San Joaquin Valley Natural Communities Conference
March 21, 2024
Hodel's Country Dining, Bakersfield

Abstracts

Oral Presentations

DETERMINING EFFECTIVE MANAGEMENT TECHNIQUES FOR THE SAN JOAQUIN VALLEY GIANT FLOWER-LOVING FLY (RHAPHIOMIDAS TROCHILUS)

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Long-term habitat restoration efforts within the Sand Ridge Preserve have been conducted in an attempt to determine best management practices for the sand dune habitat that supports a variety of sensitive species. The Sand Ridge Preserve, managed by the Center for Natural Lands Management (CNLM), is one of the last remaining inland sand dune complexes within California's Central Valley and is overrun by non-native Mediterranean annuals. In conjunction with CNLM, our studies aimed to help determine effective management techniques to 1) help reduce non-native vegetation while maintaining arthropod diversity, and 2) help direct shrub enhancement efforts for expanding potential habitat for the San Joaquin Valley giant flower-loving fly (*Rhaphiomidas trochilus*; SJVF), a species that is on the brink of extinction. The first study evaluated whether two different habitat restoration treatments affected arthropod diversity, which may be important for maintaining levels of potential prey for the SJVF. We found that neither restoration method significantly affected arthropod diversity when compared to the control. These results suggest that non-native grasses did not adversely affect dune arthropods and that unwanted vegetation removal within the preserve will maintain potential SJVF prey diversity. The second study assessed whether there were associations between shrub-layer characteristics and SJVF occurrence within SJVF-occupied habitat. Our results show that SJVF do not have a preference for specific vegetation species; however, increased SJVF activity is associated with increasing shrub density and percent cover. Both of these findings are important for decision makers interested in management and recovery of the SJVF, as well as the related federally-endangered Delhi Sands giant flower-loving fly (*R. terminatus abdominalis*), experiencing a similar threat of extinction.

CDFW ADVANCE MITIGATION FOR WILDLIFE CONNECTIVITY ACTIONS

Reagen O'Leary; Connectivity Advance Mitigation Lead for Central Region
Laurel Low; Connectivity Advance Mitigation Coordinator
Andy Amacher; Advance Mitigation Liaison to Caltrans
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On January 1, 2022, Senate Bill 790 was codified in California Fish and Game Code (Fish & G. Code sections 1955-1958) which enables California Department of Fish and Wildlife (CDFW) to approve compensatory mitigation credits for wildlife connectivity actions within CDFW's Mitigation and Conservation Banking Program and Regional Conservation Investment Strategy Program's Mitigation Credit Agreements. CDFW is developing guidelines for how to implement this innovative approach to advance mitigation. The draft Wildlife Connectivity Advance Mitigation Guidelines (Guidelines) were made public for comments in October 2023 with a 90-day review period which ended in January 2024. The CDFW Wildlife Connectivity Advance Mitigation Team is now in the process of reviewing and incorporating comments received. Once completed, we will post the Guidelines to CDFW's public website, with a goal of early summer 2024. Once the Guidelines are posted, CDFW will enter a pilot stakeholder engagement phase which will involve collaborating with stakeholders to inform future updates to the Guidelines. This presentation will (1) review new legislation related to wildlife connectivity; (2) provide an overview of what wildlife connectivity actions would encompass and their importance to special status species and habitats; (3) provide an overview of ecological criteria for wildlife connectivity action development; and (4) provide insight into the public comments received and how the Guidelines are progressing.

SPECIES DIVERSITY OF LEGLESS LIZARDS (*GENUS ANNIELLA*)

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Brian Berry; Aera Energy, Bakersfield
Clara Chase; Bureau of Land Management, Bakersfield
Geoff Hoetker; Stantec, Bakersfield
Liam Huculak; Aera Energy, Bakersfield
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A new legless lizard genus and species, *Anniella pulchra,* was described in 1852 from northern Baja California. In 1940 a second species, *Anniella geronimensis,* was described from Isla San Geronimo, on the west side of Baja California. After 14 years of detailed surveys of legless lizard populations in California, in 2013, James Parham and I described four new *Anniella* species from different parts of the range of the *Anniella pulchra.* Kern County is the only county where all five species can be found. We chose species names to honor four scientists who helped make the UC Berkeley Museum of Vertebrate Zoology a major research institution. The first MVZ director, Joseph Grinnell, was hired in 1908. He was the director for 39 years. He planned and directed vertebrate surveys of protected areas in California including Death Valley, Joshua Tree, Lassen, and Yosemite *(Anniella grinnelli).* Annie Alexander donated one million dollars to UC Berkeley in 1908 to establish a vertebrate zoology museum. She led and funded expeditions for 42 years *(Anniella alexanderae).* Charles Camp was a student of Joseph Grinnell. He was a Grinnell field assistant during vertebrate surveys in Yosemite and later he was hired as director of the UC Berkeley Museum of Paleontology *(Anniella campi).* Robert Stebbins was the first MVZ curator of herpetology. He wrote three editions of the book, *A Field Guide to Western Reptiles and Amphibian and Reptiles*. The illustrations in the book were all painted in watercolors by Stebbins. He was also my Ph.D. advisor *(Anniella stebbinsi).*

