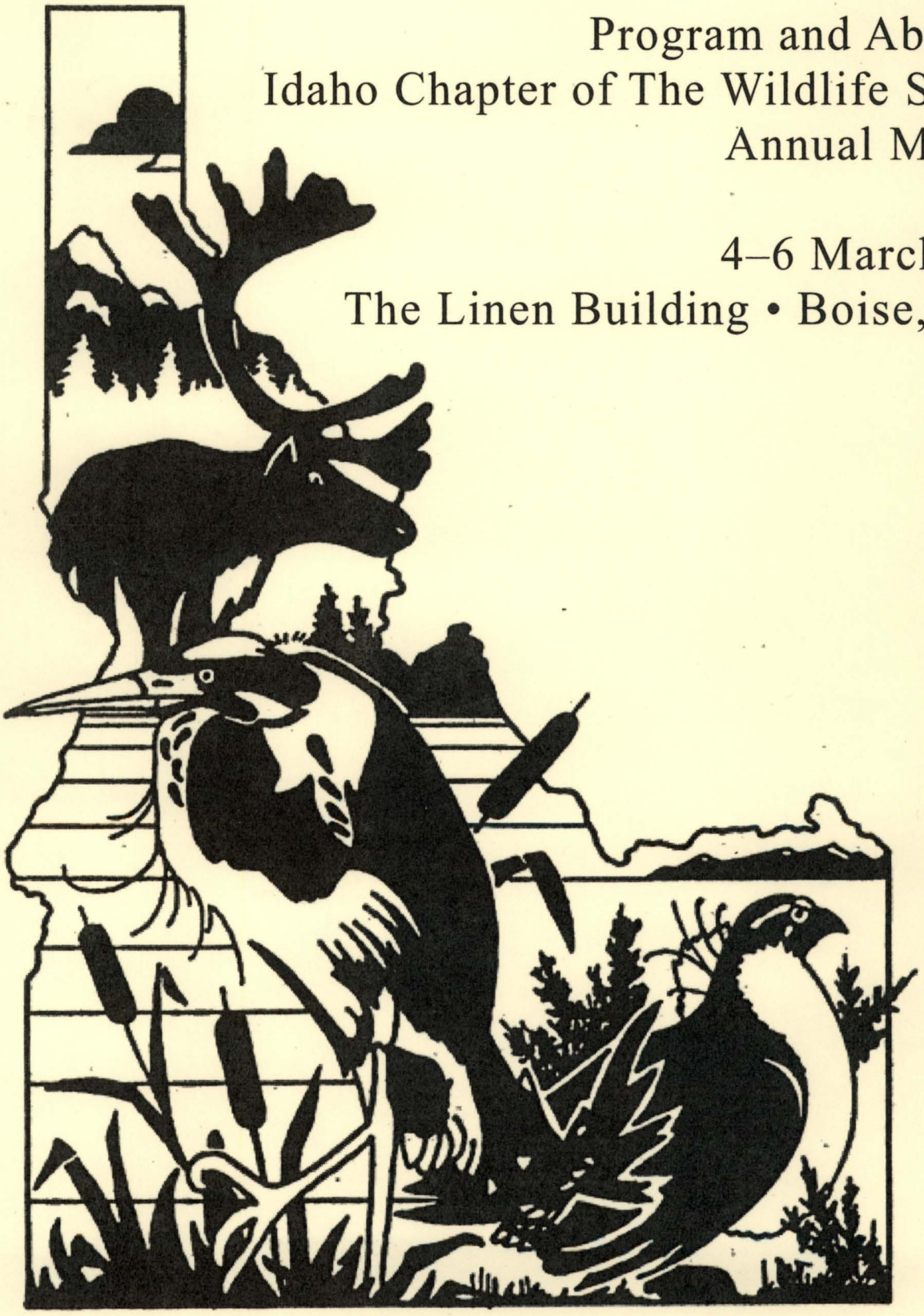
Program and Abstracts
Idaho Chapter of The Wildlife Society
Annual Meeting

4–6 March 2008
The Linen Building • Boise, Idaho



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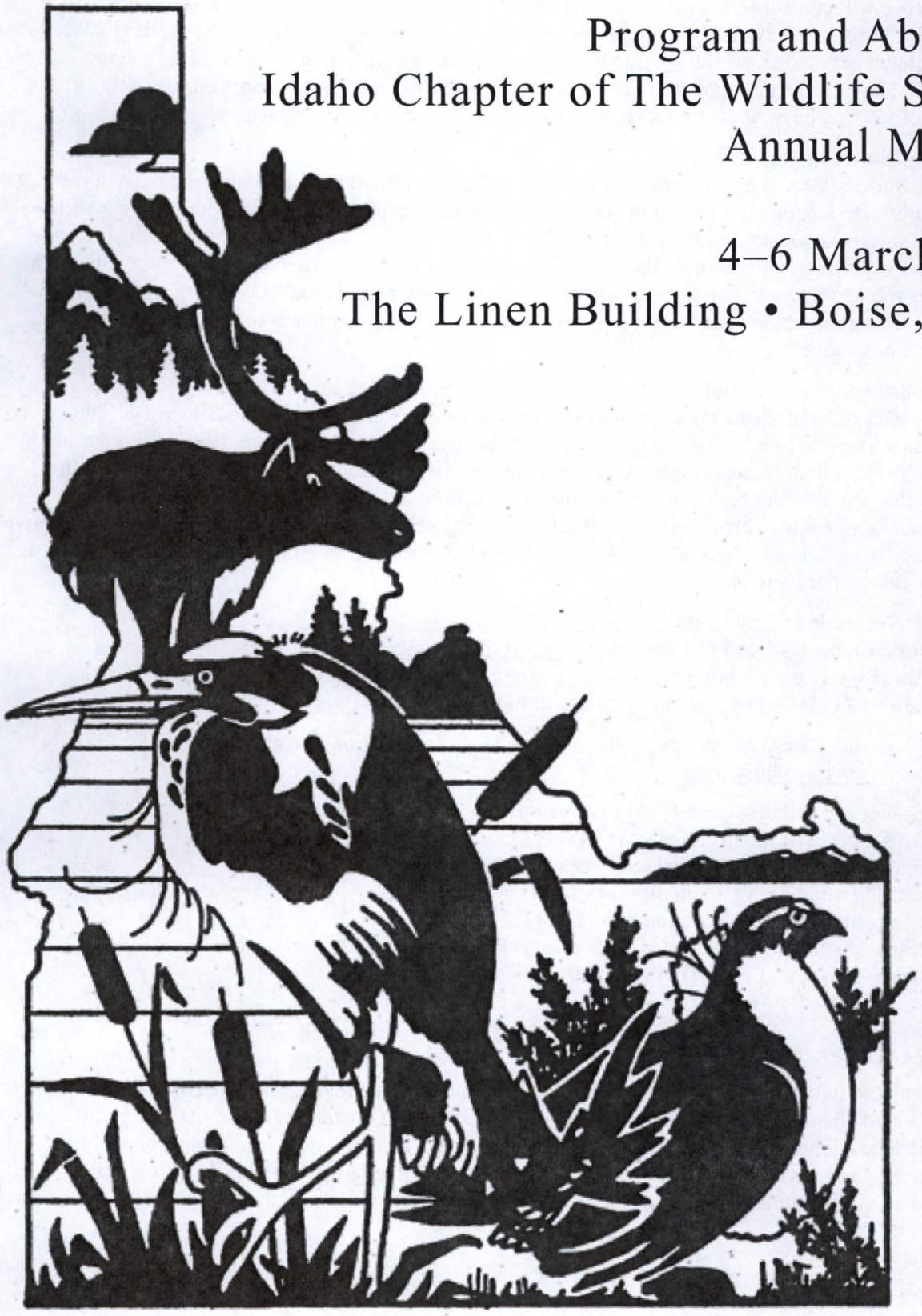

Meeting introduction

The Idaho Chapter of The Wildlife Society's annual meeting will feature a diverse scientific program with a plenary lecture, contributed oral presentations, social activities and the annual business meeting. Pre–conference activities include the Idaho Bat Working Group and the Idaho Partners in Amphibian and Reptile Conservation.

The conference will take place 4-6 March 2008 in the Capitol City of Boise, Idaho. Members are encouraged to register in advance by going to the on–line, secure registration page at the meeting's Web site: http://www.ictws.org. Alternatively, a registration form can be downloaded from the Web site for submission by mail or FAX. The current registration fee is $90, which includes the banquet. In addition, a one day only registration of $50 may be purchased at the registration table on each day of the conference.

Host City — Boise, Idaho

The City of Boise is located at the western end of the Snake River Plain near the southwest edge of the Idaho Batholith. In a region dominated by a continental climate, temperatures are moderated by maritime patterns and the area owes its aridity to the rain shadow effect of the Cascades. Boise was platted in 1864 north of the Boise River which is now flanked by an extensive Greenbelt system and numerous parks. This attracts year-round outdoor enthusiasts as well as those who enjoy more casual encounters with nature. Well-preserved historic architecture, including the Idaho Statehouse, contributes to an upbeat and inviting downtown atmosphere.

Birding in and around Boise. Boise birders benefit from living at the edge of a migratory bird flyway. To the north, these feathered visitors use Idaho forests for food and cover on their arduous journeys. Numerous water bodies in the Treasure Valley support a wide variety of resident and migratory species. To the south, the Birds of Prey National Conservation Area hosts the densest populations of nesting raptors in North America within the 600-foot high walls of the Snake River Canyon. Between the Snake River and the forested mountains, birds of prey can be glimpsed at amazing heights as they ride thermal air currents above the sagebrush-steppe. Bald eagles winter along the Boise River and heron rookeries can also be spotted in the spring. Bring your binoculars!

Snake River Birds of Prey · http://www.birdsofprey.blm.gov/index.html
The World Center for Birds of Prey · http://www.birdsofprey.blm.gov/worldctr.htm
Idaho Bird Observatory · http://www.boisestate.edu/biology/ibo/about.html
Lake Lowell and Deer Flat National Wildlife Refuge · http://www.fws.gov/deerflat/

Cultural attractions. Boise offers many cultural attractions. Information is available online for the City of Boise · http://www.cityofboise.org/

Basque Museum and Cultural Center · 611 Grove Street · 343-2671
Boise Art Museum · 670 Julia Davis Dr. · 345-8330
Discovery Center of Idaho · 131 Myrtle St. · Boise · 343-9895
The Egyptian Theatre · 700 W. Main St. · 345-0454
The Flicks · cinema & café · 646 Fulton St. · 344-4222
The Idaho State Historical Museum · 610 Julia Davis Drive · 334-2120
Morrison Knudsen Nature Center (IDFG) · 600 S. Walnut · 334-2225
Zoo Boise · 355 Julia Davis Drive · 384-4260

Conference Venue

All conference activities will take place at The Linen Building, Boise, Idaho. The Linen Building is located within the Linen District, which recently received the Idaho Smart Growth award for "its thoughtful approach to redevelopment of an underutilized, underdeveloped area of downtown Boise along with its environmentally sensitive approach to redevelopment through utilizing Brownfield's practices and sustainable design principles."

The Linen Building is divided into two major spaces; these will be designated as the 1st floor and 2nd floor spaces, and is across the street from the Modern Hotel.

Directions to the Modern Hotel:

From the Boise Airport, head north from the airport on Vista/Airport Exit exit 53. Go north on Capitol Blvd. Take Capitol Blvd. to Front Street. Take a Left (West) on Front Street. Take a Right (North) at 14th St. Take a Left (West) on Grove St.

The hotel is located on the corner of Grove Street and 14th.

Conference Contact
Kerri Vierling; kerriv@uidaho.edu; 208-885-5378

REGISTRATION
The full registration fee includes admission to all oral sessions, pre-conference workshops, the opening reception, coffee breaks, the banquet, and the program and abstracts.

The registration desk will be open at the following times in the lobby of the Modern Hotel:

Tuesday 12:00 pm – 4:30 pm
Wednesday 7:30 am – 4:30 pm
Thursday 7:30 am – 4:30 pm

Registration Fee:
$90 registration (includes the banquet)
$45 student registration
$50 one day registration
$30 extra banquet ticket

Organizing Committee

Jon Beals, Idaho Department of Fish and Game
Rita Dixon, Idaho Department of Fish and Game
Diane Evans Mack, Idaho Department of Fish and Game
David Musil, Idaho Department of Fish and Game
Kerri Vierling, University of Idaho Fish and Wildlife Department

The Committee would like to thank Gregg Servheen for organizing elections; the awards committee (Frances Cassirer, Mike Scott, Steve Knick, Chuck Peterson); Rex Sallabanks for the tribute to Chuck Harris; Steve Kraemer for IT assistance.; and Anna Owsiak and the papers awards committee (Leslie Carpenter, Idaho Power; Sean Finn, USGS; T. Holthuijzen, Idaho Power; and Jeff Knetter, IDFG).

Note: The Local Organizing Committee has made a special effort to reduce the ecological impact of such a large meeting by using reusable plates, utensils, and cups for the breaks and banquet, providing bins for recycling, and purchasing local and/or sustainable food to the extent possible.

