
Oh, dear . . . a deer!



CHOICES & CONSEQUENCES
LIVING WITH WILDLIFE
Teacher's Guide

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In cooperation with the
Colorado Foundation for Agriculture
and
USDA Wildlife Services



Overview:

This is an opportunity to help your students develop decision-making skills by providing them with the opportunity to structure a long-term management plan for a population of white-tailed deer in the community of Blackstone. In the process of learning about the complexities of the issues, they will have the opportunity to ask questions of people wrestling with this dilemma in real life situations.

The dilemma:

At the beginning of the 1900s approximately 500,000 white-tailed deer roamed the United States. Today that number has climbed to about 15,000,000. Many communities are dealing with the problem of too many deer.

The Blackstone Community encompasses 9,600 acres. It is a residential community with approximately 900 homes, two golf courses, a community mall, small industrial park and a private airfield. Twenty years ago the area was farmland with irrigation canals running through it. The land was excellent habitat for a wide variety of wildlife species. Now, the area has been subdivided and developed. Homes, streets, golf courses, etc. take the place of farms. The wildlife and especially the white-tailed deer, were forced to adapt to this changing landscape. The deer have adapted and their population has grown rapidly.

There may be several reasons for the growth in the deer population. Biologists have noted that since people have moved into the area, predators of deer, such as cougars, have moved out. The Blackstone town government, like most city governments, banned hunting inside the city limits. Also, the deer have found plenty of plants and shrubs to browse on in the landscaping the people planted around their homes.

NOTE to EDUCATORS:

You will find these notes to you in blue with activities you may want to work with your students. When possible, answers are provided to you in green.

Activities:

Have your students study the map on the next page. How many deer are represented on the map? 1500

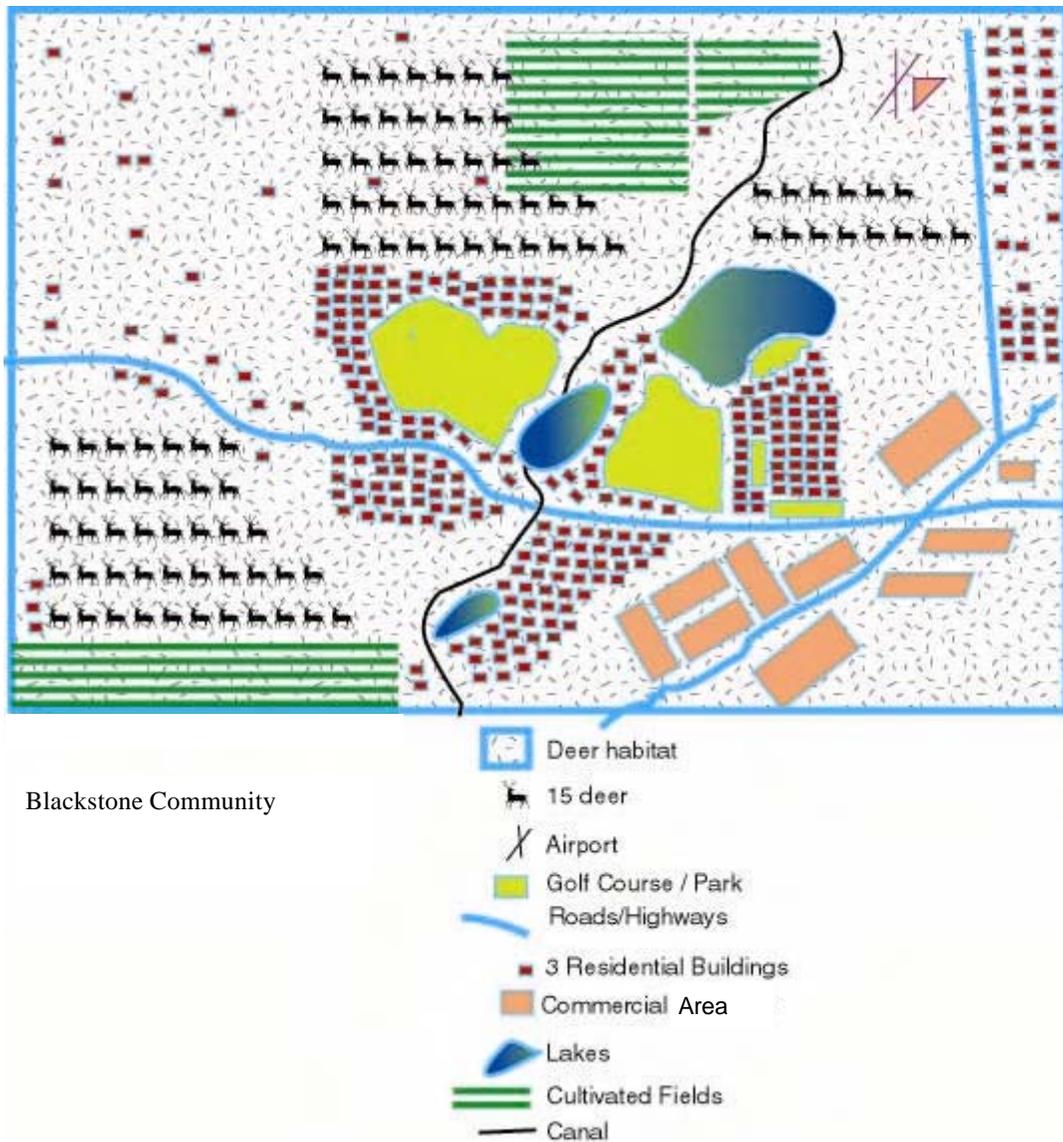
How many residential dwellings are represented? 900

