

Phase one of grizzly bear research complete

The Foothills Model Forest Grizzly Bear Research Program recently completed its first five-year phase of research.

The program was created to provide knowledge and planning tools to land and resource managers to ensure the long-term conservation of grizzly bears in Alberta. "Significant research findings over our first five years of study have led to the development of important new management tools for land and wildlife management professionals, laying the groundwork for grizzly bear conservation within Alberta," notes Gordon Stenhouse, program leader, Grizzly Bear Research Program.

The research findings and tools Stenhouse refers to have been developed for application within the original 10,000 km² study area, where five years of intensive study have taken place. Valuable research contributions in the areas of grizzly bear health and physiology have also been made. The development and testing of models that integrate grizzly bear conservation needs have been produced, resulting in knowledge and tools that have the potential to advance sustainable forest management decisions relating to this indicator of ecosystem health.

Utilizing remote sensing tools and procedures, researchers have created grizzly bear habitat maps for large-scale landscape areas. Resource selection function models (RSF) build on habitat maps by using a model that identifies the probability of grizzly bear occurrence on a given landscape. Once RSF models are created graph theory models are used to identify grizzly bear movement corridors. In addition to these new maps and models program researchers have made significant advancements in techniques for capturing and handling grizzly bears. "Moreover, we have developed new techniques for monitoring and assessing grizzly bear health. The aim of this work is to help us understand how environmental conditions are affecting the health of grizzly bear populations in Alberta," notes Stenhouse.

Source: Gordon Stenhouse, 780-865-8388

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STUDY AREA EXPANDS... The Grizzly Bear Research Program expanded its activities southward in 2004, capturing and collaring 22 grizzly bears from the Clearwater River to the Montana border. "This sample of bears will be used to determine how our existing predictive models work in new areas of study along the east slopes of Alberta. There is also a strong desire by land managers to develop our new maps and tools to include all grizzly bear habitat in Alberta," states Stenhouse.

The original study area, covering a land base roughly 10,000 km² in total area, represents a small but important portion of grizzly bear habitat in Alberta. Biologists at the

Foothills Model Forest have worked closely with researchers from various universities to develop a series of maps and models that, when coupled with workshops and training sessions, will promote better land management practices within the original study area.

"We are in a unique position to expand those maps to cover all grizzly bear habitat within Alberta," notes Stenhouse. "If we are successful, Alberta will be the first jurisdiction that I am aware of that has tools of this nature for such a large area. Over the coming year we will continue collecting data from bears captured in 2004 and evaluating our current models in these new habitats."



Legend

 Phase I (1999-2004) Study Area
 2004 Expansion Study Area
 Provincial Boundary

Since the Foothills Model Forest Grizzly Bear Research Program began in 1999 its study area has expanded considerably to include the southern portion of grizzly bear habitat in Alberta. With the expansion the program continues placing collars on grizzly bears in an effort to further its understanding of this important indicator species.

Photo Credit: Gordon Stenhouse

Map Credit: Jerome Cranston

New mapping products and tools available for resource planning

Researchers at the Foothills Model Forest are working with researchers from Wilfred Laurier University and the Universities of Saskatchewan, Alberta and Calgary to develop a series of mapping and modelling products that will help land and resource managers make decisions that minimize their impact on grizzly bears and their

habitat in Alberta's eastern slopes region. Each of these products accurately demonstrate how grizzly bears use and move across the landscape. They are proving to be valuable land use planning tools and if widely applied will contribute to achieving the program's goal.

Grizzly bear habitat maps (land cover maps) are created using remote sensing imagery for large landscape areas. "Remote

sensing has emerged as a viable source of information for generating habitat maps," notes Greg McDermid of the University of Calgary. "We have now completed seamless habitat maps for a 100,000 km² area of grizzly bear habitat in Alberta. One of the projects' goals is to expand those maps to cover all grizzly bear habitat in Alberta."

