1998

ANNUAL MEETING

OF THE

IDAHO CHAPTER OF

THE WILDLIFE SOCIETY

March 5-6, 1998

Moscow, Idaho

IDAHO CHAPTER OF THE WILDLIFE SOCIETY

35TH ANNUAL MEETING

MARCH 5 & 6, 1998

MOSCOW, IDAHO

at

The University Inn - Best Western

Program Development

Scientific Program
Kerry Reese
Susan Loper
Hollie Miyasaki

Local Arrangements
Pamela Bell
Patricia Heekin
Matthew Lucia
Hollie Miyasaki
Gary Nohrenberg
Kerry Reese

Audio-Visual Assistants
Pamela Bell
Chad Bishop
Patricia Heekin
Hollie Miyasaki
Susan Loper
Matthew Lucia

Auction/Raffle
Scott Robinson, Chair
Tom Hemker
Daryl Meints

Ted Trueblood Communications Award
Alan Dohmen, Chair

Chapter Officers

James Unsworth, President
Robin Garwood, Treasurer

Kerry Reese, Vice President
Frances Cassirer, Secretary

IDAHO CHAPTER OF THE WILDLIFE SOCIETY

1998 Annual Meeting Agenda

Good Science – Good Management

Wednesday, March 4
5:00pm-6:45pm Registration – University Inn - Best Western

Thursday, March 5
7:00am-8:00am Registration – University Inn - Best Western

TWS ANNUAL MEETING – University Room

8:15am Welcome – **Dr. James Unsworth**, President, Idaho Chapter of the Wildlife Society

8:30am-11:45am Invited Keynote Session: Grizzly Bear Ecology and Management
Chairperson: **Dr. Wayne Melquist**, Idaho Fish and Game

8:30am Keynote Presentation: THE IMPORTANCE OF MEAT TO GRIZZLY BEAR PRODUCTIVITY AND THE USE OF NEW TECHNIQUES TO ASSESS DIET AND BODY CONDITION
Dr. Charles T. Robbins, Professor of Wildlife Biology, Washington State University

9:15am CONSERVATION GENETICS OF BROWN BEARS
Dr. Lisette P. Waits, Assistant Professor of Wildlife Resources, University of Idaho

9:35am GRIZZLY BEAR AND ROAD DENSITY RELATIONSHIPS IN THE SELKIRK AND CABINET-YAAK RECOVERY ZONES
Wayne L. Wakkinen, Research Wildlife Biologist, Idaho Department of Fish and Game

9:55am Break

10:15am	EFFECTS OF ROADS ON GRIZZLY BEAR HABITAT USE **Dr. Robert Wielgus**, Assistant Professor of Wildlife Ecology, Washington State University, Wayne Wakkinen, & Pierre Vernier
10:35am	LANDSCAPES SUITABLE FOR RESTORATION OF GRIZZLY BEARS IN IDAHO **David Mattson**, Research Wildlife Biologist, Forest & Rangeland Ecosystem Science Center, USGS Biological Resources Division, and Department of Wildlife Resources, University of Idaho
10:55am	ASPECTS OF GRIZZLY BEAR RECOVERY IN IDAHO AND MONTANA **Dr. Christopher Servheen**, Grizzly Bear Recovery Coordinator, United States Fish and Wildlife Service, Missoula
11:15am	GRIZZLY BEARS IN THE BITTERROOT: MOVING PAST POLARIZATION **Hank Fischer**, Northern Rockies Representative, Defenders of Wildlife, Missoula
11:35am	SUMMARY COMMENTS **Dr. Wayne Melquist**, Nongame Wildlife Manager, Idaho Department of Fish and Game
11:45am-1:00pm	Lunch
1:00pm-2:40pm	Session A: Avian Community Ecology Chairperson: **Dr. Patricia J. Heglund**, University of Idaho
1:00pm	COMPOSITION AND TEMPORAL DYNAMICS OF AVIAN COMMUNITIES ALONG THE SNAKE RIVER, SOUTHWESTERN IDAHO **Anthonie M. A. Holthuijzen**, Von R. Pope, and Kelly D. Wilde
1:20pm	SONGBIRD USE OF NATIVE AND NON-NATIVE RIPARIAN AREAS IN THE MID-COLUMBIA RIVER BASIN DURING FALL MIGRATION ***Sherry Hudson**, Eric Nelson, and Patricia Heglund
1:40pm	HABITAT SELECTION BY FOREST BIRDS OF THE IDAHO SOUTHERN BATHOLITH LANDSCAPE **Rex Sallabanks**, Jonathan B. Haufler, and Carolyn A. Mehl

2:00pm	AN ASSESSMENT OF AVIAN REPRODUCTIVE SUCCESS IN MANAGED FORESTS OF NORTHERN IDAHO ***Cynthia K. Friers**
2:20pm	MONITORING THE DISTRIBUTION AND ABUNDANCE OF THE BIRDS OF NORTH AMERICA **J. Michael Scott**, Patricia Heglund, Rita Dixon, and Jonathan Bart
2:40pm	Break
3:00pm – 5:00pm	Idaho Chapter of The Wildlife Society Business Meeting All are encouraged to attend Palouse Room
6:00pm-10:00pm	Social and Auction – University Room Awards Live auction **Sam Mattise** – auctioneer Silent auction Raffle
Friday, March 6 7:45am-8:15am	Registration – University Inn-Best Western
8:20am-10:00am	Session B: Upland Game and Waterfowl Chairperson: **Sam Mattise**, Bureau of Land Management
8:20am	AN INVESTIGATION OF WINTERING WATERFOWL IN THE C. J. STRIKE STUDY AREA **Von R. Pope**, Anthonie M. A. Holthuijzen, and Kelly D. Wilde
8:40am	FACTORS ASSOCIATED WITH THE DISTRIBUTION OF DABBLING DUCKS ON C. J. STRIKE RESERVOIR **Frank Edelmann**, Von R. Pope, and Anthonie M. A. Holthuijzen
9:00am	THE STATUS AND MANAGEMENT OF SANDHILL CRANES IN IDAHO **Bradley B. Compton**
9:20am	HABITAT USE, REPRODUCTION, MOVEMENTS, AND SURVIVAL OF CHUKAR PARTRIDGE IN WEST-CENTRAL IDAHO ***Andrew Lindbloom**, Kerry Reese, and Pete Zager

