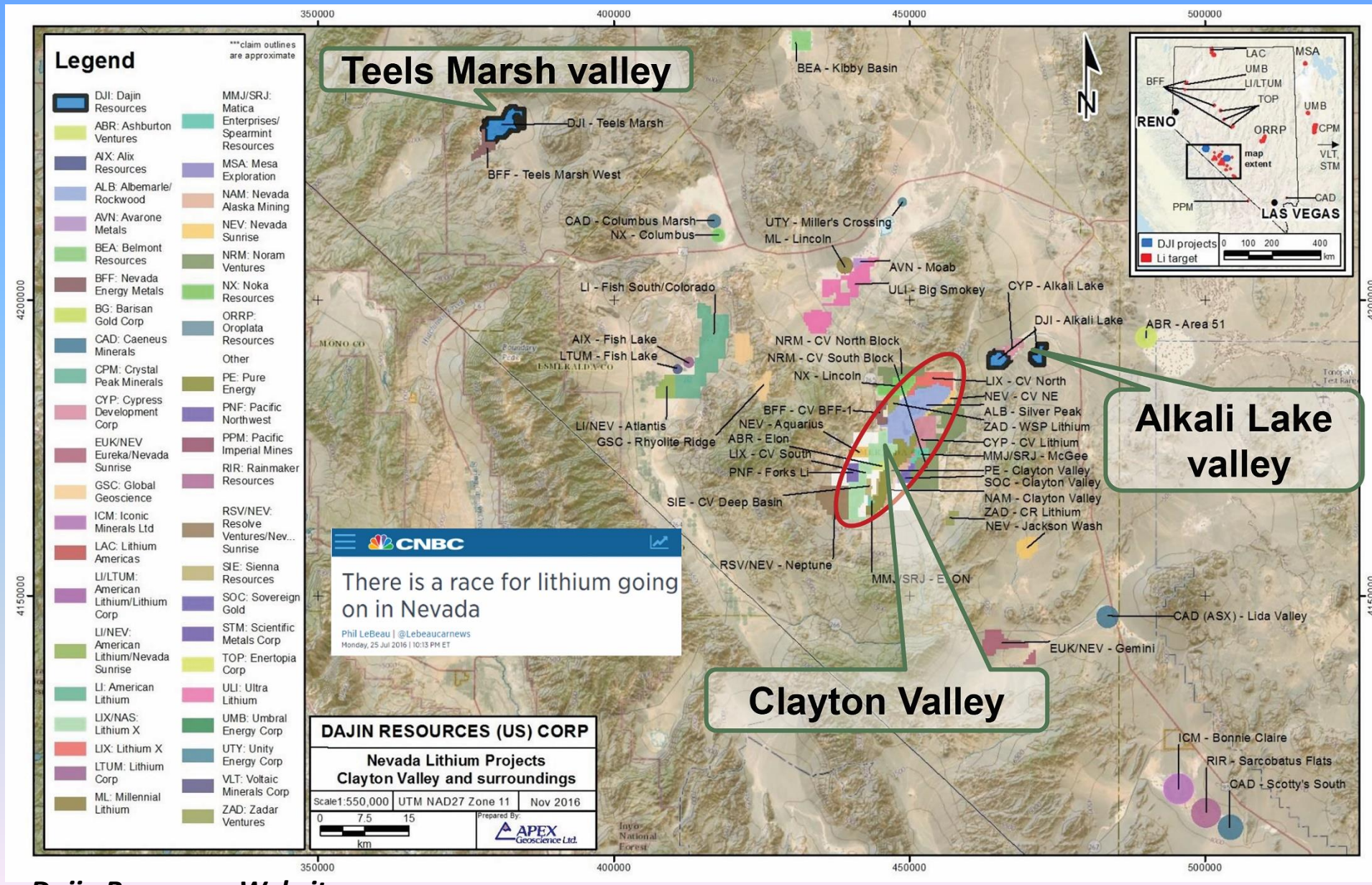




Pure Energy Minerals Website

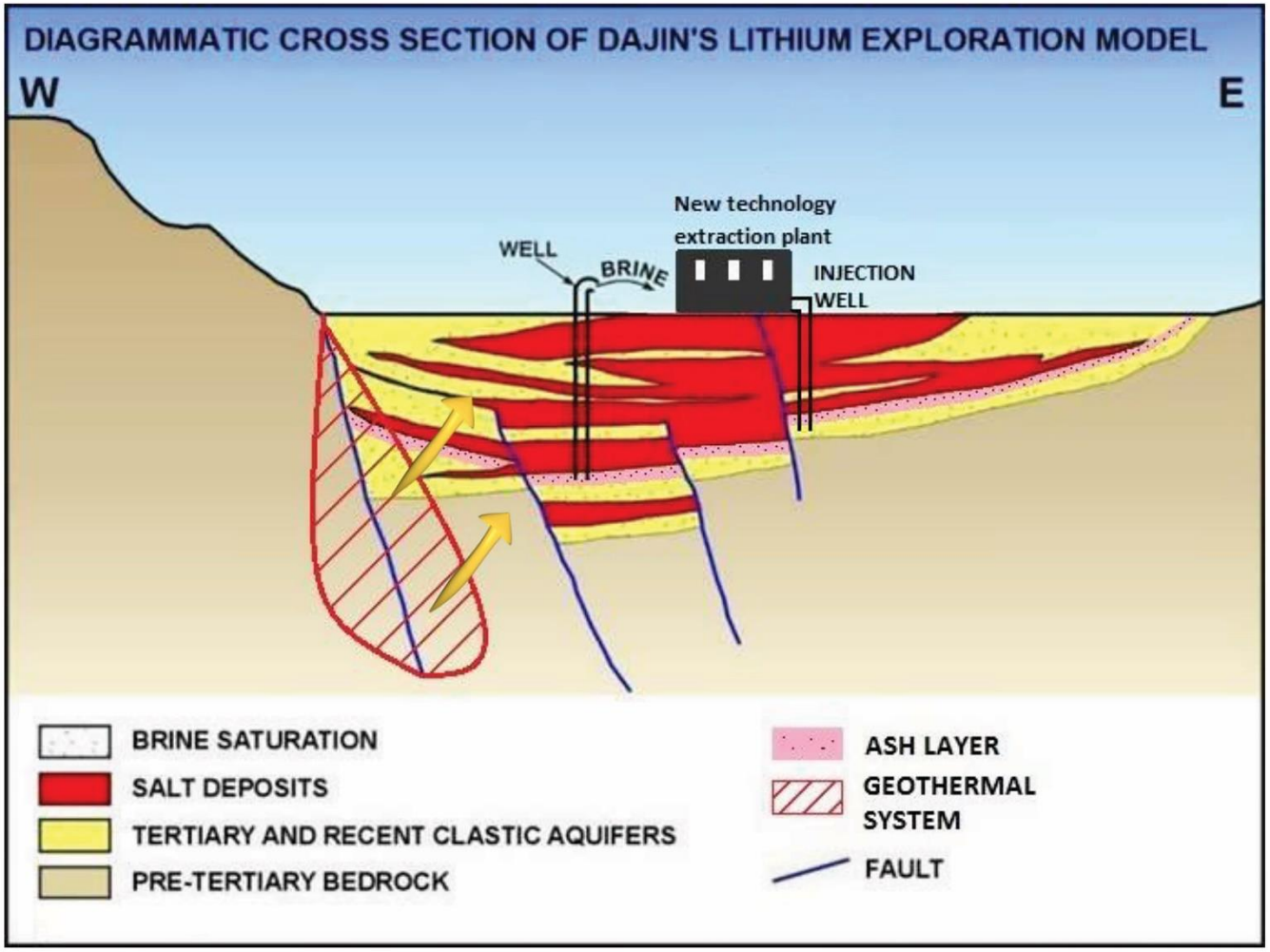
