



# GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Room 107, Reno, NV 89512  
(775) 323-3500 - Hours Tuesday -- Friday, 8:30 a.m. to 3 p.m. Monday by appointment.  
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## CALENDAR OF GSN EVENTS

Feb. 1, 2018  
THURSDAY

**SO. NEVADA CHAPTER MEMBERSHIP MEETING (1st Thursdays)**  
The meeting will be held at the LV Natural History Museum, 900 N. Las Vegas Blvd. Pizza & beer at 5:30 pm, Talk at 6:00 pm. **Speaker: Garrett Wake, NV Division of Minerals. Topic: Update on NDOM's Abandoned Mine Lands Program** . Please contact Chapter President, Paul Dockweiler for information @ [PDockweiler@Geosyntec.com](mailto:PDockweiler@Geosyntec.com)

Feb. 13, 2018  
TUESDAY

**WINNEMUCCA CHAPTER MEMBERSHIP MEETING (NOTE TUESDAY!)**  
The meeting will be held at the Martin Hotel, 94 W. Railroad St., Winnemucca, NV. Refreshments/appetizers at 6 p.m. Talk at 7:00 pm. **Speaker: Joy Lester, Gold Resource Corporation. Title: "Gold Resource Corporation- Nevada: An Emerging Producer". Sponsor To Be Announced.** For more information please contact Chapter President, Matt Fithian @ [Matthew.Fithian@ssrmining.com](mailto:Matthew.Fithian@ssrmining.com). Details on page 7.

Feb. 15, 2018  
THURSDAY

**ELKO CHAPTER MEMBERSHIP MEETING (3rd Thursdays)**  
The monthly meeting will be held at the Western Folklife Center, 501 Railroad St., Elko, NV. Refreshments begin at 6 p.m. Talk begins at 7 p.m. **Speaker: Darren Parsons, Kinross Gold. Title: "Blending Ore at Bald Mountain Mine to Achieve CN Solution Application Rate". Sponsor: CGS MULE!** For more info please contact Mark Travis at: [mark.william.travis@gmail.com](mailto:mark.william.travis@gmail.com). Details on page 7.

Feb. 16, 2018  
FRIDAY

**GSN REGULAR MEMBERSHIP MEETING (3rd Fridays)**  
The monthly meeting will be held at the Reno Elks Lodge, 597 Kumle Lane, Reno, Nevada. Drinks @ 6 p.m., Dinner @ 7 p.m., Talk at 7:45 p.m. **Speaker: Mark Coolbaugh, Dajin Resources Corp. Title: "The Potential for Lithium Resource/Reserve Growth in the Western United States" . Drinks Sponsored by: MINE DEVELOPMENT ASSOCIATES!** Cost for Dinner—\$25. GSN Students are free. Please make reservations for dinner with Laura Ruud, by emailing [gsn@gsnv.org](mailto:gsn@gsnv.org). 775-323-3500. Details on page 3. Abstract on page 6!

## G.S.N. FEBRUARY SPONSOR!



## MINE DEVELOPMENT ASSOCIATES

**FROM THE PRESIDENT**  
**J. Kelly Cluer, GSN President 2017-2018**  
**FEBRUARY 2018**



Dear GSN Members:

The 2018 exploration season is well and truly underway, and in good fashion. The light winter is letting us get on the ground without much of a break (sorry skiers). And a buoyant gold price means there is actually money to spend on that ground.

Having just returned from Vancouver Roundup, where it was good to see many of you, it is clear that the sector is on the uptick. The “Nevada room” where GSN, NMEC and other organizations were represented was exceptionally well placed and had a constant buzz of activity within and even outside. When things are moving positively everyone who always wanted a Nevada property now might even have the financial backing to go get it. I think several deals were struck there, or within 20 meters of it. This will be a year when the good properties are seeing meaningful programs executed. In time this will translate to new discoveries.

One positive result of the long downturn that I noticed at the conference was the quiet consolidation of camps, trends and belts worldwide. Small players that held postage stamp properties forever finally succumbed and long-horizon thinkers have capitalized to create some new opportunities. One of the most attractive reasons to adventure into “developing countries” exploration frontiers has been that you can have an entire belt or trend in which to do system-scale exploration. The early movers that saw this opportunity and seized it are being well rewarded. Now this luxury is coming home to more North American and other jurisdictions, perhaps to a camp near you.

The Vancouver Roundup had record attendance this year, and most of the attention was on promising exploration plays, compelling pre-development projects. The quality projects are back in demand and a sellers market is likely emerging (God help us buyers, please). It will be very interesting to gauge the evolving sentiment at PDAC in March.

In the meantime, let’s get out and explore before the snow hits - you know it’s coming.

Happy hunting,

J. Kelly Cluer

***The G.S.N. wishes to thank  
RYE PATCH GOLD for  
sponsoring the January 19th  
membership meeting in Reno!***



**Rye Patch**  
GOLD CORP.

# **GSN MONTHLY MEETING—FEBRUARY 16, 2018**

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**SPEAKER:** Mark Coolbaugh, Director, Dajin Resources Corp.