9:40am	SAGE GROUSE MANAGEMENT IN NORTH AMERICA: A REVISION OF OLD GUIDELINES **J. W. Connelly**, A. R. Sands, T. P. Hemker, and M. A. Schroeder
10:00am	Break
10:20am-11:40am	Session C: Wildlife Habitat Relationship Models Chairperson: **Dr. R. Gerald Wright**, University of Idaho
10:20am	COMMON THREADS AMONG LIFE HISTORY STUDIES: EASILY OBTAINABLE ENVIRONMENTAL MEASURES TO FACILITATE VERTEBRATE HABITAT MODELING ***J. W. Karl**, N. Wright, P. J. Heglund, and J. M. Scott
10:40am	A MODEL FOR PREDICTING SPOTTED FROG HABITAT USING THEMATIC MAPPER SATELLITE IMAGERY ***Tim Carrigan**
11:00am	DEVELOPMENT OF HABITAT USE MODELS FOR LANDBIRDS IN MANAGED FORESTS **Patricia J. Heglund**, Bill Wall, and J. Michael Scott
11:20am	TESTING THE PERFORMANCE OF WILDLIFE HABITAT RELATIONSHIP MODELS: THEORY AND APPLICATION ***J. W. Karl**, J. M. Scott, N. Wright, and P. J. Heglund
11:40am-1:00pm	Lunch
1:00pm-2:40pm	Session D: Olla Podrida Chairperson: **Dr. Lisa Shipley**, Washington State University
1:00pm	DISTRIBUTION AND RELATIVE ABUNDANCE OF AMPHIBIANS AND REPTILES IN HELLS CANYON **Kelly D. Wilde**, Anthonie M. A. Holthuijzen, Charles R. Peterson, Jon M. Beck, and Mark Gerber
1:20pm	MOVEMENT PATTERNS OF COLUMBIA SPOTTED FROGS (*RANA LUTEIVENTRIS*) IN A COMPLEX OF HIGH MOUNTAIN LAKES ***David S. Pilliod**, Charles R. Peterson, and Peter Ritson
1:40pm	AN INVESTIGATION OF SMALL MAMMAL COMMUNITIES IN THE C. J. STRIKE STUDY AREA **Aaron Utz**, Anthonie M. A. Holthuijzen, and Kelly Wilde

2:00pm	ARTIFICIAL NEST STRUCTURES AND BURROWING OWL MANAGEMENT: IMPLICATIONS OF CHAMBER SIZE AND TUNNEL DIAMETER ***Brian W. Smith** and James R. Belthoff
2:20pm	MONITORING IDAHO AMPHIBIAN AND REPTILE POPULATIONS THROUGH CHANGES IN OCCURRENCE **Charles R. Peterson**, Sarah Cooper Doering, and John Cossel, Jr.
2:40pm	Break
3:00pm-4:40pm	Session E: Large Mammals Chairperson: **Dr. James M. Peek**, University of Idaho
3:00pm	WHITE-TAILED DEER SURVIVAL AND CAUSE-SPECIFIC MORTALITY IN NORTHERN IDAHO **Pete Zager**, Brad Wendling, and Ben Nelson
3:20pm	CAUSE-SPECIFIC MULE DEER FAWN MORTALITY DURING WINTER IN SOUTHWEST IDAHO ***Chad J. Bishop**, Edward O. Garton, and James W. Unsworth
3:40pm	MOUNTAIN GOAT HABITAT AND HUMAN RECREATION USE: REMOTELY RESOLVING WILDLIFE/HUMAN CONFLICTS IN THE SAWTOOTH WILDERNESS **Robin Garwood**, Tim Wirth, and Henry Lachowski
4:00pm	HUNTING INDUCED CHANGES IN HABITAT SELECTION OF ELK ***Mathew W. Alldredge**, James Peek, and Bill Wall
4:20pm	"GET OUTA YOUR CAR AND HUNT!"; THE EFFECTS OF ROAD CLOSURES ON BULL ELK SURVIVAL IN NORTHERN IDAHO **Michael W. Gratson**, Dave J. Leptich, and P. Zager
4:40pm	Brief intermission
4:50pm	1998 Ted Trueblood Communications Awards for the best presentations by a student and a professional Chairperson: **Alan Dohmen**, USDA Forest Service
5:00pm	Adjourn annual meeting until 1999 in Boise

* Student presentations

Poster Session

Poster presentations will be displayed in the Empire Room beginning on March 5 at 8:00am. The Empire Room also is the slide preview room for speakers. Please visit these works during breaks or at other times during the meeting.

Posters will also be available during the social on Thursday evening when authors should be available for questions and discussions from 6:00 to 7:00pm.

A LANDSCAPE ANALYSIS OF IDAHO'S ROCKY MOUNTAIN ELK (*CERVUS ELAPHUS*)
Leona K. Bomar, E. O. Garton, J. M. Scott, and Pete Zager

CANYON WREN ECOLOGY ALONG THE LOWER SALMON RIVER OF IDAHO
Heather L. Johnston and John T. Ratti

DEVELOPMENT OF A HYBRID LAND COVER MODEL OF NORTHERN IDAHO
P. D. Tanimoto, J. W. Karl, N. M. Wright, and J. M. Scott.

Special Workshop on Computer Applications

March 6, 1998

A mini-workshop featuring hands-on experience with three types of modern computer applications to Idaho wildlife conservation and management.

