Idaho Chapter of The Wildlife Society
Annual Meeting

"Navigating the Nature of the New West"

March 5 – 7, 2007
The Holiday Inn • Pocatello, Idaho

Program and Abstracts

The theme for the Idaho Chapter of The Wildlife Society's 2007 Annual Conference is "**Navigating the Nature of the New West**." The conference will feature a diverse scientific program with plenary lectures, organized symposia, contributed oral presentations, and poster session, as well as social activities and an annual business meeting. Pre–conference activities include workshops focusing on current bat and herpetological management issues.

The conference will take place 5-7 March 2007 in Pocatello, Idaho. Members are encouraged to register in advance by going to the on–line, secure registration page at the ICTWS web site. Alternatively, a registration form can be downloaded from the web site for submission by mail or FAX. The current registration fee is $85, which includes the banquet. Banquet tickets for special guests (i.e. spouses) may be purchased for an additional $25. A limited number of banquet tickets will be available at the meeting. In addition, a one day only registration of $60 may be purchased at the registration table on each day of the conference.

Host City — Pocatello, Idaho

The city of Pocatello is located in southeastern Idaho at the intersection of Interstate Highways 15 and 86. Pocatello is the county seat of Bannock County and home to Idaho State University. It has a combined population of approximately 70,000, making it Idaho's second largest urban area.

Pocatello was named after the Chief of the Shoshone-Bannock Tribes who donated land to the city. It is nicknamed "the Gate City" due to its location at a natural break in the mountains and has been a major transportation hub since the days of the Oregon Trail. The city contains one of the largest railway classification yards in the West, and has an active partner in commercial rail service in the Union Pacific Railroad. Destination spots such as Yellowstone National Park, Bridger-Teton National Forest, Jackson Hole and Sun Valley are all less than three hours away from Pocatello. The Portneuf River joins the far more famous Snake River at American Falls Reservoir just north of the city.

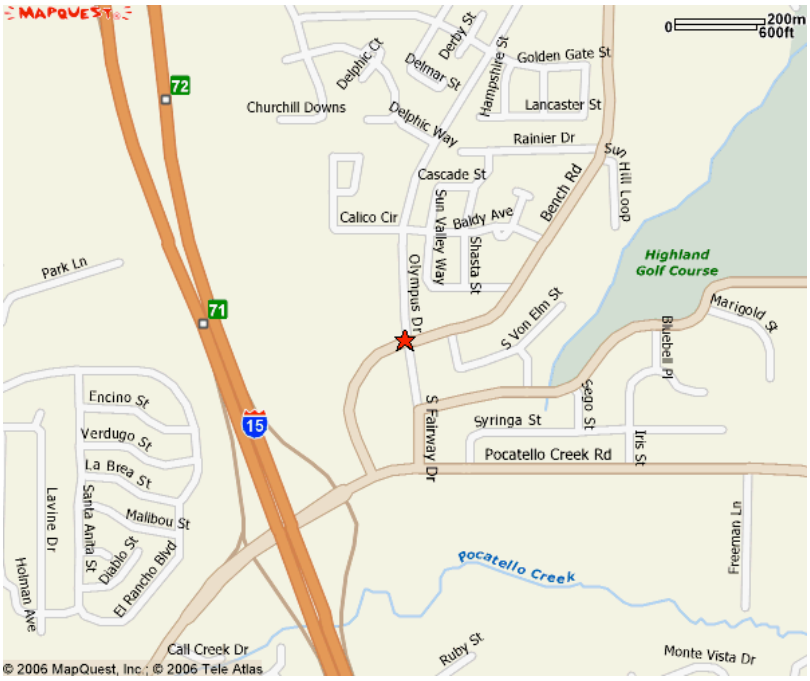
CULTURAL and ENTERTAINMENT ATTRACTIONS: Pocatello offers many cultural attractions. Information is available online

- *Fort Hall Replica* – The Fort Hall Replica gives visitors an idea of what historic Fort Hall looked like when it was used by Oregon Trail pioneers in the 19th century. (1-208-234-1795)
- *Idaho Museum of Natural History* – The museum offers displays in anthropology, vertebrate paleontology, earth science and the life sciences, Idaho State University, Building 12, Room 205C, 5th Avenue and Dillon St. (208-282-2262)
- *Bannock County Historical Museum,* 3000 Alvord Loop (208-232-0434)
- *Pocatello Zoo* – Specializing in wildlife native to North America's intermountain west, 3101 Ave. of the Chiefs. (208-234-6264).

Conference Venue

All conference activities will take place at The Holiday Inn, Pocatello, Idaho (www.holidayinn.com). The Holiday Inn is located in the heart of Pocatello, just a few miles away from Idaho State University and the downtown area. Conference rooms are located on the 1st Floor. **A special room rate of $60/night will be available to ICTWS**

attendees who reserve rooms prior to February 17th. In order to get the special rate, you must mention your association with the ICTWS meeting. After February 17th, the room rate will be $89/night.



Directions to the Holiday Inn:

From Pocatello Regional Airport:

- Go East on Airport Way to Terminal Way.
- Merge onto I-86 East
- Merge onto I-15 South via Exit 63A toward Salt Lake.
- In less than a mile, take Exit 71 (Pocatello Creek Rd/I-15 BL N.).
- Take the ramp toward Pocatello Creek Area and turn left onto Pocatello Creek Rd.
- Take a left onto Bench Rd/Pocatello Bench Rd.

From 86 (Boise and Twin Falls)

- Take Interstate 84 East toward Twin Falls.
- Interstate 84 becomes Interstate 86 East going to Pocatello.
- Merge onto I-15 South via Exit 63A toward Salt Lake.
- In less than a mile, take Exit 71 (Pocatello Creek Rd/I-15 BL N.).
- Take the ramp toward Pocatello Creek Area and turn left onto Pocatello Creek Rd.
- Take a left onto Bench Rd/Pocatello Bench Rd.

From Idaho Falls (I-15 Southbound)

- Take I-84 East towards Twin Falls
- Interstate 84 becomes Interstate 86 East going to Pocatello.
- Merge onto I-15 South via Exit 63A toward Salt Lake.
- In less than a mile, take Exit 71 (Pocatello Creek Rd/I-15 BL N.).

- Take the ramp toward Pocatello Creek Area and turn left onto Pocatello Creek Rd.
- Take a left onto Bench Rd/Pocatello Bench Rd.

Restaurants

The Brass Rail, located inside the Holiday Inn Hotel, is a full-service restaurant. It is open for breakfast, lunch, and dinner, featuring a delicious cuisine of home-made soups, Black Angus steaks, pasta dishes, and more.

The Whispers Lounge, also located inside the Holiday Inn features well known beers and micro-brews, liquors, and a wonderful wine list. A big screen TV is also available for your viewing entertainment.

Other Restaurants <1 mile from the Holiday Inn

1. Applebee's (0.04 miles)
    - 1411 Bench Rd.
    - (208) 637-0135

2. Sandpiper Restaurant and Lounge (0.04 miles)
    - 1400 Bench Rd.
    - (208) 233-1000

3. Cottonclub Lounge (0.04 miles)
    - 1415 Bench Rd.
    - (208) 237-7650

4. Burger King (0.22 miles)
    - 1315 Bench Rd.
    - (208) 637-8287

5. Subway (0.24 miles)
    - 1544 Pocatello Creek Rd.
    - (208) 233-2210

6. Perkins (0.24 miles)
    - 1600 Pocatello Creek Rd.
    - (208) 233-0006

7. Jack in The Box (0.25 miles)
    - 1611 Pocatello Creek Rd.
    - (208) 234-9305

8. Lucky Palace (0.5 miles)
    - 1721 Golden Gate St.
    - (208) 232-2895

9. Change Garden (0.8 miles)
    - 1000 Pocatello Creek Rd.
    - (208) 234-1475

10. Sizzler (0.8 miles)
    - 1000 Pocatello Creek Rd.
    - (208) 233-1547

11. Pier 49 Pizza (0.8 miles)
    - 1000 Pocatello Creek Rd.
    - (208) 234-1414

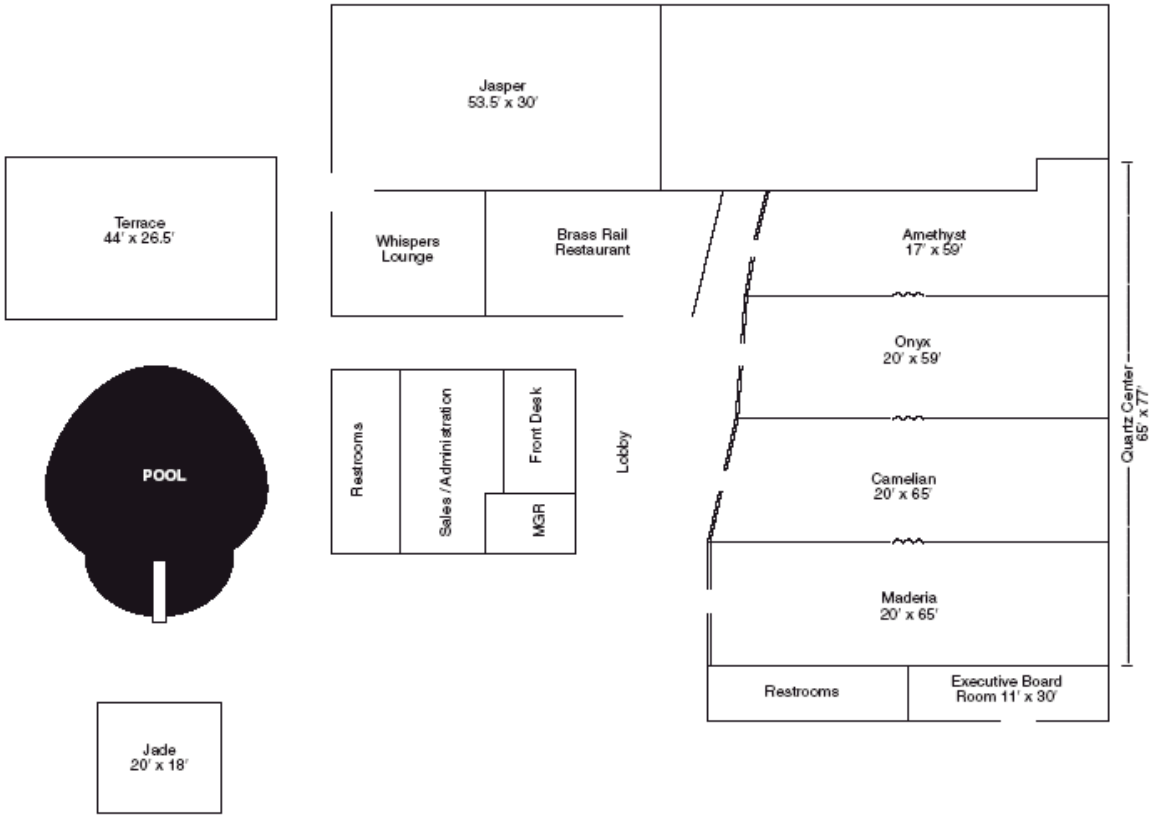
12. Dairy Queen (0.9 miles)
    - 978 Hiline Rd.
    - (208)233-6015

13. Pap Kelsey's (0.91 miles)
    - 840 E. Alameda Rd.
    - (208) 232-6931

Conference Contact

Kerri Vierling, e-mail kerriv@uidaho.edu, telephone: 208-885-5378, P.O. Box 441136, Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844-1136.

1st Floor Plan for the Holiday Inn Conference Center



SOCIAL ACTIVITIES

Monday, 5 March

18:00 – 20:00	Opening Reception—No-host bar & hors d'oeuvres Room: Jasper

Tuesday, 6 March

17:00 – 18:00	No-host bar, student mixer, and poster session Room: Jasper
18:00 – 21:00	Buffet and auction Room: Carnelian and Madeira

The Banquet dinner will be followed by a live auction. Banquet tickets are included in the registration fee for the presenter; additional ones may be purchased at the time of on-line registration. A limited number of banquet tickets will be available on site.

BUSINESS SESSIONS

Tuesday 6 March

15:40-17:00	Business meeting Room: Amethyst and Onyx

REGISTRATION

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

The registration desk will be open on Monday, March 6 from 08:00 – 18:00 and Tuesday, March 7 from 08:00 – 18:00

Registration Fee:
$85.00

Extra Banquet Tickets: $25.00 per person (Limited number available on site)

Organizing Committee

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

The Committee would like to thank for assistance with the program: Mark Pollock, Giancarlo Sadoti and Ryan Long for assistance with abstract submissions and program format, the volunteers assistance with audio-visual equipment, Anna Owsiak for coordinating the judges for the best student presentations, Katie Miller for assisting with poster planning, and Curtis Hendricks for heading up the auction efforts. Finally, thanks to all of our dedicated volunteers for making the meeting a success!

