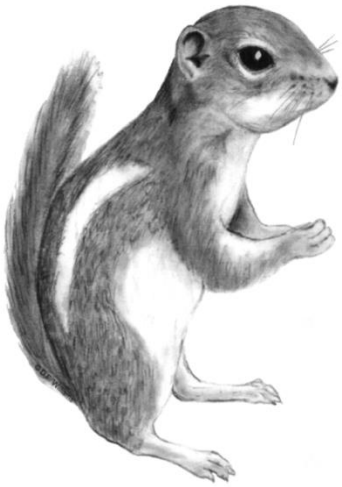
San Joaquin Valley
Natural Communities Conference
March 28, 2019
Hodel's Country Dining, Bakersfield

Program and Abstracts



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San Joaquin Valley Natural Communities Conference
March 28, 2019
Hodel's Country Dining

8:00 - 9:00	Registration	
9:00 - 9:10	Brian Cypher, Larry Saslaw	Welcome to the Conference, Moderator Schedule details and announcements
9:10 - 9:30	David Germano	*Activity and Thermal Biology of Blunt-nosed Leopard Lizards in the San Joaquin Desert of California*
9:30 - 9:50	Erin Tennant	*Space use of blunt-nosed leopard lizards (Gambelia sila) at two San Joaquin Desert protected sites*
9:50 -10:10	Mike Westphal	*Will happen, happening, happened: Blunt-nosed leopard lizard (Gambelia sila) research on the Elkhorn Plain 2016-2019*
10:10 - 10:30	Brian Cypher	*Response of San Joaquin Kit Foxes to the Topaz Solar Farm: Implications for Conservation of Kit Foxes*
10:30 – 10:50	BREAK	
10:50 - 11:10	Scott Butterfield	*One Restoration (very flexible) Plan to Rule Them All: How The Nature Conservancy and Partners are working together to strategically retire and restore farmland in the San Joaquin Valley*
11:10 – 11:30	Mitchell Coleman	*Factors affecting seedling recruitment of the shrub Atriplex polycarpa across six sites in the San Joaquin Desert, California*
11:30 – 12:30	LUNCH	***Registered participants will be served lunch.***
12:30 – 12:50		**Quick Talk Presentations**
	Erica Kelly	*Update on sarcoptic mange in Bakersfield San Joaquin kit foxes*
	Carly Summers	*Creating A Coalition Compensation Bank - Who's Interested?*
	Larry Saslaw	*San Joaquin antelope squirrel camera stations across the San Joaquin Desert*
	Geoff Grisdale	*Tipton kangaroo rats at Pixley National Wildlife Refuge*
12:50 – 1:10	Julie Vance	*CDFW Scientific Collecting Permits, Memorandum of Understanding and Incidental Take Permits: How they all work in studies and project permitting*
1:10 – 1:30	Tara de Silva	*Western spadefoots at Carnegie State Vehicular Recreation Area: Management and preliminary research results*
1:30 - 1:50	Mary J. Whitfield	*PIF Western Working Group Motus Initiative: Motus Wildlife Tracking System Network for the West*
1:50 - 2:10	Steve Blumenshine	*Applications of bioenergetics and habitat models for juvenile Chinook Salmon ecology and management – where are we now?*
2:10 - 2:30	Carie Wingert	*Review of Potential Regulatory Changes and Implications for Permitting and Compliance*
2:30 - 3:00	BREAK	Silent Auction Closes and items are purchased.
3:00 - 3:20		**SJV TWS Announcements/Awards**
3:30 – 3:50	Theresa Brickley	*Bridge replacement biology*
3:50 – 4:10	Dylan Ayers	*Using drones in field biology*
4:10 – 4:30	Eric Madueno	*Road Rehabilitation Biology*
5:00-----	**SJV TWS**	**CHAPTER MEETING, RUSTYS PIZZA, 5430 OLIVE DRIVE**

Abstracts

Oral Presentations

ACTIVITY AND THERMAL BIOLOGY OF BLUNT-NOSED LEOPARD LIZARDS IN THE SAN JOAQUIN DESERT OF CALIFORNIA

DAVID J. GERMANO, Department of Biology, California State University, Bakersfield, CA 93311-1099, dgermano@csub.edu

