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A black bear's path ambles across the dry sparse groundcover of a plateau in Northern New Mexico. Each footfall tells something of the bear, of the current ecosystem, and of the history of the area. Here he crushed some cryptogrammic crusts, combinations of fungi and algae that formed tiny castles atop the soil before the bear wandered by. The crusts, amazingly resilient when intact, lose their capacity to buffer the soil from rains when crushed. Without these crusts, the soils would have been washed off this plateau completely in the past 150 years. They may be the peasant heroes of this landscape, doing daily battle with erosion on a tiny scale while the other organisms struggle for dominance regardless of the costs.

The next footprint is more difficult to see since it landed amid a series of dwarfed blue gramma clumps. I've seen robust clumps a foot in diameter of this type of grass that grow as much as 2 feet tall. No such vigor displayed anywhere nearby. Small clumps of an inch or two mimic the larger patterns of the landscape with bare soil patches segregating tiny clumps, each clump seemingly struggling to produce viable seed heads to create a future for the species. The grasses here are tough, but not indomitable. Here between pinion and juniper trees clumps, in these relative " bare patches" between tree clusters, resources are thin and the struggle is constant and hard.

The next footstep, falling on totally bare soil, sinks rather deeply in the powdery dust. There are no plant roots to hold the foot up. The soil is unglued. The next step the bear takes is into a small runoff gully, a predictable response to the existence of bare soil in the previous track. The gully moved water recently. Yesterday was clear, but the day before was a typical afternoon thunderstorm, coming hard and fast. No chance for infiltration with that amount of rain, at least not with this amount of ground cover. The bear moves on.

The tracks mark similar microenvironments as they meander across the plateau. Blue gramma, bare soil, cryptograms, bare soil, another gully. Now and again something new adds interest to the otherwise repetitive list. In one footstep the feathery shaft of an apache plume seed flits nervously to and fro, every twist, every tumble an attempt to drive the seedhead into the trampled earth. Here the bear stepped on a black chip of obsidian, the lithic trash of a stone tool using culture. There he wandered through bare soil again, but this bare soil has been denuded not by fierce plant competition, but by ants. Their mound of meticulously sized quartz crystals fades into a rough circle of lonely packed earth, ringed by a front line of tiny blue gramma grass and deer vetch, an annual herb.

Further along, the pawprint encompasses a triangular piece of broken pottery. The pattern is still apparent after five, six or even seven hundred years is black on earth brown, drawn on with yucca "quills." I am always so amazed at how impossibly vibrant these simple geometric patterns appear. It is just one of thousands of potsherds on the plateau, each a question mark to me, representing a complex interaction between human and landscape. Did the pot last for weeks or years or generations? Whose hands shaped the coils that show such uniformity where the slip has fallen away over the centuries? This is no ordinary desert pavement. Cobbles and stones have a story to tell, but pottery speaks a human language.

Partially hidden under a pinyon, I see twisted, unidentifiable, long thin bands of oxidized metal. A different inhabitant left this behind. The list of possibilities is long. I quickly rule out early Spanish heritage. The metal is still too intact to have lasted the 400 years since the first doomed mission was set up in another canyon some 12 miles distant from this plateau. Maybe it's an old wagon part from a settler or rancher, caught off guard by an Apache raid sometime in the mid 1800's and forced to abandon gear in order to escape to safety. Could it be some bit of trash leftover from one of Adolf Bandelier's initial archeological surveys of the area in the late 1800's? Or maybe the rusty iron is something left behind by a visitor to the lodge that operated out of Frijoles Canyon from sometime around the turn of the 20th century. More likely it's of the same vintage as the three nearly decayed tin cans under the shady edge of the juniper ten feet in the opposite direction, all of it random leftovers from some camping trip in "nature." I couldn't fit the metal strips in my backpack, but I fight the urge to pick the cans up. Since each is quite likely over 50 years old and found on federal lands, they are now considered "historic" trash and protected as antiquities.

