

45TH ANNUAL MEETING OF THE IDAHO CHAPTER OF THE WILDLIFE SOCIETY

9-13 March 2015
Clarion Inn
Pocatello, Idaho



ASSOCIATED MEETINGS

- ◆ Idaho Bat Working Group
- ◆ Idaho Bird Conservation Partnership.
- ◆ Idaho Partners in Amphibian and Reptile Conservation

PROGRAM AND ABSTRACTS

Table of Contents

Meeting Introduction and Host City..... 3

Registration and Logistics..... 4

Conference Sponsors 5

Auction and Raffle Donors..... 6

Program At a Glance..... 9

Attendee and Presenter Information..... 10

Chapter Awards..... 11

Idaho Bat Working Group Meeting Agenda..... 12

Idaho Partners in Amphibian and Reptile Conservation
Meeting Agenda..... 13

Plenary Session Speaker Biographies..... 14

Plenary Program..... 15

ICTWS Business Lunch Agenda..... 16

Conservation Education and Outreach Program..... 17

Scientific Program..... 18

Idaho Bird Conservation Partnership Meeting Agenda..... 24

Abstracts of Contributed Papers..... 26

Abstracts of Ignite Session Presentations..... 44

Abstracts of Contributed Posters..... 46

Meeting Introduction and Host City

Meeting Introduction

The 45th annual meeting of the Idaho Chapter and of The Wildlife Society will take place 9-12 March 2015 in Pocatello, Idaho. Participants are encouraged to register in advance by going to the on-line, secure registration page at the Chapter's website: <http://www.ictws.org>. This year's meeting offers a diverse scientific program with a plenary session and an extensive selection of contributed oral and poster presentations, social activities and the annual Chapter business meeting.

Host City — Pocatello, Idaho

Welcome to Pocatello.

The city of Pocatello was founded in 1889 and is currently the fifth largest city in Idaho. Originating as a stop on the railroad recently extended from Utah, the right of way was granted through the Fort Hall Indian Reservation by the Shoshone chief named Pocatello. Pocatello lies at an elevation of 4,500 feet, nestled in the broad valley where the Portneuf River enters the Snake River plain. The foothills and high ridges surrounding Pocatello are mostly managed by either the BLM or USFS and provide excellent opportunity for a variety of outdoor activities including hiking, mountain biking, cross-country skiing, bird watching, hunting and fishing — literally out the back door.

The first white settlement in the area was Fort Hall, established in 1834 and located along the Snake River near the confluence of the Portneuf River about 12 miles northwest of the city. The small fort was an important supply stop for the fur trapping industry and then later for wagon trains of emigrants destined for Oregon or California via the Oregon Trail. US Hwy 30 passes through the city, but is now overshadowed by Interstate 15 serving north-south traffic and Interstate 86 branching off westward from Pocatello. The city is also served by the Pocatello Regional Airport. With the history as a travel hub, Pocatello has been referred to as the Gate City or The Gateway to the Northwest.

Pocatello is the home of Idaho State University, the second largest university in the state. Some of the larger businesses include Heinz Frozen Food, ON Semiconductor, Union Pacific Railroad and JR Simplot Company and Portneuf Medical Center. Points of interest include Idaho Museum of Natural History (ISU campus, 282-3168), Pocatello Zoo (featuring native species, 234-6264) and the Bannock County Historical Museum (233-0434).

Good spring birding areas include the American Falls Fish Hatchery Nature Trail, American Falls Reservoir and Sterling Wildlife Management Area (Aberdeen), Cherry Springs Nature Area (Mink Creek) and Portneuf Wildlife Management Area. The Portneuf Greenway includes several segments bordering the Portneuf River and the City Creek Trail System on the west bench can be accessed at several points offering good hiking into higher elevations.

Some of the wide variety of restaurants that are handy to the ICTWS meeting or rather unique to the area include: Buddy's Italian (E. Lewis), Changs Garden (Hi-line and Pocatello Cr), Grecian Key (N. Main St.), Portneuf Valley Brewing (S. 1st Ave), Sandpiper (Bench Road), Senor Iquanas (Hi-line and Pocatello Cr), Taste of India and Nepal (N. Main St), Thai Kitchen (Hi-line and Pocatello Cr), The Bridge Wine Bar (S. 1st Ave)

Conference Venue

All conference activities will take place at the Clarion Inn (1399 Bench Road; Pocatello, Idaho; Phone—(208) 237-1400; www.clarionhotel.com/Pocatello). The second session of the Idaho Bird Conservation Partnership meeting on Friday, 13 March will take place at the Idaho Fish and Game's Southeast Region Office (1345 Barton Rd.).

Registration and Logistics

Registration fees include admission to all oral sessions, symposiums, coffee breaks, social activities, banquet, and the program and a complimentary meeting gift.

Registration Fees:

\$ 145	Full registration (includes symposium, social, banquet, and meeting gift)
\$ 65	Retiree registration (includes symposium, social, banquet, and meeting gift)
\$ 25	Student registration (includes symposium, social, banquet, and meeting gift)
\$ 25	Extra banquet ticket

The registration desk will be open at the following times:

Monday	9 March	4:00 pm—6:00 pm
<i>(register Monday evening to receive two free raffle tickets)</i>		
Tuesday	10 March	7:00 am—10:00 am and 2:30 pm—3:30 pm
Wednesday	11 March	7:00 am—10:00 am and 4:15 pm—5:00 pm
Thursday	12 March	7:00 am—8:00 am

Idaho Chapter Executive Board/Conference Organizing Committee

Shane Roberts	President
Quinn Shurtliff	President-Elect
Aren Eddingsaas	Vice-President
Sandra Vistine-Amdor	Secretary
Laura Wolf	Treasurer
Don Kemner	Past-President

Conference Contact

Quinn Shurtliff - qshurtliff@gssif.com; 208-227-9056

Idaho Chapter Committee Members

Fundraising— Deniz Aygen, Sandy Vistine-Amdor, Colleen Moulton

Sponsorship— Bruce Schoeberl

Awards— Tom Hemker, Paul Makela, Jen Forbey

Scholarships— Jon Dudley, Sylvia Copeland, Tricia Hosch-Hebdon, Ross Winton

Nominations/Elections— Curtis Hendricks, J.J. Teare, Shane Roberts

Education— Christine Gertschen

Audit— Chuck Blair

Membership— Bruce Schoeberl, Katie Powell, Lisa Nutt, Don Kemner

Activities— Jeff Knetter, Sonya Knetter, Don Kemner

Local Planning— Paul Wackenhut, Martha Wackenhut, Zach Lockyer, Brett Gullett, Jason Beck

Paper/Poster Judging Coordinator— Duston Cureton

We would like to thank the session chairs and volunteers that are helping with AV, registration desk, paper/poster judging, and other logistics during the conference.

Conference Sponsors

We would like to thank the following sponsors of the 2015 Idaho Chapter of the Wildlife Society Annual Conference:

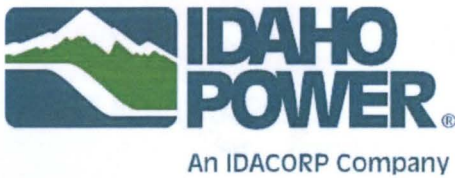
Caribou (\$1500+)



Great Blue Heron (\$1,000-\$1,500)



Sage-grouse (\$500-\$1,000)



Bat (\$250-\$500)



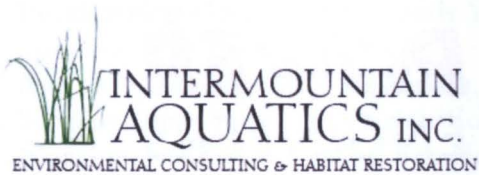
Idaho
Conservation
League



TETRA TECH

Auction and Raffle Item Donors

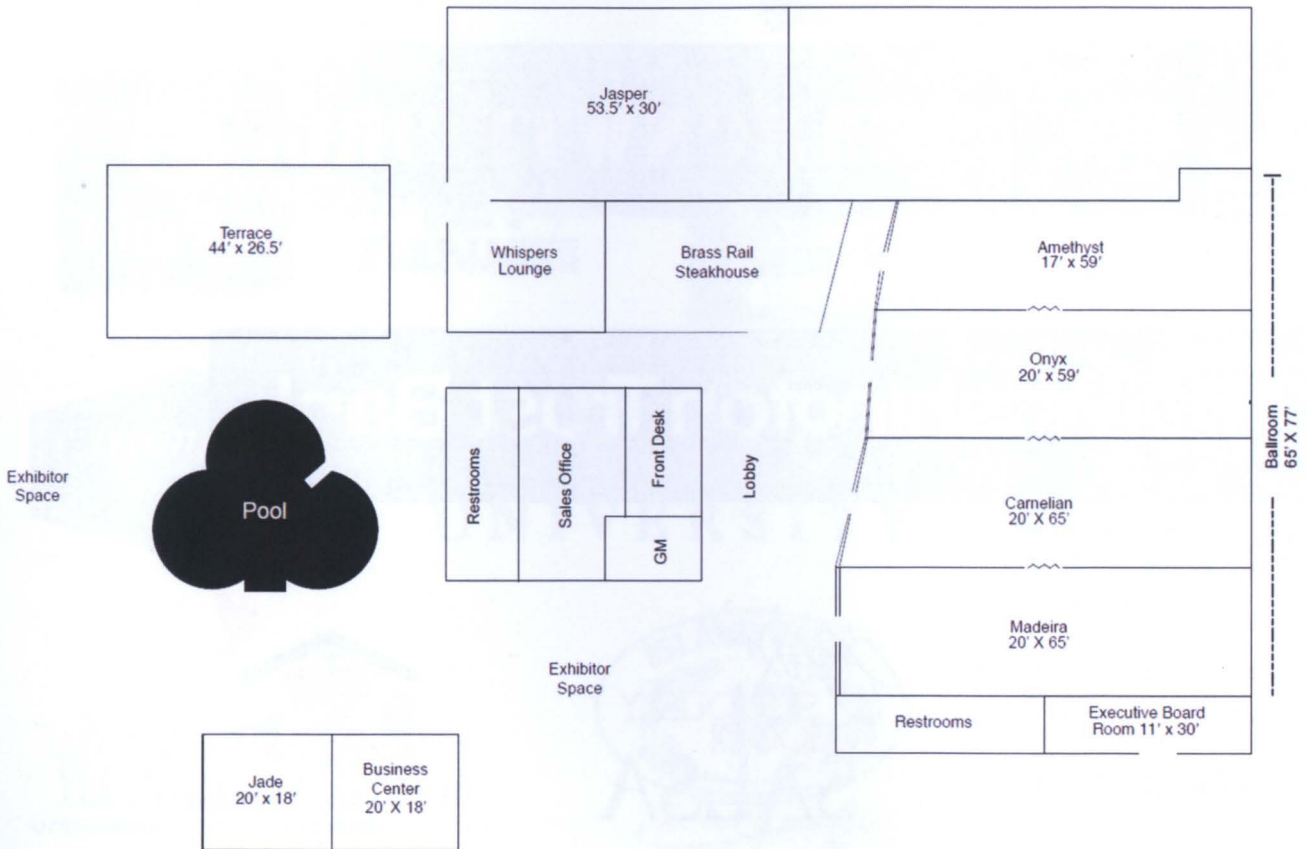
We wish to thank the following companies and organizations that supported the 2015 Annual Conference with auction and raffle item donations:





We also wish to thank all the individual donors who supported the Idaho Chapter of The Wildlife Society with their auction and raffle item donations...Thank You!

Clarion Inn Floor Plan



Program At a Glance

Monday 9 March 2015

Time	Room— Madeira
0830-1200	Idaho Bat Working Group Meeting
1330-1700	Idaho Partners in Amphibian and Reptile Conservation Meeting

Tuesday 10 March 2015

Time	Room—Carnelian/Madeira
0800-0810	Welcome - Shane Roberts, ICTWS President
0810-1050	Plenary Session <i>“The Future of the Endangered Species Act and Wildlife Management in Idaho”</i>
1050-1130	Plenary Session—Panel Discussion
1130-1330	ICTWS Business Lunch (Room—Amethyst/Onyx)
1330-1610	Conservation Education and Outreach Special Session
1610-1640	Special Session—Panel Discussion
1730	Social and Poster Session (Room—Amethyst/Onyx)

Wednesday 11 March 2015

Time	Rooms— Carnelian/Madeira	Rooms— Amethyst/Onyx
0800-0920	Wildlife Management I	Habitat Management I
0950-1130	Mammalian Ecology I	Ignite
1130-1300	Lunch Break—On Your Own	
1300-1400	Avian Ecology I	Development of Methods
1430-1610	Idaho Bird Conservation Partnership (IBCP)	Shoshone-Bannock Tribes Fish and Wildlife Program
1700-1800	Social Hour (Rooms— Exhibitor Space)	
1800	Banquet, Awards, Raffle/Auction (Room—Madeira/Carnelian/Onyx/Amethyst)	

Thursday 12 March 2015

Time	Rooms— Carnelian/Madeira	Rooms— Amethyst/Onyx
0800-0940	Mammalian Ecology II	Habitat Management II/ Landscape Ecology
1010-1130	Wildlife Management II	Avian Ecology II
1300-1700	Idaho Bird Conservation Partnership Meeting (all are welcome to attend)	

Friday 13 March 2015

Time	Idaho Fish and Game Southeast Regional Office; 1345 Barton Rd. Pocatello, ID
0800-1200	Idaho Bird Conservation Partnership Meeting (all are welcome to attend)

Attendee and Presenter Information

Locations

All conference activities will be held in the Carnelian, Madeira, Amethyst, and Onyx Rooms of the Clarion Inn; Pocatello, ID. Day two of the Idaho Bird Conservation Partnership (IBCP) Meeting on Friday 13 March 2015 will take place at the Idaho Fish and Game Southeast Regional Office; 1345 Barton Rd. Pocatello, Idaho.

Oral Presenters

Please take note of your presentation date and time. Please note that all **general session** talks should be limited to 20 minutes total (including time for questions). Ignite session talks should be limited to 5 minutes. Respect other speakers and your audience by staying within your scheduled time. It is extremely important that we maintain this schedule, so that attendees can move amongst sessions. For **general session** talks, 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., remote control, laser pointer) and how to use them. This is also the time to check and see if your PowerPoint presentation (ideally saved in Microsoft Office PowerPoint Show [.pps] format) runs properly on the projector and projection computer. Presentations should be uploaded no later than the break preceding your talk.

Posters

The poster session will be held during the Social on Tuesday, 11 March in the Amethyst/Onyx room. Poster displays should be set up after the afternoon session of contributed papers. Material to secure posters to the wall will be provided. All authors should be at their posters and prepared to discuss their work from 17:30 to 19:30 on Tuesday evening. Posters must be removed after the social.

Notice to all attendees: As a courtesy to all presenters, we request that you turn off your cellular phones while attending sessions and meetings.

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.

Past Recipients

2014	Beth Paragamian and Kerry Reese
2013	Jack Whitman
2012	Diane Evans Mack
2011	Colleen Moulton
2010	Al Larson "Bluebird Man"
2009	Pattie Soucek and Chans O'Brien, Payette National Forest
2006	Teton Regional Land Trust
2006	Jack Connelly, Steve Knick, Mike Schroeder, and San Stiver
2005	Lava Lake Land and Livestock Co.
2004	Shoshone Basin Sage-Grouse Local Working Group
2002	Rod Sando, former Director of the Idaho Department of Fish and Game
1999	The Nature Conservancy

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.

Past Recipients

2014	Wayne Melquist	1996	Ernie Ables
2013	Dave Musil	1994	Andy Ogden
2012	Jerry Hugo	1993	Tom Hemker, Kerry Reese
2011	Mike Scott	1992	Jack Connelly
2010	Randy Smith	1991	Geoff Hogander
2008	Chuck Harris	1990	Jerry Conley
2005	Craig Groves	1989	Jay Gore
2002	James Peek	1988	Alan Sands
2001	E. O. (Oz) Garton	1987	Elwood G. Bizeau
2000	Chuck Trost	1983	Jim Peek
1999	Allan Thomas	1982	Larry Wilson
1998	Chuck Peterson	1981	Lonn Kuck
1997	Lloyd Oldenburg		

Monday Morning—Madeira Room

Idaho Bat Working Group Meeting

0830-1200 (Note: Daylight savings time starts Sunday, March 8)

Attendance: Idaho Bat Working Group Members and interested parties

8:30 AM Welcome and introductions (Rita Dixon and Bill Doering, Cochairs) (5 min)

8:35 AM Bat conservation needs for Idaho State Wildlife Action Plan revision (2 h)

- Review Draft Conservation Status Ranks for Idaho bats (i.e., S-ranks)
- Review and discuss proposed list of bat Species of Greatest Conservation Need for Idaho State Wildlife Action Plan
- Review and discuss draft Idaho State Wildlife Action Plan materials relevant to bat conservation (e.g., threats [e.g., wind energy, AML closures, development, white-nose syndrome, bat exclusion, water developments etc.] and strategies)
- Ex. on behalf of ITD—discussion toward developing training materials for assessment of roadway structures use by bats and actions to minimize impacts to bats during maintenance and construction activities

10:35 AM Break (10 min)

10: 45 AM 2015 NABat pilot, WNS surveillance, and North American Bat Conservation Alliance (NABCA) (15 min)

11:00 AM Partner updates (45 min)

11:45 AM Wrap-up (15 min)

12:00 PM Adjourn

Monday Afternoon—Madeira Room **Idaho Partners in Amphibian and Reptile Conservation (PARC) Meeting**

1330-1700

Chuck Peterson (ISU)— Update on National and Regional PARC activities

Toni Holtuijzen (Idaho Power)— “Building a better breeding pond for Columbia spotted frogs.”

Don DeLong (USFS)— Development of suitable condition statements for spotted frogs and boreal toads on the Bridger-Teton National Forest.

Rita Dixon (IDFG). Idaho State Wildlife Action Plan (SWAP) Revision

- Review draft state (S) ranks for herps
- Review proposed list of herp Species of Greatest Conservation Need (SGCN)
- Review herp portions of SWAP ecological section plans

Quinn Shurtliff (Gonzales-Stoller Surveillance)—Developing an adaptive management framework for Idaho amphibian and reptile conservation activities.

Chuck Peterson (ISU)—Herpetological survey events.

Other

ICTWS Plenary Session Invited Speaker Biographies

Mark Robertson— Before moving out west, Mark completed his undergraduate degree at Michigan State University (1987, B.S. Wildlife Management). Mark joined Federal Service following graduate school (University of Idaho, 1991, M.S. Wildlife Resources) and worked with the Bureau of Land Management in Colorado as a wildlife biologist from 1991-2000. He came back to Idaho in 2000, joining the US Fish and Wildlife Service. After working directly with the Forest Service and BLM in eastern Oregon on consultation issues (Snake River Basin Office at the time), Mark became Branch Chief in the Idaho Fish and Wildlife Office overseeing much of the consultation and project planning work occurring in SW Idaho. He and his staff work on a multitude of issues (e.g., land management activities, dam operations, and transportation) with varied partners (e.g., FS, BLM, BOR, COE, FHWA/ITD), all with the intent of enhancing the conservation of species and habitat through project coordination with Federal agencies.

