There's Snow Place Like Home

Tracking the Range of Wolverines Over Time

Meet the Scientists!

Dr. Aubry,
research wildlife biologist:

One of my most interesting and exciting science experiences happened on the island of Tasmania (which is part of Australia). This was my first opportunity to experience the diversity of marsupials (pouched mammals) and egg-laying mammals that occur in the Australian region. I saw and photographed a Tasmanian devil, ringtail and brushtail possums, Bennett's wallaby (a small kangaroo), and a wombat. I 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. They look for bugs in decaying leaves and under rotting logs. The echidna looks like a slightly deflated soccer ball that is covered with poisonous spines!

Dr. McKelvey,
wildlife ecologist:

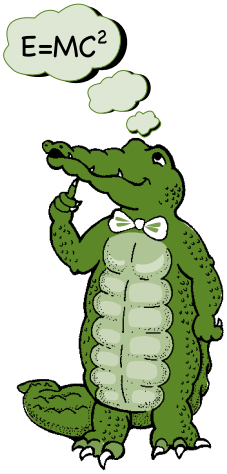
My favorite experience was digging out a wolverine snow-den in Glacier National Park. To study wolverines, scientists capture wolverine kits (baby wolverines). After the kits are captured, the scientists put tracking instruments on them. These instruments help us follow their movements.

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 wolverine mom growling right beneath my feet. I had this image of an angry female wolverine crawling up my leg and gnawing on my head. But 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

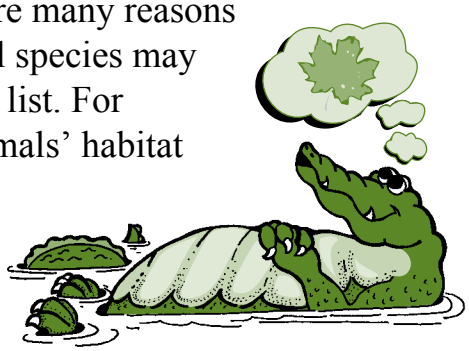


It is important for scientists to gather correct information about the topic they are studying. Not all information is reliable. Scientists need to be able to figure out whether the information they are collecting is reliable. In this study, scientists gathered information from several different places. They got information from museums, literature, and written material at state and federal buildings. The scientists did not use any information that was not reliable. When scientists (or you) use the Internet, care must be taken to know where the information came from. Usually, it is best to use Internet sites from the government (.gov), universities (.edu), or trusted sites like *National Geographic*.

If the scientists did not feel confident about their information source, they did not use that information. Therefore, some information that may have been useful was lost. It is important for scientists to keep **accurate** and reliable information. If the information is accurate and reliable, then other scientists may use that information too. Your teacher probably asks 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. The law protects species that are in danger of becoming **extinct**. There are many reasons a plant or animal species may be placed on the list. For example, an animals' habitat may be getting smaller. If an animal loses its **habitat**, it may not be able to live in another area. In this study, the scientists examined wolverine habitat. The scientists decided to study the wolverine's range. The range is where the wolverines live across an area. The scientists wanted to know the range of the wolverines in the past and in the present.



Number Crunches

How many years ago did the Endangered Species Act go into effect?

Introduction

Wolverines are the largest member of the weasel family that lives on land. They are mammals that are not easily found **(figure 1)**. They live in areas far from humans and human development. Therefore, not much is known about these mammals.

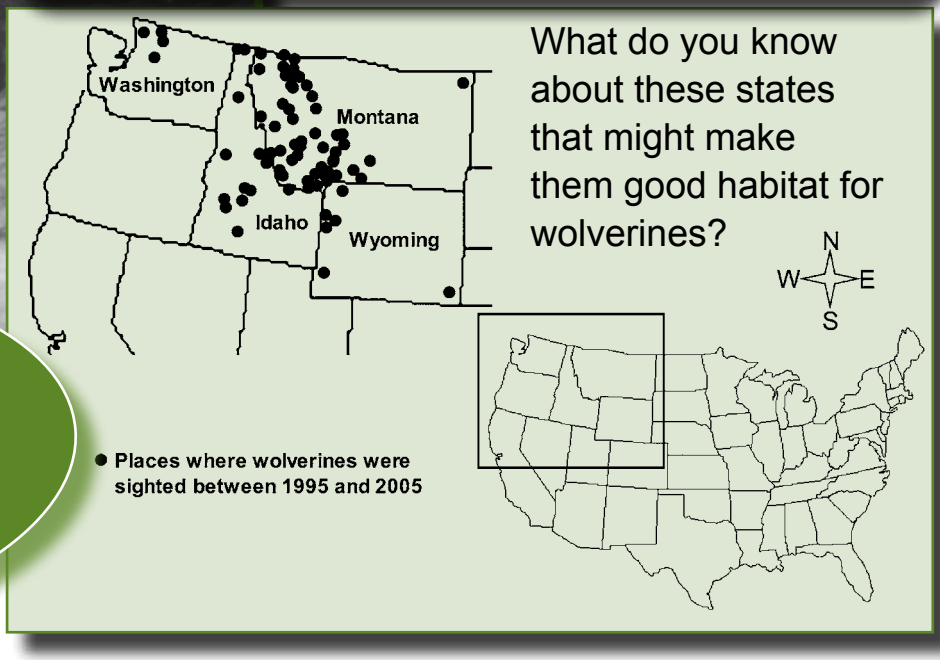
Do you know what the largest weasel in the water is? Check out our Web site to find out! www.scienceinvestigator.org!

