Habitat Shrink

ACTIVITY

Background:

Habitat loss due to human development is the most widespread threat to **endangered species**, those species that are in danger of becoming extinct. It is, therefore, the biggest concern when considering the loss of biodiversity in most areas. **Biodiversity**, the great variety of living things, is important to the health of an ecosystem. The greater the variety of plants and animals in an area, the more likely the system will recover in the face of a large-scale calamity (e.g., fires, disease, flooding). Also, about one-fourth of all prescription drugs produced today contain active ingredients that were originally found only in certain plants. The fewer plant varieties from which to choose, the fewer opportunities we may have to fight diseases.

Habitat loss attributed to humans includes the removal of trees for timber, farming, grazing livestock, and residential and/or industrial development. Strip-mining for various minerals also clears large tracts of land. In addition, roads built through an area of habitat interrupt animal migration patterns as they search for basic needs. Also, plant removal and the addition of paved surfaces both contribute to erosion and the increased flow of sediments and toxins into the water supply.

Other development plans, such as large water projects (e.g., canals), often call for people to drain and/or fill in wetlands. This can have a huge negative impact, as wetlands are habitat for a wide variety of animals, they act as an important filter for toxins, and form a natural sponge that holds in a tremendous amount of water.

Another habitat loss issue is overgrazing of cattle and other livestock. Cattle that stay in one place for an extended period of time will eat the plant life to death. Without plants to hold in the soil, topsoil runs off into streams, taking habitat from plant and animal populations found in meadows as well as in streams. Finally, depletion of the water supply and pollution of water resources will affect all habitats through which the water normally flows. This includes surface water, such as lakes and rivers, and ground water, or water found underground. Some forms of air pollution can lead to acid rain, which in turn can adversely affect soils and

Summary:

Participants play a game demonstrating the effects of habitat loss on animal populations.

Grade Level:

1-6

Time:

45 minutes

Learning Objectives:

Participants will be able to:

- Define the terms endangered species and habitat loss.
- Discuss different types of habitat loss and how they affect wildlife.
- Discover what happens to an animal population when it experiences habitat loss.

Materials Needed:

- Chalk or other material to mark off the "habitat area"
- Red and blue squares of paper to represent food and water
- Paper and pencil to record the results each round

Habitat Shrink

plant life far away from the original source of pollution.

What to Do:

1. Ask participants, *What are some of the greatest challenges facing endangered species today?* Discuss some answers and note that habitat destruction is one of the largest problems. Explain to the group that they will have a chance to see this challenge in action. They have all been transformed into "mountain lions," and are confined to a certain space nearby. In this space, from now on referred to as their habitat, the "mountain lions" must find all their food and water.

2. Designate a space large enough so that all the participants can move around in it with some comfort. There are many ways to mark off the boundary of this "mountain lion habitat," including drawing a shape with chalk on blacktop, using easy-to-remove colored tape on a gymnasium floor, or using a long piece of thin rope or string tied into a large loop. Explain that normally, mountain lions are shy and solitary animals, and depending on food availability, a male may cover a territory of hundreds of square miles. Participants should imagine that their small space represents many hundreds of square miles.

3. Once the whole group has entered the space, tell them that to survive, they must find enough food and water. Small blue squares of paper represent water, and small red squares represent food. Label each square in case anyone has difficulty seeing colors. Place enough squares throughout the area so that each participant can collect at least four water (blue) squares and two food (red) squares. Tell them that in the next two minutes, they must get at least four pieces of blue paper, and two pieces of red, without running into each other. Look at Figure 1, below to get an idea about space and numbers.

FIGURE 1

Number in group	Approx. Space at Start (in Sq. Ft.)	Amount of Food (Red Squares)	Amount of Water (Blue Squares)
10 or less	30	20	40
15	45	30	60
20	60	40	80
25 or more	75	50	100

4. Since mountain lions are very territorial, especially males, they will not tolerate close quarters. If they bump into each other, one must leave the habitat area. Tell each of the offending "mountain lions" to play rock, paper, scissors, or flip a coin, to determine which participant stays and which one must step out of the habitat.

5. Set a stopwatch and let participants hunt for water and food. If anyone loses a confrontation or, at the end of the two minutes, does not have enough food or water, they must step out of the habitat area. Those without enough water or food at the end of the period have "died" of thirst or hunger. Have the group count the number of "mountain lions" inside the habitat area, and those standing outside the habitat area. They should record these numbers each round, so they can compare them at the end of the game. Have them return their food and water squares for the next round. Unless it is specified otherwise, each round should start with the same amount of food and water squares in the habitat.

