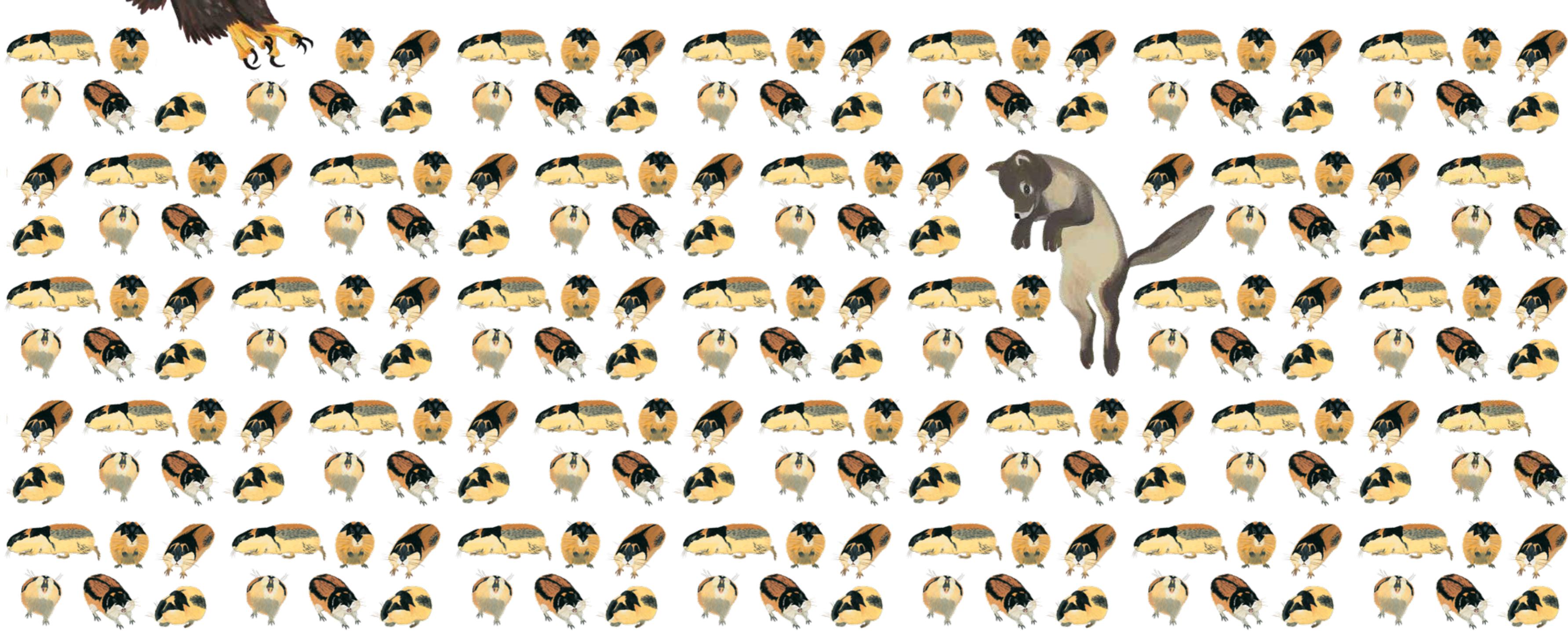
An illustration of a lemming with black, white, and orange fur perched on a large grey rock. In the foreground, there are several white cotton flowers on green stems. The background shows a landscape with mountains and a sky transitioning from yellow to blue.

Lemmings

a heartbeat in the mountains

Nina E. Eide & Inger Lise Belsvik



*To nature lovers everywhere.
We hope this inspires you to explore and take care
of our beautiful planet!*

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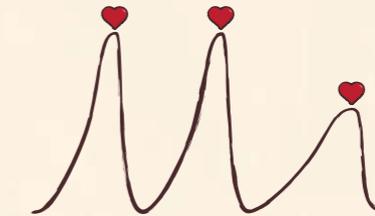
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ENGLISH TRANSLATION Elisa June Keeling Hemphill

Lemmings

a heartbeat in the mountains



Hold on tight – this book is about take take you on a lemming roller coaster!
Follow the lemmings through low years, increasing years, and peak years –
which biologists also call lemming years.
In the bottom right corner you can see where the lemmings are in the lemming cycle.
These cycles look just like the pulse of a beating heart!

Have you ever considered how important elephants wandering the savannah are for the savannah itself? If elephants didn't graze on the grasses and ravage and tear up trees, the open grasslands would become overgrown. Many of the animals living there would no longer thrive. Everything would be different!

This book is about something similar. It is about an animal called a lemming who makes its home in the Scandinavian mountains. Lemmings are much smaller than elephants, but they are just as important.

Without them, the mountains would be completely different and it would be very difficult for other animals and plants to survive there.





In outer space, satellites soar through the sky taking pictures of our planet. They make it possible to see very large parts of the earth all at the same time. Because satellites are constantly taking pictures, biologists can use these images to see how different species on earth affect their environment.

About once every four years there is a lemming year in Scandinavia. During a lemming year, millions of lemmings scurry about in the mountains squealing at passing hikers. Even though they are tiny creatures, they graze so heavily on plants that you can see the effect they have in pictures taken from outer space. Isn't that incredible?

Baby lemmings are born in small underground burrows. The burrows are like warm sleeping bags, lined with grasses and moss. This creates a cozy and safe space for the small, naked bodies. Burrow entrances are often beside or under large stones, and the burrows are connected by tunnels and pathways. For hundreds of years lemmings have continued to create their own little world, complete with tiny gardens and finely trimmed moss hedges. The busy gardeners eat, gnaw, and shape the gardens using their teeth as hedge trimmers!

Lemmings are like small hamsters with thick sausage-like bodies, short legs, and tiny ears. The shape of their bodies makes it easy for them to stay warm, even though they live far north in the cold Scandinavian mountains.



Lemming years begin under the snow and are impossible for us to see from up above.

As winter melts away, however, it becomes clear that something has happened. The mountainside looks like a battlefield after the lemmings have gnawed, ravaged, and raided throughout the winter months. Dried and dead branches from crowberry bushes lie scattered across the ground. The lemmings have gnawed the strong branches right off in a frenzy to sink their teeth into the succulent mosses that grow beneath.

As the snow melts, delicate pathways and grass nests come into view, but the lemmings have all disappeared.



After a lemming year comes a low year. Many carnivores and birds of prey starve in these years because lemmings, their favourite food, are almost impossible to find. In fact, there is so little food that many animals cannot have babies. This is what biologists call a low year, and the mountains become very quiet.

Down in the soil, however, tiny seeds lie waiting. The heavy winter grazing has cleared large areas of the mountainside, making room for new plants to grow. Now the seeds get both light and warmth, and soon new seedlings will peak up through the soil. Lemming droppings fertilize the brown battlefield, turning it into a lush green blanket. In nature everyone fights for life, even plants.

Winter is here again, and the mountains are covered with a thick blanket of snow. Beneath the snow and along the ground is a small airy space where the frost cannot reach. This is where lemmings live during the winter, with plenty of moss, grass and roots to feed on.

Lemmings dig tunnels and build winter nests in snow covered willow shrubs. They can even have babies in these cozy little nests. No other rodent species can have babies in the middle of winter!

A lemming year is on the way, and throughout the winter the lemmings multiply under the layers of snow.

Hungry carnivores have also noticed the change, and are looking forward to a good meal. An arctic fox can hear exactly where the lemmings are, scurrying and feeding under the snow. The fox stands perfectly still, listening. Suddenly it jumps, diving down into the snow nose first to snatch up a lemming.

A buzzard swoops and glides over the mountains. He is also on the lookout for lemmings. If there seems to be enough food available, he will settle down to start a family. Some animals and birds are called rodent specialists. These species only have babies in years when there are lots of lemmings and mice.

It takes two winter seasons to build up to a true lemming year,
and when it finally happens, its incredible! One thousand lemmings
become one hundred thousand lemmings, and eventually many million.

It's a lemming year!

Lemming years are like rhythmic pulses that bring new life
to the mountains.

