Genre Realistic Fiction

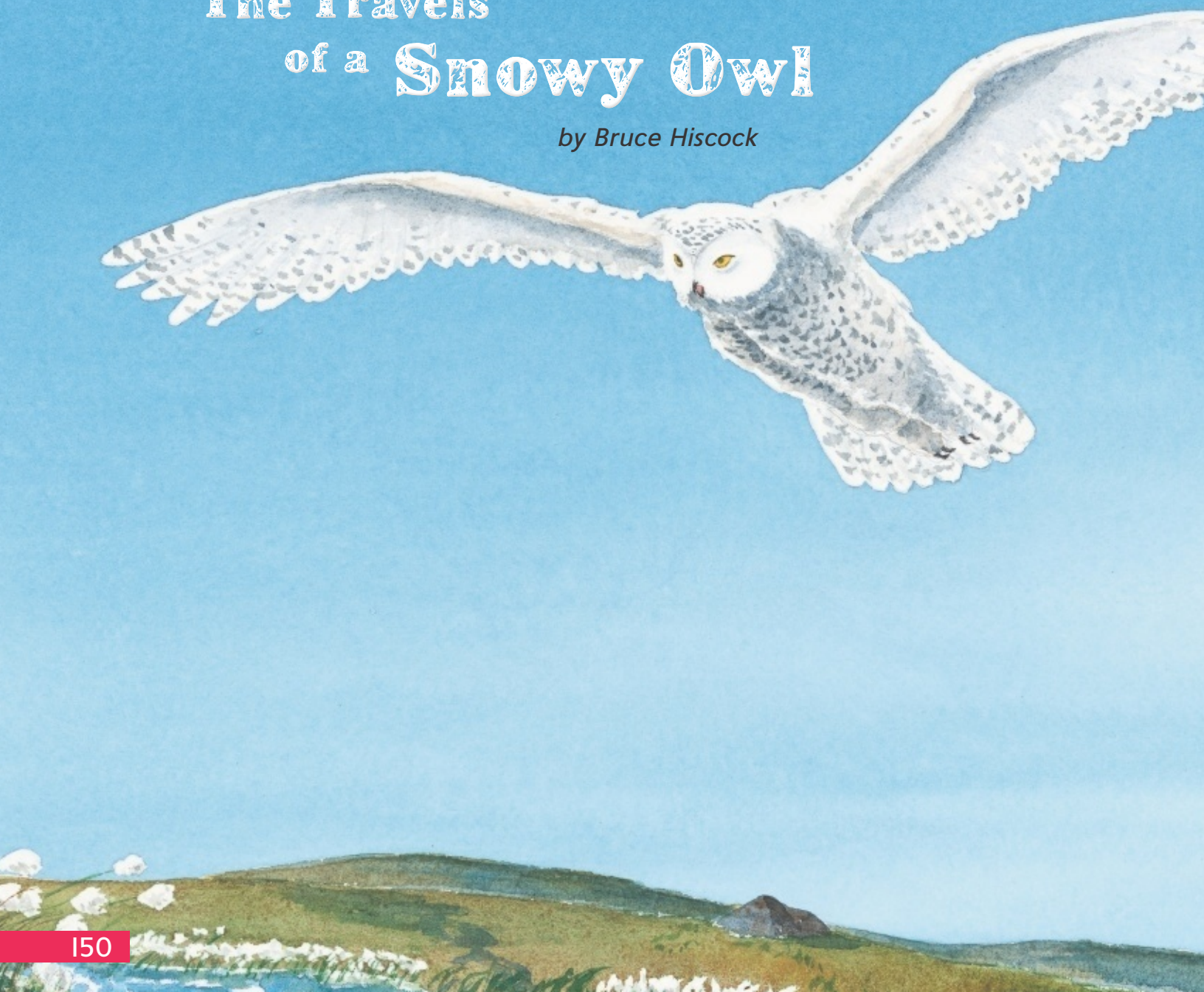
Essential Question

How do different plants and animals have their own unique cycles?