Plenary Speakers

Tara L. Teel is currently an Assistant Professor in the Department of Human Dimensions of Natural Resources at Colorado State University. She received her Ph.D. in Human Dimensions from Colorado State University and M.S. and B.S. degrees in Fisheries and Wildlife Management from Utah State University. Dr. Teel's research interests are in human dimensions of natural resources, specifically in the application of social science theory and methods to natural resource-related issues. She works closely with wildlife and other natural resource agencies in collection and application of social science data to inform their planning, management, and communication efforts. In addition to serving as a co-investigator on the *Wildlife Values in the West* study presented at this meeting, Dr. Teel is currently the co-principal investigator along with Mike Manfredo for a project entitled *Advancing Human Dimensions Expertise among State and Province Fish and Wildlife Agencies*. The project will result in development and implementation of an educational program providing training to state and province fish and wildlife agency employees in human dimensions concepts and techniques. Upon completion of the training program, participating employees will be awarded human dimensions certification by the Western Association of Fish and Wildlife Agencies. In addition to research, Dr. Teel teaches courses at both the undergraduate and graduate levels in the areas of natural resources tourism, human dimensions and recreation behavior theory, and human dimensions research methods and statistical analysis.

Michael J. Manfredo is a professor and Head of the Department of Human Dimensions of Natural Resources at Colorado State University. He received his B.S. and M.S. at the Pennsylvania State University and his Ph.D. at Colorado State University. Dr. Manfredo's research, teaching and outreach activities focus on the role of social science in natural resource management. His theoretical focus is on applying attitude and value theory to natural resource issues. He has published over 65 peer-reviewed articles in a wide variety of natural resource journals such as *Wildlife Society Bulletin, Educational and Psychological Measurement, Journal of Coastal Zone Management, Journal of*

Social Psychology, Journal of Travel Research, Society and Natural Resources, Journal of Forestry, North American Journal of Fisheries, Journal of Environmental Management, Human Dimensions of Wildlife, Leisure Sciences, and Journal of Leisure Research. He was the founding co-editor of the journal *Human Dimensions of Wildlife***.** He recently co-edited his third book entitled *Society and Natural Resources: A summary of knowledge*. He is also currently working on a book about human relationships with wildlife. Professor Manfredo has been principal investigator on over 75 research projects with funds primarily obtained from fish, wildlife, and land management agencies.

Dale Goble is the Margaret Wilson Schimke Distinguished Professor of Law at the University of Idaho. He earned an A.B. in philosophy from Columbia College and a J.D. from the University of Oregon. Following law school, he taught at Oregon for a year before joining the Solicitor's Office at the Department of the Interior in Washington, D.C. as an Honor's Program Attorney. He subsequently worked in the Lands and Minerals Division where his responsibilities included sagebrush rebellion litigation, wilderness, land-use planning, and wild and scenic river issues. He has been at the College of Law since 1982. His scholarship focuses on the intersection of natural resource law and policy, constitutional law, and history. In addition to the usual "numerous articles and essays" -- now numbering more than 50 -- he is the co-author of two books: *Wildlife Law: Cases and Materials* (Foundation Press, 2002) and *Federal Wildlife Statutes: Texts and Contexts* (Foundation Press, 2002). Since 2000, he has been a co-director of the Endangered Species Act at Thirty Project, a multi-disciplinary, multi-interest evaluation of the ESA.

Symposium: "Off-Road Vehicles on public lands: ecology, policy and management challenges

This year's meeting will include a symposium addressing off-road vehicles on public lands with Dr. Susan Solarz (The Wilderness Society) as moderator. This symposium is designed to both generate dialogue among professionals who actively work to influence motorized-travel policy in Idaho and to inform all recreation, wildlife and conservation workers about ecology, policy and use trends as well as controversies.

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

Posters: Set Up and Removal
Posters may be set up any time before 09:30 on Tuesday, 6 March in the Jasper. They MUST be removed no later than 12:00 on Wednesday, 8 March. Presenters should be available to discuss their posters in the Jasper from 17:30 – 18:30 on Tuesday, 6 March. Posters may be attached to the wall with heavy double-sided carpenters' tape (which we will provide).

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

Parking
Parking is free at the Holiday Inn.

Recycling
We have made special arrangements with the Holiday Inn to provide recycling bins at the meeting and we encourage everyone to use them.

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

SCIENTIFIC PROGRAM
Monday March 5th

	Room : Madeira
08:30-12:00	Idaho Bat Working Group workshop
LUNCH BREAK	
13:30-17:00	IPARC workshop
BREAK	
18:00	Room: Jasper Opening mixer

Tuesday, March 6th

Room	Amethyst and Onyx	Carnelian	Madeira	Jasper	Executive Board Room
08:00 – 08:10	Welcome and plenary speaker introduction	Open	Open	Open	Open for talk previews
08:10 – 09:10	Plenary talk: A foundation for conflict: wildlife values in the West				
09:10 – 09:30	BREAK				
09:30 – 11:50		Population Ecology	Novel approaches and methodology		
11:50 – 13:20	LUNCH				
13:20 – 15:20	Off Road Vehicle symposium	Open	Open	Open	
15:20 – 15:40	BREAK				
15:40 – 17:00	Business meeting				
17:00 – 18:00				No-host bar, student mixer and poster session	
18:00– 21:00		Buffet and auction			

Wednesday March 7th

Room	Amethyst and Onyx	Carnelian	Madeira	Jasper	Executive Board Room
08:00 – 08:10	Welcome and plenary speaker introduction	Open	Open	Open	Open for talk previews
08:10 – 09:10	Plenary talk: The Borax Lake Chub as a Metaphor for Tomorrow				
09:10 – 09:30	BREAK				
9:30 – 11:50		Conservation planning and policy	Behavioral ecology		
11:50 - 13:00	LUNCH				
13:00 – 15:00		Avian ecology	Herpetology		
15:20- 15:30				Student award presentations in Jasper	

MONDAY, 5 MARCH 08:30–12:00
Workshop: **Idaho Bat Working Group**
Location: Madeira

8:30 – 9:00 **Representation to the Western Bat Working Group**

9:00 – 9:15 **Proposed coordination for bat inventory and monitoring**

9:15 – 9:30 **Bats and the Wildlife Rehabilitation Committee**

9:30 – 9:45 **The Oregon bat grid in Idaho**, a presentation by Jenny Taylor

9:45 – 10:15 **Break**

10:15 – 11:00 **Idaho Bat Conservation Plan**

11:00 – 11:15 **Spatial distribution of winter and summer bat habitats on the Idaho National Laboratory,** a presentation by Christopher L. Jenkins and Kate Lambert

11:15 – 12:00 **Round room discussion** of plans, inventory, monitoring, projects for the 2007 field season

MONDAY, 5 MARCH 12:00–13:30
LUNCH

MONDAY, 5 MARCH 13:30-17:00
Workshop**: Idaho Partners in Amphibian and Reptile Conservation**
Location: Madeira

National and Regional PARC Updates – Chuck Peterson (ISU, IMNH)

All meeting attendees are encouraged to contribute their information in the following topic areas.

- Research
- Inventory and Monitoring
- Management
- Policy and Regulations
- Education

About 30 projects relevant to amphibian and reptile conservation in Idaho will be described and discussed.

18:00 Opening mixer,
Location: Jasper

TUESDAY, 6 MARCH
Plenary session
Location: Amethyst and Onyx

08:00 Welcome: **Rita Dixon**, President, ICTWS
Dr. Mike Scott: Presentation of the Arthur S. Einarsen award
Plenary Introduction

08:10 Plenary talk: A FOUNDATION FOR CONFLICT: WILDLIFE VALUES IN THE WEST. Dr. Tara Teel and Dr. Michael Manfredo

08:55 Question and discussions

09:10 Break

CONTRIBUTED PAPERS SESSIONS
***** denotes student presenter

TUESDAY, 6 MARCH 09:30 – 11:50
Session: Population ecology
Chair: Jack Connelly
Location: Carnelian
AV assistance: Lisa Cross

09:30 Wolf management in Idaho. **S. NADEAU**

09:50 Elk calf survival in northcentral Idaho: influence of predator harvest, biological factors, and landscape. **C.G. WHITE, P. Zager, and M.W. Gratson.**

10:10 Herbivore optimization by North American elk: consequences for theory and management. **K.M. STEWART, R.T. Bowyer, and J.G. Kie.**

10:30 Population viability of the southern Idaho ground squirrel (*Spermophilus brunneus endemicus*). **J. BARRETT.**

10:50 Population, community, and landscape dynamics relating to long-term persistence of the western burrowing owl (*Athene cunicularia hypugaea*). **M. AUSTIN***.

11:10 Ecology of translocated mountain quail (*Oreotyx pictus*) in western Idaho and eastern Washington. **J. STEPHENSON*, K.P. Reese, P. Zager, and A. Martens.**

11:30 Genetic variation and population genetic structure of Townsend's big-eared bat (*Corynorhinus townsendii*) in southeast Idaho**. K. MILLER***

and M.D. Matocq

TUESDAY, 6 MARCH 9:30 – 11:50
Session: Novel approaches and methodology
Chair: Aaron Haines
Location: Madeira
AV assistance: Anna Pidgorna

09:30 Harvest estimates from hunter surveys in Idaho. **B. ACKERMAN and S. Crea**

09:50 Developing a monitoring framework for wolves in Idaho**. D. E. AUSBAND and M. Mitchell.**

10:10 CCAAs: A tool for conservation of non-threatened and endangered species. **C. THOMAS**

10:30 Evaluation of paintball, mark-resight surveys for estimating mountain goat abundance. **G. PAULEY and J.G. Crenshaw.**

10:50 Lidar technology – applications and potential for wildlife habitat studies. **S. MARTINUZZI*, K.T. Vierling, L.A. Vierling, R. Clawges, and W.A. Gould.**

11:10 Development of a web-based wildlife planning tool for Blaine County, Idaho. **R. BERKLEY, M. McDonald, B.R. Butterfield, and B.J. Thomas.**

11:30 Open

11:50 – 13:20 LUNCH BREAK

TUESDAY, 6 MARCH 13:20 - 15:20
Off-road vehicle symposium
Location: Amethyst/Onyx room

Moderator: Susan L. Solarz, The Wilderness Society, Boise, ID 83702

13:20 The Ecological Effects of Off Road Vehicles (ORVs). MICHELE CRIST, Forest ecologist, The Wilderness Society

13:40 Overview of the Forest Service Travel Management Rule. **ROBERT H. POWELL, P.E.**, Transportation Engineer, USDA Forest Service, Region 4

14:00 Responsible use of public lands for the benefit of all recreationists: education and collaboration. **BRIAN HAWTHORNE**, Public Lands Director Blue Ribbon Coalition

14:20 Land management challenges posed by ORV-riding: ecology, policy and enforcement. **BLAINE NEWMAN**, Supervisory Resource Management Specialist, US Dept of Interior, Bureau of Land Management, Pocatello Field Office

14:40 Motivations and beliefs of off-road vehicle users: lessons from 25 years of social science research. **NICK SANYAL**, Conservation Social Sciences Department, University of Idaho

15:00 Panel Discussion

15:20 – 15:40 BREAK

TUESDAY 6 MARCH 15:40 – 17:00
Business meeting
Location: Carnelian

TUESDAY, 6 MARCH 17:00 – 18:00
No-host bar, student mixer and poster session
Location: Jasper

Poster 1 Interactions between butterflies (Lepidoptera: Rhopalocera) and plants (Spermatophyta: Magnoliophyta) in Cassia, Gooding, Minidoka, Oneida, and Twin Falls Counties, Idaho. **K. Fothergill and D. LEVY-BOYD***

Poster 2 Genetics of the Pygmy Rabbit *Brachylagus idahoensis.* **P. McNULTY*, W. Estes-Zumpf, and J. Rachlow.**

Poster 3 Footprint evidence for an unrecognized hominoid in the forest habitats of the Pacific and Inter-Mountain West. **D.J. MELDRUM and J. Mionczynski.**

Poster 4 Inorganic and organochlorine contaminants in sediment and biota from Deer Flat National Wildlife Refuge, Idaho. **C. THOMAS and S. Burch.**

Poster 5 Active pygmy rabbit (Brachylagus idahoensis) burrow density and habitat typification. **T. MENDEZ* and G. Weller.**

Poster 6 Egg and check survival comparing nest height and substrate material of white terns (*Gygis alba*) on Midway Atoll. **A. WISER* and G.**

Weller.

