

*Welcome to the 18<sup>th</sup> Annual  
North American Wolf Conference*



*Red wolves: photo by Bud Fazio*

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**18<sup>th</sup> Annual North American Wolf Conference**  
**Abstracts**  
**In order of appearance**

**Wednesday 8:30 – 9:00 am**

**Yellowstone National Park Wolf Project Status Update 2005**

Doug Smith, (Wolf Project Leader, Yellowstone National Park, P.O. Box 168, Officer's Row, Building 27, Yellowstone National Park, WY 82190)

At the end of December 2005, at least 118 wolves in 13 packs (Cougar Creek I & II were considered as one pack) occupied Yellowstone National Park. This represents a loss of 53 wolves (31%), the largest population drop of any year since reintroduction. Most of the decline is attributable to poor pup survival. Disease is suspected as the cause for this high pup mortality.

At least 69 pups were born and 22 survived (32% survival rate). Pup survival was especially poor on the northern range (8 of 49 pups survived until winter, 16% survival). The Druid Peak, Swan Lake, and Nez Perce packs had pups but none of them survived. Mollie's pack had no pups probably because the breeding female (alpha) died shortly before the breeding season and was not replaced. The Slough Creek and Leopold packs had more than one litter: Slough Creek was confirmed to have four breeding females (15 pups born; 3 survived) and Leopold was at least three and possibly four breeding females (19 pups born; 2 survived). Average pups produced per pack was 6.9 (including packs with multiple breeders; range 1-19) and pups survived per pack was 2.2 (range 0-5).

Den sites were again visited and scats picked up for summer food habits. The Swan Lake, Leopold, Delta, Bechler, Gibbon Meadows, Cougar Creek and Nez Perce wolves denned in a previously used den. Agate Creek, Slough Creek, Druid Peak, and Hayden Valley denned in new dens. Not counting over-summer pup mortality, 25 radio collared wolves died in 2005. Overall this was a 15% mortality rate.

Project staff detected 316 kills (definite, probable, and possible combined) made by wolves in 2005, including 244 elk (77 %), 29 bison (9 %), four moose ( 1%), six deer (2 %), one pronghorn (<1%), one badger (< 1%), two skunk (1%), four coyotes (1 %), two ravens (1%), nine wolves (3 %), and 14 unknown prey (4 %). The composition of elk kills was 18 % calves (0–12 months), 11 % cows (1-9 years old), 12 % old cows (= 10 years old), 43 % bulls, and 16 % elk of unknown sex and/or age. Bison kills included nine calves (unknown sex), ten cows, six bulls, and four unknown sex and age.

Winter predation rates (calculated via the double count method) for the period of 1995-2000 showed wolves residing on the northern range killed an average of 1.8 elk/wolf/30-day study period. Using a slightly different method (minimum kill rate), in winters 2004 through 2005 wolves on the northern range killed an average of 0.9 ungulates/wolf/30-day study period. Although methods of calculation are not directly comparable, this decline suggests changing ecological conditions on the northern range. A significant increase in scavenging on winter-killed bison and elk by wolf packs for winters 2004 and 2005 maintained wolf food consumption rates.

**Wednesday 9:00 – 9:30 am**

### **Montana State Update**

Carolyn A. Sime, (Gray Wolf Program Coordinator, Montana Fish, Wildlife & Parks, 1420 E. 6<sup>th</sup> Ave., Helena, Montana 59624) and authors V. Asher, L. Bradley, K. Laudon, M. Ross, J. Trapp, M. Atkinson, L. Handegard, K. Glazier, and J. Hoover

In 2005, Montana Fish, Wildlife & Parks (MFWP) and the U.S. Fish and Wildlife Service finalized a cooperative agreement that paved the way for MFWP to begin implementing as much of the state's approved wolf plan as allowed by federal regulations. Agency-wide the transition has been underway for over a year. MFWP now leads wolf monitoring, directs conflict management, coordinates and authorizes research, and leads outreach efforts. MFWP works closely with tribes, a variety of other state and federal agencies, interested organizations and individuals to begin the transition to managing wolves like other wildlife.

The Montana wolf population is secure but dynamic. Wolves share a landscape with people. Like other wildlife species, Montana's wolf population is subject to checks and balances, including strong reproduction in some areas, disease, vehicle strikes, and mortality due to conflicts with people. Fourteen new wolf packs were documented in 2005. Fourteen other packs no longer existed at year's end for a variety of reasons, including natural and human-caused mortality. Approximately 56 wolves died in 2005, about half as the result of conflicts with livestock. Five wolves were killed on Montana's highways. Mange was documented in several southwest Montana wolf packs. Most live-captured wolves had been exposed to various canine viral diseases, but survived. Neither parasites nor disease appeared to significantly affect Montana's overall wolf population growth.

The Montana population increased from 2004 to 2005. This was due to: (1) the state's increased effort to document wolf activity and monitor packs with a staff of six people; (2) an actual increase in wolf numbers; and (3) border packs tallying in the Montana population for the first time. As of December 31, 2005, there was an estimated minimum of 256 wolves in 46 verified packs, 19 of which met the breeding pair criteria. In the endangered area across northern Montana, there was minimum of 126 wolves in 19 verified packs, 10 of which counted as breeding pairs. Several new packs were verified in 2005. In the experimental area across southern Montana, there was a minimum of 130 wolves in 27 packs, 9 of which were breeding pairs. Several new packs were also verified.

Montana wolf packs routinely encounter livestock, and the average wolf pack territory consists of about 30% private land within the boundaries. Confirmed livestock losses decreased in 2005, despite the increased wolf population. WS confirmed that wolves killed 23 cattle, 33 sheep, 1 dog and 2 horses in calendar year 2005. Additional losses and injuries occurred, but could not be verified. A total of 35 wolves were killed to prevent further depredations, 7 of which were killed by private citizens on private lands under the new 2005 10j regulations in the experimental area. Proactive, non-lethal tools were also used.