Dajin Resources

Teels Marsh: up to 70 mg/l at 3 m depth



Dajin Resources Website

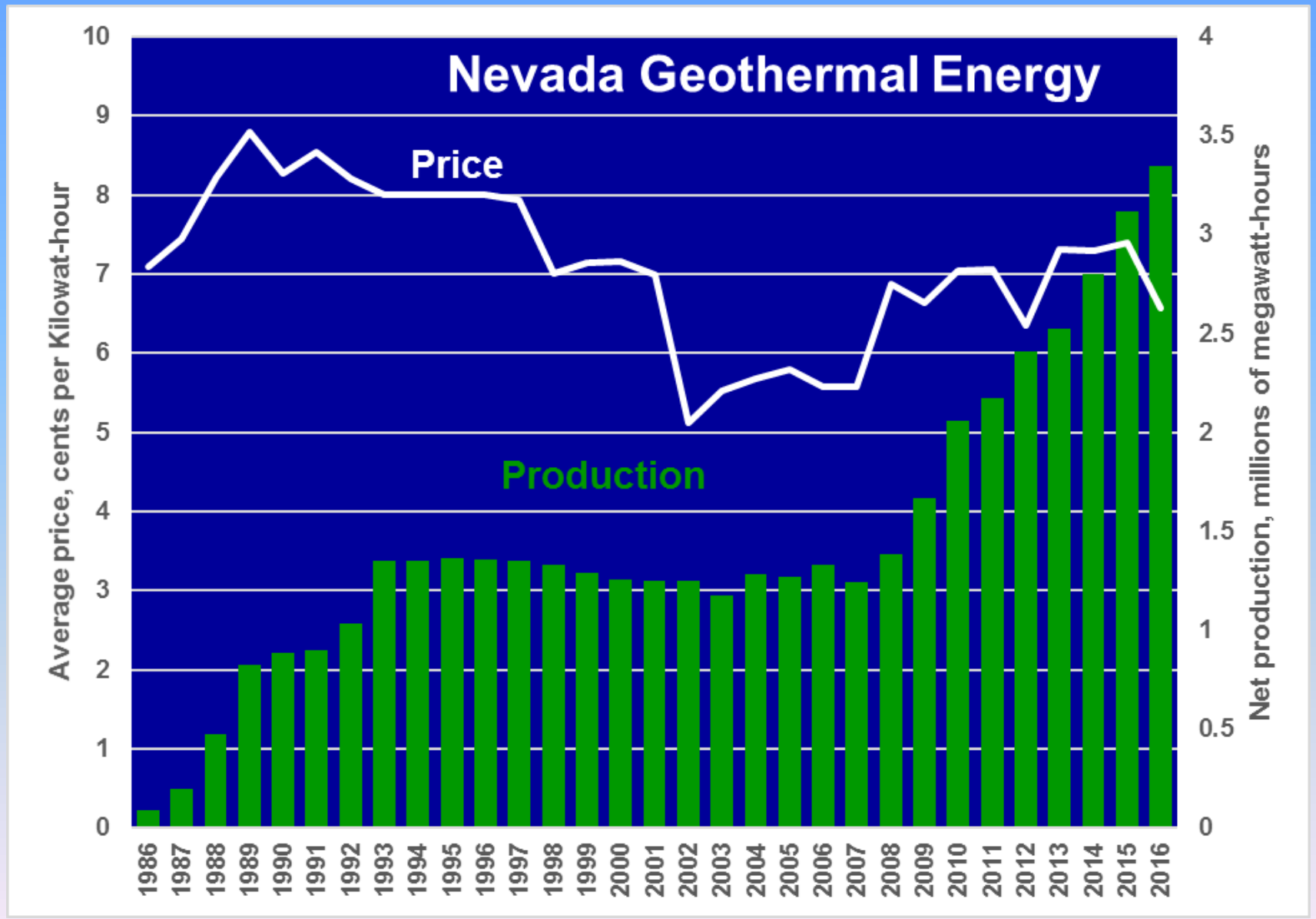
Dajin Resources: Exploration Model



- 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.

