# TWS WY Chapter
# 2008 Annual Meeting
# Professional Abstracts

### *2010 REVISION OF WYOMING'S COMPREHENSIVE WILDLIFE CONSERVATION STRATEGY*

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In 2000, Congress required states to develop Comprehensive Wildlife Conservation Strategies in order to be eligible for the State Wildlife Grants Program. Strategies are intended to coordinate the wildlife conservation actions of governments, agencies, nonprofits, and individuals at the federal, state, and local levels. The Wyoming Game and Fish Department facilitated the completion of Wyoming's first CWCS plan in 2005. The purposes of CWCS plans are to coordinate actions to restore and protect priority habitats; keep common species common; recover imperiled species; and avoid the need for future Endangered Species Act listing actions. In particular, CWCS plans are to stress proactive measures to circumvent waiting for wildlife to decline and react to problems with expensive, last-ditch recovery efforts. There are 279 species in Wyoming that have been identified as Species of Greatest Conservation Need (SGCN). Of these, 235 were listed at least in part because of a lack of data to assess their conservation status. Currently, there are 22 ongoing research and inventory projects to determine the status of SGCN species. Efforts to revise the plan are currently underway. A revised draft of the plan will be submitted to the Wyoming Game and Fish Commission in July 2010 and to the U.S. Fish and Wildlife Service in October 2010.

### *WHAT IS GOING ON WITH SAGE-GROUSE?*

**PAT DEIBERT**, U.S. Fish and Wildlife Service and **TOM BLICKENSDERFER**, Wyoming Governor's Office

Since 1999, the U. S. Fish and Wildlife Service has received 8 petitions to list the greater sage-grouse throughout all or parts of its range. The intense interest in the potential for listing has generated several conservation efforts at a variety of scales. One of significant importance and value in Wyoming is a proposed statewide Candidate Conservation Agreement with Assurances initiated by the Governor's Office. This presentation will summarize the listing history of the sage-grouse, unravel the mysteries of the listing process, summarize the current status of the petition findings, and provide description and detail of the Governor's statewide Candidate Conservation Agreement. Opportunities for successful implementation of this agreement will be identified.

### *PLAGUE IN FIVE MOUNTAIN LIONS (PUMA CONCOLOR) FROM WYOMING*

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Five fatal cases of plague (*Yersinia pestis* infection) were diagnosed in mountain lions from Wyoming that died between 2005 and 2008. Four of the mountain lions were from the Greater Yellowstone Area and the fifth was from north-central Wyoming near Buffalo. Affected animals included a mature female and one of her kittens, an aged female, a young adult male, and a mature adult male. A second kitten found with the dead dam and litter-mate survived and developed an anti-plague antibody titer that indicated it had been infected – this kitten never demonstrated any clinical signs of disease and eventually was relocated to a zoological collection. Four of the five cases occurred in late summer and early fall (August to October) and one case occurred in spring (April).

All affected mountain lions were found dead in good nutritional condition suggesting that the course of disease was acute or rapid. Characteristic gross lesions observed in all cats included abscesses of cranial/cervical lymph nodes and pneumonia. Microscopic lesions observed in all cats included suppurative and necrotizing lymphadenitis and pneumonia with abundant intralesional coccobacilli morphologically consistent with *Yersinia pestis*. A rapid

diagnosis of plague was made in all cases by fluorescent antibody tests or immunohistochemistry tests performed on lung and lymph node, and confirmation was achieved by bacterial culture and identification from multiple tissues per mountain lion.

These five cases of plague in mountain lions from Wyoming contradict the general impression that mountain lions are relatively resistant to plague, and suggest that plague may be a more common (and significant?) cause of mortality in this species than previously recognized. These cases and one additional case of plague in a mountain lion from Arizona associated with a human fatality highlight the need for wildlife professionals to become educated about zoonotic disease risks applicable to species they work with and to their geographic region. Furthermore, these cases emphasize the need for appropriate personal protective measures for wildlife professionals and enthusiasts when handling live or dead mountain lions and other carnivores in the field or laboratory, and suggestions on appropriate personal protective equipment will be provided.