Increasing public awareness of wolves, wolf management, the federal regulations, and the state's plan is a top priority for MFWP. MFWP's wolf staff is greatly assisted by MFWP biologists, game wardens, and other agency personnel. Other agencies such as USDA Wildlife Services (WS), U.S. Fish and Wildlife Service, U.S. Forest Service, and others also make significant contributions to the outreach efforts. MFWP works with local communities to incorporate wolves into the landscape and to strike the balance between wolves and people.

With Montanans' support, MFWP took on the added responsibility of wolf conservation and management in 2005, contingent on federal funding. In federal fiscal year 2005, Montana received about \$607,000. Additional funds are expected in 2006. Montana believes that the adequacy of funding will determine the degree to which people will share the land with wolves and how successfully the state will rise to the challenges and opportunities posed by wolf recovery. Those challenges and opportunities are shared by a nation that values its wildlife.

MFWP's wolf management web pages were redesigned to provide better, more timely information to the public. The public can also report wolf activity online. See: [www.fwp.mt.gov/wildthings/wolf](http://www.fwp.mt.gov/wildthings/wolf)

### **Wednesday 9:30 – 10:00 am**

#### **Wolf Management in Idaho (presented by Jim Holyan, Idaho Nez Perce Tribe, on behalf of IDFG)**

Steve Nadeau (Statewide Large Carnivore Manager, Idaho Department Fish and Game, 600 S. Walnut, Boise, ID 83707)

The state of Idaho became the designated agent for wolf management in January 2006 under authorities granted to the State by the Department of Interior under the revised 10(j) rule. MOA's between the State, FWS, Nez Perce Tribe, and Animal Damage Control Board help guide the coordinated efforts to monitor and manage wolves in Idaho. This paper gives a brief overview of what State management means to wolves and people of Idaho. Wolf population status, proposal to capture wolves in the wilderness, proposal to control wolves to improve ungulate populations, and other management topics will be discussed.

### **Wednesday 10:00 – 10:30 am**

#### **Wolf Legislation Oregon-Style**

Amaroq Weiss, (Director of Western Species Conservation, Defenders of Wildlife, Oregon Wolf Advisory Committee Member; Ashland, OR), and Clint Krebs, (Operator, Krebs Ranches, Co-Chairman, Predator Management Committee for American Sheep Industry; Oregon Wolf Advisory Committee Member; Ione, OR)

On February 11, 2005, the Oregon Fish and Wildlife Commission adopted a state wolf conservation and management plan that had been created via a stakeholder process. The Plan was immediately implementable upon adoption, with the exception of four provisions requiring legislative action, including: (1) defining the circumstances under which lethal take of wolves by livestock producers would be authorized; (2) designating a future legal status of wolves under state law; (3) establishment of a state compensation and proactive trust fund; and (4) providing for lawful incidental take of wolves by individuals lawfully trapping for other species. However, no enabling legislation was passed in the 2005 session to authorize these provisions. In December 2005, the Commission, through rule-making, excised these provisions and inserted them into an appendix at the back of the Plan, to prevent any confusion as to what steps are currently allowed by Oregon law and under the wolf Plan. We provide a narrative of the intended wolf bill's trajectory, an analysis of the obstacles preventing its successful passage, a reflection on the good things that came in small packages, an update on next steps for the bill, and a notation regarding a new curveball that's been tossed at the Plan.

**Wednesday 10:30 – 11:00 am**

**The Next Frontier: The Southern Rocky Mountains**

Rob Edward, (Carnivore Restoration Program Director, Sinapu, 1911 11<sup>th</sup> Street, Suite 103, Boulder, CO 80302)

As efforts to restore gray wolves (*C. lupus*) to the Northern Rocky Mountains head into a new phase, with managers now focused on the transition to de-listing and state management of the species, court rulings and conservation science indicate that more must be done to affect a range-wide recovery of wolves. Scientific evidence indicates that at least one region in the American West harbors vast swaths of excellent wolf habitat and abundant prey: the Southern Rocky Mountains (primarily in western Colorado and northwestern New Mexico). Further, the same evidence suggests that at least four prime sites for reintroduction exist within the Southern Rocky Mountains, and that—if occupied—these areas would provide adequate source populations of wolves. Notably, recovery of wolves in the Southern Rocky Mountains would ultimately help to secure reasonable connectivity to wolves in the Northern Rocky Mountains and Mexican wolves (*C. lupus baileyi*) in the Southwest.

Given the need to further the repatriation of wolves to suitable habitat beyond the existing recovery areas, wolf managers and decision makers should expedite a recovery planning process for the Southern Rocky Mountains and other sites in the American West. Conservation scientists, advocates and willing landowners stand at-the-ready to help implement the process. Now, it's up to the official stewards of America's wolf recovery program to enter the next challenging frontier.

**Wednesday 11:00 – 11:30 am**

**CANCELLED: Description of Summer Territories and Habitat Use of Reintroduced Mexican Wolves (*Canis lupus baileyi*)**

Dr. José A. Guevara G. (Área de Fauna Silvestre, Facultad de Ciencias Forestales, Universidad Autónoma de Nuevo León, Ap. Postal 41, 67700 Linares, NL. Mexico, Ing. Nahum E. Sánchez M., Dr. Fernando N. González S.

