TWS-WS
2025 Annual Meeting

ABSTRACTS

REINTRODUCTION PLANNING, SUCCESS AND CHALLENGES OF ENDANGERED AMPHIBIANS IN YOSEMITE NATIONAL PARK

Robert L. Grasso; Yosemite National Park - Resources Management & Science Div; rob_grasso@nps.gov; Ninette R. Daniele, Rochelle M. Stiles, Tiffany A. May, **TBD**

Species reintroductions are often difficult to conduct with some leading to success and some resulting in failure. In some cases, it is not known or well understood why some reintroductions are successful while others are not. Here we present on several amphibian species reintroductions including: the Sierra Nevada Yellow-legged frog (*Rana sierrae*), the California Red-legged frog (*Rana draytonii*), the Foothill Yellow-legged frog (*Rana boylii*), and Yosemite toad (*Anaxyrus canorus*) in Yosemite National Park. We will present on the planning, monitoring, and measures of success while also addressing challenges during each stage of the reintroduction process. We believe through careful planning, project development, assessment, monitoring and adaptive management can such reintroductions become more successful in an ever-changing environment which includes protected areas like Yosemite National Park.

Lessons Learned in Wildlife Management
Thursday 9:25 AM

COLLABORATIVE PARTNERSHIPS TO DEVELOP OUT-OF-KIND MITIGATION: A CASE STUDY AT SANBORN COUNTY PARK, SARATOGA, CA

Samuel Aguilar; California Department of Transportation; samuel.aguilar@dot.ca.gov; Mita J. Nagarkar, Lindsay A. Vivian

The Caltrans Saratoga Creek Bridge Replacement Project is an example innovative off-site biological mitigation within a densely vegetated riparian corridor. Due to limited right-of-way, onsite planting was not feasible to meet mitigation needs. Outreach to multiple local entities yielded no suitable off-site options until Sanborn County Parks identified a need for forest health enhancement instead of traditional tree planting. This led to a watershed enhancement plan that included hardscape removal and culvert remediation to meet water quality standards, alongside a tree thinning and fuels reduction project covering approximately 32 acres. Working closely with regulatory agencies, including the California Department of Fish and Wildlife and the Regional Water Quality Control Board, the project creatively bundled mitigation strategies and developed a novel "1 acre per tree" mitigation approach. The project involved successful partnerships with other state and local agencies and demonstrates the potential of innovative mitigation approaches to balance regulatory compliance with significant ecological benefits.

Poster Session

POPULATION RECOVERY, REPRODUCTIVE SUCCESS, AND HABITAT USE OF OSPREYS AND BALD EAGLES IN CENTRAL INTERIOR CALIFORNIA

Daniel A Airola; d.airola@sbcglobal.net; James A. Estep

Osprey and Bald Eagle populations suffered long-term decline and range contraction in California from persecution, habitat loss, and pesticides. Both species are believed to have recovered, but recent changes in geographic range, populations, reproductive success, and habitat use remain mostly unstudied. We studied both species within the central portion of the Central Valley and Sierra foothills. Osprey colonization began in the 1970s, and during 2020-2024, the nesting population increased at only 4.3% annually,

suggesting near habitat saturation. Over recent years, 73% of 181 Osprey nest attempts were successful, producing an average of 1.32 young per occupied nest, indicating a healthy population. Osprey nests were mostly placed on artificial structures (91%), mainly utility poles (58%). Over 2011-2024, breeding Bald Eagles increased by 18% annually, from 4 to 31 pairs. Reproductive success was healthy, with 79% of 133 nests successful and 1.29 young fledged per occupied nest. Eagles mostly nested in gray pines, Fremont cottonwoods, and other species near major waterbodies. These two species' increases have likely resulted from reduced persecution, reservoir construction, nest protection, and contaminant declines. Competition from the increasing Bald Eagle population may reduce Osprey numbers, but habitat selection differences will likely maintain healthy populations of both species.

Raptor Population Status and Ecology
Friday 8:25 AM

THE 2025 PURPLE MARTIN STATEWIDE SURVEY AND STATUS ASSESSMENT IN CALIFORNIA

Daniel A. Airola; Conservation Research and Planning; d.airola@sbcglobal.net; Emma Cox, Rodney Siegel

The Purple Martin has been a California Species of Special Concern since 1978. Its population and geographic range have declined substantially due to competition with the European Starling, snag nesting habitat loss, bridge construction disturbance, utility pole replacement, and insecticide-induced loss of prey. A statewide status assessment has not been conducted since 2008 and is needed to identify conservation priorities and management needs. We are leading a statewide survey in 2025 using specialized methods developed for a 2009 Northern California survey. Our review of 2011-2024 eBird records identified 234 known breeding sites. We will re-survey 28 of the 2009 survey sites to determine changes in occupancy and populations and 58 additional eBird sites to establish baseline populations. We will develop a habitat-population model to estimate the numbers of potential breeders in areas not accessible to eBirders. Results from the survey, eBird, and habitat-population model will be combined to estimate the statewide population. Our review of eBird records indicates that martins are concentrated in coastal conifer forests, and they nest mainly in snags (43% of sites), utility structures (32%), and bridges (17%), each of which has unique management threats that should be addressed to conserve the species.

Natural History of Birds I
Wednesday 1:25 PM

JAGUARS IN CALIFORNIA: A PAST, A PRESENT AND A FUTURE.

Jeff A Alvarez; The Wildlife Project; jeff@thewildlifeproject.com; Jeff A Alvarez

Paleontological evidence shows that Jaguars likely occurred in much of California, and even as far north as Washington State. Specific evidence of Jaguar remains (bones and fossils) indicated that they certainly were found in the southeast Bay Area, the South Coast Range southward through the Los Angeles basin, and east into the western deserts of southern California, as well as along the Colorado River drainage between California and Arizona. Historical evidence, around the time of the European invasion of California, includes direct observations of Jaguars from San Francisco to San Diego, and along the Colorado River drainage. Although no Jaguars exist in the wild in California today, at least 8 individuals have been found in Arizona, within their dispersal distance to California. This suggests that some potential exists for one or more dispersing Jaguars to cross into California, from Arizona or Mexico. Recent suggestion of reintroduction of large predators has prompted consideration of reintroduction of Jaguars into the southwestern United States. However, the first conversation must include careful consideration of the individual animals that may enter southern California and the 25 million people that currently live

there. I suggest that the California Department of Fish and Wildlife consider the potential for dispersal of this species and make plans to protect any Jaguars that cross into California.

Natural History of Carnivores I
Wednesday 4:00 PM

EXTIRPATION AS A MANAGEMENT TOOL: AN EFFECTIVE METHOD FOR LONG-TERM CONTROL OF AMERICAN BULLFROGS SYNTOPIC WITH SPECIAL-STATUS NATIVE AMPHIBIANS IN CALIFORNIA

Jeff A. Alvarez; The Wildlife Project; Jeff@thewildlifeproject.com; Jeffery T. Wilcox

American bullfrogs (*Lithobates catesbeianus*) are invasive in western North America and are well established in California, where they are widespread. This invasive species has been implicated in the decrease of native amphibian populations and is believed to have contributed to the decline of threatened and endangered amphibians regionally. We utilized air rifles, tin alloy pellets, and 2 shooters to systematically control bullfrogs in both lentic and lotic habitat types within 2 counties in California. We visited sites monthly (Apr. through Nov.) for approximately 8 and 14 years to lethally target and remove bullfrogs from aquatic habitat. The use of air rifles facilitated selective targeting; adult bullfrogs were initially targeted to break the reproductive cycle, with subadult bullfrogs secondarily targeted and removed when possible. Egg masses, when encountered, were also removed. Habitat type (lentic vs. lotic) did not appear to affect the results of the technique used. We considered bullfrogs under control when observed breeding adults were reduced by approximately 95% from original estimates, which occurred within 36 months for both sites. California red-legged frogs (*Rana draytonii*) were observed recolonizing the lotic site 12 months before bullfrogs numbers reached control levels. At the lentic site foothill yellow-legged frogs (*R. boylii*) colonized and reproduced in a pond 31 months following the onset of bullfrogs control. This technique appears to be highly efficient for bullfrogs control, which, if conducted effectively, may support colonization or recolonization of habitat by native anurans.

Studies in Exotic Species Management
Thursday 11:40 AM

A NOVEL NONINVASIVE SURVEY TOOL FOR SHREWS AND ITS IMPLICATION FOR SPECIAL STATUS SHREWS IN THE SAN FRANCISCO ESTUARY

Carla L Angulo; WRA, Inc.; carla.angulo@wra-ca.com; Mark Statham, William Claflin, Katie Smith, Cody Aylward, Ben Sacks

Shrews (*Sorex* spp.) have not been well studied, partly because they are difficult to capture and can die quickly due to their fast metabolism, high protein needs, and small body mass. There are two species of Sorex that are of conservation concern in the San Francisco Bay: salt-marsh vagrant shrew and Suisun wandering shrew. Aside from some documentation on the California Natural Diversity Database, there is sparse research on population densities, movements, or presence of these species. A novel method of collecting fecal samples recently developed for detection of salt marsh harvest mouse (SMHM) DNA has also been used to collect fecal samples from other small mammals to genetically identify presence. We partnered with land owners to identify the potential presence of SMHM and shrews within Suisun Bay. We used bait stations to passively collect feces. Then, we used previously developed genetic analyses to identify rodents and developed a new set of DNA primers to detect the presence of shrews in the pooled sample. We identified the presence of shrews across three sites. The results demonstrate the effectiveness of our method for surveying shrews and has potential to positively impact shrew conservation efforts by enabling safe and effective population monitoring.

Natural History of Small Mammals
Friday 8:45 AM

LONG-TERM IMPACTS OF LOW-INTENSITY GRAZING ON GIANT KANGAROO RATS IN THE CARRIZO PLAIN NATIONAL MONUMENT

Scott M Appleby; Cal Poly, San Luis Obispo; sappleby@calpoly.edu; Tim Bean

The Carrizo Plain is one of the largest relatively intact portions of the San Joaquin Desert, and hosts high levels of endemic species threatened by habitat loss and other anthropogenic impacts. The giant kangaroo rat (*Dipodomys ingens*) is at the center of this ecosystem, but management for this and other endangered species is complicated by multiple use mandates. Previous research has presented sometimes conflicting results on the interactions between domestic cattle and giant kangaroo rats, so in collaboration with the Nature Conservancy, California Department of Fish & Wildlife, and the Bureau of Land Management, the Carrizo Plain Ecosystem Project (CPEP) was established to better understand these interactions. Here we will present our findings after monitoring kangaroo rat populations on the Carrizo Plain for 18 years at 30 replicated study plots with or without grazing exclosures, with an emphasis on elucidating the long-term relationship between cattle grazing and giant kangaroo rat populations. Though the impacts of low-intensity grazing on Giant Kangaroo Rats may be small in magnitude, they are important to understand in the face of challenges such as limited habitat and increased climactic variation to inform future land management decisions.

Natural History of Small Mammals
Friday 9:25 AM

ADAPTIVE MANAGEMENT STRATEGIES FOR RECOVERY OF THE CRITICALLY ENDANGERED SAN CLEMENTE LOGGERHEAD SHRIKE (*LANIUS LUDOVICIANUS MEARNSI*)

Caleb MM Arellano; Institute for Wildlife Studies; carellano@iws.org; Melissa A. Booker, David K. Garcelon

The San Clemente Island loggerhead shrike (*Lanius ludovicianus mearnsi*) is one of the most endangered avian sub-species in North America. The effective population size peaked in the late 2000s, but in recent years has ranged between 32 and 137 individuals. Nest failure associated with predation events has been considered a major factor inhibiting recovery. The US Navy leads recovery efforts, which includes releasing captive-bred individuals, non-native predator control, and extensive monitoring. To better support this mission, understanding potential impacts of other factors that may be limiting population recovery, such as climate change, changes in breeding habitat composition, fire impacts, and prey availability, are critical in managing this subspecies. Additional investigations are underway to address data gaps as part of an overall recovery management plan. These efforts include conducting a population viability analysis, assessing habitat factors associated with successful nesting, and investigating over-winter survival. We are also investigating the feasibility of evaluating the effects of invasive plant densities on prey abundance and/or availability. In this talk we will discuss our approaches to filling these data gaps, and initial results from some of the tasks already underway.

Conservation on Military Lands
Thursday 10:40 AM

DOCUMENTING THE SPREAD OF THE INVASIVE MUTE SWAN (*CYGNUS OLOR*) IN CALIFORNIA

Rachel-Ann Arias; UC Davis Museum of Wildlife and Fish Biology; raarias@ucdavis.edu; Andrew Engilis Jr., Jason Riggio

Mute Swans (*Cygnus olor*) are a charismatic yet invasive species, initially introduced to urban areas on the East Coast for their aesthetic appeal. These territorial and aggressive birds threaten other waterfowl, native wildlife, and human recreationists. Native vegetation and water quality is also impacted by their overgrazing and uprooting of aquatic plants. As Mute Swans expand westward and populations become naturalized, they consistently prove to be pests requiring management or eradication. The California Department of Fish and Wildlife has classified the Mute Swan as an invasive species, yet little is known about the species distribution and ecology in California, and their spread remains unchecked in the state. In this study, we document the geographical expansion, locate known breeding populations, and characterize habitats preferred by Mute Swans in California using data from our research, coupled with iNaturalist and eBird citizen science data. Mute Swans were first documented using those platforms in California in Los Angeles in 1951. Today, this invasive species has spread to 47 of the state's 58 counties (81%), with potential breeding activity documented in 22 counties (38%). These data will help inform future management practices by wildlife management agencies.

Poster Session ***Student Paper***

INFORMING RESTORATION DESIGN: APPLYING CENTRAL VALLEY JOINT VENTURE POPULATION OBJECTIVES FOR GRASSLAND AND AT-RISK RIPARIAN BIRDS

Michael Rogner; River Partners; mrogner@riverpartners.org; Erin Hagen, Sarah Gaffney, Kristen Dybala, Renee Cormier, Haley Mirts, **Kim Armstrong**

The Central Valley has been dramatically transformed over the last century by human activities, resulting in once abundant bird populations reduced to relatively small populations or locally extinct. In order to inform restoration design and support conservation of Central Valley grassland and riparian birds, we evaluated the success of restoration sites in meeting Central Valley Joint Venture objectives for species' breeding densities. We visited 11 restoration sites in the Sacramento Valley that had both riparian and grassland vegetation, ranging in ages from 5 to 21 years old. Point count surveys were conducted twice in May-June 2023 at 42 riparian and 38 grassland locations. To evaluate the current contribution of each restoration site to meeting CVJV objectives, for each site and habitat type, we compared the mean density estimates ± SE for each species against the short-term (10-year) objectives. We found considerable variation among species, sites, and habitat types in terms of meeting short-term density objectives for focal species. While these evaluations can effectively support bird conservation, improved recommendations for restoration design will arise through increased survey effort and additional survey methods, additional sites across successional stages, evaluation of habitat covariates, indicator scores for biodiversity and consideration of multiple benefits or outcomes simultaneously.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 9:25 AM

BENTHIC MACROINVERTEBRATES AS BIOINDICATORS FOR METAL FOLLOWING WILDFIRE IN NORTHERN CALIFORNIA

William A Askea; California State University, Chico; waskea1@csuchico.edu; Don Miller, Sandrine Matiasek, Daniel Pickard

Climate change, fire suppression, and human-caused ignition have led to an increasing trend in large wildfire frequency and area burned in the western United States. With these changes in wildfire trends there is a need to study the long term effects of wildfire, especially their impact on freshwater aquatic ecosystems. Wildfire is known to release metals from the environment which poses negative ecological and toxicological implications for aquatic organisms when they are washed into streams. Metals from this runoff may accumulate in the tissues of aquatic organisms where they may persist in the food web. This study will use historical samples collected from three streams before and after the 2021 Dixie fire in Northern California to investigate the long-term effects of wildfire on aquatic invertebrates. Contamination of freshwater systems poses serious ecotoxicological health hazards to aquatic biota and stream integrity as metals become bioavailable and bioaccumulate. This study will provide insight into potential metal accumulation and persistence in aquatic invertebrates following wildfire, and how these organisms could serve as bioindicators for restoration and mitigation efforts in fire-disrupted freshwater ecosystems. Metal analysis has been conducted using inductively-coupled plasma mass spectrometry and I will share some preliminary data.

Poster Session

COMMON RAVENS DISRUPT GREATER SAGE-GROUSE LEKKING BEHAVIOR IN THE GREAT BASIN

Joseph L Atkinson; U.S. Geological Survey; jatkinson@usgs.gov; Peter S. Coates, Brianne E. Brussee, Ian A. Dwight, Mark A. Ricca, Pat J. Jackson

Expansion of human enterprise has contributed to increased interactions between common ravens (*Corvus corax*; ravens) and greater sage-grouse (*Centrocercus urophasianus*; sage-grouse), a species of high conservation concern. Sage-grouse population trends are estimated using count survey data of males attending traditional breeding grounds, known as leks. We sought to investigate associations of ravens to sage-grouse lek sites and to document interactions between sage-grouse and ravens as well as those between sage-grouse and other animals observed around leks. First, we used extensive raven point counts and sage-grouse lek observation data collected across the Great Basin, from 2009–2019 to evaluate spatial associations between ravens and sage-grouse leks. Second, we used a subset of the lek dataset from 2006–2019 to describe behavioral changes of male sage-grouse in the presence of ravens and other animals. Our analyses indicated that ravens were attracted to lek sites, especially as leks increased in size, and were associated with flush events and decreased display behaviors exhibited by lekking sage-grouse. These results suggest ravens may adversely influence sage-grouse reproduction during the lekking stage. Additionally, standardized techniques to count sage-grouse leks for population trend analyses could be negatively biased if raven presence during surveys is not accounted for.

Poster Session

INCREASING WILDFIRE PRESSURE DRIVES HABITAT DECLINE FOR SOUTHERN CALIFORNIA SPOTTED OWLS

Joshua M Barry; University of Wisconsin - Madison; jmbarry3@wisc.edu; Ronan Hart, Gavin Jones, H Anu Kramer, Kate McGinn, Benjamin Zuckerberg, Zach Peery

Environmental disturbances, such as wildfire, drought, and fuel management, are reshaping wildlife habitats in western forests and threatening forest-dependent species like the spotted owl (*Strix occidentalis*). Here, we used 35 years (1987–2022) of spotted owl detections across the southernmost extent of their geographic range in Southern California to model owl nesting and prey acquisition habitats and evaluate the effects of wildfire, drought, and fuel treatments. We found a 54% decline in nesting habitat and a 40% decline in prey acquisition habitat. Notably, 91% of suitable nesting habitat across years

occurred within the San Bernardino Mountains. Wildfires were the main driver of nesting habitat loss, responsible for approximately 30% of the decline, with most large, severe fires occurring after 2003. In contrast, fuel management contributed to only 4% of the loss. The number of potential territories containing sufficient nesting habitat (48 ha) declined by 53%, whereas territories containing sufficient prey acquisition habitat (48 ha) declined by 47%. The number of potential territories with sufficient nesting and prey acquisition habitat decreased by 73%. Our research demonstrates the pronounced impact of wildfires on spotted owl habitat, particularly in the San Bernardino National Forest, while emphasizing the minor negative effect of fuel management.

Raptor Population Status and Ecology
Friday 8:45 AM

Student Paper

WHY THE LONG FACE? LACK OF DATA LIMITING CONSERVATION ACTION FOR POTENTIALLY IMPERILED NARROW-FACED KANGAROO RAT

Garrett L Gimbel; California Polytechnic State University; ggimbel@calpoly.edu; Mark Statham, Gage Dayton, Ken Hickman, Craig Fiehler, Tim Bean, **Tim Bean**

The narrow-faced kangaroo rat (*Dipodomys venustus*) is a highly understudied Heteromyid species endemic to the central coast of California, with three currently recognized subspecies. All three subspecies are on the California Department of Fish and Wildlife special animal list and the Santa Cruz kangaroo rat (*D. v. venustus*) is considered critically imperiled - though this designation offers no formal protection. It is likely that the narrow-faced kangaroo rat has engineering/keystone effects via scatter hording seed caching, and the creation of complex burrow systems. Before management action can be taken, more information is needed on population trends, habitats associations, and sub-species taxonomic status. Using genetics to inform species and subspecies ID, we created a range-wide Maxent Habitat Suitability model. We then created a habitat Suitability Model for each confirmed subspecies and compared any differences caused by local adaptation. The results of this study will help managers make informed decisions on the population (and endangerment) status of each subspecies and provide updated tools and methods for the conservation of the species.

Natural History of Small Mammals
Friday 9:45 AM

SNAPSHOTS, SENTINELS, AND OTHER OPPORTUNITIES: ESTABLISHING A STUDENT-LED WILDLIFE MONITORING SITE

Tim Bean; Cal Poly - SLO; wtbean@calpoly.edu; Scott Appleby, Andy Aldecoa, Otto Alexander, Samara Kaplan-Zenk, Jordan Lederer, Remi Licon, Kellen McHugh, Michela Seronello, Katherine Silva, Brandon Swanson, Erin Lyn Virnig

Standardized, distributed remote monitoring approaches have become a powerful tool for collecting and sharing large amounts of reliable information about trends in wildlife distribution, abundance, and behavior. Here, we will describe efforts by a team of students and mentors at Cal Poly - SLO to establish a long-term monitoring site at Chorro Creek Ecological Reserve in western SLO County. Our approach integrates with the CDFW Sentinel Site Network and Snapshot USA, allowing students to learn contemporary field and data processing techniques using camera traps and acoustic recorders for both bats and birds, as well as access data from large-scale monitoring efforts. This project also allowed for evaluating wildlife response to a controlled burn using a BACI design, and provides opportunities for evaluating other future management efforts in an adaptive framework.

Poster Session

AVIAN COMMUNITY RESPONSES TO FOREST RESTORATION IN HAWAIʻI

Erin Bell; Purdue University; bell390@purdue.edu; Douglass Jacobs

Tropical forest restoration holds significant potential for mitigating biodiversity loss, particularly in regions with high levels of endemism, such as Hawaiʻi. This study assesses the impact of restoration efforts on avian populations across two restoration sites: Hakalau Forest National Wildlife Refuge and Puʻuwaʻawaʻa Forest Bird Sanctuary. By analyzing changes in canopy cover and bird abundance over a ten-year period using both point count surveys and remote sensing techniques, we examine the correlations between restoration success and the recovery of native bird species such as the ʻi'iwi (*Drepanis coccinea*) and ʻapapane (*Himatione sanguinea*). Preliminary results suggest a positive correlation between increased native tree cover and higher relative abundance of native birds in restored areas compared to adjacent non-restored regions. However, the response of avian communities varies by species and site, influenced by factors such as forest maturity, proximity to intact habitats, and ongoing threats from invasive species and disease. This study highlights the importance of continuous monitoring and adaptive management to optimize restoration outcomes and support the recovery of Hawaiʻi's native avifauna.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 9:05 AM

USING TIMELAPSE PHOTOGRAPHY TO MONITOR ECOSYSTEM CHANGE: A PILOT STUDY IN CALIFORNIA WATERSHEDS

Ryan A Peek; CDFW; ryan.peek@wildlife.ca.gov; Allison Salas, Kaitlin McGee, Bergen Foshay, Matt Toenies, Lindsey Rich, **Ryan Peek; Bergen Foshay**

Effective monitoring of ecosystem change over time is essential for natural resource management, guiding decisions from permitting and restoration efforts to conservation prioritization. A key limitation is often the lack of resources to effectively monitor change, particularly over periods that extend beyond traditional project windows (i.e., 2-5 years). Furthermore, comparisons across seasonal events or landscape disturbances like wildfire, drought, or floods, or planned events such as land use changes or restoration actions are often opportunistic. One method that can be used is a trail camera for timelapse photography. Timelapse data can be used to document landscape change, phenology, and seasonality by taking photos at set intervals of time from a stationary location. Using photos to estimate vegetative change provides a robust integrator of the effects of year-to-year climate variability and longer-term ecosystem change. R scripts are used to process imagery, allowing users to draw a polygon around an area or vegetation type of interest. This polygon is used to extract data from all images and calculate indices of greenness and senescence. We describe pilot efforts to monitor seasonal change at a series of watersheds in California and highlight the potential implications of using timelapse photography to track restoration efficacy.

Wildlife Techniques
Thursday 11:20 AM

RELEASE OR TRANSLOCATION HABITAT FOR THE ENDANGERED BLUNT-NOSED LEOPARD LIZARD (*GAMBELIA SILA*)

Emily E Bergman; Fresno Chaffee Zoo; ebergman@fresnochaffeezoo.org; Steve Hromada, Steven Sharp, Mark Halvorsen, Lynn Myers, Michael Westphal, Rory Telemeco

Blunt-nosed Leopard Lizards (*Gambelia sila*) are a federal- and endangered species and have fully-protected status in California. Until recently, this prevented issuance of incidental take permits (ITPs) for *G. sila* and thus translocation from project sites to protected areas. This restriction was recently loosened, and translocation may soon be permitted under some scenarios, In 2020, Fresno Chaffee Zoo received emergency permission to collect 7 lizards from Panoche Plateau to form a captive breeding colony and repatriate offspring back to Panoche Plateau, providing an opportunity to understand the conditions necessary for colonization or translocation. Over 2023 and 2024 we released 137 yearling (~10-month old) lizards back to Panoche Plateau outfitted with radio-transmitters for post-release monitoring. High precipitation in 2022-2023 resulted in high cover of invasive annual grasses, drastically reducing habitat quality. We manually mowed 50m2 plots around our 2023 release locations. Released lizards used less area than three remnant wild lizards at the plateau or lizards in a neighboring wild population despite mowing, likely because thatch still hindered movement. Instead of mowing in 2024, we selected release locations that had features heavily utilized by wild *G. sila* such as access to open ground , burrows, and shrubs for thermoregulation and predator protection. Although lizards released in 2024 had higher rates of predation, they used more area and behaved more naturally than lizards released in 2023. Our observations suggest that successful translocation of *G. sila* will require release sites to include the key features that we selected in 2024, and if thatch is present releases are unlikely to be successful.

Poster Session

WESTERN POND TURTLES - BETWEEN TWO SHELLS

Matthew P Bettelheim; AECOM; matthew.bettelheim@aecom.com;

In the spirit of this year's theme entreating us to slow down our fast-paced lives to celebrate the species we love and the mysteries that surrounds them, I am excited to debut a nature documentary more than ten years in the making. Western Pond Turtles - Between Two Shells marks the culmination of my attempt to spend less time capturing turtles and more time observing and recording the natural history of these remarkable species. By simply waiting and watching, I've been fortunate enough to witness western pond turtles nesting within arm's reach, laying eggs, courtship, and more. And some of it, I've been lucky enough to capture on film. I invite you to join me on this journey between two shells...

Natural History of Turtles and Tortoises
Thursday 9:45 AM

GUIDE TO DISTINGUISHING WESTERN POND TURTLES (*ACTINEMYS* SPP.) FROM COMMON POND SLIDERS (*TRACHEMYS* SPP.)

Matthew P Bettelheim; AECOM; matthew.bettelheim@aecom.com; Brian Acord, Rachel Freund, Annie Chang, **Matthew Bettelheim**

Laypersons and professional scientists alike are regularly confounded when trying to distinguish between northwestern/southwestern pond turtle (*Actinemys marmorata* / *A. pallida*) and any of a number of common pond sliders (*Trachemys* spp.) like the red-eared slider (*T. scripta elegans*). As pond sliders age, their distinct markings can diminish; male sliders in particular often become melanistic (an increase in dark pigmentation) with age that masks any distinctive markings (like the "red-ear" and striping) and/or enhances secondary markings (speckling) that more closely resemble a western pond turtle.

To help iNat users and the public distinguish between these two species, we created an illustrated guide to help sort out those tricky turtles. Because no single diagnostic trait alone is necessarily the silver bullet, we identified 11 key traits that, between them, should help if you can get a clear look at a turtle from any one angle. The correct identification, and correctly distinguishing between, California's native and non-native

turtles is important. With certain populations of the west's native western pond turtle experiencing threats from climate change, habitat loss, disease, etc., it is important for Agency personnel and land managers to have the most accurate representation of where western pond turtles are, and are not; just as important is to know where invasive turtles like *Trachemys* spp. are encroaching on western pond turtle habitat. Western pond turtles are a California Species of Special Concern, and are now a candidate for listing under the U.S. Fish and Wildlife Service. Establishing the species' range is critical to future management decisions.

Poster Session

DEVELOPING A COORDINATED WILD PIG MANAGEMENT PROGRAM ACROSS A MULTI-AGENCY PARTNERSHIP

Daniel S Biteman; Wildlife Innovations; biteman@wildlifeinnovations.net; S. Jake Manley, Amie B. Aguiar, R. Thadeus Sternberg

Wild pigs (*Sus scrofa*) are one of the most invasive species of mammal worldwide. Introduced to California in the 1700s, and again in the 1920s, they have since been documented in 56 of the state's 58 counties. Pigs cause significant ecological and economic impacts through rooting, wallowing, and depredation and are extremely difficult to manage. The East Bay Stewardship Network comprises five agencies that collectively manage over 272,000 acres of public lands. These contain invaluable habitat for threatened and endangered species, drinking water for neighboring cities, and are maintained for recreational access. To protect these resources, the Network aimed to develop and operate an effective pig management program. Since the pigs that use Network properties are likely interconnected, a regionally collaborative pig management effort was warranted. We helped the Network develop a scientifically-backed and adaptive pig management plan. We collected and evaluated available pig presence data to better understand pig presence on Network and adjacent properties and generated a habitat suitability model. These analyses were used to inform the development of a collaborative effort to improve the efficiency and effectiveness of pig management and continue to provide adequate protection for sensitive resources at risk due to pig presence.

Studies in Exotic Species Management
Thursday 10:40 AM

DEMOGRAPHIC SURVEY OF THE ALAMEDA WHIPSNAKE (*MASTICOPHUS LATERALIS EURYXANTHUS*) ON MT. WANDA AT JOHN MUIR NATIONAL HISTORIC SITE

Hannah Blank; National Park Service; hannah_blank@nps.gov; Mikayla Gregory, Kayla Bean, Dracena Toluao, Tori Seher

The Alameda whipsnake (*Masticophis lateralis euryxanthus*) is a federally threatened subspecies of the California whipsnake (*Masticophis lateralis*) with a current distribution of five populations in Contra Costa and Alameda counties. Direct threats to the species include habitat loss and fragmentation, primarily due to urban development. Our goal is to monitor the population of Alameda whipsnakes on Mt. Wanda at John Muir National Historic Site while providing training to interns on the natural history of species captured in the process. Park staff began monitoring in April 2018 in collaboration with The Wildlife Project and have monitored each year since. Survey methods include drift fence arrays with funnel and Sherman traps adjacent to the Alameda whipsnake’s preferred coastal scrub habitat on Mt. Wanda. Over the course of the monitoring project, 55 individual Alameda whipsnakes have been captured. Besides Alameda whipsnakes, we also capture other reptiles, amphibians, and small mammals. In 2024, we observed an increase in whipsnake captures compared to recent years, along with a 1710% increase in the number of California voles (*Microtus californicus*) captured. The data we collect provides a better

understanding of the habitat requirements and characteristics needed to support the Alameda whipsnake population on Mt. Wanda.

Poster Session

BUENA VISTA LAKE ORNATE SHREW HABITAT RESTORATION ON A DUCK CLUB

Francesca Cannizzo; Westervelt Ecological Services; fcannizzo@westervelt.com; Dr. Brian Cypher,
Francesca Cannizzo; Brian Cypher

What we think a species' habitat needs are versus what they will readily use, can often vary greatly, and in some cases be counter-intuitive to our perception. Gaining a more robust knowledge base regarding the variety of habitats a species may utilize is critical to conservation efforts seeking to successfully preserve/restore functional habitat for the benefit of the species. Westervelt Ecological Services (WES) was hired by the California High Speed High Speed Rail Authority to provide mitigation for impacts to Buena Vista Lake ornate shrew (*Sorex ornatus relictus*; BVLOS) habitat which resulted in the restoration and conservation of a duck club in western Kern County, referred to as the Lone Tree Mitigation Site. The Lone Tree Mitigation Site provides a case study exemplifying this knowledge dynamic by contrasting our perception of BVLOS habitat preferences with what the species will readily use and flourish in an arid landscape. This presentation highlights our understanding of general accepted BVLOS habitats preferences, what the species has demonstrated it will successfully use, and restoration outcomes garnered from the Lone Tree Mitigation Site experience.

Transportation Projects and Wildlife Interactions II
Wednesday 4:40 PM

EFFECTS OF BEHAVIORAL VARIATION ON CONNECTIVITY AND GENETIC STRUCTURE OF BLACK-TAILED DEER IN NORTHERN CALIFORNIA

Andrea M Broad; University of California, Davis; ambroad@ucdavis.edu; Brett J. Furnas, Michael R. Buchalski, Benjamin N. Sacks

Genetic evidence of connectivity can guide the definition of effective management units and identification of barriers to gene flow. Highly vagile species are expected to exhibit high gene flow and weak population structure. However, behavioral differences may cause differentiation among groups. Black-tailed deer in northern California are partially migratory, with individuals occupying inland mountains migrating seasonally and those in low-elevation habitats occupying year-round home ranges. Greater space use by migratory deer could confer higher gene flow among them compared to that among non-migratory deer. At the same time, strong site fidelity and social affinities among deer that migrate together could genetically differentiate them from non-migratory groups. We investigated these hypotheses using microsatellite genotypes from 1,294 individuals collected throughout north-coastal California from 2015–2020. Estimated effective migration surfaces and isolation-by-resistance modeling indicated higher gene flow in the migratory than non-migratory portions of the range. However, genetic clustering analysis indicated high levels of admixture with minimal genetic differentiation between migratory and nonmigratory groups. Our findings indicate that seasonal migration increases connectivity and does not result in positive assortative mating based on behavioral differences, supporting existing management units and indicating no immediate need to address issues of genetic management among behavioral groups.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 1:25 PM

Student Paper

A NON-INVASIVE FECAL-DNA DETECTION METHOD FOR SARCOPTIC MANGE IN THE SAN JOAQUIN KIT FOX (*VULPES MACROTIS MUTICA*)

Anaisía N Brown; University of California – Davis, Mammalian Ecology and Cons; annbrown@ucdavis.edu; Stevi Vanderzwan, Erica Kelly, Dr. Jaime Rudd, Dr. Deana Clifford, Dr. Brian Cypher, Dr. Ben Sacks

Populations of endangered San Joaquin kit foxes (*Vulpes macrotis mutica*; SJKF) living in Bakersfield and Taft, California, have declined due to an ongoing sarcoptic mange epizootic. Sarcoptic mange is a highly contagious skin disease caused by *Sarcoptes scabiei* mites. Signs of sarcoptic mange are visually apparent, causing generalized hair loss that initially begins on the ischial tuberosities, tail, and legs. Population monitoring for signs of sarcoptic mange typically involves camera surveillance. However, cameras can lead to false-positive or false-negative identification of infested individuals. Because *S. scabiei* mites induce pruritus (itching), they may elicit grooming and ingestion by foxes, enabling the development of a non-invasive fecal-DNA detection method targeting scats. To evaluate the utility of a fecal-DNA detection method, we utilized quantitative PCR and metabarcoding methods aimed at detecting mange mite DNA in fecal samples collected from infested and non-infested SJKF individuals. We will present preliminary estimates of sensitivity and specificity at the individual and population levels. A successful non-invasive fecal-DNA PCR assay for *S. scabiei* would enable mange surveillance to be combined with fecal DNA-based monitoring of population abundance and diet across the range of the SJKFs.

Poster Session

THE NATURAL HISTORY OF CALIFORNIA LEAF-NOSED BATS: TROPICAL BATS IN THE TEMPERATE ZONE

Patricia E Brown; UCLA (retired); patbobbat@aol.com;

Since 1968 I have been studying and banding *Macrotus californicus* in the low deserts of California and Arizona. With a narrow thermal-neutral zone, this species doesn't hibernate or migrate, relying primarily on behavioral adaptations and roost selection. I will share insights into their social system including stable female groups, leks in the fall and delayed embryonic development. They glean large insects and lizards from vegetation using combinations of echolocation, vision and prey-produced sounds. Threats to this species include the exploration of caves and closure of mines, and the loss of foraging habitat through development, most recently solar farms.

Natural History of Bats
Friday 10:05 AM

DO ROCKET LAUNCHES INFLUENCE THE NESTING SUCCESS OF WESTERN SNOWY PLOVERS (*CHARADRIUS NIVOSUS NIVOSUS*) AND CALIFORNIA LEAST TERNS (*STERNULA ANTILLARUM BROWNI*)?

Rachel H. Budge; California State University Bakersfield; rbudge@csub.edu; Megan R. McCullah-Boozer, Levi T. Moats, Lucas K. Hall, Kent L. Gee, Grant W. Hart, Dan P. Robinette, Emily Rice, Emily Olivares Garnica

Anthropogenic noise has been shown to affect seabird and shorebird reproductive success. Research has shown that anthropogenic noise in nesting areas has been increasing over time. Rocket launches are an extreme form of anthropogenic noise, but there is a gap in our understanding of rocket launch noise and its

effects on seabirds and shorebirds. Vandenberg Space Force Base (VSFB) is a launch site for space vehicles located on California's Central Coast and is also home to breeding colonies of threatened western snowy plovers (*Charadrius nivosus nivosus*) and federally endangered California least terns (*Sternula antillarum browni*). Rockets have been launched from VSFB since 1959 when launch cadence was high. Since 2000 however, launch cadence has been historically low, but cadence has been increasing in recent years. Our objective was to determine if low launch cadence influenced the nest success of VSFB plover and tern populations compared to plover and tern populations at reference locations along California's Pacific Coast that are not affected by rocket launches. To do this, we calculated annual nest success of plovers and terns for the last 23 years at VSFB and reference sites. We will provide additional details about these nest success comparisons in this presentation.

