

The View from Tanque Verde

§ Stand on Tanque Verde Ridge in Saguaro National Park and see, in one compelling panorama, all that makes fire management in the western U.S. problematic. A metropolis lapping at its gates. A Class I airshed tainted by industrial pollution and reluctant to add more. Invasive grasses. An isolated mountain range layered with biotas and stirred into varied fire regimes. Endangered species. Exposure to public scrutiny. A service economy. An immigrant population drawn from fire-immune places and a resident population spiked with academics. Habitat fragmentation. A forest piled with fuels like a landfill. Prodigious lightning, assuring that a landscape primed for fire would always have ignition. They are all here, and they converge with the majestic syncreticism that characterizes the Madrean archipelago.

On closer inspection the scene worsens, if that is possible. The city is Tucson, one of the Southwest's Big Four, spreading like adobe kudzu through desert, wash, and foothill. Between them the Rincon Mountains and the Santa Catalinas, meeting to the northeast, form two sides to the Tucson basin, making a gaunt amphitheater. Invasives began with red brome, a flashy pyrophyte, in the 1970s, but the cycle of drought beat it back, and instead buffelgrass, a pyrophytic perennial, much denser with calories and far more tenacious, replaced it. In the mountain forests the Mexican spotted owl complicates efforts to prescribe-burn or conduct wholesale fuel treatments, while in the Sonora Desert fire can undermine the habitat of lesser long-nosed bats and leopard frogs through burning and post-fire flooding, and flames directly threaten the park's signature species, the saguaro cactus. Settlement from mining, homesteading, and ranching had wrecked the indigenous fire regimes in the usual ways by constructing roads, trampling, stripping off the grasses, and sweeping aside the native burners; grasses morphed into brush and woody litter. In 1902 the mountains were gazetted into the Santa Catalina Forest Reserve, subsequently reorganized into the Coronado National Forest, which imposed a program of active fire suppression that Saguaro National Monument inherited in 1933. The monument itself is split into two units, an eastern one atop the Rincon Mountains and a western one on the other side of the metro area amid the Tucson Mountains (proclaimed in 1961), such that habitat fragmentation extends even to the political composition of the park itself. By mid-century a rural economy that had used fire where it could amid the pummeled grasslands was gone, replaced by a service economy of tourism, government programs, shopping malls, military bases, a university, and retirement communities, none of them eager for smoke and flame.¹

Any one of these factors could have resulted in a cautious or compromised commitment to restoring fire, or in its effective extinction – and has in plenty of places. A major failure could have cut the program off at its knees. A failed fire could be quietly buried in the obscurity of the Mimbres or Mount Trumbull. In Tucson the mountains would act like a megaphone. Too many things could go wrong. As the folk saying has it, it's better to be lucky than good. A fire program at Saguaro would have to be both.

§ Yet, paradoxically, those factors that worked against a fire program also made it work. The small can be more nimble than the large, and an administratively remote diamond in the rough can have more freedom of movement than the closely watched crown jewel. What in other times and places might be liabilities could become assets.

The park's partition, for example, segregated its two fire problems. The western, Tucson Mountains unit, was desert and saguaro, and sought fire exclusion. The eastern, Rincon Mountains unit, pursued fire restoration. The mountains had Sonora desert and saguaro-clad foothills, some infected with invasives, and fires in these lower-elevations it suppressed. Fire on the summits had a harder time burning down crenulated slopes, and prevailing southwest winds drove flame (and smoke) away from the saguaro sanctuaries and Tucson. Much of the region's tourist and snowbird population filled the basin in the winter, while its fires followed the summer monsoon. Its population was educable; the University of Arizona hosted the Laboratory of Tree-

Ring Research, a world class facility, and boasted a strong natural resources faculty, also interested in fire; during the 1970s, when the park began experimenting with new fire practices, Tucson evolved into a literary center, many of whose writers (like Ed Abbey) were attracted to environmental topics. The public granted the National Park Service more freedom of movement than it did Saguaro's surrounding Forest Service districts. And the NPS allowed its managers a degree of autonomy unknown among other federal agencies; the right ranger could move quickly to install a program. The monument (boosted into park status in 1994) never experienced a blow-out fire that attracted the angry attention of national authorities or drew the wrath of its watchful publics.

