2006 Annual Conference

The Western Section of The Wildlife Society

Plenary Theme:

Monitoring Wildlife Populations: State of the Science

Program and Abstracts

February 8-10, 2006
Doubletree Hotel
Sacramento, California

Concurrent Technical Session Schedule:

Thursday, February 9, 2006 (Salon A)
Concurrent Session: Ecology and Management of Forest Carnivores

Chair: Keith Hamm, Green Diamond Resources Company

1:00 to 1:10 p.m.	Opening Remarks
1:10 to 1:30 p.m.	*Evidence for Population Decline of Pacific Fisher* (Martes pennanti) *on the Hoopa Valley Reservation, California.* Sean M. Matthews, J. Mark Higley, Charles A. Goddard, Aaron J. Pole and Karrie T. Mellon
1:30 to 1:50 p.m.	*Genetic State-wide Studies of Black Bears in California: Preliminary Findings.* Sarah K. Brown, Douglas Updike and Holly B. Ernest
1:50 to 2:10 p.m.	*Serological and Pcr Evidence of* Anaplasma phagocytophilum *in Gray Foxes* (Urocyon cinereoargenteus) *in Northern Humboldt County, California.* Mourad W. Gabriel, Richard N. Brown, Janet E. Foley and Richard G. Botzler
2:10 to 2:30 p.m.	*Using Camera Traps to Conduct a Population Survey of Fishers* (Martes pennanti) *in the Southern Sierra Nevada.* Mark J. Jordan, Reginald H. Barrett and Kathryn L. Purcell
2:30 to 2:50 p.m.	**Break**
2:50 to 3:10 p.m.	*High Resolution DNA Marker Panel for Puma Ecology and Forensics.* Jennifer Kurushima, Julia Collins, Jay Well and Holly Ernest
3:10 to 3:30 p.m.	*Pacific Fisher Distribution and Habitat in the Shasta Lake Region of Northern California.* Len Lindstrand III
3:30 to 3:50 p.m.	*Pathogens Associated with Pacific Fishers* (Martes pennanti) *in Northwestern California: Implications for Trapping and Translocation.* Richard N. Brown, Mourad W. Gabriel, Sean Matthews, J. Mark Higley and Greta Wengert
3:50 to 4:10 p.m.	**Break**
4:10 to 4:30 p.m.	*Genetic Structure among Lowland and Montane Red Fox Populations in California.* John D. Perrine, John Pollinger, Benjamin N. Sacks, Reginald H. Barrett and Robert K. Wayne
4:30 to 4:50 p.m.	*Characteristics of Summer and Fall Home Ranges of American Martens in Coastal Northwestern California.* Keith M. Slauson and William J. Zielinski
4:50 to 5:10 p.m.	*Overview of Symposium: Fisher and Marten in California "Moving Science and Management Forward."* Keith A. Hamm

Contributed Papers Session Chairs:

Amphibians and Reptiles:

Hartwell Welsh, USFS Redwood Science Lab

Bats:

Betsy Bolster, California Department of Fish and Game

Conservation Planning:

Gail Presley, California Department of Fish and Game

Desert Ecosystems:

Rhys Evans, US Marine Corp

Amy Fesnock, National Park Service

Forest Carnivores:

Keith Hamm, Green Diamond Industries

Invertebrates:

Sandy Shanks, California Department of Fish and Game and UC Davis

Landbirds:

Dan Airola, Airola Environmental Consulting

Large Mammals:

Steve Torres, California Department of Fish and Game

Mitigation Banking:

Tina Bartlett, California Department of Fish and Game

Oak Woodlands:

Barrett A. Garrison, California Department of Fish and Game

Seabirds:

Gerard McChesney, US Fish and Wildlife Service

Shorebirds:

Mark Colwell, Humboldt State University

Small Mammals:

John Harris, Mills College

Raptors:

Allen Fish, Golden Gate Raptor Observatory

Riparian Ecosystems:

Geoff Guepel, PRBO Conservation Science

Water and Wildlife:

Marti Kie, Department of Water Resources

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discharge of agricultural drainage water, and a high evaporation rate. With salinity similar to that of ocean water, marine fish species were introduced and soon developed into an excellent fishery. In addition, hundreds of bird species use the various habitats at the Sea. However, increasing salinity threatens the ability of the Salton Sea ecosystem to continue to support these species. In addition, an agreement concerning allocation of water from the Colorado River will reduce inflows to the Sea. As part of the allocation agreement, the Resources Agency is developing an ecosystem restoration plan. The restoration plan must address infrastructure, restoration of fish and wildlife habitat, and air and water quality. Several primary infrastructure alternatives have been identified. Methods to mitigate air quality impacts and improve water quality are being explored, and habitat needs for fish and wildlife species dependent on the Salton Sea ecosystem are being assessed.