Wandering after the bear-spirit, I pass closer to a juniper tree. The ground is littered with a few of its berries, hard, purple-green, pungent as the juniper itself. This gets repeated again and again. Meandering from tree to tree, footprints ring the dripline of the branches, a handful of berries spill over the ground. Not many really. Not for so large an animal. But that goes to show what dexterity they have. Long claws on almost human hands rake berries from brambles, shrubs and trees with uncanny precision. I looked at the juniper and imagined the branches pulled forward, straining, then yielding their fruit to the bear's expert extraction. More support existed for the juniper hypothesis though.

A scat pile along the trail confirmed the theory. I poked at it with a pinyon twig. It gave me a renewed respect for the size of the creature who created it. The "bear-pie" was full of juniper-berry skins and seeds. The surface was dry. The inside was drying quickly too. Dehydrating is not difficult in New Mexico. Water evaporates quickly here. At 6500 feet, we're out of the blistering heat of the

lower elevations, but the air is still New Mexico dry. Perspiration dries on the skin as a fine white dust before you notice you've been sweating. I carry three liters of water in my daypack for short trips. By this time of the afternoon, two are gone. Scat fossilizes in such a setting. This year's waste, dries, gets whiter with time, breaks apart slowly, rolls around and eventually after a long life, rejoins the dusty soil.

Lost in thought, I stub my toe on a rock and look down again. The bear moved around the rock pile that I just stumbled over. These piles are everywhere on the plateau and return us to the inhabitants of 5-700 years before the present time. The rock piles were once walls. Stacked with mud as mortar, and covered with ponderosa pine logs and more mud, these simple dwellings were functional for keeping the sun and rain out. In the canyon only a mile and a half away, more elaborate structures were built. Some of the canyon's constructions are believed to have had 600 rooms and been several stories high (Oppelt 1989). These plateau rock piles are more likely to represent a few rooms at most. Summer dwellings. Seasonal housing up on the mesas where the beans and maize were farmed in "waffle gardens," where soils built up into cells caught and held the monsoon storms that now bombard these open soils and carry them away in a foaming slurry down the side canyons and eventually to the Rio Grande two miles away.

Hard as it is for me to imagine, this was once considered by the local people to be prime farmland. Certainly, this land never saw a tractor. The farming was subsistence agriculture, done by hand with simple tools. Dryland farming was practiced by the inhabitants of the area during their occupation from around 1200-1500 AD. All of this land was probably not in "production" the entire time. With increased population however, more and more land would have had to be put under production. Much of this mesa is likely to have been farmed. But it would not have looked like it does today, with little postage stamp gardens replacing the meager grassy interspaces between trees. Trees and farmland would not have coexisted very well.

This is a patchy landscape. It is driven by competition for resources, notably water. Pinions and junipers compete with one another within a clump. Further, clumps of trees compete with other clumps using the open spaces between as the no-man's land in the battle for resources. Interspace dwelling herbacious species suffer. The dwarfed grass is one result. The large proportion of bare soil is another. And so is the gully system that has developed to take away surface flows increased by lack of groundcover. In its current state, the trees are winning the battle for resources at the expense of the interspace species. So where would the gardens go? How would they compete with the trees?

The answer is they wouldn't. That leaves me wondering whether there was simply more water so that the competition between gardens and trees was less severe (everyone's happy because there is

no longer a resource limitation) or that something acted to reduce the tree densities in the environment, freeing up the same water for many more herbaceous plant users… in this case, garden plants such as maize and corn.

Climate change has made big news in recent decades. Perhaps a different climate provided more precipitation allowing trees and gardens to share the landscape? The record seems to indicate that there was no such alteration over the past 700 years. Tree ring analysis, whereby ring width is taken for an indicator of the wetness of a season, has been done extensively throughout the southwest. It seems that the normal variability of wet and dry years exists across the timespan.