Because lizards are ectotherms, life-history traits are greatly influenced by variations in thermal regimes. The Blunt-nosed Leopard Lizard (*Gambelia sila*) is an endangered lizard that dominates the lizard community in the San Joaquin Desert. Because of its protected status, census protocols are in place to ensure censuses during optimal times for lizard activity but have not been confirmed by a detailed study. Also, there is concern for lizard species worldwide because of changing thermal regimes due to climate change. I studied the activity and thermal biology of *G. sila* in 2003 and 2004 on the Lokern area of the San Joaquin Desert using data from radio-collared lizards. I also gathered thermal data from cloacal temperatures of *G. sila* in 1991 from the Elkhorn Plain in another part of the desert. From these data, I found that survey protocols do not set optimal times or temperatures to most effectively census this species, and that despite projected rising temperatures, *G. sila* may not be predicted to be imperiled by a moderate change in thermal regime.

SPACE USE OF BLUNT-NOSED LEOPARD LIZARDS (*GAMBELIA SILA*) AT TWO SAN JOAQUIN DESERT PROTECTED SITES

Erin N. Tennant[1,6], David J. Germano[2], H. Scott Butterfield[3], Joseph A.E. Stewart[4], and Michael F. Westphal[5]

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[3]The Nature Conservancy, 201 Mission St, San Francisco, CA, 94105
[4]Department of Ecology and Evolutionary Biology, University of California, Santa Cruz, 1156 High St, Santa Cruz, CA 95064
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[6]Erin.tennant@wildlife.ca.gov

The endangered blunt-nosed leopard lizard (*Gambelia sila*; BNLL) is a relatively large, predatory lizard that once occurred throughout much of the San Joaquin Desert. In 2015 and 2016, we collected space use data on BNLL at Semitropic Ecological Reserve and Pixley National Wildlife Refuge, two protected sites on the San Joaquin Valley floor. We used radio-collars to collect 20 or more locations for 11 males and 13 females at Semitropic and 11 males and 8 females at Pixley. We used minimum convex polygons to

estimate home range size. At Semitropic, the mean home range size for females was 7.19 ha and for males was 5.58 ha, but differences between sexes was not significant ($t = -0.47$, $P = 0.647$). At Pixley, the mean home range size for females was 1.22 ha and males was 1.89 ha, and again differences between sexes was not significant ($t = 1.42$, $P = 0.087$). Between sites, we found mean home ranges were significantly different for both males ($t = -5.59$, $P < 0.001$) and females ($t = -3.33$, $P < 0.001$). We found that males at Semitropic had mean home ranges nearly 3 times that of males at Pixley and females at Semitropic had mean home ranges nearly 6 times larger than females at Pixley. Several females at Semitropic and made long distance movements associated with laying eggs. This behavior contributed to the large and highly variable home range sizes (range: 1.66 – 19.58 ha) and greatest distances moved between consecutive days (range: 136.8 – 1152.0 m) for females at Semitropic. Our results indicate that large home ranges and long-distance movements by females associated with egg laying, especially at sites like Semitropic, are often the case with BNLL. These data further demonstrate that BNLL need large areas to sustain populations.

WILL HAPPEN, HAPPENING, HAPPENED: BLUNT-NOSED LEOPARD LIZARD RESEARCH ON THE ELKHORN PLAIN 2016-2019

Michael Westphal, Central Coast Office, U.S. Bureau of Land Management, 940 2nd Ave, Marina, CA, 93933. mwestpha@blm.gov
C.J. Lortie, J. Lucero, M. Zulian, N. Ghazian, M. Owen, York University
E. Taylor, K. Ivey, H. Neldner, Cal Poly, San Luis Obispo
E. Nix; Central Coast Office, Bureau of Land Management
H.S. Butterfield, The Nature Conservancy

The Bureau of Land Management has been conducting ongoing recovery-focused research on the endangered blunt-nosed leopard lizard, *Gambelia sila*. We report on multiple projects, including lizard thermal ecology, community relationships among reptiles, shrubs and invasive grasses, and the response of lizards to radiocollars. We also lay out a program for our research beyond 2019.