Low year – increasing year – increasing year – peak year,
low year – increasing year – increasing year – peak year.

Almost like the beat of a heart. Some people actually
call lemmings the heart of the mountains!

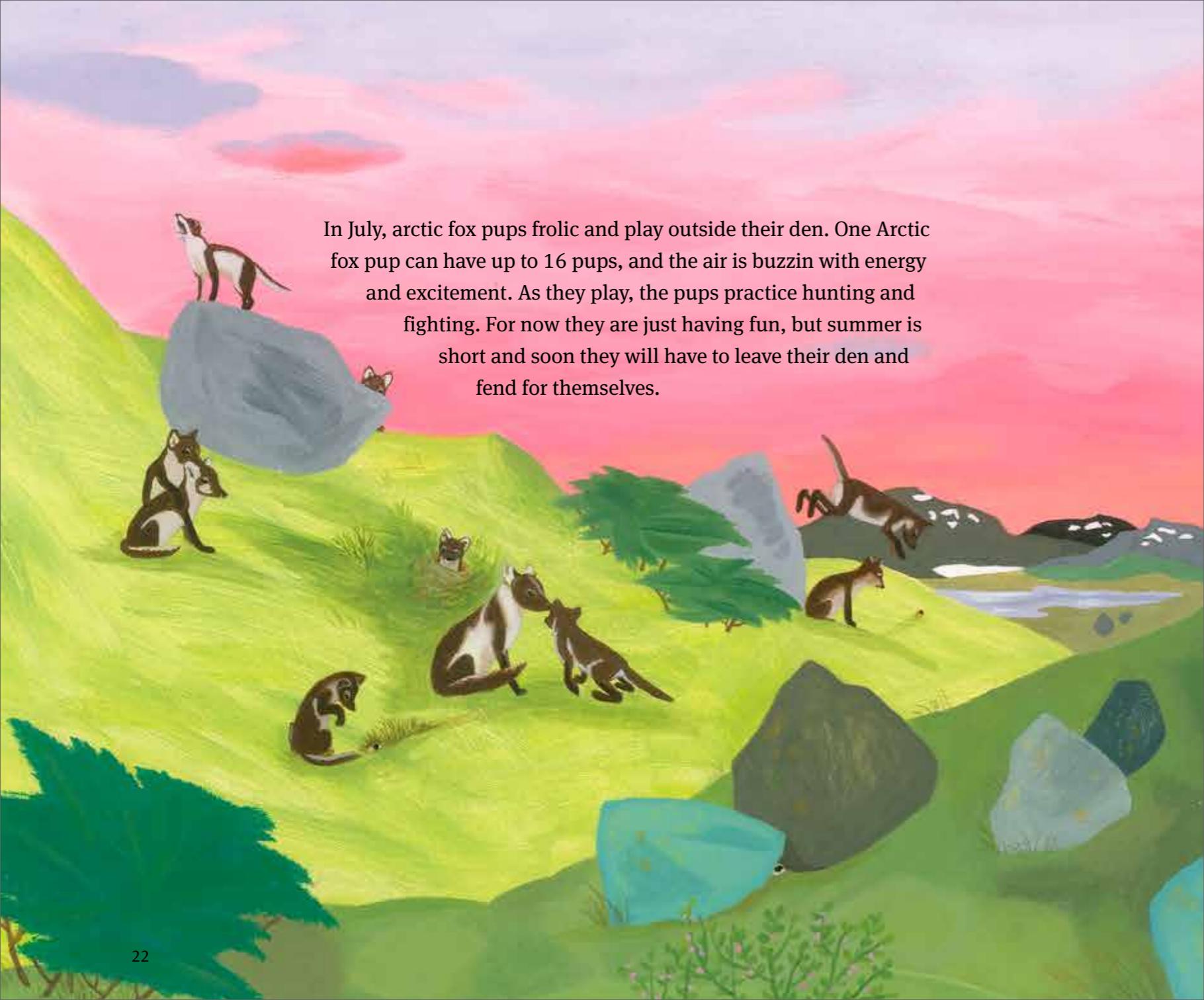
By now you have realized that the number of mice and lemmings changes dramatically from year to year, and other forms of life in the mountains follow this cycle. Almost all predatory animals and birds of prey have more young in years when rodents are plentiful.



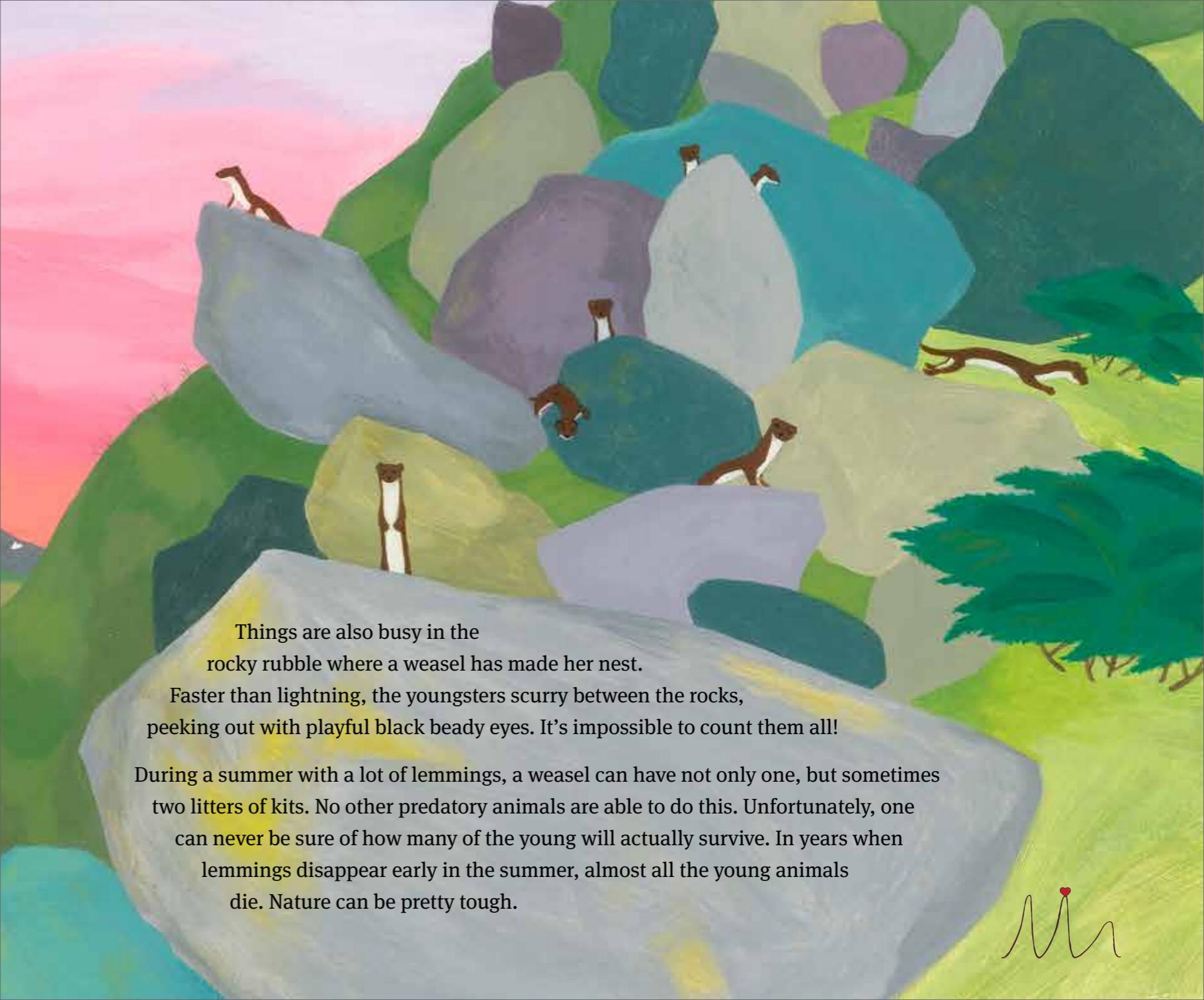
Snowy owls are nomads and can travel incredible distances to find the perfect nesting place; bustling with lemmings. Snowy owls share the responsibilities of parenting. The mother sits patiently and warms the eggs while the father is out catching food for her. Once the owlets have hatched, both parents leave the nest to hunt. They feed their owlets lemmings throughout the summer.

