

Recap: 2014 Colorado Desert Natural History Research Symposium

Symposium Report (November 7-9, 2014)

By Andrew Gottscho

As part of ABF's mission to support research in the Park, Andrew attended the symposium through an ABF Student Scholarship provided by the Rose Foundation's California Wildlands Grassroots Fund.

On Friday evening, November 7, after a scenic sunset drive over Yaqui Pass from San Diego, I arrived at the newly refurbished Steele/Burnand Anza-Borrego Desert Research Center where the welcome reception was held. With dorm rooms, bathrooms, kitchen and camping space outdoors, the modern and spacious research center is capable of hosting numerous researchers. Nine posters were presented at the welcome reception, including several by undergraduate and graduate students, and symposium attendees had ample opportunities to chat with the presenters in a relaxed setting while enjoying hors d'oeuvres and beverages.

Once symposium attendees had finished breakfast the next morning, Jimmy Smith (President, Anza-Borrego Foundation), Kathy Dice (Superintendent, Anza-Borrego Desert State Park), and Dr. Travis Huxman (Faculty Director, University of California, Irvine) welcomed us to the symposium. They noted that 2014 is a special year for both ABDSP and the California wilderness, marking 150 years since the California State Park system was founded, 50 years since the Wilderness Act was passed by Congress and the University of California (UC) Natural Reserve system was created, and 20 years since the California Desert Protection Act was enacted, all historic achievements in desert conservation. There has never been a better time to reflect upon the progress we have made in wilderness conservation, and to draw upon that inspiration to face the challenges that lie ahead of us.

Our first speakers of the morning were Dr. Cameron Barrows (Center of Conservation Biology, UC Riverside) and Dr. Mark Fisher (UC Natural Reserve System). Dr. Barrows presented interesting research regarding the impacts of climate change on four species of "blue-belly" lizards (genus *Sceloporus*) in southern California. It turns out that a circle with a 50 km radius centered over the northern Peninsular Ranges contains 30+ lizard species, the highest number reported for any national park or biosphere reserve in North America. The good news is that despite reduction of their range, these lizards are predicted to survive



Photo: Steve Bier

climate change, either by persisting in local refuges or by migrating to higher elevations.

Dr. Jennifer Gee (UC Riverside) was up next, and presented a fascinating account of California quail and Gambel's quail that hybridize along the northeastern escarpment of the Santa Rosa Mountains near Deep Canyon, where the California Floristic Province meets the Colorado Desert. This unique study system offers insight into how one species evolves into multiple species – the fate of hybridizing species depends on the causes of hybridization. The California quail occupies chaparral and woodland habitat at middle to high elevations, while Gambel's quail generally prefers desert scrub at lower elevations. Surprisingly, however, it appears that the California quail is invading the habitat of Gambel's quail due to climatic shifts, which is the exact opposite of what I would have expected. This result goes to show that the effects of climate change are not always straightforward or easily predicted.

Before lunch, we listened to an open panel discussion on the current status and future directions for conservation in the Colorado Desert, with an emphasis on bighorn sheep, the iconic species of ABDSP. The panel consisted of Jim DeForge (Bighorn Institute), Mark Jorgensen (former Park Ranger, Naturalist and Superintendent of ABDSP), Dr. Lisa Nordstrom (Institute

for Conservation Research, San Diego Zoo Global), Dr. Esther Rubin (AZ Department of Game and Fish), and Steve Torres (CA Department of Fish and Wildlife). We learned about the challenges facing desert bighorn and other wildlife in ABDSP, including the historical development of springs and other natural water sources, habitat fragmentation, disease transmitted from domestic livestock and renewable energy development in adjacent public lands. This panel discussion was eye opening to me because I had little idea of

the long, hard battles that were fought over the decades to preserve the Park, bighorn sheep and our wilderness heritage.

After we enjoyed our lunch outside on the patio courtesy of the Borrego Springs Resort, Dr. J. Mark Porter of the Rancho Santa Ana Botanical Garden kicked off the afternoon with an enlightening presentation on the evolutionary relationships of the Phlox family. This family

has nearly 400 species, and is most diverse in western North America, with a diverse array of breeding and pollination systems. Given this high species diversity, the taxonomy of this family has been unstable over the years, with new species still being discovered. Dr. Porter is analyzing DNA sequences with computer models to infer the evolutionary history of these enigmatic plants. This technical taxonomic research is important because we can't protect biodiversity, much of it hidden in plain sight, unless we really know what is out there and how it evolved in the first place.

Next, Dr. Travis Huxman (UC Irvine) spoke about the ecology of woody shrubs in the Sonoran and Colorado deserts. He noted that the past fifteen years have been the driest ever recorded in southern California, and we need to expect drought as the new normal. He argued that the copious displays of annuals that appear after rains are not truly desert plants, for they only grow "when the desert is not a desert." It is really the woody shrubs, such as creosote, acacia and mesquite that must endure the full fury of long-term drought, and many of them are succumbing. What surprised me was that some climate change models predict that the American deserts might turn into grasslands, because although drought conditions are expected to intensify, increased atmospheric carbon dioxide concentrations may increase the efficiency of photosynthesis. To test this

controversial hypothesis, Dr. Huxman and colleagues have set up a creative high-tech experiment in the Mojave Desert to artificially increase carbon dioxide concentrations in a large plot to projected levels ~30 years from now. Under these conditions, plants indeed grow faster and more copious annual blooms were observed in wet years, but scientists are still unsure how the cocktail of increased temperatures, carbon dioxide and intense drought will actually impact desert plant communities. Again, the



Photo: Andrew Gottscho

message hit home that climate change is more than just global warming.

