



# The Role of **Wildland Fire** in Our Forests



**The mission of the Colorado State Forest Service is to achieve stewardship of Colorado's diverse forest environments for the benefit of present and future generations.**



## **Written and Illustrated by Sally Burr and Gail Ross**

Sally Burr and Gail Ross are the authors/illustrators of the 12-book series "Black Forest Friends." Both are advocates for children's literacy and appear at schools, libraries and numerous community events. They live in Black Forest, Colo., and are actively involved in wildfire recovery efforts in their community.

Thank you to the following Colorado State Forest Service personnel, who provided assistance with the text and production of this book: Joe Duda, Shawna Crocker, Ryan Lockwood, Lisa Mason, Courtney Peterson and Katherine Timm. Thank you to Gloria Edwards, coordinator for the Southern Rockies Fire Science Network, for reviewing the book.

# Meet Harry, the Hairy Woodpecker.


He will share interesting facts about wildfires and forests in the “*Did You Know*” segments throughout the book.




## About Hairy Woodpeckers

About the size of an American robin, Hairy Woodpeckers live in forests and eat berries, nuts and seeds. They especially like to search for insects in tree bark. Their populations increase after large, severe wildland fires because, like many other wood-boring and bark-dwelling insects, Hairy Woodpeckers make their homes in burned trees. The large holes they make on the trees when searching for food provide homes for other birds and animals, and starts the recovery cycle in burned forests.