Program at a glance

Tuesday 4 March

Time	1st floor	2nd floor
1:00 – 4:30 p.m.	Open	Idaho Bat Working Group

*No organized social following the working group

Wednesday 5 March

Time	1st floor	2nd floor
8:30 – 11:30	Open	Idaho Partners in Amphibian and Reptile Conservation
11:30 – 1:00	Open	Open
1:00 – 1:20	Welcome: Rita Dixon Opening remarks: David Hale	
1:20 – 2:20	Plenary talk Dale Goble: Conservation reliant species: exceptions or the rule?	Open
2:30 – 2:50	BREAK	BREAK
2:50 – 4:30	Avian ecology	Herpetology and aquatic restoration
4:30 – 4:45	BREAK	BREAK
4:45 – 6:15	Open for social set-up	Business meeting
6:30 – 9:00	Evening social	Open

Thursday 6 March

Time	1st floor	2nd floor
8:00 – 10:20	Modeling and novel methodological approaches	Behavioral ecology
10:20 – 10:40	BREAK	BREAK
10:40 – 12:00	Genetics	Avian population ecology
12:00 – 1:40	LUNCH BREAK	LUNCH BREAK
1:40 – 3:00	Resource planning	Landscape ecology
3:00 – 3:20	BREAK	BREAK
3:20 – 4:40	Avian conservation and biodiversity	Mammalian ecology
6:30 – 9:30	Social and banquet	

Plenary Speaker
Dale Goble, University of Idaho

Dale Goble is the Margaret Wilson Schimke Distinguished Professor of Law at the University of Idaho. He earned an A.B. in philosophy from Columbia College and a J.D. from the University of Oregon. Following law school, he taught at Oregon for a year before joining the Solicitor's Office at the Department of the Interior in Washington, D.C. as an Honor's Program Attorney. He subsequently worked in the Lands and Minerals Division where his responsibilities included sagebrush rebellion litigation, wilderness, land-use planning, and wild and scenic river issues. He has been at the College of Law since 1982.

Professor Goble teaches natural resource law, natural resource history, and torts. His scholarship focuses on the intersection of natural resource law and policy, constitutional law, and history. In addition to the usual "numerous articles and essays" -- now numbering more than 50 -- he is the co-author of two books: *Wildlife Law: Cases and Materials* (Foundation Press, 2002) and *Federal Wildlife Statutes: Texts and Contexts* (Foundation Press, 2002). He has also co-edited two volumes that grew out of the Endangered Species Act @ 30 Project, *The Endangered Species Act at Thirty: Renewing the Conservation Promise* (Island Press, 2006) and *The Endangered Species Act at Thirty: Conserving Biodiversity in Human-Dominated Landscapes* (Island Press, 2006). Finally, he co-edited a collection of essays on the environmental history of the Pacific Northwest, *Northwest Lands, Northwest Peoples: Readings in Environmental History* (University of Washington Press, 1999). He is currently at work on an additional book for Island Press.

Since 2001, he has been an organizer of a multidisciplinary, multi-interest evaluation of the Endangered Species Act at its thirtieth anniversary. The ESA @ 30 Project has entailed two national conferences, nearly a dozen smaller workshops, and a series of briefings to groups including congressional staffs, the Associate Regional Directors of the U.S. Fish & Wildlife Service, the Nature Conservancy-Smith Fellows, and the Western Association of Fish and Game Administrators.

Idaho Chapter of The Wildlife Society Awards

The **Special Recognition Award** is intended to honor any person or group who has made an outstanding contribution within the state of Idaho to wildlife conservation, management, science, conservation education, the wildlife profession or to an area of endeavor species, community, ecosystem or region. Any person or group who has made such a contribution in the last 3 years is eligible for this award.

The **Professional Wildlifer Award** honors professionals in wildlife management. It is given to demonstrate outstanding contributions to Idaho's wildlife resources as appreciated by one's peers. The award is meant to recognize outstanding professional contribution and promote public understanding of significant wildlife management accomplishments in Idaho.

Speaker Preparation
Contributed talks are 20 minutes long. Respect other speakers and your audience by staying within your scheduled time. A brief (5 minute) period post-presentation should be left so members of the audience can ask a few questions. Take the time to practice so your delivery fits into the scheduled interval. Check with your session chair well in advance of the start of your session to make sure that you know where the tools are that you need for your talk (e.g., slide advance monitor, laser pointer) and how to use them. This is also the time to check and see if your PowerPoint presentation runs properly on the projector and projection computer.

Messages, job postings, and volunteer opportunities
We will set up a message and job board next to the registration desk.

Parking
There is free parking behind The Modern Hotel, next to The Linen Building and on the street adjacent to the hotel.

Lost And Found/Security
Please bring lost and found items to the Registration Desk.

Sponsors

Idaho Department of Fish and Game
Idaho Governor's Office of Species Conservation
MPC Corporation
USDI Bureau of Land Management

SCIENTIFIC PROGRAM

TUESDAY 4 MARCH, 1:00 – 4:30 p.m.
Workshop: Idaho Bat Working Group
Chair: Rita Dixon
Location: 1st floor

- Western Bat Working Group update (Rita Dixon, IDFG)
- Northwest Regional Gap Analysis Expert Review Tool (Rita Dixon, IDFG)
- NatureServe Rank Estimator: A New Approach to Assigning Species Ranks (Rita Dixon, IDFG)
- General discussion of current bat projects in Idaho. All meeting attendees are encouraged to contribute their information in the following topic areas:
    - Research
    - Inventory and Monitoring
    - Management
    - Policy and Regulations
    - Education

WEDNESDAY 5 MARCH, 08:30–11:30
Workshop: Idaho Partners in Amphibian and Reptile Conservation
Chair: Chuck Peterson
Location: 2nd floor

- National and Regional PARC Updates – Chuck Peterson (ISU, IMNH)
- Amphibian and Reptile Habitat Management Guidelines (David Pilliod, USGS)
- Northwest Regional Gap Analysis Expert Review Tool (Rita Dixon, IDFG)
- NatureServe Rank Estimator: A New Approach to Assigning Species Ranks (Rita Dixon, IDFG)
- General discussion of projects relevant to amphibian and reptile conservation in Idaho. All meeting attendees are encouraged to contribute their information in the following topic areas.
    - Research
    - Inventory and Monitoring
    - Management
    - Policy and Regulations
    - Education

WEDNESDAY 5 MARCH

Plenary Session

1:00 – 1:20 Welcome: Rita Dixon
Opening remarks by David Hale, urban planner of the Linen District

1:20 – 2:20 Plenary talk. **Conservation reliant species : exceptions or the rule?** DALE GOBLE

CONTRIBUTED PAPERS SESSIONS

The names of presenters are capitalized; those names with an * following their name are student presenters

Avian Ecology; 1st floor: Session Chair, Rex Sallabanks

2:50 **Costs and benefits of group living in owls.** JUSTIN WELTY*, K. McVey, M. Stuber, and J. Belthoff

3:10 **Ecotoxicological risk and exposure: a comparison of burrowing owls in natural and agricultural areas.** MATTHEW J STUBER*, K. McVey, J. Welty, and J. R. Belthoff

3:30 **Effects of Vegetation Cover on Passerine Bird Communities in Sagebrush Steppe.** SAMANTHA STALEY* and C. Jenkins.

3:50 **Evaluation of assisted brood amalgamation in sage-grouse: can adding domestically-hatched chicks into wild broods support a population?** TOM THOMPSON*, K. Reese, and A. Apa.

4:10 **Predicting the attendance probability of greater sage-grouse at lek sites in south-central Idaho: preliminary analysis.** JEREMY BAUMGARDT*, K. P. Reese, E. O. Garton, J. W. Connelly, and M. Evans.

4:45 – 6:15 Business meeting in the 2nd floor

Herpetology and aquatic restoration; 2nd floor; Session Chair: Bill Bosworth

2:50 **Amphibian colonization of anthropogenic wetlands in the Palouse bioregion of northern Idaho**. JAVAN BAUDER*.

3:10 **Modeling and Mapping Reptile Distributions for the Idaho National Laboratory.** DAVID P. HILLIARD*, Christopher L. Jenkins, and Charles R. Peterson

3:30 **Survival of neonatal rattlesnakes during simulated hibernation.** SCOTT M. CAMBRIN*

3:50 **Restoration quality and species mutualism interact, affecting stream habitat and community composition at the Stibnite Mine site.** ROBERT ARKLE and D. Pilliod

4:10 **Are Prescribed Fires Ecological Surrogates for Wildland Fires? A Stream Perspective.** DAVID PILLIOD and R.S. Arkle

4:45 – 6:15 Business meeting in 2nd floor

THURSDAY 6 MARCH

CONTRIBUTED PAPERS SESSIONS

The names of presenters are capitalized; those names with an * following their name are student presenters

Modeling and novel methodological approaches; 1st floor: Session Chair, Aaron Haines

8:00 **Comparing Two Modeling Approaches to Predict Areas of High Wolf Use in an Idaho Wilderness Area.** MICHAEL K. LUCID and L. Robinson

8:20 **Developing wolf population monitoring methods: a research update.** DAVID AUSBAND, M. Mitchell, C. Mack, J. Holyan, S. Nadeau and P. Zager

8:40 **New Frontiers in Old Landscapes: Avian Diversity and Use of the Berger Tract in Southwest Twin Falls County, Idaho**. MIRIAM AUSTIN and J. Randell.

9:00 **Successfully Capturing Mountain Quail Using a Modified Night-Netting Technique.** Troy R., D. Delehanty, and G. GILLETTE*

9:20 **Prevention of invasive species in large wildlife management areas using an innovative Ecologically Designed and Geographically Efficient (Leading EDGE) approach.** ARTHUR TALSMA and M. Atchison

9:40 **Development of a habitat and mitigation evaluation model for Ada County, Idaho**. SYLVIA COPELAND

10:00 **Wildlife-highway linkage identification and development of a statewide wildlife-highway mortality database.** Greg Burak and GREGG SERVHEEN.

10:20 BREAK

Behavioral ecology and mammalian population dynamics; 2nd floor: Session Chair, Leona Svancara

8:00 **Temporal variability in bat foraging and commuting activity patterns.** TOM RODHOUSE*, W. E. Rainey, K.T. Vierling, and R.G. Wright

8:20 **Sexual segregation in white-tailed deer: intersexual divergence in digestive function, morphology, and behavior.** KEVIN MONTEITH*, C. L. Sexton, J. A. Jenks, R. T. Bowyer, and L. E. Schmitz

8:40 **Sex-specific responses of North American elk to fuels reduction**. RYAN LONG*, J. L. Rachlow, J. G. Kie, and R. T. Bowyer.

9:00 **Rodent site occupancy probabilities along a pinyon-juniper woodland understory vegetation gradient in southern Idaho.** THOMAS J. RODHOUSE*, R.P. Hirnyck, J. Vincent, L. K. Garrett, R. G.Wright.

9:20 **Spatio-temporal Factors Shaping Diurnal Space Use by Pygmy Rabbits**. DANA SANCHEZ and J. Rachlow

9:40 **Dynamics of pygmy rabbit burrows: variation across space and time.** JANET RACHLOW, J. Witham, D. Sanchez, W. Estes-Zumpf, A. Price, H. Roberts, V. Guyer, and B. Waterbury.

10:00 **A snapshot of survival and cause-specific mortality for elk and mule deer populations across Idaho, 2005-07.** PETE ZAGER, M. Hurley, G. Pauley, and C. White

10:20 BREAK

Genetic analyses of wildlife populations: 1st floor: Session Chair, Javan Bauder

Time

10:40 **Gene flow and genetic diversity among populations of pygmy rabbits in Idaho and Montana.** WENDY A. ESTES-ZUMPF*, J. L. Rachlow, L. P. Waits, and K. Warheit

11:00 **Genetic diversity, population structure and gene flow among cougar populations in Idaho and Montana.** JOE D. HOLBROOK*, L. P. Waits, D. Onorato, C. White, J. Rachael, P. Zager, and R. Desimone.

11:20 **Genetic diversity and population structure of Mongolian wolves.** SEAN HOWARD*, N. Balkenhol, K. Olson and Lisette Waits

11:40 **Evaluating the use of noninvasive genetic sampling for monitoring gray wolves in Idaho.** STENGLEIN, JENNIFER*, C. Mack, D. Ausband, M. Mitchell, P. Zager, S. Nadeau and L. Waits

12:00 **Lunch break off site**

Avian population ecology – 2nd floor: Session Chair, Diane Evans Mack

Time

10:40 **Movement, Survival, and Reproduction of Mountain Quail Translocated From Two Source Populations.** RONALD J. TROY*, J.W. Connelly, and D.J. Delehanty

11:00 **Ecology of translocated mountain quail (*Oreortyx pictus*) in western Idaho and eastern Washington.** JOHN STEPHENSON*, K. Reese, P. Zager, and A. Martens.

11:20 **How Does Introduction of Agriculture alter Ecosystem Dynamics?: Stable Isotope Analysis of Trophic Relationships and Food Webs of Burrowing Owls in s. Idaho.** KATIE MCVEY*, J. Welty, M. Stuber, and J. Belthoff

11:40 **Breeding birds on a developed recreational site.** SCOTT R. ROBINSON

12:00 **Lunch break off site**

Resource planning – 1st floor: Session Chair: Janet Rachlow

Time

1:40 **Methods and status of land cover mapping for the Northwest Gap Analysis Project** ANNE DAVIDSON, T. Miewald, J. Ohmann, J. Kagan, E. Grossmann, T. Sajwaj, J.Aycrigg, S. Lennartz, and S. McDonough.

2:00 **Planning for Change: A Change for Planning?** LEONA, K. SVANCARA*

2:20 **From farms to sub-divisions; wildlife monitoring and resource planning in a pre-development, agricultural landscape in eastern Idaho.** JOHN J. GOODELL, J. Klausmann, and P. Hook

2:40 **Growing Houses in the Fields: Can Priority Wildlife Coexist with Residential Development in Teton County?** JEFF KLAUSMANN and J. Goodell

3:00 BREAK

Avian conservation and biodiversity 1st floor: Session Chair: Kerri Vierling

3:20 **Defining Recovery for Endangered Birds**. AARON HAINES, J.M. Scott, D. Goble, and E.O. Garton.

