
ANDY STAHL*

Symposium Speech: Fire Ecology 101 for Lawyers

Our nation is fighting a war. Like Korea, we defend hills from the enemy, only to give them up in the next campaign.¹ As in the War to End All Wars, defensive lines are built helter-skelter across the land-

* Andy Stahl is Executive Director of Forest Service Employees for Environmental Ethics, a nationwide non-profit conservation group. Stahl, a forester, has worked for the USDA-Forest Service, Associated Oregon Loggers, National Wildlife Federation, and Sierra Club Legal Defense Fund. Among his accomplishments is the northern spotted owl campaign that protected about eight million acres of public ancient forest.

¹ For a gripping account of the ebb and flow battle over the Korean highlands, see U.S. ARMY CENTER OF MILITARY HISTORY, *The Korean War: Years of Stalemate*, at <http://www.army.mil/cmh-pg/brochures/kw-stale/stale.htm> (last modified Oct. 3, 2003). The author describes one battle:

The attack began on 13 September and quickly deteriorated into a familiar pattern. First, American aircraft, tanks, and artillery would pummel the ridge for hours on end, turning the already barren hillside into a cratered moonscape. Next, the 23d's infantrymen would clamber up the mountain's rocky slopes, taking out one enemy bunker after another by direct assault. Those who survived to reach the crest arrived exhausted and low on ammunition. Then the inevitable counterattack would come-wave after wave of North Koreans determined to recapture the lost ground at any cost. Many of these counterattacks were conducted at night by fresh troops that the enemy was able to bring up under the shelter of neighboring hills. Battles begun by bomb, bullet, and shell were inevitably finished by grenade, trench knife, and fist as formal military engagements degenerated into desperate hand-to-hand brawls. Sometimes dawn broke to reveal the defenders still holding the mountaintop. Just as often, however, the enemy was able to overwhelm the tired and depleted Americans, tumbling the survivors back down the hill where, after a brief pause to rest, replenish ammunition, and absorb replacements, they would climb back up the ridge to repeat the process all over again.

Id.

scape, only to see them outflanked or overrun.² Like in Vietnam, bombers drop toxic chemicals to deny the enemy fuel and sustenance, and scorched-earth battle tactics burn the landscape to save it.³ As in the Persian Gulf, the more we fight, the more we foster the conditions that fuel the conflict.⁴ Like all wars, a military/industrial complex of mercenaries, contractors, and politicians that depends upon continued hostilities grows ever stronger and more wedded to the fight.⁵

² World War I stalemated into trench warfare after the Germans failed to force the French into an early surrender. Rather than retreat, they dug into trenches that eventually extended from the North Sea to Switzerland. See *Wars and Conflict, World War I*, at <http://www.bbc.co.uk/history/3d/trench.shtml> (last visited July 18, 2004). Describing the defensive nature of World War I, the author notes:

The trenches on both sides were protected by lines of barbed wire with No-Man's Land in-between. The shelling churned the landscape into a sea of mud and craters. As machine guns could bring concentrated fire to bear on any attacking troops, few attacks were successful. Most military offensives ended with few gains and enormous casualties. On the first day of the Battle of the Somme in 1916, the British Army lost around 20,000 men. The offensive cost the Allies over half a million casualties but only penetrated 12km at most into German lines.

Id.

³ Agent Orange was the most notorious of the chemical weapons used in Vietnam. See Arthur W. Galston, *Falling Leaves and Ethical Dilemmas: Agent Orange in Vietnam*, INSTITUTE FOR SOCIAL AND POL'Y STUDIES, 1999-2001, at <http://www.yale.edu/isps/journal/volume2/galston.html> (last visited Sept. 5, 2004). Galston describes the use of Agent Orange in Vietnam:

During the Vietnam war, approximately 100 million pounds of this mixture, applied as a 25 lb./acre spray released over a broad swath of forest by groups of fixed-wing aircraft, were used in planned defoliation operations. This operation, known as "Ranch Hand," had as its jaunty motto "Only you can prevent a forest." In addition to Agent Orange, formulations of other herbicides were employed for specific purposes, like the selective killing of rice, but Agent Orange was by far the most popular herbicide used in Vietnam.

Id.