David Kampwerth—David served in the U.S. Army for 4 years and subsequently completed a B.S. at Colorado State University. He worked for the Colorado DOW and a Toxicology and Culture Lab Chief before heading to the Wyoming GFD as a Fishery and Cave Biologist. He then joined the Bureau of Land Management as a Fishery Biologist, Regional Underground Mine Safety and Cave/Karst Coordinator. He continued taking graduate studies and began instructing courses in mining methods and safety, geology, cave and karst resource management, and karst biology/hydrogeology. David was honored to instruct the US Marine Corps in mine and cave safety for operations in Afghanistan. He transferred to the Fish and Wildlife Service as the Southeast Region Karst Coordinator and then to his current position as Field Supervisor and National Interagency Cave/Karst Resource Coordinator. David has been married for 30 years and has 3 children, 2 parrots and a dog. He enjoys rock hounding, geology, caving, hunting, and fishing.

Dustin Miller—Dustin Miller serves as the head of the Idaho Governor's Office of Species Conservation, an agency dedicated to coordinating and implementing policies and programs related to the recovery and delisting of species listed under the federal Endangered Species Act (ESA). As a member of Governor C.L. "Butch" Otter's cabinet, Dustin directs his agency to ensure that a balance between species conservation and natural resource utilization is achieved in Idaho. Prior to being appointed as the Administrator of OSC, Dustin served as a species program manager with a focus on terrestrial species conservation. Dustin previously served as the Natural Resources Field Coordinator for Senator Larry E. Craig and was a natural resource and public lands specialist working on behalf of Idaho farmers and ranchers for the Idaho Farm Bureau Federation. Dustin holds a bachelors of science in Environmental Science from the University of Idaho.

Rob Cavallaro—Rob Cavallaro is a Regional Wildlife Biologist with the Idaho Department of Fish and Game's Wildlife Diversity Program where his responsibilities include enabling management and conservation of Idaho's *Species of Greatest Conservation Need* in the Upper Snake Region. Rob has worked for nearly 20 years as a biologist in the Mountain West with state agencies, federal sector consulting and non-profit conservation organizations.

Jim Hayden—Jim Hayden is a Staff Biologist for IDFG, working primarily on wolves, bear, and cougar. He started with the Department in 1984, spending 30 years in wildlife management in the Southeast and Coeur d'Alene Regions. He has been in his current position for a little over a year now, where he intends to stay for the next 30 years. Jim did his undergraduate work in Forest Science with a minor in Wildlife at Penn State, and his graduate work in Wildlife Biology at the University of Montana. He served as President of this chapter of the Wildlife Society during 2011 and 2012, after which it was determined a 1 year term rather than a 2-year term might more suitable in the future.

Mike Scott—Dr. J. Michael Scott was a research biologist with US Department of Interior for 37 years, first as a biologist studying endangered species for ten years in Hawaii, then as director of research for recovery program of the California condor from 1985 to 2011 and most recently as Leader of the Idaho Cooperative Fish and Wildlife Research Units at the University of Idaho. He retired in 2011 as a senior scientist with US Geological Survey and University Distinguished professor in the Department of Fish and Wildlife Sciences at the University of Idaho. He is currently University Distinguished Professor emeritus at the University of Idaho. His research has included work on conservations of endangered species, interactions at the science policy interface, natural history and ecology of endemic Hawaiian birds, GAP analysis and roles and responsibilities of research biologists and professional societies at the science policy interface.

Tuesday Morning—Plenary Session

“The Future of the Endangered Species Act and Wildlife Management in Idaho”

- 0800 0810 **WELCOME**
Shane Roberts— President, Idaho Chapter of The Wildlife Society
- 0810 0830 **ENDANGERED SPECIES ACT BASICS**
Mark Robertson
- 0830 0850 **FUTURE MANAGEMENT OF AT-RISK BAT SPECIES: DISEASE, WIND ENERGY, CAVE ENTRY, ETC**
David Kampwerth
- 0850 0910 **GREATER SAGE-GROUSE: CAN AN UNPRECEDENTED LANDSCAPE CONSERVATION EFFORT PRECLUDE THE NEED FOR ESA LISTING?**
Dustin Miller
- 0910 0930 **STATUS, ECOLOGY, AND CONSERVATION OF YELLOW-BILLED CUCKOO IN IDAHO**
Rob Cavallaro, Matt Johnson and Ross Winton
- 0930 1000 **BREAK** (Exhibitor Space)
- 1000 1020 **GRIZZLY BEAR & GRAY WOLF: FUTURE MANAGEMENT CHALLENGES FOR RECOVERED PREDATORS**
Jim Hayden
- 1020 1050 **ENDANGERED SPECIES ACT AT 40: ACCOMPLISHMENTS AND BARRIERS TO AND OPPORTUNITIES FOR THE FUTURE**
Mike Scott
- 1050 1130 **PANEL DISCUSSION**
- 1130 1330 **BUSINESS LUNCH**—Amethyst/Onyx Rooms
Lunch provided
Agenda— Page 16

Tuesday Lunch Break—Amethyst/Onyx Rooms

ICTWS Business Lunch

Welcome/Introductions – Shane Roberts

2014 Business Meeting Minutes – Sandy Vistine-Amdor

Approval of minutes needed

Treasurer's Report – Laura Wolf

Audit report

University scholarship information

Treasurer's report approval needed



Updates from 2014 Business Meeting Action Items – Shane Roberts

Chapter membership dues increase

2016 meeting – Coeur d' Alene

- Joint meeting with Washington TWS and The Society for Northwest Vertebrate Biologists

2017 meeting

- Vote on joint meeting with AFS and location

Explore joint meeting with Idaho Section of the Society for Range Management

Explore logistics of an Idaho bid for National TWS conference

2015 scholarship & grant funding

Committees – Shane Roberts & Committee Chairs

Membership Committee

- 2014 survey results

Conservation Affairs Committee

- Form CAC and restructure existing committees

Elections/Nominations Committee

- Is the current Presidential succession too much of a commitment?

Education Committee – Christine Gertschen

Grants Committee

Activities Committee

Fundraising Committee – Deniz Aygen

Awards Committee – Tom Hemker

Scholarship Committee – Jon Dudley

Audit Committee – Chuck Blair

2015 Bylaw Update

Update board member descriptions/duties

Update committee information

Other New Business - All

Adjourn

*Note: Known action items in **bold***

Tuesday Afternoon—Carnelian/Madeira Rooms **Conservation Education and Outreach**

- 1330 1340 **INTRODUCTION**
Aren Eddingsaas
- 1340 1400 **CONSERVATION EDUCATION IN IDAHO**
Christine Gertschen
- 1400 1420 **INTERNSHIP PROGRAMS IN THE FISH AND WILDLIFE SCIENCES DEPARTMENT AT THE UNIVERSITY OF IDAHO: OPPORTUNITIES FOR EXPANDING WILDLIFE EDUCATION**
Kerri Vierling
- 1420 1440 **OPPORTUNITIES FOR EXPANDING WILDLIFE EDUCATION WITH THE COLLEGE OF NATURAL RESOURCES' MCCALL OUTDOOR SCIENCE SCHOOL AT THE UNIVERSITY OF IDAHO**
Carmen DeLeon
- 1440 1510 **BREAK** (Exhibitor Space)
- 1510 1530 **THE MASTER NATURALIST RESOURCE**
Tony Appelhans
- 1530 1550 **EASTERN IDAHO ENVIRONMENTAL EDUCATION ASSOCIATION**
Alana Jensen
- 1550 1610 **POCATELLO ZOO AND THE IDAHO ENVIRONMENTAL EDUCATION ASSOCIATION**
Corrine Coffman
- 1610 1640 **PANEL DISCUSSION**
- 1730 **SOCIAL AND POSTER SESSION**—Amethyst/Onyx Rooms
Hors d' Oeuvres provided
Cash bar (drink tickets accepted)

Wednesday Morning—Carnelian/Maderia Rooms

Concurrent Sessions

Wildlife Management I (Chair: Rob Miller)

- | | | |
|------|------|--|
| 0800 | 0820 | MODELING OCCUPANCY OF BARN OWLS IN RELATION TO ROADWAY MORTALITY
Tempe Regan* |
| 0820 | 0840 | SURVIVAL OF TRANSLOCATED SHARP-TAILED GROUSE: THRESHOLD DATE AND AGE EFFECTS
Stevens Mathews* |
| 0840 | 0900 | EVALUATING HERBIVORE PREFERENCES FOR MIXED VERSUS SINGLE PLANT TOXINS
Jordan Nobler* |
| 0900 | 0920 | SURVIVAL AND RECRUITMENT OF GRAY WOLF PUPS BEFORE AND AFTER HARVEST
David Ausband |
| 0920 | 0950 | BREAK (Exhibitor Space) |

Mammalian Ecology I (Chair: Zach Lockyer)

- | | | |
|------|------|--|
| 0950 | 1010 | FIFTEEN YEARS OF RECOVERY ACTIONS FOR THE NORTHERN IDAHO GROUND SQUIRREL: HOW CLOSE ARE WE?
Ana Egnew* |
| 1010 | 1030 | WHY HAVE POPULATIONS OF NORTHERN IDAHO GROUND SQUIRRELS DECLINED?
Amanda Goldberg* |
| 1030 | 1050 | BREEDING LIKE RABBITS: REPRODUCTIVE OUTPUT, MULTIPLE PATERNITY, AND JUVENILE BREEDING IN PYGMY RABBITS
Stephanie DeMay* |
| 1050 | 1110 | RESTING IN A HOT AND RISKY ENVIRONMENT: HABITAT SELECTION BY PYGMY RABBITS DURING SUMMER.
Charlotte Miling* |
| 1110 | 1130 | FEAR OR FIBER: TRADEOFFS IN HABITAT USE BY SAGEBRUSH STEPPE
Megan Camp* |
| 1130 | 1300 | LUNCH BREAK—On Your Own |

Wednesday Morning—Amethyst/Onyx Rooms

Concurrent Sessions

Habitat Management I (Chair: Paul Wackenhut)

0800	0820	HOW DO ECOLOGICAL FACTORS INFLUENCE SEED REMOVAL RATE OF HARVESTER ANTS? Matt Modin*
0820	0840	EVALUATING TWENTY ONE YEARS OF MANAGEMENT ON CRAIG MOUNTAIN WILDLIFE MANAGEMENT AREA: ARE WE MEETING OUR OBJECTIVES? Zach Swearingen*
0840	0900	EFFECTS OF CATTLE GRAZING ON SEED AVAILABILITY IN NORTHERN IDAHO GROUND SQUIRREL COLONIES. Jennifer Smith*
0900	0920	CHANGES IN RIPARIAN WOODY VEGETATION OVER 7 YEARS OF PASSIVE RESTORATION Toni Holthuijzen
0920	0950	BREAK (Exhibitor Space)

Ignite (0950-1130; 5 Minute Presentations) (Chair: Mike Elmer)

INTRODUCTION TO IGNITE	Mike Elmer
AGE DISTRIBUTION, PREGNANCY RATE, AND BODY CONDITION OF ELK WITHIN THE CRAIG MOUNTAIN WILDLIFE MANAGEMENT AREA	Justin Barrett
BUILDING A BETTER BREEDING POND FOR COLUMBIA SPOTTED FROGS	Toni Holthuijzen
IMPACTS OF ROAMING, STRAY, AND FERAL DOMESTIC CATS ON BIRDS IN IDAHO	Troy Hansel
MULTI-SPECIES BASELINE INITIATIVE (MBI) PRELIMINARY RESULTS	Michael Lucid
PTT DEPLOYMENT ON FIVE GOLDEN EAGLE NESTLINGS IN IDAHO: NINE MONTHS OF TRACKING AND LESSONS LEARNED ALONG THE WAY	Matthew Stuber
THE ONLINE OBSERVATIONS DATABASE, WHAT IT IS AND TIPS ON HOW YOU CAN USE IT RIGHT NOW	Angie Schmidt
ADOPT A SCIENTIST: ENGAGING IDAHO'S TEACHERS AND STUDENTS IN LOCAL RESEARCH AND CONSERVATION	Zoe Tinkle
IDAHO'S ILLEGAL BIG GAME HARVEST: SHOULDN'T WE KNOW MORE?	Mark Hill
THE ROLE OF DATA IN RESOLVING CONFLICTS OVER WILDLIFE ISSUES	Seth Harju
EFFECTS OF CATTLE GRAZING ON SAGE-GROUSE: A PROJECT UPDATE	Courtney Conway
A COMING TRAINWRECK: CHANGING DEMOGRAPHY OF HUNTERS AND ANGLERS	Bruce Ackerman
WHY WILDLIFE MATTERS, TO ME	David Musil

Wednesday Afternoon—Carnelian/Maderia Rooms

Concurrent Sessions

Avian Ecology I (Chair: Ann Moser)

- | | | |
|------|------|---|
| 1300 | 1320 | INCUBATION RECESS MOVEMENT OF GREATER SAGE-GROUSE IN NEVADA
Jonathan Dudko* |
| 1320 | 1340 | CHANGES IN GRASS HEIGHT AT GREATER SAGE-GROUSE NESTS DURING
INCUBATION AND TESTING INDICES FOR PREDICTING NEST MICRO-
HABITAT IN IDAHO
David Musil |
| 1340 | 1400 | INCUBATION BEHAVIOR OF TRUMPETER SWANS AT GRAY'S LAKE
NATIONAL WILDLIFE REFUGE
David Bush* |
| 1400 | 1430 | BREAK (Exhibitor Space) |

Idaho Bird Conservation Partnership (Chair: Jay Carlisle)

- | | | |
|------|------|---|
| 1430 | 1450 | THE IDAHO BIRD CONSERVATION PARTNERSHIP: AN INTRODUCTION AND
OVERVIEW OF CURRENT ACTIONS
Jay Carlisle |
| 1450 | 1510 | MAINTENANCE OF FLOOD-IRRIGATION PRACTICES ON SOUTHERN IDAHO'S
FLOODPLAINS TO PRESERVE CRITICAL HABITATS FOR WATERFOWL,
WATERBIRDS, AND UPLAND GAME BIRD
Chris Colson |
| 1510 | 1530 | CHANGES IN POPULATION SIZE, PRODUCTIVITY, AND DISTRIBUTION IN
THE WESTERN AMERICAN WHITE PELICAN POPULATION FROM 1960-2013
Colleen Moulton |
| 1530 | 1550 | COMMUNITY ENGAGEMENT TO ADDRESS THE ILLEGAL SHOOTING OF NON-
-GAME BIRDS, INCLUDING LONG-BILLED CURLEWS
Heidi Ware |
| 1550 | 1610 | UNCAPPED PIPES AS THREATS TO CAVITY NESTING BIRDS- SOURCES,

Carrie Hugo |
| 1700 | 1800 | SOCIAL HOUR —Exhibitor Space
Cash bar (drink tickets accepted) |
| 1800 | | BANQUET —Madeira/Carnelian/Onyx/Amethyst Rooms
Awards, Dinner, Auction/Raffle
Cash bar (drink tickets accepted) |

Wednesday Afternoon—Amethyst/Onyx Rooms Concurrent Sessions

Development of Methods (Chair: Terry Bowyer)

- | | | |
|------|------|--|
| 1300 | 1320 | IS RANDOM SAMPLING ALL ITS CRACKED UP TO BE? A BAYESIAN HIERARCHICAL MODEL FOR ESTIMATING ELK ABUNDANCE FROM AERIAL SURVEY DATA

Jon Horne |
| 1320 | 1340 | NONINVASIVE GENETIC SAMPLING APPROACHES FOR MONITORING WILDLIFE.

Lisette Waits |
| 1340 | 1400 | SAMPLING METHODOLOGY AND A COMPARISON OF TRADITIONAL AND MOLECULAR DIET ANALYSES FOR A TERRESTRIAL CARNIVORE.

Elyce Gosselin* |
| 1400 | 1430 | BREAK (Exhibitor Space) |

Shoshone-Bannock Tribes Wildlife Program (Chair: Aren Eddingsaas)

- | | | |
|------|------|--|
| 1430 | 1450 | OVERVIEW OF THE SHOSHONE-BANNOCK TRIBES FISH AND WILDLIFE DEPARTMENT

Chad Colter |
| 1450 | 1510 | INDIAN LAW AND FISH AND WILDLIFE MANAGEMENT

Dan Stone |
| 1510 | 1530 | FISH AND WILDLIFE ISSUES ON THE FORT HALL RESERVATION

Dan Christopherson |
| 1530 | 1550 | SHOSHONE-BANNOCK TRIBES BIG GAME MANAGEMENT

Leander Watson |
| 1550 | 1610 | SHOSHONE-BANNOCK TRIBES SOUTHERN IDAHO WILDLIFE MITIGATION PROGRAM

Aren Eddingsaas |
| 1700 | 1800 | SOCIAL HOUR —Exhibitor Space
Cash bar (drink tickets accepted) |
| 1800 | | BANQUET —Madeira/Carnelian/Onyx/Amethyst Rooms
Awards, Dinner, Auction/Raffle
Cash bar (drink tickets accepted) |

Thursday Morning—Carnelian/Maderia Rooms

Concurrent Sessions

Mammalian Ecology II (Chair: Martha Wackenhut)

- | | | |
|------|------|--|
| 0800 | 0820 | POPULATION RESPONSE OF REINTRODUCED BIGHORN SHEEP AFTER OBSERVED COMMINGLING WITH DOMESTIC SHEEP.
Jericho Whiting |
| 0820 | 0840 | PNEUMONIA IN BIGHORN SHEEP: TESTING THE SUPER-SPREADER HYPOTHESIS
Frances Cassirer |
| 0840 | 0900 | HOW FAR DO ELK ROAM ?; USING NET-SQUARED DISTANCE TO DELINEATE SEASONAL HABITAT CHARACTERISTICS AND INTER-ANNUAL RANGE FIDELITY.
Scott Bergen |
| 0900 | 0920 | EFFECTS OF SUCCESSIONAL STAGE AND PLANTED FORAGE FIELDS ON NUTRITIONAL CARRYING CAPACITY AND HABITAT SELECTION BY ROOSEVELT ELK
Lisa Shipley |
| 0920 | 0940 | IDENTIFYING HABITAT AND NUTRITIONAL LIMITATIONS FOR ELK IN NORTH-CENTRAL IDAHO: PRELIMINARY RESULTS.
Andrew Mackey |
| 0940 | 1010 | BREAK (Exhibitor Space) |

Wildlife Management II (Chair: Chris Gaughan)

- | | | |
|------|------|--|
| 1010 | 1030 | HIT OR MISS: INNOVATING OPERATIONS THROUGH R&D TO MINIMIZE IMPACTS OF STATE ROADWAYS ON WILDLIFE
Alissa Salmore |
| 1030 | 1050 | MITIGATION SETTLEMENT FOR THE IMPACTS OF THE FEDERAL HYDROPOWER SYSTEM IN SOUTHERN IDAHO: THE HISTORY, DETAILS, AND IMPLICATIONS OF THE 2014 AGREEMENT
Gregg Servheen |
| 1050 | 1110 | GETTING THE WORD OUT: WHY YOU SHOULD BE USING VIDEO TO ENGAGE YOUR PUBLIC AND HOW TO GET IT DONE.
Clay Hayes |
| 1110 | 1130 | A CANDIDATE CONSERVATION AGREEMENT TO PROTECT SAGE-GROUSE ON THE IDAHO NATIONAL LABORATORY SITE.
Quinn Shurtliff |

Thursday Morning —Amethyst/Onyx Rooms

Concurrent Sessions

Habitat Management II/Landscape Ecology (Chair: Jason Beck)

- | | | |
|------|------|--|
| 0800 | 0820 | NORTHERN GOSHAWK GENETIC DIVERSITY AND CONNECTIVITY AMONG THE NATURALLY FRAGMENTED FORESTS OF THE NORTHERN GREAT BASIN
Rob Miller |
| 0820 | 0840 | MAINTAINING A CONNECTED NETWORK OF GREATER SAGE-GROUSE POPULATIONS ACROSS THEIR CURRENT RANGE
Michele Crist |
| 0840 | 0900 | WOLVERINE RESPONSES TO WINTER RECREATION: UPDATE FROM AN ON-GOING RESEARCH EFFORT
Kim Heinemeyer |
| 0900 | 0920 | LONG-TERM MONITORING OF WYOMING BIG SAGEBRUSH GERMPLASM PLOTS
Ann Moser |
| 0920 | 0940 | Open |
| 0940 | 1010 | BREAK (Exhibitor Space) |

Avian Ecology II (Chair: Courtney Conway)

- | | | |
|------|------|---|
| 1010 | 1030 | INFLUENCE OF WETLAND FEATURES AND ANTHROPOGENIC THREATS ON AMERICAN BITTERN OCCUPANCY IN THE UNITED STATES.
Wesley Glisson |
| 1030 | 1050 | NORTHERN HAWK OWLS BREEDING IN SOUTHERN IDAHO?!
Jay Carlisle |
| 1050 | 1110 | HABITAT ASSOCIATIONS AND OCCUPANCY RATES OF EIGHT WOODPECKER SPECIES WITHIN THE CARIBOU-TARGHEE NATIONAL FOREST
Rob Miller |
| 1110 | 1130 | Open |

Thursday Afternoon—Carnelian/Maderia Rooms **Idaho Bird Conservation Partnership**

1300--1700 (all are welcome to attend)

1300 WELCOME AND INTRODUCTION

Jay Carlisle

1300 HARLEQUIN DUCKS- UPDATES AND STATUS

Sonya Knetter, Frances Cassier, and Jake Briggs

Brief Discussion

1400 PARTNER UPDATES

NRCS Conservation efforts, including how to maintain some flood irrigation

Trisha Caracraft, NRCS Biologist

100th anniversary of the migratory Bird treaty Act (2016); Celebrating and promoting awareness

Matt Stuber, USFWS Pacific Region Eagle Coordinator

1445 WORKING GROUP UPDATES

Brief (5-10 minute) updates from each working group on recent accomplishments and the focus of breakout sessions on Thursday and Friday.

