

There Goes the Neighborhood:

The Disruption of American Marten Habitat



Meet Dr. Christina Hargis:

“I like being a scientist because I get to find out new things about the world that nobody else has discovered. Usually the things I discover are very small facts, but often they turn out to be important pieces of information. I hope that the discoveries I have made about martens and other animals will help us do

a better job of keeping wildlife from going extinct.”



Thinking About Science...

Scientists often study animals in their natural *habitat*.

When they do this, they try not to disturb or harm the animals. Sometimes, they can

study animals from far away using photography or other forms of observation. Often, however, they need to take measurements of individual animals to understand whether they are healthy or sick, and sometimes just to identify them. Scientists use *live-traps* to capture animals without harming them. Then, they can examine the animal up close before returning him or her unharmed to the environment. Scientists have *ethical* standards so that they do not harm the individuals they want to study. The scientists in this study wanted to learn about a weasel-like animal called the marten. They used live-traps to study the martens before returning them to their environment.



Dr. Christina Hargis holding a baby marten.



Thinking About the Environment...

The American marten is a carnivorous mammal that lives in forests throughout Alaska, Canada, and the Northern United States. Martens are related to minks, and just like minks, they have slinky bodies and soft, rich fur. They eat mostly mice and squirrels, but sometimes they eat berries and **carrion**. They hunt for small animals by slipping quietly around big logs and tree trunks in forests. Martens avoid places that do not have trees because it is difficult for them to hunt in open areas.

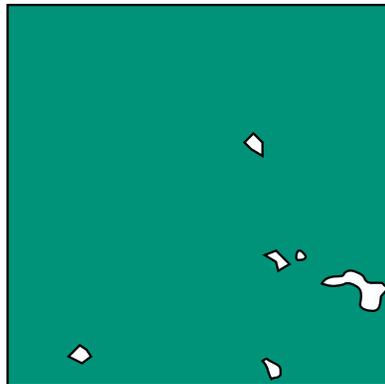
Introduction

In many places where martens live, trees are **harvested** for wood products, leaving martens with an environment very different from the **forested** one they prefer. When tree harvesting occurs, the marten's habitat is broken up, large patches of open land are created, and the forest environment remains only in little patches, or fragments. **What happens to martens if they keep finding more open areas every time they go hunting for food? Dr. Hargis and Dr. John Bissonette, the scientists in this study, wanted to know if marten populations are shrinking because of forest fragmentation.**

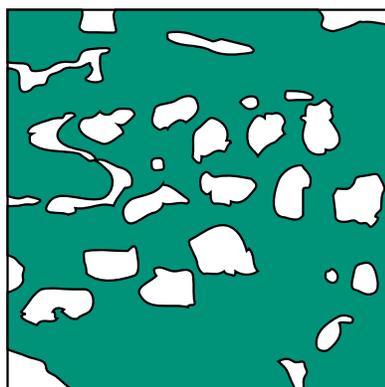


Reflection

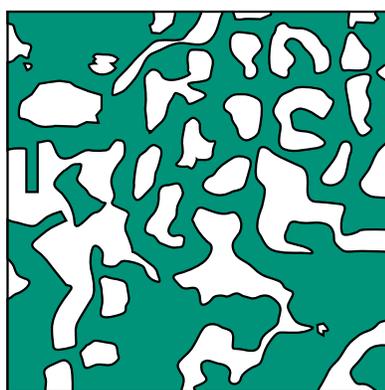
- Why is it important to know whether marten populations are shrinking?
- How do you think the scientists found out about the marten population?



2% Unforested



21% Unforested



42% Unforested

Figure 1. Different levels of forest fragmentation.

Glossary:

- associated:** (e sô'shê â'ted) closely related or connected
- carnivorous:** (kär niv'er es) characterized by feeding on animals
- carrion:** (kar'ê en) dead and putrefying flesh
- ethical:** (eth'i kel) relating to what is good and bad; moral obligation
- extinct:** (ik stingkt') no longer existing
- forest manager:** (for'ist man'i jer) a person who takes specific actions to protect and to use natural resources in a forest
- forested:** (fôr'is ted) an area characterized by dense growth of trees and underbrush
- fragmentation:** (frag'men tâ'shen) to break apart and detach
- habitat:** (hab'i tat') the place where a plant or animal naturally lives and grows
- harvest:** (här'vist) to gather or take a crop
- live-trap:** (lîv trap) a trap that captures an animal alive and unharmed
- population:** (pop'ye lâ'shen) the total of individuals occupying an area
- population density:** (pop'ye lâ'shen den'si tê) the compactness or crowdedness of a population
- scarce:** (skârs) not plentiful or abundant

Methods

The scientists selected 18 separate sites—each about 3.5 square miles (9 km²) in size—in the Uinta Mountains of northern Utah so that many levels of forest fragmentation could be studied. The sites ranged from 2 percent to 42 percent unforested land (*Figure 1*). Some of the sites were almost completely forested, while others were only about half forested. These sites were like a patchwork of open and forested land.

The scientists set 25 live-traps in each of the 18 areas and checked them for 6 nights in a row. If a marten was captured in a trap, he or she was tagged, examined, and released back into the environment. The scientists recorded each marten's weight, sex, estimated age, and whether the marten was a reproducing female. The scientists counted the number of individual martens captured in the 25 live-traps placed in each of the 18 areas over the 6 days. (How many total opportunities to capture martens did they create?) The number of martens identified in each area was used as a measure of the population density of martens within that area. Then, the scientists compared the **population density** of martens in each area to determine whether higher levels of forest fragmentation were **associated** with lower marten population density.

