Learning Objectives

For pages 144–149

In studying this text, you will focus on the following objective:

Reading: Determining the main idea and supporting details.

Set a Purpose for Reading

Read to find out what workers are learning about managing and preserving forests.

Preview the Article

1. What does the **title** tell you about the article's topic? The **deck,** or subtitle, is just below the title. What details does it provide?
2. Scan the **subheads.** What will the writer describe in each part of the article?

Reading Skill
Determine the Main Idea and Supporting Details

To find the main idea of the article, look for important details. Then think about the one idea that all of the details are about. As you read, take notes about important details. Review your notes to determine the article's main idea.

TIME

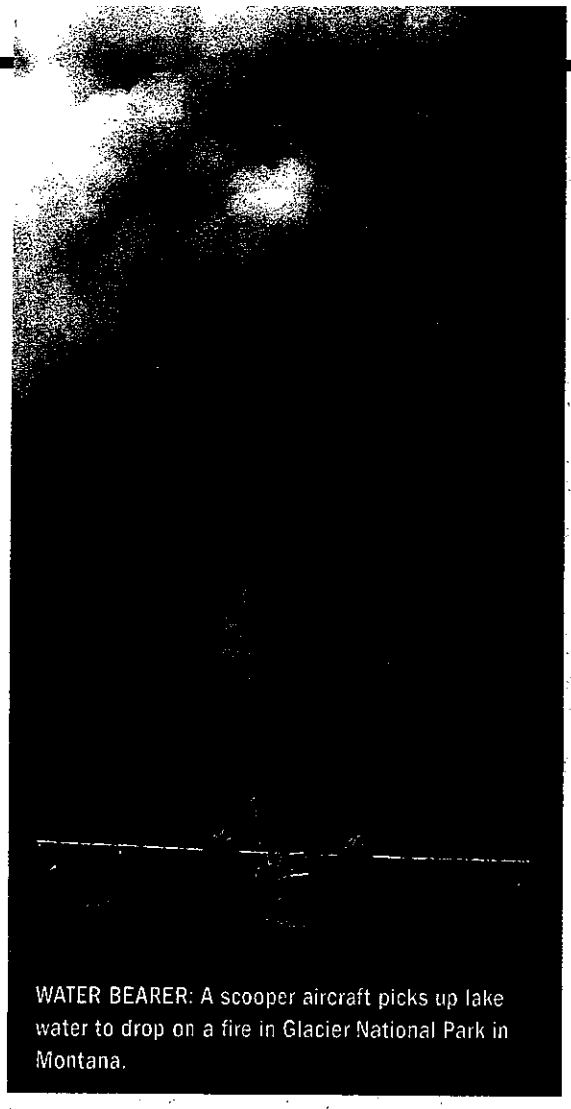
Fireproofing the Forests

Logging doesn't work. Neither, in the long run, does fire fighting. As fires annually threaten western forests, the debate over a radical form of tree surgery heats up.

By J. MADELEINE NASH

On the outskirts of Flagstaff, Arizona, Wally Covington drives his pickup truck through a dense forest of ponderosa pines. At last he arrives at the spot where, in 1993, he and his co-workers took chain saws to hundreds of trees no bigger than telephone poles. They carted off the trunks and branches and then purposely set controlled fires to clear away the smaller trees. As a result, today this area is a beautiful woodland, partly shaded by the overhanging branches of 300-year-old trees. In the spaces between the trees, where the sun reaches, grasses and wildflowers thrive.

This is the way the ponderosa pine forests of the American Southwest used to look, says Covington, director of the Ecological Restoration Institute at Northern Arizona University. And it is the way they could look again if they were thinned, or the small trees were cut down to make room for the larger trees.



AP Wide World

WATER BEARER: A scooper aircraft picks up lake water to drop on a fire in Glacier National Park in Montana.

View the Photograph Think about all the people and equipment needed to fight forest fires. How does this photo change the way you understand the jobs of firefighters?