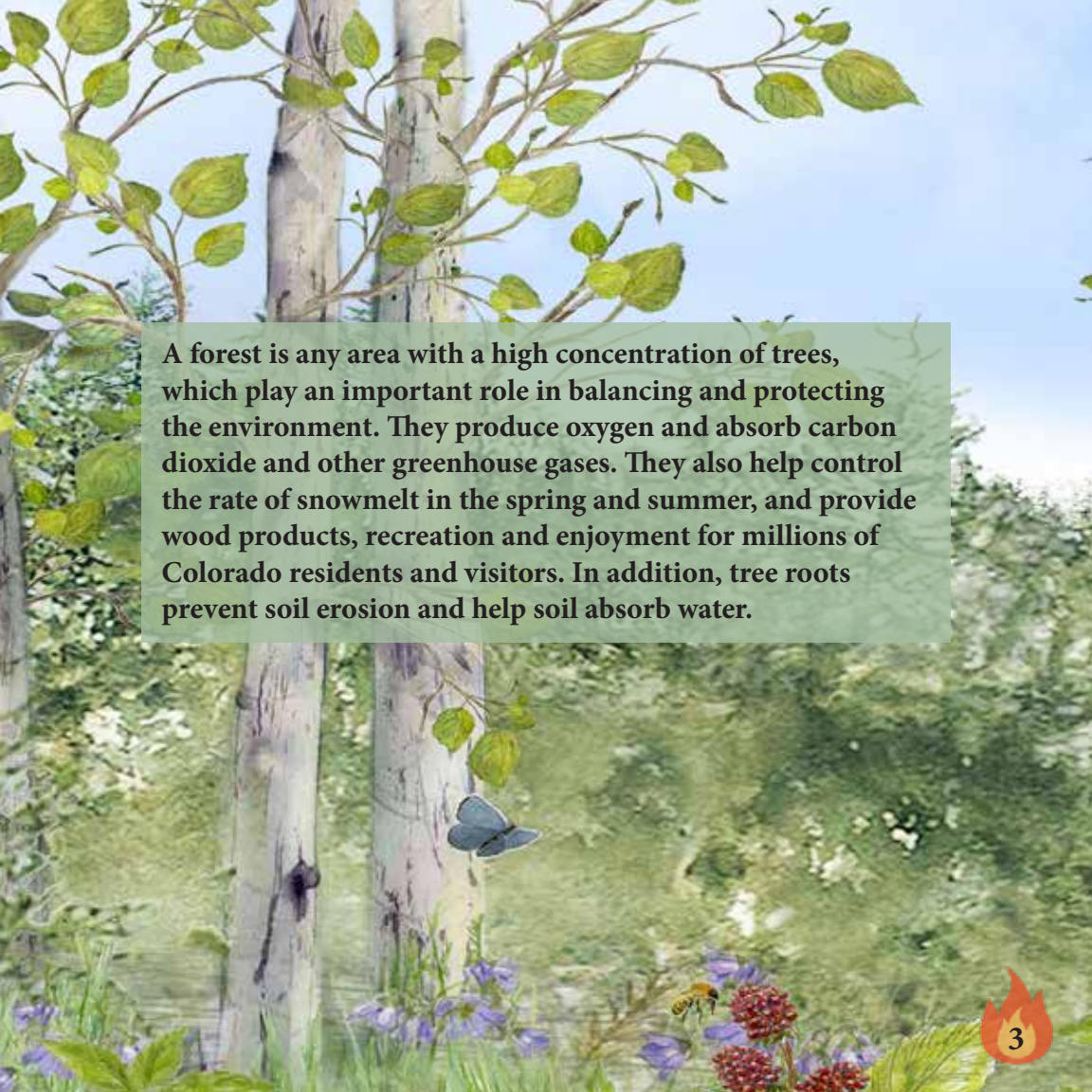




***Did You Know . . .*** a mature tree creates about 120 pounds of oxygen each year!

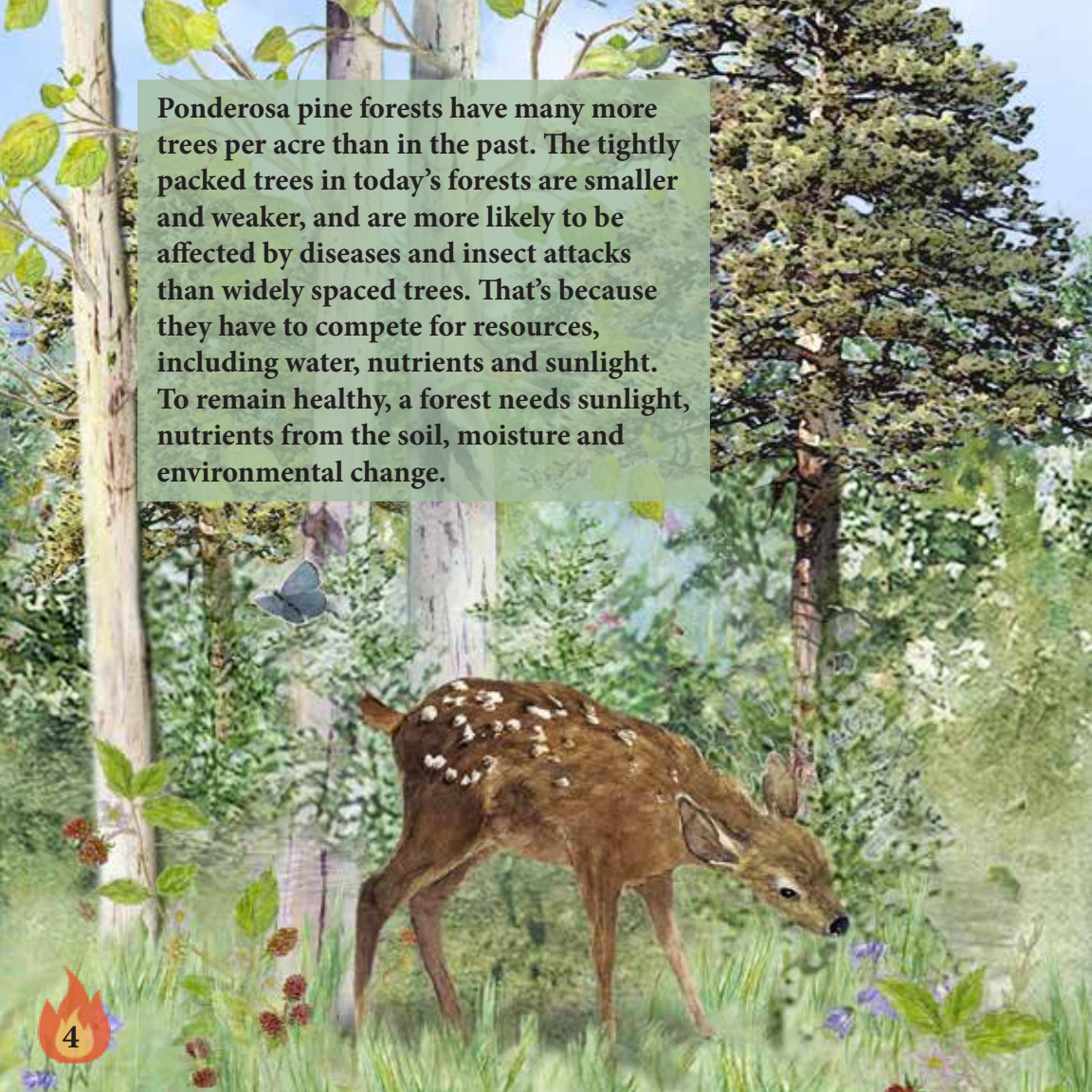


**Forests are among the most diverse ecosystems on our planet. They represent one-third of the earth's land area, and are home to more than 50 percent of all living things.**

A vibrant forest scene with tall trees, green foliage, a blue butterfly, and purple flowers. The background is a clear blue sky. The text is overlaid on a semi-transparent green box.