Buzzards and skuas also make sure to have babies in areas where lemmings are plentiful. Like all parents, they do everything they can to protect their young from danger. If you get too close to a skua's nest they might dive-bomb your head or try to lure you away by crying out and pretending to be hurt. Pretty smart, right?



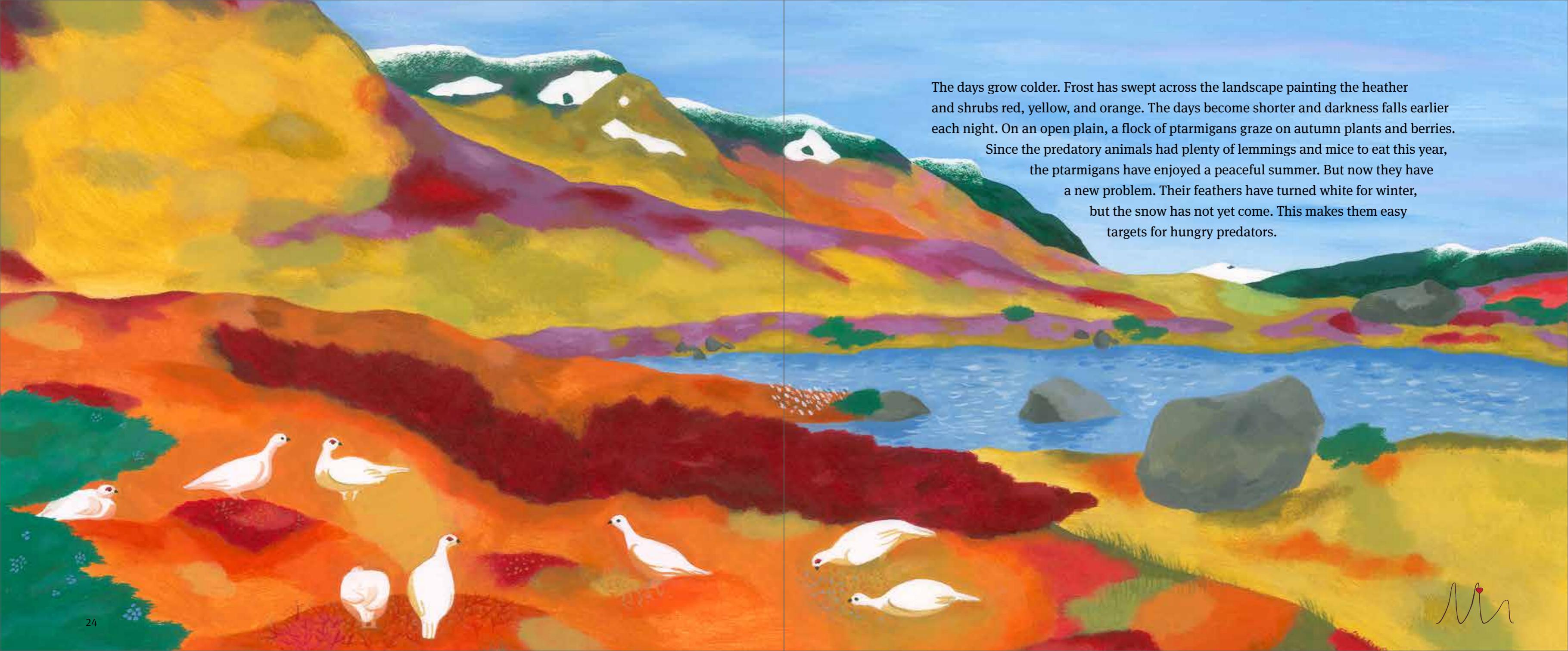
An illustration of an arctic fox den in July. The scene is set in a grassy field with a vibrant, pink and purple sky. Several fox pups are scattered throughout the landscape, some sitting on rocks, some playing together, and one running in the distance. The pups are depicted in various poses, capturing their playful nature.

In July, arctic fox pups frolic and play outside their den. One Arctic fox pup can have up to 16 pups, and the air is buzzin with energy and excitement. As they play, the pups practice hunting and fighting. For now they are just having fun, but summer is short and soon they will have to leave their den and fend for themselves.

An illustration of a weasel and her kits in a rocky, colorful landscape. The scene is set in a rocky area with a vibrant, pink and purple sky. A weasel is perched on a large rock, and several kits are scattered around, some sitting on rocks, some playing together, and one running in the distance. The kits are depicted in various poses, capturing their playful nature.

Things are also busy in the rocky rubble where a weasel has made her nest. Faster than lightning, the youngsters scurry between the rocks, peeking out with playful black beady eyes. It's impossible to count them all!

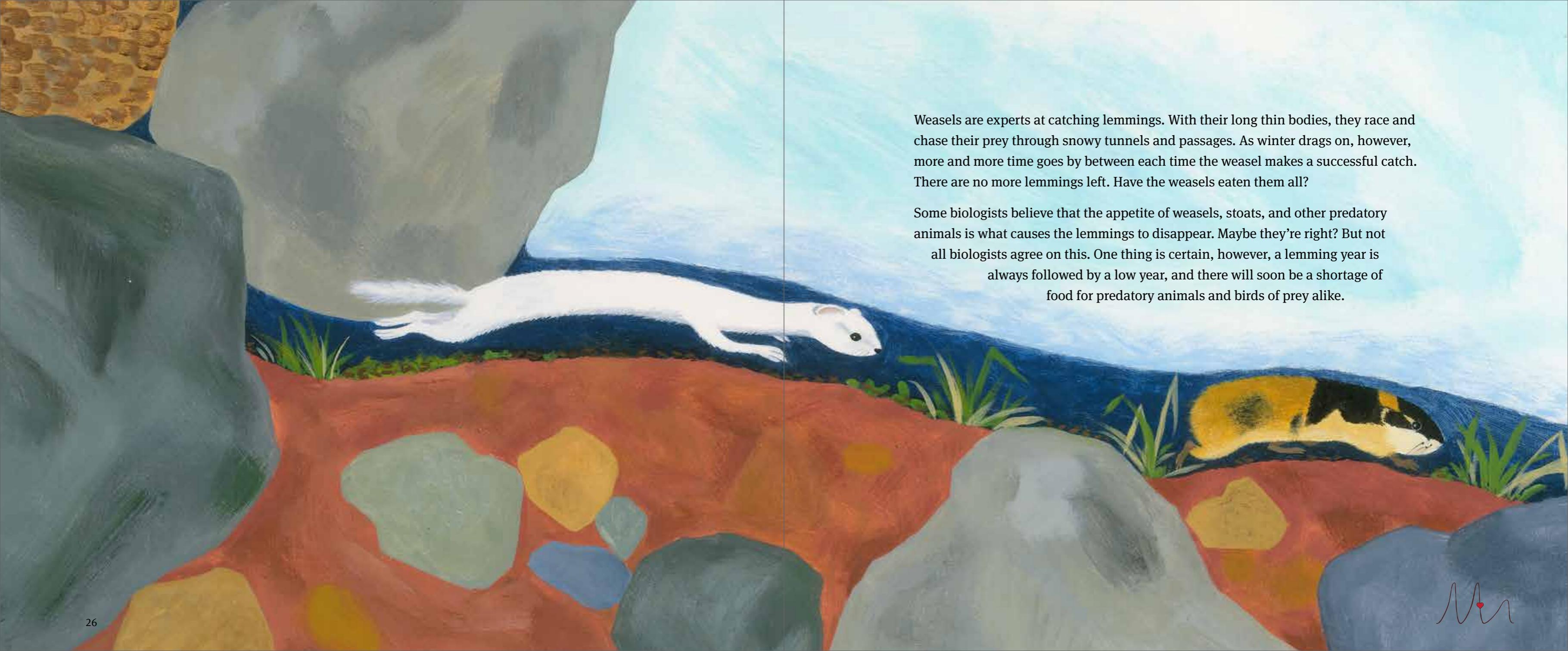
During a summer with a lot of lemmings, a weasel can have not only one, but sometimes two litters of kits. No other predatory animals are able to do this. Unfortunately, one can never be sure of how many of the young will actually survive. In years when lemmings disappear early in the summer, almost all the young animals die. Nature can be pretty tough.