But time is running out, he fears, because for more than a century these forests have not been managed correctly, and as a result, they—along with the communities around their edges—are threatened by uncontrollable fires.

Every year, it seems, the threat posed by fire looms larger. Some of the most intense wildfires in U.S. history have taken place in the last couple of decades. These uncontrollable fires have burned millions of acres of forests, killed numerous civilians[1] and firefighters, and burned thousands of homes.

So it is no surprise that these fires are fueling an intense debate. Should the U.S. Forest Service, to protect communities and restore healthy forests, approve tree thinning on a huge scale? If it does, what size trees ought to be thinned and in what sorts of forests? And if it does not, what are the options?

Some environmental groups fear that thinning might encourage logging, or the cutting down of large trees. They have taken the position that cutting down small trees is all right only in parts of the forests near areas where people live. Covington and others, however, believe that thinning, if done responsibly, is perhaps our last chance to restore health to many of our forests. But even Covington says that the science that supports thinning is still developing.

The Case for Thinning

For centuries fires have swept through the ponderosa pine forests of Arizona and New Mexico on average once or twice a decade, killing young trees but not larger trees. Scientists know this because these fires have left a series of healed-over burn scars in the trees'

1 Here, ***civilians*** refers to anyone who is not a firefighter.

tissue beneath the bark. By dating the scars left in tree rings, Tom Swetnam of the University of Arizona and his co-workers reconstructed a fire history of southwestern forests that extends back to the 14th century. And the most striking discovery they made is that beginning in the late 1800s, there was a marked drop-off in the number of fires.

William F. Campbell/Getty Images

RING COUNTER: Tom Swetnam's pine has fire scars dating from 1583.

Why did the number of fires decrease at that time? Why do we have so many uncontrollable fires today? First, sheep, cattle, and other livestock were allowed to overgraze the grasses and other plants in the forests. Without these plants, ground fires were not able to spread and to burn litter, release nutrients,[2] and thin out saplings.[3] Then came decades of logging of large trees along with improved ways to fight fires. The makeup of the forest changed so that hundreds of small trees now crowd into acre-size plots,[4] where only a few dozen large trees used to thrive. The result is that millions of acres of southwestern forestland are packed with enough wood to fuel wildfires of unequaled fury and destruction.

The situation has reached the point at which some experts are convinced that even controlled fires pose serious dangers to large, mature trees. More than 25 years ago, in fact, Covington and two Forest Service researchers experimented with the use of controlled fires in Coconino National Forest in Arizona, but they did not get the results they expected. The clumps of young trees the scientists hoped to kill survived, and the old-growth trees they hoped to save died.

Why? In the absence of fire for so long, too much fuel, in the form of dropped needles and branches, had collected at the bases of the largest trees. Yet not enough time had gone by to allow a similar buildup of fuel

2 ***Nutrients*** are substances that plants and animals get from food to stay alive and healthy.

3 ***Saplings*** are very young trees.

4 Small pieces of land are called ***plots.***

beneath the smaller trees. As a consequence,[5] flames traveled quickly through the clumps of young trees but burned slowly for long periods of time at the feet of the giant trees, killing them.

For Covington the unexpected loss of so many old-growth trees was a wake-up call. Before setting fire loose in the pine forests of the Southwest again, he concluded that the forest had to be restored to its original structure. To learn what these forests looked like before human interference, Covington and his team studied old photos and read historic texts. They also looked at records kept by early foresters. In 1909 foresters had set up a series of experimental plots across the Southwest. Among these was an unlogged, eight-acre plot in Coconino National Forest[6] that was set aside as a long-term control. Covington made 1876 the reference year for this plot—it was the last year a fire had occurred there—and then reconstructed the way the forest had looked at the time. The difference between then and now, he found, was dramatic. In 1876 the plot supported just more than 20 trees an acre, compared with 1,250 some 120 years later!