According to the information on this page, how many square miles are in the Blackstone community?

There are 640 acres per square miles so $9600/640 = 15$ square miles

There are many people in the community who like to see the deer. They enjoy the aesthetic appeal of the deer wandering through their community. Many people take part in the local newspaper's best deer photograph contest. Last year there were over 30 entries in the contest.

Deer hunting is allowed outside the city limits and is a source of income for some of the rural landowners and local businesses. More deer attract more hunters. Deer hunting provides income for businesses selling hunting supplies and licenses and for those businesses providing motel rooms and meals to hunters at this time of year. This income occurs during a time of year when summer tourists have left the community. Without the business generated by hunting there would not be much business activity in the community during the fall. Hunting is an efficient management tool used to help control the deer population. Without management, the deer herd exceeds the carrying capacity of the area.





Problems with too many deer:

The deer population has grown to 100 deer per square mile based upon spotlight surveys conducted by USDA/ Wildlife Services biologists. That's an estimated 1,500 deer in the Blackstone area (640 acres = 1 sq. mi; $9,600\text{ac}/640\text{ac} = 15 \text{ sq. mi} \times 100\text{deer}/\text{sq mi}$). Unfortunately, the presence of these deer has created some unacceptable problems. The major complaints are:

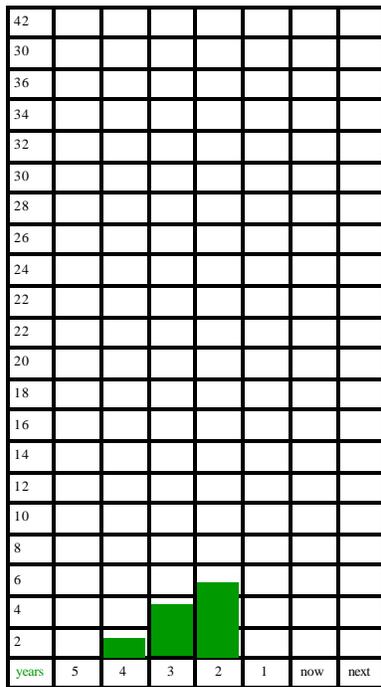
- Deer have overbrowsed the native foods available and are currently eating \$1,000 in landscaping, flowers, trees and shrubs each week. Continuous browsing of woody shrubs and sapling trees by deer has resulted in a "browse line." The overabundant deer population is degrading the forest. Consequently, deer-resistant snakeroot, stinging nettle and exotic barberry and other non-native plants are invading the area. Eventually this will limit the deer population and cause continual decline of other wildlife species.
- One of the benefits of regulated sport hunting is that deer herds can be managed by removing surplus animals. In this case the elimination of hunting is one reason the deer herd has overpopulated. Consequently, the overall health of the herd is suffering. Many deer are malnourished, reducing their body weight. Studies of the deer have shown increase in parasites on the deer and lower reproductive rates. Tick infestations and mange are now often found on deer. Many biologists are concerned that there will be a significant die-off of the deer due to an outbreak of epizootic hemorrhagic disease.
- Collisions between vehicles and deer have been increasing. There were 46 deer-auto collisions reported on the property last year in spite of a maximum 35 mph posted speed limit. One mother and her four-year-old daughter were injured when a deer crashed through the front windshield of their car. A school bus also hit a deer and blew a tire causing the bus to swerve into the roadside ditch. The children on the bus only received bumps and bruises, but the accident could have been much

