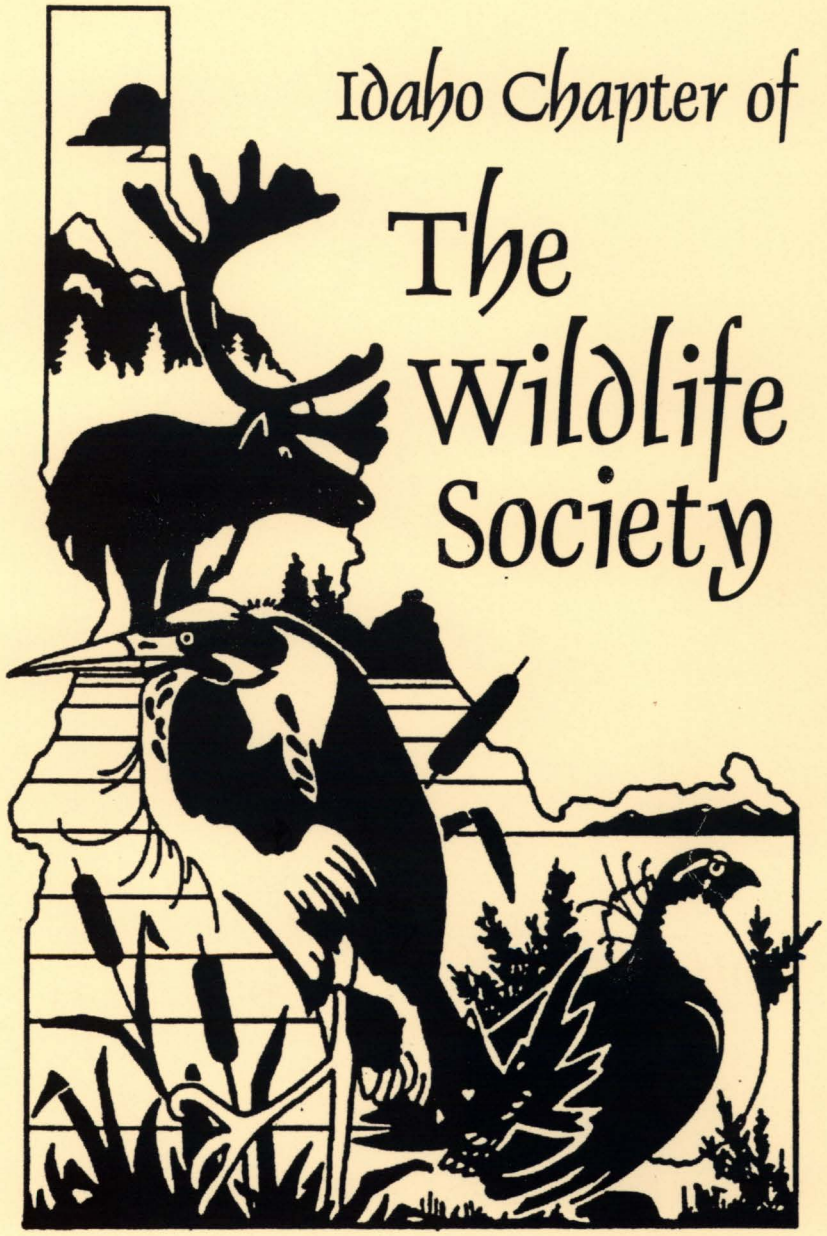
Program and Abstracts

1999 Annual Meeting

March 4—6, 1999 Boise, Idaho



Idaho Chapter of The Wildlife Society

The Grove Hotel
245 South Capitol Blvd.
Boise, Idaho

IDAHO CHAPTER
THE WILDLIFE SOCIETY
Annual Financial Report
Calendar Year 1998
by
Anthony D. Apa, Treasurer
February 28, 1999

Beginning balance - January 1, 1998	Checking	$1,998.33
	Short-term bond	3,034.98
	Total	5,033.31
Income 1/1/98 through 12/31/98	Checking	$9,331.20
	Short-term bond	186.56
	Total	9,517.76
Subtotal	Checking	$11,329.53
	Short-term bond	3,221.54
	Total	14,551.07
Expenses 1/1/98 through 12/31/98		$6,680.69
Ending balance - December 31, 1998	Checking	$4,648.84
	Short-term bond	3,221.54
		7,870.38

Checking Balance to Date:

Balance 12/21/98	$4,648.84
Expenses 1/1/99 - 2/28/99	-2,970.23
Income 1/1/99 - 2/28/99	+934.82
Balance 2/28/99	**$2,613.82**

- Hotel expenses #2200 of this
#6000
+ 500 ED Forum
3,113.82

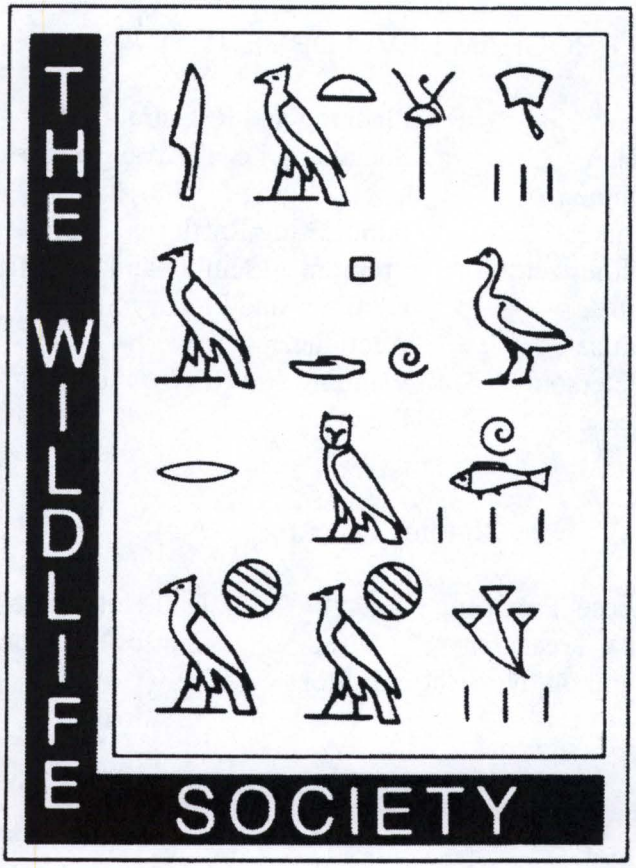
1998 Detailed Income and Expenses

Income Sources:

Annual Meeting	$7,324.00
Membership Dues	1,935.00
Bond Dividend	186.56
Checking Interest	72.20

Expenses:

Annual Meeting	$4,363.10
Newsletter	1,254.93
NW Section Dues	35.00
Youth Camp	500.00
Idaho 4-H	500.00
Misc. Expenses	27.66


THE WILDLIFE
SOCIETY

IDAHO CHAPTER OF ***THE WILDLIFE SOCIETY***

1999 ANNUAL MEETING—BOISE, IDAHO

WILDLIFE MANAGEMENT: ***WINDS OF CHANGE***

PROGRAM DEVELOPMENT:

Tony Apa	Planning and Registration
Chuck Blair	Social and Local Arrangements
Alan Dohmen	Paper Judging
Tom Hemker	Fundraising/Raffle
Toni Holthuijzen	Program Assembly and Facilities
Ted Koch	Facilities and Plenary Session
Sam Mattise	Auctioneer
Chuck Peterson	Planning and Registration
Kerry Reese	Planning

Chapter Officers:

Kerry Reese, President
Toni Holthuijzen, Vice President
Tony Apa, Treasurer
Charles Peterson, Secretary
Brad Compton, Newsletter Editor

Sponsors: Idaho Power Company

Idaho Chapter of The Wildlife Society

1999 Annual Meeting Agenda

Wildlife Management: ***Winds Of Change***

Wednesday, March 3 (Evergreen Room)

8:00–5:00 pm	**Rare Animal Workshop**—Chairperson: Chuck Harris
8:00–10:00pm	**Registration**—The Grove Hotel 2nd Floor (Landing II)

Thursday, March 4 (Evergreen Room)

ICTWS Annual Meeting

7:00–8:00am	**Registration**—The Grove Hotel 2nd Floor (Landing II)
8:00–8:20am	**Welcome and Introductions**—Cindy Deacon Williams, Idaho Chapter of the American Fisheries Society President, and Kerry Reese, Idaho Chapter of the Wildlife Society President
8:20–8:30	Introduction to Keynote Address and Speaker Ted Koch
8:30–8:45	Army Corps of Engineers Environmental Impact Statement on Breaching of the Four Lower Snake River Dams. Pat Biglow
8:45–9:15am	**Keynote Address**: Dr. Chris Frissell
9:15–10:00	Economic, Social, and Political Dimensions of Dams and Salmon and Steelhead
10:00–10:30am	**Break**
10:30am–12:00pm	**Session A: Riparian Systems**—Chairperson: Victoria Saab
10:30am	IMPORTANCE OF SPATIAL SCALE TO HABITAT USE BY BREEDING BIRDS IN COTTONWOOD RIPARIAN FORESTS Victoria Saab
11:00am	RIPARIAN HABITAT AND SEMI-AQUATIC FURBEARERS Wayne Melquist