Ookpik

The Travels of a Snowy Owl

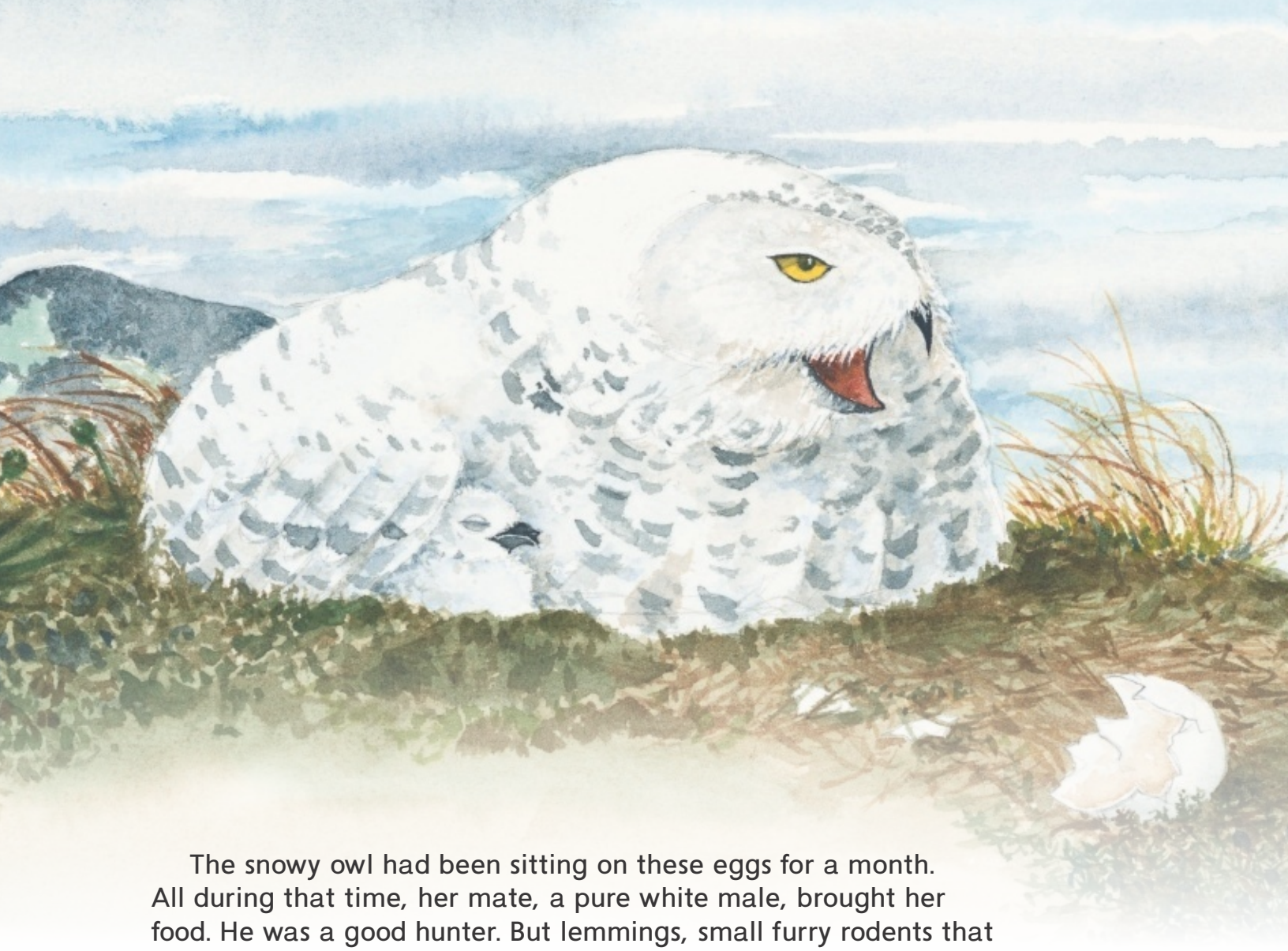
by Bruce Hiscock



Four eggs, white as the snows of winter, lay in a shallow nest on the Arctic tundra. The eggs were still warm from the mother bird. But as gusts of icy wind swirled over them, they began to cool. An Arctic fox, making his rounds, saw the nest was left unguarded. He trotted straight up the hill, hoping to steal an egg or two.

Just as the fox was about to grab his prize, a huge white owl came streaking down from the sky. Feathered feet with sharp talons struck the little fox with a glancing blow. He tumbled backward, rolled over, and raced off.

With bright yellow eyes, the snowy owl examined each of her eggs. She saw they were untouched and settled down again on the nest. The north wind blew harder, but now the eggs were safe beneath the owl's thick feathers.