Activities:

Math—have your students estimate the total cost in damage due to vehicle collisions with deer in the Blackstone Community.

$\$1,700 \times 46 = \$78,200 + \$4,000$ for the bus = $\$82,200$

Charting—have your students develop a bar chart on the increase in Lyme disease. Have them predict what they think this year and next year’s number of cases of Lyme disease will be.



worse. The average cost of damage to automobiles was \$1,700 and to the school bus it was \$4,000. Of the deer involved in accidents, sixteen were killed outright and eight were injured so severely that wildlife personnel or the police had to euthanize them. Twenty-two of the deer involved in accidents ran off. It is unknown if they survived their injuries or died.

- Deer are an important host to the ticks that transmit Lyme disease. Over the last four years the number of Lyme disease cases has increased. The first reported case occurred four years ago. Four years ago, one case was reported, three years ago three cases were reported. Two years ago five cases were reported.
- The abundance of deer has made the use of the airfield extremely risky. Often 100 deer have been observed in the grassy areas adjacent to the runway. This problem increases during the winter as the grass around the airport offers a good winter food source for the deer. There were two deer-plane collisions last year. Both were fatal to the deer. One accident occurred when the plane was taking off. Luckily the damage to the wing of the plane was minimal. The second accident was on landing and the prop and nose of the plane were destroyed. It cost \$9,700 to repair the plane. The accident sent the pilot and her passenger to the hospital. It is common practice for the pilots to fly low over the runway a couple of times before landing in an attempt to scare the deer away. The residents living close to the airport complain about these low buzzing planes.
- Many residents like to see deer and some residents feed the deer. This artificially increases the carrying capacity of the deer habitat. This causes the deer to become what is termed a “welfare herd” with the deer being dependent on humans for food. Also, feeding the deer causes deer to congregate in large numbers making the spread of parasites and disease like epizootic hemorrhagic disease and tuberculosis more likely. Feeding these animals further increases browsing damage on ornamental plants in the areas where deer are fed. The area where deer are fed is referred to as a feeding zone.

Carrying capacity is an important concept for students to understand. Carrying capacity is the number of living things the environment can successfully sustain year after year.

You can expand this dilemma with your students by asking them what should be done if one of the birds whose habitat is being threatened by too many deer is an endangered species. Does this change how they would manage the herd?

- With the high population of deer, native plants are eaten by the deer before the plants can reproduce. Consequently, it is limiting native forest vegetation. This has also resulted in the loss of undergrowth and the diversity of species of ground and shrub nesting birds such as cardinals, blue jays, warblers, towhees and wrens that depend on native vegetation.
- Unfortunately, the high population of deer has attracted unscrupulous poachers that trespass on private property to shoot deer. This has created a dangerous problem and many residents fear injury or even death from unsafe, uncaring criminals.
- Some of the farmers who raise sweet corn complain that the deer eat the seedling corn sprouts as soon as they emerge and later in the year the deer eat the ears of corn before they can be harvested. Often, 100 head of deer have been seen browsing in cornfields. The farmers report they are losing 1/3 of their crop to the deer. Physical damage to trees from antlered bucks and year-round browsing from deer in apple orchards are drastically reducing yields. One greenhouse owner reported that a herd of deer got into the plant nursery one evening and destroyed \$1,000 worth of plants.
- Damage at the golf course consists of browsing on landscaping as well as hoof marks on the putting greens. Several golfers have reported being chased by a buck during the rut.

