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Mountains with Handrails

The trouble on Half Dome

Robert E. Manning



IN 1980, JOSEPH L. SAX PUBLISHED *MOUNTAINS WITHOUT HANDRAILS*, a small but eloquent book with a strong moralistic message. He begins by asking, Should the national parks be treated as “recreational commodities,” serving visitors’ demands, or reserved as “temples of nature worship, admitting only the faithful?” This is an important question—a derivative of the fundamental tension between use and preservation as embodied in the 1916 National Park Service Organic Act—that often splits preservationists and recreationists. Of course, Sax tips his hand with the book’s title. Drawing on the philosophy of Central Park designer and early Yosemite advocate Frederick Law Olmsted, Sax says that park visitors should be asked to be “reflective,” rely on their “contemplative faculty,” and “set their own agenda” without elaborate trappings of civilization. It’s an appealing argument: “Put aside for awhile the plastic alligators of the amusement park,” Sax says the preservationist would argue, “and I will show you that nature, taken on its own terms, has something to say that you will be glad to hear.” At the risk of being still more elitist, Sax goes on to write, “The best use [of the national parks] is not to serve popular taste, but to elevate it.” *Appalachia* readers should be familiar with this argument; the classic, ethically oriented mountaineering literature preaches that the essence of mountain climbing is not reaching the summit, but the climb itself.

Of course, Sax’s book was not available in 1919, when the Sierra Club arranged for a set of cables to be installed on the final steep pitch up the east face of Half Dome, in Yosemite National Park. (How times have changed!) That’s when the trouble on Half Dome began. The cables enable the average park visitor to reach the summit by means of a day hike from Yosemite Valley. By 2008, tens of thousands of visitors annually were hiking the sixteen-mile-or-more round-trip, climbing nearly 5,000 feet, then using the cables, pulling and dragging themselves up the last 400 vertical feet—a 65 percent grade, 9,000 feet above sea level, exposed on all sides—jostling for position with as many as 100 or more fellow climbers. *The San Francisco Chronicle* recently described this group derisively as “hikers wearing tennis shoes and sandals, city kids in baggy basketball grab, children, flabby tourists, and the elderly.” According to one breathless website, “Half Dome is the ultimate Yosemite day hike—the one you can’t die without doing, and the one you’re most likely to die while doing.” On a 1-to-10 difficulty scale, this website gives Half Dome

Grabbing on to a fixed cable route, tens of thousands of climbers a year drag themselves up the final steep pitch of the granite Half Dome in Yosemite National Park.