1515 **BREAK**

1530 BREAKOUT SESSIONS

Outreach, Education, and Citizen Science

—Photo contest

—Uncapped pipes action plan progress

Research and Monitoring

—Short-eared Owl citizen science project

—Harlequin Ducks follow-up discussion

Conservation Delivery

—Flood irrigation measures

—Bird workshops for federal agencies and tribes (in prep)

1800 Optional Group Dinner (location TBD)

Friday Morning —IDFG Southeast Regional Office **Idaho Bird Conservation Partnership**

0815-1200 (all are welcome to attend)

Location—Idaho Department of Fish and Game Southeast Regional Office, 1345 Barton Road, Pocatello, ID

- 0815 Convene (Coffee/Tea)
- 0830 BRIEF UPDATES FROM THURSDAY AFTERNOON BREAKOUT SESSIONS
- 0845 BREAKOUT SESSIONS (**Break ~1015**)
- SWAP Revisions
- Review proposed/draft SGCN list
 - Quick review draft ranks for birds
 - Review draft materials from ecological sections relevant to birds
- Research and Monitoring (Continued from Thursday if needed)
- 1130 NEXT STEPS: WORK PLANS AND DELIVERABLES FOR THE SPRING/SUMMER
- 1200 MEETING ADJOURNED (Continued lunch discussions for those interested)

Abstracts of Contributed Papers

Presenter names are capitalized; those presenters with an * are students

APPELHANS, TONY* and Upper Snake Chapter of the Idaho Master Naturalists, Idaho Falls, Idaho 83401. **THE MASTER NATURALIST RESOURCE**

The objective of the Idaho Master Naturalist program is to provide a corps of trained citizen volunteers to support public and private organizations involved in stewardship of 's natural environment. Activities range from education and outreach to assisting scientists in hands on research and management in the field. Since 2010 the Upper Snake Chapter's Education volunteers have provided in-the-field hands-on learning activities to over 1000 students at the Camas Wildlife Refuge and in 2014 provided 442 hours in support of the Bear Aware program, reaching ~13,000 people. The Chapter applied for and won grants of \$2,900 to upgrade equipment for the Bear Aware trailer and \$1,200 to provide wood duck nest boxes as part of the Adopt-a-Wetland program at Deer Parks WMA. Citizen Science is a major component of the Master Naturalists repertoire and they have a proven record of providing accurate, timely and complete data sets for surveys ranging from amphibian census to large ungulate road crossings. In 2014 they supported and conducted surveys for amphibians, trout, raptors, sage and sharp tail grouse, bats and general avian inventories; conducted archaeological surveys, installed grouse fence markers, removed hazardous fence from WMAs, banded ducks, and much more. The Upper Snake Chapter provided 6,611 volunteer hours in 2014 assisting the Idaho Fish and Game, USFS, BLM, Fish and Wildlife Service, Teton Regional Land Trust, and The Nature Conservancy. They are able to organize and execute activities with minimal oversight and that stretch beyond a single year or season, and they represent a dedicated, trainable, and dependable resource for educators, managers and scientists.

AUSBAND, DAVID, E.¹, Carisa R. Stansbury², and Jennifer L. Struthers³, Jennifer L. Stenglein⁴, and Lisette P. Waits⁵,
¹Montana Cooperative Wildlife Research Unit, Natural Sciences Room 205, ²University of Montana, Missoula, Montana 59812, ³University of Idaho, Department of Fish and Wildlife Sciences, Moscow, Idaho 83844-1136, ⁴Wisconsin Department of Natural Resources, Madison, Wisconsin 53707, ⁵Idaho Department of Fish and Game, Nampa, Idaho 83686, University of Idaho, Department of Fish and Wildlife Sciences, Moscow, Idaho 83844-1136. **SURVIVAL AND RECRUITMENT OF GRAY WOLF PUPS BEFORE AND AFTER HARVEST**

Harvest can affect population demography in complex ways and this may be particularly true for species whose successful reproduction is linked with complex social dynamics. We used genetic sampling and a natural experiment to estimate recruitment in gray wolves before and after harvest in Idaho. We hypothesized that recruitment would decline after harvest began and that the decline would be attributable to the harvest of pups and not subtler mechanisms associated with group dynamics and reduced reproductive success. We collected fecal samples from wolves in 10 packs for 6 consecutive years, extracted DNA, and genotyped 154 individual pups across 18 microsatellite loci. Our hypothesis that recruitment would decline was supported; survival from 3 – 15 months of age decreased from 0.60 (95% CI: 0.48-0.72) without harvest to 0.38 (95% CI: 0.28-0.48) with harvest and recruitment declined from 3.2 (95% CI: 2.1-4.3) to 1.6 (95% CI: 1.1-2.1) pups per pack after harvest was initiated. We attributed just 18-38% of pup mortality directly to harvest and suggest that there are indirect effects of harvest on recruitment that may be associated with changes in group size and structure. Models that do not include both direct and indirect effects of harvest on recruitment may underestimate the potential impact of harvest on population growth in social species.

BERGEN, SCOTT, A. Moeller, J. Horne, and M. Hurley. IDF&G Pocatello, ID 83204. **HOW FAR DO ELK ROAM ?; USING NET-SQUARED DISTANCE TO DELINEATE SEASONAL HABITAT CHARACTERISTICS AND INTER-ANNUAL RANGE FIDELITY.**

We studied the movements of elk (*Cervus elaphus*) in the vicinity of the South Fork of the Payette River in central Idaho from 2008 – 2012. Seasonal migrations of elk in Idaho have long been recognized as a life history characteristic of this species but rarely described in a spatiotemporally explicit fashion for central Idaho. Here we report our results from characterizing seasonal, annual, and inter-annual movements of individual elk using the net-squared displacement metric (NSD) as an unbiased means of quantifying the timing and extent of these movements (Bunnefeld et al. 2011). NSD results show the proportion of this population that use non-migratory home-ranges, seasonal migrations, mixed seasonal migrations, dispersal, and nomadic annual spatial behaviors. NSD results also identify the dates that individual elk start migrations, as well as

estimate the distance that the individual has moved. Coordinating NSD results with other available utilized distribution techniques, we have estimated summer and winter range extent and proportion of use within these ranges, as well as delineate prevalent migration corridors. Coincidental to these analyses, using animal that have dispersed we identify seven alternate winter ranges through the course of the study. This dispersal information not only yields important information on the prevalence of emigration and immigration but can also help inform population estimates of the magnitude to which these movements have affected population trajectories and enumeration.

BUSH, DAVID*, and D. Delehanty. Idaho State University, Biological Sciences, Pocatello, Idaho, 83209.
INCUBATION BEHAVIOR OF TRUMPETER SWANS AT GRAY'S LAKE NATIONAL WILDLIFE REFUGE

The current trumpeter swan (*Cygnus buccinator*) population breeding at Gray's Lake National Wildlife Refuge was formed by trans-locating non-migratory trumpeter swans taken from a wild population at Red Rock Lakes National Wildlife Refuge from 1988 to 1991. The intention behind restoring trumpeter swans at Gray's Lake National Wildlife Refuge was to produce a breeding flock that would expand to other wetlands in the area. Between 1994 and 2004, 32% of cygnets hatched survived to fledge. The high incidence of cygnet mortality has continued to limit population growth. We monitored swan incubation behavior using continuous videography. We measured daily recess and incubation time until eggs hatched in order to better understand parental care during incubation. Swans were attentive to the nest, incubating until after sunrise, taking many recesses of varying length during midday, and returning to the nest before sunset. Incubation occurred throughout the night with very few recesses. After hatching, we placed radio transmitters on 50% of the cygnets at a nest. These transmitters allowed for continued monitoring and for quick retrieval upon death. Genetic relatedness will be determined using retrieved cygnets as well as eggshell fragments and unhatched eggs. The results of the genetics will allow us to tell if a genetic rescue is needed on the population.

CAMP, MEGHAN J.^{1*}, L. A. Shipley¹, M. M. Crowell¹, J. S. Forbey², J. L. Rachlow³, and T. R. Johnson³. ¹Washington State University, Pullman, WA 99163, ²Boise State University, Boise, ID 83725, ³University of Idaho, Moscow, ID 83844.
FEAR OR FIBER: TRADEOFFS IN HABITAT USE BY SAGEBRUSH STEPPE MAMMALS

When selecting foraging patches, herbivores must balance the risk of starvation and the risk of predation, and this balancing act likely influences decisions about space use. To better understand the relative importance of food quality and distance to a refuge from predators, we manipulated both in a controlled experiment with pygmy rabbits (*Brachylagus idahoensis*) and mountain cottontail rabbits (*Sylvilagus nuttallii*). The pygmy rabbit is a dietary specialist on sagebrush and a central place forager around burrow systems that serve as refuges from predators. In contrast, cottontails are generalists that are not obligate burrowers, and consequently, do not forage from a central location. In addition, the larger cottontail is able to digest fiber better than the pygmy rabbit. We conducted a series of double-choice experiments with captive rabbits in which they were given a choice between two foraging patches that varied in the amount of fiber in the food (36 – 50% NDF), and the distance from a burrow (1 – 8 m). We applied the method of paired comparisons to investigate how the two rabbit species made tradeoffs between the amount of fiber in food and the distance to a burrow, and compared coefficients between rabbit species. Distance from a burrow was riskier for pygmy rabbits than cottontails, thus pygmy rabbits traded off high fiber food for distance at a faster rate than cottontails. As a consequence, cottontail rabbits were willing to travel farther from the burrow to obtain lower fiber food than were pygmy rabbits. This study provides a functional understanding of how burrow systems and quality of food influence habitat use by these sagebrush-dwelling rabbits, advancing our ability to assess habitat quality for mammals in sagebrush steppe ecosystems and the way they use landscapes.

CARLISLE, JAY. Intermountain Bird Observatory, Boise State University, Boise, Idaho 83725. **NORTHERN HAWK OWLS BREEDING IN SOUTHERN IDAHO?!**

Northern Hawk Owls breed across the boreal forest of Canada and Alaska and are generally rare and irruptive to the lower 48. Over the last two decades, documentation of breeding by multiple pairs has occurred in northern portions of nearby Montana and Washington. Prior to 2014, there had been a single breeding record in northern Idaho in 2001 and a number of scattered reports, mostly in winter, suggestive of a species that is characterized by infrequent and irruptive occurrence in the state. In early July 2014, I discovered a family group in a remote area of the Boise National Forest and the next day, after following up on my sighting, Larry and Missy Arnold discovered a second family group a few miles away! These likely represent the southernmost breeding latitude in the United States, unexpected for a period of global warming. I will review

the status of Northern Hawk Owls in the region and offer some ideas on why they were found breeding so much farther south than ever before.

CARLISLE, J. ¹, and C. Moulton². ¹Intermountain Bird Observatory, Boise State University, Boise, Idaho 83725; ²Idaho Department of Fish and Game, Boise, Idaho 83707. **THE IDAHO BIRD CONSERVATION PARTNERSHIP: AN INTRODUCTION AND OVERVIEW OF CURRENT ACTIONS**

The Idaho Bird Conservation Partnership (IBCP) is a collaborative effort open to anyone interested in participating. The IBCP provides a foundation for state and federal agencies, non-governmental organizations, private industry, and interested citizens to cooperate and collaborate for the management, science delivery, outreach, and conservation of birds and their habitats in Idaho. The IBCP also strives to implement strategic management and conservation efforts that contribute to the achievement of high priority regional and continental bird objectives aligned with national and state bird conservation initiatives and Idaho's State Wildlife Action Plan. This talk will serve to introduce the IBCP and the Idaho Bird Conservation Issues session at TWS and will focus on the working groups we've formed, the action plans we've developed, our accomplishments to date, and our future directions.

CASSIRER, E. FRANCES¹, Thomas E. Besser², Brandi L. Crider³, Paul C. Cross⁴, Jonathan A. Jenks³, Kezia R. Manlove⁵, Pat Matthews⁶, Raina K. Plowright⁷, Daniel Walsh⁸, Paul Wik⁹, Peter J. Hudson⁵. ¹ Idaho Department of Fish and Game, Lewiston, ID 83501; ²Dept. of Veterinary Microbiology and Pathology, Washington State University, Pullman, WA 99164; ³Dept. of Natural Resource Management, South Dakota State University, Brookings, SD 57007; ⁴ Northern Rocky Mountain Science Center, United States Geological Survey, Bozeman, MT 59715; ⁵ Penn State University, Center for Infectious Disease Dynamics, University Park, PA 16802; ⁶ Oregon Department of Fish and Wildlife, Enterprise, OR 97828; ⁷ Dept. of Microbiology and Immunology, Montana State University, Bozeman, MT 59715; ⁸National Wildlife Health Center, United States Geological Survey, Madison, WI 53711; ⁹Washington Department of Fish and Wildlife, Clarkston, WA 99403. **PNEUMONIA IN BIGHORN SHEEP: TESTING THE SUPER-SPREADER HYPOTHESIS**

Following introduction of pneumonia, disease can persist in bighorn sheep (*Ovis canadensis*) populations for decades as annual or sporadic pneumonia epidemics in lambs. Recurring years of depressed recruitment due to high rates of pneumonia-induced mortality in juveniles is a major obstacle to population recovery. Management strategies for resolving this problem have so far been elusive. We are investigating the feasibility of removing individual "super-spreaders" to improve lamb survival. Individual variation in infection and transmission is well documented in human diseases (e.g. "Typhoid Mary"). We are testing the hypothesis that pneumonia epidemics in lambs are initiated by transmission of pathogens from a few "chronic-shedder" ewes. We have completed the first year of a 5-year project in the Hells Canyon region of Idaho, Oregon, and Washington, and in a captive population at South Dakota State University. Through repeated testing of free-ranging individuals in Hells Canyon, we have identified individual differences in shedding of *Mycoplasma ovipneumoniae*, a primary pathogen in the bighorn sheep respiratory disease complex. We also found that when penned separately in captivity, lambs of ewes that consistently tested positive (chronic shedders) were infected and died of pneumonia, whereas lambs born to ewes from an infected population that tested negative (non-shedders), were not infected and survived. Over the next 4 years we plan to 1) continue and expand testing of free-ranging and captive animals, 2) determine whether removal of chronic-shedder ewes improves lamb survival in free-ranging populations, 3) expand and replicate chronic-shedder commingling experiments in captivity, and 4) establish and monitor a new population founded with non-shedders from an infected population.

CHRISTOPHERSON, DAN. Shoshone-Bannock Tribes, Fort Hall, ID 83203. **USE OF FLOATING PLATFORMS AS A TOOL TO INVENTORY WILDLIFE DIVERSITY IN PONDS.**

Floating platforms and wildlife trail cameras were used to inventory wildlife species using ponds in the Fort Hall Bottoms.

COFFMAN, CORRINE. Idaho State University and Pocatello Zoo, Pocatello, Idaho, 83201. **CREATING CONNECTIONS.**

Environmental educators, wildlife educators, classroom educators, outdoor educators, ect. are vital to teaching conservation education at local levels and across the state of Idaho. They need to be able to work closely with conservation and wildlife scientists in order to share accurate information as well as inspire public support. Having a network for these educators and

professionals to communicate and share ideas is necessary in order to perpetuate conservation activities throughout the state. The Idaho Environmental Education Association is dedicated to the advancement of environmental education in Idaho. We support and promote the activities of all educators working to enhance our understanding of the natural world and our role in it. Specifically, IdEEA is working to create a network for educators across the state, and to provide a platform for discussion of important EE topics, mainly by providing the annual Idaho Environmental Education Conference. IdEEA is also working with a regional grant to set up the Educator to Educator (E2E) Project, and has worked to implement a statewide Environmental Literacy Plan. The Pocatello Zoo is a unique resource in the conservation world in Idaho. Our mission is to educate and inspire the public to be active stewards of the environment through habitat and wildlife conservation. We display strictly species native to the Intermountain West, and also act as a sanctuary to animals that can no longer survive in the wild. By facilitating a connection with the public and the animals, we hope people will be inspired and motivated to learn more about the protection of our native species. Place based education is integral in the conservation education programs at the zoo, which take place on-site, in the classroom, and around the community. The animals at the zoo are ones that people have a direct effect on with their everyday actions. As always, there are challenges with providing these programs, and trying to connect educators and conservation networks across the state. By working together at both local and statewide levels, I believe that we can create a strong framework for conservation education across the state of Idaho that can be carried into the future.

