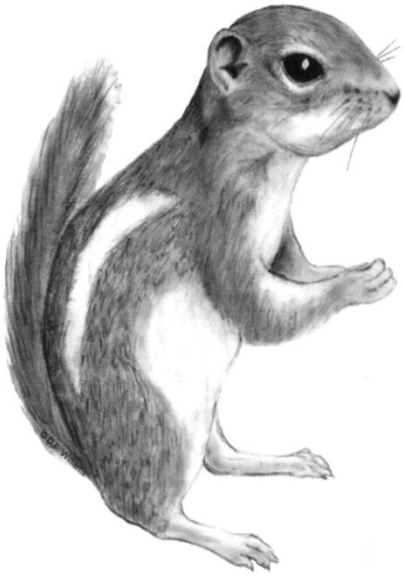
# San Joaquin Valley
# Natural Communities Conference
# March 29, 2018
# Hodel's Country Dining, Bakersfield

*Program and Abstracts*



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# San Joaquin Valley Natural Communities Conference
# March 29, 2018
# Hodel's Country Dining

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|---|---|---|
| 8:00 - 9:00 | Registration | |
| 9:00 - 9:10 | Brian Cypher,<br>Larry Saslaw | Welcome to the Conference, Moderator<br>Schedule details and announcements |
| 9:10 - 9:30 | Brian Cypher | *Response by San Joaquin Kit Foxes to a Utility-scale Solar Farm: Preliminary Results* |
| 9:30 - 9:50 | Neil Havlik | *Recent Conservation Activities on the Carrizo Plain, San Luis Obispo County, California* |
| 9:50 -10:10 | Erica Kelly | *Desert kit fox (Vulpes macrotis arsipus) food habits and competitive interactions with coyotes (Canis latrans) in the Mojave Desert* |
| 10:10 - 10:30 | Mark Noyes | *High species richness supported by niche partitioning of diverse wetlands in the central San Joaquin Valley* |
| 10:30 – 10:50 | BREAK | |
| 10:50 - 11:10 | Elianna Rosenthal | *Growth rate variation among juvenile Chinook Salmon cohorts and rearing conditions* |
| 11:10 – 11:30 | Karen Boortz | *Spatial variation in the prey availability and production potential of juvenile Chinook Salmon along the San Joaquin River restoration area during drought conditions* |
| 11:30 – 12:30 | LUNCH | ***Registered participants will be served lunch.*** |
| 12:30 – 1:10 | | **Quick Talk Presentations/ SJV TWS Announcements** |
| | Tory Westall | *Update on sarcoptic mange in Bakersfield San Joaquin kit foxes* |
| | Erin Tennant | *San Joaquin antelope squirrel range-wide survey* |
| | Jacqueline Tilligkeit | *Save a tree, use a tablet: Spatial biological data acquisition using mobile technology* |
| | Greg Salas | *San Joaquin Kit Fox artificial dens at Topaz Solar Farms* |
| | Tory Westall | *San Joaquin kit fox home ranges at the Carrizo Plain National Monument* |
| | Larry Saslaw | *SJV Conservation opportunities within the Sustainable Groundwater Management Act* |
| | Ellen Cypher | *Lessons learned from the Atwell Island Restoration Project after two decades* |
| | Reagen O'Leary | *500 Women Scientists* |
| 1:10 – 1:30 | Mike Westphal | *Desert shrubs can facilitate a diurnal lizard, Gambelia sila* |
| 1:30 - 1:50 | Mitchell Coleman | *Factors affecting seedling recruitment of Atriplex polycarpa* |
| 1:50 - 2:10 | Patti Wohner | *An index for riparian restoration success for Yellow-billed Cuckoos and implications for management* |
| 2:10 - 2:30 | SJV Chapter Awards | *Western Section and San Joaquin Valley Chapter Awards* |
| 2:30 - 3:00 | BREAK | Silent Auction Closes and items are purchased. |
| 3:00 - 3:20 | Tiera Arbogast | *Bureau of Land Management 2017 Programmatic Biological Opinion* |
| 3:30 – 3:50 | Stephanie Herbert | *Alkali Sink and Seep Weed Scrub restoration by Caltrans near Valley Acres, California* |

San Joaquin Valley Chapter Meeting Following at Rusty's Pizza Parlor 5430 Olive Drive….in the back room.

