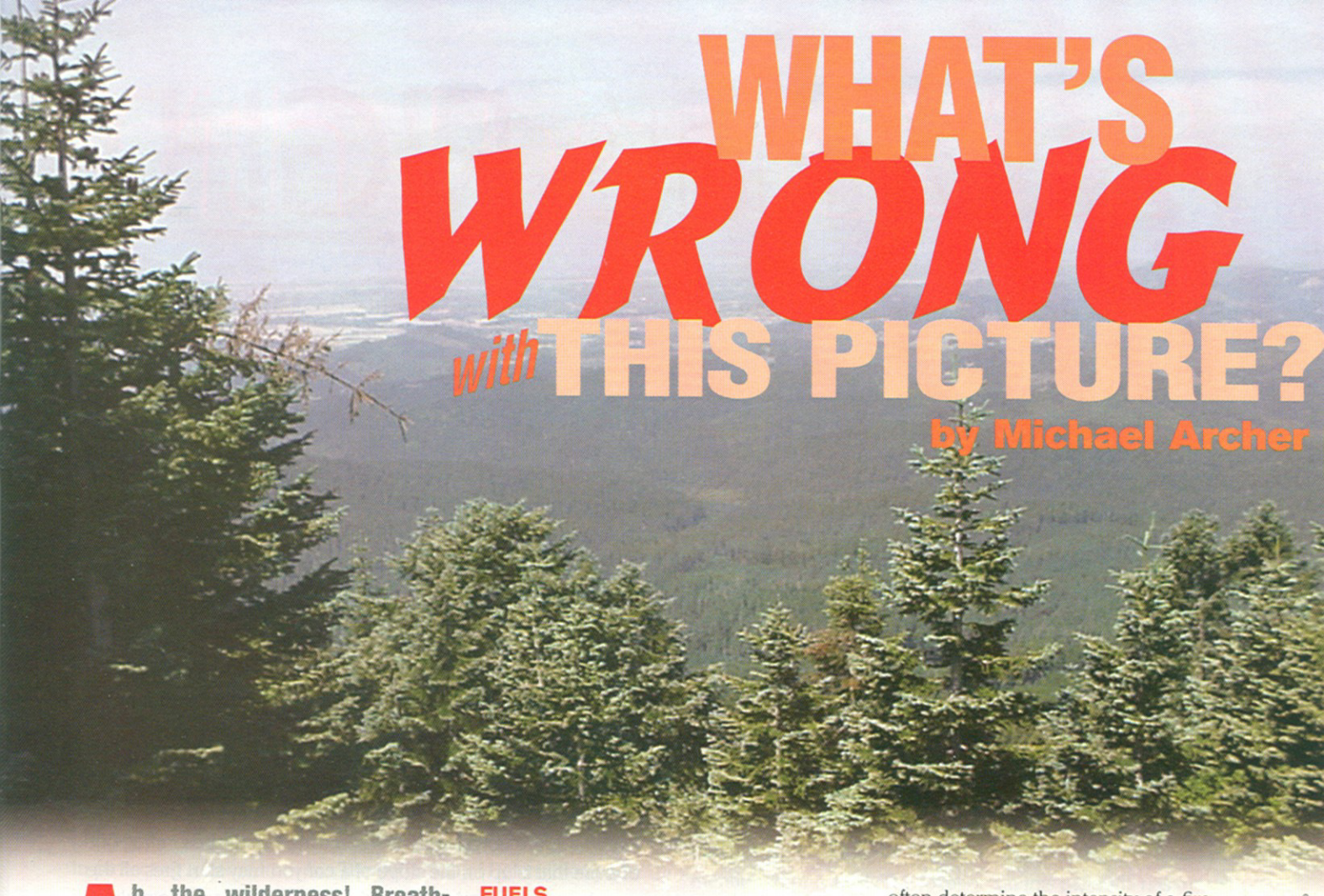

WHAT'S WRONG with THIS PICTURE?

by Michael Archer

Staff Photo

Ah, the wilderness! Breath-taking vistas, abundant wildlife, and few reminders of civilization. Sounds idyllic, doesn't it? So you find an available lot on a high ridge above an expanse of forested land that offers a glorious view of the valley below. You love the view, the smells of the forest all around, the lack of the signs of civilization. Should you buy it immediately? What could possibly be wrong with this picture? Plenty!

Fire is a danger to any home bordering on the wilderness. Over the past ten years, millions of acres in the western U.S. have gone up in smoke, taking many homes with them. Just as you choose a place to live based on crime-rate, schools, and nearness to work, so you have to add to these considerations a new one when building near the wildlands: Fire. Just as you lock your home to keep the thieves out, so you need to consider "locking" or protecting your home from fire. What does the savvy wilderness homeowner need to know about in regards to wildfires? Three primary factors to consider are fuel, weather, and topography.

