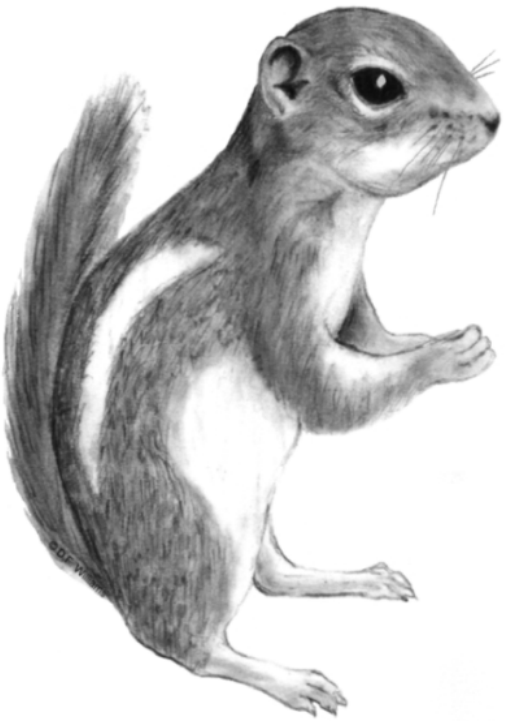
San Joaquin Valley
Natural Communities Conference
March 25, 2021

Virtual Meeting via WHOVA Video Conferencing

Program and Abstracts



San Joaquin Valley Natural Communities Conference
March 25, 2021

8:30 - 8:50	Brian Cypher	Welcome to the Conference, Moderator
8:50 - 9:10	Xerónimo Castañeda	*Six years of Tricolored Blackbird Conservation in the San Joaquin Valley: Challenges and opportunities to save this imperiled species*
9:10 - 9:30	Petros Chrysafis	*Scent deterrent as an applicable predator deterrent*
9:30 -9:50	Mike Westphal	*Blunt-nosed Leopard Lizard occupancy in the Northern Clade: How do we reverse the recent pattern of extinction?*
9:50 - 10:10	Deborah Woollett	*Guidelines, applications, and caveats to using detection dogs to find Blunt-nosed Leopard Lizard scat*
10:10 – 10:30	BREAK	
10:30 - 10:50	Erica Kelly	*Impact of a Sarcoptic Mange Epidemic on a Population of Endangered San Joaquin Kit Foxes*
10:50 – 11:30	Nicole Deatherage	*Urban Landscape Attributes and Competition Affect San Joaquin Kit Fox Occupancy and Spatiotemporal Activity*
11:30 – 12:00	LUNCH BREAK	
12:00 – 12:30		**Quick Talk Presentations**
	Anna Doty	*Effects of fire on summer roost selection and torpor expression of bats in Sequoia and Kings Canyon National Parks: a planned project*
	Patrick Walker	*Central Valley California tiger salamander behavior within vernal pool grassland complex in Madera County*
	Christopher Lortie	*Too much of a good thing: richness and restoration in drylands*
	Petros Chrysafis	*Contribution to eMammal's Snapshot USA Project*
	Kristie Stein	*Tricolored Blackbird as a focal species to promote expansion of the Motus Wildlife Tracking System*
12:30 – 1:00	Chad Thomas	*Lead ammunition as a source of poisoning in scavengers and engaging with stakeholders to reduce it*
1:00 – 1:20	Julie Vance	*Breeding variability of the Sierra Newt (Taricha sierrae) in an intermittent central California foothill stream: results of a long-term study before and after drought*
1:20 - 1:40	Jonathan Janes	*Determining a pathway for the regeneration of tetrodotoxin in the rough-skinned newt, Taricha granulosa*
1:40 - 2:00	Mitchell Coleman	*Riparian Enhancement Projects at Tejon Ranch: Past, Present, Future*
2:00 - 2:20	Ryan Hill	*Areas of Conservation Emphasis Program*
2:20 - 2:40	BREAK	
2:40 - 3:00	Erica Kelly	**SJV TWS Announcements/Awards**
3:00 – 3:20	Patrick Anderson	*Preliminary update on translocation success for San Joaquin Antelope Squirrel (Ammospermophilus nelsoni) in the Carrizo Plain*
3:20 – 3:40	Elizabeth McNamara	*Impact of polarized light produced by a utility-scale solar facility on insect diversity and abundance*
3:40 – 4:00	Aedan McCluskey	*Eradicating Nutria in the Central Valley*
4:00 -4:20	Camdilla Wirth	*Management and Monitoring of Mitigation Land in the Northern Carrizo Plain*