11:30am	AN ECOSYSTEM DIVERSITY MATRIX FOR RIPARIAN AND WETLAND SYSTEMS Carolyn A. Mehl, Jonathan B. Haufler, and Rex Sallabanks
12:00–1:00pm	**Lunch**
1:00–2:00pm	**Session A (Continued): Riparian Systems**—Chairperson: Victora Saab
1:00pm	EFFECTS OF WATERSHED AND RIPARIAN CONDITIONS ON THE DISTRIBUTION AND ABUNDANCE OF STREAM AMPHIBIANS Kirk Lohman
1:30pm	IMPACTS OF HUMAN ACTIVITIES ON RIPARIAN REPTILES IN IDAHO Charles Peterson
2:00–3:20pm	**Session B: Birds of Prey**—Chairperson: Greg Kaltenecker
2:00pm	LONG-TERM TRENDS IN PRAIRIE FALCON ABUNDANCE AND REPRODUCTION IN SOUTHWESTERN IDAHO K. Steenhof, M. N. Kochert, R.N. Lehman, and L.B. Carpenter
2:20pm	A SURVEY OF THE RAPTOR COMMUNITY IN THE HELLS CANYON AREA Von R. Pope and Anthonie M.A. Holthuijzen
2:40pm	ASPECTS OF WINTERING BEHAVIOR OF URBAN-ADAPTED RAPTORS Bruce Haak and Leon Powers
3:00pm	CORRELATION BETWEEN NUMBERS OF SONGBIRDS AND RAPTORS OF THE GENUS *ACCIPITER* DURING FALL MIGRATION IN SOUTHWEST IDAHO Greg Kaltenecker, Jay Carlisle, Sarah Hamilton, and Marc Bechard
3:20–3:45pm	**Break**
3:45–5:00pm	**Business Meeting of the ICTWS**—all are encouraged to attend
5:00–6:00pm	**Workshop**—Wildlife Certification Chuck Harris and John Haufler
7:00–9:30pm	**Idaho Bat Working Group Meeting** Idaho Dept. of Fish and Game, 600 S. Walnut, Boise

Friday, March 5 (Evergreen Room)

7:30–8:00am	**Registration**—The Grove Hotel 2nd Floor (Landing II)
8:00–10:00am	**Session C: Landscape Ecology**—Chairperson: Steve Knick
8:00am	A GAP ANALYSIS OF IDAHO LAND COVER TYPES Jason W. Karl, J. Michael Scott, Nancy Wright, Eva Strand, Philip Tanimoto
8:20am	ROCKS AND ICE REVISITED: AN ASSESMENT OF THE GEOGRAPHICAL AND ECOLOGICAL DISTRUTIION OF RESERVES IN THE UNITED STATES J. Michael Scott, and R. G. Wright
8:40am	AN ASSESSMENT OF IDAHO'S WILDLIFE MANAGEMENT AREAS FOR THE PROTECTION OF WILDLIFE Jason W. Karl, J.Michael Scott, Eva Strand, Nancy Wright
9:00am	FRAGMENTATION IN SHRUBSTEPPE: THE ROLE OF FRACTAL DIMENSION IN LAND MANAGEMENT Steven T. Knick
9:20am	DISTRIBUTION OF SMALL RANGE SPECIES AND DEVELOPMENT PATTERNS IN THE UNITED STATES Robbyn J.F. Abbitt
9:40am	PREDICTING THE OCCURRENCE OF WETLAND HABITATS USING GIS: IMPLICATIONS FOR PLANNING AMPHIBIAN SURVEYS Stephen R. Burton, John R. Lee, and Charles R. Peterson
10:00–10:20am	**Break**
10:20am–12:00pm	**Session D: Wildlife Management Techniques**— Chairperson: Signe Sather-Blair
10:20am	CONSERVATION BY DESIGN: THE NATURE CONSERVANCY'S NEW APPROACH TO CONSERVATION IN IDAHO Catherine Hurd and Alan Sands
10:40am	ADAPTIVE MANAGEMENT AT GRAYS LAKE NATIONAL WILDLIFE REFUGE, IDAHO Bill Pyle, Jane Austin, Douglas Johnson, and Janet Keough

11:00am	VOLUNTEERS AND PLANTING TECHNIQUES FOR RESTORING SOUTHWESTERN IDAHO RIPARIAN HABITATS Mary Dudley
11:20am	AN EVALUATION OF TECHNIQUES USED TO ESTIMATE POPULATION TRENDS OF CANADA GEESE Walt Bodie
11:40am	MAINTENANCE AND CREATION OF DEN STRUCTURES SUITABLE FOR CARNIVORES Timothy K. Brown and Tim Holden
12:00–1:00pm	**Lunch**
1:00–3:00pm	**Session F: Nongame Birds**—Chairperson: Helen Ulmschneider
1:00pm	IDAHO'S SHRUBSTEPPE BIRDS: WHERE AND WHY ARE THEY DECLINING? Jonathan Bart
1:20pm	INFLUENCE OF SHRUBSTEPPE FRAGMENTATION ON PRODUCTIVITY, NATAL DISPERSAL, AND HABITAT SELECTION BY SAGE THRASHERS Bruce C. Schoeberl and Steven T. Knick
1:40pm	HELLS CANYON AVIFAUNA Natalie Sunderman and Anthonie M .A. Holthuijzen
2:00pm	IDENTIFYING NEST PREDATORS OF FOREST SONGBIRDS IN WEST-CENTRAL IDAHO Kevin S. Warner and Rex Sallabanks
2:20pm	STATUS OF THE WHITE-FACED IBIS: BREEDING COLONY DYNAMICS OF THE GREAT BASIN POPULATION, 1985—1997 Susan L. Earnst, Larry Neel, Gary L. Ivey, and Tara Zimmerman
2:40pm	RIPARIAN BIRD POPULATION INCREASES WITH IMPROVED RIPARIAN CONDITION IN EAST-CENTRAL IDAHO Helen Ulmschneider
3:00–3:20pm	**Break**

3:20–5:00pm	**Session G: Potpouri**—Chairperson: Jim Clark
3:20pm	MULE DEER POPULATION MONITORING IN IDAHO James W. Unsworth and Chad J. Bishop
3:40pm	THE CLEARWATER ELK INITIATIVE: AN ADAPTIVE APPROACH TO A LARGE-SCALE MANAGEMENT CHANGE Gregg Servheen, Leona Bomar, George Pauley, Pete Zager, and Michelle Craig
4:00pm	THE ENDANGERED SPECIES ACT AND LYNX CONSERVATION IN IDAHO: PARANOIA AND POLITICS OVER BIOLOGY Dennis Murray
4:20pm	NEW PERSPECTIVES ON RECOVERY OF THE NORTHERN IDAHO GROUND SQUIRREL Rich Howard
4:40pm	A PRELIMINARY SURVEY OF WESTERN TOAD (*BUFO BOREAS*) BREEDING SITES BELOW HELLS CANYON DAM Jonathan M. Beck and Kelly D. Wilde
6:00–11:00pm	**Social and Auction** **Awards** Music by Bitterbrush Blues Band Auctioneer ICTWS—Sam Mattise

Saturday, 6 March (Evergreen Room)

8:00-10:00am	**Session H: Upland Gamebirds**—Chairperson: Allan Sands
8:00am	PLANNING FOR SAGE GROUSE IN SHOSHONE BASIN: FROM CONFLICT TO CONSENSUS Paul D. Makela, Anthony D. Apa and Randall B. Smith
8:20am	SHOSHONE BASIN SAGE GROUSE VEGETATION CLASSIFICATION EFFORT Todd A. Black and Wendy Goetz
8:40am	NESTING HABITAT AND MOVEMENTS OF SYMPATRIC SAGE AND COLUMBIAN SHARP-TAILED GROUSE IN SOUTHEASTERN IDAHO Anthony D. Apa, Kerry P. Reese, and Jack W. Connelly

9:00am	CAUSE-SPECIFIC MORTALITY OF JUVENILE SAGE GROUSE IN SOUTHEASTERN IDAHO Matthew B. Lucia, Kerry P. Reese, and John W. Connelly
9:20am	SAGE GROUSE RESPONSE TO PINYON-JUNIPER MANAGEMENT Michelle L. Commons, Richard K. Baydack, and Clait E. Braun
9:40am	IS HUNTER HARVEST REPRESENTATIVE OF AGE RATIOS IN BLUE GROUSE POPULATIONS? Hollie Miyasaki and Kerry Reese
10:00am	HABITAT, MOVEMENTS, AND NESTING OF CHUKAR PARTRIDGE IN EASTERN OREGON Hanspeter P. Walter, Kerry P. Reese, and Walt Van Dyke
10:20am	**Meeting Ends** Have a safe drive home and see you next year!

