

Program and Abstracts

Joint Meeting

Idaho Chapter of The Wildlife Society

Northwest Section of  
Partners in Amphibian and Reptile  
Conservation

*8 – 11 March 2010*  
*Owyhee Plaza Hotel •*  
*Boise, Idaho*



NORTHWEST



AMPHIBIAN AND REPTILE CONSERVATION



### **Meeting introduction**

The combined meetings of the Idaho Chapter of The Wildlife Society, Northwest Section of Partners in Amphibian and Reptile Conservation will take place 8-11 March 2010 in Boise, Idaho. Participants are encouraged to register in advance by going to the on-line, secure registration page at the meeting's website: <http://www.ictws.org>.

This year's meeting offers a diverse scientific program with a plenary session, symposium, contributed oral presentations, social activities and the annual business meeting.

### **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 seen 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>

Golden Eagle Audubon Society · <http://www.goldeneagleaudubon.org/>

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. · 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 and associated workshops will take place at the Owyhee Plaza Hotel, 1109 West Main Street, Boise, ID 83702-5649. Phone: (208) 343-4611. [www.owyheeplaza.com](http://www.owyheeplaza.com)

### **Conference Contact**

Dave Stricklan - [strickland@byui.edu](mailto:strickland@byui.edu) – (208) 496-4626



## **REGISTRATION**

Registration fees are broken down into the Northwest PARC Meeting, Symposium on Wildlife Conservation and Energy Development in the Northwest, and the Idaho Chapter of the Wildlife Society meeting. Fees for the different events include admission to all oral sessions, coffee breaks, social activities, and the program and abstracts. In addition, registration fees for the symposium include a lunch and fees for the ICTWS meeting include the banquet and a complimentary meeting gift.

### Registration Fees:

NW PARC	\$ 40	registration (includes social)
Symposium	\$ 50	registration (includes lunch)
ICTWS	\$100	full registration (includes social, banquet, and meeting gift)
	\$ 75	retiree registration (includes social, banquet, and meeting gift)
	\$ 60	one day registration (includes either the social or banquet, and meeting gift)
	\$ 50	student registration (includes social, banquet, and meeting gift)
	\$ 30	extra banquet ticket
	\$ 10	late registration fee – after March 1 <sup>st</sup>

The registration desk will be open at the following times:

Monday	8 March	11:30 am – 12:30 pm for NW PARC Meeting
Tuesday	9 March	9:00 am – 10:30 am for Energy Development Symposium
Wednesday	10 March	7:00 am – 1:30 pm for ICTWS Meeting
Thursday	11 March	7:00 am – 1:30 pm for ICTWS Meeting

### **Organizing Committee**

<b>Dave Stricklan</b>	Brigham Young University - Idaho
<b>Sam Mattise</b>	Retired BLM
<b>Sylvia Copeland</b>	
<b>Jonathan Dudley</b>	USFS Rocky Mountain Research Station

The Committee would like to thank Bruce Ackerman for organizing elections for the Idaho Chapter of The Wildlife Society; the awards committee (Kerry Reese, Jack Connelly); Anna Owsiak and the paper awards committee; and all of the students that helped with AV and other logistics.

Note: The 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**

**Monday 8 March**

Time	
12:30 – 5:30 p.m.	Northwest Section and Idaho Partners in Amphibian & Reptile Conservation
5:30 – 8:30 p.m.	NW PARC Social

**Tuesday 9 March**

Time	
8:00 – 10:00 a.m.	NW PARC / Idaho Bat Working Group
10:30 – 12:15 p.m.	Symposium <i>Wildlife Conservation and Energy Development in the Northwest</i>
12:15 – 12:55 p.m.	LUNCH Speaker: Reed Burkholder
12:55 – 5:30 p.m.	Symposium <i>Wildlife Conservation and Energy Development in the Northwest</i>

**Wednesday 10 March**

Time	
8:30 – 8:45	Welcome – ICTWS President: Dave Stricklan
8:45 – 9:45	Keynote Address: Chris Servheen
10:00 – 11:45	Panel Discussion
11:45 – 1:00	LUNCH – on your own
1:00 – 1:10	Remarks – TWS Northwest Section President: Terry Bowyer
1:10 – 4:30	Invited Speakers
4:50 – 6:00	ICTWS Business Meeting (Rainier Room)
6:00 – 9:00	Social and Poster Session (Ballroom)

**Thursday 11 March**

	<b>Rainier Room</b>	<b>Regency Room</b>
Time		
8:20 – 10:20	Modeling and Landscape Ecology/Avian Ecology	Mammalian Ecology
10:40 – 12:00	Avian Ecology	Mammalian Ecology
12:00 – 1:20	LUNCH – on your own	LUNCH – on your own
1:20 – 2:40	Avian Ecology	Mammalian Ecology/Amphibian Ecology
3:10 – 4:50	Avian Ecology – combined session	
6:00 – 9:00	Banquet (Ballroom)	Banquet Speaker: Tom Smith



## **Plenary Speaker**

**Christopher Servheen**, Grizzly Bear Recovery Coordinator, U. S. Fish and Wildlife Service, and Adjunct Associate Professor in the College of Forestry and Conservation, University of Montana

Dr. Servheen has been the Grizzly Bear Recovery Coordinator for USFWS for 28 years. As such, he is responsible for coordinating all the research and management on grizzly bears in the lower 48 states and working with biologists in Alberta and British Columbia. In 2007, he was awarded the U.S. Department of Interior's second-highest honor for his work coordinating the federal government's efforts to bring the grizzly bear back from near-extinction in the West. Much of his current work involves the impacts of highways and human developments on habitat fragmentation for bears and other large carnivores in the Rocky Mountains. In addition, Dr. Servheen teaches international wildlife conservation at University of Montana (UM). He has worked in many countries in Asia and in Europe on bears and bear conservation, and maintains close cooperative relationships with IUCN, WWF, and other international conservation organizations. He has authored or co-authored over 80 publications and supervised Masters Students and Ph.D. students at UM.

## **Banquet Speaker**

**Tom Smith**, Associate Professor in the Department of Plant and Wildlife Sciences, College of Life Sciences, Brigham Young University

Dr. Smith's work has been focused mainly on North American bear conservation and conflict management for the past 17 years. He is currently engaged in both bear and Rocky Mountain bighorn research in Utah and Alaska. Current studies with polar bears focus on den emergence ecology and response to human activities on the North Slope, Alaska.

## **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 **Charles E. Harris 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. Presentations should be uploaded no later than the break preceding your talk.

**Messages, job postings, and volunteer opportunities**

We will set up a message and job board next to the registration desk.

**Parking**

The Owyhee Plaza Hotel offers free parking by the hotel (southwest side) and in a lot off of Grove Street between 12<sup>th</sup> and 13<sup>th</sup> Streets.

**Lost And Found/Security**

Please bring lost and found items to the Registration Desk.

**Sponsors and Contributors to the 2010 Annual Meetings**

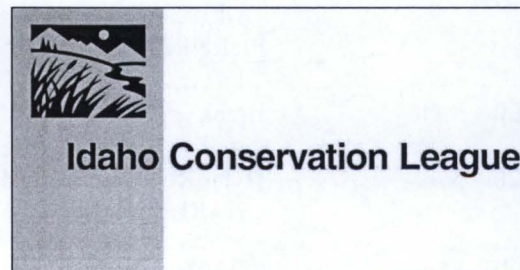
We wish to thank the Idaho State Office of the Bureau of Land Management for sponsoring the annual meeting of Idaho Chapter of the Wildlife Society and Region 1 of the U.S. Fish and Wildlife Service and the Idaho Conservation League for sponsoring the annual meeting of Northwest Section of Partners in Amphibian and Reptile Conservation. We also wish to thank the individuals, businesses, and organizations who provided special contributions or donated items for our raffle and auction.



Idaho State Office  
Bureau of Land Management



Region 1  
U.S. Fish and Wildlife Service



Idaho Conservation League



## SCIENTIFIC PROGRAM

### MONDAY 8 MARCH

#### Northwest Section and Idaho Chapter of Partners in Amphibian and Reptile Conservation

Chairs: David Pilliod, Elke Wind

Location: Ballroom

- 12:30 – 12:45            Welcome: David Pilliod and Elke Wind
- 12:45 – 1:00            National PARC: Priya Nanjappa
- 1:00 – 1:20            **Montane amphibians and climate change**  
STEVE CORN
- 1:20 – 1:40            **Landscape Genetics of Amphibians**  
STEPHEN SPEAR
- 1:40 – 2:10            Task Team Update: *Best Management Practices*  
JASON LOWE and DEDE OLSON
- Task Team Update: *Linkage Areas, Important Herp Areas*  
SIMON WRAY and DAVE CLAYTON
- 2:10 – 2:30            **Effects of post-mining stream restoration in a dynamic landscape**  
ROBERT ARKLE and DAVID PILLIOD
- 2:30 – 3:00            Task Team Update: *Restoration*  
BRAD TYLMAN and MIKE MARSHALL
- Task Team Update: *Impacts of Disturbance*  
PURNIMA GOVINDARAJULU and SUSAN BARNES
- 3:00 – 3:20            Break
- 3:20 – 3:40            **Herp Regulation in Idaho and the Northwest**  
CHARLIE JUSTUS
- 3:40 – 4:00            Task Team Update: *Communications/Social Sciences*  
RICH NAUMAN and BRANDON FESSLER
- 4:00 – 4:20            **Northern Leopard Frog Recovery**  
JANENE LICHTENBERG
- 4:20 – 4:40            **Montana State-wide Herp Assessments**  
BRYCE MAXELL
- 4:40 – 5:00            Task Team Update: *Inventory and Monitoring*  
LISA HALLOCK and AIMEE MCINTYRE



5:00 – 5:30 Task Team Update: *Disease*  
CAREN GOLDBERG and STEPH GERVASI

5:30 – 8:30 NW PARC Social in the Ivory Room  
Photo Exhibit: Naked Canaries by John Cossel  
Silent Auction Results

**TUESDAY 9 MARCH, 8:00 – 10:00 a.m.**

**Northwest Section and Idaho Chapter of Partners in Amphibian and Reptile Conservation**

Chairs: David Pilliod, Elke Wind

Location: Ballroom

8:00 – 8:20 What's going on in other PARC regions?  
PRIYA NANJAPPA MITCHELL

8:20 – 8:40 Task Team Update: *Training*  
KRIS KENDALL, CHUCK PETERSON, JANENE LICHTENBERG, ELKE  
WIND

8:40 – 10:00 2010 Task Team Planning – Where do we go from here?  
DAVID PILLIOD and ELKE WIND

**Idaho Chapter of The Wildlife Society Workshop — Idaho Bat Working Group**

Chair: Rita Dixon

Location: Crystal Room

8:00 – 8:30 Introductions and Round Robin

8:30 – 9:00 White-nose Syndrome – Implications for the West

9:00 – 10:00 Northwest Regional Gap Analysis Project – Model Review



**TUESDAY 9 MARCH, 10:30 – 5:30 p.m.**

**Symposium: Energy Development and Wildlife Conservation in the Northwest**

**Chair:** David Pilliod

**Location:** Ballroom

- 10:30 – 10:40            Welcome: David Pilliod
- 10:40 – 11:00            **Meeting Idaho's Energy Needs**  
PAUL KJELLANDER – Office of Energy Resources
- 11:00 – 11:20            **Wildlife Management in a Time of Energy Development**  
GREGG SERVHEEN – Idaho Department Fish and Game
- 11:20 – 11:40            **Transmission Lines and Wind Projects on BLM Lands**  
PAUL MAKELA – Bureau of Land Management
- 11:40 – 12:00            **Policies and Politics in Idaho Energy Development**  
JOHN ROBISON – Idaho Conservation League
- 12:00 – 12:15            Discussion with speakers
- 12:15 – 12:35            Break – Buffet Lunch (provided)
- 12:35 – 12:55            Luncheon Speaker  
**Changes in Power Generation through the Last Five Decades Give Hope to  
Advocates of Dam Removal to Save Salmon Runs**  
REED BURKHOLDER – Citizen Advocate
- 12:55 – 1:15            **Wind Development in the Northwest**  
RICH RAYHILL – Ridgeline Energy
- 1:15 – 1:35            **Solar Development in the Northwest**  
MARKUS WALBAUM – Terra Matters / SunEye Solar
- 1:35 – 1:55            **Geothermal Development in the Northwest**  
DOUG GLASPEY – U.S. Geothermal
- 1:55 – 2:15            **Meeting Idaho's Energy Needs Today and Into the Future**  
BRETT DUMAS – Idaho Power
- 2:15 – 2:30            Discussion with speakers
- 2:30 – 2:50            Break
- 2:50 – 3:10            **Transmission lines, greater sage-grouse, ravens, and raptors in southwestern  
Idaho.** KAREN STEENHOF – U.S. Geological Survey (retired)
- 3:10 – 3:30            **Energy Development-induced Landcover Change in Western Wyoming:  
Using Spatiotemporal Reconstructions to Inform on Future Landscapes**  
SEAN FINN and STEVEN KNICK – U.S. Geological Survey