Fire exclusion had obeyed the classic Southwest cycle, gaining purchase in the late 19th century. A serious if minimal fire suppression campaign by the Forest Service had started in 1922. Horseback patrols continued through 1940 when the monument assumed responsibilities (official records begin in 1937). Control was weak during the war years, and big fires still burned into the mid-1950s. Saguaro introduced its program for restoration in 1971. Its first prescribed fire came in 1984, followed by nine more. The age of active suppression by the park had lasted perhaps 30 years; by 2011 the age of restoration had run 40. As a protected site Saguaro had experienced more time under the new regime than the old.

The park never achieved what it intended – no place ever has. But it had held at bay the pressures to keep fire out, it had a functioning new-order program, and in the early 1970s it briefly shared the national stage by operationalizing the concept that would, after endless iterations and linguistic metamorphoses, become the foundation doctrine for fire's management in western wildlands, what its promulgator, Chief Ranger Les Gunzel, called a “natural prescribed fire.” It was the second unit in the national park system to do so.²

§ The immediate inspiration was the Leopold Report that the NPS encoded into a new handbook of administrative guidelines promulgated in 1968. Sequoia-Kings Canyon jumped on the prospects early and had a “let-burn” in its backcountry that summer. Most parks (and a few forests rich in roadless areas) pondered how to transition to the new regime. America's great cultural revolution in fire watched a hundred flowers bloom, as smokes drifted upward from the Selway, the Gila, and the Sierras.

In 1971 Saguaro inaugurated a program to restore lightning-kindled fire with the announced goal of “producing a fully natural area for future generations.” Lightning started 11 fires that summer, of which the park let 10 run “their natural course.” By 1974, when the park published its first formal fire plan, it had allowed 24 of 46 fires to burn freely. Overnight, it had, gestalt-like, moved from suppression to restoration, as though a picture long viewed as a vase now appeared to resemble two faces. All it took, it seemed, was a switch in perception. The new order didn't require the park to do anything new, only to stop doing what it shouldn't have done in the first place.³

The Saguaro solution synchronized philosophy and practice. The philosophy was easy. The charge to the park was to preserve and protect the natural scene. The fires would come and go with the rhythms akin to those by which saguaros blossomed or deer moved up and down the mountain with the seasons. Sense and policy argued that nature should rule, that the wisest fire policy would be to back off, as park officers did with other natural processes. If a fire went rogue, like the occasional bear or cougar, then it would be hunted down. But it belonged. The park's true fire problem was not wild fire, but fire's suppression. There was no more justification for beating down those flames than for continuing to kill coyotes. The arguments strengthened in 1976 as 90% of the park went into formal Wilderness.

Saguaro's physical geography favored the same solution. The Rincons were roadless, and trails were few, which made access onerous. Natural barriers were sparse – little more than what the abrupt crinkled slopes of the massif offered. Prescribed fire could not rely on internal buffers or a resident population. Every day might be a burn day, but if no one was on the mountain, no

one could ignite the burns, and without creating an expensive infrastructure for containment, those ignitions were no more under control than if lightning had set them. The simplest solution was to massage natural conditions into a prescription and let nature do the burning.

The natural fire plan claimed only a few handful of pages as an appendix to the general resource management plan. Its operational guidelines were few and expressed in plain-text language. Suppress human-caused fires, fires around structures, fires along the border, and all fires within saguaro patches. Eliminate mechanized firefighting except where required to save life and buildings. For the monsoon season, from mid-July to mid-September, once two inches of rain had fallen at Manning Camp by Mica Mountain, fire would be left alone. There were some limits imposed by considerations of predicted fire behavior, which pushed fires ignited under extreme conditions into suppression. But the average fire in the average year would no longer be hunted, trapped, or poisoned.

Within a handful of years a remote monument of 91,327 acres, of which 47,000 were fire-adapted, went from obscurity to national prominence. Half of Saguaro's lightning fires free-ranged. They burned as predicted; along the ground, sweeping away the litter, unthreatening to sky and city. The "natural prescribed fire" (later, transposed into "prescribed natural fire" or PNF) merged the two protest movements that had successfully stalled the suppression juggernaut. It was prescribed, that is, desired, scientifically grounded, and controlled; and it was natural, as a wildland fire should be. Appropriately, the fire plan was published as an appendix to a general landscape management plan.