Posters

I. THE LAND COVER OF IDAHO
Jason W. Karl, Michael J. Scott, and Nancy Wright

II. IDAHO BIRD OBSERVATORY
Greg Kaltenecker and Marc J. Bechard

III. WOLVERINE SURVEY IN THE SEVEN DEVILS MOUNTAINS OF IDAHO
Frank B. Edelmann and Jeff Copeland

Abstracts

ARRANGED IN

ALPHABETICAL ORDER

BY SENIOR AUTHOR

DISTRIBUTION OF SMALL RANGE SPECIES AND DEVELOPMENT PATTERNS IN THE UNITED STATES. Robbyn J.F. Abbitt. University of Idaho, Moscow, Idaho 83843.

In a world constantly expanding and eliminating native habitats, small range species are at greater risk of endangerment than those species with larger, more diverse ranges. In order to prevent these species from becoming the next generation of threatened and endangered species, it is integral to know where these species are located, as well as development trends in these same locations. This study has mapped the location of small range species of birds and butterflies on a county scale in the United States. The two taxa distributions were combined and any hot spots (counties with high numbers of both taxa) identified. Those counties and states with the highest growth rates have also been identified and mapped using geographic information systems (GIS). Results of these analyses indicate that (1) there is a relatively high county of occurrence correlation between the two taxa, (2) hot spots of these small range species occur in counties along the southern border of the United States including the states of California, New Mexico, Arizona, Texas, and Florida, and (3) Arizona, New Mexico, Texas, California, and Florida have been, and will continue to be, among the fastest growing states in the U.S. (based upon population). This southern trend relates directly to the results of previous studies that identified counties with the highest numbers of currently endangered species. By identifying these similar county subsets, it is possible that efforts to protect listed endangered species in these counties may simultaneously protect habitat for small range species of birds and butterflies.

NESTING HABITAT AND MOVEMENTS OF SYMPATRIC SAGE AND COLUMBIAN SHARP-TAILED GROUSE IN SOUTHEASTERN IDAHO. Anthony D. Apa, Idaho Department of Fish and Game, Kerry P. Reese, University of Idaho, and Jack W. Connelly, Idaho Department of Fish and Game.

From 1988-91, we investigated the nesting habitat use and movements of sympatric female sage (Centrocercus urophanianus) and Columbian sharp-tailed grouse (Tympanuchus phasianellus columbianus) in the Curlew Valley region of southeastern Idaho. We radio-marked 85 (37 sage and 48 Columbian sharp-tailed grouse) female grouse. Sage grouse nest success (44%). Hens that nested under shrubs, other than sagebrush, were not successful. Columbian sharp-tailed grouse nest success (51%). All Columbian sharp-tailed grouse that nested in native vegetation were successful, while 45% that nested in non-native vegetation were successful. Sage grouse moved over twice as far from the lek of capture to nest than did Columbian sharp-tailed grouse. Sage grouse nested in higher elevation sites, while Columbian sharp-tailed grouse nested in lower elevation sites. Sagebrush canopy cover and site slope were predictive in the segregation of sage and Columbian sharp-tailed grouse nesting habitat. Female sage grouse were more specialized in nesting habitat use, while Columbian sharp-tailed grouse were generalized. In situations where sage and Columbian sharp-tailed grouse occur sympatrically, rangelands should be managed to meet the habitat requirements of the more specialized grouse species, sage grouse.

IDAHO'S SHRUBSTEPPE BIRDS: WHERE AND WHY ARE THEY DECLINING? Jonathan Bart, Snake River Field Station, USGS, Boise, Idaho 83706.

Breeding Bird Survey (BBS) data and other sources of information indicate that several shrub steppe birds (e.g., sage grouse, Brewer's sparrow, sage thrasher) are declining in Idaho and elsewhere in the west. We extend these analyses by calculating trends for individual BBS routes and then examining spatial pattern in the trends and their relationship to habitat data including a land use/land cover layer derived by the US Geological Survey and recently made available on the Internet. The results will be used to describe more accurately than heretofore possible where and under what conditions shrub steppe birds are declining most rapidly.

A PRELIMINARY SURVEY OF WESTERN TOAD (*BUFO BOREAS*) BREEDING SITES BELOW HELLS CANYON DAM. Jonathan M. Beck, Dames & Moore, Boise, Idaho and Kelly D. Wilde, Idaho Power Company, Boise, Idaho.

Western toads (*Bufo boreas*) breed in ponds, shallows of lakes, and slow moving streams. On large rivers and high gradient streams where there are no slow moving areas, toads breed in overflow or "backwater" ponds. Backwater ponds are typically created when flood events deposit large amounts of sand and gravel along the shoreline. As flood waters recede and water levels drop throughout the summer, backwater ponds develop in oxbows, behind gravel bars, and in depressions scoured in sand deposits. On the Snake and Salmon Rivers, these ponds are used extensively by western toads. The development of dams along the Snake River, particularly above Hells Canyon, has reportedly reduced the amount of sand deposited along the shores of Hells Canyon. The apparent reduction of sand deposition caused Tim Palmer to hypothesize (*in* The Snake River Window to the West) that backwater toad breeding areas were being eliminated below Hells Canyon Dam and thus, forcing the extinction of western toads in Hells Canyon. Palmer's hypothesis increased our interest in determining the current status of toads below Hells Canyon Dam. During the spring and summer of 1996, 1997, and 1998 we surveyed 16 backwater ponds for breeding western toads. Forty-four percent of the ponds contained western toads and 25 % exhibited evidence of breeding. Toads are breeding below Hells Canyon Dam and appear to be doing well. However, we did not find numerous breeding sites. This may be attributed to many factors that this survey was not designed to determine (i.e., the impacts of dams on toad populations or toad breeding habitat), however it provides baseline data and raises new questions that can only be answered with more rigorous studies.

SHOSHONE BASIN SAGE GROUSE VEGETATION CLASSIFICATION EFFORT. Todd A. Black and Wendy Goetz, Utah State University, Land Ecology and Modeling Assessment Center (LEMA), Logan, Utah.

A major stumbling block in sage grouse (*Centrocercus urophasianus*) habitat conservation efforts is the lack of baseline habitat data and current vegetation maps (specifically sagebrush canopy coverage) for large areas (360,000 +acres). In 1998, a partnership was formed between the Bureau of Land Management (BLM), Idaho Department of Fish and Game (IDF&G), and the Land Ecology and Modeling Assessment Center (LEMA) at Utah State University Remote Sensing/GIS Lab to address this problem. Our efforts were directed at refining the 1998 Idaho GAP Analysis sagebrush vegetation layers to better suit the needs of area biologists in their efforts to manage sage grouse. Field data, including topographic information, vegetation composition, canopy coverage and structure, were collected by the IDF&G. Classification efforts began in early September of 1998. By using field data and other types of digital data layers, a final vegetation GIS database was produced. This database will further assist biologists in their efforts to protect and manage sage grouse and their habitat.

AN EVALUATION OF TECHNIQUES USED TO ESTIMATE POPULATION TRENDS OF CANADA GEESE. Walt Bodie. Idaho Department of Fish and Game, Nampa, Idaho 83686.

Trend or population estimates are needed to effectively manage Great Basin Canada goose (*Branta canadensis moffitti)* populations in the Pacific Northwest. I evaluated a management technique in current use and 2 additional techniques to monitor breeding ground population trends in southwest Idaho by comparing the precision of estimation techniques and comparing their relationship to nest counts and fall trend surveys. The additional techniques included a modified management technique (research technique) designed to standardize survey procedures and a stratified-random sampling scheme to estimate population trends over all of southwest Idaho. Pair and total number of geese counted on management breeding ground counts had higher coefficients of variation than for similar data collected on research counts ($P = 0.023$). None of the parameters measured on either type of survey correlated significantly with ground nest counts ($P > 0.05$). Breeding season and pre-hunting season stratified-random surveys produced population trend estimates with high degrees of precision and therefore may be useful in monitoring local goose population trends. Standard operating procedures for conducting management surveys to reduce variation in estimates and for conducting stratified-random surveys were developed.

MAINTENANCE AND CREATION OF DEN STRUCTURES SUITABLE FOR CARNIVORES. Timothy Kent Brown, Frontier Tree and Wildlife, Bellevue, Washington 98008, and Tim Holden, Boise National Forest, Cascade Ranger District, McCall, Idaho 83638.

Many forests lack trees and logs with hollows, crevices and cavities used by forest carnivores for birthing dens, food stashes,shelter and hibernation. Priority should be given to maintaining no-work zones around wildlife trees in loggins, fire suppression activities and recreational sites. Furthermore, rather than destroying habitat chainsaws can be weilded to maintain and/or enrich habitat. Thoughtful habitat development using mechanical means to create tree-form heterogeneity (wildlife trees) and forest floor structures will restore dens with suitable microclimates for species requirements. By sculpting cavities for bear, marten, fisher, squirrels and mice we can reduce the impact of diminishing natural habitats for a variety of wildlife and restore these opportunities.