- 3:30 – 3:50            **Wildlife and Roads**  
DENIM JOCHIMSEN – University of Idaho
- 3:50 – 4:10            **Bats, Birds, and Wind Turbines: Establishing Guidelines**  
NATHAN DARNALL – U.S. Fish and Wildlife Service
- 4:10 – 4:30            **Wildlife and Coal-bed Methane in Eastern Montana**  
BRYCE MAXELL – Montana Natural Heritage Program
- 4:30 – 4:50            **When Salmon Are Dammed: An Energy Development  
Lesson**  
RUSSELL THUROW – U.S. Forest Service
- 4:50 – 5:10            **Independent Power Projects: Microhydro and Streams**  
ELKE WIND – E. Wind Consulting
- 5:10 – 5:25            Discussion with speakers
- 5:25 – 5:30            Concluding Remarks: David Pilliod



**WEDNESDAY 10 MARCH**

**Idaho Chapter of the Wildlife Society**

**PLENARY SESSION**

**Chair:** Dave Stricklan

**Location:** Ballroom

- 8:30 – 8:45            Welcome: Dave Stricklan, President of the ICTWS
- 8:45 – 9:45            Keynote Address: **Grizzly Bear Delisting Issues**  
CHRIS SERVHEEN – U.S. Fish & Wildlife Service
- 9:45 – 10:00          BREAK
- 10:00 – 11:45        Panel Discussion: Chris Servheen, Tom Smith
- 11:45 – 1:00          LUNCH – on your own

**Invited Papers**

- 1:00 – 1:10            Remarks: Terry Bowyer, President of the Northwest Section of TWS
- 1:10 – 1:40            **Wolf Management in Idaho**  
JON RACHAEL - Idaho Department of Fish and Game
- 1:40 – 2:10            **Bighorn Sheep: the Disease Dilemma**  
FRANCES CASSIRER - Idaho Department of Fish and Game
- 2:10 – 2:40            **Wildlife Science, Management, Policy and Advocacy**  
JANET RACHLOW and J. MICHAEL SCOTT - University of Idaho
- 2:40 – 3:00            BREAK
- 3:00 – 3:30            **Misconceptions concerning the ecology of large herbivores: implications for management** R. TERRY BOWYER - Idaho State University
- 3:30 – 4:00            **Wee beasties and the late Quaternary paleoecology of North America**  
WILLIAM AKERSTEN - Idaho State University
- 4:00 – 4:30            **Role of diseases in amphibian population declines and extinctions**  
CAREN GOLDBERG - University of Idaho

**Business Meeting**

- 4:50 – 6:00            ICTWS Business Meeting in Rainier Room

**Social/  
Poster Session**

- 6:00 – 9:00            Social and Auction – No host-bar/mixer & hors d'oeuvres (combined Ballroom)  
Poster Session (set up in Regency Room – view in combined Ballroom)



## THURSDAY 11 MARCH

### Idaho Chapter of The Wildlife Society CONTRIBUTED PAPERS SESSIONS

Names of presenters are capitalized; those names with an \* following their name are student presenters.

#### Modeling and Landscape Applications/Avian Ecology

**Chair:** Robin Garwood

**Location:** Rainier Room

- 8:00            **Techniques and applications of spatial modeling as a conservation tool: A case study of mountain quail (*Oreortyx pictus*).** SONYA KNETTER, W. Bosworth, S. Romin and L. Svancara
- 8:20            **Candidate conservation agreements with assurances for greater sage-grouse: A viable conservation tool?** JASON PYRON and A. Sands
- 8:40            **Climate change and the potential resilience of U.S. National Parks.** LEONA K. SVANCARA, J. Lawler, J. M. Scott, T. Loveland, B. Horne, D. Goble, R. Wright
- 9:00            **Ongoing native riparian habitat restoration: Using soft techniques and hard working volunteers.** MARY DUDLEY and M. Young
- 9:20            **Idaho watershed initiative; a pilot habitat restoration program.** DON KEMNER
- 9:40            **Overview of the Southern Idaho BLM infrastructure development conflict map.** PAUL MAKELA, C. Braun, and D. Major
- 10:00          **Wildlife applications for forest inventory and analysis data.** CHRIS WITT

#### Mammalian Ecology

**Chair:** Brad Compton

**Location:** Regency Room

- 8:00            **Multi-scale effects of forest roads on black bears.** BENJAMIN S. JIMENEZ\*, M. Mitchell and P. Zager
- 8:20            **Fecal indices in mule deer: effects of competition with elk.** M. PAUL ATWOOD, P. Zager, J. Millspaugh, M. Matocq, R. T. Bowyer, and J. Kie
- 8:40            **Non-invasive genetic sampling reveals black bear population dynamics driven by changes in food productivity.** BARB MCCALL-MOORE and M. Mitchell
- 9:00
- 9:20            **Resource selection by mule deer: winter severity and competition with elk.** RYAN A. LONG\*, M. Atwood, R. T. Bowyer, P. Zager, and J. Kie
- 9:40            **Fecal nitrogen as an index to diet quality: sex-specific effects.** KEVIN L. MONTEITH\*, K. Monteith, J. Jenks, R. T. Bowyer, and D. Leslie, Jr.



10:00            **Notes on the occurrence of migrating tree bats in sagebrush-dominated habitats with special reference to the detection of the hoary bat (*Lasiurus cinerius*) at lava caves.** BILL DOERING

10:20-10:40    BREAK

**Modeling and Landscape Applications/Avian Ecology**

**Chair:** Toni Holthuijzen

**Location:** Rainier Room

10:40            **Columbian sharp-tailed grouse wing analysis: Implications for management in Idaho.** JEFFREY KNETTER

11:00            **Can systematic aerial lek surveys be used to assess sage-grouse populations?** HELEN ULMSCHNEIDER and M. Commons-Kemner

11:20            **Use frequency of individual nest by golden eagles in southwestern Idaho: Application to management.** MICHAEL KOCHERT and K. Steenhof

11:40            **Preliminary results of monitoring a forest grouse population in southwestern Idaho.** DAVID D. MUSIL

**Mammalian Ecology**

**Chair:** Curtis Hendricks

**Location:** Regency Room

10:40            **Did pygmy rabbits increase in the Bruneau from 1900 to 2009?** HELEN ULMSCHNEIDER

11:00            **Effects of pygmy rabbits on vegetation.** JANET L. RACHLOW, A. Price, and L. Shipley

11:20            **Maintaining connectivity for wide-ranging species: pronghorn migration routes and crucial habitat in eastern Idaho.** M. TESS O'SULLIVAN, S. Bergen and K. Murray

11:40            **New migration routes for Idaho's largest pronghorn herd?** Scott Bergen, M. TESS O'SULLIVAN and K. Murray

12:00-1:20     LUNCH BREAK

**Avian ecology**

**Chair:** Rob Cavallaro

**Location:** Rainier Room

- 1:20            **The Idaho Bird Observatory: use of volunteers to conduct long-term population monitoring of migratory landbirds.** GREGORY S. KALTENECKER, J. Carlisle, and M. Dudley
- 1:40            **Estimating greater sage-grouse fence collision rates in breeding areas: preliminary results.** BRYAN S. STEVENS\*, K. Reese and J. Connelly
- 2:00
- 2:20            **Lidar applications for wildlife biodiversity and habitat modeling.** KERRI T. VIERLING, L. Vierling and A. Hudak

**Mammalian Ecology/Amphibian Ecology**

**Chair:** Tess O'Sullivan

**Location:** Regency Room

- 1:20            **Aquatic invertebrate, avian, and amphibian use of vernal pools and playas in southwest Idaho: Description of habitats, inventory results, and conservation assessment.** CHRIS MURPHY and T. Weekley
- 1:40            **Variation across seasons in prevalence and intensity of infection by the amphibian chytrid fungus for the Columbia Spotted Frog in North Idaho.** DANELLE M. RUSSELL\*, C. Goldberg, L. Waits and E. Rosenblum.
- 2:00            **Investigation of wild and feral carnivores as reservoirs of Aleutian Disease virus.** MARK DREW and S. Stopak
- 2:20            **Changes in mountain lion space use following wolf reintroduction: simple models for understanding complex interactions.** JON S. HORNE, P. Buotte, and T. Ruth
- 2:40 – 3:10    BREAK



**Combined Session**

**Chair:** Kerri Vierling

**Location:** Ballroom

- 3:10            **Viability of White-Headed Woodpecker (*Picoides albolarvatus*) in the Interior Columbia River Basin: an exploratory metapopulation analysis.** RITA DIXON
- 3:30            **Abundance and productivity of long-billed curlews (*Numenius americanus*) on the long-billed curlew area of critical environmental concern (ACEC) in southwestern Idaho.** JAY CARLISLE and C. Moulton
- 3:50            **Impacts of regional cold front and localized weather phenomenon on autumn migration of raptors and landbirds in Southwest Idaho.** ROBERT A MILLER\*, J. Carlisle, and G. Kaltenecker
- 4:10            **The American dipper (*Cinclus mexicanus*) as an indicator of ecological integrity in streams.** KATHERINE M. STRICKLER
- 4:30            **Transmission lines, greater sage-grouse, ravens, and raptors in southwestern Idaho.** KAREN STEENHOF
- 6:00            BANQUET in Ballroom  
Awards Ceremony
- Banquet Speaker:        **Polar Bears**  
TOM SMITH -Brigham Young University



## ABSTRACTS OF INVITED PAPERS

Presented at the 2010 Annual Meeting of Idaho Chapter of The Wildlife Society.

Presenter names are capitalized.

**AKERSTEN, W. A.** Idaho State University, Pocatello, Idaho 83209. *WEE BEASTIES AND THE LATE QUATERNARY PALEOECOLOGY OF NORTH AMERICA.*

The evolution, distribution, and extinction of plants and animals cannot be adequately studied outside the context of paleoclimates. Pending time travel, paleoclimate research must rely on proxies such as stable isotopes, geomorphology, and interpreting the ecologic requirements of fossil taxa from those of living relatives. All can yield useful information but all have limitations. With few exceptions (such as giant tortoises in the North American Cenozoic), large vertebrate fossils yield relatively coarse grained data. Smaller forms; especially rodents, insectivores, and lagomorphs; provide finer grained data.. John Guilday of the Carnegie, Ernest Lundelius of the University of Texas, and their students and co-workers were pioneers in this area. They described late Quaternary faunas with co-occurring small mammal taxa which are presently strongly allopatric. The resulting disharmonious or non-analog associations (since found in fossil plants and invertebrates) turned out to be typical, not the result of mixing diachronous faunas, and the "degree of disharmony" decreased in younger assemblages. The most accepted overall interpretation is that, upon melting of continental glaciers, the freshly exposed ground was essentially barren, almost all its original cover of soil stripped away and/or buried under glacial deposits. Plants returned to the barren areas at differential rates depending on nutrients, climate, and ability to disperse. Simultaneously, the overall climate of North America became more extreme with cooler winters and warmer summers. Thus, late Quaternary floral associations were in gradual but continual flux as were the animals which utilized them, resulting in disharmonious association. Potential research problems include diachronous assemblages, samples derived from large areas or varied ecologic settings, misidentifications, changes in ecological needs of individual taxa, inadequate information about extant forms, inappropriate collection methods and competition. In spite of these limitations, disharmonious associations of small mammals yield important information about climate change during the late Quaternary.