The days grow colder. Frost has swept across the landscape painting the heather and shrubs red, yellow, and orange. The days become shorter and darkness falls earlier each night. On an open plain, a flock of ptarmigans graze on autumn plants and berries.

Since the predatory animals had plenty of lemmings and mice to eat this year, the ptarmigans have enjoyed a peaceful summer. But now they have a new problem. Their feathers have turned white for winter, but the snow has not yet come. This makes them easy targets for hungry predators.



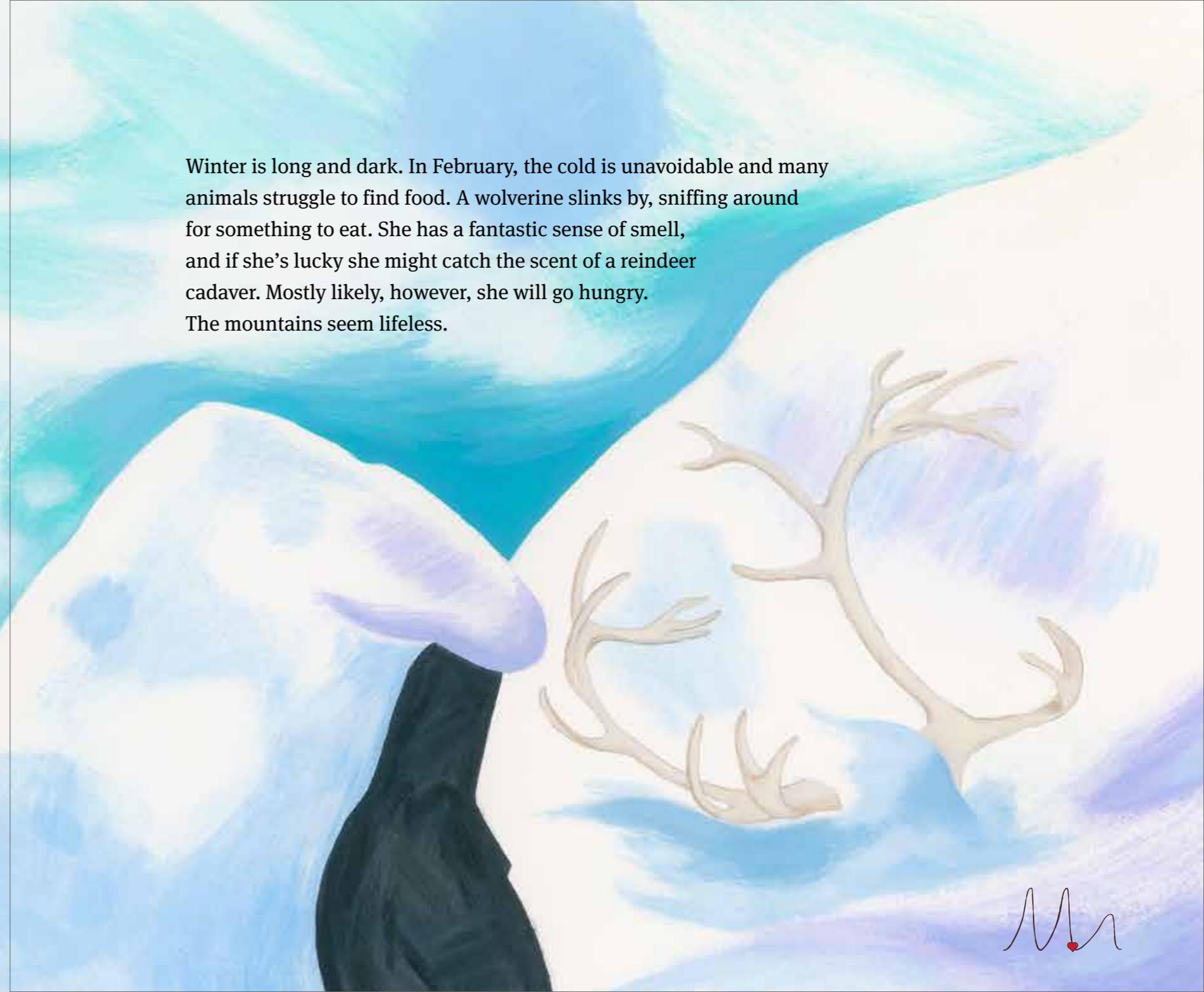


Weasels are experts at catching lemmings. With their long thin bodies, they race and chase their prey through snowy tunnels and passages. As winter drags on, however, more and more time goes by between each time the weasel makes a successful catch. There are no more lemmings left. Have the weasels eaten them all?

Some biologists believe that the appetite of weasels, stoats, and other predatory animals is what causes the lemmings to disappear. Maybe they're right? But not all biologists agree on this. One thing is certain, however, a lemming year is always followed by a low year, and there will soon be a shortage of food for predatory animals and birds of prey alike.

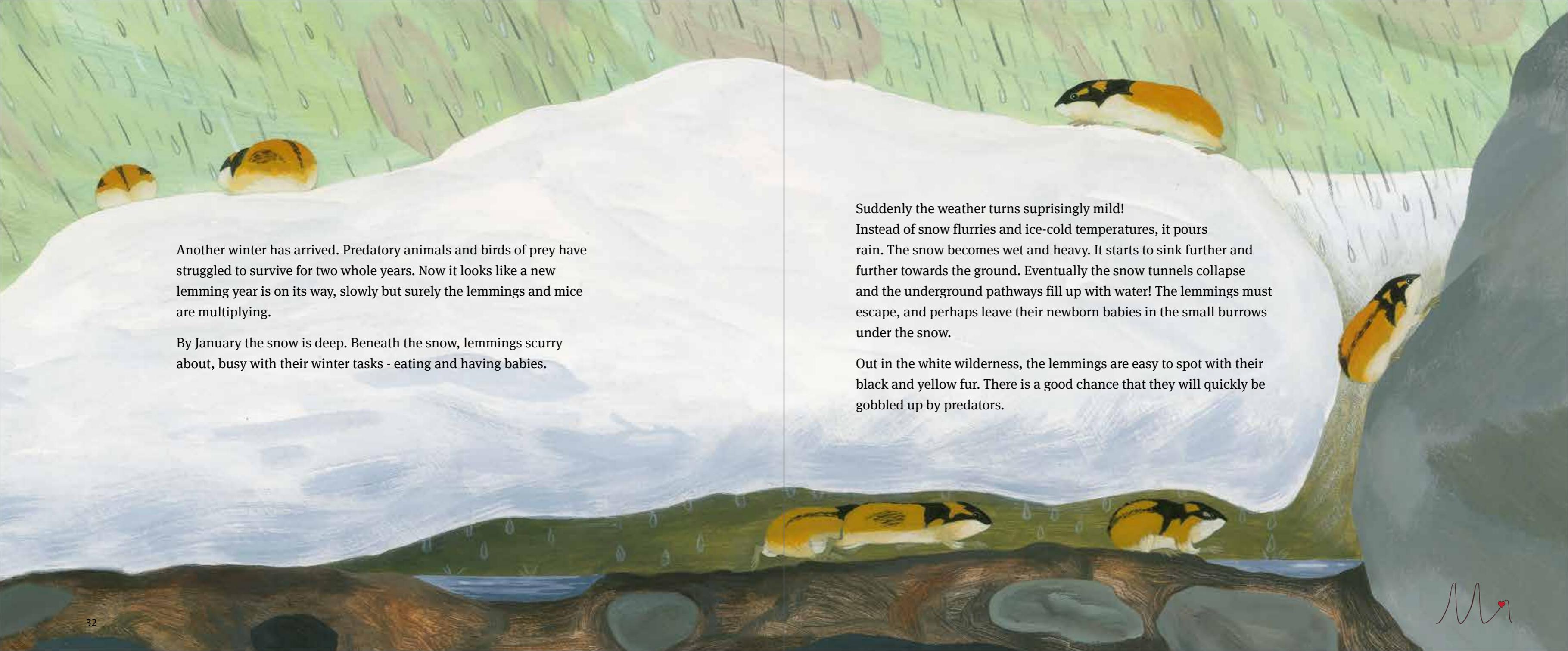


Winter is long and dark. In February, the cold is unavoidable and many animals struggle to find food. A wolverine slinks by, sniffing around for something to eat. She has a fantastic sense of smell, and if she's lucky she might catch the scent of a reindeer cadaver. Mostly likely, however, she will go hungry. The mountains seem lifeless.



