Fighting Fire with Fire:

Protecting the Homes of People and Birds

Meet Dr. Beyers:

I like being a scientist because I never get tired of asking questions and trying to answer them. The questions I like to answer are things like, "Why do plants and animals live where they do?" and "How do human activities and *land management* decisions affect animals living in the wild?" Plus, I get to run around in the woods and the *scrub* and wear jeans all the time!

Glossary

land management (land **man** ij ment): Decisions and actions involving natural lands to achieve specific purposes.

scrub (skrub): An area with short, stubby trees or bushes.

mammals (**mam** uls): Warmblooded animals that have a backbone; Female mammals have glands to produce milk for feeding their young.

ecologist (e̲ **käl** uh jist): A person who studies the relationship between living things and their environment.

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

threatened (**threh** tend): Legal term meaning the existence of the species is likely to become endangered in the future.

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

wildfire (**wi̲ld** fi̲r): An uncontrolled wildland fire started naturally or by careless human action.

climate (**kli̲** met): The average condition of the weather at a place.

nonnative (nän **na̲** tiv): Not naturally occurring in an area.

adapt (uh **dapt**): To change so as to fit new conditions.

randomly (**ran** dum le̲): A way of selecting a smaller number from a group in such a way that all members of the group have the same chance of being selected.

extinction (ik **stin**(**k**) shun): No longer existing.

conserve (kän **sürv**): To avoid wasteful or destructive use of something.

consensus (kän **sen** sus): Agreement of all or most.

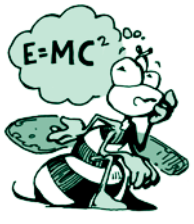
Pronunciation Guide

a̲	as in ape	ô	as in for
ä	as in car	u̲	as in use
e̲	as in me	ü	as in fur
i̲	as in ice	oo̲	as in tool
o̲	as in go	*ng*	as in sing

Accented syllables are in **bold**.

Meet Dr. Wirtz:

I like being a scientist because ever since childhood I have loved *mammals* and birds and the outdoors. By training to be an *ecologist*, I have a career that allows me to study the things I love most. I can also work outdoors, and travel to places like Africa and Australia.



Thinking About Science

The natural world holds many secrets. Although scientists study just about everything you can think of, there is still a lot to learn. In this study, the scientists wanted to learn about the *habitat* of the California gnatcatcher, a small grey bird that lives in a particular area along the coast of California (figure 1). This little bird is listed as *threatened* by the U.S. Government. In 1993, a *wildfire* burned 10,000 hectares of land. (To figure out how many acres this is, multiply 10,000 X 2.47.) The wildfire killed 330 of the

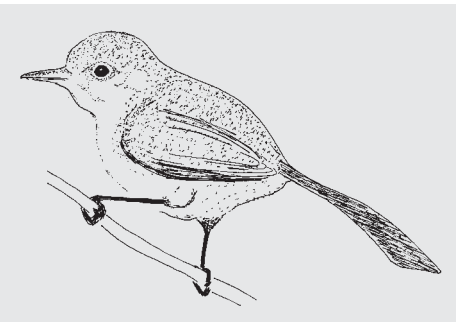


Figure 1. *California gnatcatcher*

2,200 pairs of gnatcatchers. (What percentage of the gnatcatcher pairs were killed? Divide 330 by 2,200 to find out.) The scientists wanted to know how any future fires would affect the remaining birds.

When scientists begin to study a problem, they always learn as much as possible about their subject. They do this by going to the library, just like you do when you write a class paper for school. The scientists found out that people do not know very much about what the gnatcatchers eat and where they live. As you can see, scientists learn not just from observing things and doing experiments, they also learn by reading and studying.

Thinking About the Environment

Along the central and southern pacific coastline of California, there is an area of land that has a lot of different kinds of shrubs growing on it. Altogether, these shrubs are called coastal sage scrub (figure 2). The *climate* in this area is hot and dry, and the shrubs usually do not grow higher than 2 meters. (Calculate how many feet this is by multiplying 2 X 3.28.) By the end of the summer, the shrubs become dry and brittle from the hot summer sun, and they often lose their leaves from the heat. The southern California coastal area is a place where people like to live and work, mainly because the weather is warm there all year, and the ocean is not far away. When people build houses and businesses on land, they change the land. When people build houses and businesses on land with coastal sage scrub, they remove the shrubs and replace them with buildings, roads and parking lots, and grass and other *nonnative* plants. This might not seem bad for people, but it is not good news to the California gnatcatcher. This little bird needs coastal sage scrub to reproduce. When people change the land, they almost always affect the plants and animals that live there.