COLSON, CHRIS. Ducks Unlimited, Boise, Idaho 83702. **MAINTENANCE OF FLOOD-IRRIGATION PRACTICES ON SOUTHERN IDAHO'S FLOODPLAINS TO PRESERVE CRITICAL HABITAT FOR WATERFOWL, WATERBIRDS, AND UPLAND GAME BIRDS.**

It has been estimated that as of 1980, 56% of wetlands in Idaho have been lost (Dahl 1990). The majority of these wetlands consist of floodplains converted to agriculture along the abundant streams and rivers in southern Idaho. Most critical of these agricultural conversions and land-uses is flood-irrigated perennial livestock pastures, which continue to mimic the historic floodplain functions and provide critical staging habitat for migratory waterfowl and waterbirds (Fleske 2010), and brooding and rearing habitat for waterbirds and upland game birds (Moulton 2013, Donnelly *in preparation*).

Across the Intermountain West, approximately 70% of wetlands occur on private lands and an estimated 2,300,000 acres of flood-irrigated agricultural land is spread across Oregon and Idaho (USDA 2012). However, a dramatic uni-directional trend is occurring that threatens this land use and the respective floodplain function and bird habitat that it provides. Between 2000 and 2005, the Intermountain West observed a 16% loss of flood-irrigated lands, 9% of which was associated with conversion to sprinkler irrigation (Kenny 2009). Though this conversion perhaps returns greater operational water-use efficiencies, it removes the ecosystem function and habitat of these working wetlands and floodplains. Ongoing studies are beginning to demonstrate that loss of flood-irrigation actually decreases downstream water volumes and duration of flow. As chronic drought and evolving water policy threatens wetland and irrigation-dependent habitat, respectively, across the Intermountain West, it has become critical to provide landowners with the incentives to maintain their flood-irrigation practices for the benefit of all freshwater obligate species that have relied on the resources of our floodplains for generations.

COLTER, CHAD. Shoshone-Bannock Tribes, Fort Hall, ID 83203. **OVERVIEW OF THE SHOSHONE-BANNOCK TRIBES FISH AND WILDLIFE DEPARTMENT.**

The primary duty of the Shoshone-Bannock Tribes' Fish and Wildlife Department is to protect, preserve and enhance populations of fish and wildlife, as well as the habitat they utilize. Promoting sound ecosystem management for a diverse assemblage of species sustains a unique Tribal culture and protects our Treaty reserved rights to harvest subsistence resources in our homelands. The Tribes employ a variety of management strategies, often acting as a partner with other managers, to rehabilitate habitat, study ecological processes, alleviate adverse effects of anthropogenic activities, and promote harvest based production actions.

CRIST, M.R.¹, S.T. Knick¹, and S.E. Hanser¹. ¹ U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Boise, Idaho 83706. **MAINTAINING A CONNECTED NETWORK OF GREATER SAGE-GROUSE POPULATIONS ACROSS THEIR CURRENT RANGE.**

Greater sage-grouse (*Centrocercus urophasianus*) are declining across their range due to loss and fragmentation of habitat and populations. Management agencies within the eleven western states in the sage-grouse range have delineated Priority Areas for Conservation (PACs; or equivalent designations) for focusing conservation actions. We used network theory to test the integrity of the range-wide PAC structure and to identify PACs important as either central nodes or stepping stones based on degree, betweenness, and eigenvector centrality metrics. In our preliminary results, we identified four PACs within the

range-wide network of 188 PACs that were crucial to providing landscape connectivity between the PACs for sage-grouse dispersal. Highest ranked PACs were characterized by central spatial location within the network and large size coupled with relatively short distances to a high number of adjacent PACs. We also identified 44 PACs that act as critical stepping stone habitats essential for maintaining connected PAC network. These PACs were characterized by a small size and a clustering in close proximity to large PACs. Our results are important to understanding the current configuration of PACs in the context of maintaining a connected system similar to metapopulation structure for sage-grouse. Our connectivity measures also provide a means to rank PACs for prioritizing conservation.

DE LEON, CARMEN¹, L. Vierling², and K. Vierling³. ¹NatureBridge, San Francisco, CA 94108; ²University of Idaho McCall Outdoor Science School, Moscow, Idaho, 83844; ³Fish and Wildlife Sciences, University of Idaho, Moscow, Idaho, 83844. **OPPORTUNITIES FOR EXPANDING WILDLIFE EDUCATION WITH THE COLLEGE OF NATURAL RESOURCES' MCCALL OUTDOOR SCIENCE SCHOOL AT THE UNIVERSITY OF IDAHO.**

The College of Natural Resources' McCall Outdoor Science School (MOSS) at the University of Idaho provides a number of different opportunities for expanded wildlife education at all ages. MOSS educational activities include programs for K-12 students, K-12 teachers, and graduate students. Graduate students with the McCall Outdoor Science School lead field-based science curriculum and conduct research projects of their own. The graduate students have diverse backgrounds in areas such as wildlife science, biology, social science, and environmental science. Additionally graduate students produce educational materials that can be used in a variety of K-12 settings and for a diverse number of K-12 audiences. Through this talk, we hope to familiarize potential agency partners with MOSS and begin a dialogue on future potential collaborations and educational opportunities.

DEMAI, STEPHANIE*¹, P.A. Becker², T.R. Johnson¹, L.P. Waits¹, and J.L. Rachlow¹. ¹University of Idaho, Moscow, ID 83844, ²Washington Department of Fish and Wildlife, Olympia, WA, 98501 (Becker). **BREEDING LIKE RABBITS: REPRODUCTIVE OUTPUT, MULTIPLE PATERNITY, AND JUVENILE BREEDING IN PYGMY RABBITS**

Pygmy rabbits (*Brachylagus idahoensis*) were bred in captivity in a decade-long effort to replenish the endangered distinct population segment in the Columbia Basin of central Washington. Most of the current knowledge about pygmy rabbit reproduction comes from research on captive animals. By 2012, the captive breeding program was phased out, and rabbits from the program, as well as wild rabbits translocated from other states, were transferred to large naturalized enclosures with no restrictions to breeding behavior. From 2012-2014, breeding adult rabbits and their offspring were sampled for genetics and analyzed for parentage. This scenario provided an opportunity to investigate pygmy rabbit reproduction and mating systems in a more natural setting than captivity. We used mixed-effects regression modeling and an information theoretic approach to investigate the effects of population density, individual genetic diversity, year, and enclosure on reproductive output by male and female adult pygmy rabbits. Females produced on average 7.4 kits per year, and reproductive output for both males and females decreased with decreasing genetic diversity, and increasing population density. We found significant differences between enclosures, likely reflecting differences in vegetation. As female density increased, we observed a significant decrease in the variance of male reproductive output. When females were plentiful, males bred at relatively equal rates; when females were scarce, variance increased as males competed for mates with varying success. Females and males bred with an average of 3.8 and 3.5 mates per year, respectively, and multiple paternity was observed in 81% of litters. Finally, we report the first documented cases of juvenile breeding in pygmy rabbits. This study delivers basic life history data about a cryptic species that is difficult to study in the wild, providing important information for biologists managing the recovery program in Washington, as well as pygmy rabbits across their range.

DUDKO, JONATHAN E.*^{1,2}, P. S. Coates¹, M. L. Casazza¹, D. J. Delehanty². ¹USGS, Western Ecological Research Center, Dixon, CA 95620, ²Idaho State University, Department of Biological Sciences, Pocatello, ID 83209. **INCUBATION RECESS MOVEMENT OF GREATER SAGE-GROUSE IN NEVADA**

Female greater sage-grouse (*Centrocercus urophasianus*, hereafter, sage-grouse) perform all aspects of nest construction, maintenance, and incubation. While on nest, sage-grouse have high incubation constancy averaging 94% for yearlings and 96% for adults. The remaining 4-6% of a 24-hour period is spent away from the nest on recess. Most sage-grouse take an average of two recesses per day, each during the crepuscular periods around dawn and dusk. We captured and marked female sage-

grouse in Nevada with a combination of GPS tracking devices and VHF radio transmitters to collect fine scale movement data during crepuscular recess periods. This movement data is being correlated with nest videography and microhabitat characteristics in an effort to determine space-use during recess and levels of selection for recess areas. In addition to learning more about the nesting behavior of sage-grouse, measuring recess space may identify unrecognized nesting habitat needs and improve managers' understanding of nesting habitat for sage-grouse.

EDDINGSAAS, AREN and T Stone. Shoshone-Bannock Tribes, Fort Hall, ID 83203. **SHOSHONE-BANNOCK TRIBES SOUTHERN IDAHO WILDLIFE MITIGATION PROGRAM.**

The Federal Columbia River Power System (FCRPS), primarily through hydroelectric power development, has inundated vast acres of unoccupied land, altering natural resource condition and important ecosystems the Tribes and public relied upon. As a way to mitigate the impacts for this system, the Columbia River Basin Fish and Wildlife Program (CRBFW) created regional mitigation programs with the purpose to acquire, restore, enhance, and protect ecosystems throughout the Columbia River Basin with funds directly allocated from the Bonneville Power Administration (BPA). The Southern Idaho Wildlife Mitigation Program (SIWM) was one of these mitigation programs and is administered by the Shoshone-Bannock Tribes' (SBT) Fish and Wildlife Department. The SBT SIWM mitigates those impacts by acquiring, restoring, enhancing, and protecting mitigation properties within the Upper and Middle Snake Provinces. Properties acquired under this Program are directly related to similar habitats impacted by the FCRPS and support wildlife species displaced by a project's construction, inundation, and operation. A ledger has been developed to support a credit based program in which acquired mitigation properties are credited against land adversely impacted by construction and inundation. Acquired properties are then managed for the benefit of fish and wildlife species in perpetuity by SBT SIWM. Benefits of the SBT SIWM program include protection of wildlife and habitat important to the Shoshone-Bannock Tribes, increase land under Tribal ownership/management, and provide for additional lands for public use including hunting and fishing,

EGNEW, ANA¹, D. Evans Mack², G. Burak³, and E. Yensen⁴. ¹Payette National Forest, McCall, Idaho, 83638; ²Idaho Department of Fish and Game, McCall, Idaho, 83638; ³U.S. Fish and Wildlife Service, Boise, Idaho, 83709; ⁴Museum of Natural History, College of Idaho, Caldwell, Idaho, 83605. **FIFTEEN YEARS OF RECOVERY ACTIONS FOR THE NORTHERN IDAHO GROUND SQUIRREL: HOW CLOSE ARE WE?**

The northern Idaho ground squirrel has the smallest geographic range of any ground squirrel in the world and one of the smallest of any North American mammal. Listed as threatened in 2000, decline was attributed to forest encroachment into meadows and land use changes, exacerbated by patchy habitat distribution, genetic isolation, disease, poisoning, shooting, predation, and congeneric competition. Despite a wide array of conservation efforts, the number of populations and overall abundance have not increased as planned. Achieving recovery continues to be a challenge, but this species has several things working in its favor. A strong coalition of partners is collaborating on recovery efforts. The Forest Service has begun to address 100 years of fire suppression to reverse forest encroachment into meadows and provide corridors for population connectivity. Timber management projects to benefit northern Idaho ground squirrels have moved forward even when other forest management projects have been challenged. Private landowners, finding squirrels compatible with livestock and other land management operations, have entered into Safe Harbor Agreements. Idaho Department of Fish and Game and Department of Lands have worked together to mesh sometimes conflicting mandates to protect the species and maximize revenue from state timber lands. The Fish and Wildlife Service elevated the squirrel to "Spotlight Species" status and committed employees to the collaborative group. Students and researchers from federal agencies and state universities have embraced this species as charismatic "minifauna." Their efforts are addressing critical research topics such as the effects of plague, genetic isolation, and population responses to land management practices. We describe the gains made over the past 15 years including standardized population monitoring, thousands of acres of habitat treated, and public education through interpretive projects. We also acknowledge much remains to be learned about the species. We discuss ongoing challenges and a path forward toward recovery goals.

GERTSCHEN, CHRISTINE. Sun valley ID 83353. **CONSERVATION EDUCATION IN IDAHO.**

Although conservation was a word used frequently throughout the Idaho Wildlife Summit in 2012, it is difficult to see that conservation is considered in management policies. Most of those in attendance seemed to agree that wildlife has inherent value to Idahoans and is therefore worthy of conservation. Speaker Shane Mahoney spoke of conservation as being an act of citizenship, that it is our responsibility as citizens to manage natural resources in such a way as to conserve them for future generations and because it is the right thing to do. But what does conservation mean, what does it look like on the

ground? Perhaps conservation scientists can lead the way with what conservationists are now calling rewilding. Conservation science offers a way forward and a foundation upon which wildlife and wildland management policy must be based. Can we see the place for conservation education here? There is much to know about how best to live in place and to co-exist peacefully with our neighbors. With this meeting, we begin that discussion. Could it be that conservationists, scientists and educators could come together to form a strategy in which conservation education programs can thrive? The Association for Fish and Wildlife Agencies offers a model for us here in Idaho with their North American Conservation Education Strategy and Core Concepts. But Idaho is unique and we will want to consider that as we move forward. There are many citizen science programs taking place around the country. Investigative field science is known to be best practice for teaching science. In my work with national and statewide programs such as IdEEA, NatureMapping, the Master Naturalist program, and in representing Idaho at the North American Environmental Educational Association meetings, I have gotten glimpses of what works and what doesn't. In the work of Terry Tempest Williams, Dave Foreman, Michael Soule, Lance Craighead, Marc Bekoff, and other writers on conservation, we can learn how we can contribute to rewilding, and what rewilding means. Perhaps Baba Dioum says it best: "In the end we will save that which we love. We will love that which we understand and we will understand that which we are taught." This special place called Idaho with its wildlife diversity and great wealth of wildland is too great not to conserve and we all need to know how to do that. Living with restraint and respect for the earth and its beings and coming together to find ways to disseminate how we can live more gently on the earth might make a difference. I am proposing that those of us who care deeply about the wild might come together to begin a new phase in conservation in Idaho, a phase that includes conservation education.

GLISSON, WESLEY¹ and C. Conway². ¹Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, 875 Perimeter Drive, MS 1141, Moscow, Idaho, 83844; ²U.S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, 875 Perimeter Drive, MS 1141, Moscow, Idaho, 83844. **INFLUENCE OF WETLAND FEATURES AND ANTHROPOGENIC THREATS ON THE BREEDING DISTRIBUTION OF AMERICAN BITTERNS IN THE UNITED STATES.**

American bittern (*Botaurus lentiginosus*) populations have undergone substantial declines over the past 45 years. Determining which factors may be influencing American bittern population declines across its U.S. breeding range can help inform broad-scale management decisions and prevent further declines. We used dynamic occupancy models to model American bittern occupancy as a function of wetland features and potential anthropogenic threats (e.g., development). First, we integrated continent-wide marsh bird survey data with spatial wetland data from the National Wetland Inventory (NWI) to examine wetland features that influenced American bittern occupancy. Then, we incorporated these wetland features into models that included potential anthropogenic threats to American bittern occupancy derived from Gap Analysis Program (GAP) land cover data. Wetland features were examined at a local scale (500-m radius surrounding survey points), whereas threats were examined at the scale of the catchment basin. Among NWI wetland features, American bittern occupancy was positively associated with palustrine and diked wetlands, and negatively associated with forested wetlands and open water. Among threat variables, American bittern occupancy was negatively associated with human development and recently burned areas, and positively associated with agriculture. Models incorporating these threat variables ranked higher than a model including only NWI wetland features. Our results indicate that after accounting for associations with wetland features, human development and fires at the catchment scale may be detrimental to American bittern occupancy across its U.S. breeding range. While agriculture had a positive association with American bittern occupancy, this relationship may reflect American bittern's affinity for palustrine wetlands, which are often located within agriculture-dominated landscapes. Our results will help identify the potential causes of population declines in American bitterns.

GOLDBERG, AMANDA R.^{*1}, C.J. Conway^{1,2}, D. Evans Mack³, E. Yensen. ¹University of Idaho, Moscow, Idaho 83844; ²United States Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, 83844, ³Idaho Department of Fish and Game, McCall, Idaho, 83638. **WHY HAVE POPULATIONS OF NORTHERN IDAHO GROUND SQUIRRELS DECLINED?**

Northern Idaho ground squirrels (*Urocitellus brunneus brunneus*) are listed as federally threatened by the U.S. Fish & Wildlife Service. Habitat degradation is thought to be the main cause of the species' decline. We are using a BACI design to test two hypotheses to explain why northern Idaho ground squirrel populations have declined: (1) habitat degradation, and (2) sylvatic plague. To test the habitat degradation hypothesis, we are evaluating whether experimental thin-and-burn treatments increase: survival, annual fecundity, natal recruitment, location of hibernacula, and population growth. To test the sylvatic

plague hypothesis, we are evaluating whether experimental removal of fleas (the vector of plague) increases abundance and survival. We are also examining whether plague affects abundance and survival of 4 coexisting species: Columbian ground squirrels (*Urocyon columbianus*), yellow-pine chipmunks (*Tamias amoenus*), deer mice (*Peromyscus maniculatus*), and voles (*Microtus* sp.). Over the past 2 years, we have attached radio-collars to 58 adult northern Idaho ground squirrels to locate their hibernacula and have implemented an intensive capture-mark-recapture program at eighteen 4-ha trapping grids. We are still in the pre-treatment stage of the study, but annual return rates of adult northern Idaho ground squirrels were 21.3% for males and 26.9% for females across our 9 field sites. Our flea removal treatments have proven successful: we significantly reduced flea loads on northern Idaho ground squirrels ($p < 0.001$), Columbian ground squirrels ($p < 0.01$), and deer mice ($p < 0.01$) on our plague treatment plots. We also used survey data from Idaho Department of Fish and Game collected from 2003-2010 to examine the relationship between squirrel population trends and habitat characteristics. These analyses suggest that population declines have been more common on colonies with higher percent forest canopy cover.

GOSELIN, ELYCE*, R. Lonsinger, and L. Waits. University of Idaho, Moscow, Idaho 83843.

SAMPLING METHODOLOGY AND A COMPARISON OF TRADITIONAL AND MOLECULAR DIET ANALYSES FOR A TERRESTRIAL CARNIVORE.

Trophic relationships are of interest to wildlife ecologists and managers, and analyzing predator scats for the presence of prey is a common noninvasive approach to understanding trophic interactions. Traditionally, morphological analysis of prey remains has been the most prevalent method of diet analysis, but molecular methods are becoming more widely used. Though few studies have compared morphological and molecular diet analyses, evidence suggests that molecular methods detect target prey species more frequently than morphological methods. We compared these two methods by analyzing 50 coyote (*Canis latrans*) scats for leporids, a common prey group of coyotes for which molecular species identification tests have been previously developed. We included 25 coyote scats in which leporids were detected and 25 scats in which leporids were not detected by morphological methods. While leporid prey was detected in 50% of scats using morphological analysis, we detected leporid prey in 76% of scats using molecular methods. Additionally, because few studies have explored the effect of sampling location on prey DNA detection, we analyzed five subsamples (side, center, each end of the scat, and a homogenized sample) from each scat to compare the frequency of detection of leporid DNA. The homogenized (46%) and side (44%) samples provided the highest rates of leporid prey DNA detection, respectively, while the samples taken from the ends and center of scats had the lowest rates of prey DNA detection (average = 36%). Including all sampling locations, we detected leporid DNA in 92% and 60% of samples with and without morphological detection of leporids, respectively. These results indicate that molecular diet analysis yields higher rates of prey detection than morphological analysis, but that prey detection is not equitable across sampling locations and multiple locations may be required. This information can aid managers in selecting the most efficient and accurate diet analysis methodologies.

