

FRIENDLY FIRE

by Steve Pyne

§ The Warm fire started from a lightning strike on June 8, 2006 a few miles south of Jacob Lake, between Highway 67 and Warm Springs (which gave the fire its name) and could easily have been extinguished with a canteen and a shovel. The North Kaibab instead declared it a Wildland Fire Use fire, and was delighted. Previous efforts with WFUs had occurred during the summer storm season and had yielded small, low-intensity burns that “did not produce desired effects.” The district had committed to boosting its burned acres and had engineered personnel transfers to make that happen. Since large fires historically occurred in the run-up to the summer monsoon season, when conditions were maximally hot, dry, and windy, the Warm fire promised to rack up the desired acres.¹

For three days the fire behaved as hoped. On June 11 the district decided to request a Fire Use Management Team to help run the fire, which was now over a hundred acres and blowing smoke across the sole road to the North Rim, and so required ferrying vehicles under convoy. On June 13 the FUMT assumed command of the fire. Briefings included a warning that the fire could not be allowed to enter a region to the southeast which was a critical habitat for the Mexican spotted owl. The “maximum management area” allotted for the fire was 4,000 acres. That day the fire spotted across the highway, outside the prescribed zone. The FUMT and district ranger decided to seize the opportunity to allow the fire to grow and get some “bonus acres.” The prescribed zone was increased; then increased again as the fire, now almost 7,000 acres, crossed Forest Road 225, another prescribed border. This would permit the east-trending fire to enter swathes of pinyon-juniper that the North Kaibab had long sought to burn off. The assumption was that the fire would self-extinguish as, falling off the plateau, it combusted through that dwarf forest and entered sparse shrublands. On June 22, the fire, now roughly 11,000 acres, did abate. No full assessment of conditions, as required by the approved Wildland Fire Implementation Plan, was conducted.

The fire rekindled, moving east as hoped and north which threatened the highway to Jacob Lake. On the morning of June 24 it was 15,000 acres and the district ranger decided to order mid-level fire suppression help in the form of a Type II incident management team in case the fire broke loose and threatened the road or the complex of campgrounds, inn, and ranger station at Jacob. Forecasts called for developing northeast winds. But the conditions that favored fire on the Kaibab also favored fire throughout the region; there was in particular the tricky Brins fire, with massive media attention, that threatened Sedona. There was precious little left to commit to a WFU fire that may or may not need help in the remote Kaibab. A fire simulation model known as FARSITE projected only modest growth. The model, however, was fed data from June 12, and it predicts fire behavior typical of surface burns, not crown fires. Its forecast bore no correspondence to reality.

On June 25 the fire blew up. The sought-for crown fire through pinyon-juniper lofted a convection column that evolved into a fire-generated thunderhead, a pyrocumulus. When the plume collapsed, it sent winds rushing downward, exactly like a thunderstorm but without a particle of moisture, a dust storm of flame. Those winds drove the fire south, spreading like a toxic cloud spilling out from a volcano – a cloud of combusting gas that flowed through the woods and across nominal barriers. It seared mature stands of aspen, it poured over meadows, it fried forests of mixed conifer. Terrain and turbulence meant that patches were spared or lightly scorched. But it is unlikely that the Kaibab Plateau had ever witnessed something on this scale and savagery. When the rush ended on the evening of June 27, the fire stood at 58,640 acres of smoke, white sticks, and ash.

§ “If I were the Prince of Darkness, I could not have devised a better way to destroy the Kaibab Plateau.”

Wally Covington, professor, restoration ecologist, and a man who has been around burned woods all of his career, walked through the still-raw scar of a fire that had wiped out nine nesting reserves for the northern goshawk, shut down the only roads to the plateau, including one to Grand Canyon’s North Rim, threatened a substantial chunk of the remaining habitat of the flammulated owl and endemic Kaibab squirrel, may cause a quarter of the old-growth ponderosa pine to die, promoted gully-washing erosion, and rang up suppression costs of \$7 million. To help pay those bills the Forest Service initially proposed to salvage log some 17,000 acres of the burn, which has sparked promises of monkey-wrenching by local environmental activists. When trotted out before cameras after the blowup, the district Fire Staff Officer declared that if he knew then what he knew now, he would have made exactly the same decisions. Fire belonged on the land. This was an inevitable fire, a necessary fire, a good fire. Wally Covington thought it testified to ideology gone mad, and had the temerity to say so and the clout to be heard.

I was there because I wanted to come home. Forty years before, in June, 1967, I had begun my own career in fire on the North Rim. Only five years previously had the opening salvo in fire’s great cultural revolution sounded. By my second summer the National Park Service had rewritten its policy to encourage more fire on its lands. I wanted to see what that revolution had wrought.

§ In that summer of 2006, as for many years preceding, the American public might well claim confusion as fire officers annually denounced the wildfire scene on America’s public lands as horrific while simultaneously declaring that the land under their administration required far more fire. The 10-year rolling average of acres scorched was ratcheting upward like a bull market for burning, and the prospects for ever-larger and more damaging “megafires” provided the political incentive to invest enormously in containing them. At the same time, the fire community declared that its historic commitment to suppression had been misguided and sought to reintroduce burning on a vast scale. A critic might note that both categories of fire were increasing and must somehow be related. A cynic might conclude that one followed from the other.

For decades the public had seen free-burning fire as a natural disaster or as a freak of western violence, something between a volcanic eruption and a grizzly bear attack. Fire was increasingly remote from their quotidian lives; what they knew they learned mostly from TV; and what TV showed was a nature-centered catastrophe driven by climatic forces against which heroic firefighters struggled or an outbreak of savage violence that, like wolves, somehow belonged to the native “ecology” of those remote lands. They saw massive firefights during which suppression was both overwhelming and feeble. They saw prescribed fires that slipped their leashes and ransacked countryside and town. And in 1988 they saw half of Yellowstone burn while the spectacle was interpreted simultaneously as a magnificent firefight, a bureaucratic potlatch, and an ecological marvel. The more inquisitive might note that on the Kaibab Plateau the upswell of burned area correlated not only with drought but even more precisely with plans, personnel, and programmatic reforms.

What the public was witnessing was confusing because the scene was in fact confused. The proffered interpretations might best be characterized as a rhetorical *adhan* or a speaking in tongues - in this case literal tongues of fire - that testified to that great awakening that still suffused America’s cultural revolution on fire.