**A forest is any area with a high concentration of trees, which play an important role in balancing and protecting the environment. They produce oxygen and absorb carbon dioxide and other greenhouse gases. They also help control the rate of snowmelt in the spring and summer, and provide wood products, recreation and enjoyment for millions of Colorado residents and visitors. In addition, tree roots prevent soil erosion and help soil absorb water.**





**Ponderosa pine forests have many more trees per acre than in the past. The tightly packed trees in today's forests are smaller and weaker, and are more likely to be affected by diseases and insect attacks than widely spaced trees. That's because they have to compete for resources, including water, nutrients and sunlight. To remain healthy, a forest needs sunlight, nutrients from the soil, moisture and environmental change.**



*Did You Know . . .* every day we use or eat something that comes from a tree! What do you use that comes from a tree?

Keeping our forests healthy is important for a variety of reasons including providing food for birds, mammals and many other organisms. Wildland fire is one of nature's most effective ways to bring about environmental change. It changes the look of a forest, but it is one of the most effective ways to keep forest ecosystems diverse and healthy.







*Did You Know . . .* more than 1 million acres of forestland burns each year in the United States!

Can a forest fire be good and bad at the same time? Yes! Wildfires can be frightening and destructive, but they renew the forest by cleaning and regenerating the ecosystem. Wildland fire is a natural part of a forest's life cycle. Without regular fires, forests can become dense with brush and too many trees, blocking out the sun that many other desirable plants need to survive.



**Fire is a chemical reaction that requires fuel, heat and oxygen. Pine needles, trees, grass and bushes can all fuel wildland fires. Heat can come from lightning – or people. And oxygen is always present in the air we breathe.**

**If heat, fuel or oxygen is missing, a fire cannot burn. Wildland firefighters usually fight fires by removing fuel, such as dead wood, trees and other vegetation – and applying water to the flames.**



**Fuel types, landscape terrain, wind and weather determine wildfire behavior. All vegetation – or fuel types – can be defined in three ways:**

**Surface fuels:** grasses, pines needles, shrubs and other low-lying vegetation on the ground. These fuels often contribute to a fast-moving fire.

**Ladder fuels:** smaller trees and shrubs that grow under trees. Ladder fuels help a wildfire climb from the ground to the tree tops.

**Crown fuels:** the tops of trees, or tree crowns. Wildfires burning in tree crowns are fast-moving and highly destructive. They can jump from tree to tree on their own, without help from surface fuels or ladder fuels.

**Most fires are a complex blend of these three fuel types.**





*Did You Know . . .* more than 80% of all wildfires in the United States are started by humans.

**Wildland fire is GOOD because it:**

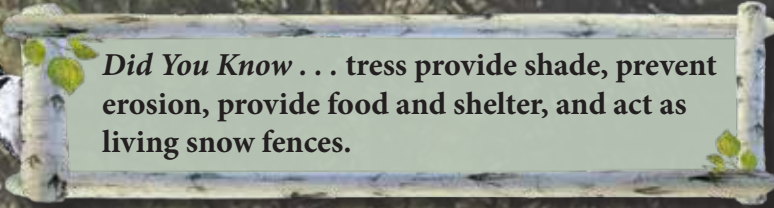
- heats fire-adapted cones and seeds, allowing them to germinate
- removes dense, low-growing underbrush and cleans the forest floor of unwanted debris, opening it up to sunlight and new plant growth
- releases important nutrients back into soils for surviving plants and trees
- controls insects and diseases, such as bark beetles, and tree parasites, such as mistletoe
- consumes diseased and infested trees
- provides new vegetation, which is a food source for some forest animals

American wildlife biologist, forester and conservationist Aldo Leopold wrote, “...fire cleans and regenerates the systems it touches.”