RESPONSE OF SAN JOAQUIN KIT FOXES TO THE TOPAZ SOLAR FARM: IMPLICATIONS FOR CONSERVATION OF KIT FOXES

Brian Cypher, CSU-Stanislaus, Endangered Species Recovery Program; P.O. Box 9622, Bakersfield, CA 93389; bcypher@esrp.csustan.edu
Tory Westall, CSU-Stanislaus, Endangered Species Recovery Program
Kenneth Spencer, Althouse&Meade, Inc.
Daniel Meade, Althouse&Meade, Inc.
Erica Kelly, CSU-Stanislaus, Endangered Species Recovery Program
Jason Dart, Althouse&Meade, Inc.
Christine Van Horn Job, CSU-Stanislaus, Endangered Species Recovery Program

We conducted a 3-year investigation of the effects of the 1,421-ha Topaz Solar Farm (TSF) in central California on endangered San Joaquin kit foxes (*Vulpes macrotis mutica*). We compared various demographic and ecological attributes between the TSF and a nearby reference site. Survival was not different between sites and predators were

the primary source of mortality on both. Reproductive success did not differ between the two sites. Home ranges were significantly larger on the TSF as were movements. Kit foxes on the reference site exhibited significant selection for untilled conserved lands while foxes on the TSF used most habitats in proportion to their availability. Den use patterns were not different between sites with number of dens used per year and rate of den switching both being similar. Food item use by foxes also was similar between the sites. We did not identify any differences in demographic and ecological attributes of kit foxes that indicated adverse impacts from the solar facility. Differences in some ecological attributes were largely a result of differences in habitat composition and associated food availability between the two sites. An important caveat is that use of the TSF by kit foxes was facilitated by numerous conservation measures.

ONE RESTORATION (VERY FLEXIBLE) PLAN TO RULE THEM ALL: HOW THE NATURE CONSERVANCY AND PARTNERS ARE WORKING TOGETHER TO STRATEGICALLY RETIRE AND RESTORE FARMLAND IN THE SAN JOAQUIN VALLEY

H. Scott Butterfield, Senior Scientist, The Nature Conservancy, 707.266.2003; scott_butterfield@tnc.org
Rodd Kelsey, Lead Scientist, The Nature Conservancy
Abigail K. Hart, Project Director, The Nature Conservancy

Once a vast system of wetlands, grasslands, and shrublands, over the last century the San Joaquin Valley has been transformed into one of the most productive and important agricultural regions in the world. This landscape now boasts a $45M agricultural economy, but agriculture at this scale has come at a cost. Less than 5% of historical habitat remains for more than a dozen threatened and endangered plant and animal species, and groundwater aquifers are in a critical state of overdraft that threatens the future of agriculture in the region. In response to water plummeting groundwater levels, in 2014, California passed the Sustainable Groundwater Management Act. It is likely that more than 200,000 acres of farmland will be permanently retired in the San Joaquin Valley as a result of this new legislation. This change creates a previously unimagined opportunity for what could be one of the largest rewilding efforts in modern history, with the potential to recover imperiled species in the Valley. Over the past two years, a broad coalition including The Nature Conservancy has worked to evaluate the potential for strategically direct farmland retirement to benefit plant and animal species, achieve the region's groundwater sustainability goals, and minimize negative social and economic impacts to communities in the San Joaquin Valley. This effort has been grounded in the work of a body of experts that have been working on the natural history, conservation, and restoration of the natural systems in this landscape for decades. There are many lessons that can guide the coming transformation and potential rewilding of this landscape. A broad coalition, including The Nature Conservancy, has worked over the past two years to evaluate the potential to strategically plan farmland retirement to benefit plant and animal species, achieve groundwater sustainability for the region (and state), and minimize the negative social and economic impacts to the farming community. Restoration is expensive and takes a long time, so it is important to understand what works, what does not work, and what the expected timelines and challenges there may be during project implementation. The Conservancy worked with partners to synthesize the available information in the peer-reviewed literature on restoration of drylands in the San