PREDICTING THE OCCURRENCE OF WETLAND HABITATS USING GIS: IMPLICATIONS FOR PLANNING AMPHIBIAN SURVEYS. Stephen R. Burton, John R. Lee, and Charles R. Peterson. Idaho State University, Pocatello, Idaho.

When biological surveys are conducted with limited resources over a large area, efficient selection of study sites becomes critical. Ideally, sample sites are randomly selected from among all areas having suitable habitat. Where relatively small patches of appropriate habitat are scattered throughout a much larger area, locating potential study sites can require large amounts of time and labor. For amphibian surveys, considerable effort could be conserved if areas of suitable habitat (i.e., wetlands) were identified during the planning stages of the study. Our goal was to evaluate the usefulness of Geographic Information System (GIS) technology in identifying potential amphibian habitat. We used data from three sources: (1) USGS Digital Elevation Models (DEM?s); (2) the 1998 Idaho GAP Analysis Land cover classification map; and (3) National Wetland Inventory (NWI) maps. We used wetland locality information collected from 1996-1998 amphibian surveys of the Caribou National Forest to build and test spatial models predicting wetland occurrence. Alone, these data sets either under-predicted (NWI, GAP) or over-predicted (DEM) the occurrence of wetlands. The data sets were combined and queried for features (e.g., slope, vegetation, NWI classification) associated with known wetlands. Models based on the query results had higher prediction accuracy than the individual data sets. These models will decrease the time and effort required for conducting surveys by narrowing the areas to be searched.

SAGE GROUSE RESPONSE TO PINYON-JUNIPER MANAGEMENT. Michelle L. Commons, Idaho Department of Fish and Game, Richard K. Baydack, University of Manitoba, and Clait E. Braun, Colorado Division of Wildlife.

The response of Gunnison sage grouse (*Centrocercus minimus*) to management of pinyon-juniper (*Pinus edulis* - *Juniperus* spp.) was studied in southwestern Colorado during 1994-1997. Near Crawford, CO, numbers of male sage grouse using leks within 100 m of live pinyon-juniper were depressed because of increased raptor presence and predation associated with coniferous trees/shrubs. Removal, by cutting, of pinyon-juniper trees/shrubs in association with brush-beating to reduce height of mountain big sagebrush (*Artemisia tridentata vaseyana*) and deciduous brush resulted in doubling numbers of male sage grouse counted on treatment leks in years 2 and 3 post-treatment. Clearing of young age classes of pinyon-juniper that have spread into sagebrush shrub-steppe appears to have great merit for enhancing sage grouse use of treated areas through increased survival, productivity, and recruitment. This is especially significant in management of small-populations of sage grouse in highly fragmented habitats which may be locally threatened with extirpation.

VOLUNTEERS AND PLANTING TECHNIQUES FOR RESTORING SOUTHWESTERN IDAHO RIPARIAN HABITATS. Mary Dudley, Idaho Department of Fish and Game, Boise, Idaho.

Restoration of protected riparian areas may be hastened and enhanced by planting native trees and shrubs. There is no exact science to successful planting due, in part, to the uniqueness of individual creeks and rivers. There *are* sound guidelines to follow. Trying different techniques to fit diverse situations is important. Obtaining quality plants whose seed source is local is best. If cuttings or poles are planted, harvesting them from a local source, preferably from along the same stream, is desirable. Another key element in establishing native riparian species involves selecting the best possible planting sites for survival. Sometimes there is a need for replanting or additional plantings or adding more species as they become available or as the site stabilizes. Properly trained and supervised volunteers can make riparian restoration projects feasible. Planting is labor intensive and requires dedicated people who plant with care. A highly motivated volunteer crew will accomplish a tremendous amount of quality work. Volunteers can also assist with riparian monitoring. Monitoring helps to determine which methods work at a particular site, thus contributing to the success of future restoration efforts.

STATUS OF THE WHITE-FACED IBIS: BREEDING COLONY DYNAMICS OF THE GREAT BASIN POPULATION, 1985 - 1997. Susan L. Earnst, Larry Neel, Gary L. Ivey, and Tara Zimmerman. USGS Forest & Rangeland Ecosystem Science Center, Snake River Field Station, 970 Lusk, Boise Idaho 83706.

The status of the White-faced Ibis (*Plegadis chihi*) in the Great Basin is of concern because of its small population size and the limited and dynamic nature of its breeding habitat. We analyzed existing annual survey data for the White-faced Ibis breeding in the Great Basin and surrounding area for 1985 - 1997. Methods varied among colonies and included flight-line counts and fixed-wing aircraft and helicopter surveys. The number of White-faced Ibis breeding pairs in the Great Basin area has nearly tripled since 1985, despite years of severe flooding and drought at major breeding areas. This growth is reflected in both peripheral (i.e., Oregon, California, Idaho) and core (i.e., Nevada and Utah) components of the population. Our data on colony dynamics illustrate the ability of the highly nomadic White-faced Ibis to compensate for poor conditions at traditional sites by moving among colonies and rapidly colonizing newly available wetlands. Their nomadic nature and the dynamic nature of their breeding habitat suggests that the White-faced Ibis would benefit from a landscape mosaic of well-distributed peripheral wetlands and persistent colony sites, and a regional management and monitoring protocol.

WOLVERINE SURVEY IN THE SEVEN DEVILS MOUNTAINS OF IDAHO. Frank B. Edelmann, Idaho Power Company, Boise, Idaho 83707, and Jeff Copeland, Idaho Department of Fish and Game, Idaho Falls, Idaho 83401 (**POSTER**).

Wolverine (*Gulo gulo*) populations are suspected to be small and vulnerable to local extinction. However, the distribution and connectivity of populations is largely unknown. We investigated the importance of the Seven Devils Mountains for connecting wolverine populations in Idaho and Oregon by identifying the proximity of natural-heritage database observations to the Seven Devils Mountains, and surveying suitable habitat as predicted by the GIS model of Hart et al. (1996). Mapping database observations suggested 3 relatively distinct subpopulations in the 1) Cascade Mountains of Washington, 2) Cascade Mountains of Oregon, and 3) the Rocky Mountains of Idaho. A scattering of observations across mountainous habitats of central Oregon also suggested that the Seven Devils lie at the eastern end of an east-west movement corridor potentially linking subpopulations in Oregon and Idaho. Hence, these subpopulations may be related through metapopulation dynamics. We confirmed one set of wolverine tracks during a helicopter survey in March 1998. Although present at the time of the survey, no observations of living wolverines were previously reported in the Seven Devils. The lack of observations may have been due to low dispersal rates because the Seven Devils are surrounded by deep gorges and agriculture dominated lowlands. Regardless, the Seven Devils provide the nearest mountainous habitat linking the central Idaho mountains with the adjacent Wallowa and Blue mountains of Oregon. Low dispersal may impact the regional viability metapopulations by lowering the likelihood that suitable habitat patches are colonized and recolonized over time. Hence, maintaining and enhancing the integrity of movement corridors between the Seven Devils and other contiguous mountain habitats in Idaho and Oregon may be essential for ensuring wolverine persistence at a regional scale.

ASPECTS OF WINTERING BEHAVIOR OF URBAN-ADAPTED RAPTORS. Bruce Haak, Idaho Dept. Fish and Game, Nampa, and Dr. Leon Powers, Northwest Nazarene College, Nampa, Idaho

Little information exists on habitat use, activity patterns and urban-adaptations of small accipiter hawks and small falcons during winter. Between the winters of 1997 and 1999 two Cooper's hawks (*Accipiter cooperii*), two sharp-shinned hawks (*A. striatus*) and one merlin (*Falco columbarius*) were trapped in or near Nampa and fitted with tail-mounted radio-transmitters. NNC students and volunteers collected telemetric locations and direct observations that yielded information on home range, perch selection, foraging behavior, prey species and night-roosting behavior. All raptors used urban, suburban and rural habitats.

NEW PERSPECTIVES ON RECOVERY OF THE NORTHERN IDAHO GROUND SQUIRREL. Rich Howard, U.S. Fish and Wildlife Service, Snake River Basin Office, 1387 South Vinnel Way, Rm. 368, Boise, Idaho 83709.

Adaptive management has many interpretations but mostly it is biologists arriving at common goals as to how one should implement recovery strategies for species and their habitat. In 1985, surveys for thenorthern Idaho ground squirrel (*Spermophilus brunneusBrunneus*) revealed a population of about 5,000 animals.Interim surveys since then revealed a declining trend. In 1995, the Fish and Wildlife Service took notice of the sustained and declining trends. Surveys conducted by scientists from Cornell University and Albertson College demonstrated an 82 % decline of this species in 10 years. An adaptive management plan was structured around habitat modifications, translocations, and cooperation between several agencies and private landowners. Implementation began in 1996 with a Conservation Agreement signed between the U.S. Fish and Wildlife Service and Payette National Forest with full support from the Idaho Department of Fish and Game –Nongame Division. While trends are still downward and the species has been proposed to be listed as threatened under the Endangered Species Act, conditions may change in time to save the northern Idaho ground squirrel from extinction.