Introduction

The California gnatcatcher is a little bird with a big problem. Its habitat has been reduced 80 percent by people that are building homes and businesses in coastal southern California. The bird's habitat consists of shrubs that can become very dry and brittle, especially during the summer. Wildfires are more likely to

Figure 2. *Coastal sage scrub.*

occur when shrubs are dry and brittle. When a wildfire burns an area of coastal sage scrub, the gnatcatchers cannot use the area for about 5 years (figure 3). They have to live somewhere else until most of the shrubs grow back. People that live and work close to areas of coastal sage scrub can also be hurt by wildfires. Wildfires sometimes damage or destroy their homes and businesses.

Although wildfires cannot always be prevented, there is a lot that people can do to reduce the strength of a fire. Have you ever heard the term "fighting fire with fire"? That's exactly what people do to reduce the threat of a wildfire. They purposely set fires in areas without letting the fire get too big or out of control. That way, if a wildfire gets started, it will not have as much fuel to burn, and people can more easily put it out. The scientists in this study wanted to know how these purposely set fires, called prescribed (pre **skribd**) fires, affect the California gnatcatcher.

Because the gnatcatcher is a threatened *species* that lives only in coastal sage scrub areas, it is important to protect as much of its habitat as possible.

Reflection Section

- What question are the scientists trying to answer?
- Do you think that prescribed burns help or hurt gnatcatchers? Why or why not?

Methods

The scientists drew a line on a map around the area with coastal sage scrub in southern California (figure 4). Then, on the map, they identified smaller areas within the larger area to study. They wanted to

Figure 3. *Coastal sage scrub still recovering after a fire. Compare this photograph with the photograph in figure 2. In the area pictured here, there is not enough scrub for gnatcatchers to live and reproduce.*

Fire Facts

Many people build their homes in areas in or near a forest or other natural area, such as a prairie or in coastal sage scrub. When homes are built in these areas, they are more likely to be damaged by a wildfire. Many homeowners want people that manage the land to put out all wildfires. Although putting out wildfires seems to be good for homeowners, it is not always the best thing for the land. Many lands need fire to be healthy. Many plants cannot reproduce until heat from a fire opens their buds or cracks their seeds. Fire helps release needed minerals in the soil, which are then used as nutrients by plants. Fire opens shaded areas in the forest, allowing sunlight in and encouraging new growth. In addition, most animals avoid being burned in a fire. Fortunately, there is a way to protect homes and at the same time get the benefits of fire. Managers can purposely set controlled fires every few years. These fires reduce the amount of burnable material available if there is a large wildfire, making it easier to put out the wildfire. When fires are purposely set as part of land management, the land gets the benefits of fire and human communities are protected.

Figure 4. *Area where coastal sage scrub grows (dark green) and areas studied (white birds).*

study places throughout the area of coastal sage scrub, so they selected areas near the ocean and farther inland (figure 4). The scientists selected areas where gnatcatchers were known to live and areas where no gnatcatchers had been living.

As you can see in figure 4, five areas were studied. Some of these areas had been recently burned and others had not been burned. Within each of the 5 areas, 200 specific points were *randomly* identified. At each point, the type of coastal sage scrub or other vegetation was identified and the height of the vegetation was recorded.

Reflection Section

- Why do you think that the scientists only studied five areas within the larger area of coastal sage scrub? Why would they not study the entire area?
- Look at figure 4. What large city is included in the coastal sage scrub area?

Findings

California gnatcatchers prefer to live in areas that have more than 50 percent of the ground covered in coastal sage scrub. If an area had less than 40 percent of the ground covered in shrubs, gnatcatchers did not live there. Coastal sage scrub had to be at least 1 meter high in an area for gnatcatchers to live there. (To find out how many feet this is, multiply 1 X 3.28.) If an area with less vegetation was close to an area with more vegetation, gnatcatchers would sometimes go into the area with less vegetation to look for food.

