



Alaska's Wild Wonders



We Need Fires to Have Healthy Ecosystems!

Many people think that fire is a bad thing and that it is harmful to wildlife, but fire actually plays a role in keeping Alaska's ecosystems healthy. Smokey Bear's message—"Only you can prevent forest fires"—is aimed at fires caused by people and is accurate in that sense. Humans usually cause fires near where people live and these can threaten life and property. People should prevent accidental fires. People cannot, however, be expected to prevent fires caused by nature. What's more, when fires aren't threatening people or property, it may be beneficial to the ecosystem to let them burn.

Take a look inside this magazine and see how fire really affects our environment and the animals that live there. You might be surprised by what you learn!

Did You Know?

In an average year in Alaska fires burn about a million acres of forest and tundra. Wow! A million acres? That's almost the size of the entire Municipality of Anchorage!

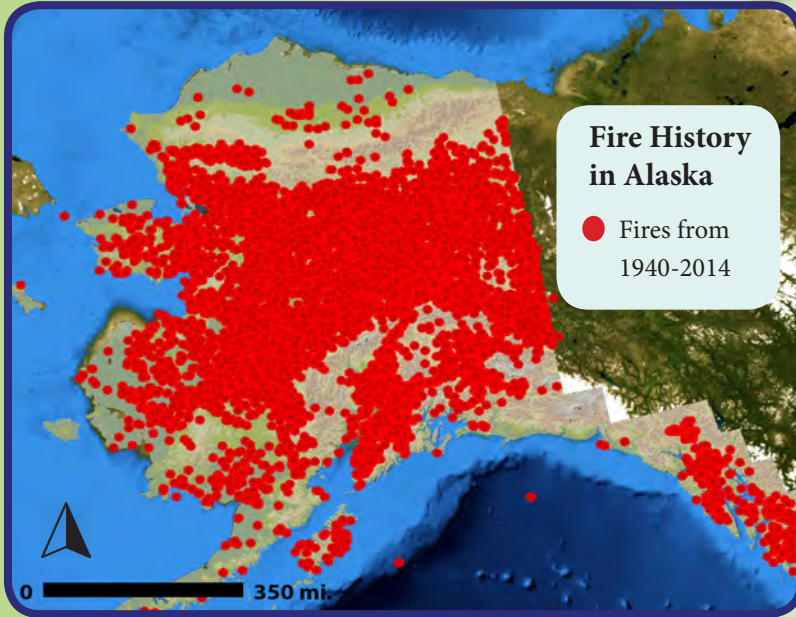
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Fire in Alaska: Burning Questions!



This map shows the locations of all the major fires in Alaska since 1940. While there are certainly fires throughout the state, notice how the Interior region of Alaska has had the most fires. Can you guess why?

This map is from the Alaska Fire Service website. You can do your own research, find out where fires are currently burning and create custom maps about Alaska's fire history. Go to <http://fire.ak.blm.gov/afs/> to check it out!

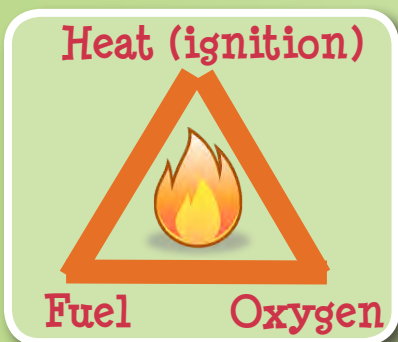
Does all of Alaska burn?

Alaska is an enormous state with several different ecosystems. **Tundra** is found mainly in the north, west coast, and mountains, but is also mixed in with boreal forest. Southeast Alaska is home to the coastal **rainforest**, where the weather is often wet and cloudy. A big part of Alaska is **boreal forest**, which makes up most of the Interior region. Fire plays a different role in each of these environments. Why? Because fire needs certain conditions to exist.

What is fire?

We've probably all felt the warmth of a fire or sat around a campfire and enjoyed roasting marshmallows. But what exactly is fire? The definition is: *The rapid and persistent chemical reaction which combines fuel and oxygen to produce heat and light.*

How does it burn?



All fires need three things to burn. These three things make up what is called the **Fire Triangle**. If you take any one of them out of the triangle, the fire will not burn.



What are the sources of oxygen, fuel, and ignition for wildfires?

Can the rainforest in Southeast Alaska burn?



Good question!

It is almost always wet in Southeast Alaska where more than 100 inches of rain fall annually. However, there are occasional sunny spells that can dry out the forest enough to create the right conditions for fires. Occasionally lightning will start a fire in Southeast Alaska, but most fires are started by people.