Poster 7 Effects of estradiol, progesterone and prolactin on glycogen accumulation in the mink uterus. **E.D. MECHAM*, J. Thomas and J. Rose.**

Poster 8 Reestablishing mountain quail into south-central Idaho. **R. TROY*, J. Connelly, and D. Delehanty.**

Poster 9 Young bighorn (*Ovis canadensis*) males: can they successfully woo females? **J.Whiting, R.T. Bowyer, and J.T. FLINDERS*.**

Poster 10 A survey of the amphibians and reptiles of the Shoshone Field Office of the Bureau of Land Management. **S. ASKEW* and J. Barrett**.

Poster 11 National wildlife refuges: maintaining threatened and endangered species in the United States. **E.L. BLADES* and J.M. Scott**

Poster 12 Jarbidge Field Office Wildlife Inventories 2006. **S. WHITFIELD and M. Cota**

TUESDAY 6 MARCH 18:00 – 21:00
Banquet, no-host bar, and auction
Location: Carnelian/Madeira

WEDNESDAY 7 MARCH
Plenary Session
Location: Amethyst/Onyx

08:00 Welcome and plenary introduction: **Rita Dixon**, President, ICTWS

08:10 Plenary talk: THE NEW WEST: THE BORAX LAKE CHUB AS A METAPHOR FOR TOMORROW. Dr. Dale Goble

08:55 Questions and discussion

09:10 Break

CONTRIBUTED PAPERS SESSIONS

WEDNESDAY 7 MARCH 9:30 – 11:50
Session: Conservation planning and policy
Chair: Rita Dixon
Location: Carnelian
AV assistance: Kerri Vierling

09:30 Overview of the Idaho Land Use Summit: An Idaho Chapter of The Wildlife Society initiated and sponsored event. **G. SERVHEEN**.

09:50 Application of the Idaho Comprehensive Wildlife Conservation Strategy within the Upper Snake River watershed. **M.B. WHITFIELD and R. Cavallaro.**

10:10 Shrub Steppe Restoration - Principles and Practices. **A. SANDS, T. Gregory, and A. Ogden**

10:30 Humanities new relationship with nature: Conservation reliant species. **J. MICHAEL SCOTT and D.D. Goble.**

10:50 What is a recovered species? **A. HAINES, J. Fay, O. Garton, D. Goble, N. Neel, J.M. Scott, D. Stanish, and D. Wilcove.**

11:10 Representation, redundancy and resiliency: waterfowl and the National Wildlife Refuge System. **A. PIDGORNA*, J.M. Scott, and J.J. Lawler.**

11:30 Open

WEDNESDAY, 7 MARCH 09:30 – 11:30
Session: Behavioral ecology
Chair: Jerry Deal
Location: Madeira
AV assistance: Harry Jageman
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09:30 Incubation rhythms of Greater sage-grouse. **P.C. COATES* and D.J. Delehanty.**

09:50 Seasonal response of elk to forest fuels reduction. **R.A. LONG*, J.L. Rachlow, and J.G. Kie.**

10:10 Evaluation of techniques for categorizing group membership of white-tailed deer. **K.L. MONTEITH*, C. L. Sexton, J.A. Jenks, and R.T. Bowyer.**

10:30 Using thermal landscapes to improve resource selection functions for black-tailed deer. **J.G. KIE and R.T. Bowyer.**

10:50 Sex differences in space use and group size of mountain sheep. **C. SCHROEDER*, R.T. Bowyer, V. Bleich, and T.R. Stephenson.**

11:10 Group dynamics and timing of mating in American bison: effects of large males. **R.T. BOWYER, V.C. Bleich, X. Manteca, J.C. Whiting, and**

K.M. Stewart.

11:30 Open

11:50 – 13:00 Lunch break

WEDNESDAY, 7 MARCH 13:00 – 15:20
Session: Avian ecology
Chair: Diane Evans Mack
Location: Madeira
AV assistance: Pam O'Hearn

13:00 Landscape use by Greater sage-grouse: effects of habitat fragmentation. **J.F. SHEPHERD, K.P. Reese, and J.W. Connelly.**

13:20 Greater sage-grouse use of threetip sagebrush in south-central Idaho. **B. LOWE, D. Delehanty, and J. Connelly.**

13:40 Micro-habitat use by nesting Greater sage-grouse in southern Idaho. **D. MUSIL**

14:00 Monitoring Idaho's Avian Species of Greatest Conservation Need: Role of the Idaho Bird Inventory and Survey**. C.E. MOULTON and R. Sallabanks.**

14:20 Delisting the bald eagle after 40 years of protection under the Endangered Species Act: Are Idaho's eagles ready? **R. SALLABANKS**.

14:40 Testing wild birds for highly pathogenic avian influenza in Idaho. **T. HEMKER and M. Drew.**

15:00 Preliminary investigations of habitat use by Northern pygmy owls. **H. JAGEMAN* and E.O. Garton**

15:20 Award ceremony for student presenters in the Jasper

WEDNESDAY, 7 MARCH 13:00 – 14:40
Session: Amphibian and reptile ecology
Chair: Christopher Jenkins
Location: Madeira
AV assistance: Gene Curl

13:00 Investigating chytridiomycosis in the boreal toad (*Bufo boreas boreas)* in

Grand Teton National Park. **S. BRUER*, S. St-Hilaire, P. Murphy, P. Sheridan, and C. Peterson.**

13:20 A "tail" of two streams: distribution and abundance of Rocky Mountain tailed frog tadpoles in two stream networks. **J.L. JONES*, C.R. Peterson, and C.V. Baxter.**

13:40 Movement of prairie rattlesnakes in a mountainous landscape in central Idaho. **J. BAUDER* and C.R. Peterson.**

14:00 Conservation biology of Great Basin rattlesnakes in sagebrush steppe ecosystems: landscape disturbance, prey availability, and rattlesnake reproduction. **C.L. JENKINS* and C.R. Peterson**.

14:20 Adjourn this session; the award ceremony for student presentations will commence at 15:20 in the Jasper.

ABSTRACTS OF PAPERS AND POSTERS Presented at the Idaho Chapter of The Wildlife Society Annual Meeting, March 5-7, 2007

Harvest estimates from hunter surveys in Idaho. B. ACKERMAN and S. Crea. Idaho Department of Fish and Game, Boise ID 83707

Surveys of hunters are conducted annually for a variety of game species in Idaho, primarily to estimate hunter participation (number of hunters, days hunted, and number and type of animals harvested, including sex, age, antler points, etc.). Surveys are also conducted to assess hunter opinions on current topics, such as changes in hunting regulations, seasons, or weapons. These large-scale surveys are usually sent to a random sample of hunters (n=2000 to 8000), usually stratified based on types of license or permit purchased or regions of the state. Telephone surveys are done to assess non-response bias. Most surveys involve manipulation of very large computer databases to select random samples of hunters. In Idaho, routine surveys are done for 5 species of large and 2 species of small mammals, 12 species of upland game birds, and waterfowl and geese. Survey results are used to monitor harvest and to recommend changes to hunting regulations. Other uses include economic valuation of hunting in specific areas. Results are available for use by managers, researchers, hunters, and other organizations. New trends include a reduced ability to rely on mail and telephone responses due to changing patterns of human response rates. Future surveys will feature increased use of online surveys and computer-assisted telephone technology. The largest project is the mandatory harvest reporting for hunters of elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*), and pronghorn antelope (*Antilocapra americana*). In 2005, 236,000 tags were sold for these species, and hunters filed 186,000 reports. Results are summarized in over 1500 different ways -- by species, general and controlled hunts, regions , game management units, and harvest weapons.

A survey of the amphibians and reptiles of the Shoshone Field Office of the Bureau of Land Management. S. ASKEW and J. Barrett. Idaho Fish and Game Department. Jerome, ID 83338.

This was the second year of reptile and amphibian surveys within the U.S. Bureau of Land Management (BLM) Shoshone Field Office (SFO) area. We undertook this project to provide data to the SFO on the occurrence of amphibians and reptiles within this portion of south-central Idaho. We identified 73 sampling sites at which water occurred during at least part of the year in sufficient volume to function as potential amphibian breeding habitat. We conducted anuran calling surveys at all sites, larval amphibian sampling at sites where conditions permitted, and visual encounter surveys (VES) for amphibians and reptiles within likely suitable habitats. We used trap arrays composed of drift fences, pit-fall traps, and funnel traps as a comparative means to detect reptiles. We also recorded incidental observations to supplement these data. The vegetation and/or hydrologic features of each sampling site and associated with each incidental observation were classified into 6 ecological systems: (1) emergent marsh, (2) playa, (3) riparian, (4) mixed sagebrush, (5) big sagebrush, and (6) grassland. We detected six amphibian and twelve reptile species in our surveys. Two of these species, the common garter snake

(*Thamnophis sirtalis*) and the western toad (*Bufo boreas*), are considered species of concern by the BLM. The sensitive reptile and amphibian species that potentially inhabit in this area but were not detected in the 2006 surveys include the Northern leopard Frog (*Rana pipiens*), Woodhouse's Toad (*Bufo woodhousii*), and Night snake (*Hypsiglena torquata*).

Developing a monitoring framework for wolves in Idaho. D. E. AUSBAND and M. Mitchell. Montana Cooperative Wildlife Research Unit, University of Montana, Natural Science Building. Room 205, Missoula, MT 59812. C. Mack. Nez Perce Tribe Gray Wolf Recovery Project Leader, P.O. Box 1922, McCall, ID 83638. M. S. Nadeau. Idaho Department of Fish and Game, 600 S. Walnut, Boise, ID 83707. P. Zager. Idaho Department of Fish and Game, 3316 16th St. Lewiston, ID 83501.

Since wolf reintroduction, radiotelemetry has been the primary tool for monitoring wolves in Idaho. However, its efficacy as the sole method for population monitoring will wane as the wolf population expands and federal funding for wolf management diminishes. Maintaining radiocollared wolves dispersed widely across the landscape is an expensive and logistically difficult monitoring approach. Few studies, however, have been able to develop reliable alternatives for monitoring wolves across varied landscapes. We are evaluating the effectiveness of wolf population monitoring methods within 4 separate study areas in Idaho. One method, the summer scat method, stratifies habitat to facilitate sampling, provides data indicative of reproduction, and can provide estimates of wolf abundance. We are also testing the efficacy of hunter questionnaires and public sightings in estimating wolf abundance in the study areas. In addition, we are pilot testing several novel methods to detect and count wolves. To provide a statewide assessment of wolf distribution and abundance, we will collate data from tested non-invasive field methods, public observation data, and radiocollared animal data into an occupancy model. Preliminary analyses indicate an occupancy model using only public sightings can provide reasonable estimates of the number of wolf packs in Idaho. Development and refinement of such an occupancy model provides a framework for wolf population monitoring in the absence of, or complementary to, intensive radiotelemetry-based monitoring.

Population, Community, and Landscape Dynamics Relating to Long-term Persistence of the Western Burrowing Owl (*Athene cunicularia hypugaea*)
M. AUSTIN, Red Willow Research Inc., Twin Falls, ID 83301

I have just completed a study of population, community, and landscape dynamics relating to long-term persistence of the Western Burrowing Owl in south central Idaho. My study area includes the Shoshone BLM Field Office Area, Craters of the Moon National Preserve, and limited portions of the Burley BLM Field Office. Research efforts include annual census of historic, recent, and occupied nest sites across a 4-yr period. Research efforts include the assessment and analysis of population dynamics (nest site fidelity, population trend, avoidance behaviors), community dynamics (food habits, inter-specific competition and relationships, assessment and analysis of biotic and abiotic features) and landscape dynamics (assessment and analysis of biotic and abiotic factors). Study results

show a net population decline has occurred over time for a population that has been reported as stable or increasing in the past. My comparison of study results with existing research has resulted in the identification of controlling factors critical to the short- and long-term persistence of the Western Burrowing Owl. These findings represent important management implications for the Western Burrowing Owl, not only in Idaho but likely throughout its North American range.

Population viability of the southern Idaho ground squirrel (*Spermophilus brunneus endemicus*). J. BARRETT. Idaho Fish and Game Department. Jerome, ID 83338.