Joaquin Valley and globally. This work identified some general trends in restoration approaches (e.g. active restoration is more likely to be successful than passive restoration, and soil and plant restoration is overall more successful than animal restoration), but also that there are large holes in the literature on what restoration practices are likely to work, their timelines for evaluation, and overall costs. To address some of these issues, The Nature Conservancy and its partners convened an expert workshop in January 2019 to develop a conceptual plan for restoration of retired farmlands in the San Joaquin Valley. The workshop, which brought together 40+ experts in species biology, restoration, policy, and permitting from 20+ organizations (federal, state, NGO, consulting) revealed a large amount of unpublished data, anecdotal stories, and experiences from people testing restoration practices in retired farmlands and associated "natural" dryland ecosystems over the past 25+ years in the San Joaquin Valley. The Nature Conservancy has Partners are currently working to tell those stories, analyze those data, and present the conceptual framework for how restoration of retired farmlands in the San Joaquin Valley can help lead to a rewilding of portions of the San Joaquin Valley while also benefiting the region with enhanced water security.

FACTORS AFFECTING SEEDLING RECRUITMENT OF THE SHRUB *ATRIPLEX POLYCARP*A ACROSS SIX SITES IN THE SAN JOAQUIN DESERT, CALIFORNIA

Mitchell L. Coleman[12], C. Ellery Mayence[2], Michael D. White[2], and R. Brandon Pratt[1]

[1]Department of Biology, California State University, Bakersfield, 9001 Stockdale Hwy, Bakersfield, California 93311

[2]Tejon Ranch Conservancy, 1037 Bear Trap Road, Frazier Park, California 93243

Native saltbush (*Atriplex* spp.) shrubs in the San Joaquin Valley of California have been largely extirpated from the valley floor due to disturbance, invasive species, and habitat conversion. Ecosystem-transforming annual grasses of Mediterranean origin are the chief invaders that have replaced native perennials. Understanding how these grasses affect saltbush populations is not well established. We hypothesized that saltbush seedling recruitment is limited by the presence of invasive grasses, which in turn keeps saltbush stands from expanding. We predicted that saltbush seedling recruitment would be reduced by 1) resource competition with invasive grasses during the wet season; and 2) the structural modification of grass residual dry matter (RDM) formed during senescence. Seedling recruitment in relation to invasive annual grasses was examined in the southern San Joaquin Valley, California. To test our predictions, we conducted a series of experiments and comparative studies across six isolated stands of saltbush. Our results suggest the most favorable sites for saltbush seed germination are characterized by low grass coverage (specifically RDM), such as the bare zones around and between mature shrubs, whereas long-term seedling survival is favored in sites away from established shrublands that are typically characterized by high grass coverage. This creates a seed/seedling conflict, wherein seeds germinate in lower numbers but seedlings survive at higher rates in dense grassy areas, . Together, these findings may explain the limited ability of saltbush to expand and should help inform restoration and land management activities.

CREATING A COALITION COMPENSATION BANK - WHO'S INTERESTED?

Carly Summers, Bakersfield Field Office, 3801 Pegasus Dr., Bakersfield, CA 93308, csummers@blm.gov

We (BLM) know there are small operators who are having a hard time meeting compensation requirements under our programmatic biological opinion. The challenge is the companies conduct a small number of generally small projects and do not have the resources to purchase their own land to put under a conservation easement. In these cases, they have often turned to Kern Water Bank, but the Water Bank has limited coverage for species. I would like to present to see if there is interest in getting a group of small companies together to collectively pursue a compensation bank. There may be opportunities to partner with other federal agencies, such as Bureau of Reclamation. My vision is that BLM would be the facilitator of this effort, and the outcome I anticipate from this presentation would be for biologists to help me find companies who have this need and connect them to me. At a subsequent time, BLM would host a meeting to discuss options to move forward.

WESTERN SPADEFOOTS AT CARNEGIE STATE VEHICULAR RECREATION AREA: MANAGEMENT AND PRELIMINARY RESEARCH RESULTS

Tara de Silva, Environmental Scientist, California State Parks, Carnegie SVRA, (925) 455-7873, tara.desilva@parks.ca.gov

The western spadefoot (*Spea hammondii*) is a burrowing toad that can (and does) breed in puddles as small as tire ruts on the roadside. While currently a Species of Special Concern, they are also under review for Federal listing. Relatively little is known about their life history, as compared to other special status amphibians. More importantly, there is a lack of publically available information on how best to manage populations that occur simultaneously with human activity. Carnegie SVRA, a California State Park for off-highway vehicle recreationalists, has a population of western spadefoot which breeds almost solely in active recreation areas. Park staff have developed monitoring and management protocols that allow for the protection of this species, as well as continued visitor use. Additionally, long-term research has been undertaken to better understand the terrestrial portion of their biphasic life and preliminary findings will be discussed.