A PROJECT-SPECIFIC SURVEY PROTOCOL FOR PRESENCE OF OR NEGATIVE FINDING OF THE TEMBLOR LEGLESS LIZARD (*ANNIELLA ALEXANDERAE*)

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The Temblor legless lizard (TLL) (*Anniella alexanderae*) occurs along the southwestern edge of the San Joaquin Valley. It inhabits saltbush scrub and annual grassland habitats in sandy soils, is fossorial, and can be difficult to detect. The California Fish and Game Commission advanced the species to candidacy for listing under the California Endangered Species Act (CESA) on July 1, 2022, and as such, the TLL now receives the same legal protection afforded to an endangered or threatened species under CESA. If the TLL remains a candidate for listing or is officially elevated to listing under CESA, this will have regulatory implications for oil and gas, renewable energy, and other development in the region. A project-specific survey protocol for presence of or negative finding of the TLL was recently developed for a proposed project in western Kern County. The survey protocol was reviewed and approved by California Department of Fish and Wildlife (CDFW). Results of the survey effort will be used to support California Environmental Quality Act (CEQA) documentation for the project and to determine if a state Incidental Take Permit (ITP) for TLL may be required. The purpose of this presentation is to share information regarding the TLL survey protocol and negotiation process with CDFW.

DIGGING INTO DETECTABILITY: UNCOVERING HOW TEMPERATURE INFLUENCES DETECTION PROBABILITY OF THE FOSSORIAL TEMBLOR LEGLESS LIZARD

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Knowledge of species distributions is critical for conservation, but surveying for rare, under-studied species presents many challenges. A two-phase occupancy study can increase knowledge gained from early occupancy studies of a species by quickly using data from the first survey period to revise the study design for a second period. The Temblor legless lizard, *Anniella alexanderae*, is a recently described fossorial species found in the southwestern San Joaquin Valley, CA, USA, and its status is currently under review by state and federal wildlife agencies. As a fossorial species that is rarely surface active, Temblor legless lizards might be unavailable for detection at certain times of year or under inhospitable conditions (e.g., hot, dry weather), indicating the importance of accounting for false negative surveys when determining its distribution. We used a multi-scale occupancy model to disentangle detection probability, availability for detection, and occupancy for Temblor legless lizards. Focusing our effort from mid-February to mid-April when temperatures are mild and soil moisture is expected to be higher near the surface, we surveyed a total of 89 sites in 2022 (n=60) and 2023 (n=68), detecting Temblor legless lizards at 12 sites, including 5 new localities. Detection probability was positively related to temperature during our late winter-early spring survey period, and availability for detection was consistently high with minimal fluctuation within each year. Nevertheless, repeated surveys

with non-detection are needed to have confidence that this fossorial lizard does not occur at a site. Temblor legless lizards were more likely to occur at sites near ephemeral streams and in areas without high clay soil content, but more investigation is needed into drivers of occurrence. Our study provides valuable information for optimizing surveys for Temblor legless lizards and suggests promising directions for future research on this species' ecology.