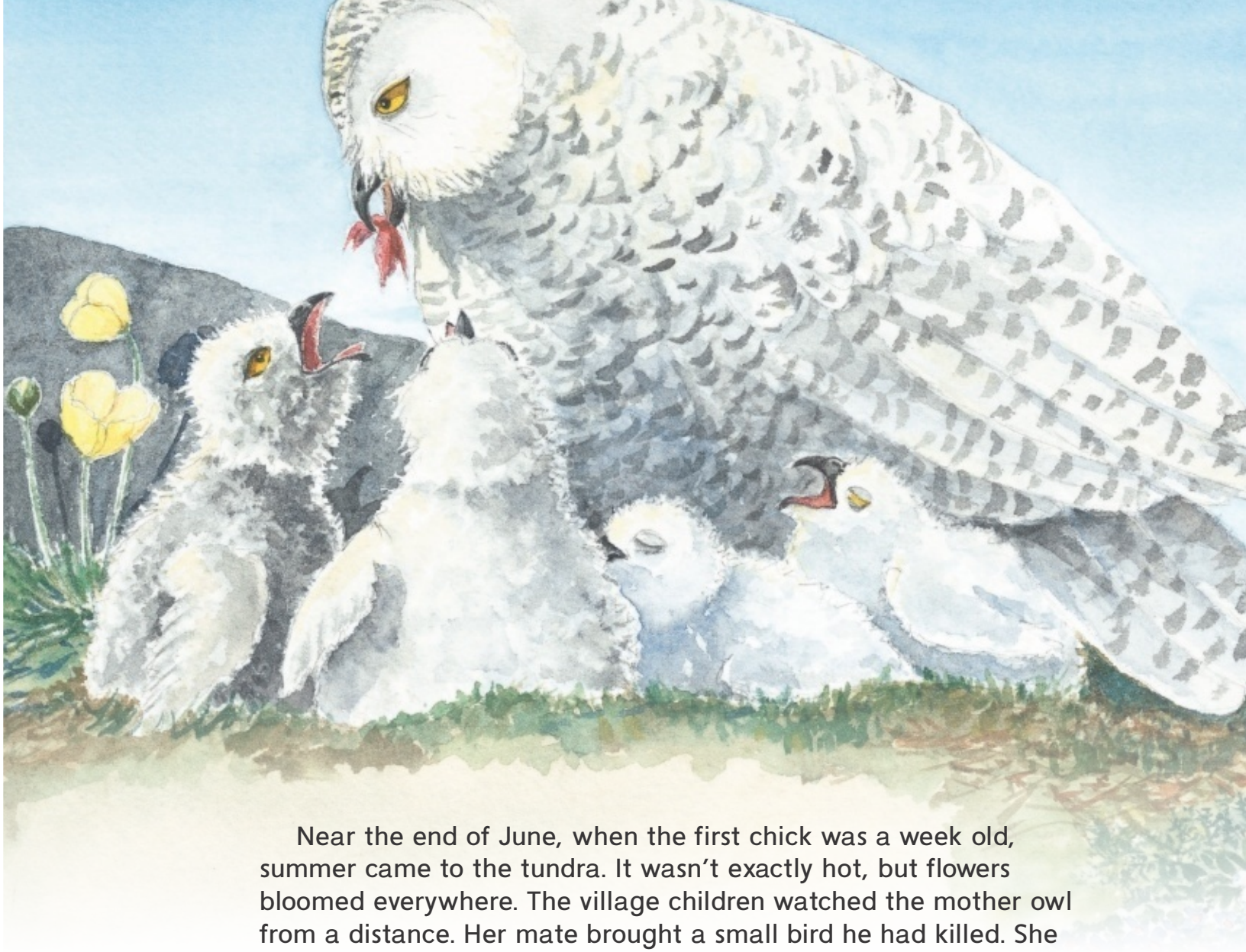


The snowy owl had been sitting on these eggs for a month. All during that time, her mate, a pure white male, brought her food. He was a good hunter. But lemmings, small furry rodents that are the favorite prey of snowy owls, were scarce that spring. The male owl was forced to chase after Arctic hares and small birds. They were far more difficult to catch than lemmings.

Scritch . . . scratch! A noise came from inside one of the eggs. Then a crack appeared in the shell. With more scratching and pecking, the egg broke open. A small, wet chick crawled out and hid beneath its mother.

Two days later, another egg hatched, and by the end of the week, four helpless, downy chicks huddled in the nest. The male owl ranged farther now, trying to find enough food for the family.

Children from a nearby village saw the white bird coming and going. "*Ookpik!*" they called, using the word for "snowy owl" in Inuktitut, the Inuit language. They were glad to see these owls were raising chicks. With few lemmings around, many snowy owls on Baffin Island would not nest at all that year.



Near the end of June, when the first chick was a week old, summer came to the tundra. It wasn't exactly hot, but flowers bloomed everywhere. The village children watched the mother owl from a distance. Her mate brought a small bird he had killed. She tore it up and gave pieces to the little owls. With beaks opened wide, they begged for more. The fuzzy white down on the oldest birds was changing to fuzzy gray as their feathers came in.

These days the mother seldom left the nest, for the chicks were not safe alone. Once, when she was away, a gull-like jaeger snatched a chick. The bird flew off quickly and fed the meat to its own babies.

During the next two weeks, the three remaining little owls left the nest and hid among the tundra grasses. They were growing fast but still unable to fly. The parents watched over them and brought them food. The big owls hunted in daylight, for during the brief Arctic summer, it is never dark.

Keeping the young owls fed was a struggle for the parents. Hunting far and wide, they were just able to find enough food. By early August, two of the owls were nearly full-grown, but the third chick had disappeared. Perhaps the fox had found it.

The oldest nestling was a male. He tested his wings frequently, hopping about and flapping. Then one blustery day, when the tufts of cotton grass bent low, he caught the wind. With a powerful stroke of his wings, he lifted up into the sky. It wasn't a long flight, but from that moment the owl was not a helpless bird on the ground. Now he was truly Ookpik, a snowy owl, a hunter able to fly.

Not long after that, his sister took her first flight, too. By the end of the summer, they were hunting by themselves.

In the Far North, fall comes early. The leaves of the tiny blueberry bushes turn red, while the dwarf birch changes to yellow. Ducks, geese, gulls, and other birds begin leaving the land at this time. These migrating birds come north only for the nesting season. Snowy owls are true birds of the Arctic. Their feathers are exceptionally thick and warm, and they will stay on the tundra all year long if there is enough to eat.

The young male owl, Ookpik, had done fairly well so far. He found a few lemmings and had learned to hunt birds. Once, he caught a young Arctic hare. But now the days were rapidly growing shorter and much, much colder. Darkness had returned, and often the wind brought a dusting of snow. Without a steady supply of lemmings for food, the owl sensed that he must leave this place or die.

On a gray morning, Ookpik rose high above the tundra and headed south. For two days he flew on, hunting whatever he could find. Below the owl, the landscape began to change. Strange green plants appeared, sticking straight up from the ground. At first these plants were small, like standing children. But as the bird continued south, they became taller and stood closer together. The plants were trees, something new to the snowy owl.

Ookpik did not care for trees. He was accustomed to hunting the endless tundra where nothing blocked his view. When he found a treeless hillside, he landed on a lichen-covered rock. There he waited until his sharp eyes noticed something small scurrying in the field. He glided down, silent as death, and caught his first meadow vole. It was fat and much like a lemming.

For a time, the owl was satisfied to stay on the hill and hunt. But as the voles disappeared and the Arctic wind roared, he knew he must go farther south.

When Ookpik took to the air again, he could see nothing but trees below. This was the taiga, a great forest of black spruce and fir that covers the land south of the tundra. The sea of dark trees was broken only by frozen lakes and rivers. Other kinds of owls lived in this forest, but it was not a place for him. A snowy owl needs open land.