CONSERVATION BY DESIGN: THE NATURE CONSERVANCY'S NEW APPROACH TO CONSERVATION IN IDAHO. Catherine Hurd and Alan Sands, The Nature Conservancy, Boise, Idaho 83705.

Since 1951, The Nature Conservancy has worked to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Advances in conservation biology including the role of patterns and processes in maintaining biodiversity, and the increased use of local decision making, market-based solutions, and collaborative models has prompted the Conservancy to develop a new approach to conservation - "Conservation by Design". The goal of Conservation by Design is to ensure the long-term survival of all viable native species and community types through the design and conservation of portfolios of sites within ecoregions. Sites will be selected to encompass multiple occurrences of target elements within an area that can sustain conservation activities. Eight strategic themes will be used to guide the activities of the Conservancy at every level in the organization. In Idaho, 4 ecoregions have been defined: the Columbia Plateau, the Idaho Batholith, the Canadian Rocky Mountains, and the Utah-Wyoming Rocky Mountains. The preliminary plan for the Columbia Plateau is complete. The plan for the Idaho Batholith currently is under development. Plans for the Canadian Rocky Mountains and the Utah-Wyoming Rocky Mountains are slated to begin in January, 2000, and 2001, respectively. Conservation by Design will allow the Conservancy to operate on a scale large enough to contribute to meaningful, long-term protection; to establish a final goal and measure progress towards its completion; and to determine the manner and extent to which our partners have contributed to our goal.

IDAHO BIRD OBSERVATORY. Greg Kaltenecker and Marc Bechard. Idaho Bird Observatory, Department of Biology, Boise State University, Boise, Idaho 83725 (**POSTER**).

The Idaho Bird Observatory conducts long-term research and monitoring of western migratory raptors, passerines, and other birds. We conduct daily standardized raptor counts, raptor banding, songbird counts, and songbird netting during autumn migration. From 3000-8000 raptors are counted each fall. Daily songbird counts are conducted to assess habitat use by migrants on the Boise Ridge. Daily mist netting is conducted to determine species composition, age and sex structure, body condition, and length of stopover of migrants. The Idaho Bird Observatory promotes wildlife viewing, public education, and public involvement. An organized volunteer program involves interested community members. The Idaho Bird Observatory is a non-profit research and education extension of Boise State University, and has many cooperators including Idaho Dept. of Fish and Game, the U.S. Forest Service, Boise Cascade Co., U.S. Bureau of Land Management, U.S. Geological Survey, Golden Eagle Audubon, and HawkWatch International.

CORRELATION BETWEEN NUMBERS OF SONGBIRDS AND RAPTORS OF THE GENUS *ACCIPITER* DURING FALL MIGRATION IN SOUTHWEST IDAHO. Greg Kaltenecker, Jay Carlisle, Sarah Hamilton, and Marc Bechard, Idaho Bird Observatory, Department of Biology, Boise State University, Boise, Idaho 83725.

We conducted daily counts of migrating raptors from Lucky Peak, located in southwest Idaho. A total of 5836 raptors of 18 species were recorded between 24 August and 1 November 1997 including Sharp-shinned Hawks (*Accipiter striatus*), Cooper's Hawks (*A. cooperii*), and Northern Goshawks (*A. gentilis*). Concurrent with counts of migrant raptors, we conducted daily censuses and mist netting of migrant songbirds at Lucky Peak. We combined totals from daily songbird counts, netting, and incidental observations to determine a Daily Estimated Total (DET) number of passerines within the study area. A total of 7049 songbirds of 54 species were recorded at Lucky Peak. We compared daily counts of accipiters with songbird DET's using a Spearman Correlation. Accipiter flights were directly correlated with songbird numbers at Lucky Peak. Daily weather conditions favorable to raptor migration at Lucky Peak also contributed to strong migrations of passerines.

THE LAND COVER OF IDAHO. Jason W. Karl, Michael J. Scott, Nancy Wright. Idaho Cooperative Fish and Wildlife Research Unit. University of Idaho, Moscow, Idaho 83844-1141 (**POSTER**).

The Idaho Cooperative Fish and Wildlife Research Unit's Landscape Dynamics Lab compiled the Idaho Land Cover Classification from Redmond et al.'s (1997) Current Vegetation Map of Northern Idaho and Western Montana and Homer's (1998) Idaho/Western Wyoming Landcover Classification. These sources were crosswalked and merged to produce a unified land cover map for Idaho. This coverage is stored as an ARC/INFO grid with a 0.09 ha (30 m) cell size and a 2 ha minimum mapping unit. For display, this data has been resampled to a 2 ha (200m) cell size. Accuracy is estimated at 67.27% (range 53.89% to 93.39%) for northern Idaho based on a scene by scene fuzzy set analysis. For southern Idaho, accuracy is estimated at 69.3% (range 63.6% to 79.3%) based on total percent correct over 9 regions. This data set and documentation can be downloaded from: http://www.wildlife.uidaho.edu

AN ASSESSMENT OF IDAHO'S WILDLIFE MANAGEMENT AREAS FOR THE PROTECTION OF WILDLIFE. Jason W. Karl, J.Michael Scott, Eva Strand, Nancy Wright. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho 83844-1141.

Idaho established its first wildlife management area in 1909. Since then, a network of 30 Wildlife Management Areas (WMA's), administered by Idaho Department of Fish and Game, has been established across the state. We used wildlife habitat relationship models developed for the Idaho Gap Analysis project to assess the contribution of Idaho's WMA's to conservation of Idaho's wildlife. A Geographic Information System (GIS) was used to produce lists of how many of 368 breeding species were predicted to occur on each of the 30 WMA's. Species richness of WMA's ranges from 95 to 267 (mean 179). 92% of Idaho's wildlife are predicted to occur in at least one WMA. 67% of federally listed threatened or endangered species occur within Idaho's WMA's. 15% of the species were predicted to occur on less than 3 WMA's. 10% of the species were predicted to occur on all WMA's. Further study is needed to validate the results of this study and assess the viability of populations within the WMA's. These results suggest that Idaho's WMA's are an integral part of Idaho's conservation network.

A GAP ANALYSIS OF IDAHO LAND COVER TYPES. Jason W. Karl, J. Michael Scott, Nancy Wright, Eva Strand, Philip Tanimoto. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho 83844-1141.

Successful conservation of Idaho's wildlife resources hinges on the preservation of sufficient habitats. We performed a Gap Analysis of Idaho's natural land cover types to examine the representation of wildlife habitats occurring on biological reserves across the state. The Idaho Land Cover Classification recognizes 72 natural land cover types. 34 cover types have less than 10% of their distribution in biological reserves. Seven cover types have more than 50% of their distribution in conservation. Of the cover types with less than 10% in biological reserves, most are riparian, desert shrub, grassland types. Among the most protected sites are non-vegetated (e.g. bare rock, lava, permanent snow) and some coniferous forest types. Because the presence of wildlife is dependent on suitable habitat, these results can be used to identify areas critical to successful conservation of Idaho's wildlife.

FRAGMENTATION IN SHRUBSTEPPE: THE ROLE OF FRACTAL DIMENSION IN LAND MANAGEMENT. Steven T. Knick, USGS Forest and Rangeland Ecosystem Science Center, Snake River Field Station, 970 Lusk Street, Boise, Idaho 83706.

The composition and configuration of a shrubsteppe landscape profoundly influences ecological processes within a system. Habitat delineation and definition of fragmentation in shrubsteppe habitats present greater challenges than in other habitats. Nonetheless, the spatial mosaic of shrublands is no less significant in influencing spread of invasive weeds, fire dynamics, and the distribution and abundance of animals. I describe measures of fragmentation, then demonstrate the effect of fragmentation on patterns of bird distribution, fire spread, and restoration of shrublands across a landscape. My objective is to develop a landscape approach to land management that incorporates habitat descriptions from remotely sensed data. Once the landscape is classified, fragmentation can be measured and critical regions identified in a GIS, using relatively simple spatial modeling tools, such as a moving window analysis. By approaching the landscape from spatial and temporal perspectives, nontrivial questions, such as minimum patch size requirements of a species, can be better defined and answered.

EFFECTS OF WATERSHED AND RIPARIAN CONDITIONS ON THE DISTRIBUTION AND ABUNDANCE OF STREAM AMPHIBIANS. Kirk Lohman. Department of Fish and Wildlife, University of Idaho, Moscow, Idaho 83844.

Changes in the structure and composition of watershed and riparian vegetation can dramatically alter stream habitats with detrimental effects on populations of obligate riparian species. Two amphibian species in Idaho are strictly dependent upon stream and riparian habitats in forested watersheds, the tailed frog (*Ascaphus truei*) and the Idaho giant salamander (*Dicamptodon aterrimus*). In surveys of northern Idaho drainages, both species were more common in streams bordered by old-growth forests than by young or intermediate-growth forests and tailed frog densities were 3-fold greater in old than in young or intermediate-growth stream reaches. Occurrence of both species was also related to substrate conditions. Changes in riparian vegetation and watershed land use that increase stream sedimentation are likely to have detrimental impacts on stream-dwelling amphibians.