MARK MARSHALL/NPS

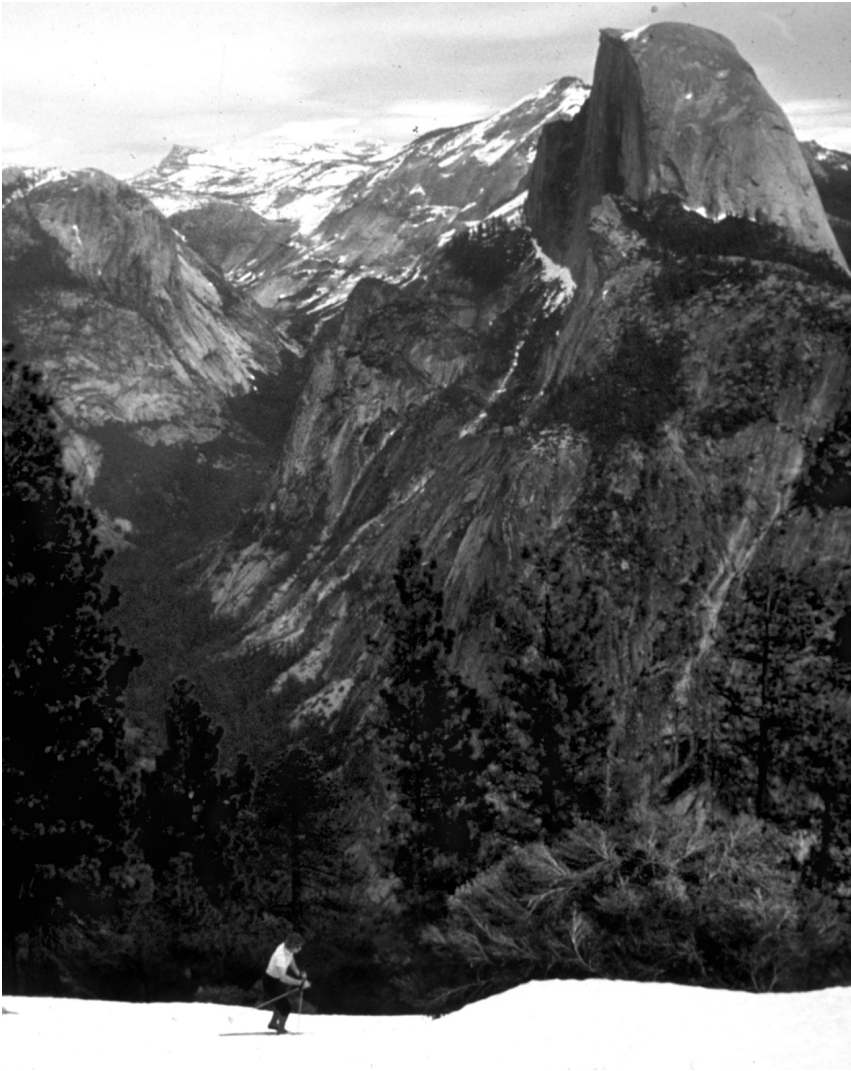
an “11,” while it gets a “9” on the “insanity factor.” The website might be right about the dying part: four hikers have died climbing the mountain in the last few years.

A “Perfectly Inaccessible” Peak

But let’s start at the beginning; first came the geology. Granite domes are a distinctive landscape feature that appear in many parts of the world. They’re formed several kilometers beneath the earth’s surface as “plutons” (after Pluto, the classical god of the underworld) or pools of magma that cool slowly and crystallize. In their underground form, nascent domes are under great pressure. However, as they are ultimately exposed through erosion and continental uplift, pressure on the granite is reduced and it expands, forming cracks, joints, and sheets that lead to a characteristic and distinctive form of erosion called *exfoliation*. In this process, sheets of rock erode from the surface of domes like the skin of an onion. Geology texts use Half Dome as the classic example of an exfoliating dome. Although Half Dome looks to be perfectly smooth from Yosemite Valley, Half Dome hikers know better. Glacial action has also shaped the Yosemite landscape. It’s commonly believed that the glaciers that formed the characteristic U-shaped Yosemite Valley cleaved and carried away the “missing half” of Half Dome. But this is probably exaggerated because the view of Half Dome from the floor of Yosemite Valley is a bit of an optical illusion; scientists estimate that about 80 percent of the northwest “half” of the original dome remains.

American Indians called Half Dome “Tis-sa-ack” (the name of a mother in Indian legend whose likeness is seen in the rock face). Its current name was bestowed in 1851 by the Mariposa Battalion, the first party of whites to enter Yosemite Valley. In the 1860s, Professor Josiah D. Whitney wrote in his *Yosemite Guide-book* (California State Legislature, 1869) that Half Dome was “perfectly inaccessible” and that it was “probably the only one of all the prominent points about the Yosemite which never has been, and never will be, trodden by human foot,” making this what may be the most ill-fated prognostication in mountaineering history. In 1875, George Anderson spent several days drilling holes in the granite of the summit’s final steep pitch, inserting steel pins and fixing ropes that allowed him to lay claim to its first ascent. John Muir scrambled up shortly after.