Poster Session ***Student Paper***

CDFW NUTRIA ERADICATION PROGRAM

Carolyn Buesch; California Department of Fish and Wildlife; carolyn.buesch@wildlife.ca.gov;

In 2017 a Wildlife Services trapper discovered a pregnant female nutria near Gustine, California. Nutria are large semi-aquatic rodents native to South America. Originally brought into California for fur farming, they were eradicated by the 1970s. After the rediscovery in 2017, an interagency team and incident command system was created to begin delineating the extent of the nutria population and create a removal program. Nutria can quickly clear wetland vegetation and destabilize water conveyance infrastructure such as levees. They are highly fecund and reproduce year-round, producing up to 3 litters per year, with 1-13 young per litter. The CDFW Nutria Eradication Program uses baited camera stations to locate and remove nutria populations. Field staff from different agencies collect data in the FieldMaps Application, use different monitoring and trapping methods, and assess habitat regularly. Partnerships with private landowners and land management agencies are crucial for statewide eradication. As of September 2024, over 5,100 nutria have been removed from nine counties in California.

Poster Session

FINE-SCALE VEGETATION CHARACTERISTICS AT HUMBOLDT MARTEN REST LOCATIONS REVEALS COMPLICATED CHALLENGES

Jessica K Buskirk; NCASI; buskirk.jessica@gmail.com; Holly Munro, Katie M. Moriarty

Coastal marten (*Martes caurina humboldtensis*) require multiple structures (e.g., trees, snags, logs) within home ranges for resting and denning, often serving as locations to avoid predators or mitigate adverse weather conditions. Land managers urgently seek vegetation information to identify risks between fuel-focused forest treatments and conservation of essential areas used by martens. We identified 88 resting locations (n = 18 martens) using both fine-scale GPS/accelerometer data or VHF telemetry in southern Oregon. We collected plot-level conditions (basal area, shrub and horizontal cover, woody material, slash/rock pile volume, canopy cover, foliage height diversity, plant area volume density) at used and random locations (n = 76, 74, respectively). Preliminarily, area of both slash and rock piles were higher at used than random locations (slash: 165±1409 m3, 5±33 m3; rock: 9,422±81,317 m3,11±40 m3, respectively). Shrub and horizontal cover were also modestly higher at used than random locations (shrub: 52±20%, 39±23%; horizontal cover: 78±16%, 68±19%, respectively). However, our confidence intervals overlapped, and summarizing vegetation metrics resulted in weak correlations of marten use. Moving forward, we will use machine learning to build decision trees describing selection. Our results highlight challenges of describing coastal marten habitat even within a relatively homogenous study area.

Natural History of Carnivores II
Thursday 8:25 AM

EFFECTS OF MICROHABITAT CHARACTERISTICS ON UPLAND SITE USE BY THE ENDANGERED BUENA VISTA LAKE ORNATE SHREW

Adrienne Calistri-Yeh; Kern NWRC; adriennecy@gmail.com; Kathryn Jimenez, Rebecca Davenport, Ynez Diaz

The Buena Vista Lake ornate shrew (*Sorex ornatus relictus*; BVLOS) is a federally endangered subspecies of shrew endemic to the southern Tulare Basin, California. BVLOS are typically associated with wetland habitats and moist soils. Kern National Wildlife Refuge (KNWR) has documented BVLOS across its wetland habitats since 1992, but several observations of the species in alkali desert scrub habitat during recent exploratory surveys exposed a need for more information on the relationship between BVLOS presence and distance to water. The objective of this study was to collect a year-round dataset of shrew activity at varying distances from water to discern seasonal differences in habitat associations and water dependence using remote cameras. 36 cameras were deployed across KNWR's upland habitat beginning in April 2024 and locations were stratified by distance to water. As of October 2024, seven sites have had BVLOS detections with the farthest detection being 1583 m from water. Using a single-season, single-species occupancy model, we aim to assess the effect of microhabitat characteristics on occupancy. Our results may reveal what habitat characteristics are most important to BVLOS, how distribution varies seasonally, and how to better manage for a species that could be more widespread than previously thought.

Natural History of Small Mammals
Friday 10:05 AM

WHY BAT MITIGATION OFTEN FAILS, AND HOW WE CAN DO BETTER: RECOMMENDED APPROACHES AND LESSONS LEARNED FROM SOUTHERN CALIFORNIA

Jill M Carpenter; jill.carpenter@lsa.net;

Loss of roosting habitat is widely understood as one of the major causes of declining bat populations worldwide. While some species of bats have adapted to the use of anthropogenic structures (e.g., bridges and culverts) for roosting, this behavior also renders these bat colonies vulnerable during structure widening, seismic retrofit, maintenance, and replacement projects. Efforts made to minimize and mitigate impacts to bats are not always successful because many biologists and environmental planners developing mitigation are not knowledgeable about the natural history or ecology of bats or how to provide appropriate mitigation, there is little published literature available on successful mitigation strategies, and because "one size fits all" mitigation measures are not applicable to bat roosts. After designing and implementing dozens of successful mitigation projects for bats in Southern California, we have developed an informal protocol for creating effective mitigation strategies for transportation projects involving bat roosts. This presentation discusses examples of ways in which mitigation for bats can fail and how to avoid the most common pitfalls. This presentation also proposes a systematic, stepwise approach that can be used for a variety of transportation infrastructure and even other types of projects to minimize and mitigate potential impacts to bats.

Natural History of Bats
Friday 8:25 AM

IMPERVIOUS SURFACE COVER AND NUMBER OF RESTAURANTS SHAPE DIET VARIATION IN AN URBAN CARNIVORE

Tali Caspi; Department of Environmental Science and Policy, UC Davis; tcaspi@ucdavis.edu; Monica G. Serrano, Stevi L. Vanderzwan, Janet Kessler, Christopher J. Schell, Benjamin N. Sacks

In the past decade, studies have demonstrated that several traits, including foraging behavior and diet, differ between urban and nonurban wildlife populations. However, little is known about how environmental heterogeneity shapes dietary variation of organisms within cities. We examined the diets of coyotes (*Canis latrans*) in San Francisco to quantify territory- and individual-level dietary differences and determine how within-city variation in land cover and land use affect coyote diet. We genotyped fecal samples for individual coyote identification and quantified diet with DNA metabarcoding. The highest contributor to coyote diet was anthropogenic food followed by small mammals. The most frequently detected species were domestic chicken, pocket gopher (*Thomomys bottae*), pig, and raccoon (*Procyon lotor*). Diet composition varied significantly across territories and among individuals. Within family groups, however, individual diets were relatively consistent. The representation of anthropogenic food in scats was correlated with impervious surface cover, suggesting that coyotes consumed more human food in more urbanized territories. The representation of invasive, human-commensal rodents in the diet was correlated with the number of food services in a territory. Overall, our results revealed substantial intraspecific variation in coyote diet associated with landscape heterogeneity and point to a diversifying effect of urbanization on population diet.

Genetics in Wildlife Investigations
Thursday 8:25 AM

Student Paper

CANNABIS FOR CONSERVATION; HOW LEGAL CANNABIS CAN SUPPORT BIODIVERSITY

Janelle Chojnacki; Cannabis for Conservation; janelle.choj@gmail.com; Jackee Riccio

Cannabis agriculture offers a unique opportunity to study and promote agroecology as well as environmental stewardship. This is particularly true in northwestern California where most outdoor farms have small footprints and are adjacent to habitat for sensitive and protected species such as the Northern spotted owl, coho and Chinook salmon, and Humboldt marten. The cannabis industry has a reputation for being extractive and contributing toxicants to wildlife and the environment, but many small-scale cannabis farmers are actually incredible land stewards, promoting and facilitating biodiversity and ecological restoration on their farms and utilizing sustainable integrated pest management and other strategies to reduce negative impacts to the environment. This presentation will highlight biodiversity research and projects occurring on licensed cannabis farms in Humboldt, Trinity, and Mendocino Counties and will advocate for wildlife biologists, natural resource agencies, and consumers to see cannabis cultivation as an opportunity for, not a hindrance to, conservation. The cannabis industry in California will also be discussed, with emphasis on the continued potential to collaborate with farmers to support the environment, as well as the financial and regulatory hurdles faced by licensed small-scale farmers.

Wildlife and Agriculture II
Wednesday 4:20 PM

COMBINING HAND CAPTURES, CAMERAS, AND TELEMETRY TO ESTIMATE POPULATION PARAMETERS OF AN ENDEMIC MONITOR LIZARD AND INFORM THE MANAGEMENT OF AN ENDANGERED BIRD

Jack T Christie; Cal Poly Humboldt; jc926@humboldt.edu; Daniel Barton, David Garcelon

The Mariana monitor (*Varanus tsukamotoi, ne indicus*; Chamorro name: hilitai) is a large lizard, growing up to 4 ft in total length, and is an opportunistic predator. They were once considered an introduced species in the Mariana islands, however recent evidence suggests they are endemic. Wildlife managers are nonetheless concerned with potential predation on the endangered Guam rail (*Hypotaenidia owstoni*, Chamorro name: ko'ko'). The two species co-occur on an islet called Islan Dåno (Cocos Island) off the coast of Guam where the ko'ko' was reintroduced in 2010 after going extinct in the wild in the 1980s. While a control program for the hilitai was implemented in 2009, little is known about their density and distribution on Islan Dano. We used hand captures, camera traps, and GPS telemetry to inform a spatial mark-recapture (SCR) model for estimating the density and abundance of hilitai, evaluating the effect of lethal removal and informing future management actions. Our estimate of 17.5 individuals per hectare is more than twice as high as previous estimates using line-transect methodology. The use of downwards facing trail cameras paired with drift fences detected other rare species on Islan Dåno as well, including the ko'ko'.

Wildlife Techniques
Thursday 11:40 AM

Student Paper

LONG-TERM OCCUPANCY MONITORING REVEALS VALUE OF MODERATE DISTURBANCE FOR AN OPEN-HABITAT SPECIALIST, THE STEPHENS' KANGAROO RAT (*DIPODOMYS STEPHENSI*)

Denise R Clark; United States Geological Survey; drclark@usgs.gov; Cheryl S. Brehme, Philip R. Gould

Long-term monitoring is vital to properly characterize changes in population distribution and abundance over time and can be used to guide management decisions by informing and evaluating the efficacy of management actions. A long-term monitoring initiative for the federally threatened Stephens' Kangaroo rat (*Dipodomys stephensi*, SKR) was established within Marine Corps Base Camp Pendleton (MCBCP), San Diego, California, USA. From 2005 to 2018, we tracked trends for SKR in: area occupied; relative densities within occupied habitat; and modeled probabilities of occupancy, colonization, and extinction. Both area occupied by SKR and density increased from 2005 to 2018 on MCBCP. Increased area occupied was correlated with increases in estimated density among years, indicating SKR population growth occurs by expansion into suitable habitat patches, as well as increases in numbers within occupied habitat. SKR occupancy was positively associated with gentle slopes (<10%) and moderate open ground (40–80%) and forb cover (>40%). Additionally, probabilities of SKR occupancy and colonization were higher in areas with moderate levels of disturbance. We conclude that long-term occupancy and density monitoring is effective in informing status and trends of spatially dynamic species and that moderate habitat-based disturbance is compatible with the management of SKR.

Poster Session

MITIGATING IMPACTS FROM RABBIT HEMORRHAGIC DISEASE VIRUS AND MONITORING POPULATION TRENDS FOR ENDANGERED RIPARIAN BRUSH RABBITS IN CALIFORNIA'S CENTRAL VALLEY

Deana L Clifford; Wildlife Health Laboratory; deana.clifford@wildlife.ca.gov; Fumika Takahashi, Melinda Houtman, Megan Moriarty, Jaime Rudd, Mary Lou Berninger, Fawzi Mohamed, Thomas Connor, Cathleen Steinbeiser, Darren Minier, Beate Crossley

After rabbit hemorrhagic disease virus 2 (RHDV2) emerged in California in May 2020, an interagency/zoo/academia/non-profit team implemented emergency conservation actions to protect

California's Central Valley endemic, endangered riparian brush rabbit (*Sylvilagus bachmani riparius*, RBR). Vaccination of ~15% of the estimated RBR population began in September 2020 to minimize disease-caused extinction risk after a single dose vaccine trial on 19 wild RBRs temporarily held in captivity demonstrated safety. All trial RBRs developed antibodies, with titers from 1:10 - 1:160. Seroconversion generally occurred 7-10 days post-vaccine and antibody response was ≥60 days in 12 individuals. A total of 1,217 RBRs have been vaccinated at least once since 2020. Spatially explicit mark-recapture-based density estimates using capture data from Fall 2020-Spring 2022 ranged from 2.66- 62.52 RBRs/hectare. In Spring 2022, RHDV2-caused deaths of three unvaccinated RBRs and one sympatric desert cottontail (*S. auduboni*) confirmed species susceptibility to RHDV2. No mortalities in vaccinated RBRs were detected. Severe flooding January through June 2023 significantly reduced the RBR population, evidenced by reduced camera-trap detections and ~80% fewer RBR captures post-flood in October-November 2023 as compared to 2020-2022. Vaccination, disease surveillance, and population monitoring are ongoing to protect RBRs and monitor post-flood recovery.

Wildlife Pathogens
Thursday 11:20 AM

COMMUNITY SCIENCE INDIVIDUALS COLLECT PEAK RAPTOR MIGRATION DATA DURING A PAUSE IN PROGRAMS.

Laura E Coatney; Swaim Biological Inc.; lauraecoatney@gmail.com; Danielle Christensen

During an unprecedented pause in programs at the Golden Gate Raptor Observatory (GGRO) from September 5 to October 13, 2024, hawkwatch teams unofficially continued collecting raptor migration data from Hawk Hill in the Marin Headlands of the San Francisco Bay Area. The pause in programming occurred during peak fall migration of raptors through the Pacific Flyway (mid-September through the beginning to mid-October). Hawkwatch volunteers (and banders), some with decades of training and experience at GGRO, met daily on their regularly scheduled team's volunteer day, between September 6 and October 13, 2024, to collect hawkwatch data (sightings of raptors (species/age/sex) and environmental data such as wind speed and direction). Hawkwatch protocols practiced by the program were followed with minor alterations, apart from recording data using paper data sheets, which was previously used by GGRO before switching more recently to data-collection application software. More than 4,000 raptors counted, up to 19 species of raptors, raptors per hour rate, as well as photos of raptors taken during the paused period will be presented here. These observations and data collected vastly expand our knowledge and understanding of trends during peak raptor migration and contribute to 40 years of the program's effort in raptor research.

Poster Session

TESTING THE USE OF RUB-STATIONS FOR SARCOPTIC MANGE TREATMENT IN SAN JOAQUIN KIT FOXES

Jessica J Copeland; UCSB ; jessicacopeland@ucsb.edu; Alyse Gabaldon, Erica Kelly, Brian Cypher, Jaime Rudd

San Joaquin kit foxes (*Vulpes macrotis mutica*, SJKF), endemic to California's San Joaquin Valley, face habitat loss and fragmentation threats. In 2013, sarcoptic mange emerged as a significant threat to the urban Bakersfield SJKF population, causing severe health issues in SJKF and a 100% mortality rate if left untreated. Given the urgency for intervention, the Endangered Species Recovery Program (ESRP) has been trapping SJKF and applying topical acaricides, but this approach is insufficient for broader population treatment. Carnivores, including SJKF, will often rub or roll to scent mark, and it may be possible to induce rubbing behavior on objects that contain medication, allowing for self-treatment. In July

2024, ESRP initiated a pilot project deploying 12 rub stations containing lure, dish soap, and dye on Bakersfield school campuses to determine their feasibility as a self-medication method for SJKF. There were 255 SJKF visitations to 9 of the 12 rub stations, but the interaction was limited, with only 19% of visiting kit foxes rubbing (49/255) and 10.5% rolling (27/255). These findings suggest that SJKF are unlikely to engage effectively with the rub stations, highlighting the need for alternative methods to address the critical threat of sarcoptic mange in the population.

Poster Session ***Student Paper***

THE EFFECTS OF FIRE ON BAT ACTIVITY IN SEQUOIA AND KINGS CANYON NATIONAL PARKS

Autumn N Corrow; California State University, Bakersfield ; acorrow@csub.edu;

Bats comprise one-fifth of all mammal species and are critically important to maintaining healthy ecosystems yet are often misunderstood by the public. Bats are ecosystem indicators, meaning that their presence or absence implies the conditions of their habitat. Importantly, we can use bats as a proxy for determining the status of recovery of habitats following natural disasters like fire. While wildfires are a natural part of California's landscape, the fire season in California and across the West starts earlier and ends later each year, with climate change considered to be the key driver of this trend. To understand how wildfire is affecting the diversity and abundance of bats, I conducted echolocation surveys in 2021-2022 within the SQF Complex, which burned in Sequoia National Forest and adjacent areas in August 2020. The goal of the study was to determine how the number of bat species and composition of bat species in a habitat change in response to the degree of fire severity. This information is crucial to understanding how bats are adapting to fires, encouraging appropriate habitat management and conservation efforts of an order facing numerous threats.

Natural History of Bats
Friday 9:05 AM

COYOTE FOOD ITEM USE ALONG AN URBAN GRADIENT IN THE SOUTHERN SAN JOAQUIN VALLEY, CALIFORNIA

Brian L. Cypher; CSU-Stanislaus, Endangered Species Recovery Program; bcypher@esrp.csustan.edu; Erica C. Kelly

Food item selection by coyotes (*Canis latrans*), a generalist forager, is largely determined by local item availability, which can be significantly altered by human activities such as urbanization. We compared coyote food item use among areas within three urbanization zones: urban, peri-urban, and non-urban. Rodents were primary food items (>10% frequency of occurrence in scats) in all zones but consisted of California ground squirrels and gophers in the urban and peri-urban zones and of gophers, kangaroo rats, and deer mice in the non-urban zone. Leporids also were a primary item in all zones but likely consisted of mostly black-tailed jackrabbits in the non-urban zone, jackrabbits and desert cottontails in the peri-urban zone, and mostly desert cottontails in the urban zone. Invertebrates consisting primarily of darkling beetles were a primary item in the urban and peri-urban zones. Unidentified birds were a primary item in the urban and non-urban zones and honey mesquite was a primary item in the non-urban zone. Anthropogenic items occurred relatively frequently in the peri-urban (grapes) and urban (trash) zones. Our results document transitional foraging patterns by coyotes in response to food availability mediated by urbanization and elucidate adaptive responses that facilitate coyote persistence in anthropogenically altered landscapes.

Poster Session

IT GETS WORSE BEFORE IT GETS BETTER? MINIMIZING IMPACTS & MAXIMIZING BENEFITS IN LARGE-SCALE RESTORATION IN OCCUPIED TURTLE HABITAT IN YOSEMITE NATIONAL PARK

Ninette R Daniele; Yosemite National Park; ninette_daniele@nps.gov; Jason P. Waddington, Joshua B. Mayo, Micheal Morales, Carson E. Lillard, Robert L. Grasso

The desperate state of our world's natural systems increasingly requires drastic, large-scale actions to restore ecological function. Yosemite National Park is undertaking the largest project of its kind to restore a Sierra Nevada meadow, in a site occupied by Northwestern pond turtles (*Actinemys marmorata*) which are proposed for federal listing. Meadow restoration is being achieved through extensive heavy equipment work to fill occupied erosion gullies in the stream channel, creating unique challenges in protecting this declining freshwater turtle. We utilized pre-project trapping, interdisciplinary planning for retention and construction of long-term aquatic habitats, radio telemetry of high value-turtles, small scale translocations, manual clearance surveys, and canine clearance surveys to achieve our objectives. We will describe our multi-pronged approach to developing informed turtle protection and impact minimization measures, and report "lessons learned" following the last 2 years of project implementation, in the intention that our highlights may help others involved in large-scale habitat manipulations (such as consulting biologists and land managers) to achieve favorable outcomes for freshwater turtles.

Natural History of Turtles and Tortoises
Thursday 8:25 AM

LOCAL SITE USE OF THE ENDANGERED SAN JOAQUIN KIT FOX IN CENTRAL VALLEY UPLANDS

Rebecca N Davenport; Kern National Wildlife Refuge; rebecca_davenport@fws.gov; Kathryn M. Jimenez, Miguel A. Jimenez

The San Joaquin kit fox (*Vulpes macrotis mutica*) (SJKF) is an endangered subspecies endemic to California's San Joaquin Valley. Amidst a landscape dominated by agricultural development, the Kern National Wildlife Refuge (NWR) provides remnant alkali desert scrub habitat for the SJKF and other upland species. However, SJKF observations at the KNWR have significantly dwindled since the 1970s, potentially due to an influx of invasive vegetation. Through an intensive 3-year habitat restoration effort, we have removed 500 acres of invasive salt cedar across KNWR. Considering that salt cedar typically colonizes riparian areas, our study is the first to document salt cedar treatment within an upland ecosystem. Our objective was to commence a multi-year study of SJKF site use patterns across all potential SJKF habitat to assess their long-term response to invasive plant removal. We established paired camera arrays at 12 sites with varying proximity to treated salt cedar stands. We evaluated multiple local site characteristics potentially influencing SJKF movement, prey availability, and predation risk, including shrub density, grass height, proportion of bare ground, and kangaroo rat burrow density. Using multi-scale, single-season occupancy models, we aim to estimate SJKF local site use through predefined biological seasons. Our results may reveal how long it takes SJKF to respond to habitat recovery, and the extent to which invasive plant removal influences site use dynamics compared to other local characteristics.

Natural History of Carnivores I
Wednesday 5:00 PM

DISTRIBUTION AND HABITAT USE OF THE SANTA CLARA COUNTY POPULATION OF RED-BELLIED NEWTS (TARICHA RIVULARIS)

Joie de Leon; San Jose State University and Swaim Biological Inc.; joiemdeleon@gmail.com; Rachel O'Malley

The red-belled newt (*Taricha rivularis*) is a poorly studied endemic California salamander species that can be commonly found along the coastal forests north of Sonoma County. In 2009, a disjunct population of red-bellied newt was discovered 130 km south of its previously known range. Here we document the range and breeding phenology of this population as of 2019 and contrast its habitat use with that of other sympatric newts. Surveys across two years suggest that the southern population of *T. rivularis* is confined to one 1-km reach of Stevens Creek and a tributary informally called Twitty Creek, and the population follows an early-March to late-April migratory breeding pattern. Spatial analysis shows that breeding male *T. rivularis* aggregate only in Stevens Creek, likely dispersing through Twitty Creek, and that they associate with riffle and run mesohabitats rather than pools. Sympatric *T. granulosa* and *T. torosa* populations tended to associate more with woody debris cover types and cobble substrates than *T. rivularis*. *T. rivularis* oviposition site selection was most influenced by large substrate size. Protecting large substrate and complex instream habitat in sensitive breeding reaches, as well as upland habitat along dispersal routes, should be an important consideration for land managers. Understanding the nuances of range, temporal behavior, and habitat needs for this disjunct population is critical to ensure the survival of this California Species of Special Concern.

Natural History of Amphibians
Friday 8:25 AM

BEHAVIORAL RESPONSES OF PINNIPEDS TO ROCKET LAUNCHES AT VANDENBERG SPACE FORCE BASE AND THE NORTH CHANNEL ISLANDS

Eugene J DeRango; Vandenberg Space Force Base; eugene.derango.ctr@spaceforce.mil; Tiffany Whitsitt-Odell, Morgan Ball, John Labonte

Vandenberg Space Force Base encompasses 42 miles of undeveloped coastline which provides ecologically important habitat for marine mammals. Three common pinnipeds, harbor seals (*Phoca vitulina*), elephant seals (*Mirounga angustirostris*), and California sea lions (*Zalophus californianus*) occur annually with varying seasonal attendance at 30 haul-out sites within or surrounding base. Numerous monitoring and minimization measures are required by the National Marine Fisheries Service when rocket launches are predicted to cause Level B (behavioral) harassment. This presentation will provide an overview of 20+ years of launch monitoring (e.g. sonic boom modeling and acoustic disturbance to pinniped haul-outs) and dive into species-specific behavioral observations from two recent launch case reports on mainland California and the North Channel Islands. To summarize, launch-specific monitoring results indicate that 45-100% of harbor seals and sea lions alert and/or flush due to booster roar or sonic booms, however, in almost all instances, peak abundance counts return to baseline within 12 hours. In contrast, elephant seal disturbance appears to be minimal. Finally, we discuss future efforts in alignment with our most recent NMFS Letter of Authorization to contribute to our understanding of population-level shifts in state-wide abundance patterns for these top marine predators.

Conservation on Military Lands
Thursday 11:00 AM

WHAT'S THAT SMELL? DETERMINING PD-INFECTION STATUS IN TRICOLORED BATS USING E-NOSE VOLATILE EMISSIONS ANALYSIS

Anna C Doty; California State University Sacramento; anna.doty@csus.edu; A. Dan Wilson, Lisa B. Forse, Thomas S. Risch

Electronic nose (e-nose) devices analyze volatile organic compound (VOC) signatures and may be used to determine the Pd-infection status of bats early in the hibernation period and prior to visible symptom development without the need for tactile captures or handling which disturb bats. An e-nose investigation of whole-body VOC emissions from Tricolored bats (*Perimyotis subflavus*), sampled noninvasively within 13 caves and 2 mines in Arkansas, showed that most tricolored bats are relatively disease free when first entering caves, but acquire Pd-infections over time, often leading to WNS disease development at variable rates prior to the exiting of surviving bats from caves in the Spring. Healthy bats exhibited significantly different E-nose smellprint signatures than Pd-infected bats, both prior to and following disease and associated WNS symptom development. These differences in VOC emissions were indicative of Pd-induced pathophysiological changes that occur in bat metabolic pathways associated with pathogenesis during the progression from healthy to early and late WNS disease states. The e-nose approach provides a new noninvasive tool for monitoring changes in bat physiological processes that occur from healthy to diseased states during winter hibernation periods, allowing for earlier confirmation of disease and treatment applications.

Natural History of Bats
Friday 9:45 AM

POPULATION GENOMICS OF THE ENDEMIC GALAPAGOS DOVE (*ZENAIDA GALAPAGOENSIS*)

Eva J Driggs; San Francisco State University; evajasinski@gmail.com; Jack P. Dumbacher, Jaime A. Chaves

The Galapagos dove (*Zenaida galapagoensis*) is an endemic bird species found on every major island of the Galapagos. However, *Z. galapagoensis* populations have declined 20-29% in the last decades due to introduced predators (e.g., cats) and human disturbance. Despite this recent decline, *Z. galapagoensis*' population dynamics remain largely understudied. Previous research using five microsatellite markers found high gene flow between populations across five islands, but little information about other important genetic metrics was provided. The proposed study will expand on this previous work by investigating the population dynamics at the genomic level, across both subspecies, and on a broader range of islands. To accomplish this, we aim to 1) sequence and assemble the first genome for *Z. galapagoensis*, 2) re-sequence a series of individuals from a wider range of islands (both subspecies), and 3) explore phylogenetic relationships among lineages and provide population genetic metrics. This study will increase our understanding of the population dynamics of *Z. galapagoensis* and inform its population status, potentially highlighting islands with dire need for conservation measures.

Poster Session ***Student Paper***

WHERE ARE THEY BREEDING? ATTACHING GSM TRANSMITTERS TO BURROWING OWLS IN ORANGE COUNTY, CALIFORNIA

Alexandra Eagleton; aeagleton@endemicenvironmental.net; Barry Nerhus Jr., Peter H Bloom

The breeding population of burrowing owls (*Athene cunicularia*) has been extirpated from Orange County (OC), California with the last individual observed 20 April 2018. However, OC still harbors a handful of overwintering burrowing owls (BUOW), whose breeding location is not known. Color banding efforts over the last decade have yielded results of one individual returning to Fairview Park in OC two successive winters, but has not yielded information on where the OC BUOW breed. In February 2024, we

attached GSM solar rechargeable transmitters to two burrowing owls overwintering in Orange County to determine their summer breeding sites. We were able to determine the breeding location for one BUOW, which showed up near Brogan, Oregon. We found success using the leg-loop harness method for transmitter attachment, and our transmitters remained on the BUOW and were not bitten or chewed off. Our challenges include selecting an appropriate duty cycle for location check-ins to retain charge, and predation potentially due to the device's presence. Using this technology, we hope to better understand the migration patterns of the burrowing owls that overwinter in Orange County in order to learn how to best support the local population.

Poster Session

MARINE RESOURCE USE BY TERRESTRIAL MAMMALS IN MAINLAND COASTAL ECOSYSTEMS.

Katie Elder; California Polytechnic State University, San Luis Obispo; katelderop@gmail.com; Seth Newsome, Tim Bean

The movement of nutrients is central to ecological processes. Ecological management has historically been constrained to the boundaries of the ecosystem in question. However, allochthonous inputs across ecosystem boundaries (ie. marine nutrients entering terrestrial food webs) can have profound effects on the recipient ecosystem. Understanding the trophic pathways by which marine subsidies move into the terrestrial environment is important for proper management of coastal habitats. This study examined the use of marine nutrients by small mammals on the Jack and Laura Dangermond Preserve, California. We quantified the use of marine subsidies using stable isotope analysis of fur and whisker samples from small mammals captured at beach and inland sites. We found that coastal small mammals were being subsidized by marine nutrients and had wider dietary niche widths than their inland counterparts. These marine subsidies can bolster small mammal populations in drought years and could in turn subsidize terrestrial consumers higher up on the food web. Coastal ecosystems are being disproportionately impacted by climate change, so understanding nuances of coastal processes is paramount to maintaining ecosystem functionality in the future.

Poster Session

BAT COMMUNITY COMPOSITION OVER AN ELEVATIONAL GRADIENT IN SEQUOIA NATIONAL PARK

Jacqueline Elston; California State University Sacramento; jelston@csus.edu; Kylie McNary, Jenny Hanson, Mel Weber, Gino Buencamino, Brad Compton, Anna Doty, **Jaqueline Elston**

Bats are a diverse order of animals; consequently species from this order fill various niches, and have different habitat needs based on morphology, microclimate preferences, roosting preferences and foraging needs. As the global climate continues to change, some bats may need to shift spatial use to adequately address their energetic needs. While some research suggests that bat species richness declines over an elevational gradient, exceptionally hot areas like the Sierra Nevada foothills in California may drive some bats to higher elevations for roosting or foraging to manage evaporative water loss or promote daily torpor. The aim of our study is to assess seasonal bat species composition and activity over an elevational gradient at Sequoia and Kings Canyon National Parks, California. Acoustic data were collected from seven sites spanning four elevation categories (foothills, montane, subalpine, and alpine) from April 2023 – August 2024. Data will be analyzed to determine if and how different bat species utilize the elevational gradient. Understanding species composition within this area can also provide insight into how white nose syndrome may affect bat populations in Sequoia and Kings Canyon National Parks, and inform future conservation efforts for species of concern.

Poster Session ***Student Paper***

MONITORING IN A CHANGING WORLD: ADAPTING TO LIMITED ACCESS

Hannah M Espinosa; Northern California Regional Land Trust; stewardship@landconservation.org;

Monitoring is an essential aspect of the job for wildlife and environmental professionals but due to climate change, access to the land is becoming more difficult. Remote monitoring via satellite imagery has allowed the Northern California Regional Land Trust to continue annual monitoring requirements and to track progress across all active projects even when the project area is inaccessible. In 2023, the Land Trust successfully implemented remote monitoring on all conservation easement and fee title properties, more than 40,000 acres in Northern California. Integrating remote monitoring into monitoring protocol noticeably reduced monitoring costs, staff field time, and staff risk due to illegal growing operations, while also expanding staff knowledge for each property. Remote monitoring made it possible to monitor growth and disruptions in forests, track progress of reforestation efforts, analyze historical fires and current fire recover, evaluate carbon projects through vegetation growth, confirm parcel data, and measure biodiversity intactness and species richness, despite the catastrophic wildfires and severe flooding seen throughout the Land Trust's service area in recent years. The natural world around us is changing rapidly, remote monitoring enables wildlife and environmental professionals to adjust and adapt to current conditions from year to year.

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 3:40 PM

A COMPARATIVE STUDY OF THE EFFECTS OF ARTIFICIAL LIGHT ON SAN JOAQUIN KIT FOXES IN URBAN AND NON-URBAN ENVIRONMENTS

Karnig M Estenssoro; California State University, Bakersfield; kestenssoro@csub.edu;

Artificial light at night (ALAN) is increasingly becoming recognized as an influential pollutant, impacting the fitness of numerous species. However, the effects on the behavior of many mammalian carnivores from ALAN remain unclear. The San Joaquin kit fox (*Vulpes macrotis mutica*; SJFK) is a small carnivorous mammal that inhabits the San Joaquin Valley of Central California. Unfortunately, this subspecies of kit fox is currently listed as endangered. Despite urbanization being one of the causes of habitat loss, the urban populations of this endangered species have acclimated well to their surroundings. A fundamental characteristic of the urban environment is the presence of ALAN, which may influence SJKF behavior. This study aims to determine how the SJKF behaviorally responds to the presence of ALAN in urban environments. To achieve this goal, we will determine if SJKF visits to scent stations differ in the presence and absence of ALAN in a Before-After-Control-Impact study design in both urban and non-urban environments. This study can contribute to understanding how small carnivores respond to light pollution and will aid SJKF conservation efforts, including detecting movement patterns and habitat preferences concerning light pollution and the potential for "wildlife-friendly" lighting practices.

Poster Session

HOW TO CONSERVE THE CHIMPANZEES AND THEIR ENVIRONMENT? MAKE THE PEOPLE HEALTHY

Sarah Etheridge; sarah.etheridge@canyons.edu;

There is a surprising relationship between chimpanzee/forest conservation and epidemiological interventions on waterborne illnesses that I have discovered in the past 15 years of my research. I first uncovered a strong correlation between human quality of life and the population density of chimpanzees in Uganda in 2008. This led me to focus on improving human health by focusing on creating water hygiene programs that could be used cross-culturally through enacting behavior change and improving self-reliance. This approach was successfully used in Nicaragua and Ghana from 2015-2020. Since 2021, I have worked with Friends of Chimps in the same areas I first conducted my research in 2008, where we have demonstrated that wildlife and forest conservation and restoration programs can only be successful if they also address the wellbeing of the human community. These programs are vital to environmental and wildlife sustainability, especially with increasing pressures of climate change and human population growth.

Poster Session

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

Brian G Fagundes; Point Blue Conservation Science; bfagundes@pointblue.org; Bonnie Eyestone, Alicia Herrera, Ryan DiGaudio, Alissa Fogg

The ecological function of rangelands generates productivity, sequesters carbon in the soil, supports robust wildlife populations, and can be 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. We evaluate key indicators of ecological function related to soil health, vegetation, and the bird community. RMN's data inform 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. RMN's conservation recommendations are being put into action with restoration projects across the state via the Roots Program, a wildlife habitat restoration program led by Point Blue Conservation Science and funded by the California Wildlife Conservation Board.

Wildlife and Agriculture II
Wednesday 3:40 PM

UNDERSTANDING BARRED OWL (*STRIX VARIA*) DIET ALONG AN INVASION PATHWAY IN CALIFORNIA AND THE PACIFIC NORTHWEST

Emma Fehlker Campbell; University of Wisconsin- Madison; Fehlkercampb@wisc.edu; Emily D. Fountain, Nicholas F. Kryshak, J. David Wiens, Ryan C. Baumbusch, Karla A. Bloem, M. Zachariah Peery

Invasive predators can negatively impact biological communities through top-down predation, but the ecological processes that shape the consumption of prey in novel communities are less understood. The "Enemy release hypotheses" and "Naïve prey hypothesis" are two explanations for why invasive species succeed in novel environments and, under these hypotheses, diets of invasive predators are expected to initially expand and then contract over time during invasion. Additionally, differing invader densities, and fluctuations in climactic and biogeographic conditions that shape prey community composition are likely to influence prey availability and selection, but the relative importance of these factors has yet to be tested. Here we used DNA metabarcoding on intestinal samples to determine diet composition and diversity of Barred Owls (*Strix varia*) within their native and invasive ranges. We present diets from 6 invasive populations in California, Oregon and Washington, and 1 native population in Minnesota and Wisconsin. Dietary diversity was greater in the invasive range across all taxonomic levels, with the leading edge of the

invasion in California having the most diverse diet. Non-mammalian prey had higher importance in the invasive range, with amphibians and invertebrates represented most often.

Studies in Exotic Species Management
Thursday 11:20 AM

Student Paper

DEVELOPMENT OF AN EFFECTIVE, VERSATILE, AND HUMANE WILD HOG TRAP

Anthony J DeNicola; White Buffalo Inc; susan.ferry@pigbrig.com; Vickie L. DeNicola, Aaron Sumrall, Pietro Pontiggia, E. Gleich, C. Gremse, **Susan Ferry**

Invasive wild pigs (*Sus scrofa*) cause substantial ecological and economic damage worldwide. Trapping is a critical tool used to manage wild pigs in native and introduced regions, but traditional strategies often involve traps that require substantial investment to acquire, set up, and manage. Given the devastating worldwide impact of wild suids, a new trapping strategy that is adaptable, efficient, effective, and humane was needed. We aimed to design and evaluate a trap that: 1) improved capacity by increasing the number of traps on the landscape; 2) decreased the costs, labor, equipment, and technology required; 3) offered the ability to catch multiple groups, and 4) reduced the impacts on trapped animals. The trap design featured a double-walled net that was evaluated by experts in wild hog management. Results regarding effectiveness and ethical considerations indicate that the trap successfully captured wild pigs while reducing injury levels from 12 – 32%, as reported with conventional coral traps, to 2%. The trap's low-cost construction and adaptable design represent a significant advancement in invasive species management and ensures its accessibility to researchers, wildlife agencies, landowners, and conservation organizations seeking an effective and humane tool to address disease, research, and damage management objectives for wild pig populations.

