

# PERTURBING MYSTERY



June 2002

History is what shapes the people we meet. To know their history is to know more about what they might do or how they might respond to what we do. The same is true of land. If what was once a grassland has been invaded by forest, or exotics, in no way will it revert to grassland after a disturbance such as a fire; it goes on from what history has made it. The choking mess above is what much of our land *used* to look like, except that ours was worse. Like this, most of it was overgrown oak/madrone forest infested with French Broom being invaded by conifers. Yet in addition to these problems are those one cannot see, particularly the largely exotic seed bank. What were the original native uses of the area such that one knows which plant communities are likely to develop and which successional processes are likely to develop after disturbance? What were the historic uses with which to guess which weeds are lying dormant in the soil? What minerals were lost from the topsoil? Why does the winter runoff take the path it does? How much forest was once grassland or chaparral and where? A site history informs us of how the land got to the conditions we see.

# WILDERGARTEN 5.3

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This book was originally produced under the name *The Responsible Party* for which there were two revisions, [1.0](#) & [2.0](#). Major revisions are for complete rewrites. Decimal revisions are for revised chapters or navigational changes and are not archived. Back revs are viewable by the numbered links below.

Revision History [1.0](#) [2.0](#) [3.0](#) [3.1](#) [3.2](#) [3.3](#) [3.4](#) [3.5](#) [4.0](#) [4.1](#) [4.2](#) [4.3](#) [4.4](#) [4.5](#) [4.6](#) [4.7](#) [5.1](#) [5.2](#) [5.3](#)

Vande Pol, Mark Edward, 1954 –

Other writings by Mark Edward Vande Pol:

[Natural Process: That Environmental Laws May Serve the Laws of Nature](#), ©Wildergarten Press, 2001, 454pp, ISBN: 0-9711793-0-1, LOC Control #2001092201.

[Shemitta: For the Land is Mine](#): ©Wildergarten Press, 2009. Contains: 217pp text, 980pp overall, 14 picture books, 2 tables, 963 photographs, 9 maps, 2 drawings, 2 charts, 145 footnotes, 358 citations, and 216 other source references, not including external Internet links. ISBN 978-0-9711793-1-8

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Wildergarten Press  
P.O. Box 98  
Redwood Estates, CA 95044-0098  
[www.wildergarten.com](http://www.wildergarten.com)



One would think we should begin a site history with ‘how things were before the white man came.’ Yet there are errant presumptions underlying most people’s beliefs about that time, arising from “Enlightened” ideas about what constitutes “Natural.” One such myth is the belief that Indians exerted little influence upon the land. It makes a nice story, but it is not even close to true. Asians invaded a late-Pleistocene North America in two waves over some 1,500 years. In the process, they were key to extirpating some 31 of the 44 large-bodied animal species they encountered, whether attacking a remnant under intra-specific predation pursuant to a major event such as an asteroid impact, habitat modification by fire, or by hunting is not clear. The extinctions even included animals with domestic potential: including a horse, a mastodon, an ox, and a camel. Indians were such good hunters that the early white explorers such as Lewis & Clark, Fremont, Leonard, and Bidwell **all** describe landscapes nearly bereft of game, that is... until they came to coastal California, which the Spanish diaries also report was loaded with big game.

One explanation for the large game numbers in California, popular among students of archaeology and ecology, is that European diseases such as smallpox, influenza, and measles took down Indian populations so rapidly and to such an extent that their numbers were greatly depleted before European settlers actually made contact with them. The theory holds that by the time the Spanish colonized California over 200 years after Columbus, there had been a recovery in the numbers of game animals and Indians to a lesser degree. Though this hypothesis at first appears reasonable, one must ask how diseases that spread over the entire continent of North America produced a different outcome in California with regard to numbers of large game.

The first extended European contact with California Indians was in 1542. Juan Cabrillo encountered a Chumash tribe in the Channel Islands off Santa Barbara. The Chumash were one of the most powerful and “urban” tribes in California. Large numbers in close quarters would make them more susceptible to contagious diseases. Smallpox, measles, and influenza have short incubation periods followed by intense, disabling, and usually fatal fevers. Yet Cabrillo described these tribes as healthy and prosperous along the entire coast, hardly depleted by disease. Thus, it is doubtful that only 20 years after Cortez had made his conquests in central Mexico (where smallpox had been devastating) these diseases could have spread 1,800 miles north across a desert, killed off large numbers of Indians and then the tribe recovered demographically. Moreover, Cabrillo stayed with the Chumash for three months, so it is unlikely the Spanish would not have noticed familiar plagues suddenly inflicting the Indians, but such was never noted in the record.