3:40 **Climate change and wildlife refuges : managing for resilience in the face of uncertainty.** J. MICHAEL SCOTT

4:00 **Biodiversity Hotspots and Species Conservation**. AARON M. HAINES, M.Leu, L.K. Svancara, G. Wilson, J. Michael Scott, and K.T. Vierling.

Landscape ecology – 2nd floor: Session Chair, Wendy Estes-Zumpf

Time

1:40 **Occupancy, detectability, and habitat associations among American pika (*Ochotona princeps*) populations in Craters of the Moon and Lava Beds National Monuments.**
C. Ray, THOMAS J. RODHOUSE, E. A. Beever, and M. R. Shardlow.

2:00 **Mitigation of marine-derived nutrient loss in the Boise-Payette-Weiser subbasin.** LAURA FELICETTI

2:20 **Mountain States Transmission Intertie 500kV, wildlife impacts in the face of energy development.** SAM MILODRAGOVICH and D. Dean

2:40 **Migration patterns of Swainson's Hawks.** MICHAEL KOCHERT, M, Fuller, L. Schueck, M. Bechard, B. Woodbridge, G. Holroyd and L. Bond

3:00 BREAK

Mammalian ecology **2nd floor: Session Chair, TBA**

3:20 **Selenium supplementation of free-ranging bighorn sheep in Hells Canyon.** E. FRANCES CASSIRER, V.L. Coggins, and C.A. Strobl.

3:40 **Translocation in relation to habitat requirements of the southern Idaho ground squirrel (*Spermophilus brunneus endemicus*).** KATIE BUSSCHER*

4:00 **Wolf delisting and State management: the demise of wolves or the beginning of a new era?** STEVE NADEAU

ABSTRACTS OF PAPERS AND POSTERS Presented at the Idaho Chapter of the Wildlife Society Annual meeting. Presenter names are capitalized; those with an * following their names are students.

ARKLE, ROBERT and D. Pilliod, U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Boise, Idaho 83706. ***RESTORATION QUALITY AND SPECIES MUTUALISM INTERACT, AFFECTING STREAM HABITAT AND COMMUNITY COMPOSITION AT THE STIBNITE MINE SITE.***

The Stibnite Mine has been a source of sediment, heavy metal, arsenic, and cyanide contamination in Meadow Creek and the South Fork Salmon River for decades. To improve instream habitat conditions, two restoration projects were initiated. Restoration actions in the 1998 project consisted of excavating a straight flowing, low gradient stream channel away from mine tailings and installing a sand filter. The second restoration project, completed in 2005, also restored the stream gradient, substrate, riparian topsoil, and plant community. The goal of this study was to determine the effects of different stream restoration strategies on the habitat and community composition of Meadow Creek in 2006 and 2007. We found habitat parameters within the 2005 restoration project are more similar to the downstream and upstream reference reaches, than to the habitat conditions within the 1998 restoration project. In the 2005 restoration reach, where the gradient is moderate and light availability is high, tailed frog larval density and occupancy rates increased to the highest levels observed in the study and macroinvertebrates were diverse and abundant just two years after completion. The 1998 restoration project is not providing habitat for tailed frog larvae, but is being used infrequently by adult Columbia spotted frogs. We found that the combination of low gradient and high light availability within the 1998 restoration reach facilitates a mutualistic interaction between a Chironomid larvae and a colonial cyanobacteria (*Nostoc* sp.). These symbionts dominate within this reach, reducing the epilithic attachment space for tailed frog larvae and for macroinvertebrate species that can be consumed by endangered salmonids. This study shows that interactions between the habitats that we create and between the species that occupy them can be complex, unpredictable, and influential on restoration or conservation effectiveness.

AUSBAND, DAVID[1], M. Mitchell[2], C. Mack[3], J. Holyan[3], S. Nadeau[4], and P. Zager[5]. [1]Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812; [2]U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, Missoula, MT 59812; [3]Gray Wolf Recovery Project, Nez Perce Tribe, McCall, ID 83638; [4]Idaho Department of Fish and Game. Boise, ID 83707; [5]Idaho Department of Fish and Game, Lewiston, ID 83501. ***DEVELOPING WOLF POPULATION MONITORING METHODS: A RESEARCH UPDATE.***

The USFWS recently proposed removing Endangered Species Act protections for wolves in the Northern Rockies. As ESA protections are removed so too are federal monitoring dollars used to gauge overall wolf population health. Radiotelemetry has been the primary tool for monitoring wolves in the Northern Rockies. Maintaining radiocollared wolves dispersed widely across the landscape is expensive and its efficacy as the sole method for monitoring will wane as federal funding declines. To develop new, cost effective monitoring methods we identified 4 study areas based on wolf density ranging from low to high. We have VHF and GPS collared wolves in the study areas to obtain a "known wolf density" allowing comparisons of wolf abundance estimates from new methods. In the summer of 2007, using only RSF generated maps and a sampling protocol, we conducted scat surveys at 480 predicted rendezvous sites and collected over 250 genetic samples to use for population estimation. In addition - without the aid of radiotelemetry - we located 7 of 9 litters of pups known to be present. We also recently surveyed 2,000 hunters to ascertain the accuracy of their wolf observations. Preliminary results show the public is largely truthful in their reporting and that public observations may be one tool for monitoring wolves in the future. We have also invented a remote sensing tool called a "howlbox" which can remotely survey an area by broadcasting a wolf howl, recording responses, and then shutting down until the next scheduled broadcast. All of survey methods are designed to feed an occupancy model that can estimate the number of wolves statewide.

Preliminary results demonstrate we can reasonably count wolves in Idaho without having to rely solely on radiotelemetry. Research will continue through November 2008 and efforts are ongoing to obtain funding so tests can be extended.

AUSTIN, MIRIAM[1] and J. Randall[2]. [1]Red Willow Research Inc. Twin Falls, Idaho 83301; [2]J. Randell, Prairie Falcon Audubon Chapter, Twin Falls, Idaho 83301. ***NEW FRONTIERS IN OLD LANDSCAPES: AVIAN DIVERSITY AND USE OF THE BERGER TRACT IN SOUTHWEST TWIN FALLS COUNTY, IDAHO.***

Audubon Society members have revived management interest in a "forgotten" corner of southwest Twin Falls County. Currently utilized for year-round livestock grazing, the failed Berger homestead tract consists of large areas of crested wheatgrass and rabbitbrush along with disturbed sagebrush steppe. Dr. Austin has completed the first year of a year-round, multi-year biodiversity project intended to identify the conservation value and potential of this non-traditional wildlife habitat. Study results to date have found the Berger tract is utilized by over 90 species of birds, two to three times the diversity known for many other Idaho habitats identified as "priority" management areas. Detections of sagebrush obligate and other species of concern (e.g. diurnal raptors) are also occurring at rates much higher than those known for regions of "native" sagebrush steppe identified as management priorities. In addition, year-round survey efforts are providing a new window of understanding to avian use of crested wheatgrass and rabbitbrush monocultures; including but not limited to intense post-fledging and migratory use. Grassroots interest by Audubon members coupled with defensible science promises new frontiers for the Berger tract and other similarly "forgotten" landscapes. This project and presentation demonstrates what the conservation and scientific community can accomplish together, and provides a unique template for similar collaborative projects around the west.

BAUDER, JAVAN*, Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844. Current Address: Department of Biological Sciences, Idaho State University, Pocatello, Idaho 83209. ***AMPHIBIAN COLONIZATION OF ANTHROPOGENIC WETLANDS IN THE PALOUSE BIOREGION OF NORTHERN IDAHO.***

Agricultural and urban development can negatively impact native amphibian species through habitat loss, fragmentation, and population isolation. Anthropogenic water bodies, such as manmade ponds and restored wetlands, may offer important amphibian breeding habitat, particularly where natural water bodies are lacking. Understanding the factors influencing amphibian colonization of newly created or restored wetlands is important in guiding future restoration efforts intending to benefit amphibians. I conducted amphibian surveys at recently created wetlands near Moscow, Idaho, during the spring of 2005 to document amphibian colonization and examine the effects of wetland and landscape variables on amphibian presence and reproduction. I used an information-theoretic approach to develop a series of *a priori* logistic regression models predicting species presence and reproduction based on preliminary results from 2004, personal observations, and earlier literature. I then ranked models using Akaike's Information Criteria (AIC). I detected long-toed salamanders (*Ambystoma macrodactylum*), Columbia spotted frogs (*Rana luteiventris*), and Pacific treefrogs (*Pseudacris regilla*) during both years and all three species were observed breeding in both years. All three species were positively associated with wetlands in agricultural habitats compared to urban habitats and species richness was greater in agricultural wetlands. Columbia spotted frogs were strongly associated with older wetlands, probably because older wetlands had greater amounts of wetland vegetation. Pacific treefrogs were also associated with greater amounts of wetland vegetation. Long-toed salamanders were associated with younger wetlands and lower amounts of wetland vegetation. No species was strongly associated with distance to nearest previously existing wetland or wetland hydroperiod. Both landscape and within wetland variables appear important in influencing wetland colonization by amphibians. Creating or restoring wetlands in agricultural or native habitats that contain some wetland vegetation will likely increase the suitability of those wetlands for amphibians.

BAUMGARDT, JEREMY*[1], K. P. Reese[1], E. O. Garton[1], J. W. Connelly[2], and M. Evans[3]. [1]Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844. [2] Idaho Department of Fish and Game, Department of Biological Sciences, Idaho State University, Pocatello, ID 83209. [3] Department of Statistics, Washington State University, Pullman, WA 99164. ***PREDICTING THE ATTENDANCE PROBABILITY OF GREATER SAGE-GROUSE AT LEK SITES IN SOUTH-CENTRAL IDAHO: PRELIMINARY ANALYSIS.***

Recent trends based on leks counts indicate populations of greater sage-grouse (Centrocercus urophasianus) are generally declining throughout their range. Currently, there are no methods in practice to estimate their actual abundance. Our objective was to estimate the probability of birds attending leks in order to relate the count to the actual abundance of the population. We used mark-resighting techniques to model the probability of male greater sage-grouse attending leks in south-central Idaho. Birds were captured in the winter and fitted with 16.5 g necklace style radio transmitters. Triangulation from 2 locations off each lek was used to "re-sight" marked birds in 2006 and 2007. We fit a Cormack-Jolly-Seber model to these data using program MARK. We assumed our method of re-sighting resulted in a 100% detection rate when birds were present, so our estimated parameter was the probability of attending leks, or site propensity. We restricted our predictor variables to time (Julian date), year, age of birds (adult or yearling), and their interactions. We included an unconstrained time variable, as well as time constrained to a linear and quadratic trend in our set of candidate models. The top model chosen by AIC model selection procedures included the variables of year and a quadratic time trend. The second-best model, with a Δ AIC value of 0.88 included age and a quadratic time trend. These results suggest that the probability of male sage-grouse attending leks peaked near the middle of April at 0.77 (SE = 0.053), was different for adults and yearlings, and varied between 2006 and 2007. We will continue to collect data in the spring of 2008 and 2009 and will include additional variables such as time of day and weather in our candidate set of models, which should result in more precise estimates of attendance probability.

Burak, G. and GREGG SERVHEEN. Idaho Department of Fish and Game, Boise, ID 83707. ***WILDLIFE-HIGHWAY LINKAGE IDENTIFICATION AND DEVELOPMENT OF A STATEWIDE WILDLIFE-HIGHWAY MORTALITY DATABASE.***

Through an agreement with the Idaho Transportation Department and the Federal Highways Administration, the Idaho Department of Fish and Game has undertaken two statewide wildlife-highway projects: 1) Identification of important wildlife-highway linkages and 2) Development and implementation of an online wildlife-highway mortality database. Wildlife linkage areas were identified using the Rapid Assessment method, which utilizes expert opinion from multi-agency personnel in a workshop setting, to identify areas of interest concerning wildlife-highway interactions along state and federal highways. To date over 300 linkage areas have been identified and mapped through out the state. The wildlife-highway mortality database is being developed as an online database that will cover state and federal roads in Idaho. This is believed to be the first centralized wildlife-highway mortality database that is accessible through the web in the United States. This presentation will cover the status of these two projects and will provide data examples and their applicability towards wildlife-highway management issues.

BUSSCHER, KATIE*, Boise State University, Boise, Idaho 83725. ***TRANSLOCATION IN RELATION TO HABITAT REQUIREMENTS OF THE SOUTHERN IDAHO GROUND SQUIRREL (SPERMOPHILUS BRUNNEUS ENDEMICUS).***

Populations of the southern Idaho ground squirrel (*Spermophilus brunneus endemicus*) have shown rapid declines in the last 20 years, mainly because of habitat loss and fragmentation. Translocations were attempted, in 2006 and 2007, in an effort to determine the best methodology for establishing new populations. Equal numbers of male and female squirrels were captured from the Van Deussen ranch (Emmett, ID) in late spring and relocated to four sites in Midvale, ID. Squirrels were either hard-released (n=34), meaning no cage or artificial burrow system was provided, or soft-released (n=40).