The majority of community residents feel that the population of deer has reached a critical number where something must be done. Past city council meetings on this subject have been controversial with some people in attendance opposed to any killing of the deer while others wanted the deer eliminated.

Government officials have decided they need to develop a long term deer management plan. There are three major steps involved in developing such a plan.



*Activity:
Have your student circle the number of deer on the map (page 3 of this guide) that can be successfully sustained by this habitat. 30 deer should be circled on the map*

Step 1: Determine the status of the deer herd.

Several years ago, community leaders asked wildlife biologists to analyze the deer situation. They wanted to know if there were too many deer in the area, the ideal number for the deer herd, and some management options. Biologists used a spotlight survey to determine that the deer population was 100 deer per square mile. Research shows that native habitat in this region of the country will support about 25 to 35 deer per square mile without damage to the habitat. This density allows native plants to thrive and provides people with the opportunity to view deer. It should reduce the number of collisions with vehicles to one fourth of what it is now.

Step 2: Establish a stakeholder committee

There are a variety of management options to be considered but first, community leaders begin by creating a committee of people who have an interest in this problem. These people are called stakeholders. This committee is made up of wildlife biologists, homeowners, farmers, business owners, government representatives, community group and neighborhood association representatives. The committee reviews management options and recommends a long-term management plan to reduce and maintain a deer population at acceptable limits.

Possible members of the committee:

1. Community residents including those who represent the following viewpoints:
 - People who want the deer removed so the deer will no longer damage their plants and shrubs around their houses.
 - People who do not want the deer harmed.
 - People who have run into deer on the roads and want this threat eliminated.
 - People who would like to hunt the deer.
 - People who want the deer to be controlled so the deer will not harm their businesses, i.e. farmers and golf course and greenhouse owners.
 - People who belong to the local gardening group. They are concerned about the damage the deer are doing to the native plants. They see invasive weeds thriving and these weed are entering gardens. They also do not like the damage the deer are doing to their gardens.

Notes to teachers: Ask your students who else should be listed here? Have them explain their reason why.

Next have them decide which people should be asked to attend a meeting to develop a long-term plan and explain why.

Why might someone not be asked to serve on the committee?

Would it be better to have people on this committee who were basing decisions on science or their emotions? Why?

*Activity:
Divide your students into small groups. Ask each group to assume the role of one of the stakeholder members. Have them decide what position they are going to take on the deer management debate. Then have them list all their reasons to support their position.*

*Extension activity:
Ask your students to analyze the arguments for the different positions. Are the arguments based on science, emotion or a combination.*

- Members of the local bird watching society. They are reporting that many native birds have moved out or died out, they don't know which, because the bird's food supply, nesting cover and shelter has been destroyed by the overbrowsing of the deer.
 - People who do not believe contraceptives should be used on deer. They feel it is inappropriate to alter an animal's reproductive system – either surgically or by administering hormones.
 - People with concerns about meat being contaminated if animals are treated in any way with chemicals and hormones.
 - People who just enjoy living with the deer.
2. Local law enforcement and medical personnel who are concerned with the increasing number of accidents and injuries resulting from deer-vehicle collisions.
 3. State wildlife agency personnel
 4. USDA Wildlife Services personnel
 5. University wildlife professor
 6. Representative of the Blackstone town council
 7. Moderator

Keep in mind the more people you have involved in the stakeholder process, the more difficult it will be to reach a consensus.

Step 3: Analyze management options.

Following are some options the group might consider; they can use just one option, a combination of options or develop new solutions.