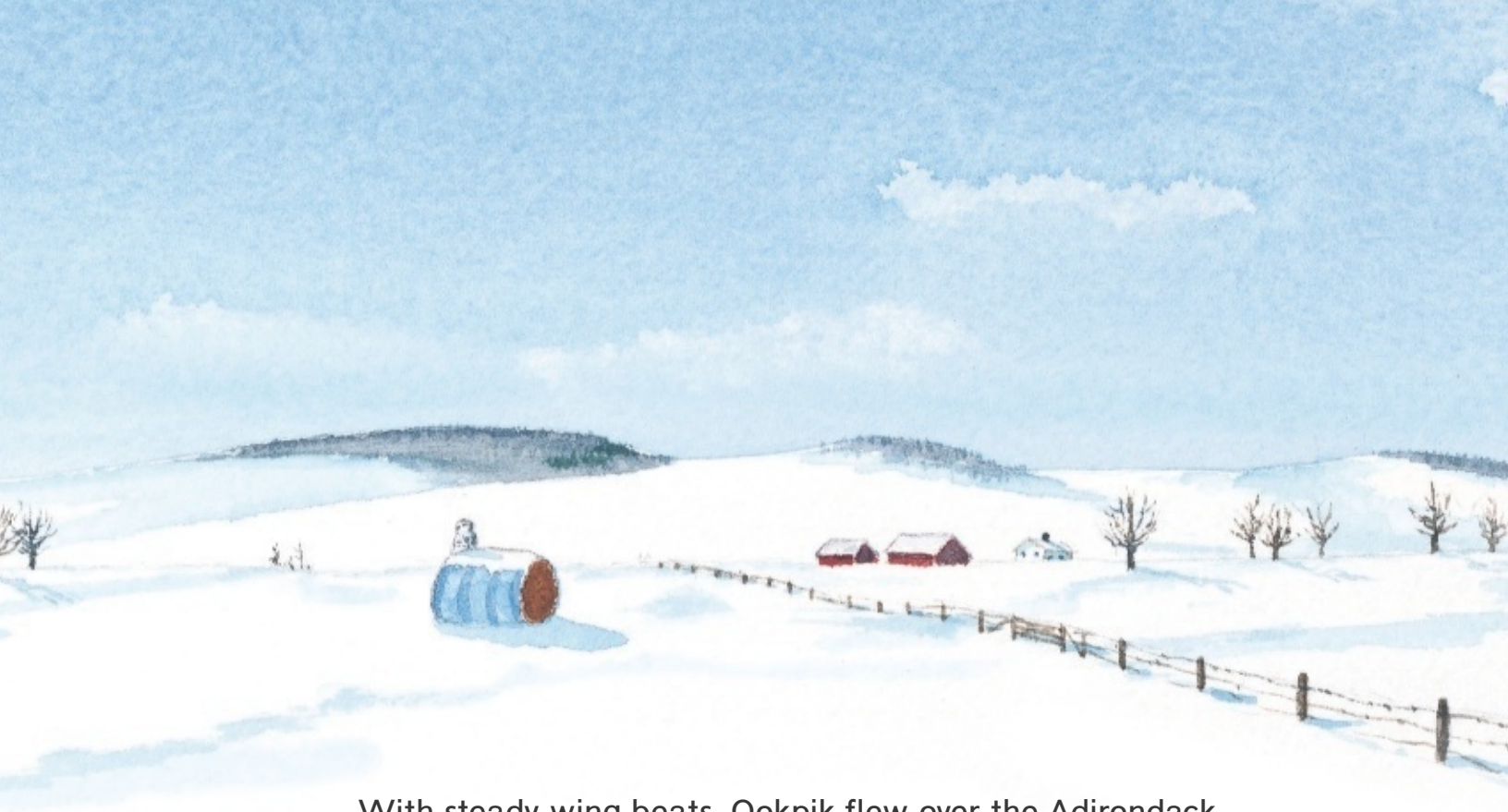
After a thousand miles, Ookpik spotted a large clearing below. Here the forest had been cut to make a farm. The owl landed on an old log barn, fluffed up his feathers, and looked around. Snowy owls prefer to hunt this way, sitting and watching until something moves.

Ookpik spotted a furry brown animal gnawing on some grain. Hungry, he launched off, keeping his eyes glued on the prey. *Honk!* A huge red monster with glowing eyes lurched at him across the farmyard. The owl veered off, barely avoiding a collision with a red pickup truck.

Once he learned to stay away from the truck, Ookpik found the farm was a wonderful place. There were plenty of mice and rats, and he was content to rest here from his long travels.

But after a week, a female snowy owl arrived. She was larger and older than he was. Snowy owls are very protective of their hunting territory. They like to have an area all to themselves, and so she chased Ookpik away.

He flew on, soaring over Ottawa, the capital of Canada. There, he saw pigeons roosting. Pigeons looked easy to catch, but the city was no place for a snowy owl. Ookpik continued south, and the next day he crossed into the United States.



With steady wing beats, Ookpik flew over the Adirondack Mountains. Few people lived here, but dense forest covered the steep slopes and broad valleys.

Beyond the mountains, he finally found the open space he needed. This was dairy-farm country. Huge pastures for cows and big fields where corn and hay had been harvested covered the land. The owl settled in for the winter. It wasn't quite like home, for there were still trees, but it would do. Tracks in the snow showed that mice and rabbits lived in these fields. And, compared with the Arctic, the cold did not seem severe.

When small birds, such as snow buntings, come south from the tundra, they often go unnoticed. Not so with a snowy owl. People driving by saw the big white bird sitting on a hay bale. The newspaper ran a story with a picture titled "Arctic Visitor." After that, many people wanted to see the white owl.