⁴ See, e.g., Ivan Eland, *Does U.S. Intervention Overseas Breed Terrorism? The Historical Record*, Cato Institute Foreign Policy Briefing No. 50 (Dec. 17, 1998), at <http://www.cato.org/pubs/fpbriefts/fpb50.pdf> (last visited July 18, 2004). Eland describes how the "numerous incidents cataloged suggest that the United States could reduce the chances of such devastating—and potentially catastrophic—terrorist attacks by adopting a policy of military restraint overseas." *Id.* at 1.

⁵ President Dwight D. Eisenhower cautioned against the rise of the Military-Industrial complex: "In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist." President Dwight D. Eisenhower, Farewell Address (Jan. 17, 1961), available at <http://www.eisenhower.archives.gov/farewell.htm> (last visited July 18, 2004).

It is our war on wildland fire; a war that started in 1910 and has seen over 900 fighters killed in combat—comparable to U.S. casualties in the Iraq War.⁶ In the war on fire, the hills we save from burning today will burn tomorrow.⁷ While fighting our battles against fire, we build defensive lines by hand and with heavy equipment. Although such lines can be successful in stopping the advance of less than severe fires, a wind-whipped crown fire will overcome any fire line.⁸ The Forest Service, the preeminent wildland firefighting agency, dumps an average of 15 million gallons of aerial fire retardant annually. Fire retardants are toxic to trout and other fish species, especially certain formulations that include sodium ferrocyanide as a corrosion inhibitor.

We fight the war on fire to win. But what does winning mean when nature is our enemy? What would a victory over wildland fire look like if we were to achieve it? Is victory achievable? And if so, at what cost in lives and money?

In the war's early years, the army of wildland firefighters deployed by state and federal governments appeared to enjoy initial success. Beginning in the early 1950s, lands burned by wildfires dropped dramatically, to about twenty percent of pre-1950s levels. Smokey Bear's troops appeared to be winning the war to eradicate fire from our forests.

Then a funny thing happened in the last ten years. The tide turned. The enemy went on the offensive, and average annual acreage burned

⁶ By the end of 2003, 913 wildland firefighters had lost their lives. National Interagency Fire Center, *Wildland Fire Accidents by Year*, at <http://www.nifc.gov/reports/year.pdf> (last visited July 18, 2004). In the Iraq War 894 allied fighters had died as of July 18, 2004. Iraq Coalition Casualty Count, at <http://icasualties.org.oif/> (last visited July 18, 2004).

⁷ In the summer of 2001, the Forest Service spent 2.6 million dollars to contain the lightning-caused Craggy fire deep in the heart of Oregon's Kalmiopsis Wilderness to only 275 acres burned. Paul Fattig, *Feds Waste Money By Fighting Too Many Fires, Group Says*, MAIL TRIBUNE, Sept. 27, 2001, available at <http://www.mailtribune.com/archive/2001/september/092701n1.htm> (last visited July 18, 2004). One year later, the lightning-caused Biscuit fire burned over the entire Kalmiopsis Wilderness, including the forests that had been saved from fire the previous year.

⁸ The 2002 Rodeo-Chediski fire jumped over 25 logging roads before reaching its full size of 467,000 acres. Peter Morrison and Kirsten Harma, *Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona*, (July 7, 2002), at <http://www.pacificbio.org/RodeoChediskiFires8July2002lowres.pdf> (last visited July 18, 2004).

increased by thirty percent over each of the three preceding decades.⁹ The fire/industrial complex, supported by the Western Governors' Association, responded with pleas for more federal money to escalate the war. Firefighting costs topped one billion dollars for the first time in 2000, but over eight million acres still burned—the worst year since 1960.¹⁰

Something seems to be going terribly wrong with the war. Far from eradicating fire from forests, the war appears only to have emboldened the enemy. To understand why, we need to examine the psychology of the enemy, what scientists call the ecology of fire.

Fire frequency, intensity, and size vary from place to place because of differences in climate. Forests in the northern tier states (Maine, Vermont, New Hampshire, northern New York, and the northern lake states), westside Pacific Coast states, and high elevation mountain ranges (Cascades, Sierras, and Rockies) burn infrequently (several hundred years between fire events on a given acre) and, when they do burn, replace the forest stand. Our one hundred year war on fire has had only modest effects on the ecology of these wet, cold forests. These forests will still burn when climatic conditions are sufficiently dry, and they will do so in a manner that kills most of the trees.