# Abstracts

## Oral Presentations

### RESPONSE BY SAN JOAQUIN KIT FOXES TO A UTILITY-SCALE SOLAR FARM: PRELIMINARY RESULTS

**Brian Cypher[1],** Tory Westall[1], Ken Spencer[2], Dan Meade[2]

[1] California State University-Stanislaus, Endangered Species Recovery Program
[2] Althouse & Meade, Inc.

In 2014, construction was completed on the Topaz Solar Farm in San Luis Obispo County, CA. The 4,830-ac project site is situated within the range of the endangered San Joaquin kit fox (*Vulpes macrotis mutica*). In November 2014, we initiated an investigation of the response of kit foxes to the solar facility. Our objectives were to compare demographic and ecological attributes of kit foxes using the solar site to those of foxes on a nearby reference site. Field work concluded in January 2018, and analyses of the data are in progress. Preliminary results based on Cox proportional hazards regression analysis, mark-recapture analysis, and other indices indicate that survival of kit foxes was slightly higher on the solar site, although differences between the solar and reference sites were not significantly different. Modeling indicated that year was the most significant factor affecting kit fox survival with mortality rates being considerably higher in the last 2 years of the study. The primary cause of mortality on both sites was predators – coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and golden eagles (*Aquila chrysaetos*). No foxes appeared to have died from activities related to the operation of the solar facility. Home range (95% MCP) and core area (50% MCP) sizes were similar between the solar and reference sites. For all foxes on both sites, untilled conserved lands were used proportionally more relative to the availability of this habitat type and untilled private lands were used proportionally less. For foxes that primarily used the solar site, solar panel arrays and stewardship lands were used proportionally more relative to the availability of these types while both untilled and tilled private lands were used proportionally less. For foxes that primarily used the reference site, untilled conserved lands were used proportionally more relative to their availability while untilled private lands, tilled private lands and even previously tilled conserved lands all were used proportionally less relative to their availability. Our preliminary analyses do not provide any indication that kit foxes are avoiding the solar site or that the facility is adversely affecting kit fox survival. Interestingly, kit foxes do seem to be avoiding tilled lands, including lands that have not been tilled for a number of years. Food and cover may be less available on these lands. Additional analyses to be conducted include reproductive success, movement patterns, den use and placement, food habits, prey availability, and competitor abundance on the solar and reference sites.

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## RECENT CONSERVATION ACTIVITIES ON THE CARRIZO PLAIN, SAN LUIS OBISPO COUNTY, CALIFORNIA

**Neil Havlik**[1], President, Carrizo Plain Conservancy
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The advent of two large solar power facilities in the northern Carrizo Plain area of San Luis Obispo County, California, spurred the associated establishment of nearly 35,000 acres of newly conserved lands as mitigation for the impact of the solar sites. This in turn led to renewed efforts to acquire, conserve, and restore these and additional lands both within and near the Carrizo Plain National Monument, and to ultimately link the National Monument to them. The background, initiation of the recent efforts, and current and planned efforts of conservation and restoration in the Carrizo Plain will be described.

## DESERT KIT FOX (*VULPES MACROTIS ARSIPUS*) FOOD HABITS AND COMPETITIVE INTERACTIONS WITH COYOTES (*CANIS LATRANS*) IN THE MOJAVE DESERT