Wolverines are mostly scavengers. This means that they feed on dead animals. Sometimes wolverines travel great distances in a day in search of food or shelter. Wolverines may seek shelter under fallen logs or boulders. Female wolverines give birth to their kits in snow caves. Wolverines are currently found in most of Alaska and Canada and only in the northern portion of the Lower 48 States **(figure 2)**.

Photo courtesy of Keith Aubry, USDA Forest Service

Figure 1. The wolverine is well-adapted for living in snowy environments. Look at the picture and name one adaptation the wolverine has to allow it to live in the snow.

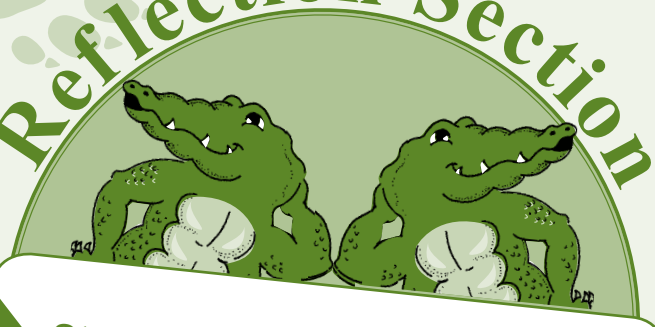
Figure 2. In the Lower 48 States, the wolverine's current range (1995–2005) is found in the mountainous Northern States. The scientists studied wolverine habitat in these states. Do you live in any of the states or areas that were studied?



What are the Lower 48 States? The Lower 48 States refers to all of the U.S. states that share a border with another state. Hawaii and Alaska are the only two states that do not share a border with the rest of the United States.

Before the scientists began their study, the range of wolverines was not well known. This was a problem. When some people asked for the wolverine to be listed as an Endangered Species their request was denied. One of the reasons the request was denied was because no one was certain where wolverines lived in the Lower 48 States. The scientists in this study, therefore, wanted to accurately map the wolverine's range over time. The scientists also wanted to study whether climate change is affecting the wolverines' range.

Reflection Section



State in your own words and in the form of a question the problems the scientists were trying to study.

What are some other animals that burrow or make dens for their homes?

Methods

By using a variety of sources, the scientists gathered records of wolverine sightings from 1801 through 2005. Each record included information identifying where the wolverines lived. The scientists divided the records into three periods.

The periods were:

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

The scientists used computer software to create maps with the data. The scientists collected information about climate over time. The scientists also gathered information about spring snow cover from recent years. This information was added to the maps. When this information was added to the maps, the scientists could see how climate and snow affected the wolverines' range.

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 up into different 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 show that the range of wolverines has shrunk, based on changes in the wolverine records from historical to current times **(figure 3)**. It was also evident that wolverines depend on particular

Figure 3. The historical distribution **(A)**, recent distribution **(B)**, and current distribution **(C)** of wolverines in the Lower 48 States.

habitat conditions for survival **(figure 4)**. Wolverines were found in alpine meadows and conifer forests. Alpine meadows are found high in the mountains. They are above the tree line **(figure 5)**. Conifer forests are areas with trees that have cones and typically do not lose their leaves in the fall or winter **(figure 6)**.

This study was the first time anyone accurately figured out the range of wolverines over time. This told the scientists several things. The scientists found that wolverines live in areas of the Lower 48 States where snowpacks stay through the spring. This is the time when wolverines make their dens. The scientists also found that most wolverines were found in alpine meadows and conifer forests.