While wildland fire is beneficial, wildfire is HARMFUL because it can:

- result in the loss of homes, private property and possibly human lives
- weaken trees, leaving them susceptible to diseases and insects
- destroy wildlife habitat, including that of endangered species
- diminish the scenic beauty of an area, reducing recreational value
- increase the chance for soil erosion and flooding
- be very expensive to protect homes and communities
- destroy valuable timber resources
- damage soil and seeds, preventing new trees and other vegetation from sprouting





*Did You Know . . .* trees provide shade, prevent erosion, provide food and shelter, and act as living snow fences.

After a wildland fire disturbance, fast-germinating plants, wildflowers, and weeds will move in and cover the burned forest floor. Grasses are slower to start, but will eventually replace many of the small plants. The grasses will thrive, especially in the summer months, but they are not a stable community and will soon be replaced by “pioneer” trees and shrubs. These trees and shrubs thrive in the sun and often are among the first to re-populate an area after a fire.

Natural succession is the series of ecological stages that all forests go through over time. Succession starts after an area has been disturbed by a wildfire or other major event, such as a bark beetle outbreak.



**Other tree and shrub species will grow and thrive in the shade of the pioneer trees and shrubs. Eventually, they will grow taller and stronger, often replacing the sun-loving trees and shrubs that initially grew after a fire. When this happens, the forest is mature and can continue growing for decades without great ecological change, until another fire or major event happens.**





***Did You Know . . .*** ponderosa pine trees often survive wildland fires. If you look at the tree rings, sometimes you can see fire scars which tells when fires happened during the tree's lifetime.



Aspen trees are an example of a pioneer species. They do not grow well in shade so wildland fires open up the landscape and make room for them to grow in the sun. Aspen trees do not burn as easily as other trees and shrubs and can often slow down a fast moving wildfire.

Many plant and animal species depend on wildland fire for their survival. Others have become fire adapted, and are able to live in ecosystems that experience frequent fires.

Ponderosa pine, which has a thick, fire-resistant bark, is one example. Aspen trees also rely on fire to clear away older trees so new, faster-growing trees can sprout from underground roots. And scrub oak requires intense heat for seeds to sprout. This plant actually has a flammable resin on its leaves that encourages intense fire!



Fungus can benefit from fire too. Morel mushrooms live underground for decades, but will not bear fruit until after a fire. Scientists believe this is caused by nutrients that are released from burned trees, and the removal of organic material on the forest floor.

Lodgepole pines produce two kinds of cones: one opens when the seeds are ripe, but the second type, called a serotinous cone, opens only after heat from a fire melts the resin holding the seeds inside. It may take decades for serotinous cones to open, but this ensures regeneration of the forest after a major fire.







Plants, such as the blanketflower and snowbush, also flourish after a fire and often are among the first species to regenerate. With many trees gone, there is more space on the forest floor and new nutrients in the soil. The snowbush may be inactive for hundreds of years, until heat from a fire opens its seeds, while blanketflowers are found in large patches for the first couple of years after a fire.

Many animals and insects also benefit from fire. Horntail wasp larvae only eat a specific kind of fungus that grows in recently burned or dying trees. Bees collect nectar from new wildflowers, pollinating and encouraging the growth of even more wildflowers. Other insects also eat Morel mushrooms, and live for decades in burned trees that provide food and shelter.



Small mice and rodents are some of the first mammals to return to a burned forest, where it is easier to hunt for food because the dense underbrush is gone. Mosses and shrubs also return, making homes for the mice, rodents and some birds.

The early return of grasses to a burned forest also attracts larger animals, including deer and elk. The open space on the forest floor encourages the growth of assorted berries, which feed hungry bears, birds and other forest dwellers.

**Fire is a natural event that will occur again at some point in a forest. As more people choose to live in undeveloped areas, the chance increases that a wildfire will threaten homes and lives.**

**The wildland-urban interface (WUI) is the area where homes and communities, and forests and wildlands, come together. WUI areas create an environment where fires can move between homes and vegetation, causing them to spread more quickly and burn hotter.**

**Just like our forests, people are responsible for being fire adapted. There are many ways to protect lives and homes from wildfire, including the removal of fuels from around homes and buildings, and using fire-resistant building materials. Managing our forests now will help ensure that they are healthy now – and that they remain healthy even after a wildfire.**

**By working together, we can create fire-adapted communities for people and forest ecosystems. Talk to your family, friends and community about how you can become fire adapted!**





*Did You Know . . .* pines and spruce tend to be flammable while deciduous trees, such as aspens, are fairly fire resistant.