What's this duff stuff?

Duff is the accumulated organic material (leaves, needles, roots, fallen branches, etc.) on the forest floor. Most fires in Southeast burn in the duff layer. Fires can actually burn for a long time underground. They burn slowly and flames may not be visible. Fires in the rainforest tend to be rather small compared to fires in other areas of the state. This is because there are lots of wet areas, like muskeg, that prevent a fire from getting too large.

Fire on the tundra

How can the tundra burn if there are no trees? There are many other plant species on the tundra that are prone to burning. Plants in the heath family such as blueberry and Labrador tea produce a flammable resin that make them burn easily.



Blueberry



Labrador Tea



Dry lichens, blueberries, cranberries, Labrador tea, and other members of the heath family are flammable. They allow ground fires to start and spread quickly in the boreal forest and tundra.



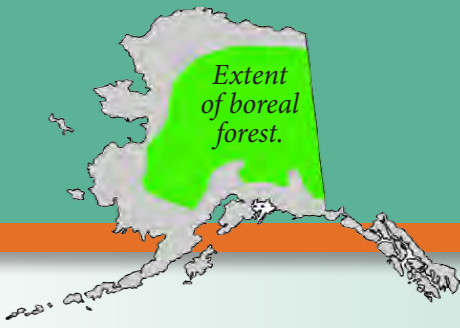
Sure tundra can burn, but does it?

Fire history shows that the tundra has not burned as often in the past as it does today. Scientists are only recently learning more about tundra fires and how they affect wildlife. The Anaktuvuk fire in 2007 was the largest tundra fire in Alaska's recorded history. Scientists are studying this site to learn about the types of impacts that fire has on plants and wildlife in the tundra.

Answers - Turn upside down to read!

Crossword Challenge: Across... (1) Woodpecker (6) Lightning (7) Meet (8) Ashes Down... (1) Willow (2) Open (3) Habitat (4) Snags (5) Fireweed Habitat Match: (1) Lynx (2) Marten (3) Ruffed Grouse (4) Moose (5) Northern 3-toed Woodpecker

Boreal Forest



The boreal forest is the largest terrestrial ecosystem on Earth, covering some 11 percent of land area on the planet! In Alaska, boreal forest is found in the Interior between the Brooks Range in the north and the Alaska Range in the south. It is characterized by the dominant tree species: aspen, spruce (black and white), and paper birch.



Aspen



Black Spruce



Paper Birch

Everyone Can Succeed!

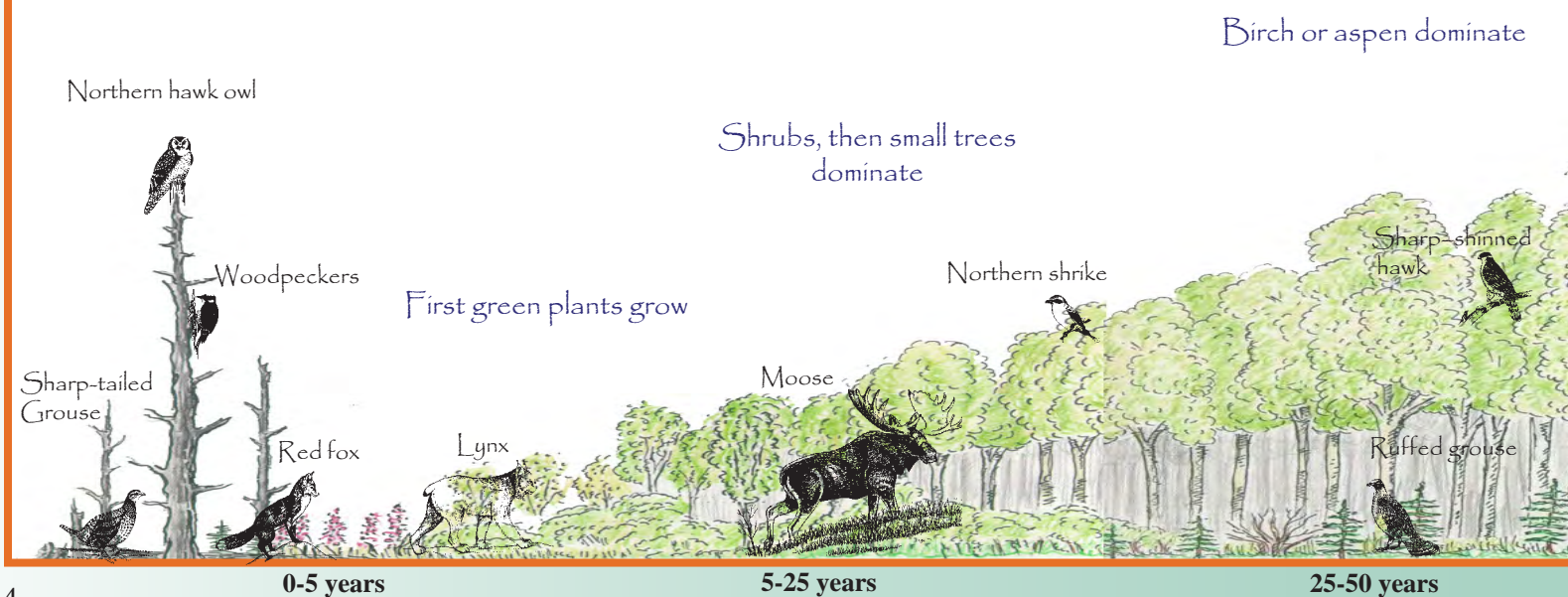
The natural change in plant and wildlife populations after a disturbance is called **succession**. Succession usually begins with small herbaceous plants (low-growing plants without woody stems) and then eventually leads to old spruce forest over time. Look outside your school. What stages of succession can you identify in your area?