### *A MAP OF FUTURE OIL AND GAS DEVELOPMENT ACROSS THE ROCKY MOUNTAINS AND ESTIMATING IMPACTS TO SAGE-GROUSE*

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Sage-grouse populations are declining throughout the western United States. This trend is likely to continue, given projected global energy needs, the impacts to sage-grouse associated with oil and gas development, and the wealth of energy resources in the region. It remains unclear how much and where future oil and gas development will occur and what the impact may be to sage-grouse populations. Here we will discuss the development of a predictive model for oil and gas development in Sage-Grouse Management Areas I and II in the U.S., including Montana, Wyoming, Colorado, Idaho, Utah, and the Dakotas. Probabilities of future energy production were determined from data collected from current producing and non-producing wells and a series of geological variables, using the Random Forest statistical model. Community Viz's Allocator Tool© was used to model projected development, constraining development by the oil and gas probability map. Rates of development predicted by the Bureau of Land Management's Reasonable Foreseeable Development (RFD) process determined the number of new wells, where available (where unavailable, past rates of development were used). The resulting model was combined with sage-grouse population data to estimate sage-grouse population losses under two scenarios: 1) the BLMs RFD predictions and 2) full development of all high potential areas. Our findings quantify population losses under the two scenarios and identify the areas of potential conflict between sage-grouse conservation and energy development and will provide options to decision makers to safe guard sage-grouse persistence with responsible energy development.

### *THE WYOMING POCKET GOPHER: A GENETIC ASSESSMENT.*

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The Wyoming pocket gopher (*Thomomys clusius*) was known only from a few specimens collected in south-central Wyoming in the 1970's, and described as distinct on the basis of its chromosome count. Our preliminary genetic analyses of pocket gophers from the region suggest that *clusius* is distinct from geographically adjacent forms such as *Thomomys talpoides ocius* (northern pocket gopher). Our specimens differ from *T. talpoides*, both in chromosome number and by more modern nuclear and mitochondrial genetic analyses, suggesting that *T. clusius* is indeed a distinct form of gopher. They appear to be readily identifiable in the field, facilitating surveys and monitoring.

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## *YEARLING GREATER SAGE-GROUSE RESPONSE TO ENERGY DEVELOPMENT IN WYOMING*

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Sagebrush-dominated habitats in the western United States have experienced extensive, rapid changes due to development of natural gas fields which have resulted in localized declines of greater sage-grouse populations. It is unclear whether population declines in natural gas fields are caused by avoidance or demographic impacts, or which age classes are most affected. We investigated habitat selection during the breeding season and demographics of greater sage-grouse to examine if natural gas development influenced yearling male or yearling female populations in the Upper Green River Basin of southwestern Wyoming. Yearling males avoided leks near the infrastructure of natural gas fields when establishing breeding territories. Additionally, yearling males reared in areas where infrastructure was present established breeding territories less often, were observed on leks during the breeding period less often, and had lower annual survival rates compared to yearling males reared in areas with no infrastructure. Yearling females avoided nesting within 950 m of the infrastructure of natural gas fields. Yearling females reared in areas where infrastructure was present had lower annual survival rates than females reared in areas with no infrastructure. Our results indicate that development of natural gas fields resulted in displacement and lower annual survival of yearling males and females, and lower fecundity of yearling males. Maintaining undeveloped areas near natural gas fields may be an effective strategy to sustain greater sage-grouse populations being affected by such developments.

## *RESEARCH-BASED MANAGEMENT OF TARGET FEEDGROUNDS AS A LONG-TERM STRATEGY FOR REDUCING BRUCELLOSIS IN WESTERN WYOMING ELK*

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Although winter elk (*Cervus elaphus*) feedgrounds are known to perpetuate the spread of brucellosis among elk, they are largely maintained to separate elk from cattle (*Bos taurus*) and prevent disease spill over. Although feedgrounds have undoubtedly prevented much interspecific transmission, recent brucellosis occurrences in Wyoming cattle during 2004-2008 were linked to feedground elk. Management strategies that lead to long-term reduction of brucellosis in elk are needed to lower risk of future elk-to-cattle disease transmission. Therefore, numerous studies of brucellosis in feedground elk were conducted during 2006-2008. Major results indicate that 1) most important transmission events at feedgrounds occur on feedlines, 2) brucellosis seroprevalence in elk at feedgrounds is positively correlated with mean feeding end-date, and 3) elk density during calving season may increase with number of days spent on supplemental feed. Based on research results, the WGFD developed the Target Feedground Project, which manipulates feeding management to reduce brucellosis in elk. This project was first implemented in winter 2007-08 and is conducted exclusively at *Target Feedgrounds*, where perceived elk-cattle commingling risk is low and there is a high potential for elk to free range in late winter/early spring. The first objective is to reduce elk densities while on feedgrounds by using Low-Density feeding. The second objective is to reduce duration of high elk concentration by manipulating end-feeding season date through systematic reductions in hay rations in late-winter/early-spring, with the goal of ending an average of 3-4 weeks earlier than long-term means. Advantages of this project, if successful, are sustainable reductions in elk brucellosis and decreased risk to cattle, lower elk feeding costs, and continued operation of feedgrounds to minimize elk-cattle commingling, elk damage, and sustain elk numbers that meet public expectation. Disadvantages are that the project is not suitable for all feedgrounds and Target Feedgrounds remain susceptible to new diseases that may arise.

