WILDFIRE AND GROUSE

TEXT BY DR. RICHY HARROD
PHOTOS BY JOHN F MARSHALL

Forest in the Pacific Northwest immediately after a severe wildfire; photo by John F Marshall

The climb seemed steeper and longer as I hiked to the top of the fire line for a third time. My upper body ached from a heavy load: multiple inch-and-a-half hose rolls stacked onto the handle of the Combi tool balanced on my shoulder. The trail was covered in three inches of fine powder dust raised by the pounding of Vibram soles worn by 25 firefighters from the crew now digging a fire line around giant boulders and working upward on the seemingly vertical slope of the Icicle Drainage. Heat radiating from the edge of the fire line had turned my face red, and sweat soaked the T-shirt under my yellow Nomex shirt. The fire hose I had hauled up the mountain wasn't working; the pump at the bottom of the hill lacked sufficient power to push water up to our location. The C-130 airtanker was dropping 4,000 gallons of retardant somewhere down the canyon, but we couldn't hear it over the deafening sound of the wildfire. Verbal communication was impossible. Strong 15-20 mph down-valley winds had arrived on this afternoon in late July 1994, and we were losing our battle with the Rat Creek Fire.

The Rat Creek Fire burned almost 22,000 acres before fall rains ended the fire season. On the day the fire escaped our suppression efforts, I was in awe of the sheer destructive power of a running crown fire. Groups of trees exploded in 100-foot flames which quickly ignited more groups of trees downwind. All the vegetation in the understory was on fire. It seemed as if nothing would survive – no vegetation, no wildlife, nothing. My education as a fire ecologist would suggest otherwise, but this was the first time I had witnessed a wildfire of this ferocity. Over the next three decades, I would experience many fires, some much larger and more severe than Rat Creek, and I would have many opportunities to study their effects on vegetation and forest ecosystem recovery across the Interior West of North America.

The effects of modern wildfires on forests and wildlife are complicated, and to fully comprehend them requires a basic understanding of fire's role as a natural and essential process. In turn, this understanding can help hunters and anglers to better assess potential impacts to specific game and fish species and their habitats. During the Rat Creek Fire described above, I worried about some of my favorite grouse hunting spots and wondered if ruffed and blue (dusky) grouse were killed in the inferno. It was time to increase my understanding of fire ecology of grouse and grouse habitats.

Ecologists use the term "fire regime" to describe the pattern, frequency, and severity of wildfires in an area over time. The most basic categories are *low* (<20% of the trees are killed), *moderate* (20-70% are killed), or *high* severity (>70% are killed) fire regimes. *Severity* refers to the impacts of wildfire on vegetation, wildlife, and/or soils. Prior to Euro-American colonization, many fires were ignited by lightning, but still more were intentionally ignited by Indigenous peoples. These fires burned freely over large landscapes creating a patchwork of recently burned areas, recovering vegetation, and patches of forest of all ages. Low fire severity regimes were characterized by *frequent* (every 5-20 years) but *low intensity* and *low severity* fires where most trees survived. These were the park-like ponderosa pine forests that the pioneers on the Oregon Trail described in their journals. At higher elevations, forests composed of lodgepole pine, subalpine fir, whitebark pine, or other high mountain species, were characterized by *low frequency* (averaging 40-120 years), *moderate* and *high severity* fires where most trees didn't survive. Finally, in between the high and low severity fire regimes, forests with a mixed composition of Douglas-fir, ponderosa pine, and true firs burned with *moderate severity* about every 20-50 years. These fires resulted in mosaics of light, moderate, and high severity patches.

The area of the Rat Creek Fire would have historically burned primarily with low or moderate severity in some places. What had changed, and why was this fire so severe? How long would it take for the vegetation to recover? Would wildlife, particularly forest grouse, be impacted, and for how long? These are important ecological questions, but as an avid hunter and fisherman, I took a personal interest in the answers. To address the first question, we must go back in time and understand the history of firefighting in the United States.

