

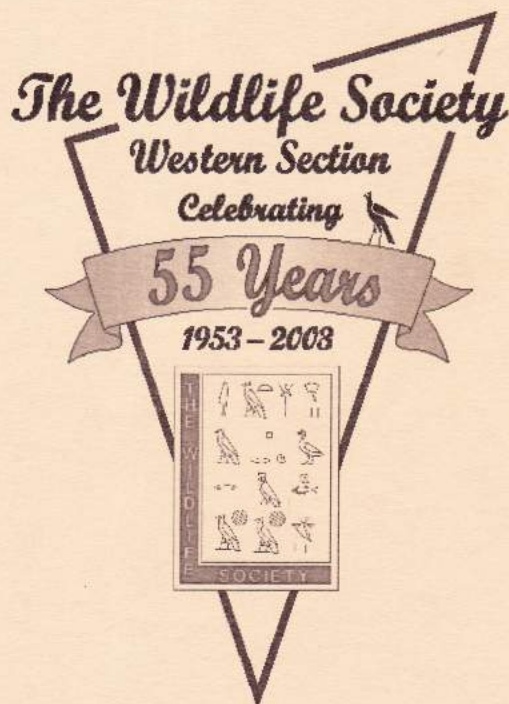
2008 Annual Conference

**The Western Section of
The Wildlife Society**

CONFERENCE THEME:

Excellence in Wildlife Stewardship through Science and Education

M. Gabriel



PLENARY SESSION THEME:

**The Role of Non-Governmental Organizations in
Wildlife Management and Conservation**

Program and Abstracts

February 6-9, 2008
Red Lion Hotel
Redding, California

DEDICATION

On June 8, 2007 Barrett A. Garrison passed away suddenly at the young age of 48. A dedicated father, husband, coach and scientist, Barry had a contagious passion for all aspects of his multi-faceted life. As a true professional at all levels, he led, mentored, questioned, researched, managed, and debated compassionately about wildlife and their management. He spoke often about ethics in the wildlife profession, always ready to lend a helping hand, idea or useful perspective to enhancing our understanding of wildlife. His enthusiasm for life and the profession he loved was contagious to everyone around him.

Barry was a charismatic and patient leader. He provided opportunities to others, and always followed up on delegated tasks. He believed in service and desired to improve the wildlife profession. He took on many active roles on the Western Section Executive Board, including President, Professional Development Committee Chair, Co-chair of the 2001 TWS Reno Annual Conference Arrangements Committee, and finally, Transactions Editor. Once active, he stayed committed to any task he accepted and enlisted the assistance of others whenever possible. He always maintained high standards for himself and others, taking each position and committee work to new levels. Barry took the lead in the movement to establish a full-time Director to increase and expand outreach and opportunities. He had a vision for the Section - to make our profession more tangible for future "Wildlifery" and more productive for his peers. Through this infectious passion for wildlife and the natural world, he helped non-biologists to better appreciate their surroundings and encouraged practicing biologists to learn more about whatever facet of the profession they were involved in.

Barry mentored countless students, peers, and many of his supervisors as well. He believed in people and knew that assigning a task or position to junior colleague would both challenge and nurture them while bringing a fresh perspective to the profession. He was personally responsible for engaging many of the past and present Executive Board's members to take on committee assignments and for initiating countless Section efforts.



changes of a large herbivore, while also assisting resource managers to more effectively manage Tule elk. From 2005 to the present, we have monitored radio telemetry and GPS-collared adult female Tule elk to examine small-scale spatial usage patterns and survival rates in both populations. We captured and radio-collared calves to estimate first-year calf survival rates, and determine causes of mortality. Preliminary results show large fluctuations in calf survival rates between populations and years. Adult survival rates were high in 2005 and 2006 but recently declined, possibly due to drier weather. Elk exhibited diurnal shifts in habitat usage, which may be related to human presence. Future work will focus on incorporating these data into a spatial population dynamics model to predict future population growth and range expansions of Tule elk at Point Reyes.

The northern spotted owl in the 21st Century: Symposium overview

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Abstract: Since the northern spotted owl (NSO) was federally listed as threatened in 1990, timber management projects in the species' range have been subject to either the Endangered Species Act Section 9 take prohibition or the Section 10 incidental take authorization of approved Habitat Conservation Plans (HCP). Under both general approaches, the goal was to perpetuate habitat for the species on managed timberlands. However, no long-term monitoring has been associated with the no-take projects and the efficacy of HCPs has not been thoroughly reviewed. In addition to habitat concerns, the expansion of barred owls into the NSO's range has complicated survey techniques and the determination of site occupancy for NSOs. A one-and-a-half day symposium immediately preceding the Western Section Annual Conference was organized to review new scientific information on the NSO, as well as the effects of barred owls on surveys and site occupancy. Panels of scientific experts and agency personnel discussed the implications of the new information and initiated discussions of new strategies for the conservation of the NSO in California. This presentation will review highlights from the symposium, including recommendations and conclusions from the panel discussions.