Poster Session

EFFECTS OF CANINE URINE ON WILDLIFE FORAGING

Gabriel A Fraser; CSUMB; gfraser@csumb.edu; Hailie Milam, Philip Yang, Dr. Jennifer Duggan

The primary objective of this study is to assess if urine from domestic dogs increases perception of risk and inhibits foraging activities of wildlife, including ground foraging birds, small mammals, and mesocarnivores, in coastal California. We will test the effects of dog urine presence on wildlife foraging by placing a sample of either domestic dog urine or water near artificial foraging patches where foraging activities are quantified as Giving-Up Densities (GUD). We will establish a wildlife camera near each foraging patch to identify all species foraging in the patch. We hypothesize that if animals perceive domestic dog urine as a direct cue for risk, GUD should be greater at foraging patches with urine present than at control patches where urine is not present. We predict higher GUD in foraging patches near domestic dog urine than patches near water for small mammals and mesocarnivores, but because ground foraging birds rely less on olfaction that mammalian species, we predict no differences in GUD for birds. Information on how domestic dog urine affects the perception of risk for wildlife will increase our understanding of the effects of domestic dogs on wildlife behavior and will be useful for managing their presence in natural areas.

Poster Session

STRATEGIES FOR FOREST THINNING: MINIMIZING IMPACT ON PACIFIC MARTEN HABITAT

Smith Freeman; University of Minnesota; freem850@umn.edu; Katie Moriarty, John Fieberg

To mitigate worsening fire severity in the western United States, forest managers are increasingly thinning tree stands to reduce available fuels. These treatments have the potential to disrupt the movements and habitat of Pacific marten (*Martes caurina*), who prefer multistory, dense conifer vegetation. We analyzed the movements from 32 GPS-collared martens within Lassen National Forest, between 2010 and 2019, to provide actionable recommendations to managers looking to lessen the impacts of forest-thinning treatments on martens. We categorized each stand in the study area by structural complexity: complex (i.e., dense), simple managed (i.e., thinned dense stands), simple (i.e., thinned or naturally sparse), and open (i.e., little or no cover canopy). We found that martens selected territories comprising a few large complex and simple managed stands and many small simple and open stands. Within their territories, they preferred large complex and simple managed stands; however, preference between the four stand types was indiscernible at smaller patch sizes. This indicates that complex and simple managed patches of these smaller areas could be good targets for fuel-thinning treatments. With additional analyses, we offer forest managers guidelines for area, shape, and location of thinned stands that minimize disruption of marten habitat.

Natural History of Carnivores II
Thursday 8:45 AM

Student Paper

SPATIOTEMPORAL PARTITIONING BETWEEN AN INVASIVE SPECIES AND A MESOCARNIVORE COMMUNITY IN AN URBAN ENVIRONMENT

Alyse D Gabaldon; California State University, Bakersfield; agabaldon1@csub.edu; Lucas K. Hall, Vanessa I. Nesheiwat

Invasive species can be detrimental to ecosystems. While the effects of invasive species on native ecosystems are many, invasive species are often capable of outcompeting species for resources, yet our understanding of these effects in urban environments is still developing. The domestic cat (*Felis catus*) is an invasive species that is commonly observed in urban areas alongside other urban mesocarnivores, however, the potential impacts and interactions domestic cats have on other urban mesocarnivores is not well understood. To address this knowledge gap, we evaluated temporal and spatial partitioning between domestic cats and other mesocarnivores in an urban environment. We predicted that if domestic cats are negatively affecting other urban carnivores, urban carnivores may spatially or temporally minimize interactions with domestic cats. We used camera traps with scent lures at high school and college campuses across the southern San Joaquin Valley to monitor the visitation patterns of urban mesocarnivores from 2020 to 2022. Generalized linear mixed models and AIC model selection will be used to evaluate spatial relationships and interactions between domestic cats and other urban mesocarnivores, and temporal overlap coefficients and peak activity analysis will be used to evaluate temporal overlap and the results of these analyses will be discussed.

Poster Session

CHALLENGES AND LIMITATIONS FOR THE RECOVERY OF THE RARE AND UNDERSTUDIED SAN JOAQUIN VALLEY GIANT FLOWER-LOVING FLY (*RHAPHIOMIDAS TROCHILUS*)

Mario E Gaytan; Center for Natural Lands Management; mgaytan@cnlm.org;

The recovery of endangered species often relies on extensive research and persistent efforts by enthusiasts, scientists, and governmental organizations. However, some species, such as the San Joaquin Valley giant

flower-loving fly (*Rhaphiomidas trochilus*; SJVF), face significant challenges that leave them at risk of extinction. Once inhabiting inland dunes as far north as Antioch, CA, the SJVF is now only found on a small dune preserve, 15 miles east of Bakersfield, CA. This rare species, one of the largest flies in North America, is difficult to study due to its deep underground larval stage, brief adult lifespan, and limited yearly "flight season" of only 4-7 weeks. These factors, compounded by the species' activity during the hottest part of the year and limited funding or interest, hinder the collection of important natural history data. Without sufficient research, protection, and recovery efforts, the long-term survival of the SJVF remains uncertain. Continued efforts are crucial, as they not only benefit the SJVF but could also support the restoration of other inland sand dune ecosystems and enhance recovery strategies for the federally endangered Delhi Sands flower-loving fly (*R. terminatus abdominalis*), found in Riverside County, CA.

Natural History of Invertebrates
Friday 8:25 AM

WINTER WARRIORS: IMMUNOGENETICS AND BLOODBORNE PARASITES IN OVERWINTERING WHITE-CROWNED SPARROWS

LeAnne H. Gip; California State University, Fresno; leannegip@mail.fresnostate.edu; Alejandra Valenzuela, Joel Slade

Climate models predict that rising temperatures will shift disease vectors northward, potentially introducing novel pathogens like avian malaria to native species. Avian malaria's impact on birds during the breeding season is well studied, but little is known about its effects in overwintering habitats. The white-crowned sparrow (WCSP, *Zonotrichia leucophrys*), which winters in California's Central Valley, is vulnerable to avian malaria. Blood samples from WCSPs collected since 2021 revealed that ~40% were positive for malaria DNA, suggesting active or latent infections. To understand the relationship between malaria infectivity and host genetics, we focus on the major histocompatibility complex (MHC) class I gene, which plays a crucial role in immune responses. DNA from ~100 WCSP samples was extracted, and MHC class I exon 3, a region with high molecular variation, was amplified using PCR. The samples were sequenced on the Illumina MiSeq platform, and bioinformatic analyses will identify MHC alleles and their correlation with malaria prevalence. We will also analyze molecular evolution rates using the Datamonkey molecular evolution server and PAML (phylogenetic analysis by maximum likelihood). This study aims to reveal how MHC variation influences malaria infectivity and shapes evolutionary dynamics in songbirds during overwintering.

Poster Session

AN INVESTIGATION OF SACRAMENTO RIVER WILDLIFE AREA UNITS TO DETERMINE RESTORATION OPPORTUNITIES FOR WILDLIFE HABITAT ENHANCEMENT AND WILDFIRE RESILIENCY

Halie R Goeman; River Partners; hgoeman@riverpartners.org; Sarah Gaffney, Michael Rogner, Madeleine Page, Kim Armstrong, April Damanti

There has been widespread loss of riparian forests and floodplain habitats across the Sacramento Valley with increased pressures from highly channelized river systems, introduction of nonnative species, and other anthropogenic alterations. As a result of these changes, vegetation occurring within these systems has become overgrown and choked with a thick understory of both native and nonnative species, significantly increasing the wildfire risk. River Partners assessed vegetation conditions and wildlife use within four Sacramento River Wildlife Area (SRWA) units in their current state to prioritize future restoration efforts for the purpose of reducing wildfire risk and benefit wildlife species. These sites were chosen after desktop analysis due to their extensive weed or California grape populations, as well as

potential for pollinator restoration. We performed vegetation releves and avian point count surveys, as well as deployed autonomous recording units to capture bird calls and wildlife cameras from May to July 2024. We also performed rapid pollinator surveys and the Bumble Bee Atlas. We will present these baseline wildlife data, and assess outcomes as associated with differences in the sites' dominant vegetation. Lessons learned from this project may help guide future restoration projects that benefit both wildlife and wildfire resiliency.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 2:45 PM

EVALUATING THE USE OF BEAK AND TALON SWABS IN BARRED OWL DIET ANALYSES

Hermary M Gonzales; University of Wisconsin-Madison; hgonzales@wisc.edu; Emily D. Fountain, Daniel F. Hofstadter, M. Zachariah Peery

Understanding the diet of an organism provides crucial information regarding species interactions and trophic niches. However, invasive methods are commonly used to collect diet data, which is not feasible for threatened and endangered species. One such method is the use of DNA metabarcoding on intestinal contents, a method that requires lethal sampling. A new, noninvasive method has recently been tested—DNA metabarcoding of beak and talon swabs—on two specialist avian species. Here, we assess the efficacy of beak and talon swabs on a generalist predator, the barred owl (*Strix varia*). Barred owls are native to eastern North America but have invaded westward and they are now found in the Pacific Northwest and California where they are destabilizing western forest ecosystems. Our study capitalizes on barred owl lethal removals being conducted in coastal California to test the efficacy of swabbing by comparing the diet results of non-lethal swabbing to lethally collected intestinal contents. We characterized the diet composition of 78 barred owls collected between 2021 and 2022 and compared diet overlap between swabs and intestines. Our future work includes extracting and metabarcoding DNA from California spotted owl (*Strix occidentalis occidentalis*) swabs collected during bandings to obtain preliminary diet information.

Poster Session ***Student Paper***

FRIEND OR FLIGHT: ALERT AND FLIGHT INITIATION DISTANCES OF THREE AT-RISK WATERBIRD SPECIES IN HAWAIʻI

Koa Grabar; University of Hawaiʻi at Mānoa; kgrabar@hawaii.edu; Kawika B. Winter, Kristen C. Harmon, Melissa R. Price

Endangered waterbirds utilize both natural wetlands and social-ecological systems like *loʻi kalo* (Hawaiian wetland agro-ecosystems), yet the relationship between birds and the managers of these systems remains understudied. Many wetland birds are conservation-reliant, necessitating control of invasive predators and plants within their shrinking habitat ranges. Social-ecological systems like *loʻi kalo* provide similar management benefits as natural wetlands while offering additional ecosystem services. This study assessed the behavior of *Aeʻo* (*Himantopus mexicanus knudseni*), *ʻAlae ʻula* (*Gallinula galeata sandvicensis*), and *ʻAlae keʻokeʻo* (*Fulica alai*) in response to wetland managers. Alert response and flight-initiation distances were measured to compare how waterbirds reacted to managers versus non-managers. Semi-structured interviews recorded management practices and manager knowledge of their waterbird populations. We found that managers were able to more closely approach *ʻAlae keʻokeʻo* and *Aeʻo* before alerting compared to non-managers, but the opposite was true for *ʻAlae ʻula*. Given the endangered status of many Hawaiian waterbirds, these findings underscore the potential of social-ecological systems like *loʻi kalo* to serve as critical habitat, mitigate habitat loss, and support human-wildlife coexistence. This study highlights the

conservation value of Indigenous wetland agro-ecosystems, examines the impact of management practices, and offers insight for future habitat conservation strategies.

Poster Session ***Student Paper***

PREDICTING THE POTENTIAL IMPACTS OF LOCATIONS OF SOLAR FACILITIES ON MULE DEER POPULATIONS IN SOUTH CENTRAL OREGON

Hanna Grock; hgrock@unr.edu; Kelley Stewart, Jamie Bowles

The BLM has been evaluating proposals for locating solar facilities on public lands across the Great Basin, including Oregon. The implications for large scale solar development on native ungulate species in Oregon has not be thoroughly investigated. Our objective was to identify priority habitats, and movement corridors used by mule deer in the south central Oregon for conservation of habitats and populations of mule deer prior to siting of solar facilities. We used locations of 158 mule deer obtained between 2015 and 2024 to identify priority habitats on seasonal ranges, migration corridors, and stopover locations of mule deer. Those data provide a crucial opportunity to predict impacts, via modeling, on mule deer prior to siting of those facilities. We are using resource selection functions and Brownian bridge movement models to identify habitats of high priority conservation, movement corridors, and stopover locations. The predicted direct and indirect impacts of solar development will be evaluated and used to inform mitigation as necessary to minimize habitat lost to solar development or for barriers created as a result of those facilities

Poster Session

SEX-BASED HABITAT SEGREGATION IN A BREEDING POPULATION OF THE SOUTHWESTERN WILLOW FLYCATCHER (*EMPIDONAX TRAILLII EXTIMUS*)

William E Haas; Pacific Coast Conservation; wehaas@the-pcca.org;

Preferred Session: Natural History of Birds

Abstract:

Sex-based habitat segregation in passerines is most commonly documented on wintering grounds with growing evidence of its importance during migration. However, sex-based habitat segregation in passerines on their breeding grounds is poorly represented in the literature. An examination of perch height, perch exposure, and prey-capture site exposure as part of a 20-year study of leg-banded Southwestern Willow Flycatchers (*Empidonax traillii extimus*) in San Diego County demonstrates significant differences between sexes. Possible explanations for sexual segregation include differential forage selection, reduction of depredation risk in relation to activity budgets, higher reproductive success, and possible enhancement of genetic health. The latter two factors may may be of specific relevance to semi-colonial species given the high level of “stolen copulations” reported (and in this study, observed) and which result in extra-pair paternity. My findings recommend specific habitat management, restoration, and habitat creation strategies that address the needs and preferences of both sexes, a missing element in habitat management and recovery planning for this endangered species.

Natural History of Birds I
Wednesday 2:45 PM

THIGMOTHERMY IN GRAVID FEMALE ARROYO TOADS (*ANAXYRUS CALIFORNICUS*)

William E Haas; Pacific Coast Conservation; wehaas@the-pcca.org;

Preferred Session: Natural History of Amphibians

Abstract:

Thigmothermy – the thermoregulatory behavior by which an organism seeks out contact with a warm substrate or object to affect body temperature – is a behavior present in most amphibians with limited access to solar radiation. It is often (correctly) assumed but poorly documented, It typically involves making exaggerated body contact with a warmer than ambient substrate. Thigmothermy has been shown in the Andean Toad (*Rhinella spinulosa*) during rainfall when its body temperature corresponded to warmer substrate temperatures and not to cooler air temperatures. However, for amphibians, substrate contact may serve a dual purpose: heat absorption by conductivity (thigmothermy) and water absorption through the skin (not thigmothermy). Determination of which is the driving force of the behavior may not always be possible. My observations provide examples of thigmothermy in endangered Arroyo Toads (*Anaxyrus californicus*). Rather than "casual" thigmothermy – that is, deriving a thermoregulatory benefit by being active and in substrate contact above a critical thermal minimum – my observations evidence the seeking out of warmer-than-ambient substrates by gravid females disproportionately to adult male, non-gravid female, and juvenile Arroyo Toads, which I hypothesize may facilitate egg maturation. Substrates used by some gravid females eliminate the dilemma of purpose.

Natural History of Amphibians
Friday 9:45 AM

ASSESSING THE INFLUENCE OF ROCKET LAUNCH AND LANDING NOISE ON THREATENED AND ENDANGERED SPECIES AT VANDENBERG SPACE FORCE BASE

Lucas K Hall; California State University Bakersfield; lhall12@csub.edu; Megan R. McCullah-Boozer, Rachel H. Budge, Kent L. Gee, Grant W. Hart, Levi T. Moats, John P. LaBonte, Lawrence F. Wolski, Dan Robinette, Emily Rice, Emily V. Olivares-Garnica

Understanding how species of concern respond to anthropogenic activities is becoming increasingly important. While the ways in which anthropogenic activities affect species are potentially many, our understanding the effects of anthropogenic noise on species is still developing. Vandenberg Space Force Base (VSFB), situated along the Central Coast of California, presents an opportunity to study the effects of anthropogenic noise on species of concern as 1) the rate of rocket launches/landings has recently increased and is predicted to significantly increase in the coming years compared to the last three decades and 2) there are multiple threatened and endangered species at VSFB that may be affected by the increased launch cadence. Our interdisciplinary research team consisting of wildlife ecologists and physical acousticians is working to understand 1) the acoustical landscape at VSFB before and after rocket launches and 2) the short and long-term responses of threatened and endangered species inhabiting areas relatively close to active VSFB launch complexes. Using previously collected and current species' data and acoustic data from VSFB, we will create models that describe and help predict species responses to rocket launches. We will discuss the scope and overview of this project.

Conservation on Military Lands
Thursday 11:20 AM

ESTABLISHING THE BASELINE FOR NONINVASIVE SCAT BASED DEMOGRAPHIC AND GENETIC MONITORING OF THE FEDERALLY THREATENED COASTAL MARTEN

(*MARTES CAURINA HUMBOLDTENSIS*)

Margaret A Hallerud; Oregon State University; hallerum@oregonstate.edu; Katie M. Moriarty, Charlotte E. Eriksson, Claire K. Goodfellow, Jennifer M. Allen, Michael K. Schwartz, Cate B. Quinn, Taal Levi

The coastal marten (*Martes caurina humboldtensis*) is a federally threatened small carnivore endemic to western Oregon and California. Due to their patchy distribution and elusive nature, coastal martens are challenging to monitor and most broad-based surveys use presence-nondetection methods such as camera-traps or scat detection dogs. Given limited information on population numbers, critical knowledge gaps for coastal marten conservation are population abundances, demographics, connectivity, and habitat associations. To fill these gaps, we generated genomic data and developed a SNP-based noninvasive genetic panel for sexing and identifying individual martens from scat samples. Our genomic data show genetic erosion of coastal martens consistent with small, isolated populations. We assess the effectiveness of our noninvasive panel for identifying individuals, tracking population structure, and estimating individual-level inbreeding and genetic diversity. Finally, we apply this panel to genotype marten scats collected between 2015-2023 and provide the first assessment of minimum population sizes and rangewide population structure. The ability to genotype scats opens the door to monitoring coastal marten density, demographics, and habitat associations. Future work will focus on developing a second noninvasive genetic panel targeted at building pedigrees and improving resolution for inference on genetic connectivity and developing similar panels for fishers (*Pekania pennanti*).

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 4:40 PM

Student Paper

NOVEL OVIPOSITION SITE SELECTION & UPLAND HABITAT USE BY FOOTHILL YELLOW-LEGGED FROGS IN THE MIDDLE FORK AMERICAN RIVER WATERSHED, SIERRA NEVADA FOOTHILLS, CA

Caroline Hamilton; Stantec; crhamilton01@gmail.com; Rick Evans

Foothill yellow-legged frog (*Rana boylii*) is a species whose breeding habitat is typically associated with shallower, lower velocity habitat types with high solar exposure across most of its range. Long-term monitoring of foothill yellow-legged frog populations in the Middle Fork American River watershed reflect this life history strategy but also depict novel oviposition sites potentially more common in larger perennial and/or managed riverine systems. We observed these novel oviposition sites in higher velocity mid-channel locations in deep substrate crevices and attached to the underside of large boulders with little to no solar exposure. Additionally, we build on other recent publications describing novel use of upland habitats by this species in the watershed.

Poster Session

SALMONID CONSERVATION THROUGH THE STUDY OF AN ANNELID WORM: *MANAYUNKIA OCCIDENTALIS* IN THE FEATHER RIVER, CA.

Dani Hartwigsen; CSU Chico; dhartwigsen@csuchico.edu; Julie Alexander, Emily Fleming, Jason Kindopp, Don Miller

Spring-run Chinook salmon, *Oncorhynchus tshawytscha*, of the Feather River in California is a threatened species of economic, cultural, environmental, and recreational importance whose wild population is rapidly declining. A major source of juvenile mortality is caused by *Ceratonova shasta*, a myxosporean parasite with a complex life cycle and two mandatory hosts: salmonids, and the definitive freshwater annelid worm *Manayunkia occidentalis*. Salmonids and *C. shasta* have been extensively studied in this

river, yet the locations of the annelids are unknown. Locating them is crucial for informing hatchery Chinook release strategies and water management to support outmigrating juvenile Chinook. Therefore, this study focusses on studying the annelid host. An infectious zone has been identified downstream of the Thermalito Afterbay Outlet. We hypothesize that the highest population density of *M. occidentalis* can be found in the previously identified infectious zone due to nutritional content originating from the Outlet. To investigate this claim, we will conduct a field study, water nutrient analysis using spectrophotometry, and determine prevalence of *C. shasta* infection in annelids through qPCR. Data will be analyzed using PCA to identify which environmental factors are most likely to explain the density of the annelid populations and prevalence of infections with *C. shasta*.

Poster Session ***Student Paper***

THE GREAT CENTRAL VALLEY HOLDS A FEW SURPRISES

Debra L Hawk; California High Speed Rail Authority; debra.hawk@hsr.ca.gov; Randi L. McCormick, Frank Meraz

Much of California has never been surveyed for plant and animal species and this is especially true of the Central Valley, which spans 40-60 miles wide and 450 miles north to south; an 18,000 square mile area largely dominated by agriculture. The active Central Valley segment of the California High Speed Rail project spans approximately 119-miles from Madera to just north of Bakersfield and thousands of surveys and hundreds of trap nights have been conducted in this span, yielding a few surprises! Swainson's hawks (*Buteo swainsoni*) were expected to occur in this area, but the location, size, and variety of nest trees selected was surprising! Similarly, California tiger salamander (*Ambystoma californiense*) were also expected to occur, but were found in some unexpected locations! Hairy Orcutt grass (*Orcuttia pilosa*) is endemic to the Central Valley, found in association with vernal pools – one lucky biologist spotted this rare grass during pre-activity surveys in an area where it was not previously known to occur. These surprises underscore the reason for the CNDDB disclaimer, "For any given location in California, a lack of species occurrences or records in no way indicates or implies that the species do not occur there."

Transportation Projects and Wildlife Interactions II
Wednesday 4:00 PM

STATUS OF LANGE'S METALMARK BUTTERFLY AT ANTIOCH DUNES NATIONAL WILDLIFE REFUGE

Mark A. Hayes; U.S. Fish and Wildlife Service; mark_hayes@fws.gov;

Lange's metalmark butterfly (*Apodemia mormo langei*) is a federally endangered species that is currently only known to occur at Antioch Dunes National Wildlife Refuge in Contra Costa County, California. Lange's metalmark is a subspecies of Mormon metalmark butterfly (*Apodemia mormo*), a species that tends to use native buckwheat species in the genus Eriogonum as its hostplant. The Lange's metalmark population at Antioch Dunes has been declining since the late 1990's, and in recent years has been precariously close to extinction. This presentation provides an overview of Lange's metalmark natural history, and the actions U.S. Fish and Wildlife Service has been taking to conserve this species. These actions include: working with our partners and external experts to monitor the population status and trends of Lange's metalmark; conducting habitat restoration and enhancements; conducting invasive plant control; preventing wildfires; reducing air pollution and trash; head-starting and captively propagating Lange's metalmark; seeding and out-planting of the Lange's metalmark hostplant, Antioch Dunes buckwheat (*Eriogonum nudum var. psychicola*); and performing research aimed at filling key knowledge gaps, such as understanding the behavior of male and female butterflies and developing an improved understanding of the conservation genomics of this and nearby populations of Mormon metalmark.

Natural History of Invertebrates
Friday 9:25 AM

EFFECTS OF EXPERIMENTAL STRUCTURAL RETENTION PLACEMENT AND ARRANGEMENT ON BIRD COMMUNITIES IN MANAGED FORESTS OF THE PACIFIC NORTHWEST

Aidan M Healey; Cal Poly - Humboldt; ah604@humboldt.edu; Jake Verschuyl, Frank A. Fogarty

Working forests encompass extensive areas on public and private lands in Oregon and Washington. In addition to producing wood products, these forests support diverse bird communities. State forest practices rules governing forest harvest dictate retention of a minimum number of trees when forests are clearcut harvested. However, little research has explored how the location and composition of those retention trees affects their use by wildlife. Additionally, standing dead snags are often limited within intensively managed forests, despite their importance as habitat features for many wildlife species. Within an existing large-scale experimental design dictating size and location of retention tree patches relative to other forest structures, I used an avian point count sampling approach to inform hierarchical community models exploring how patch size, spatial configuration, and vegetative community composition influence the bird communities in managed forests. Additionally, I evaluated avian use of mechanically created snags, with a focus on cavity nesting bird species. These findings will provide guidance to forestry professionals, land managers, and regulating agencies about best practices for using structural retention to support bird communities within working forests.

Wildlife and Agriculture II
Wednesday 4:00 PM

Student Paper

**NATURAL PEST CONTROL, THE NOCTURNAL WINGED HELPER: THE PEST, POLLINATORS, AND VECTORS BRIDGE-DWELLING BATS ARE CONSUMING IN CALIFORNIA **

Sarah E Heffelfinger; California Polytechnic State University, Pomona; Heffelfinger@cpp.edu; Dr. Rachel V. Blakey, Joseph Curti, Jaime L. Neill

Pesticides in the environment lead to issues in human health, environmental degradation, and inhibited wildlife function. Natural forms of pest control include carnivores and insectivores that consume agricultural pests. Studying the diet of bats within the agricultural landscape will reveal if they are eating agricultural pests. Documentation of bat quantities and species presence in known roosts, along with diet, will assist in estimating pest suppression impact on local growers. The results of this study will fill essential gaps in western bat knowledge and inform agricultural pest management on the benefits of decreasing their usage of chemical pesticides and increasing the utilization of bats as natural pest management. This may lead to a natural pest management plan that will promote an organic way of growing food for the health of wildlife, the environment and produce consumers. Once a month for a year we will collect guano and estimate colony size and species composition from four known bat bridge roosts across Ventura County's Santa Clara River Valley (California). We will use metabarcoding, to identify agricultural pests, pollinators, and vectors in the diet of four bat species: the Mexican free-tailed, Pallid bat, Big brown bat, and Myotis spp. Revealing bat diet may determine if grower's pesticides target the same pests that bats consume. Quantifying bat abundance, species composition, and identifying diet each month can also inform growers in what months is most beneficial to use less pesticides. Lacking knowledge on diet and bat behavior, throughout the seasons will be illuminated through studying a potential facilitative relationship between agriculture and wildlife this will uncover what major agricultural pests are being consumed by bats.

Natural History of Bats
Friday 10:25 AM

Student Paper

SPATIALLY EXPLICIT ESTIMATION OF SEX- AND AGE CLASS-SPECIFIC DENSITIES OF MOJAVE DESERT TORTOISES (*GOPHERUS AGASSIZII*) ON NAVAL AIR WEAPONS STATION CHINA LAKE

Sarah M Doyle; U.S. Geological Survey; sdoyle@usgs.gov; Sean M. Murphy, Todd C. Esque, Kristina K. Drake, Julie Hendrix, **Julie Hendrix**

Obtaining reliable estimates of population density is critical to effective wildlife conservation and management. Densities of Mojave desert tortoises (*Gopherus agassizii*) traditionally have been estimated using line-distance sampling, but the burrowing behavior of tortoises poses issues for estimation with that design-based method. Spatial capture-recapture (SCR) models are flexible hierarchical models for estimating spatially explicit population density and other demographic parameters from spatially and temporally replicated detection data; yet, few studies have explored SCR utility for estimating desert tortoise densities. We conducted a 4-day transect-based, search-area survey on a pilot demography plot within the restricted-access South Range of Naval Air Weapons Station China Lake (NAWSCL) in the western Mojave Desert to obtain tortoise detection data and applied SCR models to estimate spatially explicit sex- and age class-specific densities of desert tortoises. We obtained 99 detections of 24 individual tortoises (6 adult F, 4 adult M, 14 juveniles) during the 4-day survey. Explicitly accounting for the spatiotemporally varying survey effort, SCR model-averaged estimated mean tortoise density across the entire 2.53-km2 parameter estimation area was 18.53 tortoises/km2 (95% CI = 12.36–27.77; CV = 0.21). The estimated age class ratio was skewed towards juveniles (64% juveniles: 36% adults), whereas the adult sex ratio was female-biased (61% females: 39% males); corresponding densities were 11.86 juveniles/km2 (95% CI = 7.91–17.77), 4.08 adult females/km2 (95% CI = 2.72–6.11), and 2.59 adult males/km2 (95% CI = 1.73–3.89). Our study provides NAWSCL with preliminary local tortoise demographic estimates that can be used for long-term monitoring by establishing additional regional demographic monitoring sites. Additionally, we suggest further application of SCR models for estimating desert tortoise densities, as well as direct comparisons with traditional tortoise density estimation approaches, to update or improve density estimates and inform continued tortoise recovery.

Natural History of Turtles and Tortoises
Thursday 8:05 AM

THE IMPACTS OF WILDFIRE ON SAN CLEMENTE ISLAND'S RODENT POPULATIONS

Zachary R Henke; Institute for Wildlife Studies; zhenke@iws.org; Dylan S. Zuver, Hunter J. Cole, Melissa M. Booker, David K. Garcelon

San Clemente Island (SCI) is a U.S. Navy-owned island composed primarily of maritime desert scrub and invasive grassland vegetation communities. There are two species of mice on SCI; the endemic deer mouse (*Peromyscus maniculatus clementis*) and the introduced house mouse (*Mus musculus*). Both species are a food source for endemic predators including the island fox (*Urocyon littoralis clementae*), loggerhead shrike (*Lanius ludovicianus mearnsi*) and raptors. We have used capture-recapture data to calculate density for both mouse species since 2015. In late-July 2024, a wildfire burned approximately 25% of SCI's land area including one of our mouse sampling trap grids. Because no grid had previously burned, this fire provided an opportunity to examine the effects of wildfire on SCI's mouse population. We conducted capture-recapture sampling one month after the fire over 245 trap nights. Density of deer mice remained stable and house mice increased one month after the fire compared to sampling conducted 3-weeks prior to the fire. Further capture-recapture sampling will be conducted to determine long-term

effects of fire including the impact of increased fuel load densities and how these factors influence mouse densities. These results help us better understand fire vulnerability for these key species.

Natural History of Small Mammals
Friday 8:05 AM

URBANIZATION AND BIRD HEALTH: H/L RATIOS AND PARASITE PREVALENCE IN CALIFORNIA FINCHES

Xue Her; California State University, Fresno; xueher@mail.fresnostate.edu; Joel Slade

Urbanization is a rapidly expanding global phenomenon that significantly changes natural habitats, often forming novel ecosystems characterized by various urban features. These changes affect bird species, including Cardueline finches, like lesser goldfinches (*Spinus psaltria*), house finches (*Haemorhous mexicanus*), and pine siskins (*Spinus pinus*), which are common in California and frequently found near bird feeders. In urban environments, these birds face stressors such as elevated noise, light pollution, chemical exposure, and increased human activity. These stressors can also affect vectors of bloodborne parasites, such as avian haemosporidians, impacting parasite-host dynamics. To test whether urban stressors result in an elevated stress response, we quantified the heterophil/lymphocyte (H/L) ratios in finches, across an urban-rural gradient. H/L ratios are a well-known indicator of stress and immune function in birds. We hypothesize that urban-dwelling Cardueline finches will show higher H/L ratios, reflecting a stress response due to the prevalence of stressors in urban environments. To control for H/L ratios, we are quantifying parasitemia of haemospordians and other bloodborne parasites, as acute infections are expected to elevate these ratios. Our findings will provide insights into how urbanization influences the stress and immune response of finches, contributing to a broader understanding of how urbanization impacts wildlife health.

Natural History of Birds I
Wednesday 1:45 PM

Student Paper

DEVELOPING A TOOL FOR SPATIALLY PRIORITIZING BARRED OWL MANAGEMENT

Brendan K Hobart; University of Wisconsin-Madison; bkhobart@wisc.edu; H. Anu Kramer, M. Zach Peery, Gavin M. Jones, Connor M. Wood, John J. Keane, Katherine Fitzgerald, Robin R. Bown, Damon B. Lesmeister

The invasion of barred owls (*Strix varia*) in the western U.S. is a well-documented threat to biodiversity. The US Fish & Wildlife Service recently developed the Barred Owl Management Strategy, which aims “to reduce barred owl populations to improve the survival and recovery of northern spotted owls (*S. occidentalis caurina*) and to prevent declines in California spotted owls (*S. o. occidentalis*) from barred owl competition.” The Strategy calls for delineating Focal Management Areas—landscapes in which barred owl populations can tractably be managed. Although the Strategy provides detailed recommendations, a quantitative prioritization tool may help interested parties conduct more focused, efficient, and cost-effective barred owl management. Thus, we are developing a flexible and spatially explicit decision support tool to help end-users prioritize landscapes for barred owl management. We have produced the first version of this tool and are working with various research and management groups to refine and revise the tool, which is based in the program Zonation. For those involved in barred owl management, our tool represents an important step towards decision making and resource allocation. More broadly, our work highlights the value of coproduction in applied wildlife science and provides a template for producing meaningful outputs.

Studies in Exotic Species Management
Thursday 11:00 AM

MEDIAN TREATMENT MAY IMPACT WILDLIFE-VEHICLE COLLISIONS ON CALIFORNIA HIGHWAYS

Ben Hodgson; UC Davis Road Ecology Center; bjhodgson@ucdavis.edu; Lorna Haworth, Leo Hecht, Ash Henderson, Laura Morris, Shannon Lemieux, Michelle See, Madison Burnam, Selena Cao, Fraser Shilling

Transportation infrastructure can restrict wildlife movement and increase wildlife-vehicle collisions (WVCs) that kill over 48,000 deer in California annually. Medians, which separate opposing traffic lanes, vary in type (e.g., concrete barriers, metal guardrails, vegetated strips) and may influence WVC rates. At Caltrans' request, we assessed the impact of median types on WVC rates along California highways. Using Google Street View, we categorized median types at 1,069 mule deer (*Odocoileus hemionus*) WVC sites in Caltrans District 9 and 332 western gray squirrel (*Sciurus griseus*) WVC sites in Caltrans District 2 between January 2015 and April 2024. Chi-square tests showed significant differences between WVC site medians and randomly generated site medians, suggesting that median type affects WVC density for both species. Additionally, we analyzed 73 paired highway transects where the median transitions from one type to another, comparing WVC rates along 1-mile stretches. Wilcoxon tests revealed WVC rates were 1.95 times higher along metal guardrails than vegetated strips ($p=0.045$), though other pair comparisons were not significant. These findings highlight the influence of median treatments on WVCs and suggest that transportation planning should consider wildlife connectivity impacts to reduce collisions.

Transportation Projects and Wildlife Interactions I
Wednesday 1:25 PM

EXTENDED BENEFITS OF MITIGATION

Hal Holland; Westervelt Ecological Services; hholland@westervelt.com;

Mitigation properties are often reviewed and quantified by the acreage of mitigation they provide to offset permit impacts. However, there is a much broader contribution to the ecological landscape than what meets the regulatory eye. Properties are often selected and approved based upon their proximity to other conservation lands, connection with other natural landscapes, and the robust quality of the habitat on site. What’s more, the abundance of other native species typically falls below the radar, hidden from public perception. A review of the over 3,600 acres of habitat identified, secured, and conserved by Westervelt under contract with California High Speed Rail reflects a broad assemblage of flora and fauna, ranging from special status species, to common species beyond the scope of the regulatory permits. This presentation will review the process for lands identification and acquisition, and the years of monitoring that reveals the richness of these conserved landscapes.

Transportation Projects and Wildlife Interactions II
Wednesday 5:00 PM

AUTOMATED TELEMETRY PROVIDES INSIGHTS INTO NATURAL HISTORY AND CONSERVATION OF THE BLUNT-NOSED LEOPARD LIZARD

Steven J Hromada; Fresno Chaffee Zoo; shromada@fresnochaffeezoo.org; Mark Halvorsen, Steven Sharp, Emily Bergman, Lyn Myers, Micheal Westphal, Rory Telemeco

Describing the space use and activity patterns of endangered animals is important to implementing effective conservation strategies. Historically, collecting sufficient data on small-bodied species was challenging due to constraints of manual tracking and short battery life. The development of miniaturized tracking devices, such as UHF (ultra-high frequency) transmitters, has provided opportunities to better understand the ecology of many smaller-bodied species and assess conservation efforts. The blunt-nosed leopard lizard (BNLL; *Gambelia sila*) is an endangered species endemic to the San Joaquin Desert of Central California. We have been releasing captive-produced BNLL to bolster an almost-extirpated population on Panoche Plateau, Fresno County, where we installed an automated telemetry system of >150 remote nodes. In June 2024, we released 10 captive-reared BNLL equipped with UHF backpacks and later equipped four wild-reared lizards near the end of July. We monitored lizards with a combination of hand and automated tracking. We were able to use trilateration methods to estimate >37,000 lizard locations with a median error of ~27 meters, providing data to better quantify home ranges and habitat selection. Additionally, we used data from the remote telemetry system to predict when lizards are likely below ground, and to detect late season activity.

Natural History of Lizards
Wednesday 1:25 PM

LEVERAGING THE ENDANGERED SPECIES ACT FOR RECOVERY: A CASE STUDY WITH HUMBOLDT MARTEN

Jenny L Hutchinson; US Fish and Wildlife Service; jenny_hutchinson@fws.gov;

The Humboldt marten (*Martes caurina humboldtensis*) was listed as federally threatened in 2020. Coastal marten occur in small, isolated populations in Oregon and California and are currently threatened with habitat loss, catastrophic wildfire, and threats inherent to small populations. The Endangered Species Act (ESA) of 1973 was a visionary framework designed around protecting species and implementing recovery actions using science-based decision-making. Each section of the ESA contributes towards recovery goals and facilitates collaboration between land managers and researchers. This case study will examine how various sections of the ESA are intended to work in concert to conserve Humboldt marten and their habitat and the challenges with using science to support policy.

Natural History of Carnivores II
Thursday 9:25 AM

MONITORING HABITAT USE BY THE GREAT BASIN RATTLESNAKE (*CROTALUS LUTOSUS*): PATTERNS OF RESOURCE SELECTION AND THERMAL ENVIRONMENT IN EASTERN NEVADA

Colton R Irons; University of Nevada, Reno ; cirons@unr.edu; Kevin T Shoemaker, Bryan Hamilton, Kenneth E Nussear

Snakes and other ectotherms must select microhabitats that enable them to obtain adequate food resources, confer protection from predators, and enable them to thermoregulate effectively. Therefore, microhabitat characteristics such as vegetation structure and availability of below-ground refuges can play an important role in resource selection and habitat quality for reptiles. We assessed the thermal ecology and microhabitat selection patterns of the Great Basin rattlesnake (*Crotalus lutosus*) within a semi-arid montane region of eastern Nevada (Great Basin National Park). We surgically implanted rattlesnakes with radio transmitters and temperature dataloggers (n = 29), and we obtained locations for each snake 1-2x per week during the activity season. In addition, we deployed operative temperature models (n = 63) at a wide range of available above and below-ground microhabitats within our study area. We are using this information to assess how snakes select habitats throughout the activity season. Moreover, by comparing

available operative temperatures with field-active body temperatures we will be able to study how snakes use microhabitats for thermoregulation and assess seasonal and diurnal changes in thermal preferences. We hope to learn how a changing climate affects body temperatures of rattlesnakes and how their movement behavior influences resource selection.