Additionally, there seem to be no species shifts (another possible indicator of climate change) from records of pollen and fossilized plant remains found in bogs and packrat middens in the area. The plants that are found on the plateau today, were found as far back as 1000 years or more. There seems to be little evidence that today's climate is significantly different than what these early inhabitants might have experienced. If the climate was similar, then the only other way to balance the resource availability equation is simple. There had to be fewer trees on the landscape during the time when the land was being used for dry farming. If not, the bean and maize plants would look much like the dwarf blue gramma grasses. Not much food value there.

The people who lived successfully in this semi arid environment, who constructed the stone houses on the plateau and the complex structures in the canyons are likely to be the ancestors of today's Pueblo People. They inhabited the area for hundreds of years, their population shifting with time, sometimes more, sometimes less, sometimes more widespread, sometimes more aggregated. Early in their occupation, the plateau was likely not farmed extensively. Canyons such as Frijoles to the north, had water that was perennially available except during extreme drought. Microclimates favorable to plant growth were easy to locate and the access to water probably guaranteed that the population in the area would always be focused there. It is in this canyon remember, that the 600 room structure lays. Additionally, all along the canyon's south facing cliff are the remnants of stone buildings that lined the walls, sometimes two, sometime three stories high. At their backs, rooms were carved out of the rock wall itself, the volcanic tuff giving way to stone and bone tools quite easily. Today, some of these "caveates" are high off the canyon floor, the housing that stacked up the cliff face to encompass them having collapsed over the hundreds of years of neglect.

Even at the earliest however, it is likely that the plateau was at least partially farmed. The canyon, while climatically more favorable in our modern eyes, was also limited spatially and had a shorter growing season than the exposed plateau. Cold air drainage down the canyon combines with fewer hours of direct sunlight to offset some of the area's advantages to early farmers. Then there

was the fact that the species cultivated in the southwest, quite sensibly didn't need much water. Beans and maize could be grown on the plateau, assuming that their competition was minimal.

Again, what about this competition? What about the trees that now inhabit the plateau so prominently? The story, I think, is one of minimal tree existence to start with, and human utilization of the trees that did exist to the point that they were rare on the plateau which allowed farming to be more successful. It is easy to imagine that trees nearby the dwelling places were convenient sources of firewood. Fuels for cooking, for tool making, to fire-harden the ubiquitous pottery used by the peoples in this area must have put significant pressure on nearby pinyons and junipers. Ponderosa pines also found a local "market" and served as timbers for roofs. As the trees were removed, the gardens did better. It isn't hard to imagine that a culture that lived intimately with the seasonal cycles of drought and moisture would make the connection between the reduced tree cover and more successful gardens.

This combination of utility and the negative impact of trees on gardening put them in a position to be used freely. The landscape around dwellings, both in the canyons and on the plateaus, likely emptied of trees in a relatively short time. Evidence for this is offered by indirect archeological evidence from fire pits excavated in the 1990's show that shrubby plants such as apache plume appear more often in the later periods indicating a shortage of higher quality wood from trees (Kohler et al. In Press). The larger populations also must have forced expansion of agricultural activities. It is quite reasonable to expect that much of the plateau was eventually farmed with the result being that trees were reduced in number or eliminated from flat, easily accessed areas. It seems justifiable to expect that no matter what the density before human habitation began in earnest, the trees suffered a significant reduction with the increased human time on the land and the increasing human population. Had this bear walked through this landscape 500 years ago seeking juniper berries, he would have likely come away hungry.

The population that arrived on this landscape in the 1200's altered the landscape and ultimately made it less suitable for their own needs. The current Pueblo People in the area are generally in settlements very close to the Rio Grande. Close enough to carry water from. This proximity is probably not accidental. It may be that the migration from the cliff dwellings to the current location of the pueblos was finally necessitated by drought. Evidence exists for extreme dry periods at the end of the 1500's. After resource depletion, a drought could have forced people to new locations.