Use of habitat and nests by Tamias ochrogenys and association with tick-borne disease

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Abstract: Chipmunks, *Tamias spp.*, are important hosts of *Ixodes spp.* ticks and play a role in maintaining tick-borne infection. *Tamias ochrogenys* inhabits redwood and Douglas fir forest in Mendocino County, with a preference for old forest with extensive downed woody debris. Our data document that, among rodents in Mendocino County, only tree squirrels have a higher risk of infection with a zoonotic tick-borne disease, granulocytic anaplasmosis, than chipmunks which have an odds ratio of 4, compared to other rodents. Chipmunks supported human-biting tick species including *I. pacificus*, *I. angustus*, and *Dermacentor occidentalis*. We affixed radio collars and used radio-telemetry to observe diurnal and nocturnal activity and habitat use of chipmunks in Hendy Woods State Park, comprising predominantly redwood, live oak, and Douglas fir forests. We observed moderate dispersal distances with animals occasionally moving between transects and habitat types. Nests tended to be under decayed logs. Chipmunks may contaminate habitat in both disturbed and old growth forest, and support ticks in nests and on the forest floor. Thus the nest/forest floor interface may be an important location for tick-borne infection to be maintained and then create a health risk for humans and other animals.

Monitoring avian species diversity in montane conifer and sagebrush habitats in Northern California using automated recorders

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Abstract: The California Department of Fish and Game conducted surveys of birds, small mammals, and vegetation at 608 randomly selected plots throughout the Klamath, Southern Cascade and Modoc ecoregions of northern California from 2002-2007. Digital and analog automated recording systems were used to record bird vocalizations and document bird species occupancy at study plots during the breeding season. Recording devices were set to record for two, 5-minute periods on 3 consecutive days. Initial analysis of the data indicates this technique can be used to detect a variety of bird species and to monitor changes in their distribution over time. The recording devices documented more than 160 different bird species within the study area. Power analysis suggests that in order to monitor approximately 50 bird species, a sample of 700 plots is needed to detect a 50% decrease ($\beta = 0.2$, $\alpha = 0.1$) in the proportion of occupied sites between two time periods separated by 10-20 years. Automated recording devices have some advantages over traditional breeding bird surveys including creation of a permanent and verifiable record of birds present and the ability to efficiently collect samples at comparable times of the day.

Small mammal habitat associations in East Bay Regional Park District grasslands

Student Paper. Christine O. GABER, Reginald H. BARRETT, James W. BARTOLOME, Michelle R. HAMMOND, and Peter HOPKINSON, University of California, Berkeley, 137 Mulford Hall #3114, Berkeley, CA 94720, (510) 642-4364; E-mails: gaber@nature.berkeley.edu, rbarrett@nature.berkeley.edu, jwbart@nature.berkeley.edu, mhammond@nature.berkeley.edu, phopkin@nature.berkeley.edu

Abstract: As part of an ongoing, long-term grassland ecology study on East Bay Regional Park District lands, we collect presence/absence data for California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*), and Botta's pocket gopher (*Thomomys bottae*). We analyzed 2004 and 2006 data using nonparametric multiplicative regression in HyperNiche to create habitat models and estimate the likelihood of occurrence of these three species on our plots relative to the following environmental variables: livestock grazing, soil texture and chemistry, vegetation characteristics, topographic attributes, and study plot location within a particular park. HyperNiche identified habitat models that predicted species presence for California vole and Botta's pocket gopher. Low clay soils and the presence of sheep grazing predicted California vole presence in 2004. In 2006, soil characteristics, but not grazing treatment, were selected as predictors in the best model for this species. Study plot locations were the only variables included in the best models for pocket gophers in 2004. In 2006, our pocket gopher model included low clay, higher elevation and study plot location. Interannual variability in rainfall and other conditions may affect the importance of environmental variables in predicting species presence year to year.

Pathogens associated with fishers (*Martes pennanti*) and their sympatric mesocarnivores in Northern California

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Abstract: The conservation of a species requires the understanding of many ecological factors, including health risks from infectious pathogens that have the potential to limit the success of management efforts. We evaluated a population of fishers in northern California, currently a candidate species meriting listing under the federal Endangered Species Act, and their sympatric mesocarnivores. Our analysis includes samples from 76 fishers and 65 mesocarnivores including striped skunks, spotted skunks, ringtails, gray foxes, and raccoons, trapped between December 2004, and March 2007, near Hoopa, CA. We report pathogenic exposures to canine distemper virus (CDV), canine parvovirus (CPV), canine herpes virus (CHV), canine adenovirus (CAV2), West Nile virus (WNV), *Toxoplasma gondii* (TG), *Anaplasma phagocytophilum* (AP), and none were exposed to *Bartonella spp.* or *Yersinia pestis*. Twenty seven of 145 fecal samples were PCR-positive and product sequences matched CPV sequences from Genbank. There was no significant difference between seroprevalence of CDV, CPV, CAV, CHV, WNV or CPV active infections between fishers sampled in the area and their sympatric mesocarnivores. Surveillance of wildlife health in species that are sympatric with at-risk wildlife may be beneficial in conservation management efforts.