Natural History of Snakes
Thursday 11:20 AM
Student Paper

A META-ANALYSIS OF THE IMPACT OF DRONES ON BIRDS

Émile Brisson-Curadeau; McGill University; emile.brissoncuradeau@mail.mcgill.ca; Rose Lacombe, Marianne Gousy-Leblanc, Vanessa Poirier, Lauren M. Jackson, Christina Petalas, Eliane Miranda, Alyssa Eby, Julia Baak, Don-Jean Léandri-Breton, Emily Choy, Jade Legros **Lauren M Jackson**

Drones are increasingly used to monitor, film, and survey birds. Many studies also report that drones can reduce bird disturbance compared to traditional methods, such as ground counts or helicopter surveys. However, best practices on how drones should be flown to reduce adverse behavior are usually species-specific and context-dependent, and are therefore often difficult to apply to new management scenarios. Here, we review 149 peer-reviewed scientific studies involving drone use and bird surveys, and present a phylogenetically informed meta-analysis to better understand which factors may help reduce flushing response in birds. We find that the distance between the drone and the bird, drone speed, bird breeding status, and species size all strongly influence the chances of a flushing response. Finally, we provide drone operational guidelines that are specific to and applicable across both drone type and taxa of interest.

Poster Session ***Student Paper***

A NOVEL WAY TO MONITOR NESTS USING MOTUS TAGGED BIRDS AND A CTT NODE.

Edwin Jacobo; Washington State University/Southern Sierra Research Station; edwin.jacobo@wsu.edu; Lauren Roux, Mary J. Whitfield, Nidia Jaime, Annie Meyer, Sasha Robinson, Pat Lorch

Nest monitoring is critical to understanding the drivers of population dynamics in avian species. For some bird species, nests can be difficult to find or monitor due to multiple factors such as secretiveness, sensitivity to visitors around the nest, and nest height and concealment. Yellow-billed Cuckoos (*Coccyzus americanus*,YBCU) frequently fall into several of these categories because their nests are well concealed and often located greater than 8 m high, while adults show secretive breeding behavior and can be sensitive to people near their nests. These factors often result in prohibitive personnel costs to find their nests and monitor their nesting behavior. In 2024, we tagged a YBCU with a Motus CTT HybridTag and used behavioral observation and hand tracking to locate the tagged cuckoo's nest. Next, we placed a CTT radiotelemetry node 17 meters from the nest to monitor nesting behavior that was corroborated by field observations. This resulted in high temporal resolution data of cuckoo nesting behaviors, such as incubation timing, foraging and nestling feeding frequency, and nesting success. This approach provided invaluable nesting behavioral information and revealed nodes as a valuable tool for studying breeding birds while minimizing costs and observer disturbance around nests.

Poster Session

FACTORS INFLUENCING ROAD CROSSINGS BY ELK

Brielle C. Jaglowski; Cal Poly Humboldt; bcj33@humboldt.edu; Carrington Hilson, Micaela Szykman Gunther

Highways fragment important habitat and can serve as impassable barriers to wildlife. Installing wildlife crossing systems creates opportunities for safe animal movement, improved human safety, and reduced property damage. Research identifying key zones of connectivity can aid in providing recommendations for locations of these systems and other tools to improve highway safety. Although elk-vehicle collisions have been documented across northwestern California, the factors associated with these highway crossing zones have not been studied in this region. To address this gap in research, the objectives of this study were to determine the frequency of elk highway crossings on hourly, daily, and seasonal time scales, and to evaluate how various environmental and anthropogenic factors influence the probability of elk crossing US-101 in northwestern California. Using GPS collar data collected between December 2016 and February 2024 from 45 female Roosevelt and tule elk from 16 established herds adjacent to US-101, a resource selection function was used to predict the probability of elk highway crossing frequency across the study area. Environmental and anthropogenic covariates used in the model include: distance to forest edge, forest cover, land cover type, Terrain Ruggedness Index, slope, distance to urban area, distance to secondary road, number of highway lanes, presence of underpass, traffic volume, season, and time of day. The openness ratio of highway undercrossings within established elk home ranges was calculated and elk use of underpasses was determined through the deployment of trail cameras from June to October 2024. These results will contribute to future management decisions regarding wildlife crossing systems and increasing connectivity to mitigate the negative impacts of highways on elk and other large mammals as well as reduce conflict and safety risks with humans.

Poster Session ***Student Paper***

ECOLOGY AND CONSERVATION OF THE TULARE BASIN'S ENDEMIC SCORPION

Prakrit Jain; UC Berkeley; prakritjain@berkeley.edu;

Described just over a year ago, the Tulare Basin Scorpion (Paruroctonus tulare) is the latest addition to the United States' diverse scorpion fauna. This species is endemic to the lowland southern San Joaquin valley, among the most severely degraded regions of the western US. Consequently, P. tulare has lost over 80% of its historic range leaving it imminently threatened with extinction. In this talk, I will discuss what is known about the ecology of this species with a special focus on its unique habitat. I will then discuss the implications of Paruroctonus tulare's specialist ecology on its distribution and conservation as well as what this species can teach us about habitat preservation in the Tulare Basin more broadly.

Natural History of Invertebrates
Friday 10:25 AM ***Student Paper***

VARIATION IN ACOUSTIC ACTIVITY OF BATS ACROSS MULTIPLE HABITAT TYPES BY SEASON IN SEQUOIA AND KINGS CANYON NATIONAL PARK, CALIFORNIA.

Jonathan Janes; California State University Sacramento; jjanes@csus.edu; Anna Doty

With increasing pressure to mediate the effects of white-nose syndrome (WNS) in bats, more emphasis has been placed on understanding activity levels in areas where WNS and its causative agent, *Pseudogymnoascus destructans* (Pd), have yet to cause the same population level crashes that species like *Myotis septentrionalis* has experienced. Bats in the Pacific Southwest, specifically within California, have remained relatively unscathed from the effects of WNS and Pd. However, that does not mean that population dynamics and overall activity levels will not change in response to any future introduction of WNS coupled with other external stressors; with the inevitable, it is important to understand how

population dynamics exist currently. Specifically, a portion of this large study investigates how activity levels of bats vary by season across multiple habitat types within Sequoia and Kings Canyon National Park in California with objectives to provide a management framework for the National Parks System.

Poster Session ***Student Paper***

AN UPDATE ON THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFES CLIMATE AND BIODIVERSITY MONITORING SENTINEL SITE NETWORK

Nicole Cornelius; California Department of Fish and Wildlife; nicole.cornelius@wildlife.ca.gov; Whitney Albright, Levi Souza, Phillip Smith, Michelle Selmon, Dena Spatz, Shannon Sinkovich, **Nicole Cornelius Jim Stilley**

The establishment of a long-term statewide climate and biodiversity monitoring network is crucial to the successful implementation of Governor Newsom's Nature-Based Solutions Executive Order N-82-20 which is commonly referred to as the 30x30 initiative. As a result of this executive order, the California Department of Fish and Wildlife (CDFW) is working with several partners to establish a Climate-Biodiversity Sentinel Site Network to monitor ecosystems and wildlife throughout California. CDFW has established 39 sentinel sites on select Wildlife Areas and Ecological Reserves across the state. The network will conduct annual biodiversity inventories, real-time climate monitoring, and migratory species tracking via Motus. Resulting data is processed using automated and machine learning tools. The intention of the data is two-fold with (1) to be a resource for land managers to make informed management decisions in light of climate change and its impact on biodiversity and (2) to be a transparent and inclusive open-source data set for public use. This presentation will discuss the results of data collected during the 2023 field season, some preliminary results of the 2024 field season, and future directions for the network.

Jim Stilley AND Nicole Cornelius will present this paper.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 9:45 AM

ON THE IMPORTANT OF AGRICULTURE FOR THE CONSERVATION OF WILDLIFE

Matthew D Johnson; Cal Poly Humboldt; mdj6@humboldt.edu;

Slowing the loss of biodiversity amidst the sixth mass extinction is a core tenet of the field of wildlife conservation, and it is propelled by legal and regulatory frameworks that emphasize intervention for species-at-risk. The overwhelming focus on species extinctions, however, has de-emphasized the extent and consequences of the loss of abundance of still-common wild animals. Working agricultural lands comprise up to 40% of the Earth’s ice-free terrestrial land surface, and habitat conversion to agriculture is a leading cause of both global defaunation and greenhouse gas emissions. In this presentation, I argue that more wildlife work should focus on keeping common animals common, particularly in working landscapes where people work, grow food, and live in co-existence with wild animals.

Wildlife and Agriculture I
Wednesday 1:05 PM

HUMMINGBIRD HAPPENINGS: THE SEASONALITY OF PHYSIOLOGICAL AND BEHAVIORAL ENERGY BALANCE STRATEGIES IN ANNA'S HUMMINGBIRD (*CALYPTE ANNA*)

Chelsea B Johnson; San Francisco State University; cjohnson59@sfsu.edu; Sam M. Sandoval, Jesus R. Ovalle, Derrick J.E. Groom

Major seasonal life history events, such as reproduction, molt, and migration, can have vastly different energy demands. To meet these changing energy needs, various strategies can be employed to maintain energy balance, with each having inherent fitness costs and benefits. On one hand, birds can modulate energy intake by modifying foraging intensity. On the other, birds can regulate energy expenditure via activity and metabolism. However, our knowledge of how energy balance strategies vary across the annual cycle remains poor. The objective of this project is to characterize patterns of energy balance in Anna's hummingbirds (*Calypte anna*) during different seasons. Hummingbirds have among the highest metabolic rates of any vertebrate, yet their precious nectar resources fluctuate seasonally, all while they undergo energetically demanding annual life history events. Four weeks of data were collected during each of three seasons: summer molt, fall migration, and winter. Body mass, condition, molt status, and basal metabolic rate were measured weekly. Torpor frequency was estimated using thermal imaging. Feeding intake and activity were measured daily. As environmental conditions continue to shift drastically in the face of climate change, studying these patterns can help shed light on energy and resource use across the year.

Poster Session ***Student Paper***

A 3-D THERMAL CAMERA SYSTEM TO STUDY BATS' FLIGHT IN THE WILD

Dave S Johnston; H. T. Harvey & Associates; djohnston@harveyecology.com; Marcus Chevitarese

Our understanding of naturally flying bats is limited, and a better knowledge of the natural history of their aerial ecology could play a vital role in their conservation. The expansion of wind energy infrastructure has been detrimental to bat populations, primarily through collision mortality. We used advanced 3-Dimensional (3D) Geo-Tracking technology to provide a deeper understanding of bat flight behaviors in the wild. This Thermal Tracker 3D system was developed by the Pacific Northwest National Laboratory and commercialized by Sightir, We deployed the Thermal Track 3D (TT3D) to passively track bats with thermal stereoscopic imaging. The TT3D system relays real-time positional data of tracked bats by recording multiple parameters of bat flight, including altitude, speed, wing beats per second, and trajectory. We used a Wildlife Acoustics SM4 bat detector to help identify bats to species as we recorded them with the TT3D. Sequences of the recorded 30 thermal images per second were then analyzed using algorithms to interpret the biophysics of a bat’s flight. In addition to advancing our knowledge of the aerial ecology of bats, this ongoing research may also provide a toolset to reduce wind energy impacts to bats.

Wildlife Techniques
Thursday 10:40 AM

THE USE OF SOCIAL INFORMATION FOR PROSPECTING AND NEST SITE SELECTION BY WESTERN BLUEBIRDS (*SIALIA MEXICANA*)

Fatime W Jomaa; Cal Poly Humboldt; fwj2@humboldt.edu; Matthew D. Johnson, Cody Pham

Habitat selection in birds holds important implications for fitness and conservation practices. Social information, in tandem with habitat cues, may provide an efficient way for an individual to assess future breeding site quality. We investigated the hypothesis that prospecting Western Bluebirds use post-breeding social information to select nest sites the following year across winegrape vineyards in Napa Valley. In late summer of 2023, 10 vineyards without a history of nest boxes received 20 boxes each (n=200). On five vineyards, 12 boxes received a three-day experimental treatment using playback and an old nest to simulate reproductive success (n=60). We filmed experimental boxes during the treatment period, as well

as nearby boxes within range of the vocalizations (near-treatment, n=30), and boxes located on the 5 vineyards with no treatment at all (control, n=30). Boxes were re-visited during the summer of 2024 to determine timing of use and occupying species, and to collect local habitat data. We found that Western Bluebirds preferred boxes near isolated tree patches, and the effectiveness of social information on nest selection was mediated by habitat. Video analysis will determine whether prospecting visitation rates influence probability of future nest box use.

Wildlife and Agriculture I
Wednesday 2:25 PM

Student Paper

GOLDEN EAGLE DEMOGRAPHICS AND HABITAT USE ON A CALIFORNIA CENTRAL COAST LANDSCAPE

Bobby Kamansky; Center for Natural Lands Management; bkamansky@cnlm.org;

Golden eagles (*Aquila chrysaetos*) are one of the largest raptors in North America. They require small mammal populations and consistent nesting substrates. They are a fully protected species in California and a species conservation interest at the continental level. Recent studies provide some understanding of survey methods and eagle density in California. But little is known about population fluctuations, demographics and, gaps exist in knowledge about nesting territory preferences and sizes. To understand eagle demographics, population, nesting and foraging preferences, I conducted eagle surveys during the breeding season on three routes (2019-2024) and baited seven stations with wild pig carcasses (2022-2024). I observed three nesting territories, 14 individual eagles and 9 immature eagles utilized 14,000 acres of central Coast Range blue oak woodland and serpentine grassland. Most eagle foraging was observed in open grasslands of 2,000 acres or more. Nesting occurred in large oak trees on steep slopes – except one nest in a Valley oak tree in a deep canyon. Young eagles dominate the population after breeding season and compete for carrion at carcasses. The population of six breeding adults and 8-10 immature eagles appears to be relatively stable, but environmental factors such as drought and cold/snow limited nesting.

Raptor Population Status and Ecology
Friday 9:05 AM

GRAZED TO THE GROUND: HOW INVASIVE UNGULATES THREATEN RANCHLANDS AND ECOSYSTEMS

Lauren S. Katayama; laurenk2@hawaii.edu; Derek Risch, Mark Thorne, Kyle Caires, Greg Friel, Carolyn LW Auweloa, Karen Steensma, Stephanie A. Shwiff, Jason Omick, Melissa R. Price

Invasive wild ungulates pose significant global concerns due to their impact on ecosystem functions and competition with native species. Many island systems lack large native predators to control wild ungulate populations, which intensifies these adverse effects, particularly on agricultural land. Across Hawai‘i, approximately one million acres of ranchland are dedicated to beef production. However, the overabundance of axis deer, mouflon sheep, and feral goats has resulted in overgrazing of some areas, which increases sediment runoff, promotes spread of invasive plants, decreases ecosystem health, and threatens the livelihood of generational ranchers. This study examines the relationship between invasive ungulate abundance and changes in plant biomass on ranchlands in Maui and Hawai‘i Island. We utilized game cameras, grazing exclusion cages, and line-transect sampling to quantify wild ungulate detections, vegetation loss, and plant community composition. Higher detections of wild ungulates were positively associated with reduced plant biomass but were not statistically significant ($p= 0.26$). Wild ungulates were found across all types of plant community composition, indicating that the expansion of wild ungulates is widespread on ranchlands. Our findings underscore the widespread expansion of ungulates across the

landscape and highlight the necessity of collaborative management between agricultural and conservation land managers for sustainable land use.

Wildlife and Agriculture I
Wednesday 2:45 PM

Student Paper

PREVALENCE OF CANINE DISTEMPER VIRUS, CANINE PARVOVIRUS, AND CANINE ADENOVIRUS IN ENDANGERED SAN JOAQUIN KIT FOXES IN CALIFORNIA

Jaime Rudd; Endangered Species Recovery Program; jrudd@csustan.edu; Erica Kelly, Deana Clifford, Brian Cypher, **Erica Kelly**

Canine distemper virus (CDV), canine parvovirus (CPV), and canine adenovirus (CAV) pose potential threats to carnivores, including endangered San Joaquin kit foxes (*Vulpes macrotis mutica*; SJKF). We studied viral exposure in six SJKF populations across urban and exurban areas in California from 2019-2022. Serum from 45 individuals was tested for viral antibody titers, while 395 oculonasal and soft palate swabs were PCR tested for CDV presence that would indicate viral shedding. While no active CDV shedding was detected, antibody titers were detected in nine (20%) SJKF, indicating exposure. Additionally, CDV infection resulted in the death of five SJKF from urban and exurban populations from 2019 - 2023. CPV antibodies were widespread, found in 42 (93.3%) serum samples. CAV antibodies were less common, with only one fox (2.2%) having detectable antibody titers. Although CAV hasn't been diagnosed as a cause of SJKF mortality, it remains concerning due to potential high mortality in young canids. Overall, antibody prevalence for all three viruses was comparable between urban and exurban environments suggesting similar factors influencing viral exposure. These findings emphasize the need for ongoing monitoring of viral threats to SJKF populations, particularly given their endangered status and the potential impact on their conservation.

Wildlife Pathogens
Thursday 11:00 AM

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

Erica C Kelly; CSU Stanislaus, Endangered Species Recovery Program; ekelly@esrp.org; Brian L. Cypher, Jaime L. Rudd, Alyse D. Gabaldon, Tory L. Westall, Nicole A. Deatherage, Deana L. Clifford

Since 2015, we have conducted annual six-week systematic, citywide camera surveys during the summer in Bakersfield, CA to obtain population estimates and document the spatial spread of sarcoptic mange in endangered San Joaquin kit foxes (*Vulpes macrotis mutica*; SJKF). In 2019, we set up additional cameras in Taft, CA and have since included them in our yearly survey. We observed a 68% decline in Bakersfield SJKF camera detections between 2015 and 2020. Our lowest detections of SJKF were observed in 2020 with only 41 individuals, compared to 129 individuals in 2015. Similarly in Taft, we detected the lowest number of SJKF in 2020 at seven individuals compared to ten in 2019, although we only had one years' worth of data prior. Mange detections have considerably decreased in the last 4 years for both Bakersfield and Taft, and the Bakersfield population has shown a steady increase from 2021-2024. However, Taft's SJKF population fluctuates between 24 and 13 individuals respectively. While mange hadn't been detected in either urban population since 2022, we recently documented six mange-infested individuals from Bakersfield in 2024. Based on fluctuating annual incidence rates along with previous epidemiological modeling, these finding suggest that sarcoptic mange has become endemic.

Poster Session

THE ECOLOGICAL VALUE OF CALIFORNIA WALNUT WOODLANDS TO AVIFAUNA

Natasha Khanna-Dang; California State University, Los Angeles; natasha.khanna.dang@gmail.com; Dr. Eric M. Wood

Changes in land use following Euro-American colonization resulted in the severe reduction of the endemic Southern California black walnut (*Juglans californica*) and much of its woodland habitat in Southern California. I will share our research findings on the importance of these woodlands to the larger ecosystem and discuss how ecological research can be intersectional by addressing both conservation and social justice issues. We quantified the availability of trees and large shrubs and the feeding behavior of birds in eight patches of California walnut woodland in Los Angeles County during the spring, summer, and fall periods of 2023. We related habitat features within and adjacent to the eight patches to bird foraging behavior and compared bird feeding patterns relative to tree and shrub availability, documenting 49 species of trees and shrubs (17,904 plant observations) and 49 species of birds (1,009 foraging observations. Total counts of native tree and shrubs ($R2kl = 0.30$; $p < 0.10$), and native tree and shrub richness ($R2kl = 0.64$; $p < 0.001$) were positive predictors of the counts of feeding birds. Conversely, building density adjacent to the woodland patches ($R2kl = 0.77$; $p < 0.001$) and non-native tree and shrub counts ($R2kl = 0.71$; $p < 0.001$) were negative predictors of the counts of feeding birds. Birds foraged on the western sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), and blue elderberry (*Sambucus mexicana*) in higher proportion to their availability in the woodlands (ranging from 14% to 68% higher use relative to a plant's availability). This research was directly inspired by the anti-gentrification efforts of community groups affiliated with Takaape' Washuut Black Walnut Day in Northeast Los Angeles.

Natural History of Birds II
Wednesday 5:00 PM

Student Paper

LOCAL SCALE OCCUPANCY AND RELATIVE ABUNDANCE OF VOCALIZING AVIAN SPECIES USING AUTONOMOUS RECORDING UNITS

Natalie E Kluck; California Department of Fish and Wildlife; natalie.kluck@wildlife.ca.gov; Ian A. Dwight

As population declines threaten avian species throughout California, standardized monitoring strategies are increasingly important for habitat management and conservation. Passive acoustic monitoring reduces the need for human observers, creating the opportunity to monitor species with limited funding or staff. Using a novel approach, we deployed autonomous recording units (ARUs) across nine public wildlife areas and refuges in northern California to assess occupancy and relative abundance of vocalizing avian species during spring and summer of 2024. ARUs were deployed using a random sampling design within a hexagonal tessellation grid. Recordings from 284 ARU stations were processed using BirdNET Analyzer, from which a subsample of vocalization detections were validated and detection probability thresholds developed. Maps of relative abundance were created using Kriging interpolation, and occupancy was estimated using single-site single-season models. While previous large-scale ARU studies have provided valuable data, making inference at local scales creates a powerful tool to inform and improve habitat management practices. Further, this passive monitoring technique can be applied to any vocalizing species that is detected by BirdNET, including anuran and mammalian species. The broad applicability of this work emphasizes the significance of integrating and standardizing acoustic monitoring in an increasingly fragmented landscape.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 8:05 AM

DELINEATION OF MULTIPLE FOREST DISTURBANCES OVER TIME: A CASE STUDY ACROSS CALIFORNIA'S SIERRA NEVADA

Anu Kramer; University of Wisconsin - Madison - Madison, WI; hakramer@wisc.edu; Elizabeth M. Ng, Jason M. Winiarski, Alexander Koltunov, Michèle R. Slaton, Gavin M. Jones, M. Zach Peery

Disturbances shape assemblages and spatial patterns of flora and fauna across the globe and accurate disturbance mapping can aid scientists and land managers. However, differentiating between disturbance types using remote sensing is challenging, especially in forests with hidden subcanopy disturbances. On federal lands in the western US, wildfire, drought, and fuel management are three primary disturbance agents. The USFS's Forest Activity Tracking System (FACTS) provides nationwide fuels management data on USFS lands. While FACTS data seem useful, they have not been widely utilized, partially due to missing data and uncertainty. We compared FACTS polygons (prescribed fire, mechanical, and manual fuel reduction) with annual predictions of canopy loss (Mortality Magnitude Index in the eDaRT system for Landsat processing) and assessed their spatial and temporal accuracy in the primarily forested Sierra Nevada, CA. We also examined missing treatments and cases without completion dates. We then characterized annual disturbance across 20 years (2003-2022) in Sierra Nevada USFS lands. Overall, 68% of USFS lands were disturbed (1.5 million ha). Of the 1.5 million ha disturbed, 66% was wildfire, 19% fuel management, and 41% drought (other mortality), with some disturbance overlap. These data can aid scientists and managers studying and caring for these rapidly-changing ecosystems.

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 4:20 PM

TEN THOUSAND SNAKE SNACKS: COMMUNITY SCIENCE DOCUMENTS SNAKE ECOLOGY AT A RACER'S PACE.

Isaac W Krone; University of California, Berkeley; ikrone@berkeley.edu; Alexey Katz, Andrew Durso, Eric Gren, Thomas Herrera, Erich Hoffmann, Daniel Hughes, Justin Lee, Natalie Ng, Kinsi Petersen, Spike Pike, Meg Scudder

Observations on the community science platform iNaturalist often carry more information than what users identify. These “secondary data” often include organisms other than the single organism identified by the community, and sometimes, the interactions between these organisms. By carefully combing through more than ten years of iNaturalist snake observations, we have compiled a growing database of more than 9,400 observations of snake predation. These observations span the globe (146 countries) and include 706 species of snakes, including some for which no previously published diet records exist. Our dataset is richest in the United States. Here, I take a closer look at the scope of this growing dataset, review some of the interesting records we’ve surfaced and compare the diets of a few common US snakes as revealed by previous literature and our community science observations.

Natural History of Snakes
Thursday 11:00 AM

BRIDGING THE GAP BETWEEN STUDENTS, WILDLIFE, AND SCIENTIFIC COMMUNICATION: DAVIS WOOD DUCKUMENTARY

Edilyn C Lazo; University of California, Davis; eclazo@ucdavis.edu; John M. Eadie, Tenaya M. Russell

The University of California, Davis Wood Duck Nest Box Project, led by Dr. John Eadie, has played a vital role in supporting Wood Duck conservation through 26 years of research and hands-on student involvement. This project has contributed to the recovery of Wood Duck populations in California's Sacramento Valley while providing over 700 undergraduate student interns with practical field experience. Student filmmaker Edilyn Lazo documented the 2024 field season, focusing on the efforts of a monitoring intern crew and master's student Tenaya Russell. The resulting 12-minute film explores the impact of artificial nesting sites on Wood Duck conservation and highlights the intersection of research, student engagement, and wildlife preservation. In a 5-minute presentation preceding the screening, Edilyn will discuss the project's significance, its legacy of fostering student involvement in real-world conservation, and the collaborative student efforts behind the documentary's production.

Natural History of Birds II
Wednesday 5:20 PM

Student Paper

QUANTIFYING SILVER-HAIRED BAT ROOSTING HABITS IN THE DIXIE FIRE BURN SCAR

Alexander C Lewis; Cal Poly Humboldt; acl431@humboldt.edu; Ted Weller, Ho Yi Wan

Silver-haired bats (*Lasionycteris noctivagans*) are one of the most widely distributed forest bats in North America. Although wildfires have been increasing across their range, how they respond to wildfire is understudied. Previous studies on silver-haired bats and fire predominantly focused on roosting behavior in low-severity controlled burns or used acoustics to understand activity levels post-wildfire. Quantifying how silver-haired bats use the physical structures created by high-severity wildfires is critical in the face of rapidly shifting fire regimes. During the summer of 2023 and 2024 we radio-tracked 68 male and 23 female silver-haired bats to 41 roosts on the Lassen National Forest. Preliminary results indicate that bats used taller and larger-diameter trees compared to randomly selected trees on the landscape. Of these roosts, 87% were in stands burned at high severity. With fire frequency and severity forecasted to increase in the coming years, it is important to understand how areas that were thought devoid of life are potentially used by bats and inform post-fire management efforts

Natural History of Bats
Friday 8:45 AM

Student Paper

APPLICATION OF REMOTE SENSING FOR MANAGEMENT OF A LARGE HOME RANGE NON-NATIVE MAMMAL

Helen Lin; Endemic Environmental; hlin@endemicenvironmental.net; Daniel Biteman

Recent advancements in remote sensing technology enable us to obtain large-scale environmental data both spatially and temporally. Such landscape-scale data is essential when conducting animal movement studies. However, the application of remote sensing data in species management is a relatively novel concept and can bring great advantages saving costs in laborious surveys. In this study, to identify activity centers of feral pigs for population management in large open areas within and around the East Bay Stewardship Network (EBSN), we extracted remote sensing data, including temperature, precipitation, and NDVI data, from 2019-2023, to derive climate variables and vegetation cover in the area. Subsequently, we conducted a MaxEnt analysis and mapped the probability of species occurrence during wet and dry seasons. The result shows seasonal variation in feral pig distribution and potential strategies land managers can use to control the non-native species population. Remote sensing data for species management can help managers identify target areas across large landscapes and large time frames with standardized data, and help surpass the hurdle of initial laborious and costly surveys.

Poster Session

AUGMENTING TRANSLOCATED SAGE-GROUSE BROODS & GUIDING FUTURE RELEASE LOCATIONS

Nicole I Lindenauer; University of California, Davis; U.S. Geological Surveys; nlindenauer@usgs.gov; Peter S. Coates, Megan C. Milligan, Steven R. Mathews-Sanchez, Mary B. Meyerpeter, Gail L. Patricelli

Greater Sage-Grouse (*Centrocercus urophasianus*; hereafter, "sage-grouse") populations have declined significantly across the western United States, including in the Bi-State Distinct Population Segment (Bi-State DPS), largely attributed to habitat loss and fragmentation. For the Parker Meadows subpopulation in the Bi-State DPS, landscape changes combined with likely inbreeding depression resulted in rapid population declines during the early 2000s. Thus, translocations were initiated in 2017 to prevent local extirpation. As part of this conservation project, we compared the efficacy of two translocation methods to help inform management decisions that optimize population restoration efforts. We compared whole-brood translocations (females with their broods) and augmented-brood translocations (broods augmented with extra chicks from a donor brood). We evaluated initial chick retention rates and survival estimates within translocated whole-broods and augmented-broods, as well as between donor and non-donor broods within the source population. We also compared habitat selection and survival between resident and translocated broods and created source-sink habitat maps to help guide suitable future release locations. By identifying the most effective translocation method and optimal release locations, we will provide valuable insights for conservation managers aiming to restore sage-grouse populations. These findings are preliminary, subject to change, and provided for best timely science.

Natural History of Birds II
Wednesday 4:00 PM

Student Paper

UNDERSTANDING THE EFFECTS OF GROUNDWATER DEPTH ON RIPARIAN HABITAT QUALITY IN THE KERN RIVER VALLEY IN CALIFORNIA

Patrick D Lorch; Southern Sierra Research Station; plorch@southernsierraresearch.org; Mary J. Whitfield, Reed Tollefson, Sandra Wieser

Recent work by Rohde et al (2024; "Establishing Ecological Thresholds and Targets for Groundwater Management." Nature Water 2: 312–23) proposes using the relationship between greenness and groundwater well depth to quantify how dependent a riparian plant community is on groundwater. Regression of normalized difference vegetation index (NDVI) on depth to groundwater (DTG) is expected to show a strongly negative relationship in groundwater dependent ecosystems (GDE). We use this approach to examine factors that may be affecting wildlife habitat quality. Using DTG data from 28 sites in riparian habitat along the South Fork Kern River, we generated these regressions to compare this relationship between sites with different distance to actively managed irrigation wells. We consider different ways to standardize NDVI and DTG to compare across sites and years. We demonstrate that this method can be very useful for identifying sites that are more groundwater dependent. We also show that this approach can identify water depth thresholds to be used as triggers for limiting groundwater pumping. We discuss how these methods might be used in wildlife conservation using the Western Yellow-billed Cuckoo as an example.

Poster Session

EXAMINING THE EFFECTS OF SONGBIRD NEST BOXES AND LAND USE ON AVIAN COMMUNITY COMPOSITION AND FUNCTIONAL DIVERSITY IN NAPA VALLEY VINEYARDS

Eleanor K MacDonald; Cal Poly Humboldt; em648@humboldt.edu; Autumn Turner, Cody Pham, Daniel Karp, Matthew Johnson

Agricultural expansion threatens biodiversity, but promoting native species like insectivorous birds in agricultural landscapes could benefit both biodiversity and farm productivity alike. Recently, some California winegrape growers have used nest boxes to promote biodiversity and attract insectivorous birds in an effort to help control insects. While early findings suggested nest boxes have a positive impact on bird functional richness and abundance, later research found no significant effect on avian community composition or pest control. This project addresses research needs using a before-after-control-impact experiment involving winegrape vineyards in Napa Valley, California. The objectives of this study are to (i) examine how habitat and landscape composition influence bird communities and (ii) how the addition of nest boxes affects insectivore abundance. Avian point counts were conducted for two seasons on 20 vineyards, 10 with existing nest boxes and 10 with nest boxes added between field seasons. We hypothesize that the addition of songbird nest boxes to winegrape vineyards attracts insect-eating birds, and these effects are mediated by local and landscape level characteristics. We also hypothesize that the beneficial effects of within-farm habitat complexity on bird abundance and diversity are mediated by the composition of the surrounding landscape.

Wildlife and Agriculture I
Wednesday 1:45 PM

Student Paper

HABITAT SELECTION AND MOVEMENT ECOLOGY OF THE CALIFORNIA POPULATION OF GREAT GRAY OWL, *STRIX NEBULOSA YOSEMITENSIS*

Heather L Mackey; Yosemite National Park; heather_mackey@nps.gov; Ramiro Aragon Perez, Rachel V. Blakey, Sarah Stock, Dustin Garrison, Mike McDonald, Katherine Gura, Bryan Bedrosian, Rodney B. Siegel

Abstract: Great gray owls (GGOWs) in the Sierra Nevada are considered a genetically unique subspecies (*Strix nebulosa yosemitensis*), with low genetic diversity and a small population size. The majority of this population resides in Yosemite National Park where it's associated with meadow areas subject to short-term disturbances from park activities and is at risk of wildlife-vehicle collisions, the greatest known source of mortality. From March 2022 to March 2024, we collected movement data from five owls with GPS transmitters, and compiled habitat data at use points derived from remotely-sensed data and field-based surveys. We addressed three objectives: (1) describe diel activity and seasonal space use of GGOWs, (2) identify key habitat variables that predict foraging and roosting habitat selection, and (3) determine drivers of habitat selection along roads. We found that GGOW foraging was positively associated with canopy density but negatively associated with number of canopy layers and canopy cover. We also found that GGOW roosting was positively associated with number of canopy layers, canopy density, and canopy cover. This work will aid in the conservation of California's GGOW population by informing meadow restoration and management of roadside vegetation within GGOW home ranges.

Raptor Population Status and Ecology
Friday 9:45 AM

GREATER SAGE-GROUSE CHICK SURVIVAL WITHIN A POST-FIRE LANDSCAPE

Belle J Malley; University of California, Davis; U.S. Geological Survey; bmalley@usgs.gov; Peter S. Coates, Steven R. Mathews, Michael P. Chenaille, Gail L. Patricelli

Greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) are an ecological indicator species of the sagebrush steppe ecosystem and have declined substantially across their range, mainly attributed to habitat loss and degradation. Wildfire is a leading cause of habitat loss throughout the western portion of sage-grouse range, resulting in adverse effects on population growth rates (λ). Recent studies attributed declines in λ to decreased adult and nest survival following wildfire. However, the relationship between wildfire and chick survival remains unclear. Here, we estimated chick survival at two post-wildfire sites in Nevada and California. We divided chicks into two groups: inside the burn perimeter (n=21) and on edges of the burn perimeter (within a 200m buffer; n=9). We found that chicks within the burn had a survival estimate of 0.35 (95% CRI = 0.23 – 0.49), while chicks at the burn edge had a survival estimate of 0.49 (95% CRI = 0.26 – 0.73). Thus, interiors of burned areas may lead to reduced chick survival, while edges may constitute important habitat for sage-grouse broods in a post-fire site. Future research exploring microhabitat differences between burned interior and its edges could provide valuable insights. These findings are preliminary, subject to change, and provided for best timely science.

Poster Session ***Student Paper***

FOREST STRUCTURE AND DISTURBANCE REGIMES AFFECT THE DENSITY AND DISTRIBUTION OF AN ENDANGERED FISHER (*PEKANIA PENNANTI*) POPULATION

Marie E Martin; Oregon State University; marie.martin@oregonstate.edu; Sean M. Matthews, Eric L. McGregor, Andria M. Townsend, Heather L. Mackey, Sarah L. Stock, Rebecca E. Green, Chad Anderson

Many forest-dependent species evolved in disturbance-prone landscapes, with intermittent, low-severity disturbances producing heterogeneous conditions to support their persistence. However, fire suppression and climate change have altered disturbance regimes and drought cycles, resulting in larger, higher severity wildfires and extensive drought-induced tree mortality. Fishers (*Pekania pennanti*) are a forest-dwelling species often associated with late-seral, complex forests and are sensitive to losses in canopy and forest cover resultant from landscape disturbance. In the southern Sierra Nevada, fishers occur within a federally-endangered distinct population segment and recent landscape-scale tree mortality and increasing risk of high-severity wildfire are persistent threats to their recovery. Here, we estimated the contemporary abundance, density, and distribution of fishers in the southern and central Sierra Nevada, in the area encompassing Sequoia, Kings Canyon, and Yosemite National Parks. We incorporated live-capture, remote camera, and telemetry data into integrated spatial-capture recapture models to estimate fisher abundance and density, and simulated the effects of 1) prescribed fire intended to restore ecosystem function and 2) stochastic wildfires at varying severities and spatial extents. We further incorporated these data and detection-nondetection monitoring data into an integrated occupancy model to estimate structural and landscape features that shape the contemporary distribution of fishers. Through this work, we identify forest structure and landscape conditions associated with the distribution of imperiled fishers, and elucidate the putative, differential effects of prescribed and stochastic fire on their persistence.

Natural History of Carnivores II
Thursday 9:05 AM

GENOMIC ASSEMBLY OF THE GALAPAGOS ENDEMIC LAVA GULL FOR SPECIES CONSERVATION

Jessica A Martin; San Francisco State University ; jmartin48@mail.sfsu.edu; Jack Dumbacher, Jaime Chaves

High-quality reference genomes permit deeper investigation into species' evolution and provide insight into species conservation. Next-generation sequencing allows researchers to generate high-accuracy long-read genetic data in real-time from anywhere in the world, increasing accessibility to sequence data. The lava gull (*Leucophaeus fuliginosus*), an endemic bird of the Galapagos archipelago, is the world's rarest gull with an estimated population of less than 400 pairs. Little research has been done on this species due to their small population size. We aim to sequence and assemble the lava gull reference genome for use in estimating genetic effective population size, studying population subdivision, identifying distinct conservation units, and providing other management information. We prepared a library from an adult female lava gull on San Cristobal island using Oxford Nanopore's Ultra-Long DNA Sequencing Kit and sequenced using a PromethION 2 Solo. We generated 1.78 million reads, consisting of 29.4 gigabases at an estimated 22x coverage. A preliminary Flye assembly generated a total length of 1.34 Gb, with 1,363 contigs and an N50 of 37.1 million. The generation of the lava gull reference genome is an important step in determining this species' conservation status and how best to focus management efforts.