After a snack break, we listened to Dr. Michael Wells (University of San Diego and CA State Parks) explain the ecology of wildfires in San Diego County, specifically how coniferous woodlands, chaparral and grasslands respond differently to fires. For example, mature yellow pine trees in the highest elevations of the county, with their thick fire-resistant bark, thrive under frequent, low-intensity fire regimes. Ground fires clear away underbrush, allowing cones to germinate and preventing fuel levels from accumulating to dangerous levels. But if fire is suppressed in a pine forest for extended periods, catastrophic canopy fires can occur, especially during Santa Ana conditions, such as the infamous Cedar Fire of 2003 – California's worst fire that mostly destroyed a huge swath of the county. Dead forests are often succeeded by chaparral. Although chaparral is harder to get a fire started in, once it gets going it is very intense. But if a chaparral habitat is burned frequently enough, the seed bank becomes exhausted and grassland can take over. This is how early cattlemen converted rangelands to pasture for their livestock, as native Californians did for wild game before them. Analyses of rings from adult trees killed in Cuyamaca during the Cedar Fire show that the interval between fires increased dramatically after the 1860s, coinciding with the relocation

of the Kumeayaay people. There is good news and bad news regarding wildfires over the next century. The bad news is that wildfires are expected to destroy more pine woodlands under hotter and drier climatic conditions. The good news is that Dr. Wells and colleagues are actively working to restore and protect conifer woodlands by planting select species in isolated refuges in Cuyamaca Rancho.

Dr. Bruce Pavlik (Royal Botanical Gardens Kew), author of the critically acclaimed book *The California Deserts: An Ecological Rediscovery*, delivered the keynote address about the immense challenges that America's deserts will face in our lifetimes. Right now one of the biggest challenges is renewable energy on public lands – for example, there are currently proposals for projects directly impacting up to 177,000 acres within the 22.5 million acre plan area in southern California under the Desert Renewable Energy Conservation Plan (DRECP; www.drecp.org). Dr. Pavlik argued that this wave of development is

dividing conservationists by pitting those concerned about global climate change against those focused on regional desert biodiversity, ultimately resulting in a giveaway of public lands to multinational corporations. Dr. Pavlik argued that there is a better way to address climate change without developing high-biodiversity wilderness (for instance, by using parking lots, rooftops, and other developed or degraded lands for solar panels). But first, we need to overcome the perception of deserts as a wasteland by the general public. Dr. Pavlik urged the promotion of eco-tourism and for citizen scientists to engage with their communities. He urged everyone to do his or her homework on the trade-offs of renewable energy projects. He lamented the lack of research regarding the impacts of renewable energy on biodiversity, especially rare species.

After the keynote address, we enjoyed our banquet dinner on the patio courtesy of the Borrego Springs Resort. It was clear that the talks of the day had inspired attendees, as I overheard many interesting stories and debates. After the banquet, Mark Jorgensen presented photographs from his new book (photographed by Jeff Young), *Desert Bighorn Sheep: Wilderness Icon*. Mr. Jorgensen is well qualified to write this book, given his 50 years of experience working with desert bighorn as Park Ranger, wildlife ecologist, and Park Superintendent, and Mr. Young's

photography, focusing on rarely-seen behaviors of these sheep, is stunning. It was a wonderful conclusion to a very full day.

Sunday morning brought numerous opportunities to learn about natural history firsthand from the presenters, including separate field trips to learn about bighorn sheep, birds, plants, fire ecology, etc. I opted to attend the lizard trip with Drs. Fisher and Barrows, who took a small group of us out to the windblown sandy flats just outside of town. With decades of combined experience searching for life on the dunes, our guides were expert trackers and pointed out all sorts of things we might have normally overlooked. The highlight was when we tracked down a Colorado Desert fringe-toed lizard and we learned about numerous adaptations that this species has evolved for life in fine wind-blown sand, including toe fringes, which increase traction in loose sand, a camouflaged pattern and a shovel shaped snout. We also discovered some rare plants, found a tarantula burrow and learned how to identify the tracks of burrowing owls, roadrunners, beetles, lizards, snakes and more. That afternoon, taking an alternative route back to San Diego up Grapevine Canyon, I enjoyed a renewed sense of enthusiasm, appreciation and concern for the California desert wilderness and its irreplaceable flora and fauna. I certainly look forward to returning to Borrego Springs for the next symposium.

Acknowledgments

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Andrew Gottscho was the 2012 winner of Anza-Borrego Foundation's Howie Wier Memorial Conservation Grant for his research on the evolution and conservation of fringe-toed lizards in the Colorado Desert.

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Join ABF for a weekend devoted to the cultural history of our Southern California desert. The weekend of events will include research posters, a full day of lectures, a banquet dinner and field tours. Participants can enjoy a relaxed weekend learning about the variety of research projects happening in our region. We hope to see you there!