Dajin Resources Website

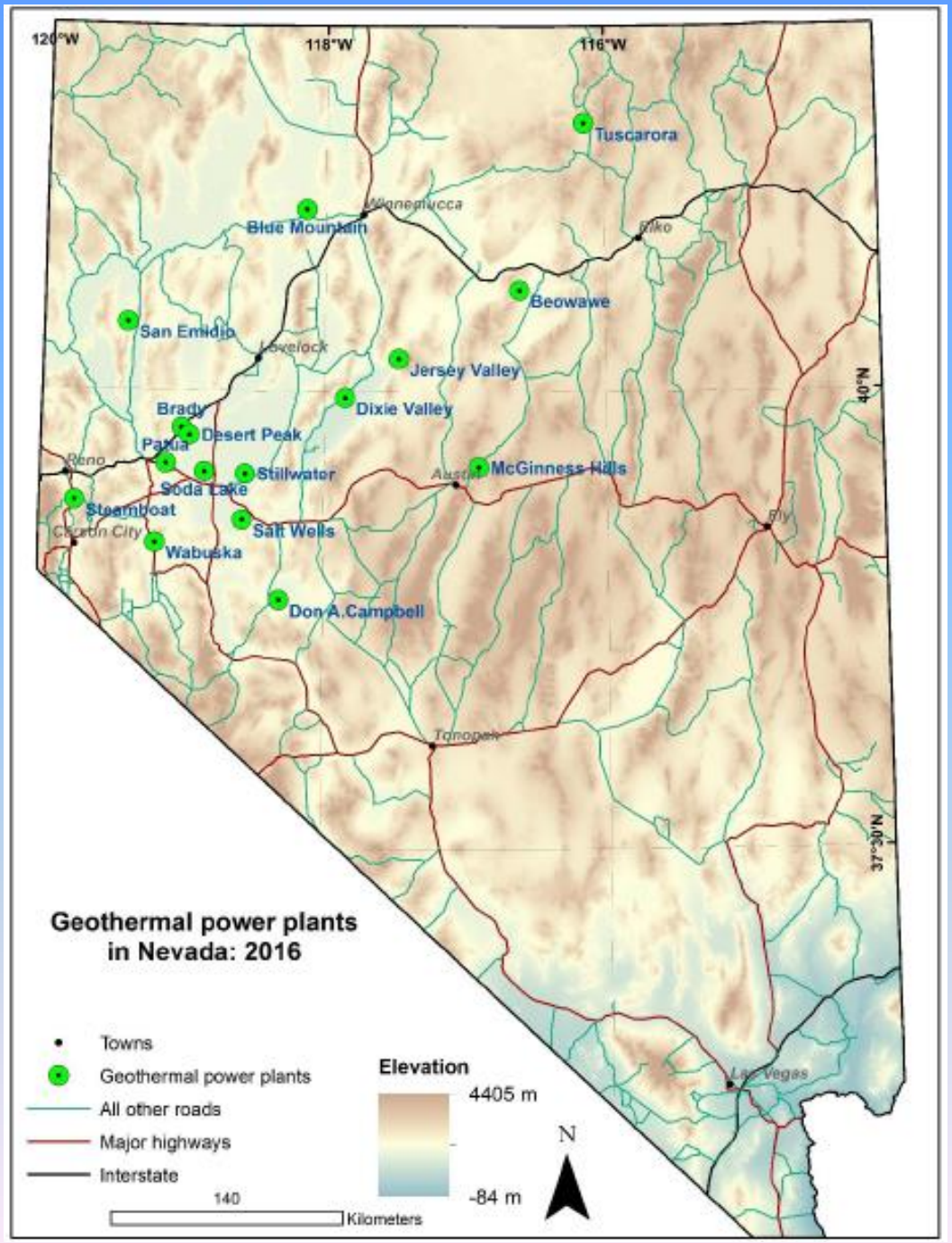
Geothermal Energy



Ayling, 2017

Geothermal Energy

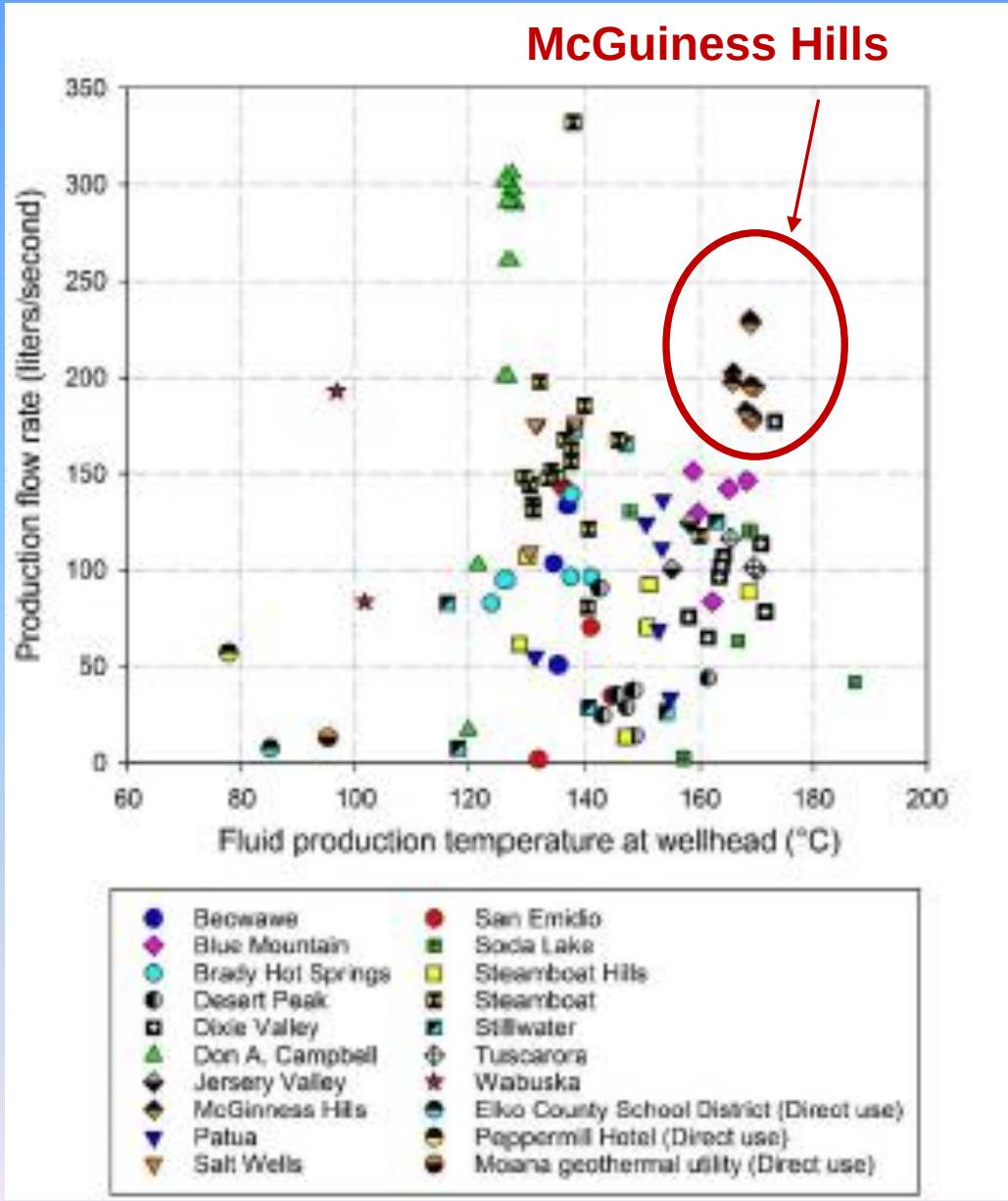
- Geothermal Plants at 16 locations
- Ormat runs 9 of them
- McGuiness Hills passed Steamboat in 2016 to become leading producer



