

## Bears of the Northern Continental Divide

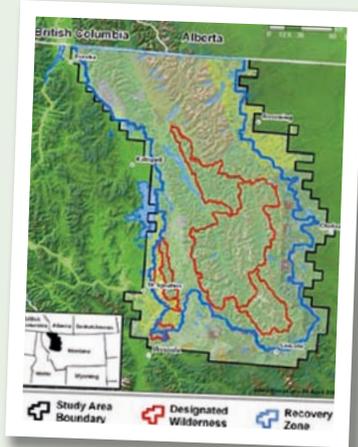
*Katherine Kendall*

*Research Ecologist, USGS West Glacier Field Station  
Northern Rocky Mountain Science Center*



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**K**ate Kendall has been studying grizzly and black bear ecology for years. The Northern Continental Divide Ecosystem (NCDE) of northwest Montana is one of the last strongholds of the grizzly bear in the lower 48 states. The NCDE is the largest of six established recovery zones, potentially harboring the greatest



number of grizzly bears, and is the only zone contiguous to a strong Canadian population. Kate works to identify population size and trends, survival rates, and the corridors that link separate populations. Advanced genetic technology has allowed Kate and other scientists to examine these parameters through the identification of species, sex, and individuals from DNA extracted from bear hair—without handling any bears.

### Greater Glacier Bear Project

The goal of this interagency, interdisciplinary study from 1997 to 2002 was to develop and apply non-invasive genetic techniques to determine density, trend, distribution, and genetic health of the grizzly bear and black bear populations in the greater Glacier National Park area. Genetic laboratory techniques for non-invasive collection of hair and feces were employed resulting in the identification of 185 individual grizzly bears in 1998 and 222 in 2000. Data analysis and population modeling information have been published.



### Northern Divide Bear Project

Between 2003 and 2008 this project applied the non-invasive genetic techniques along with statistical models to estimate the number of grizzly and black bears inhabiting the NCDE. DNA profiles and information on degrees of genetic variation, relatedness of individuals, and sex were used to investigate survival rate questions and changes in regional diversity patterns. Approximately 13,000 samples were collected from bear rub and 21,000 were collected from hair snag stations for a total of 34,000 hair samples. Genetic analysis of these samples resulted in an estimate of 545 individual grizzly bears.



### Northern Divide Bear Rub Project

This project—which runs from 2009 to 2012—is evaluating the effectiveness of noninvasive sampling to monitor trends in the threatened grizzly bear population in the NCDE. The same hair collection methods as the Northern Divide Project are used, however this work will collect bear hair over multiple years to determine how the population changes over time. Changes in abundance, survival rate, regional density, and genetic structure are investigated in this study. Field work from May to October of 2009 was conducted across an 8.5 million acre study area using 14 biological science technicians. 9,240 bear hair samples were collected from 4907 bear rubs. The work will result in population growth and survival rate estimates along with other valuable information.

### Whitebark and Limber Pine Communities

Whitebark and limber pine seeds provide a significant food for wildlife, particularly the threatened bear populations. Both species are declining due to introduced disease and fire exclusion. This project aims at documenting regional population status, distribution in Glacier National Park, blister rust infection and mortality rates, effects of the decline on biodiversity, impacts of blister rust control activities on surrounding plant communities, and to identify stands for treatment with managed fire and planting.

Kate Kendall was Principal Investigator on all these projects. Her research work appears in diverse publications that address ecology, genetics, restoration, and wildlife issues. <http://www.nrmc.usgs.gov/staff/kkendall/research>

*All photos courtesy of  
U.S. Geological Services*