§ When it began, the fire revolution was one, its partisans united against a sharply etched villain. They all detested the paramilitary swagger and waste of fire control, and scorned its public justifications. It had become, they denounced, a law unto itself, divorced from the purposes of protected reserves. They thought that some fire - more than then existed - belonged on the land.

They believed the real problem was fire control, and that controlled fire – what they termed prescribed burning – was smarter, cheaper, safer, and more ecologically benign.

It was an era poised for change, and the first boulder that rolled over the cliff set off a landslide. In 1962 the privately endowed Tall Timbers Research Station north of Tallahassee commenced a series of annual conferences on fire ecology. The next year a report commissioned by the Secretary of Interior on elk at Yellowstone metamorphosed into a full-bore appeal to recharter the principles by which the National Park Service governed its natural parks. The Leopold Report, named after its chair, Starker Leopold, son of Aldo, identified fire's restoration as the poster child for rendering the parks into "vignettes of Primitive America." A year later the Wilderness Act gave statutory underpinning to that inchoate yearning to keep the wild wild.

The half-century war on fire soon confronted multiple insurrections. One came from a public aroused by environmental concerns and enthused by a wilderness ethos, one from among scientists newly sensitive to fire's ecological services, and one from nature, which made increasingly apparent that fire's removal could be as ecologically powerful as its introduction. It became difficult to argue that natural fire did not belong in natural areas, and if good there, that its goodness should not be distributed widely through the proxy of prescribed burns. Very quickly, intellectual opposition collapsed. The revolutionaries had needed to do little more than find a bullhorn through which to speak their minds.

§ William Wallace Covington, Regents professor at Northern Arizona University and Director of the Ecological Restoration Institute, was a child of the Sixties. Born in 1947, the middle of three sons, he was raised in Wynnewood, Oklahoma. His father, a jack-of-all-trades from prizefighter to radio announcer to barnstorming pilot, was above all an ardent woodsman, a one-time forester, who got himself and his sons where they could camp, hunt, and fish as often as possible. Sundays were spent, alternately, at his mother's Methodist church or his father's church of the woods ("mostly my dad's," Wally recalls). For scripture, his father introduced him to Aldo Leopold's *Sand County Almanac*. Then, when he was seven, his father died, and the family later moved to Grand Prairie, Texas until he enrolled at North Texas State.

Several years after his father had died, his mother, he recalls, came down with a life-threatening cancer. That nudged him into a premed undergraduate program, research in oncology, and a year at the University of Texas medical school where he pursued a dual PhD-MD program. He quit when he found he could not take the emotional pounding that dealing with terminally ill patients demanded, those who were beyond restorative care. He took a year off, decided he wanted to live in the Southwest, and taught at Gallup, New Mexico, where he became an all-purpose activist for the causes of the day. "I was basically a hippie." His contract was not renewed. He returned to school for a master's in Biology at the University of New Mexico, and then went to Yale's School of Forestry, where he did fundamental work on soils and logging. By the time he graduated with his doctorate, he had accepted a post at Northern Arizona University in Flagstaff, Arizona, and in 1975 made his first, ephiphanal visit to the Kaibab Plateau.

These were landscapes dominated by ponderosa pine and fire. But they were also landscapes deeply ill from past overgrazing that had strip-mined the understory grasslands, the logging off of old-growth that had broken the forest structure, and the exclusion of free-burning fire that left those landscapes to gag on their accumulated debris. They were, in brief, landscapes not unlike those cancer patients that had attracted and exhausted him; but this time a cure was possible, or better a prescription for prevention. The research he conducted under Forest Service contract assumed a reintroduction of fire as the means to restored health.

§ By the mid-1970s that was the collective wisdom of the day: fire had to reenter the landscape. The tricky issue was how. The National Park Service formally revised its policies in 1968. The Forest Service stepped through a sequence of half measures, allowing some wilderness fires in

1972, publicly converting in 1974 to the doctrine that fire management had to serve land management, and adopting a formal policy of fire by prescription in 1978.

But ideas were easy. Implementation was tough, as both agencies struggled to make philosophy practical. The American public became rudely aware of what was happening when Yellowstone burned through the summer of 1988. Apologists cleverly framed the ensuing outcry by debating whether fire belonged in Yellowstone; that was easy, of course it did. What they avoided was the gist of the operational issue, how and at what cost and under what social compact should fire belong? Even as the NPS burned up \$130-300 million (no one knows exactly how much) while failing to control the fires, the Park Service and its apologists managed to skip over the point where the philosophical rubber hit the road of real-world ecology. The agency was, it claimed, only doing what came naturally.

It was exactly this issue that the fire community has never resolved within itself. The revolution, like a bar magnet, had two poles that held the fractious particles within a common force field. The poles were bicoastal. One resided in Florida, focused on the Tall Timbers Research Station and the charismatic Ed Komarek; a sense of fire as used on private land, fire as historical and cultural, fire as a means to promote biotic assets, whether longleaf pine, bobwhite quail, or open-woods cattle. The other pole centered on the national parks of the Sierra Nevada, with its intellectual anchor in the University of California–Berkeley and its focus on public lands, and for its prophets such wildlife and rangeland professors as Starker Leopold and Harold Biswell. The Florida faction wanted fire in the hands of people; the California cohort, as far as possible, left to nature. Behind the wilderness model was the expectation that, while prescribed fire might be necessary as an expedient, the agencies would ultimately surrender their colonial oversight to the indigenous processes of nature. Prescribed fire was an expedient, to be succeeded by natural fire as possible.

Of course fire control never collapsed, and as exurbs have sprouted like mushrooms it has regenerated with the tenacity of scrub oak, its roots all the stronger for the hacking it received. But it lost its sense of singularity and inevitability; fire protection is no longer the sole point of fire agencies. And although the debate continues to be dressed up in a Smokey Bear costume for public display, with the choice presented as one between fire's exclusion or fire's inclusion, the real decisions are among the ways and means of reestablishing fire. Fire's great cultural revolution had begun with a fire in the minds of men, and for the federal agencies that discourse had ended 30-40 years ago. What has remained is to realize those fiery ideals on the land.

§ Unfortunately, putting fire back has proved more daunting than taking it out. Shortly after arriving in Flagstaff, Wally was working with Forest Service researchers keen to reinstate fire. They believed that reintroducing fire would be enough to clean out the clotted understory that choked the land like woody plaque. Plots were laid out, burned, and assessed. But everyone knew the results could only be good.