**Erica C. Kelly**[1,2,3], Brian L. Cypher[1], David J. Germano[2], Paul T. Smith[2]

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[2] California State University, Bakersfield
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Kit foxes (*Vulpes macrotis*) and coyotes (*Canis latrans*) are sympatric throughout their range, resulting in the potential for interference and exploitative competition. Ecological interactions between coyotes and desert kit foxes (*V.m. arsipus*) in the Mojave Desert have not been investigated in detail and an extensive, multi-year analysis of desert kit fox diet has never been performed. We collected and analyzed desert kit fox and coyote scats from the Mojave Desert to determine exploitative competition, used camera stations to analyze habitat partitioning to determine interference competition, and incorporated prey abundance data to determine the relationship between relative prey abundance and item use by the two study species. Our findings suggest that desert kit foxes in the Mojave Desert in California prefer to consume rodents and invertebrates, but will expand their diet in response to drought or seasonal conditions. For coyotes, the most frequently occurring items consumed were rodents and lagomorphs. Thus, desert kit foxes and coyotes consumed similar items which could promote exploitative competition, but they did so in varying frequencies depending on the year and season. Desert kit foxes consistently had lower dietary diversity than coyotes, indicating that desert kit foxes are more specialist consumers while coyotes are more generalist. We also found that desert kit foxes and coyotes did not appear to partition habitat on a landscape scale. Other potential strategies, such as temporal avoidance and den use by desert kit foxes, may be sufficient to reduce competition and maintain coexistence. This balance may become imperiled as human disturbance continues in the Mojave Desert and potentially affords a competitive advantage to coyotes. Therefore, conservation and management strategies may become necessary to promote a healthy, self-sustaining desert kit fox population in the Mojave Desert in California.

## HIGH SPECIES RICHNESS SUPPORTED BY NICHE PARTITIONING OF DIVERSE WETLANDS IN THE CENTRAL SAN JOAQUIN VALLEY

**Mark Noyes**[1], Project Planner

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Located in central Merced County, the Dutchman Creek Conservation Bank supports 10 wetland dependent wildlife species including 6 large branchiopod species (endangered Conservancy fairy shrimp [*Branchinecta conservatio*], threatened vernal pool fairy shrimp [*B. lynchi* ], midvalley fairy shrimp [*B. mesovallensis*], California clam shrimp [*Cyzicus californicus*], California fairy shrimp [*Linderiella occidentalis*], and endangered vernal pool tadpole shrimp [*Lepidurus packardi*]) and 4 amphibians (threatened California tiger salamander [*Ambystoma californiense*], California species of special concern western spadefoot [*Spea hammondii*], western toad [*Anaxyrus boreas halophilus*], and Sierran tree frog (*Pseudacris sierra*]). Unlike many other areas of the San Joaquin Valley, wetlands at the Dutchman Creek Conservation Bank have a high degree of connectivity, are relatively evenly-sized, and support higher-than average large branchiopod diversity. Given the high connectivity and distribution of wetlands at the site, species occurrences appear to be non-randomly distributed throughout the landscape, which suggest spatial, and by extension, temporal niche portioning based on an elevational gradient. Despite high richness of special-status species, a majority of the landscape surrounding the Dutchman Creek Conservation Bank is at risk of being lost to development or agricultural conversion, which highlights the need to recognize this area as a regional conservation target.

## GROWTH RATE VARIATION AMONG JUVENILE CHINOOK SALMON COHORTS AND REARING CONDITIONS

**Elianna Rosenthal**[1] and Dr. Steve Blumenshine[1]

[1]Department of Biology at California State University, Fresno

The San Joaquin River (SJR) in California's Central Valley represents the historical southern-most range of Chinook salmon *(Oncorhynchus tshawytscha*). However, the construction of the Friant Dam and its water diversion canals in 1942 caused degradation of extended portions of the SJR and extirpated one of the largest Chinook salmon runs in the United States. In 2006, the San Joaquin River Restoration Program (SJRRP) was created to mitigate the negative effects of the Friant Dam on river function and integrity, and to restore a self-sustaining Chinook population below Friant Dam. The artificially changing river levels and flows of the SJR affect thermal dynamics of the rearing habitat in the restoration reaches. Temperature plays a significant role in juvenile salmonid survival, through effects on growth, metabolism, development and early life history phenology. As fish are reintroduced into the SJR, it is crucial to know the optimum thermal conditions for fish growth to facilitate a sustainable population. JCS growth rates were calculated using otolith analysis techniques. We can use juvenile growth rate data from hatchery conditions to provide a baseline reference for water temperature-growth relationships. On a larger scale across Chinook populations in North America, we can

study these relationships with bioenergetic model simulations to examine population-specific temperature regulation of manifested and potential growth. These patterns can help inform both water management and salmon conservation, especially in California where river water temperatures are highly regulated by water agencies and conflicting water demands and uses.