A CASE STUDY OF THE ROLE OF FIRE AND GRAZING IN THE REDUCTION OF *ATRIPLEX* SHRUBLANDS IN THE SAN JOAQUIN DESERT

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In deserts that have not been invaded by non-native forbs and grasses, fire is typically not a factor in their ecology because of low fuel loads; however, if they do occur, fires kill shrubs and maintains a grass subclimax. Since the mid-19th Century, the San Joaquin Desert has been invaded by non-native grasses and forbs, and fires caused either by lightning strikes or humans likely led to large areas losing shrubs. Overgrazing by livestock in the mid to late 1880s probably also contributed to the loss of shrubs. In 1997 at the beginning of a grazing study on the Lokern in western Kern County, California, a wildfire swept through a part of the study area. To avoid confounding effects, the rest of the study site was prescribed burned. I used this event to determine the effects of fire on *Atriplex* shrubs at the site, a major vegetative component of this desert. Virtually no shrubs survived the prescribed burn (99.9% killed). By 2000, *Atriplex* shrubs began to return to the site, likely due to heavy rains in winter 1997–1998 that washed down seeds from living shrubs upslope off the study site. Counts across all eight plots (wildfire and prescribed fire) showed *Atriplex* returning to most, but not all, of the study site. Cattle grazing also led to significantly less shrub volume than in control plots in 2001, but by 2006, only shrubs in one of the two plots grazed by cattle had lower volume than the two control plots. These data reaffirm the need to manage conserved lands in the San Joaquin Desert to control the growth of non-native grasses and forbs so fires do not remove shrubs.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE OFFICE OF SPILL PREVENTION AND RESPONSE ENVIRONMENTAL SCIENTIST'S ROLES DURING AND AFTER A PETROLEUM OR RENEWABLE FUEL INCIDENT

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The Office of Spill Prevention and Response (OSPR) was delegated by the Department of Fish and Wildlife to be the public trustee agency with custodial responsibilities for protecting, managing, and restoring the state's fish, wildlife, and plants. It is one of the few state agencies in the nation that has major pollution response authority and public trustee authority for wildlife and natural habitats. The state mandate ensures that prevention, preparedness, restoration, and response will provide the best achievable protection for California's natural resources. When a spill or potential spill is reported to California Office of Emergency Services and/or the National Response Center they will notify OSPR's Field Response Team (FRT). The FRT includes a Wildlife Officer, an Oil Spill Prevention Specialist, and an Environmental Scientist available to respond 24 hours a day, 365 days a year. The Environmental Scientist responding to the spill takes on many roles depending on the complexity of the spill. During a small spill an Environmental Scientist will fill the role

of the Environmental Unit Leader and Wildlife Branch Director, protecting Resources at Risk, conducting surveys, monitoring and assessing the cleanup activities, and determining cleanup endpoints. In addition to spill response, Environmental Scientists participate in drills and exercise throughout the state and prepare geographic and area response plans.

HOW CDFW OSPR RESPONDS TO IMPACTED OILED WILDLIFE DURING AN OIL SPILL

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I will use a short PowerPoint during my 5-minute talk to briefly discuss how the California Department of Fish and Wildlife Office of Spill Prevention and Response (CDFW OSPR) responds during an oil spill to wildlife that are or at risk of being oiled. I will touch on: Why OSPR responds, activation of the wildlife Branch, the effects of oil on wildlife, and why the Oiled Wildlife Care Network (OWCN) is important.

CALM'S WONDERFUL WILDLIFE CARE CLINIC AND ITS IMPACT ON OILED WILDLIFE AND THE SAN JOAQUIN KIT FOX

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With the support of UC Davis, the Oiled Wildlife Care Network (OWCN), The Wonderful Company, and the Wheeler Foundation, CALM is now home to the Wonderful Wildlife Care Clinic (WWCC). This clinic is the first inland oiled wildlife response facility and state of the art animal hospital.

CO-INFECTION WITH CANINE DISTEMPER VIRUS AND COCCIDIOIDES SPP. IN SAN JOAQUIN KIT FOXES IN THE PANOCHE VALLEY OF CALIFORNIA

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Canine distemper virus (CDV) causes a highly contagious, often fatal disease in carnivores. Infection with CDV causes immunosuppression, increasing susceptibility to secondary infections. *Coccidioides immitis* and *C. posadasii* are two fungal pathogens that cause coccidiomycosis. While *Coccidioides spp.* infections have caused significant disease in humans and domestic animals throughout the Western hemisphere, sporadic cases have been reported in free-ranging wildlife with varying severity of pathogenicity ranging from non-clinical infections to fatal disease. In California, nearly all reports are caused by *C. immitis*. In 2019 and 2022, the cadavers of four endangered San Joaquin kit foxes (*Vulpes macrotis mutica*) from the Panoche Valley in

San Benito County, California, were submitted for necropsy to the California Department of Fish and Wildlife and the California Animal Health and Food Safety Lab. Two kit foxes were observed to have neurologic signs prior to death (e.g., seizures, circling, ataxia, and incoordination), while the other two kit foxes were found dead. Gross examination and histopathology showed that three of the four kit foxes were infected with CDV, while the fourth kit fox had vehicle-related trauma. All four kit foxes also had pulmonary granulomas with fungal spherules containing endospores characteristic of *Coccidioides* spp. The three kit foxes co-infected with CDV also had evidence of a systemic, disseminated infection with *Coccidioides* spp. Although *C. immitis* has been documented in a San Joaquin kit fox by serology, these are the first case-reports of *Coccidioides* spp. associated lesions in San Joaquin kit foxes.