Abstracts

Oral Presentations

6-YEARS OF TRICOLORED BLACKBIRD CONSERVATION IN THE SAN JOAQUIN VALLEY: CHALLENGES AND OPPORTUNITIES TO SAVE THIS IMPERILED SPECIES

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The Tricolored Blackbird (*Agelaius tricolor*) is a near endemic with 95 percent of the population found in California. A combination of narrow geographic range and colonial breeding make Tricolored Blackbirds particularly susceptible to disturbance and habitat loss. As a result, the population has declined dramatically over the last 80 years from an estimated millions of birds in the 1930's (Neff 1937) to approximately 177,000 birds in 2017 (Clipperton 2019). A central challenge for the conservation of this species is that Tricolored Blackbirds now concentrate breeding colonies in agricultural fields of the San Joaquin Valley, especially in Triticale grain fields associated with dairies. Since 2014, Audubon California has led a coalition of federal and state agencies, NGO, and industry groups to leverage public funds through a Regional Conservation Partnership Program (RCPP) to find a balance between the provision of natural habitat, the protection of at-risk colonies on agricultural lands, and supporting the livelihood of dairy farmers. Through targeted outreach, we have engaged with more than 25 producers to save nearly 60 nesting colonies and protect over 640,000 breeding birds. Regardless of our successes, the uncertainty in future funding has put the gains we have made with dairy producers to protect Tricolored Blackbirds at-risk of unravelling. To ensure the Tricolored Blackbird persists now and into the future, we are in search for the next door of opportunity to open.

SCENT DETERRENT AS AN APPLICABLE PREDATOR DETERRENT

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Livestock depredation is one of the most prominent forms of human-wildlife conflict. As such various non-lethal deterrents are utilized to reduce depredation. In this pilot study we investigate the effect that various scents have on predator presence in the Sierra Nevada foothills and whether they can be effectively utilized as a non-lethal deterrent. Various scent and camera trap stations were set up for 12 weeks to examine the effect that scents have to predators. Results indicate laundry detergent and cigarette smoke to be the most effective deterrent with predator numbers reducing to zero after the scent was established.

BLUNT-NOSED LEOPARD LIZARD OCCUPANCY IN THE NORTHERN CLADE: HOW DO WE REVERSE THE RECENT PATTERN OF EXTINCTION?

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Rory Telemeco; Fresno State University
Lyn Myers; Fresno Chaffee Zoo
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The blunt-nosed leopard lizard, *Gambelia sila*, is represented by three major primordial genetic subdivisions: one located on the southern valley floor, another localized around the Carrizo Plain to the west of the Valley Floor Clade, and a third localized around the Panoche Hills and Panoche Valley in the north. Since the 1980's the Northern Clade has experienced a dramatic decline in lizard observations in the area between the Panoche Hills and the Northern Kettleman Hills. Populations in the Tumey and Ciervo Hills, the Coalinga Nose, the Guijarral Hills, and Northern Kettleman Hills appear to have been extirpated, even though habitat superficially appears to be intact. Geographically, this represents over half of the north – to south distribution of the species in the western part of the San Joaquin Valley within the Northern Clade. We here describe this pattern of absence and lay out a plan for restoring the species to areas where the species has recently gone extinct.

GUIDELINES, APPLICATIONS, AND CAVEATS TO USING DETECTION DOGS TO FIND BLUNT-NOSED LEOPARD LIZARD SCAT

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From 2011 through to 2018, a multi-partner study assessed whether conservation detection dogs could be used to locate the scats of wild-occurring blunt-nosed leopard lizard (BNLL; *Gambelia sila*) to increase sample sizes and enhance databases as part of broader research efforts. Absent genetic tools for species confirmation/identification of field-collected lizard scats, a method was developed, focusing on samples found by conservation dogs.