This work deals with the changes in size and shape of territories of three Mexican wolf packs in summer, the first 5 years after their reintroduction in the wild, in the mountains of the west part of Arizona, U.S.A. The movements of the packs were determined following them daily, in periods of 6, 12 and 24 hours continuously. These periods were selected randomly for the season (from May to October). We followed the animals using radio telemetry, footprints tracking and direct observations. During the study the size of the packs ranged from 2 to 7 animals.

The home range was analyzed between months and years using Kernel analysis at 95, 80, 65 and 50 % of records. We used the “Home Range” extension of Arc View. The movements and territories were calculated with the extension “Movements” of the same program.

The results show a significant variation in the size of territories and movements of every pack between years in the first two years (from 500 to 13,000 hectares) stabilizing after this time. There were also significant differences in the home range between packs in a season two years after releasing the animals (13,000 to 23,000 hectares). The core areas (Kernel analysis at 50 %) for every pack have a higher proportion of grasslands (30 to 60 % of the areas) than the complete home range, where the grasslands are poorly represented (3 to 10 % of the areas). The primary

areas of the home range are clearly overlapping the areas with the greater detection of elk (*Cervus elaphus*). In this region, elk are the main prey of the wolves.

**Wednesday 11:30 – Noon**

**Implementing Recovery of the Red Wolf – Integrating Research Scientists and Managers**

Buddy B. Fazio, (Team Leader, USFWS Red Wolf Recovery Program Alligator River NWR, USFWS, 708 N. Highway 64, Manteo, NC 27954, and authors M.K. Stoskopf, K. Beck, T. Fuller, E.M. Gese, B. T. Kelly, F. F. Knowlton, D. L. Murray, W. Waddell, and L. Waits)

The Red Wolf Recovery Implementation Team functions as a unique model in helping guide the establishment of a viable red wolf population in northeastern North Carolina. This multidisciplinary Team makes recommendations to the U.S. Fish and Wildlife Service's Red Wolf Recovery Program for use in the red wolf adaptive management plan. Full interaction among field team members and Implementation Team members creates vital synergy in addressing adaptive management and species recovery challenges. The world's only red wolf population in North Carolina is composed of more than 100 red wolves over 1.5 million acres in five counties.

**Wednesday 1:00 – 1:30 pm**

**Seasonality and Recurrence of Depredation and Wolf Control in Western North America, *Wildlife Society Bulletin* 2005, 33(3): 876–887**

Marco Musiani, PhD, (Assistant Professor, Faculty of Environmental Design, University of Calgary, 2500 University Dr NW, Calgary, Alberta, T2N 1N4 Canada, Office 3171)

Due primarily to wolf (*Canis lupus*) predation on livestock (depredation), some livestock producers and other interest groups oppose wolf conservation, which is an important objective for large sectors of the public. Predicting depredation occurrence is difficult, yet necessary to prevent it. Better prediction of wolf depredation also would facilitate application of sound depredation management actions. In this paper we analyze temporal trends in wolf depredation occurrence and wolf control, which is employed as a depredation management action. We gathered data from wolf depredation investigations for Alberta, Canada, from 1982–1996 and for Idaho, Montana, and Wyoming, USA, from 1987–2003. We showed that wolf attacks occurred with a seasonal pattern, reflecting the seasonality of livestock calving, grazing practices, and seasonal variation in energetic requirements of wolf packs. Seasonal wolf attacks were auto-correlated with lags of one year, indicating annual recurrence. Cross-correlation analyses indicated that limited wolf control was rapidly employed as a short-term response to depredation, and was not designed to decrease wolf depredation at a regional scale or in the long-term. We therefore discovered a recurring seasonal–annual pattern for wolf depredation and wolf control in western North America. Ranchers and managers could use our data for focusing investment of resources to prevent wolf depredation increases during high-depredation seasons.

**Wednesday 1:30 – 2:00 pm (split presentations)**

**Integrating and Evaluating Livestock Guarding Dogs for Reducing Wolf-Human Conflicts on Michigan Farms**

Anna C. Cellar and Thomas M. Gehring, (Central Michigan University, Dept of Biology, Mt. Pleasant, MI 48859)

As wolf populations continue to recover, the chance for wolf-human conflicts also increases. Using an experimental design, we are testing livestock guarding dogs as a non-lethal management tool for preventing wolf depredations (i.e., predators preying on livestock as a food source) on cattle. Furthermore, we are including farmers as an important stakeholder in managing depredations. In March 2005, 6 working cattle farms in the Upper Peninsula of Michigan were each given 2 Great Pyrenees pups. Funds for food and dog care costs are provided to the farmers during the duration of the study. Following guidelines we have given them and with our supervision, farmers are responsible for the care and training of their dogs. Proper training was accomplished by raising the pups with the livestock they will be guarding in order to establish a bond between dog and livestock. Pups were raised in pens with calves until 7 months of age. During fall 2005, pups were incorporated into the adult cattle herd and will remain permanently with the cattle. Nine cattle farms, 6 treatment and 3 control, are being monitored for predator activity using sand tracking swaths, data loggers and farmer observation. Monitoring predator activity began in 2005 and will continue throughout 2006. Predator visitation on treatment farms in 2005 will be compared to visitations on treatment farms in 2006. Additionally, the difference in visitations between treatment and control farms in 2005 will be compared to the difference in visitations on farms in 2006. Success will be determined by the dogs' ability to deter wolf use of livestock areas and of the farmers' perceived effectiveness of the dogs. This project will provide farmers with a management tool that can be integrated into normal farming practices to reduce livestock losses from predators. Additionally, decreased depredations and farmers' proactive and involved role in managing depredations can translate into reduced animosity towards wolves and the agencies that manage them. This research will provide baseline data for a non-lethal management tool that could reduce the conflict between wolves and agriculture while benefiting both.