NATAL DEN OBSERVATIONS AND FEEDING HABITS OF DESERT KIT FOXES

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Desert kit fox (*Vulpes macrotis arsipus*; DKF) range includes parts of Nevada, Utah, California, Arizona, New Mexico and into western Texas. In California, DKF can be found in the Mojave Desert portions of Kern, San Bernardino, and Los Angeles Counties. In the spring 2021, I was asked to help with documentation of the presence of DKF on two proposed solar electric generation facilities and then with the implementation of a CDFW approved DKF eviction plan. I documented, with game cameras, the active burrows of the desert kit fox within the area. Most notable to me is the photographic and video 5 – 20 second documentation of the feeding behaviors of reproductive pairs of desert kit fox, including frequency, prey delivery, diversity of prey items, and the interactions of the adult parents during prey delivery to the natal den. Monitoring via game cameras is ongoing at the solar installation sites providing insights to desert kit fox behavior pre, present and post to installation of solar panels as well as pupping behavior and other species uses of kit fox burrows.

YELLOW-BILLED CUCKOO POPULATION DYNAMICS ON THE SOUTH FORK KERN RIVER

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The South Fork Kern River Valley has been recognized as an important Yellow-billed Cuckoo (*Coccyzus americanus*) breeding area for over 40 years and has a long history of cuckoo research (Gaines 1977, Laymon et al. 1997, Whitfield and Stanek 2011, Jacobo et al. 2020). The population has historically fluctuated between 2 to 24 pairs, with an average of 11 pairs (Laymon et al. 1997). After the 2012-2016 drought, the estimated South Fork Kern River Valley cuckoo population plummeted from eight estimated breeding territories in 2012 (Stanek and Stanek 2012) to only one in 2016. The impact of this drought was likely exacerbated by the onset of the prolonged megadrought (2001-2021) that affected most of California and other parts of the southwest (Williams et al. 2022). The Kern cuckoo population, however, has recovered to 10 breeding territories in 2022 despite the ongoing drought. In this presentation, we will update last year's talk on this topic highlighting

some of the new information that we have collected on unexpected local and long distance cuckoo movements due to our Motus setup, as well as implications for interpreting cuckoo survey data.

EVALUATING METHODS FOR ESTIMATING POPULATION SIZE AND CHARACTERISTICS OF WESTERN JOSHUA TREE (*YUCCA BREVIFOLIA*) IN THE MOJAVE DESERT, CA

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The Western Joshua tree (*Yucca brevifolia*; WJT) is a culturally and ecologically important species under serious threat across a large portion of California's desert. In 2020, the Western Joshua Tree was listed as a candidate species under the California Endangered Species Act (CESA). As a result of this new legislation, population surveys have been increasingly necessary to estimate WJT impact and mitigation requirements for permitted projects. Regulators, consultants, and conservation scientists need a standardized method for surveying WJT woodlands. We compared the cost, efficacy, and quality of results for different methods for quantifying WJT woodlands on impact and mitigation sites, including 100% coverage counts, sub-plot counts, transect surveys, fixed-ratio plots, and LiDAR. When high quality data is available, LiDAR is the most cost effective method and yields accurate results. In most cases a sub-sample method provides the best accuracy for the cost.

CDFW MONITORING AND WILDLIFE MANAGEMENT PROJECTS ON THE CARRIZO PLAIN

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I will be discussing the long term monitoring of San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia silus*) surveys, the current status of tule elk (*Cervus canadensis nannodes*) and pronghorn (*Antilocapra americana*), biodiversity monitoring, and other projects in development on the Carrizo Plain.

