How Many Bears (Coyotes) Can Live in This Forest?

Modified from Sustainable Agriculture and Wildlife: Piecing Together a Habitat Puzzle. 1992. Iowa State University Extension and Outreach.

Study Units

Wildlife Management

Supplemental Information

Coyotes will be used to illustrate carrying capacity. Limiting factors restrict the number of coyotes so the population hovers near the carrying capacity of the habitat. Limiting factors for coyotes include food supply, shelter, and space (due to social tolerance / territoriality of the animal).

Food usually is the crucial limiting factor. Territories are established where there is adequate food. Young coyotes leave their parents' territory when they are old enough, and sometimes must travel many miles to find an unoccupied territory. When coyotes eat smaller prey items (e.g., rodents, insects) they have a tendency to be solitary or in pairs. However, in winter when they eat more carrion (dead animals) they often form groups, which can defend large food supplies like dead deer or livestock.

The number of pups in a litter is highly dependent on an adequate supply of food for the female. When food is scarce, females often do not complete pregnancies and may even resort to cannibalism if young are born. Hungry coyotes will eat almost anything available. Researchers have found string, rubber, and candy in the stomachs of coyotes!

Availability of shelter or cover is another limiting factor. Coyotes can live in a wide variety of habitats, but need denning sites, which can include brush-covered slopes, steep banks, rock ledges, thickets, and hollow logs. There may be only two coyotes in one square mile so their territories often cover many different kinds of habitat. For example, they may have a den in a timber, but range through farm fields and prairie areas looking for food.

In this activity, "food" is the limiting factor in the specified habitat - timber. All possible conditions are not covered by the design of the activity. In reality, a variety of factors influence the carrying capacity of an area. This simplistic illustration shows students that any area will have a limited carrying capacity for any kind of animal. Refer to *Wildlife Management* for links to information about habitat, carrying capacity, and limiting factors.

Teaching Suggestions

You may want to start this activity with a simple discussion of the carrying capacity of your classroom. See the *Project WILD* 'Classroom Carrying Capacity' activity for suggestions.

Follow the procedure for the activity. Substitute the following data for coyotes (a more common Iowa animal) for the bear data when creating the cards and analyzing results.

The following will make enough pieces for a class of 25-30 students. There will be less than 25 pounds of food per student/coyote so not all students/coyotes will survive.

color	food	amount
green	plant food (mulberry, wild plum, corn, chokecherry)	mark five pieces P-7, 25 pieces P-4
blue	cottontail rabbits	mark five pieces R-7, 25 pieces R-4
yellow	mice	mark five pieces M-6, 25 pieces M-3
red	dead livestock	mark five pieces L-2, 25 pieces L-1
purple	other mammals (deer, raccoon)	mark five pieces O-2, 25 pieces O-1
orange	birds, insects, etc.	mark five pieces B-1, 25 pieces B-1/2

Iowa Coyote Diet Information (one coyote requires ~ 25 pounds of food to survive ten days)

color	food	amount
green	plants	7 pounds = 29%
blue	cottontail rabbits	7 pounds = 28%
yellow	mice	6 pounds = 25%
red	dead livestock	2 pounds = 7%
purple	other mammals	2 pounds = 6%
orange	miscellaneous items	1 pound = 5%

Note: These figures indicate what a typical coyote in Iowa consumes in a ten-day period. Figures are based on research data from a study of summer food habits of coyotes in Iowa. Percentages vary in different parts of North America. For example, coyotes in Arkansas eat persimmons and more poultry. Another study in Utah found coyotes need about 2.5 pounds of food daily.

Use the *How Many Coyotes Can Live in This Forest Student Data Sheet* to discuss the value of food found by each student/coyote. Use the questions to discuss the results of the exercise. Help students define *carrying capacity* and *limiting factor*. As a class, try to determine the carrying capacity of habitat for coyotes based on the available food in the activity. How many students/ coyotes survived? Is this number at, above, or below carrying capacity?

Evaluation
See the activity.

Student Materials
How Many Coyotes Can Live in This Forest Student Data Sheet

Teacher Aids
None

Additional Materials
- [Animal Diversity Web: Coyote](#)
- Dinsmore, J.J. 1994. *A Country So Full of Game.* Iowa City: University of Iowa Press.
- Mathwig, H.J. 1973. *Food and Population Characteristics of Iowa Coyotes* Iowa State J of Res. 47:167-189.

How Many Coyotes Can Live in This Forest – Student Data Sheet

	Crippled	Blind	Mother	1	2	3	4	5	6
Pounds of food									

	7	8	9	10	11	12	13	14	15
Pounds of food									

	16	17	18	19	20	21	22	23	24
Pounds of food									

	25	26	27	28	29	30	31	32	33
Pounds of food									

Questions

How many coyotes survived?

Did the crippled and blind individuals get enough food? If not, what do you think will happen to them?

Did the mother coyote get twice the amount of food so that she could feed her young?

If she did not enough food, who will she feed first, herself or her young? Why?

Was there enough food to feed all the coyotes? If not, how many could this habitat support?

What do you think would happen to those coyotes that were unable to get enough food?

Do you think that the number of animals this habitat can support stays the same or changes over time? Why?