Surveys of the southern Idaho ground squirrel have detected a long-term downward trend in population size, and habitats within its range have been fragmented by agricultural development and invaded by exotic plants. To understand the effects of habitat degradation on ground squirrels, I monitored seven local populations of southern Idaho ground squirrels in a variety of habitats and quantified differences in the available vegetation among these local populations. By trapping resident ground squirrels, I estimated sizes of age/sex classes, estimated reproductive and survival rates, and monitored body condition changes through measurements of body mass and estimates of body fat. Using estimated demographic rates and sizes of age/sex classes I estimated the long-term persistence of the local populations. Overall, I found the demographic rates of this species were not sufficient to maintain the long-term viability of isolated local populations. The survival rate of juvenile females was found to be the parameter with the greatest influence on population viability, and the survival rate of both juvenile males and females was found to be positively correlated with pre-hibernation body mass. I found the body condition of juveniles was poorer, the emergence body condition of all age/sex classes was more variable between years, and the predicted duration of local population persistence was less in areas with more invasive grasses. In contrast, forbs appeared to provide beneficial qualities. Enhancing the quality of the habitat and, more specifically, limiting the encroachment by invasive annual grasses, should be a high priority in any attempt to reverse the long-term decline in the southern Idaho ground squirrel.

Movement of Prairie Rattlesnakes in a Mountainous Landscape in Central Idaho
J. BAUDER[1] and C. R. Peterson[2]. [1]Deptartment of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844. [2] Department of Biological Sciences, Idaho State University, Pocatello, ID 83201

Many species of reptile and amphibian at the northern latitudes of western North America make seasonal movements among over-wintering, foraging, and breeding habitats. Prairie rattlesnakes in southern Wyoming are known to exhibit long-distance, straight lined movements between hibernacula and summer foraging/breeding habitats. However, it is largely unknown how these movement patterns are affected by topography. The goals of this study are to characterize the movement patterns of prairie rattlesnakes in the Big Creek drainage of central Idaho and examine how these patterns are influenced by the rugged mountainous topography of that area. We hypothesized that topography would act as a barrier to rattlesnake movement and predicted that most rattlesnakes would move downslope from hibernacula located along the sides of the valley and restrict

their summer movements to lower elevations near riparian areas. We monitored the movements of 12 male prairie rattlesnakes using radio telemetry during the summer of 2006. The mean total distance moved during the summer was 3.70 km (1.45 SD, straight lined distance) and the mean maximum distance moved from the hibernacula was 1.26 km (0.80 SD, straight lined distance). Seven snakes spent most of the summer in a single general activity area while making low directional movements. Three snakes continued making relatively directional movements during the entire summer. Several snakes also displayed considerable movement during late summer, which may have been directed at locating mates. Rattlesnake movements were not entirely restricted to low elevation riparian areas. Four snakes made extensive movements uphill and four additional snakes made more localized uphill movements. It appears that many of the snakes in our study did not exhibit the movement patterns described in prairie rattlesnakes in southern Wyoming. It also seems that topography does not act as a strong barrier to rattlesnake movement in this area.

Development of a web-based wildlife planning tool for Blaine County, Idaho. R. BERKLEY, M. McDonald, B. R. Butterfield, and B. J. Thomas. Idaho Department of Fish and Game, Jerome, ID 83338.

Rapidly increasing development and loss of wildlife habitat in Blaine County, Idaho necessitate the development of a tool for adequately assessing the effects of urbanization. We worked with non-profit organizations and Blaine County staff to develop a web-based application that maps known and predicted occurrences of several important wildlife species in Blaine County, Idaho. We used elk and mule deer winter locations, spring and winter sage-grouse locations, summer pronghorn locations, and summer and winter mountain goat locations to develop species range polygons based on known species occurrences over the past 10-15 years. In addition, we incorporated habitat data from both the Idaho GAP project and the Idaho Department of Fish and Game's (IDFG) Comprehensive Wildlife Conservation Strategy to map predicted distributions of rare and sensitive species in Blaine County. These data were then intersected with Blaine County parcel data using GIS software, and the results incorporated into a web-based application that reports known or predicted wildlife occurrences on individual parcels based on parcel number or physical address. This application was developed in concert with a Blaine County ordinance that regulates the development of new subdivisions throughout the county, and will provide a tool for Blaine County to use when evaluating each proposed subdivision's potential impact on wildlife and wildlife habitat. Currently, IDFG staff are reviewing the application for both accuracy and usability prior to providing it to Blaine County as a planning tool.

National wildlife refuges: maintaining threatened and endangered species in the United States. E.L. Blades and J.M. Scott. University of Idaho Environmental Science Department and U.S. Geological Survey's Cooperative Fish and Wildlife Research Unit, Moscow, ID 83844.

I studied the ability of national wildlife refuges to maintain viable populations of threatened and endangered species in the United States. Nine categorical variables were

gathered from U.S. Fish and Wildlife Service Reports to Congress and internet resources for 1271 Threatened and Endangered species including: population status, listing status, taxonomy, recovery achieved, recovery priority number, critical habitat establishment, special rulings, and expenditures. I split these 1271 listed species into three groups for comparative statistical analyses: 1) listed species for which refuges have been established 2) those occurring on a refuge but for which refuges have not been established and 3) listed species not found on a national wildlife refuge. Using population status as the dependent variable, Jonckheere-Terpstra, Chi-Square tests and logistic regression analyses were run with SAS 9.1 to determine significant differences and associations between variables. Listed species occurring on national wildlife refuges and listed species for which refuges have been established are both improving in population status at significantly higher rates and declining at significantly lower rates than listed species not found on a national wildlife refuge ($p<.05$). Further, threatened and endangered species for which refuges have been established exhibit higher rates of improvement and lower rates of decline than species found on a refuge but without a refuge established for them, although the difference is not statistically significant ($p=.13$). Variables included in the final regression model were analyzed in detail as factors most associated with significantly different population statuses observed in the three study groups. For listed species for which refuges have been established, home range sizes were attained and examined in relation to refuge sizes to determine which species can be supported at evolutionary, demographic, and outbreeding viability levels. Additionally, threats posed to listed species for which refuges have been established due to climate change were explored.

Group dynamics and timing of mating in American bison: effects of large males.
R. TERRY BOWYER[1], Vernon C. Bleich[2], Xavier Manteca[3], Jericho C. Whiting[1], and Kelley M. Stewart[1]. [1]Department of Biological Sciences, 921 South 8th Avenue, Stop 8007, Idaho State University, Pocatello, ID 83209, USA. [2]Sierra Nevada Bighorn Sheep Recovery Program, California Department of Fish and Game, 407 West Line Street, Bishop, CA, 93514, USA. [3]School of Veterinary Science, Autonomous University of Barcelona, Barcelona 08193, Spain.

We studied group size, composition, and mating activities in American bison (*Bison bison*) during rut on the Delta Junction Bison Range in interior Alaska, USA, during 1996 and 1997. Most groups of bison were mixed sex (90%), but large males occurred in only one-half of all groups. Mating peaked in mid August during both study years and was highly synchronous. Scent-marking was coincident with mating, an outcome consistent with an hypothesis of such behavior actuating ovulation. Moreover, females in groups with large males were more likely to copulate than those in groups with smaller males. No differences in group size occurred among habitat types occupied by bison. Group size of bison, however, was larger with increasing distance from the forest edge, which likely was a response to predation risk. Groups containing large males also were larger than those with smaller males, which likely provided those individuals with additional benefits from reducing risk of predation. Our results are consistent with large males seeking out adult females for mating rather than vice versa, but more research is needed to completely resolve this issue.

Investigating chytridiomycosis in the boreal toad (*Bufo boreas boreas)* in Grand Teton National Park. S. BRUER, S. St-Hilaire, P. Murphy, P. Sheridan and C. Peterson. Idaho State University, Pocatello, ID 83209.

Chytridiomycosis is a skin disease of amphibians caused by the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*). It is highly virulent in susceptible populations and has been implicated as a major factor in global amphibian declines. Populations of the boreal toad (*Bufo boreas boreas*) in Colorado have been decimated and are known to be highly susceptible; however, populations in Grand Teton National Park appear to be doing well. We conducted a study to determine the prevalence of *Bd* within the region. Our sampling throughout the Grand Teton area shows that *Bd* is present at most known toad breeding sites, and a strain has been isolated from the region. We conducted a laboratory challenge to determine a) if this strain of *Bd* is as virulent as the strain from Colorado, and b) if it causes disease in boreal toads from Wyoming and Colorado. It was determined that the *Bd* strain found in the Grand Teton area is pathogenic to both populations of boreal toads under laboratory conditions.

Greater sage-grouse incubation rhythms in relation to factors of age classes, timing of incubation, predation, habitat, and climate. P. S. COATES and D. J. Delehanty. Department of Biological Sciences, Idaho State University, Pocatello, ID 83209-8007.

***Abstract*:** We used around-the-clock video monitoring to make precise measurements of greater sage-grouse (*Centrocercus urophasianus*) incubation constancy (percent of time spent on nests) and recess duration. We evaluated incubation rhythms in relation to factors of incubation timing, age classes, microhabitat, predator abundance, and food availability. Females employed a distinctive bimodal recess distribution that peaked at sunset and 30 min prior to sunrise indicating that grouse return to nests during low light. Yearling incubation constancy was lower than adults throughout incubation periods and constancy decreased during later ordinal dates within both age classes. Also, daily recesses of yearlings were more frequent than adults and yearlings recessed at times of greater daylight. Video images revealed that common ravens (*Corvus corax*), the most frequently recorded predator, depredated nests typically during mornings and evenings after sunrises and before sunsets, respectively, and indices of raven abundance was negatively related to recess duration. Yearlings may be more energetically constrained than adults and are faced with greater trade-offs between foraging and concealing eggs. Our data showed strong evidence that nest undercover was positively related to incubation constancy. We hypothesize that a need to forage is reduced in greater cover because grouse save energy due to a favorable parental microclimate and greater nest foliage may also increase water availability at the nest. Knowledge of incubation rhythms in relation to environmental factors is valuable to management of sage-grouse because it will help conserve nest habitats and ecological communities that promote reproduction through successful incubation behavior.

Interactions between butterflies (Lepidoptera: Rhopalocera) and plants (Spermatophyta: Magnoliophyta) in Cassia, Gooding, Minidoka, Oneida, and Twin Falls Counties, Idaho. K. Fothergill and D. LEVY-BOYD. Conservation Seeding and Restoration, Inc. Kimberly, ID 83341.

Public interest in butterflies is rapidly growing and this interest fuels conservation activities. For many holometabolous insects the quality and availability of nutrient resources, specifically floral resources, during the adult stage correlates with fecundity, egg weight, and longevity. During 2003, 2004, 2005, and 2006 butterflies were photographed during butterfly counts, surveys, and other field efforts documenting butterfly and plant interactions. 177 photographic records document 49 adult Lepidoptera species utilizing 55 species of plants from 21 plant families. The list of south-central Idaho flora generated by this opportunistic study provides a starting place for planning butterfly conservation and informs land management and restoration efforts.

What is a recovered species? A. HAINES, J. Fay, O. Garton, D. Goble, N. Neel, J. Scott, D. Stanish, and D. Wilcove. Center for Research on Invasive Species and Small Populations, University of Idaho, Moscow, ID 83844-1141.

We reviewed 551 completed recovery plans for 1,075 currently listed species (i.e., under protection of the Endangered Species Act [ESA]). We compiled data on recovery criteria stipulated in recovery plans to recover species (i.e., downlist and delist species). Ten percent of recovery plans did not stipulate any recovery criteria because data was lacking for a species, or the recovery plan focused on extinction prevention and population stabilization rather than recovery. Stipulated recovery criteria focused on defining a larger population size or number of populations and then maintaining this criterion during a defined monitoring period (i.e., foreseeable future). However, how recovery was stipulated varied among taxonomic groups. The median population size/number of populations at listing was 650/3 for vertebrates and 99/4 for plants, for downlisting criteria it was 2,000/3 for vertebrates and 1,500/5 for plants, and for delisting criteria it was 2,000/4 for vertebrates and 2,400/8 for plants. Population size and number of populations stipulated for recovery of threatened species was not significantly greater than population size or number of populations at listing. However, recovery criteria for endangered species were greater than population size and number of populations at listing. A recovered species has over 2 decades of ESA protection, a 95% chance of persisting 100 years, and is categorized as vulnerable or endangered based on the International Union for Conservation of Nature and Natural Resources (IUCN). Results from our research suggest that recovery criteria suffer from a lack of biological data, and in the absence of recovery guidelines set by ESA, recovery criteria is based on minimal rather than sustainable ecological requirements for species persistence.