At the other end of the spectrum are forests of the lower elevation interior West, southern pine states from Texas to Florida, lower elevation Sierra mountains, and dry grasslands of the western Great Basin and interior California. These lands, when left to their own devices, burn frequently (every three to five years), generally removing fine fuels and leaving mature trees. The war on fire has had a dramatic effect on the structure and ecology of these dry lands. Tree densities have increased ten to one hundred fold in the absence of fire's natural thinning. Rangeland juniper has moved from its accustomed location in rocky slopes into valley bottoms where it is displacing sagebrush and other shrubs and grasses.

It is in these chronically dry forests that the war on fire has had the unintended consequences of increasing fire's intensity. The war has suppressed the regular schedule of frequent, low-intensity fires. Now it takes only a small handful of insurgent fires that escape initial at-

⁹ Average annual acreage burned was 4.8 million between 1993 and 2003; 3.7 million between 1983 and 1993; 3.7 million between 1973 and 1983; and 3.9 million between 1963 and 1973. National Interagency Fire Center, *Wildland Fire Statistics*, at <http://www.nifc.gov/stats/wildlandfirestats.html> (last visited July 18, 2004).

¹⁰ *Id.*

tack to create stand-replacing conflagrations covering hundreds of thousands of acres at a time. Although our fighting forces claim ninety-eight percent success in suppressing fires in these dry forests,¹¹ the two percent that escape do so as if armed with weapons of mass destruction—weapons of wood and brush built up over decades of fire suppression.

Between these two extremes lie the preponderance of forests where fire variety is typical—sometimes small and cool, other times large and hot, most times some of each mixed in a mosaic of burn intensities. Our war on fire in these forests may have only shifted the balance away from smaller, cooler fires to larger, hotter fires.

Moisture distinguishes forests that burn frequently from forests that do so rarely. Chronically wet forests burn rarely, only during periods of sufficiently extreme drought to dry out the woods. Chronically dry forests would burn frequently, if left to their own devices. In other words, the amount of wood, the biomass, in a forest is largely irrelevant to whether the forest will burn. Lots of wet wood, typical of Alaska's Tongass National Forest where fires are unknown, won't burn at all, whereas even a small amount of dry grass can burn ferociously.

The answer to what's gone wrong with our war on fire is to be found in studying our nation's climate during the one hundred year war. Climates vary on decades-long cycles that are strongly influenced by complex processes in the world's oceans. When it appeared during the mid-twentieth century that our troops were winning the war on fire, in reality, the enemy was simply hunkered down by a wet climate, biding its time until conditions were ripe for an offensive. With the continent-wide drought that began in the 1990s, fires quickly overwhelmed our fighting forces. Unless, and until, we learn how to control droughts, the war against fire will ebb and flow with the weather.

There is an alternative to war. As in Bosnia, our primary justification for continued fighting is to protect innocent civilians and their homes from death and destruction. Whether a home burns depends upon its construction materials and the immediate landscape within one hundred feet of the house. Building homes with fire-resistant materials and keeping yards clear of flammable brush is the best protec-

¹¹ Les Rosenkrance, Testimony before the Senate Energy Committee, Subcommittee on Forests and Public Land Management (June 29, 1999), *available at* <http://www.doi.gov/ocl/fire.htm> (last visited Sept. 5, 2004).

tion against home losses to wildland fires. As Forest Service fire scientist Jack Cohen explains, “Unlike a flash flood or an avalanche where a mass engulfs objects in its path, fire spreads because the locations along the path meet the requirements for combustion.”¹² Remove the requirements for combustion and fire stops.

The path to ending our war on wildland fire begins with removing civilians from the field of battle. Then we can call for an end to the war honorably, secure in the knowledge that our children are safe and nature can take care of her own.

¹² Jack D. Cohen, What is the Wildland Fire Threat to Homes?, Thompson Memorial Lecture (Apr. 10, 2000), at <http://www.firelab.org/fbp/fbpubs/fbpdf/cohen/homeig.pdf> (last visited Sept. 5, 2004).