This was the plot that Covington's team experimentally thinned in 1993 and 1994, taking care to preserve all old-growth trees. The area now supports some 60 trees an acre, and as individual trees, they seem far healthier than before. For one thing, the outer coating of their needles has increased in toughness, which helps discourage plant-eating insects. For another, they are producing more resin,[7] which provides protection against damaging insects such as bark beetles. Best of all, thinning is no longer needed, as slow-burning controlled fires can now safely do the job.

The Value of Open Space

Many variables determine how a wildfire behaves, but among the most important are wind speed, topography,[8] air temperature, humidity,[9] and the amount of fuel. Forests with patches of open space have less fuel. But these types of forests have all but disappeared. At one time, the open spaces helped lessen the danger of horrific blazes. Today vast areas of forest have no open spaces but instead are packed with unburned kindling.[10]

Restoring these patches of open space is critical.[11] Unfortunately, there is no easy way to do this because the amount

5 ***As a consequence*** means "as a result."

6 ***Coconino National Forest*** is near Flagstaff, Arizona.

7 ***Resin*** is sap, or the sticky liquid made inside trees and other plants.

8 ***Topography*** refers to land features such as hills, valleys, and streams.

9 ***Humidity*** is a measurement of the moisture in the air.

10 ***Kindling*** refers to old, dry, fallen leaves, sticks, and branches that start on fire easily.

11 Here, ***critical*** means "extremely important."

Thayer Allyson Gowdy

BACK BURNER: In Arizona, a weary firefighter walks away from a blaze he has just set.

View the Photograph Why is it important that only trained firefighters set controlled burns?

of fuel varies widely from forest to forest. To many forest ecologists, dealing with fuel loads—whether by thinning, controlled burning, or a combination of the two—is the best strategy we have for making sure that the ponderosa pine forests survive into the future. And the good news, says Mark Finney, a researcher with the Forest Service's Fire Sciences Laboratory in Missoula, Montana, is that it probably won't be necessary to thin or control-burn every acre of forest at risk.

Most fuel-reduction measures have had fairly narrow goals, such as protecting valuable stands of trees. The logical[12] next step, as Finney sees it, is to use these measures across hundreds of thousands of acres. It is already clear, he notes, that controlled burns have the power to lessen the likelihood of large, destructive fires.

12 Something clear and reasonable is ***logical.***

Not All Forests Are Alike

Not all forests, however, are good candidates for thinning. Among the best examples are the lodgepole pine forests that grow at higher elevations across the mountains in the West. Lodgepole pines thrive in a cool, moist environment, which keeps fires at bay for long periods of time. So the lodgepoles grow densely together—so densely, in fact, that numerous smaller lodgepoles are shaded out and die from lack of light. These dead and dying trees, combined with lower-growing spruce and fir trees, provide a massive fuel load, which can lead to terrible blazes.

Yet attempting to thin lodgepole pine forests to prevent such fires would be foolish, say scientists, because these blazes serve important ecological functions. For instance, many lodgepole pines package their seeds in resin-sealed cones that can be opened only by intense heat. If the cones aren't opened, the seeds cannot take root and grow into saplings.

No one questions the value of thinning for fire control around homes and other structures. What is much harder to weigh is the balance of risks and benefits of thinning in terms of ecology. Great care needs to be taken so that thinning does not hurt the very forests it is supposed to heal.

Respond and Think Critically

1. Write a brief summary of this article before you answer the questions that follow. State the main ideas in your own words. How have the southwestern forests changed in the last 100 years? **[Summarize]**
2. Why do some people want to thin the forests? How would this affect tree growth in lodgepole pine forests? **[Draw Conclusions]**
3. For the last 100 years, foresters' policy has been to prevent forest fires. Do you think that this policy has helped or hurt the forests? Explain your response. **[Evaluate]**
4. **Text-to-Self** Would you rather live near a forest that has been thinned or near a forest whose trees have not been cut? Why? **[Connect]**
5. **Reading Skill** **Determine Main Idea and Supporting Details** Use the details you took notes about to determine the main idea of the article. What one idea are the details about? Explain.
6. **BQ** **BIG Question** In what ways are those who are studying forest management extraordinary? Why is their work important to us? Support your answer with details from the article.