### *NESTING SUCCESS AND RESOURCE SELECTION OF GREATER SAGE-GROUSE (CENTROCERCUS UROPHASIANUS) IN NORTHWESTERN SOUTH DAKOTA*

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Understanding population dynamics and resource selection is crucial in developing wildlife resource management plans, particularly for sensitive species. Greater sage-grouse (*Centrocercus urophasianus*) populations have declined range-wide at a rate of 2% per year from 1965 to 2003. In northwestern South Dakota, sage-grouse occupy habitats at the eastern edge of their range, and populations have generally declined over the long-term average. Reasons for the decline are mostly attributed to human-induced factors such as sagebrush degradation and removal, improper range management practices, oil and gas exploration, and West Nile virus infection. We conducted a 2-year study to investigate the nesting ecology of sage-grouse in northwestern South Dakota. Female sage-grouse were captured and radio-marked ($n$ = 53) on traditional display grounds. Radio-marked hens were tracked to estimate nesting effort, nesting success, and resource selection. Nest initiation was 96%, with an overall nest success of 46 ± 5%. Hens selected habitats with greater sagebrush canopy cover and nest bowl visual obstruction compared to random sites. Nest success models developed in Program MARK indicated taller grass structures increased nest success. Management of sage-grouse nesting habitat on the eastern edge of their range should focus on increasing levels of sagebrush density and canopy cover while maintaining cover and height of grasses. We recommend that land managers maintain maximum grass heights of 26 cm.

### *CLIMATE VARIABILITY IN THE UPPER SNAKE RIVER WATERSHED: THE PIKA'S (OCHOTONA PRINCEPS) PERSPECTIVE*

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Recent drought and increasing demands on the water supply emphasize the need to account for climatic variability in all aspects of natural resource management. In particular, moisture variability can influence fire occurrence, habitat quality and wildlife distributions. Tree-rings provide a window into past precipitation regimes, yielding critical information on decadal and multi-decadal trends in water resources. We used tree-rings to reconstruct streamflows in the Upper Snake River Watershed (USRW) to better understand historic precipitation patterns in the region. We sampled Douglas fir (*Pseudotsuga menziesii*) and limber pine (*Pinus flexilis*) at 11 sites in the Greater Yellowstone Ecosystem (GYE). Tree cores and cross-sections from each site were used to develop a proxy for annual precipitation that spans 1125 – 2006 A.D. The USRW provides the headwaters for the Snake River, one of the most heavily used rivers in the west.

In August 2008 we initiated a collaborative pika (*Ochotona princeps*) monitoring project in Grand Teton and Yellowstone National Parks to better understand how climatic variability may influence wildlife. Because of their association with alpine communities and their vulnerability to warm temperatures, pikas may act as harbingers of change in montane environments. While just beginning, this project provides much-needed data on pika habitat use and response to variable environmental conditions. This work will help resource managers better understand natural climatic variation in the GYE and will facilitate sustainable resource management that considers a range of possible conditions. The efficacy of future wildlife management efforts largely depends on changing climate conditions and the underlying natural precipitation variability.

***MONITORING WYOMING GREATER SAGE-GROUSE POPULATIONS: THE IMPORTANCE OF REPEATED COUNTS AND THE INFLUENCE OF SCALE.***

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Accurate assessment of animal population trends is fundamental to population biology and important for effective conservation and management. Methods of monitoring animal populations must consider many factors, including life history of the species, availability of human resources (time and money), and the required accuracy of population estimation. The presence and abundance of animals varies temporally and therefore, repeated monitoring visits to a particular site can result in more accurate estimates of population trends. Wyoming greater sage-grouse (*Centrocercus urophasianus*) populations are monitored through several methods. *Lek counts* involve counting the number of males attending a lek during the breeding season and are the most widespread means of monitoring greater sage-grouse. Male attendance at leks varies throughout the breeding season and therefore, monitoring efforts attempt to count each lek a minimum of three times during a breeding season to obtain a maximum count of males at each lek. However, it is unclear how these repeated counts affect the assessment of population trends. We used generalized additive models and simulation techniques to determine the effect of repeated counts on the accuracy of population trend estimates using Wyoming's *lek count* data. These methods can be used to estimate detailed changes within population trends and identify years in which the rate of decline or increase changes significantly. We also tested the hypothesis that repeated counts have less influence on the accuracy of population trend estimates as the number of sites monitored increases, thus, decreasing the need to repeatedly sample individual sites. Our results suggest scales at which repeated counts may not result in significant increases in the accuracy of population trend estimation.