HAYES, CLAY Idaho Dept. of Fish & Game, Lewiston, Idaho 83501. **GETTIN' THE WORD OUT: WHY YOU SHOULD BE USING VIDEO TO ENGAGE YOUR PUBLIC AND HOW TO GET IT DONE.**

Given that resource management, conservation efforts, and even research are often influenced by public perception, it is no surprise that efforts aimed at public outreach and involvement are an important part of what we do. How we go about informing the public, though, isn't so straight forward. Agencies and conservation organizations have embraced social media but informing the public isn't always as simple as sharing a blog post or sending out a newsletter. Although traditional text based media is still important in outreach efforts, trends show that video content is much more likely to be seen by, and elicit action from, your audience. According to Cisco, global video traffic will make up 79 percent of all consumer Internet traffic in 2018, up from 66 percent in 2013. Posting video content is as easy as sending an email, but creating informative and entertaining video content that retains your audience's attention takes a bit of thought. Here, we'll talk about the basics of planning, capturing, editing, and uploading high quality videos that will inform your public and keep them engaged.

HEINEMEYER, KIMBERLY¹, J. Squires², M. Hebblewhite³, J. Copeland⁴. ¹Round River Conservation Studies, 104 East Main St #302, Bozeman, MT 59715; ²USFS Rocky Mountain Research Station, Missoula, MT 59801; ³University of Montana, Missoula, MT 59801, ⁴The Wolverine Foundation, 4444 Packsaddle Rd, Teton, ID 83452. **WOLVERINE RESPONSES TO WINTER RECREATION: UPDATE FROM AN ON-GOING RESEARCH EFFORT**

The growing popularity of backcountry winter recreation has resulted in expanding recreation in wolverine habitats. The responses of wolverines to winter recreation are unknown. The recently released Idaho Management Plan for the Conservation of Wolverines identifies the need to understand potential effects of backcountry winter recreation on wolverines as a

Plan Objective. We have been conducting research on wolverine responses to winter recreation since 2010 and have monitored 17 wolverines across 5 Idaho and Wyoming study areas using GPS collars. All study areas are located in areas of wolverine habitat overlapping areas of either or both snowmobile and ski backcountry recreation. Concurrent to wolverine monitoring, we provided GPS units to volunteer recreationists at trailhead parking areas, with >4500 recreation tracks collected. We also completed aerial recreation surveys and used remote trail use counters to provide independent data on recreation use and intensity. We are examining wolverine movements, diel activity patterns and habitat selection at multiple spatial scales and have found that wolverines respond to spatial and temporal variation in winter recreation. Preliminary data summaries indicate these responses are complicated, with wide variation based on overall exposure to recreation and other individual characteristics. Wolverines may occupy home ranges with high levels of winter recreation but with potential increased energetic cost in terms of movement rate and duration. Additional data and analyses are required to increase our understanding of the interaction between wolverines and winter recreation.

HOLTHUIJZEN, ANTHONIE. Idaho Power Company, Boise, Idaho 83702.

CHANGES IN RIPARIAN WOODY VEGETATION OVER 7 YEARS OF PASSIVE RESTORATION

In 2005, the Daly Creek Ranch, encompassing about 10,200 acres, located near Richland in eastern Oregon was purchased by Idaho Power Company as proposed mitigation for ongoing operation of the Hells Canyon Hydroelectric Complex. Livestock grazing was the main land use activity over the past 120 years. Grazing ceased in 2007, except for limited, non-authorized (trespass) livestock grazing. In 2007, 14 permanent vegetation plots were established along (main) Daly Creek that were quantitatively monitored in 2007, 2011, and 2014. At each plot information was collected on herbaceous ground cover, including litter and bare ground, dominant grasses and forbs (3 each); and cover, density, and height of woody vegetation (shrubs and trees). Bare ground decreased about 3-fold and forb cover about doubled over the period of study. Shrub cover increased by a factor of 2.5 between 2007 and 2011, but no change was noted between 2011 and 2014. Tree cover increased by a factor of 1.5 between 2011 and 2014. Shrub density (stems/ha) remained the same over the period of study, but tree density steadily increased. Shrub height remained the same; tree height increased but not significantly. Tree diversity increased from 1 to 6 species. Changes in cover and density of shrubs and trees were less vigorous and rapid as expected. Incised channels, a lowered water table, and xerification of the floodplain are a legacy of past livestock grazing practices that will take a much longer timeframe to reverse.

HORNE, JON, S. Bergen, and M. Hurley. Idaho Department of Fish and Game, Lewiston, Idaho, 83501. **IS RANDOM SAMPLING ALL ITS CRACKED UP TO BE? A BAYESIAN HIERARCHICAL MODEL FOR ESTIMATING ELK ABUNDANCE FROM AERIAL SURVEY DATA.**

Aerial surveys are commonly used to monitor ungulate populations, including elk in Idaho. The general approach to obtain abundance estimates involves (1) randomly selecting a subset of areas (subunits) to be flown within a larger study area and (2) correcting the observed number of elk seen for visibility bias. Interestingly, this approach combines two of the dominant paradigms for statistical inference: Model-based inference is used to estimate the probability that a group of elk is observed based on characteristics such as group size and amount of forest and snow cover near the group. Subsequently, these probabilities along with subunit-level sampling probabilities (from the survey design) are used to estimate abundance for the entire study area (i.e., design-based inference). We describe a hierarchical model for estimating elk abundance that takes this traditional approach one step further by making the entire inference model-based. The hierarchical model contains conditional probability models describing (1) subunit occupancy, (2) the number of elk groups in a subunit, (3) the number of individual elk per group, and (4) the visibility bias of observed groups. Potential benefits of this approach include greater efficiency (equally precise estimates with reduced flight time), increased flexibility in defining the study area (inference space) post hoc, and happier observers! Furthermore, while the model was developed for aerial surveys of elk, the approach can be easily adapted to monitoring programs for other important species such as snorkel surveys of anadromous fish, point-counts for birds and non-invasive sampling for wolves.

HUGO, CARRIE. Bureau of Land Management, Coeur d'Alene Field Office, Coeur d'Alene Idaho 83815. **UNCAPPED PIPES AS THREATS TO CAVITY NESTING BIRDS- SOURCES, SOLUTIONS, STUMBLING BLOCKS, AND THE NEED FOR ACTION IN IDAHO.**

Uncapped pipes are a common and possibly underestimated threat to cavity nesting birds. This threat has received signifi-

cant attention from the media in the last few years because of the alarming estimates of bird mortality due to uncapped mine claim markers in Nevada. While mine claim markers have been the focal point for the threat of uncapped pipes, there are many common, widespread, and overlooked sources that can be easily mitigated by individuals as well as private, government, and non-government organizations. Though media attention has increased awareness of this threat, the nature of implementing what seems to be a simple solution (capping pipes) is more complex than one might think. The Idaho Bird Conservation Partnership has identified uncapped pipes as an issue that requires attention in Idaho and has begun implementing an action plan to assess this threat to cavity nesting birds within Idaho. A summary of the current knowledge of the scope of this threat in Idaho, and possible future actions by the Idaho Bird Conservation Partnership will be presented.

JENSEN, ALANA. Gonzales-Stoller Idaho Falls, ID 83401. **A SAMPLING OF CONSERVATION EDUCATION IN IDAHO FALLS**

Environmental Surveillance, Education and Research (ESER) Program outreach: We are committed to furthering environmental education in the southeastern Idaho community.

Classroom Presentations: ESER staff members are available for presentations to groups and classrooms in southeastern Idaho.

War on Weeds: War on Weeds was initiated in 2001 to provide a real world educational opportunity concerning local issues for area high school students.

Teacher Outreach: The Rocky Mountain Adventure program is designed to educate teachers about native Idaho habitats, to provide tools and hands-on activities that can be adapted to their classrooms, and to introduce them to experts who may serve as classroom resources.

Summer Science Camp: Rocky Mountain Adventure summer science camps educate students about environmental issues in their community and encourage environmental careers.

Ask A Scientist: The ESER program creates a weekly column for the Post Register. The column calls on the experience and knowledge of scientists representing businesses, organizations, and agencies in southeastern Idaho to answer questions from local students and adults. In conjunction with Ask a Scientist, the Meet A Scientist program hosts a guest scientist each month at a free public forum.

Idaho Nature Probe: Idaho Nature Probe is a free, web-based, interactive project designed to engage students and citizen scientists in authentic scientific processes.

Eastern Idaho Environmental Education Association: Eastern Idaho Environmental Education Association is a non-profit organization of professionals from government and private industry whose mission is to promote environmental stewardship, education, and resource conservation in eastern Idaho. EIEEA sponsors these yearly events:

Green Your Classroom Grant Program: Three local schools are chosen each year to show how they can make a difference in taking care of the Earth.

Idaho Falls Earth Day Celebration: This annual event features educational exhibits and informational displays, children's arts and crafts projects, entertainment, raffles, and classroom projects from area school children.

Idaho Falls Water Festival: This annual event engages sixth-grade students and educators in demonstrations, activities, and educational materials designed to teach water ecology, conservation, and the importance water plays in the health of every living thing.

Annual Excellence in Community Environmental Education and Outreach Awards: The awards are presented to organizations and individuals who have supported environmental education programs and community events that promote environmental stewardship and resource conservation in eastern Idaho.

MILLER, ROBERT A.¹, Jay D. Carlisle¹, and Tammy Fletcher². ¹Intermountain Bird Observatory, Boise, Idaho 83725, and ²Caribou-Targhee National Forest, Idaho Falls, Idaho 83401. **HABITAT ASSOCIATIONS AND OCCUPANCY RATES OF EIGHT WOODPECKER SPECIES WITHIN THE CARIBOU-TARGHEE NATIONAL FOREST.**

The Caribou-Targhee National Forest has identified eight woodpecker species as management indicator species for the Targhee portion of the forest. We surveyed the forest for these eight species using a spatially balanced sampling design (four points spaced 500 m apart in a 2 × 2 grid). We used a single visit minute-by-minute replacement survey design with both silent and species-specific broadcast techniques. We collected habitat data at the point-scale within 50 m of each survey point and at the grid-scale (1 km × 1 km) with GIS techniques from digital elevation models and mid-level forest inventory data. We analyzed the data using a multi-scale occupancy modeling approach. We surveyed 31 grids between 15 April and 28 May 2014. We detected 275 woodpeckers/sapsuckers including 86 Northern Flickers spread across 21 grids, 57 Wil-

Williamson's Sapsuckers (12 grids), 45 Red-naped Sapsuckers (11 grids), 24 Hairy Woodpeckers (nine grids), 14 American Three-toed Woodpeckers (four grids), four Black-backed Woodpeckers (three grids), and four Downy Woodpeckers at a single grid. Of the eight species evaluated, five species had a sufficient number of detections for at least partial statistical analysis – Williamson's Sapsucker, Red-naped Sapsucker, Hairy Woodpecker, American Three-toed Woodpecker, and Northern Flicker, each leading to a baseline probability of occupancy within the forest. The probability of detection of each species was higher for the broadcast than the silent listening period. In general, the habitat associations which resulted from the analysis, and all associations with high confidence, agreed with the published literature. These results will help prioritize management actions and provide a baseline for long-term monitoring of population trends.

Szarmach, Stephanie J., **ROBERT A. MILLER**, Jay D. Carlisle, Gregory S. Kaltenecker, Muhammad Arshad, and James F. Smith. Intermountain Bird Observatory, Boise, Idaho 83725. **NORTHERN GOSHAWK GENETIC DIVERSITY AND CONNECTIVITY AMONG THE NATURALLY FRAGMENTED FORESTS OF THE NORTHERN GREAT BASIN.**

Forest fragmentation limits movement of individuals, and even highly mobile species, like birds, can fail to disperse across such landscapes. The naturally fragmented forests of the northern Great Basin are thought to have led to the evolution of unique species, such as Christ's paintbrush and South Hills Crossbill. Other species in these forests may also exhibit unique genetic diversity. The Northern Goshawk, a species occupying these forests, has shown low integration between geographically dispersed populations elsewhere in its range. We evaluated genetic diversity and connectivity of the goshawks in the northern Great Basin by searching for signs of inbreeding depression, estimating effective population size, and placing the birds in biogeographical context of other populations in the West. We utilized blood and feather samples from nestling and adult birds from five forest islands in south-central Idaho to compare microsatellite loci and mitochondrial DNA sequences among individuals. Our work provides a foundation for understanding the genetic ecology of goshawks in the northern Great Basin, and the genetic health and integration of these birds compared with other populations.

MILLING, CHARLOTTE^{1*}, J. Rachlow¹, T. Johnson², M. Chappell³, J. Forbey⁴, and L. Shipley⁵

¹Department of Fish and Wildlife Sciences, University of Idaho, Moscow, ID 83844. ²Department of Statistical Science, University of Idaho, Moscow, ID 83844. ³Department of Biology, University of California—Riverside, Riverside, CA 92521. ⁴Department of Biological Sciences, Boise State University, Boise, ID 83725. ⁵School of the Environment, Washington State University, Pullman, WA 99164. **RESTING IN A HOT AND RISKY ENVIRONMENT: HABITAT SELECTION BY PYGMY RABBITS DURING SUMMER.**

During periods of rest, both security and thermal parameters likely shape habitat selection by small-bodied prey species. Lagomorphs are active year-round and are prone to both predation and overheating. We hypothesized that shelter from thermal extremes would influence selection of resting sites by pygmy rabbits (*Brachylagus idahoensis*), with individuals selecting cooler microsites during summer and warmer ones during winter. We also hypothesized that habitat features that reduce the risk of predation would be important during both seasons. We collared 14 pygmy rabbits in the Lemhi Valley with VHF transmitters and used radio telemetry to identify resting locations used between the hours of 1000 and 1700 during the summer of 2014. We measured a suite of security metrics and biophysical variables contributing to the thermal environment at each resting site and at two randomly selected, paired locations. We used conditional logistic regression to evaluate 13 *a priori* candidate models of resource selection in an information theoretic framework. Lower radiation (i.e., shade), higher concealment from terrestrial predators, and closer proximity to refuge (i.e., burrow entrances) strongly influenced selection of resting sites. Air and ground temperatures were correlated with shade, supporting selection for cooler resting sites during summer. Our results suggest that characteristics of sagebrush vegetation that influence both thermal and security properties are important for pygmy rabbits, and that changing temperature regimes might alter habitat suitability for this species.

MODLIN, MATT*, Joseph Holbrook, Alex Suazo, Kerri Vierling, David Pilliod, and Robert Arkle. University of Idaho, Moscow, Idaho 83844 (MM, JH, AS, KV). US Geological Survey, Forest and Rangeland Ecosystem Science Center, Boise, Idaho 83706 (DP, RA). **HOW DO ECOLOGICAL FACTORS INFLUENCE SEED REMOVAL RATE OF HARVESTER ANTS?**

Seed movement is the primary mechanism that allows for colonization and genetic interchange between plant populations. Granivores, or seed consumers, are a guild of animals that largely contributes to seed movement across many landscapes.

Our objective was to evaluate how ecological factors influence seed removal rate by Owyhee harvester ants (*Pogonomyrmex salinus*), a common granivore within sagebrush-steppe environments. We sampled ant nests during summer 2014 within eleven 50 x 50 m plots inside the Morley Nelson Snake River Birds of Prey National Conservation Area in southwestern Idaho. We presented seeds from four plant species at 1.5 and 3 m from each ant nest, and quantified removal rates. We also recorded temperature during foraging period, distance to nearest neighbor, nest height (i.e., index of colony size), and habitat characteristics including percent cover of all vegetation, cheatgrass (*Bromus tectorum*), and bare ground. We used a generalized linear mixed model and an information-theoretic approach to evaluate competing hypotheses. Our top model indicated that seed removal was positively associated with temperature and nest height, and negatively associated with distance-to-seeds, cheatgrass cover, and bare ground. These preliminary results supported our expectations that higher temperatures generally increase ant activity within a foraging period. We also found evidence that larger colonies removed more seeds, but higher cheatgrass cover likely increased search and handling time resulting in fewer seeds removed. We did not expect distance-to-seeds to negatively influence seed removal rates, however, we observed a strong effect of distance. Collectively, these preliminary results provide insight into the relationship between harvester ants and native seed removal, which can be used to inform seed restoration treatments within sagebrush-steppe environments.

MOSER, ANN¹, and A. Sands². ¹Idaho Department of Fish and Game, Boise, Idaho, 83707; ²Sage Wildlife Consulting, Boise, Idaho, 83707. **LONG-TERM MONITORING OF WYOMING BIG SAGEBRUSH GERMPLASM PLOTS.**

We evaluated long-term survival and growth of 13 Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) germplasms planted in 2 common gardens experiments in 1987 at Glens Ferry, Idaho and Brown's Park, Utah. Seed was collected from the 13 germplasms from distinct locations in 7 states, including Glens Ferry and Brown's Park. The seed was grown out in a nursery and containerized plants of 20 individuals from each germplasm (160 total seedlings) were randomly planted within a grid at each site. The Glens Ferry plot was re-visited in 2005 and 2010 and observers recorded whether each plant was alive or dead. We visited the Glens Ferry and Brown's Park plots in 2014. In addition to survival, we also measured morphological and reproductive characteristics of each plant. At both locations, plants from the local seed source had the highest long-term survival, but overall survival was better at Brown's Park (48%) than Glens Ferry (35%). Brown's Park plants at Brown's Park had 75% survival, but other germplasms also did well. Glens Ferry plants at Glens Ferry had 95% survival and greater vigor and leader lengths than most germplasms. Survival curves at Glens Ferry demonstrated the high survival rate of the local source seed at that site, compared to the other germplasms. In addition, many plants survived many years before dying. One-hundred one plants died prior to 2005, with 32 plants indicating they had attained maturity and recently died. Another 62 plants died between 2005 and 2010; i.e., they had survived an estimated 20 years before dying. These results document the importance of utilizing a local seed source for Wyoming big sagebrush rehabilitation and restoration projects.

MOULTON, COLLEEN¹ and M. Wackenhut². ¹Idaho Department of Fish and Game, P.O. Box. 25, Boise, ID 83707; ²Idaho Department of Fish and Game, 1345 Barton Road, Pocatello, ID 83204. **CHANGES IN POPULATION SIZE, PRODUCTIVITY, AND DISTRIBUTION IN THE WESTERN AMERICAN WHITE PELICAN POPULATION FROM 1960-2013.**

We compiled nest count and productivity data from western American White Pelican (*Pelecanus erythrorhynchos*) colonies to 1) assess population trends, 2) determine changes in productivity rates, and 3) investigate latitudinal changes in pelican colony distribution. There are currently 18 active colonies in the west. Peak breeding population of 46,000 birds was documented in 1992, and has fluctuated dramatically on an annual basis between 1980 and 2013. Average annual productivity steadily declined between 1960 and 2013, from a high of 1.09 chicks fledged per nest in the 1960s, to a low of 0.30 chicks fledged per nest for the 2010-2013 time period. Median latitude of active colonies has changed from a historic median of 41.87 degrees to a current median of 44.44 degrees; a northward shift of 177.33 miles. Median latitude of colonies established since 1980 was 45.24 degrees. The two largest colonies, Anaho Island National Wildlife Refuge in Nevada and Gunnison Island in Utah, representing 60% of the breeding population, are currently two of the most southern colonies in the western population. Results from this analysis suggest that 1) use of continuous datasets is important for assessing population trends and status for a boom-and-bust species such as the pelican, 2) collection of productivity data at pelican colonies should become a routine part of monitoring, and 3) future management of this species will likely need to incorporate effects of climate change and a shifting breeding population.

