NORTHERN DIVIDE GRIZZLY BEAR PROJECT

A study to estimate the grizzly bear population size in the Northern Continental Divide Ecosystem

INTRODUCTION

Limited to less than two percent of their original range, grizzly bears (*Ursus arctos horribilis*) were listed as a threatened species in 1975 under the Endangered Species Act. With this legislation came the responsibility for regional land and wildlife managers to monitor their recovery. The Interagency Grizzly Bear Committee (IGBC) and six geographical recovery zones were established to coordinate conservation measures. The six million-acre Northern Continental Divide Ecosystem (NCDE) in northwestern Montana is one of their last strongholds. Of the six recovery zones, the NCDE potentially harbors the greatest number of grizzlies and is the only zone contiguous to a strong Canadian population. For these reasons, it may have the best prospect of long-term survival for this threatened species in the lower 48 states. However, little information exists about the bears in this region. In an effort to understand and manage the grizzly bear population in the NCDE, managers and biologists are working to identify population trend, survival, and the corridors that link separate populations. The Northern Divide Grizzly Bear Project will apply recent advances in genetic technology to estimate population size while minimizing human conflict.The Project is a large, cooperative effort involving ten federal, state, and tribal agencies as well as the participation of private and corporate landowners.

GRIZZLY BEAR RECOVERY

The Grizzly Bear Recovery Plan (US Fish & Wildlife Service 1993) specifies thresholds that must be attained before the grizzly bear population in the NCDE can be considered recovered. These include the distribution of females with cubs across the landscape, a human-caused mortality quota not to exceed 4% of the population (with females accounting for less than 30%), and occupancy of the Mission Mountains. In recent years the mortality threshold has been exceeded, but the significance of these numbers cannot be evaluated until there is adequate information on population size. The IGBC's technical advisory group recommended the use of genetic techniques to accomplish this goal.

THE USE OF GENETICS

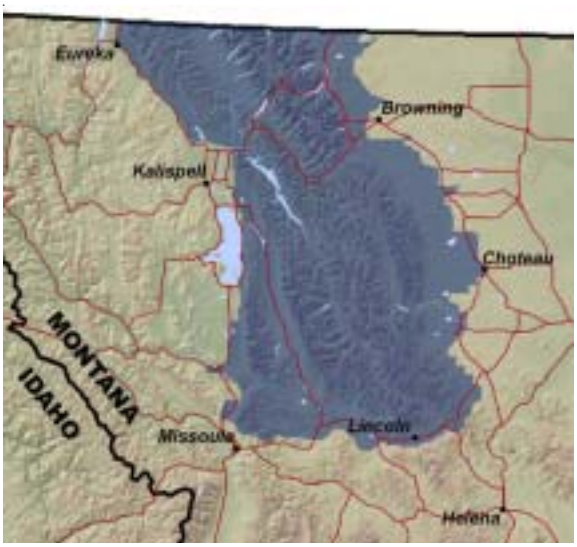
Information contained within the root, or follicle, of a bear hair allows geneticists to determine species (grizzly bear or black bear), gender, and unique identity. Containing a unique code for each individual, DNA (de-oxyribonucleic acid) harbors a unique arrangement of chemicals that can be mapped and compared to those from other samples. It is found within all cells but is most easily collected from bears by shed hair. This "DNA fingerprint" allows researchers to total the number of bears sampled. Statistical models then calculate the number of bears not sampled and incorporate them into an estimate of the total population size. While genetic techniques are a relatively new tool for biologists, they have been used in many projects to advance the methods of sampling and analysis. In 1998-2000, bear hair was collected in the northern third of the NCDE for the Greater Glacier Area Bear DNA Project. Biologist Katherine C. Kendall of the US Geological Survey led this effort and now leads the Northern Divide Grizzly Bear Project.

GENETIC ANALYSIS

Specific regions (microsatellite loci) in the nuclear DNA (nDNA) are amplified using an optimized polymerase chain reaction (PCR) method and analyzed. This process yields information from one locus to determine the species, six additional loci to determine unique identity, and a separate gender-specific locus to determine sex. This project intends to use 15 loci to determine genetic variation in the population.

STUDY AREA

The Northern Divide Grizzly Bear Project study area comprises 8 million acres of diverse, mountainous terrain. Extending south from the Canadian border, it continues west to the Whitefish and Mission Ranges, south to the Blackfoot River basin, and eastward from the Rocky Mountain Front. It includes a varied landscape encompassing five Wilderness areas (Bob Marshall, Scapegoat, Great Bear, Rattlesnake, and Mission Mountains), portions of five National Forests (Flathead, Kootenai, Lolo, Helena, and Lewis & Clark), Glacier National Park, the Blackfeet and Flathead Indian Reservations, and other federal, state, and private lands.



METHODS

Two sampling techniques, rub tree surveys and hair snagging, will be used to collect bear hair in 2004. These non-intrusive sampling methods allow us to collect genetic material from bears without physical capture.

RUB TREES

One source of hair samples will be collected from naturally occurring bear rub trees flanking the hiking trails in the NCDE. It is believed that bears rub on trees to scratch or as a way to announce their presence to other bears. Short strips of barbed wire are attached to rub trees helping to extract larger samples with more follicles. Rub tree surveys will cover trails as well as forest roads, fences, and game trails throughout the study area. In areas where bear rub trees are prone to being bumped by horseback riders and pack stock, care will be taken to avoid placing wire where it could come into contact with stock or riders. We are also currently working to develop alternatives to barbed wire for use in high stock-use areas.

HAIR SNAGS

A 7x7 km grid superimposed on the study area is used to systematically distribute baited hair snagging stations. One hair snag station will be built in each of the 659 grid cells. Snag sites are located in bear travel routes and foraging habitats. They consist of one 80-ft piece of barbed wire stretched around four trees or posts at a height of 50 cm. A liquid scent lure, formulated to attract bears without providing a food reward, is poured on rotten logs in the center of the corral. Bears deposit hair on barbs as they cross the wire to investigate the scent. Crews return 14 days after set up to collect the hair. In areas with cattle, fences are built to prevent trampling of the station. Hair snag stations will be located at least 600 feet from any trails and 1600 feet from any developed site.

FIELD OPERATIONS

This project involves a large number of personnel distributed throughout the study area. Field crews will be trained in sampling protocols, safety, and backcountry ethics. During summer 2003, crews located rub trees and built fences to keep cattle from entering hair snagging sites. Bear hair will be collected from rub trees and hair snags during the summer of 2004. Four 14-day hair snag sessions will be conducted in each cell with snag sites moved between sessions. To facilitate the organization of project operations, the study area is divided into nine subunits that are coordinated by personnel familiar with local bear activity, access, and agency regulations.

PRIVATE LANDS

A significant portion of the study area is privately owned. Local representatives of the project will contact landowners to inform them of the work, seek permission for access, and provide updates on Project activities.

PROJECT STATUS

In 2002, representatives of the agencies responsible for grizzly bears and their habitat in northwestern Montana sought support to gather the data on grizzly bear population status within the NCDE. A Congressional appropriation in 2003 provided support to undertake study planning, rub tree survey route identification, cattle exclusion fencing, and private landowner permissions during 2003. Additional funding is required to accomplish hair sampling in 2004 and genotyping in 2005. Following extensive analysis of data and peer-review of findings, the population estimate is expected to be available by the end of 2007. Further information regarding the Northern Divide Grizzly Bear Project can be found online at:

http://nrmsc.usgs.gov/research/beardna.htm

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