When Europeans first arrived in North America, many attempted to suppress natural fires in the forests and grasslands they sought to use. Eventually, some professional foresters came to view fire as a benefit to forests and grasslands, but at the beginning of the 20th century the thinking remained split; some still argued to exclude fire. The fires of 1910 (known as the "Big Burn") ended the debate: 3 million acres burned in northeast Washington, northern Idaho, and western Montana, destroying communities and taking the lives of over 87, including 78 firefighters. Wildland fire became public enemy number one in western forests; Congress doubled the Forest Service budget in 1911, effectively institutionalizing a professional wildland firefighting workforce. By 1934 or '35, the Forest Service had adopted the 10AM rule: all fires were to be extinguished by 10AM on the morning following their detection. An aggressive advertising campaign featuring Smokey Bear taught multiple generations that fires were undesirable and should be suppressed. The addition of many firefighters as the result of the New Deal's Civil Conservation Corp made the suppression effort very effective. Fires were being excluded from forests and grasslands.

Below: *historical photo of the Rat Creek drainage in 1934; note the "patchwork" or "mosaic" of varied tree species and growth patterns*

Below: *regrowth in the Rat Creek drainage as of 2010 – note the dramatic increases in forest density compared to 1934; photo by John F Marshall*

Extensive clearcut logging and grazing in low- and mid-elevation forests for most of the late 1940s until about 1990 contributed to successful fire suppression efforts by keeping many logged areas in young forest (younger more open stands of trees are barriers to fire spread) or carrying low amounts surface fuels due to grazing. Trees continued to grow elsewhere in the absence of regular fires. As logging and grazing began to wane by the 1980s, landscapes were becoming more homogeneous, no longer self-limiting in terms of large fire spread. This was particularly true in dry and mesic forests dominated by low and moderate severity fire regimes distinguished by frequent fires. By the 1990s, large and severe wildfires were on the rise because of the increased growth of dense and layered forest conditions across all forest types, and this was now coupled with lengthening fire seasons and an absence of varied forest age and density mosaics. The 1994 fire season saw a record number of acres burned and money spent on fire suppression in the Northwest; the Rat Creek Fire was just one of many.

Plants and animals of dry interior forest and grasslands are adapted to fire but have different ecological strategies for surviving a frequent fire environment. Some plant species, such as ponderosa pine, resist fire and survive because of thick bark and elevated canopies. Others endure fire by re-sprouting or evade fire with long-lived seeds in the soil. Most wildlife species either flee, like forest grouse do, or seek refuge in underground burrows or rock crevices. Some plant and animal species invade following fire, taking advantage of new areas to grow or forage. As vegetation regrows or new plant species become established, new and changing habitats emerge for wildlife. Would the vegetation and habitats in the Rat Creek Fire recover, particularly for forest grouse?

"It turns out that the young forest growth which emerges after fires, particularly along riparian areas, is the perfect habitat for ruffed grouse."

It turns out that the young forest growth which emerges after fires, particularly along riparian areas, is the perfect habitat for ruffed grouse. Ruffed grouse prefer habitats with high woody stem densities and herbaceous vegetation. Their diet in summer consists of succulent plant parts, fruits, and insects, while winter diets include buds, twigs, and seed cluster on broadleaf trees. The speed at which this vegetation reemerges after wildfires is astounding. In the year following the Rat Creek Fire, many of these habitat and forage components returned despite the severity of the burned area. However, the downed logs important for male grouse drumming were missing for several years post-fire, as was the dense overstory cover needed for nesting and brood rearing. Some burned trees (snags) fell to become logs on the ground within about 5-7 years, and the majority fell within 12 to 20 years; vegetation growth was tremendous after about 10-12 years. From personal observation, the ruffed grouse were liking their new digs.