Response of small mammals to Ponderosa pine restoration in northeastern California

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Abstract: We examined the response of small mammals to experimental treatments designed to accelerate the development of late-seral-stage forest structure in eastside pine forests on the Gooseneck Adaptive Management Area in Klamath National Forest. Small mammal populations were monitored using mark-recapture methods on 20 experimental units before and after two different thinning treatments and a prescribed burning treatment that were applied 1998 and 2001. *Tamias senex*, the most common species we captured and one generally associated with high canopy closure, was initially more abundant on one of the thinning treatments but that difference declined over time. *T. senex* survival declined in the year following thinning or burning treatments on a unit but showed no long-term response to the treatments. *Tamias amoenus*, increased dramatically on both the thinned and the burned units but the response lagged the treatments by 3-4 years. *Spermophilus lateralis* also increased on the thinned and the burned treatments 1-2 years after the treatments. *Tamiasciurus douglasii* varied greatly from year-to-year but showed no consistent response to the treatments. *Peromyscus maniculatus* showed a positive response to the thin and burn treatment 5 years after the burn was applied.

Tree vole nest abundance and habitat associations in managed forests

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Abstract: Currently, two species of tree vole are recognized within California. The northern species is commonly referred to as the red tree vole (*Phenacomys longicaudus* = *Arborimus longicaudus*) and the southern species as the Sonoma tree vole (*Arborimus pomo*). The current line of demarcation for these species is believed to be the Klamath River. We studied nest abundance of Sonoma tree voles on forests owned and managed by Green Diamond Resource Company. During 2001-2004, crews surveyed 68 10-ha grids using line transect methods to detect nests of arboreal species. Forest stands ranged in age from 23 to 123 years. We located 886 nests of tree dwelling species, of which, 129 were characterized as vole nests based on physical evidence. Approximately 47% of the vole nests were classified as recently occupied. Ninety percent of vole nests were found in Douglas-fir trees and nest tree DBH ranged from 6 to 64 inches. Detection probabilities of nests, results of habitat sampling at the nest tree and grid level and challenges to monitoring this secretive and highly specialized arboreal mammal will also be presented.

Birds of the East Bay grassland

Michele R. HAMMOND, Sasha GENNET, Devii RAO, Reginald H. BARRETT, James BARTOLOME, Christine O. GABER, and Peter HOPKINSON, University of California, Berkeley, 137 Mulford Hall, Berkeley, CA 94720, (510) 642-4364; E-mail: mhammond@nature.berkeley.edu

Abstract: We are conducting a long-term study on grassland ecology of the Eastern San Francisco Bay area. We are developing a baseline vegetation and wildlife dataset for Valley Grassland habitat and examining the effects of livestock grazing on the plant and wildlife communities. We have 35 grazed and 17 ungrazed grassland plots throughout EBRPD and Parks RFTA land. We conducted line-point surveys for vegetation and point count surveys for birds. We chose to focus on species with direct nesting and foraging associations to grassland habitat: Western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), horned lark (*Eremophila alpestris*) and grasshopper sparrow (*Ammodramus savannarum*). Preliminary analyses suggest no consistent trends over the years 2004-2007. Livestock grazing does not appear to negatively impact any of the species within our grassland bird guild, but appears to positively affect the guild overall. Larger grassland patch size and low diversity of habitat types at a landscape scale appears to favor these bird species.

The impact of predator exclosures on snowy plover nesting success: A 7-year study

Student Paper. **Michael A. HARDY** and Mark A. COLWELL, Wildlife Department, Humboldt State University, 1 Harpst St., Arcata, CA 95521, (707) 822-8867; E-mails: mah60@humboldt.edu, mac3@humboldt.edu

Abstract: Nest predation has been identified as a major threat to ground-nesting birds, and predator exclosure cages have been used extensively in North America to protect the nests of threatened plovers. Exclosures are generally effective at reducing egg predation, but sometimes have unintended consequences, including increased predation of incubating adults. We evaluated the effectiveness of exclosures at enhancing productivity of threatened Western snowy plovers (*Charadrius alexandrinus nivosus*) breeding in coastal northern California from 2001-2007. In coastal beach habitats, exclosed nests survived better than unexclosed nests and exclosed beach nests survived as well or better than unexclosed nests in higher-quality habitat on gravel bars of the lower Eel River. There was no significant difference in partial clutch loss or hatchability between exclosed and unexclosed beach nests, but exclosed nests suffered from higher rates of nest abandonment. Although exclosures can greatly increase nest survival, increased nest abandonment or predation of incubating adults can potentially outweigh any positive effects. Consequently, use of exclosures must be considered carefully, especially when dealing with small or threatened populations.