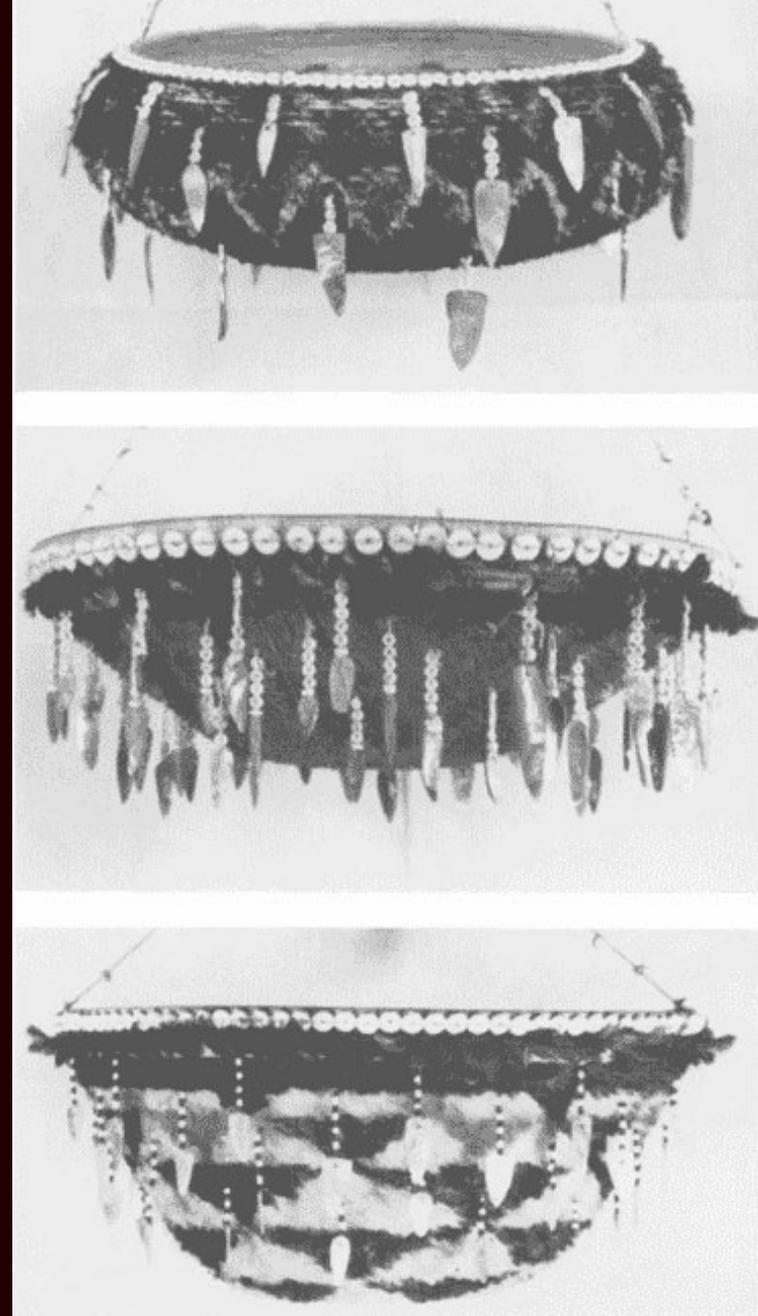
Clovis Point in Chert, 11,500-9,000 BC,  
Sevier County, Utah,  
Image by Daderot via Wikimedia Commons

Sir Francis Drake's landing in June 1579 was 37 years after Cabrillo, 400 miles north of Santa Barbara and across the Golden Gate in what is now Point Reyes National Seashore. He and his men stayed with (probably) the Olemaloque Miwok for about five weeks, not enough time for a full blown plague to get started, but likely noticeable to a perceptive observer. In this case, It is possible to infer from the description of Indian behavior found in the log that there *might* have been just such an incipient plague:

*“And now, as the time of our departure was perceiued by them to draw nigh, so did the sorrowes and miseris of this people, seeme to themselues to increase vpon them; and the more certaine they were of our going away, the more doubtfull they shewed themselues, what they might doe; so that we might easily iudge that that ioy (being exceeding great) wherewith they receiued vs at our first arriuall, was cleane drowned in their excessiue sorrow for our departing: For they did not onely loose on a sudden all mirth, joy, glad countenance, pleasant speeches, agility of body, familiar reioycing one with another, and all pleasure what euer flesh and bloud might bee delighted in, but with sighes and sorrowings, with heauy hearts and grieued minds, they powred out wofull complaints and moanes, with bitter teares and wringing of their hands, tormenting themselues.”* (Source link)