***2007/08 WYOMING CHRONIC WASTING DISEASE SURVEILLANCE***

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In 2007, the Wyoming Game and Fish Department (WGFD) continued statewide surveillance for chronic wasting disease (CWD). Retropharyngeal lymph nodes were collected from hunter-harvested animals by WGFD personnel at meat processors and check stations. Samples were also obtained from road-killed and targeted animals. A total of 4,226 deer, elk, and moose samples were analyzed. Of these samples, 115 tested positive for CWD representing 94 mule deer, 13 white-tailed deer, and 8 elk. Chronic wasting disease was identified in six new deer hunt areas (12, 23, 87, 122, 125 and 163) and one elk area (110). No CWD positive moose have been identified in free-ranging Wyoming populations.
Surveillance has documented a slow, progressive northwest spread of this disease from the historic endemic area in the southeastern corner of the state. A steady increase in prevalence has also been observed in hunt areas were this disease has persisted for several years.

At the time this abstract was written, 2008 surveillance results were not yet available; preliminary findings will be covered in the presentation.

### *WYOMING BLM SAGE-GROUSE POLICY*

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WY BLM sage-grouse policy, first issued in 2004, is currently being updated to incorporate new information from plans, strategies, assessments, guidelines, studies and an Executive Order from the Governor of Wyoming for sage-grouse management for state lands and state agencies. Existing land use plans have not yet incorporated these recent research findings and management guidelines. Updated policy will facilitate changes to land use plans.
The WY BLM sage-grouse habitat management policy establishes timing and distance restrictions that apply to all proposed activities, not just oil and gas development. As land use plans are updated, the new distance restrictions will be incorporated. The policy regarding the Governor's Executive Order and the establishment of Core Population Areas is for field offices to work towards conservation of sage-grouse habitats with partners and stakeholders who may propose using the core area approach. The management challenge for all of us is how to manage sage-grouse habitats while, as the Executive Order points out, recognizing the valid exiting rights and the existing terms of oil and gas leases as well as the existing NEPA decisions covering the development areas, keeping in mind that just over half of the surface ownership inside the Governor's Core Areas is managed by BLM, while approximately 70% of the oil and gas minerals under the Core Areas is managed by BLM. (Need info here about % of surface acres are leased and the probability that those leases will be developed). Restricting or modifying activities with contractual rights in the Core Areas will have to be voluntary.
Another challenge for sage-grouse habitat management is from wind energy development. Very few areas, especially for the BLM surface within Core Population Areas, have restrictions beyond the standard timing and distance restrictions for any proposed activity. Until completion of a public process, existing land use plan decisions will direct the implementation of authorized actions such as wind energy development.

### *DESIGN TO MONITOR TREND IN ABUNDANCE AND PRESENCE OF AMERICAN BEAVER (CASTOR CANADENSIS) AT THE NATIONAL FOREST SCALE*

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Wildlife conservationists design monitoring programs to assess population dynamics, project future population states, and evaluate the impacts of management actions on populations. Because agency mandates and conservation laws call for monitoring data to elicit management responses, it is imperative to design programs that match the administrative scale for which management decisions are made. We describe a program to monitor population trends in American beaver (*Castor canadensis*) on the U.S. Department of Agriculture, Black Hills National Forest (BHNF) in southwestern South Dakota and northeastern Wyoming, USA. Beaver have been designated as a management indicator species on the BHNF because of their association with riparian and aquatic habitats and its status as a keystone species. We designed our program to monitor the density of beaver food caches (abundance) within sampling units with beaver and the proportion of sampling units with beavers present at the national forest scale. We designated 6$^{th}$ level hydrologic unit codes as sampling units in a stratified random sampling design that we developed based on habitat modeling. Habitat modeling indicated the most suitable beaver habitat was near perennial water, near aspen (*Populus tremuloides*) and willow (*Salix* spp.), and in low gradient streams at lower elevations. Results from initial monitoring in October 2007 allowed us to assess costs and logistical considerations, validate our habitat model, and conduct power analyses to assess whether our sampling design could detect levels of beaver decline stated in the objectives. Beaver food caches were located in 20 of 52 sampled watersheds. Monitoring 20 or 25 watersheds inhabited by beaver should provide sufficient power to detect 15–40% in overall declines in the beaver food cache index. Indices of abundance, such as the beaver food cache index, provide a practical measure of population status to conduct long-term monitoring across broad landscapes such as national forests.