Ayling, 2017

Geothermal Energy

- **Fluid Production Temps ranged from 97˚C to 187˚C**

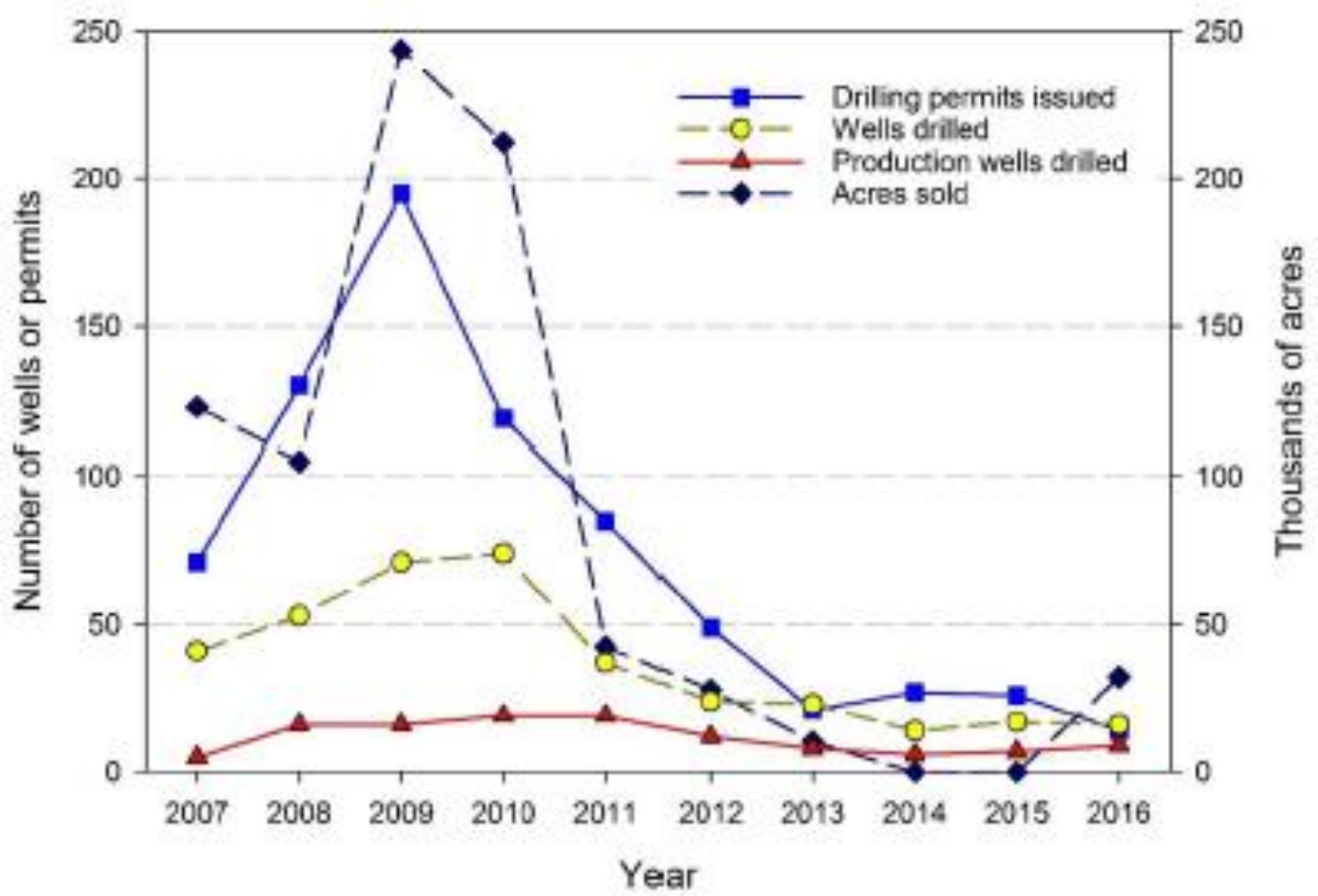


Ayling, 2017

Geothermal Energy Exploration

Drilling has fallen off since its high in 2010

16 new wells drilled in 2016, 9 for production



