

Age

Grades 6 – 12

Subjects

Science, Mathematics, Vocational
Agriculture, Social Studies

Skills

Analysis, computation (calculating
percentages), evaluation

Duration

Two 45-minute periods

Group size

Any

Setting

Indoors

Materials

- Paper and pencils
- Condition, reproduction and
management cards (photocopy masters
on page 69 to 72)
- Dice: one per student

Checks and balances

(Adapted from *Project WILD Activity Guide*)

Objectives

Students will be able to:

1. Evaluate hypothetical wildlife management decisions.
2. Identify at least four factors that can affect the size of a wildlife population.

Method

Students become managers of a herd of animals in a paper-and-pencil and discussion-based game.

Background

Wildlife managers attempt to maintain healthy populations of wild animals, while factors—both avoidable and unavoidable—affect the populations. Some of these factors are loss of habitat, weather conditions, pollution of food and water sources, development of other natural resources, poaching and recreation pressures. Many people are unaware of how such pressures can affect wildlife.

In Canada, provincial and territorial wildlife agencies manage wildlife populations within their respective boundaries. The Canadian Wildlife Service, under Environment Canada, is responsible for some policies and programs affecting migratory species of animals (principally birds), as well as the import and export of animals and animal products, inter-provincial transportation of all species, and additional wildlife-related responsibilities.

Wildlife management is based on the best scientific and technical knowledge available. Such knowledge is growing; however, it is still limited and is continually affected by changes in the complex relationships between wildlife, human beings, and their shared environments.

In a sense, everyone shares responsibility for wildlife management. Although there are legally responsible agencies, their work requires the thoughtful and informed co-operation of citizens. There are frequently differences of opinion about the most appropriate policies and programs affecting wildlife. Individual citizens, private conservation groups, private industry, community groups and others all make important contributions to the overall conservation and protection of wildlife and its habitat.

In the Yukon, caribou are managed by the Yukon Department of Renewable Resources. There are 24 caribou herds in the Yukon. Three of the herds (Porcupine, Nelchina/Mentasta and 40 Mile) are barren-land caribou; the rest are woodland caribou. Barren-land caribou are smaller than their woodland cousins and engage in long-distance migrations between their calving and wintering grounds.

Two herds that have received a lot of attention are the Porcupine and Aishihik herds. The Porcupine is a barren-ground herd, and the Aishihik is a woodland caribou herd. U.S. interest in oil and gas development in the heart of the calving area for the Porcupine Caribou Herd, has spawned a public outcry. Predator control has been used as a management strategy to offset the rapid decline of the Aishihik herd.

The major purpose of this activity is for students hypothetically to assume the role of wildlife managers in a game situation and thus gain insight into some of the complex variables that influence stewardship of the wildlife resource.

Procedure

1. Each student is the manager of a caribou population. The carrying capacity of the habitat is 100 animals. The point of the activity is to end up with a viable population after nine rounds, representing nine years. If at any time the student's population of caribou reaches less than 10 or more than 200 individual animals, that student no longer has a viable herd and observes the other students until the conclusion of the activity.
2. Each student has a starting population of 100 animals. The cards are separated into three decks totalling 36 cards: a condition deck (18 cards), a reproduction deck (9 cards), and a management deck (9 cards). Shuffle the cards within each deck. Explain that cards will be drawn in the following sequence: condition card, reproduction card, condition card, management card. This sequence of draw will be repeated, each repetition representing an annual cycle. (The students may think of each draw as representing a different season, e.g., autumn, winter, spring, summer.) As each card is drawn, it is read aloud to the entire class. Each student then rolls his or her die and follows the instructions on the card to determine his or her herd population's new size. Some computations will result in fractions; numbers may be rounded to the nearest whole.

Note: Students may object to the use of dice to determine the impact of decisions made for wildlife management purposes. Their concerns are appropriate; wildlife management is based on more than the chance elements reflected in the use of dice. However, chance has an impact on caribou as well, as in the case of weather conditions in a given year. Encourage the students to discuss and consider what is realistic and what is unrealistic about the impact of dice in this activity, and to recognize that wildlife management is far more complex than can be represented through this activity.

3. Wrap up the activity with a class discussion. Include topics such as:
 - The apparent impacts of the condition, reproduction and management cards.
 - The benefits and disadvantages of the management decisions made.

- Outcomes of the different management strategies used by different students. (Ask students to discuss how they might manage their herds differently given a second chance.)
- Realistic and unrealistic aspects of the activity.
- Examples of ways in which habitat can be improved in the short and long term.
- The necessity, benefits and disadvantages of human management of wildlife populations for both people and animals.

Variations

1. Add a monetary aspect to the activity. For example, students allowing hunting might have more revenue available for projects like habitat enhancement based on income from sale of hunting licences. Expenses might include salaries of wildlife managers, funds for research, feeding animals in severe conditions, relocation, etc.
2. After using the given cards once, students may want to experiment with changing some of the parameters on the supplied cards or making additional cards. Students may also want to make additional complete sets of cards for use by small groups or individual students.

