

There's Snow Place Like Home:



Photo courtesy of Ken Curtis.

Tracking the Range of Wolverines Over Time

Meet the Scientists



▲ Dr. Keith Aubry, Research Wildlife Biologist: One of my most interesting and exciting science experiences occurred last winter when I traveled around the island of Tasmania (which is part of Australia). This was my first opportunity to experience the diversity of **marsupials** (pouched mammals) and **monotremes** (egg-laying mammals) that occur in the Australian region. I saw and photographed a Tasmanian devil, ringtail and brushtail possums, a Bennett's wallaby (a small kangaroo), and a wombat (a chunky, **herbivorous** marsupial). I also learned all about the **extinct** Tasmanian tiger. One of my most memorable experiences was watching an **echidna** (one of only two egg-laying mammals in the world) hunt for bugs in decaying leaves and under rotting logs. The echidna (also called a spiny anteater) looks like a slightly deflated soccer ball that is covered with poisonous spines!

▼ Dr. Kevin McKelvey, Wildlife Ecologist: My favorite experience was digging out a wolverine snow-den in Glacier National Park. To study wolverines, scientists capture wolverine kits (baby wolverines) and put tracking instruments on them. These instruments help us follow their movements. To put the instruments on them, we first dig down through the snow to the wolverine den site. The den site is usually under about 8 feet of snow and under large rocks or downed trees. To find the dens, we have to look for wolverine tracks.

I was lucky enough to follow tracks that led to the den. The den was visible by a small hole in the snow. I was digging down, with the surface of the snow about 2 feet above my head when I broke through into the center of the den. Immediately, I heard the mother wolverine growling right beneath my feet. I had this image of an **enraged** female wolverine crawling up my leg and gnawing on my head. But Mr. Jeff Copeland, who has years of experience with wolverines (but who was also standing safely on top of the snow) said: "It will be fine." It ended up being fine.

We were able to capture the two kits, and conditions were perfect for putting the

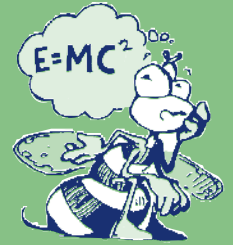
instruments on them without causing them a lot of stress. We had to work quickly with mom circling about 50 meters away, waiting for us to be done! (In the picture, the wolverine kit is covered with a blanket to protect its eyes while we are studying it. The wolverine kit was released back to its mother when we were finished.)



Thinking About Science

It is important for scientists to gather correct information or **data** about the topic they are studying. Not all information is **reliable** information. Scientists, therefore, need to be able to determine whether the data they are collecting are reliable. In this study, scientists gathered information from museums, literature, and **archived** material at State and Federal buildings. Once they gathered all their information, they did not use any that was unreliable or not well documented. When scientists (or you) use the Internet, care must be taken to know the source of the information. Usually, it is best to use Internet sites from State and Federal Governments (.gov), universities (.edu), or trusted sites like *National Geographic*.

If the scientists in this study did not feel confident about their data source, they did not use that information. As a result, some information that may have been useful was lost. It is important for scientists to keep **accurate** and reliable data so that their findings will be correct. You have heard your teacher ask you to carefully write down your **observations** and data during experiments at school. Now you can see why that is important!



Thinking About the Environment

The Endangered Species Act is a law that was created in 1973 to protect **species** that are threatened with or in danger of extinction. There are many reasons a plant or animal species may be placed on the endangered species list. For example, an animal's **habitat** may be getting smaller because humans are building their houses



in that area. If an animal loses its habitat, it may not be able to survive in another habitat. In this study, scientists examined wolverine habitat to see what things may be shrinking the wolverine's **geographic range**. Their geographic range is where wolverines are found across the United States and Canada.

Number Crunches



How old is the Endangered Species Act?

Introduction

Wolverines, the largest **terrestrial** member of the weasel family, are mammals that are difficult to find (**figure 1**). Because they live in areas far from humans and human development, therefore, not much is known about these mammals. Wolverines are primarily scavengers, and they sometimes travel great distances in a day in search of food or shelter. In North America, they are currently found in most of Alaska and Canada, but only in the mountainous northern portion of the lower 48 States (**figure 2**).

Wolverines may seek shelter under fallen logs or boulders, and female wolverines give birth to their kits in snow-dens.

Neither the current nor historical range of wolverines in the lower 48 States was well known before the work of these scientists. This was a problem because some groups had **petitioned** for the wolverine to be listed as an endangered species. One of the reasons the petitions were denied was because no one was certain where wolverines occurred in the United States. The scientists in this study, therefore, wanted to accurately map the wolverines' range over time and evaluate how climate change might be affecting their range.



Figure 1. The wolverine is well adapted for living in snowy environments. By looking at the picture, name one adaptation the wolverine has to allow it to live in the snow. Photo courtesy of Keith Aubry.