Blue (aka “dusky”) grouse prefer mountain habitats near forest edges. They use different habitats at different times of the year. Throughout the spring and summer, they forage and nest at lower elevations in grasslands, shrublands, and deciduous or coniferous forests. Nest sites are usually located under some form of cover, such as a fallen log, or shrub, and nests are lined with conifer needles. Of these requirements, only the fallen logs would have been in short supply in the first five years after the Rat Creek Fire. In the winter, dusky grouse live in the high country, roosting in and feeding on the needles of conifers. The Rat Creek Fire burned severely in the mid-elevation habitats but tended to burn patchier in the upper elevations, which would have helped grouse survive through the winter. I have hiked to these areas numerous times in the years since the Rat Creek Fire. In recent years, it’s become hard to tell from the ground that these habitats had ever burned, and blue grouse seemed as abundant as before the fire.

Left: *remaining evidence of fire at high elevations above Rat Creek; photo by Dr. Richy Harrod in July, 2024*
Above: *20 years of change in the Rat Creek drainage – 1994 on the left, 2014 on the right; photos by John F Marshall, copyright 2016*

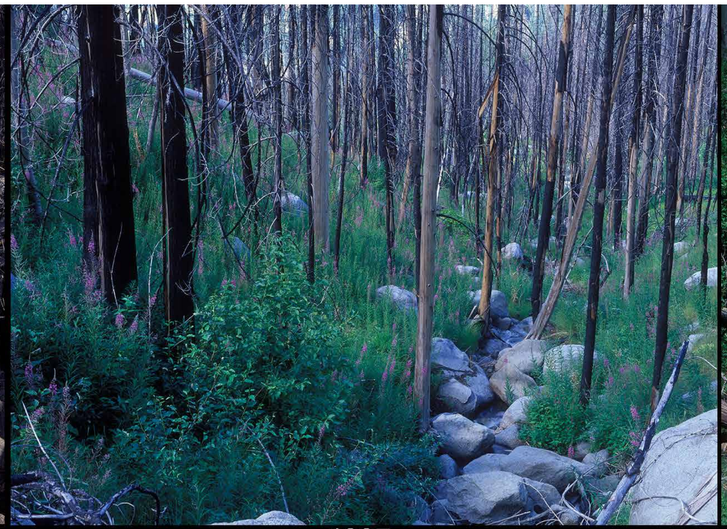
Right: *ruffled grouse; photo by Dr. Richy Harrod*

Below: *20 years of change after the Rat Creek Hatchery Complex Fire of 1994; all photos by John F Marshall, compilation copyright 2016*

In general, both ruffed and blue grouse prefer landscape mosaics over homogeneous habitats because they can eat a variety of food sources (seeds, insects, leaves, needles), therefore making them well-adapted to fire environments. The Rat Creek Fire was ultimately beneficial for grouse and many other wildlife species. What at first appeared to be a completely scorched landscape turned out to be a mixture of varied fire severity. Even the severely burned areas are now thick with shrubs and young trees.

Thirty years later, the fire area appears as a faint scar, and the stress of my firefighting effort that day in 1994 has faded as well. I've hiked ridges within the Rate Creek Fire area in pursuit of deer and grouse many times over the years since the fire. My understanding of wildfire and the subsequent recovery of forest habitats has much improved since that fateful day. I still worry about large, severe wildfires, but fires in the right time and place are necessary and beneficial. A growing number of foresters and fire professionals are once again seeing the benefit of fires and use prescribed fire, and even some wildfires, to meet forest and habitat management objectives. As a society, we still have a long way to go to find ways to better live with fires in and around our communities. Fire has been and will continue to be an important and necessary process for maintaining healthy forests and grouse habitats.

1994



1997

2000

2006

2010

2014

Dr. Richy J. Harrod received his PhD in Ecosystem Sciences from the University of Washington in 2003. He worked in public land management for 28 years; he's published over 50 scientific papers on forestry and fire topics, has taught college courses, given over 100 presentations at conferences and public meetings, and written numerous articles about hunting or fishing adventures.

In addition to his work as a fire ecologist, Dr. Harrod has produced over eighty television shows covering hunting, fishing, and cooking of fish and wild game. Two of his short films, We are Outdoorsmen and Shaped by Landscapes, were official selections of the Leavenworth Mountain Film Festival in 2018 and 2019. Past episodes of his television show, The Northwest Outdoorsmen, can be found on YouTube under the HarrodOutdoors channel.