**BOWYER, R. TERRY.** Department of Biological Sciences, Idaho State University, Pocatello, ID 83209. *MISCONCEPTIONS CONCERNING THE ECOLOGY OF LARGE HERBIVORES: IMPLICATIONS FOR MANAGEMENT.*

Life-history characteristics of large herbivorous mammals are not simply those of small mammals scaled large. Obvious differences include large body size and associated allometric and digestive differences, long life span, small litter size, extended maternal care of young, and strong density dependence. These traits have lead to populations in which carrying capacity ( $K$ ) is important. There is considerable confusion in the literature concerning  $K$  and how this concept relates to the ecology and management of large herbivores. Herein I explore how conceptual models of population dynamics, including the significance of compensatory and additive mortality, can be used to understand both theoretical and applied aspects of the ecology of large mammals, including delineating important misconceptions. I further offer a framework for assessing the relationship of populations of large mammals to  $K$ , and discuss its relevance to management.



**CASSIRER, FRANCES.** Idaho Department of Fish and Game, Lewiston, ID 83501.

***BIGHORN SHEEP: THE DISEASE DILEMMA.***

Bighorn sheep (*Ovis canadensis*) population management and restoration in Idaho and elsewhere have experienced recurring setbacks due to pneumonia-caused mortality. Outbreaks causing high rates of mortality and sporadic, enzootic pneumonia have played important roles in limiting populations. Recent epizootics in surrounding states have received much attention from the media, but are only the latest in a long history of pneumonia outbreaks in this species, and demonstrate the difficulties faced by wildlife managers trying to successfully address this problem. State and federal politics in Idaho relative to the role domestic sheep play in transmitting disease to wild sheep provide additional tension and complexity to the issue. I will present an overview of how disease appears to limit bighorn sheep populations based on research in Hells Canyon and elsewhere, and I will also provide some thoughts on how science might contribute to resolving the problem.

**GOLDBERG, CAREN S.** University of Idaho, Moscow, ID 83844. ***ROLE OF DISEASE IN AMPHIBIAN POPULATION DECLINES AND EXTINCTIONS.***

Disease is a leading causative factor in global amphibian population declines. The amphibian chytrid fungus (*Bd*) is now the largest infectious disease threat to global biodiversity, with 92.5% of amphibians listed as critically endangered undergoing 'enigmatic' declines possibly linked to this pathogen. *Bd* has caused rapid extinctions of amphibian communities in the mountains of the Central America and elsewhere, but susceptibility of amphibians to this pathogen varies across species and habitat. In north Idaho, Columbia spotted frogs (*Rana luteiventris*) across 5 counties have tested positive, while a small sample of headwater species have all tested negative. Whether this pathogen is currently having a population-level impact is unknown. Susceptibility varies widely among species, with western toads (*Anaxyrus boreas*) found to be highly susceptible while American bullfrogs (*Lithobates catesbeianus*) carry high loads of this pathogen without apparent harm. With climate change, bullfrogs are likely to expand their invasive range, impacting native amphibian communities through competition and predation as well as increased exposure to this pathogen. Warmer temperatures may also cause *Bd* to spread to headwater species of unknown susceptibility, adding to the stress of increased stream temperatures and decreased flows. Another infectious disease that may threaten amphibian populations in Idaho is ranavirus (FV3). At least two die-offs symptomatic of this disease were observed last summer in Latah County. Whether this is a stable process caused by a native strain or a threat to the persistence of these communities is unknown at this time. Monitoring of amphibian populations and their pathogens is essential to detecting declines as they occur and to increasing our understanding of how to manage for the persistence of native amphibian communities in our area.



**RACHLOW, J. L.**<sup>1</sup>, **AND J. M. SCOTT**<sup>1,2</sup>. <sup>1</sup>Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844; <sup>2</sup>U.S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, ID 83844. ***WILDLIFE SCIENCE, MANAGEMENT, POLICY AND ADVOCACY.***

Wildlife professionals frequently deal with controversial issues and communicate about them with government officials, non-government organizations, special-interest groups, and citizens. The tension between science and advocacy in these interactions has sparked much debate. However, a clear understanding of what constitutes advocacy, or what is perceived to do so, remains elusive. The discussion about advocacy in science often has been represented as a false dichotomy (advocacy versus inaction). One consequence is the reluctance of scientists to apply their expertise and interact in the policy arena. Another is the potential for science or scientists to be perceived as biased. We report on efforts to characterize perceptions of advocacy among wildlife professionals. We ask what roles are available for wildlife scientists and our professional societies to influence decision-makers, and how can we most effectively contribute to wildlife policy.



## ABSTRACTS OF SUBMITTED PAPERS

Presented at the 2010 Annual Meetings of Idaho Chapter of The Wildlife Society and Partners in Amphibian and Reptile Conservation.

Presenter names are capitalized; those with an \* following their name are students.

**ARKLE, ROBERT S.**, and D. S. Pilliod. U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Boise, ID 83706. *EFFECTS OF POST-MINING STREAM RESTORATION IN A DYNAMIC LANDSCAPE.*

The Stibnite Mine has been a source of sediment, heavy metal, 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. The second restoration project, completed in 2005, also restored the stream gradient, substrate, and riparian plants. The goals of this study were to 1) determine how instream habitat and community composition of Meadow Creek respond to different stream restoration strategies and 2) whether these restoration projects were resistant or resilient to natural disturbances such as fire and debris flows. Prior to fire and debris flow disturbance, preliminary results indicated that habitat parameters within the 2005 restoration project were 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 was not providing habitat for tailed frog larvae, but was being used infrequently by adult Columbia spotted frogs. After wildfire and debris flow disturbance, we observed substantial changes to habitat and macroinvertebrate composition and declines in tailed frog larvae in the 2005 restoration project and downstream reference reaches. However, the 1998 restoration reach and the upstream reference reach, which were exposed to wildfire effects, but not debris flow effects, remained relatively unchanged. Since the channel morphology of the 2005 restoration reach was resistant to the post-fire debris flow, we expect that as sediment levels decrease, macroinvertebrates and tailed frogs will recolonize quickly as was observed following the initial restoration effort.

**ATWOOD, M. PAUL**<sup>1</sup>, P. Zager<sup>2</sup>, J. J. Millspaugh<sup>3</sup>, M. D. Matocq<sup>4</sup>, R. T. Bowyer<sup>1</sup>, and J. G. Kie<sup>1</sup>. <sup>1</sup>Department of Biological Sciences, Idaho State University, Pocatello, ID 83209; <sup>2</sup>Idaho Department of Fish and Game, Lewiston, ID 83501; <sup>3</sup>Department of Fisheries and Wildlife Science, University of Missouri, Columbia, MO 65211; <sup>4</sup>Department of Natural Resources and Environmental Science, University of Nevada Reno, NV 89512. *FECAL INDICES IN MULE DEER: EFFECTS OF COMPETITION WITH ELK.*

We measured nitrogen, neutral detergent fiber, and glucocorticoid metabolites in mule deer (*Odocoileus hemionus*) feces at Tex Creek Wildlife Management Area near Idaho Falls, Idaho, USA, during Jan-Mar 2007 and Jan-Apr 2008. We also used DNA techniques to determine sex of the individual depositing each fecal group. Finally, we used location data derived from GPS collars placed on elk (*Cervus elaphus*) and kernel techniques to build maps of elk population density for each month for both winters. We then analyzed each fecal index as a function of year, month, sex, elk population density,



and interactions among those variables. We observed no differences between sexes in any of the fecal indices among deer. Fecal nitrogen among deer was higher in 2007 (mild winter) than in 2008 (severe winter). There was no relationship between fecal nitrogen among deer and elk density. Neutral detergent fiber in deer feces did not vary as a function of elk density. In 2007, the mild winter, there was a significant positive relationship between elk population density and glucocorticoid levels, indicating increased stress among mule deer wintering in close proximity to elk. Contrary to predictions, glucocorticoid levels in deer were lower in 2008 than in 2007, and showed no significant relationship with elk density.

**Bergen, Scott<sup>1</sup>, M. T. O'SULLIVAN<sup>2</sup>, and K. Murray<sup>3</sup>.** <sup>1</sup>Wildlife Conservation Society, Pocatello, ID 83402; <sup>2</sup>Lava Lake Institute for Science and Conservation, Hailey, ID 83333; <sup>3</sup>Snow Leopard Trust, Seattle, WA 98103. ***NEW MIGRATION ROUTES FOR IDAHO'S LARGEST PRONGHORN HERD?***

We studied pronghorn antelope from their summer range near the Pioneer Mountains (SE Idaho). Pronghorn antelope were fitted with radio-GPS collars to track their daily locations from Oct 2008 to Sept. 2009. Radio-GPS collars were programmed to sample at a higher frequency (8/day) for fall and spring migration from and to summer range. In the fall of 2009, collars released and GPS location data was collected from collars. We found that pronghorn were migrating to winter range that was previously unknown. In this newly described migration route, Pioneer pronghorn face many natural and anthropogenic obstacles in their migration north to winter range occurring in the Little Lost River and Birch Creek Valley's just south of the continental divide. The migration route narrows to 200m and continues restricted for greater than 5 kilometers and the migratory corridor has a strong group and inter-seasonal fidelity. When reaching the winter range pronghorn aggregate from several different summer ranges forming potentially the largest herd of pronghorn antelope occurring in Idaho (800 to 1,200 individuals). We quantify the stewardship and habitat type of the areas used by the amount that they are utilized by the pronghorn. Further, location data will be used for the purposes of performing resource selection function modeling within the winter summer and migratory seasons. The second phase of this multi-year project will be described in which other important pronghorn migration corridors will be identified by collaring the more spatially diverse winter herd. Migration corridors from the winter range are at risk as development projects seek to impose new threats on a region that has important conservation values for other endangered wildlife. The data will be analyzed and presented for the purposes of federal, state and private land stewards to preserve these areas of critical habitat.

**CARLISLE, JAY<sup>1</sup> and C. Moulton<sup>2</sup>.** <sup>1</sup>Idaho Bird Observatory Boise State University, Boise, ID 83725; <sup>2</sup>Idaho Department of Fish and Game, Boise, ID 83707. ***ABUNDANCE AND PRODUCTIVITY OF LONG-BILLED CURLEWS (NUMENIUS AMERICANUS) ON THE LONG-BILLED CULEW AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN SOUTHWESTERN IDAHO.***

The Idaho Bird Observatory (IBO) and Idaho Department of Fish and Game (IDFG) are working in cooperation to re-visit a 30-yr old study of Long-billed Curlews (*Numenius americanus*) on BLM lands in southwestern Idaho. Curlews are an IDFG Species of



Greatest Conservation Need and are a BLM 'Watchlist' (Type 5) species. In particular, assessing the current status of the population nesting in the Long-billed Curlew Area of Critical Environmental Concern (ACEC) is important due to the continued increase in development pressure throughout southwestern Idaho. Here, we discuss 2009 efforts to study abundance and productivity of Long-billed Curlews within the ACEC, compare current and historic population estimates, and address future research and monitoring directions. During 2009, we detected an average of 1.35 Long-billed Curlews per point per survey and this was lower than the 1.84 curlews detected per point during surveys within the ACEC in 2007-08. Curlews were not distributed evenly throughout the ACEC during 2007-09, and curlews were notably absent from the northwest section of the ACEC. This represents a likely shift in abundance since the 1970s when higher numbers were found in the western part of the ACEC. We located 17 Long-billed Curlew nests in 2009, of which five (29.4%) were successful. We also located chicks from an additional 18 nests that we had not located prior to fledging. Thus, we know that the ACEC continues to be an important nesting area but low apparent nesting success is reason for concern. Also, human disturbance, including direct mortality, is likely to be a factor influencing current habitat quality for nesting curlews. These initial results indicate that although curlews appear to be relatively abundant within the ACEC, there are a number of issues and threats that may need to be addressed.