The response of San Gabriel Mountains bighorn sheep to fire

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Abstract: During winter and spring, bighorn sheep (*Ovis canadensis nelsoni*) in the San Gabriel Mountains occur on chaparral-dominated ranges from 3,000-5,500 feet elevation. We evaluated the response of this population to periodic conflagrations that burn in this mountain range. A resource selection model identified a strong, positive relationship between the springtime distribution of bighorn sheep within 15 years of a fire, and a strong negative relationship beginning 15 years following fire. We compared recruitment rates on burned and unburned ranges following two fires. Recruitment rates on the burned ranges exceeded those on unburned ranges in only one year after two fires; however, the differences did not occur during the same years post-fire. Recruitment rates on burned ranges did not exceed unburned ranges three years following fires. We hypothesize that the inability to detect consistent differences in recruitment rates was associated with different movement patterns among bighorn sheep. Rates of increase on burned ranges remained substantially higher than unburned ranges up to nine years post fire. The distribution of bighorn sheep and the consistently higher rates of increase following fires

Abstract: Coarse woody debris (CWD) is considered an important habitat component for small mammals, but it also represents a fuel source for wildfires and is sometimes removed or reduced during fire management activities. Removing CWD may be beneficial for fire management but also might be detrimental to wildlife. Therefore, we studied the effects of experimental removal of CWD on survival, body mass, and capture rates of small mammals. On 22 1.1-ha study plots in mixed blue oak-coast live oak woodland habitat in Coastal Central California, small mammals have been live trapped each spring and fall since 1993. In mid-late winter 2007, we measured CWD and other habitat attributes on each study plot and subsequently removed CWD from 11 of the 22 plots. We conducted a single post-treatment trapping session in April-May 2007. Preliminary results indicate that small mammals were more likely to be encountered at sampling points with CWD present compared to points where no CWD was found. Further, capture-recapture survival models indicated that CWD was an important habitat factor for some small mammal species. We will discuss the initial effects of CWD removal on small mammals in this study area.

CoyoteBytes.org: A website to inform urban coyote management

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Abstract: Conflicts between urban coyotes and humans have increased in recent years. We know of >110 incidents in California, most within the past decade, where humans were bitten by coyotes. However, few data are available on incidents of coyote attack on pets. We suspect many conflicts occur because of human behaviors that results in coyote habituation; with informed management, most are preventable. We have developed a website, <http://www.CoyoteBytes.org>, to provide management recommendations to homeowners and municipal officials to reduce coyote conflicts in suburban areas. Additionally, website visitors may submit first-hand reports describing conflicts and encounters. The web site contains an incident map, an Internet-enabled webGIS tool, allowing coyote incidents to be mapped by type of incident and by progress through time. This should help homeowners better understand how to prevent suburban coyote conflicts, thus reducing the incidence of misuse of pesticides in ill-conceived efforts to control coyotes. The information being collected will allow a more complete analysis of this problem, thereby improving management recommendations. A better understanding of the problem, as well as of impacts of management strategies currently in use, should aid decision-making in cities and counties' attempts to find appropriate solutions.

Comparison of geographic, ecological and anthropogenic factors on bird richness and abundance in riparian habitat

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Abstract: We modeled the association of bird richness and abundance with environmental factors in riparian habitat of Santa Barbara, Ventura, and western Los Angeles counties. We assumed that avian richness and abundance were determined independently at each site. We tested three hypotheses: (1) Richness is correlated with the structural complexity and number of habitat types near the site; (2) Abundance is determined by the area of each habitat; (3) Anthropogenic activities affect richness and abundance differently when compared to natural areas. We used GIS variables and point-count data from 231 stations in 2003 and 65 stations in 2004. To test the first hypothesis, we used vegetation type within 1000 m and geomorphology factors (watershed, watershed size, stream order, elevation, precipitation, temperature, and distance to coast). For the second hypothesis, available habitat was indirectly tested with drainage size, stream order, floodplain, and areas without cover. Lastly, we combined anthropogenic activities with those factors selected in the previous models. Anthropogenic variables were proportion and types of human development within 1000m, number of upstream dams, human population, distance

to major roads, and time since last fire. Preliminary results indicate that very few variables explain the majority of observed variation in richness and abundance.