Each successional stage of the boreal forest provides habitat for different animals. Some animals rely on more than one successional stage to meet their needs. For example, some owls need older forests to hide and nest in, but they hunt for small mammals in newer areas of the forest among herbs and shrubs where more prey animals can be found.

Did You Know?

Because spruce trees are shade tolerant they can live and slowly grow beneath aspen and birch trees. When the aspen and birch trees die, the spruce dominate the forest. If there was no disturbance in the forest it would eventually end up becoming all spruce. That would not be good for many species of wildlife.

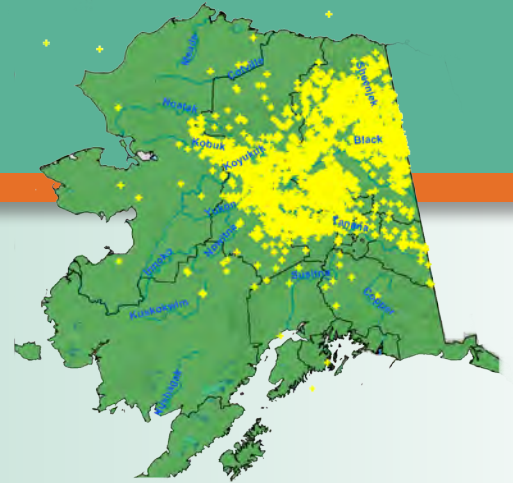
Boreal Forest Succession



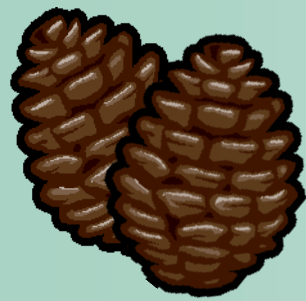
It's Designed to Burn

What do you get when you have hot, dry summers, lots of highly flammable materials, and lightning? That's right...fires.

A combination of hot, dry summers, frequent lightning, and abundant spruce trees make the boreal forest in Alaska fire prone. Black spruce trees are particularly vulnerable to fire because they have branches near the ground and a high resin content. Most black spruce forests burn before they're 100 years old.



This map shows over 4,000 lightning strikes for more than a 24-hour period in early June 2014! You can see the number and location of lightning strikes for any day you want. Check it out by going to the Alaska Fire Service website. <http://fire.ak.blm.gov/afs/>