In any event, as with abandoned fields everywhere, a gradual process of reclamation took place. Native plants re-established themselves. Grasses and herbs replaced the beans and maize that

previously grew here. And without competition from the trees, a robust growth benefited grazers like deer and elk perhaps allowing their numbers to recover from the extensive hunting that probably accompanied the high local human population.

Today, deer and elk populations are once again high, perhaps artificially so. There are no large predators now except man. And within the invisible line that surrounds this plateau and some 30,000 acres around it, even man can't affect the population at present. The deer and elk have their way with what remains of the sparse herbaceous groundcover

So grasses and herbs refilled the void left by the migration of the aboriginal inhabitants of the area. Trees too would soon begin to establish, or re-establish a foothold on the mesas. And since trees are better competitors for water, we'd expect that in fairly short order, the plateaus would look much like they do today… covered in pinions and junipers with some ponderosa pines struggling to eke out a living at this marginally low elevation. That was not to be however. For a while, the grasses would win the battle. But they couldn't do it alone. Being weaker competitors than the trees, they needed assistance. And that assistance had been raining down out of the skies for hundreds or thousands of year as lightning.

A peculiarity of walking in this dry environment during the summer is that you should plan your trip to be down from the more exposed areas by early afternoon. It is then that the heat of the day generates enough energy that it boils into an electrical fury. Sometimes there is rain, great tumultuous cloudbursts drenching you to the skin, causing the earth to writhe and foment and flow. But just as often, a few big drops fall, and the energy pent up in the clouds releases it's anxiety as lightning alone, unaccompanied by much moisture. More than once, I've found myself running for the canyons when I've overstayed my welcome and the time between lightning and thunder is under a second. I have almost always reached the canyon bottom completely dry but for the perspiration from running, which dries again, leaving me powdered and still breathing hard.

This propensity for dry lightning has shaped the landscape in Northern New Mexico, and indeed much of the southern Rockies for eons. There is no need to call in the hand of man to explain the fire adapted systems here. Man's fiery hand is only a small contributing factor to the much larger natural backdrop of lightning caused conflagrations (Allen In Press). Fires ignite often. And in another time, they might burn for days or even weeks before coming under control by a good soaking rain or an impassable topographic feature.

While this lightning is more often associated with slightly higher elevations, the plateaus are not immune to fire. Ignition is quick and fire spread rapid in grassland covered mesas. Once started, these fires are hot enough to kill tree seedlings and robust enough to catch in the needles of full

grown pinions and junipers. Unlike ponderosa pine whose lower branches self prune with time, and whose bark is thick and corky, pinions and junipers hold even their lowest of branches for decades, providing an ideal ladder for fire to climb into their canopies. Should the canopies of these shorter, fuller trees escape harm, a fire burning in their own litter will often kill stem tissue on the thin barked trunk. Death results in either instance.

Grass on the other hand is generally unaffected by fire. It's growth centers are below the ground surface. Fire actually assists grasses by cycling nutrients more rapidly than would otherwise occur in such a water limited environment. And it keeps out competitors. Competitors like pinion and juniper trees.

Early documentation from Spanish explorers in the region can be taken as weak support for the idea of fire maintained grasslands in the region. One quote I've seen several times, but could not relocate for this paper can be paraphrased as "plenty of good grass growing as tall as the belly of a horse." I can recall this quote because I was struck by its use to describe pre-European conditions in two distinctly different places in New Mexico by two different authors. One author had used the quote to justify her belief that the low elevation deserts in the southern part of the state were once rich grasslands. Another author used the quote to describe the pre-European state of the area where I've been tracking a bear far to the north and at 6500 feet in elevation. It's hard enough to trust a potential real estate agent (the original Spanish explorer), but to have the quote cast over such a wide swath of the southwest, one might assume that the entirety of New Mexico was once an uninterrupted grassland!