Testing Wild Birds for Highly Pathogenic Avian Influenza in Idaho. T. HEMKER and M. Drew. Idaho Department of Fish and Game, Boise, ID 83707.

In 2006, intensive sampling of migratory birds began throughout North America in an attempt to provide early detection of the highly pathogenic avian influenza found recently

in Europe and Asia. As of the end of 2006, over 70,000 samples had been collected including about 1,400 in Idaho. None of the samples have tested positive for the highly pathogenic avian influenza. In the Pacific Flyway, the target species have been pintail, widgeon, teal and shoveler ducks as well as long-billed dowitchers and red-necked phalaropes. These species were selected because of the higher likelihood they could interact with Asian conspecifics. Juvenile mallards were also targeted because of their ability to be a reservoir for newly introduced diseases. Sampling will continue in 2007 in Idaho and throughout North America.

Preliminary Investigations of Habitat Use by Northern Pygmy Owls. H. JAGEMAN and Edward O. Garton. University of Idaho, Moscow, ID 83843.

We investigated habitat use of northern pygmy owls by conducting calling surveys and using radio telemetry. The study area is located in Northern Idaho on mixed ownership lands to the north and east of Moscow, Idaho. We were able to radio tag four owls and conduct calling surveys at approximately 150 points. Radio tagged owls were captured in October of 2006 and followed until the transmitter expired or the signal was lost for some other reason. We used Holohil BD-2 transmitters (1.5 g) which have an approximate battery life of 14-weeks. Calling surveys were conducted from existing open roads in both the spring and fall of 2006 using recorded calls from a Fox-Pro Digital Game. Positive responses to recorded calls were recorded at approximately 25% of the calling stations. In the spring of 2006, calls were placed at 0.8 km intervals along the road, but in the fall of 2006 the distance between stations was lengthened to 1.6 km to assure there was no double counting of owls. There was no significant difference in response rate in the fall and spring. Preliminary results of both the calling surveys and radio telemetry work suggest that owl use is primarily associated with older mature forest stands and riparian areas. Some owls appear to migrate to lower elevation areas during the winter while others do not. Of the four radio tagged owls, two remained on their fall home range into the winter and two appear to have migrated to other areas. The two owls that moved off of their fall home range were using higher elevation areas with greater snow accumulation and of this writing have not been relocated.

Conservation Biology of Great Basin Rattlesnakes in Sagebrush Steppe Ecosystems: Landscape Disturbance, Prey Availability, and Rattlesnake Reproduction. C. L. JENKINS[1,2] and C. R. Peterson[1]. [1] Herpetology Laboratory, Idaho State University, Pocatello, ID 83209, [2] North America Program, Wildlife Conservation Society, Idaho Falls, ID 83401.

Over the past 5 years, we have presented the results of studies on rattlesnake ecology on the Idaho National Laboratory. In this presentation, we provide a synthesis of these studies and build a conceptual map that outlines how these studies come together to give us an understanding of how the fire-cheatgrass cycle is influencing rattlesnake populations. Our early studies found that rattlesnake populations in close proximity had significantly different reproductive outputs. Based on these results, we developed studies to determine the factors that could be responsible for such patterns in rattlesnake reproduction. We examined the influence of disturbance on prey availability and the resulting influence on rattlesnake ecology. We also examined the influence of disturbance

on the availability of time for snakes to forage and determined whether snake populations had become locally adapted to their environment. The results from these studies suggest that Great Basin rattlesnakes are being negatively impacted by the conversion of sagebrush steppe through a series on complex interactions. Our results show that precipitation and disturbance patterns as well as associated substrate and vegetation characteristics are having broad possibly compounding impacts on small mammal communities. Specifically, areas with higher precipitation and lower disturbance have more species rich, abundant, and high biomass small mammal communities. These patterns in prey availability cause snakes to move in more linear paths in search of prey. However, snakes appear to use the same general areas year to year instead of making major shifts in response to prey availability. Snakes in areas with higher prey availability gain more weight, resulting in higher reproductive output. Disturbance had no influence on the availability of foraging times and we found no local adaptation in snake populations. The results from these studies have important applied implications for rattlesnakes, predators, and sagebrush steppe ecosystems.

A "tail" of two streams: distribution & abundance of Rocky Mountain tailed frog tadpoles in two stream networks. J. L. JONES, C. R. Peterson, and C.V. Baxter. Idaho State University, Pocatello, ID 83209

As part of a larger study on the ecology of Rocky Mountain tailed frog (*Ascaphus montanus*) tadpoles, we addressed three questions: 1) How does tadpole occurrence and abundance vary in a stream network? 2) How does tadpole age class structure vary in a stream network? 3) Do stream networks with different geology, climate, and resulting environmental conditions share similar patterns? During 2005 and 2006, we studied two stream networks of comparable tadpole biomass/density: Mica Creek, Idaho and Youngs Creek, Montana. To observe patterns at multiple spatial scales, we divided each network into stream segments, reaches, and transect belts. We randomly selected over 120 transect belts beginning at the headwaters of each network and continuing to the largest stream order occupied by tadpoles. In each stream transect, we estimated tadpole biomass and density, measured physical habitat features, and estimated food availability. In both stream networks, occurrence and abundance increased from headwater to intermediate orders and then decreased in larger stream orders. 1st year tadpoles decreased in density with increasing stream order, while 3rd year tadpole density increased with increasing stream order. The influence of food and physical habitat features on tadpole distribution and abundance changed across spatial scales, indicating that food resource availability may influence tadpoles at a finer spatial scale than temperature. Although our two different stream networks maintained similar patterns in tadpole occurrence and abundance, the availability of food and habitat differed between the two networks, indicating that factors limiting Rocky Mountain tailed frog tadpole distribution and abundance vary geographically.

Using thermal landscapes to improve resource selection functions for black-tailed deer.
J. G. KIE and R. T. Bowyer. Department of Biological Sciences, Idaho State University, Pocatello, ID 83209.

We studied habitat use by black-tailed deer (*Odocoileus hemionus columbianus*) on winter range in northern California, USA. Habitats included open grassland savannas, deciduous woodlands, and dense thickets of live oak (*Quercus wislizenii*). Climate was typically Mediterranean, with temperatures rarely dropping below freezing. Deer were more likely to occur in or near live oak than were random locations, spending 80% of their time in or near live oak during day and 70% of their time at night. During warm, sunny days, black-body temperatures were higher than ambient in habitats other than live oak, but were equal to or lower than ambient in live oak. Deer were more likely to occur in or near live oak when weather was warm, dry, sunny, and calm. The most parsimonious logistic regression model to distinguish whether deer would be found in or near live oak was based on the interaction between wind speed and relative humidity (AIC weight, $w_i = 0.18$). Five other models based on other combinations of air temperature, solar radiation, relative humidity, and wind speed, however, could not be distinguished from the best model based on the criterion $\Delta AIC < 2$ ($w_i = 0.13 – 0.06$). We formulated 2 resource selection functions (RSF) using conditional logistic regression, blocking by individuals, to distinguish between deer locations and random points. The RSF using habitat type (live oak cover versus other habitats), wind speed, and relative humidity performed marginally better ($w_i = 0.63$) than did the RSF that included habitat type alone ($w_i = 0.37$). We concluded that black-tailed deer in winter pelage were using live-oak thickets to ameliorate heat gain on calm, sunny days with low humidity.

Seasonal response of elk to forest fuels reduction. R. A. LONG, J. L. Rachlow, and J. G. Kie. Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844 (RAL, JLR); Department of Biological Sciences, Idaho State University, Pocatello, ID 83209 (JGK).

Over the past century, fire exclusion policies have altered natural fire regimes in forested habitats across North America. The ecological consequences of fire suppression are varied, but in many cases include accumulation of high fuel loads and an associated increase in occurrence of high-severity fires. Consequently, fuels reduction programs have been integrated into forest management strategies. Despite frequent application, however, empirical research on the effects of forest fuels reduction on wildlife is limited. We evaluated seasonal response of elk (*Cervus elaphus*) to a fuels reduction program at the Starkey Experimental Forest and Range (Starkey) in northeastern Oregon. From 2001-2003, 26 stands of true fir (*Abies sp.*) and Douglas-fir (*Pseudostuga menziesii*) that suffered high rates of mortality from a spruce budworm (*Choristoneura occidentalis*) outbreak were mechanically thinned and burned to reduce fuel loadings, and an additional 27 stands were left untreated to serve as experimental controls. We used elk location data collected during spring (1 April-14 June) and summer (15 June-31 August) of 1999-2006 to compare use of treated and untreated stands through time and to model the effects of a series of environmental covariates on use of treated stands. During spring, elk used treated stands significantly more than control stands, and selection of treated stands was only mildly influenced by topography, proximity to other treated stands, proximity to roads, time since treatment, and precipitation. Conversely, during summer elk used control stands significantly more than treated stands, and selection of treated stands was strongly related to distance from open roads, topography, and

competition with cattle. These results indicate that although elk may increase use of forest stands following fuels reduction, the magnitude of that response varies seasonally and is related to multiple environmental factors. Consequently, site-specific evaluations may be necessary to understand the impacts of forest fuels reduction on wildlife.

Greater sage-grouse use of threetip sagebrush in south-central Idaho. B. LOWE, D. Delehanty, and J. Connelly. Idaho State University, Pocatello, ID 83209

Greater sage-grouse (*Centrocercus urophasianus*) populations have declined due to decreased or degraded sagebrush (*Artemisia* spp.) habitats. Disturbances that change the sagebrush-steppe community may have an impact on sage-grouse populations. Increasing fire frequency is an example of a disturbance that can rapidly alter the sagebrush-steppe community. I examined the use of threetip sagebrush (*A. tripartita*) by sage-grouse as nest cover. Threetip sagebrush is one of few species of sagebrush that will sprout following fire. Sage-grouse used threetip sagebrush as nest cover less than expected based on random vegetation samples. The only other species of sagebrush used as nest cover was big sagebrush (*A. tridentata*). Sage-grouse that used big sagebrush as nest cover had greater nest success than those using threetip sagebrush, but the difference in success was confounded by age of sage-grouse females.

Lidar technology – applications and potential for wildlife habitat studies. S.MARTINUZZI, K. T. Vierling, L. A. Vierling, R. Clawges, W. A. Gould. Geospatial Laboratory for Environmental Dynamics, College of Natural Resources, University of Idaho, Moscow, Idaho 83844-1135.

Three-dimensional habitat structure is an important variable influencing animal-habitat associations; however, quantifying habitat structural information over large areas can be challenging. Current methods for characterizing habitats and mapping species distribution are based on field data that are often limited in spatial extent, and/or on remotely sensed data that are unable to detect vertical structure. Laser altimetry, or lidar, is a remote sensing tool that can provide unprecedented fine-grained information about the 3-D physical structure of terrestrial and aquatic environments and over broad areas, and therefore is a promising tool for species-habitat modeling. In this presentation we will (1) present an overview of the lidar technology, (2) review recent applications of lidar for habitat modeling in terrestrial and aquatic environments, (3) discuss potential future applications and challenges of this technology, and
(4) introduce current studies using lidar for mapping and characterizing wildlife habitat types in Idaho.

Genetics of the Pygmy Rabbit *Brachylagus idahoensis.* P. MCNULTY, Wendy Estes-Zumpf, Janet Rachlow. University of Idaho, Moscow, ID 83843

The Pygmy rabbit (*Brachylagus idahoensis)* is a small sagebrush obligate which lives in small, fragmented populations in Utah, Idaho and Montana. Because the populations are small and fragmented, understanding dispersion can be crucial for the continued success of the species. Pygmy rabbits disperse relatively long distances for their size and not

much is known about what geographic features might serve as barriers. To understand what serves as a barrier in pygmy rabbit dispersion, we studied rabbits at several field sites in Idaho, Montana and Utah in June and July of 2006. These field sites were selected on the basis of proximity to a geographic feature, such as sites on either side of a mountain range or river. We trapped the rabbits and then gathered measurements on weight, foot size, ear size, ectoparasite load, and sex. We also obtained a DNA sample. Nineteen microsatellites were examined in order to understand how closely related populations were and what geographic features the rabbits cross while dispersing. This will help us understand what geographic features are acceptable and which might further break up the fragmented populations.