### *WOLVES AND WOLF MANAGEMENT IN WYOMING - 2007 THROUGH 2008*

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Wolves in the Northern Rocky Mountains (NRM) were delisted on March 28, 2008. On July 18, 2008, the U.S. Federal District Court in Missoula, Montana, issued a preliminary injunction that immediately reinstated temporary Endangered Species Act (ESA) protections for gray wolves in the NRM. All wolves in Wyoming (WY) are protected under the ESA as an experimental population and are currently managed by the U.S. Fish and Wildlife Service (USFWS). The USFWS managed wolf population growth and wolf distribution in WY outside Yellowstone National Park (YNP) to minimize chronic loss of livestock from wolves. In 2007, we reduced confirmed wolf depredations by >55% compared to 2006 by aggressively removing chronically depredating wolves early in the grazing season. In 2008, the number of livestock depredations will probably be similar to or lower than the number of depredations in 2007 with >60 confirmed depredations (34 cattle and 26 sheep). Thirty-eight wolves (approx. 15% of the WY wolf population outside YNP) were lethally removed in control actions in 2008; however, we maintained the wolf population well above recovery objectives. We estimate >183 wolves live in WY outside YNP in >18 confirmed packs and >16 breeding pairs. We documented 64 dead wolves in WY (outside YNP). Causes of mortality include: agency control = 38 (59% of total mortality); hunters = 9 (14%); under investigation = 7 (11%); natural = 3 (5%); vehicle strikes = 2 (3%); individual livestock control = 2 (3%); capture related = 1 (2%); and unknown = 2 (3%). Twenty-five wolves were captured and radio collared in Wyoming (outside YNP) in 2008.

### *JONAH INTERAGENCY OFFICE*

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The Jonah Interagency Office (JIO) was established in 2005 as a result of the Bureau of Land Management's (BLM) Record of Decision for the Jonah Infill Drilling Project in Sublette County, Wyoming. A funding commitment was made by EnCana and British Petroleum (BP) to fund the office and associated mitigation and monitoring needs for a total of $24.5 million. $16.5 million was directed to the funding of compensatory, off-site wildlife mitigation. A brief history will be given of the JIO and associated duties highlighting those that have significant benefits to wildlife. Pertaining specifically to wildlife mitigation, over $8 million has been committed to date on approximately 20 projects. Water well developments, fence inventory and modifications, conservation easements with conservation plans are some of JIO's current projects that have been funded. Information will be provided for projects completed to date and others that are in the planning process, including estimates of direct and indirect acreages affected and the use of these funds for the leveraging of other partner contributions.

### *DISPERSAL MOVEMENTS OF SUBADULT COUGARS FROM THE BLACK HILLS OF SOUTH DAKOTA AND WYOMING: CONCEPTS OF RANGE EDGE, RANGE EXPANSION, AND RECOLONIZATION*

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Dispersal plays a vital role in cougar (*Puma concolor*) population ecology, increasing genetic viability and maintaining gene flow between populations. The Black Hills cougar population is at the eastern edge of cougar range in North America and completely surrounded by the Northern Great Plains. In addition, the population rebounded from practical extirpation to that of a flourishing cougar population within the 20th century. Because of the semi-isolated nature of a re-established cougar population, we wanted to document dispersal movements of

subadult cougars captured within the Black Hills ecosystem. Subadult cougars were captured during the winters of 2003-2006, fitted with VHF radio-transmitters, and monitored weekly. Locations were plotted in ArcGIS and dispersal distances calculated from capture point/natal home range to: site of death, last know location, or post dispersal home range centerpoint. Kittens were captured by hand from radioed females to document age of independence and dispersal. A total of 29 subadult cougars were captured in the Black Hills (*n*=19 males, *n*=10 females). Cougars reached independence an average of 13.5 months from parturition; with dispersal occurring 1-3 months post independence. Males dispersed (mean = 302.5 km; range: 29.9-1,067.0 km) further than females (mean = 48.5 km; range: 12.5-110.1 km). Female cougars exhibited 40% philopatry, with no successful recruitment of subadult males to the Black Hills population. We documented several (*n*=5) long distance dispersal movements (>250 km) from male cougars and suggest that males making long distance movements were in essence seeking an available mate. Dispersal movements away from the study area crossed atypical cougar habitat (i.e., prairie/grassland, agricultural, and interstate highway systems). Our results suggest that cougar population connectivity, range expansion and habitat recolonization are occurring across North America and furthermore we suggest that agencies react proactively to cougar movements and increase public knowledge of cougar ecology in areas where cougars have been devoid for decades to millennia.

