

MAMMALIAN STUDIES

Northern Prairie Wildlife Research Center Jamestown, North Dakota

Northern Prairie Wildlife Research Center's (NPWRC) mammalian research was initially focused on understanding and finding ways to manage the role of mammalian predators in waterfowl population dynamics. More recently mammalian research programs have expanded to include a greater diversity of species over a wider segment of the nation's grasslands. The transfer, in October, 1998, of the Minnesota Wolf Project to NPWRC further expanded the Center's responsibility and capability for mammalian research.

CURRENT RESEARCH

SWIFT FOX STUDIES — The swift fox once occupied most of the Great Plains of North America from west-central Texas to the prairies of Alberta. Settlement of the prairies led to declines in swift fox numbers, and by 1900 the species was rare in the northern parts of its range. Since the 1960s, swift foxes have shown limited range and population increases, probably due to changes in predator control methods and policies. Factors limiting broader expansion of swift foxes into unoccupied portions of their historical range are unknown. Studies conducted by NPWRC scientists include 1) investigations of swift fox biology; 2) development of methods to survey species distributions; 3) testing the hypothesis that interspecific competition from red fox is an ecological barrier to swift fox range expansion and population growth and; 4) evaluation of habitat requirements at a landscape level, including potential dispersal corridors and relocation sites. NPWRC is participating in the experimental reintroduction of swift foxes into Badlands National Park, and advising in reintroductions on the Blackfeet Tribal lands in Montana and the Bad River Ranch in South Dakota. *Contact: marsha_sovada@usgs.gov*



CANADA LYNX HABITAT USE — Canada lynx, classified on the Endangered Species List as threatened, have returned to Minnesota, as they often do about every 10 years when snowshoe hare numbers increase. This study examines habitat use, basic movements, natural history, and persistence. Partners are the Natural Resources Research Institute, University of Minnesota Duluth, Superior National Forest, and North Central Research Station. *Contact: david_mech@usgs.gov*



WOLF NATURAL HISTORY — When the wolf was placed on the Endangered Species List in 1967 little was known about wolf natural history. This long-term life history study investigates survival, mortality, pack structure, territoriality, movements, scent marking, howling, predatory behavior, productivity, demography, and longevity. This information is necessary to understand the wolf and to manage or restore wolf populations. Partners include the North Central Forest Experiment Station, Superior National Forest, University of Minnesota, and the National Park Service. *Contact: david_mech@usgs.gov*

WOLF-PREY INTERACTIONS IN YELLOWSTONE NATIONAL PARK (YNP) — Since wolves were reintroduced into YNP in 1995 and 1996, they have relied on elk as their primary prey. The current Greater Yellowstone population has increased very rapidly to 145-150 wolves. During this same time elk numbers have decreased from 20,000 in 1995 to 12,000 in 1999. Elsewhere, wolves are known to reduce ungulate numbers under some conditions, so wolf predation could similarly influence the elk herd in YNP. However, wolf predation can also compensate for other elk mortality factors and can result in culling less-fit ungulates from the population. This study addresses the need for YNP managers to fully understand the dynamics of the wolf-elk system and their potential effects on the Yellowstone ecosystem. *Contact: david_mech@usgs.gov*

POPULATION TREND OF WOLVES IN THE CENTRAL SUPERIOR NATIONAL FOREST — Population trends of wolves in unharvested populations have seldom been studied, and little is known about factors affecting wolf population trends. NPWRC's study of wolf population trends in the central Superior National Forest seeks to determine these factors and how they affect the wolf population. Begun in 1966, this study is one of only two such long-term investigations. Results from this investigation provide a gauge against which trends in reestablished wolf populations can be measured. Partners include the USDA's North Central Forest Experiment Station and Superior National Forest. *Contact: david_mech@usgs.gov*

WOLF SOCIAL BEHAVIOR — The basic unit of wolf populations is the pack, which is primarily a family. Thus to fully understand the nature of the wolf, one must be familiar with the interactions and relationships among members of the pack. This study of wolf social behavior examines the roles of various pack members and the social interactions among them, and takes place in extreme northern Canada, where wolves can be directly observed at close distances. A primary focus of this investigation is to determine the behavior and function of each member of the pack in relation to the pack's annual litter of pups. Because pups form almost half of a wolf population, a thorough understanding of the social relationships of the pups to the other pack members is important for a full understanding of wolf populations and demographics. Studies of these familial relationships allow important insights for planning wolf reintroduction programs. This study is conducted in cooperation with Canada's Nunavut Department of Sustainable Development, Polar Continental Shelf Project, and Atmosphere Environmental Services. *Contact: david_mech@usgs.gov*