**Title:** "The Potential for Lithium Resource/Reserve Growth in the Western United States"

(See Abstract on page 6)

Social Hour begins @ 6:00 pm; Dinner @ 7:00 pm; Talk @ 7:45 pm

**Location:** Reno Elks Lodge, 597 Kumle Lane, Reno NV (across from the Convention Center)

**DINNER COST—\$25.00 per person.**

**Reservations due by 5:00 p.m. on WEDNESDAY, FEBRUARY 14, 2018**

For dinner reservations, please e-mail [gsn@gsnv.org](mailto:gsn@gsnv.org) or call 775-323-3500

**(Please remember you will be invoiced \$25 if you do not cancel your reservation by Feb 15th)**

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## **GSN SOUTHERN NEVADA CHAPTER MEETING**

**THURSDAY, FEBRUARY 1, 2018**

**Location:** Las Vegas Natural History Museum  
900 North Las Vegas Blvd, Las Vegas, NV

**Time:** 5:30 p.m.—Pizza & Beer  
6:00 p.m.—Talk begins

**Speaker:** Garrett Wake, Chief Southern Nevada  
Nevada Division of Minerals

**Abstract:** Abstract: The Nevada Division of Minerals' Abandoned Mine Lands (AML) Program is entering its 30<sup>th</sup> year of operation, and recent technological advancements will play a key role in the program's future. This talk will focus on how the Division manages the different aspects of the program, and how new technology like aerial drones, GIS software and tablets are changing how we address this problem.

We hope many of our GSN Southern Nevada Chapter Members will attend this meeting. Many of the GSN Board Members will be in attendance this evening and look forward to meeting new members and catching up with old members!

**I will have the brand new 2018 Membership Directories with me so please help save GSN mailing costs and pick your directory up at the meeting if you are in the Las Vegas area!**

# “FACES OF GSN”

## Martha J. DeLong

Howdy! 'Long-time no see!' Don't you find it rather humorous, then, that I get to provide 'The Faces of GSN' article this month, as many of you won't know my face, then or now. Some of you will recognize the 'then' face, but maybe not the 'now' one. The attached pictures should 'solve the mystery'!

My career has followed a rather different path from most of all y'all, yet I have remained a member of GSN, since 'the good ol' days'! Don't get me wrong, my days are still good, just different.

Back in 'the good ol' days', some thought of me as 'Happy Days Diminy' reincarnate: *'Alice was her name, but her many friends and acquaintances knew her only as Happy Days – one of a number of female prospectors who abandoned home, family and other civilized amenities for the uncertainties of life in the mining camps of central Nevada around the turn of the century'*. I must admit, I resembled those remarks, then!



the 'then' face Martha (we were trying to see how much field kit we could pile on at once...)

That was then (starting in earnest in 1981). For my 'since then' (I moved to the 'oil patch' and beyond, starting in 1992), all y'all can log onto LinkedIn and see where I have been (Wild-Wild West, Gulf Coast USA, Nigeria, New Zealand, Australia, UK (working North Africa), Oman, Bahrain...) and what I have been up to (Exploration, Environmental, Risk, Health & Safety, Compliance, Auditing, Maths Teaching (yes, 'Maths'), Editing and Proofreading...), and that I have been 'round the block' (giggle) a few times with quite a variety of companies (mining, oil and gas, quarrying, manufacturing, waste management, secondary education). Would you believe I still use my 'geology learnings' pretty much every day?

As I look back, I now consider my work to have been the enabler for my experiences – my stories. Have I lived to work or worked to live? I will let you be the judge of that after having read the following:

-Always befriend a 'Mountain Man' by the name of Beaver, when working on national forest ground where they grow lots of weed(s). Not a good idea to bring in a rig, during harvest time.

-Drive an old Ford Bronco, with crap tires, from Houston, Texas, to Tuscarora, Nevada. Try to get there in 3 days! Carry only 2 crap spares and have 3 flat tires. Have 'Purchasing' tell you that you can only buy preferred supplier 'big name' tires. Reiterate to 'Purchasing' that you are in the middle of nowhere's-ville (near Tucumcari?) with a huge weather front moving through. (Moral of the story? Take care of your pony and your pony will take care of you.)

-Remember that a buckaroo is a buckaroo and not a cowboy! (Verified by the Cowboy Museum in OK City!) Never go to the local watering hole on the day these guys get paid. If you do, park on the highest part of the property (preferably next to a dead sheep) to sleep it off the next day. Keep the 2-way radio turned way up in case 'boss-man' shows up.

-Make sure you know how to read 'No Trespassing' in Basque. Do not get a flat tire, up in the hills, in the vicinity of a Basque shepherd's summer 'gypsy' wagon, unless you can handle the smell and the red wine. (Love that picon punch though and those 'filter organs' always served as appetizers at the local Basque restaurant!)