After a few years, however, the field trials showed outcomes that were the exactly opposite of what had been predicted: loosed fires had killed few of the young trees without burning them up, while slow-cooking fires had girdled the bases of the old-growth ponderosa – the fabled yellow pine – two-thirds of which died over the next ten years. This was not what agencies wanted to hear. The Forest Service had just completed its painful conversion away from fire's suppression to a doctrine of fire by prescription. Wally's agency cooperators demanded he surrender his data on old-growth tree mortality since his work was under contract and hence the property of the Forest Service. The results, while obvious to anyone who visited the sites, were not published until 25 years later.

The solution was to establish his own program, which he did in 1978. In 1992 he laid out what became known as the "Pearson plots" on never-logged lands in the Fort Valley Experimental Forest outside Flagstaff (Gus Pearson was the first director of the forest). These would create a standard, a natural referent, a desideratum that Wally derived from his reading of

Leopold. Secretary of Interior Bruce Babbitt, from an old Flagstaff family, became interested and had the Bureau of Land Management make available some land at Mount Trumbull in the Arizona Strip country on which to establish some field trials. (It probably helped that the site was so remote that it might be considered the Area 51 of fire research.) The next year Wally received a big NSF grant to create his baseline.

Detailed research into the history of the site showed that the current forest bore little relation to its presettlement predecessor. That forest had resembled a savanna with small groves of yellow pine dappling glades of grasses and forbs and washed by frequent fires across the surface. An onslaught of sheep stopped those flames in their tracks. Overgrazing ended fires, which found nothing to burn; this allowed reseeding to inedible woods, which grew in stunted thickets, starving everything on the site and encouraging the occasional ferocious fires that could wipe out even the canopy of ponderosas. A pavement of pine needles buried the site's biodiversity. Outside the Pearson plots, where logging had felled old-growth ponderosa, the forest structure had further degenerated. The landscape was deeply ill, and without aggressive treatment, it would die. It would shrivel during prolonged droughts, become sick with beetles and mistletoe, and ultimately burn up in an escalating fever of windy holocausts.

Wally concluded that fire alone could not reverse this decline, for fire could only act on what existed: messed-up woods were likely only to encourage messed-up fires. Rather, the solution was to first restore the structure of the old forest by thinning out all the intrusive conifers and then applying fire. Function would follow form, and preliminary experiments seemed to bear out his belief. At this point "restoration" acquired a historical dimension to Wally, for it was the forest as it existed before the shattering blows of settlement that seemed to furnish a reasonable target for restored health. Cutting the small stuff and getting surface fires back on the land would spare the old-growth yellow pine from extinction. While he shared with environmentalists a passion for Aldo Leopold, Wally read the Leopold of the land ethic and the Leopold who healed a Wisconsin farm deeply scarred by settlement, not the Leopold as prophet of the wild. Out of this experience evolved what became known as the "Flagstaff model."

§ As the plots matured, drought brought a wave of wildfires to the region, scouring out large swathes of ponderosa forest that had occasionally torched but not known sustained crown fires. One after another, like sections of a giant faultline rupturing in quirky sequence, patches of ponderosa forest around Flagstaff erupted under conditions quite different from their evolutionary heritage, powered by drought and the explosive mantle of young conifers that had grown up like an immense shag rug under the old-growth canopy. To Wally the scene demanded quick and massive remedial action. A century of abuse had left the forest too enfeebled and vulnerable to recover from the kind of trauma such fires inflicted.

In 1994 Wally wrote a seminal paper on his conclusions to date. That summer off-the-charts wildfires shocked the national fire Establishment, sparking a new common federal fire policy and alarming thoughtful observers about what the future might bring. Secretary Babbitt enlisted Arizona Senators Jon Kyl and John McCain to provide political leverage. Meanwhile, the Mount Trumbull experiments scaled up the Pearson plots to something approaching operational acreage. In 1997 Wally's efforts acquired a surer institutional identity with the creation of the Ecological Restoration Institute at NAU, a congressional set-aside through the Forest Service. The Flagstaff model began to get national attention.

Which meant it also attracted national critics. Fire's great cultural revolution had been a bubble in a larger pot aboil with enthusiasms, a kind of environmental Great Awakening, which for many became a kind of secular religion. It had its magical icons, among them reintroducing the wolf and dismantling Glen Canyon dam; but perhaps nothing commanded more practical symbolism than to stop logging on the public lands. Particularly with the use of the Endangered Species Act, that was slowly happening. Now in the name of fire protection, ostensibly to spare old-growth ponderosa from incineration, Wally Covington, a retread forester, was proposing to

bring a species of woods-product industry back on the land. Critics suspected that the Flagstaff model was not about reintroducing fire but reinstating chain saws. When the Flagstaff model was cited in the National Fire Plan authorized in 2000 and the Healthy Forests Restoration Act of 2003, Wally's program became visible, powerful, and suspect. During the Southwest's record 2002 fire season a color photo of treated Flagstaff forest appeared on the front page of the *New York Times*.

The polarizing of American politics meant compromise would not be easy. What Wally saw as science-based preventive medicine, others saw as forester-inspired quackery. What hard-core wilderness proponents saw as deference to nature's way, Wally saw as surrogate religious sentiments - ecology as theology. Had he known what was to follow he might have traded his father's Leopold for his mother's Methodism, and cited Paul's epistle to the Hebrews, "For our God is a consuming fire."

§ The fact was, fire's reintroduction simply didn't happen on the scale desired. Setting fires was complicated, and letting fires free-range proved less widely suitable than expected. Meanwhile a decade of celebrity conflagrations roared across TV screens, usefully timed with national election years and unhelpfully thrusting suppression back to the forefront as an exurban fringe met a burning backcountry. Firefighting costs went ballistic, agencies were traumatized by an outburst of fireline fatalities, and the argument that prescribed burning alone could set matters right seemed too complex and long-range to meet needs. Besides, those who had witnessed the revolution wanted to see its results. They wanted regime change. Impatience grew.

The bicoastal split became more pronounced. Agencies began to set numerical targets for burning, although most of the acres occurred where they always had (the South), not where they were most loudly boosted (the West). But the West had something the South didn't: vast tracts of uninhabited land, some in legal wilderness, some just generic wildland, which suggested that naturally ignited fires could be left to roam under designated conditions. Early experiments went under the name "prescribed natural fire," but after several spectacular breakdowns, including an apotheosis in the 1988 Yellowstone outburst, the term was replaced by "wildland fire use," an expression as fatuous as "prescribed natural fire" was oxymoronic.