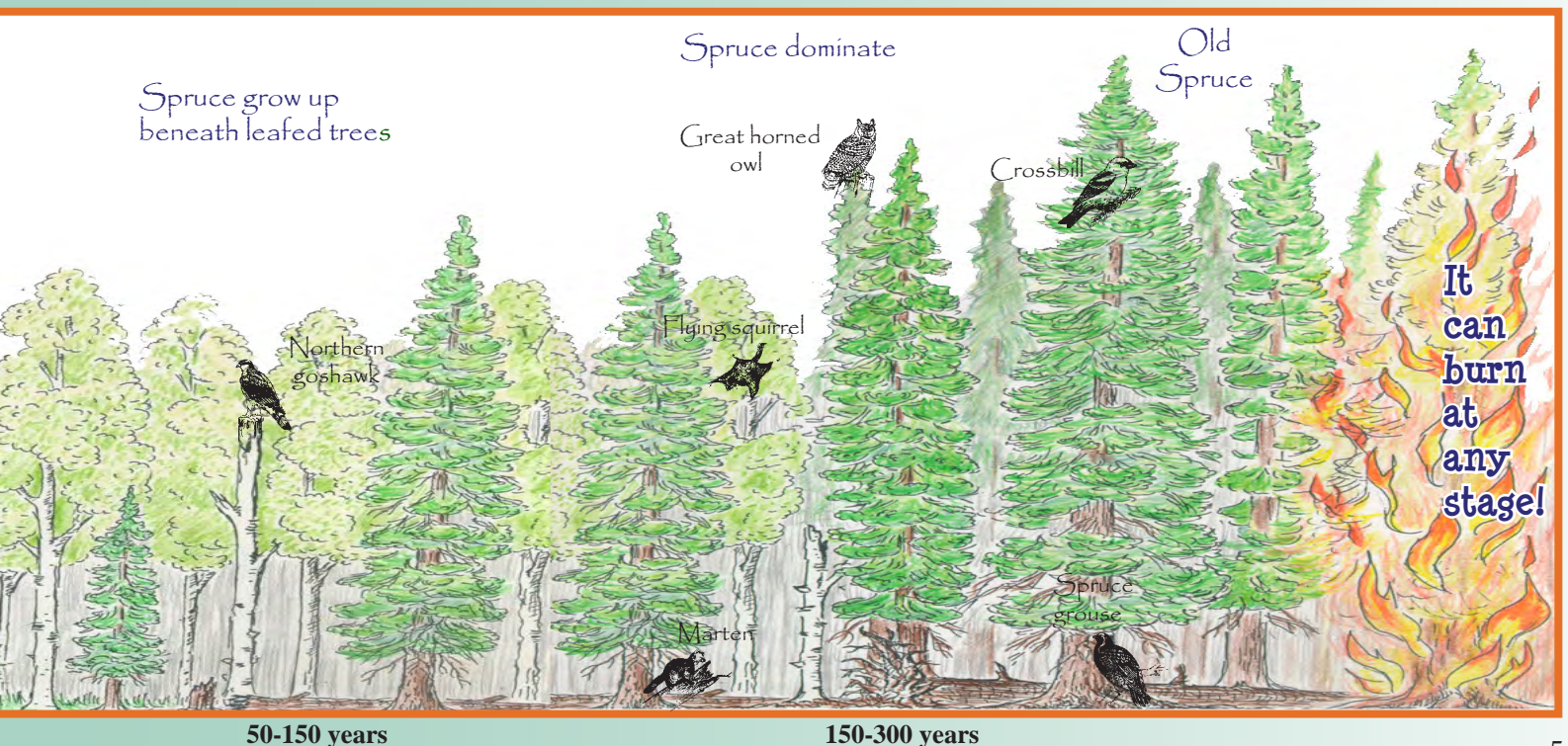


Spruce Need Fire!

Black spruce trees have what is called **semi-serotinous** cones. They have a waxy coating that keeps the cones closed until a heat event (like fire) causes them to open up and drop their seeds on the newly exposed soil.

Did You Know?

Hundreds of fires burn in Alaska every year. Most of them are human-caused, but many are caused by lightning. Even though there are more human-caused fires, they burn fewer acres than naturally-caused fires.



Fire and Wildlife

It's all about habitat

Every animal has specific habitat requirements to meet its need for food, water, shelter, and space. If an animal's habitat needs are not met in a certain location it cannot live there. In order to have a lot of wildlife diversity you need a lot of different types of habitat!

Fires create habitat diversity!



Standing dead trees are called **snags**.

Don't fires just burn everything up?

No! Not at all!

Some animals die in fires but many animals have the ability to fly or run away. Plus there are many areas within the fire perimeter that do not burn. Wildlife biologists look at the long-term benefits of fire, such as habitat creation and rejuvenation. In fact, fire is sometimes used as a tool by biologists to enhance habitat.

Fires actually burn some areas completely, scorch other areas, and leave some areas untouched. The result is a patchwork of habitats called a **habitat mosaic**.



Wildlife need an edge!

The border where two successional stages meet is called an **edge**. Edges support the greatest diversity of wildlife and many animals use edges as travel routes and hunting grounds. Examples of edges are where a mature spruce forest meets a young birch forest, or an open meadow, or willow thickets. Can you find any edges around your home or school?



The black-backed woodpecker thrives in recent burn areas where it eats beetles that invade dead and dying trees.

Learn more about Alaska's wildlife at www.wildlife.alaska.gov

Into the Future!