WOLF DEPREDATIONS ON LIVESTOCK — In agricultural areas, wolves often prey on livestock in direct conflict with human activities. An understanding of wolf depredations on livestock is key to minimizing the conflict and to developing wolf management techniques. As wolf populations recover in various areas, the degree of conflict will increase, making means of reducing that conflict much more important. This study examines the nature of wolf livestock depredations and the factors that influence them, and seeks to determine alternate methods of minimizing such depredations. Partners include the University of Minnesota and the Minnesota Department of Agriculture. *Contact: david_mech@usgs.gov*

EFFECTS OF CANINE PARVOVIRUS AND OTHER DISEASES ON WOLVES — Canine parvovirus (CPV) is a relatively new disease of domestic dogs but has also spread to wildlife. CPV has the potential for affecting wolf populations because of its tendency to kill pups less than three months of age. CPV was first found in wolf populations in the mid 1970's and has retarded wolf recovery in some areas for certain periods. This study examines the relationship between wolf population parameters and rate of exposure of wolves to CPV. In addition, it examines other diseases and their effects on wolves. Partners include the University of Minnesota College of Veterinary Medicine, North Central Forest Experiment Station, and Superior National Forest. *Contact: david_mech@usgs.gov*

RELATIONSHIPS BETWEEN DEER MOVEMENTS, SURVIVAL, AND WOLF PREDATION — This study examines spatial and temporal variations in radio-collared deer killed by wolves by comparing current locations of wolf-killed deer to those documented during 30 years of sampling to assess the long-term spatial dynamics between deer and wolf packs. Daily and monthly movements, natal dispersal, and migrations between seasonal home ranges vary in their effects on predisposing deer to wolf predation. Partners include the North Central Forest Experiment Station and Superior National Forest. *Contact: david_mech@usgs.gov*



EFFECT OF WOLVES ON DEER POPULATIONS AND DEER HUNTING — Because wolves prey primarily on white-tailed deer in the Lake Superior states, some members of the public perceive the wolf as a competitor to human hunting. This perception affects human attitudes towards wolves, influencing both wolf recovery and management of recovered wolf populations. This study examines the relationship between wolf density and deer numbers, as well as the age, sex, and condition of deer killed by wolves and the effect of snow conditions on the wolf-deer interactions. The North Central Forest Experiment Station and the Superior National Forest are partners. *Contact: david_mech@usgs.gov*

DEER MORTALITY — Measuring rates and causes of radio-collared deer mortality is necessary to understanding the influences of wolf predation in deer population dynamics. NPWRC is monitoring deer survival and mortality throughout the year to be able to assess both seasonal and long-term deer population dynamics. Biologists relate these rates to winter severity and changes in deer and wolf numbers. Cooperators are the North Central Forest Experiment Station, Superior National Forest, and Minnesota Department of Natural Resources. *Contact: david_mech@usgs.gov*

DEER MOVEMENTS — Many northern white-tailed deer seasonally migrate between summer and winter home ranges, although the proportion of different populations that migrate varies. This variation can determine numbers of prey seasonally available to wolves and can impact wolf-pack dynamics and movements. Exploratory movements and natal dispersal by yearling deer also influence distribution of prey for wolves. NPWRC scientists document various types of deer movements by radio-tracking individual deer to increase our understanding of natal dispersal, migration, gene flow, and effective population size. The long-term research also helps scientists understand the influences of social relationships, learning and memory in the spatial dynamics of deer matriline, which are the foundations of deer populations. Partners in are the North Central Forest Experiment Station and Superior National Forest. *Contact: david_mech@usgs.gov*

MOOSE — Moose are an important primary and alternate prey species for wolves, depending on locations of individual wolf packs and seasonal availability of migratory white-tailed deer. This study measures reproduction and natural mortality rates in moose to determine how these factors influence population levels. Study animals are also used to test aerial observation rates of moose and improve precision of moose population estimates. Partners are Minnesota Department of Natural Resources, Fond du Lac band of Lake Superior Chippewa, and the 1854 Authority. *Contact: michael_nelson@usgs.gov*



ELK IN THEODORE ROOSEVELT NATIONAL PARK (THRO) —Impacts of reintroduced elk on park vegetation, other wildlife, and neighboring landowners are priority management concerns at THRO. To provide the National Park Service with the key biological information needed for elk management planning, NPWRC scientists are (1) estimating vital rates and developing population projection models; (2) evaluating the feasibility of using fixed-wing aircraft to estimate elk numbers; (3) mapping the distribution of elk within THRO and on adjacent public and private lands; (4) identifying travel corridors used by elk entering and leaving the park; (5) documenting responses of elk to hunting outside the park; and (6) modeling the influence of vegetation associations, roads, trails, and water sources on the distribution of elk activity. Results of this study will constitute the biological basis for a National Park Service elk management plan. *Contact: glen_sargeant@usgs.gov*