Effects of estradiol, progesterone and prolactin on glycogen accumulation in the mink uterus. E. D. MECHAM, J. THOMAS and J. ROSE. Idaho State University, Pocatello, 83209

Most mammalian prenatal losses occur after fertilization, but before implantation, emphasizing that optimal uterine conditions must be established to ensure reproductive success. The uteri of rats, mice and humans accumulate glycogen as a source of energy, in a reproductive cycle-dependant pattern and many reproductive failures (i.e. spontaneous abortions), are correlated with low uterine glycogen concentrations. Our objectives were to determine: 1. if the mink uterus contains glycogen as an energy source, and 2. the effects of estrogen, progesterone and prolactin (PRL) on uterine glycogen accumulation. Female mink (4 /group) were assigned at random to one of 8 groups. Mink in Group 1 received no treatment (Controls). Mink in Groups 2,4,6 and 8 each received a slow release Silastic implant containing 100 mg estradiol-17beta (E), while mink in groups 5,6,7, and 8 each received an implant containing 200 ug Haloperidol (HAL) to increase endogenous PRL secretion. One week later, mink in groups 3,4,7 and 8 each received an implant containing 100 mg progesterone (P). Mink were sacrificed one week later and uterine samples assayed for glycogen concentrations by glucose hexokinase chromophotography assay. Both E and P increased glycogen concentrations ($P < 0.05$), but exhibited no synergism when given together. Interestingly, HAL-treated mink, exhibited significantly elevated uterine glycogen concentrations ($P < 0.05$), and mink treated with HAL + E had the greatest concentrations of glycogen, suggesting a synergism between E and PRL. It would appear that in addition to the many direct actions of E and P on the uterus that are essential for implantation, uterine glycogen synthesis is also stimulated by these hormones in mink. Because blood PRL levels increase in mink prior to and during the breeding season, we hypothesize that PRL may also contribute to the development of a more receptive uterine endometrium for implantation, by increasing uterine glycogen reserves.

Footprint evidence for an unrecognized hominoid in the forest habitats of the Pacific and Inter-Mountain West. D.J. MELDRUM[1] and J. Mionczynski[2], [1]Idaho State University, Pocatello, ID 83209-8007, [2]Atlantic City, WY 82520.

Persistent reports of observations of an unrecognized hominoid, commonly referred to as Bigfoot or sasquatch, emanate from the forests of the Pacific and Inter-Mountain West.

Reports occasionally correlate with the discovery of large tracks. A sample of footprints, representing a wide temporal and geographic range, is evaluated, including 3-D imaging techniques. Alleged sasquatch footprints are readily distinguished from human by their proportions, e.g. heel length/breadth, and their morphology, e.g. lacking the trace of a stiff longitudinal arch. Several examples exhibit a distinctive midtarsal pressure ridge and other indications of midfoot flexibility, characteristic of apes and early hominids. An early example involves the controversial Patterson-Gimlin film. The film-subject's feet evidence kinematics that correlates with dynamic features evident in the associated footprints, in that a "midtarsal break" is indicated. Additional independent examples exhibit, in a consistent manner, the presence of this feature, which would concentrate ground reaction forces of push-off beneath the metatarsals, and spare the relatively long prehensile toes the bending stresses associated with the toe-off of modern human gait. Ape absence in recent temperate forests is an often-repeated objection to the existence of sasquatch. Some argue ape physiology requires a rich and constant food supply not available in temperate forests. There is, however, little support for this argument considering, first, that fossil hominoids were once spread throughout temperate forests in Europe and Asia, while living hominoids represent a mere relic of this Old World radiation, and second, considering that there are diverse and abundant resources potentially available to a large omnivore, with known or potential large-bodied ape digestive physiology and masticatory adaptations. Wet temperate forests provide a dense undergrowth rich in edibles, while surrounding habitats offer seasonal variability. Characteristics attributed to sasquatch, i.e. hominoid ancestry, large body size, omnivory, and bipedalism, are potentially congruent with a temperate zone distribution.

Active Pygmy Rabbit (*Brachylagus idahoensis*) Burrow Density and Habitat Typification T. MENDEZ and G. Weller. Brigham Young University, Rexburg, ID 83460.

Pygmy Rabbits (*Brachylagus idahoensis*) are the smallest Leporid in North America. Females are larger than males but adults rarely attain 500 grams. The Pygmy Rabbit and the Volcano Rabbit (*Romerolagus diazi*) are the only two species of rabbits in the Americas to dig their own burrows. Historically, Pygmy Rabbits were associated with sagebrush (*Artemesia spp.*) steppe regions of Montana, Idaho, Wyoming, Utah, Nevada, California, Oregon, and Washington. With the conversion of their habitat to agricultural systems, their range has been dramatically reduced and fragmented. We examined the density of active burrows of Pygmy Rabbit burrows in Long Canyon, Idaho in March, June and October of 2005 and 2006. We also typified the habitat associated with the active burrows. Active burrow density was the highest in June and the lowest in April. Active burrows were associated with taller Sagebrush specimens (*Artemesia spp*.), with a higher horizontal obscurity than near-by sites without active/inactive burrows.

Genetic Variation and Population Genetic Structure of Townsend's big-eared bat (*Corynorhinus townsendii*) in Southeast Idaho. K.G. MILLER and M. D. Matocq, Idaho State University, Pocatello, Idaho, 83209.

The current levels and geographic distribution of genetic diversity in Townsend's big-eared bats in southeast Idaho are the result of both historic and ongoing processes. Historically, the Snake River Plain may represent one of the northern-most extents of this species' range. If southeastern Idaho has been long-occupied, we would expect to find a genetic pattern of isolation by distance among populations, accompanied by high levels of variation comparable to more southerly distributed populations. In terms of ongoing processes, little is known about this species' movement and mating behavior in the region. Previous research has suggested that individuals mate within and are highly loyal to a single hibernaculum, which would contribute to among-population structure. In order to begin examining genetic diversity and population structure, we have genotyped 132 individuals from fifteen roosts on the Upper Snake River Plain using five microsatellite loci. We find levels of genetic diversity within these populations that are comparable to those found in more southerly distributed populations of this species. Our analyses of population genetic structure suggest that the majority of variation is apportioned within populations with very low subdivision among populations and no evidence of an isolation by distance pattern. These results suggest that either the Snake River Plain was recently colonized but that the colonization captured a large range of diversity, or that this region has been long occupied and that ongoing gene flow across these populations is high. If our continued analyses further support ongoing gene flow, this may suggest that individuals are not entirely loyal to single hibernacula across winters, and/or that individuals may not mate at the hibernacula in which they overwinter.

Evaluation of techniques for categorizing group membership of white-tailed deer. K. L. MONTEITH, Department of Biological Sciences, Idaho State University, Pocatello, ID 83209, C. L. Sexton, National Park Service, Theodore Roosevelt National Park, Medora, ND 58645, J. A. Jenks, Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD 57007, R. T. Bowyer, Department of Biological Sciences, Idaho State University, Pocatello, ID 83209, USA

We studied sexual segregation, particularly patterns of group membership for white-tailed deer (*Odocoileus virginianus*), in Lincoln County, Minnesota, USA, to evaluate current techniques used to categorize animals when studying sexual segregation. We observed deer by driving a fixed transect approximately 3 times/week in the evening from late April until mid-July 2004, when sexes of white-tailed deer were sexually segregated. We pooled observations by week to investigate patterns in group membership associated with date of parturition (late-May). Group membership was defined according to Hirth (1977). In addition, we grouped individuals using a solitary categorization method. Group categorization methods were evaluated based on documented changes in reproductive behavior and physiology related to parturition, and differences in species social structure and reproductive behavior. Mean (±SE) group size was 1.76 ± 0.05 (n = 746, range 1-11) with a sex ratio (M:F) of 1:2.64 ± 0.01. Hirth's (1977) method resulted in only slight changes in group composition throughout the sampling period. Timing of physiological and behavioral changes associated with nutrient acquisition and securing of resources and space exhibited by reproductive females with the onset of lactation was accurately reflected in the solitary categorization

by a significant increase in solitary females, a decline in mixed-sexed groups, and slight increases in solitary and male groups near time of parturition. Our solitary categorization method was sensitive to changes in behavior and physiology exhibited by reproductively active females and their association with males and other females during sexual segregation. We provide examples of differing reproductive strategies, productivity, and social structure between regions and species, and stress the importance of considering group membership when investigating patterns of sexual segregation in white-tailed deer and other sexually dimorphic ruminants.

Monitoring Idaho's Avian Species of Greatest Conservation Need: Role of the Idaho Bird Inventory and Survey. C. E. MOULTON and R. Sallabanks, Idaho Department of Fish and Game, 600 S. Walnut, Boise, ID 83707. Tel. (208) 334-2920; e-mail cmoulton@idfg.idaho.gov

Idaho's Comprehensive Wildlife Conservation Strategy (CWCS) was officially accepted by the U.S. Fish and Wildlife Service in February 2006. A major component of CWCS implementation is monitoring of Species of Greatest Conservation Need (SGCN) and their associated habitats. There are over 200 species that have been identified as SGCN; 53 of which are birds. The Idaho Bird Inventory and Survey (IBIS) program, which seeks to monitor all birds throughout the state in a coordinated manner, provides a unique opportunity to efficiently monitor these high priority birds. The initial focus of IBIS has been determining distribution and abundance of waterbirds at Idaho's wetland Important Bird Areas and Idaho Department of Fish and Game Wildlife Management Areas. In 2006, we conducted waterbird monitoring at 30 wetland sites throughout the state. Monitoring efforts included general waterbird counts, marsh bird playback surveys, and colonial waterbird counts. During general waterbird counts and marsh bird playback surveys at 25 sites, 24 of the 25 waterbird SGCN were detected. At least 1 SGCN was detected at each site. Forty-four percent of sites had 15 SGCN detected, 28% had 6-10 SGCN, and 28% had at least 11 SGCN. These surveys also provided 15 latilong distribution updates for 9 SGCN. Colonial waterbird counts at all known island colonies yielded Idaho breeding population estimates for 3 SGCN (California Gull, American White Pelican, Caspian Tern), and site-level estimates for 3 additional SGCN (Cattle Egret, Snowy Egret, Black-crowned Night-heron). From these initial results, the IBIS program shows great potential for serving as an important implementation tool for Idaho's Comprehensive Wildlife Conservation Strategy.

Micro-habitat use by nesting greater sage-grouse in Southern Idaho. D. MUSIL. Idaho Dept. Fish & Game, Jerome, ID 83338.

Greater sage-grouse (*Centrocercus urophasianus*) nests (n=209) were sampled on 13 study areas in Idaho during 4 field seasons (2002-2005). Traditional methods were used to measure overstory and understory cover and height. Grass height was also measured during the early stages of incubation 30-50m from the incubating hen and again after nest hatch to estimate height at the nest site as close to nest initiation as possible. Differences between successful and unsuccessful nests will be presented in univariate and multivariate analysis.

Wolf Management in Idaho. S. NADEAU, Idaho Department of Fish and Game Boise, Idaho 83709

The state of Idaho became the designated agent for wolf management in January 2006 under authorities granted to the State by the Department of Interior under the new 10(j) rule. MOAs between the State, FWS, Nez Perce Tribe, and Animal Damage Control Board help guide the coordinated efforts to monitor and manage wolves in Idaho. The USFWS indicated they would be posting a delisting rule the winter of 2007. Idaho oversaw wolf control for livestock depredations as well as took the lead in all monitoring and management in Idaho. In 2006, IDFG and the NPT estimated more than 650 wolves in 71 packs and a minimum of 42 breeding pairs. Wolf depredations were confirmed in 27 cattle and more than 200 sheep in 2006. 69 wolves were confirmed killed in depredation control actions, illegal kills, and other mortalities. The state is planning the first wolf hunting season and this presentation will review what that process and overall wolf management will look like in 2007.

Evaluation of paintball, mark–resight surveys for estimating mountain goat abundance. G. R. PAULEY and J. G. Crenshaw, Idaho Department of Fish and Game, Rt 2 Box 192, Kamiah, ID 83536, USA

We evaluated mark–resight estimates of mountain goat (*Oreamnos americanus)* abundance using paintball marks at Seven Devils and Black Mountain, Idaho, USA. We marked mountain goats with recreational paintball equipment fired from a helicopter. Blue-violet dye marks were difficult to distinguish from dark, soiled areas on goats, while orange, yellow, and red, oil-based paint marks were easily recognized, highly visible, and persisted for at least 71 days. Marking rates varied with equipment function and pilot effectiveness, and ranged between 6.3 and 14.6 goats marked/hour of flight time. Precision of abundance estimates was reasonable with mark samples ≥51% of $\hat{N}$. We analyzed a 3-occasion survey at Black Mountain using Program MARK to determine the likelihood and magnitude of potential sources of bias. Model M_b, which allows a behavioral response to capture, was best supported by the data, while Model M_t, which allows time-varying capture probabilities, had reasonable support. The pattern of time-varying capture probabilities likely was a by-product of trap-shy behavior. Model M_b was 3 times more likely than model, M_t, to be the best approximating model, given the data. Behavioral response to marking and time-varying capture probabilities can be accommodated with >2 survey occasions. However, the strong evidence for a behavioral response implies that Lincoln-Petersen estimates of abundance are inappropriate. The set of candidate models did not include a model that would accommodate heterogeneity of individual sighting probabilities, which remains a concern with the mark–resight approach.