Poster Session ***Student Paper***

EFFECTIVENESS OF CONSERVATION ACTIONS AND POPULATION TRENDS OF GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*) IN THE BI-STATE DISTINCT POPULATION SEGMENT

Steven R Mathews; U.S. Geological Survey; smathews@usgs.gov; Peter Coates, Brian Prochazka, Sarah Webster, Cali Weise, Cameron Aldridge, Michael O'Donnell, Kevin Doherty, John Tull

Greater Sage-Grouse (*Centrocercus urophasianus*; sage-grouse) populations have declined significantly across their range and in the Bi-State Distinct Population Segment (DPS), largely attributed to habitat loss and fragmentation. Over the last few decades, wildlife managers have implemented habitat conservation actions aimed at restoring sage-grouse populations in the Bi-State DPS. Using a Progressive Change Before-After-Control-Impact Paired Series design, we evaluated the effects of conservation actions on sage-grouse population abundance using count data from 57 leks for which we had lek data prior to and after conservation implementation during 1990–2021. Relative to leks with no conservation actions, leks within 5 km of a conservation action had an average annual increase in abundance of 4.4% since 2012, resulting in a total increased abundance of 37.4%. While Bi-State sage-grouse populations declined overall through our study, the total sage-grouse abundance in the Bi-State DPS today is 37.4% higher than if no conservation actions had occurred. Additionally, we estimated sage-grouse population trends across six population cycles from 1960–2023. Estimated population growth of the Bi-State DPS across the last two (15 years), four (28 years), and six (45 years) population cycles was 0.976 (95% CRI = 0.964 – 0.986), 0.990 (0.977 – 0.999), and 0.979 (0.969 – 0.987), respectively.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 8:45 AM

A NON-INVASIVE GENETIC METHOD TO SURVEY FOR NORTH AMERICAN PORCUPINES

Sean M Matthews; Oregon State University; sean.matthews@oregonstate.edu; David S. Green, Maire E. Martin, Ruth S. Mock, Cara L. Appel, Jennifer M. Allen, Taal Levi

Using non-invasive survey methods to detect the presence of wildlife are evolving at a rapid pace. For some species, a lack of verified survey methods can limit their conservation and management. A species for which few non-invasive techniques are currently available is the North American porcupine (*Erethizon dorsatum*). Although distributed across North America, evidence suggests that porcupines have declined in the west. Porcupines occur at low densities and do not respond to many commonly used baits. Porcupines are seasonally deficient in sodium, and this trait may be useful for non-invasive surveys using sodium-

soaked wood blocks and identifying porcupines by dentition patterns. The frequency of chewing on wood blocks by non-target species, however, increases our uncertainty in detecting porcupines. Thus, we conducted a pilot project to evaluate our ability to genetically identify porcupine from their saliva on salted wooden blocks. We collected swabs directly from the inner cheek as a control and swabs of wood blocks chewed on by a captive North American porcupine at the Sequoia Park Zoo. We detected porcupine DNA using DNA metabarcoding in all of our control and wood block samples. Future efforts should quantify how the degradation of DNA in the field will influence DNA analyses.

Poster Session

INVESTIGATING PACIFIC POCKET MOUSE MICROHABITAT SELECTION THROUGH BEHAVIORAL OBSERVATIONS

Ashley Flanders Max Moore; San Diego Zoo Wildlife Alliance; aflanders@sdzwa.org; Sadie Trombley, Shauna King, Alison Greggor, Debra Shier

The critically endangered Pacific pocket mouse (PPM; *Perognathus longimembris pacificus*) is a nocturnal solitary rodent restricted to coastal sage scrub habitat in southern California. Current knowledge of PPM habitat suitability is based on large-scale multi-year occupancy modeling of two extant populations, but little is known about microhabitat selection, especially in released populations. Understanding PPM microhabitat requirements is critical for informing habitat management efforts at reintroduction sites. To investigate this, we conducted focal behavioral observations at night to locate the burrows of captive-born PPM in the first active season following reintroduction. After we located the burrows, we conducted microhabitat surveys at natural burrow entrances, artificial acclimation burrows, and random locations within the reintroduction site. With these data, we are exploring the difference in microhabitat characteristics between the natural burrow and other locations to understand PPM microhabitat selection post-release. In addition to shedding light on PPM microhabitat selection, conducting behavioral observations has allowed us to fill information gaps in foraging and breeding behavior, burrow establishment and use, and interactions with heterospecifics for this cryptic species. We present preliminary data and highlight the value of behavioral observations by showcasing novel observations related to PPM natural history.

Ashley Flanders AND Max Moore will present this paper.

Poster Session

YOSEMITE TOAD REINTRODUCTION: SURVIVAL, BEHAVIOR, AND PREDATION AT 'TOAD ISLAND' IN YOSEMITE NATIONAL PARK

Tiffany A May; Yosemite National Park/San Francisco State University; aurora6853@gmail.com; Robert L. Grasso, Ninette Dainele, Rochell Stiles

Once abundant, Yosemite toads (*Anaxyrus canorus*) now occupy less than 50 percent of their historical range. Climate change impacts, such as low snowfall, higher temperatures, and fires have altered toad phenology and spatial/temporal connectivity among seasonal habitats. At ‘Toad Island’ Yosemite toads had not been observed since the 2013 Rim Fire, though there was previously a healthy population. To aid species’ recovery and develop reintroduction methodology, the park embarked on a pilot project to re-establish Yosemite toads at Toad Island. In 2022, we collected tadpoles from 3 robust populations and the San Francisco Zoo successfully headstarted a reintroduction cohort. In June of 2024, we released 118 adults to Toad Island. To understand dispersal, micro-habitat use, and survivability, we fitted 30 toads with radio-transmitters and tracked their movements from June-September; we performed visual surveys

weekly to monitor un-tagged toads. Here we present initial findings, including movement, morphometric, and predation data, as well as ‘lessons learned’ from the 2024 pilot.

Natural History of Amphibians
Friday 8:05 AM

Student Paper

YOSEMITE TOADS AND WILDFIRES: A HABITAT IN TRANSITION

Tiffany A May; Yosemite National Park/San Francisco State University; aurora6853@gmail.com; Carson Lillard Van Delden, Robert L. Grasso

Frequent and more severe fires are affecting wildlife across the Western United States, including higher elevation species such as the Yosemite toad (*Anaxyrus canorus*). While there have been studies on the effects of fire on western toads (*Anaxyrus boreas)*, the impacts of fire on Yosemite toads are largely unknown. Fires can alter the hydrology of breeding habitat, destroy the upland forests needed for foraging, and reduce overwintering burrowing habitat by decimating rodent populations. Over the past 30 years, fires have significantly impacted Yosemite toad habitats in Yosemite National Park, transforming large portions of the landscape. This presentation will explore the role of fire in Yosemite toad habitats and examine its effects on both historical and current populations.

Natural History of Amphibians
Friday 10:25 AM

Student Paper

PALEO-BIOLOGY IN GALAPAGOS TO INFORM TRANSLOCATION OF ENDEMIC SPECIES

Jaden McCaffrey; SFSU; jmccaffrey@sfsu.edu; Jack Dumbacher, Jaime Chaves

The Galápagos Islands are renowned for their biodiversity and endemic species. However, the introduction of invasive species, such as cats, rats, and dogs, has caused significant declines in native biodiversity. This study aims to reconstruct historical species assemblages on Pinzón, Santa Fe, Santiago, and Rábida Islands, providing a baseline for rewilding and conservation efforts by the Galápagos National Park. By examining paleo material from lava tubes, museum specimens, and field journals, we seek to establish a pre-human baseline vertebrate community assemblage. Lava tubes, which serve as natural repositories for semi-recent faunal remains, act as pitfall traps and barn owl roosts, providing valuable evidence of past species assemblages. Paleo material will be analyzed using a combination of morphological assessments and ancient DNA (aDNA) techniques. By integrating genetic analysis with traditional morphological methods, we aim to create a more complete understanding of the historical biodiversity of these islands, including species that may have gone undetected through morphological study alone. A comparison of historical and present-day species assemblages will deepen our understanding of the impacts invasive species have had on endemic wildlife. This research will guide future translocation and restoration initiatives, contributing to the islands' ecological recovery.

Poster Session ***Student Paper***

EXAMINING THE INFLUENCE OF ENVIRONMENTAL FACTORS THAT CONTRIBUTE TO THE SUCCESS OF TRANSLOCATED BIGHORN SHEEP

Sean R McCain; University of Nevada, Reno; seanmccain@unr.edu; Dr. Kelley Stewart, Dr. Vernon Bleich, Brett Wiedmann, Rusty Robinson, Dr. Kevin Shoemaker, Tom Dilts

Bighorn sheep (*Ovis canadensis*) were extirpated from much of their historic range in the 19th and 20th centuries as a result of widespread disease. In response, translocations emerged as a valuable restoration tool to return bighorn sheep to their native range in North America, but many of these translocated populations were characterized by low recruitment, limited range expansion, and poor population performance. Some investigators have implicated a failure to consider local adaptations to environmental conditions as a factor limiting translocation success, but research examining region-specific environmental factors has been limited. Our objective is to examine the spatial and temporal differences in resource selection between male and female bighorn sheep in the Little Missouri River region of North Dakota, an area that is most appropriate for the Rocky Mountain ecotype, and Antelope Island in Utah, which is most appropriate for the desert ecotype. Historically, populations at both locations experienced poor performance as a result of possible ecotype mismatch, but they are now improving after the addition of stock from source locations that more closely align with their release sites. The addition of bighorn sheep ecotypes from source environments that more closely align with the target environment might appear to be a strong predictor of improved population trajectories.To evaluate factors that might positively influence population trajectories, we are using resource selection functions to compare selection patterns in both locations. Our results will contribute to the improvement of restoration strategies and enhance translocation success.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 1:45 PM

Student Paper

BEYOND THE CDFW PROTOCOL: LATE SEASON OBSERVATIONS OF A BLUNT-NOSED LEOPARD LIZARD (*GAMBELIA SILA*) UNTIL OVERWINTERING

Randi McCormick; McCormick Biological, Inc.; rmccormick@mcbioinc.com;

Blunt-nosed leopard lizards (*Gambelia sila*) are generally active from mid-spring to early fall, entering a period of brumation during the winter months. The California Department of Fish and Wildlife survey methods are designed around the optimum times for detection: April 15 to July 15 (adults) and August 15 to September 30 (hatchlings). After protocol surveys had been completed with negative results, McCormick Biological, Inc. staff detected a blunt-nosed leopard lizard, possibly young of the year, during site preparation work for a project. To ensure avoidance, we monitored the individual daily as it foraged in nearby habitat. Biologists noted foraging, nightly burrow selection, movements and weather between October 12 and November 22. Adults of this species have been found to be opportunistic foragers, lying in wait for insects and occasionally other lizards. In addition to consuming insects, the individual we observed pursued more lizards than we expected, consuming several over the observation period. Burrow construction and use of existing burrows were both observed. These observations are of value in understanding conservation considerations and habitat use expected of this species.

Natural History of Lizards
Wednesday 1:05 PM

DO VOCALIZATION PARAMETERS OF CALIFORNIA LEAST TERNS (*STERNULA ANTILLARUM BROWNI*) CHANGE IN RESPONSE TO A NEARBY ROCKET LAUNCH?

Megan R McCullah-Boozer; California State University Bakersfield; mmccullah@csub.edu; Rachel H. Budge, Levi T. Moats, EmilyV. Olivares Garnica, Lucas K. Hall, Kent L. Gee, Grant W. Hart, Dan P. Robinette, Emily Rice

Many species rely on acoustic signals for communication, and disruptions to these signals can negatively impact populations. California least terns (*Sternula antillarum browni*; herafter 'terns'), a federally listed endangered migratory seabird, are particularly vulnerable, with statewide populations decreasing year over year. One tern nesting colony resides at Vandenberg Space Force Base, within 1 km of space launch complex 2 (SLC-2) operated by Firefly Aerospace. The effects of rocket noise on the vocalizations of this population are unknown. Our objective is to test competing hypotheses (Lombard effect or acoustic adaptation hypothesis) explaining the vocalization response of terns to a loud acoustic event like a rocket launch. In this analysis, we target the Firefly Aerospace Alpha rocket launch on July 3rd, 2024. We deployed 12 Wildlife Acoustics Song Meter SM4TS in March 2024 before terns arrived for nesting. Eight devices were spaced 100 meters apart, and the remaining four were configured in a square with a spacing of twenty-five meters. These devices recorded vocalizations and rocket launch noise from March 2024 to August 2024. Pre- and post-launch vocalization activity, amplitude, and frequencies are compared, and these results will be presented.

Poster Session ***Student Paper***

MITIGATING DEVELOPMENT IMPACTS: CREATING PROTECTED BREEDING HABITAT FOR CALIFORNIA RED-LEGGED FROG AND CALIFORNIA TIGER SALAMANDER

Sadie McGarvey; Integral Consulting Inc.; smcgarvey@integral-corp.com;

In Summer 2023, a 0.3-acre seasonal pond and wetland swale were constructed within a grazed grassland parcel (mitigation site) to provide compensatory mitigation for impacts to waters of the U.S./State associated with a nearby development project. The mitigation site occurs within critical habitat for California red-legged frog (*Rana draytonii*) (CRLF) and proximal to critical habitat for California tiger salamander (*Ambystoma californiense*) (CTS) - both species are known to occur locally. Since February 2024, 13 juvenile and adult CTS and 60+ juvenile CRLF encountered during project implementation have been relocated to the mitigation site. Further, an adult CRLF was observed naturally dispersing into the new wetland, signaling early colonization. Dipnet surveys conducted in Spring 2024 resulted in negative findings for CTS and CRLF, however, surveys will be conducted in Spring 2025 and beyond to document breeding presence/absence within the created pond. The appearance of adult CRLF within the created wetland suggests a promising potential for natural colonization and future breeding at the mitigation site. Compensatory mitigation required for the development project resulted in the creation of aquatic breeding habitat and the opportunity to "seed" the mitigation site with CTS/CRLF, increasing the likelihood of refocusing breeding efforts on land protected in perpetuity.

Lessons Learned in Wildlife Management
Thursday 9:45 AM

DEVELOPING A NEW COMPENSATORY MITIGATION CREDITING PROCESS: SB790 AND A WILDLIFE CONNECTIVITY PILOT PROJECT

Sadie McGarvey; Integral Consulting Inc.; smcgarvey@integral-corp.com; Paula Gill, Yancey Cashell

California Senate Bill 790 (SB790), passed in 2021, allows the California Department of Fish and Wildlife (CDFW) to grant compensatory mitigation credits for Wildlife Connectivity Actions. These actions aim to improve habitat connectivity, migration, recolonization, and breeding opportunities that have been disrupted by infrastructure or habitat fragmentation. In September 2024, CDFW released the Wildlife Connectivity Advance Mitigation Guidelines, outlining how credits will be calculated based on two variables: a "Credit Scoring" system (0-100) and a "Crediting Factor" to be developed through six pilot projects. One such pilot project is the creation of a wildlife undercrossing along Highway 17 in Santa Clara County, designed to benefit multiple special-status species. In collaboration with the Midpeninsula

Regional Open Space District, Integral biologists have developed a method to calculate the Crediting Factor by assessing ecological value improvements from the project. Using species-specific indices derived from quantitative and qualitative data, this method has received tentative approval from CDFW and collaboration is ongoing. This work advances the process for approving future Wildlife Connectivity Actions, paving the way for increased funding and efforts to reconnect habitats and promote ecosystem health.

Transportation Projects and Wildlife Interactions II
Wednesday 4:20 PM

THE IMPACTS OF WILDFIRE ON SPOTTED OWLS: A BIOREGIONAL-SCALE DATA SYNTHESIS

Kate McGinn; University of Wisconsin-Madison; mcginn4@wisc.edu; M. Zachariah Peery, John Keane, Kevin Roberts, Brian Dotters, Sheila A. Whitmore, William J. Berigan, Lief Gallagher, Paula A. Shaklee, Thomas E. Munton, Ronan Hart, R. J. Gutiérrez, Gavin M. Jones

Wildfire has been a fundamental component of natural ecosystem dynamics for millennia. However, climate change and land use have altered fire regimes globally such that that many wildlife species are now threatened by larger, more severe, and/or more frequent wildfires. Fuels reduction treatments may be used to create landscapes that are more resilient to wildfire and lessen the impact of high-severity fire to wildlife. However, there is lingering uncertainty regarding the extent to which fire-adapted species are truly threatened by novel wildfire characteristics. The spotted owl (*Strix occidentalis*) has become a focal point of controversy owing to its use of forests that have been substantially impacted changing fire regimes. Here, we leveraged over three decades of surveys across 1514 historical spotted owl territories and GPS movement data from 169 individuals across seven national forests, three national parks, and privately owned land in California, USA, to answer the question: “How have spotted owls responded to changing fire regimes?”. Across the region, we found that spotted owl territories were more likely to become vacant and less likely to be colonized if they experienced recent extensive high-severity fire. Movement analysis showed that individual spotted owls were unlikely to select forest burned at high-severity. Thus, our expansive data synthesis provided an unambiguous conclusion to lingering uncertainty: Large and severe fires threaten the persistence of spotted owls across their range. If managers are charged with conserving this species in California, forest restoration and fuels reduction treatments that reduce the risk of large and severe fires without substantial degradation of suitable habitat appear to be necessary.

Raptor Population Status and Ecology
Friday 9:25 AM

MATERNAL STRESS INFLUENCES OFFSPRING IMMUNE FUNCTION IN A WILD LIZARD

Tess McIntyre; San Jose State University; tess.mcintyre@sjsu.edu; David C. Ensminger

Many wildlife species are experiencing novel stressors due to changing environments such as habitat loss, increased predation, and human interferences. An individual's physiological response to stressors can negatively impact their immune function and wound healing abilities. However, the transgenerational impact of a mother’s hormonal stress levels on her offspring is currently understudied. While prior research indicates that there is a negative correlation between individual lizards’ stress levels and their wound healing, recent research suggests transgenerational impacts of stress may prepare offspring for a stressful environment, therefore increasing wound healing rates. We hypothesize that western fence lizard (*Sceloporus occidentalis*) neonates born from mothers with elevated glucocorticoids (a key metabolic and stress related hormone) and control mothers will display differing rates of healing from superficial wounds. We collected gravid mothers, applied treatment, raised their hatchlings in the lab, administered a

cutaneous wound to the hatchlings, and imaged their rate of wound healing over time. Preliminary results suggest that in the first four days post-wounding, hatchlings from glucocorticoid-treated mothers exhibited faster wound healing. Heightened stress in gravid mothers may prepare their offspring for more physiological challenges – leading to an increased chance of survival in a mutable habitat.

Poster Session

TESTING ADAPATIVE HABITAT SELECTION IN BREEDING SWAINSON'S HAWKS

Elizabeth D Meisman; Cal Poly Humboldt; edm170@humboldt.edu; Christopher Vennum, Ho Yi Wann, Jeffrey Dunk, Christopher Briggs, Peter Bloom, Michael Collopy, Brian Woodbridge, Matthew Johnson

The theory of adaptive habitat selection posits that individuals preferentially select habitats that maximize or improve their fitness, though various behavioral or environmental constraints can result in mismatches between habitat quality and selection. In long-lived territorial species like Swainson's Hawks (*Buteo swainsoni*), these mismatches may pose serious risk to population viability. One of the longest running raptor studies in North America has tracked breeding in a population of Swainson's Hawks in Butte Valley, California over the past 45 years (1979-present). Swainson's Hawks exhibit strong site fidelity to territories on their breeding grounds. Thus, this long-term dataset is ideal to test whether adaptive habitat selection is operating as habitat conditions have changed over time. I will create generalized linear models to assess nesting territory selection, nesting success, and productivity (measures of habitat quality) over time and as a function of varying land cover compositions (alfalfa, cereal grains, row crop, grassland, juniper, and bare dirt). I will present results of resource selection functions examining nesting territory selection at multiple spatial scales. This information may have implications for understanding how the Butte Valley Swainson's Hawk population may respond to future changes in land use. Preliminary results will be presented.

Wildlife and Agriculture II
Wednesday 5:20 PM

Student Paper

MITIGATION AND MONITORING OF HABITAT CONNECTIVITY FOR SAN JOAQUIN KIT FOX

Frank Meraz; High Speed Rail Authority ; frank.meraz@hsr.ca.gov; Jane Anderson

An essential operational goal for the California High-Speed Rail (HSR) project is the use of zero emission trains operating on 100% renewable energy, between San Francisco to Los Angeles within 3-hours. The HSR Authority recognizes that unintended impacts associated with project must be addressed in parallel with construction and operational goals. Wildlife corridors and safe crossings have been the focus of the early planning, design and permitting decisions. This presentation will highlight mitigation efforts to maintain habitat connectivity and will touch on the design of wildlife underpass corridors, bridges, and viaducts to create a permeable rail line. The placement of 338 various dedicated wildlife crossing structures aims to avoid habitat fragmentation. Construction is nearing completion along the first 119-mile segment in the Central Valley, which covers 15 different habitat types. A Wildlife Crossing Monitoring Program has been developed to better understand how the SJKF and other terrestrial wildlife species interact with the designs of each crossing structure. The findings will be made available to CDFW, USFWS, Caltrans and other agencies to improve other wildlife connectivity programs and guidance documents.

Natural History of Carnivores I
Wednesday 4:40 PM

WHY DID THE BOBCAT CROSS THE ROAD? URBAN BOBCAT BEHAVIOR AND ROADKILL MITIGATION STRATEGIES

Margaret Mercer; University of Arizona; mmercer3@arizona.edu; Cheryl Mollohan, Kerry Baldwin, Al LeCount, Jesse Alston

Bobcats (*Lynx rufus*) have had success persisting in urban areas, but vehicle collisions are a large source of mortality. Identifying how bobcats alter behavior near roads can help wildlife managers develop management strategies to reduce mortality from vehicles. To determine how roads affect bobcat movement, we analyzed GPS data from bobcats collared by the Bobcats in Tucson Research Project using continuous-time movement analyses. Our study focused on three questions regarding bobcat movement near roads: 1. Do bobcats avoid crossing roads? 2. Do bobcats use culverts and underpasses to cross roads? 3. Does bobcat behavior change when road density increases? We found that bobcats crossed roads 11% less frequently than expected from random chance, but we found no evidence that bobcats use culverts or underpasses to cross roads or that bobcat movement behavior (i.e., speed or home range size) varies with road density. Our results suggest that managers interested in reducing bobcat mortality from vehicle collisions need to do more than simply providing crossing structures. Fences to funnel bobcats toward crossing structures, rumble strips to scare bobcats from roads, reduced speed limits, and wildlife warning signs for drivers may be effective tools to reduce bobcat mortality from vehicle collisions.

Transportation Projects and Wildlife Interactions I
Wednesday 2:45 PM

Student Paper

HOW DO ENVIRONMENTAL CUES INFLUENCE DAILY MOVEMENT OF PRONGHORN IN SOUTHEAST OREGON?

Jerrod L Merrell; University of Nevada, Reno; jmerrell@unr.edu; Dr. Kelley M. Stewart, Dr. Don G. Wittaker

Movement between distinct locations is an important strategy used by animals to escape environmental extremes or to maximize access to forage. This behavior occurs in multiple taxa around the world. Animal movements can fall into many classifications such as long-distance migration, exploratory movements, short-distance migrations, range shifts, and daily movement within a home range. Being able to distinguish movement types is important for conservation of habitat and movement corridors. It is also important to examine environmental factors that influence the initiation of these movements. Pronghorn (*Antilocapra americana*) make daily decisions about distances to move to best access high quality forage and minimize the effect of environmental changes. Pronghorn movements have been a focus of study, but little is known about how environmental cues influence these movements. Our objective was to identify daily changes in pronghorn home ranges and understand how these changes influence movement types in a population of pronghorn in southeast Oregon, USA. We deployed 203 GPS collars on adult female pronghorn between 2019 and 2021 by helicopter capture. We recorded daily precipitation, temperature and wind speed within a home range and used multiple regression to understand the influence on daily movements. We used time series, by month and seasonal, to look at how movements vary at separate times of the year. We identified individual variation of the effect of environmental cues and distances moved. We also identified variation of the influence of environmental cues during different seasons. Our observations indicate that pronghorn movement is influenced by daily variation of environmental factors such as precipitation, temperature, and wind speed. And that these variations are influenced by seasonality of weather.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 2:05 PM

BROOD PARASITISM ON GREATER SAGE-GROUSE BROOD BY CHUKAR IN NEVADA

McCoy R Meshach; USGS; mmeshach@usgs.gov; Belle J Malley, Steven R Mathews, Peter S Coates

Greater sage-grouse (*Centrocercus urophasianus*; hereafter sage -grouse), a galliform bird native to sagebrush steppe ecosystems of western North America, have experienced substantial population declines and range contraction in recent years. In the American West, several non-native galliform species have distributions that overlap sage-grouse, creating potential competition for nest and brood sites. While interspecific nest parasitism has been documented in sage-grouse previously, no observations of parasitic chicks within sage-grouse broods have been reported, to our knowledge. Here, we describe the first documented case of parasitism by chukar *(Alectoris chukar*), an introduced galliform bird from Eurasia, on a sage-grouse nest and brood in western Nevada in 2023. Because nest parasitism has been shown to have negative effects on nest success in other galliform species, our observation indicates that further investigation of interspecific nest and brood parasitism occurrence and effects on sage-grouse could help inform their conservation and management. This information is preliminary, subject to change, and provided for best timely science.

Poster Session

CAPTURING COMMON RAVENS AND TRACKING BREEDING-SEASON MOVEMENT PATTERNS

Charles G Meyer; U.S. Geological Survey; cmeyer@usgs.gov; Peter S. Coates, Steven R. Mathews

The common raven (*Corvus corax*; raven) is an intelligent generalist avian predator with a high degree of behavioral flexibility, allowing for populations to exploit anthropogenic resources for breeding substrates and forage. In the American West, raven populations have increased substantially in recent decades, especially in sagebrush ecosystems where they are an important nest predator of greater sage-grouse (*Centrocercus urophasianus*; sage-grouse). Predation by over-abundant ravens on sage-grouse nests is thought to be a primary contributor to local sage-grouse population declines, particularly across the southwest portion of sage-grouse range. Our study objective was to capture territorial breeding ravens from their nests and fit them with GPS units to identify foraging patterns and relate to sage-grouse nesting areas within sage-grouse nesting periods. Here, we present 1) methodological descriptions of raven captures after testing multiple techniques, 2) preliminary estimates of home range sizes across different life stages, and 3) preliminary movement patterns of ravens during nesting and fledgling stages in relation to sage-grouse nesting habitat. These initial results could help inform management decisions aimed at minimizing adverse effects of nest predation by ravens on sage-grouse populations. These findings are preliminary, subject to change, and provided for best timely science.

Poster Session

WRITING EFFECTIVE MITIGATION MEASURES

Sue G Meyer; California High Speed Rail Authority; sue.meyer@hsr.ca.gov;

The California Environmental Quality Act (CEQA) requires lead agencies to incorporate into environmental documents feasible measures which could minimize significant adverse impacts. Other environmental laws, such as the federal and state endangered species acts and the Clean Water Act have

similar requirements. Regardless of one's role in project development, you will encounter mitigation measures, whether through drafting, implementing, or enforcing them. Effective mitigation is vital for minimizing environmental impacts, yet many projects struggle to turn well-intentioned plans into actionable and enforceable strategies. We will explore the common pitfalls that contribute to this disconnect, including vague language and unenforceable commitments. Through a review of CEQA's requirements and best practices, we will highlight essential elements for bridging this gap, such as clarity, feasibility, and adaptability of measures. Our discussion will emphasize the importance of integrating scientific evidence and collaborative input to enhance practical implementation. Attendees will leave with valuable insights and actionable strategies to ensure that mitigation measures not only comply with CEQA requirements but also effectively protect environmental resources throughout the project lifecycle.

Transportation Projects and Wildlife Interactions II
Wednesday 3:40 PM

ESTIMATING TOTAL ROADKILL RATE FOR A US STATE

Alice Michel; Road Ecology Center, UC Davis; aljmichel@ucdavis.edu; David Waetjen, Chloe Schaecher, Fraser Shilling

Wildlife-vehicle collision (WVC) causes direct mortality and reduces population connectivity. Although the idea of WVC is well-characterized, its total impact on wildlife populations remains poorly understood. Here, we describe a method for estimating the impact of WVC at the US state scale, with a case study on California mule deer (*Odocoileus hemionus*). We used GenEst (USGS) (Dalthrop et al., 2018) to fit models, which incorporates rates of carcass observation, persistence, and effort, taken from our data collections systems, and search efficiency, from the literature. Our models were constrained by habitat suitability and split into categories by: traffic volume, bioregion, and year and season. Rates of deer-vehicle collisions (DVC) were estimated for each category using 43,021 observations of DVC between 2016-2023. We find region-variable rates, between 0-1.4 DVC/km (South Coast) and 0.4-5 DVC/km (Sierra Nevada/Modoc). We estimated that 34,000 to 53,000 mule deer were killed per year. This represents about 10% of the estimated statewide population, suggesting WVC may play an important role in its steady decline. Our approach is readily applicable to other populations with sufficient data collection, which we are carrying out for other CA species.

Transportation Projects and Wildlife Interactions I
Wednesday 2:05 PM

IT'S HOT IN HERE: POST-WILDFIRE ROOST AND MICROCLIMATE SELECTION OF A SMALL INSECTIVOROUS BAT, THE CALIFORNIA MYOTIS

Katelyn Miller; California State University Sacramento; katelynmiller@csus.edu; Anna Doty

An unprecedented global increase in wildfires has disrupted ecosystems and has displaced wildlife through habitat and resource loss. Despite this, recent studies have suggested that some bats, specifically the California myotis (*Myotis californicus*), take advantage of a post-fire landscape's increased foraging and roosting opportunities. To understand how bats adapt to living in a post-fire landscape, we used telemetry to radio-track bats to roosts within the Mosquito fire burn scar in Tahoe National Forest, June-August 2024. Roost selection was quantified as a function of burn severity as well as tree characteristics. Burn severity is defined by the Rapid Assessment of Vegetation After-Fire Index (RAVF). Additionally, temperature-sensitive dataloggers were placed in an around roost trees to thermally profile the preferred microclimate of M. californicus to understand how roost microclimate affects roost selection. I hypothesize that roost selection of the California myotis is influenced by roost microclimate, which can be altered by fire. Results from this study will help inform wildlife managers how to manage landscape for

more optimal roosting habitat of the California myotis, and will further elucidate the complex relationship between bats and wildlife in California.

Natural History of Bats
Friday 9:25 AM

Student Paper

QUANTIFYING ANTIPREDATOR BEHAVIORS OF THE NORTHERN PACIFIC RATTLESNAKE ON THE CENTRAL COAST OF CALIFORNIA

Katherine L Molinari; California State University, Monterey Bay; kmolinari@csumb.edu; Dr. Jennifer Duggan

The Northern Pacific rattlesnake (*Crotalus oreganus*) frequently occurs in wildlife- urban interfaces in coastal California. Rattlesnakes are out of brumation from April to October, often basking when humans are likely to be recreating. For some species, such as Eastern gray squirrels and Western fence lizards, increased exposure to humans results in habituation to human presence and decreased antipredator behavior. This study examines if increased exposure to humans results in decreased antipredator behavior (i.e., rattling, flight) for the Northern Pacific rattlesnake, therefore, increased risk for both humans and snakes. We are quantifying antipredator behaviors of the Northern Pacific rattlesnake by measuring Alert Distances (ADs) and Flight Initiation Distances (FIDs) of individuals encountered on a reserve closed to the public. During each measurement, snakes are photographed for identification, allowing us to track the number of encounters with each snake. Preliminary results suggest decreases in AD and FID with increased temperature, and increases in AD and FID with increased snake age/size and human exposure. Continued data collection will allow us to better quantify AD and FID for snakes with increased exposure to humans, and thus assess the need for managing risk in recreational areas with dense populations of the Northern Pacific rattlesnake.

Poster Session

EFFECTS OF ROADS ON SPACE USE, HABITAT SELECTION, POPULATION DYNAMICS AND HEALTH OF THE RINGTAIL (*BASSARISCUS ASTUTUS*)

J.P. Montagne; San Diego Zoo Wildlife Alliance; jpmontagne@sdzwa.org; Scott Tremor, Justin Chung, Cassidy Sadowski, Debra M. Shier

Ringtail (*Bassariscus astutus*) are nocturnal, reclusive procyonids ranging throughout most of southwestern North America. They were given fully protected status in California in 1968 following declines primarily associated with fur hunting. Little is still known about the natural history of this species resulting in poorly informed management strategies. Ringtail are highly susceptible to road mortality. Several road-strike hotspots have been identified in San Diego County where normal movement patterns are impeded by vehicle traffic. To better understand impacts of roads on ringtail health, behavioral ecology and space-use patterns, the San Diego Zoo and San Diego Natural History Museum are collecting movement data from ringtails at two chaparral dominated sites, one next to a major highway and one over five miles from a highway as a control. We are recording GPS and accelerometer data from individuals to determine how roads may be affecting ringtail movement ecology at these two sites. We are also conducting full health screens on each individual during each capture. These new data will allow us to recommend mitigation measures to reduce human impacts and promote recovery of one of the most understudied mammals in southern California.

Poster Session

ROADKILL INDUCED EXTIRPATION OF LARGEST KNOWN POPULATION OF PACIFIC NEWTS (*TARICHA* SPP.) REQUIRES EMERGENCY RESPONSE

Madison Julia T Morgan; University of California, Davis; Madisonmorg02@gmail.com; Shannon Lemieux, Laura Morris, Selena Cao, Fraser Shilling

Volunteers recorded 7+ years of mass roadkill mortality of one of California's largest known populations of Pacific newts (*Taricha* spp.) on Alma Bridge Road (ABR) in Santa Clara County. ABR bisects newt habitat and Lexington Reservoir breeding grounds, resulting in one of the highest-reported rates of amphibian roadkill (34,231 dead newts, 2018-2024). The number of road-killed newts per hour of volunteer effort has been significantly declining about 10%/year (P=0.045). Simple linear and multilinear regressions revealed no significant relationship between roadkill and traffic or precipitation, variables which can influence roadkill rates. A decline in roadkill without a change in external factors suggests a population decline, with our analysis suggesting a rapidly approaching population crash. Midpeninsula Regional Open Space District is collaborating with the County and AECOM to mitigate roadkill, proposing 1.2 miles of elevated roadway segments along the 4.1 miles of ABR, with estimated completion in 3+ years. If this strategy had been implemented between 2018 and 2024 with 100% effectiveness, it still would have resulted in 9,633 recordings of newt roadkill. The response to this ecological emergency lacks urgency, a factor crucial to preventing population extirpation. We stress the treatment of ecological emergencies as true emergencies.

Poster Session ***Student Paper***

A BOLD CHALLENGE - ASSESSING WILD BEE OCCURRENCE IN FORESTS THAT DIFFERED IN STAND AGE AND FIRE SEVERITY AT LARGE SPATIAL SCALES.

Katie M Moriarty; Senior Research Scientist; kmoriarty@ncasi.org; Lincoln Best, Jesse Fan Brown, Rose McDonald, Felix Bruner, Rebecca Hayes, Leithen M'Gonigle, Hanna Jackson, Lauren Ponisio

Bees provide pollination services that influence floral diversity, abundance, and overall ecosystem productivity. Although research exists in agriculture or urban areas, few studies have investigated diversity and abundance of bees in conifer forests of the Pacific Northwest. We present preliminary results from three studies focused on bee occurrence in both forested systems and recently burned fires, explore predictions related to distribution, and highlight opportunities to enhance managed or burned landscapes. We surveyed 202 stands (2020-2023), hand-netting or passive trapping (3-6 occasions/year, >2 years). For bees netted by hand, we recorded the flower the bee was pollinating and followed netting protocols suitable for lab-based pathogen identification and DNA metabarcoding of pollen. We collected and identified ~100,000 bees to species. In the coast range, bee abundance and richness increased in stands where forest canopy had recently been removed through thinning or cut forests. In burned forest, floral richness and diversity decreased with severity. Bee richness and abundance increased with increasing floral resources. Preliminarily, native floral enhancements were effective in burned slash piles and increased bumble bee abundance and diversity. Our data, combined with ongoing efforts by the Oregon Bee Atlas, can help inform elusive bee distributions, floral associations, and restoration actions.

Natural History of Invertebrates
Friday 8:45 AM

A CALL FOR COLLABORATIVE CONSERVATION, INNOVATIVE TECHNOLOGY TO DESCRIBE NATURAL HISTORY, EVIDENCE-BASED REVIEWS, AND HISTORICAL

CONTEXT

Katie M Moriarty; NCASI, Inc.; kmoriarty@ncasi.org; Jessica K. Buskirk, Margaret Hallerud, Matthew Delheimer, Alyssa Roddy, Dax Morfin, Sean Matthews, Maddy Rifka, Jennifer Hartman, Marie Martin, Taal Levi

Effective wildlife management and conservation requires knowledge of a species or population's natural history, demography, habitat use, and potential risks for management action or inaction. Using a combination of non-invasive surveys, telemetry, GPS movement data, and directed experiments, we evaluated the distribution, population vulnerability, genomics, and perceived risk and foraging behavior of Humboldt martens (*Martes caurina humboldtensis*), an endangered subspecies of Pacific marten. Despite working with a team of esteemed scientists to provide extensive information relatively quickly, exterior timelines and resource limitations required assumptions to be made about the natural history and behavior of this elusive subspecies. We provide historical context, highlight current knowledge and persistent gaps, and provide a hopeful vision for future collaborations. Some achievable goals include being kind, using innovative ways to share data, and focusing on prospective meta-analysis by adopting common protocols.

Natural History of Carnivores II
Thursday 9:45 AM

UNBROKEN FROM CANADA TO MEXICO: IS INTERSTATE 5 A CONTINENTAL BARRIER TO WILDLIFE?