A WFU fire was a burn that "advanced agency objectives." In principle it seemed too good to be true. It promised to be cheaper, safer, and more ecologically wholesome. As with prescribed fire, it required preapproved plans and had rules, and as with suppression, a WFU required ready crews in reserve. But as long as the fire stayed within the domain allotted for it, it was doing nature's work. It returned fire's agency to nature. And not least, it absolved institutions of liability. They did not start the fire, nature did. Nature made the decisions, nature determined what would incinerate and what would survive. No one could be sued. There were no permits required for smoke. There would be no haggling with environmental groups over a human presence. You would outsource fire production to nature as companies might outsource manufacturing to countries with less onerous taxes or labor laws. A small fraction of such fires, left to loiter, might go looking for trouble and bolt away, burning up what years had conserved; but by then the fire was a wildfire, a bureaucratic metempsychosis that allowed its costs and consequences to be borne by suppression.²

Yet suppression still provided the organizational template. From the beginning, the reformers had tried to create a parallel organization, seeking the same kind of funding, comparable crews, an equivalent public acknowledgement; they lacked only a parallel Smokey Bear. Now, a similar logic of success appeared. In the past a failed initial attack had become an argument for further, fuller suppression, for a better initial attack could have caught the fire when it started. Now, a failed WFU became an argument for fire's more comprehensive reintroduction. More burning, a wider geography of WFUs, could have dampened fuels and prevented an escalation to conflagration. A rogue WFU was regrettable, but did not alter the fundamentals. The failure lay

in execution, not conception. Besides, in any conflict there will always be victims of friendly fire.

To some this might look like the ideological equivalent of money-laundering. But to many, raw with impatience over decades of dawdling with fire's reintroduction and alarmed as fire consumed more and more agency budgets, an expanded program of WFUs seemed a slick solution. It could get the burn out the way the old logging-driven Forest Service had sought to get the cut out. This was where the smart money went, literally. The agency could not pay for the fire program it had, much less the one it wanted. But an audit of large fire suppression costs led OMB to conclude that, with WFUs, the agency was "taking meaningful steps to address its management deficiencies," which is to say, working to get the amount of area burned up and the costs of fires down.³

In 1996 the Kaibab National Forest began to plan for prescribed natural fire. The claims advanced were that PNFs would be "low-intensity burning" of a sort "not currently available" on the forest, that the PNF would occur "under specific guidelines and favorable climatic conditions," and that "the use of prescribed natural fire will assist in changing the current situation of infrequent, high-intensity fires to frequent, low-intensity fires." Unfortunately, the proposed guidelines, known as prescriptions, did not include an irony index. In 2000 the Kaibab approved the PNF program, now renamed Wildland Fire Use. The environmental assessment concluded that the program would have "No Significant Impact." The Warm fire began as a WFU.⁴

§ The Kaibab Plateau is an outlier; the southernmost of the High Plateaus, the northernmost of the southwestern Sky Islands, the easternmost of the staggered plateaus through which the Grand Canyon is excavated. It appears like an inverted saucer, or low-domed altar, its low slopes disguising its height (over 9,000 ft). In Paiute it means "mountain lying down." To both mind and eye, it suggests a mountain skewed, or even inverted.

It is a place that makes ideas seem original, then obvious, then too complicated to understand. The Canyon is one example. Upon discovery, it quickly became a testimony to fluvial erosion. The river cut the Canyon's gorge. But a century of inquiry is still unable to say just how the Colorado River veered west to cross the grain of the plateaus and make the excavation possible. So too one of founders of geomorphology, William Morris Davis, made the Canyon a centerpiece of his theoretical cycle of erosion. The scene was there for anyone with eyes to see, a sequence of leveling erosion, followed by uplift and renewed erosion, shelf by shelf. It was self-evident, until the Canyon declined to agree and the theory itself fell into disrepute.

In the 1920s, after hundreds of predators had been killed by government hunters, the mule deer herd "irrupted," overwhelming the woods. The browse line that ringed the plateau became as celebrated in conservation circles as clearcuts in the 1960s. Aldo Leopold evoked the outcome by suggesting it looked "as if someone had given God a new pruning shears, and forbidden Him all other exercise," and then made the Kaibab deer herd an exemplar of game mismanagement. Removing predators had disequibrated Kaibab ecology; Leopold concluded that such irruptions posed a greater threat to the forest than anything save fire. Yet the reality of that fabled irruption, much less its mechanics, is now in doubt, and its meaning garbled.⁵

Now, perhaps, it is fire's turn. On the Kaibab, that slabby mountain like a low-mounded altar, consensus views have a way of becoming burnt offerings.

§ Wally Covington first visited the Kaibab in 1975, and like so many others, found himself enchanted. Here was a place that might be spared the worst of the coming conflagrations; the Kaibab would be the apex of a management triangle that stretched from Flagstaff to Mount Trumbull. For 50 years only one large fire had blasted over the plateau, the Saddle Mountain Burn of 1960, which had begun in the park before ripping across the boundary. Since then there had been 300 acres burned in a wildfire on Powell Plateau, and two 1,000+ acre burns on the

North Kaibab National Forest. While the absence of fire was of course the problem, big fires had not already gutted the woods. In 1997 Wally and his colleagues at NAU commenced studies with Grand Canyon National Park to reconstruct fire history, similar to what he had done at the Pearson plots. Those data would provide a baselevel to determine what preventative treatments might be needed. There matters stalled.

Part of the problem was that Wally had, in the eyes of critics, overreached himself. Convinced by the merits of the Mount Trumbull trials, he campaigned to extend those techniques into legally gazetted wilderness nearby. That caused pushback. Wilderness should be left to the wild. Besides, intensive treatment was expensive; ultimately it could only work if some market existed for the debris; small wood lumber, biomass energy, pulp, something. That looked even more like a wood-product industry in camouflage.