Soft-release involved placing a squirrel in an individual cage, 0.6 x 0.6 x 0.46 m (1.27 x 2.54 cm mesh), containing corrugated tubing (10 x 60 cm) for shelter, and releasing after four days. Food was provided to all squirrels. Radio-collars (~6 grams) were fitted to adults (n=40) and juveniles (n=34). Squirrels were tracked until they settled in an area, or died, or until the signal was too weak to track. Vegetation was assessed at each settlement site, along with a randomly selected corresponding companion site, using a 10-m radial plot and Daubenmire plot frames. A 35% survival rate was observed for all collared squirrels. Fifty-five percent of adults (22 of 40) and only 12% of juveniles (4 of 34) survived. A logistic regression analysis was used to determine if age, sex, or release type were associated with survival. Age was the only factor found to be significantly associated with survival. Wilcoxon signed-rank tests found no significant differences between vegetation cover of occupied and unoccupied sites (n=32, p>0.05). Further examination of the study area will continue in spring of 2008 to assess overwintering survival.

CAMBRIN, SCOTT M.* Idaho State University, Department of Biological Sciences Box 8007 Pocatello, ID 83209. ***SURVIVAL OF NEONATAL RATTLESNAKES DURING SIMULATED HIBERNATION.***

The objective of this study was to evaluate the effects of feeding and body condition of neonatal Great Basin Rattlesnakes (*Crotalus oreganous lutosus*) on survival over simulated hibernation in the laboratory. This approach was undertaken because of the difficulty of in getting good survival estimates from mark-recapture studies in the field. I collected 10 pregnant females from two different overwintering sites on the Idaho National Laboratory in southeastern Idaho. I allowed the females to give birth in the laboratory and then kept the young (n = 115) in temperature and light controlled environmental chambers set to mimic field conditions through the winter. Masses and snout – vent lengths were measured after birth and before hibernation and all individuals were given the opportunity to feed on baby laboratory mice 1-2 times before entering hibernation. I calculated body conditions from the residuals of the regression of mass on length. Neonates that survived the winter had much higher body condition than non-survivors (0.027 vs. -0.035). Of individuals that ate 2 meals, 92% survived; of individuals that ate 1 meal. 43% survived; and of individuals that did not eat, only 19% survived. The overall survival rate for the study was 41%. This value is somewhat lower than most field studies (53% to 77%), perhaps because of a late start into hibernation (November 18) and the long duration (206 days) of hibernation. I conclude that the number of meals before hibernation should have a considerable effect on overwinter survivorship of neonatal rattlesnakes in the field in southeastern Idaho.

CASSIRER, E. FRANCES[1], V.L. Coggins[2], and C.A. Strobl[2]; [1] Idaho Department of Fish and Game, 3316 16th St. Lewiston, ID, 83501; [2]Oregon Department of Fish and Wildlife, 65495 Alder Slope Road, Enterprise, OR, 97828. ***SELENIUM SUPPLEMENTATION OF FREE-RANGING BIGHORN SHEEP IN HELLS CANYON***

Selenium deficiency may play a role in predisposing animals to disease, and consequently, selenium supplementation could potentially increase the ability of animals to mount an effective immune response to pathogenic organisms. Between 1997 and 2006, we provided commercially available salt blocks supplemented with 90 mg/kg of selenium and six other trace minerals (Zn, Fe, Mn, Cu, I, Co) to bighorn sheep (*Ovis canadensis canadensis*) in selected populations in the Hells Canyon metapopulation, and in 2000 and 2001 we also provided these populations with high selenium (120 mg/kg) and Vitamin E (600 IU/lb) fiber blocks. We analyzed selenium levels from whole blood collected at capture and found that levels were adequate (>0.05 ppm) based on standards in domestic sheep. Bighorn sheep were observed using supplemental blocks in all populations where available, however, whole blood selenium levels in two of the supplemented populations (average blood selenium = 0.12 ppm) did not differ from populations that were not supplemented (average selenium levels in 3 unsupplemented populations 0.12 – 0.21 ppm, $p > 0.05$). Average selenium level in the third supplemented population was twice that of all other populations (0.42 ppm, $p < 0.001$). Two months after we removed mineral blocks from this population, blood selenium had declined to levels

observed in the unsupplemented populations ($\bar{x} = 0.22, p = 0.23$). However, despite the success of supplementation at elevating blood selenium levels, this population continued to experience pneumonia-caused mortality in adults and lambs. Disease and selenium-level patterns in supplemented and unsupplemented populations suggested that pneumonia-caused mortality of bighorn sheep in Hells Canyon was not a consequence of selenium deficiency and we found no evidence that selenium supplementation improved herd health.

COPELAND, SYLVIA[1], E. Bottum[2], and C. Baun[3]. [1]ERO Resources, Boise, Idaho 83703; [2]Idaho Department of Fish and Game, Nampa, Idaho 83686;, [3]Environmental Conservation Services, Garden City, ID 83714. ***DEVELOPMENT OF A HABITAT AND MITIGATION EVALUATION MODEL FOR ADA COUNTY, IDAHO.***

With increasing development pressure and potential loss of important wildlife habitat in Ada County, we formed a multi-agency group to model habitat quantity and quality and the effectiveness of proposed mitigation measures. First, we developed a model based on the concept of "No Net Loss" (NNL) of wetlands, using habitat units that equaled the number of acres x habitat quality (i.e. vegetation type and rangeland condition). However, the model failed to incorporate some factors that affect habitat quality, such as disturbance and fragmentation. We then researched the availability and applicability of other models, including Habitat Evaluation Procedures (HEP) based on Habitat Suitability Indices for select species in an area. We also researched models used in conservation planning and other mechanisms for ranking habitat value in a given area, such as the National Resources Conservation Service's Wildlife Habitat Appraisals. In the absence of identified priority habitats and species or Wildlife Overlays, such as in Blaine and Teton Counties, we felt the need to incorporate factors that would account for priority habitats and species. We focused on big game species in the foothills and sagebrush-dependent species of conservation concern in the Snake River plains. We drafted factors that affected habitat quality of these species and then incorporated these factors into a checklist. We present our draft model along with a review of other ranking mechanisms and models, including wetland mitigation, HEP, Fisheries and Oceans Canada NNL policy on aquatic habitat productivity, and the Victoria Department of Sustainability and Environment's Vegetation Quality Assessment. We hope the review and process of designing a model will help clarify the complexity of the issue and that biologists may find some applicability to other species and areas of Idaho.

DAVIDSON, ANNE[1], T. Miewald[2], J. Ohmann[3], J, Kagan [4], E. Grossmann[4], T. Sajwaj[1], J. Aycrigg[1], S. Lennartz[2], and S. McDonough[1].[1]University of Idaho, Moscow, Idaho, 83844, [2]Sanborn, Portland, Oregon, 97204; [3]U.S. Forest Service, Corvallis, Oregon, 97331; [4]Oregon State University, Corvallis, Oregon, 97331. ***METHODS AND STATUS OF LAND COVER MAPPING FOR THE NORTHWEST GAP ANALYSIS PROJECT***

The Northwest Gap Analysis Project (NWGAP) is currently mapping the distribution of Ecological Systems (ES) across Idaho, Washington, Oregon, Montana, and Wyoming, which includes 12 MRLC mapping zones. Developed by NatureServe, ES represent a midscale vegetation classification system designed to be map-able with Landsat 30 meter resolution imagery. Three mapping teams have been involved; (1) Oregon State University and USDA Forest Serve, (2) Sanborn Solutions, Inc., Portland, Oregon, and (3) NWGAP, Moscow, Idaho. Different modeling approaches are being explored to evaluate which method effectively represents the natural distribution of ES within each map zone. Oregon State University is employing Gradient Nearest Neighbor (GNN) and Random Forest modeling techniques, while Sanborn and NWGAP are using a Classification and Regression Tree (CART) modeling approach. Frequent communication among the mapping teams ensures consistent application of each ES definition and seamless representation across the region. Draft land cover maps are currently available for MRLC zones 1, 2, 8, 9, 10, 20, 29 and 30. The distributions of 142 ES are represented with deterministic accuracy rates of many ES above 80%. The land cover maps for

NWGAP are scheduled to be completed in early Summer 2008 and will be available for download from the National Gap Analysis Program.

ESTES-ZUMPF, WENDY A.*, Janet L. Rachlow, Lisette P. Waits, and Kenneth Warheit. Department of Fish and Wildlife Resources, Center for Research on Invasive Species and Small Populations, University of Idaho, Moscow, ID 83844. ***GENE FLOW AND GENETIC DIVERSITY AMONG POPULATIONS OF PYGMY RABBITS IN IDAHO AND MONTANA.***

Gene flow influences genetic diversity and contributes to the health and persistence of populations. We examined current and historic gene flow and genetic variation in the pygmy rabbit (*Brachylagus idahoensis*), a sagebrush specialist that occurs in small isolated populations in the Great Basin region. We quantified genetic diversity and population differentiation in pygmy rabbits from 19 populations across Idaho and 6 populations in southwestern Montana using 16 microsatellite loci and a 509bp fragment of the mitochondrial control region. Genetic diversity was lowest on the periphery of the species range in Montana and west of the Salmon River in Idaho. Expected heterozygosity ranged from 0.62 to 0.78 and haplotype diversity ranged from 0 to 0.82. We identified 36 mitochondrial haplotypes. Rabbits north of the Snake River in Idaho and Montana shared several haplotypes but had no haplotypes in common with rabbits south of the Snake River. Furthermore, haplotypes from southeastern Idaho were unique from those in southwestern Idaho. Population differentiation was also greatest between rabbits on either side of the Snake River (Fst values ranged from 0.006 to 0.2). In general, the Snake River and/or the Snake River Plain appears to have severely limited gene flow among populations of pygmy rabbits in both recent and historic times. The Continental Divide, however, does not appear to be a barrier to gene flow. Low elevation passes between Idaho and Montana with sagebrush habitat likely permit gene flow among populations of rabbits across the Divide.

FELICETTI, LAURA. Washington State University, Pullman WA 99164. ***MITIGATION OF MARINE-DERIVED NUTRIENT LOSS IN THE BOISE-PAYETTE-WEISER SUBBASIN.***

This project intends to mitigate marine-derived nutrient loss resulting from salmon extinction due to hydro project development in the Boise/Payette/Weiser subbasins. We will substitute the natural nutrient cycle provided by returning anadromous fish through application of anadromous fish carcasses, salmon analogues, and fertilizer. We will treat 500m segments of twelve small (2-3 meters wide) streams (4 in each sub-basin) with pasteurized fish carcasses (at roughly 0.5 carcasses/m^2) to twelve control streams. To begin understanding which treatment is the most viable mitigation alternative in ecological and economic terms, we will treat an additional two streams, one with fish analogue and the other with a nutrient fertilizer. Treatment will occur once a year (in August) for three years. All treatments will be adding roughly 27.5g N/m^2 and 5.5g P/m^2 for 500 meters. Prior and subsequent to application of nutrient treatments, we will monitor aquatic, vegetative, and terrestrial food webs using isotope and lipid analysis of sampled species. Data from 3 years of treatments will be used to model the relative effectiveness and effects of carcass, analogue, and fertilizer treatments on ecological food webs. The results of the model will be used to choose the final mitigation treatment type most appropriate for the Boise/Payette/Weiser system.

GOBLE, DALE, D.[1], J. M. Scott[2], and A. Haines[3]. [1] College of Law University of Idaho Moscow , ID 83844; [2] Department of Fish and Wildlife University of Idaho, Moscow , ID 83844; [3]Center for Research on Invasive Species and Small populations, University of Idaho Moscow Idaho 83844-1141.
CONSERVATION RELIANT SPECIES : EXCEPTIONS OR THE RULE?

The recovery (delisting) of a threatened or endangered species is often accompanied by the expectation that conservation management of the species will no longer be necessary. However, the magnitude and pace of human impacts on the environment make it unlikely that substantial progress will be made in delisting many species unless the definition of "recovery" includes some form of active management. Preventing de-listed species from again being at risk of extinction may require

continuing, species-specific management actions. We characterize such species as "conservation-reliant", and suggest that viewing "recovery" as a continuum of states rather than as a simple "recovered/not recovered" dichotomy may enhance our ability to manage such species within the framework of the Endangered Species Act. With ongoing loss of habitat, disruption of natural disturbance regimes, and the increasing impacts of non-native invasive species, it is probable that the number of conservation-reliant species will increase. We will discuss the development of "recovery management agreements", with legally and biologically defensible contracts that would provide for continuing conservation management following delisting. The use of such formalized agreements will spread authority, responsibility and leadership for conservation of species at risk with state wildlife agencies other federal agencies, and with state, local, and tribal governments, as well as with private entities. Conservation of at risk species will no longer be just a federal problem.

GOODELL, JOHN, J. Klausmann, and P. Hook, Intermountain Aquatics Inc., Driggs, ID 8342. ***FROM FARMS TO SUB-DIVISIONS; WILDLIFE MONITORING AND RESOURCE PLANNING IN A PRE-DEVELOPMENT, AGRICULTURAL LANDSCAPE IN EASTERN IDAHO.***

A recent real estate boom coupled with weak development regulations threatens to permanently destroy and degrade wildlife habitat and functional open space in Teton County Idaho. Development has primarily occurred in the Teton Basin; however, over twenty-five thousand acres of irrigated and dry-land, transitional habitat (mostly farmland) adjacent to the Teton River Canyon was recently acquired by developers. Relatively little scientific information exists concerning development impacts on wildlife resources. Baseline inventories and ongoing monitoring programs rarely occur on private lands slated for development, especially when wetland or fisheries regulations are not applicable. Working hand in hand with developers, Intermountain Aquatics initiated a wildlife monitoring program in the spring of 2007. We developed a landscape-level study design targeting four wildlife species or groups with high conservation priority status: Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), neo-tropical migrant passerines (sage-obligates & riparian-obligates), raptors, big game (emphasizing mule deer [*Odocoileus hemionus*]). Songbird sampling occurred in wooded draws (a mosaic of aspen forest, riparian shrubs, and mountain shrub species), Conservation Reserve Program (CRP) grassland habitat, sage-steppe habitat, and cultivated areas. Sharp-tailed grouse lek survey data reveal a relatively high density of grouse within the study area. Wooded draws contain over 70% of species richness detected within the study area. Densities of grasshopper sparrows (*Ammodramus savannarum*) vary in CRP grasslands and are correlated to grass structure. Over 80% of brewer's sparrow (*Spizella breweri*) detections occurred in relic sage-steppe habitat, comprising 4% of study area. Habitat and wildlife data are being used to guide landscape-scale planning to best conserve wildlife populations. Additionally, baseline observations and ongoing monitoring data are being used to plan dry-land habitat restoration on approximately four thousand acres of agricultural land.