The Colorado State Forest Service (CSFS) has a variety of programs to help you, your family, and your community become fire adapted, including:

- Colorado Wildfire Risk Assessment Portal (CO-WRAP) for community leaders and planners ([www.coloradowildfirerisk.com](http://www.coloradowildfirerisk.com))
- Community Wildfire Protection Plans for homeowners associations, subdivisions, fire protection districts, counties, and others
- Fire Adapted Communities for community leaders, planners, fire protection districts, counties, communities and others
- Firewise Communities/USA® for communities in the Wildland Urban Interface
- Assistance from a CSFS forester for landowners, communities, local municipalities, counties and others
- Project Learning Tree for educators and students
- Information and education for all Coloradans!

For more information, visit the CSFS website at [www.csfs.coloradostate.edu](http://www.csfs.coloradostate.edu) or call (970) 491-6303.

# Glossary

***Adaptation:*** The process of adjusting to the environment for better survival.

***Biodiversity:*** The variety of life on Earth, reflected in the variety of ecosystems and species, their processes and interactions, and the genetic diversity within and among the species.

***Coniferous:*** A plant that bears seeds as cones and generally produces narrow needle-like leaves.

***Crown fuels:*** The tops of trees, or tree crowns.

***Disturbance:*** An event that causes changes in the composition and structure of a forest, such as a wildland fire, drought, insect infestation, disease, flood, avalanche, or windstorm.

***Ecosystem:*** The interacting system of biological community and its non-living environment.

***Fire Ecology:*** The study of fire and its effects in ecosystems.

***Fire Management:*** Actions to prevent wildland fires, stop them, or manage them for a particular purposes, such as improving wildlife habitat.

***Fire Suppression:*** The act of putting out a wildfire.

***Forest Management:*** The proper care and control of wooded land to maintain forest health, soil condition, water quality, wildlife habitat, production of wood products, beauty and other values, to accomplish specific objectives.



***Fuel:*** Any living or dead material that will burn, such as dry leaves, fallen branches, pine trees, grasses, and even homes. Fuels that gather over time increase the possibility of large wildland fires.

***Heat:*** A form of energy that raises the temperature of matter.

***Hydrophobic:*** Objects that tend to repel or not absorb water. Soils can become hydrophobic after they have been burned.

***Interface:*** The boundary or over-lap between two different areas of things, such as housing developments and forests.

***Ladder Fuels:*** Plants and other living and dead materials that provide a path between fuels on the ground to the branches and crowns of trees.

***Mosaic:*** A collection of diverse landscapes or habitats created by wildfires.

***Suckers:*** The name for new aspen trees that are produced from under ground by older aspen tree roots because of increased soil temperatures.

***Surface fuels:*** Grasses, pine needles, shrubs, and other low-lying vegetation on the ground.

***Wildfires:*** Uncontrolled fires that burn in the country or wilderness or wildland areas.

***Wildland fire:*** Uncontrolled fires that may not need to be suppressed. They burn and help the ecosystem.

***Wildland:*** An area where there is essentially no human development or man-made structures.

# References

## Books

Arno, Stephen E., and Stephen Allison-Bunnell. *Flames in Our Forest - Disaster or Renewal?* Washington D.C.: Island Press, 2002.

Cottrell, William H., Jr., *The Book of Fire, 2nd edition.* Missoula, Montana: Mountain Press Publishing, 2004.

Peluso, Beth A., *The Charcoal Forest - How Fire Helps Animals and Plants.* Missoula, Montana: Mountain Press Publishing, -2004.

## Websites

University of Phoenix. Are Wildfires Good for the Environment? Written by Jenny Jedeikin - November 27, 2012. This site contains many additional wildland fire related articles. [www.phoenix.edu](http://www.phoenix.edu)

Wonderopolis - Where the Wonders of Learning Never Cease. Are all Forest Fires Bad? - #908 Wonder of the Day. [Wonderopolis.org](http://Wonderopolis.org)

## Artwork and Photographs

All artwork is original water color art created by Sally Burr and Gail Ross. Photographs were taken in Black Forest, Colo., after the 2013 wildfire and are courtesy of Bill and Sally Burr.



# The Black Forest Friends Book Series

Written and Illustrated by  
Sally Burr and Gail Ross



Be a part of all  
their adventures!

[www.EverAfterStories.com](http://www.EverAfterStories.com) . . . [EverAfterStories@aol.com](mailto:EverAfterStories@aol.com)