All sessions meet in the microcomputer lab in the College of Education, Room 203
Enrollment limited to 20 participants for each session.

Session 1: 1:00pm-2:00pm Aerial Survey

Instructors: **Fred Leban & Dr. E. O. Garton**, Fish & Wildlife Resources, U. of Idaho

Learn how to use the new windows version of the Aerial Survey Program currently under development to estimate abundance and herd-composition for elk, mule deer, big-horn sheep, and moose from aerial surveys. Use the program to design stratified random surveys, estimate numbers, and compare surveys from year to year.

Session 2: 2:00pm-3:00pm Searching Literature

Instuctors: **Dr. E. O. Garton & Naomi Ferguson**, Fish & Wildlife Resources, U. of Idaho, and ABSEARCH, Inc.

Learn how to search for published literature presenting results of research on individual species of wildlife, geographic regions of the U.S., issues in wildlife management, and specific research/management topics. Learn to use bibliographic programs and databases available to install on your own computer or searchable on-line over the World Wide Web.

Session 3: 3:00pm-5:00pm Geographic Information Systems

Instuctors: **Liza Fox & Phil Tanimoto**, Forest Resources and Fish and Wildlife Resources, U. of Idaho

Learn to use ArcView to display and analyze mapped information such as the observed locations of rare Idaho animals like wolverine, fisher, and lynx as well as how to combine this information with maps of distributions of vegetation types and geographic features such as roads and public and private ownerships.

ABSTRACTS

Arranged in

alphabetical order

by senior author

HUNTING INDUCED CHANGES IN HABITAT SELECTION OF ELK.

Mathew W. Alldredge, James Peek, and Bill Wall, Wildlife Resources, University of Idaho.

Many forests of the Pacific Northwest are intensively managed and logged, which has a definite impact on wildlife species. Logging opens tree canopies, creates large brush fields, and develops a network of roads that provide access in these areas. The influence of forest alterations on elk (*Cervus elaphus*) is being investigated in the western portion of Idaho hunting unit 10A, in Clearwater County of north-central Idaho. This area experiences a considerable amount of recreational use throughout the year and a large amount of hunting pressure in the fall. Currently work is being done to model the understory vegetation and to determine habitat use by elk throughout the year. Radio-collared elk were found to utilize open canopy shrub fields from June until the start of the general rifle season. Elk shifted their use to mature conifer stands during the rifle season. The preliminary results indicate that habitat selection by elk shifted to mature coniferous stands due to hunting pressure.

A MODEL FOR PREDICTING SPOTTED FROG HABITAT USING THEMATIC MAPPER SATELLITE IMAGERY.

Tim Carrigan, University of Idaho, Boise Center

The ability to predict potential habitats is necessary for the conservation of special status species. The Columbia spotted frog (*Rana luteiventris*) is a candidate species south of the Snake River in Idaho with few known historic accounts. To better understand the potential distribution of spotted frogs in SW Idaho, a multivariate habitat model based on Thematic Mapper satellite imagery was developed. Spotted frog locations determined from field surveys were overlaid with geometrically corrected Thematic Mapper satellite imagery layers. Spacial resolution of the imagery was 30m. We determined the habitat index by calculating the Mahalanobis distance for the spectral values at each 30m cell to the mean vector of spectral values for all of the habitat cells used by frogs. The Mahalanobis distance was then recoded within GRASS to a relative value by conversion to a Chi-squared probability. The resultant probability values were mapped using ARC-INFO. Model validation will be required using future survey results. The completed model will be used to help identify areas of concern, potential future surveys, and lands for intensive management and potential acquisition.

CAUSE-SPECIFIC MULE DEER FAWN MORTALITY DURING WINTER IN SOUTHWEST IDAHO.

Chad J. Bishop, Edward O. Garton, University of Idaho, Moscow, and James W. Unsworth, Idaho Department of Fish and Game, Nampa.

A knowledge of the factors which contribute to mule deer (*Odocoileus hemionus*) fawn mortality during winter is necessary for successful management of deer populations. Major factors include predation, nutritional quality of forage, habitat quality, fawn condition at the beginning of winter, and weather. We radio-monitored 61 fawns during the 1995-96 winter and 60 fawns during the 1996-97 winter on 3 study areas in southwest Idaho. Bitterbrush (*Purshia tridentata*) and cheatgrass brome (*Bromus tectorum*) samples were randomly collected from various habitats within each study area and analyzed for protein content and digestibility. For the 3 study areas combined, fawn survival rate was 0.754 (SE = 0.055) during the 1995-96 winter, and 0.447 (SE = 0.065) during the 1996-97 winter. Predation on weakened fawns was the major cause of mortality both winters. During the 1996-97 winter, mean capture weight of mortalities ($\tilde{y}$ = 34.3 kg, SE = 0.894) was significantly lower ($P = 0.03$) than the mean weight of surviving fawns ($\tilde{y}$ = 36.9 kg, SE = 0.845). Bitterbrush quality was significantly different between study areas during each of the winters ($P < 0.001$). We plan to develop a predictive fawn mortality model based on our data. Factors contributing to fawn mortality appear to be related to one another. Understanding these relationships is beneficial for mule deer management.

SAGE GROUSE MANAGEMENT IN NORTH AMERICA: A REVISION OF OLD GUIDELINES.

J. W. Connelly, Idaho Department of Fish and Game, Pocatello; A. R. Sands, The Nature Conservancy, Boise; T. P. Hemker, Idaho Department of Fish and Game, Boise; and M. A. Schroeder, Washington Department of Fish and Wildlife, Bridgeport.

