

## Who Gives a Hoot?

# Determining the Value of Owl Habitat

## Glossary

**endangered species** (n dan jüerd spē shez): Wild plants or animals with so few individual survivors that the species could become extinct in the area where it naturally lives.

**economic** (ē kō nom ik): Having to do with the management of money in a home, business, or government.

**psychology** (sī kōl uh je): The science that studies the ways that people think and the reasons for their actions.

**sociology** (so sē ôl uh je): The study of people living together in groups.

**economics** (ē kō nom iks): The study of the way that goods and wealth are produced, distributed, and used.

**conservation** (kän sūr va shun): The care and protection of natural resources such as forests and water.

**mammals** (mam uls): Warm-blooded animals that have a backbone; female mammals have glands to produce milk for feeding their young.

**old-growth forests** (ôld grōth fôr ests): Forests that contain trees that are hundreds or sometimes thousands of years old.

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

**forest managers** (fôr est män ij ürs): Skilled individuals that take care of natural resources.

**vegetation** (vej uh ta shun): Plant life.

**represent** (rep re zent): To be an example of.

## Pronunciation Guide

|          |           |           |            |
|----------|-----------|-----------|------------|
| <b>a</b> | as in ape | <b>ô</b>  | as in for  |
| <b>ä</b> | as in car | <b>u</b>  | as in use  |
| <b>e</b> | as in me  | <b>ü</b>  | as in fur  |
| <b>i</b> | as in ice | <b>oo</b> | as in tool |
| <b>o</b> | as in go  | <b>ng</b> | as in sing |

Accented syllables are in bold.

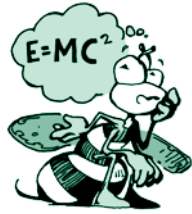


*Dr. Loomis*

### Meet Dr. Loomis:

I like being a scientist because I like solving puzzles about human behavior. I am interested in how much people value clean air and water, and protecting the environment for things like hiking and as homes for *endangered species*. People cannot buy resources like clean air in stores, so it is hard to put a price tag on them. As a scientist, I play detective to discover these values by asking people questions.

decisions about the natural environment. I discover how people feel about the environment by asking them questions. As a scientist, I get to travel to interesting places all over the world, including Chile, Peru, Mexico, Spain, Russia, Portugal, and Ghana!



### Thinking About Science

When people think about science, they usually think about topics like biology, chemistry, and astronomy. These topics are grouped into a category of science that deals with physical aspects of all life. There is another category of science that includes topics that deal with human behavior, such as *psychology*, *sociology*, or history. You study these kind of topics in

Social Studies class. Scientists call these kind of topics social sciences. In this study, the scientists investigated the economic behavior of people. *Economics* is a social science built on the idea that people spend money on things that are important to them. The scientists asked people if they would be willing to spend money on environmental *conservation*. By doing this study, the scientists gained a better understanding of how important the environment is to different people.



### Thinking About the Environment

Have you ever seen Mt. McKinley (also called Denali [duh nă le]) in Alaska? Have you ever seen Yellowstone National Park in



*Dr. González-Cabán and son Omar*

### Meet Dr. Armando González-Cabán:

I like being a scientist because it is fun to play detective and try to understand how people make *economic*

### Fire Facts: Forest Fuels

Within a forest, forest fire fuels are not all the same. They sit in layers, kind of like a three-layer cake. Ground fuels are found beneath the surface of the soil, and include materials like tree roots and decaying matter. Surface fuels are found at the top of the soil level, and include grasses, fallen needles and leaves, decaying wood, and other vegetation. The top layer of fuels is above the level

of the soil and includes branches, dead trees, and treetops (called crowns). When a fire begins to burn the top layer of fuels, it can spread quickly. When you see a photograph of a large wildfire with flames in the crowns of trees, that kind of fire is called a crown fire. Prescribed fires, which are strictly controlled, burn only the surface fuels. Prescribed fires leave the large trees standing and unharmed.



Wyoming? How about the Amazon River in Brazil or the Sahara Desert in Africa? You might not have ever seen any of these natural places, but you still might think they are valuable. You might think they are valuable because you would like to visit them one day. Or maybe you think they are valuable because they provide homes for wildlife. You might not think they are valuable at all. Natural areas have a lot of different kinds of value to humans. Some people might think that forests are valuable because they provide wood for building homes, or

because they provide homes for birds and *mammals*. As you can see, people might think the environment is valuable for a lot of reasons.