### *MITIGATION FOR CIMAREX NATURAL GAS SEQUESTRATION DEVELOPMENT NEAR BIG PINEY, WYOMING*

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During spring 2008 Cimarex applied for a special use permit from the Office of State Lands and Investments to construct, operate, and maintain a natural gas sequestration plant known as the Riley Ridge Methane & Helium Recovery Facility on State Trust lands west of Big Piney, Wyoming. The proposed facility site was in one of the few elk crucial winter range complexes where elk use native ranges and are not known to winter on elk feedgrounds. The Wyoming Game and Fish Department was concerned about development impacts to elk crucial winter range, and potential redistribution of elk and conflicts with nearby ranching operations. Potential agricultural conflicts include elk damage to stored hay and cattle feed lines. Risk of brucellosis transmission from elk to cattle is a critical concern in northwestern Wyoming because elk herds associated with feedgrounds maintain higher brucellosis infection levels than non-fed herds. Wyoming's five elected officials serve as the Board of Land Commissioners for State Trust lands, and they declined issuing the special use permit application during their June 2008 meeting. While the Board of Land Commissioners mission is to maximize income from State Trust lands, they recognized the importance of wildlife as a renewable resource, and directed Cimarex to develop a mitigation agreement with the Department prior to the Board's final decision to issue or not issue the special use permit. The special use permit for the Cimarex facility was tentatively approved during the Board of Land Commissioners August 2008 meeting on the basis of a letter of agreement between Cimarex and the Department. Final approval is contingent on completion of an MOA containing the details of the mitigation agreement. Agreed upon mitigations include $450,000 for an elk distribution study (upcoming five years), $350,000 for habitat improvements (upcoming ten years), and $750,000 for damage prevention and handling (upcoming 50 years). The Wildlife Heritage Foundation of Wyoming will hold funds in a dedicated account pending WHFW Board approval. In addition, Cimarex agreed to required wildlife stipulations throughout the development and operation of the facility.

### *WYOMING TOAD UPDATE*

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The Wyoming toad (*Bufo baxteri*) is endemic to a single basin in Albany County, Wyoming. After severe population declines in the 1970's, it was listed as endangered under the federal Endangered Species Act in 1984 and given a recovery priority of 1 (the highest possible). *B. baxteri* continues to be one of the most endangered vertebrate species in the United States. Over the past decade, under the advice of the Wyoming Toad Recover Team, state and federal agencies, non-government conservation groups and zoos across the country have cooperated to conduct a captive propagation and reintroduction program that has recently been expanded to include Safe Harbor sites. This talk will provide a brief history of Wyoming Toad conservation and discuss the species' current status in light of ongoing recovery efforts, including recent reintroductions and population monitoring.

### *USING LANDSCAPE-LEVEL PLANNING TO IDENTIFY MITIGATION OPPORTUNITIES FOR ENERGY DEVELOPMENT IMPACTS*

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Biodiversity offsets, one component of the mitigation hierarchy (avoid, minimize, restore offset), provide a mechanism for maintaining or enhancing environmental values in situations where energy development is sought despite detrimental environmental impacts. They seek to ensure that unavoidable negative environmental impacts of development are balanced by environmental gains, with the overall aim of achieving a net neutral or positive outcome. We present transparent, data-driven approaches to guide planning for anticipated energy development, for both individual projects and region-wide efforts. First, we present a framework for identifying biodiversity offsets at the project-level, including establishment of a working group, setting goals for biological targets, and using the Marxan site-selection algorithm to determine an appropriate spatial scale and identify a set of potential offset sites. To demonstrate this process we use a case study from the Jonah Natural Gas Field in Wyoming. While mitigation for development has typically occurred on a project-by-project basis, as in the Jonah Field example, such an approach can underestimate cumulative impacts of development and limit opportunities for truly balancing conservation and development. Therefore, we present a second pro-active approach that uses ecoregional planning to identify the most biologically critical areas and current and projected energy development across an entire region. This provides increased opportunities to use all components of the mitigation hierarchy. It identifies the most biologically critical, irreplaceable areas that should be avoided and could serve as offset sites for development impacts elsewhere, while identifying other areas where ecoregional goals for biological targets could be met in multiple locations and where development may occur if impacts are minimized.