Extensions

1. Have the students do a research project on the management of a specific caribou herd, such as the Porcupine or Southern Lakes herds.
2. Invite a wildlife manager from a local government to talk to the class about wildlife management.

Evaluation

Discuss with students:

1. Four factors that can affect the size of a wildlife population.
2. The idea that wildlife management may involve more management of people than of wildlife.



<h2>Reproduction cards</h2>	<p>Reproduction card: excellent year</p> <p>This has been an excellent reproduction year. Increase your herd by (100/your current population size) times five times your roll, if your population is over 50 individuals. If your population is between 50 and 10, increase your population by the number equal to three times your roll. If your population is under 10, you may not reproduce.</p>
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<h3>Condition cards</h3>	HABITAT LOSS CARD The building of a new mining town has occurred, destroying critical habitat. Decrease herd size by the number five times your roll.
WEATHER CARD A cold, wet calving season has had a serious negative impact on the survival of the herd. Decrease your herd by the percentage equal to five times your roll.	HABITAT LOSS CARD Oil and gas development of calving grounds has destroyed critical habitat. Decrease herd size by the number five times your roll.
WEATHER CARD Swollen rivers caused by torrential rain have had a negative impact on the survival of the herd. Decrease your herd by the percentage equal to five times your roll.	HABITAT DEGRADATION CARD An increase in logging roads has occurred, damaging critical habitat. Decrease herd by the number equal to three times your roll.
WEATHER CARD A mild winter with little snow has had a dramatic positive impact on the survival of the herd. Increase your herd by the percentage equal to five times your roll.	HABITAT DEGRADATION CARD Aircraft have begun flying over the herd's calving grounds. Decrease herd by the number equal to three times your roll.
WEATHER CARD A dry summer has lessened insect harassment and had a positive impact on the herd. Increase your herd by the percentage equal to five times your roll.	HABITAT DEGRADATION CARD Construction of a pipeline has occurred, damaging critical habitat. Decrease herd by the number equal to three times your roll.

<p>HABITAT DEGRADATION CARD Mineral exploration has occurred, damaging critical habitat. Decrease herd by the number equal to three times your roll.</p>	<p>HABITAT LOSS CARD Oil and gas exploration has occurred, resulting in a loss of critical habitat. Decrease herd by the number equal to three times your roll.</p>
<p>HABITAT LOSS CARD A forest fire has resulted in a loss of critical habitat. Decrease herd by the number equal to three times your roll.</p>	<p>PREDATOR CARD An increase in the wolf population has occurred, affecting the herd size. Decrease herd size by the percentage equal to your roll.</p>
<p>HABITAT LOSS CARD A hydroelectric power development has resulted in a loss of critical habitat. Decrease herd by the number equal to three times your roll.</p>	<p>DISEASE CARD Disease has struck the herd. Decrease herd by the percentage equal to your roll.</p>
<p>HABITAT LOSS CARD Increased traffic along a traditional migration route has resulted in a loss of critical habitat. Decrease herd by the number equal to three times your roll.</p>	<p>POACHING CARD Poaching, illegal killing of animals, has reduced the size of the herd. Decrease herd by the number equal to two times your roll.</p>
<p>HABITAT LOSS CARD Clearcut logging has resulted in a loss of critical habitat. Decrease herd by the number equal to three times your roll.</p>	

<h2>Management Cards</h2>	<h3>EDUCATION CARD</h3> <p>Project Wild and other education activities have led to increased understanding of wildlife and habitat. Increase or decrease herd (students decide which before rolling the die) by the percentage equal to two times your roll.</p>
<h3>HABITAT IMPROVEMENT CARD</h3> <p>Oil and gas exploration have been stopped in the herd's calving grounds, improving critical habitat. Increase herd by five times your roll.</p>	<h3>LAW ENFORCEMENT CARD</h3> <p>More conservation officers and law enforcement activities have protected the herd against illegal actions like poaching. Increase herd by the percentage equal to two times your roll.</p>
<h3>HABITAT RESTORATION CARD</h3> <p>A national park has been created in the herd's calving grounds. Increase herd by the percentage equal to five times your roll.</p>	<h3>HABITAT ACQUISITION CARD</h3> <p>Habitat acquisition has increased the area of available and suitable habitat. Increase the herd by five times your roll.</p>
<h3>HABITAT ALTERATION CARD</h3> <p>A small forest fire has occurred, altering critical habitat. Increase or decrease herd (students decide which before rolling the die) by the percentage equal to two times your roll.</p>	<h3>HUNTING CARD</h3> <p>A request for a hunting season has been made. Do you wish to allow hunting in your area? If yes, decrease your herd by the percentage equal to five times your roll. If no, record no change in the size of your herd.</p>
<h3>RESEARCH CARD</h3> <p>A long-term study in vegetation mapping has been successfully accomplished. Increase or decrease herd (students decide which before rolling the die) by two times your roll.</p>	<h3>PREDATOR CONTROL</h3> <p>An aerial wolf kill has been requested to combat the recent and rapid decline of the caribou herd population. Do you wish to allow predator control in your area? If yes, increase your herd by the percentage equal to five times your roll. If no, record no change in the size of your herd.</p>