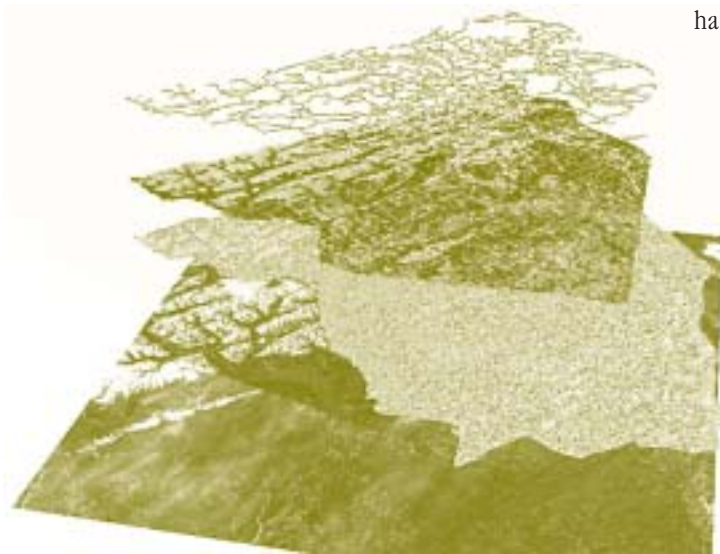
Scott Nielsen of the University of Alberta has developed a series of resource selection function models (RSF) that build directly on habitat maps already developed. "A resource selection function gives the probability that an animal will utilize a resource, such as a food item, within a given period of time," notes Nielsen. "We developed RSF models for three separate time periods, and tested them for their ability to predict grizzly bear occurrence on a monthly basis."

Grizzly bears, which are active from April through October, use different food resources at different times of year. Nielsen is continuing his work on RSF models with emphasis on incorporating GPS collar bias and new predictive food models, which he hopes will improve the predictive capability of future RSF maps.

Building on RSF models, Barbara Schwab of Wilfred Laurier University has attempted to describe landscape connectivity and movement patterns for female grizzly bears using graph theory analysis. "Graph theory analysis has allowed us to identify connections between individual areas of quality grizzly bear habitat," notes Schwab. The connections Schwab refers to were established using a least-cost path model. "There is any number of different paths that connect individual areas of quality grizzly bear habitat. The least-cost path is the path that takes the least amount of time, distance or effort, for a grizzly bear to travel from one area of quality habitat to another."

Once the least-cost path was identified Schwab overlaid location data from female grizzly bears, collected in 1999 and 2000, to determine how accurately the graph theory analysis identified connectivity and movement corridors between habitat patches. "About 50 percent of location points fell within 100 meters of the least-cost path while 75 percent fell within 400 meters of the least-cost path. This leads us to believe graph theory analysis has real value in aiding appropriate land-use decisions," says Schwab. The next step in Schwab's research is to incorporate samples from all age and sex classes of bears and to prepare movement corridor maps for the 100,000 km² area mapped to date.

Source: Gordon Stenhouse, 780-865-8388
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Building from the bottom up, researchers have developed habitat maps using remote sensing technologies. Once habitat maps are developed they are used to develop resource selection function models, which are then used to create graph theory models that predict grizzly bear movement corridors.

Image provided by Jerome Cranston

New application of digital camera technology

In an effort to increase understanding of grizzly bear habitat use, researchers fixed two modified digital cameras to existing GPS radio collars in 2003. The primary function of the cameras was to collect one digital image per hour during daylight hours to integrate with GPS data points being collected by the collars.

While the cameras failed after four days out on grizzly bears, viable images were collected from one of the cameras. Preliminary analysis indicates that the cameras have significant value. "We learned, for example, that bears would accept an additional 300 grams in total collar weight and would not remove the collars because of the addition of the camera unit," notes Andrew Hunter of the Department of Geomatics Engineering at the University of Calgary. But most importantly, the images acquired could play an important role in both habitat map validation and food use models developed at the Foothills Model Forest.

Because of technical issues encountered last season, cameras and camera housings were completely redesigned in 2004. The collars were deployed again this past spring with new cameras. Unfortunately, researchers will not know how this work has progressed until the collars drop off later this fall prior to denning.

Assuming the cameras are successful, researchers will move forward with plans to fully integrate motion-sensing technology. "Motion sensing data will allow us to separate grizzly bear movement into different components, which will provide new insights into bear behavior. Specifically, we are interested in utilizing temporal components of the location data to learn more about foraging patterns and movement corridors," notes Hunter. This information will then be integrated into testing the existing RSF maps and graph theory movement corridor maps.