Luckily, spring always returns! The days are mild and the sun is shining. The snow melts away and old lemming nests reappear. Since it is a low year again, there are no lemmings to be seen, but their nests can make new homes for other species. Bumblebees are happy to move in and lay their eggs here.

Just like in the forest, bumblebees play an important role in the mountains. Many plants rely on bumblebees to visit their flowers. The bees carry pollen from one flower to the next, and this allows the plants to seed and grow berries or fruits. Without bumblebees and other insects there would be hardly any bilberries in the mountains!

An illustration of a snowy mountain slope during a rainstorm. The sky is green with vertical rain streaks. Several lemmings with black and yellow fur are visible: two on the upper left slope, one on the upper right slope, and two on the lower slope near a small stream. The snow is white and appears to be melting or sinking under the weight of the rain.

Another winter has arrived. Predatory animals and birds of prey have struggled to survive for two whole years. Now it looks like a new lemming year is on its way, slowly but surely the lemmings and mice are multiplying.

By January the snow is deep. Beneath the snow, lemmings scurry about, busy with their winter tasks - eating and having babies.

Suddenly the weather turns surprisingly mild!

Instead of snow flurries and ice-cold temperatures, it pours rain. The snow becomes wet and heavy. It starts to sink further and further towards the ground. Eventually the snow tunnels collapse and the underground pathways fill up with water! The lemmings must escape, and perhaps leave their newborn babies in the small burrows under the snow.

Out in the white wilderness, the lemmings are easy to spot with their black and yellow fur. There is a good chance that they will quickly be gobbled up by predators.



When the cold returns, the wet snow freezes, creating a thick layer of ice. This makes things very difficult for animals that rely on plants for food. Reindeer usually use their hooves to kick the snow away and reach the nutritious lichen. Now they can't break through the ice. The calves that were born last summer must go hungry. Grouse and hare also struggle to find food when the plants they usually eat are covered by a layer of ice. When animals cannot find enough food they become weak and many die.

There were not very many lemmings this spring. It could have been a new lemming year, but the mild weather in mid-winter disrupted the cycle this time.

The climate is changing. Historical weather patterns and research suggest that winters will be warmer and more rainy in the future. How will this affect the animals and plants living in the mountains? Biologists do not know, but they are trying to find how mountain ecosystems will change as the climate changes.

Rainier winters make life difficult for many animals living in the mountains, especially lemmings. Snowy owls, skuas, and arctic foxes all prefer to eat lemmings and will most likely disappear if lemmings become harder to find. Wouldn't that be sad? Without lemmings, large mountain areas would likely become overgrown with crowberries, and no animals like eating crowberries. This would leave less room for beautiful wild flowers to grow, and many insect species might disappear.

A keystone species is a species that is so important that if it disappears, the whole ecosystem around it changes. Elephants are keystone species on the savanna. Lemmings are keystone species in the mountains. Can you believe that such a tiny animal can be so important!



More About Lemmings

Latin name: *Lemmus lemmus*

Weight: 35–135 grams. About as heavy as a medium-sized potato.

Size: Their body shape is oblong and slightly round, with short legs. Their bodies are 7–15 cm long, with a short tail about 1–2 cm long.

Characteristic features: Norwegian lemmings have a very characteristic appearance, with yellowy-orange fur speckled with black spots on their heads and along their backs.

Food: Lemmings are herbivores that eat grasses, rushes, and mosses.

Lifespan: They probably only live a few months on average. They likely live a little longer in the increasing phase of the lemming cycle compared to in peak years. In captivity they can live to be 2–3 years old.

Mating and birth: Lemmings reach maturity at only 3 weeks old. After mating, it only takes three weeks before the baby lemmings are born. This means that a female lemming can become a grandmother when she is only three months old! Lemmings can

reproduce all year long, but most litters are born during the summer. Female lemmings raise their young alone.

Number of young: Lemmings can have as many as 16 babies in a litter, but 5–7 is most common. A female may have 3–5 litters during her short life.

Lifestyle: Lemmings are solitary animals, and are mostly nocturnal. When there are few of them, we hardly ever see them. In years with more lemmings, they become more active and we can often spot them darting around in the light of day.

Habitat: Lemmings are found all the way from the low-lying birch forests up to the snowy mountains where only lichens and mosses grow. In years when there are many lemmings in the mountains, they have been known to set out on long journeys, sometimes even ending up in evergreen forests or along the coast.

During the summer, lemmings live in humid areas, often near marshes with grasses and rushes. During the winter they move to drier areas with lots of mosses, and are happiest in areas where the snow is extra deep, in the snow beds.



Distribution: The Norwegian lemming is only found in Norway, Sweden, Finland, and on the Kola Peninsula which is a part of Russia.

Migration: Lemmings wander in large groups during peak years. We say that they migrate. It is probably a lack of food that causes the lemmings to move from one area to the next. They often follow rivers and small streams, and most of them cross waterways, rivers and roads in the exact same place. Because of this, it often looks like they travel as a group, but this may just be a coincidence.

Numbers: No one knows exactly how many lemmings there are. In low years there might only be a few thousand, while in peak years the mountains are crawling with them! If we compare with other well studied lemming species, we can estimate that there may be between 10,000–20,000 lemmings per square kilometre, or 1–2 per 100 square meters in peak years. In an area the size of a FIFA football field, which is 68 metres wide and 105 metres long, this would equal between 70 and 140 lemmings. Scandinavia has a lot of mountainous areas, over 150,000 square kilometres! If lemmings were spread equally in all of these areas, this would amount to more

than 2–3 billion lemmings in peak years! In reality there are probably not quite this many, since not all mountain areas are suitable for lemmings. In peak years, however, there are definitely many, many millions of them!



Other rodents in the Scandinavian mountains

In addition to lemmings, many other vole species can be found in the mountains. The most common are the field vole, the tundra vole, the grey red-backed vole, and the bank vole. Their numbers vary from year to year just like the lemmings.





Teeth that never stop growing

Lemmings belong to a group of animals called rodents. Rodents are known for chewing and gnawing. All this grazing on twigs, bark, and roots, wears down their teeth. Because of this, rodent teeth continue to grow throughout their lives. Biologists have measured that rats teeth can grow as much as 2.7 mm per week. That means that a rats teeth can grow 2.7 cm in 10 weeks. If a lemming lives to be 2 years old, their teeth would have grown more than 27 cm during their lifetime!

Colours like a wasp

The colour combination of yellow and black is a common warning signal in the animal kingdom. Many of the insects that sting are yellow and black, like for example wasps and bees. Some people think that lemmings are yellow and black to signal that they taste bad, but it is more likely that these colours provide the best camouflage in the golden mountain landscape during the fall.

Claws like an excavator

During the winter, lemming claws grow wide and long. They become like shovels that can be used to dig tunnels and hollow out small snow caves, deep down in the snow.