The scientists suspect that gnatcatchers need areas with more vegetation because insects do not live in areas with less vegetation. Insects are the gnatcatcher's main

source of food. After fire burns an area of coastal sage scrub, the shrubs are burned to the ground. The shrubs can grow back, but it takes them about 5 years to grow 1 meter high. California gnatcatchers cannot live in an area that has been burned until about 5 years following the fire.

Reflection Section

- How many feet are in 1 meter? (Hint: You can find out by reading the "Findings" section.)
- Why do you think that gnatcatchers cannot live in an area that has been burned until about 5 years after the fire?

Implications

The California gnatcatcher's habitat is reduced when people build homes, other buildings, roads, and parking lots in areas of coastal sage scrub (figure 5). Once buildings are built near coastal sage scrub, people want to reduce the risk of wildfire to those buildings. One way to do that is to set prescribed fires in the coastal sage scrub areas that are close to buildings. The fire will burn most of the fuel away. Then, if a wildfire does occur in the coastal sage scrub, it will not be able to reach any buildings.

Reflection Section

- Do you think that the habitat of the California gnatcatcher should be conserved? Why or why not?
- How do you think that purposely setting fire in the natural areas near buildings protects those buildings from wildfires?

Figure 5. *Coastal sage scrub with buildings nearby.*

FACTivity

The question you will try to answer with this FACTivity is: What should be done when the habitat of a threatened bird is in conflict with the safety of people's homes? The method you will use to try to answer this question is: Divide your class into two discussion groups and one decision group. Each discussion group will take one of the following positions:

Group 1: People's homes are much more important than conserving the habitat of a bird, even if it is threatened. Therefore, wildfires must be controlled by reducing the amount of fuel available. This must be done by frequently burning areas of coastal sage scrub surrounding people's homes. If this burning takes away a threatened bird's habitat, that is the way it has to be.

Group 2: When people build homes in areas that are likely to have wildfires, they take the chance that their homes will be burned by a wildfire. We should leave these areas alone. If a wildfire occurs, we can then go into the coastal sage scrub areas and put the fire out. Until then, we should let nature take its course.

The two discussion groups should meet separately for at least 10-15 minutes to develop an argument to support their position. One person should be appointed the spokesper-

son for the group, and another person should record what the group members say during their discussion.

The third group will make the decisions. This group will decide which course of action to take based on the presentations of the other two groups. While the two discussion groups are developing their arguments, the third group must decide how they will choose a course of action. Will they vote and allow the majority to rule? Will they insist on *consensus*? Will one person make the decision for everyone else? After the 15 minutes has passed, the first two groups will each present their argument to the third group. The decision-making group will then make a decision, and explain why and how they made their decision. The decision-making group may choose parts of more than one option when making their decision.

Note: People often disagree about the best course of action to take to solve a problem. This FACTivity is similar to the process communities across the United States take to decide on a course of action. Many communities have locally elected commissions (kuh **mish** uns) that serve as the decisionmakers. What is the name of the body that makes these kinds of decisions for the United States as a whole? (Hint: It is made up of people elected from across the United States, and it is divided into two houses.)

From: Beyers, J. L. and Wirtz, W. O. II. (1997). Vegetative characteristics of coastal sage scrub sites used by California gnatcatchers: Implications for management in a fire-prone ecosystem. In: *Proceedings: Fire Effects on Rare and Endangered Species and Habitats Conference.* Coeur d' Alene, Idaho: November 13-15, 1995, 81-89

Fire Facts: Writing a Prescription for Fire

When you are sick and go to the doctor, the doctor might prescribe medicine or some other action to help you to become healthy again. Prescribed fire (a fire that is started on purpose) works in a similar way. But why start a fire on purpose? Fire is one way to help restore health to a forest. If trees are too crowded, if there are too many dead leaves and branches on the forest floor, or if insects and disease have become widespread, the forest may need help from fire. Land managers only prescribe fire when the weather conditions are right. Long before a fire is lit, prescriptions are made for different types and locations of forests. The prescription describes what the condition of the forest should be after burning. Factors to consider are the locations of homes and other buildings, weather forecasts, wind speed, humidity, the amount of moisture in the trees, and the types of trees and plants. Before fires are started on purpose, the forest conditions have to be measured to see if they meet the prescription for that type of forest. Burning begins only when conditions are right. If the weather conditions change quickly or the fire does something unexpected, firefighters reduce the flames or put the fire out.