However, I still find some value in the quote from this perspective. I have seen areas on the plateau where grasses currently grow tall and thick as described in the quote. They exist in remnant pockets throughout the area. Taking the report at a discounted face value, one might ask which grasses native to New Mexico might actually grow such as described? The local answer is a grass known as little bluestem. For prairie enthusiasts, it is the same grass species growing across the dry, grassy Midwest. It is the most fire resistant of the several grasses commonly found growing in the Pajarito Plateau region where I've been tracking this bear. It grows tall, thick,reddish brown and could easily be imagined as a great windfall to a visitor with grazing horses, cattle, sheep and goats in mind. It responds to fire with a ferocious burning and a gleeful renewal. Where other more delicate plants may decline after a fire, little bluestem explodes. It is a true phoenix of a grass.

For my part, I'll accept that the quote has some basis in fact. I will also accept that it is probably a reference to little bluestem and to the more northern parts of the state. And from this I will

conclude that fires were indeed shaping the grassland regions in New Mexico among which the Pajarito Plateau is counted.

So the Spanish arrived finding rich grasslands in the area. But the bear I've been following hasn't been feasting on grass seeds… he's been eating juniper berries. If he depended on grass seed here, he'd be pretty hard pressed to survive. Where did all the trees come from? As was noted earlier, records of pollen and macrofossils in bogs and packrat middens indicate that the trees have always been in the area. They were never completely killed off, not by fire in the years after native abandonment of the area, or by fuelwooding during the Puebloan ancestral occupation. They hid protected on steep rocky ledges where fire would not carry and the effort to harvest was too great. They were removed or precluded from the open plateau tops by the hand of man or the lick of flame. But they were only kept in check so long as there was human pressure or fire keeping them out, holding them at bay. With the coming of the Spanish in the late 1500's, a new kind of agricultural land use was initiated. The Spanish brought with them, large domesticated grazing animals. These would be the primary element of change eventually, but at first, impacts appear only locally. It would take another 250 years, new markets and new technologies for the impact to be acute enough to alter the entire landscape yet again.

Domestic animals had been a part of the dryland farming experience for centuries. However, the domesticated animal list seems to have begun and ended with turkeys until Spanish arrival. Whatever description one uses to describe the relationship of the Puebloans to the Spanish upon their arrival in the late 1500's, it is clear that they quickly embraced some parts of the Spanish cultural complex. Sheepherding, and cattle added useful fiber and food sources to a subsistence lifestyle in the pueblos. Even the pueblo revolt of 1680, the only successful Indian war on the continent, probably did not affect the adopted practice of grazing animal husbandry.

However, there was no market for excess meat at that time. There was no reason to keep vastly more animals than could be practically used. It is quite likely that grazing impacted the landscapes adjacent to the pueblos and this has been shown in reconstructions of fire histories done along the Rio Grande corridor in New Mexico. Apparently the impact was fairly local. But what happened locally is worth chasing a bit.

According the work by Tom Swetnam (Swetnam and Baisan 1996), a tree ring analyst by trade, fire frequencies in the areas around known human habitations actually declined during this time after the coming of large domesticated grazers. The presumption is that these grazers reduce the grass and herb cover that allows fires to carry long distances once ignited. And we begin to see a possible

explanation for our trees on the plateau. If we exclude wide spreading fires from the plateau, we once again pit trees against grasses in a battle slanted in favor of trees.

However, the nearest pueblos are miles from our particular plateau. Given that there were no vast markets to dispose of excess production, there is no reason to expect that large numbers of animals were grazed so far from the places of human habitation. We do not yet have an explanation. Grass still grew in profusion. Lightning still aided in its defense against trees. We still don't have juniper berries to fill the belly of a calorie greedy bear seeking to build up reserves for the coming winter.