Laura J Morris; UC Davis Road Ecology Center; laumorris@ucdavis.edu; Shannon Lemieux, Jay Chen, Ciera Kelly, Madison Morgan, Ben Hodgson, Leo Hecht, Fraser Shilling

Interstate 5 (I-5) is a high-traffic highway that potentially acts as a continental barrier to wildlife. We propose the definition that "a continental barrier is any divide across a continent that restricts wildlife movement and creates habitat connectivity issues and/or behavioral changes across ecoregions along its length". We conducted a meta-analysis of literature using an observed (in literature) to expected (from habitat suitability models) ratio. We divided I-5 into seven ecoregions and used habitat maps to create lists of 'ecologically expected' (EE) native mammalian species for each region. Using Google Scholar, we collected literature that addresses the effects of I-5 on any regional EE species (OI-5), or any regional species interactions with highways (OA). Ungulates had the highest OI-5/EE and OA/EE ratios (0.7 and 0.83), while soricomorphs had the lowest (0.09 and 0.2). For all species, Southern California had the highest OI-5/EE and OA/EE ratios (0.67 and 0.79), while Northwestern WA had the lowest (0.12 and 0.21). Of the 119 pieces of literature collected, analysis thus far shows 84% support I-5 being a continental barrier for a limited subset of EE species.

Transportation Projects and Wildlife Interactions I
Wednesday 2:25 PM

Student Paper

BEYOND THE KARST: DIVERSIFICATION AND RADIATION OF THE GENUS *HYDROMANTES* IN NORTHERN CALIFORNIA

Casey D Moss; hydromantesbrunus@icloud.com; Noah M. Morales, Robert W. Hansen, Nicholas Van Gilder, Elizabeth L. Jockusch

The web-toed salamanders (*Hydromantes*) have long been of interest to biogeographers due to their enigmatic distribution—southern Europe and California. In recent years, populations of *Hydromantes* have been discovered in increasingly unexpected settings, causing us to question our concept of what constitutes suitable habitat. Among these are populations of the Mt. Lyell Salamander (*H. platycephalus*) living in

xeric desert-edge canyons on the eastern slope of the Sierra Nevada. In 2018, Bingham et al. partitioned the Shasta Salamander (*H. shastae*) into 3 species based on mitochondrial DNA, allozyme loci, and modest morphological differences. Those authors acknowledged that the ranges of these northern species were not fully understood, and it was clear that large areas of the Klamath Mountains and other Northern California ranges had not been adequately explored for populations of *Hydromantes*. In 2022 we began using a combination of satellite imagery and field knowledge to identify several areas that warranted surveys based on geology, elevation, and slope exposure. Over the past several years we have focused survey efforts on increasingly rugged and remote areas in the Shasta-Klamath region. Though surveys are ongoing, preliminary results from our work will be shared along with directions for future research.

Natural History of Amphibians
Friday 9:25 AM

FEATHER MITES IN WHITE-CROWNED SPARROWS (*ZONOTRICHIA LEUCOPHRYS*): TEMPORAL VARIATION AND THEIR EFFECTS ON CONDITION

Katherine N Moua; California State University, Fresno ; kmoua263@gmail.com; Dr. Joel Slade,
Katherine M Moua

Host-parasite dynamics in wild migratory songbirds are often studied during the breeding season, with limited focus on the overwintering period. White-crowned Sparrows (*Zonotrichia leucophrys*; WCSP) migrate seasonally to Central California, where they harbor ectoparasites, such as feather mites, during the winter. While some research suggests a negative association between feather mites and bird condition, recent studies indicate these mites may be commensal. This study examined the relationship between feather mite presence and WCSP morphological condition using data from 2021 to 2024. Principal component analysis (PCA) reduced five variables, retaining PC1 (morphometrics) and PC2 (date sampled). Both variables significantly explained variation in mite scores using a generalized linear mixed model. Results showed that smaller birds and those sampled earlier in the season had higher mite prevalence, suggesting that feather mite abundance is influenced by both host condition and seasonal timing. This research contributes to understanding host-parasite interactions in overwintering birds and highlights the importance of both seasonal and condition factors in shaping these relationships.

Poster Session

PHENOLOGICAL PATTERNS IN BAT ACTIVITY AND SPECIES RICHNESS USING LONG-TERM ACOUSTIC SURVEYS WITHIN ORCHARDS OF A SOUTHERN CALIFORNIA URBAN AGROECOSYSTEM

Jaime L Neill; Cal Poly Pomona; Jlneill@cpp.edu; Dr. Elizabeth Scordato, Dr. Joy O'Keefe, Dr. Erin Questad, Dr. Hamutahl Cohen, Dr. Rachel Blakey

Bats are essential to the health of ecosystems and act as biological control agents in agriculture, though questions pertaining to phenology, activity abundance, and how bats utilize agricultural landscapes remain. Urban agroecosystems offer a range of resources for bats and may provide quality foraging habitat, particularly when crops are structurally complex like orchards. By assessing bat activity and species richness within orchards and riparian areas of the Santa Clara River Valley in California, we can identify when peaks in bat activity correlate to insect abundance throughout the year including during the growing season. Studying timing and amount of bat foraging activity within an orchard can help growers with their timing of pest management and utilizing these native species to reduce damage caused by pests. Preliminary results show bat activity is highest within summer and beginning of fall, however activity peaks within these seasons differ among species. Having a higher diversity of bat species can potentially aid in insect population control in orchards and nearby riparian areas throughout most of the year.

Managing orchards and surrounding areas to promote healthy bat communities and other native biological control agents can help reduce the need for pesticides on managed lands.

Poster Session

TERRESTRIAL MOVEMENTS OF THE SOUTHWESTERN POND TURTLE

Barry Nerhus; bnerhus@endemicenvironmental.net;

The terrestrial habitat of the semi-aquatic southwestern pond turtle (*Actinemys pallida*) remains under-researched compared to its aquatic environment. This study documents the nesting and estivation movements of *A. pallida* in southern California from 2009 to 2024, along with a potential hatchling migration. Utilizing radio telemetry on transmittered turtles and observations of naturally encountered individuals, we measured distances from aquatic habitats to terrestrial movement locations. These behaviors are critical for population survival and provide essential insights for the conservation and management of *A. pallida*. Understanding the terrestrial movements and habitat preferences of this cryptic species is vital for effective conservation strategies.

Natural History of Turtles and Tortoises
Thursday 8:45 AM

TURTLE LEECHES FOUND ON NORTHWESTERN POND TURTLES AND SAN DIEGO COUNTY IN CALIFORNIA

Barry Nerhus; Endemic Environmental Services Inc. ; bnerhus@endemicenvironmental.net; Vanessa Lozano

The northwestern and southwestern pond turtles are two species of freshwater turtles facing significant population declines across their ranges. The primary threats to their survival are habitat loss and invasive species, while disease also poses a potential risk to their remaining populations. Recently, the parasitic North American Turtle Leech (*Placobdella parasitica*) was confirmed in Oregon on the northwestern pond turtle (*Actinemys marmorata*), a species native to regions east of the Rocky Mountains. In 2024, we documented the presence of *P. parasitica* at the Cache Creek Preserve in Yolo County, CA, affecting both *A. marmorata* and red-eared sliders (*Trachemys scripta*). Additionally, we found *P. parasitica* on a common snapping turtle (*Chelydra serpentina*) at a golf course adjacent to the San Diego River. These findings suggest that *P. parasitica* may be widespread throughout California. We recommend that leech surveillance be included in turtle sampling efforts and emphasize the importance of collaborating with leech experts to monitor this potential threat.

Poster Session

COMPARING THE RELATIVE EFFECTS OF SEVERE FIRE, DROUGHT, AND FUEL TREATMENTS ON SPOTTED OWL OCCUPANCY

Elizabeth M Ng; University of Wisconsin Madison; emng@wisc.edu; H. Anu Kramer, Connor M. Wood, Jason M. Winiarski, Kate A. McGinn, Sheila A. Whitmore, Jonathan P. Eiseman, Kevin G. Kelly, M. Zachariah Peery

Across the Sierra Nevada, fire suppression and logging have densified and homogenized forests. In response, fuels treatments are being implemented to improve forest resilience to increasingly severe fire and drought. However, the implementation of these treatments is constrained by costs, access, and concern

for their effects on wildlife. We compared the effects of severe fire, drought-induced tree mortality, and fuel treatments on the occupancy of the California spotted owl (CSO). We integrated CSO data from a regional acoustic monitoring project and a 15-year disturbance and management dataset to compare disturbance and management at both site- and population levels. CSO occupancy was negatively related to severe fire and positively related to drought-induced tree mortality. When considering treatments in isolation, heavier treatments (mean proportion of site treated (MPST) = 1.1%) had a negative relationship with CSO occupancy, while lighter treatments (MPST = 12.8%) had a positive relationship. However, when controlling for drought and fire, there was no significant effect of either treatment intensity on CSO site occupancy. This is the first study to compare the effects of the primary agents of forest change in the Sierra Nevada on an at-risk species and underscores the need for effective implementation of fuels management.

Raptor Population Status and Ecology
Friday 8:05 AM

Student Paper

ASSESSING LIVESTOCK GUARDIAN DOG IMPACTS ON COYOTES AND NON-TARGET WILDLIFE BEHAVIOR

Tricia T Nguyen; California Polytechnic State University; tnguy705@calpoly.edu; William T. Bean, John D. Perrine

Livestock guardian dogs (LGDs) are becoming a popular predator management tool for domestic sheep producers in California. Coyotes (*Canis latrans*) represent a significant proportion of sheep depredations in the United States, costing producers an estimated 40 million dollars annually. While LGDs have long been used worldwide, their use warrants further study due to the site-specific success of predator management and the potential for LGDs to impact non-target species as a novel, non-native predator. We aim to explore the mechanisms by which LGDs deter coyotes and the impacts of LGDs on coyote and non-target species behavior in a novel study region, the California Central Coast. Between 2021 and 2023, we deployed 30 camera traps across three sites with varying levels of LGD presence: completely absent, intermittently present, and always present. I present our study approach and preliminary summary data on the shifts in species activity peaks and in diel overlap between species, species occupancy and richness by site and distance from stationed LGDs. These findings may contribute to a broader understanding of factors contributing to LGD success across regions and their impacts on biodiversity, allowing livestock producers and wildlife managers to make informed decisions about implementing this predator management strategy.

Wildlife and Agriculture II
Wednesday 5:00 PM

Student Paper

THE INFLUENCE OF ABIOTIC FACTORS ON BUENA VISTA LAKE SHREW (*SOREX ORNATUS RELICTUS*) ACTIVITY PATTERNS

Monique A Nunez; California State University Bakersfield; mnunez31@csub.edu;

A sizable knowledge gap exists regarding ecological interactions of the Buena Vista Lake shrew (*Sorex ornatus relictus*), a federally endangered small mammal endemic to the San Joaquin Valley of California. No studies have examined the effect of abiotic factors on *S. o. relictus* activity patterns. To deepen our knowledge of *S. o. relictus* and identify potential challenges to their persistence, I used camera trap data collected at four sites in the southern San Joaquin Valley between 2016 and 2020 to associate the occurrence of *S. o. relictus* at bait stations with corresponding abiotic conditions. I determined that ambient air temperature was the most supported variable to predict the presence or absence of *S. o. relictus* at bait stations. An inverse association exists between *S. o. relictus* presence and ambient air temperature,

where the predicted probability of shrew presence increased as air temperature decreased. My results can potentially inform a reevaluation of the air temperature parameters in the current survey protocol for detecting *S. o. relictus* presence. Doing so may increase the probability of detecting *S. o. relictus*, a critical component of conservation efforts, and aid the well-being of an endemic, endangered subspecies.

Natural History of Small Mammals
Friday 9:05 AM

A SECOND TADPOLE SHRIMP (*LEPIDURUS LEMMONI*) NATIVE TO CALIFORNIA CENTRAL VALLEY VERNAL POOLS

Sean M O'Brien; Westervelt Ecological Services; seanobrien1342@gmail.com; Brent P. Helm

It has previously been thought that only one species in the genus Lepidurus occurs in California's Great Central Valley, USA - the federally listed as endangered vernal pool tadpole shrimp (*Lepidurus packardi*). However, the alkali tadpole shrimp (*L. lemmoni*) was observed in the southern portion of the Central Valley in 2019 within several alkaline playa pools. This species' presence in the Central Valley likely represents a remnant historic native population concentrated between 0 to 25 km south of the southern edge of the historic Tulare Lake. Alternatively, the occurrence may be a natural or anthropogenic range extension or perhaps a new species. The discovery of a species (or possibly new or cryptic species) very uncommon to the Central Valley provides additional management implications that Tulare Basin pools provide habitat for rare species at risk of development and should be protected. Furthermore, alkali pools within this region should receive more intensive and widespread survey attention, especially from a large branchiopod perspective.

Natural History of Invertebrates
Friday 9:45 AM

FROM CITY TO COUNTRYSIDE: IMPLICATIONS FOR ADAPTIVE IMMUNITY IN BIRDS

Emmanuel O Okposio; California State University, Fresno; okposio_emmanuel@mail.fresnostate.edu; Kevin McGraw, Joel Slade

Urbanization is associated with novel habitats, pathogens, and a general decline in species and genetic diversity. Most studies on the genetic diversity of urban species focus on neutral loci like microsatellites that may not reflect diversity in fitness-related traits. In this study, we will determine the role of urbanization on the major histocompatibility complex (MHC class I) in House Finches, *Haemorhous mexicanus*. We have collected blood samples from at least 30 House Finches in each urban, suburban, and rural area in and around Fresno, California, and Phoenix, Arizona. Firstly, we hypothesize that rural House Finches will vary in genetic diversity at MHC compared to their suburban and urban conspecifics because of putative anthropogenic barriers to gene flow. We have PCR-amplified the polymorphic peptide binding region of MHC class I and will sequence them on the Illumina MiSeq platform. We will discuss the number of MHC alleles, and the number of private alleles, and estimate indices of sequence polymorphisms between the three population units. In addition, we will discuss population divergence using Jost's D estimate and STRUCTURE. This study will ultimately shed light on the associations between urbanization and the evolution of an adaptive immune gene.

Genetics in Wildlife Investigations
Thursday 8:05 AM

Student Paper

NEST SITE SELECTION OF FERRUGINOUS HAWK WITHIN BUTTE VALLEY

Sierra G Olsen; Cal Poly Humboldt; sgo10@humboldt.edu; Elizabeth Meisman, Matthew Johnson, Dr. Chris R. Vennum

The ferruginous hawk (*Buteo regalis*) is the largest Buteo species in North America, and occupies arid grasslands. A small population of ferruginous hawks has been observed breeding within Butte Valley, California located in the northeastern region of the state. We investigated nest site selection at the nest tree scale via collection of on-the-ground nest tree attributes and on a larger habitat scale via resource selection functions utilizing land cover types. We compared nest tree height and diameter at breast height (DBH) to the four nearest neighbor trees based on surveys conducted during the 2024 breeding season. Using matched case logistic regression, we found that ferruginous hawks show a slight positive selection for tree height and DBH. Using monitored nest site locations, we conduct analysis on different natural and agricultural land cover types and report patterns distinguishing occupied nests and random points through generalized linear models . This research may aid in understanding breeding habitat requirements and can assist managers in predicting new nesting sites as this population continues to grow.

Poster Session ***Student Paper***

WHERE DO YOU HELP WILDLIFE GET ACROSS 300 MILES OF THE CALIFORNIA AQUEDUCT? A DATA-DRIVEN PROCESS INFORMING SOLUTIONS.

Brock A Ortega; Dudek; bortega@dudek.com; Shelly Amrhein - California Department of Water Resources, Valerie Goodwin – Dudek, Mike Howard - Dudek, Mike Henry, PhD - Dudek, Anna Cassady - Dudek, Alexandria Reed - Dudek, Lorna Haworth - Dudek, Autumn Iverson - Point Blue Conservation Science

Aqueducts can constrain some ground-based wildlife species' movement patterns and gene flow for certain suites of species. In 2020 the California Department of Water Resources launched an effort to prepare two Habitat Conservation Plans (HCPs) to cover Operations and Maintenance (O&M) Activities for the State Water Project (SWP), which uses aqueducts to supply water from Northern California to Southern California. To identify the suite of affected species and extent of potential constraints, and to evaluate potential hot spots and opportunities, a wildlife movement study and analysis was performed across 294-linear miles of the aqueduct. The analysis considered focal and other key species, species habitat modeling, priority area mapping for connectivity, crossing type usage analysis, and identification of "important areas" for wildlife movement. Based on the results of the analysis, the study provided a discussion of the effects of structures and other barriers and issues and offered solutions and recommendations for improving wildlife movement. These were used to identify species-specific and cumulative hot spots to focus mitigations at. These include installation of additional crossing structures and other wildlife movement corridor improvements to support and enhance wildlife movement and genetic flow across the aqueduct system and are described in this Poster.

Poster Session

AVIAN BIODIVERSITY IN CENTRAL CALIFORNIA VINEYARDS

Lindsay E Peria; California Polytechnic State University, San Luis Obispo; lperia@calpoly.edu; Clinton D. Francis

Avian biodiversity is declining across the country, and conservation lands alone will likely not be able to support vibrant avian communities long-term. Agricultural expansion contributes to this bird population decline, but the integration of bird friendly practices into agricultural land, such as vineyards, could

support many birds that have lost habitat to development. We assessed how different habitat characteristics of existing vineyards in San Luis Obispo County, California, including percent grassland, shrubland, vineyard, agriculture, and canopy cover, as well as structural complexity, influence taxonomic and functional avian community structure as well as individual species occupancy. Variation in canopy cover and shrubland cover appeared to have the greatest influence on community composition in and around the vineyards. Whereas canopy cover, structural complexity, and proximity to streams influenced many species' occupancy. Vineyard modifications such as adding small amounts of canopy and preserving existing natural habitat could have large impacts on bird communities in vineyards. This analysis will help guide local bird friendly vineyard management to help increase the abundance and diversity of birds that can utilize these modified lands for foraging, shelter, and to connect larger areas of protected land.

Wildlife and Agriculture I
Wednesday 2:05 PM

Student Paper

GENETIC ASSESSMENT OF SPRINGSNAILS (*PYRGULOPSIS*) FOR INVENTORY, MONITORING AND CONSERVATION ACROSS THE GREAT BASIN IN NEVADA AND UTAH.

Kristy L Pilgrim; USFS National Genomics Center; kristine.pilgrim@usda.gov; Michael Young, Eric Miskow, Kathryn Perez, Chante Lundskog, Michael Schwartz

Springsnails are tiny, frequently cryptic, aquatic gastropods that are endemic and adapted to small springs, many with limited distribution. The *Pyrgulopsis* genus alone may have over 100 species, many of which are recognized as Species of Greatest Conservation Need and several are proposed to be or are currently listed under the Endangered Species Act. Springsnails are found throughout the Great Basin with the largest concentration in Nevada and Utah. There are over 35,000 individual springs in the two states, and determining springsnail presence and species composition is both challenging and critical. With expanding development, increasing groundwater extraction and habitat destruction, there's growing concern for springsnail persistence. Over the past five years there has been a concentrated effort by several state and federal agencies to answer these questions. Our agency partners used systematic sampling to inventory key springs. We then applied a molecular species delineation approach to identify *Pyrgulopsis* species and their distribution. The data is then compiled into an accessible database to aid with conservation and management of these important organisms.

Natural History of Invertebrates
Friday 9:05 AM

FIRST-YEAR FINDINGS OF INVASIVE SPECIES REMOVAL EFFORTS TO MITIGATE THE DECLINE OF NORTHWESTERN POND TURTLES (*ACTINEMYS MARMORATA*) AT A PRESERVE IN WOODLAND, CA

Trinity B Pineda; Endemic Environmental Services; tbpineda1@gmail.com; Vanessa I. Lozano, Dean Nerhus, Thea B. Wang, Barry Nerhus

Northwestern pond turtle (*Actinemys marmorata*) (NWPT) population decline has been attributed to several factors, including competitive interactions with invasive red-eared sliders (*Trachemys scripta elegans*) (RES) for basking and nesting habitat and invasive American bullfrogs (*Lithobates catesbeianus*) for food resources as well as the predation of juveniles. Direct removal of RES and bullfrogs from the environment is thought to improve habitat conditions for NWPT. NWPT trapping surveys and invasive species removal efforts for RES and bullfrogs were conducted within the 15-acre wetlands of the Cache Creek Nature Preserve (CCNP) in Woodland, CA. Monthly turtle trapping and bullfrog gigging bouts were conducted for 3-4 day periods during the 2024 season. A total of 98 RES, 831 bullfrogs, and 150 other invasives were removed; twelve NWPT were marked and released. The twelve NWPT captured, (10

males, and 2 females, including 1 gravid female), were all adults; no juveniles were detected. Currently, CCNP RES population outnumbers the WPT population approximately 8:1, with no NWPT juvenile recruitment. Post-invasive species removal monitoring will continue in order to measure the efficacy of this management action.

Poster Session

NATURAL HISTORY AND CURRENT TAXONOMY OF THE GENUS *ANNIELLA*

Victoria E Prado; Self; tori.e.prado@gmail.com; Sam Bacchini

The California legless lizard genus (*Anniella*) is endemic to California and Baja California. *Anniella* are primarily fossorial and forage for larval and adult invertebrates in loose soil and leaf litter. This genus is known to reach sexual maturity at approximately 120 millimeters snout-to-vent length and give birth to live young. Although *Anniella* inhabit various vegetation communities and soil types, this group has key habitat requirements: layer of plant litter, shrub or tree communities, and undisturbed soils. Each of these features provide a root system, shade, moisture retention, and/or soil aeriation. In 2013, Papenfuss and Parham divided the one accepted species, *Anniella pulchra*, into five species. California Department of Fish and Wildlife continues to manage *Anniella* as a single taxon, while acknowledging the proposed nomenclature. Papenfuss continues sampling efforts for *Anniella* and collaborates on building robust genetic tools to better determine *Anniella* phylogenetics and taxonomy. *Anniella pulchra* was listed as a Species of Special Concern by the California Department of Fish and Game in 2004 and were protected from take in 2013. Current conservation threats include loss of native habitats to exotic weeds (e.g. post-wildfire colonization), agriculture, and urbanization of suitable habitat.

Natural History of Lizards
Wednesday 2:05 PM

GENOMIC IMPACTS OF FRAGMENTATION AND DISEASE IN THE ENDANGERED SAN JOAQUIN KIT FOX

Sophie Preckler-Quisquater; University of California, Davis; squisquater@ucdavis.edu; Brian Cypher, Jaime Rudd, Deana Clifford, Stevi Vanderzwan, Ben Sacks

Fewer than 5,000 federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) remain, largely due to habitat loss and fragmentation. Additionally, sarcoptic mange outbreaks in Bakersfield and Taft threaten these urban populations. To date, sarcoptic mange infestations have not been documented outside of the urban areas despite extensive surveillance, nor has it been observed in any other kit fox subspecies. We identified several non-urban populations that are relatively isolated and may be at increased risk of extinction due to inbreeding or disease. To assess the genomic impacts of fragmentation and disease, we sequenced whole genomes from kit foxes samples in urban (n = 5) and non-urban (n = 12) populations, comparing levels of inbreeding and genetic load. We also investigated immune-related genetic diversity (e.g., MHC, IFNG, IL2) between urban and non-urban populations, and between the San Joaquin kit fox and individuals from the closely related desert kit fox subspecies (n = 7), to explore potential links to sarcoptic mange susceptibility. Our findings provide insights into how genetic diversity and population connectivity may influence disease vulnerability and persistence in this endangered species.

Genetics in Wildlife Investigations
Thursday 9:25 AM

GENETICS AND NESTING BEHAVIOR IN A RECOVERING POPULATION OF THE THREATENED HAWAIIAN STILT (AE&LSQUO;O; *HIMANTOPUS MEXICANUS KNUDSENI*)

Kristen R Harmon; University of Hawai'i ; kmcorey@hawaii.edu; Arleone Dibben-Young, Robert J.Toonen, Ale'a Dudoit, Evan Freel, Maddie Emms, Melissa R. Price, **Melissa R Price**

Breeding behaviors in birds can influence genetic diversity and so are of interest in the management of endangered species. However, egg dumping (intra-specific egg parasitism), pairing of closely related individuals, and extra-pair copulation are difficult to detect via behavioral observations, and must be corroborated with genetic information. Cooperative breeding behaviors such as helpers-at-the-nest and incubation by more than two adults, as well as other breeding behaviors such as suspected egg dumping, were recently documented in the Threatened Ae‘o (Hawaiian Stilt; *Himantopus mexicanus knudseni*) on the island of Moloka‘i in the Hawaiian Islands. As these behaviors are rarely observed in Charadriiformes (wading birds), in this study we compared behavioral observations of potential relationships among chicks and adults with genetic relatedness, utilizing reduced-representation sequencing and analysis of SNPs. We observed genetic evidence consistent with egg dumping, potential extra-pair copulation, and inbreeding, but were not able to assess the relatedness of extra-pair adults that contributed to incubation and nest defense. As many of the individuals in this population are color-banded and monitored regularly by local community residents, this study lays a foundation for further studies of behavior and genetic diversity in this recovering species.

Natural History of Birds II
Wednesday 4:20 PM

EFFECTS OF REPRODUCTIVE STATUS ON STANDARD METABOLIC RATE OF THE PRAIRIE RATTLESNAKE (*CROTALUS VIRIDIS*) AT HIGH ELEVATION SITE WITH A SHORT ACTIVE SEASON

Emma M Reardon; California Polytechnic State University ; emreardo@calpoly.edu; Nicole E. Yee, Trevor D. Ruiz, Haley A. Moniz, Scott M. Boback, Emily N. Taylor

Variation in the metabolism of rattlesnakes attributable to reproductive status is critical to understanding viviparous energetic requirements and has potential implications for reproductive frequency and adaptive success in the face of changing climates. We investigated the effect of reproductive status on standard metabolic rates of female Prairie Rattlesnakes (*Crotalus viridis*). We utilized internal temperatures and morphometric data from a population of *C. viridis* at a high-elevation site in northwest Colorado to estimate average standard metabolic rates of pregnant and non-pregnant females throughout their relatively short active season, and to estimate the average standard metabolic rate of females during their extended inactive season. Based on those rates, estimated annual energy requirements for survival among pregnant prairie rattlesnakes were significantly higher than the baseline energy requirements of non-pregnant prairie rattlesnakes: pregnant females were estimated to require 1097 kJ (90% CI: 953-1241) of energy compared to an estimated 598 kJ (90% CI: 571-624) for non-pregnant females. We estimated that pregnant females’ annual energetic requirement for survival is 1.83 times greater than that of non-pregnant females (90% CI: 1.66-2.02). The energetics of reptiles, especially that of snakes, is realtivley unnderstudied compared to other wildlife; these estimated energetic budegets based on standard metabolic rates contribute to a greater knowledge base for rattlesnakes, which have uniquely low energetic requirements.

Poster Session

PACIFIC MARTENS, A FOREST OBLIGATE, PERSISTED AFTER A MEGAFIRE

Deirdre L. Replinger; Cal Poly Humboldt; dr327@humboldt.edu; Christopher J. Collier, Micaela S. Gunther, Katie M. Moriarty, Alyssa M. Roddy, Ho Yi Wan

Increasing frequency, size, and severity of wildfires in the western U.S. threatens forest-dependent wildlife species. The Pacific marten (*Martes caurina*) has been considered to rely on mature, structurally-complex forest but has recently been found to occupy forest burned at high severity. To ascertain the relationship between the marten and burned landscapes, we used remote camera traps and non-invasive hair snares to assess marten occurrence, density, and home range in Lassen National Forest in northeastern California, burned by the 2021 Dixie Fire—the largest recorded single fire in California history. We detected martens at sites across the burn severity gradient, from unburned forest to stands burned at high severity. Preliminary results indicate that an individually identifiable marten's home range spanned multiple burn severity classes, from unburned forest outside the fire perimeter to high-severity burn. Genetic analysis will identify individuals and sex ratio; subsequent analyses will estimate marten abundance and density, as well as the effect of the spatial heterogeneity of burn severity on marten occurrence. Because we detected multiple martens in 2022, 2023, and now 2024, we provide evidence for marten survival following an expansive high severity and intensity fire as well as short-term persistence of a rare forest-associated species.

Poster Session ***Student Paper***

NIGHT WINGS OF SOUTHERN ALAMEDA COUNTY

David L Riensche; driensche@ebparks.org;

Bats perform substantial ecological services, including insect consumption, pollination, seed dispersal, and nutrient cycling. Their low reproductive rates, and sensitivity to human disturbance makes bats vulnerable to a variety of threats including habitat loss and fragmentation, climate change, pesticides, toxic wastewater, wind farm development, and the fungal disease white-nose syndrome. With the help of the "Bat Brigade" wildlife volunteer group, the East Bay Regional Park District (EBRPD) conducted an 8-year study (2017 to 2024) of bat distribution, abundance, and calls per hour at three locations in Southern Alameda County. A total of 48 bat exit and acoustic surveys were conducted periodically between April and July at Sunol Wilderness Regional Preserve, Lake Del Valle Regional Park and Camp Arroyo Regional Recreation Area. The study confirmed the presence of 7 genera and 9 species of bats, including two (2) California Species of Special Concern, the Pallid Bat (*Antrozous pallidus*), and the Western Red Bat (*Lasiurus blossevilli*). Additionally, the acoustic sampling detected the following species in order of abundance: Yuma Myotis (*Myotis yumanensis*), Mexican Free-tailed Bat (*Tadarida brasiliensis*), and California Myotis (*Myotis californicus*). Lastly, this effort demonstrates the tremendous energy that more than 1,000 volunteers can bring to a wildlife conservation program as community scientists contributing more than 5,000 hours of supervised service annually.

Poster Session

BLACK SKIMMER (*RYNCHOPS NIGER*) BREEDING SUCCESS IN THE EAST BAY REGIONAL PARK DISTRICT, CALIFORNIA

David L Riensche; driensche@ebparks.org; Meredith L. Elliott

The Black Skimmer (*Rynchops niger*), one of our most distinctive colonial waterbirds, is listed as a California Species of Special Concern. Factors affecting their breeding population include limited suitable open nesting habitat, human disturbance, varied food availability, predation (feral animals and gulls), extreme weather, and environment pollutants. It is projected that by the year 2050, due to climate change, this coastal bird will have its habitat reduced by 50%. Typically, islet-breeding skimmers are in close

proximately to nesting tern species which provide early warning and defensive behaviors against intruders. Since 2001, the East Bay Regional Park District has been working to establish and enhance a California Least Tern (*Sterna antillarum browni*) colony at Hayward Regional Shoreline located along the eastern shore of the San Francisco Bay. These efforts are to assist in the recovery of this State and Federally listed endangered species and resulted in the attraction of breeding Black Skimmers to the site in 2015. For a total of eight breeding seasons (2015 to 2024), the Black Skimmer, California Least Tern, the threatened Western Snowy Plover (*Anarhynchus nivosus nivosus*) have nested successfully, in association with American Avocet (*Recurvirostra americana*) and Black-necked Stilt (*Himantopus mexicanus*). The results presented on Black Skimmer breeding chronology, hatching and fledging success, and diet in the northern portion of the species range answers data gaps that may help inform future research, protection, and management measures for this special status bird species.

Poster Session

THE IMPORTANCE OF OYSTER SHELLS IN THE BREEDING SUCCESS OF THE WESTERN SNOWY PLOVER

David Riensche; driensche@ebparks.org; Meredith L. Elliott

The Pacific Coast population of the Western Snowy Plover (*Anarhynchus nivosus nivosus*) is a federally Threatened species and is a California Species of Special Concern. Knowledge about their nest site selection requirements is important to this species' management in the San Francisco Bay area. We measured the percentage of sand, percentage of crushed oyster shells, number of shells, and total shell surface area for 56 nests of Western Snowy Plover at the California Least Tern colony at Hayward, California, over a 14-year period (2008-2021). Using pairwise t-tests, we compared these measurements to those obtained from 56 randomly chosen non-nest sites. Results indicate that plovers select nest sites with greater oyster shell metrics than paired random sites. The contrast in the shell-related nest metrics (i.e., the difference between the nest site and the paired site) showed significant, positive relationships with both hatching success and number of fledglings using linear regression analysis. These results, supporting federal species recovery, suggest that the Western Snowy Plover may improve their nesting success through oyster shell enhancement, which may provide more camouflage for the eggs and chicks than locations with fewer shells.

Natural History of Birds I
Wednesday 1:05 PM

CALIFORNIA BLACK RAIL (*LATERALLUS JAMAICENSIS COTURNICULUS*) RESPONSE TO MARSH RESTORATION AT BAY POINT REGIONAL SHORELINE, CALIFORNIA.

David L Riensche; East Bay Regional Park District ; driensche@ebparks.org; Chris Barton, Karla Jean Meyers

The Bay Point Restoration and Public Access Project was initiated with goals of restoring ecological habitat, providing public access and long-term climate resiliency at a former sand dredge processing site in the waterfront community of Bay Point along the southern shoreline of Suisun Bay, in northern Contra Costa County, California. The project hydrologically reconnected the site to adjacent tidal emergent marsh and restored transitional and upland habitat. Public access improvements included a 1-mile loop trail, kayak launch, parking, restroom, and other visitor amenities. Providing public access was a primary project focus because the Bay Point community represents one of the most underserved areas in the region, with residents experiencing social and financial hardships with scarce access to outdoor recreation and interpretive opportunities. A key finding of the project is that restored habitat in close proximity to public access can be compatible land uses as evidenced by California black rail (*Laterallus jamaicensis*

coturniculus) occupying the restored area shortly after construction. The California Back Rail is listed as a California threatened species. Bay Point Regional Shoreline provides habitat for several special status species including the salt marsh harvest mouse, white-tailed kite, northern harrier, salt marsh common yellowthroat, and Suisun song sparrow. Analysis of systematically obtained call count data, collected during the breeding seasons of 2020 to the present is showing a positive trend of increasing California black rail occupancy in the restoration area. Field research is showing that the California black rail population is now three times higher in this recently restored wetland, which may aid recovery efforts elsewhere designed to enhance breeding habitat for this threatened species and provide public access.

Restoring/Monitoring Wildlife Populations and Habitats III
Thursday 8:25 AM

VALIDATING IBUTTONS FOR CHARACTERIZING SUMMER NIGHTTIME MICROHABITAT USE IN DESERT TORTOISES ACROSS LIFE STAGES

Katelyn N Rock; San Diego Zoo Wildlife Alliance; karock@sdzwa.org; Thomas A. Radzio, Talisin T. Hammond, Ronald R. Swaisgood, Melissa J. Merrick

Faced with climatic extremes, desert species may be at increased risk of depleting water and energy reserves in summer, thus, understanding their thermal ecology and microhabitat use is more crucial than ever to predict responses to climate change. Like many species, desert tortoises (*Gopherus agassizii*) use burrows as refugia from high daytime surface temperatures to avoid overheating and conserve energy and water. However, during summer, nighttime temperatures are lower at the surface than in burrows. Tortoises sometimes overnight at the surface during summer, raising the question of whether night surface use will increase under climate warming, a strategy that could buffer energy reserves but also increase predation risk. Cameras can address this question, but they are limited by tortoise movements among burrows and do not provide temperature information. In August 2023 and 2024, we observed juvenile and adult tortoise activity in the wild using time-lapse cameras and simultaneously recorded tortoise and environmental temperatures using temperature loggers (iButtons) affixed to tortoises and positioned in burrow and surface microhabitats. We will use camera observations to assess whether tortoise and environmental temperature data can be used to accurately predict nighttime microhabitat use in response to climate change across life stages.

Poster Session

TRIAL BY FIRE: ASSESSING SPACE USE OF BURNED LANDSCAPES BY PACIFIC MARTEN.

Alyssa M Roddy; NCASI, Inc. and Department of Wildlife, Cal Poly Humboldt; alyssaroddy@gmail.com; Jessica K. Buskirk, Christopher J. Collier, Matthew Delheimer, Deirdre Replinger, Micaela S. Gunther, Ho Yi Wan, Katie M. Moriarty

Large, high-severity fire frequency has drastically increased in recent decades in dry conifer forests of the western United States, yet species' responses to fire are poorly understood, particularly for marten. To address this paucity, we assessed post-fire space use by Pacific marten (*Martes caurina*), a forest-obligate carnivore, in California (Dixie Fire; 2021) and Oregon (Flat Fire; 2023). Using GPS collar data collected in 2024, we calculated marten use-areas (size, burn severity composition) and examined marten use of burns (Manly-Chesson index; $\alpha>1$ = selection, $\alpha<1$ = avoidance). Male and female marten use-areas were 5.25±1.81 (average±SD; n=10) and 4.19 km2 (n=1), respectively. Unburned forest comprised the highest proportion of use-areas (58±29%) with variation across severities (low = 14±7%, moderate-low = 9±7%, moderate-high = 9±9%, high = 11±9%). Marten exhibited weak selection of unburned forest (α = 1.24±0.30) and avoidance of high severity burn patches (α = 0.29±0.37). Our data suggest marten are

using a full gradient of burn severities; this is unexpected given that large, high-severity fires typically degrade forest structure features important to marten. Future studies examining whether martens are capable of long-term persistence in post-fire landscapes will be valuable for developing informed forest management practices and species conservation strategies.

Natural History of Carnivores II
Thursday 8:05 AM

EFFECTS OF VEGETATION ON THE BEHAVIOR OF HUNTING BARN OWLS (*TYTO FURCATA*) AND THEIR PREY

Jadzia M Rodriguez; Cal Poly Humboldt; jmr303@humboldt.edu; Matthew D. Johnson

Changes in habitat and vegetation in space and time can strongly affect the behavior of both prey and their predators, thus shaping the outcomes of predator-prey interactions. In managed agroecosystems, these changes could mediate the capacity for natural enemies to reduce economically damaging pests. Farmers in Napa Valley, CA install nest boxes to attract American barn owls (*Tyto furcata*) to their winegrape vineyards for rodent pest control. However, vineyards exhibit marked spatial and temporal variation in habitat structure due to viticultural practices (i.e., mowing cover crops, trellis systems, and pruning). How the owls respond to this habitat heterogeneity remains unresolved. During the spring and summer of 2024, we deployed GPS tags fitted with accelerometers on adult breeding barn owls in Napa Valley to track their hunting behavior. These data will be used in integrated step-selection function and resource selection function analyses to reveal how changes in vegetation structure affect hunting strike location distributions. By leveraging improved GPS tracking technology, a heterogeneous landscape, and predictable and abrupt changes in vegetation caused by viticultural practices, this research will investigate questions fundamental to understanding predator-prey interactions while also shedding light on how owls contribute to rodent pest management in this agricultural ecosystem.