HAINES, AARON M.[1], J.M. Scott[2], D. Goble[3], and E.O. Garton[4]. [1]Center for Research on Invasive Species and Small Populations, University of Idaho, CNR Room 103A, Moscow, ID 83844-1141. [2]United States Geological Survey, Idaho Cooperative Fish & Wildlife Research Unit, University of Idaho, Moscow, ID 83844-1141; [3]College of Law, University of Idaho, Room 201, Moscow, ID 83844. [4]Dept. Fish and Wildlife, CNR Room 104A, University of Idaho, Moscow, ID 83844. ***DEFINING RECOVERY FOR ENDANGERED BIRDS***

The goal of the Endangered Species Act (ESA) is to recover listed species. However, the ESA does not clearly define recovery. Thus, federal agencies implementing the statute have been forced to grapple with the definition of recovery without guidance. Federal agencies define standards of recovery through recovery plans of listed species. We examined recovery plans for 83 listed bird species to identify how recovery is being defined. Recovery criteria mainly consisted of increasing population size and number of populations to be stabilized over a defined period of time. We found that 31% of listed avian species lacked recovery criteria because of limited population sizes or range

or lack of information. Birds were listed with a relatively higher population size compared to other species, but avian species had lower number of populations stipulated for recovery compared to other species. For avian species that have been recovered, population sizes and number of populations at time of delisting were more robust than those stipulated in recovery plans. In the absence of recovery guidelines set by ESA, recovery criteria is based on minimal rather than sustainable ecological requirements for species persistence.

HAINES, AARON M.[1], M. Leu[2], L. K. Svancara [3], G. Wilson[4], J. M. Scott[5], and K.T. Vierling[6]. [1]Center for Research on Invasive Species and Small Populations, University of Idaho, Moscow, ID 83844-1141; [2]United States Geological Survey, Forest and Rangeland Science Center, Boise, ID 83706; [3]Idaho Conservation Data Center, Idaho Department of Fish and Game, and the University of Idaho, Moscow, ID 83844-4061; [4]Landscape Dynamics Lab, University of Idaho, Moscow, ID 83844; [5]United States Geological Survey, Idaho Cooperative Fish & Wildlife Research Unit, University of Idaho, Moscow, ID 83844-1141; [6]Department of Fish & Wildlife, University of Idaho, Moscow, ID 83844-1141.
BIODIVERSITY HOTSPOTS AND SPECIES CONSERVATION

Identification of biodiversity hotspots has become a common strategy to delineate important areas for wildlife conservation. However, the use of biodiversity hotspots has been criticized for not incorporating important habitat, ecosystem services, anthropogenic activity, and lacking consistency in identifying important conservation areas. The purpose of this study was to identify biodiversity hotspots to improve conservation efforts for species of greatest conservation need in the state of Idaho by addressing the criticisms of previous biodiversity hotspot delineations. We evaluated the use of multiple approaches to define biodiversity hotspots and we identified the weighted approach, which incorporates a species habitat range and endangerment status, as identifying biodiversity hotspot areas with higher species overlap. In addition, we grouped species based on their sensitivity to specific human threats (i.e., development, agriculture, fire suppression, grazing, roads, and logging) and identified ecological sections within the state of Idaho that required specific conservations actions to address these human threats. This approach can be useful for land managers or local governments as a way to effectively apply theoretical conservation biology to on-the-ground conservation actions or planning efforts.

HILLIARD, DAVID P.*, Christopher L. Jenkins, and Charles R. Peterson. Department of Biological Sciences, Idaho State University, Pocatello, Idaho 83209. ***MODELING AND MAPPING REPTILE DISTRIBUTIONS FOR THE IDAHO NATIONAL LABORATORY***

The goals of this study are to understand the factors affecting reptile distribution and to make predictive distribution maps for individual species across the development zone (central 259 km^2) of the Idaho National Laboratory (INL). This information will be used to help develop the conservation management plan for the INL. We developed a habitat-based sampling design using vegetation cover, burn status, and terrain roughness to define 14 environmental types. We randomly placed a trapping array at one site in each of the 14 environmental types and conducted visual encounter surveys (VES) at each trapping location and two more randomly chosen sites per environmental type. Incidental species observations were also recorded. Six species of reptiles were found to occur within the development zone. The number of observations / trapping records were 1071 sagebrush lizard, 119 western rattlesnake, 104 pygmy short-horned lizard, 27 gopher snake, 13 western skink, and 11 for terrestrial garter snake. Sagebrush and pygmy short-horned lizards were widespread throughout the development zone. All other species had more limited distributions. We used a boolean model based on a species-environmental type matrix to create a map of predicted presence and absence of each species in the study area and of overall reptile species richness. We used the trapping and VES data to map the probability of detecting each species in each environmental type polygon. We found that the presence / "absence" VES and trapping data alone were insufficient for modeling approaches requiring both positive and negative data (e.g., logistic regression). We are currently developing distribution models based on several GIS layers (topography, terrain roughness, cover, and burn status) and all of

the positive (presence) animal data (e.g., Mahalanobis distance-based models). These analyses will help managers visualize where reptiles distributions occur so better facility siting decisions can be made.

HOLBROOK, JOE[1]*, L. P. Waits[1], D. Onorato[2], C. White[3], J. Rachael[4], P. Zager[5], and R. Desimone[6]. [1]University of Idaho, Department of Fish and Wildlife Resources, Moscow, Idaho, 83844;[2] Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, Naples, FL 34104; [3] Idaho Department of Fish and Game, Nampa, ID 83686; [4] Idaho Department of Fish and Game, 3101 S Powerline Rd, Nampa ID 83686; [5]Idaho Department of Fish and Game, 1540 Warner Avenue, Lewiston, ID 83501-5699; [6]Montana Fish, Wildlife & Parks, P.O. Box 20070,Helena, Montana 59620. ***GENETIC DIVERSITY, POPULATION STRUCTURE AND GENE FLOW AMONG COUGAR POPULATIONS IN IDAHO AND MONTANA***

Cougars (*Puma concolor*) were once widely distributed in the Western Hemisphere, but human activities have extirpated this species from most of eastern North America and portions of South America. Cougars have persisted in western North America, and recent genetic studies have provided conflicting results on the level of gene flow across the range of this highly vagile carnivore. Several studies have concluded that there is high connectivity and low levels of population genetic structure across hundreds of kilometers while others have found evidence of barriers to movement and low levels of gene flow over similar or smaller spatial scales. To evaluate genetic diversity and connectivity of populations in Montana and Idaho, we sampled >150 cougars from the Owyhee Mountains of southern Idaho, the Clearwater drainage of north-central Idaho and the Garnet Mountains in western Montana. Nuclear DNA microsatellite data were generated for all samples using eight unlinked loci. Heterozygosity levels were relatively high (65 – 69%) and did not differ substantially among sampling areas. Gene flow was restricted between sampling areas as shown by Fst levels that ranged from a high of 0.147 (Montana to S. Idaho) to a low of 0.059 (Montana to N. Idaho). Bayesian clustering analyses without apriori population data suggested the most likely number of populations was three (Montana, N Idaho, S. Idaho). A small number of migrants was detected among all three populations, and movements were asymmetric among study areas. The Snake River plain appears to be a substantial barrier to dispersal for cougars in Idaho. Currently, we are analyzing ~ 100 new samples from central and southern Idaho and increasing the number of loci to 12 for the entire dataset. These additions will increase the spatial coverage and power of our analyses to evaluate movement patterns and gene flow among cougars.

HOWARD, SEAN*[1], N. Balkenhol[1], K. Olson[2] and L.P. Waits[1]. [1]University of Idaho, Moscow, Idaho 83844; [2] University of Massachusetts, Amhest, Massachusetts 01003 and Wildlife Conservation Society, Bronx, NY 10460. ***GENETIC DIVERSITY AND POPULATION STRUCTURE OF MONGOLIAN WOLVES.***

Declining numbers of gray wolves (*Canis lupus*) around the world have heightened the need for studies that evaluate genetic diversity and structure of remaining populations. In Mongolia, information on the number and status of local wolf populations is severely limited, but declines up to 80% have been suggested for some regions. Thus, numerous questions exist concerning population structure and genetic health of Mongolian wolves. Do individuals belong to one panmictic population, or are there multiple genetic groups? If population substructure exists, does it correlate with landscape types like forest or grassland habitat? And, how do levels of genetic diversity compare to wolves from other regions? We address these questions by generating mitochondrial DNA (mtDNA) sequence data for the control region and nuclear DNA data at 17 microsatellite loci for 71 wolves from eastern Mongolia. Our analyses indicate that genetic diversity in Mongolian wolves is relatively high with an expected heterozygosity of 0.76 and an average number of 8.3 alleles per locus. Bayesian clustering analyses suggest that Mongolian wolves are a single, panmictic population across our 123,500 km^2 study area. We obtained 4 unique mtDNA sequences from 45 wolves. We will compare our results to published work on wolves in other countries, and discuss conservation implications and future research needs for Mongolian wolves.

KLAUSMANN, JEFF and J Goodell, Intermountain Aquatics Inc., Driggs, ID 83422.***GROWING HOUSES IN THE FIELDS: CAN PRIORITY WILDLIFE COEXIST WITH RESIDENTIAL DEVELOPMENT IN TETON COUNTY?***

Teton County Idaho is one of the fastest growing counties in the Western United States. Residential development threatens wildlife including many sensitive species of high conservation concern. The West Rim is a vast farming area in the northwestern corner of the county that connects the Big Hole Mountains with high priority big game winter range in Teton Canyon. Over the past 18 months roughly 24,400 of 37,000 acres on the West Rim have been sold to developers. It is unclear how wildlife will respond to anticipated development and whether ecologically-based planning can improve outcomes. In recent decades scientists and resource managers have developed concepts for landscape-scale development planning, but these have rarely if ever been applied from start to finish in planning and implementing rural residential development over large areas and multiple subdivisions. We are working with several developers to apply widely recommended development mitigation practices including: (1) identify and plan for priority wildlife, in this case Columbian sharp-tailed grouse, neo-tropical migrant passerines, raptors, mule deer and other big game; (2) cluster homes aggressively; (3) protect high quality native habitat (relict sage steppe and woodlands) where possible; (4) provide meaningful buffers around priority habitats such as Teton Canyon, relict natural habitat, Sharptail leks, and raptor nests; (5) concentrate open space in large, contiguous areas for maximum ecological function; (6) preserve key game movement corridors. Because over 100 years of intensive farming has eliminated most native habitat, we are also emphasizing extensive restoration of sage steppe, mountain shrub and aspen-riparian vegetation as well as wildlife-focused management of Conservation Reserve Program lands and other wildlife enhancements. Detailed resource inventories are being used to guide planning, and future monitoring will be used to evaluate whether recommended mitigation and restoration strategies can allow priority wildlife to coexist with residential development.

KOCHERT, MICHAEL[1], M. Fuller[1], L. Schueck[1], Marc Bechard[2], B. Woodbridge[3], Geoff Holroyd[4], and Laura Bond[2]. [1]U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Snake River Field Station, 970 Lusk St., Boise, Idaho 83706; [2]Boise State University, Boise, ID 83725. [3]U.S. Fish and Wildlife Service, Yreka, California 96097. [4]Canadian Wildlife Service, Edmonton, Alberta, T6B2X3. ***MIGRATION PATTERNS OF SWAINSON'S HAWKS.***

We radio tracked 46 adult Swainson's Hawks (*Buteo swainsoni*) from Idaho, 6 other U.S. states and 2 Canadian provinces to their austral summer range. Preliminary results indicate that birds departed the nesting grounds between 12 August and 13 October on a southerly course. Swainson's Hawks arrived in central Argentina between 7 November and 30 December. Southward migrations lasted from 42 – 98 d. Travel distances we report reflect a minimum distance because it is unlikely that birds flew a straight line between location estimates. Cumulative tracking distances for fall migration ranged from 8,849 – 13,209 km. A bird from southeast Arizona had the shortest distance, and a hawk from northern California had the longest. Hawks readily moved around their austral range, moving 500 to 600 km among clusters. Birds left Argentina on a northerly bearing between 13 February and 26 March. North migration lasted 51 to 82 d, and cumulative tracking distances ranged from 9,047 – 11,585 km. During fall migration 79% of the hawks made 1 to 7 stopovers, lasting between 1.2 and 27.0 d. Of these hawks, 42% stopped for ≥ 9 d at their first stopover, which occurred north of the U.S. – Mexico border, mainly in the Great Plains. Of the migrating birds, 37% made 1 to 1 stopovers lasting 4.0 to 8.4 d, with most occurring north of the U.S. – Mexico border. The southern Great Plains and the northern Chihuahuan desert appear to be important stopover areas.