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

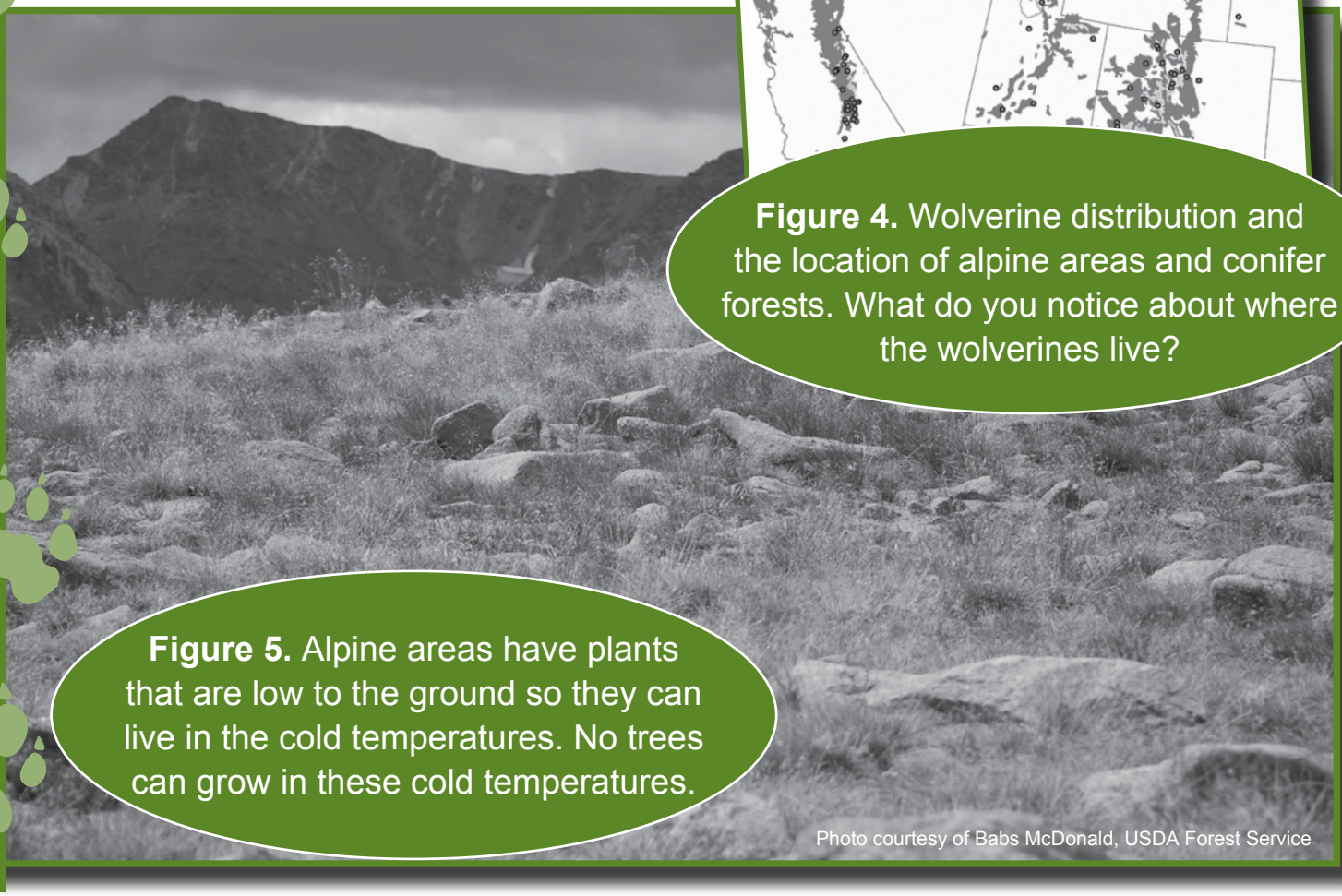


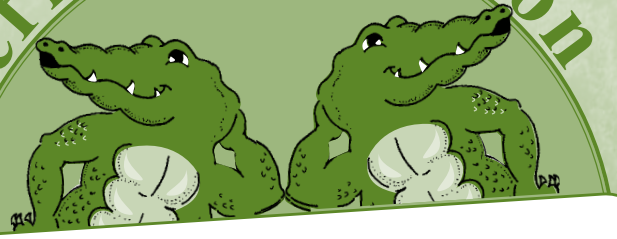
Figure 5. Alpine areas have plants that are low to the ground so they can live in the cold temperatures. No trees can grow in these cold temperatures.