In more modern times, Half Dome has achieved legendary status in the climbing and hiking communities. The first technical ascent of the vertical



The distinctive shape of Half Dome, seen here from Yosemite Valley, has become the symbol of Yosemite National Park. NATIONAL PARK SERVICE

north face was in 1957 via a route pioneered by Royal Robbins and others, the first Grade VI climb in the United States. Today, climbers follow nearly 50 routes to the summit. For those who wish to stick to the trails, the John Muir Trail leaves Yosemite Valley at the Happy Isles trailhead and climbs by some of the most scenic and iconic features in the park, including Vernal and Nevada falls, Liberty Cap, and Little Yosemite Valley. After about six and

a half miles, the Half Dome Trail branches off for the last two miles to the “subdome” (a false summit) and the shallow saddle at the base of the cables, and from here hikers pull themselves up the cables to the summit.

Half Dome is one of the most recognizable and charismatic mountains in the world. Towering over the east end of Yosemite Valley, its distinctive shape has become a symbol of the park and the Sierra Nevada. Getting to the top of Half Dome is high on the life list of many climbers and hikers from around the world. In broader American culture, Half Dome is prominently featured on the recently minted California state quarter, it appears on the new California driver’s license, and it appears in the logos of a number of organizations and businesses, including the Sierra Club and The North Face.

The Cables Route

The “cables route” consists of two parallel strands of braided steel cables approximately two and half feet apart, supported by metal stanchions fixed to the granite, and spaced at intervals of approximately ten feet. Wooden planks are anchored between most pairs of stanchions offering climbers a series of footholds. The cables route travels about 600 linear feet to gain the last 400 feet of elevation to reach the broad summit of Half Dome. From the mostly flat 13-acre summit, the views are astounding, sweeping west down the length of Yosemite Valley, north across the valley to Yosemite Falls, and east and south out over the vast High Sierra. The National Park Service takes the cables “down” (that is, removes the stanchions and lays them and the cables flat on the rock surface) at the end of the hiking season (normally Columbus Day), and puts them back “up” on Memorial Day weekend (snow and weather conditions allowing).

The cables have beckoned increasing numbers of hikers to Half Dome over the years for what the younger generations call an epic hike. The vast majority start at sunrise in Yosemite Valley to make the sixteen-or-so-mile round-trip hike that usually takes ten to twelve demanding hours. This hike poses a number of potentially serious challenges. The granite track of the cables route has been polished by the boots of all those hikers over the years and can be slippery, especially when wet. The hike can be exhausting, and this can be exacerbated by dehydration. Some hikers suffer from altitude sickness. Many suffer vertigo associated with the extreme exposure of climbing the cables, and this can lead to a “freeze response” when on the cables. One hiker was recently quoted, “Everything in my body was shaking. I felt like I



The cables route travels about 600 linear feet to gain the last 400 feet of elevation. Some hikers suffer vertigo and “freeze.” WILLIAM RING

was going to vomit.” Many hikers do not adequately prepare. In the kind, understated words of Yosemite ranger Mark Fincher, “Many of the hikers making their way to the cables don’t hike routinely, and for many it is their first real exposure to wilderness.” Once on the mountain’s summit, they may

encounter lightning storms that can develop quickly in the afternoon. All this is made worse still by extreme crowding on the cables and long delays in ascending and descending. It's been estimated that there may have been as many as 200 climbers on the cables at one time. Frustration with this slow pace, along with diminished cognitive abilities from exhaustion and vertigo and "summit fever," have led some hikers to move outside the cables to get around congested areas and bottlenecks, exposing them to a greater degree of danger from falling and serious accidents.