MUSIL, DAVID, and J. W. Connelly, Idaho Dept. Fish & Game, Boise, Idaho 83712. CHANGES IN GRASS HEIGHT AT GREATER SAGE-GROUSE NESTS DURING INCUBATION AND TESTING INDICES FOR PREDICTING NEST MICRO-HABITAT IN IDAHO

Past research has demonstrated the importance of a sagebrush (*Artemisa* spp.) overstory and herbaceous understory in providing quality nesting habitat for greater sage-grouse (*Centrocercus urophasianus*). Our research focused on height of individual grass species calculated at the beginning of incubation based on grass growth sampled within 50 m of nests actively incubated. The 6 most common grass species that occurred at nests included: Sandberg bluegrass (*Poa secunda*, 81% of nests), bluebunch wheatgrass (*Pseudoroegneria spicata*, 49%), bottlebrush squirreltail (*Elymus elymoides*, 47%), cheatgrass (*Bromus tectorum*, 39%), Idaho fescue (*Festuca idahoensis*, 17%), and Indian ricegrass (*Achnatherum hymenoides*, 16%). During incubation, cheatgrass residual height increased 8%, Idaho fescue increased 3% and the rest of the common grasses decreased 6-37% in residual height with Indian ricegrass declining the most. Nest sites had taller residual grass height for bluebunch wheatgrass and Idaho fescue than occurred at random plots ($P < 0.01$). Bluebunch wheatgrass and Sandberg bluegrass had taller live grass height at nests than at random plots ($P < 0.009$). Indices were developed and logistic regression analysis conducted by using the percent difference in grass and shrub heights compared to sage-grouse guidelines. Sites were 2 times more likely to be used for nesting for every 1 unit increase in the index for dwarf sagebrush. Sites were 2 times more likely to be used for nesting for every 1 unit increase in the index for perennial grasses and were 7-8% more likely to be used for nesting for every 1% increase in bluebunch wheatgrass canopy cover. Our work strongly suggests abundant and robust native bunch grasses, especially bluebunch wheatgrass, are important to female sage-grouse selecting nest sites. Using indices based on the breeding habitat guidelines may be an important way to cast variables when measuring habitat and should be considered in future research.

NOBLER, JORDAN^{1*}, Shipley, L.A.², Crowell, M.², Camp, M.², Rachlow, J.L.³, Forbey, J.S.¹. ¹Boise State University, Boise, Idaho 83725. ²Washington State University, Pullman, WA 99164. ³University of Idaho, Moscow, Idaho 83844. EVALUATING HERBIVORE PREFERENCES FOR MIXED VERSUS SINGLE PLANT TOXINS

Potentially toxic plant chemicals influence the foraging behavior of herbivores and may affect patterns of habitat selection. Chemically defended plants such as sagebrush (*Artemisia* spp.) contain complex mixtures of toxins that vary among and within taxa, making it difficult to predict habitat selection by herbivores on the basis of any one compound. Moreover, chemical differences may explain variable palatability of sagebrush for herbivores. Because toxins consumed individually could overload any single detoxification pathway, we predicted that generalist herbivores would prefer mixtures in which any individual compound in the mixture is in lower concentration than when offered alone. We also predicted that sagebrush specialists would have higher tolerances for both individual and mixed compounds and consequently not show clear preferences. We compared preference for individual monoterpenes (camphor, camphene, 1,8-cineole, alpha-pinene, and beta-pinene) offered singly versus in mixtures between a sagebrush specialist, the pygmy rabbit (*Brachylagus idahoensis*), and a sagebrush generalist, the mountain cottontail (*Sylvilagus nuttallii*). Specialists did not demonstrate clear preferences between mixtures or individual monoterpenes. In contrast, generalists exhibited strong preferences, consuming more cineole and camphene than the mixture, and more mixture than β -pinene and camphor. These results suggest concentrations of β -pinene and camphor may better predict foraging by cottontails than other monoterpenes. Pygmy rabbits that specialize on sagebrush are likely capable of consuming a suite of monoterpenes and mixtures. We propose that higher tolerance to monoterpenes by pygmy rabbits and to specific monoterpenes by cottontails are likely associated with the rates at which monoterpenes are detoxified. Identifying which chemicals and mixtures are detoxified the slowest and are therefore least tolerated may help explain the varying palatability of species, subspecies, and populations of sagebrush among diverse herbivores.

SALMORE, ALISSA. Idaho Transportation Department, Pocatello, Idaho 83201. HIT OR MISS: INNOVATING OPERATIONS THROUGH R&D TO MINIMIZE IMPACTS OF STATE ROADWAYS ON WILDLIFE

Roadways are integral to human communities but have direct and indirect effects on wildlife populations. The Idaho Transportation Department (ITD) aims to provide citizens with "safety, mobility, and economic opportunity" through efficient data-driven management of interstates and state highways across Idaho. However, given the reality of fiscal resources and engineering standards, highway operations can be difficult to reconcile with the protection of wildlife. Solutions other than wildlife crossing structures offer the best potential for actual implementation within the context of current ITD agency con-

straints. In this presentation, I report on the findings and status of ITD and collaborative projects aiming to develop actions congruent with highway operations that will minimize roadway impacts on wildlife. Projects discussed will include wildlife-vehicle collision mitigation prioritization, a recent study of elk and moose movement on US-20, and on-going development of animal-on-road detection systems. Projects like these may result in location-appropriate actions to protect wildlife, but success will require innovative thinking, collaboration, and a commitment of resources to develop and implement each action.

SERVHEEN, GREGG, Idaho Department of Fish and Game, Boise, ID 83712. **MITIGATION SETTLEMENT FOR THE IMPACTS OF THE FEDERAL HYDROPOWER SYSTEM IN SOUTHERN IDAHO; THE HISTORY, DETAILS, AND IMPLICATIONS OF THE 2014 AGREEMENT**

The Northwest Power Act stipulates that fish and wildlife be given equal consideration with the development of hydropower in the Columbia River basin. The Act set up Northwest Power and Conservation Council and its fish and wildlife program. And the program quantified wildlife habitat impacts of Black Canyon, Deadwood, Anderson Ranch, Minidoka, and Palisades dams in southern Idaho. This quantified impact, called the mitigation ledger, was calculated by habitat evaluation procedures (HEP) to describe in numbers of habitat units by species what was to be mitigated through implementation of habitat protection and restoration projects by the Idaho Department of Fish and Game, Shoshone Bannock Tribe, and the Shoshone Paiute Tribe. These entities have been implementing mitigation since 1997 according to agreements with the Bonneville Power Administration. However, in 2014 the state of Idaho reached a \$40M settlement for Idaho's allocation of the mitigation ledger that erased that mitigation debt for the state of Idaho. That 10 year agreement sets terms and conditions under which Idaho can implement the remaining mitigation and manage and operate mitigation properties in perpetuity. Those terms include a minimum number of acres to be protected, a specified payout rate, ability to set up stewardship accounts, and funding for operation and maintenance of mitigation properties in perpetuity in return for indemnification of all wildlife mitigation debt in southern Idaho.

SHIPLEY, LISA A., K. Wat, and E. Lopez-Perez. Washington State University, Pullman, WA 99164. **EFFECTS OF SUCCESSIONAL STAGE AND PLANTED FORAGE FIELDS ON NUTRITIONAL CARRYING CAPACITY AND HABITAT SELECTION BY ROOSEVELT ELK**

Low productivity in Roosevelt elk (*Cervus elaphus roosevelti*) populations on the Olympic Peninsula has been linked to low forage quality and loss of forage resources. Northwestern forests have experienced intensive timber management, recreation, and farming activities that may influence the quality and quantity of available forage. As a response, managers have attempted to increase the quality and quantity of forage through managing succession and planting forage fields. We compared the diet composition and relative nutritional carrying capacities (NCC) for Roosevelt elk among forest successional stages, habitat types, and planted forage fields across the seasons. In addition, we examined whether female elk responded to nutritional carrying capacity of forest stands when selecting habitat. We measured forage biomass across seasons by clipping, drying and weighing understory vegetation on plots within conifer forest stands ranging in successional stage, riparian areas, and planted forage fields. We determined the digestible energy and protein of major forages, calculated NCC from the Fresh-Deer model, and determined seasonal diet composition from plant fragments in feces. Finally, we created Resource Selection Function models from radiolocations of 30 female elk over 2 years. We found that NCC was highest in conifer stands 4-15 years old, planted forage fields, and riparian areas. Within their fall-spring home ranges, female elk selected habitats further from roads, closer to forage/forest edges, with lower slopes, and higher NCC. Our results suggest that stands providing abundant, high-quality forages, whether in early successional forests, riparian areas or planted forage fields, are beneficial to Roosevelt elk.

SHURLIFF, QUINN R. Gonzales-Stoller Surveillance, 120 Technology Dr., Idaho Falls, ID 83402. **A CANDIDATE CONSERVATION AGREEMENT TO PROTECT SAGE-GROUSE ON THE IDAHO NATIONAL LABORATORY SITE.**

The Idaho National Laboratory (INL) Site is a restricted-access area operated by the U.S. Department of Energy, Idaho Operations office (DOE-ID), that provides important habitat for greater sage-grouse (*Centrocercus urophasianus*) over an area one quarter the size of Yellowstone National Park. In 2014, DOE-ID voluntarily entered into a Candidate Conservation Agreement (CCA) with the U.S. Fish and Wildlife Service (USFWS) to protect greater sage-grouse and its habitats on the INL Site. This was the first such agreement signed in Idaho for sage-grouse. The CCA complements Idaho's State Alternative, developed in 2012 by Governor C. L. "Butch" Otter's task force, and other efforts to preclude the need for sage-

grouse to be listed under the Endangered Species Act. Here, I describe the primary threats to sage-grouse on the INL Site and what DOE will do to address them. I also outline other components of the conservation framework established by the CCA, including population and habitat triggers, conservation measures and objectives, and a robust monitoring program.

SMITH, JENNIFER*¹, G. Vaziri¹, S. Cunningham¹, A. Goldberg¹ and C. Conway^{1,2}. ¹University of Idaho, Moscow, Idaho, 83844, ²United States Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, 83844. **EFFECTS OF CATTLE GRAZING ON SEED AVAILABILITY IN NORTHERN IDAHO GROUND SQUIRREL COLONIES.**

The Northern Idaho ground squirrel is a federally threatened species that lives in montane meadows that support cattle grazing. The squirrels eat the seeds and leaves of grasses and forbs; yet the effects of cattle grazing on food availability for the squirrels have not been examined. Northern Idaho ground squirrels hibernate for ~8 months per year. The squirrels try to increase body mass prior to entering hibernation at a time that coincides with cattle grazing. We designed an experiment to evaluate whether grazing affects the availability of grass and forb seeds during critical pre-hibernation foraging time for Northern Idaho ground squirrels. We compared vegetative characteristics between paired grazed and ungrazed plots. The number of seed heads and percent herbaceous cover was higher in ungrazed plots, but seed biomass within seed traps was higher in grazed plots. These results suggest that cattle may be reducing the number of seed heads available for Northern Idaho ground squirrels but may also be increasing the number of fallen seeds.

STONE, DANIEL. Shoshone-Bannock Tribes, Fort Hall, ID 83203. **TRIBES, RESOURCE MANAGEMENT, AND THE LAW.**

Developing sound resource management policy and engaging in effecting collaborative management actions often requires a thorough review of the associated rights and interests of the Shoshone-Bannock Tribes. By examining over a century of legal issues dealing directly with the Tribes' reserved Treaty rights to harvest subsistence foods you will be more familiar with our approach to resource issues. This presentation is intended to provide a primer on the legal processes that have shaped the modern fish and wildlife management policy of the Tribes.

MATHEWS, STEVEN R.*^{1,2}, P. S. Coates², and D. J. Delehanty¹. ¹Idaho State University, Biological Sciences, Pocatello, Idaho, 83209. ²US Geological Survey, Western Ecological Research Center, 800 Business Park dr, Dixon, California, 95620. **SURVIVAL OF TRANSLOCATED SHARP-TAILED GROUSE: THRESHOLD DATE AND AGE EFFECTS**

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) currently occupy less than 10% of their historic range. Translocation, the movement and intentional release of animals to the wild, often has been used to establish, reestablish, or augment populations as a conservation method. Historically, many translocations have failed to establish, reestablish, or augment populations of North American prairie-grouse. To better understand the variability in the success of grouse restoration efforts via translocation, it is important to understand the effects that translocation has on classes (age, sex, etc.) of individuals. In this study, we evaluated factors influencing near-term survival (≤ 150 days post release) of two translocated CSTG populations in NE Nevada, representing two distinct restoration attempts. We found a threshold date in which the probability of survival differs significantly before vs after, at about 40 days post release. Survival increased from 0.943 before the threshold during the first 40 days, to 0.967 after 40 days post release. We also demonstrate that grouse age significantly affects an individual's probability of survival through 150 days. Yearling grouse have a significantly higher probability of survival than adult grouse. The probability of an adult grouse to survive 150 days was 0.461, while the probability of a yearling grouse to survive was 0.707. Translocating yearling grouse, coupled with past findings of translocating inseminated females into high quality nesting habitat, provides managers with a better framework to design successful CSTG restorations.

SWEARINGEN, ZACH*^{1,3}, C.J. Conway^{1,2}, F. Cassirer³, and P. Zager³. ¹University of Idaho, Moscow, Idaho, 83884. ²U.S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, 83844, ³Idaho Department of Fish and Game, Lewiston, Idaho, 83501. **EVALUATING TWENTY ONE YEARS OF MANAGEMENT ON CRAIG MOUNTAIN WILDLIFE MANAGEMENT AREA: ARE WE MEETING OUR OBJECTIVES?**

Land managers should periodically evaluate whether management actions are achieving the intended objectives. Evaluation of management actions is a key component of adaptive management and the focus of our research on the Craig Mountain Wildlife Management Area (CMWMA). The Idaho Department of Fish and Game has been managing CMWMA for 21 years and needs an assessment of its management actions. We used bird survey data collected on CMWMA during four intervals (1993/94, 1997, 2002, 2013/14) along with management and natural disturbance data to investigate how management and disturbance have influenced the density and distribution of three of the six CMWMA target mitigation species (pileated woodpecker, yellow warbler, and black-capped chickadee). We wanted to assess whether CMWMA is meeting its management objectives to protect and enhance the population and habitat of these three target species.

TEMPE REGAN*, Department of Biological Sciences and Raptor Research Center, Boise State University, Boise, ID 83725. C. J.W. McClure. The Peregrine Fund, Inc., Boise, ID 83709. A. Kociolek. Western Transportation Institute, Montana State University, Bozeman, MT 59717. M. Lowe. Idaho Transportation Department, Boise, ID 83707. J. Belthoff. Department of Biological Sciences and Raptor Research Center, Boise State University, Boise, ID 83725. **MODELING OCCUPANCY OF BARN OWLS IN RELATION TO ROADWAY MORTALITY**

Barn Owls (*Tyto alba*) are killed in greater numbers along roads than any other North American bird of prey. Interstate-84 (I-84) in southern Idaho has the world's highest known rate of Barn Owl-vehicle collisions. Little is known about Barn Owl occupancy in this region, it is unclear if owls are killed in proportion to their abundance, or if they are equally abundant in segments with lower mortality and somehow escape collisions. We were interested in (1) modeling Barn Owl occupancy, and (2) using model-based results to spatially project probability of occurrence along the interstate to compare with actual Barn Owl mortality locations. During winter 2014 we surveyed for owls at 222 randomly selected point count locations (3 times each, 666 total surveys) along a 300-km stretch of I-84. Each point count included silent listening followed by broadcast of Barn Owl vocalizations. We detected Barn Owls during 52/666 (7.8%) point counts and at 39/222 (17.6%) locations. Occupancy analysis revealed that the probability of Barn Owl detection was 0.32 ± 0.06 (SE). Detection increased with playback of Barn Owl calls, and with increasing date, moon illumination, and cloud cover. Barn Owl occupancy increased with proportion water, presence of trees, and increasing distance from the nearest dairy. Occupancy decreased with presence of irrigation pivots, higher grassland and sage steppe cover, greater development and increasing distance to the Snake River. The number of dead Barn Owls in 1-km highway segments increased with occupancy probability, which supports the notion that owls are killed in higher numbers when they are most abundant. However, a large proportion of the variation was not explained by owl occupancy, so other factors such as geometric features of the roadway, traffic patterns, fluctuations in rodent abundance, and owl behavior near I-84 likely influence mortality rates and locations.

VIERLING, KERRI T.¹, C. Conway², C. Moffitt², and E. Braker¹. ¹University of Idaho, Moscow, Idaho, 83844, ²U. S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, 83844. **INTERNSHIP PROGRAMS IN THE FISH AND WILDLIFE SCIENCES DEPARTMENT AT THE UNIVERSITY OF IDAHO: OPPORTUNITIES FOR EXPANDING WILDLIFE EDUCATION.**

Undergraduate students majoring in Fish and Wildlife Sciences (hereafter FWS) degrees at the University of Idaho are encouraged to obtain relevant work experiences to help better prepare them for careers following graduation. These relevant work experiences are diverse, and agency partnerships are important for these student experiences. In this talk, we aim to provide information about internship requirements within the FWS degree. Additionally, we will share information about the new Doris Duke Conservation Scholar Program within FWS. The Doris Duke Conservation Scholar Program is a collaboration among 5 universities (including the University of Idaho) which includes university faculty, USGS Cooperative Research Unit scientists, and graduate students as mentors for the undergraduate Doris Duke Conservation Scholars. Undergraduate students with a demonstrated interest in environmental issues and cultural diversity are selected as Doris Duke Conservation Scholars, and as part of this program, they receive training, mentorship, and funding for summer work experiences for two years. An important aspect of this program are paid internships, which include research and agency-based collaborations. We seek to share details about the Doris Duke program with interested agency partners.

WAITS, LISETTE, S. DeMay, R. Lonsinger, and S. Woodruff. Department of Fish and Wildlife Sciences, University of Idaho, Moscow ID 83844-1136. **NONINVASIVE GENETIC SAMPLING APPROACHES FOR MONITORING WILDLIFE.**

Monitoring of population demographics is a critical component of all conservation and management programs, but designing efficient and accurate monitoring approaches remains a challenge for many species. Noninvasive genetic sampling

(NGS) of hair, feces or feathers has emerged as one of the most promising new tools for population monitoring. The goal of this presentation is to provide an overview of monitoring approaches and provide case studies from a variety of species including kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), Sonoran pronghorn (*Antilocapra americana sonoriensis*) and pygmy rabbits (*Brachylagus idahoensis*). Specifically, we will draw from 16 years of NGS studies conducted by our research group and highlight the importance of considering the interactions between sample deposition rates, removal rates, and DNA degradation rates that affect the efficiency and cost effectiveness of these approaches. We will also discuss different sampling design options and the use of these methods for estimating occupancy, population size, survival and reproduction.