**Testing Shock-Collars as a Non-Lethal Control for Site-Aversive Conditioning of Wolves in Northwestern Wisconsin**

Shawn T. Rossler, Thomas M. Gehring, Mike T. Rossler, (Central Michigan University, 121 Brooks Hall, Mt. Pleasant, MI 48859, Ronald N. Schultz, and Adrian P. Wydeven, (Wisconsin Department of Natural Resources, Box 220, Park Falls, WI 54552)

The goal of our research is to minimize conflict and help farmers develop a more tolerant attitude toward wolves through a non-lethal control management scenario utilizing shock collars. Research includes the rigorous experimental testing of the effectiveness of shock collars to deter wolves from visiting forest road intersections that are baited with road-killed deer. Once shock collared animals are baited to an intersection, a 40-day shocking period begins followed by a 40-day post shock monitoring period to determine if aversive conditioning has occurred. In addition to determining aversive conditioning of wolves at baited sites during the period of May-August 2005, we conducted shock-collar experiments on 2 farms in northwestern Wisconsin that had wolf depredations in 2004. Data loggers and shock towers were placed on these farms to monitor wolf visitation and the effectiveness of shock collars to prevent wolf visitation. Preliminary results for the forest road aspect of our research during the summer 2005 revealed during the 40-day shocking period the average visitation rate equaled 2.6 days for shock collared wolves (SE =

0.600; n=5), and an average visitation rate of 14.5 days for control wolves (SE = 3.50; n=2). Results for the 40-day post shock monitoring period revealed an average visitation of 2.2 days for shock collared wolves (SE = 0.374; n=5) and an average visitation rate of 17.50 days for control wolves (SE = 4.50; n=2). The mean home-range of experimental wolves equaled 101.4 km<sup>2</sup> (SE = 13.3) and mean home-range of control wolves 34.84 km<sup>2</sup> (SE = 8.0) during the entire 80 day monitoring period. Mean distance shock collared wolves spent away from baited sites during the 40-day shock period equaled 4,099 m (SE = 342) and mean distance for controls during the same period 1,954 m (SE = 193). Mean distance shock collared wolves spent away from baited sites during the 40-day post shock period equaled 5,179 m (SE = 262) and mean distance for controls equaled 2,594 m (SE = 464). On the 2 farms in which shock collar technology was implemented there were no confirmed visitations to the farms by shock collared animals. We discuss the possible application of shock-collar technology as a management tool for use in chronic problem areas and/or with recovering wolf populations.

**Wednesday 2:00 – 2:30 pm**

### **Farmer Perceptions and Use of Livestock Guarding Dogs in Michigan**

Thomas M. Gehring and Kurt C. VerCauteren, (Department of Biology, Central Michigan University, Mount Pleasant, MI 48859)

It is important to develop, refine, and disseminate management tools that farmers can integrate into their normal farming practices to reduce livestock losses from predators and reduce the incidence of disease transmission from wildlife. We surveyed livestock producers in the Upper Peninsula (UP) and northern Lower Peninsula (NLP) of Michigan to determine the prevalence of livestock guarding dogs (LGD's), and the levels of perceived risk from predation and wildlife disease. In a 2002 survey, we found that over 60% of livestock producers in Michigan were interested in using LGD's for reducing predation, but few (12%) had received educational materials outlining management options. In a 2005 survey of farmers in the UP, we found that only 4% of respondents currently used LGD's with an estimated annual savings benefit of \$2,000. However, only 9% had received educational materials on the use of LGD's for reducing predator-livestock conflict. Further, 60% of respondents indicated a high- to very high-level of concern that wolves would kill their livestock, with an additional 22% indicating a moderate-level of concern. In the same 2005 survey of NLP farmers we found that only 1% of respondents currently used LGD's with an estimated annual savings benefit of \$1,000. Only 12% had received educational materials on the use of LGD's. Further, 34% of respondents indicated a high- to very high-level of concern that their livestock would contract bovine TB from deer, with an additional 22% indicating a moderate-level of concern. These data suggest that a striking interest and need exists within the farming community in Michigan to develop LGD's as a farm management tool for protecting livestock.

### **2006 Keynote: Jamie Rappaport Clark**

Jamie Rappaport Clark is Executive Vice President at Defenders of Wildlife. With more than 490,000 members and supporters, Defenders is one of the nation's most progressive advocates for wildlife and habitat. Before assuming Defenders' high-level executive position in February, 2004, Clark was Senior Vice President for Conservation Programs at the National Wildlife Federation from 2001-2003. In that position she directed all conservation advocacy programs, which were implemented in partnership with NWF's 46 state affiliate organizations and

grassroots volunteers nationwide. Before assuming NWF's lead conservation post in May 2001, Clark was Director of the U.S. Fish and Wildlife Service (FWS) from 1997-2001. As head of the principal federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats, she oversaw the management of more than 530 national wildlife refuges and 66 national fish hatcheries. She also directed the administration and enforcement of the Endangered Species Act, Migratory Bird Treaty Act and other wildlife laws. Prior to being named Director, Clark served the agency as Assistant Director, Ecological Services (1994-1997); Chief, Division of Endangered Species (1993-1994); Deputy Assistant Regional Director, Endangered Species/Permits, Southwest Region (1991-1993); and Senior Staff Biologist, Division of Endangered Species (1989-1991).

Some of the major conservation successes achieved during Clark's lengthy tenure with the FWS include the spectacular recovery of the gray wolf, bald eagle, and peregrine falcon, and the passage of the National Wildlife Refuge System Improvement Act, which ensures that activities on refuges are consistent with sound wildlife conservation principles.