Over the years, most accidents on Half Dome have been minor. But an increasing number require assistance from park rangers, and some of these accidents have become very serious. In 1985, lightning struck five people on the summit; two of them died. In 2007, three hikers fell to their deaths in separate incidents. Two of these cases involved hikers who were on the mountain when the cables were not "up." Another person died and one had a near miss in 2009. In the latter, a hiker fell from the cables and was sliding on his back toward oblivion when his baggy pants caught on a projection in the granite (one of those exfoliated ridges). This may be the only case in mountaineering history where a climber has been saved by a "giant wedgie." Of course, these accidents are tragic for those involved but are also traumatic for other hikers who witness them, some of whom report enduring nightmares. Responding to these accidents can also put park rangers at risk. These accidents, which drew substantial media attention such as the *San Francisco Chronicle's* front-page series of articles called "Danger on the Dome," caused the National Park Service to change the way it manages recreational use of Half Dome.

Wilderness Management and Other Oxymorons

In his influential book, *Wilderness and the American Mind* (Yale University Press, 2001), historian Rod Nash notes the paradoxes of wilderness in the United States and beyond. First, we don't value wilderness until it's just about gone. Then, after preserving the remnants of wilderness that are left, we "love it to death." Finally, to save wilderness, we manage it in such a way that it's no longer really wilderness. After all, the word *wilderness* suggests free from the control of humans whereas *management* suggests just the opposite.

Despite the very high use of Half Dome, it's important to note that it's part of the 95 percent of Yosemite National Park designated as Wilderness under the provisions of the landmark federal Wilderness Act of 1964. The act stipulates that Wilderness areas are "to provide opportunities for solitude

and a primitive and unconfined type of recreation.” Moreover, National Park Service wilderness policy states, “Unacceptable impacts are impacts that would . . . unreasonably interfere with the atmosphere of peace and tranquility . . . in wilderness. . . .” Consequently, in 2010, the National Park Service decided to limit use on Half Dome, instituting a mandatory permit system.

Based on monitoring counts of use on Half Dome, the permit system limited use on weekend days and holidays to 400 hikers: 300 day-hikers and 100 backpacking parties. A permit was not required for weekdays because monitoring data showed that use was relatively low during this period. Permits for day-hikers were made available on a government website and phone number, cost a nominal \$1.50 per person (plus a \$5 per group processing fee), and could be reserved as much as four months in advance. On the first day of sales, permits sold out in 32 minutes. A ranger was stationed at Half Dome where permits (in the form of a ticket) must be presented. Climbing Half Dome via the cables route without a permit was subject to a \$5,000 fine, six months in jail, or both. The Park Service monitored use of Half Dome during that 2010 season to test how the permit system was working and found that congestion on the cables was substantially reduced on weekend days and holidays, but that congestion on weekdays had increased substantially. The average number of hikers on weekend days and holidays (days for which permits were required) was 301 (many permit holders apparently did not do the hike as originally planned), and the average number of hikers on weekdays was 692. The 2010 monitoring report concludes, “Thus, it appears that an unintended consequence of the permit system was the interchange of use levels from weekends to weekdays.” Based on these findings, the Park Service extended the permit system to include all days during the 2011 Half Dome “season.” Permits for weekends in May and June 2011 sold out in 5 minutes. Half Dome permits started showing up on Craigslist for as much as \$100.

The Science of Wilderness Management

Meanwhile, the National Park Service commissioned a program of research to support management of recreational use on Half Dome. Scientists at two universities (Virginia Tech and Colorado State), a consulting company (Resource Systems Group), and park staff conducted the research, which they reported at a recent national scientific and professional meeting in New Orleans. This program of research included several components. First, a series of statistical

models of use of Half Dome were developed using (1) travel time on the cables (measured by a card that visitors carried with them and that a field technician “stamped” with the current time at key locations, including the base of the cables, on the summit, and then again at the bottom of the cables) and (2) a systematic series of photographs of hikers on the cables to determine how many hikers at one time were on the cables route and how many were climbing outside the cables. Researchers found statistically significant relationships between the number of hikers at one time on the cables and (1) the time required climb the cables and (2) the number of hikers outside the cables. More specifically, when more than 30 people were on the cables at any one time, travel time slowed significantly, and some climbers moved outside the cables. Analysis also found that “free flow” ascent time on the cables is about 21 minutes and that this corresponds to roughly 30 people at a time on the cables.