6. For the second round, tell the group that the area has been repopulated with the same number of "mountain lions," so everyone is back in the activity. This round, however, a rancher has cleared a section of the land to graze cattle, so mark off a fourth of the habitat to

Habitat Shrink

ACTIVITY

indicate the rancher's land. The grasses growing there attract deer, so the food should still be spread evenly across the whole habitat, including the rancher's new section. Players, however, may not enter the new grazing land. Otherwise, they should continue to search for food and water as in the first round. Have them go for another two minutes, and have them record the results at the end of the period.

7. For the third round, tell participants that an interstate has been routed through part of the habitat. Mark off a relatively thin strip through the middle of the habitat. Disperse food throughout, even on the road, as deer venture out at the forest edge to graze. Mountain lions cannot cross the road, or they will be hit by oncoming traffic. The other rules from the first round and second round are still in effect. Run the game again and record results.

8. For the fourth round, tell participants that nearby towns grow and put in shopping centers off the interstate, taking another corner of the available habitat. Ground water use increases, and very few prey animals venture into the parking lots of shopping centers. Mark off another fourth of the habitat that mountain lions cannot use. Place only half the number of water (blue) squares throughout the rest of the habitat for this round. Place food (red) squares only outside the shopping area. Play this round as the others, with the addition of the shopping centers.

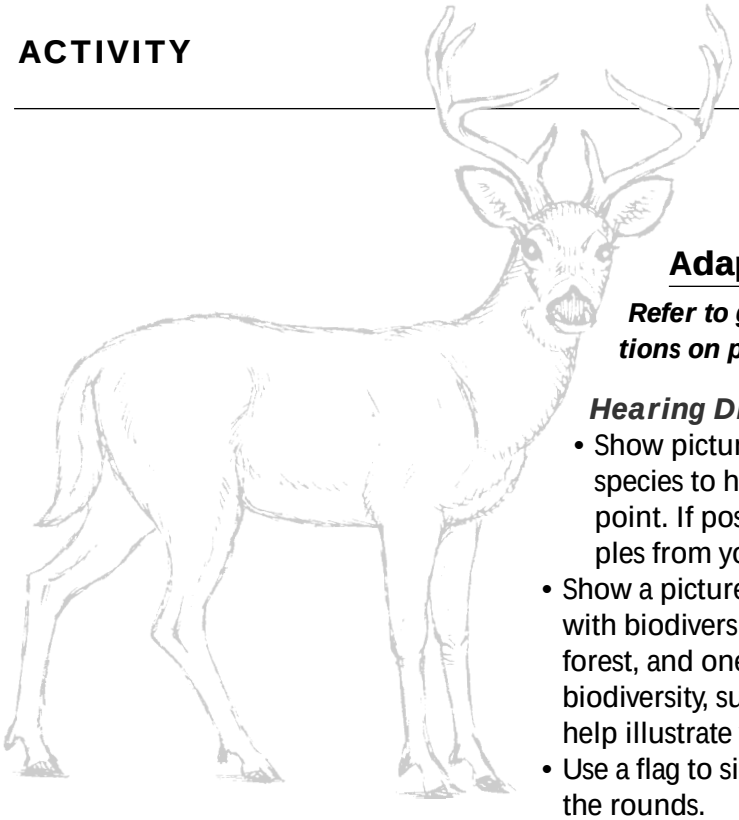
9. The rounds can continue with other impacts, including pesticides and/or sewage contaminating water sources, suburban sprawl limiting the amount of space mountain lions can use, and so on. Consider using species and/or types of human impacts in the activity that are representative of your region. For example:

- Some housing developments in New Jersey and other states have pushed into black bear territory; both humans and bears have suffered some ill effects as a result (bears guilty of foraging in residential garbage or attacks on pets are either relocated or, occasionally, shot by state wildlife officials).
- In the Pacific Northwest, salmon have suffered population declines due to changes in their waterways (large dams have made it difficult for some salmon to find their spawning pools; silt from deforestation has run into streams in some areas, incredibly reducing water quality).
- Golden-cheeked warblers, which spend their summers in a small region in central Texas, are experiencing declines due to fragmentation of the juniper and oak woodlands upon which they depend for nesting and food.