Wildlife and Agriculture I
Wednesday 1:25 PM

Student Paper

COMPARING PEDIGREE-BASED AND GENOMIC MEASURES OF INBREEDING IN AN ISOLATED URBAN MOUNTAIN LION POPULATION

Cassandra R Rodriguez; University of California, Davis; casrodrig@ucdavis.edu; Sophie Preckler-Quisquater, Stevi Vanderzwan, Jeff Sikich, Seth P.D. Riley, Benjamin Sacks

Urban developments and highways can isolate wildlife populations, subsequently decreasing their numbers and increasing matings between close relatives, which reduces genetic diversity. Low diversity can lead to genetic disorders and lower fitness, known as inbreeding depression. The mountain lion population in California's Santa Monica Mountains (SMM) is isolated, increasing their risk of inbreeding and inbreeding depression. Inbreeding is traditionally measured with pedigree-based methods, which can underestimate inbreeding when founders are themselves partially inbred. To address this limitation, we conducted a genomic study to assess inbreeding directly based on runs of homozygosity (ROH) in >100 individual mountain lions collected 2002–2024 from the SMM and adjacent areas. We used genotyping-by-sequencing to estimate inbreeding from both pedigrees and ROH. Our analysis revealed that ROH consistently provided higher estimates of inbreeding compared to pedigree-based methods. This study has implications for the conservation of this vulnerable population, already showing physical signs of potential inbreeding depression, similar to the Florida Panthers. The results are crucial for mountain lion conservation, particularly in light of the Wallis Annenberg Wildlife Crossing, and data generated establishes a baseline for assessing this population's future genetic health and fitness. This information is vital for understanding factors contributing to effective conservation planning.

Genetics in Wildlife Investigations
Thursday 9:05 AM

Student Paper

SOARING THE SKIES: WHERE DO REINTRODUCED CALIFORNIA CONDORS SPEND THEIR TIME?

Jose J Rodriguez Gutierrez ; Cal Poly Humboldt; jjr74@humboldt.edu; Logan Hysen PhD student in Michigan State University, Danial Neyeri PhD student in Texas A&M, Ho-Yi Wan Professor at Cal Poly Humboldt, Tiana Williams-Claussen, Wildlife Director, Yurok Tribe

With over 150,000 globally endangered species, conservation can feel daunting. However, efforts like wildlife reintroductions and captive breeding have shown success. The California condor, for example, has grown from 22 individuals to over 300 wild birds across the western U.S. and Baja, Mexico. This study examines how wild condor populations utilize space and how their home ranges vary annually and geographically. Using GPS tracking data, we analyzed home range patterns of condors released in southern and central California over a four-year period through Kernel Density Estimates (KDEs) and Minimum Convex Polygons (MCPs). Results show that while both flocks exhibit high site fidelity and varying annual home ranges, southern California condors maintain significantly larger home ranges, and central California condors spend more time near coastal regions than their southern counterparts. These findings raise important questions about why condors choose certain areas and how environmental factors influence their movements. By embracing curiosity and asking deeper questions about these patterns, we can better understand their behavior and be where the action is—guiding future conservation efforts more effectively.

Poster Session

EFFECTS OF WILDFIRE ON AMERICAN BLACK BEAR (*URSUS AMERICANUS*) POPULATIONS IN LASSEN VOLCANIC NATIONAL PARK

Daniel C. Ruka; UC Davis, National Park Service; dcruka@ucdavis.edu; Roger A. Baldwin

The increasing frequency and intensity of megafires, driven by global climate change, pose significant challenges to wildlife populations and their habitats. In this study, we aim to assess the impact of the 2021 Dixie Fire, one of California's largest wildfires, on the American black bear (*Ursus americanus*) population within Lassen Volcanic National Park (LVNP). Using remote-triggered cameras and hair snaring techniques across 33 sampling locations, we will evaluate changes in population size, occupancy, and habitat use with data collected before and after the fire. By employing spatially explicit capture-recapture models and occupancy modeling, we will generate detailed insights into how the black bear population has responded to the wildfire disturbance. Our research will advance the scientific understanding of megafire impacts on large omnivorous mammals, providing essential information for conservation management. The findings will inform adaptive strategies for wildlife managers and stakeholders, aiding efforts to mitigate the effects of escalating fire regimes on black bear populations. This research will not only enhance scientific knowledge but also raise awareness of the growing risks and occasional benefits wildfires pose to large mammalian species in fire-prone ecosystems.

Poster Session ***Student Paper***

HABITAT USE & PARTITIONING BY *RANA BOYLII* & *TARICHA RIVULARIS* IN THEIR AQUATIC LIFE STAGES

Beth L Sabo; Sonoma State University; biologistbeth@gmail.com; Dave Cook, Dan Crocker, PhD, Derek Girman, PhD

How do amphibians share stream habitat in their aquatic life stages? The answer is: we have a lot to learn! This study investigates two obligate stream-breeding amphibians whose ranges, breeding seasons, and habitat overlap spatially and temporally in first order streams. We 1) collected data on the aquatic life stages of *R. boylii* and *T. rivularis*, 2) applied the existing body of knowledge about *R. boylii* that is currently based in riverine and higher order stream systems to small first order streams, and 3) compared and contrasted it with habitat use between these two species. We collected data at the meso-, sub-, and microhabitat scale, including canopy closure and fish presence, and looked at spatial distribution throughout aquatic life stages. Key findings highlight the value of runs at the mesohabitat level, low gradient riffles and pocket water runs at the subhabitat level, and patterns in substrate type, water flow rate, and canopy cover among species and life stage. We also identify a novel subhabitat designation that is highly influential to larval life stages: protected side channel pools. Based on these results, we offer specific management recommendations that can support egg and larval development for *R. boylii* and *T. rivularis*.

Natural History of Amphibians
Friday 10:05 AM

RESTORATION MONITORING - CHALLENGES AND OPPORTUNITIES

Allison J Salas; California Department of Fish and Wildlife; allison.salas@wildlife.ca.gov; Ryan Peek, Lindsey Rich

Monitoring is critical for assessing the effectiveness of restoration projects aimed at restoring ecosystems and biodiversity but is rarely done. This is likely because of a multitude of challenges that can hinder its success. One major challenge is the complexity and variability of ecosystems. Natural systems are dynamic, making it difficult to establish baseline conditions and track long-term changes effectively. A second challenge is the lack of standardized, quantitative field methods, which complicates data collection, comparison and synthesis. Another challenge is the time lag between restoration efforts and observable ecological outcomes. Many ecosystem processes occur over extended periods, making it challenging to measure short-term success or failure. Yet another challenge is that restoration projects often lack adequate funding for sustained, long-term monitoring, which is necessary to capture these delayed effects. Opportunities exist to combat these challenges, however, and promote consistent, effective, and efficient restoration monitoring. These opportunities include the development of core monitoring protocols, tiered monitoring approaches, utilization of remote sensing and community science, creating a centralized data platform, and collaborating across agencies and organizations to learn from one another. Addressing these challenges is essential for enhancing the success of habitat restoration initiatives.

Poster Session

RESTORING FORESTS AND BIODIVERSITY: KARUK TRIBE COMBINES TRADITIONAL ECOLOGICAL KNOWLEDGE AND MODERN SCIENCE TO REVITALIZE ECOSYSTEMS AND PROTECT THEIR CULTURE

Emilio Tripp; Karuk Tribe; etripp@karuk.us; Karuk Wildlife Team, **Daniel Sarna**

This presentation explores the Karuk Tribe's efforts to restore forest habitats degraded by logging and the absence of traditional fire, through the integration of Traditional Ecological Knowledge (TEK) and modern wildlife monitoring techniques. Using Acoustic Recording Units (ARUs), game cameras, GPS collar data for ungulates, and GPS loggers for turtles, our team is building a biodiversity monitoring

system to guide restoration. These efforts aim to address the loss of biodiversity and the overgrown, homogenized forests left by past disturbances. The Karuk people have lived in harmony with this landscape since time immemorial, guided by a deep physical, emotional, and spiritual connection to their homelands. This enduring relationship, passed through generations, enables the Tribe to restore the land to its natural balance. By combining TEK with modern tools, we are filling knowledge gaps and creating sustainable restoration strategies that reflect Indigenous wisdom. Yootva (thank you) for considering this work. We are eager to share how the integration of Karuk TEK with modern wildlife science supports biodiversity conservation and the healing of Karuk Ancestral Lands.

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 4:00 PM

SPATIAL DYNAMICS OF SAN CLEMENTE ISLAND FOX ADULT FEMALES AND PUPS

Destiny M Saucedo; Cal Poly Humboldt & Institute for Wildlife Studies; destinymsaucedo@gmail.com; David Garcelon, Micaela Szykman Gunther

The Island fox (*Urocyon littoralis*), native to six of the eight California Channel Islands, has been a focal point of conservation efforts since their population decline during the 1990s. However, limited information exists on the spatial ecology of adult females during reproduction and the movement and survival of pups in their first year. This study attempts to fill these gaps by investigating home range sizes of adult female San Clemente Island foxes (*Urocyon littoralis clementae*) during different stages of reproduction, while also examining the survival and dispersal patterns of their pups. Additionally, the spatial and behavioral patterns of the foxes will be explored in relation to the island's two dominant habitats: grassland and maritime desert scrub. GPS collars were deployed on 12 adult females to estimate home range sizes before, during, and after denning, offering insights into how reproductive activities influence movement. Eighteen pups were fitted with VHF collars and data collection was supported by solar-powered digital signal repeaters (digipeaters) distributed across the island. The findings from this research will provide insights into the spatial ecology of both adult females and pups, contributing valuable information to guide future conservation and management strategies for this species of conservation concern.

Poster Session ***Student Paper***

HARBOR SEAL HAULOUT BEHAVIOR IN AND NEAR MORRO BAY

Claire Q Savage; Cal Poly San Luis Obispo; csavage_@hotmail.com; Heather Liwanag

Harbor seals (*Phoca vitulina*) are coastal marine mammals that haul out close to areas of human activity, but they are notoriously reactive to human disturbance. There is currently no monitoring program documenting the occurrence of harbor seals along the central coast of California. Plans for a windfarm offshore of Morro Bay are likely to increase ship traffic and other human activity in the Morro Bay area. The goal of this project was to document the location and timing of harbor seal haulout behavior in Morro Bay and surrounding areas, to establish a baseline of haulout behavior prior to windfarm construction. To do this, we conducted regular ground surveys using binoculars at Estero Bluffs, Morro Bay, and Los Osos, documenting harbor seal abundance through a half tide cycle. We related harbor seal haulout behavior to abiotic factors like tide level and direction, air temperature, and wind. Preliminary results indicate that that these factors significantly affect harbor seal abundance, but in different ways at different sites. Going forward, we will conduct standardized surveys throughout the year to generate baseline data that will ultimately help us understand the impacts on increased anthropogenic activity associated with the offshore windfarm on our local harbor seals.

Poster Session ***Student Paper***

WHERE TO BEGIN? APPROACHING A LARGE SCALE WILDLIFE INVENTORY ACROSS ONE OF THE LARGEST PRIVATE RANCHES IN CALIFORNIA

Rob Schell; WRA, Inc.; schell@wra-ca.com;

There are few pieces of land left in the west that remain unknown. Fewer still that exist entirely in private ownership, span 85 square miles across four counties, and that are located less than 50 miles from San Francisco. The magnitude of time and labor required to canvas 50,000 acres of wilderness using traditional survey methods can be daunting. Using relatively simple GIS tools, landscape modeling, eDNA metabarcoding, and finally traditional survey methods as a validation tool, WRA was able to quickly and economically build a landscape level picture of targeted species distribution across a vast and rugged property. This talk will focus on the approach, methods, and findings of one of the most extensive validated eDNA case studies that occurred at what stands to be a conservation stronghold in an increasingly urbanized region.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 1:05 PM

PREDATOR-PREY RELATIONSHIPS AMONG TOP PREDATORS IN CALIFORNIA VERNAL POOLS: DYNAMICS OF CALIFORNIA TIGER SALAMANDERS (*AMBYSTOMA CALIFORNIENSE*) AND PREDACEOUS DIVING BEETLE LARVAE (FAMILY *DYTISCIDAE*)

Jesse H Schmieg; Sonoma State University; schmiegj@sonoma.edu; Dave Cook, Derek Girman

In California vernal pools, both California Tiger Salamanders (*Ambystoma californiense*) and predaceous diving beetle larvae (family *Dytiscidae*) serve as top predators, playing key roles in shaping aquatic ecosystems. Through mesocosm experiments, we aim to investigate whether salamander larvae face higher mortality in the presence of predaceous diving beetle larvae, the predation rates between them, and how size disparities between these two predators may affect these interactions. Additionally, we seek to deepen our understanding of trophic dynamics in these ecosystems. As vernal pools continue to decline due to habitat loss and degradation, understanding these predator-prey interactions is essential for informing conservation efforts and managing the cascading effects of species interactions.

Natural History of Amphibians
Friday 8:45 AM

Student Paper

MAPPING RINGTAIL (*BASSARISCUS ASTUTUS*) DISTRIBUTION AND DEVELOPMENT OF GENETIC MARKERS: TOOLS TO AID FUTURE MONITORING AND MANAGEMENT.

Kristyn Schulte; kristyn.schulte@gmail.com;

Ringtails (*Bassariscus astutus*) are hypothesized to be in a long-term population decline. Mitigating this hypothesized decline has been infeasible to date given the deficiency of data on ringtails. To update critically needed information, we are compiling existing observation and community science data while deploying trail cameras, to develop an updated map of ringtail distribution in California. Additionally, there is limited genetic research available and no markers suitable for low-quality sample types typical with non-invasive methods. We aim to fill this knowledge gap by developing genomic markers, a vital first for this species.

Natural History of Carnivores I
Wednesday 3:40 PM

WHAT HAS GENETICS TAUGHT US ABOUT FISHERS, MARTEN AND WOLVERINES?: A 20 YEAR UPDATE

Michael K Schwartz; National Genomics Center for Wildlife and Fish Conservation; michael.k.schwartz@usda.gov; Kristine Pilgrim, Jody Tucker

Genetics in Wildlife Investigations
Thursday 8:45 AM

SPOTTING THE DIFFERENCE: A COMPARATIVE STUDY OF *ANEIDES* SPOTTING AND CANOPY COVER

Meg F Scudder; University of California, Berkeley, MVZ (McGuire lab); megfds@berkeley.edu; Isaac Krone

The objective of our study was to “spot” a potential correlation between canopy cover and yellow-spotted coloration in *Aneides lugubris*. We hypothesized that increased local canopy color decreases the size of salamanders’ spots, informed by other forest specialist *Aneides*, such as *Aneides niger*, which exhibits uniform, dark coloration. We tested this using community science data from iNaturalist, focusing on 3,495 observations of *Aneides lugubris* across 30 California counties up to May 22, 2023. Adult individuals were classified into "large spotted" or "small spotted" categories based on visible coloration, and a logistic regression was performed to analyze spot size against mean canopy cover as measured within 30, 100, and 100 meters from the salamander, using the GLAD 2010 dataset from Global Forest Watch. Logistic regression reveals a slight but statistically significant relationship between “smaller” spotting in observations and increased canopy cover ($SE = 0.002$, $z = -5.08$, $p < 0.001$), This suggests that canopy cover exerts a small yet significant influence on the species' spotting patterns. We also find a statistically significant relationship between higher latitudes and smaller spots, and demonstrate that canopy cover is still an important determinant of spotting patterns despite a strong latitudinal gradient in tree cover.

Poster Session

WHOLE GENOME OF THE CRITICALLY ENDANGERED GALAPAGOS PETREL (*PTERODROMA PHAEOPYGIA*) AND IMPLICATIONS FOR CONSERVATION

Isabella Sessi; San Francisco State University Department of Biology; isessi@sfsu.edu; Jack Dumbacher, Jaime Chaves

The Galapagos petrel (*Pterodroma phaeopygia*), a critically endangered seabird endemic to the Galapagos Islands, faces threats from invasive species and habitat destruction. Genomic information is vital in managing endangered species, but it is most beneficial if based on high-quality reference genomes. This study aims to generate the first whole-genome sequence and assembly of P. phaeopygia using Oxford Nanopore Ultra-Long Reads sequenced on a PromethION 2 Solo. A library was prepared using a sample collected from an adult male individual on San Cristobal Island in July of 2024. Sequencing produced 1.8 million reads comprising 22.63 gigabases, an estimated 18x coverage, and a minimum contig length required to cover 50 percent of the assembled genome sequence (N50) of 21,412 bases. The reference genome generated in this study will not only support future population genomic studies, but also provide

critical data for the conservation and management of the Galapagos petrel, thereby contributing to efforts to preserve this vulnerable species.

Poster Session ***Student Paper***

IMPROVING PLANTING DESIGN AND WEED MANAGEMENT OF RESTORED BEE AND BUTTERFLY HABITAT IN CENTRAL VALLEY AGRICULTURAL LANDSCAPES

Corey S. Shake; Point Blue Conservation Science; cshake@pointblue.org; Sophie J. Noda

Native butterfly and bee fauna in California's Central Valley have experienced significant declines in the last few decades. Farmers, non-profits, and local, state, and federal agencies in the region are partnering to address habitat losses for these insects by restoring native plants to crop field margins and waterways. We used our 6-year dataset of bee and butterfly counts at 18 habitat restoration sites in farmland in the Sacramento Valley to examine how planting design and plant species composition relate to native bee and butterfly abundance and butterfly community composition. As expected, native bees were more abundant in planting designs that resulted in higher floral density. Native bees exhibited evidence of preference for some native and some introduced plant species and these preferences varied by season. Though full analysis is pending, it appears that butterfly species' richness and abundance was more tied to landscape-scale factors and presence of host plants than to richness of blooming or non-blooming plants. Our findings underscore the need to use planting designs that increase the density and seasonal abundance of floral resources, to widen the variety of butterfly host plants used, and to thoughtfully manage introduced species in these restoration efforts.

Natural History of Invertebrates
Friday 10:05 AM

BLUNT-NOSED LEOPARD LIZARDS (*GAMBELIA SILA*) HAVE THE CAPACITY FOR GREATER SEASONAL ACTIVITY THAN COMMONLY ASSUMED.

Steven A Sharp; Fresno Chaffee Zoo/California State University-Fresno; ssharp@fresnochaffeezoo.org; Mark Halvorsen, Emily Bergman, Steve Hromada, Lynn Myers, Michael Westphal, Rory Telemeco

Blunt-nosed Leopard Lizards (*Gambelia sila*) are federal- and state-listed endangered species endemic to California's San Joaquin Desert. One adaptation for living in harsh desert habitats is an abbreviated active season in spring and early summer. However, their capacity for activity in the "off season" during late summer and winter is not well understood. Understanding the seasonality and timing of emergence from winter torpor of this endangered species is critical for in situ monitoring. The *G.sila* assurance colony housed at Fresno Chaffee Zoo's Conservation Action Center(FCZ/CAC) provides a unique opportunity for understanding activity patterns, especially during periods when activity is less frequent. At FCZ/CAC, *G. sila* are maintained under naturalistic seasonal cycles designed to mimic natural changes in temperature, photo period, and humidity levels, but conditions never become as harsh as possible in the wild. Under these idealized conditions, *G. sila* are active both earlier and later in the year than typically understood, from mid-February until early October. Monitoring *G.sila* under naturalistic captive conditions can help us make better-informed decisions about when to monitor or plan anthropogenic activities around natural populations of *G. sila*.

Natural History of Lizards ***Student Paper***
Wednesday 1:45 PM

PLANNING WILDLIFE CROSSINGS AT THE STATE SCALE USING SPATIALLY EXPLICIT DECISION SUPPORT

Fraser Shilling; Dudek; fshilling@dudek.com;

Wildlife crossing structures (WCS) are proposed as the primary way to improve wildlife connectivity across transportation. Barrier fencing is used independently to reduce wildlife-vehicle collisions (WVC). WCS effectiveness depends on understanding the interacting influences of wildlife and human activity. There are no published, science-based, and objective methods for decision-support for WCS siting at US state extents. To inform WCS planning on 8 highways throughout CA, supported by ~$28 million from the Wildlife Conservation Board, locations were identified: 1) where new over OR under-crossings are ecologically needed and feasible to construct, and 2) where existing structures provide connectivity. The following spatial datasets were used: 1) available wildlife occurrences and movement, 2) WVC, 3) habitat suitability models, 4) topography, 5) human disturbance and development, 6) ownership, and 7) infrastructure data. I developed a logic-based model in GIS to associate the disparate data types in a decision-support framework. The result was identification of places along each highway of types of actions critical to reduce wildlife-vehicle conflict and improve connectivity. For each highway, one to three locations are being or have been evaluated by engineers and plans developed for construction of 13 WCS and fence alignments, with an eventual cost of over $200 million.

Transportation Projects and Wildlife Interactions I
Wednesday 1:05 PM

COMBATING A FUNGAL DISEASE IN MOUNTAIN YELLOW-LEGGED FROGS THROUGH IN AND EX SITU STRATEGIES

Spencer Siddons; San Diego Zoo Wildlife Alliance; spencer.siddons@gmail.com;

Disease can pose a severe threat to the persistence of threatened and declining wildlife. In recent decades, the pathogenic amphibian chytrid fungus, *Batrachochytrium dendrobatidis* (Bd), has contributed to global amphibian declines and extinctions, and innovative mitigation strategies have been required to combat this pathogen. Here, I will discuss efforts to mitigate the impacts of Bd on the federally and state-listed endangered mountain yellow-legged frog, *Rana muscosa*, in southern California. We have tested both in situ anti-fungal treatments and ex situ immune priming as management strategies for this species. Our approach is ecologically and evolutionarily informed: by using Bd isolated from the release site and treating frogs with site-specific probiotics after clearing their Bd infections, we aim to test whether carefully tailored pre-release treatments can enhance post-release outcomes. Although these Bd mitigation methods are at their infancy, our investigations shed light on Bd dynamics and mitigation strategies in this region and may provide solutions to other threatened amphibian species battling Bd.

Wildlife Pathogens
Thursday 11:40 AM

REPORTING ON LARGE-SCALE STUDIES FOR MOHAVE GROUND SQUIRREL (*XEROSPERMOPHILUS MOHAVENSIS*)

Kathryn Simon; MGSCC; kathy.simon@mgsconservation.org; Todd Esque, USGS, Sean Murphy, USGS, Felcia Chen, USGS, Steve Ishii, VMSI, Jordan Swart, USGS, Sarah Doyle, USGS

A group of dedicated MGS scientists formed a new non-profit in 2023 with the mission of ensuring the continued survival of the state threatened Mohave ground squirrel. With two grants (CDFW Watershed Branch and WCB) in hand, a collaboration of federal, state and local parners was formed and a large scale

project for long-term monitoring of the species was underway in 2024. We are here to report on progress on our first year of innovative field studies anmd our innovative collaboration, the key to our sucess.

Natural History of Small Mammals
Friday 8:25 AM

PLUMAGE COLORATION AND BODY CONDITION AS SIGNALS OF MHC CLASS I DIVERSITY AND GENOTYPE IN MALE HOUSE FINCHES (*HAEMORHOUS MEXICANUS*)

Alexandria R Singh; California State University, Fresno; Alexandria2000@mail.fresnostate.edu; Joel Slade, Daniel Baldassarre

Pathogens shape the evolution of host immune systems and one gene family that experiences pathogen-mediated selection is the major histocompatibility complex (MHC), which encodes cell-surface receptors that present pathogen-derived antigens to T cells. The heterozygote advantage predicts that animals should select mates that are dissimilar or diverse in MHC genotype to maximize their offspring's MHC diversity, which may confer greater immunocompetence. Parasite-mediated sexual selection further suggests that MHC genetic quality should be signaled by sexually selected traits. Female house finches (*Haemorhous mexicanus*) prefer males with redder plumage, which requires dietary carotenoids for pigmentation that are also used for general health (e.g., body condition and immunity). I hypothesized that redder plumage and better body condition would signal MHC class I genetic quality and predicted that plumage traits and body condition would correlate with MHC I diversity and genotype. I found that amino acid and supertype allelic diversity at MHC I did not explain plumage color or body condition, however, pairwise distance at MHC I between males correlated with pairwise distance in plumage saturation, suggesting a relationship between MHC I genotype and plumage color. This study will add to the growing field of honest signals of immunogenetic quality in ornamented birds.

Poster Session

***SALMONELLA* IN THE CITY: CONSTITUTIVE AND GENETIC INNATE IMMUNITY AGAINST A HARMFUL PATHOGEN IN CARDUELINE FINCHES**

Lindsey G Biehler; California State University, Fresno; lindbiehler@mail.fresnostate.edu ; Tricia A. Van Laar, **Joel WG Slade**

Historically, pine siskins are highly susceptible to *Salmonella* infections, yet few studies explore their immune response against this pathogen. We looked at pine siskins, lesser goldfinches, American goldfinches, and house finches—following a significant outbreak of avian *Salmonella enterica* serovar Typhimurium in 2020-21. The research focused on two key hypotheses: that these finch species vary in their innate immune function, measured through bacterial killing assays (BKA), and in their genetic diversity at the Toll-like receptor 4 (TLR4) gene, which plays a crucial role in the immune response against *Salmonella*. We expected pine siskins to have the weakest immune defense and the lowest genetic diversity at TLR4, given their historical vulnerability to *Salmonella*. Surprisingly, our results showed significant variation in immune responses, with pine siskins having the highest genetic diversity at TLR4, while house finches, typically more resilient to *Salmonella*, had the lowest TLR4 variation. Additionally, the three *Spinus* species (goldfinches and pine siskins) had lower bactericidal ability compared to house finches. These findings provide new insights into the immune dynamics of wild songbirds, particularly why some species are more susceptible to *Salmonella* infections, and offer valuable data for conservation efforts aimed at protecting vulnerable bird populations from bacterial diseases.

Wildlife Pathogens
Thursday 10:40 AM

IMPROVING METHODS IN ENVIRONMENTAL REVIEW PART 1: HABITAT ASSESSMENT OF WILDLIFE SPECIES WITH POTENTIAL TO OCCUR ON A PROJECT SITE

Shawn Smallwood; puma@dcn.org; Noriko Smallwood, **Noriko L Smallwood**

For an environmental review to predict project impacts to wildlife, the wildlife community must be accurately characterized as part of the environment. Ideally, field surveys would inventory the wildlife community, but inventory requires many surveys using multiple methods at great time and cost. Habitat assessments are performed in reconnaissance surveys and desktop reviews to determine likelihood of occurrence of species on a project site, but they vary greatly in assumptions, methods, and accuracy. We propose standards for habitat assessment, starting with a standard definition of habitat, and the assumption that habitat is present until proven otherwise. Multiple reconnaissance surveys should be conducted at various times of day (and night) across seasons. All occurrence databases should be reviewed; however, absence of occurrence records is not evidence of species' absence. When comparing habitat associations to vegetation cover on site, refrain from pigeon-holing species into unrealistically narrow portions of the environment. Most wildlife are mobile and use more of the environment than often expected, and both the delineation of vegetation cover and the summary of habitat associations are prone to error and bias. While focus is usually on special-status species, all species compose the wildlife community, which needs accurate characterization to predict impacts.

Lessons Learned in Wildlife Management
Thursday 8:25 AM

IMPROVING METHODS IN ENVIRONMENTAL REVIEW PART 2: RECONNAISSANCE SURVEYS FOR CHARACTERIZING THE WILDLIFE COMMUNITY

Shawn Smallwood; puma@dcn.org; Noriko Smallwood

For an environmental review to predict project impacts to wildlife, the wildlife community must be accurately characterized as part of the existing environmental setting. Biologists seek to accomplish this by reviewing occurrence records and with various types of survey – the most common being reconnaissance survey. However, reconnaissance survey objectives vary, as do methods, interpretation of results, and reporting. We propose a protocol for performing wildlife reconnaissance surveys to maintain flexibility in survey conduct while standardizing specific field and reporting methods to enable the establishment of benchmarks against which to compare and interpret survey findings, and to determine whether the wildlife community has been sufficiently sampled in support of an accurate characterization. We propose that each new species detection be recorded with time into the survey, and that the number of species detected be modeled as a function of time into the survey. The model can predict the number of species theoretically available to be detected during the survey, and it can predict the number of species detected at standardized survey durations. We offer recommendations on objectives, how many surveys to perform, survey duration, times of day to survey, personnel, field techniques, documentation of detections, minimum reporting levels, and interpretation of results.

Lessons Learned in Wildlife Management
Thursday 8:45 AM

WHITE-NOSE SYNDROME COULD SOON AFFECT CALIFORNIA&RSQUO;S HIBERNATING BATS

Katrina Smith; California Department of Fish and Wildlife; katrina.smith@wildlife.ca.gov; Deana Clifford, Amelia Tauber, Dylan Winkler

In 2024, the fungus that causes white-nose syndrome in bats was detected in several counties across California, although bats with visible signs of the disease have yet to be observed in the state. White-nose syndrome has killed millions of bats since it was first detected in New York in 2006. Hibernating bats like little brown myotis, Yuma myotis, and cave myotis are especially vulnerable to the disease. White-nose syndrome develops when the fungus *Pseudogymnoascus destructans* invades bat skin cells, damaging delicate wing tissue. Bats with white-nose syndrome end hibernation early when water and insect prey resources are scarce, which often results in dehydration and depletion of fat reserves. As a result, infected bats often perish. In 2023, the California Department of Fish and Wildlife first confirmed presence of the fungus in a bat roost in Humboldt County. In 2024, the fungus was also confirmed present in Sutter, Placer, Amador, and Inyo counties. Inconclusive laboratory results suggest the fungus may also be present in several other counties. Presence of the fungal pathogen suggests the disease could manifest in California's hibernating bats within the next few years. Sustained efforts to monitor bat populations will be critical to understanding and managing this devastating disease.

Natural History of Bats
Friday 8:05 AM

MONITORING CLIMATE CHANGE AND BIODIVERSITY THROUGH THE CALIFORNIA SENTINEL SITE NETWORK

Phillip Smith; California Department of Fish and Wildlife; Phillip.Smith@wildlife.ca.gov; Shannon Sinkovich, Nicole Cornelius, Jim Stilley, Whitney Albright, Levi Souza, Dena Spatz, Michelle Selmon

Long term monitoring is crucial for understanding patterns of change in ecosystems at local, regional and state wide scales. Understanding the effects of climate change at multiple spatial, temporal, and taxonomic scales can support adaptive land management decisions and inform long term goals and strategies for conserving California's biodiversity. The California Department of Fish and Wildlife (CDFW) is working with several partners to establish a Climate Biodiversity Sentinel Site Network to monitor ecosystems and wildlife on public and private lands. In this ongoing and growing effort, CDFW has established 39 sentinel sites on select Wildlife Areas and Ecological Reserves across the state. Each sentinel site hosts or will host a research grade weather station, four terrestrial wildlife monitoring plots with cameras and acoustic sensors, and a Motus wildlife tracking station. Resulting data is processed with multiple automated and machine learning tools and will allow scientists to evaluate links between climate change and its effects on local species and ecosystems. This presentation will include data collected during the 2023 field season and preliminary data collected in the 2024 field season.

Poster Session

FROM POISON TO SIGNAL: UTILIZING MACHINE LEARNING TO QUANTIFY ANTI-PREDATOR WARNING COLORS IN GARTER SNAKES (*THAMNOPHIS*)

Jacob M Smith; University of Nevada, Reno; Jacobpie48@gmail.com; Kelly E. Robinson, Chris R. Feldman

Many dangerous or poisonous animals use colors or patterns to warn potential predators of danger (aposematic signal), and thus avoid molestation. Pacific newts (*Taricha*) produce tetrodotoxin (TTX), a paralyzing toxin, and also possess bright orange or red bellies which they reveal when confronted. However, some garter snakes (*Thamnophis*) have evolved resistance to this toxin. In fact, after ingesting newts, some garter snakes might retain enough TTX to be rendered poisonous themselves. We hypothesize

that toxin-resistant garter snakes have evolved colors or patterns as anti-predator signals. We thus predicted that snakes with higher levels of TTX resistance would possess stronger aposematic signals (e.g., red coloration, etc). We quantified TTX resistance in snakes from across multiple sites in California (sympatric and allopatric with newts). We then quantified RGB from these same snakes from photos. We used machine learning to quantify the surface area of red coloration. We found a positive relationship between TTX resistance and red coloration. We hope to determine if this coloration is detectable by predators. This project will provide an innovative technique in machine learning to quantify a unique predator-prey system and enhance the efficiency of photograph data processing.

Poster Session ***Student Paper***

FIGHT OR FLOOD? DO THE IMPACTS OF WEATHER AND COMPETITION SHAPE SMHM DENSITIES AND HABITAT USE?

Katie Smith; WRA, Inc., UC Davis; ksmith@wra-ca.com; Carla Angulo, Melissa Riley, Serena Hubert

Recently it has become clear that habitat use by the salt marsh harvest mouse is quite flexible. But that begs the question, if SMHM do not REQUIRE pickleweed, why are they mostly restricted to marsh habitat? And why are SMHM abundant in marshes during some years, and rare during other years? And what about all those other rodents we catch? These are the kinds of questions that can only be answered with long term, comprehensive datasets collected during periods of diverse conditions. The most comprehensive multi-year study in the last decade occurred only during drought conditions, which was great for looking at the impacts of habitat and competition, but not at teasing out the impacts of other environmental factors, most importantly, precipitation. An inability to account for weather has hindered our ability to evaluate historical datasets, but data collected in the past five years has begun to illuminate the impacts of precipitation, revealing that some substantial impacts of wet winters may not be realized until over a year later. Even more interestingly, those impacts seem to be influenced by competition, by way of habitat. Here we present the interaction between weather, habitat, and competition, and discuss impacts on SMHM conservation.

Natural History of Small Mammals
Friday 10:25 AM

MOTUS MATURES IN CALIFORNIA

Levi Souza; Levi.Souza@wildlife.ca.gov; Whitney Albright, Nicole Cornelius, Dena Spatz, Ryan Peek, Michelle Selmon

Motus is a world-wide network of automated wildlife tracking stations. Over the last 5 years, the network has developed substantially in California. The California Department of Fish and Wildlife is a major contributor to this network, through its development of Sentinel Sites for long-term monitoring of climate change, wildlife diversity and wildlife movement. Here, we provide an overview of the Department's Motus project, summarize detections on our lands and outline future directions the project will take. We also provide a map of California station Motus project assignments. The Department manages 25 Motus station throughout the state. We have detected 30 species and are active partners on tagging projects involving 7 species. The detection summary will include lists of species detected and frequency, detection frequency over time, number of detections per station (controlling for time deployed), and several other variables. Over the next several years, the Department will retrofit 30 California Motus stations to detect very tiny 2.4 GHz tags, build 2 node networks for fine scale movement tracking, initiate tagging projects on additional species and continue to build out the network.

Poster Session

ALAMEDA SONG SPARROW HABITAT USE AS A METRIC FOR RESTORATION SUCCESS

Bradley Speno; brad.speno@gmail.com; Dr. Lynne Trulio, Dr. Rachel E. O'Malley, Dr. Katie LaBarbera

Restoration is acknowledged worldwide as a conservation need to return ecosystem functions, though projects require monitoring to justify effort. In the San Francisco Bay, manmade salt ponds are becoming restored to tidal marsh, notably by the South Bay Salt Pond Restoration Project. The Alameda song sparrow (*Melozipa melodia pusillula*) has been documented to use restored and reference marshes, but their use of restored salt ponds is not fully understood. We hypothesize relationships between salt pond restoration age, percent cover of native plants, and Alameda song sparrow abundance. We also address questions on Alameda song sparrow habitat requirements. Alameda song sparrow abundance index data is used with botanical survey data at sites ranging in restoration age and native plant composition. We collect mist netting and bird banding data from a subset of these sites to confirm breeding success. Linear regression, principle component analysis, and analysis of variance show effects of each variable on Alameda song sparrow abundance. Similar Alameda song sparrow abundance across variably aged sites age and native composition both show how quickly nesting habitat might be provided for the species.

Poster Session ***Student Paper***

AUTOMATED WILDLIFE MONITORING ON WILDLIFE CROSSINGS

Vedant Srinivas; Stanford University; vedants8@stanford.edu; Mark Norman, Josh Zylstra, Fraser Shilling

Wildlife monitoring on highway crossing structures informs conservation efforts. Traditional methods with motion-activated cameras and manual analysis are time-consuming, expensive and prone to human error. We focused on monitoring wildlife crossings that are part of the I-90 Snoqualmie Pass East Project, WA. The wildlife monitoring program for this project involves 15 networked thermal cameras, generating over two million images and videos annually. We created a computer vision model capable of classifying thermal animal footage in real-time. The model was trained on simulated thermal data, created through a custom image morphing algorithm, as well as real thermal data. The purpose of the model was to remove false positive detections from the motion detecting camera, and classify footage by species (deer, elk, otters, pumas, etc.). The model was trained on a dataset of 26,000 simulated thermal images across 10 animal classes as well as 720 images of deer collected from WSDOT cameras. In one test, the model achieved a precision of 100% and a recall of 98.80% on 270 videos of 813 deer from an overcrossing on the I-90 corridor. The model is currently deployed in a WSDOT data center for real-time classification of footage from cameras on wildlife crossings.