This was the first time that genetic analysis was established to identify and distinguish among the scats of BNLL and sympatric lizard species, from scat samples recovered by dog-handler teams. The new DNA technique can now be applied on a large scale for research and conservation purposes.

However, several observations made consistently during the eight consecutive years of fielding with dogs also suggested strict limitations to using this survey method for certain BNLL applications, especially those currently tied to regulatory monitoring. Separate ground-truthing was therefore conducted in 2019, to address remaining feasibility questions around using BNLL scat detection dogs to meet a presence/absence objective

and for additional relevant considerations (e.g., required survey timing). This irrefutably confirmed that BNLL scat detection dog team surveys are not suitable for regulatory monitoring purposes for this species. Factors such as faint scent of BNLL scat necessitating an intensive, sustained pressure search, a constrictive search window confined only to the spring, seasonal vegetation growth/presence, and western whiptail lizard co-occurrence– and their importance related to using conservation dogs – are detailed in this presentation.

IMPACT OF A SARCOPTIC MANGE EPIDEMIC ON A POPULATION OF ENDANGERED SAN JOAQUIN KIT FOXES

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A demographically robust population of endangered San Joaquin kit foxes (*Vulpes macrotis mutica*) occurs in the city of Bakersfield, CA. In spring 2013, sarcoptic mange was detected in this population and the disease quickly spread. In January 2019, the disease also appeared in a smaller kit fox population in the neighboring town of Taft, CA. Over the last 8 years there have been 410 reports of kit foxes with mange, 100 confirmed deaths, 113 foxes treated in the field, and 137 foxes treated at the California Living Museum (CALM). In conjunction with responding to reports of kit foxes with mange, the Endangered Species Recovery Program (ESRP) has also conducted a yearly citywide camera survey in Bakersfield since 2015 and Taft since 2019 to assess the occurrence of mange among kit foxes and the spatial pattern of spread. Based on the Bakersfield survey, the number of foxes detected declined from 129 in 2015 to 41 in 2020, representing an approximate 68% decrease. These data are consistent with casual observations, trapping efforts, and reports from the public, all of which also indicate a substantial decline in the number of foxes in Bakersfield and Taft. Healthy foxes are still being observed throughout both urban areas providing hope that mange will not cause extirpation of this population. After almost 4 months of no mange calls or sightings, ESRP unfortunately collected 2 kit fox carcasses in Taft in February 2020 that were confirmed to have mange. Mange response, camera survey monitoring, and a study regarding the potential for mange transmission at the urban/exurban interface will continue in an effort to assess whether the epidemic will terminate as fox densities decline below a critical threshold, or whether the disease becomes endemic in the population with periodic eruptions.

URBAN LANDSCAPE ATTRIBUTES AND COMPETITION AFFECT SAN JOAQUIN KIT FOX OCCUPANCY AND SPATIOTEMPORAL ACTIVITY

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The San Joaquin kit fox (*Vulpes macrotis mutica*) is a federally listed endangered and California listed threatened species that persists in the city of Bakersfield, CA, along with other canids including coyotes (*Canis latrans*), red foxes (*V. vulpes*), gray foxes (*Urocyon cinereoargenteus*), and domestic dogs (*C. familiaris*). Adaptations to urban environments by a unique guild of canids consisting of native, non-native, and domestic species have not been thoroughly studied. We investigated San Joaquin kit fox land use and competition with other canids in the heterogeneous urban landscape of Bakersfield from 2015 to 2019, using annual camera survey data from a city-wide distribution of 111 1-km^2 grid cells. We found that San Joaquin kit fox occupancy was driven primarily by a selection for campuses (schools, churches, medical centers, etc.) and avoidance of paved roads. When not considering dogs, San Joaquin kit foxes were associated with the presence of other wild canid species, though their effect on San Joaquin kit fox occupancy is unclear. On a finer scale and when considering dogs, San Joaquin kit foxes were rarely associated and seldom occurred with other canids on a daily, yearly, or 5-y scale. In cells where other canids were immediately present, San Joaquin kit foxes altered temporal activity by appearing 3 h later and exhibited less variance in the amount of time spent at the camera. Thus, although kit foxes share the urban habitat with multiple larger competitors, they likely employ spatial and temporal partitioning to facilitate coexistence. Additionally, San Joaquin kit foxes are currently affected by sarcoptic mange skin disease, caused by an infestation of the *Canis* variety skin mite, *Sarcoptes scabiei*. Mange was likely responsible for a 40% reduction in occupancy estimates, 37-49% extinction probabilities, and a 69% decrease in abundance for San Joaquin kit foxes over the course of the study. An understanding of San Joaquin kit fox habitat preferences and how they reduce competitive risk can help develop effective land management and mitigation policy for San Joaquin kit foxes affected by urban development.