**CORN, STEVEN.** U.S. Geological Survey, Aldo Leopold Wilderness Research Institute, Missoula, MT 59801. ***MONTANE AMPHIBIANS AND CLIMATE CHANGE.***

Climate change since the mid-20<sup>th</sup> Century has resulted in reduced extent and duration of snowpack in some mountainous areas of the West, and the trend is predicted to continue. Amphibian breeding phenology in mountain habitats is largely determined by snow melt and analysis of snow survey data suggests that amphibians in the Pacific Northwest and northern Rocky Mountains may be breeding earlier now than in 1950 by a week or more. Population modeling of Columbia Spotted Frogs in the Bitterroot Mountains, Montana, indicates higher survival after mild, short winters. A warming climate with less severe winters might lead to higher survival population growth rates for some montane frog populations, however reduced snowpack and increasing summer temperatures may alter the hydrology of the small wetlands that most species require for breeding. These effects are expected to be most severe at lower elevations, but amphibian species may not be able to simply shift their distribution to higher elevations. Both persistent snow and low temperatures may limit upward expansion into unoccupied habitats.

**DIXON, RITA.** Idaho Department of Fish and Game, Boise, ID 83707. ***VIABILITY OF WHITE-HEADED WOODPECKER (*PICOIDES ALBOLARVATUS*) IN THE INTERIOR COLUMBIA RIVER BASIN: AN EXPLORATORY METAPOPOPULATION ANALYSIS.***

The White-headed Woodpecker (*Picoides albolarvatus*) is endemic to pine-dominated (*Pinus* spp.) forests in the mountainous regions of the West. In its northernmost range, this species typically inhabits coniferous forests dominated by ponderosa pine (*Pinus ponderosa*). Within this range, defined by the Interior Columbia River Basin, the distribution of ponderosa pine forms a selva between the forested mountainous regions, and the lower, mostly treeless environments of the Columbia Plateau and Snake River Plain—the region contains disjunct patches with continuous tracts of forest in some



places while in others large expanses of arid shrub-steppe environments exist. Silvicultural practices and changes to historical fire regimes have largely contributed to the quantitative and qualitative loss of ponderosa pine throughout the region in the last 100 years. This irregular distribution, coupled with fragmentation and geographic barriers, presents a potential metapopulation dynamic for the White-headed Woodpecker in the Interior Columbia River Basin. I describe the metapopulation of the White-headed Woodpecker in the Interior Columbia Basin and assess its long term prospects. I used abundance estimates from a regionwide survey and detailed life history studies as the foundation to forecast probable future trajectories of abundance and to forecast the probability of persistence of White-headed Woodpecker populations in the Interior Columbia River Basin.

**DOERING, BILL.** Power Engineers, Meridian, ID 83642. ***NOTES ON THE OCCURANCE OF MIGRATING TREE BATS IN SAGEBRUSH-DOMINATED HABITATS WITH SPECIAL REFERENCE TO THE DETECTION OF THE HOARY BAT (LASIURUS CINERIUS) AT LAVA CAVES.***

Information on movement patterns, resource requirements, and stopover habitat of migrating tree-obligate bats is lacking. This study is predicated on the assumptions that tree bat species will seek concentrated food sources, utilize alternate roosting habitats, and traverse atypical habitats during migration. Dominated by low vegetation with sparse trees, the broad Snake River Plain would appear to present a significant obstacle to tree bat migration. It is well-established that volcanic features, such as lava tubes, craters, and fissures, provide valuable habitat and concentrated food sources for summer resident bat populations. Limited observations suggest that tree-roosting bat species may opportunistically avail themselves of these same resources during migration. To investigate the role caves might play during migration in tree-obligate bat species, passive acoustical monitoring stations were established at the entrances of several lava caves on the Idaho National Laboratory and Big Desert of Eastern Idaho. Anabat systems were deployed to automatically record the echolocation calls of bats from approximately 30 minutes before sunset to 30 minutes after sunrise during sampling evenings. A total of 42,978 echolocation call files were collected during late summer and fall of 2009. Some initial findings are presented here. Results document the presence of hoary bat, likely occurrence of silver-haired bat (*Lasionycteris noctivagans*), and the putative occurrence of red bat (*Lasiurus blossevillii/borealis*), all tree-roosting species. The occurrence of the red bat would present a new species for the state of Idaho and a significant range extension. The potential importance of caves to migrating tree bats is currently unrecognized and warrants greater research and management attention.

**DREW, MARK<sup>1</sup>** and S. Stopak<sup>2</sup>. <sup>1</sup>Idaho Department of Fish and Game, Wildlife Health Laboratory, Caldwell, ID 83607; <sup>2</sup>USDA-APHIS-Wildlife Services, Boise, ID 83709.

***INVESTIGATION OF WILD AND FERAL CARNIVORES AS RESERVOIRS OF ALEUTIAN DISEASE VIRUS.***

Aleutian Disease (AD) is a parvovirus of ranched mink that is associated with poor kit production and adult mortality. All color phases of ranched mink are susceptible, but the light colors derived from the Aleutian color phase are most prone to morbidity and mortality. Ranched mink can be tested for AD and an eradication program implemented.



Wild carnivores are thought to be a potential reservoir for AD in ranched mink. Wild and feral carnivores were live trapped, euthanized and sampled. Blood and tissue samples were collected and submitted for testing for AD and related viruses. Serum samples were tested for AD using the counter electrophoresis test and the lateral flow test, and for Canine parvovirus and Feline Panleukopenia using Immunofluorescent assay. The tests could not easily distinguish between the three pathogens, but wildlife does not appear to be important as reservoirs of AD for ranched mink in Idaho.

**DUDLEY, MARY** and M. Young. Idaho Department of Fish and Game, Southwest Region, Boise, ID 83714. ***ONGOING NATIVE RIPARIAN HABITAT RESTORATION: USING SOFT TECHNIQUES AND HARD WORKING VOLUNTEERS.***

The Southwest Region's Volunteer Program's focus is native habitat restoration on private and public lands. Restoring riparian habitats comprises a major ongoing effort for over six months every year. Volunteers comprise the workforce to build fences, plant trees and shrubs, construct willow weavings, fertilize, water and weed plantings and photograph project work. We begin the riparian restoration season in April with fence building, planting one and two gallon\* containerized native species grown from locally harvested cuttings and seed and constructing willow weavings through June. We construct willow weavings using hundreds of willow poles we harvest locally to armor raw eroding cut banks too unstable to plant otherwise. We resume restoration project work in September, constructing willow weavings through mid-November, or until snow and/or frozen ground stop us. During the spring and fall we typically schedule two projects every week and warn volunteers to expect to work 12-15 hours/day and, by the way, bring your own lunch - we might provide a few cookies!

\*In 2010 and 2011 we will plant five gallon and larger plants to better compete with rhizomatous non-native pasture grasses that dominate in certain areas, hampering establishment of the woody trees and shrubs we plant.

**HORNE, JON S.**<sup>1</sup>, P. Buotte<sup>2</sup>, and T. Ruth<sup>2</sup>, <sup>1</sup>University of Idaho, Moscow, ID 83844; <sup>2</sup>Selway Institute, Bellevue, ID 83313. ***CHANGES IN MOUNTAIN LION SPACE USE FOLLOWING WOLF REINTRODUCTION: SIMPLE MODELS FOR UNDERSTANDING COMPLEX INTERACTIONS.***

Animal space use is the result of several interacting processes including home range behavior, resource selection, and avoidance or attraction to other animals. We briefly describe traditional approaches to modeling resource selection/home range and discuss some of the challenges presented by these methods. We then describe a recent modeling approach based on weighted distributions that allows for simultaneous estimation of home range, habitat selection, and the effects of other species on animal space use that overcomes many of these challenges. We apply this approach to understand changes in mountain lion (*Puma concolor*) space use before and after the reintroduction of wolves (*Canis lupus*). We used telemetry locations that were collected on 36 adult mountain lions during 1987 through 1994 and 1998 through 2005 on the Greater Yellowstone Northern Range. In addition to these data, we compiled information on the distribution of key environmental variables such as vegetation, topography, and snow cover as well as areas used by elk (*Cervus canadensis*) and wolves. A critical component of the model was the ability to incorporate the effects of temporally varying covariates (e.g., snow



cover, elk and wolf use). Model parameters are estimated via numerical maximum likelihood and can be used to infer both the magnitude and direction of influence of each covariate. Information theoretic criteria can be used to identify a set of model covariates for predicting space use.

**JIMENEZ, BENJAMIN S.\*<sup>1</sup>**, M. S. Mitchell<sup>1</sup> and, P. Zager<sup>2</sup>, <sup>1</sup>Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812; <sup>2</sup>Idaho Department of Fish and Game, Lewiston, ID 8501. ***MULTI-SCALE EFFECTS OF FOREST ROADS ON BLACK BEARS.***

The black bear (*Ursus americanus*) population within the Coeur d'Alene River watershed of northern Idaho is exposed to high hunting and recreational pressure facilitated by a dense network of gravel and paved forest roads. Bears are hunted using bait and dogs in spring and fall, and non-lethal pursuit with dogs is allowed during a summer season. To understand the effects of forest roads black bear behavior we used data collected from 28 adult bears fitted with Global Positioning Systems (GPS) collars from June 1 2007 through the fall of 2008. We used locations acquired at 20 minute intervals to assess habitat selection and activity patterns of males and females at home range (2<sup>nd</sup> order) and within home range (3<sup>rd</sup> order) scales, both annually and seasonally. We tested the hypotheses that black bears 1) will show no response to roads in 2<sup>nd</sup> order habitat selection in areas of relatively consistent road density, 2) will show a functional response to roads in 3<sup>rd</sup> order habitat selection, i.e. use of habitat near roads will be inversely proportional to traffic volume, 3) show seasonal shifts in activity patterns and movement rates in areas of high road density and high traffic volumes that are counter to previously described seasonal activity patterns. To assess fine scale habitat selection and movement patterns, as well as the influence of roads, we used matched case-control logistic regression analysis, where available habitat was defined by movement rates of a given animal. We also calculated average movement rates of bears throughout the year to see if activity patterns changed seasonally as well as in response varying traffic volumes. Avoidance of areas containing primary food sources or increased activity and energy expenditure may have profound consequences for bears. Understanding how traffic volume and road density influences habitat selection and movement patterns can therefore play an important role in management of the species.