## SPATIAL VARIATION IN THE PREY AVAILABILITY AND PRODUCTION POTENTIAL OF JUVENILE CHINOOK SALMON ALONG THE SAN JOAQUIN RIVER RESTORATION AREA DURING DROUGHT CONDITIONS

**Karen Boortz**[1], Graduate Student

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San Joaquin River Restoration Project, kaboortz@gmail.com

A critical part of the San Joaquin River Restoration Project is estimation of juvenile Chinook Salmon (JCS) outmigration for each cohort, which depends on JCS growth and survival. This suggests the need to estimate the river's production potential for JCS with respect to prey and water temperature. However, understanding of the spatial and temporal variation of these critical habitat variables is relatively undeveloped. In cooperation with Cramer Fish Sciences, JCS net pens (4/site) were installed at sites representing a downriver gradient (Scout Island (SI), Gravelly Ford (GF), and the Mendota Wildlife Refuge (MWR)) to support a river mainstem and floodplain production study. Seston and benthic macroinvertebrate samples were taken outside and inside each net pen every two weeks from February 2016 through April 2016. Invertebrate abundances varied through an interaction between sites and sample location (in/out of net pens) with abundances from the downriver MWR sites ca. 2-10x greater than SI and GF respectively. Sample differences between inside and outside of net pens at GF could be indicative of the effects of JCS predation on invertebrates. However, we only observed differences in these sample types at GF, where prey abundances were relatively low and fish growth was correspondingly slow. The three main sites also varied greatly in invertebrate taxonomic assemblages, which along with temperature, affect the growth potential of JCS rearing in the various reaches of the restoration area. Overall, prey abundance and composition will be coupled with information on water velocity and temperature as well as disturbance events to help to guide project management in establishing realistic goals for the potential production of JCS cohorts.

# DESERT SHRUBS CAN FACILITATE A DIURNAL LIZARD, *GAMBELIA SILA*

**Michael F. Westphal**[1], Taylor Noble[2], H. Scott Butterfield[3], Christopher J. Lortie[4]

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Shrubs can play a key role in the structure of desert communities, and can function as foundation species. Understanding desert shrub ecology is therefore an important task in promoting conservation in the San Joaquin Desert. A useful model for the function of shrubs in deserts is ecological facilitation, which explores benefits that shrubs confer on their community. Facilitation has been well developed in the context of shrub-plant interactions but less well studied for plant-animal interactions. We used radiotelemetry to test the hypothesis that a dominant desert shrub facilitates Gambelia sila, a lizard endemic to the San Joaquin Desert. We hypothesized that the *G sila* would spend some part of its daily activity cycle associated with California jointfir, *Ephedra californica*, on a portion of the Elkhorn Plain where *E. californica* is the dominant shrub species. We predicted that lizard association with shrubs would increase during the afternoon peak temperature period. We relocated lizards three times daily for 24 days and scored whether lizards were within 0.5 meters of a shrub, which we used as an indicator of shrub association. We also scored lizard behavior according to a set of predefined behavioral traits. We constructed home ranges following the minimum convex polygon method and generated estimates of shrub density and relative shrub area within each home range polygon. We obtained 1190 datapoints from a sample of 27 lizards. We found substantial individual variation in how frequently lizards associated with shrubs. We found that lizards were associated with open sites significantly more often than with shrubs, but were associated with shrubs more than predicted by percent shrub area within their home ranges. Lizards were associated significantly more often under shrubs during the afternoon peak temperature period, and lizards were observed cooling under shrubs significantly more often. The frequency of association of individual lizards with shrubs was not correlated with the density of shrubs within their home range, suggesting that lizards were actively choosing to associate with shrubs. Our results suggest that shrubs may facilitate thermoregulation for a significant proportion of the *G. sila* population on the Elkhorn Plain.