1. Conduct a public hunting program using firearms.

Pros: Historically, this has been the most successful management tool for controlling deer populations in this area. In addition, the sale of hunting licenses has provided a source of revenue to implement wildlife management programs.

Cons: Many residents do not like rifle fire in their neighborhoods and are concerned about safety and private property rights. For these reasons, the city of Blackstone passed an ordinance against the discharge of firearms within the city limits.

Costs: Hunting generates revenue for the community but it is costly to manage a public hunt. Cost run from \$83 to

\$237 per animal for personnel costs to manage a hunt. Hunters need to be check in and out and hunt monitored.

2. Hire a private sharpshooter. This process begins by luring the deer into one location with bait. Then the sharpshooter shoots the deer.

Pros: This method has limited effectiveness. It keeps the gunfire confined to a safe area.

Cons: Same as in #1. Identifying qualified/authorized persons to conduct this type of activity is often difficult. There are also liability issues.

Costs: Range from \$72/ deer to \$260/deer

3. Contract with USDA Wildlife Services (WS). WS is a federal agency which conducts long term management programs to reduce damage to acceptable limits. They have the ability to safely and humanely dispatch deer from the area by shooting and/or capturing and euthanizing the deer. Edible venison is donated to local food banks. WS also has the experience, expertise and ability to design plans for deer proof fencing and make recommendations for planting plants that deer are less likely to eat. This organization also collects biological data from the deer to determine overall herd health as well as monitor population trends.

Pros: Management options are conducted by professionals and based on scientific research of deer herds.

Cons: Costly and it precludes public hunting.

Cost: Costs may range from \$50 per animal to a year-round control program averaging \$50,000 per year.



4. Allow archery hunting. Training and ability to shoot accurately should be required of the archery hunters by the community government. Safety zones would be established and the sportsmen could pay for the privilege of hunting.

Pros: This type of hunting does not cause a lot of noise. It is safer than public hunting with firearms.

Cons: It is difficult to remove the number of deer necessary to be successful in limiting deer numbers in a normal archery hunting season. Some people are just as fearful of archery hunters as they are of hunters with firearms. Because archery equipment is not as effective at killing deer, injured deer are sometimes not killed outright but survive for days or weeks with injuries from arrows. Thus, this method has limited effectiveness.

Costs: This type of hunting may be a revenue generating activity.

Activity: Have your students figure the cost involve in option 7.

*Traps: $\$300 + \$330 = \$630 \times 50$
traps = $\$31,500$*

*Transfer crates:
 $\$150 + \$90 = \$240 \times 10 =$
 $\$2,400$*

Trucks & Trailers: $\$60,000$

Total cost: $\$93,900$



5. Issue crop depredation permits to farmers to allow them to hunt deer to protect their crops.

Pros: It helps remove the deer that are causing damage to a specific area.

Cons: Farmers may not be expert hunters nor can they remove enough deer. Farmers have limited amount of time to hunt deer as they need do their farm work.

Cost: minimal

6. Trap and relocate the deer (also called translocation).

Pros: For some people, it is more appealing to relocate a deer rather than kill it.

Cons: This option involves considerable cost, time and effort. A place to relocate the deer must be found. In getting estimates on what it costs to remove and relocate deer, the group found that other communities spent \$434 per deer to trap, remove and do a follow-up study on what happened to deer after they were relocated. Many of the deer did not survive the relocation process due to stress. These deer were also more likely to be hit by vehicles because they were in unfamiliar territory. There is also a risk of spreading disease from the deer being relocated to deer in the new area.

Costs: When factoring in the survival rate, \$2,876 was spent to relocate each deer. Unfortunately, for the Blackstone community, other communities close by also have an abundance of deer. Their initial inquiries found that no one wants to take the deer.

7. Live capture then euthanize the deer. Capture techniques include clover traps, panel traps, drop nets, standing tangle nets and chemical immobilization.

Pros: The meat provides food for food banks. Traps can often be reused.

Cons: Costly. Chemical immobilization prevents being able to use the meat. The animals are under a great deal of stress during the capture process.