By now, too, the park had decided on other means. Flush with money lavished on the National Park Service in the aftermath of Yellowstone's summer of fire, Grand Canyon finally got serious about a fire program, adopted a new fire plan in 1992, and began aggressively putting fire back into the land. Prescribed burns and WFUs began to blanket the woods. One fire, Bridger-Knoll, left for observation, bolted free and burned into the national forest and across some 50,000 acres. A prescribed burn (the ominously named Outlet fire) went feral, forced the evacuation of the North Rim, and even skimmed over and around the Canyon rim, reburning Saddle Mountain. (Revealingly, it started the day before a Park Service burning crew lit the fire at Bandelier National Monument that scoured out Los Alamos.) Probably 95% of the area burned since the park's creation in 1919 burned in the 15 years that followed the 1992 plan. (For the Kaibab Plateau as a whole, roughly 90% burned between 1994 and 2006.) Whether or not biotic goals were being advanced, the park was getting the burn out – getting a mix of large-area fires, some of considerable ferocity. It had little need for Wally's prescriptions. It had little stomach to hack down thousands of small-diameter trees that could only infuriate environmentalists, an undertaking that was in any event unnecessary and expensive. It was finally getting fire on the land.⁶

Wally was sympathetic but dubious. This looked like faith-based ecology – sprinkle fire like pixie dust and everything will turn lovely. The park had an expensive, well-staffed program sharply attuned to fuel loads and potential fire behavior. But someone like Wally concerned with old-growth ponderosa knew that even surface fires could kill a significant fraction by slow-burn girdling around the accumulated debris at their base; the tree died a year or two later, well after any survey had passed on to new ignitions. That had not happened historically because frequent surface flames had flushed away the needlecast every few years; now a century of compacted biomass, the tangible residue of Kaibab history, was available to slow-cook roots.

Yet the park had no monitoring program in place to measure such biotic consequences. Nature would take care of itself. These ignitions, Wally insisted, were not natural fires; they acted on lands profoundly disturbed for a century; they might well be indistinguishable in their ecological consequences from those sky-blotting conflagrations that the agencies were warning would devastate the public domain and that had helped jar loose billions in federal funding to prevent.

Still, he regarded the Kaibab overall as redeemable. Then came the Warm fire.

§ “This fire really hit me hard.”

As Wally walks through the charred landscape a year later, he wonders if the Kaibab can still be saved. The 1996 Bridger-Knoll fire, left for observation below the rim, had burned 52,000 acres to the west; now the Warm fire has gutted the center and northeast; and the park has imposed a rapid series of burns, some intense, to the south. Within a decade the fire regime of the Kaibab Plateau had inverted. The WFU program had promised to replace unnatural, damaging, high-intensity fires with natural, benign, low-intensity burns. In fact, it had replaced decades of

small, low-intensity burns, held by aggressive suppression, with an eruption. The Wildland Fire Implementation Plan had not included among its required prescriptions an irony index.

Wally wonders “how much is left to work with,” if there is enough to save – if the scale and suddenness of the shock leaves sufficient flex in the land to warrant further preventative measures, or if the Kaibab will be left to sort out its own future. He points to a cluster of yellow pine. “They’ll be dead in a year or two.” This was a landscape in rehab, not restoration. The Warm fire, he says, “really took the wind out of my sails.”

More than a change in wind was a change in climate, the one that mattered most, the climate of opinion. Wally Covington found himself on the wrong side of the revolution. The National Fire Plan had been authorized at a moment of federal budget surplus; the Bush Administration has, as VP Dick Cheney famously put it, “other priorities”; there is little interest in a possibly expensive program of ecological restoration in areas with few voters and fewer lobbyists. Even woody biomass energy cannot compete with corn-grown ethanol as a political sop.

But the deeper reason for Wally’s alienation is that his vision runs cross-grained to environmentalist enthusiasms. A small-wood harvest program might work but only if long-term contracts would allow access to that cellulose-clotted understory. That looks, or can be made to look, like logging by another name. The environmental community wants nature to restore fire; the fire community wants fire back, by whatever means works soonest and cheapest. The restorative agenda proposed by the Flagstaff model requires too much research, too much money, too much time, and it looks too much like silviculture by another name.

As the era of big fires returned to the Kaibab, so too environmental groups had made their ambitions real. The Sierra Club and Southwest Center for Biodiversity had shut down logging. The Grand Canyon Trust had bought out grazing rights. Collectively, they had established the northern goshawk as an index species of ponderosa pine health, made forest plans sensitive to the flammulated owl, and blocked off portions of the plateau as sanctuaries for the endangered Mexican spotted owl. Yet in one gulp the Warm fire had burned through reserved nesting sites for the owls and goshawk, wiped out a chunk of old-growth, and shifted habitat away from pine-dependent species including the endemic Kaibab squirrel (“the owls and squirrel haven’t found a way to live in aspen,” Wally notes). A naïve observer might describe the outcome as the fire equivalent of a clearcut.

Of course the Kaibab will not be destroyed by fire. Already greenery is poking through the charcoal. The scenic highway to the park will be awash with aspen, always a tourist delight. Mule deer will gorge on the sprouts. The biotic kaleidoscope will turn. The question is whether this is what we wish for the land and how we wish to achieve it. Wally belongs to an older school of conservation, a new-era forester read in Aldo Leopold, but still someone with a powerful sense of stewardship. People created the mess, they can’t just walk away. If we value the goshawk, the flammulated owl, the tassel-eared squirrel, and old-growth ponderosa, then we have to intervene to save them. Eventually the Kaibab Plateau may fall largely under a regimen of naturally ignited fires; but the process of transformation is going to be awkward, and should be cautious, a voluntary rather than forced conversion. Wally worries that suddenly plastering the plateau with large burns will homogenize both the landscape and our options available for management - wonders whether the desired bold stroke, a series of shock-and-awe fires, will only catalyze an ecological insurgency that will be “unacceptable to future generations.”

He voiced public concerns over the fire, and proposed to stage a workshop to examine the larger conservation issues of the Kaibab that the Warm fire’s management raised. Forest Service officials then warned him that his public statements were becoming an issue. His criticisms might harm the cause of wildland fire use and “take away a tool from our toolbox” since the public, blinkered by Smokey Bear, couldn’t be expected to understand the complexities of fire management. The important thing was to get fire back on the land, and the fire community had to stand united. He was also informed that funding looked bleak for his Ecological Restoration Institute. And he was told there was no interest in a workshop on the Kaibab.⁷

Eventually the funding came through – those old political contacts paid off. But the workshop idea died stillborn. The North Kaibab conducted an “after action review” of the Warm fire that laid out the abundant flaws that led to the eruption and listed steps to prevent them from happening again. A more caustic draft asked “What Went Wrong???” and concluded: wrong place, wrong weather, wrong time of year, wrong fire monitoring assessment, wrong results, and wrong attitude, but conceded that in the end that “old standby, the weather” would get the blame. What was not at issue was the doctrine of WFU, which was fast becoming the treatment of choice for western wildlands. This was not the fire the North Kaibab had wanted; but it was a fire it was willing to accept as the cost of getting the burned acres it needed.⁸

Wally thought otherwise. “If you really want to destroy a ponderosa pine ecosystem,” he argued, “graze the hell out of it, suppress fire, cut old-growth, and then let wildfire run amok.” An “overzealous” WFU program could well be “the coup de grace” for the western wildwoods.