They came with binoculars, cameras, spotting scopes, and sometimes their neighbors. Ookpik was indifferent to his fame. The sight of this magnificent bird, however, thrilled the people. Everyone was warned not to approach too closely, and so the owl and the bird watchers got along well.

Most owls are rather secretive. They hunt by night and are hard to see. But Ookpik was usually in plain view, and he hunted any time he saw a small animal. In this way the winter months slipped by.

With the first warm days of spring, great flights of Canada geese winged over the farm, honking as they flew. Ookpik watched them and felt the pull of his birthplace. The winter had been good to him. He was strong, healthy, and ready for a long flight.

In bright daylight, the big owl left the meadows and started north. Stopping only to hunt, he flew over the mountains, over the cities and farms, and above the dark forests of the taiga.

After many days, the owl passed the land of little sticks, where small trees stand like children. Beyond those trees lay the hills and open plains of the Arctic. Here, at last, Ookpik was home. He glided down and landed on a tundra mound. The owl still had the dark spots of a young bird, for males do not become pure white until they are older.

"Ookpik!" shouted a girl from the village, and she ran to tell her friends. The snowy owl paid no attention. He sat perfectly still, waiting for the first lemming to appear.

RANGE

Snowy owls are found in the northernmost lands all around the world. This includes Alaska, Canada, Greenland, Iceland, some British Isles, Scandinavia, and Russia, including Siberia. They are able to survive in the Arctic because their thick feathers provide what is perhaps the best insulation of any bird in the world. Even their feet are well feathered.

LIFE

Little owls are covered with fluffy white down for the first week or so after they hatch. Gray down appears as their feathers begin to grow in. They leave the nest when they are three to four weeks old, but these chicks still cannot fly. Leaving the nest is a survival strategy. The chicks spread out and hide among the tundra plants. By separating in this way, it is unlikely that every small owl will be found by foxes, wolves, or birds of prey. If they stayed together, a predator might take the entire brood. The fledglings begin flying when they are about fifty days old and can fly nearly as well as their parents after a week or two.

Like most wild birds, about half of the nestlings will not live through the first year. Predators, lack of food, and bad weather all take a toll. If an owl makes it through the first year, its chances of surviving the next years are much better.

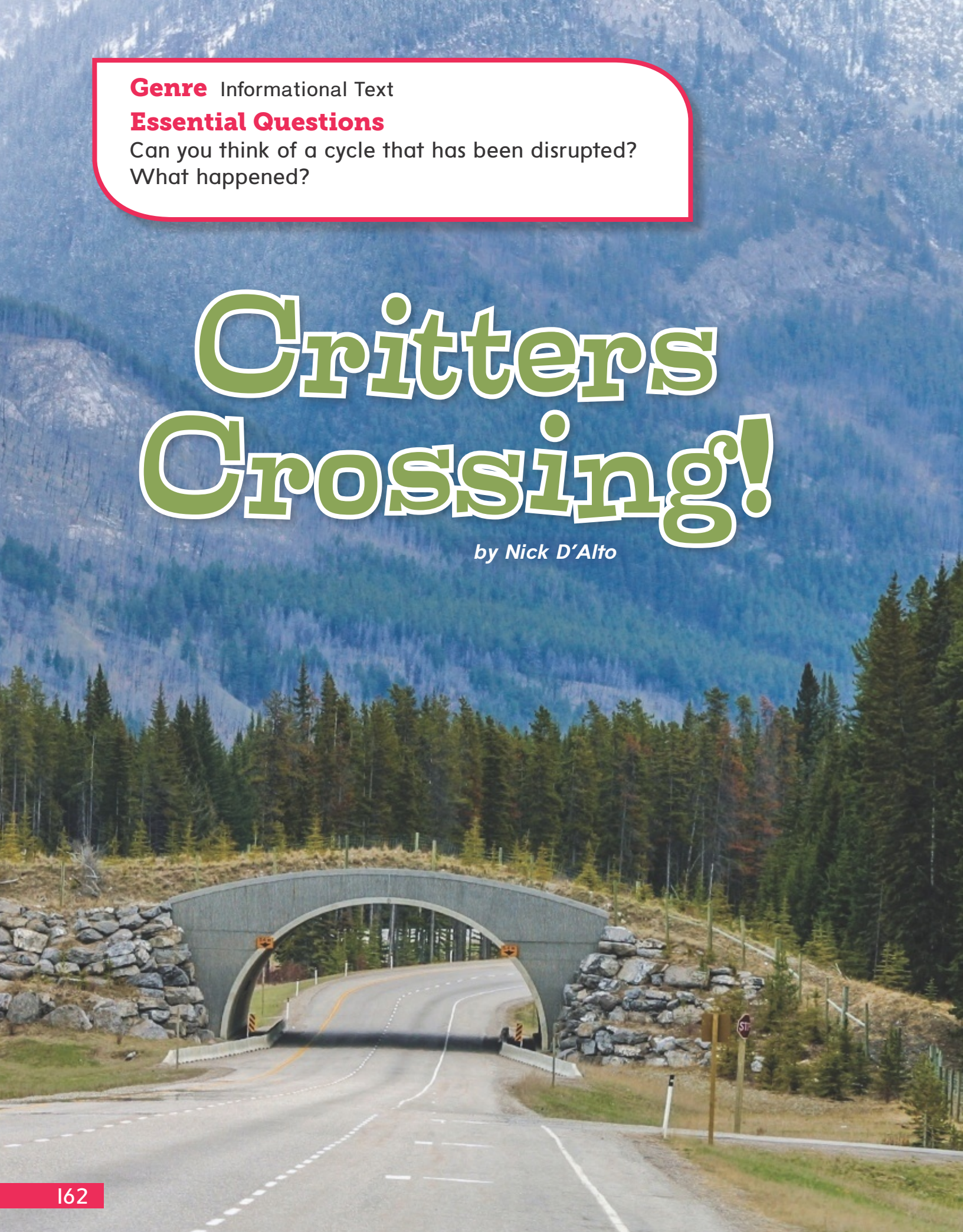
Genre Informational Text

Essential Questions

Can you think of a cycle that has been disrupted? What happened?