Representation, redundancy and resiliency: waterfowl and the National Wildlife Refuge System. A. PIDGORNA, J.M. Scott, and J.J. Lawler. Environmental Science Program, University of Idaho, Moscow, ID 83843 (A.P.); U.S. Geological Survey,

University of Idaho, Moscow, ID 83843 (J.M.S.); Oregon State University, Environmental Protection Agency, Corvallis, OR 97333 (J.J.L.)

The National Wildlife Refuge System (NWRS) is a network of 545 protected areas designated to manage and protect wildlife. The 1997 NWRS Improvement Act requires the NWRS to be managed in a manner consistent with the preservation of its biological integrity and diversity. We used the principles of representation, redundancy, and resiliency as indicators of biological integrity and diversity. We applied these principles to 43 waterfowl species on NWRS lands, as waterfowl species have been a priority conservation target for the NWRS. We examined representation and redundancy at three scales – national, flyway, and climatic – during each of the three life cycle stages of waterfowl. Assessment of resiliency included parameters such as the size of refuges, their susceptibility to climate change, and the proximity of refuges to disturbance sites. Preliminary results of this study indicate that the representation and redundancy of waterfowl species in the U.S. is currently well captured by the NWRS at all scales at which we analyzed our data.

Delisting the bald eagle after 40 years of protection under the Endangered Species Act: Are Idaho's eagles ready? R. SALLABANKS, Idaho Department of Fish and Game, 600 S. Walnut, P.O. Box 25, Boise, ID 83707.

Known numbers of nesting bald eagles (*Haliaeetus leucocephalus*) in Idaho have grown from a single pair in 1969 to 216 today. These figures exceed national trends where population numbers in the lower 48 states have increased from approximately 417 active nests in 1963 to an estimated 7,066 breeding pairs in 2006. Recovery of the bald eagle is due, in part, to habitat protection and management actions, and the reduction in levels of persistent organochlorine pesticides (such as DDT) occurring in the environment. Federally listed as endangered in 1967, the bald eagle was down-listed to threatened in 1995. Although initially proposed for removal from the list of threatened and endangered wildlife in 1999, at the time this abstract was prepared, the bald eagle remained a listed species. Bald eagle recovery in Idaho is assessed in terms of 10 management zones as described in the 1986 Pacific Bald Eagle Recovery Plan. Even though some management zones are shared with surrounding states, recovery population goals for numbers of breeding pairs of bald eagles in Idaho have been exceeded in 6 of the 10 management zones. In other words, numbers of eagles in Idaho alone, regardless of how many might be within the same zone but beyond the state border, are in most cases sufficient to have met the recovery goals set by the Pacific region recovery team in 1986. For those zones that are wholly contained within Idaho (3 zones), recovery goals have been exceeded in all cases, and sometimes by as much as 950%. I will review changes in the number of breeding bald eagles in Idaho over the last 37 years as well as provide an update on the status of the delisting process and the species' current protective status.

Shrub Steppe Restoration - Principles and Practices. A. SANDS[1], T. Gregory[2], and A. Ogden[2]. [1]The Nature Conservancy; [2]Idaho Department Fish & Game.

Nearly all remaining shrub steppe communities in Idaho and elsewhere have been damaged to one degree or another by anthropogenic actions over the last 100+ years. Lesser damaged communities can recover with improved management but many are so severely depleted that only seeding intervention can restore them. Restoration is an extremely challenging and expensive undertaking. Moreover, the science of restoration is still in it's infancy in terms of equipment, methods, understanding seed germination and seedling ecology, dealing with exotic annual vegetation, availability of native species, appropriate mixes, and seeding rates. Recently, more focus has been given to addressing these challenges and this has resulted in a number of advances. These include ways, both mechanical and chemical, for controlling undesirable competing vegetation and appropriate seeding mixtures and planting rates to avoid dominance by any one species. Some of the tools that were used in the past to convert shrub steppe to monocultures of perennial grass, resulting in a philosophical rejection by many wildlifers today, may actually be useful in restoring shrub steppe.

Sex differences in space use and group size of mountain sheep. C. SCHROEDER, R.T. Bowyer, V. Bleich, and T. R. Stephenson. Idaho State University, Pocatello, ID 83201.

Sierra Nevada mountain sheep (*Ovis canadensis sierrae*) no longer occupy most of their former range. The recovery of this endangered species depends on management strategies based on sound scientific research. A critical aspect in the ecology of mountain sheep is behavior, particularly the differences in space use and group size between males and females in winter. We used data from GPS-collared mountain sheep to calculate average daily movements. Male sheep moved 2 times farther per day than did females. Females formed larger groups in relation to the distance from escape terrain. Daily movements and group formation may differ between sexes for mountain sheep, and management should reflect these differences.

Humanities new relationship with nature: Conservation reliant species J. MICHAEL SCOTT Senior Scientist US Geological Survey and Professor of Wildlife Biology Department of Fish and Wildlife University of Idaho, Moscow , ID 83844-1141 and , Dale D Goble, College of Law University of Idaho Moscow , ID 83844

The recovery (delisting) of a threatened or endangered species is often accompanied by the expectation that conservation management of the species will no longer be necessary. However, the magnitude and pace of human impacts on the environment make it unlikely that substantial progress will be made in delisting many species unless the definition of "recovery" includes some form of active management. Preventing de-listed species from again being at risk of extinction may require continuing, species-specific management actions. We characterize such species as "conservation-reliant", and suggest that viewing "recovery" as a continuum of states rather than as a simple "recovered/not recovered" dichotomy may enhance our ability to manage such species within the framework of the Endangered Species Act. With ongoing loss of habitat, disruption of natural disturbance regimes, and the increasing impacts of non-native invasive species, it is probable that the number of conservation-reliant species will increase. We will discuss the development of

"recovery management agreements", with legally and biologically defensible contracts that would provide for continuing conservation management following delisting. The use of such formalized agreements will facilitate shared management responsibilities between federal wildlife agencies and other federal agencies, and with state, local, and tribal governments, as well as with private entities that have demonstrated the capability to meet the needs of conservation reliant species.

Overview of the Idaho Land Use Summit: An Idaho Chapter of The Wildlife Society initiated and sponsored event. G. SERVHEEN. Idaho Department of Fish and Game, Boise, ID 83707.

Through a Wildlife Information Network grant sponsored by the The Wildlife Society, the Idaho Chapter of the Wildlife Society obtained funding and sponsorships to hold the Idaho Land Use Summit at the Nampa Civic Center on September 14-15, 2006. The Summit was attended by more than 200 people from across Idaho interested in how changing land use and human development is affecting the future of Idaho. Speakers from Colorado, New Mexico, Montana, and California presented information the the changing New West and what this might mean to Idaho in terms of fish and wildlife, hunting and fishing, and public access. Panels on Idaho's rural communities and the role of government relative to these issues were held. Finally, attendees were asked to participate in break out sessions and identify the priority rural values to protect in Idaho and the priority short and long-term strategies that should be taken to help balance growth and development with the conservation of Idaho's fish and wildlife, recreation, and rural values. Next steps and ongoing efforts are discussed.

Landscape Use by Greater Sage-Grouse: Effects of Habitat Fragmentation J. F. SHEPHERD *Idaho Dept. Fish and Game, Boise, ID 83707*, Kerry P. Reese *University of Idaho, Moscow, ID 83844,* Jack W. Connelly, *Idaho Dept. Fish and Game, Pocatello, ID*

This study assessed patterns of habitat use during summer by non-breeding greater sage-grouse (*Centrocercus urophasianus*). From 1999 to 2002 we examined 2 study areas in southwestern Idaho with different levels of recent wildfire activity, and hence different levels of shrubsteppe fragmentation. The Jarbidge study area was 69.5% sagebrush cover (*Artemisia* spp.) at the beginning of the study in 1999 and declined to 63.5% in 2002. The Grasmere study area declined from 84.9% to 83.3% sagebrush cover from 1999 to 2002. The combination of existing grasslands and recent wildfires (open grass-forb dominated areas with varying amounts of bare ground) was 31.9% and 7.6% for the Jarbidge and Grasmere study areas, respectively, at the end of the study in 2002. In both study areas, we analyzed landscape metrics within circular buffers of 150- and 450-m radii centered on each sage-grouse location as well as the same number of random locations: each extent was analyzed separately. The amount of sagebrush land cover was not significantly different at sage-grouse locations (use points) and available habitat (random points) at either analysis extent, despite study area. At the 150-m analysis extent, sage-grouse in the Jarbidge study area used areas with higher edge density of grass-forb dominated land cover than was randomly available and than was used or

available in the Grasmere study area. Sagebrush patches adjacent to large, abrupt patches of grass-forb dominated habitat provided less edge density on their perimeter. These sagebrush patches are effectively smaller than patches with more interspersed sagebrush habitats on their perimeter, since the patches with abrupt edges receive less use on their periphery. At the 450-m extent, sage-grouse used areas similar to those randomly available with respect to all landscape metrics in both study areas.

Ecology of translocated mountain quail (*Oreortyx pictus*) in western Idaho and eastern Washington. J. STEPHENSON, K. Reese, P. Zager, and A. Martens. University of Idaho, Moscow, ID 83844.

The distribution of mountain quail (*Oreortyx pictus*) has declined considerably in the eastern portion of its historical range in the past 100 years. In response, translocations are being used to supplement and restore populations in this region. We translocated 322 mountain quail into Asotin Creek Wildlife Area (AC) in eastern Washington and into Craig Mountain Wildlife Management Area (CM) in western Idaho on 12 March 2005 (n=145) and 17 March 2006 (n=177). Of these, 199 mountain quail were radio-marked and monitored for 6 months until batteries failed. Six-month survival was 13% (26/199), confirmed mortality was 76% (151/199), and 11% (22/199) of radioed birds went missing or had faulty transmitters. Translocated mountain quail moved up to 24.4 km from release sites at AC and up to 33.6 km at CM. Nests were located a mean distance of 2.0 km (n=16, range: 0.1 to 6.2 km) from release sites at AC and 6.4 km (n=8, range: 2.2 to 15.8 km) at CM. Overall mean clutch size was 9.0 eggs. Nest success was 92% (11/12) in 2005 and 58% (7/12) in 2006. Mean hatch date for successful nests was 1 July (range: 15 June to 13 July). Males incubated 13 nests, females incubated 9, a female started to incubate 1 nest but a male completed incubation, and 1 nest was not incubated. Brood success was 61% (11/18) with an average of 5.8 chicks per successful brood at 28 days after hatching. All 24 nests were located in or near edge habitat and 15 (63%) were located in Douglas fir-dominated plant associations. Nests were also found in ponderosa pine (n=4, 17%), talus/garland (n=2, 8%), and rose/snowberry, bluebunch wheatgrass, and cottonwood/alder riparian (n=1, 4%) plant associations. Further analysis of the data will be included in a Master's thesis expected in December 2007.

Herbivore optimization by north american elk: consequences for theory and management. K. M. STEWART, R. Terry Bowyer, and J. G. Kie. Idaho State University Pocatello, ID, 83209

Understanding herbivore optimization has implications for theories underpinning ecosystem processes, management of large herbivores, and the landscapes they inhabit. We designed an experiment to examine interactions related to density dependence of North American elk (*Cervus elaphus*) and resulting plant responses to herbivory in the Blue Mountains of Oregon, USA, from 1999 to 2001. We experimentally created high (20.1 elk/km^2), and low (4.1 elk/km^2) population densities of elk and built exclosures to examine effects of herbivory on productivity and species composition of plants. We hypothesized that if herbivore optimization occurred with increasing density of elk, there should be a concordant increase in plant production, followed by a decline in productivity

as grazing intensity continued to increase (i.e., herbivore optimization). Net aboveground primary productivity (NAPP) increased from no herbivory to moderate density of elk and then declined as herbivory by elk continued to increase in areas with high NAPP (i.e., mesic and logged forests), but not in areas with low NAPP (i.e., xeric forests and grasslands. Apparent offtake of plants followed a similar pattern to NAPP and was greatest at intermediate levels of herbivory by elk, and then declined as NAPP approached zero. Quality of plants, as indexed by % nitrogen (N), also exhibited a parabolic function with increasing density of elk. We hypothesize that such subtle changes in NAPP from herbivory may be more common than previously thought; carefully designed experiments are required to detect those responses to herbivory by large herbivores.