-Rip and re-seed temporary drilling roads only while standing on the back rippers of a D-8 CAT with the wind blowing a gale, the seed flying who knows where, and the snow starting to pile up. Skinners must be capable of making 360° 'snow donuts'. (Should be a competency required in all contracts.)

-Consult with a lawyer to ensure that your field partner cannot put a lien on your real home because of the amount of time spent co-habiting in the field under the same roof! Ply this person with heaps of alcohol and make him listen to songs with what he thinks to be 'drug lyrics' (inside joke) on the flight back home, and then convince him to sign the papers on the 'dotted line'.

-Beware the field summer hand that likes to have parties in the rented field accommodation on your days off, forgets to clean up and then never shows up again for work! (Why does 'Pet Shop Boy's' music come to mind?)

-Learn to map, mentored by only the best x-Anaconda geo. Brief: create a geologic map with topography. Use: 2 range-finders, a photo stand (sprayed fluorescent orange), flagging and book of 'Standard Field Tables'. Must (cont. pg. 5)

(M. DeLong—cont. from pg. 4)

have really steep terrain. Close your daily traverse loop with an error of no more than 5'. (If >5', go back, find your mistake - do not pass GO, do not collect \$200!) Mapping (and camping out) must continue for at least 2 months (during tarantula migration). I learned so much! Go to town, crossing the creek 35 times, every 10 days for a steak and a shower. Keep your favourite 'landman's' phone number on speed dial in case the irate landowner sticks his hand through a glass door at the local country store. Dietary requirement - 1 can of asparagus/day. (Paleo ain't got nothin' on this diet, but 2 months of liver and onions, night after night, in a Tonopah casino just might!)

-Sample new growth on balsam fir trees, traversing up and down rutted, muddy, logging roads in the Northern Peninsula of Michigan in the spring. Rent a 'low-rider' sedan so your 'quads' get a better work out, hopping in and out of the car every ¼ mile. Run the car through the car wash more than once (don't forget the undercarriage) before returning. Tie the front bumper back on with orange flagging. Park car against a wall. After such an experience, always keep biochem in mind as a prospecting tool. It is brilliant at finding where the old tram line went, dumping ore all the way up and down the hill.

-Know the bell sequencing to the hoistman for the inclined man-cage as you don't want to be dropped off at a flooded level in the old part of the mine. (Note: Hoistman's wives make great babysitters when working underground!)

-Know when you are being shot at when working out of a helicopter, north of Vegas, in an old mining district. Tell the local Sheriff, who will not care, but you might just get a free cup of coffee for your time.

-Drive all night to get a part for the rig's water pump, so that the company does not have to buy pipe! (Sure wish I had Roy Orbison's 2017 version (with the Royal Philharmonic) of 'I Drove All Night' back then when driving THE I-80!) Do not let the drilling crew feed bologna and pipe dope sandwiches to your summer hire's dog in your absence.

-Volunteer (or be volunteered) to sit the rig on the side of a mountain, the week before Christmas, in the freezing desert, where the wind blows as cold as ice and the pipe gets stuck in the hole and the sheriff comes to visit as he sees the rig's lights at night and thinks we are running a meth lab (or whatever) and the driller has a Utah driver's license and the driller's pickup has Nevada plates and the rig comes out of California and we all are questioned to the hilt...and no, no one ended up in jail...but almost!

-Pay attention to the wild ponies who are running like 'bats outta hell' when driving back to Hawthorne. Check the news for the occurrence of a BIG earthquake some place like San Fran.

-Assist the local health centre, near Fallon, by retrieving a severed finger left in the baling machine. Take a little bag of ice with you in which to put the finger.

-Ensure that you have had 'media-communications' training before answering the phone, with a Canadian 'mining rag' journalist on the other end of the line, telling them that there 'ain't diddly squat' on 'that thar' property! (I have no idea how the company lawyers sorted this one out!)

-Always get in the vehicle and lock the door when the local 'tribal youth' (of Nigeria), start to separate you from the rest of your group when trying to assess and remediate an old oil spill from Biafra days. (Ha! What will a locked door do for ya?) Suspect foul play when the same 'tribal youth' laugh their guts out when you are looking down into several shallow sampling bore holes and are wondering why you see movement. The North Koreans are NOT the only ones full of worms!

-Do not proceed if you are told: 'bad juju madam' and there are all sorts of weird things hanging from the trees in the jungle. Do not land the helicopter if the 'navy-man' is not waving the white flag at the oil terminal. Do not let the locals take the cages for the bags from the recently burned down baghouse to the TDU to use in the repair of their community jungle roads. Do not proceed down the river to the oil terminal in boats that lose both engines and whose radio craps out (all on the same trip) while sand dredging hoses block the entire width of the river. I think the term is: 'sitting duck'. If you are lucky, you will have some 'heads' on the boat with you as company, being taken down river to be buried with some chief. Take death threats seriously when uncovering corruption activities. (Just get outta of Dodge!)