A second component of the research involved a survey of Half Dome hikers. A representative sample of hikers was surveyed after they had completed their hike. The survey included many questions about the socio-demographic characteristics of hikers, their assessment of the Half Dome hike, and their attitudes toward management. Key findings were that (1) 60 percent of respondents reported feeling crowded on the cables; (2) 23 percent believed the likelihood of hikers having an accident is high (though incongruously, only 12 percent believed the likelihood of them having an accident is high); (3) 79 percent of respondents reported seeing hikers outside the cables while holding on to the cables, 24 percent reported seeing hikers outside the cables while not holding on to the cables, 53 percent reported seeing hikers “frozen” on the cables from fear, and 78 percent reported seeing hikers who were unprepared for the hike; (4) 4 percent reported going outside the cables on the ascent, 16 percent on the descent, and 11 percent on both the ascent and descent; and (5) 71 percent of those who went outside the cables reported they did so to avoid being delayed by crowds. In summary, Half Dome hikers tend to feel crowded, believe accidents can happen (mostly to other hikers), report going outside the cables occasionally, but seeing others go outside the cables more often, mostly to cope with crowding.

A third component of the studies involved field technicians walking the upper stretch of the trail to Half Dome from the top of Nevada Fall to the subdome, recording the number of hikers they met along the way. On permit days in 2010, an average of 120 hikers were encountered, while on nonpermit

days an average of 267 hikers were encountered. These numbers are very high for a Wilderness area and do not comport well the Wilderness Act's emphasis on solitude.

A fourth component of the research program constructed a computer-based simulation model of visitor use on Half Dome. Data collected to construct the model included hiking times from the Happy Isles Trailhead in Yosemite Valley to the subdome, travel times to ascend and descend the cables, time spent on the summit, and behavior on the cables (i.e., whether hikers remained inside or went outside the cables). The resulting model is being used for several purposes. For example, the model estimates that a maximum of 227 hikers per day can be allowed to hike to Half Dome without exceeding the 30 people-at-one-time figure noted earlier (the point at which some visitors begin to move outside the cables). Under the current maximum use level of 400 hikers per day, the model estimates that it would take 47 minutes to evacuate the summit in case of a lightning storm or other emergency; under pre-permit use levels of 2008, it's estimated that it would take well over an hour. For safety reasons, some have proposed that hikers be required to use climbing harnesses and "clip on" to the cables in *via ferrata* style. (The Italian phrase means "iron way," referring to cables routes in the Dolomites.) But this would slow climbing to such a degree that the model estimates that only 70 hikers could be allowed to do the hike per day without exceeding the 30 people-at-one-time standard.

"This Page Is Intentionally Left Blank"

The National Park Service has issued several reports that describe ongoing research, planning, and management efforts for Half Dome. In a sometimes stiff, bureaucratic style, pages of these documents that for some reason do not contain any printing (e.g., dividers between chapters) are marked "This Page Is Intentionally Left Blank." This is a well-meaning attempt to assure readers that they're not missing anything important, but it may well be a metaphor for the future of Half Dome. Where do we go from here?

Our national parks are icons of American nature and culture, but they are historical artifacts as well, the result of decisions made as much as a century ago. In 1919, very few people visited Yosemite, and the National Park Service sought ways to entice visitors. As a result, the park now includes more than 100 miles of scenic roads, a golf course, a ski resort, a luxury hotel, and cables on Half Dome. Installing a third cable (which has been suggested) and then

maybe a fourth seems out of step with the growing scarcity and more contemporary appreciation of wilderness. When these artificial attractions cross the line into carnival-like distractions, such as the Yosemite Firefall¹ and roads through giant sequoias, we bring them to a well-deserved end. What shall we do with the cables on Half Dome? Of course, there's no shortage of strong public opinion. One public comment on the current permit system reads, "Our group has been hiking Half Dome for years never having a problem and now cannot get permits. This sucks, whoever did this sucks!"