§ What happens next to the Kaibab biota will depend on what already exists on the land and on what follows, which in the southwest means whether rains return. Already the aspen rhizomes in the soil are suckering like wildflowers. The patches of exotic cheatgrass along the roadsides will propagate outward. Wildlife will search out new habitats, while owls and squirrels, and cougars and deer work out their complex choreographies. But all this is occurring amid a drought as serious as any the southwest has experienced in a century (the 2002 season was the worst in a millennium), and amid the uncertainties of climate change. Allow wild fire to ramble and the only known you will produce is wild landscape.

And that of course is the crux. So powerful is fire that its management can determine the larger uses of the land. The best way to control fire is to control its surroundings; but it is equally true that fires can define those surroundings. In the early years of colonial forestry, officials recognized that controlling fire was a means to control landscapes and the populations that used them. Deny fire, and you deny biotic access, and eventually change the land to something different. So, too, with fire’s reintroduction. A program of WFU commits those lands to a wilderness ethos regardless of legal designation.

Today the public domain is increasingly divided like Caesar’s Gaul into three parts. One part fronts exurban sprawl, and this is where the Flagstaff model is accepted as a relatively benign means to help shield communities from fires rushing out the public lands. A second part consists of wilderness, parks, and other ecological preserves, and this is where WFU will figure significantly. The third part is the land between those polarities, and it is up for grabs.

The arc between those oppositely charged plates is casting sparks, and the resulting fires will decide what kind of future those between-lands will have. If they are allowed to burn hugely because suppression cannot contain wildfires or because WFU fires are promoted, then they become in fact if not in name wilderness. Just as the WFU avoids many of the encumbrances associated with prescribed fire or thinning-and-burning, so the WFU sidesteps the political hassles associated with placing lands formally into the National Wilderness System. The lands become wild by stealth.

§ Ultimately the contest over the Flagstaff model is not about competing prescriptions of what diameter trees to remove and what sequence of burning to install but about conflicting philosophies of people and nature. Wally stands for an updated version of conservation in which humans have duties and must accept a responsibility to repair the damage they do and ensure that rare and valued natural assets get protection.

This is, in a sense, a more ecologically sensitive version of the multiple-use doctrine that has guided much of Forest Service history. Removing people will remove all the good things people do. The more vocal environmentalists want a nature left alone, the sooner the better, and look forward to a rewilding of public lands. Removing people will remove all the bad things people do. The assumption is that nature unaided will produce the best basket of environmental goods

and services and that a naturally caused event like a lightning fire is nature's way of catalyzing the process. But wilderness is not identical with the natural, the historical, or the biodiverse. In the end it celebrates a transcendence of Nature, or what its proponents have always said it does, wildness. Wild fire may advance other environmental goals, or it may not. The only guaranteed outcome is a furtherance of the Wild.

Nor is fire simply a natural process or a "tool in the toolbox." It has its own logic, its own ancient symbiosis with humanity, and its own capacity for irony. It is not a mechanical implement like a fiery woodchipper, but a profoundly biological process that synthesizes its surroundings, all of it, including the legacies of human handling. We might well reverse the old saying that an epidemic spreads like wildfire and say that a fire burns like a disease, a contagion of combustion.

The Warm fire blew up because of conditions made possible by over a century of fire practices. The downdrafts that drove the fire on its wild rush were the blowback from history. It remains to be seen whether the fire produces a biotic blowback of comparable dimensions.

§ Once before the Kaibab had been, momentarily, at the vanguard of a national fire discourse, and it pivoted, as fire issues always have, around the role of people in deciding what fire was appropriate and what fire they might in truth be able to do.

In 1890 John Wesley Powell barged into a meeting between Secretary of Interior John Noble and the two leading American foresters of the day. Bernhard Fernow was founding chief of the Bureau of Forestry, and Gifford Pinchot, the man who would succeed him and remake it into the Forest Service. This was a year before the country began creating forest reserves, and the two foresters were arguing, among other items, that such reserves were essential or else the land and timber would simply be lost to fire. Powell was then chief of the U.S. Geological Survey and director of the Bureau of American Ethnology, which he founded, and was still widely honored as the man who made the first descent through the Grand Canyon in 1869. Powell's subsequent Geographical and Geological Survey of the Rocky Mountain Region set up headquarters in Kanab, Utah, lying between the Kaibab and the High Plateaus, and commenced wide-ranging inquiries that led to the celebrated 1878 *Report on the Lands of the Arid Region of the United States*, one of the founding documents in American conservation. Among his conclusions was that fire took far more timber than the axe. The primary burning came from the hands of American Indians, and his crews codified that interpretation by mapping burned lands. Remove the Indian, Powell admitted, and you would remove a major source of ignition. It was this Powell that Fernow and Pinchot expected would support their cause.

Instead Powell reversed himself and argued that the character of indigenous burning actually preserved the forest. Those fires were light, frequent, varied, and ineradicable; they kept the woods from exploding if left solely to the logic of nature. Contrary to forestry dictum, Powell urged a program that would emulate that local lore, what he had witnessed among the peoples he knew best, the Kaibab Paiute. Fernow and Pinchot were outraged. They dismissed Powell's perspective as an incitement to vandalism, rightly saw its challenge to forestry's axioms as a political threat, and denounced deliberate woodburning as mere "Paiute forestry." These were, after all, among the most technologically primitive peoples in North America. That august professions like forestry, grounded in European academies, should recant their scientific sureties and accept the practices of wandering indigenes who lived on wild grass seed, lizards, and grasshoppers, and the occasional deer, was beneath consideration. When critics in the early days challenged the Forest Service doctrine on suppression, their calls for controlled or "light" burning were lumped with that old bugbear, Paiute forestry.