NAVIGATING UNCHARTED TERRITORY: INSIGHTS FROM TEMBLOR LEGLESS LIZARD SURVEYS

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Ongoing coverboard surveys are being conducted for the Temblor legless lizard (TLL) (*Anniella alexanderae*). Given the absence of an officially approved and published survey protocol for this species, we find it crucial to share insights gained during the 2024 survey season. Until additional temporary survey methods gain acceptance or an official protocol is established, it may be advantageous to explore alternative approaches beyond coverboard surveys. Furthermore, as awareness of this species grows, collaborative efforts should contribute fresh ideas to shape the final survey protocol. During the 2024 season, we encountered specific challenges related to the level of effort needed for the survey protocol and the ability to quickly identify the presence of the species. These experiences underscore the need for adaptive strategies and a collective approach in refining the survey methodology.

REPATRIATING BLUNT-NOSED LEOPARD LIZARDS TO PANOCHE PLATEAU: LESSONS FROM YEAR 1

Rory S. Telemeco; Fresno Chaffee Zoo
Emily Bergman; Fresno Chaffee Zoo
Steven Sharp; Fresno Chaffee Zoo
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In 2020, the unique, northern clade population of Blunt-nosed Leopard Lizards (*Gambelia sila*) on Panoche Plateau declined to less than 10 individuals. We received emergency permission to collect 5 animals in 2020 and 2 animals in 2021 to found an assurance colony at Fresno Chaffee Zoo. We successfully bred these animals, producing >100 offspring in three years, and released 17 ~10-month old animals back to Panoche Plateau in 2023. Each animal was radio-collared and regularly monitored throughout the 2023 active season. Although lizards displayed high survival (41% confirmed survival, and 47% slipped collars with no sign of predation), they moved and grew little compared to wild animals, and they did not reproduce. We discuss potential causes for minimal movement and growth and changes we are implementing to our protocols to improve success moving forward. We will continue releasing and monitoring *G. sila* annually until >50 natural-born female *G. sila* successfully reproduce for at least 2 years, at which point we think the population will be able to self-sustain and grow to carrying capacity.

GIANT KANGAROO RAT POPULATION EXPANSION IN NORTHERN CARRIZO PLAIN

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Giant kangaroo rats (*Dipodomys ingens*; *GKR*) are a federally and state listed endangered species endemic to the San Joaquin Valley and their largest population center is in the Carrizo Plain, with much of that population concentrated in the Carrizo Plain National Monument. In 2015, Sequoia Riverlands Trust (SRT) began managing approximately 8,000 acres of mitigation land resulting from solar voltaic development in the

northern Carrizo plain. This land was likely used for intensive cattle ranching and dryland farming until the mid 1900's which may have historically prevented GKR from utilizing the habitat. Over 9 years of management, SRT has tracked the GKR population with mark-recapture live-trapping and non-invasive sign surveys, and documented increased presence of giant kangaroo rats over time. Our most recent surveys indicate a large increase in GKR activity since 2018. Our results, in combination with historical aerial imagery, show that the giant kangaroo population continues to increase on the property.

UPDATES FROM THE RANGE: 10 YEARS OF THE RANGELAND MONITORING NETWORK

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The ecological function of rangelands generates productivity, sequesters carbon in the soil, supports robust wildlife populations, and can be viewed as a key determinant of financial and ecological sustainability. Point Blue's Rangeland Monitoring Network (RMN) seeks to preserve the ecological value of rangelands and recommend conservation actions that enhance their function for people and wildlife. Since the inception of RMN in 2014, our biologists have collected information on soils, plants, and birds from over 500 unique locations on 100 ranches across the state, including the San Joaquin Valley. We evaluate key indicators of ecological function related to soil health, vegetation, and the bird community. This presentation focuses on the metrics around vegetation and birds. We use line-point intercept and relevé methods to assess vegetation cover and composition, and to evaluate species richness, functional groups, and presence of noxious weeds. Avian point count surveys are conducted during the peak of the breeding season (April – June) to evaluate the presence of focal bird species by habitat type such as grassland, oak woodland, and riparian. RMN's data inform spatial and temporal variation across ranches, relationships between management practices and ecological function, and provide ranchers and other stewards of the land with tools to monitor ecological function on California rangelands.