### Introduction

The northern spotted owl is an endangered species that needs *old-growth forests* in the Pacific Northwest to live (figures 1, 2, and 3). Unfortunately, old-growth forests, like all forests, may catch fire and be damaged or destroyed. Scientists estimate that over a 100-year period there is a 70 percent chance of a large *wildfire* burning a for-

est so that northern spotted owls can no longer live there. (What does it mean to say that there is a 70 percent chance of something happening?) There are many things *forest managers* can do to reduce the risk of a large forest fire. One of the best ways is to use what managers call prescribed (pre *skribd*) fire. These are small fires that burn the lower forest *vegetation* but leave the large trees standing. Prescribed fires are purposely started and are strictly controlled by forest managers.

By purposely burning the vegetation that grows near the



Figure 1. Northern spotted owl.



Figure 3. The Pacific Northwest of the United States.

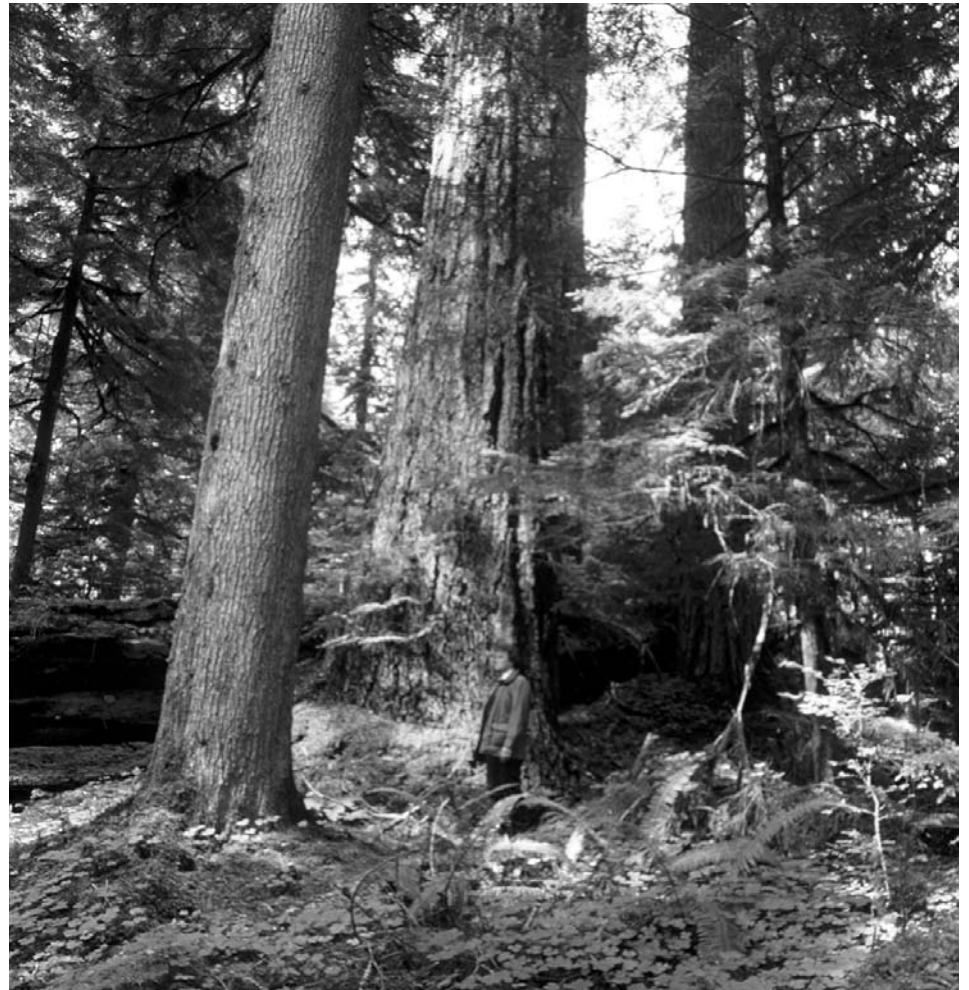


Figure 2. Old-growth pine forest that provides habitat for the northern spotted owl.

ground, the total amount of wood fuel is reduced. That way, the old trees that the owls need are left standing and the area is better protected from large fires.

Unfortunately, prescribed fires cost a lot of money. As you can see, this can be a big problem. If managers leave the old-growth forests as they are, there is a risk of a large forest fire destroying the owls' habitat. The owls would have no place to live. Managers could conduct prescribed fires if they had money. The scientists in this study wanted to know whether people like you and your family and friends value the endangered owl's habitat enough to support spending more of our tax money on prescribed fires.



### Reflection Section

- What is the question the scientists are trying to answer?
- Do you think that it is important to protect the habitat of an endangered species like the northern spotted owl? Why or why not?