10. When finished, talk to the group about what happened. Look at the data collected from each round. Ask the group, *Did the numbers of lost mountain lions change each time different parts of the habitat disappeared?* Discuss how each change would affect their other needs of finding cover and a safe place to raise their young. Ask, *How in each instance people can make a positive difference for predators, and why this would be a good idea?* Make a list of these ideas on a flipchart or board.

ACTIVITY

Habitat Shrink



For Older Participants (Grades 7 and Up):

Have participants gather in small groups to come up with additional impacts for Step 9 above. Ask, *What other human actions cause habitat destruction?* Make a list on a board or flipchart. *In this area, what actions have the most impact? What animals are/will be most affected?* Have participants try to come up with solutions for each of the actions they listed.

Questions:

- What is habitat destruction?
- What happens to animals when their habitat is destroyed?
- How can we make a difference?

Adaptations:

Refer to general adaptations on pages 11-16.

Hearing Disabilities:

- Show pictures of endangered species to help illustrate your point. If possible, use examples from your region.
- Show a picture of an area rich with biodiversity, such as a rainforest, and one with very little biodiversity, such as a lawn, to help illustrate your point.
- Use a flag to signal the end of the rounds.
- Use a different colored tape, chalk, or string to mark off areas where participants cannot go as the rounds progress.
- Keep track of the rounds on a board or sheet of butcher paper to help participants track the game.

Learning/Cognitive Disabilities:

- Show pictures of endangered species to help illustrate your point. If possible, use examples from your region.
- Show a picture of an area rich with biodiversity, such as a rainforest, and one with very little biodiversity, such as a lawn, to help illustrate your point.
- Show a picture of a mountain lion to help participants visualize what animal they will be in the game.
- Use larger pieces of colored paper with pictures of water (e.g., a wave or a glass of water) and food (e.g., an apple or a drumstick) on them for participants who have difficulty reading.
- Reduce the number of food and water tokens that participants must collect as needed.
- Provide collection bags with handles.
- Narrate the rounds as needed to help keep participants informed.
- Use a whistle to signal the end of the rounds.
- Use a different colored tape, chalk, or string to mark off areas where participants cannot go as the rounds progress.
- Simplify the rules for each round and/or decrease the number of rounds as needed.
- Keep track of the rounds on a board /sheet of butcher paper to help participants track the game.
- Extend the time of the rounds as needed.

Motor Disabilities:

Overall:

- Choose a level, accessible site for the game, such as a gym or blacktop.
- Pair up participants as needed. Encourage partners to actively engage the participants in the game and to not do everything for them.
- Instead of pieces of paper, use blue sponges to represent water and pink or yellow sponges to represent food.
- Encourage participants who have reachers to use them to pick up

Habitat Shrink

items during the game.
- Provide collection bags with handles.
- Reduce the number of food and water tokens that participants must collect as needed. An alternative is to place some of the tokens inside of hula-hoops and make these tokens off-limits to other participants.
- Extend the time of the rounds as needed.

Visual Disabilities:

Overall:
- Have a box filled with a variety of items with different shapes and textures (e.g., different leaves, grasses, acorns, etc.) for participants to explore to illustrate biodiversity. Then have a box filled with just one type of leaf or grass for participants to explore and compare it to.
- If possible, have a nature sounds tape with a mountain lion on it for participants to listen to before playing the game.
- Assign partners to those participants who need assistance. Have the partners verbally lead them through the game, assisting with finding the required tokens, etc. Encourage the partners to describe the action that is going on in the game.
- Choose a level site for the game, such as a gym or blacktop.
- Use a guide rope to mark of the playing area.
- Each time you shrink the area or mark off areas where participants cannot go, allow participants to explore these new dimensions and get their bearings before starting the round.
- Use colored sponges as food/water tokens.
- Reduce the number of food and water tokens that participants must collect as needed.

For participants with low vision:
- Place the water tokens on top of pieces of white paper and the food tokens on top of pieces of yellow paper on the playing surface to provide contrast. Make these tokens off-limits for other participants.
- Provide collection bags with handles.
- Narrate the rounds as needed to help keep participants informed.
- Use a whistle to signal the end of the rounds.
- Extend the time of the rounds as needed.

For participants who are blind:
- Place tokens inside of hula-hoops and make these tokens off-limits to other participants. Participants who use canes will be able to feel the hula-hoops and then find the tokens with minimal assistance.