I've lost the tracks on some rocks at the edge of the plateau. From here, there is a rocky steep descent into the canyon below. I choose not to follow. I can see where White Rock Canyon, carved by the Rio Grande cuts off the end of the canyon below me far off and to my right. Looking up canyon and across, I see the almost obscene white antenna tower from the Very Large Array, a part of a network of similar listening devices set up to pick up information from space (alien communications?). That would be part of the Los Alamos National Laboratory (LANL). That would be one small corner of the land that holds much of the history of the making of the atomic bomb. It surrounds this side of Bandelier National Monument. And it's impact on the widest possible landscape would be several books if one were to chase it very far. But that is too big for me to contemplate right now.

Before there was the VLA antenna, there was atomic research. Before there was atomic research, there was a school for boys founded in the nature study tradition on a ranch that extended over much of the area. Camp-school. And before that, the ranch earned an honest living with livestock. Thousands of animals. Hundreds of thousands over a few years. Perhaps millions even. But that is quite a bit of rocky ground free of tracks to pick out a trail across, from pueblos to millions of grazing animals. Let's start with trains.

The Santa Fe and Topeka Railroad made it's way through the area in the latter half of the 19th century. Prior to that, English-speaking people from the eastern part of the US had been trickling in for decades. Certainly, they also brought grazers, and these grazers had ever widening impacts. However, like the Spanish and the Puebloans, the impacts of grazing were likely to be localized. The real threshold wasn't reached until massive transport opened the way for the movement of goods from these still desperately remote reaches of the country to larger communities both east and west. Trains met that need perfectly. With the coming of the trains, the ability to take a sheep raised on grass on the Pajarito Plateau, load it up and ship it living or dead to a town 500 miles or farther away, became a reality. Suddenly, the grasslands were a source of free income. Sheep and cattle could

convert these resources into meat. Meat could then be sold for capital. For the cost of a few animals, a rancher could begin an empire. A boom was almost guaranteed.

I've seen a picture of a bridge over the Rio Grande near a now disappeared town called Buckman (not reproduced here). The photo is infamous in these parts to resource managers. In the photo, an endless herd of sheep is being driven from one side to the other. Sheep fill the foreground and empty into the background. Sheep by the tens of thousands on one drive. Sheep that will participate in the decimation of the grasslands on mesas such as the one I'm on. In a five-year period, everything changed here. Everything.

Grasses that were once robust were grazed beyond recovery. Soils began to erode from the lack of cover and from the disturbance of so many hooves. Fires, if ignited, burned themselves out before traveling far. And trees, less palatable than grasses by far and not having to fend off fires, were given a double push toward control of the landscape.

It was during this rush that elk began to take their first serious hit from the new situation they found themselves in. Struggling for newly limited resources, they were also prey to market hunting for meat, and trophy hunting by a new breed of sportsman that could be brought in on the same train tracks that delivered the sheep and cattle back to gluttonous cities. Whether habitat loss, over hunting, disease or a combination of these, elk and bighorn sheep were extirpated from the region by 1900 (Allen In press). So went the grizzly, the bighorn sheep, and the wolf.

Predator control also had a likely effect. It may even be seen that predator control programs were a direct result of the overgrazing of these areas. Once destruction of previously rich rangelands had been done by sheep and cattle, it was inevitable that there be a decline in native grazing animals. Part of the impetus for predator control was to enliven sport hunting in the state. Is it any wonder that there was a deadened sport-hunting environment? What chance of competing would elk and deer have against a human driven onslaught of biblical proportions? Edward Abbey once referred to cows as "hoofed locusts." In this context, his statements are more realistic than one might have otherwise imagined. When the elk got there, the cupboard was bare. And it remained bare for years.

Two thoughts need to be fleshed out here before leaving this scene behind. First, grazing in a semi arid environment has dramatic impacts under the best of regimens. I've made the drive from Bandelier National Monument to Santa Fe dozens of times. There is a place where the highway forms a fenced off corridor through pinion and juniper dominated grasslands. On the highway side of the fence, the grass is thick and not quite what a Midwesterner would consider lush, but healthy nonetheless. On the far side, is an enormous rangeland where I have yet to have seen a single grazing animal. However, their dusty trails mark the fence line. And their grazing, light as it may be, has

effectively eliminated the grasses above ankle height anywhere that can be seen down that stretch of the road. “Light grazing” is heavy grazing in the southwest. Its impact lasts a very long time.