Despite a relatively thorough knowledge of the population ecology and habitat requirements of sage grouse (*Centrocercus urophasianus*), this species continues to decline throughout most of its range. Breeding populations have decreased by an average of 33% over the long term in those states with long-term lek attendance data ($n = 9$). Habitat deterioration, loss, and fragmentation have reduced the quantity and quality of nesting and early brood-rearing habitat causing population declines. The last management guidelines for sage grouse were published >20 years ago. A large amount of new information has been obtained since these guidelines were published and they are now outdated. Here we discuss a revision of those guidelines and identify significant changes in the new guidelines.

THE STATUS AND MANAGEMENT OF SANDHILL CRANES IN IDAHO. Bradley B. Compton, Idaho Department of Fish and Game, Pocatello.

Sandhill cranes (*Grus canadensis*) represent one of the oldest known species of birds; estimated at 2.5 million years old. Historically, these birds were common throughout North America. However, because of unregulated harvest and habitat loss, populations declined from the late 1800's through the early 1900's. The Rocky Mountain population of greater sandhill cranes was estimated at 500 individuals in 1940. Control over unregulated harvest, protection and acquisition of key habitats, and increases in small grain production helped this population rebound to nearly 22,000 individuals in 1990. With this increase in populations has come an increase in crop damage concerns. Because of these concerns the Idaho Fish and Game Commission reclassified the sandhill crane from protected nongame to migratory game bird in early 1996. During September of 1996, the Idaho Fish and Game Department administered Idaho's first sandhill crane hunt; harvesting 20 birds. Hunting, organized hazing, and lure crop fields will be used to reduce crop damage concerns.

FACTORS ASSOCIATED WITH THE DISTRIBUTION OF DABBLING DUCKS ON C.J. STRIKE RESERVOIR. Frank Edelmann, Von Pope, and Toni Holthuijzen, Idaho Power Company, Boise, Idaho.

C.J. Strike Reservoir provides habitat for wintering and migrating waterfowl in southwest Idaho. Recreational boating and hunting are also permitted throughout the reservoir. Because these activities may displace waterfowl, we tested the hypothesis that recreation interacts with environmental conditions to influence the relative habitat use and distribution of dabbling ducks on the reservoir. During the fall and winter of 1995-1996, we quantified the reservoir's shoreline and surface characteristics using GIS, and the spatiotemporal distribution of dabbling ducks, hunters, and boats using aerial surveys. Logistic regression and correlation revealed that ducks were associated with shallow-water and emergent-wetland shorelines before and after the hunting season. During the hunting season, ducks were associated with deep-water and avoided shallow-water habitats. Primary areas of waterfowl hunting coincided with dabbling duck concentrations before and after the hunting season. We were unable to detect any relationship between the distributions of boats and ducks. Assuming that habitat was selected to maximize survival, dabbling ducks preferred shallow-water habitats, and hunting potentially displaced them from these preferred habitats. Hunting disturbance may render preferred habitat on the reservoir relatively unsuitable.

AN ASSESSMENT OF AVIAN REPRODUCTIVE SUCCESS IN MANAGED FORESTS OF NORTHERN IDAHO. Cynthia K. Friers, Department of Biological Sciences, University of Idaho, Moscow, Idaho 83844-3051.

Reproductive success and abundance of shrub- and ground-nesting passerines is being studied within a managed forest landscape of northern Idaho. The response of breeding birds to early-successional habitat stands is being measured in eight study plots using nest searches and point counts. Data from 1997 revealed 48.0% of nests were successful, 41.4% were failures, and 10.6% were of unknown fate. Predation was the most common cause of nest failure, but nest parasitism resulted in failures as well. Fourteen nests of six species were parasitized by Brown-headed Cowbird. Mayfield estimates of nest survival for American Robin and Chipping Sparrow were 25.3% and 29.8%, respectively. For species whose nests were located, there was a positive correlation between density and number of found nests. These results will be combined with data from a second year to provide management recommendations aimed at maintaining viable bird populations within an active, industrial forest landscape.

MOUNTAIN GOAT HABITAT AND HUMAN RECREATION USE: REMOTELY RESOLVING WILDLIFE/HUMAN CONFLICTS IN THE SAWTOOTH WILDERNESS. Robin Garwood, Tim Wirth, Henry Lachowski, USDA Forest Service.

The mountain goat (Oreamnos americanus) is a management indicator species for many National Forests in the Intermountain West. Increasing use of fragile wilderness and alpine areas by humans in this region is affecting habitat and behavior of mountain goats. This project used a geographic information systems (GIS) and remote sensing technology to map mountain goat habitat and human recreation use patterns in the Sawtooth Wilderness of central Idaho. Digital elevation models (DEMS) were used to produce base GIS layers including slope, elevation, and a measure of roughness. Vegetation in the study area was mapped using a Landsat Thematic Mapper image. Recreation use patterns were determined by mapping the locations of trails, campsites, and recreation opportunity classes within the Wilderness. Areas identified as mountain goat habitat were compared to areas of high human use to determine where conflict may be occurring. These potential conflict areas are targeted for monitoring and management action to minimize disturbance to mountain goats and their habitat. This project was sponsored by the Forest Service Remote Sensing Steering Committee.

"GET OUTA YOUR CAR AND HUNT!"; THE EFFECTS OF ROAD CLOSURES ON BULL ELK SURVIVAL IN NORTHERN IDAHO. Michael W. Gratson, Dave J. Leptich, P. Zager, Idaho Department of Fish and Game.

To understand how to improve bull elk (Cervus elaphus) survival during the hunting season, we investigated the relationship between bull survival and road access, hunter density, topography, habitat structure, and season structure in the Idaho Panhandle (IPNF) and Clearwater (CNF) National Forests. On each study area we monitored survival of bulls in a roaded area (RO), an unroaded area (UN), and a managed access area (MA), where most roads were closed to vehicle use during general elk seasons. Road closures improved bull survival rates by 15-20%; levels intermediate between RO and UN (IPNF) or comparable to UN (CNF). Bull survival could be predicted on the IPNF by a combination of season structure, hunter density, road density, and vegetation cover structure, and on the CNF by a combination of hunter density, open road density, vegetation cover structure, slope, and bull age.