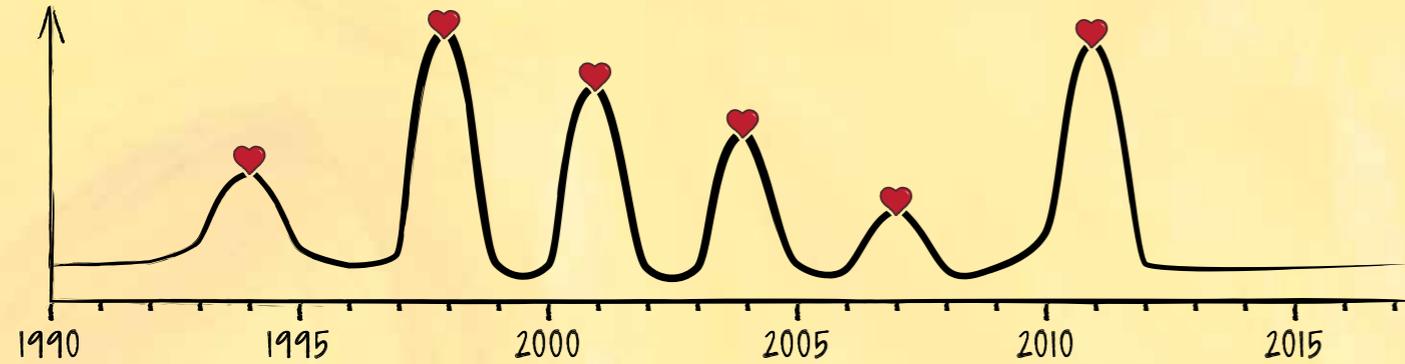
Big families

In a peak year, a single female lemming can create a family of more than 1000 lemmings! How can this be possible?

If a female has 5 litters, with 10 babies in each litter, then she has produced 50 young lemmings! If all of these lemmings survive and reproduce, they will have just enough time to have 3 litters of their own. With 10 babies in each of these new litters, our original female lemming now has 300 lemming grandchildren. Before she dies, the first litter of grandchildren might also reproduce, which means she will now have 1000 great grandchildren.

When we add this all up, 50 young lemmings, plus 300 grandchildren, and 1000 great grandchildren, we have 1350 lemmings – if all of them survive. Almost no other mammals are able to reproduce and multiply this quickly!

All About Rodent Cycles



Rodent cycles

A lemming year occurs every 3–5 years. In fact, many species in the northern hemisphere show this kind of population cycle. In certain places, the time between peak years is a lot longer. In North America, for example, many species have a 9–10 year cycle.

Why are there rodent cycles?

This is a question that biologists have been trying to answer for a very long time, for many decades in fact. Many theories have been explored through observation and experiment, but researchers are still not in agreement or sure that they truly understand this system yet. They are pretty sure, however, that there are many factors working together:

Could it be that there isn't enough food?

As you have learned, lemmings graze so heavily on plants that the effect can be seen from outer space. Many researchers have wondered if lemmings, in fact, eat so much they they simply run out of food. It seems, however, that there is usually more than enough left.



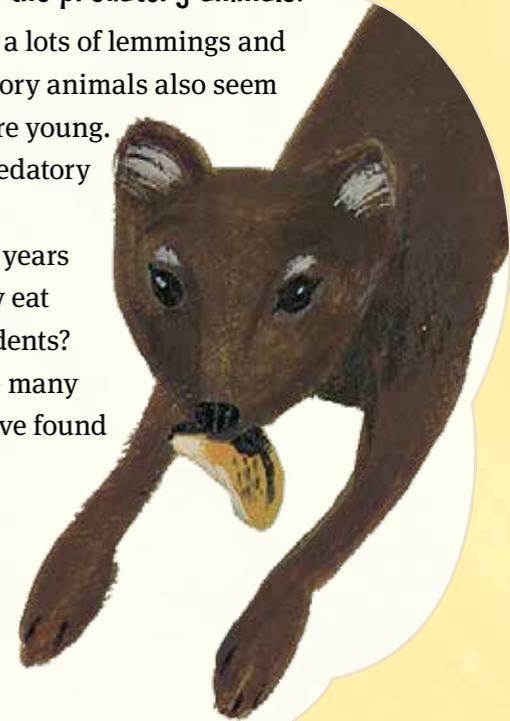
Could it be that the plants are defending themselves?

The tastiest plants are always eaten first and those that remain are often less edible. Some plants defend themselves against grazing by having leather-like leaves, sharp edges, or thorns. Some have so much silica (a form of quartz crystal) in their leaves that the stomachs of herbivores cannot digest them. Other plants simply taste bad, and some even produce poisons.



Could it be the predatory animals?

When there a lots of lemmings and mice, predatory animals also seem to produce more young. Could it be that predatory animals become so numerous in some years that they actually eat up all of the rodents? Yes, perhaps – many researchers have found evidence to support this theory.



Could it be that there are too many lemmings?

During lemming years, the Scandinavian mountains teem with squealing lemmings. As they multiply, there becomes less and less space, and they may become aggressive as they try to defend their small territories. Since they constantly have to defend themselves, there is not a lot of time to eat. In fact, surveys of dead lemmings found during peak years show that many have completely empty stomachs. Some biologists believe that lemmings die of prolonged stress. Diseases are also spread more easily when so many rodents live so close to one another.



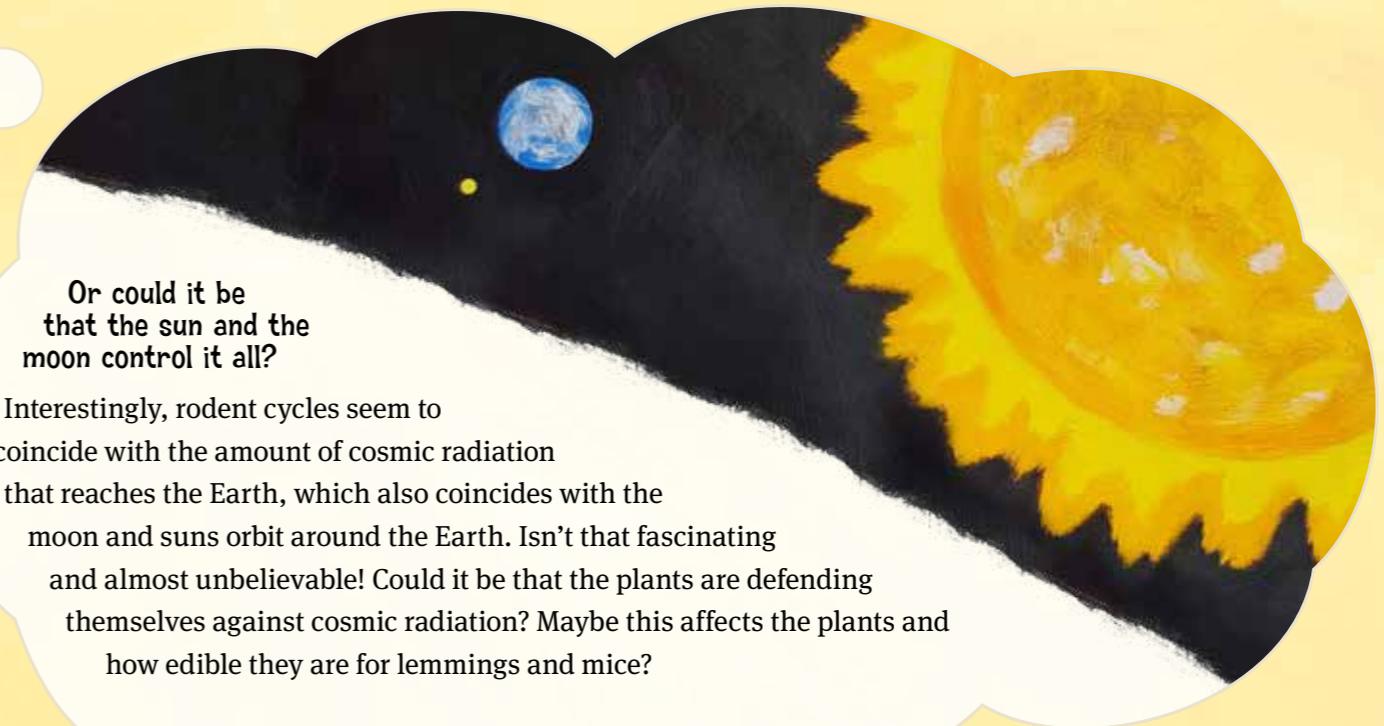
But what about climate change?