PIF WESTERN WORKING GROUP MOTUS INITIATIVE: MOTUS WILDLIFE TRACKING SYSTEM NETWORK FOR THE WEST.

Mary J. Whitfield, Southern Sierra Research Station, 7872 Fay Ranch Road, P.O. Box 1316, Weldon, CA 93283, 760.378.3345, mjwhitfield.ssrs@gmail.com

The Motus Wildlife Tracking System (motus-wts.org) is an international collaborative research network of automated radio-telemetry receiving stations spearheaded by Bird Studies Canada (BSC). Motus facilitates landscape-scale research and education on the ecology and conservation of migratory animals. The current receiver station array comprises more than 400 sites from the Canadian Arctic to South America, operated by more than 100 collaborators. Despite the successes of Motus research throughout the

existing network, there are notable and significant gaps across the western portions of North and South America. The lack of Motus stations in the west further exacerbates the migration ecology knowledge gap between eastern and western populations of small birds (Carlisle et al. 2009, Bayly et al. 2018). Building on the success of the Motus Wildlife Tracking System Network in the east, we propose to expand the use of this technology to meet pressing information needs for western birds and other wildlife to inform conservation actions within the next decade. In this presentation, I will talk about Motus , Partners in Flight Western Working Group's Motus initiative and ways that people can help build the Motus network in the west.

APPLICATIONS OF BIOENERGETICS AND HABITAT MODELS FOR JUVENILE CHINOOK SALMON ECOLOGY AND MANAGEMENT – WHERE ARE WE NOW?

Steve Blumenshine, California State University, Fresno, M/S SB73; 559.278.8770; sblumens@csufresno.edu

Bioenergetics and habitat models to address growth or consumption by Chinook Salmon use a standard set of coefficients to relate metabolic process to temperature for any population of the broad-ranging species. However, recent studies have shown varying temperature tolerances in salmonids, which may suggest that populations in the southern end of the range (e.g. San Joaquin River) likely tolerate higher temperatures than more northern populations. Generalization about predator and prey energy densities may also affect and bias simulated growth and consumption estimates.

Our approach uses several lines of evidence to better understand relationships between temperature and salmonid growth. We focus this effort on juvenile Chinook Salmon in the San Joaquin River Restoration Program, which seeks to restore the southern-most run in North America, as well as other populations in the San Joaquin-Sacramento drainage. We used data from wild and hatchery cohorts along the SJR, meta-analyses for other populations, and simulations with inSTREAM and bioenergetics models.

Multiple lines of evidence suggest that juvenile Chinook Salmon growth rates in southern rivers are quite robust, despite the degraded conditions of these ecosystems. We found that estimated scope for growth and consumption rates differ by ca. 35% by using direct versus published energy densities of juveniles. Implied growth performance is greatly affected by assumptions of juvelines' thermal history.

Our broader main objectives are to generate population and habitat specific bioenergetics algorithms and encourage a broader use of population-specific relationships of temperature and growth rate. A focus on these approaches can help fisheries managers set realistic expectations for restoration projects and better inform conservation goals of water management in California.

REVIEW OF POTENTIAL REGULATORY CHANGES AND IMPLICATIONS FOR PERMITTING AND COMPLIANCE

Carie Wingert, Senior Environmental Scientist, [1] Quad Knopf Inc. (QK) – Clovis Office, 601 Pollasky Avenue, Suite 301, Clovis, CA. 93612, Carie Wingert@QKInc.com, Office: (559) 449-2400, Cell: (805) 748-1350

In an ever-changing regulatory environment, it is important to stay current on proposed changes in natural resource legislation and to communicate with clients how these changes could affect their projects. To foster an increasing awareness of regulatory issues, QK has been a member of the Natural Resources Task Force, California Council for Environmental and Economic Balance (CCEEB) for the past five years. CCEEB is actively engaged in reviewing and commenting on natural resource (and other) legislation at the draft stage. In this presentation, QK will highlight some of the more significant legislative proposals and discuss the potential effects those may have on projects, including a brief review of some of the proposed revisions to the California Fish and Game Code that was completed by the California Law Revision Commission.