RESPONSE OF SAN JOAQUIN KIT FOXES TO ROAD CONSTRUCTION SITES

Brian Cypher; CSU-Stanislaus Endangered Species Recovery Program
Erika Noel; McCormick Biological, Inc.
Erica Kelly; CSU-Stanislaus Endangered Species Recovery Program
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The California Department of Transportation (Caltrans) occasionally conducts construction projects within the range of the San Joaquin kit fox (*Vulpes macrotis mutica*). Kit foxes have been known to access construction sites and their presence, particularly if they establish dens, can cause significant delays in the work. We intensively monitored radio-collared kit foxes on study areas encompassing two large construction project sites in Bakersfield, CA to assess their activities on and around the sites. One project was the Centennial Corridor (CC) road construction project and the other was the Mercy Southwest Hospital (MSH) expansion construction project. Kit foxes were present in the area encompassing both projects before and during the

active construction work. Camera station surveys were conducted on 10 occasions at the CC site and kit foxes were detected using the site in nine of the ten surveys, including the last one. Four of the five foxes captured at the CC site were radio-collared and all four were detected using the site. Of the 2,402 locations collected, 29.5% were on the site. At the MSH site, 21 of the 38 foxes captured were radio-collared and 15 of these were detected using the site. Of the 15,379 locations collected, 7.8% were on the site. Survival probability for foxes with >5% of their locations on the MSH site (n = 10) and <5% of their locations on the site (n = 10) was 0.81 and 0.79, respectively, and did not differ significantly. Two foxes tracked for most of the study gradually decreased use of the MSH site as construction activities increased, but then suddenly increased their use of the site toward the end of the study. Based on our results, resident kit foxes will continue using a construction site despite extensive disturbance and intensive construction activities occurring on the site. Excluding kit foxes from accessing a construction site is extremely difficult, if not impossible. Thus, we highly recommend site inspections prior to the initiation of work each day to ensure that foxes are not present and that new dens are not being created. Any new dens should be removed using approved methods as soon as possible. Foxes should be discouraged from denning in materials stored on site using fencing or by elevating the materials off the ground. All workers should receive training in identifying foxes and their sign.

RESPONSE OF MESOCARNIVORES TO MOONLIGHT IN AN URBAN ENVIRONMENT: A TEST OF COMPETING HYPOTHESES

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Mesocarnivores often occupy predator and prey positions in trophic webs. This dual role makes predicting their behavioral responses challenging when faced with risk. While risk can be assessed using multiple senses, vision is commonly used by many species to evaluate risk, and light levels can influence visibility. Because light levels change over the lunar cycle, the degree of visibility in the environment also changes. This variation in nocturnal visibility may influence the activity of mesocarnivores and there are two hypotheses potentially explaining changes in their activity (i.e., predation risk allocation hypothesis, visual acuity hypothesis). The predation risk allocation hypothesis predicts the activity of prey will be lunarphobic to avoid being seen by predators. The visual acuity hypothesis predicts the activity of species with good night vision (tapetum lucidum) will be lunarphilic as their ability to see will be enhanced. I tested these hypotheses by monitoring the activity of four species of mesocarnivores in an urban environment over multiple lunar cycles from 2020 to 2022. I used remote cameras at campuses across urban areas in Bakersfield to monitor the activity of four mesocarnivores (domestic cats [*Felis catus*], San Joaquin kit foxes [*Vulpes macrotis mutica*], striped skunks [*Mephitis mephitis*], and Virginia opossums [*Didelphis virginiana*]). I used generalized linear mixed models and AIC model selection to determine the effect of moonlight on the activity of mesocarnivores after accounting for other environmental effects. I found that moonlight was not a meaningful predictor of mesocarnivore activity. Furthermore, none of the species in this study exhibited lunarphobic or lunarphilic behavior. The results of this study do not support the predation risk allocation hypothesis or the visual acuity hypothesis. The nocturnal activity of mesocarnivores in urban environments may be influenced by other factors aside from moonlight.

COMPARATIVE PHYLOGEOGRAPHY OF MOJAVE-DESERT-DERIVED ENDEMIC SPECIES OF THE SAN JOAQUIN DESERT

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Species-level endemism has long been recognized as a feature of the San Joaquin Desert. This desert biome is receiving new attention, and its affinity for its neighbor and progenitor biome, the Mojave Desert, is now being appropriately, and informatively, described in genetic terms. Important papers on genetic structure across populations of the blunt-nosed leopard lizard and the desert night lizard published in the last few years show highly similar patterns of colonization, differentiation, and, potentially, secondary contact between the San Joaquin and the Mojave forms of these species, revealing the historical establishment of the San Joaquin Desert and thus its legitimacy as a unique and conservation-worthy biome. Proposed additional work on other species, including the desert glossy snake (*Arizona elegans*), the San Joaquin coachwhip (*Masticophis flagellum ruddocki*), and the yellow-backed spiny lizard (*Sceloporus uniformis*), will allow us to confirm whether these patterns hold across numerous taxa. The conservation outcome will be a renewed focus on the San Joaquin Desert as a biome and biodiversity hotspot, which in turn will lead to increased investment in landscape scale habitat protection and restoration.