Bats and foraging habitat---critical management issues.

Patricia E. Brown and Robert D. Berry, Brown-Berry Biological Consulting, 134 Eagle Vista, Bishop, CA 93514, (760)387-2005, Email: patbobbat@aol.com.

Abstract: Knowledge of roosting and foraging requirements is necessary in managing for viable bat populations. The advances in transmitter technology now allow small bats to be tracked to roosts. Delineating foraging habitat and home range is a bigger challenge. Bats are very mobile, active at night and can cover areas not accessible by roads. For some species that don t travel far from the roost, ground tracking has been used to determine foraging habitat. For example, *Macrotus* in the California desert has been tracked from the ground while foraging in desert washes. *Corynorhinus* on Santa Cruz Island commuted from the roost at the coast to forage in native oak and ironwood forests on the mountains. Nocturnal aerial tracking from a light aircraft has been successful in determining foraging habitat and extending the distance traveled for three species of bats (*Macrotus*, *Euderma*, and *Idionycteris*). *Idionycteris* in Arizona traveled approximately 80 km roundtrip nightly between the roost in creosote bush scrub at 1000 meters and the foraging areas in mesquite grassland and pinyon/juniper woodland (1500 - 2000 meters) in the next mountain range to the east. Protecting habitat for foraging near the roost would not have been appropriate for this species.

Desert bats and management issues.

Patricia E. Brown and Robert D. Berry, Brown-Berry Biological Consulting, 134 Eagle Vista, Bishop, CA 93514, (760) 387-2005, Email: patbobbat@aol.com

Abstract: At least 17 bat species are found in the deserts of California and Nevada, and several more species occur sporadically. Many species are colonial, and a single impact can remove large numbers. Most bats have only one baby a year, and populations recover slowly. Roosting habitat (mines, rock crevices, trees, etc) may be over 30 km from foraging habitat. Human activities influence bat distribution and may threaten their survival. Mines provide primary shelter for several species, principally the California leaf-nosed and Townsend's big-eared bats, that are threatened by mine closure for hazard abatement and renewed mining, and by recreational entry into mines. OHV activity

impacts foraging habitat and increases access to mines and caves; recreational rock-climbing can disturb crevice-roosting species. Agricultural conversion and pesticides kill insect prey and may poison bats. Urbanization destroys foraging and roosting habitat. Channelizing desert washes removes riparian foraging habitat. Dams along the Lower Colorado River have altered bat diversity. Exotic vegetation (tamarisk) replaces native desert riparian and can change the prey base. Removal and burning of palm skirts can endanger roosting bats. Wind turbines can kill bats, especially during migration. Some of these impacts can be mitigated, such as by installing bat gates on mines, while others can only be acknowledged.

Pathogens associated with Pacific fishers (Martes pennanti) *in northwestern California: Implications for trapping and translocation.*

Richard N. Brown, Humboldt State University, Department of Wildlife, Arcata, CA 95521, (707) 826-3320, Email: RNB2@humboldt.edu; Mourad W. Gabriel, Integral Ecology Research Center, 102 Larson Heights Road, Mckinleyville, CA 95519, (707) 826-1313, Email: mgwbio@mgwbio.com; Sean Matthews, Wildlife Conservation Society, Hoopa Tribal Forestry, Hoopa, CA 95546, (530) 625-4284, Email: smatthews@wcs.org; J. Mark Higley, Wildlife Division, Hoopa Tribal Forestry, Hoopa, CA 95546, (530) 625-4284, Email: mark@pcweb.net; and Greta Wengert, Integral Ecology Research Center, 102 Larson Heights Road, McKinleyville, CA 95519, (707) 826-1313, Email: mgwbio@mgwbio.com.

