Inland Geological Society

June 2016

Newsletter of the Inland Geological Society Volume 32 No. 6

Wednesday, June 8th

Time:
Social: 6:00pm
Dinner: 7:00pm
Lecture: 7:30pm

Location:
LSA Associates
1500 Iowa Ave
Suite 200
Riverside, CA
92507
(Map on Pg. 4)

Coming to Dinner? Please RSVP:
By Monday 6/3
(909) 227-7704
Baircrystal@ca.rr.com

In this Issue:

June Speaker:

Ms. Marina West, PG

General Manager/Chief Engineer/Treasurer of Bighorn-Desert View Water Agency

A Poor Judgment Can Lead to Vetter Judgment

Abstract

In 2014, Bighorn-Desert View Water Agency (BDV), a "small water system" serving approximately 3,050 residents (1,900 service connections) in rural unincorporated San Bernardino County, in partnership with the Mojave Water Agency (MWA), completed a project known as the Ames/Reche Groundwater Storage and Recovery Program (Ames). This capital project, first outlined in the MWA 2004 Integrated Regional Water Management Plan was, upon completion, awarded the 2015 Clair A. Hill Water Agency Award for Excellence for being creative and innovative, fiscally responsible and environmentally sensitive while fostering excellence in a collaborative stakeholder-driven effort among the five participating water supply agencies. It is recognized as a regional solution to local groundwater basin sustainability.

The Ames project was the hallmark of local creativity and innovation as it aimed to develop a mutually cooperative arrangement for management of the Ames Groundwater Basin. This groundwater basin principally underlies the service territory of BDV but several municipal suppliers export from the basin. The other project partners are Hi Desert Water District, Mojave Water Agency, County of San Bernardino Water Zones W-4 (Pioneertown) and Zone W-1 (Landers). From the Ames Basin, these agencies extract a total annual basin production of approximately 1,650 Acre-Ft. In order to avoid costly litigation and court imposed adjudication, these agencies came to accept the

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management needs and parameters outlined in the many studies and tools developed for this purpose: BDV Conceptual Model for the Ames Groundwater Basin; Ames Basin Groundwater Management Plan; MODFLOW Groundwater Model; Water Budget; Recharge Feasibility Study.

The design and construction of the this groundwater recharge facility necessary to sustain our critically important native resource was completed following extensive environmental proceedings in accordance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), execution of a land lease with the Bureau of Land Management and acquisition of all associated state and federal permits (ie. take permit, streambed alteration, mitigation lands, etc.).

The groundwater producers finally negotiated an agreement which resulted in groundwater production caps, a recharge facility and robust monitoring program operated, maintained and administered by MWA (ie. neutral party), a physical solution (ie. recharge facility) to mitigate pumping beyond limits or to "pre-store" State Water Project, development of long-term storage accounting protocols allowing for a "water market" between agencies for the unused native groundwater baselines. The agreement allows BDV to collect a "fee" for utilization of the storage capacity of the groundwater basin underlying the agency boundaries. This fee also accounts for exportation out of the basin by the other parties and thus loss of non-consumptive return flows (i.e. septic return flows). In 2014, the municipal producers, along with MWA acting as our State Water Contractor, voluntarily entered into a Court Approved Stipulated Judgment to finalize this innovative and cooperative groundwater management program. The Judgment marks the completion of the original project concept outlined in the 2004 MWA Integrated Regional Water Management Plan.

Funding for the project came from an Environmental Protection Agency State and Tribal Assistance Grant secured by BDV approximating $475,000 and a $1,000,000 grant from MWA. BDV was able to accomplish all project objectives with the funds provided and at no cost to the BDV customers while concurrently providing huge benefit to the customers of Hi Desert Water District and County of San Bernardino who did not provide any capital funding. The BDV Board of Directors has declared that this project marks the completion of a "generational" promise to bring an outside source of water into the Ames Basin to supplement that which is recharged naturally. The project connects the Ames Basin to the State Water Project via a 3,650 foot conveyance pipeline and is designed to recharge up to 1,500 acre-ft annually on 6 acres of federally managed land. The project parameters were designed to specifically meet the participant's demands for imported water well into the future.