Critters Crossing!

by Nick D'Alto



We're driving west along the Trans-Canada Highway, near Banff, Alberta, and a huge bridge overpass looms ahead. Wait, are those deer walking across it? A bridge that lets animals cross over a highway?

The bridge is just one of 41 different crossing structures designed to accommodate animals inside Canada's Banff National Park. These crossings include six overpasses, which are bridges that cross above a road, and 35 underpasses, which are roads that go under a road. Since monitoring began in 1996, a dozen species of large mammals, including black bears, grizzly bears, elk, and deer have crossed the road over 200,000 times using these unique structures. Worldwide, thousands of wildlife crossings are in use today. In the United States, wildlife crossings protect bighorn sheep in Colorado and panthers in Florida.

Tie-Up on Alligator Interstate 75

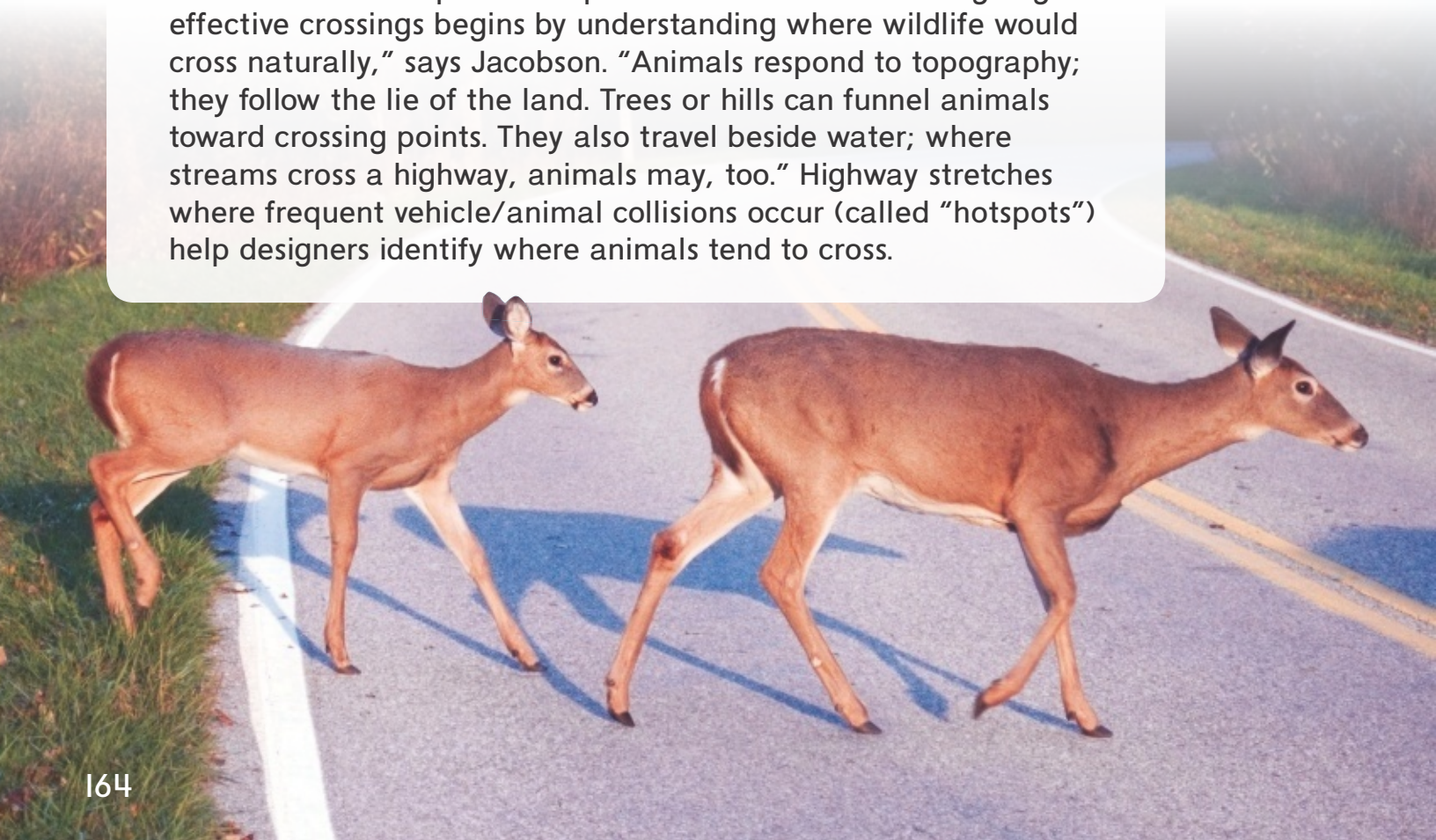
GPS and other technologies have revolutionized how people travel. Now, a computer model is helping scientists do the same for wildlife travel. The Geographic Information System (developed at the University of Florida's Landscape Ecology Program) maps habitats of animal populations across the state. Then it overlaps this data with maps of Florida's highway system to identify points where both animals and vehicles cross roads.