Abstract: Western populations of fisher, *Martes pennanti*, were recently designated by the USFWS to be a distinct population segment (DPS) meriting listing under the Endangered Species Act. Disease was noted as a potential issue in this DPS, and this study provides preliminary information on exposures of a population in northwestern California that appears to have declined during recent years. Of 31 fishers sampled during Winter, 2005, one (3%) had been exposed previously to canine distemper virus, 13 (41.9%) had been exposed to a feline parvovirus-like virus, and 30 (96.8%) had been exposed to *Anaplasma phagocytophilum*, the cause of granulocytic anaplasmosis. Although little is known about disease in fishers, both viruses cause mortality of susceptible mustelids. In addition, anaplasmosis causes debilitating immunosuppression in susceptible species; the seroprevalence of fishers for exposure to *A. phagocytophilum* is unprecedented for areas other than Hoopa. While these data are preliminary, they illustrate the importance of (1) disinfecting traps and handling equipment between captures to minimize risks of spreading viruses throughout a population, and (2) consideration of disease issues prior to translocation of wildlife that could succumb to diseases cycling at a release site or into areas with existing communities that might be adversely affected by disease.

Genetic state-wide studies of black bears in California: Preliminary findings.

Sarah K. Brown, Wildlife and Ecology Unit of the Veterinary Genetics Lab, University of California, Davis, CA 95616, (530) 754-5186, Email: skbrown@ucdavis.edu; Doug Updike, California Department of Fish and Game, 1812 9th Street, Sacramento, CA 95814, Email: DUpdike@dfg.ca.gov; and Holly Ernest, Wildlife and Ecology Unit,

representative group, an assessment of the current status of native species and a summary of knowledge gained over 10 years of surveys will be presented.

Serological and PCR evidence of Anaplasma phagocytophilum *in gray foxes* (Urocyon cinereoargenteus) *in northern Humboldt County, California.*

Mourad W. Gabriel, and Richard N. Brown, Humboldt State University, Department of Wildlife Biology, 1 Harpst Street, Arcata, CA 95521, (707) 826-1313, Email: mourad@mgwbio.com; Janet E. Foley, University of California, Davis, Center for Vectorborne Diseases, Davis, CA 95616; and Richard G. Botzler, Humboldt State University, Department of Wildlife Biology, 1 Harpst Street, Arcata, CA 95521.

Abstract: Granulocytic anaplasmosis (GA) is an emerging tick-borne disease in North America caused by *Anaplasma phagocytophilum*, an obligate, intracellular bacteria. Since first reported in 1994, over 1300 human cases have been documented in the U.S. Although GA has been documented in numerous wildlife species, gray foxes (*Urocyon cinereoargenteus)* have not been evaluated previously for exposure to this agent. Traps were set for 1522 trap-nights during a 16-month period in 2003-2004 within the Hoopa Valley Indian Reservation, Humboldt County, California. A total of 54 individual gray foxes were sampled and 16 individual foxes were recaptured. Twenty-eight (52%) of these gray foxes were *A. phagocytophilum* seropositive. Foxes trapped in areas outside tribe-established human residential boundaries were more likely to be seropositive (16 of 23) than foxes trapped within the human residential boundary (12 of 31). There was a significant decreasing trend in seroprevalence from summer to winter. Six (9%) of the 70 total captures were infected at the time of capture as determined by PCR amplification of DNA with sequences matching *A. phagocytophilum*. We suggest that gray foxes may serve as competent wildlife sentinels of *A. phagocytophilum*. The clinical implications of anaplasmosis in gray foxes are not known but deserve further investigation.

Wildlife habitat changes in mixed-conifer forests in the central Sierra Nevada.

Barrett A. Garrison, California Department of Fish and Game, 1701 Nimbus Road, Rancho Cordova, CA 95670, (916) 358-2945, Email: bgarrison@dfg.ca.gov, and Stacy Hall, 5472 Adams Street, Mounds View, MN 55112, Email: littlstac@hotmail.com.