Costs: Trap construction costs include \$300 for labor for each trap and \$330 for material. Transfer crates cost \$150 in materials and \$90 for labor. It is estimated that 50 traps and 10 transfer crates are needed. The costs for trucks and trailers to haul the traps and deer is estimated to be \$60,000. This would need to be added into the overall cost for option 7 and 6.

8. Contraception has been studied as a way to control deer populations. There are three basic methods of contraception: surgical sterilization, synthetic steroid hormone supplementation and immunocontraceptive vaccines. None of these works economically.

Surgical sterilization is a permanent method of contraception. It requires capturing individual deer and performing surgery. It is similar to the spaying and neutering of cats and dogs.

Synthetic steroid hormones result in contraception by changing an animal's reproductive hormone balance. The hormone can either be given in food or implanted under the skin of the animal after capture. This would be compared to giving deer birth control pills. The problem with putting the hormones in a deer's food is that some other animal may eat the food before the deer eats it.

With immunocontraception an animal is injected with a vaccine to stimulate its immune system to produce antibodies against a protein involved in reproduction. These vaccines can be given by shooting the deer with a syringe dart.

Pros: It sounds like a more humane solution.

Cons: Currently, there are no viable methods to successfully use birth control on free-ranging herds:

1. There is currently no contraceptive vaccine registered for use with deer.
2. 3. Wildlife managers are concerned over whether it is appropriate to alter an animal's reproductive system and are concerned about changing an animal's reproductive behavior. The female would continue to cycle thus the buck would stay in rut.
3. 4. There are also human safety concerns in that people may end up eating contaminated meat.
4. If a vaccine is used, there are also question about who will administer and monitor its effectiveness?

Costs: Very expensive





Additional Resources:
Living with Wildlife Activity Sheets
National Wildlife Research Center
970 266-6000
www.aphis.usda.gov/ws/nwrc

Prevention and Control of Wildlife
Damage CD ROM or Handbook
202 Natural Resource Hall
University of Nebraska
P.O. Box 83819
Lincoln, NE 68583

9. Reduce the size of the herds by sterilizing some of the deer. Currently there are no legal and cost-effective ways to sterilize a large number of free-ranging deer. However, some residents think this is an option that should be investigated.

Pro: It sounds like a more humane solution.

Cons: It is a very expensive solution that causes stress to the animal and may affect general herd health.

Cost: Very expensive solution that causes stress and may affect herd health.

10. Work with homeowners to provide technical assistance on how they can keep deer from eating ornamental vegetation. This includes providing information on how to:

- Frighten deer away. This can be done by using gas exploders, pyrotechnics, gunfire or tethering dogs. The use of some of these devices is restricted or forbidden within community boundaries and usually too noisy to use in a suburb..
- Plant plants that are unattractive to deer.
- Treat plants with deer repellents. There are a wide variety of repellants available. There are two basic types of repellants. Area repellents are applied near plants to be protected and deer are repelled by the repellent's smell. Contact repellants are applied directly to the plants to be protected and the deer are repelled by the taste of the plant. Studies have show these do not work well.
- Place netting over plants, tubing around tree trunks and build a deerproof fence. The traditional deer proof fence is eight feet high and made of woven wire. Many people consider it unattractive fencing to have around their homes. Another option is electric fence. However, the city has an ordinance against this type of fence.

Pros: Non-lethal.

Cons: Extremely limited in effectiveness with abundant deer numbers.

Cost: Usually affordable but does not usually solve the problem.

YOUR STUDENTS' TURN

It is your turn as a class to decide how to solve the problem with the deer. Your solution may be a combination of management methods listed in this exercise or a completely new idea.

As you work to develop a solution, your Wildlife Services person will be available to answer your questions. He or she will share with you possible consequences of your solution.

If you are participating in Choices & Consequences, as you work to develop a solution to the problem, you can e-mail questions you have to a team of people who are working with wildlife issues every day.

There is no easy solution. Each solution has a consequence and the goal of this exercise is for students to use critical thinking skills to develop a solution that will work in their community.