Before joining the FWS, Clark was Fish and Wildlife Administrator for the Department of the Army; Natural/Cultural Resources Program Manager for the National Guard Bureau; Research Biologist, U.S. Army Medical Research Institute; and Wildlife Biologist, National Institute for Urban Wildlife. Clark holds a M.S. in Wildlife Ecology from the University of Maryland. She received a B.S. in Wildlife Biology degree from Towson State University in Towson, Maryland, where she also did post-graduate work in environmental planning. She lives with her husband, Jim and son, Carson (named after Rachel Carson) James Leopold in Leesburg, Virginia.

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**Thursday 8:00 – 8:30 am**

**Reintroduction of the Mexican wolf (*Canis lupus baileyi*) to the Southwestern United States: An Economic Perspective**

Timm Kroeger,<sup>a,b</sup>\* Frank Casey,<sup>a</sup> and Chris Haney<sup>a</sup> (<sup>a</sup> Defenders of Wildlife, 1130 17<sup>th</sup> St., NW, Washington DC 20036, <sup>b</sup> State University of New York, College of Environmental Science and Forestry, 1 Forestry Dr., Syracuse, NY 13210)

In 1998 the Mexican gray wolf (*Canis lupus baileyi*) was reintroduced to the Blue Range Wolf Recovery Area (BRWRA), located in east-central Arizona and west-central New Mexico. The reintroduction was the result of efforts to reestablish a wild population of Mexican gray wolves in the species' former home range. Because the gray wolf is a large predator and a species that elicits interest nationwide, its reintroduction to an area used by humans is bound to generate economic impacts ranging from direct uses (*e.g.*, tourism, livestock losses, wildlife watching, hunting) to indirect uses (ecosystem services, *e.g.*, control of other predators, impacts on riparian vegetation) and non-uses (existence, stewardship, and bequest values), and comprising both market and non-market impacts. Although several studies have provided comprehensive estimates of the economic impacts of the reintroduction or conservation of gray wolves in other regions in the U.S., to date no such study has been carried out for the southwestern U.S. The purpose of this study is to remedy this shortcoming.

We apply different valuation approaches in order to generate a comprehensive assessment of the economic impacts caused by the reintroduction of Mexican wolves to the BRWRA. These

approaches rely both on individuals' observed and stated willingness-to-pay (WTP) for wolf reintroduction. We estimate observed willingness-to-pay based on the results of a market experiment in "wolf-friendly" beef that was conducted in New Mexico in 1998. Stated willingness-to-pay is estimated in two ways: first, we apply a single-point benefit transfer to the WTP for wolf reintroduction reported in the study whose context most closely resembles that of the BRWRA, namely, the reintroduction of gray wolves to central Idaho in 1995; in addition, we conduct a meta-analysis of all available WTP studies on gray wolf reintroduction, and apply the estimated WTP regression function to derive WTP estimates for reintroduction of wolves to the BRWRA. Besides WTP for reintroduction, we also provide quantitative estimates of other impacts associated with reintroduction for which sufficient data were available. On the cost side, these comprise depredation by wolves on livestock, dogs, and horses, veterinary expenses for injured livestock, the cost to ranchers of filing claims for compensation of livestock losses, and the economic multiplier effects associated with uncompensated livestock losses.

Our results suggest that reintroduction of Mexican wolves to the Southwest has generated substantial benefits as well as costs. It further indicates that benefits outweigh costs by a large margin, at both the regional and the national levels of analysis. We find that non-use values are the single largest component of total benefits associated with reintroduction.

**Thursday 8:30 – 9:00 am**

**Mexican Gray Wolf Status Update 2006: Challenges from the Captive Breeding Program to the Recovery of Free Ranging Mexican Wolves**

Patrick Valentino, (J.D., California Wolf Center, P.O. Box 1389, Julian, CA, 92036), Susan Lyndaker Lindsey, Ph.D. (Wild Canid Center, P.O. Box 760, Eureka, Missouri, U.S.A., 63025), Daniel D. Moriarty, Ph.D., California Wolf Center and University of San Diego, Department of Psychology, 5998 Alcalá Park, San Diego, CA 92110)

Formidable challenges facing the Mexican Wolf Recovery Program include the release of captive raised wolves. This presentation will outline the current status of the Mexican Gray Wolf in captivity and challenges in raising a wild wolf.

Listed in 1976 under the Endangered Species Act, the Mexican gray wolf is one of the rarest land mammals in the world. The goal of the Mexican Wolf Recovery Plan is the re-establishment of wild populations from captive-raised wolves. The U.S. captive population is managed by the American Zoo and Aquarium Association. Today about 340 Mexican wolves survive, with about 300 held at 47 facilities in the United States and Mexico. The others are free ranging in the Apache and Gila Forests of Arizona and New Mexico. Mexican wolves are held in a variety of facilities creating management challenges. Critical issues include the improvement of husbandry practices to increase chances of wild survival. Size of enclosures, feeding protocols and evaluation metrics all contribute to what character of wolf gets released in the wild. While more pups are being born in the wild, political boundaries have restricted free recovery of Mexican wolves. The number of wolves released and the numbers that need to be managed in captivity will determine the focus of captive wolf managers. The program's 5 Year Review recommends a larger recovery area for Mexican wolves. Increased opportunities for releasing more Mexican gray wolves from captivity will increase the genetic diversity in the wild and also benefit northern ranging gray wolves.