Wildlife Techniques
Thursday 11:00 AM ***Student Paper***

CONSERVATION PRIORITIZATION IN THE SALT MARSH HARVEST MOUSE

Mark J Statham; UC Davis; statham@ucdavis.edu; Cody Aylward, Sophie Preckler-Quisquater, Katie Smith, Laureen Barthman-Thompson, Benjamin N. Sacks

The salt marsh harvest mouse (SMHM, *Reithrodontomys raviventris*) is a federally listed endangered species endemic to the coastal marshes of the San Francisco Bay Estuary. We combined range wide field survey data and conservation genomics to help identify population segments of particular concern. We resolved genetic units corresponding to the known subspecies. However, we also identified a previously

unrecognized discrete genetic lineage near Richmond. Our survey of the species found that the population at Richmond is the last one remaining throughout all the central portion of the SMHM range. The populations in the central Bay were likely the first ones founded when the San Francisco Bay was reformed after the Pleistocene. Thus, these central populations are ancestral to those in the species strongholds in the south San Francisco Bay and to the north in San Pablo and Suisun Bays. Our analyses also indicated that the Richmond population had extremely low genetic diversity. The population is isolated on a small patch of habitat surrounded by urban features with minimal high tide escape habitat. It is in severe jeopardy of being wiped out by sea level rise, additional anthropogenic changes in the adjacent urban area, or through stochastic events.

Genetics in Wildlife Investigations
Thursday 9:45 AM

NESTING BEHAVIOR IN A POPULATION OF NORTHWESTERN POND TURTLES, *ACTINEMYS (EMYS) MARMORATA*

Madison Stein; Sonoma State University; steinma@sonoma.edu; Nicholas Geist

The Northwestern pond turtle (NWPT), *Actinemys marmorata*, is a species listed by the Departments of Fish and Wildlife in the 3 western states and is currently pending listing by the USFW. Little is known about the specific habitat conditions required for reproductive success and how land affected by intensive agriculture may alter these conditions. To address the existing knowledge gaps, Sonoma State University has initiated a study focused on a population of NWPT inhabiting stock ponds on a working cattle ranch in Alameda County, California. Our preliminary studies during the 2024 summer nesting season identified 20 successful nests and documented multiple failed nesting attempts by gravid females. Our data show that nest site characteristics at our site vary when compared to similar studies done at other sites in California. This research will provide critical new insights into the nesting behavior of this population of NWPT, and has the potential to inform land managers in California to be better equipped to evaluate current grazing and land use practices, protect and maintain wetlands, and assess the impacts of agricultural practices on native herpetofauna.

Natural History of Turtles and Tortoises
Thursday 9:25 AM

Student Paper

BOOM AND BUST IN A NON-NATIVE POPULATION OF DIAMOND-BACKED WATERSNAKE (*NERODIA RHOMBIFER*) IN NORTHERN CALIFORNIA

Eric W Stitt; ICF International and Save The Snakes; eric.stitt@icf.com; Peter S. Balfour

Anthropogenic non-native species introductions are noted with concern when an animal population becomes established, individuals become numerous, and dire ecological consequences result. Examples are numerous where intentional or unintentional human facilitation of species introductions result in native species loss and extinctions, changes in vegetation composition or structure, loss of ecosystem functioning, introduction of non-native pathogens and parasites, and other consequences, and control/ eradication focus is rightly placed on extant non-native populations. Receiving much less attention are those instances where a population is introduced, grows to attain potential noxious invader status, and winks out, with no remnant of the formerly abundant species. To our knowledge, such an example is heretofore unknown among snakes. Here we report on the historic establishment, proliferation, and extirpation of a population of diamond-backed watersnake (*Nerodia rhombifer*) in Northern California. Museum records, newspaper accounts, personal interviews and unpublished reports help us reconstruct the history and demise of the population, and we place this knowledge within the context of other documented boom/bust populations for similar vertebrate groups.

Natural History of Snakes
Thursday 10:40 AM

THE SCENTED UNDERWORLD: EUCALYPTUS ESSENTIAL OILS AND THEIR EFFECTS ON SOIL HEALTH

Paola M Suarez Campa; LA Zoo Intern; paolamsua@gmail.com; Daphne Garcia, Aaron Perez

Eucalyptus trees were introduced into California in the 1850s for their potential as lumber and have since become one of the most common invasive arboreal plants. However, the essential oils stored in eucalyptus leaves which have antifungal and antibacterial properties, have been documented to negatively affect soil health. This study investigated the impacts of these essential oils on soil microbial activity and macronutrient levels in comparison to native oak species. We sampled 3 locations in the LA Zoo's Oak Woodland area. We used Solvita soil respiration kits to assess microbial activity and we also measured pH, nitrogen, and phosphorus levels. Results indicated that soils beneath eucalyptus trees were more acidic and had lower macronutrient levels compared to those beneath oak trees. The soil respiration analysis also showed reduced CO2 levels in areas where eucalyptus leaves were most abundant, suggesting lower microbial activity. In combination with the acidification, reduced macronutrient levels, and diminished microbial activity, this study supports previous findings that eucalyptus essential oils negatively impact soil health. However, from a conservation perspective, prior to removal of these trees, adequate replacements must be found to provide critical habitat for avian species, particularly nesting raptors, and to prevent erosion.

Poster Session

BATS AND WILDFIRE IN NORTHERN CALIFORNIA - HOW DID THE DIXIE FIRE IMPACT BAT SPECIES DISTRIBUTION AND ACTIVITY PATTERNS IN NORTHERN CALIFORNIA? A THESIS UPDATE

Amelia A Tauber; California State University, Sacramento & CDFW; amelia.tauber@wildlife.ca.gov; Dr, Ronald M. Coleman, Dr. Scott D. Osborn

The California Department of Fish and Wildlife (CDFW) Bats and WNS project installed 8 long-term acoustic stations in Plumas and Tehama counties in the spring of 2021. The Dixie Fire began three months after the stations were installed. As the wildfire spread it encompassed three acoustic stations, burned within 1 mile of four stations, and within 3 miles of one station. The Dixie Fire was the largest recorded wildfire in California to date, burning 374,000 hectares at mixed intensities. 55% of that area burned at high severity. For my thesis work, I will analyze acoustic data collected for the CDFW project before, during, and after the fire to improve understanding of how wildfires impact Northern California's bat communities. To date, 17 species of bat have been found in the study region and over 6 TB (>2 million files) of call data has been collected. Though statistical analyses are not yet completed, observations suggest there were changes in both bat activity levels and species observed between the pre-fire period of 2021 and the same time range post-fire in 2022. This poster will discuss these changes and potential next steps for the study.

Poster Session ***Student Paper***

SMALL, YOUNG, AND ELUSIVE: CAPTIVE REARING REVEALS THE EARLY LIFE OF BLUNT-NOSED LEOPARD LIZARDS

Rory S Telemeco; Fresno Chaffee Zoo; RTelemeco@fresnochaffeezoo.org; Steven Sharp, Mark Halvorsen, Emily Bergman, Steven Hromada, Michael Westphal

Blunt-nosed Leopard Lizards (*Gambelia sila*) are federal- and state-endangered lizards endemic to San Joaquin Desert habitat in central California. As with many endangered species, not all life-stages are equally understood. Most studies of *G. sila* focus on adults during the spring reproductive season, due to challenges accessing other stages (both biological and regulatory). In 2020, Fresno Chaffee Zoo received emergency permission to create a *G. sila* breeding colony for Panoche Plateau in the hopes of repatriating offspring and restoring this isolated population. An auxillary benefit of this colony is that it provides unprecedented access to *G. sila* during their more elusive life-stages, such as hatchlings during their first fall. We report on a suite of early-life traits measured in captive-reared *G. sila* (N = 152) including primary sex ratio, growth rate, symmetry, and thermal preference. We then compare these values to the limited observations available for wild animals in the field. Our results confirm that our incubation and rearing conditions produce *G. sila* with traits similar to those observed in the wild and provide new details about the natural history of this unique and endangered species.

Natural History of Lizards
Wednesday 2:25 PM

CAVITY STRUCTURES FOR NESTING PURPLE MARTINS: AN INNOVATIVE DESIGN

Karine Tokatlian; Midpeninsula Regional Open Space District; ktokatlian@openspace.org;

Purple martin (*Progne subis arboricola*), a California Species of Special Concern, historically nested in existing wood power poles at Mt Thayer in Santa Clara County. By 2008, only 100-220 pairs were estimated in the southern coastal area of California from Marin to Santa Barbara Counties and are suggested to be close to local extirpation, making the small Mt Thayer population regionally significant. For several years the Midpeninsula Regional Open Space District has monitored martin breeding activity at Mt Thayer and provided a variety of nesting structures ranging from traditional nest boxes to experimental hollow cavity structures that emulate natural habitat, to support state goals of reaching >2,000 martin pairs and to support nesting in cavities rather than bird boxes or houses. In 2024, martins selected experimental cavity structures over traditional boxes, and successfully fledged a record high of 13 young at the site. Cavity structures can be used as an effective tool to support nesting martins and to facilitate preference for natural cavities. The District has formalized the cavity structure design to share with others for implementation at suitable sites within their western range.

Natural History of Birds I
Wednesday 2:25 PM

LESSONS LEARNED FROM THE FIELD: A CONSULTANT'S PERSPECTIVE ON BUMBLE BEE SURVEYS

Christina Torres; SWCA Environmental Consultants; christina.torres@swca.com;

Following the publication of bumble bee survey considerations by the California Department of Fish and Wildlife in June 2023, biologists throughout California have adopted methodology for habitat assessments and presence/absence surveys for the detection of nesting and foraging bumble bee species. After the implementation of survey guidelines, data collected during Crotch’s bumble bee presence/absence surveys for the 2024 season offers potentially valuable insight to better inform methodology for upcoming survey seasons.

Poster Session

A MULTISPECIES APPROACH TO THE CONSERVATION OF THE SAN QUINTIN KANGAROO RAT (*DIPODOMYS GRAVIPES*)

Scott B Tremor; San Diego Natural History Museum; stremor@sdnhm.org; Eric Mellink, Jorge Andrade, Monica Riojas, Sula Vanderplank

The historic range of the San Quintín kangaroo rat (*Dipodomys gravipes*), once thought extinct but rediscovered in 2017, is restricted to a strip less than 170 km long and a few km wide within the coastal plains around San Quintín, Baja California. This rodent was first described in 1925 by Laurence M. Huey, who described the habitat in this area as hard soils covered with grasses. Similarly, Edward W. Nelson (1922) reported that "the vegetation is so low and insignificant that the plain has the appearance of an open prairie." The habitat was recovering from years of wheat cultivation beginning in 1891, abandoned in 1917. The San Quintín kangaroo rat thrives in disturbed habitat left after the fallowing of fields. With the construction of the transpeninsular highway, agriculture was renewed in 1971 and by the early 2000s had expanded over much of the plain, but then it stalled because of saltwater intrusion into the aquifer. Desalinization plants have been introduced into the region, allowing the once fallow fields to be cultivated yet again. Dipodomys gravipes is listed as endangered by the Mexican government, and the renewed threat of expanding agriculture illuminates the need for targeted conservation. Many other narrow endemic taxa of flora and fauna share the San Quintín kangaroo rat's range, highlighting the desirability of a multispecies approach to conservation of the region's wildlife.

Poster Session

SHIFTING FOREST STRUCTURE, CLIMATE, AND WILDFIRE SHAPE THE OCCUPANCY OF A MONTANE MESOCARNIVORE GUILD

Jody M Tucker; USDA Forest Service, Rocky Mountain Research Station; Jody.tucker@usda.gov; Marie Martin, Sean Matthews, Eric McGregor, Stephanie Eyes, Erica Anderson, Brad Smith, Micah Bingaman, Jordan Heiman

In recent years southern Sierra Nevada (SSN) forests have experienced rapid environmental change including drought, widespread tree mortality, and mega fires burning over 700,000 acres in 2020-2021 alone. We analyzed 13 years of monitoring data from the US Forest Service's Sierra Nevada Carnivore Monitoring Program to assess the impacts of these changes on the endangered SSN fisher population and three co-occurring carnivore species (marten, grey fox, ringtail). We used a hierarchical, multi-species occupancy analysis to estimate annual occupancy and detection probabilities incorporating covariates for forest structure tree mortality, fire severity, and climate. We summarized annual occupancy patterns across three regions and three elevation strata. Across the SSN occupancy for fisher and marten fluctuated annually but was relatively stable in some regions but declined significantly for both species on the Sequoia National Forest by 2023. Conversely, by 2022 grey fox occupancy more than doubled compared to the first 3 years of the study. Fisher occupancy also varied across elevation strata with occupancy declining most strongly at low elevations. Fisher occupancy decreased after fire across all fire severity levels, with the greatest decline in areas of high severity fire. However, response to fire varied across species with marten occupancy also declining but grey fox and ringtail occupancy increasing in high severity fire areas. Our results illustrate the value of long-term monitoring data in evaluating the impact of environmental change on wildlife species.

Natural History of Carnivores I
Wednesday 5:20 PM

SEASONAL PREY SELECTION OF CHIROPTERA IN NORTHERN CALIFORNIA

Lucas C Vanderkar; California State University, Chico; lvanderkar1@csuchico.edu; Donald Miller, Shahroukh Mistry, David Keller

The order Chiroptera is one of the most widely understudied groups of mammals, despite being the most diverse – over 1,400 species composing 20% of all mammals. The difficulty in studying these organisms lies in their nocturnal and elusive nature. One of the hardest puzzles to solve among the lives of bats are their diets. Nighttime foraging often occurs well above treetops and buildings and can be up to 60km away from roosting sites. Recent advancements in DNA metabarcoding have emerged as valuable tools for elucidating bat diets by providing comprehensive data on their feeding patterns. This study employs this method in conjunction with dissections of fecal pellets to investigate the diets of insectivorous bats living in Northern California. By integrating both molecular and morphological analyses, we aim to achieve a higher resolution of dietary data. Samples were collected from the rural landscape of Big Chico Creek Ecological Reserve in Chico, CA, during Winter and Spring 2024. These findings will be compared with ongoing data collection from the Chico State University farm during Fall 2024, Winter 2024/2025, and Spring 2025. This research contributes to a greater understanding of bat diets, ultimately informing conservation strategies for these critically important yet vulnerable species.

Poster Session

SEASONAL VARIATION IN BAT COMMUNITY COMPOSITION ALONG AN URBAN GRADIENT

Kellie Ventura; California State University Sacramento; kventura2@csus.edu; Anna Doty

Urbanization affects wildlife communities through habitat alteration and loss, which can be particularly detrimental to species that are sensitive to environmental changes, such as bats. Bats play a critical role in ecosystems as pollinators and insect predators, but their populations can be impacted by habitat loss and fragmentation. This study explores bat community composition as a function of urban development and seasonality across three sites that vary in urban development in northern California: CSU Sacramento (high urban) and Rattlesnake Bar, Beal's Point, and Folsom Point within Folsom Lake State Recreation Area (intermediate urban and rural). Acoustic monitors will be deployed for the summer, fall, and winter seasons for 30 days each season, and will be rotated every 10 days. Additionally, a fourth round of monitoring will take place at Auburn Airport (Auburn, CA), Effie Yeaw Nature Center (Sacramento, CA), and Round Valley Regional Preserve (Brentwood, CA) to further capture bat diversity along the urban gradient. By analyzing species richness, diversity, and activity patterns, I aim to assess how urbanization impacts bat populations. I expect lower species diversity in more urbanized areas and also expect seasonal variation in bat activity. This research will contribute valuable insights into the effects of urban expansion on bat communities and inform conservation strategies for urban landscapes.

Poster Session ***Student Paper***

LESSONS LEARNED FROM FIFTEEN YEARS OF WVC REPORTING ON THE CALIFORNIA ROADKILL OBSERVATION SYSTEM (CROS)

David P Waetjen; UC Davis; dwaetjen@ucdavis.edu; Fraser M. Shilling

The California Roadkill Observation System (CROS) was launched in August 2009 as a novel US-state scale wildlife-vehicle conflict (WVC) reporting system. Since its inception, CROS has collected over 212,800 observations making it the largest WVC reporting system in the US. WVC observations have come from several sources, including amateur observers; state, federal, and local agencies; private entities;

and highway patrol officers. Spatial accuracy of observations is <13m (median error) and species identification is >97% correct, with no difference between professional and amateur observers. Multiple uses have been made of the data: 1) Planning dozens of wildlife fencing/crossing projects throughout the state; 2) To model habitat suitability and species distributions; 3) To locate high-density and statistically-significant clusters of WVC (hotspots); and 4) To estimate the economic costs of these crashes and compare to costs of building fencing. Because of its longevity and size, CROS has served as a global standard for other more recent large-extent systems. It also seems to be motivating state policy and expenditures, evidenced by citation of the system in legislative language. There are many lessons learned from developing, managing and using a system like this, not least of which is the near-impossibility of getting funding.

Transportation Projects and Wildlife Interactions I
Wednesday 1:45 PM

CACHE CREEK CONSERVANCY: REVITALIZING IMPACTED LANDSCAPES THROUGH RESTORATION AND EDUCATION

Felicia Wang; Cache Creek Conservancy; felicia.wang44@yahoo.com; Ivy Liu, Vanessa Lozano

The Cache Creek Conservancy (CCC) is a 501c(3) non-profit organization based in Woodland, California. CCC's mission is to restore and enhance the lower Cache Creek watershed and its highly impacted landscapes. For almost three decades, CCC has utilized invasive removal and wildlife monitoring to restore native habitat. The Arundo Eradication program started in 2021, focuses on removing Arundo donax along the lower Cache Creek. To date, CCC has successfully treated and retreated more than 7.28 acres of Arundo. Besides invasive plant eradication, CCC has more recently delved into invasive wildlife removal, specifically American Bullfrog and Red-eared Slider. This past season, over 800 bullfrogs and 98 sliders were removed from the Cache Creek Nature Preserve's wetland habitat. Alongside invasive removal, CCC conducts systematic surveys to monitor how restoration efforts are impacting native wildlife, including special status species such as Swainson's Hawk, Northwestern Pond Turtle, and Valley Elderberry Longhorn Beetle. The data is used by CCC and Yolo County to develop management plans for various restoration sites along the lower Cache Creek. Additionally, these initiatives have been integrated into a college internship program that allows students and recent graduates gain valuable hands-on experiences in the environmental career field.

Poster Session

INVENTORY OF SMALL MAMMALS TO INFORM RESTORATION AT SANTA MONICA MOUNTAINS NATIONAL RECREATION AREA

Thea B Wang; The Santa Monica Mountains Fund ; thealetter.tw@gmail.com; Shannon Lemieux, Seth P. D. Riley

Santa Monica Mountains National Recreation Area is the nation's largest urban park and has lacked knowledge about its small mammal communities. Information on small mammal natural history, species richness, and abundance is needed by managers to determine where small mammals occur and where they are the most diverse. We used live-traps to characterize the small mammal community at 30 sites in the two most abundant habitat types: chaparral and coastal sage scrub. The sites were co-located with existing long-term vegetation survey sites, and vegetation structure covariates were considered to explain the variation in small mammal distribution and diversity. Capture success was high, and we captured 11 native species, including 2 heteromyids, 5 Peromyscus species, 2 woodrats, harvest mice and voles, the full predicted small mammal fauna. We found healthy small mammal communities in both habitat types and across the park. These baseline data will be used to measure the success of native plant restoration projects

and verify that restored areas function as habitat for small mammals. Small mammals are a good proxy for general wildlife response to restoration, because rodents interact with native plants through seed predation, herbivory, and soil disturbance, and are a critical food source for predators.

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 5:00 PM

THE IMPACTS OF CLIMATE, HABITAT AND WILDFIRE ON SIERRA NEVADA SMALL MAMMAL COMMUNITIES

Reina M Warnert; University of California Merced; rwarnert@ucmerced.edu; Jessica L. Blois

California is considered a biodiversity hotspot based on its high species richness and endemism, and the threats to ecosystems that support these species. Small mammals are key components of healthy ecosystems, serving as seed and fungal dispersers, prey, and habitat engineers. Recently, Sierra Nevada ecosystems have experienced an increasing amount of change, including climate change, more severe and frequent fires, and associated vegetation change. Small mammals are demonstrably sensitive to changes in climate and habitat, but the long-term influence of fire on small mammal communities is poorly understood. We aim to explore the drivers of small mammal richness, focusing on fire, habitat, and climate. Historical survey and resurvey projects provide high-quality species occurrence data from the last century in the Sierra Nevada. Results indicate that historic fire regime plays a key role explaining variation in modern small mammal richness across the Sierra Nevada and that inclusion of variables related to fire improves model fit compared to models with just climate and habitat. Overall, our work contributes knowledge on the factors influencing small mammal communities in an era of global change.

Restoring/Monitoring Wildlife Populations and Habitats II
Wednesday 5:20 PM

Student Paper

SPATIAL AND TEMPORAL EFFECTS OF WILDFIRE DISTURBANCE ON MAMMAL HABITAT USE IN FIRE-ADAPTED CALIFORNIA ECOSYSTEMS

Erin N Weiner; California State University, Long Beach; enweiner98@gmail.com; Mason Fidino, Nathan C. Gregory, Emily A. Blackwell, Maximilian L. Allen, Christopher C. Wilmers, Theodore Stankowich

Fire is a natural form of disturbance that shapes resource availability across spatial and temporal scales. As fire regimes change in response to climate change and anthropogenic factors, further work is necessary to understand how wildfire disturbance impacts medium-large (>0.5-kg) mammals. We used autologistic occupancy models to determine how ten mammal species responded to four wildfire events in Orange County and Santa Cruz County, California, USA, across a landscape and over time. Most species increased usage of sites affected by higher fire severity and/or heterogeneity, in the burned interior or along burned edges. Mesocarnivores increased their use of burned areas after a fire, while small herbivores and large carnivores did not exhibit a strong response to wildfire over time. Mule deer (*Odocoileus hemionus*) were the only species to increase use of sites with lower fire severity and sites in unburned areas, and during mid- to late-successional stages. Although most mammals appeared to prefer landscape heterogeneity and resource pulses created by more severe wildfire, there was some variation. Wildlife managers should draw on region-specific studies when seeking to reintroduce healthy fire into fire-adapted ecosystems.

Restoring/Monitoring Wildlife Populations and Habitats 1
Wednesday 2:25 PM

THE LIZARD KING OF THE SAN JOAQUIN DESERT: THE YELLOW-BACKED SPINY LIZARD IN CENTRAL CALIFORNIA

Michael F Westphal; US Bureau of Land Management; mwestpha@blm.gov; Joseph Belli, Richard Seymour, Logan Mikus, Devorah Woollett-Smith, Alice Whitelaw, Ngaio Richards, Cristhian Mace, Brian Berry, Max Westphal, Ben DeDominic, Gary Longo, Emme Nix, Mark Statham

The yellow-backed spiny lizard, *Sceloporus magister uniformis*, is well known from the Mojave Desert, where it is widespread and abundant. It is less well known from Central California. We report on an intensive survey effort conducted in 2024 where we sought out *S. m. uniformis* across its potential range in the San Joaquin and western Mojave Desert, using visual surveys and scat detection dogs / genotyping from scat. We found *S. m. uniformis* to be widely but patchily present in the western San Joaquin Valley and associated ranges from the Panoche Hills in the north to the Lokern region in the south. The species was found to be present in the Transverse Ranges to the south of the San Joaquin Valley and abundant in the western Mojave. Preferred habitat was rock outcrops and anthropogenic structure such as riprap in desert washes. Temperature preferences ranged from about 18C to 30C, and the species could be observed March-October whenever the temperature was within these bounds. We present an updated map of its distribution in central California. This large lizard deserves increased attention due to its potential endemism and restriction to the San Joaquin Desert biome.

Natural History of Lizards
Wednesday 2:45 PM

ANNUAL SURVIVAL OF A MIGRATORY BIRD LINKED TO CLIMATE-DRIVEN STRESSORS ACROSS THE MIGRATORY CYCLE: DECLINE OF WILLOW FLYCATCHERS IN THE KERN RIVER VALLEY, CA

Mary J Whitfield; Southern Sierra Research Station; wifl1989@gmail.com; Jeffrey A. Manning

Neotropical migratory birds experience variable atmospheric conditions throughout their annual life histories, raising questions about drivers of annual survival. The Southwestern Willow Flycatchers (*Empidonax traillii extimus*, SWFL) breeding in the Kern River Valley (KRV), California declined over the last 20 years despite breeding and survival parameters that were comparable to other SWFL populations that were stable or increasing in size and management that increased nest success, indicating that non-breeding season mechanisms may be at play. We used a long-term (24-yr) mark-recapture dataset from 617 individually marked flycatchers in the KRV breeding ground to investigate additive and interactive effects of multiple atmospheric conditions in breeding, migration and winter ranges on annual survival to improve our understanding of this decline. Our analyses indicate that increased numbers of months with above normal drought severity on the wintering grounds decreased annual apparent survival, whereas years with increased drought severity on the breeding ground prior to and during the previous season increased survival. An additional subset analysis of the data during a steady decline (2000-2014) revealed that survival decreased in response to increased drought conditions prior to flycatchers arriving on the wintering grounds, with female survival exceeding that of males and unknown sexed birds.

Natural History of Birds II
Wednesday 3:40 PM

NATURAL HISTORY OF SOUTHWESTERN WILLOW FLYCATCHERS ON THE OWENS RIVER, CA

Mary J Whitfield; Southern Sierra Research Station; wifl1989@gmail.com; Annie Meyer, Nidia Jaime, Kelly Colegrove

The once common, endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*, SWFL) is rare throughout California, with scattered populations occurring at a few sites in the state. Most of these populations have declined over the past 10 to 20 years, however, the Owens River population has increased during this time. We monitored SWFLs on the Owens River during the 2021-2023 breeding seasons to determine abundance, nesting success, and nest parasitism rates. We estimated that there were at least 57 to 101 SWFL territories in our study area from 2021 to 2023, a significantly higher population than reported in 2016 (27). We recorded an average apparent nest success rate of 52% (n=38, 2021 and 2022); and an average parasitism rate of 34% (n=61, 2021-2023). Willow Flycatcher breeding success on the Owens River over the past years has apparently been good enough to support a healthy flycatcher population despite Brown-headed Cowbird parasitism. Nonetheless, reducing cowbird parasitism would be a good management strategy given the decline of Willow Flycatcher populations in California. Increasing the number of young birds produced in this population could also increase the dispersal of flycatchers to other areas along the Owens River as well as beyond the Owens River watershed.

Natural History of Birds I
Wednesday 2:05 PM

EARLY AGE AT SEXUAL MATURITY; LESSONS LEARNED FROM A MARKED, TRANSLOCATED POPULATION OF THREATENED FROGS

Jeffery T Wilcox; Mitsui Ranch Preserve; jtwilcox@comcast.net; Michael Palladini, Tanner Lichty, Nicolette Murphey, Jeff A. Alvarez

Sexual maturity is the point in an individual's life history that demarcates the preparation for passing on heritable traits from being capable of passing them through sexual reproduction. Earlier age at sexual maturity confers a higher probability of surviving to pass on genetic material; and higher fitness because offspring are born sooner and potentially reproduce sooner. Age at sexual maturity is a trait that profoundly influences the intrinsic growth rate and is integral to predicting the demographic performance of animal populations. Understanding demographic performance allows wildlife managers to assess the relative success of translocations when restoring populations of imperiled species. Observations made of a marked population of California red-legged frogs in the years preceding their translocation to a neighboring county compelled us to reassess published statistics of their age at first reproduction. Informed by our observations, we anticipated that California red-legged frogs are capable of reproducing at an earlier age than previously reported. We translocated 6 egg mass halves over three years and observed several egg masses at the recipient site in the second winter of the project, confirming our observations from the donor site: that at least some California red-legged frogs are capable of sexual reproduction at a younger age than previously reported.

Natural History of Amphibians
Friday 9:05 AM

CAN WILDLIFE COEXIST WITH CANNABIS? CHARACTERIZING BIRD AND BAT COMMUNITIES ON AND NEAR LICENSED CANNABIS FARMS IN HUMBOLDT COUNTY, CALIFORNIA

Mac Wilson; Cal Poly Humboldt; mw379@humboldt.edu; Janelle Chojnacki, Alex Lewis, Jackee Riccio, Matt Johnson

Cannabis is a novel agricultural commodity that is grown in biodiverse areas of the Pacific Northwest, with Humboldt County, California being a major epicenter of production. Despite being a highly regulated industry with many potential environmental impacts, there is a dearth of field research on the wildlife communities present on licensed cannabis farms. In this presentation, we discuss findings from two years of monitoring bird and bat communities on and near these farms, and the response of secondary cavity-nesting songbirds to the installation of artificial nest boxes in cultivation areas. From May to August of 2022 and 2023, we conducted point counts and deployed ultrasonic detectors on six farms, and in October 2022 four of the six farms received habitat enhancements including artificial bat roosts and songbird and owl nest boxes in a before-after control-impact experimental design. In 2023, point counts were expanded to areas surrounding these farms to compare these wildlife communities to areas that are representative of the landscape before conversion to cannabis production. Our findings indicate cannabis farms are associated with diverse bat communities, and that bird communities on and surrounding farms are often distinct in several important ecological aspects including species abundance and functional richness.

Wildlife and Agriculture II
Wednesday 4:40 PM

UPDATES ON THE TERRESTRIAL AND VERNAL POOL INVERTEBRATES OF CONSERVATION PRIORITY LIST

Dylan N Winkler; California Department of Fish and Wildlife; dylan.winkler83@gmail.com; Dr. Hillary Sardiñas

Terrestrial invertebrates are the most biodiverse group of animals, yet many species are facing declines. The California Department of Fish and Wildlife (CDFW) conserves and manages declining invertebrates in California, but most remain understudied. To help meet this challenge, CDFW maintains a Terrestrial and Vernal Pool Invertebrates of Conservation Priority List (TVPICP List). The TVPICP list is a subset of the Special Animals List and identifies invertebrate species of conservation concern. Taking species on the list for scientific, educational or propagation purposes requires a Scientific Collecting Permit (SCP) from CDFW. In this talk, we will define the TVPICP List, describe why it is important, and highlight some species on it. An updated TVPICP List based upon the most up-to-date available information goes into effect in January, but many species on it are still poorly understood. Of the 265 invertebrate species and subspecies on the revised list, over 40% have one or zero records in the California Natural Biodiversity Database. However, we know that additional records occur in other biodiversity portals or museum collections. By collating those records and documenting current field observations, we continue our efforts to better understand distributions and inform terrestrial invertebrate conservation priorities in California.

Natural History of Invertebrates
Friday 8:05 AM

A DECADE OF CONSERVATION: LESSONS LEARNED IN MANAGEMENT, MONITORING AND RESTORING SENSITIVE WILDLIFE AND HABITAT IN THE NORTHERN CARRIZO PLAIN

Camdilla D Wirth; Sequoia Riverlands Trust; camdilla@sequoiariverlands.org; Ian J. Axsom, Lindsay Peria, Ben Munger

Sequoia Riverlands Trust, a non-profit land trust, manages more than 17,000 acres in the Carrizo Plain, California's largest remaining grassland and a hotspot for endangered and threatened species. Since 2015, we have adaptively managed solar mitigation land for several sensitive San Joaquin Valley endemic species including San Joaquin kit fox and giant kangaroo rat. Over the last decade, our long-term wildlife habitat management and monitoring program has had many successes and challenges, including tricolored

blackbird nesting habitat restoration, shrub establishment in grassland habitat, and giant kangaroo rat population expansion. We will share the story of our conservation work and the importance of fostering collaboration and connection in strengthening capacity for wildlife and habitat management, with a look forward to future projects.

Lessons Learned in Wildlife Management
Thursday 8:05 AM

BOBCAT HABITAT SELECTION ACROSS A FRAGMENTED AGROECOSYSTEM LANDSCAPE IN SOUTHERN CALIFORNIA

Betty L Wong; Cal Poly Pomona; blwong@cpp.edu; Seth P.D. Riley, Joanne G. Moriarty, Elizabeth S. Scordato, Erin J. Questad, Rachel V. Blakey

Urbanization and agriculture have expanded significantly in recent decades, leading to habitat loss, fragmentation, and reduced landscape connectivity for carnivores. Bobcats (*Lynx rufus*), wide-ranging ambush predators, are associated with intermediate urbanization who also use agricultural areas. However, the features of agricultural landscapes that attract bobcats remain unclear. Using 12 years of bobcat location data collected by the National Park Service in the agroecosystems of Los Angeles and Ventura Counties, we analyzed their habitat selection and movement behavior using integrated step selection functions. My preliminary results show that bobcats select for natural habitats, use agricultural areas in proportion to their availability, and avoid urban areas. Bobcats are also seen moving fastest through urban areas in comparison to agricultural areas, suggesting greater preference for agricultural areas. Since bobcats are natural enemies of rodent pests that deal considerable damage to agricultural areas, understanding what influences bobcat presence in these areas is crucial for maintaining resilience in these ecosystems. Our future work will identify specific features of urban-agricultural ecosystems to inform growers and natural resource managers on how to increase connectivity between natural and agricultural areas to encourage not only bobcats, but wildlife movement permeability overall throughout this region.

Poster Session ***Student Paper***

A TALE OF TWO TAILS: LINEAGE FORMATION IN A GLOSSY SNAKE SPECIES COMPLEX MIRRORS PARTITIONING OF DESERT ECOSYSTEMS IN THE ARID SOUTHWEST

Dustin A Wood; U.S. Geological Survey ; dawood@usgs.gov; Jonathan Q. Richmond, Michael F. Westphal, Bradford D. Hollingsworth, Robert N. Fisher, Amy G. Vandergast

Historical subspecies often serve as important units for conservation policy and management when other information is lacking. However, adaptive management of sensitive species is compelled to rely on the best scientific data available, making accurate delineation of lineage diversity an important and enduring task. The California glossy snake, *Arizona elegans* occidentalis is currently recognized as a Species of Special Concern in California due to rangewide decline and projected effects of anthropogenic development throughout the range. To test whether *A. e. occidentalis* forms a cohesive group, we used genomic analyses combined with an expanded taxonomic and geographic sampling scheme across the species. We show strong genomic evidence for recognizing a new species, *Arizona occidentalis*, that encompasses all of the formerly recognized subspecies of the so-called “short-tailed glossy snakes”, and is the sister species to *Arizona pacata*, the endemic species in Baja California. We retain the name *Arizona elegans* for the “long-tailed glossy snakes” in the eastern portion of the complex’s range. Within *Arizona occidentalis*, we show support for regional genetic partitioning into San Joaquin, Mojave and Sonoran Desert groups and discuss whether one or more of these groups merit recognition as Distinct Population Segments as defined in the Endangered Species Act of 1973, given the on-going habitat loss along the western edge of its range.

Natural History of Snakes
Thursday 11:40 AM

MEASURING AND MONITORING SPAWNING GRAVEL FOR STEELHEAD TROUT (*ONCORHYNCHUS MYKISS*) ALONG THE CARMEL RIVER

Destiny-Ciara M. Yano; California State University, Monterey Bay; dyano@csumb.edu; Joab Pimentel, Nikki Gigliotti, Lucas Raymond, James Guilinger

Nearly a decade has passed since the removal of the San Clemente Dam, and the steady flow of sediments from the stockpile continues to travel down the Carmel River. This ongoing sediment transport has significant implications for the river ecosystem, particularly for the steelhead trout, an endangered species whose habitats lie downstream. Steelhead trout are known to migrate upstream after the winter months to lay their eggs in designated spawning grounds. These spawning grounds require specific conditions: coarse gravel and fast-flowing water. By measuring and monitoring the size of the spawning gravel using a gravelometer through cross-sections of the river, we can assess the health and suitability of these habitats over time. The data collected from these measurements is crucial for conservation efforts. If there is a notable accumulation of fine sediments burying the spawning gravel, this information can be presented to conservation agencies that protect and restore critical aquatic ecosystems. This study is particularly valuable for its focus on the long-term effects of low-impact dam removal projects.

Poster Session

DEVELOPMENT AND EVALUATION OF AN ENHANCED METHOD FOR SWAINSON'S HAWK NEST MONITORING

Sarah J Yates; QK; Sarah.yates@qkinc.com; Denver-Rose Harmon, Mattole Whitaker, Roland Garcia

An enhanced method of gathering behavioral data of nesting Swainson’s hawks was developed by QK using ZooMonitor, an App-based data collection method developed by the Lincoln Park Zoo to record captive animal behavioral data. We describe ways the app was modified from captive to wild animal data collection, development of behaviors specific to Swainson’s hawk in the App, provide examples of representative data output and graphical representations of data using the App, and describe the advantages of using the App compared to the standard method of using a hard-copy data forms. The App was tested in 2023 and 2024 during a pilot study of two active nests near a bridge construction project. We highlight some problematic aspects of the methodology that were encountered, and solutions developed to overcome those issues, provide recommendations for next steps in the study, and discuss data gaps that should be filled by other means.

Poster Session

CONTAMINANT SURVEILLANCE IN NORTH AMERICAN RIVER OTTERS IN CALIFORNIA

Jaime Rudd; Endangered Species Recovery Program; jrudd@csustan.edu; Juntong Zhou, Megan Moriarty, Robert Poppenga, Ryan Bourbour, Deana Clifford, **Juntong Zhou**

North American river otters (*Lontra canadensis*) play a vital role in aquatic ecosystems, however, their populations are vulnerable to various environmental threats, including contaminants that may impact their health and, by extension, the health of aquatic ecosystems. The goal of this study was to determine if river otters are exposed to anticoagulant rodenticides, insecticides, and heavy metals. We performed necropsies

on 20 river otter carcasses collected from the Sacramento and San Joaquin River Delta from May 2019 - December 2022. Trace exposures to anticoagulant rodenticides were detected in 45% of the tested river otters (9/20). We detected lead exposure in 10% (2/20) and mercury in 65% (13/20) of tested river otters. Trace levels of fipronil sulfone, the metabolite of fipronil, were detected in 20% of tested river otters (4/20). Other insecticides, such as organophosphorus, neonicotinoids, and pyrethrins, were not detected. While larger sample sizes and regionally specific sampling areas may help create baseline “normative” values, these results suggest that river otters in the Sacramento-San Joaquin Delta are not uniquely exposed to certain classes of pesticides that were tested for. However, the metabolic half-life of pesticides varies and may no longer be detectable in tissues by the time carcasses are collected.

Poster Session