LONG, RYAN A.[1]*, J. L. Rachlow[2], J. G. Kie[1], and R. T. Bowyer[1]. 1Department of Biological Sciences, Idaho State University, Pocatello, ID 83209; 2Department of Fish and Wildlife Resources,

University of Idaho, Moscow, ID 83844. ***SEX-SPECIFIC RESPONSES OF NORTH AMERICAN ELK TO FUELS REDUCTION.***

Sexual segregation outside the mating season is nearly ubiquitous among polygynous cervids, and can be influenced by differential selection of forage by the sexes. A powerful approach to testing hypotheses about the relationship between selection of foraging habitat and sexual segregation is to evaluate sex-specific responses to experimental manipulation of habitat. Few studies, however, have considered the potential for habitat manipulation to affect female and male cervids in different ways. We evaluated responses of female and male North American elk (*Cervus elaphus*) to an experimental fuels reduction program at the Starkey Experimental Forest and Range (Starkey) in northeastern Oregon, USA. From 2001 to 2003, 26 stands of true fir (*Abies* spp.) and Douglas-fir (*Pseudotsuga menziesii*) were mechanically thinned and burned, whereas 27 similar stands were left untreated to serve as controls. We used locations from 48 females and 14 males collected during spring and summer of 2005 and 2006 to compare seasonal patterns of habitat use between sexes. During spring, females selected 4-year-old burns and used 2 and 3-year-old burns in proportion to their availability, whereas males avoided all fire-treated stands. In addition, control stands were avoided by females but selected by males during spring. During summer, control stands were selected and treatment stands either were avoided or used in proportion to their availability by the sexes. Use of treated stands by female and male elk was influenced by different environmental variables across seasons, but mean overlap of utilization distributions (UDs) between the sexes was higher in summer than spring. These results indicate that although fuels reduction treatments at Starkey may have increased foraging opportunities for female elk in spring, those treatments likely were of little benefit to male elk. In addition, fuels reduction might have increased spatial segregation of the sexes during spring but decreased segregation during summer.

LUCID, MICHAEL K. and Laura Robinson. Idaho Department of Fish and Game, 3101 S. Powerline Road, Nampa, ID 83686. ***COMPARING TWO MODELING APPROACHES TO PREDICT AREAS OF HIGH WOLF USE IN AN IDAHO WILDERNESS AREA.***

Developing an accurate model to predict areas of high wolf use has important management implications including non-invasive monitoring techniques, detecting wolves as they migrate into new areas, and predicting capture opportunities. We compared the accuracy of two modeling approaches to predict areas of high use by wolves in Idaho's Selway-Bitterroot Wilderness. The first model used site characteristics (slope, aspect, distance to water, and elevation) of known rendezvous sites in a distribution model. The second used documented wolf sign along surveyed trails as a response variable in a logistic regression model that considered several ecological variables (slope, aspect, elevation, burn history, elk sign, vegetation index, and water) in an information theoretic approach to determine the variables most associated with trails of high wolf use. Both models indicate slope, burn history, and vegetation index can be used to accurately predict areas of high wolf use. Data for these variables are easily obtained and may aid in monitoring efforts following the potential delisting of wolves.

MCVEY, KATIE*, J. Welty, M. Stuber, and J. Belthoff, Dept. of Biological Sciences and Raptor Research Center, Boise State University, Boise, Idaho 83725. ***HOW DOES INTRODUCTION OF AGRICULTURE ALTER ECOSYSTEM DYNAMICS?: STABLE ISOTOPE ANALYSIS OF TROPHIC RELATIONSHIPS AND FOOD WEBS OF BURROWING OWLS IN S. IDAHO.***

Agriculture changes natural landscapes and affects many species of plants and animals. Unlike most species of native wildlife that appear to be displaced by agriculture, burrowing owls (*Athene cunicularia*) nest in higher densities in agricultural landscapes. Prey diversity and availability appear to drive greater burrowing owl abundance in agricultural areas. It is unknown if and how burrowing owl food webs differ between habitat types, but montane voles (*Microtus montanus*) and Orthoptera species, both important burrowing owl prey, occur in higher abundance in agricultural areas. Our objective was to characterize trophic structure and food web dynamics that involve burrowing owls,

their prey, and other raptors within natural and agricultural settings within the Snake River Birds of Prey National Conservation Area (Idaho, USA) using stable isotope analyses of carbon and nitrogen. Stable isotope values are helpful to depict food webs because isotopic values differ at the level of the producer and can be traced throughout food webs. Characterization of food webs and trophic structure requires tissue samples from owls and other raptors, their prey, their predators, and plant tissue from within both habitats. We collected such samples throughout the 2007 breeding season for burrowing owls and other species of raptors and subjected them to stable isotopes analysis. Our paper will describe initial results and compare them to previously reported relationships that were based largely on regurgitated pellet analysis.

MILODRAGOVICH, SAM[1] and D. Dean[2]. [1]Northwestern Energy, Butte Montana 59701, [2]POWER Engineers Inc., Boise, ID 83709. ***MOUNTAIN STATES TRANSMISSION INTERTIE 500KV, WILDLIFE IMPACTS IN THE FACE OF ENERGY DEVELOPMENT.***

Increasing electric consumption, population growth, increasing awareness of global warming, legislation, and insufficient infrastructure are combining to drive demand for new sources of electricity. Wind, clean coal, natural gas and possibly nuclear generation are likely new sources of electric generation. Most locations for new generation are long distances from the demand/population centers, requiring construction of new transmission facilities to deliver electricity. Construction of new generation and transmission facilities has the potential to impact wildlife on many levels. With a paradigm shift in the energy business toward cleaner energy production, innovative approaches for assessing impacts to wildlife are important to minimize wildlife impacts. Northwestern Energy, formerly know as Montana Power, is an investor-owned utility, proposing to build a 500kV transmission line from southeastern Idaho to southwestern Montana. The proposed line would: extend 350-390 miles, be constructed of lattice steel towers and tubular steel self-supporting towers with an average height of 110-130 feet, require a right-of-way width approximately 220 feet, and have an average span of approximately 1,500 feet between towers. Potential wildlife impacts are being identified through a combination on Geographic Information System analyses, field verification, personal communication with local agencies, and existing literature. Further assessment(s) of impacts to specific species and habitats is anticipated during and after construction through field investigations. Continued input of wildlife professionals is encouraged and appreciated.

MONTEITH, KEVIN[1]*,C. L. Sexton[2], J. A. Jenks[3], R. T. Bowyer[4], and L. E. Schmitz[5]. [1]Department of Biological Sciences, Idaho State University, Pocatello, ID 83209; [2]National Park Service, Theodore Roosevelt National Park, Medora, ND 58645; [3]Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD 57007; [4]Department of Biological Sciences, Idaho State University, Pocatello, ID 83209, USA; [5]South Dakota Department of Game, Fish and Parks, Rapid City, SD 57702, USA. ***SEXUAL SEGREGATION IN WHITE-TAILED DEER: INTERSEXUAL DIVERGENCE IN DIGESTIVE FUNCTION, MORPHOLOGY, AND BEHAVIOR.***

Causes of sexual segregation have been widely debated in the literature; a clear understanding of the behavior and its consequences are of theoretical and applied importance. Some factors affecting sexual segregation may cause varying responses among species of sexually dimorphic ruminants, and across different landscapes. Nevertheless, we hypothesized that there may be two ultimate factors that will explain sexual segregation: predation and the gastrocentric hypothesis. Proximal factors may also influence patterns and the degree at which segregation occurs. We designed an experiment to examine the relationship between digestive function of the sexes and segregation behavior of white-tailed deer (*Odocoileus virginianus*). We monitored digestive function of 3 treatment groups (i.e., male, nonreproductive female, and reproductive female) of captive adult ($\geq$ 2 yrs) white-tailed deer of varying age and reproductive status during 3 consecutive years. Digestive function was monitored by measuring forage and fluid intake and retention rates, body mass, apparent digestive efficiency, diet choice, and incisor arcades. We also monitored patterns of spatial segregation, group membership, and habitat use of free-ranging white-tailed deer within 45 km of the captive facility to allow the

relation of digestive function with changes in behavior. There was clear divergence in digestive function between reproductively active females and nonreproductive females and males. Incisor arcades of males and females did not differ, but incisor arcade relative to body mass was greater for females. Sexual segregation of deer in Lincoln County peaked about 4-5 weeks post-parturition and remained high through the remainder of the 12 week sampling period, which coincided with high nutrient demand of reproductive females during lactation. We discuss seasonal resource demand between the sexes and express the importance in considering the sexes separately when evaluating management alternatives and provide support for the predation and gastrocentric hypotheses.

NADEAU, STEVE, Idaho Department of Fish and Game, Boise, Idaho 83707. ***WOLF DELISTING AND STATE MANAGEMENT: THE DEMISE OF WOLVES OR THE BEGINNING OF A NEW ERA?***

Gray wolves (*Canis lupus*) were reintroduced into Idaho and Yellowstone in 1995 and 1996. The wolf populations reached recovery goals in 2002, and currently number close to 800 in Idaho. At the time of this writing the USFWS proposed publishing a delisting rule for the Northern Rocky Mountain wolf population in February. Once delisting occurs, the states of Idaho, Montana, and Wyoming will take over wolf management. Along with delisting comes inevitable litigation. Litigation will depend not only on federal rules and nuances, but also on state management plans. The state of Idaho lists wolves as a big game animal similar to bears, lions, elk and deer, and plans to harvest wolves and maintain healthy viable populations forever. Some wolf advocates believe states will overkill wolves and manage at too low a number, and some believe that wolves should never be hunted. Anti wolf activists believe states can never kill enough. How will state managers handle this controversial animal? Who should you believe? This presentation will review the current status of wolves, proposed wolf management, and the direction Idaho will go if given the opportunity.

PILLIOD, DAVID S. and R.S. Arkle. USGS Forest and Rangeland Ecosystem Science Center, 970 Lusk St., Boise, Idaho 83706. ***ARE PRESCRIBED FIRES ECOLOGICAL SURROGATES FOR WILDLAND FIRES? A STREAM PERSPECTIVE***

Prescribed fire is used to reduce the risk of catastrophic wildland fire and is espoused as a means to restore the ecological integrity of western forests. While there is evidence that fire risk is reduced after fuel management, few studies have examined whether prescribed fires result in similar ecological processes and post-fire conditions as wildland fires. Using a before-after-control-impact design in small stream ecosystems in central Idaho, we found that stream amphibians, invertebrates, and primary producers did not respond to spring broadcast burning relative to changes observed after wildland fire. Stream communities were influenced by habitat disturbances, particularly those caused by high flow events. In watersheds burned in wildland fires, high flow events resulted in greater changes in stream communities in watersheds that burned at high severity relative to those that burned at low severity. However, even watersheds that burned at low severity in a wildland fire still resulted in greater stream community changes compared to those observed after prescribed fire. Therefore, from a stream perspective, prescribed fires do not appear to mimic "low severity" wildland fires. This raises new questions about how stream communities have been influenced by fire suppression and about whether prescribed fire management practices, that do not mimic wildland fires, will continue to alter systems that evolved under frequent fires.

RACHLOW, JANET.[1], J. Witham[1], D. Sanchez[1], W. Estes-Zumpf[1], A. Price[1], H. Roberts[2], V. Guyer[3], and B. Waterbury[4]. [1]University of Idaho, Moscow, Idaho 83844; [2]708 Lombard St., Salmon, Idaho 83467; [3]Bureau of Land Management, Salmon, Idaho 83467, and [4]Idaho Department of Fish and Game, Salmon, Idaho 83467 (BW). ***DYNAMICS OF PYGMY RABBIT BURROWS: VARIATION ACROSS SPACE AND TIME.***

The burrowing behavior of pygmy rabbits provides opportunities for monitoring the species. Pygmy rabbits use burrow systems year-round, and individuals use 1 to >5 different burrows systems seasonally. Burrow systems can persist for several years and may be occupied by different individuals

across time. Despite this general understanding, the dynamics of burrow use by pygmy rabbits are poorly understood. We used data from censuses of burrow systems to ask three questions: 1) how are burrows distributed spatially; 2) how does density and distribution of burrow systems differ between sites and across years; and 3) how do patterns of occupancy change over time? We conducted burrow censuses at two sites in the Lemhi Valley in 2002-07, and data were available from previous surveys conducted by H. Roberts. Locations of burrows were recorded using GPS units, and activity status was assessed based on integrity of burrow entrances and presence and appearance of fecal pellets. Burrow systems in the Lemhi Valley were closely associated with mima mounds, and consequently, the distribution of burrow systems differed from a random pattern. Density of active burrow systems ranged from 0.6/ha to >5.0/ha, and both density and proportion of active burrows differed between sites. Density of active burrow systems also differed significantly across years, and a similar cycle was documented at sites monitored since 2002. Density peaked in 2004, declined to a low in 2006, and increased again in 2007 to levels documented during 2002. These results suggest that burrow systems might be useful for evaluating changes in relative abundance of rabbits over time. Many questions remain regarding ecological factors that influence burrow use and construction, and we briefly discuss how such factors could be incorporated into a monitoring design for pygmy rabbit burrows.