Abstract: In the early 1930s, the U.S. Forest Service developed the Vegetation Type Map (VTM) for the forests, woodlands, shrublands, and grasslands of California. In forests, detailed information on tree species composition, diameters, and heights and ground cover were collected on rectangular 0.2-acre plots to support the map. These plots were collected at the time when active fire suppression as well as large-scale industrial logging was just beginning in California so these data represent baseline pre-fire suppression habitat conditions. Comparisons of VTM data with current measurements from the same locations can yield important information on changes in wildlife habitats. To determine if changes have occurred to mixed-conifer habitat, we re-measured vegetation at 74 relocated VTM points in central Sierra Nevada in 2002 and 2003 using a cluster of three 0.2-acre plots. Points were randomly selected from more than 2,500 original VTM plots measured between 2000-6000 ft elevation. We found that stem densities and basal areas

were significantly greater and tree diameters significantly smaller in 2002-03 than in the 1930s. These differences indicate that substantial changes in wildlife habitat have occurred in the past 70 years, which has implications for forest and wildlife management in this region.

Sex and habitat effects on home ranges of blunt-nosed leopard lizards (Gambelia sila).

David J. Germano, Department of Biology, California State University, Bakersfield, CA 93311-1022, (661) 654-2471, Email: dgermano@csub.edu.

Abstract: I radio-tracked 33 male and 27 female blunt-nosed leopard lizards (*Gambelia sila*) from 2002-2004 in the southern San Joaquin Valley of California. From May to July each year (to August in 2004), I tracked leopard lizards 2-4 times per week and recorded GPS locations. Mean home range size of females was 5.51 ha using 95% MCP and 7.79 ha using 95% Kernel Method, which was not significantly different from mean home range size of males of 5.69 ha (95% MCP) and 8.42 ha (95% Kernel Method) based on ANOVA (MCP, F 0.05, 1, 58 = 0.01, P = 0.923; Kernel, F 0.05, 1, 58 = 0.09, P = 0.765). However, 3 female home range estimates (1 female each year) were 2-3 times larger than other female estimates. When these estimates were removed, standard error estimates were similar between males and females and there were significant differences in mean home range sizes (MCP, F 0.05, 1, 54 = 16.06, P = 0.0002; Kernel, F 0.05, 1, 55 = 13.54, P = 0.001). In 2004, comparisons were made of home range size in open areas and areas covered by saltbush (*Atriplex* sp.). No differences in sizes of home ranges were found for males (MCP, F 0.05, 1, 15 = 0.177, P = 0.680; Kernel, F 0.05, 1, 15 = 0.331, P = 0.573) or females (MCP, F 0.05, 1, 12 = 0.004, P = 0.949; Kernel, F 0.05, 1, 12 = 0.41, P = 0.843) between open areas and areas with shrubs.

Winter use of an inland lake by western gulls.

Richard T. Golightly and Talitha F. Penland, Humboldt State University, Department of Wildlife, Arcata, CA 95521, (707) 826-3952 (Golightly), (707) 826-3956 (Penland), Email: rtg1@humboldt.edu, tfp1@humboldt.edu; and Scott H. Newman, Wildlife Trust, Palisades, NY 10964, (212) 380-4460, Email: newman@wildlifetrust.org.

Abstract: Western gulls were found to be abundant (as many as 8,000 individuals) at an inland lake in southern California, 70 km from the coast. We surveyed Castaic Lake for gulls every 10-18 days for extended periods between 2002-2005. Gulls were few in summer and fall, but dramatically increased in November. Gull numbers were variable between November and March, after which most individuals returned to the marine environment (presumably to the breeding colonies). Based on DNA samples of captured gulls (n=25), this population was 84% female. We radio-marked 12 of these gulls. Although count surveys showed western gulls to be numerous throughout winter, these individuals regularly used the marine environment, and fewer than 20% of the radio-marked gulls were present at the lake at any one point in time. Thus the total number of gulls using the lake was much greater than indicated by ground counts on any one day. Most western gulls at the lake appeared to be associated with the breeding colony at Anacapa Island. We found correlations between abundance, movements, and

Shorebird Migration Program has begun to develop a clearer picture of shorebirds including western sandpipers (*Calidris mauri*), dunlin (*C. alpina*), and long- and short-billed dowitchers (*Limnodromus scolopaceus*, *L. griseus*) which migrate from Mexico north to their breeding grounds in Alaska. During this period we have tracked over 400 birds, many over distances spanning much of their spring migration route. Here we will report on results of these studies. We have shown that while individual birds can travel over 3,000 km in a single flight, the majority use a system of stopover sites within 100s of km of each other. Use of these sites is influenced by sex of birds, date, origin of migration, and age. In 2004 we measured triglyceride levels of migrating western sandpipers from Mexico to Alaska as an index of fattening rate, and we found that birds were fattening more rapidly as they moved further north and got closer to the breeding grounds. Understanding the site requirements of these far-ranging species will help us better manage their resources.