New life arises from the ashes

Life continues. Fires burn organic material and fertilize the soils for new plants to grow. Many burned plants are not killed. After a fire, newly burned areas are soon covered by a thick carpet of green plants, such as fireweed—one of the first green plants to sprout after fire. Over the next several years shrubs such as alder, willow and berry bushes begin to grow in the warm, sunny sites along with several tree species.

Fire and Climate Change

The change in the Earth's weather patterns over time is called **climate change**. Climate affects where plants and animals live. In Alaska it also contributes to the types and frequency of wildfires. A warming climate will lead to more fires and could change the habitat for many animals. Highly flammable spruce forests will likely decline and be replaced by more birch and aspen forests.

Scientists study the effects of fire today and attempt to determine what the future vegetation will look like. How do you think climate change will affect the future of fire in Alaska?



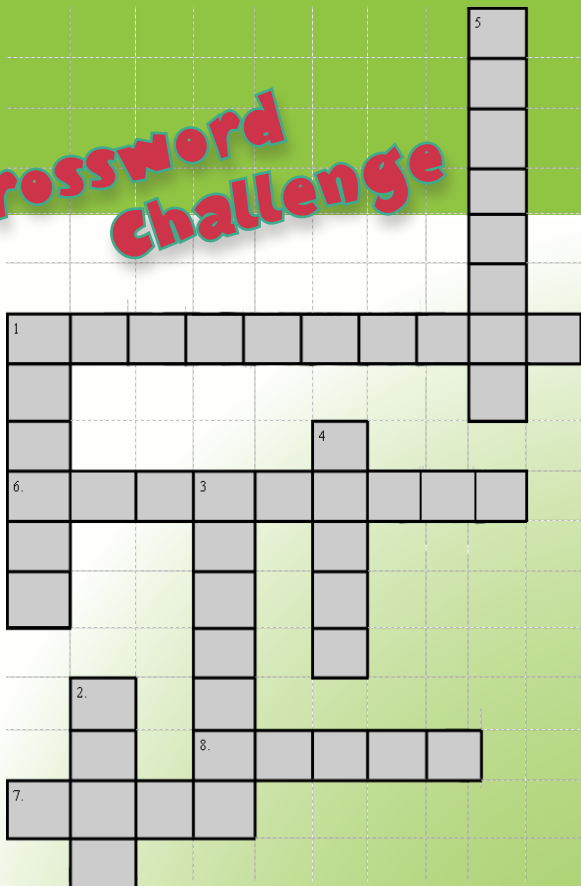
What about moose and caribou?

A warming climate could be a good thing for moose, and possibly not so great for caribou. Why? Because caribou rely on old-growth spruce forests and lichen, which may decline with more fire in a warming climate. Moose on the other hand thrive on aspen, willow, and birch. These plants will likely increase with a warming climate. Moose love willow—it's their favorite food!



Crossword Challenge

Fire Puzzles



ACROSS

1. Bird that arrives after a fire to eat bark beetles in dead or dying trees.
6. In Interior Alaska this starts many fires.
7. Edges are where different successional stages_____.
8. Burned shrubs and other plants turn into _____ which help new plants grow.

DOWN

1. Favorite food of moose.
2. Spruce cones do this after a fire.
3. Wildland fires can improve _____ for wildlife.
4. Dead, standing trees that provide food and homes for birds and small mammals.
5. One of the first green plants to sprout after a fire.



Answers on page 3

Habitat Match

Answers on page 3

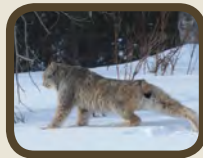
Each paragraph describes one of the animals below. You will notice that different animals use various succession stages. Draw a line from the animal to its story.



Marten



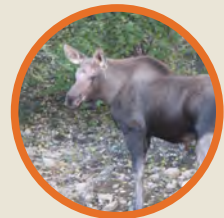
Ruffed grouse



Lynx



Northern three-toed woodpecker



Moose

1. Snowshoe hares are my main food. My tufted ears help me listen for movement. I hunt in shrubby areas, but stay close to the mature birch-spruce forests that offer cover and shelter.

2. I make my den in old, hollow spruce trees and travel into newly burned patches to find voles to eat.

3. I nest on the ground near the base of a tree. My summer home is in alder thickets and willows, with some trips to the mature forest. In the winter you'll find me eating seeds and buds in a mature aspen forest.

4. After spending most of my day eating willow leaves and twigs, I like to bed down in the cool spruce forest.

5. I chisel out my nesting cavity in a snag (dead tree) near the edge of old forests. Recently burned spruce forests provide me with plenty of bark beetles and other insects to eat.

Alaska's Wild Wonders Issue No. 4, July 2014, photos courtesy of ADF&G, USFWS, and Jim Dau.

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