DEVELOPMENT AND EVALUATION OF AN ENHANCED METHOD FOR SWAINSON'S HAWK (*BUTEO SWAINSONI*) NEST MONITORING

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The California Department of Transportation identified the need for monitoring a known Swainson's hawk (*Buteo swainsoni*) nest for the Cottonwood Creek Bridge Replacement Project in Madera County, due to the proximity of the nest to the project. A nesting pair of Swainson's hawks and three young at a nest approximately 0.45 mile from the Project were monitored for five days a week while construction activities were occurring from April to July 2023. QK developed an enhanced method of gathering behavioral data of nesting hawks using an App-based collection method that was tested in 2023 during a pilot study conducted for that bridge project and which will be continued in 2024. We describe modifications made to the App, provide a short tutorial for using the App, and describe the advantages of using the App compared to the standard method of using a hard-copy data form. We provide examples of data gathered, which includes examples of the automated data output into an Excel spreadsheet that eliminates data transcription and entry from hard copy field forms and examples of graphs of behavioral data that can be generated. We provide a summary of findings from the pilot study, some problematic aspects of the methodology that were encountered and solutions that were developed, next steps in the study, as well as data gaps that should be filled by other means.

RIPARIAN RESTORATION, ANTHROPOGENIC IMPACT REMEDIATION, AND THE RETURN OF THE LEAST BELL'S VIREO (*VIREO BELLII PUSILLUS*) AT THE BIG TUJUNGA CONSERVATION BANK ADJACENT TO THE ANGELES NATIONAL FOREST

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The Big Tujunga Conservation Bank (Big T) was established for the restoration and permanent protection of habitat for the federally threatened Santa Ana sucker (*Catostomus santaanae*) and California mountain lion (*Puma concolor*), within and adjacent to the Big Tujunga Creek, Los Angeles, CA. Prior to establishment, Big T was heavily impacted by daily and persistent trespass related impacts including dumping, dam building, religious ceremonies, hunting, recreation, and other illegal activities. In 2022, Big T was fenced, no trespass signage was installed, approximately 500 feet of trail remediation occurred, and an excess of 40 cubic yards of trash and deleterious invasive plants such as Arrundo (*Arrundo donax*), Spanish broom (*Spartium junceum*), tree tobacco (*Nicotiana glauca*), and castor bean (*Ricinus communis*) were removed. The first breeding season after restoration activities, the California and federally endangered Least Bell's vireo (*Vireo bellii pusillus*) was documented on site for the first time, despite multiple previous years of surveys without detections.

FLOODS, FIRES, AND FILAVAC - CONSERVATION CHALLENGES OF MANAGING AN ENDANGERED POPULATION OF RIPARIAN BRUSH RABBITS (*SYLVILAGUS BACHMANI RIPARIUS*) IN THE SAN JOAQUIN VALLEY

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Riparian brush rabbits (*Sylvilagus bachmani riparius*) are an endangered subspecies of brush rabbit found only in dense riparian habitat in the northern San Joaquin Valley of California. Riparian brush rabbits have lost over 90% of their historic habitat, and remnant habitat is fragmented and prone to flooding and wildfire. A population of riparian brush rabbits was established on the San Joaquin River National Wildlife Refuge through a successful captive breeding and reintroduction program. Over 1,400 rabbits were reintroduced to the refuge from 2001-2013, and it is now the largest population of riparian brush rabbits. This reintroduced population, now over 20 years old, still faces many threats to their existence. Major threats to the riparian brush rabbit include habitat loss and degradation, widespread flooding, wildfires, and climate change. Recently, a new threat emerged, rabbit hemorrhagic disease virus serotype 2 (RHDV2). RHDV2 is a highly contagious and fatal lagomorph disease, which was first detected on the refuge in 2022. Conservation actions to mitigate these threats are on-going and include the development of a population estimate via remote camera transects, a large-scale vaccination campaign, habitat restoration, and emergency flood rescues.