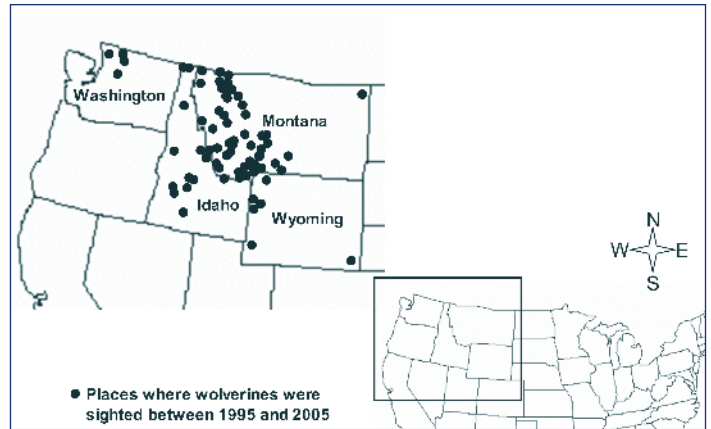


Figure 2. In the lower 48 States, the wolverine's current range (1995–2005) is restricted to northern portions of the western mountains. The scientists studied wolverine habitat in these States.

Reflection Section

- What questions were the scientists trying to answer?
- What are some other animals that burrow or make dens for their homes?



Methods

The scientists gathered information about wolverine trapping and sightings between 1801 and 2005. They also gathered information about wolverines from museums. Each record included geographic information identifying where the wolverines were seen. The scientists divided the records into three time periods—

- 1995–2005 (current)
- 1961–1994 (recent)
- 1801–1961 (historical)

The scientists used computer software to create maps with the data. The scientists also collected information about the type of vegetation in the area. They collected information about climatic (*klī ma tik*) conditions over time and about the spring snow

cover from recent years. The scientists added all this information to the maps to see how particular climatic conditions or spring snow cover compared with the wolverine records.

Number Crunches

- What is the total number of years that the scientists obtained information about wolverines?

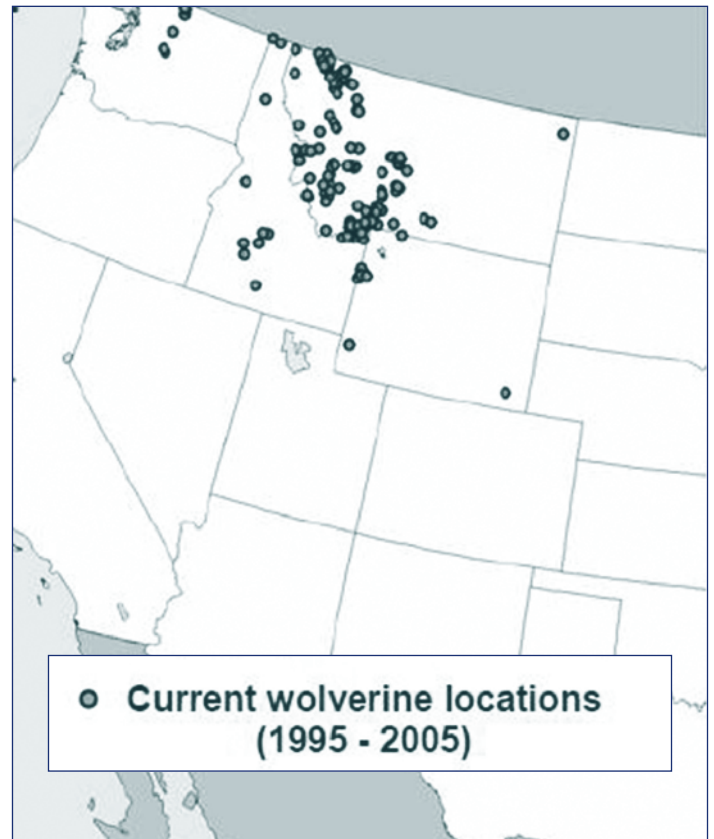
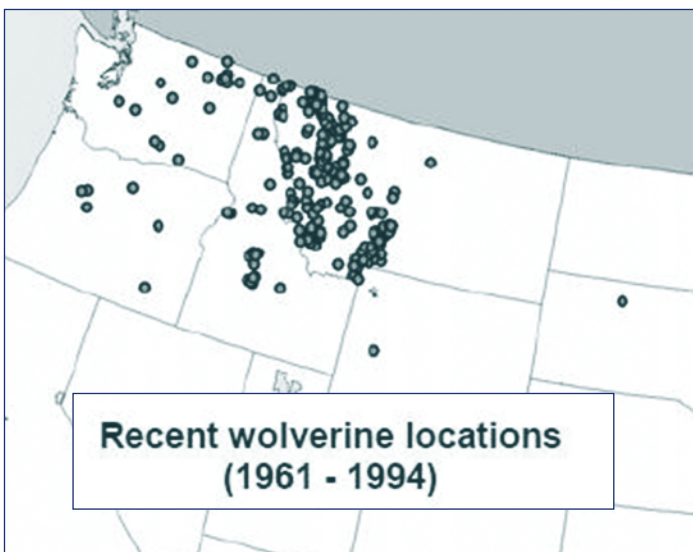
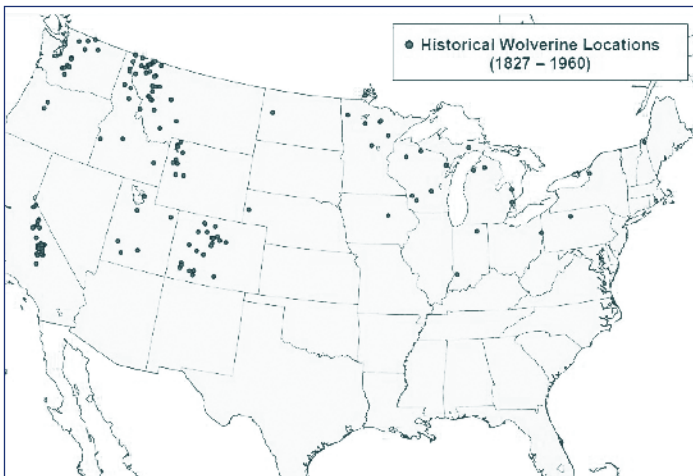
Reflection Section