Ray, Chris[1], THOMAS J. RODHOUSE[2], E.A. Beever[3], and M. R. Shardlow[4]. [1]University of Colorado, Boulder, CO, 80309; [2]National Park Service, Bend, OR 97701; [3]US Geological Survey, Anchorage, AK 99503; [4]University of Idaho, ID 83844. ***OCCUPANCY, DETECTABILITY, AND HABITAT ASSOCIATIONS AMONG AMERICAN PIKA (OCHOTONA PRINCEPS) POPULATIONS IN CRATERS OF THE MOON AND LAVA BEDS NATIONAL MONUMENTS.***

Recent concerns have arisen over the long-term fate of American pika (*Ochotona princeps*) populations in North America, relative to climate change and other stressors. Localized extirpations have occurred in isolated Great Basin mountain ranges at increasing rates. Thermal stresses may have shaped distributions and contributed to these extirpations. Given current predictions of future climate change, further extinction risk appears considerable. Surprisingly, pika populations persist at Craters of the Moon and Lava Beds National Monuments, two extensive low-elevation lava flows. These sites are far warmer and drier than locations where pikas have recently been lost, and the species' presence there defies general predictions of persistence available from the literature. Occupancy surveys were conducted in these parks during 2005-2007. Pikas were readily detected ($\hat{p}$ >0.9), particularly when indirect sign was used. Pikas occurred more frequently in structurally complex lava flows with deep fissures and overhangs, and where forage plants, particularly forbs, were relatively abundant. Pikas apparently select a subset of environmental conditions within an otherwise extensive and superficially homogeneous habitat type. Both National Monuments may provide regionally significant refugia for pikas and other glacial relicts under climate change.

ROBINSON, SCOTT R., Bureau of Land Management, Coeur d'Alene, ID 83815. ***BREEDING BIRDS ON A DEVELOPED RECREATIONAL SITE.***

The Bureau of Land Management (BLM) constructed a seasonal, day-use recreation facility in 2002 and 2003. Its provides a 4 lane boat launch, vehicle and trailer parking spaces, boarding and moorage docks, picnic sites, and a wooden boardwalk with 3 decks to watch wildlife. Twenty-five percent of the study area was covered by asphalt and manicured lawn. This study evaluated the breeding birds during 10 years: 5 years before construction with 5 years during and after construction of this facility. Forty-four species with established breeding territories were identified at least once during this study. The average number of species per year remained the same during both time periods. The finite numbers of territories, as well as the standard measurement per 40 ha, were also similar during both time periods. Of the 44 species, 21 had an increased average of 15 territories, while 21 had a decreased average of 9 territories for an average net gain of 6 territories per year after construction.

Two species had the same average number of territories per year between both time periods. With few exceptions, the observed data supports the conclusion that the pre- and post-samples were not significantly different from one another. Those exceptions include 4 species that had individually significant *P* values and 7 other resident species that nested in tree cavities. The major reason for this conclusion is that many of the cottonwood trees, which also have cavities, remained standing along the water's edge after construction was completed. Replacing noxious weeds with asphalt and manicured lawn made very little difference, and allowing grass and flowers to grow outside the development benefited ground-nesting species. Human disturbances were minimized because most visitors used the site primarily to launch their boats and then left to play on the water during the day.

RODHOUSE, THOMAS J.[1], R.P. Hirnyck[2], J. Vincent[3], L.K. Garrett[4], and R.G. Wright[2]. [1]*National Park Service, Bend, OR 97701*; [2]*University of Idaho, Moscow, ID 83844*; [3]*Idaho State Parks and Recreation, Island Park ID 83429*; [4]*National Park Service, Moscow, ID 83844*; *University of Idaho, Moscow, ID 83844.* ***RODENT SITE OCCUPANCY PROBABILITIES ALONG A PINYON-JUNIPER WOODLAND UNDERSTORY VEGETATION GRADIENT IN SOUTHERN IDAHO***

Rodents may be sensitive indicators of environmental change; particularly those species that exhibit tightly coupled habitat associations. The pinyon-juniper woodland reaches its northern distributional limit in southern Idaho, and, like many communities at the margins, may be particularly prone to rapid structural changes, particularly within the context of climate change. How will pinyon-juniper rodent communities also at the margins respond to these changes? In an effort to establish baseline patterns of occupancy and habitat association, we conducted a live-trapping survey over three seasons in the pinyon-juniper woodlands of City of Rocks National Reserve and Castle Rocks State Park, Idaho. Principal components analysis (PCA) of site environmental characteristics indicated that survey sites occurred along a gradient of understory vegetation cover. We estimated site occupancy and detection probabilities for *Peromyscus truei*, *Tamias dorsalis*, *Tamias minimus*, and *Perognathus parvus* with first-order Markovian multi-season occupancy models and PCA score covariates using PRESENCE software. Occupancy probabilities for each of these species reflected the dominant environmental gradient, with *P. truei* most likely to occur in sites with low understory vegetation cover and *T. minimus* occurring in sites with high understory vegetation cover. *T. dorsalis* occupancy was weakly associated with low understory vegetation conditions and *P. parvus* occupancy did not differ significantly from the null model representing random occupancy within the woodland study area. Rodent monitoring is a costly enterprise but site occupancy and use modeling provides a relatively efficient approach. Species such as *P. truei*, and to a lesser extent *T. dorsalis*, may be useful indicators of pinyon-juniper stand structural conditions, but study design components such as survey sample size, site-level sampling effort, and definition of the sample unit require careful consideration.

RODHOUSE, THOMAS J.[1], W. E. Rainey[2], K.T. Vierling[3]; R. Gerald Wright[3]. [1]National Park Service, Bend, OR 97701; [2]Berkeley, CA 94709; [3]University of Idaho, ID 83844. ***TEMPORAL VARIABILITY IN BAT FORAGING AND COMMUTING ACTIVITY PATTERNS.***

Bats are important components of western North American faunal assemblages, and many species are considered rare and at risk by state and federal authorities. However, bats are difficult to study and are frequently overlooked in studies of riparian and other environments where bats are concentrated. Advances in acoustic technology have created opportunities for sampling bats in a wide variety of environments but comprehensive recommendations for acoustic sampling design and analytical strategies are not well established. Temporal variability in resource use by bats has been widely recognized but not well described across regions and species. Describing this variability and accounting for autocorrelation in time series is an important exercise for researchers who wish to design studies with appropriate temporal sampling windows to characterize bat resource use. Misspecification of design characteristics, or failure to account for variability at a range of temporal scales, can bias study results. We employ several graphical and statistical tools to describe temporal variability in activity patterns of foraging and commuting bats in riparian and wetland habitats across a

range of temporal scales, elevations, and bat assemblages in eastern Oregon and the Sierra Nevada, California. Temperature is a readily measured and powerful covariate that can explain much of the variability in bat activity and should be included in all acoustic surveys in temperate regions. Other recommendations include the optimal number of consecutive nights needed to minimize variation and autocorrelation among sample units. Careful consideration must be given to the sampling window at the seasonal scale, which, not surprisingly, must be defined in the context of study objectives as well as expectations of seasonal variation in activity patterns.

SANCHEZ, DANA and J. Rachlow. Dept. of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho, 83844. . ***SPATIO-TEMPORAL FACTORS SHAPING DIURNAL SPACE USE BY PYGMY RABBITS.***

Energetic demands, individual characteristics, and resource distribution can influence patterns of space use by wildlife. Previous investigations have described basic characteristics of space use by pygmy rabbits (*Brachylagus idahoensis*), a small, burrowing, sagebrush specialist native to the Great Basin and intermountain West. We studied factors influencing diurnal space use by adult pygmy rabbits during 2 breeding and 2 non-breeding seasons at 3 sites in the Lemhi Valley, Idaho, during 2004–2005. Pygmy rabbits used larger areas than predicted by allometric models and documented by some previous investigations. Sex and season strongly influenced mobility and space use by rabbits. Males used larger home range and core areas during the breeding (12.0 ± 1.6 ha, 2.2 ± 0.2 ha) and the non-breeding seasons (3.7 ± 0.9 ha, 0.7 ± 0.3 ha), used more burrow systems (7.5 ± 0.5), moved farther between locations (54.4 ± 6.5m, breeding), and used more widely dispersed burrow systems than did female rabbits. We found significant study site effects in many movement parameters, suggesting that resource distribution might influence space use decisions by pygmy rabbits. Rabbits on a study site with lower shrub canopy cover and burrow system density used smaller home range and core areas, used fewer burrow systems, moved shorter distances between locations, and moved among burrow systems less frequently than did rabbits on a study area with greater potential cover resources. Differences in perceived predation risk might contribute to this contrast. Regardless, our results suggest that pygmy rabbits use relatively large areas, and exhibit seasonal and site-specific variation in patterns of movement and space use. Therefore, larger habitat patches may be needed to conserve pygmy rabbits to accommodate seasonal and regional variation in resource availability and animal space use needs.

SCOTT, J. MICHAEL , US Geological Survey and Professor of Wildlife Biology University of Idaho Moscow Idaho 83843. ***CLIMATE CHANGE AND WILDLIFE REFUGES : MANAGING FOR RESILIENCE IN THE FACE OF UNCERTAINTY.***

The U.S. National Wildlife Refuge System (NWRS) is the largest system of protected areas in the world. It encompasses over 93 million acres (37.6 M ha) and is composed of 547 refuges. Compared to other protected areas, the units are relatively small, typically embedded in a matrix of developed lands and situated at low elevations on productive soils. Projected changes in precipitation, temperature and sea level rise associated with climate change will have NWRS-wide effects on species and their habitats. Climate related changes in the distribution and timing of resource availability may cause species to become decoupled from their resource requirements. The impacts of most concern are those that may occur on NWRS trust species that have limited dispersal abilities or occur on refuge at the extremes of their geophysical, ecological or geographical distributions. Projected sea level rise has substantial negative implications for 161 coastal refuges, particularly those surrounded by human developments or steep topography. Managing the "typical" challenges to the Refuge system requires accounting for the interaction of climate change with other stressors in the midst of substantial uncertainties about how stressors will interact and systems will respond Climate change adds a known forcing trend in temperature and other environmental variables to all other stressors that likely will result in complex non-linear challenges to species and ecological processes that will be exceptionally difficult to understand and mitigate. The historic vision of refuges as fixed islands of safe haven for

species met existing needs at a time when the population of the United States was less than half its current size and construction of the first interstate highway was decades in the future. I will discuss the new tools, new partnerships and new ways of thinking that will be required to maintain the integrity, diversity, and health of the refuges in the face of climate change and expanded human populations and economies.

STALEY, SAMANTHA[1*] and C. Jenkins,[2] [1]Department of Earth Systems, Stanford University, Stanford, CA, 94309; [2]North America Program, Lost River Sinks Region, Wildlife Conservation Society, Pocatello, ID, 83204. ***EFFECTS OF VEGETATION COVER ON PASSERINE BIRD COMMUNITIES IN SAGEBRUSH STEPPE.***

Sagebrush steppe ecosystems have been classified as endangered due to a variety of threats, including the conversion of shrub habitats to annual grasslands. Passerine bird communities have been shown to respond to these types of threats. The Idaho National Laboratory contains some of the least disturbed remaining sagebrush habitats. To determine how fires in relatively pristine sagebrush habitats influence bird communities, we conducted point counts in 6 cover types, including burned, on the INL in 2006 and 2007. We found that bird species richness and diversity were similar among cover types dominated by Big Sagebrush (*Artemisia tridentata*), despite differing understory vegetation. However, species richness and diversity were significantly lower in burned areas. We found no difference in overall bird abundance among cover types. Overall, a high abundance of relatively few species characterized the bird communities in burned areas; Horned Lark (*Eremophia alpestris*) and Western Meadowlark (*Sturnella neglecta*), both grassland species, represented ~75% of species in burned areas, whereas they represented at most 50% of the species in habitats dominated by Big Sagebrush. Sagebrush obligates, including the Brewer's Sparrow (*Spizella breweri*), represented smaller fractions of bird communities in burned areas than they did in unburned areas. We are currently using multivariate techniques to further examine ecological communities of birds (e.g., sagebrush obligates) and to determine how bird communities are distributed among cover types in our study area. Initial results from these analyses suggest bird communities can be differentiated using these techniques. The completed results from these analyses will be included as part of the presentation. Our study suggests the importance of undisturbed sagebrush steppe to sagebrush obligates and to the overall presence of diverse passerine bird communities.

STENGLEIN, JENNIFER*, C. Mack, D. Ausband, M. Mitchell, P. Zager, S. Nadeau and L. Waits, University of Idaho, Moscow, Idaho 83843. ***EVALUATING THE USE OF NONINVASIVE GENETIC SAMPLING FOR MONITORING GRAY WOLVES IN IDAHO.***

Traditional methods of monitoring population size and status for large carnivores are time consuming, expensive and require extensive efforts to capture individual animals. One promising new population monitoring approach for gray wolves (*Canis lupus*) is fecal DNA sampling. In summer of 2007, we initiated a pilot study to evaluate the success and cost-effectiveness of this approach for Idaho gray wolves in two areas of known high wolf density (Game Management Unit 28 and GMUs 33, 34, and 35) and two areas of low wolf density (GMU 24 and GMU 43). To focus sampling efforts across a large study area, we identified probable rendezvous sites based on landscape characteristics derived from logistic regression analyses of telemetry locations of known rendezvous sites. From June – August, 478 probable rendezvous sites were visited and scat and/or hair samples were collected at 12% of the sites, totaling 198 scat and 73 hair samples. For each scat, a genetic sample was taken from the tip and the side to evaluate whether fecal DNA sampling location affected PCR success and/or error rates. Individual identification of each sample was accomplishing by analyzing eight microsatellite loci using an Applied Biosystems 3130xl capillary machine and associated software. Fecal samples had higher PCR amplification success rates (70%) than hair samples (63%). There was little difference in success rates between the tip (64%) and side (67%) of fecal samples, but feces collected from the tip of the scat had higher genotyping error rates (23%) than samples collected on the side (13%). A minimum count of individual wolves across the study area is ongoing. The results

of this study will be used to determine the most effective method for summer scat surveys and to evaluate the feasibility of using noninvasive genetic sampling methods for wolf monitoring and management efforts in Idaho.