CCAAs: A tool for conservation of non-threatened and endangered species. C. THOMAS. U.S. Fish and Wildlife Service, Boise, ID 83709.

Historically, most of the public's attention related to the Endangered Species Act (Act) has been focused or directed toward species listings, recoveries, habitat conservation plans, and outcomes of interagency consultations. Less attention has been given on a tool that the Act provides to facilitate conservation of at-risk or candidate species; species not yet listed and of conservation concern. This tool is called a Candidate Conservation Agreement with Assurances (CCAA). CCAAs are voluntary agreements between private landowners and the U.S. Fish and Wildlife Service (Service) that provide for the conservation of the target species while maintaining land use flexibility. The Service's Snake River office has completed four CCAAs to date; development of additional CCAAs is underway. Species covered by existing CCAAs include sharptail grouse (*Tympanuchus phasianellus*), southern Idaho ground squirrel (*Spermophilus brunneus endemicus*), and Columbia spotted frog (*Rana luteiventris*). The development, implementation, and parties involved in two CCAAs currently in place will be discussed.

Inorganic and organochlorine contaminants in sediment and biota from Deer Flat National Wildlife Refuge, Idaho. C. THOMAS and S. Burch. U.S. Fish and Wildlife Service, Boise, ID 83709.

A 1998 contaminant investigation conducted within Deer Flat National Wildlife Refuge indicated that mercury was present in the foodchain, and further study was needed to determine if mercury levels were of potential risk to piscivorous birds. Between 2001 and 2003, we collected sediment, fish, Western/Clark's grebe (*Aechmophorus* spp.) eggs, and bald eagle (*Haliaeetus leucocephalus*) feathers from Deer Flat National Wildlife Refuge to determine whether contaminant concentrations were at sufficient levels to contribute to reduced reproductive success of grebes and bald eagles. We determined contaminant concentrations, eggshell thickness, and reproductive success. Mean residue concentrations in all matrices were generally low, with two exceptions. Concentrations of selenium and mercury in biota exceeded thresholds for adverse effects reported in the literature. Mean mercury concentrations in some grebe eggs exceeded threshold effects levels; mercury concentrations in bald eagle feathers were within the range associated with impaired reproduction. Selenium concentrations in fish species exceeded levels

associated with mortality in some species. Mean concentrations of DDE in grebe eggs were below levels associated with adverse effects, although individual concentrations in eggs exceeded levels associated with eggshell thinning. Reproductive success varied by species and year.

Reestablishing Mountain Quail Into South-central Idaho. R. TROY, J. Connelly, and D. Delehanty. Idaho State University, Pocatello, ID 83209

Mountain quail (*Oreortyx pictus*) have been extirpated from most of their historic range in Idaho. Habitat suitability assessments performed in 2004 indicated that the Bennett Hills north of Glenn's Ferry, Idaho, were suitable for mountain quail restoration. Here, we report first year results of an effort to reestablish mountain quail in this area. Embedded in our restoration effort is an experimental comparison of the post-release performance of mountain quail from two distinct source populations, southern California (*O.p. eremophilus*) and southwestern Oregon (*O.p. palmeri*). To control for effects of sociality, pre-release diet, and body condition, quail from both sources were held communally through the winter of 2005-2006 in a large aviary at Idaho State University, Pocatello, Idaho. We released 52 mountain quail in the spring of 2006 of which 36 were fitted with Holohil necklace style radio collars (4.3 g). We monitored radio-marked quail throughout the breeding season and retrapped surviving birds in the fall, weighed them, and refitted the quail with replacement collars to continue our monitoring through winter. Survival rate of 33 radio-marked mountain quail was 40% through September 1, 2006. Quail were distributed (live quail and mortalities) a mean distance of 11.8 km (n=33) from the release site and were located at a mean elevation of 1416 m (n=33) and increased in mass by 1.5% (n=7). Of the 33 birds that we were able to monitor, one successful clutch was detected. Quail from the two source populations did not differ in distance from release site, elevation, reproductive rate, survival and mass. We plan to release an additional 75-100 mountain quail into the area during the spring of 2007.

Elk calf survival in northcentral Idaho: influence of predator harvest, biological factors, and landscape. C. G. WHITE, P. Zager, and M. W. Gratson. Idaho Department of Fish and Game, Lewiston, ID 83501

We evaluated survival and cause specific mortality of elk (*Cervus elaphus*) calves on 2 contrasting study areas in northcentral Idaho from 1997 to 2004. Recruitment was adequate and stable on the South Fork study area, and inadequate and declining on the Lochsa study area. We examined the effects of landscape structure, predator harvest levels, and biological factors on summer calf survival. The primary proximate cause of calf mortality on both study areas was predation by black bear (*Ursus americanus*) and mountain lion (*Puma concolor*). Annual calf survival ranged from 0.06 – 0.46 on the Lochsa study area and from 0.18-0.57 on the South Fork study area. After implementing an increase in predator harvest on the Lochsa study area we witnessed a significant increase ($\chi^2 = 10.704$, df = 1, $P = 0.001$) in calf survival as compared to a control area where harvest level remained consistent. On the South Fork study area calf survival significantly declined ($\chi^2 = 17.007$, df = 1, $P < 0.001$) after removal of predator harvest. Our models predict that calf survival was influenced by biological factors, landscape

structure surrounding calf locations, and by predator harvest levels. The model that best explained calf survival on the Lochsa included high predator harvest, the estimated birth mass of calves, and the percentage of shrub cover surrounding calf locations. The model that best explained calf survival on the South Fork included low predator harvest, the age of calves at capture, and the percentage of forest with 33-66% canopy cover. Our conclusions are that levels of predator harvest and presumably predator density can have a significant impact on calf survival. But also that resource limitations as expressed through calf birth mass and consequences of fire suppression over the last decade as expressed through decadent shrubfields may also impact calf survival.

Application of the Idaho Comprehensive Wildlife Conservation Strategy Within the Upper Snake River Watershed. M.B. WHITFIELD and R. Cavallaro. Teton Regional Land Trust, Driggs, ID 83422.

Idaho's Comprehensive Wildlife Conservation Strategy (ICWCS) is the state's most complete big picture assessment of the habitat requirements of Idaho's species of greatest conservation need (SGCN) to date. The aim of the plan is to promote proactive conservation through collaboration among conservation partners in a non-regulatory manner. Partnering organizations throughout Idaho, in cooperation with Idaho Department of Fish and Game, are beginning to move the Strategy toward Action Planning to advance much needed on-the-ground conservation. Idaho has the nation's third fastest growing population, a fact readily evident in the suburban and second home sprawl consuming vital private land habitats in many parts of the state. Even though over 50% of Idaho is in federal ownership, important private land habitats are often located in lower elevations and along major river corridors where growth pressures are most evident. The ICWCS methodology uses maps of the predicted distribution for SGCN in association with ecological systems data to identify and portray habitat conservation priorities. The Teton Regional Land Trust (TRLT) is working with the Department within the Upper Snake River Watershed to apply ICWCS strategies to conservation action planning. Conservation partners are indentifying measurable objectives in a broadly collaborative manner. These objectives include strategic implementation of conservation strategies and establishment of monitoring protocols to track outcomes. Land protection, habitat restoration, and adaptive habitat management strategies are being applied strategically to benefit SGCN.

Jarbidge Field Office Wildlife Inventories 2006. S. WHITFIELD and M. Cota, BLM, Twin Falls ID, 83301

We inventoried small mammals and reptiles in 49 study areas of public land in 13 vegetation communities within South Central Idaho. The methodology for the study design is generally from Manley et al. (2005). Two sizes of Sherman live traps [3"x 3.5"x 9" and 4"x 4.5" x 15"] would be set alternately at 20 m intervals along eight 200 m transects (total of 80 traps). Vegetation sampling conducted along the transect lines of the hexagon and habitat type was recorded for each site. Traps would be placed within 2 meter of the transect center line and situated to take advantage of microhabitat (particularly shade, logs/sticks, rocks) and rodent burrows. Traps would be set open and

checked once in the morning for a minimum of four and three nights on consecutive days. In the morning traps would be checked prior to 10:30 am. Data collected would include species, weight, age class [juvenile, sub-adult, adult], breeding status [non-breeding, enlarged testes, lactating, pregnant], relevant body measurements [ear, hind foot, tail, and total length], and trap location recaptures were noted. To inventory for fossorial and/or nocturnal species a combination 3 drift fences and funnel traps can be used to augment visual encounter surveys (Jones 1986). Traps will be number (1) for funnel trap on the base azimuth, then funnel traps 2 and 3 clockwise from the first. The pit fall trap in the center will be trap 4. Trapping for was done for 28 days at each site (Peterson 2006). Traps were checked no more than 2 days apart and prior to 11am. Diurnal reptiles can be detected by visual encounter surveys (Manley et al. 2005). Observers start at either end of the hexagon and walk the transect searching under rocks, logs, in crevices and other cover along each transect. Each transect is a belt 10 meters on either side of the center line. Search time is variable depending upon the complexity for the 2450 m (total) for each hexagon, but should be completed in 2 – 3 hours. Every reptile observed would have the following data collected: observer, transect number, time, species, detection type [auditory, visual, etc.], and substrate type as appropriate [e.g. rock, bare ground, log, etc], habitat, and snout-vent length for captured specimens. Each hexagon is to be searched for reptiles on 2 days during same time the area is being trapped for small mammals. Breeding bird point count surveys were conducted in early summer within the hexagon of each habitat. Nests were also located and GPS location was recorded.

Young bighorn (*Ovis canadensis*) males: can they successfully woo females? J. WHITING and R. T. Bowyer, Idaho State University, Pocatello, ID 83209-8007; and J. T. Flinders, Brigham Young University, Provo, UT 84602.

Mating by young males and a low ratio of males to females can decrease pregnancy rates and postpone birthdates in ungulates, thereby hindering population growth. Young bighorn males (*Ovis canadensis*) behave differently than older males, and age, mating behavior, and social rank determine reproductive success. We estimated birthdates in 2 populations of bighorn sheep in Utah, USA, to determine if mating by young males and low male-to-female ratios resulted in fewer young born, a shift in timing of births, or asynchronous births. When reintroduced, the Rock Canyon population consisted of 2 males (both 2.5 years old) and a 1 to 7.5 ratio of males (> 2 years old) to adult females; the Mount Nebo population consisted of 4 males ≤ 1.5 years old and a 0 to 12 ratio of males (> 2 years old) to adult females. For both populations, the number of young born did not differ between 1st parturition period after reintroduction (females were impregnated by mature males from their source population) and the 2nd parturition period (females were impregnated by young, reintroduced males). Mean birthdates and synchrony (*SD*) of births did not differ for Rock Canyon (12 May 2001 ± 4.5 days, 14 May 2002 ± 3.2 days) and Mount Nebo (23 May 2005 ± 8.1 days, 22 May 2006 ± 10.2 days) between the 1st and 2nd years following reintroduction. We conclude that females are adjusting parturition to coincide with the onset of nutritious forage regardless of the age of males with which they mate or low male-to-female ratios. *Key words*: bighorn sheep, births, males, mating, *Ovis canadensis*, parturition, reproduction, synchrony, timing.

Egg and Chick Survival Comparing Nest Height and Substrate Material of White Terns (*Gygis alba*) on Midway Atoll. A. WISER and G. Weller. Brigham Young University, Rexburg, ID 83460.

The White Tern (*Gygis alba*) is a small (length: 31 cm wing span 30 cm) seabird found across the tropical oceans. It lays eggs, incubates and fledges young almost year round on Midway Atoll. Nests building is absent, females lay one egg in the fork of a tree, on bare thin branches or on various man made structures. Midway Atoll is a US Fish and Wildlife Refuge with large areas of the refuge dominated by native shrubs (Naupaka, *Scaevola sericea*), introduced Ironwood (*Casuarina equisetifolia*) and various man-made structures. It has been proposed that man-made structures and the lower native shrubs provide substrates which are more stable and therefore lead to higher egg and chick survival. We examined the survivorship of eggs and chicks located on natural verses man-made substrates and at various altitudes above the ground for six weeks in May and June of 2006. Survivorship of eggs and chicks varied with nest height and substrate.