-Blessed be KLM airlines that fly your children all over the world. Blessed be the lepers who sit with you outside the Lagos airport and cry with you tears of sadness (if they can cry) as you wave goodbye to your children and who again sit with you, outside the Lagos airport, and clap for joy with hands (missing a few fingers) and cry with you tears of joy (if they can cry) upon the return of the KLM plane and your children. (We do not know how lucky we are!)

-Learn the hierarchy on the drilling/production rigs/platforms. Know that exploration and production are not kissing cousins, but are more like the Wallabies vs. the All Blacks at rugby or Pakistan vs India at cricket! Go to those platforms more than 5 times so that you can experience helicopter ditch (into water) training. Tell the guy next to you that (cont. pg. 6) (M. DeLong, cont. from pg. 5)

you will be bowling over him and out the window like a runaway freight train if he doesn't move fast enough! If you get stuck on an offshore floating production and offloading vessel because of weather, make sure you pick a room that has a flare, serving as your night light!

-Do not let operators walk up to machinery with moving and rotating parts and stick their fingers in. Electrical safeguarding is a wonderful concept, as is Lock-Out Tag Out for those maintenance men who like to get caught up in conveyor belt systems!

-When quarrying, try not to move the overburden twice, and when you are done quarrying, try not to fill up the old quarry with TRASH. And if ya do, get ready for the gas. And if you get the gas, run a HAZOP on your gas processing/electricity generation facility, so that employees do not park right next to the inlet manifold. And when it is reclamation/rehabilitation time, convince the environmental engineers to tell management that it is going to cost 200-400M more dollars than the consultant first estimated (or else). (Pumping leachate and groundwater for years and years and years costs a few bob! Oh, but I have a better idea – GW exclusion zones...)

-Convince management (or else) that it is illegal to provide destruction documents to clients for the treatment of their hazardous waste when it still sits in drums in warehouses all over the city, eating through the metal bottoms and leaking into the ground!

-Pray that you are not on the Crisis Management Team when it is activated after a call from the North African desert, saying that terrorists have just stormed the gas plant, and that company personnel have been lost, some tied to production vessels and blown up.

-Try not to investigate fatalities. It is just too sad.

-Remember what Mohammed said: 'Secure the camel...and praise Allah'...and shalla, the camel will still be there in the morning! (So why don't these people put their kids in seatbelts?)

-Take time to run a few marathons, cycle a few 100 mile races, swim some really long boring distances too!

So yes, I have worked to LIVE. Rowing/sculling is my latest passion now which has taken me to various countries to compete at the Master's Level: Italy, UK, Germa-Belgium, Denmark, Australia, New Zealand, and most recently Slovenia and the UAE. The kids got me into it. (Kids are doing GREAT, by the way, as is the KIWI chemical engineering husband of 20years!) I ain't too bad for an OLD lady rower, having won gold at the international level. I do need to tell you, though – I am NOT OLD! How about you? I think it is time for you to tell your stories!

In closing - 'Dally tight' and remember what Job would say (hey, that dude was a really tall guy, based on the size of his tomb in Oman): 'speak to the earth, and it shall teach thee!' Kind regards, Martha J. DeLong



the 'now' face of Martha



the 'huffing and puffing' face of Martha

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## The Potential for Lithium Resource/Reserve Growth in the Western United States"

**Mark Coolbaugh, Director, Dajin Resources Corp.**

Reno Meeting Abstract: After lithium extraction from brines began at Clayton Valley, Nevada over 50 years ago, lithium production has remained relatively flat in the western United States, while substantial increases in production have been realized in other parts of the world. This talk will review recent lithium resource discoveries from around the world, examine the characteristics of these lithium deposits, and discuss why the western United States is still prospective for significant additions to resources and reserves. The western United States lacks large lithium-rich pegmatites, but does have large tonnages of lacustrine sediment-hosted lithium mineralization, for which significant advancements in extraction technologies are being made. The western US similarly boasts world-class lacustrine lake-hosted and/or volcanoclastic sediment-hosted ore deposits of boron and beryllium that have been mined for decades. The single producing lithium brine operation in the US at Clayton Valley also remains the world's deepest lithium brine operation, highlighting the potential for relatively deep and concealed lithium brines elsewhere in the Great Basin. Lithium brines in the Great Basin may be focused at greater depths relative to other closed basins in the world, due in part to rates of tectonic subsidence and sedimentation, and the timing of volcanoclastic sediment and tephra deposition, which largely predates the Holocene. Finally, the western US is home to the world's largest lithium resource in active geothermal fluids at the Salton Sea, where advanced research into production viability is continuing.