Wally of course saw the story differently, saw that the Kaibab had experienced over many millennia the presence of anthropogenic fire. The tribes had moved from lowland to plateau with the seasons, just as visitors do today. But to make the Kaibab habitable, they had burned, probably just as Powell and his colleagues described. Of course the Kaibab had ample lightning,

and granted time enough, that lightning would by itself impose its order on the land. But the regime that existed when sheep blunted the flames was not simply the outcome of natural ignition. It was a messy merger of both torch and bolt. Likewise, many of those fires had supported hunting, which on the Kaibab meant mule deer. The saga of the Kaibab's disruption from historic conditions was not simply the result of removing cougars and wolves, or of suppressing lightning-kindled fires, but of also removing the keystone species for both: humans.

Wally read in that history a place for people. His critics did not, and reincarnated a version of Paiute forestry which this time held that people had been irrelevant or trivial. Whether they had burned or not did not matter since only the transcendent forces of nature such as climate could meaningfully shape the patterns of fire. Small numbers of wandering folk could no more alter those cosmic rhythms than could tassel-eared squirrels. The argument overlooks one of the defining features of fire, that it propagates, and it looks away from the inconvenient fact that it is humanity's combustion habits that are now shaping even climate.

§ Now it had all come a full and vicious circle, as the Forest Service found its administration consumed by fire. In 1910, on the eve of the fabled Big Blowup, Chief Forester Henry Graves had declared that fire protection was 90% of American forestry. Two strenuous decades later, his successor William Greeley dropped that proportion to 75%. Whatever its grander visions, fire drove the agency's practical management. Yet foresters thought of the land's burning as a kind of fever, like a childhood disease, that a maturing country would outgrow and then be forever inoculated against.

For a while the agency succeeded, for everywhere a first-order fire protection system reaps large rewards, like the rye that waxes fat on slashed-and-burned old-growth forest. Young trees seeded in, as foresters knew they would. Burned area declined, and continued to fall even as burners were removed and new lands brought under the pale of protection. The proportional costs sank; the Forest Service had, as its founders declared it would, moved beyond fire's grasp. It handled fire as it might annually weed a garden. For a while fire management claimed as little as 13% of budgets.

Then the reckoning came. It came in escalating economic costs, in the accumulation of ecological toxins, and in the inextinguishable loss of firefighter lives; the vicious spiral of more firefighting and more fires, more money and more damages. Those revanshist woods became fuels, the lost grasses shifted surface fires into the crowns and prevented controlled burns, expenditures shot upward, demanding more and more crews and airtankers to keep a lid on. The federal agencies faced a full-blown ecological insurgency for which summer surges of armaments could do little more than chase smokes and take casualties.

What should have been obvious from the start was that fire was not something done on the side like paving roads or collecting trash from campgrounds or investigating the occasional poaching. In fire-prone lands fire management was the defining feature of land stewardship. It synthesized everything: it shaped everything; it determined everything. It could never be put back in its bottle because it had never been in one. It had always been on the land, perhaps quelled but never snuffed out. There was no way to contain fire except by containing the land. Wally was right. To lose control over fire was to lose all the rest.

As the blowback worsened, the fiscal claims demanded by fire climbed. By 2006 it commanded 45% of the agency's budget, and five former chiefs, watching in horror as fire costs ate up more and more of a fixed fund, signed an open letter that demanded congress reform the system. Dale Bosworth, chief during the 2005 centennial celebrations, noted that if trends continued another three, or five, or ten years, fire would take it all. He might have been quoting Henry Graves.

§ In the economy of nature, fire works with the "creative destruction" commonly attributed to free-wheeling capitalism. What is happening throughout the West, either by intent or accident, is

the ecological equivalent to the economic shock therapy urged upon the countries formerly under Soviet communism. Those committed to change argue that the sooner the transition, the better; the more quickly the invisible hand of nature can take over, the faster the necessary adjustment to a “natural” market economy. That the system may begin to experience wild booms and busts, or that some valuable features might be lost in the transition, or that mixed economies might work best, is irrelevant. What matters is to break the grip of the old system and allow the new order to begin. That is not Wally’s way.

And that is why, at least in the short term, Wally Covington’s strategy is unlikely to prevail. A beleaguered Bush Administration is no position to face down environmentalists, and its dismal budgetary standing leaves few options for anything that promises to demand federal expenditures, especially in areas with few voters. Even the fire community seems to be abandoning patient restoration projects for more dramatic gestures. In May, 2007 a fire officer and 30-year veteran of the Coconino National Forest around Flagstaff, Van Bateman, was convicted of arson for setting woods fires. His defense: he was only doing unofficially what onerous bureaucracy had made too cumbersome. He was getting fire back on the land, and insisted his behavior was “common practice.” He might have added in the words of fireman Beatty in *Fahrenheit 451* that “fire was best for everything!” and that its “real beauty is that it destroys responsibility and consequences.”

The Forest Service of course denied Bateman’s claim, but what shocked was not his justification but the cavalcade of defenders, many with honorable fire records, who rose to a kind of defense. Van Bateman was right: fire had to get back on the land. That this fire vigilantism was an eerie echo of the promiscuous woodburning against which early fire protection had fought so bitterly seemed lost, just as it escaped public discourse that the natural fires that the agencies sought with such effort and expense to reinstate could be indistinguishable from those wildfires whose havoc they had made a cause for public alarm.

§ The scope for Wally’s work on the Kaibab will likely shrink. There are too many critics who don’t want to see the Flagstaff model expand beyond Flagstaff; who fear any return to an era of saw and torch; who doubt that anything people do can help nature; who find the agnosticism of letting nature choose too convenient a way to avoid humanity’s own moral obligations. Wally’s vision that his experiments might extend to the North Rim and spare that beloved landscape from a violent conversion through a full-immersion baptism by fire is unlikely to happen.

Yet the work goes on. The ERI has students, projects, a slightly more secure funding; he remains a recognized presence, and for most observers and colleagues, an honorable one. He is, he jokes, one of the “silverbacks.” In the debate over the Kaibab he is marginalized rather than ostracized, an aging revolutionary who finds himself a member of the faction that accepted compromise when in revolutionary times it is the extremists who rise to power.