### *TESTING REMOTE CAMERAS TO COUNT INDEPENDENT FEMALE GRIZZLY BEARS WITH CUBS OF THE YEAR AND DOCUMENT GRIZZLY BEAR DISTRIBUTION*

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Currently, ground and aerial observations of independent females grizzly bears with cubs of the year (COY) are used to estimate population size and monitor trends of the Yellowstone grizzly bear population. Observations of females with COY are high in Bear Management Units (BMU) containing large areas of open terrain or moth feed sites where bears are highly visible. However, there are several BMUs in Wyoming on the southern portion of the ecosystem that are heavily timbered and contain no moth sites. Observations of grizzly bears in these units are extremely difficult, often resulting in no females being observed. We conducted surveys in one BMU in the Blackrock/Spread Creek area near Moran Junction, Wyoming using remote-sensing cameras during the summers of

2006 and 2007 to estimate the probability of detecting females with cubs of the year, while also creating a valid protocol for potential implementation in the future. A 2.5 km x 2.5 km camera grid was placed in the study area for approximately 4 weeks in 2006 and 6 weeks in 2007. Detection probabilities for grizzly bears were quite high in this area (P = 0.21). While the camera grid was very effective at detecting bears, the low density of female grizzly bears with COY made it an inefficient method for use in surveying this cohort. The effectiveness of grizzly bear camera detection suggested a utility in documenting grizzly bear distribution as they expand into new areas of the Greater Yellowstone Ecosystem in Wyoming.

### *DYNAMIC MESSAGE SIGN BOARDS – MITIGATION EFFORT TO REDUCE WILDLIFE MORTALITY ON ROADWAYS*

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Thousands of pronghorn and mule deer migrate through the upper Green River Valley each spring and fall. Vehicle traffic throughout Sublette County has increased dramatically in recent years. As a result vehicle collision with wildlife has become more frequent. Vehicle collisions with wildlife usually results in injury or mortality to wildlife and costly vehicle repair. Too often it results in human injury or death.
The Jackson Hole Wildlife Foundation initiated a project in Teton County to reduce wildlife/vehicle collisions using dynamic message sign boards. Early results of this project show a marked decrease in road killed wildlife. Through energy development mitigation funding Wyoming Game & Fish Dept. was able to purchase 8 dynamic message sign boards for use on Sublette County roadways. This presentation outlines the cooperative effort undertaken to complete this project.

### *THE STATUS OF MOOSE (ALCES ALCES) AND MULE DEER (ODOCOILEUS HEMIONUS) HABITAT ASSESSMENTS IN WYOMING*

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The Wyoming Game and Fish Department (WGFD) initiated a series of ungulate habitat assessments in 2007 in response to declining habitat conditions on crucial moose (*Alces alces*) and mule deer (*Odocoileus hemionus*) ranges. These projects are based on evaluations completed in the 1980's in some crucial habitat areas in Wyoming. The assessments are designed to quantify existing habitat quality and to provide prioritized management recommendations. The Conservation Research Center of Teton Science Schools (TSS) contracted with the WGFD to complete 4 of these projects in 2007 and 2008. Two moose herd unit habitat evaluations are ongoing in northwest Wyoming. Two mule deer herd unit habitat evaluations are ongoing in the Wyoming Range and in the Platte Valley. Existing habitat conditions are documented through patch-level mapping and through a series of vegetation transects. Prioritized management recommendations are developed based on the potential to effectively enhance habitat for the species and other wildlife, the ability to work with the land manager on post treatment management and on the likelihood that vegetation will respond to treatment.

Project end products include final written reports and interactive GIS maps with hyperlinked transect data, site photos and patch information. Written reports summarize current habitat conditions and provide a prioritized list of short and long term management proposals. TSS also provides a comprehensive series of information and education workshops designed to disseminate project results to interested publics. The WGFD will use the results of this work to partner with landowners, land managers and conservation groups to improve moose and mule deer habitat in the focus areas.