## **GSN WINNEMUCCA CHAPTER MEETING**

**TUESDAY, FEBRUARY 13, 2018 (note it's on TUESDAY!!)**

**Location: The MARTIN HOTEL, 94 Railroad St., Winnemucca, NV**

**Time: 6:00 p.m.—Appetizers & Drinks**

**7:00 p.m.—Talk begins**

**Speaker: Joy Lester, Gold Resource Corporation**

**Title: Gold Resource Corporation- Nevada: An Emerging Producer**

**Food and Drinks Sponsored by:**

**To Be Announced**

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## **GSN ELKO CHAPTER MEETING**

**THURSDAY, FEBRUARY 15, 2018**

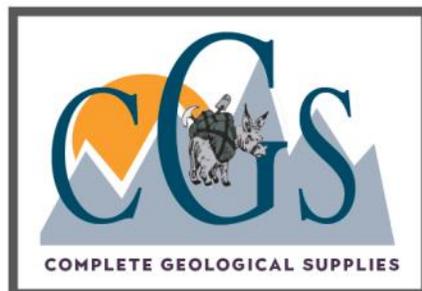
**Location: The WESTERN FOLKLIFE CENTER, 501 Railroad St., Elko**

**Time: Appetizers & Drinks @ 6:00 p.m., Talk @ 7:00 p.m.**

**Speaker: Darren Parsons, Kinross Gold**

**Topic: “Blending Ore at Bald Mountain Mine to Achieve CN Solution Application Rate”**

**Food and Drinks Sponsored by:**





## Dissolved Mineral Resource Exploration regulatory authority now at the Division of Minerals



On June 9, 2017, Assembly Bill 52 was signed into law, allowing for the regulation of dissolved mineral exploration boreholes and wells. The Statute also mandated the joint development of regulations between the Nevada Division of Water Resources, the Nevada Division of Environmental Protection, and the Nevada Division of Minerals. The statute went into effect on January 1, 2018, and the draft regulations are in the process of being approved. The statute and regulation outlines the procedure for the drilling and operation of dissolved mineral resource exploration boreholes and wells. This bill addressed the need for mineral claim holders or private land owners to be able to explore for locatable minerals that are dissolved in brine aquifers that require sampling and pumping to determine economics. Pumping and sampling of wells within a single exploration project of up to 5 acre-feet is allowed without obtaining a water right from the Division of Water Resources. A project is defined as a BLM “notice” or “plan of operation” if on Federal mining claims, or a designated area if on non-Federal lands. This statute also addressed concerns relating to borehole and well drilling in basins with active geothermal or oil operations or leases. Dissolved mineral resource exploration wells or boreholes within these areas of limitations may require blow-out prevention equipment, temperature monitoring or have depth restrictions in order to address safety or resource conflicts with geothermal or oil resources.

A draft of the regulations is available on the Division web site. The adoption hearing before the Commission on Mineral Resources will be noticed once legal review is complete. The Division of Minerals began regulation as guided by the statute, and approved the first two well permits in January. If you intend to drill for lithium brine or other dissolved minerals in Nevada, please note the following changes which became effective 1-1-2018:

1. Exploration boreholes require a notice-of-intent approval by the Division of Minerals. This is for both Federal and non-Federal lands. If the borehole is proposed to be drilled in a “area of limitation”, such as an active geothermal or oil lease, consultation with the Division is required.
2. Exploration wells for dissolved minerals must be permitted through the Division unless an entity already has a legal underground water right issued by the Division of Water Resources.
3. The Division of Water Resources will no longer issue or re-new mining and milling or exploration waivers for dissolved mineral exploration.

Interested parties should see the Division’s website for more information concerning the drilling of dissolve mineral resource exploration wells and boreholes, including all forms and an interactive map operators can use to determine if their project is within an area of limitations.

***For further information regarding this topic see the Nevada Division of Minerals website ([minerals.nv.gov](http://minerals.nv.gov)) or open-data site (<http://data-ndom.opendata.arcgis.com>), or contact the Division at [ndom@minerals.nv.gov](mailto:ndom@minerals.nv.gov).***

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*Thank you to our generous  
sponsor for the Winnemucca Chapter  
Meeting in January*



*Thank you to our generous  
sponsors for the Elko Chapter  
Meeting in January*

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EXPLORATION • WELLS • PUMPS



Save THE DATES for the GSN Spring 2018 Field Trip scheduled for June 8-10, 2018. The trip will be visiting the Monte Cristos and the Eastside area. We expect the trip to sell out so plan ahead and save your spot early. You won't want to miss this one!



**G.S.N. BABY NEWS!!**

GSN Member Garrett Frey and his wife, Kelli welcomed a beautiful baby daughter on December 16, 2017. They named her Madeleine Annette Frey. She weighed in at 6 lbs. 9 oz. and was 19 inches long. Congratulations to the new family from the GSN!!