CAUSE-SPECIFIC MORTALITY OF JUVENILE SAGE GROUSE IN SOUTHEASTERN IDAHO. Matthew B. Lucia, Kerry P. Reese, Dept. Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844, John W. Connelly, Idaho Dept. of Fish and Game, Pocatello, Idaho 83204.

Historically, sage grouse (*Centrocercus urophasianus*) occupied the sagebrush-grassland habitat types of 15 states and 3 Canadian provinces. However, recent population trends indicate a precipitous decline in sage grouse breeding populations range-wide. Idaho has seen a 40% decline in the last 10 years. Based on available data throughout the species' range and documented habitat changes in Idaho, population declines may be due to low juvenile survival associated with decreasing quantity and quality of brood-rearing habitat. Our objectives are to estimate survival rates, document mortality agents, and document movement patterns of juvenile sage grouse in southeastern Idaho. These data will be analyzed and compared to adult sage grouse survival rates and compared between a fragmented, relatively xeric habitat dominated by Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) and agriculture and a mountain valley habitat dominated by mountain big sagebrush (*A. t. vaseyana*) largely unaltered by agriculture. Fieldwork began in summer 1997. Twenty-six juvenile sage grouse were captured by night-lighting on summer range and equipped with radio-transmitters. Preliminary results from 1997 fieldwork indicate predation as the most common cause of death of juveniles. Avian predators more commonly preyed on juveniles than did mammalian predators. Accidental deaths due to powerline collisions accounted for a relatively high percentage of juvenile deaths. There was no hunting mortality for the 1997 hunting season. Thirty-three juvenile sage grouse were radio-marked in 1998. Preliminary results from 1998 indicate similar mortality patterns.

PLANNING FOR SAGE GROUSE IN SHOSHONE BASIN: FROM CONFLICT TO CONSENSUS. Paul D. Makela, U.S. Bureau of Land Management, Burley, Anthony D. Apa and Randall B. Smith, Idaho Department of Fish and Game, Jerome, Idaho.

Shoshone Basin constitutes a significant stronghold for sage grouse (*Centrocercus urophasianus*) in south-central Idaho. The Basin is popular with game bird hunters and is promoted as a Watchable Wildlife Area. Concerns over sage grouse population trends escalated in the early 1990's. Standardized lek monitoring initiated by IDFG in 1987 documented 215 males. Total male attendance at the seven leks dwindled to 62 by 1990. Habitat management concerns also peaked at this time, as proposed seeding maintenance burns on public lands, and herbicide sprays on private lands threatened to fragment potentially crucial sage grouse habitat. Range managers and livestock permittees were also concerned about the long-term stability of ranch operations. Data gaps and land ownership patterns necessitated creative solutions. With cover maps and supporting data, biologists developed a GIS-based "habitat quality map" delineating poor, fair and excellent nesting habitat. In 1994, the BLM initiated a working group to develop recommendations for landscape-level management in the Basin. Representatives from the BLM, IDFG, NRCS, Idaho Dept. of Lands, livestock permittees/private landowners and a concerned sportsman met regularly in facilitated meetings to identify and discuss resource issues and explore options. Smaller task-groups refined analyses and management proposals. Patience, flexibility, creativity, trust and mutual respect are essential for success. A Coordinated Resource Management Plan is nearing completion.

AN ECOSYSTEM DIVERSITY MATRIX FOR RIPARIAN AND WETLAND SYSTEMS. Carolyn A. Mehl, Jonathan B. Haufler, and Rex Sallabanks. Wildlife & Ecosystem Management Associates, 5 Yellow Pine Dr, Boise, Idaho 83716.

The ecosystem diversity matrix (EDM) is a landscape classification tool described by Haufler (1994) and Haufler et al. (1996, 1999) and can also function as a coarse filter for use in an ecosystem management process. When properly defined and mapped, a coarse filter will describe the amounts and distributions of ecological communities necessary for the maintenance and enhancement of biological diversity and ecosystem integrity; two of the basic ecological objectives of ecosystem management. Because of this important function, the coarse filter must be able to identify the range of ecological communities within the planning landscape in sufficient detail to account for the full occurrence and distribution of biological diversity. Furthermore, to adequately identify and understand this range of ecological communities, landscape classification systems must be able to integrate across terrestrial, riparian/wetland and aquatic systems. This paper introduces the EDM for riparian/wetland systems and provides a description of its use in landscape assessment and biodiversity documentation for ecosystem management in central Idaho. In addition, we specifically demonstrate the use of the riparian/wetland systems EDM for biodiversity documentation using the results of 2 years of bird data. The bird research revealed that the EDM distinguished differences in species abundance across the planning landscape based on the ecological communities defined in the matrix framework. Finally, the importance of the riparian/wetland systems EDM as a zone of integration between terrestrial and aquatic communities is also discussed.

RIPARIAN HABITAT AND SEMI-AQUATIC FURBEARERS. Wayne Melquist, Idaho Dept. of Fish and Game, 600 S. Walnut, P.O. Box 25, Boise, Idaho 83707.

Several species of semi-aquatic furbearers, including beaver, mink, muskrat, and otter, are highly dependent upon aquatic ecosystems for their survival. Each of these species have morphological and behavioral adaptations that allow them to persist in an aquatic environment under widely varying conditions. The beaver, through its dam-building ability, is unique in that it can alter the habitat to suit its needs, which, in turn, benefits the other furbearers and a host of other species. Human-constructed dams, on the other hand, have profound effects on semi-aquatic furbearers that depend on healthy riparian habitats. I will discuss various characteristics of each of these furbearers and comment on how dams and diversions can impact them.

IS HUNTER HARVEST REPRESENTATIVE OF AGE RATIOS IN BLUE GROUSE POPULATIONS? Hollie Miyasaki and Kerry Reese, Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844.

We tested the hypothesis that harvest data adequately represented the age ratio of a population of blue grouse (*Dendragapus obscurus pallidus*). Chick to hen ratios gathered from observations of radio-marked blue grouse broods during the late summer of 1996 and 1997 were compared with chick to hen ratios from check stations and wing barrels. There was no significant difference ($p=0.05$) when comparing radio-marked, check station, and wing barrel methods or between years. However, there were discrepancies in the wing barrel data of 61% more and 47% fewer chicks per hen than radio-marked ratios in 1996 and 1997, respectively. These results indicate that check station data is a reliable way to estimate productivity for the Cuddy Mountain blue grouse population. Wing barrel data were more variable and not the recommended method of gathering productivity information.

THE ENDANGERED SPECIES ACT AND LYNX CONSERVATION IN IDAHO: PARANOIA AND POLITICS OVER BIOLOGY. Dennis Murray, Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844.

Lynx are at the southern periphery of their range in Idaho, and although once present in areas including the Clearwater National Forest (CNF) they are now very rare in the area. The United States Fish and Wildlife Service is currently reviewing the status of lynx in the contiguous U.S. and may decide to list the species under the Endangered Species Act. The University of Idaho, in cooperation with the Idaho Department of Fish and Game and the United States Forest Service, had planned to release 40-60 lynx in the Clearwater during 1999-2000. Preliminary work undertaken on the CNF in anticipation of the release suggested that the area likely could support a viable population of lynx. Also, the Fish and Wildlife Service ruled that released lynx would not be covered under the Endangered Species Act were the species to be listed, because of their non-native status. However, opposition to the project was mounted by conservation groups and individual hunters; as a result of such pressure the State of Idaho eventually refused to issue an import permit for lynx. This occurred despite a permit being issued by the State of Colorado for release of lynx in that state. In this presentation I will describe the chronology of events that lead to the permit refusal, and show how the threat of listing lynx under the Endangered Species Act acted as a catalyst for misinformed public opposition and agency capitulation. I will conclude by suggesting that situations where the ESA will cause reintroduction programs involving controversial species to be compromised may become increasingly common in the future.

IMPACTS OF HUMAN ACTIVITIES ON RIPARIAN REPTILES IN IDAHO. Charles R. Peterson, Herpetology Laboratory, Department of Biological Sciences, Idaho State University, Pocatello, ID 83209-8007.

Although relatively few studies have specifically addressed the impacts of human activities on reptiles in riparian areas, a number of activities probably influence riparian reptiles either directly or indirectly. These include urbanization, agriculture, dams, channelization, roads, grazing, logging, and recreation. Of the 22 species of Idaho reptiles, only four species (Painted Turtles, Common Garter Snakes, Western Terrestrial Garter Snakes, and Rubber Boas) are closely associated with riparian habitats. Although none of these species have special status in Idaho, some concerns exist over population trends of Painted Turtles and Common Garter Snakes. Painted Turtles overwinter, breed, and forage in the water and often bask in riparian areas. Garter snakes and Rubber Boas often forage in riparian habitat, and their overwintering sites are usually located near riparian areas. Habitat loss, modification, and fragmentation, direct mortality from motorized vehicles, and reductions in the sizes of prey populations, probably account for most of the negative impacts on these reptiles.