In a queasy way, he finds himself back in the cancer wards. He walks amid the charred yellow pine, shakes his head, yet wonders whether this might be a spot to maybe plant a handful of ponderosa seedlings to replace those giants lost, to reestablish the conditions that prevailed when the forest seemed robust. Another spot he would leave alone. He remains a man who thinks in terms of things done on the ground, and amid the doubts there is also determination.

“I don’t want to give up.”

§ In 1969 lightning kindled a fire on the Dragon’s Head, a pyramid-shaped butte in the middle of the Grand Canyon. Smoke drifted up, while beads of flame dribbled across the lightly vegetated limestone until they fell over the sheer wall of the Coconino sandstone and deeper into the gorge. Then the North Kaibab fire officer demanded that the park suppress that fire or else he would do it for them. The fire could go nowhere, and sending a B-17 to coat the Dragon’s Head with diammonium phosphate was expensive; but that was not the point. The point was that suppression demanded instant action, and could not tolerate hesitation, slackers, or conscientious

objectors. To let some fires burn out called into the question the premise that fire suppression was the basis for fire management, that the best way to prevent big fires was to control all fires at their origin.

Thirty-eight years later, the Warm fire presented an unsettling symmetry. Its originating spark was not merely tolerated but promoted, and plans were altered opportunistically. The Dragon's Head fire could go nowhere; the Warm fire, everywhere. In the bad old days it was axiomatic that taking fire out could allow nature to recover from the abuses of settlement. That outcome proved true in many places; then it became an ideology, went too far, and nature produced a mess. Today the postulate is that putting fire in will allow nature to recover, and that will likely prove true in many places. But how fire gets on the land will matter as will how we account for our oversight of that process.

The cycle of revolution was still turning, and was turning now on its own. Policy had changed, all for the good; the politics perhaps had not. There could be no dissent from the proposition that fire was good and that more fire was better. The prophets and critics who had objected to suppression in the Sixties had bequeathed only acolytes, not replacements. The prophets had become patriarchs. They left no tradition of dissent. The old fundamentalisms had seemingly passed through a looking-glass, reversing their image but leaving them otherwise intact. Fire's great cultural revolution appeared poised to replace one ruling elite with another, one defining ideology with another, one long-suffering landscape with another; or perhaps not. Whether the outcome would be the one desired was a matter of taste and cultural choice, a question of values. The one surety was that it would not be what everyone predicted.

The Kaibab is neither destroyed nor saved but in the process of radical change, and what needs to be preserved in fire management is that oft-frustrating, typically tedious process of democratic discussion, not only among squabbling factions of people but between them and nature. The radicals who stopped the agency from doing things they disliked seem prepared to shut off similar dissension now that it is doing what they wish. That, not the flames, is the concern, and why Wally's voice needs to be heard, because there is no technical fix to fire in wildlands as there is to fire in cities, and what happens over the next several decades amid a changing climate is no more likely to fit our forecasts than the FARSITE model predicted the Warm fire's blowup.

§ In 1936 the Civilian Conservation Corps constructed the original North Rim fire cache, a year after the adoption of the 10 AM policy by the Forest Service. When that policy began, Chief Forester Gus Silcox declared that it was an "experiment on a continental scale" to stop abusive burning. It would happen, and then wither away as no longer necessary. Instead it endured, because what made it unsustainable was also what made it administratively attractive: its simplicity. It said what to do and how to measure success.

The policy reforms that bubbled up from the Sixties had replaced that nominal simplicity with a charge to take "appropriate response." This prevented mindless adherence, but left unsettled just what action was appropriate. Practitioners ached for some set of guidelines that would tell them what to do and how to judge their decisions, for the uncertainties of fire are far vaster than its verities. A WFU program promised to lift much of that burden from them. They didn't start the fire, and if it broke free, it was an unculpable act of nature. In the end, what finally condemned the 10 AM policy was not its determination to control fire but the administrative rigidity that hardened its vision into fundamentalism.

The new fire cache stands ready for occupation. Looking over 19th-century America as only a Prussian forester could, Bernhard Fernow had sourly dismissed "the whole fire question" as the product of "bad habits and loose morals," adding that there was "no other reason or necessity for these frequent and recurring conflagrations." Perhaps 70 years from now some former rookie will return to marvel at the cache's bulked-up size, big enough to support a small city, and its modern apparatus, wired like a spacecraft, and then marvel how the fire landscapes of the Kaibab

had come to change as they did and wonder if this age too, perhaps like all ages, had its bad habits and loose morals.

written September, 2007
Copyright 2007 Stephen J. Pyne

¹ Quote from “Warm Fire After Action Review. North Kaibab Ranger District. Kaibab National Forest. October 11, 2006,” p. 1

² For general standards, see “Wildland Fire Use Implementation Procedures Reference Guide (May 2005), signed off by all the federal land agencies. For the local scene, see “Kaibab National Forest Fire Management Plan” (October 2005), which includes the specifics of WFUs.

³ USDA Office of Inspector General, Western Region, “Audit Report. Forest Service Large Fire Suppression Costs,” Report No. 08601-44-SF (November 2006), p. 3.

⁴ PNF review submitted to Fish and Wildlife Service (1999), p. 3; “no significant impact” quote from environmental assessment (2000).

⁵ Leopold, *Sand County Almanac* (Oxford: Oxford University Press, 1949), pp. 130-132; and Christian Young, *In the Absence of Predators. Conservation and Controversy on the Kaibab Plateau* (Lincoln, NE: University of Nebraska Press, 2002), p. 201

⁶ An excellent summary of burned history since 1959 is available in Garrett W. Meigs, “Recent patterns of large fire events on Kaibab Plateau, Arizona, USA,” Honors thesis, Cornell University, Department of Natural Resources (May 2004). I rely on Meigs for my statistical analysis.

On Covington’s park research, see Peter Z. Fulé et al, “Assessing fire regimes on Grand Canyon landscapes with fire-scar and fire-record data,” *International Journal of Wildland Fire* 12 (2003), pp. 129-145, and Fulé et al, “Comparing ecological restoration alternatives: Grand Canyon, Arizona,” *Forest Ecology and Management* 170 (2002), pp. 19-41, both of which provide general bibliographies.

⁷ W.W. Covington, notes from conversation with Regional Forester Forsgren, 11:30p.m. Monday, Feb. 12, 2007.

⁸ “WHAT WENT WRONG???. Warm Wildland Fire Use – Wildfire,” draft 7-09-06, North Kaibab Ranger District – Kaibab NF.