# Activity Update

Mike Brady, December 2017  
[www.activityupdate.com](http://www.activityupdate.com)

## NEVADA

Pasinex Resources Ltd. announced that it acquired an option to earn an 80% interest in the Gunman Property (Zn) from Cypress Development Corp. for \$675,000 cash, 4,800,000 shares and \$2,950,000 in exploration expenditures over 4 years. *Press Release:* December 7

Ramelius Resources Ltd. announced that it acquired an option to earn an 80% interest in the South Monitor Property from Newmont Mining Corp. for \$8,000,000 in exploration expenditures over 8 years. *E/MJ:* November 2017

West Kirkland Mining Inc. announced that it acquired an option to earn a 100% interest in 2,500 acres of claims in the Tonopah District from Tonopah Divide Mining Co. for \$75,000 cash, \$100,000/year in exploration expenditures over 4 years increasing to \$200,000/year thereafter. *Press Release:* December 18

Rye Patch Gold Corp. announced that recent drill results at the Florida Canyon Project include 88.4-123.5 meters @ 2.08 gpt Au (FCR17-015); 129.5-187.4 meters @ 1.30 gpt Au (FCR17-015); 79.2-149.3 meters @ 2.94 gpt Au (FCR17-016) and 164.6-221.0 meters @ 2.60 gpt Au (FCR17-016). (resource = 76,000,000 tonnes @ 0.37 gpt Au measured+indicated) *Press Release:* November 29

Renaissance Gold Inc. announced that recent drill results at the Buffalo Canyon Project include 0-45.7 meters @ 0.26 gpt Au (BC17-01); 121.9-135.6 meters @ 0.43 gpt Au (BC17-02); 0-79.2 meters @ 0.35 gpt Au (BC17-03) and 86.9-134.1 meters @ 0.28 gpt Au (BC17-04). *Press Release:* December 6

Klondex Mines Ltd. announced that based on recent drill results at the Fire Creek Project, open pit resources aggregate 42,900,000 tonnes @ 0.87 gpt Au, 1.9 gpt Ag indicated and 31,700,000 tonnes @ 1.17 gpt Au, 3.1 gpt Ag inferred. (underground reserve = 218,200 tonnes @ 44.74 gpt Au, 33.2 gpt Ag proven+probable) *Press Release:* December 21

Gold Standard Ventures Corp. announced that recent drill results at the Dark Star Project include 117.3-185.8 meters @ 3.35 gpt Au (DS17-28); 53.4-172.3 meters @ 1.27 gpt Au (DS17-29) and 48.8-213.4 meters @ 2.26 gpt Au (DS17-30). (resource = 15,380,000 tonnes @ 0.54 gpt Au indicated) *Press Release:* December 7

Corvus Gold Inc. announced that recent drill results at the Mother Lode Project include 275.55-341.83 meters @ 1.24 gpt Au (ML17-03); 118.87-132.59 meters @ 1.28 gpt Au (ML17-08); 236.22-248.41 meters @ 2.88 gpt Au (ML17-10) and 97.54-135.64 meters @ 2.67 gpt Au (ML17-11). (resource = 8,545,000 tonnes @ 1.57 gpt Au indicated-sulfide) *Press Release:* December 12

Canarc Resource Corp. announced that recent drill results at the Fondaway Canyon Project include 75.6-81.7 meters @ 3.74 gpt Au (FC17-1); 332.6-362.7 meters @ 1.46 gpt Au (FC17-2) and 122.7-188.1 meters @ 2.83 gpt Au (FC17-3). (resource = 2,050,000 tonnes @ 6.18 gpt Au indicated) *Press Release:* December 5

## **GSN at the AME ROUNDUP in VANCOUVER!**

Laura travelled to Vancouver for the AME Roundup Convention, Jan 22-25, 2018. The GSN booth was set up in the Nevada Mineral Exploration Coalition's "Nevada Room". The room was busy during the entire show! Thanks to everyone who helped load, haul, setup and teardown including Steve Green, Elizabeth Zbinden, Ruth Carraher, Bob Thomas, and especially Dave Shaddrick who drove the GSN display up and back!!



# ROCK TALK

## Largest Hayward Fault earthquake since 1981 raises questions about what could happen next

Posted on [January 4, 2018](#) by [Temblor](#)—By [David Jacobson](#) and [Ross Stein, Ph.D.](#)



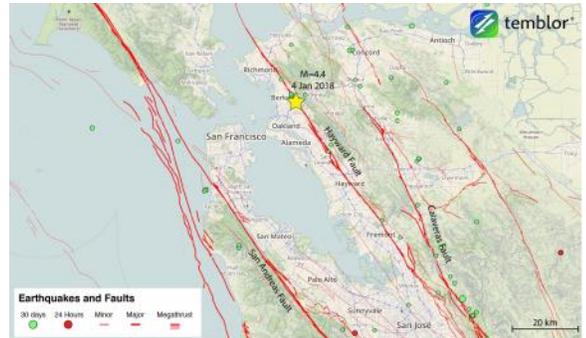
### The entire Bay Area was awakened

Last night, at 2:39 a.m. local time, a M=4.4 earthquake struck along the Hayward Fault underneath the city of Berkeley. The quake was felt throughout the entire Bay Area, and by noon today, over 35,000 people had filled out felt reports on the USGS website. Based on the distribution of shaking, nearly 10 million people would have been exposed to some level of shaking. Close to the epicenter shaking was moderate, and no damage is expected. Based on its magnitude, the quake was felt across a much greater area than expected. The last M=4.4 shock on or close to the Hayward Fault struck near Fremont in 1981, some 36 years ago. A M=4.5 shock struck on the Rodgers Creek Fault in 2006 near Santa Rosa. The Rodgers Creek Fault is effectively the same Fault with a different name.