DEVELOPMENT OF HABITAT USE MODELS FOR LANDBIRDS IN MANAGED FORESTS. Patricia J. Heglund, Biological Sciences and the Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Bill Wall, Wildlife Biologist, Potlatch Corporation, Lewiston, J. Michael Scott, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho.

We examined habitat relations among landbirds in managed forest from 1995 to 1997, to aid in development of predictive models for use in land management planning. Ten-minute, fixed radius point counts were used to gather data from 94 stands representing five forest structural categories. Relative abundance values of birds within structural categories were not significantly different from one another. Examination of species assemblages within treatments suggest that although species composition changed with stand structure, relative abundance of birds among stands was similar. Seventy-two species were detected within the five structures, and of those, 50 species occurred in large enough numbers to use in an analysis of habitat relations. Logistic regression and cluster analysis were used to arrive at functional groups of species with similar forest structural requirements. In general, clusters of species were separated based on varying degrees of canopy closure, type and availability of subcanopy layers, distance to water, and number and average size of trees. Stand data associated with each species in a cluster were summarized to provide specific management recommendations. Spatial models are currently being constructed from the data for use in planning landscapes in the north Idaho area.

COMPOSITION AND TEMPORAL DYNAMICS OF AVIAN COMMUNITIES ALONG THE SNAKE RIVER, SOUTHWESTERN IDAHO. Anthonie M. A. Holthuijzen, Von R. Pope, and Kelly Wilde, Idaho Power Company

From 1988 through 1994, avian communities were seasonally surveyed along 10 upland and 16 riparian transects to determine species abundance, habitat associations, and temporal dynamics in the Snake River corridor. Species richness was highest in spring (148 species) and declined through fall (95 species) and winter (72 species); trends were similar for upland and riparian habitats separately. Riparian habitats had similar diversity values for spring but increasingly diverged for fall and winter. Of upland habitats, *Shrub Savanna* showed the highest bird diversity, followed by *Desertic Shrubland*, *Shrubland*, and *Desertic Herbland*. Bird densities in riparian habitats averaged 22 times higher than in upland habitats (range = 18-34 times). Avian communities differed in their composition between upland and riparian habitats for each season. All bird species commonly found in upland habitat were found in riparian habitat. Little overlap was found in avian community composition among seasons for riparian habitat. Upland avian communities were not clearly defined over the seasons. Habitat along the Snake River corridor generally is in poor ecological condition. Sagebrush obligate species would benefit from restoration efforts to reestablish upland shrub cover. Riparian habitat, of critical importance to the avian community, would benefit from fencing.

SONGBIRD USE OF NATIVE AND NON-NATIVE RIPARIAN AREAS IN THE MID-COLUMBIA RIVER BASIN DURING FALL MIGRATION. Sherry Hudson, Eric Nelson, and Patricia Heglund. USFWS and the University of Idaho.

Conservation of songbird stopover areas during migration may be equally as important as conservation of breeding and wintering habitat. In this study we examined bird use of native Willow (*Salix spp.*) and non-native Russian-olive (*Elaeagnus angustifolia*) areas in the Mid-Columbia River Basin during fall migration. Mist netting, area searching, and vegetation surveys took place from mid-August to mid-October, 1997, at three Russian-olive and three Willow dominated sites. Mist netting results show higher relative abundance (11.7 versus 5.2 birds/100 net hours) and species captured per day (8.8 versus 5.8) for neotropical migratory songbirds at Willow sites over Russian-olive sites. However, short-distance migrants were found to have higher relative abundance at the Russian-olive sites over the Willow sites (33.4 versus 19.1 birds/100 net hours). At four sites, species richness did not differ significantly between vegetation types; and the Russian-olive sites had higher relative abundance (48 versus 33 birds/100 net hours). Area search results agree with some, but not all, of the mist net results. In the remaining field seasons, we will conduct behavioral observations to help in the determinations of what factors might be influencing use of willow dominated areas versus Russian-olive dominated areas. Ultimately, the results will be used to recommend appropriate management strategies for the Mid-Columbia River National Wildlife Refuge Complex.

Testing the Performance of Wildlife Habitat Relationship Models: Theory and Application J.W. Karl, J.M. Scott, N. Wright and P.J. Heglund. Idaho Fish and Wildlife Cooperative Research Unit, University of Idaho.

Wildlife habitat relationship models have widespread application for wildlife research and management. Knowledge of the influence of model complexity and scale of application could guide future modeling efforts. Our objective was to determine how model performance corresponds with different model complexities, data resolutions and levels of analysis. We used the GAP Analysis methodology to model the predicted habitat of 66 northern Idaho birds at three resolutions of geographic information system (GIS) data varying the complexity of the models. We tested these models against breeding bird survey data at two spatial scales (site and cover type level). Our results indicate that model performance generally increases as model complexity increases. This performance increase results from a decrease in commission errors (species predicted but not observed). Overall performance is affected little by model complexity at coarse (10 ha) data resolutions, indicating that complex models may not be necessary to achieve desired levels of performance at coarse (e.g. statewide) scales. Model performance is also higher at the cover type level than the site level. The influence of model complexity, data resolution and level of analysis on the performance of wildlife habitat relationship models requires that specific objectives be defined prior to modeling wildlife habitats. Also, wildlife habitat relationship models designed for one application may not generalize well to other situations.