That's all you get. Importantly, the log also notes the presence of super-abundant game: *“infinite was the company of very large and fat Deere* (probably elk), *which there we sawe by thousands.”* Yet when the Indians did make food offerings to the English, which were ample, there was **no red meat**. The Indians gave them artifacts, fish, intricate decorated baskets, bread, and roots, but no elk meat, dried or otherwise, and nothing made of elk-skin. Most of the men were naked and the women wore rushes, the Indian king's robe was made of the skins of small animals (possibly mink), and his seconds wore robes of feathers.

Anybody familiar with Point Reyes National Seashore knows there is fog and wind there almost all summer. Yet If these Indians were such successful hunters with *‘thousands of deere’* around, why were they not wearing elk skin as did coastal Indian tribes farther north? Materials from such an abundant resource should have been ubiquitous.



*Pomo Indian feathered baskets with clamshell disk beads and abalone pendants. Source: Project Gutenberg eBook, Francis Drake and the California Indians, 1579, by Robert F. Heizer.*

The first Spanish land expedition of Gaspar de Portolá 190 years after Cabrillo was documented primarily in the diaries of Juan Crespí, Miguel Costansó, and Pedro Fages. They report that said numerous and prosperous Chumash were more concerned with wars than subsistence. Most Indians received the Spanish gratefully (possibly as potential allies), offering them gruel and pies made from seed, massive quantities of coastal fish, and but one (1) offer of red meat (deer), and that from the only chief they noted who clearly possessed regional clout.

Game never goes unmarked in explorers' diaries, as it was a critical source of food for their travels. The Spanish reported herds of elk, deer, and antelope, some large, all the way up the Central Coast. **Yet this exception of red meat in Indian offerings repeats in ALL of the rest of the Spanish tribal first encounters.** The lack of meat became so serious the Spanish were forced to slaughter mules on the return trip to survive, despite the ample game. Why?

A Spanish "escopeta" musket shoves a .69 caliber casting out of a smooth bore, exiting with the unpredictable trajectory of a knuckle-ball. It has a lot of knock-down power, but it is so slow and so inaccurate that it was not much use at more than 50 yards. The Spanish were in a hurry and apparently unable to hunt the ungulates because they were sufficiently wary of people as to stay out of range. But if game was so plentiful, why weren't the Indians hunting animals down to minimal numbers, just as they were everywhere else in North America?

California Indians were every bit as capable hunters, but unlike the rest of the country they faced a powerful, social, intractable, intelligent, and aggressive competitor: the Grizzly Bear. Yes, grizzlies once roamed over most of the US, but where winters are cold, bears hibernate. To control bears at that point then requires only killing denning pregnant females. Yet even then, it wasn't easy. The following account from northeastern, California is from Ishi, the last survivor of the Yahi tribe near what is today Mount Lassen:

*A grizzly bear is not game that a lone man armed with only bow and arrow seeks out. The Yahi hunted a grizzly **if it was hibernating and only if there were several men together**, enough to surround it with a circle of burning brush before it was fully awake... They shot into the open mouth if possible... to induce hemorrhaging. If a bear charged, a man tried to defend himself with a firebrand while his companions closed in with bows and arrows.*

It was not easy to kill even a hibernating grizzly. To take on a group of bears while awake armed only with bows and arrows would be suicidal.



**Grizzly Bear, Denali National Park and Preserve.**  
Uploaded by Albert Herring via Wikimedia Commons



The diaries describe multiple troops of 16-100 bears, tracks all over the State, and lots of bear scat along San Francisco Bay while camped next to the “Palo Alto” (left) along San Francisquito Creek, nearby the highest concentration of Indian villages on the San Francisco Peninsula. Only once did the expedition encounter Indians hunting at all and it was a very large band. Although some Indian women did wear deerskin skirts, the diaries describe the tribes as naked and many women wearing woven grasses or rabbit. The Spanish concluded that the most effective tool with which to recruit Indians would be their expressed great desire for clothing. During subsequent Spanish expeditions, the lack of meat continued and borderline nudity remained the standard of Indian dress until Coastal explorers met a tribe offering meat and wearing coats (including bear) at Destruction Island off the coast of Washington, after which point nudity ceased to the north. One has reason to suspect bears constrained a food and material economy obviously based on small game, fish, clams, and plants farther south.