Breeding phenology of the Northern red-legged frog (Rana aurora) at Humboldt Bay National Wildlife Refuge

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Abstract: Developmental stages, specifically egg masses, are an excellent life stage to study breeding biology due to their static nature. The northern red-legged frog (*Rana aurora*) has received little attention in California despite its relatively constricted range and numerous potential population stressors. We studied the breeding phenology of the northern red-legged frog at Humboldt Bay National Wildlife Refuge from November 2006 to April 2007. Surveys were conducted 1-2 times per week for a total of 23 survey efforts over 21 weeks. Oviposition microhabitat data and abiotic information was collected at each egg mass location. Egg masses (N=237) were individually monitored and their fate was determined. Our results suggest that northern red-legged frogs have a prolonged breeding season that exceeded three months (first egg masses seen on December 17, 2006 to last egg mass seen on March 25, 2007). However, an explosive breeding event (82 new egg masses in three nights) in February, following four weeks of limited production, suggests these frogs are using environmental cues to oviposit egg masses during favorable conditions. These results will contribute to the baseline knowledge of the northern red-legged frog in California and assist resource managers in making informed decisions to best conserve this species.

Distribution of the amphibian assemblages of zero-order basins and their relationships to the landscape mosaic in the Mill Creek watershed, Del Norte County, CA

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Abstract: Headwaters amphibians have excellent potential as biological indicators of ecosystem status because of high site fidelity, sensitivity to disturbance, long lives, and ease of sampling. Furthermore, they offer large cost savings compared with sampling for other potential vertebrate indicator species. Amphibians occur in large numbers in healthy forest ecosystems and play an important role in regulating invertebrate communities and thus indirectly have strong effects on the carbon sequestration dynamics of forest litter and soils. In 2006 we conducted time-constrained upland searches, and aquatic area-constrained searches at 28 zero-order sites in four forest seral stages of redwood forest at Mill Creek and adjacent parklands. Results showed significant differences in species numbers and assemblage composition between stands on the heavily logged Mill Creek property and those on adjacent parklands. For example, in the upland, we averaged 5.5 animals per hour on the property versus 12.7 animals per hour in the parkland. We suggest that as the managed forests on the property recover, amphibian numbers will approach that of adjacent late-seral forests. We intend to compare these baseline values with future monitoring of these assemblages over decades in order to track changes in the Mill Creek biota as forests recover late-seral conditions.

Forensic methods and DNA evidence of intraguild predation on fishers (Martes pennanti) in California

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Abstract: Intraguild predation within fisher (*Martes pennanti*) communities has not been adequately documented in the literature. In most accounts, observers have suspected potential predators based only on puncture wounds and visual clues at a predation scene, which can be misleading in determining the predator species. Furthermore, forensic DNA evidence of intraguild predation is absent from the literature. We generated a field protocol for documenting and collecting forensic DNA evidence of predation on fishers through different fisher research projects in California. In addition to physical evidence such as bite wound measurements and non-fisher fur at the scene, our protocol suggests collecting matted fur, swabs of bite wounds, and swabbing nails and teeth. Through evidence collected at the scene of several fisher mortalities, we have been able to identify predators of fishers through three types of samples: matted fisher fur with predator saliva, predator fur left on and nearby the carcass, and swabs of the interior of bite wounds. Here, we report the first DNA documentation of intraguild predation on fishers by another predator.

Home range, seasonal movements and habitat use of Mountain yellow-legged frogs (*Rana muscosa*) in a Northern Sierra Nevada stream

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Abstract: Mountain yellow-legged frogs (*Rana muscosa*) inhabit the Sierra Nevada Mountains of California and Nevada where they occupy aquatic habitats at elevations ranging from 1400 to 3700m. To date, no published information on the home range or movement patterns of this species within lower-elevation streams of the northern Sierra Nevada Mountains exists. In this study, we quantified the movement patterns, home range, and microhabitat associations of mountain yellow-legged frogs within a stream in Plumas National Forest, with particular attention to movements out of the main stream channel and into the forest. From July 2005 through September 2007, fifty individual mountain yellow-legged frogs were affixed with radio transmitters and tracked throughout the year. We found differences in movements and home ranges between the seasons. Microhabitat use also varied with season. Documented movements away from the creek were infrequent and never exceeded 22m, but were more common in late spring and mid-winter, possibly because off-creek refugia were more abundant. Results of this study will provide more insight into the conservation needs of this rare species in managed forests.

Assessing the conservation status of the native Sacramento Valley red fox

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Abstract: Recent results from genetic studies have shown that red foxes in the Sacramento Valley are native to California. Furthermore, new genetic findings indicate reduced levels of genetic diversity raising concerns about the health and long-term viability of this population. To address these concerns, we have initiated a study to determine population size and structure, threats, reproductive health, survival rates and habitat use of red foxes in the Sacramento Valley. Such information is required to develop effective management strategies across their current distribution. In this talk, we present preliminary results on the distribution of these foxes based on an interactive, web based approach with strong community involvement. We will then outline our plans to expand field and lab-based investigations over the next several years.