**KALTENECKER, GREGORY S.<sup>1</sup>**, J. Carlisle<sup>1</sup>, M. Dudley<sup>2</sup>. <sup>1</sup>Idaho Bird Observatory, Boise State University, Boise, ID 83725, <sup>2</sup>Idaho Department of Fish and Game, Southwest Region, Nampa, ID 83686. ***THE IDAHO BIRD OBSERVATORY: USE OF VOLUNTEERS TO CONDUCT LONG-TERM POPULATION MONITORING OF MIGRATORY LANDBIRDS.***

In 1994, the Idaho Bird Observatory initiated an autumn avian migration project designed to monitor long-term trends in western migratory bird populations. Since 1995, a standardized hawk migration count has been conducted annually at Lucky Peak, located on the Boise Ridge. Counts are conducted daily from 25 August through 31 October. Diurnal raptors are also trapped and banded at two locations on the Boise Ridge during this same time period. Since 1997, we have maintained a passerine mist-netting effort daily from 16 July through 15 October at Lucky Peak to document species composition, migration timing, and stopover biology of over 60 species of western migratory landbirds. A forest owl banding program, targeting Northern Saw-whet and Flammulated



Owls, was initiated in 1999 at Lucky Peak, and is operated daily from 28 August through 28 October. The vast majority of these projects are accomplished with volunteer labor. Each fall, more than 30 volunteers contribute over 5000 hours of volunteer labor and thousands of miles driven in personal vehicles. These volunteer contributions are valued at well over \$200,000 annually. We receive assistance from three types of volunteers: full-time volunteer crew, part-time community volunteers, and undergraduate and graduate students. Full-time volunteers may receive a per diem to reimburse for meals, but all other volunteers are unpaid. Volunteer labor is well-documented by a third party: Idaho Department of Fish and Game's Regional Volunteer/Reservist Program. This third-party partner also calculates the value of volunteer time based on standard rates. Volunteer labor has resulted in continuation of a long-term monitoring and research project for over 15 years, has resulted in numerous contributions to peer-reviewed scientific literature, has trained hundreds of young biologists and students in bird capture, handling and other research techniques, and has provided opportunities for research to dozens of undergraduate and graduate students.

**KEMNER, DON.** Idaho Department of Fish and Game, Boise, ID 83707. ***IDAHO WATERSHED INITIATIVE; A PILOT HABITAT RESTORATION PROGRAM.***

The Idaho Watershed Initiative promotes healthy landscapes providing improved water quality, reduced wildfires, and better fish and wildlife habitats for the benefit of the Idaho public. The Idaho Watershed Initiative began as a pilot funding program in 2009. An overview of upcoming 2010 restoration projects will be presented. Future direction and opportunities for the Idaho Watershed Initiative will be discussed.

**KNETTER, JEFFREY.** Idaho Department of Fish and Game, Boise, ID 83707. ***COLUMBIAN SHARP-TAILED GROUSE WING ANALYSIS: IMPLICATIONS FOR MANAGEMENT IN IDAHO.***

Columbian sharp-tailed grouse were petitioned for listing under the Endangered Species Act in 1995 and 2004. It is necessary to evaluate their current status and viability in Idaho, particularly in light of expanding energy development and the expiration of CRP contracts throughout their range in Idaho. More than 9,600 Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) wings harvested in southeastern Idaho (1986-2009) were examined to provide data on sharp-tailed grouse population parameters. Juveniles comprised 51.7% (range 32-68%) of the harvest, or an average of 1.11 (range 0.5-2.1) juveniles/adult. This analysis has increased awareness of Columbian sharp-tailed grouse management in Idaho and has identified information gaps necessary to manage this species more effectively.

**KNETTER, SONYA, W. Bosworth, S. Romin and L. Svancara.** Idaho Department of Fish and Game, Boise, ID 83707. ***TECHNIQUES AND APPLICATIONS OF SPATIAL MODELING AS A CONSERVATION TOOL: A CASE STUDY OF MOUNTAIN QUAIL (OREORTYX PICTUS).***

Spatial modeling is an innovative approach for researchers and managers to explore diverse questions in ecology, conservation, and evolution. Spatial models can be used to prioritize and organize survey efforts, prioritize and target conservation and restoration activities, investigate how the characteristics and spatial configuration of habitats relate to



species persistence in fragmented landscapes, provide a framework to study gene flow, evaluate the distribution of other species, and evaluate the impacts of climate change. To illustrate, we present methods used to construct species distribution models for Mountain Quail (*Oreortyx pictus*) in Idaho and the Inland Northwest. We used the program Maxent, one of a suite of correlative modeling techniques that relate known species occurrence data to underlying environmental predictor variables. The goal is to provide a context to understand patterns of population decline and to help guide conservation strategies.

**KOCHERT, MICHAEL<sup>1</sup>**, and Karen Steenhof<sup>2</sup>, <sup>1</sup>USGS, Forest and Rangeland Ecosystem Science Center, Snake River Field Station, Boise ID 83706, <sup>2</sup>Owyhee Desert Studies, 18109 Briar Creek Road, Murphy, ID 83650. ***USE FREQUENCY OF INDIVIDUAL NEST BY GOLDEN EAGLES IN SOUTHWESTERN IDAHO: APPLICATION TO MANAGEMENT.***

We assessed frequency of nest use by golden eagles in Southwestern Idaho from 1966 to 2009. Preliminary results show that eagles used individual nests between 2 and 26 times (mean = 4.9 times) over the years. The length of consecutive non-use ranged between 1 and 35 years (mean = 5.1 years). Eagles occasionally built new nests and, in most cases, laid eggs in the nest in the year it was constructed. However, a few nests remained empty for up to 6 years before being used. To assess long-term use frequency of individual nests, we examined use of 16 golden eagle nests between 1971 and 2003 in 16 different territories occupied in all years. Preliminary results demonstrate that eagles used these nests for an average of 10 years (range: 2-21 years). During the 34-year period, length of consecutive non-use for these 16 nests averaged 12 years (range 4-28 years). A golden eagle pair reoccupied a nesting territory that had been vacant for 16 nesting seasons and laid eggs in a nest that had not been used for 22 years. Effectiveness of current nest protection guidelines is discussed in relation to these results.

**LICHTENBERG, JANENE.** Confederated Salish and Kootenai Tribes, Wildlife Management Program, Pablo, MT 59855. ***NORTHERN LEOPARD FROG CONSERVATION.***

Despite widespread distribution, the northern leopard frog (*Lithobates [=Rana] pipiens*) is a species of conservation concern. Populations are declining throughout much of its range in western North America. These declines are likely the result of multiple factors including habitat loss and degradation, disease, pollutants, drought and exotic species. The U.S. Fish and Wildlife Service is reviewing a petition to list populations of northern leopard frogs west of the Mississippi River as threatened or endangered. Several western states and provinces already consider the northern leopard frog a species of concern. This species was likely extirpated from the Flathead Indian Reservation in Montana during the 1980's. The Confederated Salish and Kootenai Tribes are beginning the eighth year of a project to re-establish populations on the Reservation. Through genetic testing, site evaluation, experimentation, and follow-up monitoring we have identified some factors important to the successful recovery of this species as well as many challenges. Although we have observed some overwintering success we have yet to establish any breeding populations.



**LONG, RYAN A.\*<sup>1</sup>**, M. P. Atwood<sup>1</sup>, R. T. Bowyer<sup>1</sup>, P. Zager<sup>2</sup>, and J. G. Kie<sup>1</sup>. <sup>1</sup>Department of Biological Sciences, Idaho State University, Pocatello, ID 83209, <sup>2</sup>Idaho Department of Fish and Game, Lewiston, ID 83501. **RESOURCE SELECTION BY MULE DEER: WINTER SEVERITY AND COMPETITION WITH ELK.**

Populations of mule deer (*Odocoileus hemionus*) have declined across much of their range in the past 40 years. A concurrent increase in populations of North American elk (*Cervus elpahus*) has raised the question of whether interspecific competition is important where these 2 ungulates are sympatric. We studied patterns of resource selection and space use by mule deer and elk on winter range at Tex Creek Wildlife Management Area near Idaho Falls, Idaho, USA, during January-March 2007, and January-April 2008. We used conditional logistic regression to estimate resource selection functions and evaluate overlap in resource selection and spatial distribution between mule deer and elk. In addition, we took advantage of a substantial difference in winter severity between the 2 years of our study to evaluate the influence of winter severity on resource partitioning by mule deer and elk. Mule deer consistently used low elevations and steep slopes during mild and severe winters. Elk used habitats in proportion to availability during a mild winter in 2007, but patterns of selection by elk were more similar to those of mule deer during the severe winter of 2008. In addition, the distribution of elk shifted during the severe winter, resulting in a substantial increase in spatial overlap between the 2 species. Elk responded to increasing winter severity by changing their spatial distributions and resource selection, whereas mule deer did not do so. We conclude that elk are more capable of responding behaviorally to severe winter conditions than mule deer.

**MAKELA, PAUL**, C. Braun, and D. Major. U.S. Bureau of Land Management, Boise, ID 83709. **OVERVIEW OF THE SOUTHERN IDAHO BLM INFRASTRUCTURE DEVELOPMENT CONFLICT MAP.**

Interest in energy development and expansion of power transmission facilities has increased in recent years in Idaho and across the western United States. While animal and plant species concerns and other issues are routinely addressed in environmental documents on a project-specific basis, we saw a need for a "big picture" approach for displaying potential zones of "conflict" to use as an educational aid in project planning at the broad scale. During 2009 we developed the Southern Idaho Infrastructure Development Conflict Map, based on a subset of resources and lands of concern including selected special status plant and animal species, designated lands (e.g. wilderness, military and others), big game, visual resources, priority restoration areas, and cultural/historic resources (e.g. National Scenic and Historic Trails, and National Register of Historic Places Districts). Depending on species sensitivity to development or other factors, we assigned each resource a conflict category and numeric value of low (value=1), moderate (value=2), high (value=3), or development precluded (value=100). In three cases (e.g. pygmy rabbit, greater sage-grouse, slickspot peppergrass) we assigned two or more conflict scores to each, depending on the type of habitat, modeled distribution or other factors. In GIS, we rasterized spatial data for each resource, and summed conflict scores across the various resource themes overlying the landscape. The resulting "conflict map" shows a gradient of low to high conflict and development precluded zones that can be used as a tool during early phases of infrastructure planning.



**MCCALL-MOORE, B.**<sup>1</sup> and M. Mitchell<sup>2</sup>, <sup>1</sup>Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812; <sup>2</sup>U.S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812. ***NON-INVASIVE GENETIC SAMPLING REVEALS BLACK BEAR POPULATION DYNAMICS DRIVEN BY CHANGES IN FOOD PRODUCTIVITY.***

We conducted research on the demography of a harvested north Idaho black bear (*Ursus americanus*) population to determine the underlying dynamics of changes in population abundance, to determine how much these dynamics were driven by variation in food productivity, and to evaluate how these processes could influence inferences based on mark-recapture analysis. In cooperation with Idaho Department of Fish and Game and the USDA Forest Service, we used barb-wire corrals to collect black bear DNA during 2003-2006 in the Purcell Mountains of Idaho. We analyzed these DNA samples to determine the number of uniquely identified individuals in each year,  $N_u$ . We used a combination of both genetic and mark-recapture analyses to evaluate the sources of variation in  $N_u$  over the four years and to what extent this variation was driven by changes in productivity of foods on the landscape. Specifically, we investigated deviations of Hardy-Weinberg equilibrium and genetic substructure in relation to changes in abundance, and whether variation in vital rates were a function of changing berry productivity in the study area. We found a heterozygote deficiency and detected genetic substructure indicating we sampled  $\leq 4$  subpopulations within the same area over the four years (a Wahlund Effect). Our mark-recapture analyses suggest this pattern was probably in response to landscape changes in summer berry abundance. Our results suggest important variation in population dynamics driven by changes in food productivity, which should be considered when using mark-recapture analyses to monitor population trends for black bears.