### Methods

The scientists designed information that explained how the risk of fire could be reduced in old-growth forests. Then, the scientists developed information that they hoped would help people think about the reasons they might value old-growth forests (see "Thinking About

the Environment," above). For example, they asked people to think about the beauty of the forest, the use of the forest for wood products such as furniture, and the forest as a home for wildlife. The scientists asked people if they would pay money to reduce the risk of a large wildfire in old-growth forests.

The scientists put the information and the questions into a booklet and sent the booklet to a random sample of people in California and New England (figure 4). When the scientists picked their random sample, it means that all of the people living in California and New England had an equal chance of being selected to receive the information. However, only a small per-

## Fire Safety Tips from Smokey and His Friends at the United States Fire Administration!

Although Smokey wants you to prevent wildfires, he also wants you to prevent uncontrolled fires in your home. Every year, almost 100,000 fires are started by kids. Here are some tips to help you prevent uncontrolled fires in your home:

1. Do not play with lighters, matches, or candles.
2. Remind adults to turn pot handles toward the center of the stove. Pot handles should never hang over the

edge where someone could bump them and knock them off of the stove.

3. Never put anything over a lamp, like clothes or a blanket, not even when you are playing.

4. Don't stand too close to a fireplace or a wood stove.

5. Ask adults to install smoke alarms, if you do not have them, in your house.

6. Remind the adults in your household to change smoke alarm batteries every spring and fall.

7. Don't play with electrical cords.

8. Never stick anything into an electrical socket except an electrical plug.

9. Turn off electrical equipment when you are finished using it.





**Figure 4. The State of California and the area of New England.**

centage of the total number of people living in the areas received the booklet. The people that received the booklet were assumed to *represent* everyone in California and New England. You can do the same thing with a bag of M&Ms® candy. If you shake

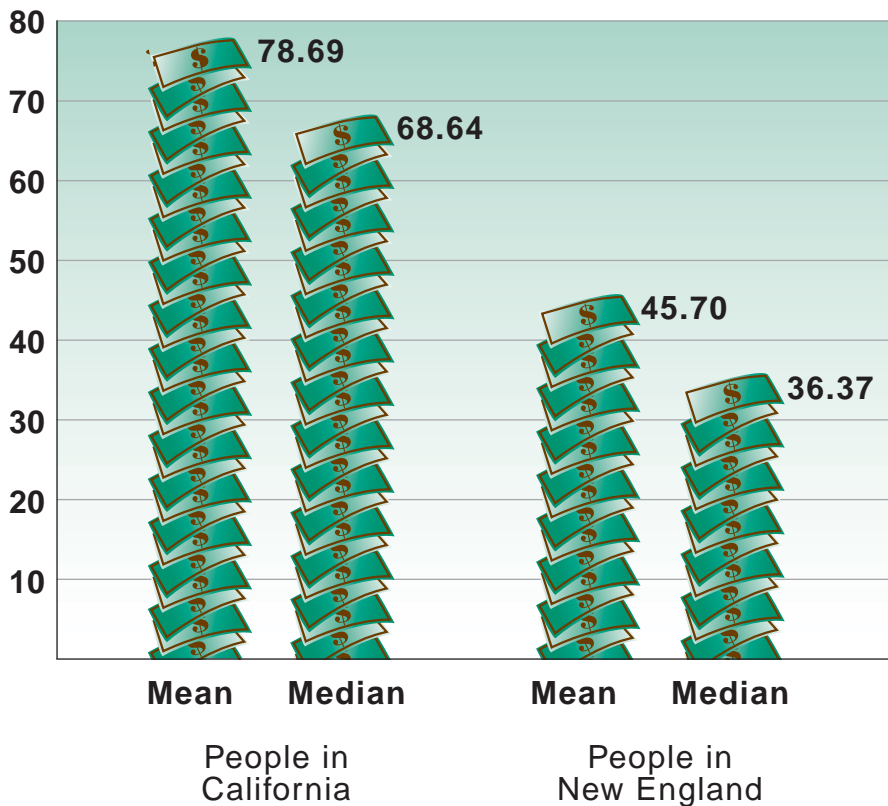
the bag right before you pick out an M&M®, and you pick five M&Ms®, (shaking the bag in between), you can assume that the five pieces closely represent the number and proportion of colors in the rest of the bag of candy.

**Findings**

Once the scientists had collected the responses from their sample, they calculated how much money people said they would be willing to pay to reduce the risk of a large wildfire in old- growth forests. From all of the responses, the scientists calculated the mean (or average) and the median amount that people said they would pay (figure 5). (What is

the difference between the mean and the median? <sup>1)</sup> [When you see a small number following a word as you see it here, that means that further information is provided at the bottom of the page. Look for the small number at the bottom of the page for more information about the mean and median!]