- Why do you think the scientists divided the years into three different time periods?
- How do you think warmer temperatures might affect wolverines? (Hint: look back at the Introduction section to see where wolverines typically give birth.)



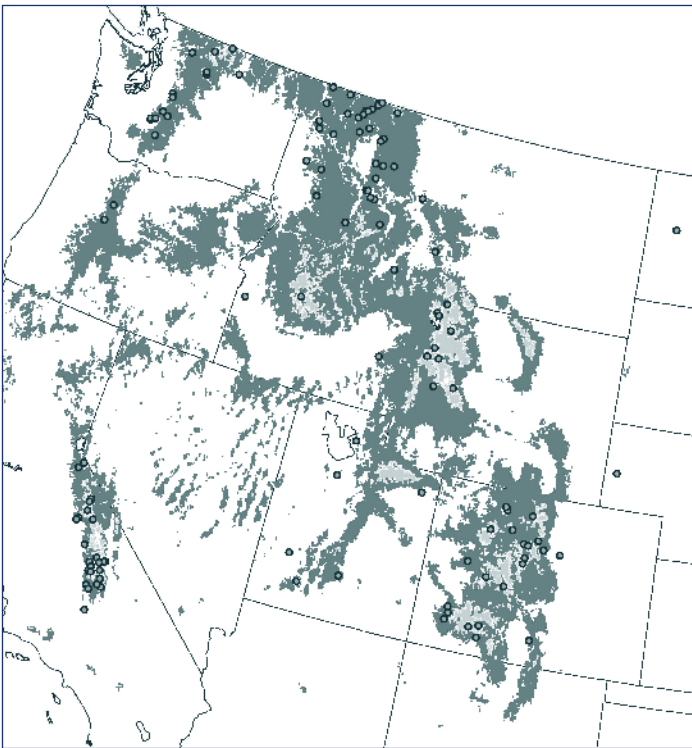
Findings

The completed maps showed that the range of wolverines shrunk over time, as illustrated by wolverine records from historical to current times (figures 3a, 3b, and 3c).



Figures 3a, 3b and 3c. The historical, recent, and current distribution of wolverines in the northern mountains of the Western United States. Forest Service image.

It was also evident that wolverines depend on particular habitat conditions for survival (**figures 4a and 4b**).



Figures 4a and 4b. Wolverine distribution and the location of alpine areas and conifer forests. What do you notice about where the wolverines live?

This study was the first time anyone accurately assessed the range of wolverines over time. The scientists found that wolverines live in areas of the United States where snowpacks remain through the spring period. This is the time when wolverines make their dens. The scientists also found that most wolverine sightings were in alpine meadows and conifer forests. Alpine meadows are found high in the mountains (**figure 5**). Conifer forests are areas with trees that have cones and that typically do not lose their leaves in the fall or winter (**figure 6**).



Figure 5. Alpine areas have plants that are low to the ground so they can live in the cold temperatures.



Figure 6. Some types of conifer forests are found in Earth's cooler regions.

Reflection Section



In your own words, summarize what the scientists found.



Do you think the findings support the idea that the wolverine's habitat may be in danger? Why or why not?