A SURVEY OF THE RAPTOR COMMUNITY IN THE HELLS CANYON AREA. Von R. Pope and Anthonie M.A. Holthuijzen, Idaho Power Company Boise, Idaho 83707.

From 1995 to 1998 we documented cliff-nesting raptors in the Hells Canyon reach of the Snake River using point surveys. Also, all nesting raptor species recorded incidentally were incorporated in our data base. In 1995 we surveyed the main canyon and its tributaries from Hells Canyon Dam to Oxbow Dam (26.0 miles). In this reach we documented 17 occupied nesting territories, including 6 Golden Eagle (*Aquila chrysaetos*), 5 American Kestrel (*Falco sparvarius*), 2 Common Raven (*Corvax corus*), 2 Prairie Falcon (*Falco mexicanus*), 1 Peregrine Falcon (*Falco peregrinus*) and 1 Red-tailed Hawk (*Buteo jamaicensis*). In 1996, we surveyed suitable areas of cliff for nesting raptors along the Snake River Canyon and its tributaries from Oxbow Reservoir to Farewell Bend (72.6 miles). In this reach we documented 19 occupied territories including 6 Golden Eagle, 5 Red-tailed Hawk, 4 Common Raven, 3 Prairie Falcon, and 1 American Kestrel. Species richness and diversity varies greatly from Brownlee Reservoir downstream to Hells Canyon Reservoir. Numbers of cliff nesting raptors reported by Asherin and Claire (1976) differed both in species density and composition from our surveys. We also surveyed known historical sites of two endangered species, the Bald Eagle (*Haliaeetus leucocepalus*) and Peregrine Falcon (*Falco perigrinus*). The Bald Eagle territories were never occupied, although a new territory was occupied and produced at least one young in 1998. The Peregrine Falcon territory was occupied in all four years surveyed.

ADAPTIVE MANAGEMENT AT GRAYS LAKE NATIONAL WILDLIFE REFUGE, IDAHO. Bill Pyle, U.S. Fish and Wildlife Service, Grays Lake National Wildlife Refuge, 74 Grays Lake Rd., Idaho 83285; Jane Austin and Douglas Johnson, U.S.G.S. Northern Prairie Wildlife Research Center, 8711 37th St. SE, Jamestown, North Dakota 58401, and; Janet Keough, U.S.G.S. Patuxent Wildlife Research Center, 11510 American Holly Dr., Laurel, Maryland 20708.

Management tools currently in operational use by wildlife refuges of the Intermountain Region will be assessed for their efficacy in maintaining habitat for breeding waterbirds and other biotic resources. Twelve units, 32-70 ha each with a total of 600 ha (1483 ac.) of Grays Lake National Wildlife Refuge, were devoted to a multi-year, replicated field experiment to test four management regimes: continuous idle, fall burning/idle, fall cattle grazing, and summer cattle grazing/idle. Each treatment will be applied to three randomly-selected units during 1997-2000. Each unit will receive standardized and repeated monitoring for breeding bird use; nest success by waterbirds and sandhill cranes; small mammal abundance; predator community composition; and composition and production of vegetation. Preliminary results from 1997-98, pre-treament years, are discussed. The Service expects to base its long-term management of Grays Lake meadows upon study results.

IMPORTANCE OF SPATIAL SCALE TO HABITAT USE BY BREEDING BIRDS IN COTTONWOOD RIPARIAN FORESTS. Victoria Saab. Rocky Mountain Research Station, Boise, Idaho 83702.

Patterns of habitat use by breeding birds were studied in cottonwood riparian forests along 100 km of the South Fork of the Snake River in southeastern Idaho. A hierarchical approach was used to examine habitat use at three spatial scales: microhabitat (local vegetation characteristics), macrohabitat (cottonwood forest patch characteristics), and landscape (composition and patterning of surrounding vegetation types and land uses). Bird distribution and abundance and vegetation data were collected on 57 cottonwood forest patches ranging in size from 0.40 ha - 205 ha. The surrounding landscape changed from a valley surrounded by mountains on the upstream end of the study area, a narrow canyon adjacent to natural upland vegetation in the mid section, to a wide, open floodplain dominated by agriculture on the downstream end. The best predictors of high species richness (r^2 = 0.71) were natural and heterogeneous landscapes, large cottonwood patches, and close proximity to other cottonwood patches. The most frequent significant predictor of species occurrence was the landscape component describing increases in upland natural vegetation with decreases in agriculture. Both interior and edge specialists were found in cottonwood riparian forests that are linear in nature with large amounts of edge. Nest predators, brood parasites, and exotic species responded positively to human-altered landscapes. Landscape patterns were the primary influence on frequency of occurrence of most bird species, while macrohabitat and microhabitat were of secondary importance. Thus, surrounding landscape features should be a primary consideration for selecting riparian reserve areas.

INFLUENCE OF SHRUBSTEPPE FRAGMENTATION ON PRODUCTIVITY, NATAL DISPERSAL, AND HABITAT SELECTION BY SAGE THRASHERS. Bruce C. Schoeberl, Boise State University, Department of Biology, Boise, ID 83725 and Steven T. Knick, USGS Forest and Rangeland Ecosystem Science Center, Snake River Field Station, 970 Lusk Street, Boise, Idaho 83706.

Distribution and abundance of shrubland-obligate passerines are related to composition and configuration of the landscape. The causal mechanism may be differential productivity among habitats. In 1998, we examined the relationship between local vegetation characteristics and nest success of sage thrashers (*Oreoscoptes montanus*), sage sparrows (*Amphispiza belli*), and Brewer's sparrows (*Spizella breweri*) in the Snake River Birds of Prey National Conservation Area. Young were successfully fledged at 1 of 15 sage thrasher, 1 of 9 sage sparrow, and 13 of 33 Brewer's sparrow nests. Of these, only nesting success of sage sparrows was related to habitat. To test the effect of habitat fragmentation on reproduction and dispersal, we will move to an area possessing fragmented and unfragmented landscape patterns 32 km south of Bruneau, Idaho for the 1999 and 2000 breeding seasons. We will focus on sage thrashers because they are negatively affected by fragmentation and their size allows us to use telemetry. Productivity, dispersal, and habitat selection will be compared to local habitat variables and landscape configurations to determine which mechanisms account for abundance and distribution patterns.

ROCKS AND ICE REVISITED: AN ASSESMENT OF THE GEOGRAPHICAL AND ECOLOGICAL DISTRUTIION OF RESERVES IN THE UNITED STATES. Scott, J. M. and Wright, R. G.: US Geological Survey, Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho 83844-1141, USA (mscott@uidaho.edu).

Creation of a complete network of biological reserves in a country requires that the level of protection attained with existing reserves be known before new refuges are established. This knowledge can be used to further protect biodiversity with a minimum of duplication of past efforts and the most efficient filling of gaps in the reserve network. We present the results of a study in which we mapped the occurrence of biological reserves in different physical environments across the coterminous United States. We examined the occurrence of theses reserves by 500meter elevation intervals, quintiles of soil productivity, five degree blocks of latitude and longitude, and ecoregions. Observed patterns of occurrence suggested uneven distribution within all these coarse filter features. The areas with the highest level of protection were those that were least productive and or least accessible. We discuss the implications of these findings for future siting of reserves.

THE CLEARWATER ELK INITIATIVE: AN ADAPTIVE APPROACH TO A LARGE-SCALE MANAGEMENT CHANGE Gregg Servheen, Leona Bomar, George Pauley, Pete Zager, Michelle Craig, Idaho Dept. of Fish and Game, 1540 Warner Ave, Lewiston, Idaho 83501,University of Idaho, Moscow, Idaho 83843, Nez Perce National Forest, Route 2 Box 475, Grangeville, Idaho 83530 (MC)

Over the past 12 years in the Clearwater basin, elk calves have declined by 42%, bull numbers are down by 37%, and total numbers are down 23%. These declining trends in elk (*Cervus elaphus*) populations in the Clearwater basin have focused elk management concerns on the need to improve elk habitats. The Clearwater Elk Initiative proposes to reestablish more natural disturbance regimes in the 6 million-acre Clearwater basin in Idaho, including increasing the early seral conditions preferred by elk. This restoration project proposes habitat treatments including prescribed natural fire, prescribed fire, and timber harvest to reestablish the ecological function and benefits of large-scale disturbance. Because the amount and type of habitat treatments and their potential effects on elk populations and other species are unknown, an experimental design for monitoring populations and mechanisms of response to habitat disturbance is necessary. We propose a paired comparison sampling methodology for differentiating treated and untreated elk populations and habitats. The design includes use of winter elk sightability surveys to measure population numbers and distribution response to habitat treatments. We also propose monitoring indices such as pregnancy rates and body condition using fecal and urine samples to differentiate between mechanisms of population change. The problems in developing an experimental approach on a large scale are discussed. Scale and the need to provide both adaptability and structure within the interagency effort are discussed.