WATER DEVELOPMENTS IN THEODORE ROOSEVELT NATIONAL PARK (THRO): IMPLICATIONS FOR UNGULATES AND HERBIVORY — The National Park Service maintains a number of water developments in the south unit of THRO, ostensibly to provide large ungulates with reliable sources of drinking water and disperse impacts of herbivory. The developments are difficult to maintain, detract from the natural appearance of the park, and probably do not all serve useful purposes. NPWRC scientists are using time-lapse videography to estimate seasonal frequencies of use by wildlife and park visitors, which they will relate to site characteristics and weather conditions. Park managers ultimately will use results of this study to decide which of the developments should be maintained and which should be closed and removed. *Contact: glen_sargeant@usgs.gov*



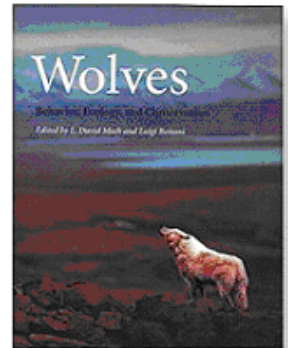
MONITORING ALTERNATIVE FOOD RESOURCES FOR PREDATORS — Small mammals and insects are the primary alternative prey of many predators of nesting birds. Although numerous methods are used to index small mammal and insect populations, the methods are often labor intensive. The goal of the study is to develop practical methodology to assess alternative prey species, leading to better understanding of mechanisms affecting predation rates for nesting ducks in the Prairie Pothole Region of North Dakota. *Contact: marsha_sovada@usgs.gov*

MONITORING MAMMALIAN PREDATOR DISTRIBUTIONS AND DEVELOPMENT OF SURVEY METHODS — Obtaining information on predator populations has been a long-standing logistical problem. The ability to detect changes in species distributions or relative abundance with effective yet practical methods would allow managing agencies to respond to the predator community when developing and implementing management strategies for grassland nesting birds. We are determining the distribution of mammalian carnivores in the prairies and transition zone of western Minnesota and assessing the practicality of using newly developed methods for conducting landscape-scale presence/absence surveys to define distributions. We are evaluating the performance of Markov chain Monte Carlo methods of image reconstruction to build distribution maps and will develop a long term monitoring plan for the implementation of cost effective and efficient track surveys. *Contact: marsha_sovada@usgs.gov*



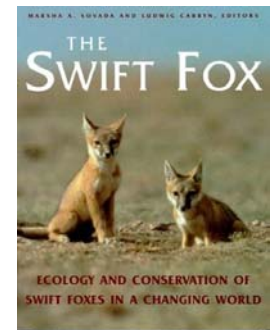
RELATED ACTIVITIES

SYNTHESIZING WORLDWIDE LITERATURE ON WOLVES — In the last 30 years, information about wolves greatly increased and thus, an overall synthesis of that information was appropriate. Dr. L David Mech, a Northern Prairie scientist, spearheaded an effort to update and synthesize this information for publication about wolf ecology, behavior and conservation. Collaborating with Dr. Luigi Boitani, from the University of Rome, Dr. Mech co-edited a comprehensive book titled *Wolves: Behavior, Ecology, and Conservation* published by the University of Chicago Press. The book includes contributions from many of the world's leading wolf experts, including the co-editors. Additional information about the book is available at: http://www.wolf.org/wolves/shop/learn04/mech_book.asp



TECHNICAL ASSISTANCE — The NPWRC wolf research program provides regular advice to wolf recovery efforts and reintroduction projects. Center scientists serve on the Gray Wolf Eastern Population Recovery Team, advise on red wolf recovery, restoration of wolves to Yellowstone National Park and Idaho, and reintroduction of the Mexican wolf. In addition, a NPWRC scientist has chaired the IUCN-SSC Wolf Specialist Group since 1978 and regularly advises foreign governments on wolf restoration and management. Center scientists have also assisted with the Yellowstone Bison EIS and consulted on wild horse and burro research issues.

FOSTERING INFORMATION EXCHANGE ON SWIFT FOXES — In 1998 NPWRC and the Canadian Wildlife Service convened an International Symposium on Swift Foxes. The symposium objective was to foster information exchange and identify the "state of the science of swift fox ecology and status in North America. Biologists and endangered species experts from fifteen states, three provinces, and seven countries participated in the symposium to discuss current distribution, population dynamics, characteristics of dispersal, habitat selection, disease, taxonomy, legal status, and conservation of this species, as well as information about the closely related kit fox. A result of the symposium was a publication co-edited by Dr. Marsha A. Sovada, a Northern Prairie Scientist and Dr. Lu N. Carbyn from the Canadian Wildlife Service titled *Ecology and Conservation of Swift Foxes in a Changing World*. The book includes contributions from many of the leading swift fox experts. Additional information about the book is available at: <http://www.cprc.ca/swiftfox.html>



TECHNICAL ASSISTANCE — The NPWRC fox research program provides regular advice to swift fox and island fox recovery efforts and reintroduction projects. Center scientists serve on the Swift Fox Conservation Team, the Channel Island Fox Recovery Team, and advise on restoration of swift foxes into Badlands National Park and the reintroduction on the Bad River Ranch in South Dakota.