# TWS WY Chapter
# 2008 Annual Meeting
# Professional Abstracts

### *AN EFFICIENT METHOD FOR COLLECTING A SET OF COMMON DATA FROM SAGEBRUSH VEGETATION*

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Wildfire, various management practices, energy development, and changing climate have affected or likely will affect sagebrush across Wyoming. Monitoring programs typically provide information necessary to document effects of disturbance and management practices on vegetation in specific locations. But after polling managers and biologists with the Wyoming Game & Fish Department, BLM, and Forest Service, we realized that little information is being collected to address the condition of, or changes to, sagebrush vegetation state-wide. That state-wide perspective complements the more local focus and is needed for a complete understanding of what is happening to sagebrush in Wyoming.

We have developed and tested a sampling method that can be used on individual projects while also yielding information that gives biologists and managers this state-wide view. Last summer we used this method on two projects in sagebrush vegetation. For the first, we collected data from 25 plots in a paired-plot design, to document the effects of prescribed fire and wildfire on sagebrush in the Shoshone National Forest in northwestern Wyoming. For the second, we sampled 126 plots extending from the Absaroka foothills southeast to Laramie, for comparing sagebrush vegetation on lands under conservation easement to that on other private lands. Using our methods, a two-person crew can collect data on a number of vegetation characteristics -- shrub cover, density, vigor, and size-class distribution; cover of other plant growth-forms and of individual plant species; cover of biotic soil crust organisms; and amounts of other ground-cover categories -- in 90 minutes (on average) per sampling point. We are now developing a database to store the data and provide them for various analyses.

This sampling method, as we have used it, will not answer the needs of investigators on all projects in sagebrush vegetation. But it can be adapted to specific projects, through changes in the emphasis on the features being measured, or by the deletion of some features and the addition of others. If those adaptations are made carefully, then the information collected can be incorporated into a state-wide data set.

### *WINTER RESOURCE SELECTION BY COW ELK IN A NATURAL GAS FIELD*

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Concern over the effects of human activity on ungulates is increasing as human populations and development continue to expand across North America. It is critical to identify the mechanisms and effects of human-caused disturbance in order to develop best management practices that provide for coexistence of wildlife and people. One particular human activity of concern is energy development and its potential impact on elk (*Cervus elaphus*) populations. Rules and regulations restricting energy development on elk winter range are often thought to minimize disturbance to elk at a critical time of year. We developed resource selection functions for GPS-collared cow elk (n=17) in an active natural gas field in southern Colorado during winter 2006-2007 as part of an effort to better understand elk ecology in areas where energy development is ongoing. Female elk avoided roads and areas with high road density during the day but not during twilight or nighttime. Elk showed strong selection for forest and avoidance of edge habitat during the day, which may explain the observed positive association between elk and gas wells (which were located primarily in forested areas). Elk showed a strong association with edge habitat between forest and non-forested areas during twilight and nighttime. Elk avoided houses during day and twilight, but were closer to houses than expected at night. These results show that elk resource selection in relation to disturbance differs depending on time of day and that fragmentation of important daytime forested refugia as a result of increased road density could emerge as a factor requiring management attention. At present we are incorporating data from winter 2007-2008 into the analysis to more fully examine resource selection with increased sample size and over multiple winters.

***WYOMING LANDSCAPE CONSERVATION INITIATIVE: A COLLABORATIVE SCIENCE-BASED APPROACH***

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The Wyoming Landscape Conservation Initiative (WLCI) was organized in fall 2006 as a long-term, science-based effort to conserve and enhance fish and wildlife habitats while facilitating responsible development through local collaboration and partnerships. This large-scale program encompasses all land ownerships in Wyoming west of the Continental Divide and south of Teton County, and includes the Great Divide Basin. Sagebrush, mountain shrub, aspen, riparian, and aquatic communities are the focus of work within this area. The partnership has grown to include additional groups and now formally includes the Bureau of Land Management, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Forest Service, Wyoming Department of Agriculture, Wyoming Game and Fish Department, six county commissions, and eight conservation districts. Ongoing WLCI efforts include scientific assessment of wildlife resources and anticipated development impacts in southwest Wyoming, implementation of strategic actions to conserve fish and wildlife, monitoring of conservation actions to provide information for future work, and improving communication and sharing of data and information. The WLCI also is in the process of creating local project development teams to cooperatively identify resource needs, develop strategies to meet landscape level issues, facilitate local participation and foster projects with local involvement. Examples of projects completed to date include restoring stream connectivity, treating invasive species, removing impediments to migration, enhancing forage, and creating wetlands. The vision for future work is to incorporate scientific information into decision making and develop processes that have local-level ownership. The collaborative effort represented by the WLCI is unique as it provides a means to address multiple concerns at a scale that considers all activities on the landscape, incorporates multiple needs in project implementation, and can leverage resources that might not be available for single agency projects.