# FACTORS AFFECTING SEEDLING RECRUITMENT OF ATRIPLEX POLYCARPA

**Mitchell Coleman**[1,2], Dr. R. Brandon Pratt[1]

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In the San Joaquin Valley of California, invasive annual grasses have widely invaded native saltbush communities. We hypothesized that grasses limit saltbush seedling recruitment, leading to persistently invaded grasslands and thereby inhibiting saltbush succession. We predicted that this could happen due to competition for water between grasses and saltbush seedlings. Alternatively, a dense cover of residual dry matter (RDM) produced by the grasses may negatively impact saltbush seedlings. We conducted an experiment manipulating competition, RDM presence, and shade (shade cloth control with no RDM) over a two-year period. We measured, on a seasonal basis, seedling germination, mortality, survival, and growth (% vegetative coverage) for the saltbush *Atriplex polycarpa* (Torr.) S. Watson. We also monitored soil moisture and temperature across the treatments. Grass competition and RDM both reduced *A. polycarpa* germination and survival, though RDM had a larger treatment effect than competition in the context of germination and mortality rate. Seedling survival was low in all treatments, but the rate of survival was lower in the competition and RDM treatments. Coverage of *A. polycarpa* was reduced by RDM, but not by competition. Soil moisture and temperature at 10 cm depth did not vary with RDM or competition treatments, although both varied by season. Surface soil temperatures were decreased by the presence of shade. We conclude that invasive grasses negatively influence the recruitment of *A. polycarpa* in the San Joaquin Valley, and that the primary mechanism through which this occurs is through inhibition of saltbush germination by a dense cover of RDM. Land management techniques which minimize RDM should benefit saltbush seedling recruitment.

*Key Wor*ds: invasive annual grasses, residual dry matter, competition, Valley Saltbush Shrublands, *Atriplex polycarpa*.

## BAT DATA AND HOW TO SHARE THE (BAT DATA) LOVE

William E Haas[12], Executive Director, Pacific Coast Conservation Alliance (PCCA)
Director, Central Coast Bat Survey (CCBS)

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PCCA Web Site: https://the-pcca.org, CCBS Web Site: https://centralcoastbatsurvey.org

Where to put all those data! Whether from a casual night out recording bat call files with ghoulish friends to project-specific surveys to long-term studies, especially those endeavors that have no state or federal reporting requirements, we are all collecting data that need to be preserved and shared. There's eBird, iNature . . . well, it turns out that, well, for bats, there's an AMP for that! The Bat Acoustic Monitoring protocol (BatAMP) provides a place where users can archive and visualize bat datasets generated from any type of acoustic detector or species identification process. The BatAMP goal is to combine a large number of datasets so both prominent and more subtle patterns in the data can be explored with the ultimate objective to further the understanding of migratory movements of bats as well as their seasonal activity throughout North America. Using the Central Coast Bat Survey (CCBS) study model, we'll illustrate how we use BatAMP as a conduit to archive and share our Central Coast bat data. For standardization, the CCBS survey methods were developed using North American Bat Monitoring Program (NABat, a project of the USGS) monitoring protocols. In doing so, we can augment and tailor data collection from our long-term study sites to meet NABat requirements. You can too! Too many places to upload your data you're thinking? Well, it is a goal for both programs to facilitate data sharing, in particular through the BatAMP program. Reporting your data to BatAMP will allow those data to find the NABat database in the future, even if you're not directly involved in the NABat program. Program contact information, Web site addresses, data examples, and a brief description of both BatAMP and the NABat program will augment the presentation.