EFFECTS OF FIRE ON SUMMER ROOST SELECTION AND TORPOR EXPRESSION OF BATS IN SEQUOIA AND KINGS CANYON NATIONAL PARKS: A PLANNED PROJECT

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Bats are currently facing a myriad of threats, including an increase in the frequency, duration, and severity of fire events. How bats cope with habitat changes due to fire remains under-studied in the United States, particularly in western regions such as California. However, the key to some mammals' survival may lie with their ability to employ torpor, an energy-conserving strategy whereby metabolic and heart rate, as well as body temperature, reach minimal levels to expend only a fraction of the energy that is used during activity. Determining how bats physiologically cope with, or even exploit, fire-affected regions in the unique landscapes of Sequoia and Kings Canyon National Parks gives important insight to how, and if, small mammals are capable of dealing with the changes that accompany forests significantly and persistently altered by fire. Therefore, we plan to fit 30 bats, captured from a variety of fire-affected landscapes in Sequoia and Kings Canyon National Parks, with temperature-sensitive transmitters to assess their use of torpor and roost selection from June - August 2021. The results of this study will potentially lead to more informed bat management practices within Sequoia and Kings Canyon National Parks, and give insight into how bats physiologically interact with different fire-affected landscapes.

CENTRAL VALLEY CALIFORNIA TIGER SALAMANDER BEHAVIOR WITHIN VERNAL POOL GRASSLAND COMPLEX IN MADERA COUNTY

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Generally, a minimum total length of 100 millimeters is considered the minimum size required for larval California tiger salamanders (CTS) to metamorphose into their terrestrial form. On April 19, 2019, several larval CTS were captured in a vernal pool in Madera county. One larva was measured to have a total length of 90 millimeters. This larva exhibited reduced gill size, leg muscle development, and tail fin reduction. When the larva was placed back in water, the larva was observed resurfacing and gulping air over a period of 5 minutes. Eight days later the pond was observed to be dry and no CTS were observed.
The air-gulping behavior suggests that the larva was breathing air using its lungs and thus able to leave the pond without suffocating. Further investigation into regional climatic influences on CTS larvae metamorphose size may be warranted to further inform decisions pertaining to mitigation, survey methods, planning, and other scientific studies.

TOO MUCH OF A GOOD THING: RICHNESS AND RESTORATION IN DRYLANDS

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1. The biodiversity–ecosystem function literature provides a useful framework to examine many processes associated with species diversity in ecology. Maintenance of biodiversity by facilitation in arid ecosystems is a critical function.
2. Here, we examined the complex interactions between local plant species richness and the intensity of shrub facilitation for maintaining biodiversity in arid plant communities.
3. A synthesis including a meta-analysis was used to compile nearly 600 papers on positive interactions mediated by shrubs in dryland plant communities (search terms: shrub, positive, facilitat*) to examine whether interactions in these studies changed with reported local species richness. A total of 19 studies and 141 independent instances directly examined and reported facilitation of diversity measures in naturally assembled plant communities and provided estimates of local species richness.
4. The net effect of increasing local plant species richness was negative and shifted the relative frequency of interactions with shrubs from positive to negative with increasing local species richness. This relationship suggests that increases in richness do not always enhance functions that maintain diversity in plants communities likely due to concurrent increases in the indirect negative interactions between species under shrubs or in changes in the local species pool.