In the calculation above, the scientists did not include the responses of people that did not respond to their questions. The scientists assumed that the people that did not respond would not be willing to pay anything. Therefore, the average and median amounts that they used were lower than the values in figure 5. The scientists took the lower average amount and multiplied it by the number of people living in each area. Then, they divided the total amount by the number of hectares of protected old-growth forest in California and Oregon. By doing this, they were able to estimate how much money people living in California and New England would be willing to pay per hectare to reduce the risk of wildfire in California and Oregon (table 1).



**Figure 5. Amount people in California and New England are willing to pay in dollars per household to reduce wildfires in old-growth forests.**

<sup>1)</sup>The mean is the average, the quantity that is determined by dividing the sum of two or more quantities by the number of quantities added. The median is the number halfway between the smallest and the largest. For example, take the numbers 2, 5, 8, 26, 27, 30, and 50. The average is 21.14, and the median is 26.



**Table 1.** Average amount people are willing to pay to reduce the risk of wildfire in old growth forests.

|                       | Amount People Are Willing To Pay Per Hectare | Amount per Acre (Multiply the per hectare amount by 2.47) |
|-----------------------|--|---|
| People in California  | \$386  | \$953.42  |
| People in New England | \$128  | \$316.16  |



**Reflection Section**

- Why do you think that people in California are willing to

pay more money to reduce fire risk in California and Oregon old-growth forests than people in New England?

- Look at table 1. From this table, can you tell how many hectares equal 1 acre? How many would you say that it is?

**Implications**

Using the amounts calculated from the responses to their questions, the scientists concluded that people in California and New England place a high value on protecting old-growth forests for northern spotted owl habitat. This study shows that old-growth forests are important for many reasons, including providing habitats for endangered species such as the northern spotted owl. In the future, people that make decisions about whether to pay for

a prescribed fire may want to consider many different kinds of values, including the value of providing habitat for endangered species.



**Reflection Section**

- Are you surprised that people in New England are

willing to pay money to protect owl habitat that is located across the country in California and Oregon? Why?

- Do you think that people that make decisions about using tax money for prescribed fires should consider values like providing habitat for endangered species? Why or why not?



**FACTivity**

In this FACTivity, you will answer the questions: What is the value of a

favorite possession? Is there just one value, or is the value different for different people? Why might different people place different values on an item? To answer these questions, you will follow this method: Select five classmates to bring a favorite personal possession to class. It could be something like a stuffed animal or a model car. For each of the five items, construct a survey using the form below as a guide. Make one copy of the survey for each member of the class. Each class member

*Questionnaire Example for Each Item*

| I am a boy_____ girl_____ | I Am Willing To Pay This Amount |
|---------------------------|---------------------------------|
| Item 1:                   |                                 |
| Item 2:                   |                                 |
| Item 3:                   |                                 |
| Item 4:                   |                                 |
| Item 5:                   |                                 |

*Example of Results: 15 Average Amounts*

|         | Overall Average Amount | Girls' Average Amount | Boys' Average Amount |
|---------|------------------------|-----------------------|----------------------|
| Item 1: |                        |                       |                      |
| Item 2: |                        |                       |                      |
| Item 3: |                        |                       |                      |
| Item 4: |                        |                       |                      |
| Item 5: |                        |                       |                      |

will write in the maximum amount they would be willing to pay to purchase each item. Try to be realistic, as if you really had a chance to purchase the item (but you do not really have that chance!). A class member cannot submit an amount for their own item.

Collect all of the surveys and calculate the average amount the class is willing to pay for each item. To calculate the average, add all of the amounts and divide the total by the number of classmates participating in the bidding

for that item. Calculate the average amount that the girls are willing to pay for each item. Then, calculate the average amount that the boys are willing to pay for each item. You will have 15 average amounts, 3 amounts for each item. (See the example below.) Hold a discussion in your class on the average value of each item. Are the values different for boys and girls? Why do you think this is? Would the person that owns the item be willing to sell his or her item for the average amount?

Why or why not? As a class, discuss what this FACTivity illustrates about the value of an item. What are the similarities and differences between bidding on a classmate's favorite item and being willing to pay a certain amount to protect endangered species habitat?

From: Loomis, J. B. and González-Cabán (1997). Comparing the economic value of reducing fire risk to spotted owl habitat in California and Oregon. *Forest Science*, 43(4): 473-482.