**Thursday 9:00 – 9:30 am**

**The Mexican Wolf Reintroduction Program – Unusual Circumstances, Distinct Challenges, and a Few Modest Suggestions**

Eva Lee Sargent, PhD, (Director, Southwest Programs, Defenders of Wildlife, 110 S. Church, Suite 4292, Tucson, AZ 8570), Craig Miller, (Southwest Representative, Defenders of Wildlife, 110 S. Church, Suite 4292, Tucson, AZ 85701)

The Mexican wolf reintroduction program differs from the other wolf restoration projects in many ways. One of the differences is the wolves themselves: Mexican wolves are smaller, have fewer pups, and resemble the coyotes that are commonly hunted in the reintroduction area. Also, initial releases involve captive bred animals and take place in a region where cattle are grazed year around on huge allotments, which are difficult to monitor. Many of the project's challenges are political: the Blue Range Wolf Recovery Area encompasses some of the most anti-government counties in the nation, and these local stakeholders have a lot of clout at both the state and federal level. There is a high rate of illegal wolf killing – over 25 wolves since 1998. Our recovery plan has not been updated since 1982, and the lack of an overarching, long-term plan with measurable goals continues to impede progress. The reintroduction program is overseen by a six-agency committee on which the states of Arizona and New Mexico take the lead. In this complex environment, decisions are slow to be implemented and the management committee states that it is in no way responsible for wolf recovery, which further justifies the slow pace of program improvements. The Mexican wolf project takes a backseat to Yellowstone in the national media. Wolf reintroduction and recovery in Mexico – which is essential to long term survival – is difficult to influence and easy to overlook. The biggest impediment to recovery is “the box” – Mexican wolves are required to stay within artificial boundaries, and if they disperse outside, they are usually recaptured and translocated back. Translocations are a significant factor in the failure of our wolves to survive and thrive.

There are some bright spots in a program that repeatedly appears to take one step forward, two steps back. The Service seems poised to seriously consider expanding “the box” to allow wolves to disperse over a wider area. There are dedicated people at every involved agency, and the interagency field team – which deals less with paper and more with real wolves – is capable and committed. The White Mountain Apache Tribe became a full cooperator and brought with it 1.5 million acres of wolf habitat. Some ranchers have opened-up to collaborative projects to minimize wolf-livestock conflicts. Mexican government agencies and conservation organizations are taking serious steps toward wolf reintroduction south of the border. Recent studies have pointed to the Grand Canyon ecoregion as great wolf habitat, and changes in land ownership and use in the area are promising. Finally, the courts have repeatedly decided that the Mexican wolf project will continue and the latest political attempts to shut down the program have failed, at least for now. Suggestions for improving the program, getting out of the political muck, and making real progress toward Mexican wolf recovery will be discussed.

**Thursday 9:30 – 10:00 am**

**Yellowstone's Trophic Cascade: Are Wolves Really Changing Willow Communities?**

Nathan Varley, (Department of Biological Sciences, University of Alberta, Box 490, Gardiner, Montana, 59030), M. S. Boyce, E. H. Merrill, H. L. Beyer, (Department of Biological Sciences, University of Alberta, Edmonton, Alberta), R. L. Crabtree, (Yellowstone Ecological Research Center, Bozeman, Montana)

The trophic cascade concept is popular in ecological research and many recent studies suggest wolves as top predators are structuring communities via their top-down effects in food webs. In the wolf-elk-willow food chain of Yellowstone National Park (YNP), an effect has been readily suggested but not yet well-supported due in part to lack of evidence for causal relationships. Browsing of willow by elk has suppressed willow growth in YNP historically, but significant growth events occurred in willow communities in the late 1990's, which has generated widespread speculation that wolves have benefited willow since re-introduction. However, alternative hypotheses have also indicated climate may be a more prominent causal factor than wolves. Elk browse rates at 19 willow plots were estimated from the difference between pre-(2004) and post-winter (2005) biomass measurements. The top-down (wolves) and bottom-up (climate) hypotheses were evaluated using information-theoretic criteria to decipher among models that best explained spatial variation in elk browse rates. Elk consumed 40-70% of available willow biomass, a relatively high rate that draws into question whether release from browse suppression is or can occur under current rates. Elk use of willow is best explained by landscape levels of general elk use or abundance, the patterns of which are in part influenced by wolf presence. However, theories that rely on the assumption that elk avoid areas like willow communities due to predation risk may need to be re-evaluated on the basis of a lack of evidence for such a response. The relative contribution to willow browse rates by the various factors are discussed, and future avenues of research into this topic are suggested.

**Thursday 10:30 – 11:00 am**

**Who's your Daddy? – Results From a Genetic Study of the Yellowstone, Idaho and Montana Wolf Populations**

Bridgett vonHoldt, John Pollinger and Robert Wayne, (Department of Ecology and Evolutionary Biology, University of California, Los Angeles, 621 Charles Young Drive South, Los Angeles, CA 90095-1606)

We report the results of an ongoing study of the population genetics of the reintroduced Yellowstone and Idaho wolf populations and the naturally recolonized Montana population. The goal of our study is to provide important insights for use by the wolf management and conservation community (federal and state agencies, Yellowstone National Park biologists, the Nez Perce tribe, NGO's and volunteer field observation community). Our objectives were twofold: 1) Determine the degree of connectivity (effective migration and genetic exchange) between the three populations, identify migrants and determine the ability to genetically identify the population origin of individuals; and 2) reconstruct the genetic pedigree of the Yellowstone wolves since their reintroduction in 1995, combine this pedigree with observational results by Yellowstone biologists and the field observation community, to elucidate the behavior and social structure of individuals and packs, the dynamics of pack formation/disintegration, interpack dynamics and genetic health of the population. We genetically characterized over 500 individuals ranging from the 1995 reintroduced Yellowstone and Idaho founders through individuals sampled in 2005. We were able to resolve Montana, Idaho and Yellowstone populations as genetically distinct and were able to identify a number of migrants between populations. Even though migration has occurred, the amount has not been appreciable, genetic exchange has been minimal and the populations remain effectively isolated from each other. We are currently constructing a genetic pedigree of the Yellowstone population since its reintroduction with available genetic samples. To date the reconstructed pedigree consists of over 100 individuals and we are continually adding more individuals as genetic and observational data is compared and corroborated with help from Yellowstone biologists. Our study is made possible by funding from the Yellowstone Foundation, the Montana and Idaho offices of the US Fish and Wildlife Service,

the California Wolf Center, and UCLA, and the many people who have helped us find and fill-in missing samples and provided key observational information and insight.