The scientists also used live-traps to capture, count, and estimate the number of smaller mammals on each site. They did this to understand whether the martens' food supply on each site was plentiful or **scarce**.



Reflection

- Why do you think the scientists tagged the martens?
- Why do you think the scientists recorded the martens' weight, sex, age, and reproductive status?
- Think about the reasons the marten population might decline, remain stable, or

increase. Why did the scientists want to know if the martens' food supply was plentiful or scarce?

Findings

The scientists found that on the more fragmented forest sites, fewer martens were captured. In fact, the scientists only captured one marten on any site that was more than 25 percent unforested (*Figure 2*). The scientists also found that the martens' food supply was plentiful. Dr. Hargis and Dr. Bissonette concluded that forest fragmentation has a negative effect on marten population density, even when the martens' food supply is abundant.

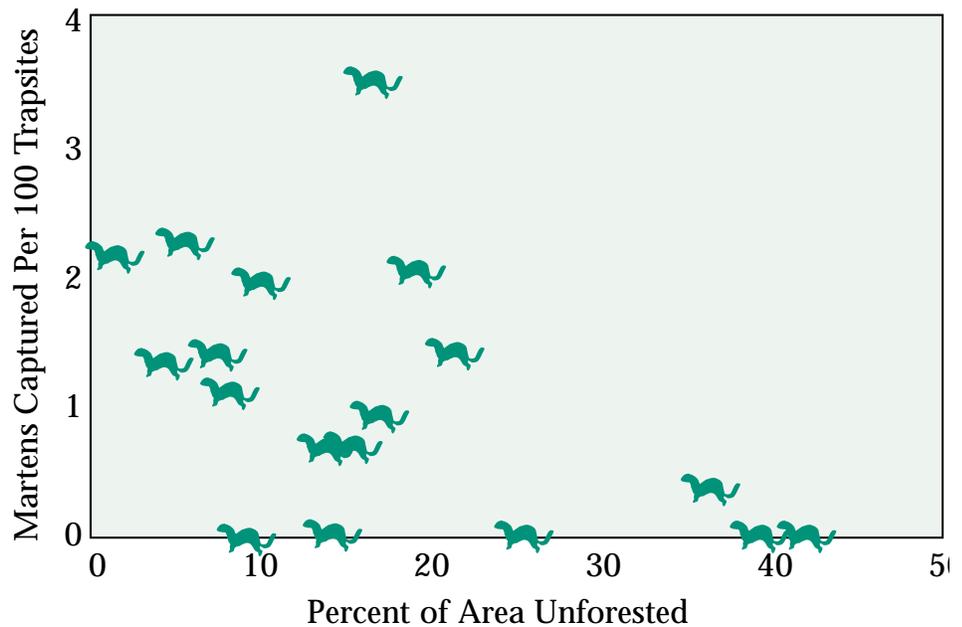


Figure 2. Each point (marten) on the graph represents one of the 18 sites studied. The scientists only captured one marten on any site that was more than 25 percent deforested. No martens were captured at five of the sites.



Reflection

- If the martens' food supply had not been plentiful, what conclusion could the scientists make about forest fragmentation and the decline of the marten populations?
- If you were the scientists, what would you tell forest managers they can do to help stop the decline of marten populations?

Implications

If forest managers want martens to live in the forests they manage, they must be careful to harvest trees so that no more than 25 percent of each 30-acre site, or about 7.5 acres, is harvested. It is also important not to cut trees in a patchwork pattern, but to leave large areas forested so that martens can live in the forest.



Reflection

- What human activity is impacting the marten population?
- What might happen to the marten population if **forest managers** do not heed the advice of these scientists?
- What might happen to the populations of rodents, rabbits, birds, fruit, and insects if the marten population gets very small?
- Is it important to stop the decline of the marten population? Why or why not?

From: Hargis, Christina D. and Bissonette, John (1997). Effects of forest fragmentation on populations of American Marten in the intermountain west, In G. Proulx, H. N. Bryand, and P. M. Woodard (Eds.). *Martens: taxonomy, ecology, techniques, and management*, Provincial Museum of Alberta, Edmonton, pp. 437-431.



Discovery FACTivity

The scientists in this study wanted to know about the forest habitat of the American marten. In this FACTivity, we are going to study different soil habitats. Get five shoe boxes and line them with

plastic. Fill the shoe boxes with soil from five different areas. These areas can be:

- 1) a forest,
- 2) a compost pile,
- 3) a roadside,
- 4) a lawn, and
- 5) a garden.

Make sure that you have supervision when you are digging up soil from the roadside. And, be sure to get permission to dig the lawn soil. Carefully investigate the different soil samples. Do not injure any animals as you study them, and disturb them as little as possible. What kind of animals are living in each of the soil samples? How many animals are living in each of the soil samples? What do you think caused the numbers and types of animals to be different in each sample? Which soil sample has been altered the most by humans? Which one has been altered the least by humans? Are some human activities helpful to animals? Which ones?

Be sure to return the animals and the soil to their original environment!