The Hayward Fault creeps, as does a 100-mi (170-km) long section of the San Andreas, and only a handful of other California faults. This means that the Hayward Fault is not frictionally locked and can slip without large earthquakes. While some creeping faults are completely unlocked and do not build up the significant stress needed to generate large earthquakes, the Hayward Fault is only partially locked. So while there is creep at the ground surface, large (M~7) earthquakes tend to occur on average every  $161 \pm 65$  years. For those keeping track, it has been 149 years since the last major event.

### The Hayward Fault—149 years and counting since the last large event

Based on the location, depth (13 km or 8 mi), and mechanism (right-lateral strike-slip), this earthquake very likely occurred on the Hayward Fault itself, and not a secondary strand. The Hayward Fault extends from San Pablo Bay where it joins up with the Rodgers Creek Fault, to south of San Jose, where it merges with the Calaveras Fault, a length of 140 mi (230 km). It makes up one of the larger faults within the San Andreas Fault System, and has a history of large, damaging earthquakes. In 1868, a M~6.8 earthquake destroyed downtown Hayward, and did significant damage in San Francisco. In fact, the 1868 earthquake was known as the “Great Earthquake” until 1906.

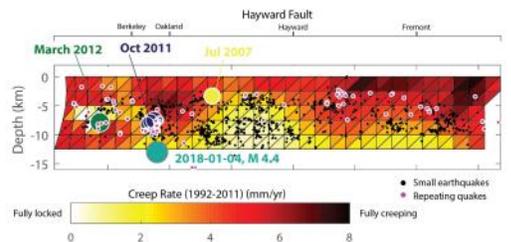


### Today's quake struck on the edge of a large stuck patch of the Hayward Fault

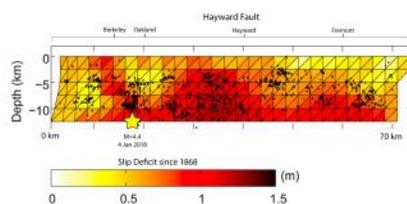
In the area around this morning's earthquake, there is significant evidence of creep. The figure below, from Shirzaei and Burgmann, 2013, shows creep along the Hayward Fault, with the approximate location of today's earthquake shown. What becomes evident from this figure is that the area in which this morning's earthquake nucleated is a locked portion of the fault, and that locked patch extends for 20-30 km (12-20 mi) to the southeast.



Prof. Manoochehr Shirzaei at Arizona State University told Temblor that today's event “occurred in an area that is stressed due to creep on the surrounding segments, and so was encouraged.” USGS geologist David Schwartz added that, “the M=4.4 occurred along a ‘hotspot’ on the Hayward fault. This is an approximately 8 km (5 mi) long section of the fault that has hosted 15 M 3.0-4.0 shocks in the past 10 years. [Today's earthquake is] the largest and deepest event in this grouping but its location not unusual.” Because of all of this, this earthquake should not be considered surprising.



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### What next?

Based on the lack of creep in the location of today's event, as well as the large locked patch to the south toward Fremont and Hayward, if a large earthquake were to start here, we believe it would rupture to the south. This area also has a slip deficit of more than a meter (3.3 ft) since 1868, as shown in the figure below, suggesting it could be more susceptible to a large earthquake.

Nevertheless, the statistical likelihood of this morning's earthquake being a foreshock to a M=6+ event in the next week is low, about 1 chance in 250, according to the USGS. However, the USGS does also estimate that there is a 10% chance that this could be a foreshock to an earthquake of equal or greater magnitude. Therefore, people should renew and reconsider their seismic readiness.

One of the reasons why the Hayward Fault is of great importance is because James Lienkaemper and Patrick Williams, 2010 calculated from the record they unearthed of prehistoric earthquakes that there is a 29% chance of a large quake along this portion of the Hayward Fault in the next 30 years. The USGS has multiple earthquake scenarios for this section of fault, some of which reach M=7.4. Such an event would have a significant impact on the entire Bay Area, stressing the importance of preparation. The USGS is developing a scenario of such an event ([HayWired](#))

### We are behaving like cigarette smokers

David Oppenheimer, the former director of the USGS Northern California Seismic Network, had this to say to Temblor: “The scientific and engineering communities have led us to the solution to seismic resilience, but the public behaves like a cigarette smoker. They know that quakes are bad for them, but they are not willing to do what they should.” He continues, “The solution is to follow the leads of San Francisco, Santa Monica and Los Angeles that require substandard residential structures to be identified and seismically retrofit in a timely fashion. Unfortunately, none of these programs apply to homes; they only address apartment and larger buildings. Mortgage lenders should require property owners to carry earthquake insurance. Elected officials must do their part to implement ordinances and laws that require the public to upgrade at-risk private property. A small investment in mitigation will have large payoffs to property owners, inhabitants, and resiliency of our metropolitan area.”