Long winters with plenty of snow are most likely a determining factor for cycles in nature, and this explains why such cycles are found in the northern hemisphere. The snow provides rodents with protection against predators. This means that lemmings, who reproduce beneath the snow, can even grow in numbers throughout the winter. With climate change causing warmer and wetter winters, this protection disappears. This may result in fewer lemmings and mice in the mountains, and less obvious peak years.



Or could it be that the sun and the moon control it all?

Interestingly, rodent cycles seem to coincide with the amount of cosmic radiation that reaches the Earth, which also coincides with the moon and suns orbit around the Earth. Isn't that fascinating and almost unbelievable! Could it be that the plants are defending themselves against cosmic radiation? Maybe this affects the plants and how edible they are for lemmings and mice?

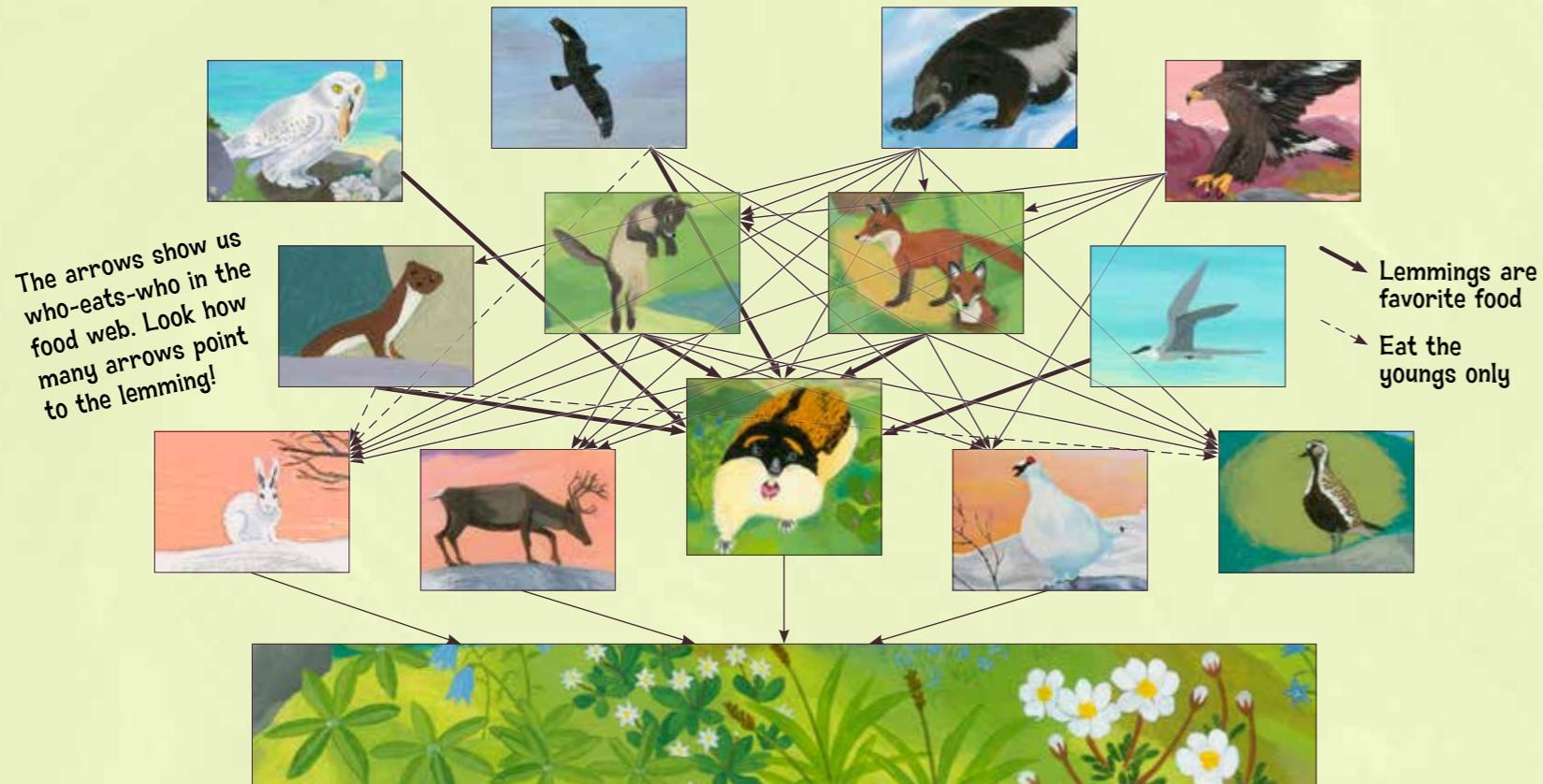


Why do other species also follow cycles?

As you have learned in this book, other species also show cyclic patterns following the rodent cycle. In nature it is often a struggle to survive, and many animals must go hungry a lot of the time. When there are no mice and lemmings to be found, predatory animals become thin. They grow weak and cannot reproduce. When there is plenty of prey, however, the opposite is true. Predatory animals have plenty to eat, they stay strong and healthy, and they have lots of young. In this way, rodent cycles affect the whole food chain, and their ecosystem.

The mountain ecosystem and keystone species

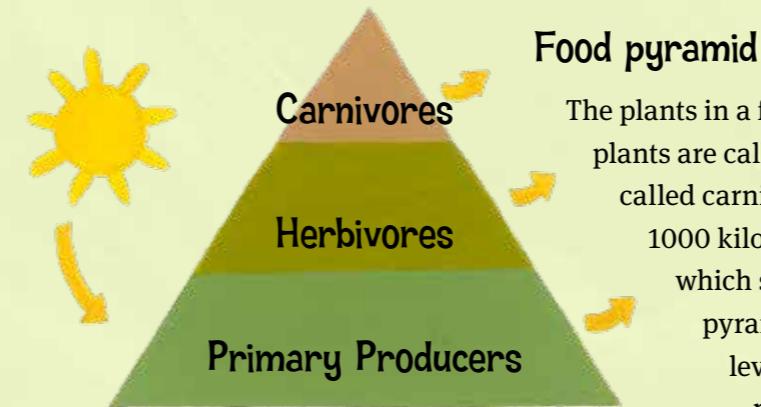
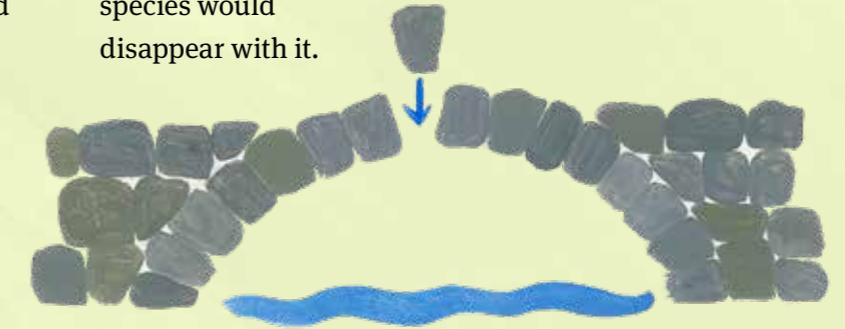
Since animals eat both plants and other animals, the different species are considered to be linked in what we call a food chain. The network connecting all the species in a mountain area is called a food web. If we include the surrounding environment (the water, the soil, and the air), it is called a mountain ecosystem.



What is a keystone species?

Animals that have connections to multiple other species are important in their ecosystem. Some species are in fact keystone species. The lemming, as you have read, is a keystone species. The word keystone comes from a time, long ago, when bridges were built completely out of stone. The keystone was the central stone that locked and secured the entire construction. This specific stone made sure that the bridge could stand for hundreds of years. If the keystone fell out, however, the whole bridge would collapse.