Crespí’s diary relates that bears showed no fear of humans, attacked soldiers on horseback, entered a camp of 64 men and 189 mules at night more than once... then requiring **seven or eight** of said “lot of knock-down power” .69 caliber musket balls at close range. You can bet news of that feat of Spanish arms traveled faster than Spanish mules (especially nursing so many men with scurvy). In *every* subsequent meeting with the tribes, the visitors were greeted with either blind fear (at Pajaro) or open arms. As it turned out, besides geese, bears were the only game upon which the Spanish believed they could rely for the return trip. Bears were easy to hunt with a gun on horseback because they showed no fear of people.

Together, these incidents with bears weave a spatial distribution pattern: “Many bears” were in “Bear Valley” (above San Luis Rey in San Diego County), the San Gabriel Valley, along the Santa Barbara coast, the Los Osos (“the bears”) Valley, the Salinas Valley, the Coyote Valley, the San Andreas VALLEY, and from Oakland into Richmond (also a boggy area between ranges of hills). In all of those places, wherever there were bears, there was ample big game. In the few spots with people proximate to bears, the Indians not only offered no meat but gave the Spanish decoys for shooting geese.

In Los Osos, Crespí’s diary reported “groups” of **100 grizzlies** “grazing like oxen”, tearing up the ground (probably foraging for bulbs) aerating the soil over an area of between **5-7 square miles**. Where bears were that many, there were no villages. Yet there were sightings near the most densely populated villages on the California coast. Apparently people and bears shared an uneasy co-existence, each taking advantage of the other. It was an occasionally deadly stand-off that, over thousands of years, exerted profound effects upon the landscape. Yet in some ways, it was a very good deal for both species.

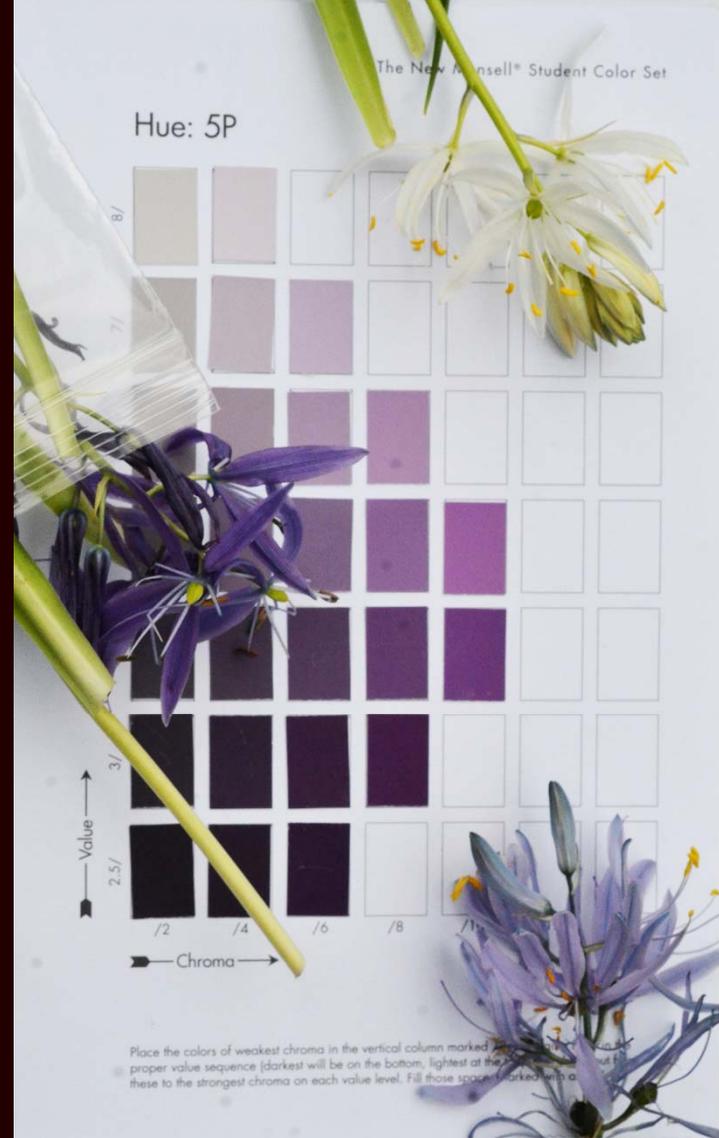
El Palo Alto, 1883

Source: Stanford ALL Image Exchange (SALLIE)