Common Threads Among Life History Studies: Easily Obtainable Environmental Measures to Facilitate Vertebrate Habitat Modeling J.W. Karl, N. Wright, P.J. Heglund, and J.M. Scott, Idaho Fish and Wildlife Cooperative Research Unit, University of Idaho

Modeling vertebrate distributions remains a cost effective method for managing faunal diversity. Current modeling efforts, however, are based, to a large extent on information thought to be readily available in published literature. While very general habitat descriptions are adequate for small scale (1:100,000 or less) predictions, many times they do not provide enough detail for large scale applications. This process underscores the need to collect quantitative habitat data when field surveys are conducted. Many wildlife publications, however, lack easily obtained information about a species' habitat. With little extra effort in the field, all wildlife studies could report the following baseline habitat information: primary habitat types, percent canopy cover, elevation, slope, aspect, mean temperature, distance to riparian areas, and distance to edge. In this paper we document the lack of detailed habitat information for many species and present a standardized format for collecting and reporting such data. This format will assure data are collected in a consistent manner that will facilitate pooling of small scale studies to determine large scale patterns. This baseline information will provide a common thread of understanding across the range of a species which could improve modeling efforts, and ultimately species conservation.

HABITAT USE, REPRODUCTION, MOVEMENTS, AND SURVIVAL OF CHUKAR PARTRIDGE IN WEST-CENTRAL IDAHO. Andrew Lindbloom, Kerry Reese, University of Idaho, Moscow, and Pete Zager, Idaho Department of Fish and Game, Lewiston.

Population characteristics of chukar partridge (*Alectoris chukar*) in the Lower Salmon River canyon were assessed by trapping and fitting 51 chukars with necklace- and backpack-mounted transmitters. Birds were located approximately weekly between March and August of 1995 and 1996. Chukars used shrub cover types more ($P < 0.001$) and rock cover types less ($P = 0.009$) in summer than in spring. Shrub cover types were used more than expected during both spring and summer ($P < 0.05$), and areas of dense yellow starthistle (*Centaurea solstitialis*) were used less than expected ($P < 0.05$). Apparent nest success was 45% for 23 nests, 10 of which were renests. Most chukars (91%) nested in either rock or grass/forb cover types. Habitats of shrub and grass/forb were used approximately equally (43% and 47% of locations) by chukar broods, with rock habitats used infrequently (11%). Average daily movement for spring and summer was 280 ± 44.5 SE m and 100% MCP home range was 39.8 ± 5.0 SE ha. Average spring/summer survival rate was 0.48 ± 0.10 SE.

MONITORING IDAHO AMPHIBIAN AND REPTILE POPULATIONS THROUGH CHANGES IN OCCURRENCE. Charles R. Peterson, Sarah Cooper Doering, And John Cossel, Jr. Idaho State University, Pocatello, Idaho.

Declines in populations of some formerly common, widespread amphibians and reptiles indicate the need for a statewide monitoring program. Such declines show that we can no longer assume that amphibian and reptile populations are doing well. The mark-recapture studies needed to document changes in numbers of animals are too time consuming and expensive to conduct on a statewide basis. The best evidence that we have for amphibian population declines actually comes from studies documenting changes in the occurrence of species over wide areas rather than changes in numbers of individuals. This suggests that an alternative, more feasible approach is to survey periodically selected study areas for changes in the number of sites occupied by each species. Such a program could involve selecting 20 study areas around the state so that all species and major biological community types would be represented at least twice. Every year, 2-3 study areas (with 10-20 separate sites each) could be surveyed using standard techniques so that all would be sampled once per decade. If a considerable decrease (e.g., 25%) in the number of occupied sites for a species is detected, further studies could be conducted to determine the extent and nature of the declines. We are testing this approach by repeating herpetofaunal surveys conducted during the 1970's on the INEEL and in the Snake River Birds of Prey National Conservation Area.

Movement Patterns of Columbia Spotted Frogs (*Rana luteiventris*) in a Complex of High Mountain Lakes. David S. Pilliod and Charles R. Peterson, Idaho State University, and Peter Ritson, Portland Community College.

Effective conservation and management of amphibian populations requires detailed information about migration and dispersal. Unfortunately, the complexity of amphibian habitat use patterns is often underestimated, leading to inadequate habitat protection. To better understand the movement patterns of frogs in alpine environments, we studied the Columbia Spotted Frog (*Rana luteiventris*) in the Frank Church River of No Return Wilderness in central Idaho. Between 1995 and 1997, we examined frog movement patterns associated with sex, age, lake location, and fish stocking history by marking over 5300 frogs in 71 lakes. To investigate seasonal migration patterns, rates of movement, and potential travel corridors, we telemetered a total of 114 frogs. We found that frogs moved between lakes up to 2000 m apart, using riparian areas (meadows, streams, and lakes) as stepping stones in otherwise dry, terrestrial routes. Females typically traveled further than males and made longer migrations to summer foraging areas. We observed fall migrations of entire lake subpopulations to hibernacula from 200 to 750m away. Apparently, frogs use their habitat selectively, often using upland sites for summer foraging, specific lakes for breeding, and other lakes for hibernating. These results indicate that an understanding of the seasonal habitat use of amphibians is needed to effectively protect their complex habitat requirements.

HABITAT SELECTION BY FOREST BIRDS OF THE IDAHO SOUTHERN BATHOLITH LANDSCAPE. Rex Sallabanks[1], Jonathan B. Haufler[2], and Carolyn A. Mehl[2], [1]Sustainable Ecosystems Institute, Meridian, Idaho, and [2]Boise Cascade Corporation, Boise, Idaho.

Breeding bird communities were sampled in 46 forest stands in west-central Idaho (Southern Batholith Section) in 1996 and 1997. Each stand was classified to habitat type (potential vegetation of a site) class and vegetation growth stage (successional stage). A total of 11,341 individual birds representing 95 species were detected. Small tree (mid-seral) grand fir and old growth subalpine fir ecological land units (ELUs) were the most species rich; old growth Douglas-fir, old growth cool, moist grand fir, and early to mid-seral subalpine fir were the most species poor. Most species were influenced by vegetation growth stage (n = 22, 67%), while fewer differed significantly in their distribution with respect to habitat type class (n = 7, 21%). No species was found to be distributed evenly among ELUs (i.e., as if habitat type class and vegetation growth stage were uncorrelated with detection frequency); specific ELUs in which birds were detected significantly more frequently than expected were identified for most species (n = 30, 91%). By integrating our results with a recently developed "ecosystem diversity matrix", the influence of different management scenarios on the composition of bird communities in forests of the Idaho Southern Batholith can be assessed. The capacity for current and future landscape conditions to provide suitable habitat to maintain avian biodiversity and support viable populations of breeding birds can also be evaluated.