From the beginning BDV Staff was determined to avoid environmental conflict in designing this project within the deeply incised Pipes Wash (dry wash) identified as the only and therefore critically important wildlife linkage corridor between the San Bernardino Mountains and the Twentynine Palms Marine Corps Air Ground Combat Center. Not to mention, areas within the wash are inhabited by the federally threatened Desert Tortoise. To that end, traditional engineering designs including mass grading/clearing of native vegetation and excavation of "recharge basins" were avoided. Instead the land was used in a manner that promotes biodiversity conservation, environmental education, low-impact outdoor recreation and thus preserves open space and the scenic beauty of the adjacent Sand to Snow National Monument (created in 2016) which includes the proposed Black Lava Buttes Area of Critical Environmental Concern (ACEC). This project avoids visual impact by working in close proximity to already disturbed portions of the wash, leaving all native vegetation in place thus minimally disturbing the ground and allowing natural processes to continue. Further minimizing the footprint, the project was located in close proximity to the BDV Morongo Basin Pipeline and metering structure (turnout) which connects Morongo Basin region to the State Water Project delivery system.

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Since becoming fully operational in 2014, a total of 170 Acre-Ft has been recharged at the Ames/Reche Groundwater Storage Facility.

Biographies:

Marina West, PG is the General Manager/Chief Engineer/Treasurer of the Bighorn-Desert View Water Agency where she has served in that capacity since 2008. Bighorn-Desert View Water Agency (BDVWA) is a small water system serving the hi-desert communities of Landers, Flamingo Heights and Johnson Valley. Over the past 8 years, Marina has led BDVWA out of some tough financial and public relations challenges but considers among her top achievements the completion of the Ames/Reche Groundwater Storage and Recovery Program for which the Agency was selected to receive the 2015 Clair A. Hill Water Agency Award for Excellence from the Association of California Water Agencies as well as the recently completed San Bernardino Local Agency Formation Commission (LAFCO) action to dissolve an adjacent small county run water district so that it could be annexed into BDVWA enlarging the Agency's customer base by 30% and further stabilizing it's position in the region.

Prior to joining Bighorn-Desert View Water Agency she was the Chief of Operations for the Joshua Basin Water District for 4-years following a 16-year career with the Orange County Water District's Hydrogeology Department. Marina's work moved away from a hydrogeology focus and her efforts were directed into water distribution around the turn of the century after she was assigned to operate and manage the OCWD Talbert Seawater Barrier. This was not just a series of injection wells but a high capacity distribution system comprised of pipelines, valves and a pump station fueled by the effluent of Water Factory 21, OCWD's first advanced wastewater treatment plant decommissioned to make way for the now operational Groundwater Replenishment System. At the time of her departure from OCWD, Marina was working with the engineering and consulting staff on the design of the next generation of injection wells and control strategies.

Marina holds a Bachelor of Science in Geology from Cal Poly Pomona (1988), a certificate in Water Distribution from Santiago Canyon College (2000) and a Master of Public Administration from Cal State San Bernardino (2011). She is a registered Professional Geologist in California and is also licensed with the state as a Distribution Operator (D5) and a Treatment Operator (T2).

RIMS Science and Engineering Fair Presentations

The Anthropocene Epoch *- Amanda Roeliza and Misty Niesl*

Abstract: The Anthropocene is a highly debated epoch effectively ending the current Holocene Epoch within the Quaternary Period and is defined as an epoch where human impact would be highly recordable within the future rock record. This study should prove the existence of the Anthropocene Epoch studying the impact of Okinawa's urbanization and rapid population growth on the surrounding marine ecosystem. Three sand samples were collected from each beach from Okinawa Island within the Ryukyu Island Arc, to include: urban zone, agricultural zone, and isolated area with a freeway overpass. Four samples were collected from a remote island and is identified as a candidate for a control group due to the limited human impact in the area. Sand samples were sieved and masses measured to calculate the percentage of each grain phi size. 100-200 sand particles were examined and classified to determine a statistical representation of each sample. Acetic acid was used to dissolve all calcium carbonate material because of its buffering ability to ensure that non-calcic compounds were not dissolved. The remaining contents were composed of mineral (felsic/mafic), manmade particles (plastic/glass/metal), and various other undissolved substances.

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The grain sizes of every sample centered on a medium grain size. Man-made products were identified, though not in great quantities, as the majority of the sample was mineral.