Photo courtesy of Babs McDonald, USDA Forest Service

Photo courtesy of Babs McDonald, USDA Forest Service

Figure 6. Many conifer trees grow in cooler climates.

Reflection Section



- Summarize what the scientists found in your own words.
- Do you think the findings support the idea that the wolverine's habitat may be in danger? Why or why not?

Discussion

Wolverines have already lost areas where they can live. The finding that wolverines live near areas that have spring snow cover is important. It is important because if the climate changes and becomes warmer, areas that currently have spring snow cover may have snow melt earlier in the year. If the climate changes in these areas, the wolverine habitat will change too. Additionally, the wolverine's reproduction may be affected. The scientists believe that more research needs to be done to fully understand what climate change means for wolverine populations.

Pronunciation Guide

ā	as in ape	ū	as in use
a	as in car	u	as in fur
ē	as in me	ü	as in tool
i	as in ice	ŋ	as in sing
ō	as in go	ə	as in about (both a and u)
oi	as in for		

Accented syllables are in **bold**.

Glossary

Accurate (**ak** ür ət): Free from error.

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

Extinct (ek **stin(k)t**): No longer living.

Marsupial (mar **sūp** ē ul): A pouched mammal.

Habitat (**hab** uh tat): Environment where a plant or animal naturally grows and lives.

Observation (**ob** sür **vā** shun): Watching carefully and making note of details to help arrive at a judgment.

Reliable (re **lī** ə bəl): Dependable.

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

Accented syllables are in **bold**.

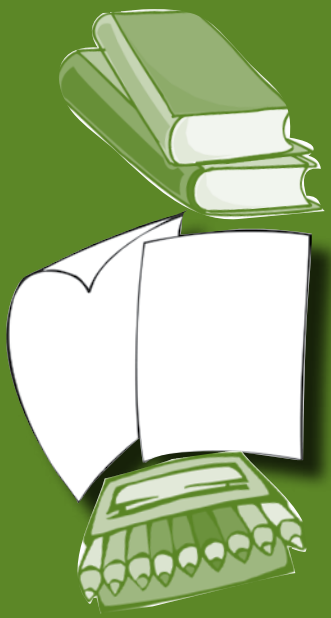
- Why would the wolverine's reproduction be affected? (Hint: Think about why wolverines need spring snow cover.)
- Based on what you have learned from this article, do you think it is possible that the wolverine may need to be listed as an endangered species at some point? Why or why not?

This article was adapted from Aubry, K.B.; McKelvey, K.S.; 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

FACTivity

Time needed: Two class periods

Materials needed per student group:



- Animal field guides that include range maps, such as bird, reptile, amphibian, or mammal guides
- Two blank maps of the United States (see page 61)
- Two pieces of blank white 8 ½ x 11 paper
- Markers

The question students will answer in this FACTivity is:

What is the geographic range of an animal?

The process students will use to answer this question is:

In the first class period:

1. Choose an animal to study that lives in the United States. This animal may be selected from one of the field guides.
2. Using the field guide and other sources, find out the following information about your animal:
   - What is your animal's habitat? When you find out about the areas it lives in, mark those areas on one of the blank maps.
   - What does your animal eat?
   - Does your animal have predators? If so, what are they?
   - What size is your animal?
   - What does your animal look like?
   - What is the climate where the animal lives?
   - What are three adaptations your animal has so that it can live successfully in its habitat?
3. Use this information and any other interesting facts to create an Animal Fact File. The Animal Fact File should be displayed on two 8 ½ by 11 pieces of paper.

In the second class period:

1. One of the blank U.S. maps should be filled out with the current range where your animal is found. Label this map "Where [animal species name] Currently Lives." The other map will be used to make a prediction about how you think your animal's ▶

FACTivity continued

range will move as the climate becomes warmer. Think about what you read in the wolverine article to help you make this map. Label this map "Predicted Future Range of [animal species name]."

2. 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: For students that need an extra challenge, they can include an Animal Fact File and map on one of the predators or prey for their animal.

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

National Science Education Standards addressed in this article:

Science as Inquiry: Abilities to do scientific inquiry, Understandings about scientific inquiry

Life Science: Reproduction and heredity, Regulation and behavior, Populations and ecosystems, Diversity and adaptation of organisms

Earth Science: Structure of the Earth system

Science in Personal and Social Perspectives: Natural hazards, Risks and benefits, Science and technology in society

Science and Technology: Understandings about science and technology

History and Nature of Science: Science as a human endeavor, Nature of science

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