AN INVESTIGATION OF WINTERING WATERFOWL IN THE C. J. STRIKE STUDY AREA. Von R. Pope, Anthonie M. A. Holthuijzen, and Kelly D. Wilde, Idaho Power Co., Boise ID.

During the winters of 1989-1993, we determined numbers, temporal dynamics, and spatial distribution of wintering waterfowl along 88 miles of impounded and unimpounded sections of the Snake River in southwestern Idaho. Monthly jet boat surveys were conducted from October through March. Numbers of waterfowl rapidly increased from October through December (from an average of 296 birds/mi to 754 birds/mi), declined slightly in January, rebounded in February, followed by a steep decline in March (to an average of 390 bird/mi). Dabbling ducks were the most commonly recorded group of waterfowl (75.3%), followed by surface dippers (14.9%), and divers (9.8%). The mallard was the most common species (55.7%), followed distantly by the American wigeon (17.2%) and the American coot (13.1%). Common goldeneyes were the most common diving duck (81.6%). Concentration areas were generally situated near wetland complexes, either associated with the reservoir, or with islands in the Snake River. The C. J. Strike Reservoir and associated wetlands offer resting and loafing areas to waterfowl. Expanding wetlands are maintained by stable reservoir levels. The surveyed area is important to wintering waterfowl at the local level, of moderate importance at the regional level, and of relatively low importance within the Pacific Flyway.

MONITORING THE DISTRIBUTION AND ABUNDANCE OF THE BIRDS OF NORTH AMERICA. J. Michel Scott, Patricia Heglund, Rita Dixon, University of Idaho; Jonathon Bart, U.S. Geological Survey, Boise Idaho.

Knowledge of trends in distribution and abundance of the bird species found in North America is of interest to policy makers and conservationists, as well as professional biologists. How common is it? Where can I find it? Is it decreasing, increasing, or stable in its numbers? These are frequently asked questions, and questions we don't always have answers for. They are questions that require extensive monitoring if we are to answer them for every species. In this presentation, we will present the results of our efforts to identify all current attempts to track the abundance and distribution of the birds of North America. We restricted our efforts to those that were comprehensive taxonomically or geographically during at least one season. We identified 65 programs that met these criteria. We determined which species lacked coverage and the precision of the mean estimator of abundance for those that were covered. We found the effectiveness of monitoring efforts varied among different behavioral, ecological, taxonomic, conservation, and legal categories in which we grouped species. Few training programs and even fewer evaluation programs exist. Thus, adjustments and additions to current monitoring are needed if we are going to be able to answer basic questions regarding the status and distribution of North America's avifauna.

ARTIFICIAL NEST STRUCTURES AND BURROWING OWL MANAGEMENT: IMPLICATIONS OF CHAMBER SIZE AND TUNNEL DIAMETER. Brian W. Smith and James R. Belthoff, Department of Biology and Raptor Research Center, Boise State University, Boise, ID

We tested effects of chamber and entrance size on nest-site selection by burrowing owls in southwestern Idaho. In 1997, natural nest burrows occupied in 1995 or 1996 were surrounded by clusters of 3 artificial burrows. Each artificial burrow within a cluster of 3 consisted of a 2-m section of perforated, plastic drainage pipe (15 cm diameter) and one of three chamber sizes: a small (4.5 gal) plastic container, a medium (5 gal) plastic bucket, or a large (18 gal) plastic container. Also, we deployed clusters of 2 artificial burrows in suitable habitat. Each burrow within a cluster of 2 consisted of a 5 gal bucket for the chamber, but had a tunnel that was either 10 cm (4 in) or 15 cm (6 in) in diameter and 2 m long. Burrowing owls nested in 21 of 34 (61.8%) clusters of 3 and 12 of 24 (50%) clusters of 2. In clusters of 3 (designed to assess choice for chamber size, 16 pairs of owls (76.2%) used large chambers, three (14.3%) used medium chambers, and two (9.5%) used small chambers. This distribution of use differed significantly from uniform ($P<0.001$) and indicates that burrowing owls preferred to nest in the largest available chamber. In clusters of 2, (designed to assess choice of tunnel entrance size), eight pairs of owls (66.7%) used 10-cm tunnels and four (33.3%) used 15-cm tunnels; this distribution was not significantly different from uniform ($0.10<P<0.25$). Our results indicate that chambers larger than 5 gal buckets should be considered in the management of burrowing owls in Idaho.

AN INVESTIGATION OF SMALL MAMMAL COMMUNITIES IN THE C.J. STRIKE STUDY AREA. Aaron Utz, Anthonie M. A. Holthuijzen, and Kelly D. Wilde. Idaho Power Company, Boise, Idaho.

We investigated small mammal communities in the C.J. Strike Study Area from 1988 to 1991. Objectives were to determine presence and relative abundance, identify distinctive animal communities, and uncover critical factors that may influence presence/absence of distinctive small mammal communities. Thirteen species of small mammals were collected from 3 upland and 3 riparian cover types using live traps and snap traps. Two pitfall traps were also randomly placed on each transect. Deer Mice (*Peromyscus maniculatus*) dominated the trapping effort. Relative densities of small mammals were similar between sites. Poor separation existed between upland and riparian communities and no special small mammal communities were found. Some small mammal species showed affinities for certain structural diversity and cover, but deer mice were found in all cover types sampled. The small mammal community of the study area was typical of other communities described for shrubland and riparian habitat in the northwestern U.S. The prevalence of deer mice, coupled with evidence of grazing and range fire, suggest that the upland cover types are the result of a deteriorated *shrubland* habitat. Land management practices striving to return *desertic* and *savanna shrubland* to healthy *shrubland* habitat would benefit not only small mammal communities but other species.