For example, the system predicts high-priority sites along Florida's I-75 (also known as "Alligator Alley"), and on U.S. 41, which runs near Florida's Everglades. Using this information, highway planners can modify existing structures (such as fencing and vegetation), or develop new crossing systems.

"Roads and highways connect our built environments, but they can divide natural habitats," says Sandra L. Jacobson, a wildlife biologist and wildlife-crossing expert who works for the USDA's Forest Service Research Station in California. "Animals need to travel from place to place to perform different life functions; they move for water, food, and seasonal migration. But imagine if a highway separated, say, your bedroom from your kitchen—how dangerous!" Road collisions kill wildlife, endanger motorists, and interrupt traffic. "Over one million deer are hit each year on our nation's highways," reports Jacobson. "In the eastern United States, cars kill more deer than their natural predators." In a way, two transportation systems are colliding: our roads and the "habitat corridors" that animals follow.

Highway engineers have traditionally used fences and signs to address this problem. (You've probably seen animal-crossing signs.) Now, experts are adapting crossing structures normally associated with people, such as bridges, tunnels, and overpasses, to the needs of animals. It's all part of *transportation ecology,* an emerging science that considers how natural and built environments interact. "It's a new field," notes Jacobson. "Not much was known [about habitat corridors] before the 1970s." Transportation ecology draws together many experts, including biologists, highway engineers, and geologists.

But the most important experts are the animals. "Designing effective crossings begins by understanding where wildlife would cross naturally," says Jacobson. "Animals respond to topography; they follow the lie of the land. Trees or hills can funnel animals toward crossing points. They also travel beside water; where streams cross a highway, animals may, too." Highway stretches where frequent vehicle/animal collisions occur (called "hotspots") help designers identify where animals tend to cross.



"Jumpouts" allow wayward animals to escape from the highway.

A Gate for Every Gait

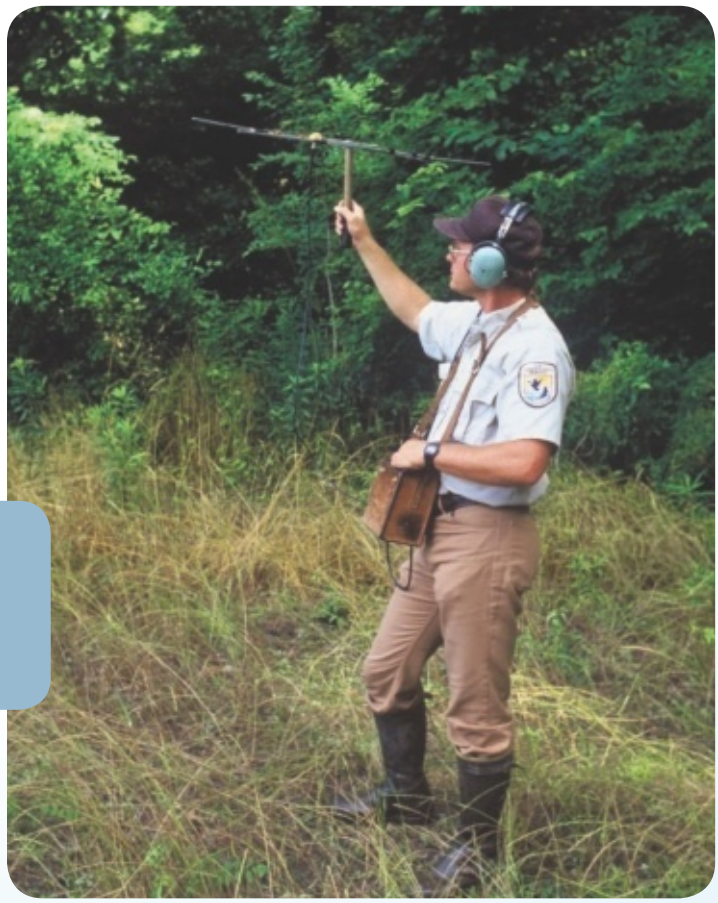
The best wildlife fences are sized and located to keep particular species off the highway. Yet some animals still stray and become trapped on the road. When this happens, one-way gates, jumpouts (which are raised platforms), and other escape structures built into the fences can help trapped animals exit the roadway safely.

Engineers can apply this data to build fences along the highway. These fences are designed to keep animals out while moving them toward a structure where they can cross safely. "Overpasses (also called wildlife bridges or bio bridges) take animals over the highway," Jacobson says. "Underpasses let animals travel beneath." The structures can range from a small tunnel for tortoises (and other slow crossers!) to Banff's largest highway overpass (which has a 180-foot span). A few crossings are specialized, such as pipes that are kept moist just for amphibians. Others let a wide range of species cross.

Selecting the best structure depends on understanding species' behavior. "For example, bears will go through a fairly small underpass," notes Jacobson. "They're accustomed to tight spaces from hibernating. But pronghorn antelope must see clearly in all directions, to escape from predators. They won't tolerate a tunnel. They need a high bridge, or an overpass they can look out from. My job is describing these kinds of animal behaviors to the engineers, so they can design a suitable structure."

Convincing animals the finished crossing is natural can make the structure less intimidating. The Lava Butte Underpass helps mule deer and other species cross U.S. 97 in Oregon. Its design team worked with botanists to incorporate native plants along the path. These were grown in soil and compost piled on the tunnel's concrete floor to simulate the countryside (much the way habitats are designed and constructed in zoos). "It's not easy to get the plants to grow under there without direct sunlight," says Jacobson. "But floor terrain is especially important for smaller animals. For example, mice want cover from aerial predators. They won't go out in the open, and won't enter a big, open tunnel, either. So we've included fallen logs as mini tunnels, to give them hiding places along the way."