Comparing results between the heavily populated island of Okinawa to the isolated islands, Okinawa displayed that human impact greatly influenced the sediment, and the future rock record, of the area. This was displayed by the amount of man-made material within the sediment and the diversity of species present in the biogenic particles was much lower compared to the isolated island. The sediment clearly displays noticeable and notable human impact, showing proof that the Anthropocene should be considered as a new age within the Quaternary Period; therefore, the hypothesis is accepted.

Biographies: **Amanda Roeliza** Hunt is a junior and Misty Niesl a sophomore at San Jacinto High School, in San Jacinto CA. This is a second year science fair project that started Amanda's sophomore year and she is very passionate about science. Her experience with science fair, has developed a love for geology and the Earth sciences. Her other interests include: music, drawing, and reading. In the future, she would like to attain a degree in the Earth Science and a minor in piano performance. Her ultimate goal is to become a geology professor.

Misty Neisl's passions are sports and art. She is most comfortable helping and teaching, especially children. She is interested in child education / care, as well as animal training / care. She hopes to achieve degrees in Elementary teaching with a minor in pediatrics, or equine studies.

A Study of the Impact of Sewage Effluent on the Santa Ana River *- Alvin Agatep*

Abstract:
The purpose of this project was to determine the water quality of the Santa Ana River as a result of the effluent flowing through the water treatment plant located next to the river in Riverside. Much knowledge of the actual quality of the water would be derive through a series of tests from water quality test kits. 3 tests were conducted at the 4 predetermined sites over a course of three months starting from the end of November to the beginning of February. Sites were determined based on the influence of effluent on the water's quality. Water from test sites 1-4 had relatively similar levels for temperature, chloride concentration, total dissolved solids, alkalinity, dissolved oxygen, hardness, carbon dioxide, and salinity. Notable results were that oh pH, nitrate, and phosphate. Where water was located in site 3 (effluent mix) and site 4 (river water; no mix), the water seemed to be just a tad bit basic with pH values between 7.09 and 7.46. Nitrate levels were significantly low in sites 1 and 2 (effluent water), where levels in these sites were from 2.8 ppm and below. Sites 3 and 4 had values from 7 ppm up to 8.2 ppm. Finally, phosphate levels in site 1 (effluent water) had higher levels of phosphate (2.5 ppm) compared to the other sites, with their values being lower than 2 ppm. With high levels of alkalinity, hardness and TDS levels coming from all sites, it was fully determined that the water from the Santa Ana River was not drinkable. This was reassured by levels indicated by the EPA, which demonstrated that the levels found from these tests highly surpassed the safe consumption rates. Although exposure to these high levels does not affect one's physicality (except for the toxicity from consumption), through experimentation, it was concluded that with the very low concentrations of nitrate and high concentrations of phosphate, the water was indeed safe to partake in recreational purposes.

Biographies:
Alvin Agatep is sophomore at King High School in Riverside and runs track and cross country.

Upcoming Meetings/Events

Rock & Gem Shows—Various locations

Various rock and mineral shows will be throughout So. California. To find one near you, visit www.rockngem.com/showdates.asp

AEG—So. California Chapter Meeting

The next meeting info has not been announced. For more info., visit the So. California Chapter at www.aegsc.org/calendar/.

AEG—Inland Empire Section Meeting

Dr. John Izbicki, USGS, will be giving a talk (Topic to be determined) at the June 2016 meeting. For more info., visit www.aegsc.org/chapters/inlandempire/.

South Coast Geological Society and San Diego Association of Geologists Joint Meeting

Jeffrey R. Keaton, PEG will be giving a talk on the Oso Landslide in Snohomish County, Washington on **Wednesday, June 8, 2016**. For more info., please visit SCGS on Facebook and/or www.southcoastgeo.org.

Los Angeles Basin Geological Society

LABGS has not posted their February meeting; however, it's generally the 4th Thursday of each month. Visit their website for more info. (www.labgs.org).

San Diego Assoc. of Geologists Meeting

Mr. Steve Borron will be giving a talk on "Predicting Slope Failures Using Slope-Monitoring Radar" on **Wednesday, July 13, 2016**. For more info, visit their website at www.sandiegogeologists.org.

Student Presentations: Format and Deadlines

Students who wish to give a poster and/or oral presentation of their projects must submit a biography and abstract by the 10th of the month prior to the month of presentation.