CONTRIBUTION TO EMAMMAL'S SNAPSHOT USA PROJECT

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In 2019, eMammal launched a nationwide camera trap project titled Snapshot USA. The purpose of the project was to gather camera trap data on mammals from all 50 states and make the data accessible to anyone interested. In 2019 the Central Valley was represented using a riparian and chapparal habitat while 2020 it was represented through a grassland and pine forest habitat. In an effort to target unique Central California mammals, camera traps were placed to capture Kit fox, Kangaroo rat, Tule Elk and Fisher and so far have been successful on the first three.

TRICOLORED BLACKBIRD AS A FOCAL SPECIES TO PROMOTE EXPANSION OF THE MOTUS WILDLIFE TRACKING SYSTEM

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The Tricolored Blackbird (*Agelaius tricolor*, TRBL) has suffered a long-term decline in abundance in California, including a 63% loss from 2008 to 2014, which led the California Fish and Wildlife Commission in April 2018 to list it as Threatened under the California Endangered Species Act (CESA). There is insufficient data on the movements of these birds, including whether breeding populations are year-long residents, migrants, or a mix of both. Bird populations may experience threats during one or more stage of the annual cycle, therefore identifying when and where populations are throughout the year is a critical step the in conservation of threatened populations (Marra et al. 2015). Here, we propose to expand the number of Motus Wildlife Tracking System stations in California to facilitate research on this species. The addition of Motus stations in California will benefit Tricolored Blackbirds as well as many other species of wildlife that exist within the Central Valley. We have formed a small group of interested partners to work on proposal writing and fundraising, and we are looking for additional collaborators to move forward with this effort.

LEAD AMMUNITION AS A SOURCE OF POISONING IN SCAVENGERS AND ENGAGING WITH STAKEHOLDERS TO REDUCE IT.

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Abstract: Since the reintroduction of the California condor, wildlife managers have had to address various forms of mortality, but none more so prominent than lead poisoning. Lead becomes bioavailable to scavenging condors and other wildlife when hunters and ranchers do not retrieve quarry that is shot (common when managing nuisance species such as ground squirrels), or leave remains from successful hunts (e.g viscera, inedible portions of game). Since 2007 the Institute for Wildlife Studies, in partnership with other conservation groups such as Great Basin Institute, have conducted outreach and education that brings this information to hunting/ranching communities, in addition to the availability and performance of lead alternatives. One such method is live fire shooting demonstrations, in which a lead and non-lead projectile are fired into a water based bullet trap to highlight how lead core bullets fragment, and non-lead bullets do so either minimally, or not at all. Through stakeholder collaboration and community building, many ranchers and hunters are choosing non-lead ammunition when hunting, and as a result are ensuring that food sources for scavengers such as condors are free of any contaminants. This transition of the traditional practice (use of lead ammunition) was most efficiently achieved through working with the community instead of against it. Hunting and ranching are proud partners of wildlife conservation, and tactile

approaches that treat them as partners in a collaborative effort have proven effective. In this presentation we will conduct the aforementioned shooting demonstration, and discuss communication strategies to more effectively engage hunters and ranchers in a constructive and inclusive manner.

BREEDING VARIABILITY OF THE SIERRA NEWT (*TARICHA SIERRAE*) IN AN INTERMITTENT CENTRAL CALIFORNIA FOOTHILL STREAM: RESULTS OF A LONG-TERM STUDY BEFORE AND AFTER DROUGHT

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Very few studies have been conducted on the Sierra newt (*Taricha sierrae*), a species that is distributed throughout the western slope of the Sierra Nevada. During late winter and early spring, the Sierra newt congregates in intermittent streams to breed. During the 1998-1999 breeding seasons, *T. sierrae* instream movement and distribution were studied in a segment of the south fork of Little Dry Creek, located on the McKenzie Preserve in eastern Fresno County. In this study, *T. sierrae* individuals (marked by tattoo) exhibited high site fidelity within stream subareas, but there were several individuals that moved extensive distances, particularly after storm events. In 2004-2010 and within this same population and stream segment, a total of 634 newts were marked with PIT tags. Starting in 2004, this stream segment was then surveyed for newts bimonthly or weekly during each breeding season through the 2021 breeding season. During 2012-2015, little breeding occurred, and in one year no breeding was observed. Peak numbers of individuals observed in this stream segment post drought have not yet reached those observed before the drought. However, several marked individuals continue to be detected during post-drought breeding seasons.