**Thursday 11:00 – 11:30 am**

**The Relevance of Distinct Population Segments to Conservation of Wolves and Grizzly Bears in the Western U.S.**

Carlos Carroll, (Klamath Center for Conservation Research/Wilburforce Foundation, P.O. Box 104, Orleans, CA 95556)

The Endangered Species Act of 1973 mandated the protection of both species and distinct population segments (DPS) of vertebrate fish and wildlife. This allows for protective measures before large-scale declines occur that would require listing a species or subspecies throughout its entire range. Congress anticipated that the DPS designation would be used sparingly. To clarify this directive, the USFWS developed the vertebrate population policy (VPP), which requires that a population, to merit designation as a DPS, be discrete (substantially reproductively isolated from other conspecific population units) and significant (an important component in the evolutionary legacy of the species). The guidelines are less clear for establishing DPS's solely to delist recovered populations of an otherwise still threatened species. In fact, some of the criteria for establishing a DPS as listable, such as significance, might argue against rapid delisting. Such "delisting" DPS's do facilitate the important secondary goal of returning wildlife management responsibility to the states, which may be especially important for "conservation-reliant" species that require decades or longer for full recovery. However, to be consistent with the ESA, such DPS's should further or at least not hinder rangewide recovery of a species.

In the past, most DPS designations have been applied to anadromous fishes, which have genetic and geographic subunits that are relatively easily identified. It is more difficult to apply the DPS policy to terrestrial species such as the wolf and grizzly bear that currently inhabit only a small portion of their historic range, as measures of either current or historic genetic similarity may not be good guides to the distinctiveness of restored populations in today's landscapes. A 2003 DPS proposal for wolves was enjoined by the courts in part due to misapplication of the DPS policy, and a recent proposal for a Yellowstone grizzly bear DPS has been similarly criticized.

Green (2005) proposed that the conservation intent of the DPS policy could be accomplished more effectively by shifting focus away from identifying DPS's based primarily on uncertain taxonomic data, towards a policy similar to that used by Canadian agencies, in which "designatable units" are identified based on both distinct conservation status and either 1) genetic distinctiveness, 2) range disjunction, or 3) occupation of unique biogeographic zones. Habitat models are one tool for defining designatable units based on ecological barriers such as expanses of unsuitable habitat. However, delisting proposals that affect a particular DPS should take into account the broader rangewide context for recovery. For example, even infrequent dispersal between DPS's may be important for initial recolonization and subsequent genetic interchange. The proposed wolf and grizzly bear DPS's arguably do not meet current VPP standards that require "sparing" use of the DPS designation, due to the limited genetic divergence between populations inhabiting proposed DPSs. However, they would represent valid management units under such a revised policy. To be coherent, such a policy would first require a comprehensive evaluation of recovery potential, and establishment of recovery goals, in all biogeographic zones historically inhabited by the species.

**Thursday 11:30 – Noon**

**Developing Long-Term Monitoring Protocols for Wolves in Idaho**

Curt Mack, (Nez Perce Tribe, Nez Perce Tribe, Lapwai, Idaho), Kyran Kunkel, (Mountain Thinking Conservation Science Collaborative, Gallatin Gateway, Montana), Wayne Melquist, (University of Idaho, Moscow, Idaho)

To date, the Nez Perce Tribe and the United States Fish and Wildlife Service have used radio telemetry as the primary method for monitoring wolves (*Canis lupus*) in the northern Rocky Mountains. While this method is reliable and was appropriate for a small, recovering Idaho wolf population, it is too expensive, logistically difficult, intrusive, and unnecessary for long-term statewide conservation and management of a much larger recovered wolf population. More appropriate wolf monitoring protocols are needed to address management objectives on 2 different levels: (1) short-term documentation of minimum population levels above a federal re-listing threshold to satisfy delisting requirements, and (2) long-term population distribution, status, and trend for effective conservation and management of the species. We reviewed 396 relevant papers and sent questionnaires internationally to evaluate existing survey and monitoring methods and assess their application to Idaho's unique landscapes. We determined that no single method would adequately address identified monitoring objectives, nor be applicable statewide across the varied landscapes of Idaho. We recommend a suite of coordinated methods for further field testing and evaluation.

**Thursday 1:00 – 1:30 pm**

**In The Trenches: Wolf Information for Public Contacts**

Linda M. Thurston, Consultant (P.O. Box 490, Gardiner, MT 59030) and Nathan Varley, (University of Alberta)

Wildlife managers and others that work on wolf-related issues throughout the Rocky Mountains frequently have the opportunity to contact the public to provide information and correct misinformation about wolves. Several of the most common questions, concerns, and myths can be addressed accurately and delivered in a non-threatening manner. For example, have you ever been told, “the wolves that were reintroduced are a larger species than the one that used to be here, and they are eating all the elk,” or have you ever been asked, “why is habitat a problem, looks like there is plenty of grass to me...” These and other topics are addressed with suggested answers and information for the some of the most common points of debates on wolf issues. The information is gathered from existing scientific literature and expert opinion and presented with tips for providing information in a manner that promotes listening and trust. In sum, this presentation better equips field personnel and managers with a review of the facts and/or best available information for common discussions on wolves with the public “in the trenches.”