CURRENT KNOWN RANGE AND DISTRIBUTION OF WESTERN YELLOW BATS (*DASYPTERUS XANTHINUS*) IN CALIFORNIA

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Recent acoustic surveys conducted for our Central Coast bat survey found the Western Yellow Bat (*Dasypterus xanthinus*) at locations well north of its historically documented coastal California occurrences in Los Angeles County. Subsequent focused surveys have found the species to be broadly distributed throughout southern California - from the Nevada border to the Pacific coast - as far north as the 37th Parallel including local sites such as the Kern River Parkway Trail, Wind Wolves Preserve, and the Buena Vista Aquatic Recreation Area. I will discuss the species' natural history (incl. habitat associations); physical characteristics; diagnostic acoustic call features (the most useful tool to detect the species) and focused survey techniques; and suggest potential conflicts with the Western Red Bat (aka Peters' Red Bat, *Lasiurus frantzii*). The underlying theme of the presentation will be to illustrate the how (incl. probable dispersal routes) and the why of the species' apparent range expansion over the past century. I will also explain the relationship between a "good" bottle of Scotch and its influence on finding rare species of bats.

Informal Poster Session

DEGRADATION OF LOW-DENSITY POLYETHYLENE AND *PLANTANUS ACERIFOLIA* LEAVES IN AN EPHEMERAL POND AND ARID GRASSLAND

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Plastic pollution is a pervasive contaminant of concern worldwide. To understand the lifecycle of plastic pollution in arid landscapes, I am investigating how low-density polyethylene plastic degrades compared to naturally occurring leaves from the London planetree (*Plantanus acerifolia*) in terrestrial and freshwater habitats. I investigated 1) if leaf and plastic degradation rates differ, and if this pattern is consistent across habitats, and 2) how leaf and plastic materials impact macroinvertebrate communities. A traditional leaf pack experiment was conducted with three treatments; natural leaves, plastics, and a mix of both materials. Leaf packs were anchored in a grassland and ephemeral pond in February 2021 (n = 55 treatment habitat^{-1}) and subsets were harvested every 1-3 months for one year (n = 3-6 leaf packs treatment^{-1} habitat^{-1}). Results indicated that plastic degraded 115 × faster in the grassland compared to the pond, while natural leaves degraded 1.7 × faster in the pond compared to the grassland. Macroinvertebrates did not preferentially colonize certain leaf pack treatments, suggesting that plastic could serve as an alternative habitat resource for macroinvertebrates. This study provides insight into how varying environmental conditions can impact plastic degradation in the environment, advancing knowledge on the fate of plastics in arid habitats.

USING MOTUS AND GROUND NODES TO UNDERSTAND HOW BIRDS USE THE RIPARIAN FOREST IN THE KERN RIVER VALLEY

Patrick Lorch; Southern Sierra Research Station
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Annie Meyer; Southern Sierra Research Station
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Since 2018, western portions of the Motus Wildlife Tracking Network have grown very rapidly. There are now over hundreds of Motus stations detecting tagged birds, bats and Monarch butterflies. California now has roughly 60 stations with more going in all the time. We have tagged several Western Yellow-billed Cuckoos in the Kern River Valley riparian forest. One of those birds, nicknamed Hummus, is an example of how we can learn new things about both local movements within the riparian forest during breeding season as well as long distance movements during migration. We show these examples graphically and explain what we have learned about Cuckoo movements in the west. We finish with a description of how to use the Motus.org web page to look at movements of tagged animals through a Motus station near you.

COMPARISON OF SAN JOAQUIN KIT FOX DEN AND CALIFORNIA GROUND SQUIRREL BURROW ATTRIBUTES

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California ground squirrels (*Otospermophilus beecheyi*; CAGS) and endangered San Joaquin kit foxes (*Vulpes macrotis mutica*; SJKF) frequently occur sympatrically. CAGS control strategies include lethal measures administered within CAGS burrows, which could harm or kill a SJKF if mistakenly applied to an occupied SJKF den. To identify attributes to distinguish between SJKF dens and CAGS burrows, we assessed dimensions, penetration depths, ejecta patterns, and the presence of various types of sign at 65 known SJKF dens and 80 CAGS burrows. Mean entrance height, width, and circumference all were significantly larger for SJKF dens. However, the ranges of values for all dimensions for the CAGS burrows encompassed the ranges for the SJKF dens. Penetration depth analyses revealed some general trends, but few absolute criteria to distinguish between the two. Dirt berms, scat, prey remains, and trash were observed at both SJKF dens and CAGS burrows. None of the attributes we assessed provided unequivocal criteria for distinguishing between SJKF dens and CAGS burrows. Also, SJKF occasionally usurp CAGS burrows and CAGS occasionally move into SJKF dens. Therefore, administering lethal control measures within burrows should be avoided as it presents a risk to SJKF and many other species that may use CAGS burrows.