## AN INDEX FOR RIPARIAN RESTORATION SUCCESS FOR YELLOW-BILLED CUCKOOS AND IMPLICATIONS FOR MANAGEMENT

Patti Wohner[1] and Jenna Stanek[1],

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Riparian forests in the southwestern U.S. were historically dynamic ecosystems where frequent hydrological disturbances created ever-changing vegetation structure and composition. The overall amount of riparian forests and successional diversity within the remaining riparian forests have declined significantly over the past century coinciding with changed hydrology, impoundments, lack of tree regeneration, and drought. Although riparian restoration for the recovery of threatened and endangered songbird species has been done, sites are typically not continually managed for high quality habitat and successional turnover. In the Kern River Valley (KRV), from 1986 to 1996, 142 ha of riparian forest was planted for Yellow-billed Cuckoo (YBCU). The YBCU population

rose to 24 pairs in 1992 due to restoration and management, but now 30 years later the trees have matured with little to no successional turnover and the number of estimated YBCU pairs have declined to 1 in 2017. During historical KRV restoration, vegetation characteristics were measured and songbird territory mapping was conducted in 0 to 11 year old restoration sites and naturally regenerated controls. As part of a current riparian restoration project, we enhanced 30 ha of mature riparian forest by redirecting water and planting cottonwood and willow trees. To facilitate our understanding of current restoration success, we implemented territory mapping at our current restoration sites and non-restored mature forest controls. We used historical data in a principal component analysis to determine songbirds and vegetation associated with YBCU territories and compared these results to our current spot mapping and vegetation data. While YBCU metapopulations dynamics may be affecting the YBCU population numbers in the KRV, our results show that all songbird species and vegetation associated with historical YBCU territory use have also declined in the KRV.

## BUREAU OF LAND MANAGEMENT 2017 PROGRAMMATIC BIOLOGICAL OPINION

**Tiera Arbogast**[1]**,** Natural Resource Specialist

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Overview of the 2017 programmatic biological opinion (2017 programmatic bo) on oil and gas activities on bureau of land management (blm) lands in the san joaquin valley. Blm initiated consultation with the united states fish and wildlife service (usfws) in 2016 as the previous 2001 programmatic bo was set to expire in september of 2016. On december 22, 2017, the usfws issued the 2017 programmatic bo, which includes a 'no jeopardy' opinion and incidental take statement for most of the common federally listed threatened and endangered species potentially impacted by oil and gas development within the southern san joaquin valley. A guiding principle is to improve the health and productivity of the land to support the multiple-use and sustained yield mission of the blm. The 2017 bo plays an integral role in achieving the multiple-use mission because it facilitates production and exploration of blm-administered fluid minerals while minimizing and mitigating impacts to federally listed species in the san joaquin valley. Projects permitted by blm under the 2017 bo are required to comply with conservation measures; this applies to a variety of blm authorizations including drilling, pipeline and powerline installation, well abandonment and operations and maintenance. Conservation measures include general project requirements, species specific measures, habitat restoration and compensation and replacement.

## ALKALI SINK AND SEEP WEED SCRUB RESTORATION BY CALTRANS NEAR VALLEY ACRES, CALIFORNIA

Stephanie Herbert[1,] Environmental Planner/Natural Sciences

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Cherry Avenue, between Taft and Bakersfield California, is a large restoration project in alkali sink and seep weed scrub habitat. These habitat communities are relatively unstudied compared to more showy habitats, and restoration treatments therefore vary in success. Caltrans' goal is to restore 17 acres of natural habitat alkali/seep weed scrub habitat utilizing a native seed collection, specialized seeding techniques, and a rigorous maintenance and monitoring methodology. Seed collection will occur at the Coles Levee Ecosystem Preserve to capitalize on a local, native seed source. The collection uses a dynamic seed list of over 20 species, where most seed lists do not incorporate more than 10 species. The application will mirror natural seeding events and precipitation conditions in the area, to maximize seed germination. These protocols have been developed by working closely with CDFW, seed collection companies, and restoration professionals. It would be beneficial to the San Joaquin natural science community to share our successes and failures in this restoration effort. Botanists and restoration specialists are increasingly demonstrating the value of native/local seed in our efforts, but the seed collection companies often do not provide these seeds in bulk. I am hoping with this talk to highlight several key issues: the increasing need for local seed, the application of a large scale seed collection, and novel restoration techniques in a highly specialized habitat. Introducing this project early in development and drawing attention to a potential problems and solutions would require introducing the topic to the community before our results have been collected. I am hoping to introduce the project this year and return to the conference in the coming years to present my results.