§ Surely, it was too much to expect that this momentum could continue. The park's mission was its saguaros, not its ponderosa pine and Emory oak. The liberation of national park fire programs, flourishing like fireweed in the aftermath of the Leopold Report, would inevitably be succeeded by the bureaucratic equivalent of more shade-tolerant species as the NPS sought both to free and to contain its fire experiments – a paradox not unlike the PNF. Once the euphoria passed, the reins tightened.

Further addendums were added in 1974 and 1978. A formal fire plan was published in 1979, along with the return of a national manual (NPS-18), followed by an interim update in 1983, and a full spectrum revision written to evolving national specifications and absorbing post-Yellowstone lessons in 1991. By then the program, despite greater investments, was ebbing. The trend was evident even as the park crafted that first stand-alone fire plan in 1979. The document tabulated the record to date: 40 natural fires and 918.5 acres burned. Twenty of those fires and 896 acres, however, had occurred in the first two years. Subsequent seasons never reached anything like those proportions. Fewer fires were allowed; with a couple of exceptions they burned fewer acres; and prescribed burning was unable to make up the difference. The park seemed to recruit fires as the Sonora Desert did saguaros; its fire program waxed and waned as conditions warranted.

The program stuttered in the field for all the familiar reasons: what had pushed it ahead now pulled it back. The fire organization had persisted, and with it the tendency for suppression to become a default option amid ambiguity or when conditions were less than ideal. The PNF program stalled after the 1988 Yellowstone fires caused a systemic reboot, and the same held for prescribed fire after the 2000 Cerro Grande debacle. Prescribed fire proved too complicated and expensive to substitute for lost natural fires. The experiment reached an breathtaking climax in 2010 when the 110-acre Mica Mountain burn cost \$300,000; such monies, allocated under NFP fuels treatment projects, would no longer be allowed away from the WUI. The 4,500-foot elevation that roughly separated the desert from the woodlands – and segregated banned burns from tolerated ones – was arbitrary, and difficult to enforce. The troubling legacy of stockpiled fuels argued for a prudence that could easily segue into pusillanimity. Bufflegrass promised to reconnect what natural and recent history had fragmented – a shotgun marriage that would allow fire to spread across what had formerly been natural barriers. Besides, a single wildfire could

consume the entire park. The 2011 Horseshoe Two in the Chiricahuas fire burned four times the fire-adapted area of Saguaro; the Wallow fire in the White Mountains, 12 times. One rogue burn could break the bank.

Then there were the actual fires themselves. The earliest had behaved exactly as advocates hoped. But when a natural fire in 1994 threatened to cross the park boundary into national forest, the Forest Service discovered it had no funds for “prescribed fire,” and no means to jointly manage such a burn, and the fire was suppressed. The 1999 Box Canyon fire, powered by red brome in the lower foothills, burned into saguaro stands, effectively doing what urban developers had been prohibited from doing. The Helen II fire in 2003 crowned and wiped out prime Mexican spotted owl habitat. When the desired landscape fires had come, they had not behaved as expected. While subsequent landscape-scale planning among the agencies has eliminated some of the administrative concerns, it has not restored the expunged fires. Reforms take time, and time translates into missing acres burned.

Everything has become more cumbersome. What in early plans had been typewritten, or hand-annotated appendices, is increasingly encased in an exoskeleton of bureaucratic procedures. The 1971 appendix totaled 12 pages; the 2007 plan, stuffed with boilerplate legalese, ran to 157. As planning to accommodate fire swelled, actual burning on the ground shriveled. Local lore, local control, local autonomy – all yielded as the complexity of fire on the American scene argued for greater political considerations, which meant more encumbrances, which moved liability and power upward. Knowledge of fire behavior and effects gained by “homesteading” rangers was replaced by GIS data banks, commissioned research, and LANDFIRE. The pioneers passed from the scene. The 2007 plan was written by a professional contractor.