Spatial ecology of a population of the aquatic garter snake, Thamnophis atratus, *associated with a montane, cold-stream environment in northwestern California.*

Hartwell H. Welsh, Jr.[1], Amy J. Lind[2], and Clara A. Wheeler[1]

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[2]U.S. Forest Service, Sierra Nevada Research Center, 2121 2nd St., Suite A101, Davis, CA 95616

Abstract: We studied the movements, spacing patterns, and stream habitat use of the aquatic garter snake, *Thamnophis atratus*, at Hurdygurdy Creek in the Smith River National Recreation Area, from 1986 to 2001, using mark-recapture techniques. We captured and marked 1730 snakes and recorded 519 recaptures. Here we examine movements and hierarchical spatial patterns of this population of snakes by gender and age class at the: (1) macro-scale, the distribution of captures along the 4.7 km study reach, (2) meso-scale, reflected in the relative use of stream meso-habitats (i.e. riffles, runs, pools), and (3) micro-scale, evidenced by the use of differentiated sub-components of particular meso-habitat units, for example, the shallow stream margins or small back water pools adjacent to a riffle. This population of snakes exhibited differences in movement patterns, and in the use of stream meso- and micro-habitats, relative to both gender and age class. Our results are interpreted relative to age class differences in the foraging strategies employed by these snakes to capture a wide range of aquatic and riparian prey species. We suggest several non-exclusive hypotheses to explain these differences based on sexual selection, optimum foraging, and prey selection related to ontogenetic shifts associated with snake growth and development.

Using chin spot patterns to identify individual mountain yellow-legged frogs.

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Abstract: The study of animals in the field often requires the ability to identify individuals. Numerous techniques at marking individual animals have been developed that require extensive handling and sometimes invasive measures, like ear tags, elastomer injections, and PIT tags. An alternative to physical alteration of study animals is the use of natural markings for identification. Mammals that have unique pelage and skin patterns, such as some felids, pinnipeds, juvenile cervids, and whales, are readily identified using these markings. Some of these identification techniques have been extended to amphibians when individual identification is necessary. In our study of mountain yellow-legged frog (*Rana muscosa*) movements, we photographed the chin spot patterns of all captured frogs at the time of radio attachment and three months later at recapture in order to test the effectiveness of identifying individual frogs using these natural markings. Throughout the first three months, observers were able to identify individual frogs based on chin spot patterns all but one time. Further field tests and photo comparison trials were conducted with similar results, though definite changes in certain aspects of spot patterns were apparent. Although this method of individual identification requires animal handling, it is a reliable alternative to other animal-marking techniques.

Wildlife and hydropower relicensing in the Sierra Nevada: Issues and answers

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Abstracts: There are 116 hydropower projects in California subject to periodic re-licensing by the Federal Energy Regulatory Commission (FERC). Impact assessments for recent hydro project re-licensings in the Sierra Nevada focus on key "issues" as determined by the resource/project nexus, potential for impact, and opportunities for mitigation. The "hydro" in hydropower re-licensing generally translates to a greater emphasis on aquatic issues than on terrestrial wildlife issues. Wildlife issues associated with continued operation and maintenance of a project commonly fall into one or more of the following categories: 1) effects on special-status species (e.g., bald eagle); 2) effects on species that utilize project facilities for nesting or roosting (e.g., bats); 3) effects on species with a lacustrine, riverine, or other aquatic habitat requirement (e.g., waterfowl); 4) effects of ancillary water conveyances (e.g., canals, flumes) on wildlife; and 5) effects of project-related electric power lines on birds (e.g. electrocution, collision). This presentation will examine processes used to assess impacts to terrestrial species during hydro re-licensing, including an overview of actual studies performed on recent projects and the results of these studies.

Monitoring coastal California gnatcatchers at a regional level.