FUELS

Fuels come in three densities. Light fuels include grasses and seedlings, small plants that, when dry, quickly ignite, but burn out in less than five minutes. Medium fuels such as brush will burn longer, typically within five to ten minutes. Heavy fuels like trees, logs, and large debris can burn for up to an hour and retain heat long after the flame front has passed.

Fuels are also broken into three general groups: Aerial fuels, surface fuels, and ground fuels. Aerial fuels consist of vegetation, both alive and dead, that exist in the forest canopy (tree tops) and can include high brush, moss, tree branches, and the like. Surface fuels consist of vegetation that is below the canopy, such as brush; fallen bark, twigs and branches; and the leftovers from logging, such as tree limbs, also known as "slash". Augmenting surface fuels and last on the list are the ground fuels. This is material of similar composition to surface fuels, but buried under the ground. Ground fuels include peat moss, tree roots, and decomposing matter, like leaves, duff, and logs. Of these three fuel groups, surface fuels are the most important because they often determine the intensity of a fire.

Moisture content varies seasonally in live fuels, daily in dead fuels. Live fuels can be influenced by drought, insect infestation, arboreal diseases, and temperature variation, but, aside from certain foliage that contains combustible oils, will hold up better in the face of a fire than dead foliage, which is at the mercy of the weather more than anything else. As the relative humidity changes, so too does the combustibility of dead vegetation.

WEATHER INFLUENCES

There are several types of weather that can have an influence on fire behavior. The notorious Santa Anas that occur in the L.A. area (and which may have different names in different regions, such as Chinooks, East Winds, or, as meteorologists call them, foehn winds) can be the bane of firefighters. Unstable air, such as thunder cells, can produce lightning and strong variable winds. Low-level maxima or "jet streams", which are generally high above the ground, can drop to ground level at any time of the year and anywhere in the country, having a deleterious effect on any fire suppression going on in the region. Sea breeze fronts,

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where the heating of the land and adjoining sea changes pressure enough that marine air is forced inland, usually do not cause firefighters pause, but can produce gentle breezes that either cool the area and increase the relative humidity, or may simply push a fire along a little faster. Low-pressure areas produce an air mass that swirls in a counter-clockwise fashion (in the southern hemisphere it goes clockwise), producing more moisture at ground level, which is good for fire suppression. Its opposite number, the high-pressure area, swirls in a clockwise direction (in the northern hemisphere), increasing pressure towards the center, which reduces moisture content and kicks up the wind.

So how does a non-meteorologist find out what the weather is like all through the year at their potential dream house? Checking weather records for a given area can be informative. Local newspapers may keep records of this data, and certainly the National Weather Service keeps detailed records as well for many regions of the country. Talking to local residents can be instructive as well, as they may know the peculiarities of the local weather and what signs to be aware of that might influence the fire hazard.

TOPOGRAPHY

Many of the most expensive homes in the U.S. are built in the worst possible location. There are a number of things a potential homeowner needs to look for in surveying a lot where he or she wants to build their dream home.

Slopes can have a profound effect on fires – a 30% slope will cause a fire to move twice as fast as it would on level ground. A south-facing slope is the most likely to have problems with dry brush and trees. Typically, this is the area where the trees are thinnest and grass is more prevalent. The relative humidity is lower here, mostly due to more intense sunlight than, say, the north face would receive. The average temperature will be higher here and, as a result, a fire will spread more quickly here than anyplace else. A north-facing slope is the exact opposite of the south-facing slope. Since snows melt later and rainwater is held longer in the soil, trees will be more prevalent, foliage will be heavier and retain a higher moisture content, relative humidity is higher and the rate of spread of a fire should be less, depending on the fuel and weather components of the area. The east and west sides of a hill will provide a blend of the north and south aspects. The principal unique features of these areas are that the eastern side will heat sooner than any other slope during the day and the western slope will cool latest in the day.

Being king of the hill has an additional hazard during a fire: The farther down the hill the fire starts, the more fuel it has going uphill and the hotter and wider the flame front will be when it reaches the top. This means that a steep, brush-covered hill is a real danger to any residence above it, especially if it faces south. Another fact of ridge fires is that the wind produces a "leeward eddy", a phenomenon that causes the air (or fire) to swirl around and blow against structures from two sides at once, something which can be very damaging to a home as the fire can hit front and back simultaneously.