For a while it seemed that climate and notoriety might rekindle the program. The Southwest swung into a cycle of drought and lightning starts, while after the 1988 Yellowstone fires, the NPS found itself flush with fire monies, to which the National Fire Plan added more. Instead of a hotshot crew, Saguaro housed a Fire Use Module, ready to attend to PNFs. A 2004 summary observed brightly that over the past decade some 12,000 acres had burned as wildfire, 10,000 had free-burned as PNFs, and 3,600 had been prescribed burned. That year’s budget exceeded \$850,000, apart from emergency expenditures on wildfires. It was a lot of money per acre burned. The founding premise had been that free-ranging fires would be cheaper and safer than fought ones. Although advocates could point to success in principle and nearly half the park had burned in some form during the previous decade, skeptics could note the inability to keep up with original promise. To them the program appeared to be afflicted with a kind of wasting disease, withering neuron by neuron, limb by limb.⁴

The Rincons had in presettlement times burned every 10 years or so on average. One cycle, two cycles, maybe three cycles might be skipped without enormous distress. But the Rincons had missed roughly five return intervals prior to establishment of the monument, and some eight since then. The new era averaged 100-200 burned acres a year. With 47,000 fire-adapted acres the park was morphing from a 10-year fire cycle to a 313-year one. Restoration had, at best, introduced a single burst of burning that did not even cover the landscape once fully. Besides, what mattered ecologically was not the return of a burnover, but the reestablishment of a fire regime. It wasn’t happening. In bulk terms fire continued to leak away from the mountains. Combustibles still ratcheted upward like the speculative frenzy that precedes a stock market crash. To the minds of at least some observers nature’s economy was poised on a cliff.

It may be that the issue is less about bureaucratic barriers than the problematics of size and the probabilities of timing. It may happen that recent endeavors like the 2005 interagency merger of Santa Catalina and Rincon fire management and the FireScape project will allow for the necessary economies of operational scale, permitting Saguaro to share expenses and liabilities with the Coronado and the regional fire community. More critically, the clarification of what “appropriate management response” or its latest iteration and avatar (it seems to be “strategic management response”) means within federal fire policy may replace the troubled natural

prescribed fire concept with a more flexible and readily funded response to wildfire. Fire will be fire, as the mantra goes. Burned acres, partisans hope, will follow. Maybe.

Or maybe not. The park's signature species renews itself episodically. It recruits when conditions are favorable and lies dormant when they are not. Each flower blooms for 24 hours, with the bulk of its pollination done at night by bats in what seems a miracle of ecological synchronicity. A new generation must then establish itself in the ground. A saguaro cactus lives 150-200 years, which is to say, the old-growth saguaros that justified the park were established in the 50 years prior to the Mexican War and Gadsden Purchase. The giants that flourish today germinated about the time of Anglo settlement; they declined as cold snaps and fires and the various insults of settlement, particularly grazing, visited them; they have rebounded when those pressures have lifted, as they have recently. Yet while long-lived, the saguaro is notoriously shallow-rooted. For all its iconic majesty it is an opportunist.

That improbable matching of pollen and pollinator, and of seedling and survival, might well stand for what has happened with Saguaro's fire program. It flowered briefly, pollinated during a brief blossoming when people and climate converged. The program took root, then pulsed through dormancy and revival, at times robust and often faltering as conditions opposed further recruitment. Now it must find ways to persist and grow a new generation in the face of an increasingly inimical setting. Fire and manager will have to meet within whatever brief efflorescences of opportunity occur. Saguaro will have to be lucky as well as good.

Steve Pyne
February, 2012

Acknowledgements: Thanks to Perry Grissom for an informative chat and a generous cache of historic documents. The park is unusual both in having records and in making them available; I'm grateful for both. Thanks, too, to NAFRI's Fire in Ecosystem Management (M-580) course which hosted a field trip to Saguaro and the Santa Catalinas. Of course no one I talked to is responsible for my opinions or interpretation.

¹ Basic information from *Saguaro National Park Fire Management Plan* (July 2007); "Saguaro National Park, Administrative Timeline Relating to Fire"; National Park Service, Fire Management Program, background paper; Saguaro, *Historic Resource Study*, Chapter 4 (F), Forest Fire Policy; Pamela J. Swantek et al, "GIS Database Development to Analyze Fire History in Southern Arizona and Beyond. An Example from Saguaro National Park," *Technical Report No. 61*, U.S. Geological Survey, Cooperative Parks Study Program, University of Arizona (1999).

² See Louis L. Gunzel, "National Policy Change...Natural Prescribed Fire," *Fire Management* 35(3) (summer 1974), pp. 6-8, and Dave Gibson, "Saguaro National Monument Prescribed Fire Plan," honors thesis, BSc Forestry, University of Arizona (1974).

³ Gunzel, "National Policy Change," p. 8.

⁴ Figures from Saguaro National Park, "Briefing Statement. Fire Management Program," May 28, 2004.