**MILLER, ROBERT A.\***, J. D. Carlisle, and G. S. Kaltenecker. Idaho Bird Observatory, Department of Biological Sciences, Boise State University, Boise, ID 83725. ***IMPACTS OF REGIONAL COLD FRONT AND LOCALIZED WEATHER PHENOMENON ON AUTUMN MIGRATION OF RAPTORS AND LANDBIRDS IN SOUTHWEST IDAHO.***

Weather has a significant effect on avian migration but whether the effect is similar across diverse geographic regions and across all species remains to be determined. We evaluated the impact of regional cold fronts and localized weather phenomenon on the autumn migratory timing of multiple landbirds and raptor species. The focus of the analysis was on the total landbirds and the top ten individual species by volume along with total raptors and the top five individual species. Using 13 years of data from the Idaho Bird Observatory in Southwest Idaho (1997-2009), including standardized landbird mist-net captures and raptor counts during autumn migration, we determined significant patterns which differ from the established literature with regards to the effect of regional cold fronts on fall migration. Our data show a depression of migratory volumes of most species on the days immediately before, during, and after the passage of a cold front, with peak flights for most species occurring many days later. Furthermore, local weather affects were evaluated to determine among other things that atmospheric pressure is positively correlated, while local wind speed is negatively correlated with the passage of most species. Many species specific results were discovered, some differing dramatically from the overall average. Lastly we present hypotheses that could explain the unique



impact of weather phenomenon on avian migration in the western United States; most notably that most avian species choose to migrate during calm winds and high pressure when the opportunity presents itself.

**MONTEITH, KEVIN L.\*<sup>1</sup>**, K. B. Monteith<sup>2</sup>, J. A. Jenks<sup>2</sup>, R. T. Bowyer<sup>1</sup>, and D. M. Leslie, Jr.<sup>3</sup>.  
<sup>1</sup>Department of Biological Sciences, Idaho State University, Pocatello, ID 83209; <sup>2</sup>Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD 57007; <sup>3</sup>Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK, 74078. ***FECAL NITROGEN AS AN INDEX TO DIET QUALITY: SEX-SPECIFIC EFFECTS.***

Concentration of fecal nitrogen has been used widely as an indicator of forage quality for free-ranging ruminants; however, potential weaknesses in this index have been reported. Differences in digestive function between species negate the use of interspecific comparisons of fecal nitrogen. Moreover, marked differences in digestive function between sexes within a particular species may bias fecal nitrogen as an index to diet quality. Our objective was to evaluate the influence of sex and reproductive status on concentration of fecal nitrogen. Male, nonreproductive female, and reproductive female white-tailed deer were fed an ad libitum diet of corn and pelleted soyhulls, and a restricted diet where corn was offered at 40% of ad libitum intake. We collected feces twice daily from May to October, 2008 and 2009. We combined weekly samples per individual and dried, ground, and processed samples using Micro Kjeldahl procedures to determine the concentration of nitrogen. In general, fecal nitrogen reflected diet quality because deer on the restricted diet had lower fecal nitrogen compared with the ad libitum diet. During gestation, mean fecal nitrogen of reproductive females was similar to that of males and nonreproductive females on comparable diets. During lactation, however, fecal nitrogen of reproductive females in both diet groups was lower ( $P < 0.05$ ) than males.

**MURPHY, CHRIS**, and T. Weekley. Idaho Department of Fish and Game, Boise, ID 83712.  
***AQUATIC INVERTEBRATE, AVIAN, AND AMPHIBIAN USE OF VERNAL POOLS AND PLAYAS IN SOUTHWEST IDAHO: DESCRIPTION OF HABITATS, INVENTORY RESULTS, AND CONSERVATION ASSESSMENT.***

The goal of this novel study was to collect baseline biologic information on vernal pools and playas in southwestern Idaho. Objectives were to inventory vernal pools and playas to: 1) characterize their distribution in the Owyhee Uplands Ecological Section; 2) survey aquatic invertebrate (primarily Branchiopoda), waterfowl, shorebird, and amphibian use; 3) describe plant communities; 4) classify biophysical habitats; 5) assess ecological condition at multiple spatial scales; and 6) evaluate value for special status animals and plants. Over thirty vernal pool and playa sites were visited in 2008 and 2009 at which 44 invertebrate vouchers were collected and 52 vegetation plots sampled. Sites ranged from wet, marsh-like vernal pools to infrequently flooded playas, the latter being dominant on the Snake River Plain and the former on the Owyhee Plateau and Camas Prairie. Invertebrates were common vernal pool and playa inhabitants and included at least one new state record. The Anostracan (fairy) shrimp were found at nearly all inundated sites. Three species from the *Branchinecta* genus were collected. *Eubranchipus serratus*, the only non-*Branchinecta* species of Anostracan shrimp



observed, was collected at 2 sites. Notostracan (tadpole) shrimp were found at 5 sites. Multiple duck and shorebird species were observed near many sites, supported by robust populations of invertebrates (including unidentified insects). Amphibians were rarely observed. Sixteen vernal pool and playa plant communities were identified from multivariate classification of plot data. Over 126 vascular plant species have been documented from vernal pools and playas in southwest Idaho. Two rare plant species were collected, Davis' peppergrass (*Lepidium davisii*) and a species of mesa mint (*Pogogyne* species). Excavated livestock-watering reservoirs were the most frequently observed human impact. Early data from these surveys indicate widespread occupancy of vernal pools and playas in southwest Idaho by a diverse community of plants, aquatic invertebrates, and birds.

**MUSIL, DAVID D.** Idaho Department of Fish and Game, Jerome, ID 83338. ***PRELIMINARY RESULTS OF MONITORING A FOREST GROUSE POPULATION IN SOUTHWESTERN IDAHO.***

Little is known about ruffed grouse (*Bonasa umbellus*) and dusky grouse (*Dendragapus obscurus*) abundance, population trends, and harvest rates in Idaho. In an attempt to develop survey methods tailored for Idaho's landscape, a double sampling method has been tested in the Squaw Creek drainage of the Boise National Forest. Twelve 1,000 m random line transects and 2 roadside routes were sampled to survey displaying male grouse abundance during the last 3 years. Nineteen ruffed grouse males have also been captured with a modified mirror trap for monitoring survival, movements, and home ranges. Random line transects and trails were surveyed for abundance of brood rearing female ruffed grouse in 2009 by using recordings of chick distress calls. Hunters were interviewed as they exited the study area during the 2009 hunting season and harvested grouse were weighed and separated by age-sex classes. Hunters were separated by whether they were primarily hunting forest grouse or big game and their effort recorded.

**O'SULLIVAN, M. TESS<sup>1</sup>**, S. Bergen<sup>2</sup>, and K. Murray<sup>3</sup>. <sup>1</sup>Lava Lake Institute for Science and Conservation, Hailey, ID 83333; <sup>2</sup>Wildlife Conservation Society, Idaho Falls, ID 83402; <sup>3</sup>Snow Leopard Trust, Seattle, WA 98103. ***MAINTAINING CONNECTIVITY FOR WIDE-RANGING SPECIES: PRONGHORN MIGRATION ROUTES AND CRUCIAL HABITAT IN EASTERN IDAHO.***

Rural areas throughout the American West have experienced dramatic increases in human population growth in recent decades, resulting in development of lands that serve as crucial wintering areas and habitat linkages for species such as sage grouse, mule deer, elk and pronghorn. Among long-distance migrants, pronghorn are especially vulnerable to habitat fragmentation due to their reluctance to jump over fences. Therefore, we initiated a study to gather data on pronghorn habitat use and movements in eastern Idaho to inform land use planning, land management, and conservation. We captured 10 female pronghorn in October 2008 in the Pioneer Mountain foothills with a net-gun fired from a helicopter, and equipped them with Global Positioning System (GPS) collars with mortality sensors and release mechanisms. From October through August, we monitored the survival of the collared animals using both ground and aerial telemetry. Nine of the ten collars were recovered in August 2009. The newly documented migration route stretches from the Pioneer Mountain foothills to the Little Lost and Birch Creek river



valleys, passing through the Craters of the Moon National Monument – a round trip in excess of 160 miles. During the winter, the pronghorn congregates with other regional pronghorn herds from the area, making it Idaho's largest pronghorn herd. The route crosses federal, state, and private land and narrows in one stretch to a bottleneck less than 200 meters wide. We have continued the study for a second year; in September 2010, 14 pronghorn does were captured and outfitted with GPS collars. The animals will be monitored using radio telemetry until the collars release in August 2011. The study has been a collaborative effort with many partners including private landowners, NGOs, and natural resource management agencies.

**PYRON, JASON<sup>1</sup>** and A. Sands<sup>2</sup>. <sup>1</sup>U.S. Fish and Wildlife Service, Boise, ID 83709; <sup>2</sup>The Nature Conservancy/Idaho Department of Fish and Game, Boise, ID 83714. ***CANDIDATE CONSERVATION AGREEMENTS WITH ASSURANCES FOR GREATER SAGE-GROUSE: A VIABLE CONSERVATION TOOL?***

Candidate Conservation Agreements with Assurances (CCAAs) provide private and state property owners and wildlife managers a conservation tool for species that may be considered for listing under the Endangered Species Act. We describe the program, its application to an isolated population of sage-grouse in west-central Idaho, and its potential for achieving meaningful conservation. In spite of some identified limitations, we believe that these agreements have both direct and indirect benefits as a valuable tool for conservation of sage-grouse and other species on private lands and advocate for their use in the future.

**RACHLOW, JANET L.<sup>1</sup>**, A. J. Price<sup>1</sup>, and L. A. Shipley<sup>2</sup>. <sup>1</sup>Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844; <sup>2</sup>Department of Natural Resources, Washington State University, Pullman, Washington 99164-6410. ***EFFECTS OF PYGMY RABBITS ON VEGETATION.***

Foraging and burrowing by pygmy rabbits have the potential to influence the sage-steppe vegetation in diverse ways. We examined locations of burrow activity and duration of occupancy of burrows across 8 years at two sites in eastern Idaho. Because sagebrush is the primary forage for pygmy rabbits, we hypothesized that foraging might affect sagebrush structure, and consequently, habitat quality for pygmy rabbits and other sympatric species. We tested whether duration of burrow occupancy affected characteristics of shrub vegetation around burrow systems and whether effects were more pronounced closer to the center of burrowing activity. Individual burrow systems remained active for 1-8 yr, and most were occupied  $\geq 4$  yr, which exceeds the life span of the species. Sagebrush around burrows occupied for longer durations exhibited evidence of higher browsing intensity, increased seedling density, more open understory, and less visual obstruction (a measure that includes both shrub and herbaceous vegetation). We also noted an inverse relationship between cover of sagebrush and cover of rabbitbrush, which is a disturbance-adapted shrub. The changes we observed in vegetation as duration of burrow occupancy increased suggests that pygmy rabbits have the potential to influence quality of sagebrush habitat around burrow systems, potentially contributing to abandonment of burrow systems and shifts in burrow use across the landscape over time.



**RUSSELL, DANELLE M.\***, C. S. Goldberg, L. P. Waits, and E. B. Rosenblum. University of Idaho, Moscow, ID 83844. ***VARIATION ACROSS SEASONS IN PREVALENCE AND INTENSITY OF INFECTION BY THE AMPHIBIAN CHYTRID FUNGUS FOR THE COLUMBIA SPOTTED FROG IN NORTH IDAHO.***

The pathogenic chytrid fungus *Batrachochytrium dendrobatidis* (Bd) is contributing to amphibian declines worldwide; however, there is little data on infection patterns across seasons in the northern hemisphere. Our objectives were to further understand the ecology of this pathogen in north Idaho by investigating the patterns of Bd infection of Columbia Spotted Frogs (*Rana luteiventris*) across age classes and seasons within a year. We collected skin swabs from 224 Columbia Spotted Frogs in spring, summer, and fall 2009 at 7 ponds in the Palouse region of north Idaho. We tested each swab for Bd in the laboratory using quantitative PCR techniques. We analyzed patterns of prevalence using  $\chi^2$  tests and intensity using ANOVA. We constructed a set of candidate models concerning the influence of age class and season on Bd intensity using mixed effect models that controlled for pond as a random variable, and determined the strength of evidence for each one using Akaike's Information Criterion (AIC). Across age classes, Bd prevalence and intensity was highest in autumn. Only 5% of metamorphs tested positive for Bd (n=21), suggesting that Bd is acquired after metamorphosis. Juvenile Columbia Spotted Frogs had the highest prevalence and intensity (100%, n= 23), possibly indicating that they are the most vulnerable age class. Adult Spotted frogs had high prevalence in all seasons (60% or greater, n=168), indicating the infection is being maintained within the population and adults may be serving as disease reservoirs. While age class and season are correlated, model weights show that both variables are important for explaining patterns of Bd infection in this system. Further laboratory and ecological studies are needed to determine Bd-related mortality rates and population impacts on the Columbia Spotted Frog and other amphibians in this area.