DETERMINING A PATHWAY FOR THE REGENERATION OF TETRODOTOXIN IN THE ROUGH-SKINNED NEWT, *TARICHA GRANULOSA*

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Tetrodotoxin (TTX) is a highly potent neurotoxin that can be found in bacteria, as well as in a number of vertebrates and invertebrates. The rough-skinned newt, *Taricha granulosa*, has been shown to express TTX. However, what is not known is the mechanism through which *T. granulosa* produce the toxin; whether it is a product of an endosymbiotic bacterium, or if it is manufactured biochemically. Additionally, if TTX is produced biochemically, it is not clear how or if metabolic rate (MR) affects the rate of regeneration. We predicted that immediately following expression of TTX, *T. granulosa* would increase MR to promote regeneration. We therefore measured the MR of *T. granulosa* as O_2 consumption prior to and after the expression of TTX (n=14, N=9 control; N=5 test). O_2 consumption was measured initially, then again measured the same day following initial TTX expression. The MR for all *T. granulosa* was again measured

periodically (on day 6, 11, 30, and 60) to determine any potential changes in MR due to TTX regeneration. Data collection is still ongoing. As of yet, we have not found any significant difference in the MR of *T. granulosa* for any phase of the study for either control or test animals ($p>0.05$). If TTX production occurs biochemically, it is possible that they utilize a not yet discovered pathway to produce it. More research is needed to fully understand this process in *T. granulosa*. Genomic studies should be in the next steps to see if genes can be isolated that give rise to proteins that have some role in the synthesis of TTX in newts.

RIPARIAN ENHANCEMENT PROJECTS AT TEJON RANCH: PAST, PRESENT, FUTURE

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Riparian and wetland vegetation communities are critical biological resources that support disproportionately high ecosystem services and biodiversity relative to the land area they occupy. These systems are particularly important refugia in low-elevation arid regions such as the Mojave and San Joaquin deserts in California, both of which straddle Tejon Ranch. However, many riparian habitats and wetlands on Tejon have historically been adversely affected by cattle grazing, particularly during summer months, and by year-round feral pig rooting and wallowing with coinciding infestations of non-native plants (e.g., salt cedar, *Tamarix ramosissima*). This disturbance regime has degraded the native density, biodiversity, structure, and habitat use of riparian habitats. One of the priorities established by the Conservancy in its management plan is to enhance and restore riparian and wetland ecosystems. Since 2014, we have been working to enhance riparian habitats through a combination of targeted invasive plant removal efforts coinciding with seasonal grazing management, which entails reducing riparian pasture sizes and replacing creek water with upland water sources for livestock. Seasonal livestock management has targeted dry season exclusion from select riparian pastures (generally May-October), when livestock use of the creeks is highest and when riparian tree seedlings/ herbaceous understory taxa generally emerge and are most sensitive to disturbance. Six years on, preliminary data analysis suggests that the new grazing regimen has been effective, with an increased native plant species richness and cover, comprised of both understory and canopy taxa. Our data also suggest that grazing exclusion is not universally beneficial for maintaining or increasing native species richness at the landscape scale, with habitat type, pre-existing non-native species presence, and plant life history traits being important factors. Going forward, we aim to continue the current level of data collection to help inform our adaptive management strategy, as well as work to monument new riparian enhancement pastures.

AREAS OF CONSERVATION EMPHASIS PROGRAM

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Areas of Conservation Emphasis (ACE) is an effort by the CDFW Conservation Analysis Unit to understand how biological resources are distributed across the state and provide stakeholders with an easy-to-use map interface reflecting multiple facets of biodiversity to inform conservation planning. Information on Species Richness, Significant Habitats, Connectivity, and Climate Resilience is available through a series of ACE map layers in various levels of detail. Users may click an ACE map unit—hexagon or watershed, to access a table of species observed or modeled. At a coarser scale, ACE indices tell a story of relative biodiversity levels across the landscape. Species distribution models and observation data are aggregated and summarized to produce native, rare, and rarity-weighted (Irreplaceability) species richness scores for each hexagon and watershed. These scores are further generalized into an overall Biodiversity score for each map unit. For users requiring greater detail, a series of maps is available portraying scores for each constituent taxa—amphibians, birds, reptiles, mammals, fish and plants—for each of the richness metrics. Information-rich ACE maps are organized in a hierarchical manner in the web-based ACE-Viewer so conservation practitioners may choose the category of information and level of detail that best suits their needs.