Carlisle, J.¹, **HEIDI WARE**¹, J. Gardetto², and M. J. Byrne². ¹Intermountain Bird Observatory, Boise State University, Boise, Idaho 83725; ²Bureau of Land Management, Boise, ID. **COMMUNITY ENGAGEMENT TO ADDRESS THE ILLEGAL SHOOTING OF NON-GAME BIRDS, INCLUDING LONG-BILLED CURLEWS**

Long-billed Curlew populations have declined in portions of their breeding range, including in some historical strongholds in Idaho. Causes include habitat loss and degradation, environmental toxins, and human disturbance and the importance of each factor varies regionally. On the Long-billed Curlew Habitat ACEC in southwestern Idaho, we have accumulated evidence that direct persecution of curlews is contributing to continuing declines in the local population. How can we make headway on this issue without alienating the people that recreate in this area? In October and November, various partners including the IBCP, IDFG, BLM, and IBO began conversations about how to address illegal shooting of birds. The next step was a “stakeholder” meeting in December to introduce the issue and brainstorm with user groups and stakeholders. We are now working together to develop a communications plan and educational materials. We will discuss the challenges of this issue and successful aspects of our efforts to date.

WATSON, LEANDER. Shoshone-Bannock Tribes, Fort Hall, ID 83203. **THE SHOSHONE-BANNOCK TRIBES BIG GAME MANAGEMENT.**

The Fort Hall Reservation was set aside in 1867 as the permanent homeland for the Shoshone-Bannock Tribes. The Reservation hosts a bounty of fish and wildlife resources, including healthy populations of big game species that sustain our membership. Careful management of Reservation big game populations is the primary responsibility of the program so that future generations of Tribal members continue to harvest subsistence foods from the Reservation. This presentation will provide a program overview of the Tribes’ Big Game Program and our approach to sustainable harvest of this valuable resource.

WHITE, JIM¹, A. Mackey¹, R. Cook², and J. Cook². ¹Idaho Department of Fish and Game, Lewiston, ID 83501; ²National Council for Air and Stream Improvement, Inc., La Grande, OR 97850. **IDENTIFYING HABITAT AND NUTRITIONAL LIMITATIONS FOR ELK IN NORTH-CENTRAL IDAHO: PRELIMINARY RESULTS.**

Partnered with the Clearwater Basin Collaborative, we captured elk in North-Central Idaho to understand if nutrition may be influencing elk abundance and herd health within varying habitat types. During fall and early winter of 2013/2014, we captured adult female elk from three Game Management Units (GMU): 11, 10A, and 15. Each animal was fitted with a GPS collar, and data on nutritional condition, lactation status, pregnancy, age, parasite loads, trace elements, and selenium levels were collected. A subset of elk were recaptured from each of these study areas during April 2014 to determine post winter body condition – a repeated measures design useful in determining seasonality of nutritional limitations. This fall, a second year of data was collected from these study sites and a fourth study area in GMU 10 was added, increasing our sample size to 111 animals. These data will help determine if nutritional limitations may be operating on these herds, how severe the limitations may be, and what season (summer vs. winter) the limitations may be occurring. Furthermore, they provide a starting point to understand how habitat, succession and nutrition may play a role in population dynamics of elk across the Clearwater Region. Here, we will present the general summaries of the preliminary data collected thus far and share plans on expanding the sample to other areas of the Clearwater Region.

Shannon, Justin¹, J. WHITING², R. Larsen³, D. Olson³, J. Flinders³, T. Smith³, and R. T. Bowyer⁴. ¹Utah Division of Wildlife Resources, Salt Lake City, UT 84114; ²Gonzales-Stoller Surveillance, Idaho Falls, ID 83401; ³Brigham Young University, Provo, Utah 84602; ⁴Idaho State University, Pocatello, Idaho 83209. **POPULATION RESPONSE OF REINTRODUCED BIGHORN SHEEP AFTER OBSERVED COMMINGLING WITH DOMESTIC SHEEP.**

Bighorn sheep (*Ovis canadensis*) often die from respiratory disease after commingling with domestic sheep. From 2000 to 2009, we observed commingling between domestic and reintroduced bighorn sheep in 3 populations in Utah, USA. We investigated how commingling affected survival of radio-collared female bighorns that were released initially (founder) and those that were subsequently released (augmented). We predicted that the proportion of young surviving to their 1st winter and population growth would be lower after observed commingling with domestic sheep. We observed groups of bighorns year-round on 2,712 occasions and commingling between domestic sheep and bighorns in 6 instances. On Mount Timpanogos, survival rates were best modeled as constant for females ($n = 57$) before and after observed commingling with domestic sheep. Survival rates of female bighorns, however, decreased significantly in Rock Canyon ($n = 21$) and on Mount Nebo ($n = 22$) for founder, but not augmented bighorns after observed commingling with domestic sheep. Also, the proportion of young surviving to their first winter was almost 3 times lower and population growth was reduced for bighorns after observed commingling with domestic sheep in Rock Canyon and on Mount Nebo. Commingling between domestic and bighorn sheep reduced population parameters in 2 of 3 bighorn populations we studied; however, on Mount Timpanogos interactions between those 2 species were not fatal for radio-collared female bighorns. Wildlife managers should consider the spatial separation of these 2 species, and the location of hobby farms and trailing operations of domestic sheep near release sites for bighorns.

Abstracts of Ignite Session Presentations

ACKERMAN, BRUCE. A COMING TRAINWRECK: CHANGING DEMOGRAPHY OF HUNTERS AND ANGLERS.

Everyone gets a year older. But IDFG's biggest customers, hunters and anglers, are aging out of the population and not being replaced at the same rate. The biggest group are the "Baby Boomers", who were born 1947-1960, and are now ages 55 to 68. This is very important for 4 reasons. 1) This is the biggest group of license and tag buyers. 2) They gradually buy fewer licenses past age 60. 3) When they get to age 65, we give residents a deep discount on licenses and tags. 4) Nonresident hunters seldom travel to Idaho for hunting after age 60, especially nonres. elk hunters (\$\$\$). This means we are about to take a big reduction in income over the next 10 years. This is a huge train wreck that can't be stopped or easily fixed. But we can brainstorm some ideas on how we can make the best of it.

JUSTIN BARRETT. AGE DISTRIBUTION, PREGNANCY RATE, AND BODY CONDITION OF ELK WITHIN THE CRAIG MOUNTAIN WILDLIFE MANAGEMENT AREA.

Recent downward trends in elk recruitment have been documented in Idaho Game Management Unit 11. To help us better understand underlying factors associated with this, we conducted a biological assessment of harvested antlerless elk during the 2013 hunting season. Biological samples were analyzed to provide estimates of age distribution, over-all health, pregnancy rate, lactation rate, and body condition of antlerless elk in the population.

CONWAY, COURTNEY, J. W. Connelly, K. Launchbaugh, D. Gotsch, W. Pratt, P. Makela, D. Kemner, D. Musil, E. Strand, J. Robison, and J. Whiting. EFFECTS OF SPRING CATTLE GRAZING ON SAGE-GROUSE: A PROJECT UPDATE

We will summarize our progress after one year of field work on a 10-year study designed to examine the effects of spring cattle grazing on greater sage-grouse demographic traits. We conducted field studies at two study sites in southern Idaho (Browns Bench and Jim Sage) and will report results from 2014 and outline plans for the 2015 field season.

HANSEL, TROY. IMPACTS OF ROAMING, STRAY, AND FERAL DOMESTIC CATS ON BIRDS IN IDAHO.

Estimated losses of wild birds to domestic cat (*Felis catus*) predation within the continental US are over 1 billion birds/year. Idaho birds and other non-game wildlife are threatened by domestic cats. The Idaho Bird Conservation Partnership is working to reduce these impacts on Idaho birds.

HARJU, SETH. THE ROLE OF DATA IN RESOLVING CONFLICTS OVER WILDLIFE ISSUES.

Conflicts over wildlife issues are often difficult to resolve. This is partly because each party has a vague fear of what will happen to their interests if the opposition gets their way. By bringing data to bear on the consequences of decisions (often easily collected or already available), we can add clarity and thus move the resolution process forward.

HILL, MARK. IDAHO'S ILLEGAL BIG GAME HARVEST: SHOULDN'T WE KNOW MORE?

Conservation Officers only document a small percentage of the big game animals that are taken unlawfully in Idaho. Some estimates suggest our wildlife violation detection rate is less than 5%. Determining the unlawful take component of the harvest is critical to illustrating the cumulative impacts of wildlife violations.

HOLTHUIJZEN, ANTHONIE. BUILDING A BETTER BREEDING POND FOR COLUMBIA SPOTTED FROGS

Columbia spotted frogs (*Rana luteiventris*) (CSF) are found at Idaho Power Company's (IPC) Daly Creek Habitat Management Area lands located at the confluence of the Powder River and Eagle Creek, near Richland Oregon. Historical breeding ponds used by CSF on the property were choked with vegetation and considered ecological traps. My main

objective was to create breeding ponds for CSF and to determine the optimal configuration of these ponds.

LUCID, MICHAEL. MULTI-SPECIES BASELINE INITIATIVE (MBI) PRELIMINARY RESULTS.

From 2010-2014 the MBI collaborative of 12 partner organizations conducted standardized surveys for 183 species at 2,161 survey sites and maintained 1,169 micro-climate data loggers in the Idaho Panhandle and adjoining mountain ranges. Our efforts focused on 20 Species of Greatest Conservation Need (amphibians, land snails, and forest carnivores) which Idaho and Washington State Wildlife Action Plans listed as 'lacking essential information'. We are convinced no one will ever say that about these 20 species again.

SCHMIDT, ANGIE. THE ONLINE OBSERVATIONS DATABASE, WHAT IT IS AND TIPS ON HOW YOU CAN USE IT RIGHT NOW.

The Observations database houses Idaho Fish and Game as well as Partner datasets. A subset of these data make up the Idaho Natural Heritage Program data used in a variety of projects including the State Wildlife Action Plan. This talk will introduce you to the Observations database and provide you with a few tips on how to successfully utilize the functionality in place.

**STUBER, MATTHEW. PTT DEPLOYMENT ON FIVE GOLDEN EAGLE NESTLINGS IN IDAHO
NINE MONTHS OF TRACKING AND LESSONS LEARNED ALONG THE WAY.**

The U.S. Fish and Wildlife Service deployed five 45-gram PTTs on golden eagle nestlings in Idaho in the summer of 2014 as part of a larger west-wide study of juvenile golden eagle movements and behavior. This talk will give an update on the first nine-months of movements and fate of these Idaho juveniles, as well as some lessons learned along the way.

Abstracts of Contributed Posters

ABEL BECKY¹, Martha Wackenhut¹, and Devon Green².

¹Idaho Department of Fish and Game, 1345 Barton Rd., Pocatello, ID 83204. ²Caribou-Targhee National Forest, 410 E. Hooper Ave., Soda Springs, ID 83276. **LONG-TERM ACOUSTIC MONITORING OF BAT ACTIVITY AT MINNETONKA CAVE.**

Minnetonka Cave is Idaho's largest limestone cave, and Idaho's only show cave, with 33,000 tourists visiting each summer. Idaho Department of Fish and Game in cooperation with federal agencies, has initiated increased monitoring at important hibernacula in response to the threat of possible westward spread of White-nose Syndrome (WNS). Semi-annual hibernacula surveys have shown increasing trends in use by bats at Minnetonka Cave since the 1990's, and species include those that are potentially the most vulnerable to WNS. Beginning in 2011, we installed a long-term acoustic monitoring system outside the entrance of the cave to monitor activity of bats across seasons and verify species present at the site. We used the Wildlife Acoustics SM2BAT bat detector, secured in weatherproof housing, to record ultrasonic vocalizations bats make while in flight. We obtained 583,026 acoustic files over 21 months. Of those files, 358,187 (61%) were recordings of bats. We used Sonobat 3.1.1 software to automatically classify bat call files to species or genus groups. In addition to automatic classifications, we manually checked a random sample of bat call files and Sonobat-generated classifications of species whose presence at the site was unexpected. We documented acoustic activity of bats throughout the year. Activity levels were the highest during July and August, lowest from December through February. We documented calls indicating the presence of Townsend's big-eared bat, big brown bat, western red bat, hoary bat, silver-haired bat, Mexican free-tailed bat and long-eared myotis, little brown myotis, long-legged myotis and western small-footed myotis at the site. To reinforce our classifications of *Myotis* species, we captured bats with a harp trap inside the entrance of the cave in October 2014. We verified all acoustically detected *Myotis* species. Minnetonka Cave is a significant hibernaculum and will remain a high priority for bat conservation in Idaho.

CALL, RYAN^{1*}, J. Whiting¹, B. Bybee¹, B. Pace², T. Stefanic³, B. Abel⁴, B. Doering⁵, J. Melgaard¹, and R. Cavallaro⁴.

¹Gonzales-Stoller Surveillance, Idaho Falls, ID 83401; ²Idaho Master Naturalists, Upper Snake Chapter, Idaho Falls, ID 83401; ³Craters of the Moon National Monument and Preserve, Arco, ID 83213; ⁴Idaho Department of Fish and Game, Pocatello and Idaho Falls, ID 83204 and 83401; ⁵Power Engineers, Meridian, ID 83642. **SEASONAL ACTIVITY AND OCCURRENCE OF BATS IN SOUTHEASTERN IDAHO.**

Recent threats (e.g., wind-energy development and white-nose syndrome) are affecting bat populations throughout North America. At the regional scale, data are lacking on seasonal activity and occurrence of bats in southeastern Idaho, especially migrating tree bats that are most at risk from wind-energy development. To determine activity and occurrence of bats across southeastern Idaho, we conducted acoustical driving surveys on 18, 48-km transects in two ecoregions (Snake River Plain and Middle Rockies) from June to October 2014. We manually identified bat echolocation calls and considered a bat pass to be ≥ 1 identifiable pulse of a bat call separated from other pulses by at least one second. We conducted 43 surveys in the Snake River Plain and 43 surveys in the Middle Rockies. The mean (\pm SD) length of time for surveys was 94 min. (\pm 27.5 min.) in the Snake River Plain and 76 min. (\pm 18.7 min.) in the Middle Rockies. Bat activity was higher in all months in the Middle Rockies than the Snake River Plain. Across the Snake River Plain, bat activity peaked in August and September and then stopped in October. Activity in the Middle Rockies peaked in July, decreased in August and September, and then stopped in October. For migrating tree bats, activity was higher across all months in the Middle Rockies than the Snake River Plain except during August. Activity was higher for big brown bats (*Eptesicus fuscus*) during all months in the Middle Rockies. In contrast, activity for little brown bats (*Myotis lucifugus*) was higher during August and September in the Snake River Plain. Our results provide important information regarding the seasonal activity and occurrence of bats in southeastern Idaho. These data can inform conservation and management of these mammals, especially in areas of potential wind-energy development.

CRAWFORD, ERIC. Idaho Department of Fish and Game, Lewiston, Idaho 83501. **ENUMERATING THE UNLAWFUL TAKE OF BIG GAME SPECIES IN THE CLEARWATER REGION OF IDAHO**

DAVIS, BENJAMIN * and Gene Weller. Brigham Young University- Idaho, Rexburg, Idaho 83440. **THE RESPONSE OF A BLUE GRAMA-PINYON PINE-JUNIPER RANGELAND TO JUNIPER MASTICATION IN CENTRAL ARIZONA.**

The distribution of pinyon-juniper woodlands has increased an estimated tenfold in the past 130 years. Pinyon-juniper encroachment negatively alters herbaceous productivity, wildlife habitat, and watershed health on western rangelands. In 2009 and 2010, juniper mastication occurred on blue grama-pinyon-juniper woodlands in the Tonto National Forest, located near Payson, Arizona, USA. The "Reading the Range" collaborative rangeland monitoring program recorded the vegetative and ground cover response of treated rangelands to juniper removal using standardized monitoring protocols. Decreased bare ground cover, increased frequencies of several perennial grass species, and an increase in persistent litter cover occurred as a result of juniper removal ($P \leq 0.05$). No difference occurred in fetch (distance to the nearest perennial plant) and live vegetative basal cover. Herbaceous production post-treatment decreased primarily as a result of changes in the aboveground biomass of blue grama (*Bouteloua gracilis* (Willd. ex Kunth) Lag. ex Griffiths) ($P \leq 0.10$), whose recovery is edaphically and climatically driven. These data suggest that land managers should consider treating phase I (shrubs and herbs dominate trees) and phase II juniper woodlands (trees are codominant with shrubs and herbs) to maintain herbaceous productivity, wildlife habitat, and watershed health while phase III woodlands (trees dominate shrubs and herbs) should be allowed to persist on rocky ridges for wildlife habitat and corridor movement.

FREMGEN, MARCELLA,* J. A. Velasco*, J. C. Connelly, and J. S. Forbey. Boise State University, Boise, Idaho 83725. **PARASITE PATTERNS: HOW DO SAGE-GROUSE PARASITES DIFFER BETWEEN SEASONS, SITES, AND SEXES?**

Herbivores often have abundant food resources, but may be challenged with finding high quality food from available sources. Herbivores attempt to consume sufficient nutrients while avoiding plant secondary metabolites (PSMs) that plants produce as defense. PSMs often have adverse physiological effects on consumers, but such effects may be dose-dependent. However, PSMs may have neutral, or even therapeutic effects, at low doses. One potential effect of consuming PSMs is that they may act as anti-helminthics at low doses and help decrease intestinal parasite loads. Greater Sage-grouse (*Centrocercus urophasianus*) are a sagebrush-obligate bird which depend on sagebrush for food and cover throughout winter. Consumption of 100% sagebrush throughout winter may provide anti-parasite benefits to sage-grouse. We quantified parasite loads of *Raillietina centrocerci*, a tapeworm common in sage-grouse, using the McMaster egg counting technique, and compared parasite loads among seasons, sites, and sexes of birds. There was a trend towards lower parasite loads in winter than in fall within a site and there was a significant difference in parasite loads among different sites throughout southern Idaho. There was no difference in parasite loads between sexes. Our next step is to determine if intake of PSMs during winter explains variation in parasite loads of sage-grouse. The influence of diet on parasite loads may have profound ecological benefits because parasite loads can decrease body condition, fitness or mating success in free-ranging wildlife.

GRASKI, KARLI 1*, Marcella R. Fremgen¹, Gail Patricelli², Alan Krakauer², and Jennifer S. Forbey¹. ¹Boise State University, Boise, Idaho 83725. ²UC Davis, Davis, California 95616 **DOES OFF-LEK HABITAT QUALITY INFLUENCE ON-LEK DISPLAY EFFORT OF MALE GREATER SAGE-GROUSE?**

The structural and dietary quality of plants is highly variable across the landscape and may influence energy acquisition by herbivores needed for energy dependent activities. For sage-grouse, male display efforts are energetically expensive, with successful males expending up to four times their basal metabolic rate to display. Previous work found that males who had the greatest energy expenditure during the lekking season also lost the least weight and foraged farthest from the lek. We hypothesized that the energetic benefit of foraging farther from the lek is due to higher quality food or cover compared to near lek vegetation. To initially test this hypothesis, we quantified the structural and nutritional quality of sagebrush at different distances away from the lek as well as at patches used by sage-grouse for foraging and roosting. We found no difference in density, percent cover, or height of live or dead sagebrush among different distances (edge, 100, 200, 400 or 800 m) away from leks, but there was a trend for plants near the lek edge to have higher crude protein than those farther away from leks. We found no difference in percent grass, percent forbs, volume of sagebrush, or crude protein of sagebrush among forage, roost, or near lek (100 m from edge) patches, but forage patches tended to have taller sagebrush than roost or near lek patches. The preliminary results suggest that selection for off-lek patches by male sage-grouse may not be driven by the structural or nutritional quality of plants. We propose that chemical defenses may be more indicative of off-lek

habitat use by male sage-grouse during the lekking period.