**SPEAR, STEVEN.** Project Oriante: The Indigo Snake Initiative, Clayton, GA 30525 & Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844. ***LANDSCAPE GENETICS OF AMPHIBIANS.***

Landscape genetics is a rapidly emerging field that seeks to use environmental and landscape data to understand genetic diversity and connectivity of populations. The field has great relevance for conservation and management of populations, as it provides a framework to understand how land use change and disturbance affect movement and evolutionary potential of populations of interest. For instance, landscape genetic techniques can be used to identify specific variables that serve as barriers to gene flow, or conversely, to facilitate connectivity. Such information can also be used to identify key corridors for population connectivity. Amphibians are a common study group for landscape genetic studies, and there have been several studies conducted in the Northwest. I present examples of several of these studies, and how they provide insight into conservation of northwest amphibians. In particular, I highlight case studies that demonstrate how frog and salamander populations are structured in mountainous environments common to the west, as well as studies that have examined the role of both natural and anthropogenic disturbance on amphibian populations. These studies often reveal surprising responses to landscape features that would not have been detected using



more traditional methods. Thus, landscape genetics provides a strong complimentary approach to studies on abundance and direct movement for herpetological conservation.

**STEENHOF, KAREN.** Owyhee Desert Studies, 18109 Briar Creek Road, Murphy, ID 83650  
***TRANSMISSION LINES, GREATER SAGE-GROUSE, RAVENS, AND RAPTORS IN SOUTHWESTERN IDAHO.***

Proposals to construct new electrical transmission lines throughout the western United States have raised concerns about possible effects on greater sage-grouse (*Centrocercus urophasianus*). Recent research has identified common ravens (*Corvus corax*) as an important nest predator of sage-grouse, and research conducted more than 20 years ago in the Morley Nelson Birds of Prey National Conservation Area demonstrated that high-voltage transmission lines attract ravens and other avian predators. During the 1980s Bureau of Land Management and PP&L biologists found that a new 500-kV transmission line enhanced opportunities for perching, nesting, and roosting. Raptors and ravens were attracted to the 500-kV line, and productivity of hawks and eagles nesting on transmission towers was as good as and sometimes better than that of those nesting on canyon cliffs. In addition, biologists documented 13 communal night roosts of Common Ravens on the transmission line, including one roost on transmission line towers within the NCA with more than 2100 ravens. Studies revealed that ravens moved an average of 6 km and up to 60 km from transmission line roosts each day. The Gateway West Transmission Project proposes more than 1000 km of 500-kV and 300 km of 230-kV transmission lines across Wyoming and southern Idaho. In southwestern Idaho, the BLM will be considering several alternative routes for the proposed Gateway West lines. Each of the alternatives will affect grouse and raptors differently.

**STEVENS BRYAN S.\*<sup>1,2</sup>, K. P. Reese<sup>1</sup>, and J. W. Connelly<sup>3,4</sup>.** <sup>1</sup>Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID; <sup>2</sup>Department of Statistics, University of Idaho, Moscow, ID 83844; <sup>3</sup>Idaho Department of Fish and Game; <sup>4</sup>Department of Biological Sciences, Idaho State University, Pocatello, ID 83209. ***ESTIMATING GREATER SAGE-GROUSE FENCE COLLISION RATES IN BREEDING AREAS: PRELIMINARY RESULTS.***

We used probability sampling methods to estimate collision rates of greater sage-grouse with fences in lekking areas across southern Idaho during the spring of 2009. We randomly selected 1x1 km sampling units within approximately 2.5 km of active greater sage-grouse leks in 16 lek routes monitored by Idaho Department of Fish and Game, and searched all fences within these areas for the presence of fence collision sites. One-stage cluster sampling was used to estimate collision rates within each lek route, and stratified cluster sampling treating lek routes as strata was used to estimate global collision rates over all study areas. We sampled 66.2 km of fence from March-May 2009, of which approximately 40.9 km was sampled on  $\geq 2$  occasions. During these surveys we located 38 collision sites, 29 of which were from greater sage-grouse. An additional 24 collision sites were found outside the randomly selected sampling areas and were not used to calculate fence collision rates. Estimated fence collision rates for individual lek routes were variable, and ranged from 0-2.94 collisions per linear km of fence. Global avian fence collision rates across all lek routes ranged from 0.062-0.493 per linear km of fence for all species, and 0.062-0.384 collisions per linear km of fence for greater sage-grouse.



Preliminary results suggest greater sage-grouse fence collision rates in lekking areas may vary considerably by location. We are currently beginning a second season of fence collision surveys, as well as an experimental study to test the effectiveness of reflective markers at reducing fence collision rates in identified high-risk areas. Future work will attempt to model collision risk as a function of site and landscape features, with the goal of producing a tool for managers to assess collision risk across the southern Idaho landscape, and prioritize areas for future mitigation methods.

**STRICKLER, KATHERINE M.** University of Idaho, Moscow, ID 83844-1136. ***THE AMERICAN DIPPER (CINCLUS MEXICANUS) AS AN INDICATOR OF ECOLOGICAL INTEGRITY IN STREAMS.***

Dippers (*Cinclus* sp.) have frequently been proposed as indicator species because of their apparent sensitivity to impaired stream water quality. I reviewed existing criteria for selection of indicator species and assessed the suitability of American dippers (*Cinclus mexicanus*) as indicators of biological integrity in streams in light of these requirements. American dippers satisfy only eight of 16 published criteria for selection of effective ecological indicators. Most importantly, dipper tolerance levels for most stream disturbances have not been well-studied (with the exception of stream acidity), and correlations between dippers and other ecosystem components have been shown only infrequently. This review identified notable shortcomings in the use of dippers as ecological indicators of stream health. However, several weaknesses could be reduced with more focused research, and others may be outweighed by the advantages of using dippers as ecological indicators. A possible resolution is to include dippers in multispecies indices of biological integrity.

**SVANCARA, LEONA K.** <sup>1,2</sup>, J. J. Lawler<sup>3</sup>, J. M. Scott<sup>1</sup>, T. R. Loveland<sup>4</sup>, B. V. Horne<sup>5</sup>, D. D. Goble<sup>1</sup>, R. G. Wright<sup>1</sup>; <sup>1</sup>University of Idaho, Moscow, ID 83844; <sup>2</sup>Idaho Department of Fish and Game; <sup>3</sup>University of Washington, Seattle, WA 98122; <sup>4</sup>U.S. Geological Survey, EROS Data Center, Sioux Falls, SD 57198; <sup>5</sup>U.S. Geological Survey, Biological Resources Discipline, Reston, VA. ***CLIMATE CHANGE AND THE POTENTIAL RESILIENCE OF U. S. NATIONAL PARKS.***

Considered the "most ominous" of all potential threats to biodiversity, climate change is resulting in shifted species ranges, altered phenologies, modified and more difficult migrations, as well as changes in competition, predation, disease, and mutualistic and parasitic interactions. Given that a minimum latitudinal shift of 300 km and altitudinal shift of 500m can be expected for a 3° C warming in the temperate zone, the conventional approach to habitat and species preservation (i.e., creating protected areas) may not be sufficient to maintain the current suite of species and/or habitats. Species in reserves with little altitudinal variation are likely to experience climatic changes beyond tolerance levels and, if in highly fragmented landscapes, may have little opportunity to move. We used a consensus-based bioclimatic modeling approach, 30 different climate simulations, and current and projected distributions for 738 vertebrate species, to model current patterns of species richness across a subset of National Park Service lands with significant natural resources and project how these patterns of richness might change with changing climates. In particular, we estimated percent species gain, species loss, and species turnover in each park, as well as how many species will be lost from all parks,



and differences among taxa. Projected faunal changes in parks indicated that between 12% (under the lower emission scenario B1) and 18% (under the high emission scenario A2) of the amphibians, birds, and mammals currently at a park will be lost while 7% to 10% will be gained under the same scenarios. Salamanders, bats, rodents, seabirds / shorebirds, falcons, and woodpeckers were most likely to experience losses in the park system. Our results indicate that, even under the lower greenhouse-gas emission scenario, species and communities in the National Park System will likely undergo substantial changes in the next 60-90 years.

**ULMSCHNEIDER, HELEN<sup>1</sup> and M. Commons-Kemner<sup>2</sup>.** <sup>1</sup>Boise District BLM, Boise, ID 83705; <sup>2</sup>Idaho Department of Fish and Game, Nampa, ID 83686. ***CAN SYSTEMATIC AERIAL LEK SURVEYS BE USED TO ASSESS SAGE-GROUSE POPULATIONS?***

We flew systematic helicopter surveys for sage-grouse leks over 1,000,000 acres of remote, intact sagebrush in the Bruneau FO of southwest Idaho during 2004-09, using north-to-south transects spaced ½ mile apart. The results showed much higher populations (approximately 80 leks and 2000 grouse in 2004-05; 0.5 males at leks/sq km) than the rangewide stronghold map in the 2004 Conservation Assessment of Greater Sage-grouse. That map was built from ground-based lek count data. Thus, the stronghold data for the Bruneau FO was based on data collected from a maximum of 10 leks. Population trends observed from the air paralleled trends observed from ground based lek-route counts in Owyhee County. Repeated systematic aerial counts in a 225-square-mile area of the densest leks from 2005 to 2008 showed a 60% decline in number of sage-grouse. Ground counts during that same time period both within and adjacent to the aerial survey area showed a 55% decline. Further, numbers of grouse counted from the air do not appear to be inflated because ground counts were higher than counts conducted from the helicopter on 5 leks during 2009. Finally, we found greater variability of lek locations, both from historic locations and between years, raising questions about the use of aerial lek-to-lek surveys for assessing population status or trend. However, when aerial lek surveys are the only way to obtain sage-grouse population data, systematic surveys should be used to gain an accurate assessment of population strongholds and trend for conservation purposes.

**ULMSCHNEIDER, HELEN.** Boise District BLM, Boise, ID 83705. ***DID PYGMY RABBITS INCREASE IN THE BRUNEAU FROM 1900 TO 2009?***

Pygmy rabbits have been petitioned to be listed as endangered, they are on the sensitive species list of the BLM, and biologists have been concerned about their populations westwide. For the Bruneau Field Office in southwest Idaho, only about a half dozen records of pygmy rabbits existed in the Conservation Data Base of IDFG prior to 2002, most from the early 1900's. From 2002 to the present, we discovered widespread populations throughout the mountain sagebrush zone, from the Owyhee Mountains in the northwest to the Nevada border in the southeast. We have documented over 700 active or recently active burrow systems. We developed a survey method of looking for burrows and scat by walking and targeting appropriate patches of sagebrush, the tallest and densest patches on the landscape. Systematic surveys (i.e., straight lines, grids) or randomized spots would be largely futile with a species that targets small specific patches within the vast sagebrush landscape. Additionally, efforts to model the habitat with GIS



were not useful, because of the quality of sagebrush and soil data, because first we had to find the animals to know what they use, because of differences in habitat in different areas, and because of the small scale necessary to target. The field-based targeted method of looking for burrows and scat has worked well for many biologists in other states, including Wyoming, Utah, Nevada, Oregon, California, and Montana. Significant populations of pygmy rabbits have been discovered in all these states, including areas where they were previously unknown. Probably, pygmy rabbits did not increase in the Bruneau since 1900, just our knowledge of them increased. We attribute the lack of knowledge of pygmy rabbit populations to a dominance of paper trails in the lives of working biologists, instead of rabbit trails.