Ayling, 2017

Oil and Barite

Only one well spudded in 2016

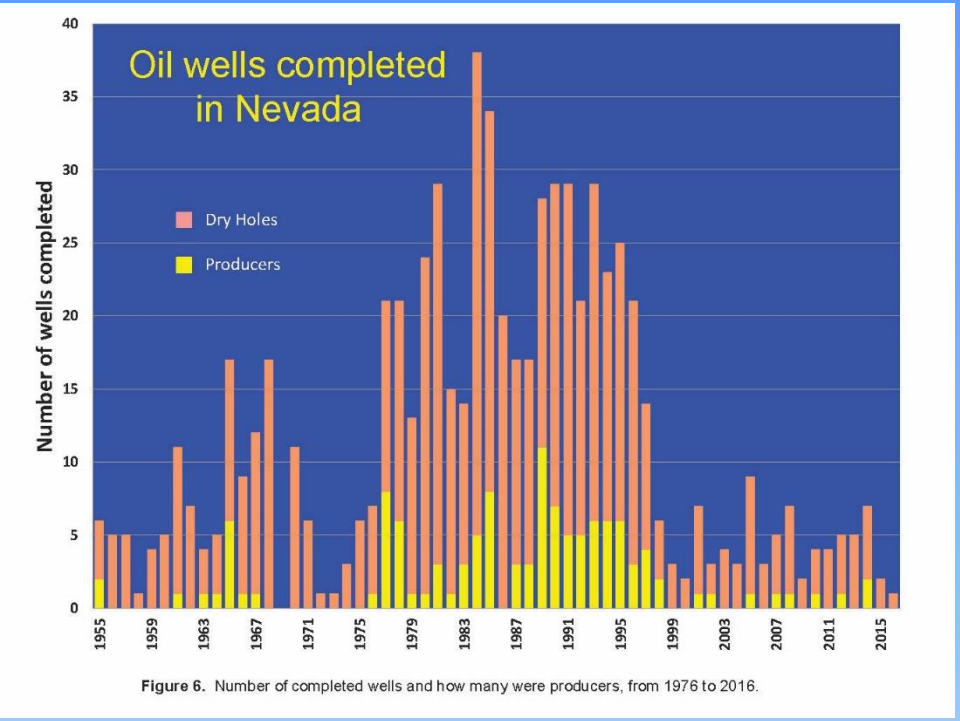
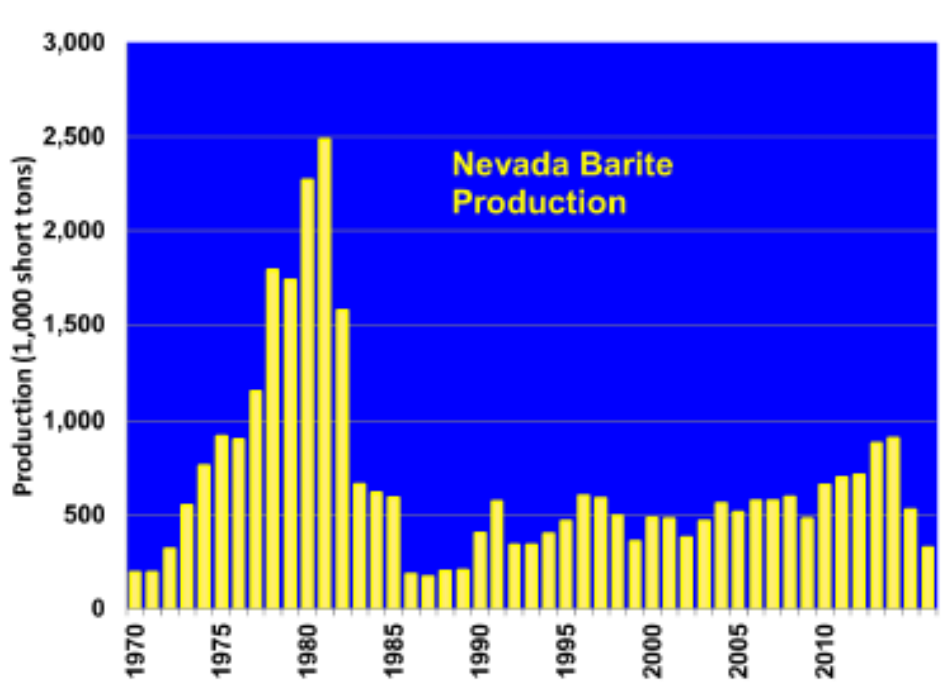


Figure 6. Number of completed wells and how many were producers, from 1976 to 2016.



Davis, 2017, Muntean, 2017