Understanding grizzly bear habitat use with respect to foraging and movement corridors provides greater insights into the integration of human activities in grizzly bear habitat with minimal impacts. Hunter hopes findings from the study can be passed on to land managers to ensure protection of grizzly bear habitat at levels that can sustain Alberta's grizzly bear population.

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Images taken by camera collars placed on grizzly bears help validate habitat mapping and food models.

In October 2004, two more cameras will be retrieved and their images analyzed.

Photo Credit: Grizzly Bear 'G7'

Image provided by Andrew Hunter

MILESTONES

Award Winning Research...



Gordon Stenhouse and Jim LeLacheur receive the Emerald Award for Environmental Excellence in Research and Innovation.

Photo Credit: The Alberta Emerald Foundation for Excellence.

Foothills Model Forest Programs recognized for excellence...

The Foothills Model Forest Grizzly Bear Research Program received the 2004 Emerald Award for Environmental Excellence in Research and Innovation. While the award signifies the program's enormous scientific contribution toward conservation of grizzly bears in Alberta, researchers with the Foothills Model Forest agree that a great deal of work remains before the program realizes its long-term goal.

On another note, the Foothills Model Forest Social Science Program also received accolades for its work since 1995, winning a 2003 Canadian Forest Service (CFS) Merit Award for Creativity and Innovation. The award was given to the Foothills Model Forest and seven CFS researchers in recognition of their joint work in the areas of sociology, economics and non-timber valuation in partnership with the Canadian Forest Service.

"The recognition our programs are garnering signifies the calibre of work taking place at the Foothills Model Forest," notes Don Podlubny, general manager of the Foothills Model Forest. "The nature of this type of recognition further signifies the contribution our partners have made to our research."

Source: Lisa Jones, 780-865-8329
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Social Science Program surveys public on grizzly bear management

Managing for grizzly bears is a complex issue for land and resource managers. In May, 2004 Bonnie McFarlane, senior human dimensions specialist at the Canadian Forest Service, undertook a study to understand public attitudes and opinions on grizzly bear management. The survey included residents from the Edmonton area along with people living in the Foothills Model Forest land base.

"This study will help bridge the gap between what is needed ecologically to achieve grizzly bear conservation and what is socially acceptable," says McFarlane. "We hope to get a better idea of the types of trade-offs people are willing to make to ensure a viable grizzly bear population in the model forest. It is the public acceptance of these trade-offs that is currently lacking from grizzly bear and biodiversity-related research at the Foothills Model Forest."

The trade-offs McFarlane refers to are the specific choices Albertans may have to make between conservation, industrial use of the forest, including forestry and oil and gas development, and non-timber uses of the forest, such as recreational access to wilderness. McFarlane says, "Examining stakeholder preferences and the acceptability of different management options will help policy makers reach decisions that are socially acceptable."

Grizzly bears, which are seen as an indicator of ecosystem health, serve a similar role within the study, functioning as an indicator of more general attitudes people maintain toward resource management decisions. "Because the study places specific emphasis on grizzly bear management we believe it will provide a window into broader concerns surrounding human dimensions of biodiversity conservation," notes McFarlane.



Model forest research is helping to bridge the gap between what is needed ecologically to achieve grizzly bear conservation and what is socially acceptable in terms of land and resource management decisions.

Photo Credit: Unknown

Source: Bonnie McFarlane, 780-435-7359
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How many bears?

How many grizzly bears live in the Foothills Model Forest area? This is one of the most often asked questions of the Foothills Model Forest Grizzly Bear Research Program. In part, work conducted in 1999 provided a partial answer to this question. More importantly, however, the past five years of study have aided in the development of new designs and techniques to answer this question in much more detail. In 2004, at the request of Alberta Sustainable Resource Development, the Foothills Model Forest Grizzly Bear Research Program undertook a DNA hair census that will provide population estimates for a grizzly bear population unit in west-central Alberta. This project will also supply data that will be used to test alternative sampling strategies that will ultimately streamline DNA census work for planned future grizzly bear population inventories.