Waterfowl use on managed wetlands during the non-breeding period at the Sacramento National Wildlife Refuge complex, Sacramento Valley, California

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Abstract: California's Sacramento Valley is a major wintering area for waterfowl, supporting about 40% of total ducks and 50% of total geese in the Pacific Flyway during mid-winter. Managed wetlands play an essential role by providing high-quality forage, emergent vegetation cover, loafing sites, and resting areas. Waterfowl use at the Sacramento National Wildlife Refuge Complex was surveyed during the non-breeding period (August-April), 1994-2006. A total of 510 surveys were conducted on four refuges, which include approximately 270 individual management units. Average waterfowl densities (ducks and geese combined per acre) among refuges ranged from 51-188 birds on seasonally flooded wetlands (SF), 21-53 birds on semi-permanent wetlands (SP), and 7-30 birds on permanent wetlands (PW). When densities were compared within refuges on non-hunted units, waterfowl use was 65-89% less on PW and 26-64% less on SP wetlands compared to SF wetlands. Use was 21-69% less on PW than SP. Factors affecting waterfowl use on these areas include habitat productivity, plant species composition, water depth, specific habitat features, and human disturbance. Management considerations are offered for improving waterfowl use on the different wetland types. However, reduced wintering waterfowl use should be considered when making decisions to convert SF to SP or PW habitat.

Using molt cycles to categorize age in tropical birds: An integrative new system

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Abstract: Methods to accurately differentiate age classes are essential for the long-term monitoring of resident New World tropical bird species. Molt and plumage criteria have long been used to accurately age temperate birds and recent studies have shown that similar criteria can be used to categorize tropical individuals into age classes. Application of temperate age-classification models to the Neotropics has been hindered because annual life cycle events of tropical taxa are not always in concordance with temperate age-classification nomenclature. Here we detail a categorical age class system for tropical birds using molt cycles, and examine implications of the system using case studies. Our proposed, cycle-based age-classification system can be used for all birds, including temperate species, and provides a framework for investigating questions that address the dynamics of tropical bird populations which could ultimately influence management decisions.

Home range size and food habits of ringtails (*Bassariscus astutus*) in a Central Valley riparian forest, Sutter County, California

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Abstract: Few home range and/or food habits studies have been conducted of ringtails (*Bassariscus astutus*) in California and in particular the Central Valley. During 1990 and 1991, a radiotelemetry study was conducted on eight ringtails (four males, four females) to determine home range sizes in riparian forest. Additionally, 172 ringtail droppings were collected from December 1989 through November 1990 and examined for their contents. All research was conducted within the mature riparian forest along the Feather River at the Abbott Lake Unit of the Feather River Wildlife Area, Sutter County, California. Ringtail home range sizes ranged from 5.3 to 21.4 ha with an average of 12.0 ha with a total of 733 distinct radiotelemetry fixes for the eight ringtails. The fecal analysis revealed that although mammals were the most consumed items on an annual basis, mammals were dominant food items only during the winter and spring periods while fruits were dominant during the summer and autumn periods. The

POSTER SESSION ABSTRACTS

Poster title: *Western pond turtle conservation strategy*

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California Department of Fish and Game has recently commissioned Redwood Sciences Laboratory to develop a conservation strategy for the Western pond turtle. California has a wide variety of biogeographic regions, and an even greater number of conservation issues for this charismatic poikilotherm. Using an interactive map of California we describe many of the conservation issues across the state and provide an opportunity for turtle researchers, scholars, consultants, and enthusiasts to add concerns based on their experiences with the species. This interactive map will help us establish and maintain communication with interested parties during development of a strategy for the conservation of Western pond turtle populations throughout California.

Poster Title: *River Otter Network: long-term monitoring of ecosystem health*

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Abstract: Many river otter (*Lontra canadensis*) populations in North America and beyond have suffered dramatic declines due to human impacts. Little information exists about river otter populations in the Pacific Northwest. Are they threatened or thriving? Since 1999, the HSU Wildlife Department has facilitated an ongoing study to monitor the distribution and demography of river otters in coastal and inland areas in Humboldt & Del Norte counties, CA. The study is an example of citizen science in action; records are supplied by students, professionals, and many outdoor enthusiasts likely to encounter otters in the wild. Data are sent via the internet or mail. Records include: date, time, location, number of adults and young, behavior and habitat information. Records are mapped using GIS software. Over 1,200 observations have been recorded in a variety of sites, including fresh, brackish and salt water habitats. Between 8-17 litters were recorded each year; mean litter size 2.3 (n = 53). Group size ranged from 1 to 9 individuals. Monitoring river otters, a top carnivore in the food chain, may provide a useful measure of ecosystem health. The network (otters@humboldt.edu) is providing a unique database to assist fisheries and wildlife managers.