Engineers sometimes use tripwires to count how many cars pass a stretch of highway. Transportation ecologists have monitoring tools, too. "Motion-triggered cameras have snapped thousands of pictures of animals crossing different structures," says Jacobson. "We also use *track plates*, soot-covered flat sheets of paper or metal." Animals walk across the plates and leave footprints behind, letting biologists estimate the number and kinds of wildlife that crossed. Scientists have also experimented with "hair snagging." Sticky or prickly wires stretched near ground level catch a few hairs from a passing animal. Then DNA testing of the hair reveals the species. (Bear or moose?) This kind of testing can even determine each animal's ancestry, showing scientists the genes that are "crossing" from one habitat to another.



Researchers use a variety of equipment to capture the traffic patterns of deer.

An animal bridge, like the one shown above, allows animals to safely cross highways. The natural terrain of the bridge encourages animal traffic.

"It's all about discovering what works best so we can use results to improve for next time," says Jacobson. For example, in Banff National Park, the crossing systems have reduced traffic-related mortality of large mammals by over 80 percent, improving safety for both animals and motorists. For the future, transportation ecologists are developing new methods to make wildlife crossings more effective and affordable. For example, wildlife bridges might be built from lighter, recycled materials, since even large animals are much lighter than vehicular traffic. Other proposals capitalize on biological differences, such as color sensitivity; for example, humans will spot a bright red bridge (meaning animal crossing ahead), but a deer's less color-sensitive vision sees just a muted pathway encouraging it to cross.

On your next road trip, you might see an astonishing wildlife crossing, such as Montana's Animals' Bridge, used by bears and mountain lions. Australia's Christmas Island even has an overpass for migrating crabs! Other crossings, like badger tunnels (used in the United States and Europe) are far less obvious. You might drive by these and never notice them. That's all right, because the animals will.

Respond

Comprehension

You will answer the comprehension questions on these pages as a class.

Text Connections

1. Why do you think Ookpik, unlike other owls, does not hunt secretively in the dark during the southern winter?
2. Do you think animal bridges are more effective than signs warning drivers to watch for animals? Explain.
3. Describe an adaptation that helps snowy owls survive cold weather.
4. How do people in "Critters Crossing!" and "Monsoons" work with nature?
5. Why do you think wildlife crossings are especially important in national parks like Banff?
6. What information in "Critters Crossing!" would you want to research on your own? How could you research it?

Did You Know?

If built, a proposed wildlife overpass over a 10-lane Los Angeles highway could be the largest in the world. This overpass would allow mountain lions to travel between the Santa Monica Mountains and other areas. Without it, researchers fear the mountain lions could end up extinct.

Look Closer

Keys to Comprehension

1. Explain the ways the mother snowy owl in "Ookpik" interacts with her owlets in order to help them survive. Quote details from the text to support your answer.
2. Infer why transportation ecologists need so many different strategies for counting animal crossings. Quote details from "Critters Crossing!" to support your inference.

Writer's Craft

3. Describe the treatment of the topic of animal migration in "Ookpik" and "Critters Crossing!"
4. Explain what the term *transportation ecology* means, based on information in "Critters Crossing!"
5. Consider the ways in which "Ookpik" and "Critters Crossing!" describe things that scare traveling animals. Compare and contrast their representation of this topic.

Concept Development

6. Describe challenges faced by traveling animals based on the information in both "Ookpik" and "Critters Crossing!"

Write

Write about one animal's journey across a wildlife bridge from the perspective of that animal.

Read this Science Connection. You will answer the questions as a class.

Text Feature

A **bulleted list** organizes items that do not need to be in a particular order.

Protecting Migrating Birds

In North America, many bird species migrate each spring and fall to take advantage of areas with the most food and the best types of weather. Their migration patterns can be complex. People are still learning how birds navigate. Although birds use senses besides sight when traveling, the setting sun, stars, and other landmarks are very important to their orientation as they make their long journeys.

In the darkness of night, however, artificial lights can cause huge problems for birds. As birds fly over towns and cities, lights shining from skyscrapers, homes, and businesses can confuse the birds. Birds can become trapped and lost within a city. Many die by flying into lighted buildings.

As birds fly in daytime, window reflections, rather than artificial light, become the problem. When windows reflect natural objects nearby, birds mistake them for open space. They can accidentally veer into the glass. Ironically, many buildings designed in the hopes of helping nature include extra windows for solar lighting and heating.

So what can be done? As people have studied this issue, they have found some solutions:

- Cities can change aerial radio tower lights so that they blink, which makes them easier for birds to navigate around.
- Offices in skyscrapers can turn off their lights at night or install types of light shields.
- People can put special decals on existing windows.
- Large windowed buildings can install specialized glass that has a pattern etched into it so birds can better see the windows.

Although good, these ideas do not totally solve the problem. For the sake of endangered migratory birds, scientists and engineers must continue to study this situation. They must find new and better ways to help birds safely travel each year.

Reflections of the sky are often clear enough to confuse birds.

1. What are some things migrating birds use when navigating?
2. Give two examples of how windows can be dangerous for migratory birds. Explain why they are dangerous.
3. Choose a building near you that has a lot of windows. Make a list of problems this building could cause for migratory birds. For each problem, identify one or two solutions. Identify what might be involved in implementing your proposed solutions.

Go Digital

As birds migrate, they need safe places to rest. Research ways people can change their yards in order to make them friendlier to migratory birds.