Researchers hope to streamline DNA census work by testing different approaches toward DNA sampling, including whether resource selection function (RSF) models can predict the best locations for DNA bait sites to obtain the highest number of samples possible. It is also hoped that an additional strand of barbed wire will improve sampling of cubs and yearling bears that may have been missed by traditional one wire DNA bait site designs.

“In previous DNA studies, researchers moved sites between sessions as one way of ensuring the entire study area was sampled and to lessen the chance of bears becoming habituated to bait sites,” says Stenhouse. “However, moving bait sites is expensive and time consuming and may reduce recapture

levels, which ultimately reduces our population estimate precision. As a result, we are testing the feasibility of fixed bait sites.” The end result of testing both fixed and mobile bait sites is the creation of two datasets that researchers will analyze in an effort to identify the best possible approach for generating population estimates. Results of this work will be available in 2005.



New sampling designs and techniques for collecting grizzly bear hairs are being tested to determine the most effective sampling method available. These sampling methods will eventually be put to use across Alberta to help determine how many grizzly bears live in the province.

Photo Credit: Kim MacLean



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UPCOMING EVENTS

GRIZZLY BEAR RESEARCH PROGRAM: ROLLING OUT A SUITE OF PLANNING TOOLS

In November, sponsors of the Grizzly Bear Research Program are invited to one-day workshops that will introduce resource selection function models and movement models. This is the Program's first step in knowledge and technology transfer. For more information contact the Foothills Model Forest at 780 865-8330.

CHISHOLM, DOGRIB AND LOST CREEK FIRE RESEARCH WORKSHOP

In early 2005 findings from two years of wildfire research will be presented at a one-day workshop. The workshop will be in Edmonton. For more information contact Lisa Jones at 780 865-8329 or Dennis Quintilio at 780 785-3100.

OPPORTUNITIES TO INTEGRATE SCIENCE INTO FOREST MANAGEMENT PRACTICE

On November 2-3, senior managers from Public Lands and Forest Division within Alberta Sustainable Resource Development and Foothills Model Forest researchers are meeting to exchange knowledge and ideas. The intended outcome of the workshop is to identify new opportunities for the integration of model forest research in forest management practice in Alberta.

For information on Foothills Model Forest events and activities visit www.fmf.ab.ca or contact the model forest at 780 865-8330.

ADDITIONAL EVENTS

A REPUTATION AS A WORLD LEADER IN SFM

The Foothills Model Forest Phase III Vision is to play a key role in establishing Alberta and Canada's reputation as a world leader in sustainable forest management. Judging by the number of tours to international delegations in the fall the Foothills Model Forest is achieving

its vision. Since August 2004 the model forest hosted the following tours:

SEPTEMBER 16-17: Russian representatives from the Komi Model Forest Project and the Russian Academy of Sciences.

SEPTEMBER 22-23: A Japanese delegation touring western Canada through the Canadian Council of Forest Ministers International Forestry Partnership Program.

SEPTEMBER 28: Cuban foresters from government and research institutes.

OCTOBER 6-7: A Foothills Model Forest Technical Field Workshop was held. The group was a mixture of American and Canadian foresters and students.

OCTOBER 22-23: The Montréal Process Working Group toured the Foothills Model Forest to learn about the model forest local level indicators experience. This working group is committed to developing and promoting C&I for sustainable forest management with representatives from 12 different countries.



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In 1992, Natural Resources Canada, through the Canadian Forest Service, initiated Canada's Model Forest Program. The program has successfully built partnerships and conducted sustainable forest management research across Canada. Emphasis is now shifting to the application of model forest research and tools.

The Foothills Model Forest, located in Hinton, Alberta, is an original member in the Canadian Model Forest Network. The sponsoring partners of the Foothills Model Forest are Alberta Sustainable Resource Development, Canadian Forest Service, Jasper National Park and Weldwood of Canada Limited, Hinton Division. Each sponsor makes a five-year commitment to the organization. The land that each partner manages is included in the 2.75 million hectare Foothills Model Forest land base. Together these sponsors demonstrate their commitment to advancing sustainable forest management in Alberta and Canada.