WATERFOWL NEST DEPREDATION DATA — Nest success rate is a critical determinant of duck production. NPWRC is host to the largest inventory and monitoring effort involving duck nesting in the Great Plains. Information on duck nests is collected by Center biologists and numerous cooperators in standardized format. Data are archived at the Center and periodically analyzed to assess status and trends in duck nest success and develop input for various population models. The file includes information on depredated nests that can be used to draw inferences about the predator species involved.

PUBLIC EDUCATION — NPWRC serves a wide array of mammalian information through its home page (<http://www.npwrc.usgs.gov>). Included are numerous resources related to prairie species and their habitats, such as: aging, monitoring, and management techniques; distributional data; species accounts and bibliographies; and information on nest depredation. New resources are added constantly. The Minnesota Wolf Project maintains an extensive education program. The wolf is one of America's most controversial animals, and considerable misinformation has long persisted about the creature. All recovery plans dealing with wolves encourage extensive public education about wolves. Thus, as part of public-private partnership, Project scientists founded the International Wolf Center, a nonprofit organization whose mission is to deliver objective, accurate information about wolves. This self-sustaining organization, located in Ely, Minnesota, in the heart of Minnesota's wolf range, has an annual operating budget of about \$1 million. It receives 45,000-50,000 visitors per year to its museum and captive wolf colony, publishes a 32-page quarterly magazine, *International Wolf*, which reaches close to 10,000 members, and through its Speaker's Bureau and guided field trips educates thousands more people every year. Its website (<http://www.wolf.org/>) receives some 10,000-14,000 visits each week. NPWRC uses the International Wolf Center as its primary arm for interpreting its research results about wolves to the public.

SYMPOSIA — NPWRC routinely organizes symposia when there is a need to bring scientists together to review the "state of the science." International symposia featuring mammalian issues have included *Ecology and Management of Islands, Peninsulas, and Structures for Nesting Waterfowl* (1988) and *Managing Predation to Increase Production of Wetland Birds* (1990), held in

Jamestown. In addition, Center staff led the organization of the *Forum on Wildlife Telemetry* at Snowmass, Colorado (1997), the *North American Swift Fox Symposium* at Saskatoon, Saskatchewan (1998), and the International Wolf Center's International Wolf Symposium, *Beyond 2000-Realities of Global Wolf Restoration*, held in Duluth in February 2000.

TECHNICAL ASSISTANCE: LITERATURE REVIEW AND RECOMMENDED MANAGEMENT PLANS FOR MAMMALS OF SOUTHWESTERN NORTH DAKOTA — Available information about the mammals of North Dakota have not been compiled nor synthesized into a single resource. Information that is published is located in a variety of journals that are dispersed and typically are difficult to find or to access. Furthermore, it is more difficult to locate unpublished information in theses, dissertations, and reports. Managers require thorough knowledge and understanding of the species within a community to better manage the entire ecosystem. Management of multiple-use public lands and private lands often relies on various management approaches. To define those approaches, adequate information about components of the system is required. NPWRC scientists are synthesizing scientific literature and current knowledge related to mammals that occupy the Little Missouri National Grasslands and providing recommendations for appropriate management of individual species

TECHNICAL ASSISTANCE: REVIEW OF PREDATION MANAGEMENT — Predation remains one of the most important factors influencing waterfowl production. Waterfowl and wetland managers require thorough knowledge and understanding of the relationships between breeding waterfowl and their predators. Management of public lands for waterfowl production in Minnesota and other portions of Region 3's prairie pothole region often rely on various management approaches to minimize predation of nesting waterfowl. Managers and planners requested a review of the current literature and knowledge of effects of management on waterfowl predation, and a review of pertinent ecology, population dynamics, and natural history of predators commonly occurring in Minnesota and northern Iowa. NPWRC scientists are providing the FWS Region 3 a synthesis of scientific literature and current knowledge related to predator ecology and the effects of management on predators.

FOR FURTHER INFORMATION:

Marsha A. Sovada, Ph.D.
Northern Prairie Wildlife Research Center
8711 37th Street SE
Jamestown, North Dakota 58401-7317
(701) 253-5506
marsha_sovada@usgs.gov

L. David Mech, Ph.D.
Minnesota Wolf Project
Gabbert Raptor Center
1920 Fitch Street
University of Minnesota
St. Paul, MN 55108
(651) 649-5231
david_mech@usgs.gov