Abstracts and biographies must be in the following format:

a. Limit biography and abstract to 500 words or less each.
b. Formats must be in arial font, 11 point and submitted as a word (.doc), text (.txt) or PDF (.pdf) document only.

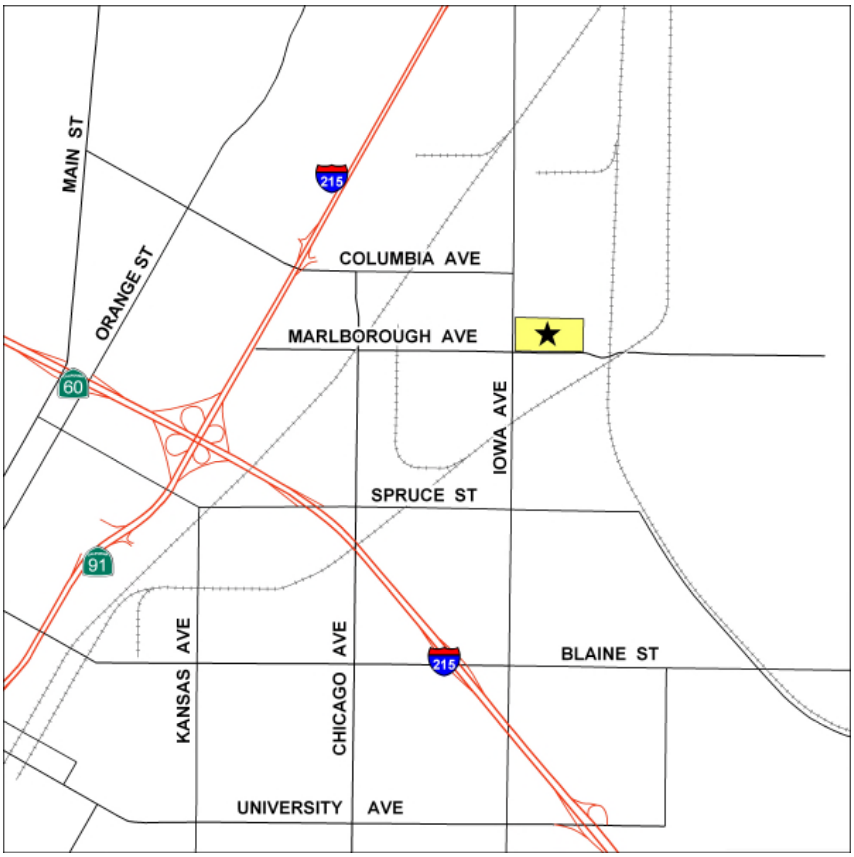
All presentations should be limited to 7 to 10 minutes in length followed by 5 minutes for questions and answers.

IGS Meeting Schedule

July 14, 2016 (Thursday)
Lisa Pierce, Water Resources Institute at California State University, San Bernardino
Topic TBD

IGS MEETING LOCATION:

LSA Associates, Inc.
1500 Iowa Ave, Suite 200
Riverside, CA 92507



2016 IGS OFFICERS

Co-President
Greg Johnson, LADPW
gjohnson@dpw.lacounty.gov
626.458.1741

Co-President
Rob Johnson, AMEC
rob.b.johnson@amec.com
951.369.8060

Co-Vice President
Jeff Fitzsimmons, Lahontan RWQCB
geojeff08@att.net
951.212.5018

Co-Vice President
Debbie Kunath, Consulting Geologist
Debbie_Kunath@ymail.com
760.885.0232

Treasurer
Margaret Gooding, LSA Associates
Margaret.gooding@LSA.net
951.781.9310 x279

Secretary
Crystal Bair, Student at CSUSB
Baircrystal@ca.rr.com
909.227.7704

Membership
Steven E. Mains, Watermaster Support Services
watermains@aol.com
951.780.5636

Newsletter Editor
Shelby Barker, Tetra Tech
shelby.barker@tetratech.com
760.680.0389

Web Mistress
Marina West, Bighorn Desert View Water Agency
wells.out.west@gmail.com
760.910.3264

Web Master
Ernie Roumelis, AKW Geotechnical
eroumelis@verizon.net
951.265.9849