Glossary

accurate (ə kyə rət): Free from error.

archived (är kīvd): Collected or filed.

data (dā tə): Factual information used as a basis for reasoning, discussion, or calculation.

echidna (i kid nə): A type of egg-laying mammal that is also known as a spiny anteater.

enraged (en rājd): Angered.

geographic range (jē ə gra fik rānj): The area defined by the location of the farthest populations of a species.

extinct (ik stɪŋ (k)t): No longer living.

herbivorous ((h)ər biv rəs): Feeding on plants.

marsupial (mār sü pē əl): A pouched mammal.

monotreme (mä nə trēm): Any of the order of egg-laying mammals.

observation (äb sər vā shən): Watching carefully and making note of details to help arrive at a judgment.

petition (pə ti shən): To make a request.

reliable (ri lī ə bəl): Dependable.

species (spē shēz): Groups of organisms that resemble one another in appearance, behavior, chemical processes, and genetic structure.

terrestrial (təs t(r)ē əl): Of or relating to land as opposed to air or water.

Accented syllables are in **bold**. Marks are from the Merriam-Webster Pronunciation Guide.

Discussion

Wolverines have already experienced habitat losses. Discovering that wolverines live near areas that have spring snow cover is important. It is important because as the climate changes and becomes warmer, the snow in these areas will melt earlier in the year. As the climate in these areas warms, the range of suitable wolverine habitat will change. In addition, the wolverine's reproduction may be affected. The scientists believe that more research needs to be done to fully understand the potential impact of climate change on wolverine populations.

Reflection Section



Why would the wolverine's reproduction be affected? (Hint: Think about why wolverines need spring snow cover.)



Based on what you have learned from this article, do you think it is possible that the wolverine may need to be listed as an endangered species? Why or why not?





Time Needed

1.5 class periods

Materials needed per student group:

- Animal field guides that include range maps, such as bird, reptile, amphibian, or mammal guides and other resources with wildlife information.
- Two blank maps of the United States. (See page 27, "Moving on Up," for a blank map.)
- Two pieces of blank white 8 1/2 x 11 paper.
- Markers.

The question students will answer in this FACTivity is: What is the range of an animal?

Process:

In the first class period:

Choose an animal to study that lives in the United States. This animal may be selected from one of the field guides. Using the field guide and other sources, find the following information about the animal:

- What is the animal's habitat? When you find out about the areas it lives, mark those areas on one of the blank maps. Label this map "Where [animal species name] Currently Lives."
- What does the animal eat?
- Does the animal have predators? If so, what are they?
- What is the average size of the animal?
- What does the animal look like?
- What is the climate where the animal lives?
- What are three adaptations the animal has so that it can live successfully in its habitat?

Use this information and any other interesting facts to create an Animal Fact File. The Animal Fact File should be displayed on two pieces of 8.5- by 11-inch paper.

In a short paragraph, answer the question posed at the beginning of this FACTivity.

In the second class period:

One of your blank U.S. maps should already be filled out with the animal's current range. You will use the other map to make a prediction about how you think the animal's range will move as the climate changes. Think about what you read in the wolverine article to help you make this map. Label this map "Predicted Future Range of [animal species]." Once all of the groups have created an Animal Fact File and completed the two maps, the files and maps can be compiled into a class book.

Extension



If students have read and done the FACTivity from "Moving On Up" in this edition of the *Natural Inquirer*, they may compare their animal range maps with the tree range maps.



If you are a trained Project WILD educator, you may use the activity "Shrinking Habitat" on page 310.



What You Can Do:

Turn it off! Using less energy means producing less carbon dioxide. Some examples of things you can turn off when you are not using them are lights around your house, water when you are brushing your teeth, and your computer or television. You can also save energy by turning down your thermostat and using cold water when you wash your clothes.

Additional Web Resources

National Geographic Wolverine Information and Pictures

<http://animals.nationalgeographic.com/animals/mammals/wolverine.html>

University of Michigan's Animal Diversity Web: Wolverine Information

http://animaldiversity.ummz.umich.edu/site/accounts/information/Gulo_gulo.html

Adapted from Aubry, K.B.; McKelvey, K.S.; and Copeland, J.P. (2007).

Distribution and broadscale habitat relations of the wolverine in the contiguous United States. *Journal of Wildlife Management*. 71(7): 2147–2158. <http://www.treesearch.fs.fed.us/pubs/28925>.

National Science Education Standards

Standards addressed in this article include:

Science as Inquiry:

Abilities To Do Scientific Inquiry,
Understandings About Scientific Inquiry

Life Science:

Regulation and Behavior,
Populations and Ecosystems,
Diversity and Adaptation of Organisms,
Reproduction and Heredity

Earth Science:

Structure of Earth System

Science and Technology:

Understandings About Science and Technology

Science in Personal and Social Perspectives:

Science and Technology in Society,
Natural Hazards

History and Nature of Science:

Science as a Human Endeavor,
Nature of Science