LONG-TERM TRENDS IN PRAIRIE FALCON ABUNDANCE AND REPRODUCTION IN SOUTHWESTERN IDAHO. K. Steenhof, M. N. Kochert, R.N. Lehman, USGS-FRESC, Snake River Field Station, 970 Lusk Street, Boise, Idaho 83706. L.B. Carpenter, Raptor Research Center, Boise State University, 970 Lusk Street, Boise, Idaho 83706.

We studied a nesting population of Prairie Falcons (*Falco mexicanus*) in the Snake River Birds of Prey National Conservation Area (NCA) from 1974-1997 to identify factors that influence abundance and reproduction. Our sampling period included two major droughts and associated crashes in Townsend's ground squirrel (*Spermophilus townsendii*) populations. The number of Prairie Falcon pairs found on long-term survey segments declined significantly from 1976-1997. Early declines were most severe at the eastern end of the NCA, where fires and agriculture have changed native shrubsteppe habitat. More recent declines occurred in the portion of canyon near the Orchard Training Area (OTA), where the Idaho Army National Guard conducts artillery firing and tank maneuvers. Overall Prairie Falcon reproductive rates were tied closely to annual indexes of ground squirrel abundance. Most reproductive parameters showed no significant trends over time, but during the 1990s, nesting success and productivity were lower in the stretch of canyon near the OTA than in adjacent areas. Extensive shrub loss, by itself, did not explain the pattern of declines in abundance and reproduction that we observed. Recent military training activities likely have interacted with fire and livestock grazing to create less than favorable foraging opportunities for Prairie Falcons in a large part of the NCA.

HELLS CANYON AVIFAUNA. Natalie Sunderman and Anthonie M .A. Holthuijzen, Idaho Power Company, Environmental Affairs Department, Boise, Idaho 83707.

Due to the rugged terrain and limited accessibility, little information is available on avian communities along the Snake River in Hells Canyon. From 1995 through 1998 as part of the relicensing process, we conducted avian surveys of upland and riparian cover types along approximately 170 miles of the Snake River corridor. Surveys were conducted during the four seasons using point counts and line transects. During surveys, 114 bird species were observed. Additional species were observed incidental to other field activities for a total of 226 bird species. Lazuli bunting (*Passerina amoena*), spotted towhee (*Pipilo maculatus*), western meadowlark (*Sturnella neglecta*), black-capped chickadee (*Parus atricapillus*) and black-billed magpie (*Pica pica*) were the species most commonly reported. We documented 28 bird species that are considered state or federal sensitive. Bird densities differed among the vegetation cover types and seasons sampled. Hells Canyon provides habitat for a diverse avian assemblage. This study provides baseline information needed for future evaluation of population trends and documents various species at low elevations or outside their known range.

RIPARIAN BIRD POPULATION INCREASES WITH IMPROVED RIPARIAN CONDITION IN EAST-CENTRAL IDAHO. Helen Ulmschneider, Bureau of Land Management, Salmon, Idaho 83467.

In the early 1990's, the BLM began making changes in grazing management on many creeks in the Lemhi Resource Area. During the breeding season 1994-98, I conducted standard point counts along eight of these creeks to determine bird population response to improved riparian condition. Numbers of birds detected on the two creeks that changed the most nearly doubled in 5 years. The shrub component on these creeks was already continuous. Herbaceous vegetation along the creeks increased from stubble heights of < 2 cm to > 30 cm. Shrub sprouts increased dramatically in some areas. Because new shrubs were not yet large enough to provide increased nesting habitat, I hypothesize that increases in breeding bird numbers resulted from increases in insect populations with more herbaceous vegetation. I will also discuss how we have been effective in making changes on the ground in the notoriously difficult arena of public lands grazing management.

MULE DEER POPULATION MONITORING IN IDAHO. James W. Unsworth and Chad J. Bishop, Idaho Department of Fish and Game, Nampa, and Mark Hurley, Idaho Department of Fish and Game, Pocatello.

The Idaho Department of Fish and Game has traditionally monitored mule deer (*Odocoileus hemionus*) populations by obtaining estimates of population size (sightability surveys) and age and sex ratios (herd composition surveys). Improved population models can be developed by incorporating survival rate estimates into the existing framework. A 1998 fee increase in deer and elk tags enabled the Department to begin monitoring overwinter fawn survival on an annual basis. In December and January 1998-99, we captured and radio-collared 270 fawns in 10 game management units across central and southern Idaho using helicopter drive nets and helicopter net guns. Numerous sportsmen were involved in capture operations to bolster support for our management efforts. Fawn mass, chest girth, and hind foot length were recorded to provide an indication of early winter condition. Enhanced population monitoring will help wildlife managers meet specific management goals of herd size and composition by altering doe harvests according to annual changes in survival, recruitment, and population size. Improved monitoring will also enable managers to more accurately communicate population status to hunters.

HABITAT, MOVEMENTS, AND NESTING OF CHUKAR PARTRIDGE IN EASTERN OREGON. Hanspeter P. Walter, Kerry P. Reese, and Walt Van Dyke. University of Idaho, Moscow 83844 and Oregon Department of Fish and Wildlife, Ontario, Oregon 97914.

The chukar partridge (*Alectoris chukar*) has thrived since its introduction to Oregon in 1950, but very little quantitative biological data regarding habitat use is available. Results of a 2-year radio telemetry study in eastern Oregon are presented. Attributes of nest sites are described. Estimated nest success was higher in 1997 (60%) than 1998 (37%), and mean hatch of monitored nests was 43 days later in 1998. Investigation of habitat use revealed differential use of cover types and slope angles by broods and adults. Broods used more shrub and less rock cover types than adults did in both years, and broods used shallower slopes in both years. Home range estimates and daily movements of chukars were also calculated. Mean core home range estimates (~17 -25 ha) did not differ between years, and daily movements (~200 - 300 m) were similar between years and between adults and broods. The chukar is typically associated with rocks and grasses in this area, but our results indicate a more complex life cycle requiring additional habitats during nesting and brood rearing. Differences in nesting success and habitat use between years could be related to climatic conditions.

IDENTIFYING NEST PREDATORS OF FOREST SONGBIRDS IN WEST-CENTRAL IDAHO. Kevin S. Warner and Rex Sallabanks. Dept. Biology, Boise State University, Boise, Idaho 83725 and Sustainable Ecosystems Institute, Meridian, Idaho 83642.

Recent studies of forest songbirds in west-central Idaho indicate nest predation to be responsible for >70% of nest failures. Identifying nest predators is therefore critical if we are to offer forest managers information on how to potentially improve nest success of forest songbirds. To address this information need, we studied nests and their predators in 1997 and 1998 using artificial nests and remotely triggered cameras. Predators were identified in two ways: (1) identification of teeth marks in clay eggs; and (2) photographic identification using cameras placed at nests. Analysis of teeth mark data in clay eggs showed the Deer Mouse to be responsible for 47% (n = 159) of predation events, the Yellow-pine Chipmunk 32% (n = 108), and birds 6% (n = 30). Of 84 photos of visitors to artificial nests, 10% (n = 8) were of mice, 46% (n = 39) chipmunks, 7% (n = 6) Columbian Ground Squirrel, 15% (n = 13) ungulates, and 10% (n = 9) birds. These results suggest that in grand fir (*Abies grandis*) forests of west-central Idaho, small mammals are the primary predators of ground and low shrub-nesting songbirds. Management for such birds might therefore have the greatest benefit if it also included prescriptions to limit small mammal habitat.

ERRATUM AND ADDITION

Please add to the program:

Friday, 5 March — Session G: Potpouri—Chairperson: Jim Clark

5:00pm — EFFECT OF SAMPLE SIZE ON THE PERFORMANCE OF FIVE RESOURCE SELECTION METHODS
Frederick A. Leban and Edward O. Garton.

EFFECT OF SAMPLE SIZE ON THE PERFORMANCE OF FIVE RESOURCE SELECTION METHODS. Frederick A. Leban and Edward O. Garton. Department of Fish & Wildlife Resources, University of Idaho, Moscow, Idaho 83843-1136

We investigated the effect of sample size (number of animals and number of locations per animal) on 5 methods of analyzing resource selection (Neu, Friedman, Johnson, compositional analysis, and compositional analysis on ranks). Fifty-three female elk (*Cervus elaphus*) were intensively monitored at Starkey Experimental Forest and Range, Oregon from April - November, 1994. We systematically resampled elk locations by varying the number of animals (5, 10, 20, 30, 42) and the number of locations per animal (10, 20, 30, 50, 100, all), and calculated the percentage of correct conclusions (accuracy) for 1000 runs for 6 resource types (aspect, distance to open roads, distance to cover, distance to forage, % canopy closure, and vegetation). The percentage of correct conclusions increased with increasing number of animals and increasing observations per animal for all variables. However, the percent correct were low (<60%) for few animals (5 or 10) with only 10 observations which are the typical sample size of many wildlife studies. We recommend a minimum of 20 animals with 50 observations each to adequately determine resource selection for a population.