STEPHENSON, JOHN*, K. Reese, P. Zager, and A. Martens. University of Idaho, Moscow, ID 83844.
ECOLOGY OF TRANSLOCATED MOUNTAIN QUAIL (OREORTYX PICTUS) IN WESTERN IDAHO AND EASTERN WASHINGTON.

The distribution of mountain quail (*Oreortyx pictus*) has declined considerably in the eastern portion of its historical range in the past 100 years. In response, translocations are being used to supplement and restore populations in this region. We translocated 322 mountain quail into Asotin Creek Wildlife Area (AC) in eastern Washington and into Craig Mountain Wildlife Management Area (CM) in western Idaho on 12 March 2005 (n=145) and 17 March 2006 (n=177). Of these, 199 mountain quail were radio-marked and monitored for 6 months until batteries failed. Six-month survival was 13% (26/199), confirmed mortality was 76% (151/199), and 11% (22/199) of radioed birds went missing or had faulty transmitters. Deaths were attributed to avian predators (39%), mammalian predators (12%), humans (2%), and unknown causes (47%). Risk of death was positively correlated with movement rate. Birds at AC dispersed shorter distances initially, moved less overall, and were found at lower elevations throughout the spring/summer period than birds at CM. Home ranges (95% fixed kernel, LSCV h) were larger at CM (25.4 ± 5.2 ha) than at AC (6.0 ± 1.2 ha). Mountain quail preferred deciduous and conifer cover types, avoided grass, and used shrub cover in proportion to availability at the 3rd order of selection. Nest success was 81% (13/16) at AC and 63% (5/8) at CM. Overall brood success was 61% (11/18) with an average of 5.8 ± 1.0 chicks per successful brood at 28 days after hatching. All 24 nests were located in or near edge habitat and 15 (63%) were located in Douglas fir-dominated plant associations. Canopy cover at nest sites was included in the top 6 models predicting successful vs. unsuccessful nests. Future release locations for mountain quail at these study areas should include adequate canopy cover to minimize movements, and therefore increase survival and productivity rates.

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ECOTOXICOLOGICAL RISK AND EXPOSURE: A COMPARISON OF BURROWING OWLS IN NATURAL AND AGRICULTURAL AREAS

Burrowing owls (*Athene cunicularia*) nest in higher densities in irrigated agricultural habitat when compared to natural habitat. In fact, they are the only species of raptor to show a preference for and an increased association with irrigated agriculture during their breeding season. This association may occur because agricultural areas provide a more reliable and abundant source of prey, particularly invertebrates. One potential cost of this association for burrowing owls, however, is an increased risk of exposure to pesticides applied to agricultural fields. Harmful effects of pesticide exposure can range from relatively minor physiological and behavioral changes, such as a decrease in thermoregulatory ability and food consumption, to severe health effects, such as decreased immune system function, and can even result in death. The purpose of this study is to compare levels of direct and indirect exposure of burrowing owls to pesticides in agricultural and non-agricultural areas. Specifically, our study examines adults, nestlings, and fledglings to determine if and how pesticide exposure affects burrowing owl behavior, survival, growth, and productivity. It will also compare eggshell thickness and p,p'-DDE (a metabolic product of DDT) levels in eggs in agricultural and non-agricultural areas, as this chemical, now banned in the US, is still used in Mexico and lingers in soils where previously applied. We will use this information in an ecological risk assessment for burrowing owls and an evaluation of the role of irrigated agriculture in their demography.

SVANCARA, LEONA, K.* University of Idaho. ***PLANNING FOR CHANGE: A CHANGE FOR PLANNING?***
Over the next 25 years, Idaho is projected to continue being one of the fastest growing states in the US, reaching nearly 2 million people in 2030. The increasing prevalence of low density development patterns, coupled with a lack of land use planning, is exacerbating habitat loss and fragmentation in many areas. To help the Bureau of Land Management understand and predict effects of land use decisions, we integrated conservation information with land use patterns in a spatial decision support system. Applied appropriately, such decision support tools can improve the efficiency, defensibility, transparency, and repeatability of the decision-making process for land use planning. Tied to the Idaho Comprehensive Wildlife Conservation Strategy, they also provide a framework for implementing effective conservation actions.

TALSMA, ARTHUR and M. Atchison, The Nature Conservancy, 950 W. Bannock St., Boise, Idaho 83702. *PREVENTION OF INVASIVE SPECIES IN LARGE WILDLIFE MANAGEMENT AREAS USING AN INNOVATIVE ECOLOGICALLY DESIGNED AND GEOGRAPHICALLY EFFICIENT (LEADING EDGE) APPROACH.*
Invasive weeds have been rated as the number one threat to native grasslands and shrub steppe plant communities in some western landscapes. Traditionally, land managers spend most of their time fighting weeds with expensive herbicides and biocontrols on large noxious weed invasions. We have designed an innovative cooperative leading edge approach to weed control and prevention. We define (EDGE) as Ecologically Designed and Geographically Efficient strategies to manage weed invasions in large rugged landscapes. We couple Digital Aerial Sketch Mapping (DASM) surveys and Strategic Weed Action Teams (SWAT) with ranchers and land managers to effectively detect and control weeds that are invading relatively weed free areas. The Nature Conservancy has demonstrated the capacity to increase participation by wildlife managers and private landowners to prevent weeds from expanding in large landscapes using these cost effective early detection and rapid response strategies. We have tested this approach in Hells Canyon and the Owyhee Mountains to benefit plant communities and wildlife diversity. Application of the Leading EDGE approach has also received positive peer review by wildlife managers and weed scientist seeking to manage invasive species in other countries in South America and Africa.

THOMPSON, TOM*[1], K. Reese[1], and A. Apa[2]. [1]University of Idaho, Moscow, Idaho 83844; [2]Colorado Division of Wildlife, Grand Junction, Colorado 81505. ***EVALUATION OF ASSISTED BROOD AMALGAMATION IN SAGE-GROUSE: CAN ADDING DOMESTICALLY-HATCHED CHICKS INTO WILD BROODS SUPPORT A POPULATION?***
The decline in greater sage-grouse (*Centrocercus urophasianus*) populations over the last 30 years, particularly in fringe and low density populations such as in Alberta, Washington, Utah, California and Colorado have fueled wildlife agencies to consider using translocation of adult grouse as a management strategy to supplement declining populations. A potential alternative to the translocation of reproductively-active adults would be to supplement broods of successful females in those population with wild chicks that were hatched and raised in captivity (i.e., domestically-hatched). Between 2005 and 2007, we developed and investigated the feasibility of this management technique on 2 populations in northwestern Colorado. Over the course of this study we collected 302 eggs from both laying and incubating radio-marked females and incubated and hatched them in captivity. Chicks were then raised to either1-4 days (treatment 1) or 5-9 days (treatment 2) before being placed into unrelated wild broods within the 2 study areas. We successfully introduced 71.1% (118/166) of all chicks that hatched into wild broods. Adoption rate over the 3 years was over 95% successful, and the chicks in treatment 1 had higher survival compared to treatment 2 to 28 days post adoption. Details of the procedure will be presented.

Troy R., D. Delehanty, and G. GILLETTE*, Idaho State University, Pocatello, Idaho 83201. ***SUCCESSFULLY CAPTURING MOUNTAIN QUAIL USING A MODIFIED NIGHT-NETTING TECHNIQUE***

Mountain Quail (*Oreortyx pictus*) have experienced acute declines throughout the eastern portion of their historic range. In an effort to restore the species and gain life history information, resource managers have translocated over 3000 Mountain Quail since 1986. Because of short duration in battery life associated with small transmitters and difficulty recapturing Mountain Quail in remote, steep, brushy habitat characteristically associated with the species, long-term monitoring has proven to be problematic. We explored the feasibility of night-netting radio-marked Mountain Quail and found it to be an effective means of recapture. During 2006 and 2007, we targeted 25 Mountain Quail in the Bennett Hills of Idaho for recapture and caught 23 (92%). Additionally, technological advances in illumination allowed us to modify night-netting by placing the spot-light at the rim of the net to avoid illumination of the netter and increase efficacy. This finding may be useful in facilitating long-term research and restoration of Mountain Quail as well as other gallinaceous birds.

TROY, RONALD J[1]*, J.W. Connelly[2], and D.J. Delehanty[1]; [1]Idaho State University, Pocatello, Idaho, 83209. [2]Idaho Fish and Game, 1345 Barton Road, Pocatello, Idaho 83204. ***MOVEMENT, SURVIVAL, AND REPRODUCTION OF MOUNTAIN QUAIL TRANSLOCATED FROM TWO SOURCE POPULATIONS.***

Mountain quail (*Oreortyx pictus*) have been extirpated from most of their historic range in Idaho. Here, we report the results of an effort to reestablish mountain quail in an area where habitat suitability assessments indicated suitable habitat currently existed. Embedded in our restoration effort is a comparison of post-release performance of mountain quail from two distinct source populations, southern California (*O.p. eremophilus*) and southwestern Oregon (*O.p. palmeri*). To control for effects of sociality, pre-release diet, and body condition, quail from both source populations were over-wintered communally in a large aviary at Idaho State University, Pocatello, Idaho. In spring of 2006 and 2007, we released 52 and 73 mountain quail respectively, into the Bennett Hills, south-central Idaho. In 2006, 33 mountain quail were fitted with radio collars and monitored year round. Cumulative survival rates were 40% through 1, Sept. 2006 (n=33) as compared to 32% in 2007 (n=25). As of Sept. 1 or date of mortality, quail were found a mean distance away from the release site of 11.8 km ± 1.20 SE (n=33) in 2006 and 4.7 km ± .66 SE in 2007 (n=25). Mean elevation was 1415 m ± 62 SE in 2006 (n=33) and 1847 m ± 28 SE in 2007. We detected one breeding pair with 7 chicks in 2006 and 5 breeding pairs with 37 chicks in 2007. Cumulatively, quail from the two source populations did not significantly differ in survival rate, distance from release site, elevation or reproductive rate. Knowledge of post release performance in relation to source populations will assist wildlife managers in future restoration of mountain quail populations.

WELTY, JUSTIN*, K. McVey, M. Stuber, and J. Belthoff. Boise State University, Boise, Idaho 83725. COSTS AND BENEFITS OF GROUP LIVING IN OWLS.

The choice for group or solitary living can be based on a variety of costs and benefits. Potential benefits of grouping include group defense, early detection of predators, and increased productivity through information or foraging advantages. Costs of group living include parasite transmission, detection by predators, and possible increases in adult and egg yolk androgens resulting from increased conspecific aggression. Western burrowing owl (*Athene cunicularia hypugaea*) nesting distributions range from solitary (≥1km between nests) to semi-colonial (as little as 50m between nests). We examined relationships between group living and egg yolk androgens, ectoparasite (fleas) abundance, depredation on dummy nests and on actual nests, nest defense behavior, and overall productivity in burrowing owls nesting within s. Idaho. Egg androgens did not rise with closer neighbors, but ectoparasites increased significantly as distance to nearest neighbor decreased. However, experimental evidence suggests that increased ectoparasite loads do not lower overall body condition in nestlings, so costs related to increased parasites in groups may be minimal. While grouped and solitary dummy nests were depredated at similar frequencies, fewer actual nests were depredated as distance to nearest neighbor decreased. The potential benefit of group defense or early

warning in semi-colonial owls may explain why so few semi-colonial nests were depredated. For instance, neighboring males joined with the focal male to attack a dummy predator and neighboring nestlings returned to their burrows after a warning call from the focal male. Finally, productivity increased as distance to nearest neighbor decreased. While burrowing owls may incur costs of increased parasites, the benefits of increased productivity and decreased depredation from early warning and cooperative defense may help explain why burrowing owls frequently nest in close association with conspecifics.

ZAGER, PETE[1], M. Hurley[2], G. Pauley[3], and C. White[4], [1]Idaho Department of Fish and Game, 3316 16th Street, Lewiston, ID 83501; [2]Idaho Department of Fish and Game, P.O. Box 1336, Salmon, ID 83467; [3]Idaho Department of Fish and Game, Route 1 Box 66H, Kamiah, ID 83539; [4]Idaho Department of Fish and Game, 3101 South Powerline Road, Nampa, ID 83686. ***A SNAPSHOT OF SURVIVAL AND CAUSE-SPECIFIC MORTALITY FOR ELK AND MULE DEER POPULATIONS ACROSS IDAHO, 2005-07.***

We monitored survival and cause-specific mortality for adult female elk and mule deer in multiple study areas distributed across Idaho during 2005-06 and 2006-07. Overall survival of adult female elk ranged from 0.76 to 0.98 during 2005-06 and 0.67 to 0.98 in 2006-07. Survival declined markedly during this period in the Clearwater Region and McCall Sub-region study areas, whereas it remained stable or increased in the Salmon, Upper Snake, Magic Valley, and Southwest region study areas. Hunter harvest, wolf predation, and cougar predation were the primary proximate mortality factors, and the relative role of each varied spatially and temporally. Survival of elk marked at 6 months of age and monitored until age 1 was 70-73.5% in the Lolo Zone and 100% in GMUs 28 and 36B during this period. Predation by cougars and wolves was the primary proximate cause of mortality, accounting for 66-78% of the known-cause deaths. Adult female mule deer survival ranged from 0.67 to 1.00 during 2005-07 in our study areas. Hunter harvest and predation were the primary proximate causes of mortality. These data demonstrate the spatial and temporal variability in ungulate population dynamics across Idaho and provide baseline values for wildlife managers and decision-makers.