Just like the keystone in a bridge, the lemming is the keystone species in the mountain ecosystem. If this particular species disappeared, many species would disappear with it.



The plants in a food web are called primary producers. Animals that eat plants are called herbivores, and animals that eat other animals are called carnivores. Primary producers are always the most abundant. 1000 kilos of plant material supports about 100 kilos of herbivores, which supports about 10 kilos of carnivores. This is called a food pyramid, and it shows the loss of energy between the different levels in a food web. This is why, in the wild, there are always more herbivores than carnivores.

Monitoring the environment

By using pictures from satellites in space, we can monitor the environment, and even map the distribution of plants and animals. You can explore yourself using Google Earth. With the click of a button you can even be out in outer space!

If you zoom in on Kenya, you can see the distribution of savannahs, rainforests, large rivers, and even some of the biggest migration routes that animals use to cross the great savannas. If you zoom in on Scandinavia, you will see peaks, some glaciers, treeless mountain tundra, forested valleys, creeks, and rivers. Grazing by lemmings cannot be seen directly, but researchers use computers to help identify these areas.

The species that leaves the biggest trace is us humans. Today there are almost 8 billion people living on Earth, and we have spread to almost all the corners of the planet.

Although lemmings do not weigh very much (only about 35–130 grams), the total weight of all the lemmings in a peak year is enormous. Even though no one truly knows how many lemmings there are, there are definitely many millions of them in peak years. 1 million lemmings would weigh about 85,000 kilos,

and if there really were 1 billion lemmings in peak years, that would amount to over 85 billion kilos of lemmings. Suddenly it doesn't seem so strange that the grazing by these little animals can be seen all the way from outer space!



Studying our fantastic environment!

If you found some of these facts exciting, then maybe you are a biologist in the making?

Nina E. Eide, one of the authors of this book, has been working as a biologist for almost 25 years. She finds it very exciting to try to find answers to questions about lemmings and the interactions between animals in the mountain ecosystem. You will often find her with her nose down in the moss counting plants, animals, and even lemming droppings! By counting lemming droppings, she can find out whether it is a low year or a peak year, and by doing this in lots of places, she can look at differences between different mountain areas.

She also measures the temperature using tiny temperature loggers that are placed out on the ground all year long. This is how she finds out when the first snow fell, when it melted again, and whether or not there were warm periods through the winter. She also digs snow

profiles to see if there are layers of ice in the snow. This tells her whether or not it rained during the winter. Nina also measures the height of the airy space between the ground and the snow, and compares all of this information with the number of lemmings in the mountains the following summer.



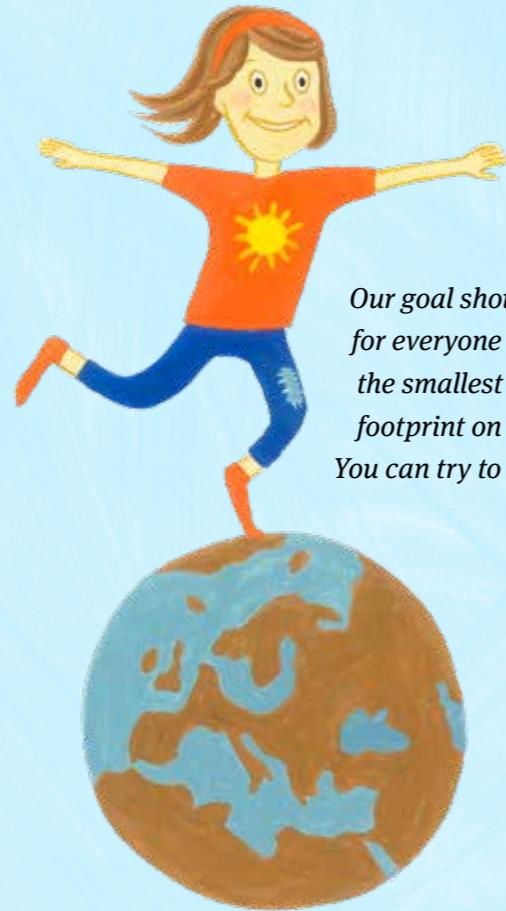
A changing climate

Winters are steadily growing warmer. As you've read, rain on snow freezes into icy layers that make it more difficult for animals to survive in the mountains. Increased temperatures and more rain during the winter are the result of global warming. This is partly due to the fact that there are so many people who rely on our natural environment.

Our ecological footprint

Everything we eat, the clothes and shoes we wear, and really everything we surround ourselves with on a daily basis, comes from nature. If you break down a car into all of its parts, you'll find that all of them come from nature in one way or another. It might be kind of difficult to see the similarity between a car and a lemming in the mountains, but we know for sure that climate change is the result of too many people using and relying too heavily on nature. Some people use the term "ecological footprint" to describe just how much humans affect nature. It's actually a pretty good idea. If you use

a lot, you leave a large footprint, and if you use a little, you leave a smaller footprint.



Our goal should be for everyone to leave the smallest possible footprint on our Earth. You can try to do this too!

Here's what you can do to help reduce global warming:

- **Only buy things that you really need.**
- **Re-use things, and give clothes that no longer fit or toys that you have grown too old for to someone else.** It's a great idea to pass things along. In addition to being nice, you're helping both other people and the environment. Little cousins often find it very fun to get toys and clothes that their older cousins have used.
- **Learn to repair things that are broken.** Then you don't have to throw things away and buy new all the time. You and your parents will save a lot of money, and you save the environment. In fact, it is actually really fun to repair things yourself! It is also possible to create entirely new things from old things. Then it becomes something unique that only you have.
- **Skip buying the newest cellphone.** If you really want to do something good for the environment, keep using your old telephone until it doesn't work anymore.
- **Eat more vegetables, fruits, and berries.** As you can see from the food pyramid, a lot of energy is lost from plants to herbivores. If everyone ate more vegetables, there would be more food for everyone. This is why it's also important not to make more food than you can eat up. This way you don't have to throw away food, and you use less of nature's energy.
- **Bike more often, or take the bus or train.** Cars and airplanes emit gases that contribute to global warming. Because of this, it's a much better idea to use our own muscles and other environmentally friendly types of transportation whenever you can. When you bike, you also get stronger and faster. When you take the train, you get to see new places and lots of nature, and you can even stretch out your legs when you get tired of sitting.

Learn more

If you want to learn more about lemmings, mountain ecosystems, or interactions in nature, you can check out the following books:

- *Meet the Arctic Fox*. Nina E Eide, Terje Borg, Camilla Næss and Inger Lise Belsvik. Mangschou AS, Bergen, 2013.
- *What If There Were No Lemmings? A Book about the Tundra Ecosystem*. Suzanne Buckingham Slade. Capstone, 2010.
- *A Snowy Owl Story (Wildlife on the Move)*. Melissa Kim and Jada Fitch. Islandport Press; Board Book edition, 2015.
- *Basher Science: Climate Change*. Simon Basher. Kingfisher; Pap/Pstr edition, 2015.

If you feel like you want to do even more to reduce global warming, take a look at some of these websites for more tips on how you can help:

- climatekids.nasa.gov
- parkcitygreen.org/Calculators/Kids-Calculator.aspx
- wwf.org.uk/get-involved
- amnh.org/explore/ology/earth/ask-a-scientist-about-our-environment/how-can-kids-help-prevent-global-warming

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Do you want to get to know the Scandinavian lemming?

During lemming years, the mountains teem with angry lemmings.
But all of the sudden they are all gone, and many years can pass
before you see a lemming again.

In this book, you can follow the Scandinavian lemmings through
peak years and low years. You can also read about why lemmings are
so important that they are called “a heartbeat in the mountains”.
But climate change might cause all of these lemmings to disappear.

Without lemmings, what do you think would happen
to all of the other mountain species?

*Nina E. Eide, a biologist at the Norwegian Institute for Nature
Research, has together with co-writer and illustrator
Inger Lise Belsvik, written this sequel
to “Meet the Arctic Fox”.*

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