Poster Title: *Using noninvasive techniques to study stress hormones and genetics in river otters in Northern California.*

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(Student Poster)

Abstract: North American river otters (*Lontra canadensis*) are useful indicators of environmental health. They are thought to be susceptible to habitat disturbance, including seasonal runoff, which causes changes in turbidity and contamination. Otters subjected to degraded environments are likely to exhibit increases in glucocorticoid stress hormone levels. Long-term stress may have deleterious effects such as decreased reproduction and increased susceptibility to disease. Questions regarding the ecology and behavior of river otters have, until recently, been difficult to address. The elusive nature of river otters makes behavioral and ecological studies difficult to conduct without invasive techniques. We will extract DNA and hormones from scat using validated methods. Genotyping individual otters by microsatellite analysis will enable us 1) to determine relatedness within the Humboldt Bay population, 2) to examine gene flow across northwest California, and 3) to evaluate sociality and seasonal movements of these coastal otters. Water quality data and scat samples will be collected from known latrine sites from multiple otter groups

for 12 consecutive months to evaluate seasonal water quality variation, stress and seasonal latrine site use. Establishing non-invasive methods to investigate ecological questions are essential for research on secretive, low-density mammals like otters.

Poster Title: *Fog deters birds from high-voltage roost*

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Abstract: Nuisance bird species congregate and roost in electric substations. Pacific Gas and Electric Co. (PG&E; San Francisco, California), like many American electric utilities, experiences problems with this phenomena. One of the biggest problem locations within transmission substations is at high-voltage series capacitor banks. The associated accumulation of bird excrement on substation equipment presents serious risks to system reliability because under the right conditions, the bird excrement is conductive and can cause a system outage. PG&E is using a non-toxic organic compound (methyl-anthranilate - an EPA approved food grade aerosol that smells like grape flavoring) to deter 50,000 to 70,000 starlings, blackbirds, finches and sparrows from roosting on high voltage equipment in the Central Valley. This is the first time the compound has been used on high voltage equipment.

Poster Title: *Intersexual variation in the foraging ecology of Western wood-pewees: Females do work harder*

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Abstract: In avian foraging studies, data on males and females are frequently pooled. While this may increase sample size, it can also obscure important differences in foraging behavior and habitat use. To investigate intersexual variation in foraging use and behavior, we completed 57 observations (31 male and 26 female) of Western wood-pewees (*Contopus sordidulus*) breeding along the edges of 5 montane meadows in the southern Sierra Nevada. Birds were observed for up to 20 min. and the rate of attack (no. attacks/min.) was calculated. We also recorded several behavioral and habitat characteristics pertaining to the used substrate. Results suggest that female pewees forage at a higher rate than males ($= 2.53 \pm 0.18$ SE and 1.02 ± 0.08 SE attacks/min), fly shorter distances to prey, and spend more time in the lower canopy and understory. Females also foraged from shorter substrates than males and from trees with smaller mean diameter. By understanding foraging behavior and habitat needs of both male and female pewees, we can more effectively manage for both sexes and potentially include other species that use ecotonal habitat in Sierran montane meadows.

Poster Title: *Rapid field pathogen tests are not sensitive enough for use on fishers (*Martes pennanti*)*

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(Student Poster)

Abstract: Fishers in the Pacific states were recently designated a distinct population segment that warrants listing under the federal Endangered Species Act. We have documented pathogenic exposures and infections of fishers and sympatric ringtails, raccoons, gray foxes, spotted skunks, and striped skunks. We used commercially available IDEXX SNAP® tests developed for rapid detection of canine parvovirus (CPV), *Anaplasma phagocytophilum* (AP) (agent causing granulocytic anaplasmosis) and *Borrelia burgdorferi* (BB) (agent causing Lyme disease) infections in domestic dogs. We compared polymerase chain reaction (PCR) detection results of CPV to SNAP® Parvo Antigen Test results and indirect fluorescent antibody (IFA) serology for AP and BB to results from SNAP® 4DX serological tests. Ninety CPV SNAP® tests were run on 66 fisher and 24 sympatric mesocarnivore samples. All results from CPV SNAP® test were negative while PCR detected 17 positive fecal samples. The 4DX SNAP® tests detected antibodies to AP and BB in two and one of the samples respectively, as compared to positive results obtained by IFA in 16 and 6 samples for AP and BB, respectively. We conclude that rapid field testing for pathogens may provide a high level of false negatives to be useful in making management and conservation decisions concerning fishers.