Robinson, Lacy and **MICHAEL LUCID**. Idaho Department of Fish and Game, Coeur d' Alene, Idaho 83815. **MULTI-SPECIES BASELINE INITIATIVE FOREST CARNIVORE BAIT STATIONS (A HOW TO GUIDE)**.

MBI a collaboration of organizations conducting surveys for wildlife and micro-climate across the Idaho Panhandle and adjoining mountain ranges. From 2010-2014, MBI conducted bait station surveys for fisher, wolverine, lynx, and other species in 498 5x5 km² grid cells. Nine partner organizations contributed staff time to the project and over 200 volunteer citizen naturalists assisted with field work. With 500,000 remote camera images and 2,000 DNA samples we detected wolverine at 7 stations, lynx at 2 stations, and fisher at 57 stations.

MCMAHON, LAURA*, J. Rachlow, J. Forbey, and L. Shipley. University of Idaho, Moscow, Idaho 83844 Boise State University, Boise, Idaho 83725, Washing State University, Pullman, Washington 99164. **EFFICACY OF GPS TECHNOLOGY FOR COLLECTING FINE-SCALE MOVEMENT DATA ON A SEMI-FOSSORIAL SMALL MAMMAL**.

GPS technology is commonly used to study movements and habitat selection by highly vagile, large-bodied mammals. However, more work is needed to assess feasibility of GPS devices for collecting location data necessary to address these types of questions for small mammals. Large errors in GPS locations could mask patterns of movement and resource selection for less mobile species that select resources at finer scales. At two study sites in east central Idaho, we are attaching GPS units scheduled to collect one location every 15 minutes on pygmy rabbits (*Brachylagus idahoensis*), and we are also performing stationary GPS trials. Our goal is to evaluate the accuracy and fix rates of 15-g GPS transmitters worn by pygmy rabbits, a mammal weighing < 500 g, to determine how transmitter performance varies with habitat characteristics. We hypothesized that cover provided by sagebrush and burrows will reduce performance of the GPS transmitters. While a rabbit occupied a burrow system, we predicted that location errors will increase and probability of obtaining fixes will decrease. While a rabbit moved above ground, we predicted that shrub canopy will increase the magnitude of location errors, but not significantly alter the probability of fix success. This work will inform use of GPS technology to collect fine-scale data to understand factors that influence burrow use and resource selection by pygmy rabbits.

MELODY, DANIEL P*, B.C. Robb, G.L. Parikh, J.A. Vucetich and J.S. Forbey, Boise State University, Boise, Idaho 83705 **THE IMPACT OF DIETARY TOXINS ON DIET SELECTION AND NUTRITIONAL CONDITION OF FREE-RANGING MOOSE**.

Herbivores must balance nutrient requirements with the energetic costs of detoxifying co-occurring plant toxins. We hypothesized that variation in the toxicity of plants coupled with the energetic costs associated with detoxification could predict diet selection and nutritional status of free-ranging herbivores. We tested this hypothesis using a population of moose (*Alces alces*) at Isle Royal National Park in Lake Superior, Michigan. The island contains a high proportion of balsam fir trees (*Abies balsamea*) which comprises 71% of available winter browse for moose and are known to produce high concentrations of defensive toxins. We obtained fecal and urine samples from moose over two consecutive winters. Additionally we obtained browsed and non-browsed samples of balsam fir from 31 separate foraging patches used by moose on the east and west ends of the island. Browsed and non-browsed samples of balsam fir were analyzed for concentrations of monoterpenes, total polyphenols, tannins and crude protein. Fecal and urine samples were used to quantify glucuronic acid (GA), urea nitrogen (UN) and creatinine (C). GA:C ratios were used as a biomarker of detoxification with greater ratios equating to greater intake of toxins. UN:C ratios were used as a biomarker of nutritional condition with higher ratios equating to lower nutritional health. We found no difference in chemical signatures between trees on the east side and west side of the island. Moose selected against trees with high concentrations of monoterpenes on the west side, but were not selective or selected for monoterpenes on the east side. GA:C ratios were positively correlated with UN:C ratios and intake of balsam fir, suggesting that higher toxin intake resulted in lower nutritional condition. Reduced nutritional condition associated with toxin intake could negatively influence fecundity, winter survival rates and susceptibility to predation and thus, could explain population dynamics of free-ranging moose.

NOBLER, JORDAN*, Pauli, B.P.¹, Shipley, L.A.², Rachlow, J.L.³, Forbey, J.S.¹. ¹Boise State University, Boise, Idaho 83725. ²Washington State University, Pullman, WA 99164. ³University of Idaho, Moscow, Idaho 83844.

EVALUATING HABITAT SELECTION TRADEOFFS USING AN INDIVIDUAL BASED MODEL

Foraging herbivores must make complex tradeoffs when selecting habitat, including nutritional variation, the potentially deleterious effects of plant toxins, and structural variability that may influence predation risk. The relative weights given to individual habitat characteristics are difficult to quantify, and likely vary between species, habitats, and seasons. We propose an individually based modeling approach to quantify these tradeoffs. We created a spatially explicit model of sagebrush habitat using field observations that include available crude protein, total monoterpene concentrations, and available concealment from aerial predators. Pygmy rabbits within the model foraged according to a combination of simple rules: maximization of protein, minimization of monoterpenes, or maximization of concealment. The model was run repeatedly, systematically varying the frequency with which each rule was followed. Model-generated distributions of foraging were then compared to empirical data quantifying pygmy rabbit foraging collected concurrently with habitat quality data. Initial results suggest that pygmy rabbits prioritize toxin avoidance over both protein content and available concealment. Further calibration of the model could yield more explicit predictions of habitat tradeoffs that could be tested and compared to a combination of captive feeding trials and field experiments. We also propose that similar models could be adapted to examine habitat preferences of diverse wildlife, including species of conservation concern.

PARSONS, MITCHELL*, J. Rachlow, C. Milling, and T. Johnson. University of Idaho, Moscow, Idaho 83843.
SAGEBRUSH STRUCTURE AND REPRODUCTION; HOW DO PYGMY RABBITS ALTER THEIR HABITATS?

Many species alter their environments via direct and indirect pathways. Pygmy rabbits (*Brachylagus idahoensis*) are a sagebrush-dependent, obligate burrowing species, and the activities of rabbits (browsing, deposition of feces and urine, and soil disturbance) have the potential to alter growth and reproduction of sagebrush around burrow systems. Where mima mounds occur, burrows often are located on these resource islands. We expected that pygmy rabbits would alter sagebrush structure and reproduction on mima mounds, and that the effects would increase with duration of burrow occupancy. Using survey data on activity of burrow systems, we sampled vegetation on 104 mima mounds occupied by pygmy rabbits from 0 to 12 years at two study sites in the Lemhi Valley, Idaho. At each mound, we measured a suite of vegetative characteristics, including percent cover of different categories, shrub height, and percent live and browsed sagebrush. We also counted seedlings and estimated biomass of inflorescence to index reproduction by sagebrush. Longer duration of occupancy of mima mounds by pygmy rabbits resulted in greater soil disturbance and higher levels of browsing. Pygmy rabbits significantly decreased cover of live sagebrush and increased cover of grasses and forbs. Pygmy rabbits also influenced reproduction of sagebrush; duration of occupancy increased both density of seedlings and reproduction of sagebrush shrubs. These data suggest that pygmy rabbits alter vegetation communities around their burrows in multiple ways, but that the net effect on fitness of sagebrush might be positive. The patchy distribution of burrows also suggests that pygmy rabbits might shape patterns of habitat heterogeneity at multiple scales in sagebrush landscapes.

PIKCILINGIS, ERIN* (erinpikcilingis@u.boisestate.edu), Department of Biological Sciences and Raptor Research Center, Boise State University, Boise, ID 83725. S. Hanser. U.S. Geological Survey, Snake River Field Station, Boise, ID 83706. J. Thompson. Borah High School, Boise, ID 83709. E. Yensen. Department of Animal Science, Michigan State University, East Lansing, MI 48848. A. Kociolek. Western Transportation Institute, Montana State University, Bozeman, MT 59715. M. Lowe. Idaho Transportation Department, Boise, ID 83707. J. Belthoff. Department of Biological Sciences and Raptor Research Center, Boise State University, Boise, ID 83725. **HOW SPATIAL, GEOMETRIC, AND BIOTIC FEATURES OF ROADS AFFECT VEHICULAR COLLISIONS WITH BARN OWLS (*TYTO ALBA*) ALONG INTERSTATE 84 IN SOUTHERN IDAHO.**

Roadway collisions directly kill billions of animals each year and affect many vertebrate and invertebrate taxa. Among birds, vehicular collision rates are particularly high for barn owls (*Tyto alba*). One of the world's highest roadway mortality rates for barn owls occurs along Interstate 84 (I-84) in southern Idaho. Although mortality occurs in numerous portions of the I-84 corridor, there are segments where barn owls are killed in extraordinary numbers. Little is known about how spatial, geometric, and biotic factors influence this variation in barn owl mortality. Spatial features describe the characteristics of where a barn owl is found in space and time as well as its relative position to several factors important to barn owl biology.

Geometric features describe characteristics of the roadway, and biotic features describe living aspects of the barn owls and associated organisms, including small mammal abundance along the highway. The primary prey items of barn owls are small mammals, and owls may be colliding with traffic while hunting along the highway. Our objective was to examine how these features influence barn owl mortality. Three years of barn owl road mortality surveys along the focal highway provided >1200 barn owl road kill locations for modeling. To determine relative abundance of prey we also surveyed small mammals along the I-84 corridor using a combination of track and camera traps. Initial analyses suggest that (1) barn owl mortality increases as small mammal abundance increases, (2) commercial annual average daily traffic, percentage of hay/pasture, and percentage of cultivated crops are positively correlated with barn owl mortality, and (3) distance to Snake River Canyon and distance to nearest dairy had a negative relationship with number owl mortality. Our results will help guide future mitigation efforts to reduce barn owl roadway mortality.

POWELL, KATIE¹, B. Woodridge¹, J. Brown². ¹US Fish and Wildlife Service, Boise, Idaho 83709, ²University of Nevada Reno. **THE WESTERN GOLDEN EAGLE TEAM; LANDSCAPE-SCALE CONSERVATION STRATEGIES FOR GOLDEN EAGLES.**

The Western Golden Eagle Team was established in June 2013 by the U.S. Fish and Wildlife Service Regions 1, 2, 6, and 8 to proactively address energy-related conservation needs of Golden Eagles by developing landscape-scale conservation strategies and facilitating research efforts intended to fill critical gaps in our knowledge of eagle ecology. The WGET coordinates with other USFWS eagle teams, agencies, independent research groups, and universities to assist with and leverage projects, and to ensure that efforts are complementary. Our primary objectives are to develop decision support tools, such as maps and predictive models that may be used in project and conservation planning, and conservation measures that may be taken to avoid, reduce, or mitigate the effects of limiting factors or threats. Although our mandate is species-specific, we are working to reach out to the broader scientific community and make sure that our efforts are coordinated with west-wide habitat and biodiversity conservation actions.

Robert A. Miller^{1,3}, **MATT STUBER^{1,4}**, and Jay D. Carlisle^{2,3}. ¹Idaho Bird Conservation Partnership, ²Idaho Bird Conservation Partnership, Coordinator, ³Boise State University – Intermountain Bird Observatory; Boise, Idaho, 83725, ⁴U.S. Fish and Wildlife Service – Migratory Birds and Habitats Program; Boise, Idaho, 83709. **SHORT-EARED OWL SURVEYS IN IDAHO: AN INNOVATIVE APPROACH USING CITIZEN SCIENCE TO CONDUCT LONG-TERM MONITORING**

The most significant threat to short-eared owls (*Asio flammeus*) in North America is the loss or alteration of native grasslands, shrublands, and wetlands across the species' range. Despite evidence and growing concern that short-eared owl populations are experiencing range-wide declines in North America, very little population monitoring has been dedicated to this species. Population monitoring of short-eared owls on a large-scale has been difficult as: **a)** they are nomadic, which blurs stewardship responsibilities for the species, **b)** they demonstrate annual fluctuations in numbers, which necessitates long-term and continuous survey efforts to detect population trends, and **c)** they are crepuscular and secretive, which makes it difficult to detect them during other ongoing survey efforts such as the North American Breeding Bird Survey and the Christmas Bird Count. The Idaho Bird Conservation Partnership (IBCP), in partnership with the Alaska Department of Fish and Game and the Owl Research Institute (ORI; in Charlo, Montana), has developed a state-wide survey program for short-eared owls in Idaho that overcomes these difficulties. This program utilizes a visual-detection survey methodology developed by ORI, implemented across a state-wide spatially balanced grid, with the goal of assessing long term-population trends, habitat associations, and statewide population estimates for short-eared owls in Idaho with statistical rigor. This program will utilize Idaho's large base of volunteer citizen scientists in order to achieve maximum coverage and increase longevity of the effort. The IBCP is currently recruiting and will be deploying volunteer citizen scientists under this program in 2015 and hopes to expand the effort beyond Idaho state boundaries in the future.

TALSMAN, ART. The Nature Conservancy. **COLLABORATIVE RESTORATION TO BENEFIT NATIVE SPECIES IN THE OWYHEE CANYONLANDS.**

Habitat loss and fragmentation are the leading threats to the Greater Sage-grouse. Conifer encroachment in sagebrush communities reduces both plant diversity and cover, and degrades habitat for many wildlife species including sage-grouse. The rugged and remote Owyhee Canyonlands of southwest Idaho provide critical habitat for sage-grouse. The expansion of

western juniper (*Juniperus occidentalis*) has diminished important sage-grouse breeding, nesting, and brood-rearing habitat. Besides impoverishing local plant communities, juniper trees provide perches for avian predators and as a result sage-grouse abandon encroached areas. Using low-impact methods to remove encroaching juniper trees, we can restore native plant communities and improve wildlife habitat (Baruch-Mordo et al. 2013). We can also take direct actions to enhance rare wet meadows, which are key sage-grouse brood-rearing habitat.

THALMANN, JOHANNA*¹, R. T. Bowyer¹, K. A. Aho¹, F. W. Weckerly², and D. R. McCullough³. ¹Department of Biological Sciences, Idaho State University, Pocatello, Idaho, 83209; ²Department of Biology, Texas State University, San Marcos, TX, 78666; ³Department of Environmental Science, Policy, & Management, UC Berkeley, Berkeley, CA, 94720.

ANTLER AND BODY SIZE IN BLACK-TAILED DEER: RETROSPECTIVE ANALYSIS OF COHORT EFFECTS.

For large mammalian herbivores, extreme climatic events and high population densities decrease forage availability and create cohort-wide declines in fitness. We examined harvest data from a previous study to determine cohort effects on body and antler size of black-tailed deer (*Odocoileus hemionus columbianus*) ($n = 450$) in central California, USA. Two models were created, each with numerous extrinsic variables to predict a single intrinsic variable (body or antler size). Extrinsic factors such as weather, specifically annual precipitation, during parturition and the first year of growth are often cohort specific, and have lasting effects on antler and body size in males. Female population density can greatly affect forage availability during critical stages of growth and development of offspring, and thereby also influence size of males later in life. In our study, female population density during the first year of growth had a more dominant effect than precipitation. Harvest of female deer resulted in increases in the overall size of males, even during years of drought. Extrinsic factors during gestation were important in determining antler size of male deer, but not body size. Temperature during the year prior to harvest influenced both body and antler size of male deer. The insights that our study offers about the interactions between density-dependent and independent factors will enhance our understanding of the variable growth of cervids between cohorts.

TINKLE, ZOE*¹, J. Forbey¹, P.O. Montiglio², C. Baun³, and K. Warner³. ¹Boise State University, Boise, Idaho 83725;

²University of California Davis, Davis, California, 95616; ³Idaho Army National Guard, Boise, Idaho, 83705. **TO FORAGE OR FLEE: POPULATION DEMOGRAPHICS, FORAGING BEHAVIOR, AND PERSONALITY OF PIUTE GROUND SQUIRRELS (*UROCITELLUS MOLLIS*) IN STRUCTURALLY VARIABLE HABITATS**

Piute ground squirrels (*Urocitellus mollis*) are a critical prey species in the Morley Nelson Snake River Birds of Prey National Conservation Area (NCA) in southwestern Idaho. Piutes are found in structurally variable habitats within the sagebrush-steppe ecosystem and encounter heavy predation throughout their range. Individuals within a population of prey often differ in their willingness to take risks (boldness) which affects their foraging behavior. Individuals with different levels of boldness are often favored in different habitats. The objective of this study was to compare population demographics and foraging behaviors and boldness of individuals in two structurally distinct habitats. A mark-and-recapture study of Piute ground squirrels was conducted in two habitat types within the NCA. Demographic characteristics and boldness were measured for individuals within a sagebrush-dominant habitat and a native grass-dominant habitat. Foraging behaviors were observed in both habitat types using giving up density (GUD) feeding stations. We found that even though demographic characteristics of Piutes within the two habitats were similar, individuals on average were more bold within the sagebrush-dominant habitat than in the native grass-dominant habitat. We also found that individuals spent more time eating at feeding stations located in the sagebrush-dominant habitat than in the native grass-dominant habitat. These results suggest that populations in structurally variable habitats can have similar demographic characteristics but can differ significantly in the personalities and behaviors of individuals within those populations. Management efforts have previously been informed by research focused on population demography, however it is possible that the behavioral landscape of populations within different habitats could also be impacted by management.

WALKER, NICHOLE* Bryan Aber, Bok Sowell and Dan Tyers. Montana State University, Bozeman, MT 59729. **GRIZZLY BEAR DIETS IN ISLAND PARK, ID.**

Grizzly bear (*Ursus arctos horribilis*) are a recovering and expanding species in the Greater Yellowstone Ecosystem (GYE). Bears are expanding outside of Yellowstone National Park (YNP), and into surrounding multiple use forests. This



expansion includes use of the Island Park area of Idaho, a multiple use area with a history of clearcutting. Bear use of naturally created mosaic habitats is well understood, however use of human created mosaics through timber harvest is understudied. Important insights in to use of habitat can be derived from diet analysis. We investigated grizzly bear diet in the Island Park area of Idaho. We estimated diets from fecal volume derived from hard parts analysis. Researchers surveyed random known grizzly bear locations and collected 244 scats from 8 individuals in the summers of 2013-2014. Invertebrates occurred in 86.1 % of scats, graminoids in 56.2%, forbs in 52.5%, and roots in 36.9% of all scats. Percent volume of hard parts was determined by sifting and sub sampling fecal matter through common methods, and adjusting final values with accepted correction factors. We found that fecal volume over 10% consisted of invertebrates ($38.2\% \pm 1.9$), and ungulates ($11.2\% \pm 2.6$). We found significantly higher invertebrate consumption and lower meat consumption than reported by 3 previous studies in adjacent areas of the GYE. Whitebark pine and fish (trout) were not detected in diets of bears in Island Park.