An interesting local phenomenon that is a combination of weather and topography is a "thermal barrier". This is a situation where, in a canyon, a layer of warm air forms about halfway up a slope, trapping cooler air in the bottom of the canyon. In a wilderness canyon it has the following effect: As night falls, cooler air collects in the valley's deepest points and a warmer air mass collects on top, increasing the temperature and lowering the relative humidity compared to other parts of the canyon. This means that a fire in the canyon will remain most active in the area immediately above this thermal barrier, so homes midway up the slope could be at greater risk even than those on the summit during a nighttime blaze.

It seems that the obvious choice for building a home in a canyon would be in the deepest part of the valley, as this appears to be the spot least likely to be threatened. Not necessarily. Firebrands are not all embers – some are logs. Debris rolling out of a fire that is up on the slope of a canyon may start fires all the way down the slope into the valley. It is therefore wise to make sure there is no loose debris above your property before a fire breaks out. Wind can also increase in velocity as it whistles down a canyon with steep walls and a narrow floor.

Another topographical feature is a "saddle". This is a valley that crosses a ridge. As the valley concentrates wind, so too does a saddle, creating a "path of least resistance" to fire. Two other features that should be considered are box canyons and what firefighters call "chimneys". Box canyons are canyons that dead-end. These allow fuel to pre-heat at the blocked end, increasing the likelihood of a fire. Chimneys are steep narrow canyons that rise up towards a ridge. These are very dangerous in a fire, as the air pressure differential combined with the rising slope draws fire up into them at a rapid advance. It is best not to buy or build a home located at the top of a chimney and be cautious about building in a box canyon.

Ironically, even though it may be more hazardous to have a home on a ridge, the higher a home is in the mountains the danger of fire decreases because snow levels last later into the year and the air temperature is reduced, further decreasing the likelihood of a fire. So, aside from the increased chance of lightning strikes, having a home on the top of a ridge at high altitude may actually be safer than having a home in a valley at sea level.

DEFENSIBLE SPACE

As can be seen from the previous discussion, most locations have some disadvantage in regards to fire. Location is an important starting point, but the homeowner (either existing or

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aspiring) can do some things to further protect their home from fire. The term "Defensible Space" has been created to describe a philosophy of landscaping that incorporates years of experience in protecting a home from fire. The definition of Defensible Space is "the area around a building that has been significantly modified so that a wildfire's intensity will be reduced enough to prevent the fire from igniting the house and allow fire fighters to safely defend the house". Here are some of the essential tenets. Clearing brush and trees away from the property for a distance of at least thirty feet is a cardinal rule in creating Defensible Space. Man-made objects, such as driveways, lawns, walls, fountains, and man-made streams form another important part of the strategy. Types of plants selected for use adjacent to structures and out for a distance of thirty feet should be carefully reviewed to reduce fire danger. Trimming of natural foliage and clearing of dense underbrush around trees needs to be accomplished as well. Finally, the right selection of building materials for the house needs to be made (fire-resistant materials, self-cleaning gutters, boxed eaves, etc).

WHAT'S RIGHT WITH THIS PICTURE?

So, after reading all this, you may be thinking: 'Is there any way I can live securely on the fringe of the wilderness?' The answer: You bet! By being aware of these problems before purchasing land, or by following well established principles for "firewise" living if you already own property, you can have the best of both worlds – enjoyment of the wilderness and the feeling of security that comes from knowing that you're prepared in case of a fire. Compare the photo at the beginning of this article with the one shown above. The property shown here is on level ground with a good clearance from the trees and well back from the edge of the ridge. The situation can be further improved by clearing the grass and the few remaining trees, creating a Defensible Space. The first photo showed a tangled thicket up close to the edge of the ridge where the photo was taken. In addition, the property would be perched right on the rim of the hilltop, inviting the "leeward eddy" mentioned previously. The location on this page still has the view of the valley below, but without the encroaching forest, and is well back from the edge of the slope. This is a more firewise location and will reward the owner with the best of both worlds – a pristine natural environment and Defensible Space around your home.

You've seen many cautions about where not to build. The best places to build would be away from the danger zones mentioned in the article, such as the rim of a ridge. Being on top of a hill, but away from the edge of the hill would be better. Obviously, being in the flatlands would be safer unless there were strong winds coming out of nearby canyons or across sweeping plains. You have a choice when selecting where to build: You can elect to ignore the dangers and simply build where your heart tells you, or you can listen to your head and choose an area that may not be quite as appealing, but still has beautiful vistas and is more defensible (which may even increase the value of the property). So, what's your choice?

Michael Archer is the owner of Firebomber Publications "Dedicated to providing exciting firefighting fiction to the general public". The author donates 50% of the proceeds from the sale of Firebombers Incorporated products to support the families of injured and fallen firefighters, and also offers an affiliates program to qualified organizations to help them with their fund-raising. Firebomber Publications can be found on the web at www.firebomberpublications.com.