ALL OF THIS IS JUST ONE MORE MANIFESTATION OF THE USE VERSUS preservation issue that is at the heart of the national parks and our tension-filled relationship with the environment more broadly. The Organic Act of the National Park Service famously directs that the agency's purpose is "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." In his homey wisdom, Aldo Leopold characterized the situation more generally as "How can we live on a piece of land without spoiling it?" And Garrett Hardin, in his influential paper "The Tragedy of the Commons,"² used Yosemite as an example of common property resources, arguing that the only way to avert the tragic destruction that comes with the inevitable trend toward overuse is "mutual coercion, mutually agreed upon." As we've seen with Half Dome, science—in this case, an impressive program of social science—can help inform this process by providing objective information on current and likely future conditions. But decisions on the desired future of Half Dome will have to address what we want as a society for this iconic place and what we're willing to give up to get it.

But what about wilderness and mountains *without* handrails? Nash takes a relative, cultural view of wilderness, ultimately concluding that wilderness is the places people call wilderness. Given the diversity of contemporary society, this means that wilderness is really a spectrum of areas that might include Half Dome, but certainly includes most of the rest of Yosemite—95 percent according to Congress. And this is how the park is managed, its wilderness

¹ The Yosemite Firefall was a nightly spectacle from 1872 to 1968. Embers from a bonfire on Glacier Point were pushed over the precipice, falling 3,200 feet into Yosemite Valley. To tourists who watched from below, it resembled a glowing waterfall.

² *Science*, 162, no. 3859: 1243–1248 (December 13, 1968).

divided into a series of zones, each offering a more remote, solitary, and pristine experience as we move farther from the trailheads. To be generous, we might call Half Dome a “wilderness threshold” zone and be happy that it beckons and rewards so many hikers, converting many of them in the process to confirmed wilderness advocates. This is the type of compromise that’s needed to join preservationists and recreationists into a unified force for parks and wilderness. But we should also remember the lesson that Sax offers: most of wilderness should probably be met more on its own terms than ours. An important corollary is that when we build handrails on mountains, we create recreation opportunities that may be more like an amusement park than a national park, and we’d better be ready for the consequences, including managing these places as intensively as they’re used.

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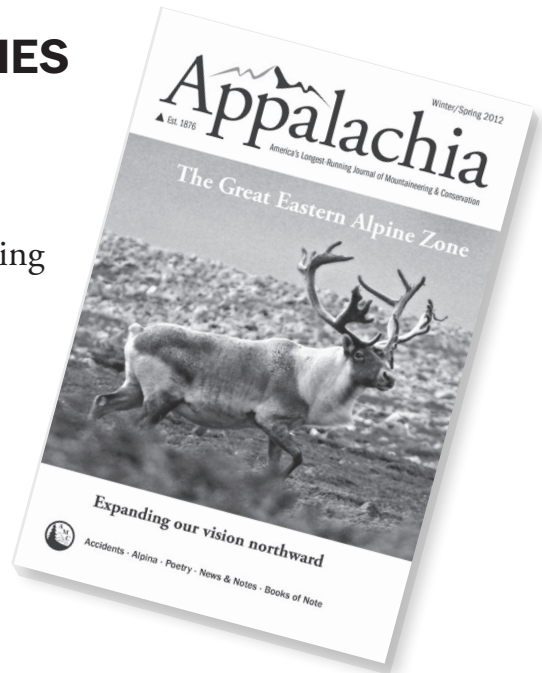
Reference Note: Joseph L. Sax’s book, Mountains Without Handrails: Reflections on the National Parks, is still available through its publisher, The University of Michigan Press.

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