Secondly, tree invasion of these former grasslands becomes a self-fulfilling cycle. More trees means less grass via competition for water and nutrient resources. Less grass means fewer and less wide-spreading fires. Less fire means trees can compete more effectively. There is a threshold of course. All things do balance in the end perhaps. Our plateau shows no signs of the recent fire seasons which blew up in the mountains around the town of Los Alamos. In 2000, the fires didn’t stop at high elevation. They ripped down mountainsides and into pinion and juniper habitat. And the gaps between the trees were no protection in this extreme conflagration. Flaming logs exploded, whole branches were carried aloft by the self generated storm-like winds and dropped like well placed incendiary bombs into clusters of pinion and juniper trees. Trees took flame and in winds that pushed flames sideways, caught others in a patchy orgy. But this plateau was spared that fate… for now.

The conditions for such fires are rare. It may take another 50 or 100 years for the right combination of tree patch density, drought, high wind and ignition source to coincide to set the scale back to grassland. And perhaps it would not return to that now anyhow. There is reason to believe that the changes that have been brought about are going shadow us into the foreseeable future.

Some of that evidence is based on erosion estimates in the current land cover regime. In one study of erosion Craig Allen, a USGS ecologist, found that the hill slope was melting away at a rate of 2cm per decade. My introduction to the area was through this long-term monitoring project. After a massive year of rainfall and more sediment movement than had ever been recorded in the previous seven years, we recalculated erosion rates. We drew more conservative conclusions based on a better knowledge of the system. At .5-1cm per year of soil loss, the existing soils will disappear in approximately 400 years in most places. That sounds like a long time, far longer than any of us plan for, but the reality is that it takes thousands of years to form a rich soil bank. A loss of all soil in 400 years is dramatic indeed.

What landscape will our bear wander across in 400 years then? If he backed up that distance, he’d be in a fallow farm field, recovering from human occupation. One hundred and fifty years ago, he would have been more likely to eat sheep than eat juniper berries. In a hundred years, perhaps the catastrophic fire will have altered the landscape again. But with thinner soils on which to re-establish, after an intense conflagration, soils may not be in a state to support much life. Further erosion and loss of ability to support plant life are the likely consequences. A downward spiral.

In the meantime, the bear, the dwarf grasses, the potsherds and obsidian flakes, the occasional basalt tool, the anomalous rock piles where dwellings once stood, and the pinion and juniper trees themselves face changes along an unknowable trajectory. Archeological surface "smear" from increased erosion has affected the ability of scientists to utilize this most prevalent form of historical record. Soil loss rates are intolerably high if biotic sustainability is the goal. Herbaceous diversity and recruitment of new plants suffers. Overgrazing continues due to a lack of forage and a lack of enough large predators. This combined with a high value on the reintroduced elk in the local hunting economy means that over wintering animals coming to the plateau from high mountain meadows provide a burden on the landscape. Should the grasslands be restored? Should the political designation of this plateau and the other 25,000 acres that share its history be changed to reflect the realities associated with the area? Should restoration to some previous state take place regardless of designated use? What should the role of humans be in this setting?

The poignancy of these questions only becomes apparent as I turn back around to read the sign I've just walked by. The sign is made of wood. It's a boundary marker meant to be read by those arriving on the plateau from which I've just returned. "Entering the Bandelier Wilderness." And the management of such a place, so affected by so many layers of human influence over time, stands as a marker for questions about human interactions with "natural places" around the world. Today, they are not the focus of my struggle. Tomorrow they will be. For now, like the bear, I'm feeling the need to get a drink, find someplace comfortable and lie down for a rest. I've had quite a day.

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