Poster Title: *Breeding biology and seasonal movement of urban Steller's jays*

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Abstract: Steller's jays as opportunistic omnivores have successfully adapted to anthropogenic environments throughout much of their range. While jays are important nest predators on species of concern such as the marbled murrelet in Northern California, managers are interested in links between human activity in parks and wilderness areas and the distribution and activities of jays. The basic social unit in the Steller's jay is the breeding pair that defends the area around its nest site year round in a loose form of territoriality, described as site-centered dominance. This social relationship and the high tolerance of residents towards neighbors and transients intruding into their territory for food and nesting material creates a pattern of overlapping home ranges among neighboring pairs. We investigated home ranges of breeding pairs in suburban neighborhoods along the fringe of the redwood forest throughout Arcata (Humboldt County, CA). This marked jay population experiences a highly heterogeneous habitat. Patchy food sources and high social tolerance of jays facilitate regular assemblages of neighboring birds. We show that home range sizes and movement patterns of birds can change dramatically with season, breeding status and availability of natural and anthropogenic foods.

Poster Title: *Nest site characteristics of the Western pond turtle (*Clemmys marmorata*): Implications for species management*

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Abstract: The Western Pond Turtle (WPT), *Clemmys marmorata*, a California Species of Special Concern, has been declining throughout its range for at least 20 years. Habitat alteration and lack of recruitment are noted as primary causes (Jennings & Hayes, 1994). There is a particular lack of data concerning nesting patterns of WPT throughout their range. We have collected data on two very different nesting localities in Northern California: one is adjacent to the Sonoma County coast, the other further inland at a vernal lake in Lake County. We collected data during the 2007 nesting season focused on a range of nest site characteristics, including number, location, and arrangement of nests, degree of depredation, and timing of nesting. At both sites the nests were heavily preyed upon, suggesting recruitment is of concern, even in the middle of the species' range, where it is thought to be least at risk. These data imply that suitable nesting habitat adjacent to WPT populations needs to be adequately protected, as they are fundamental to conserving and bolstering populations of this species.

Poster Title: *Exploratory risk taking behavior in Steller's jays (Cyanocitta stelleri)*

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Abstract: Locating high quality resources is critical to maximizing individual reproductive success (Prop and Black 1998, Temple 2004). In long-lived species improvements in reproductive potential may require continual reassessment of alternative mates and breeding locations (Black 1996). Individuals with a high propensity to take risks and explore or exploit an unknown or neighboring territory might be better suited to prospecting for potentially higher quality habitat. Alternatively, an individual's motivation or need to investigate alternatives and bear the costs of exploration may depend on the quality of the explorer's own territory and resources. In this study individuals were captured, measured, and temporarily placed in an aviary equipped with trees and catching locations, simulating arrival in a foreign territory, to determine variation in exploratory behavior among individual Steller's jays. The purpose of this study is to gain a greater knowledge of the behavioral dynamics of animal populations, including how an individual's propensity to take risks may facilitate their success at locating and establishing a territory. The results of this study will be included in a larger study addressing factors that influence fidelity to mates and territories in Steller's jays.

Poster Title: *Shorebird populations and habitat use during a dry and a wet spring at the Sacramento National Wildlife Refuge, California*

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Abstract: Sacramento National Wildlife Refuge (SNWR) provides important wetland habitat for both resident and migratory shorebirds, particularly during spring migration when California's Central Valley (Valley) supports an average population of 335,000 shorebirds. SNWR provides various wetland types, including seasonally-flooded marsh, watergrass, semi-permanent/permanent pond and vernal pool. Shorebirds were surveyed on SNWR during the springs of 1997 and 1998. During the dry spring of 1997, Valley wetland and flooded agricultural habitats were limited as they dried up quickly, and SNWR's spring shorebird count peaked at 36,361. Conversely, during the wet spring of 1998, Valley habitats were more abundant and remained flooded for a longer period, and SNWR's spring shorebird count peaked at 4,503. During both years, most species preferred seasonally-flooded marsh and/or vernal pool, but some larger species preferred watergrass. Semi-permanent/permanent pond was selected against by all species during both years. Although vernal pool comprised less than two percent of the total habitat acres, it held the highest density of shorebirds and was preferred by more species than the other wetland types. Results indicate that wetland managers targeting benefits for spring shorebirds should consider more active wetland management during dry springs and conserve vernal pool habitats in their natural state.

Poster Title: *Influence of mate presence on Steller's jay (Cyanocitta stelleri) cache concealment effort*

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Abstract: Steller's jays often store food and return to retrieve the stored items at a later time. Between caching and consumption, stored food has the potential to be stolen by mates and other conspecifics. We investigated whether Steller's jays adjust cache concealment effort when in the presence of a mate, and if there is a difference in concealment adjustment between the sexes. We recorded the distance traveled from food sources to caching locations in urban Arcata, California, USA. Caching distances were documented for all individuals when alone and when in the presence of a mate. We found that both sexes