DISTRIBUTION AND RELATIVE ABUNDANCE OF AMPHIBIANS AND REPTILES IN HELLS CANYON. Kelly D. Wilde and Anthonie M. A. Holthuijzen, Idaho Power Co. Boise, Charles R. Peterson and Jon M. Beck, Idaho State Univ. Pocatello, and Mark Gerber, Boise.

In 1995-1997 we assessed presence and relative abundances of amphibians and reptiles in Hells Canyon with drift fences and funnel traps, constrained time and area searches and incidental observations. Over 1,400 reptiles were trapped at 87 sites between Weiser and Hells Canyon Dam. Twelve species of reptiles were captured with racers (*Coluber constrictor*) being the most abundant. Seven species of amphibians were observed in the study area. Most species of herptiles appear to be wide ranging throughout the study area. However some are limited in distribution to only the southern end of the canyon (spadefoot toad (*Scaphiopus intermontanus*) and striped whipsnake (*Masticophis taeniatus*)), and others by specific habitat types (tailed frog (*Ascaphus truei*) and gopher snake (*Pituophis catenifer*)).

WHITE-TAILED DEER SURVIVAL AND CAUSE-SPECIFIC MORTALITY IN NORTHERN IDAHO. Pete Zager, Idaho Department of Fish and Game, Brad Wending and Ben Nelson, University of Idaho.

In part to answer questions generated by a liberalized white-tailed deer season, we investigated survival and cause-specific mortality of adult whitetails in Game Management Unit (GMU) 1 (Priest Lake area) from 1987 to 1994 and in GMU 15 (South Fork of the Clearwater River) from 1990 to 1996. During the 1990-94 period of overlap, buck survival was 0.45 in GMU 1 and 0.63 in GMU 15. Adult doe survival was 0.68 in GMU 1 and 0.75 in GMU 15 during the study period. Annual survival rates did not change during the study period. Hunting and predation were the primary sources of mortality for both sexes and their effects were essentially equal. We present management implications of these data.

POSTERS

A LANDSCAPE ANALYSIS OF IDAHO'S ROCKY MOUNTAIN ELK (*CERVUS ELAPHUS*). Leona K. Bomar, E.O. Garton, J. M. Scott, and Pete Zager Dept of Wildlife Resources, Univ. of Idaho, Moscow, Idaho.

Rocky Mountain Elk (*Cervus elaphus*) are distributed throughout Idaho from wilderness areas to the margins of intensively farmed agricultural lands. Understanding the changes which occur in elk demographics at various spatial scales and identifying the variables influencing these population characteristics is critical for effective management. We are currently examining elk at four scales, determining what patterns exist and using GIS to analyze correlations between these patterns and independent variables such as habitat changes, geologic types, precipitation, fire, roads, predators, and harvest. Our goal is to develop a predictive model which combines elements of landscape ecology and metapopulation theory. Managers could use this model as a tool for evaluating alternative management strategies.

CANYON WREN ECOLOGY ALONG THE LOWER SALMON RIVER OF IDAHO. Heather L. Johnston and John T. Ratti, University of Idaho, Moscow, Idaho.

Canyon wrens (*Catherpes mexicanus*) are among the least-studied passerines in North America, and no research data are available for Oregon, Washington, or Idaho. For 2 years we have assessed regional distribution, habitat-use patterns, and nest-site temperature regimes. We tested the hypothesis that canyon wren density was limited by availability of suitable nesting cavities. Results from an artificial nest box study did not support this hypothesis. Although distributed throughout sloping grasslands with occasional rock outcrops, our data suggested canyon wrens were concentrated in habitats dominated by precipitous cliffs with large boulders. Using thermal recorders, we monitored daily temperature regimes at nest sites. Nesting cavities in larger diameter substrates remained cooler during the day and warmer during the night than substrates of smaller surface diameter. Thus, wrens may use such sites to reduce thermoregulatory energy expenditure during incubating and brooding. We discussed potential effects of hydroelectric impoundments and increased recreational activity.

Development of a Hybrid Land Cover Model of Northern Idaho. P.D. Tanimoto, J.W. Karl, N.M. Wright and J.M. Scott. Idaho Fish and Wildlife Cooperative Research Unit, University of Idaho.

The land cover classification of Caicco (1989) has served for nine years as an excellent reference for the Idaho Gap Analysis Program. However this product, as the first statewide GAP project, predates current approaches to land cover mapping and is at a coarser resolution than the 1:100,000 nation-wide GAP standard. A subsequent classification of northern Idaho by Redmond et al. (1996) followed contemporary standards and yielded a product with 30-meter resolution, but was determined to be sufficiently accurate only to broad cover classes (e.g. grassland, coniferous forest). Overall satisfaction of the typing of Caicco and of the resolution of Redmond et al. permitted us to recommend a process for building upon the advantages of both data sets and for using ancillary data to build what we believe will be a higher-accuracy product. We conducted a hierarchical aggregation of conifer classes from Redmond et al. before reassigning those more specifically by overlaying data from Caicco. In addition, we reduced the specificity of some conifer classes by incorporating spatial & contextual information. Foothills grasslands, for example, generally indicated moderate-precipitation conditions, permitting us to reclassify some Douglas-fir and mixed mesic forests to ponderosa pine-dominated mixes. We will develop our enhancement of the Redmond et al. data set by incorporating topographic, precipitation, and proximity analysis, and by establishing explicit modeling parameters that reflect Northern Idaho's spatial ecology.