PRELIMINARY UPDATE ON TRANSLOCATION SUCCESS FOR SAN JOAQUIN ANTELOPE SQUIRREL (AMMOSPERMOPHILUS NELSONI) IN THE CARRIZO PLAIN

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In arid and semi-arid environments, burrowing mammals play a key role in increasing landscape heterogeneity through facilitative (positive) species interactions. The loss of burrowing mammal populations can consequently lead to negative effects cascading through the ecosystem; it is therefore critical to understand these facilitative interactions for conservation and management. For instance, accounting for facilitative interactions during translocation could improve success rates. To investigate the importance of burrow facilitation on San Joaquin antelope squirrel (*Ammospermophilus nelsoni*; SJAS) translocation success, we designed a program for SJAS using a natural experiment, with paired sites selected for the presence and absence of a burrowing facilitator, the giant kangaroo rat (*Dipodomys ingens*; GKR). We radio collared 60 SJAS from core habitat within the Carrizo Plain. We then translocated 40 to uninhabited lands in their historic range, half to a site with GKR and half without. We compared daily survival and home range size across the three treatment groups. Our study will highlight the importance of quantifying facilitative interactions when selecting release sites for translocation and planning restoration campaigns.

IMPACT OF POLARIZED LIGHT PRODUCED BY A UTILITY-SCALE SOLAR FACILITY ON INSECT DIVERSITY AND ABUNDANCE

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Efforts to impede global climate change and meet the required reduction of greenhouse gases to below 1990 levels has caused energy generation and consumption to shift exponentially towards renewable energy sources. Utility-scale solar facilities are the fastest growing source of energy production. However, solar facilities require vast amounts of land for development, inevitably altering local landscapes and ecosystems. It is still unclear how utility-scale solar facilities will impact local environments and ecology. A review of current available literature indicates that polarized light pollution produced from photovoltaic panels is disruptive to avian species as well as flying insects. The purpose of this study is to assess potential impacts of polarized light pollution from utility-scale solar facilities on insect diversity and abundance by comparing Townes-style malaise-trap samples collected within a utility-scale solar farm to Townes-style malaise-trap samples from selected control sites outside the same solar farm.

ERADICATING NUTRIA IN THE CENTRAL VALLEY

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Nutria (*Myocastor coypus*), a semi-aquatic rodent species native to South America, are now considered one of the most ecologically detrimental invasive mammals in North America. After California declared the species eradicated following their escape from fur farms, they were again detected in Merced County in 2017. The species' rapid reproductive rate along with their destructive herbivory and burrowing habits can lead to widespread ecological damage, harming vulnerable wetland habitats, posing threats to native species, and weakening the agricultural infrastructure of California's Central Valley. By utilizing vested knowledge of the foraging and grooming behavior, movement, and socialization habits of nutria, the CA Department of Fish and Wildlife, USDA Wildlife Services, CA Department of Food and Agriculture, and additional funding organizations have helped to remove more than 2,250 nutria from the Central California landscape since 2018. The use of additional modern technologies in both field and office settings has been and will continue to be critical to short- and long-term monitoring efforts to ensure successful eradication. Within the boundaries of California regulation, the Nutria Eradication Project has undergone extensive development and planning to increase the effectiveness of the methods employed, including recently establishing a Judas Nutria Program. The highest chance of eradication will come from combining increased awareness of land owners, conservationists, and the public along with the constantly advancing methods used within the Project.

MANAGEMENT AND MONITORING OF MITIGATION LAND IN THE NORTHERN CARRIZO PLAIN

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Sequoia Riverlands Trust (SRT), a non-profit land trust, has protected more than 20,000 acres in the Carrizo Plain, the majority located in the Northern end. Since 2015 we have adaptively managed solar mitigation land for several Central Valley endemic species including San Joaquin kit fox and giant kangaroo rat. We will discuss our management and monitoring of species as well as our infrastructure improvements and restoration work over the last several years with a look forward to future projects.