**VIERLING, KERRI T.**<sup>1</sup>, L. A. Vierling<sup>1</sup>, and A. Hudak<sup>2</sup>. <sup>1</sup>University of Idaho, Moscow, ID 83844; <sup>2</sup>USFS Rocky Mountain Research Station, Moscow, ID 83843. **LIDAR**

***APPLICATIONS FOR WILDLIFE BIODIVERSITY AND HABITAT MODELING.***

Lidar remote sensing provides highly detailed 3- dimensional information about ecosystem structure across large areas. While 3-dimensional ecosystem structure has long been recognized as important for characterizing and modeling wildlife habitat, investigations into the relationship between lidar-derived habitat information and animal communities are just beginning to be published. The goal of this talk is to provide an overview of lidar and to describe studies where wildlife research has been enhanced through the use of lidar data. Because lidar data and the associated processing algorithms are becoming increasingly available to scientists across the region (e.g. we have ~300,000 ha of lidar coverage in 21 project areas across the major ecosystems found in Idaho), we will highlight the opportunities for wildlife scientists and managers to engage with interdisciplinary research teams to address the conservation and management of animal species.

**WITT, CHRIS.** U.S. Forest Service, Rocky Mountain Research Station, Boise, ID 83702.

***WILDLIFE APPLICATIONS FOR FOREST INVENTORY AND ANALYSIS DATA.***

The U.S. Forest Service's Forest Inventory and Analysis (FIA) program collects data across all forested lands in the United States. These data are useful for analyzing habitat features of many species using forest ecosystems. Here I present two examples of how FIA data have been used to address habitat issues in the Intermountain West. I used FIA data collected in Utah to quantify potential breeding habitats for Lewis' woodpeckers (*Melanerpes Lewis*) in the absence of their preferred habitat of recently burned forest. An open sub-canopy, shrubby understory, and snags of adequate height and diameter are preferred by these birds for breeding activities. These areas are of increasing importance given the fire suppression activities of the past century. The analysis suggests that aspen forests hold the most potential for these birds in Utah. I also developed a modeling tool to estimate area within the Arizona portion of the Upper Gila Mountains Recovery Unit containing nesting and roosting habitat for the Mexican spotted owl (*Strix occidentalis lucida*). The owl was listed as "threatened" by the U.S. Fish and Wildlife Service in 1993 and a recovery plan implemented in 1995. Estimates were produced for the period of time when the owl was listed (1993-1999) and compared to current (2001-2007) estimates. Results suggest that habitat has been maintained since recovery plan implementation and illustrates the utility of FIA data as a monitoring and assessment tool. These examples



show how freely available and continuously collected FIA data can be used to quantify potential habitat, assess ongoing management efforts, and develop models to steer landscape-scale resource management plans.



## ABSTRACTS OF POSTERS

Presented at the Idaho Chapter of the Wildlife Society.

Presenter names are capitalized; those with an \* following their name are students.

**BISSON, JEREMY.** Twin Falls District Bureau of Land Management, Burley, ID 83318  
***DEVELOPMENT OF A LANDSCAPE APPROACH TO JUNIPER MANAGEMENT –  
IMPLEMENTATION OF THE FMDA IN THE TWIN FALLS DISTRICT.***

The Fire, Fuels and Related Vegetation Management Direction Plan Amendment (FMDA) is an important step towards jointly managing vegetation conditions for effective wildfire suppression efforts and providing suitable special status species habitats. Overarching goals and objectives of this plan include protecting and enhancing sage-grouse source habitats, and protecting key ecological components (such as aspen) in plant and animal communities. One implementation consideration is mechanical treatments in areas where fire is not appropriate to move vegetation types towards desired future conditions. This project describes a recent approach to plan and manage juniper vegetation in south central Idaho. Efforts include mapping the extent and successional stages of juniper within the boundary of the Burley Field Office, completing projects that improve habitats for wildlife and special status species, and developing a 15 year site specific restoration project.

**KNETTER, SONYA, and Rex Sallabanks.** Idaho Department of Fish and Game, Boise, ID 83707. ***RECOVERY, DELISTING, PROTECTION, AND MONITORING OF THE BALD EAGLE (HALIAEETUS LEUCOCEPHALUS).***

After 40 years as an endangered species in the United States, the bald eagle (*Haliaeetus leucocephalus*) was removed from the federal list of endangered and threatened wildlife on 8 August 2007. Fueled by a reduction in threats to the bald eagle, the population in the lower 48 States increased from 487 breeding pairs in 1963 to approximately 10,000 today. The recovery of the bald eagle is primarily due to the reduction in levels of persistent organochlorine pesticides (such as DDT) occurring in the environment and habitat protection. Currently, potential threats include heavy metal contamination, encroachment of nesting habitat by development, and power lines. The protections provided to the bald eagle under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA) continue to remain in place post-delisting. To help provide more clarity on the management of bald eagles after delisting, the U.S. Fish and Wildlife Service (USFWS) published a regulatory definition of “disturb,” the final National Bald Eagle Management Guidelines, and a proposed rule for a new permit that would authorize limited take under BGEPA and grandfather existing Endangered Species Act (ESA) authorizations. As with any delisted species in the U.S., the ESA requires  $\geq 5$  yr of post-delisting monitoring; such monitoring for the bald eagle began in 2009 on a national scale. Using information from Idaho and recommendations made by the Pacific Flyway Council, this poster reviews bald eagle recovery, the delisting process, current protections under the BGEPA and MBTA, management guidelines, provisions for take, and the USFWS post-delisting monitoring plan. Despite successful recovery from the brink of extinction, continued vigilance of bald eagle populations is critical to ensuring America’s national symbol continues to thrive in the absence of ESA protection.



**SCHWENDER, MEGAN, A. Moser, B. Lowe, S. Harmon, and M. Remming.** Idaho Department of Fish and Game, 324 S. 417 E. Jerome, ID 83338. **WILDLIFE RESPONSE TO THE MURPHY COMPLEX FIRE.**

In July 2007 the Murphy Complex fire burned over 504,000 acres of sagebrush steppe in SW Idaho. This study was conducted with the purpose of evaluating the fire rehabilitation efforts undertaken by the Bureau of Land Management and other agencies. A specific rehabilitation strategy was planned and in the fall of 2007, the prescribed treatment began which included the seeding of native and nonnative grasses as well as antelope bitterbrush (*Purshiatridentata*), Wyoming big sagebrush (*Artemisia tridentata*) and mountain big sagebrush (*A. tridentata* var. *vaseyana*). In order to quantify the effect of these treatments on wildlife and bird populations, we used a stratified random sampling method to survey the burned area. This involved the selection of 45 1-2 km square sampling blocks within the burn. These blocks were sampled for breeding birds and small mammals. We used standardized point counts to survey for breeding birds. Each block was subdivided into 4 sub-blocks with the center of each block serving as the center point for the point count. Three visits were made to each sampling block and 2 sub-blocks were surveyed each time, totaling 6 replicate surveys over the field season. To survey for small mammals, we trapped for 3 consecutive days within a standard grid using 25 Sherman live traps. Standardized lek route surveys at 9 locations within the Jarbidge Field Office boundaries have historically been conducted for Greater Sage Grouse (*Centrocercus urophasianus*) by IDFG and BLM. These surveys continue and were boosted in the spring of 2009 by aerial lek surveys conducted by IDFG. In the spring of 2009 IDFG collared twenty-one Sage Grouse. This enabled us to monitor existing populations of grouse within the burn boundary. Each bird was monitored monthly. Overall we found a low occurrence of diversity in the wildlife and birds sampled within the burn boundary.

**STEVENS, BRYAN S.\*<sup>1,2</sup>, K. P. Reese<sup>1</sup>, and J. W. Connelly<sup>3,4</sup>.** <sup>1</sup>Department of Fish and Wildlife Resources; <sup>2</sup>Department of Statistics, University of Idaho, Moscow, ID 83844; <sup>3</sup>Idaho Department of Fish and Game; <sup>4</sup>Department of Biological Sciences, Idaho State University, Pocatello, ID 83209. **FACTORS INFLUENCING SURVIVAL AND DETECTABILITY BIAS OF AVIAN FENCE COLLISION SURVEYS IN SAGEBRUSH STEPPE.**

We used hen ring-necked pheasant (*Phasianus colchicus*) carcasses to study factors influencing survival and detection bias associated with avian fence collision surveys in southern Idaho, USA, during the spring of 2009. We randomly placed 50 pheasants on each of 2 study areas, estimated detection probability during fence-line surveys, and monitored survival and retention of carcasses and their associated sign over a 31-day period. Survival modeling suggested site and habitat features had little impact on carcass survival, and the constant survival models were most supported by the data. Model averaged carcass daily survival probability was low on both study areas, and ranged from 0.777-0.812. Survival of all carcass sign varied strongly by location. Survival modeling indicated a strong site effect, and the top sign survival model included a site effect parameter. Model averaged daily survival probability for collision sign on the 2 study sites ranged from 0.863-0.988, and was higher on the Upper Snake than Browns Bench site. Logistic regression modeling indicated that detection probability of carcasses during fence-line surveys for avian collision victims was influenced by habitat type and



microsite shrub height at the carcass location. Carcasses located in big sage habitats were detected at a lower rate (0.364) than carcasses in low sage habitats (0.701), and increasing shrub height at the carcass location resulted in reduced detection probability. Additional evidence showed shrub canopy coverage at the carcass location negatively influenced detection probability during surveys. Avian fence collision surveys in sagebrush-steppe habitats should be conducted at short sampling intervals to reduce the impact of survival bias on collision estimates. Researchers should be aware of the effects of local vegetation on detection probabilities, and methods to correct detection probabilities based on collision site attributes should be applied to ensure more accurate collision rate estimates.

**ULAPPA, AMY C.<sup>1</sup>, J. S. Forbey<sup>1</sup>, E. Drussel<sup>1</sup>, J. L. Rachlow<sup>2</sup>, A. L. Price<sup>2</sup>, and L. A. Shipley<sup>3</sup>,** <sup>1</sup>Boise State University, Boise, ID 83725-1515, <sup>2</sup>University of Idaho, Moscow, ID 83844-1136, <sup>3</sup>Washington State University, WA 99164-6410. ***DEVELOPING A METABONOMIC TOOL TO UNDERSTAND FOODSCAPES FOR PYGMY RABBITS.***

We describe the application of an emerging bioanalytical field, metabonomics, that can help determine whether plant secondary metabolites (PSM) influence the interactions between plants and specialist herbivores. Field observations demonstrate that pygmy rabbits (*Brachylagus idahoensis*) consume specific sagebrush (*Artemisia tridentata*) plants more than others within a foraging patch. In addition, there is variation in the length of time pygmy rabbits have foraged on patches of sagebrush based on difference in the length of time burrows are continuously occupied. No studies have investigated why these patterns exist. We hypothesize that a compound or group of compounds might explain differences between browsed and unbrowsed sagebrush and between plants from burrow systems that have been occupied for long and short time periods by pygmy rabbits. We developed a metabonomic approach that can reveal and compare the metabolic profile of individual sagebrush plants to test this hypothesis. We collected leaves from long and short occupancy foraging areas (i.e., around active burrows) and from browsed and unbrowsed sagebrush near Leadore, ID. We used High-Pressure Liquid Chromatography-Mass Spectrometry (HPLC-MS) to separate and identify compounds from these samples. We detected 427 individual compounds in sagebrush and identified 10 of 15 phenolics known to occur in various species of *Artemisia*. Initial results suggest that chemical profiles differ quantitatively between long and short occupancy foraging areas. We speculate that chronic feeding by pygmy rabbits could alter the chemistry of sagebrush or that pygmy rabbits stay longer at foraging patches with the PSM profiles they prefer. Future research will use metabonomic approaches to investigate these possibilities more extensively. Results from metabonomic studies could enhance understanding of forces driving diet selection, and thus habitat use by pygmy rabbits. Results could assist wildlife managers in conserving and restoring preferred forages for this sagebrush obligate.