**Thursday 1:30 – 2:00 pm**

**Wolves and People in Yellowstone**

Dr. John W. Duffield, Dr. David A. Patterson, and Chris J. Neher, (University of Montana, Department of Mathematical Sciences, Missoula, MT 59812) and Dr. Glenn Plumb (Yellowstone Center for Resources)

This paper summarizes the results of an extensive 2005-2006 Yellowstone National Park visitor survey focused on the economic impacts of wolf recovery on park visitation and the regional economy. The study replicates a survey and economic analysis undertaken 15 years earlier (in June 1991) that was the basis for the projected economic impacts described in the 1993 and 1994 wolf recovery Environmental Impact Statements. The EIS contained a benefit-cost analysis of the likely effects of the presence of wolves on park visitation, ungulate numbers, hunter harvest, management costs, and costs related to livestock predation, as well as projected impacts to the regional economy. The current study revisits these issues based on visitor response after more than ten years of experience with wolves in Yellowstone. The current study is unique in providing a comparison of park visitor attitudes, values, expenditures and socio-economic characteristics at two widely separated points in time. In addition, the 2005-2006 sampling covers an entire year of visitation, with separate subsamples of winter, spring, summer and fall visitors developed through contacts at all entrance stations. A subsample of visitors utilizing the wildlife observation pullouts in the Lamar Valley was also recruited for the study. The survey was implemented using the Dillman total design method with three mail contacts. As of late January 2006, the response rate to the mail survey was 68.5%, with a preliminary total of 1725 completed surveys. One finding is that park visitors in the winter and shoulder seasons are more likely to be in Yellowstone primarily to view wildlife, compared to summer visitors. Preliminarily, the estimated regional economic impact due to the presence of wolves is on the order of \$20 million, which is similar to the estimates made 15 years earlier. Wolf restoration in Yellowstone is an internationally important wildlife conservation success story. This paper summarizes the empirical evidence on the economic and social dimensions of that story.

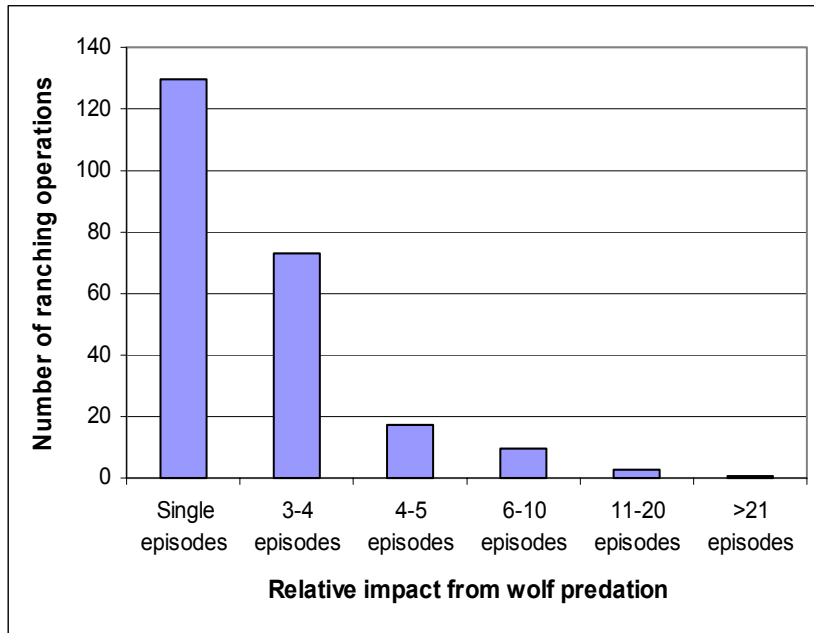
**Thursday 2:00 – 2:30 am**

**Ranch-level Metrics Improve Scaling Socioeconomic Impact of Gray Wolf *Canis lupus* Depredation on Domestic Livestock**

J. Christopher Haney<sup>1</sup>, Gina Schrader<sup>2</sup>, Suzanne Stone<sup>2</sup>, and Frank Casey<sup>1</sup>, <sup>1</sup>Conservation Policy and <sup>2</sup>Regional Conservation Programs, (Defenders of Wildlife, 1130 17<sup>th</sup> Street, NW, Washington, DC 20036-4604)

Predator restoration typically meets stiff resistance where livestock depredations cause fiscal losses. We analyzed individual ranches affected by verified gray wolf *Canis lupus* depredation from 1995–2004 in the northern Rockies, USA. During this interval, numbers of ranches with livestock depredations scaled annually to the regional wolf population size ( $r^2 = 78\%$ ), about one ranch per wolf pack each year. Some 240 different ranches experienced one or more depredation episodes, about 0.7% of all cattle/calf and sheep/lamb ranches operating across the states of Idaho, Montana, and Wyoming. Of the affected ranches, 56% requested compensation for only one verified depredation episode during the entire decade. At least 85% of affected ranches experienced no more than one verified wolf depredation episode every two or three years. Despite ongoing range expansion in this wolf population, presumably some of which is onto private lands where livestock are more vulnerable, so far no acceleration has been detected in the rate of new ranches impacted by wolf depredation. Although depredation costs are consequential for a very few ranches, impacts verge on trivial for the regional livestock industry. At least two applications of these results are apparent. First, real policy implications of livestock depredation can be highly vulnerable to skewed socioeconomic assessment, so we recommend expanding policy metrics beyond public opinion surveys that target only the most disaffected stakeholders. Second, gauging the impacts of depredation at the ranch level can be used to prioritize where best to direct pro-active, preventative measures that can mitigate impacts of livestock depredation by carnivores.

**Frequencies of depredation episodes resulting in compensation to northern Rockies ranching operations, 1995-2004**



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