## OTHER UPCOMING EVENTS

**5 February 2018 Nevada Petroleum & Geothermal Society, Reno, Nevada monthly meeting.** Cocktails at 6:30 PM, Dinner at 7:00 PM, Ramada Reno Hotel; 1000 East 6th St., Reno NV 89512. **SPEAKERS:** John Menghini, BLM, Reno, NV and Lowell Price, NDOM, Carson City, NV. **TOPIC:** "State-of-the-State: An Update on Geothermal, Dissolved Minerals (Lithium in Brine), and Oil & Gas Exploration and Development in Nevada". Please make reservations by Friday, February 2nd by using the following link: <https://www.123signup.com/register?id=hcbjb>

**6 February 2018** Arizona Geological Society meeting, Speaker: Paul F. Hlava presents Causes of Color in Minerals and Gemstones. 6 p.m. to 9 p.m. at the Sheraton, 5151 E Grant Rd. (& Rosemont), Tucson, AZ Click on the link for more info and online registration: [Paul F. Hlava presents Causes of Color in Minerals and Gemstones](#) Dinner closes on February 2nd.

**6? February 2018 DREGS (Denver Region Exploration Geologists), Speaker & Topic To Be Announced.** Social 6 p.m., Presentation 7 p.m. at Berthoud Hall, Room 241, CO School of Mines, Golden. For more info. contact James Piper at [geopros@q.com](mailto:geopros@q.com)

**12 February 2018 SME Northern Nevada Section Monthly Meeting.** Circus-Circus Mandalay Room, Reno NV. **UNR Mining Engineering Students will be presenting their research on various topics!** Happy Hour @ 6 pm, Dinner @ 7 pm. Please contact Alex Wheatley for more information [NnevSME@gmail.com](mailto:NnevSME@gmail.com). You can pay dinner in advance at: <https://squareup.com/store/nnevsmc>

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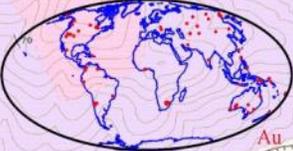
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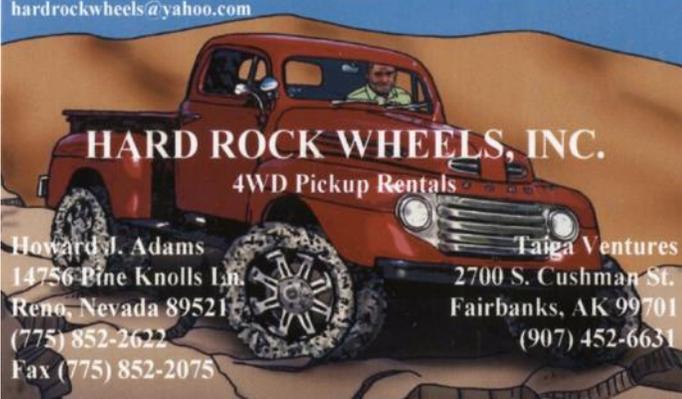
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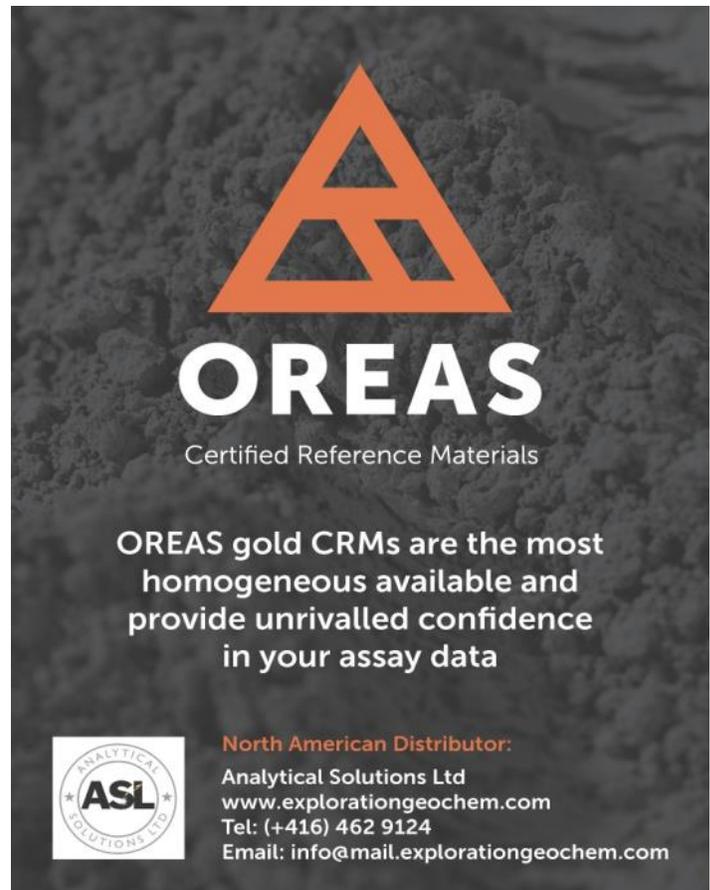
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