BRIDGE REPLACEMENT BIOLOGY

Theresa Brickley, Associate Environmental Scientist, [1] Quad Knopf Inc. (QK) – Clovis Office, 601 Pollasky Avenue, Suite 301, Clovis, CA. 93612,Theresa.Brickley@QKInc.com, Office: (559) 449-2400, Cell: (415) 640-1289

Many bridges in the San Joaquin Valley are being replaced or retrofitted because of seismic deficiencies. QK biologists provided environmental services for many projects for the California Department of Transportation, city and county municipalities, and other clients. Bridge projects are unique and challenging because the construction activities are substantial, long-lasting, and often located over protected waterways and riparian habitat where natural resources are concentrated. Construction schedules are often delayed because of high water levels and unsafe conditions, and to protect resources. To ensure compliance with regulatory requirements, biologists are contracted to conduct biological surveys and prepare permit applications, provide environmental training to workers, install and examine netting to exclude birds and bats, conduct on-site monitoring, and document post-construction reclamation. Biologists must understand project permit requirements, communicate with a variety of personnel, be observant in the field, and keep detailed records. Most importantly, they must be proactive in recognizing and addressing concerns before they become permit violations. In this presentation, we discuss common issues encountered and highlight case study examples of unique problems and solutions.

USING DRONES IN FIELD BIOLOGY

Dylan Ayers, Associate Environmental Scientist, [1] Quad Knopf Inc. (QK) – Clovis Office, 601 Pollasky Avenue, Suite 301, Clovis, CA. 93612,Dylan.Ayers@QKInc.com, Office: (559) 449-2400, Cell: (813) 244-6515

Unmanned Aerial Vehicles (UAV), commonly referred to as "Drones" have become powerful tools that have only just started to become integrated into many industries. This presentation explores the potential uses of UAV technology in the field of natural resource management and the ways that QK has implemented these new tools to compliment traditional techniques used in field biology. By using standard flight planning software such as DroneDeploy, DJI GSPro, or Pix4D, UAV flights can be tailored to capture images of specific areas that are later combined to create high-resolution orthomosaics. Captured orthomosaics can be used to digitize habitats and vegetation communities, identify compliance issues and violations, measure impacted areas, and identify nest/burrow locations at resolutions nearing 0.5 inches. This technique provides a much higher resolution image compared to widely available satellite imagery. In addition to high resolution aerials, the photogrammetry process creates "point clouds" which can be used to extract topographic information (DSM, DTM, DEM) that can be very accurately measured and used to calculate extremely precise volumes of cut and fill. Reconnaissance and surveillance tasks are well suited to an aerial camera platform and QK has used UAVs to capture photos and video of hard to reach areas. The perspective offered by UAVs provides a unique view of project sites and work areas that ground-based photos just can't achieve. Habitat delineations and construction monitoring require significant effort, and a large part of documenting these activities can be achieved much more efficiently and with greater visual impact than using traditional ground-based photographic documentation.

ROAD REHABILITATION BIOLOGY

Eric Madueno , Associate Environmental Scientist, Quad Knopf Inc. (QK) – Bakersfield Office, 5080 California Avenue, Suite 220 Bakersfield, CA 93309,Eric.Madueno@QKInc.com, Office: (661) 616-2600, Cell: (661) 778-5250

Motor transportation is one of the top forms of transportation in California. To ensure public safety, roadway rehabilitation is of upmost importance. QK biologists provides environmental services for many transportation projects for the California Department of Transportation, city and county municipalities, and other clients.. QK is conducting biological surveys and construction monitoring for an ongoing Caltrans roadway rehabilitation project along State Route 58 east of Bakersfield that contains a high concentration of San Joaquin kit fox both as residents and transients. As the Project has progressed, QK monitored 53 SJKF dens, including one natal den where pups were successfully raised and several dens that have been active through the course of the Project. Environmental sensitive areas (ESA) were established to protect active dens along the construction area. Biologists monitored these dens during daily and nightly construction activities and have documented SJKF behavior during these events. In this presentation, we provide information on the behavior and interactions of the San Joaquin kit fox related to construction activities, and provide examples of unique problems encountered and solutions that were developed. .