This spatially-demarcated competition between “apex predators” (humans and bears) both for prey and for plant foods offers us a model by which to posit why the vegetation was distributed as the Spanish explorers described with Indians restricted to proto-agriculture, effectively turning the entire landscape into a food resource, some of it dedicated to defensive purposes. The Spanish noted areas near villages as obviously burned at least annually just after the grass harvest and possibly again at season’s end (especially tarweed). Such would foster small annual plants while precluding shrubs and trees that bear fruit attractive to bears. But were small seeds the most desirable of foods? Having hand-collected grass seed for years along with gobs of clovers and other wildflowers for our restoration project, I can say that these seeds are so small that nobody could have subsisted on them alone. Yet there is a sound reason for growing them close to a village: Seeds require harvesting baskets, grinding tools, fire, and cooking technology to make them edible. Food processing technology rendered a field of small seeds useful to people but useless to bears. Effectively a field of wildflowers formed a defensive perimeter, burned clean so that one could see any threat attempting an undetected approach. This strategy of using vegetation without food value for bears as a form of “area-denial” is quite possibly repeated farther north, where people grew fields of camas around their villages on a huge scale (right). Camas bulbs are indigestible without cooking. The same would be true of “soap root” lilies in this area.

Niche separation between areas controlled by people versus those controlled by grizzly bears would therefore have profound effects upon the distribution of vegetation and wildlife (which is why you are getting this story), both because of burning patterns and the foraging and rooting disturbances by bears. Hold on for a bit, and you will start to see just how complex, subtle, and impressive the cumulative effects on vegetation may have been over thousands of years. It is our beliefs that distort what we see.

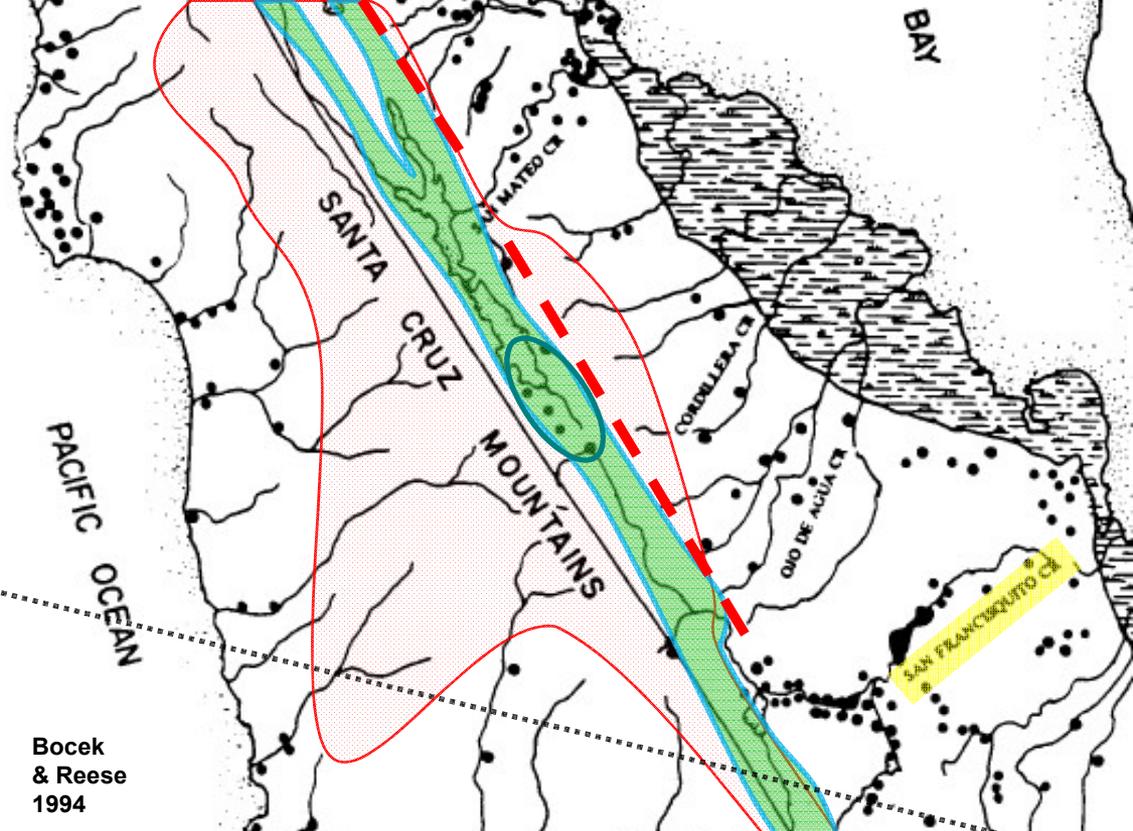
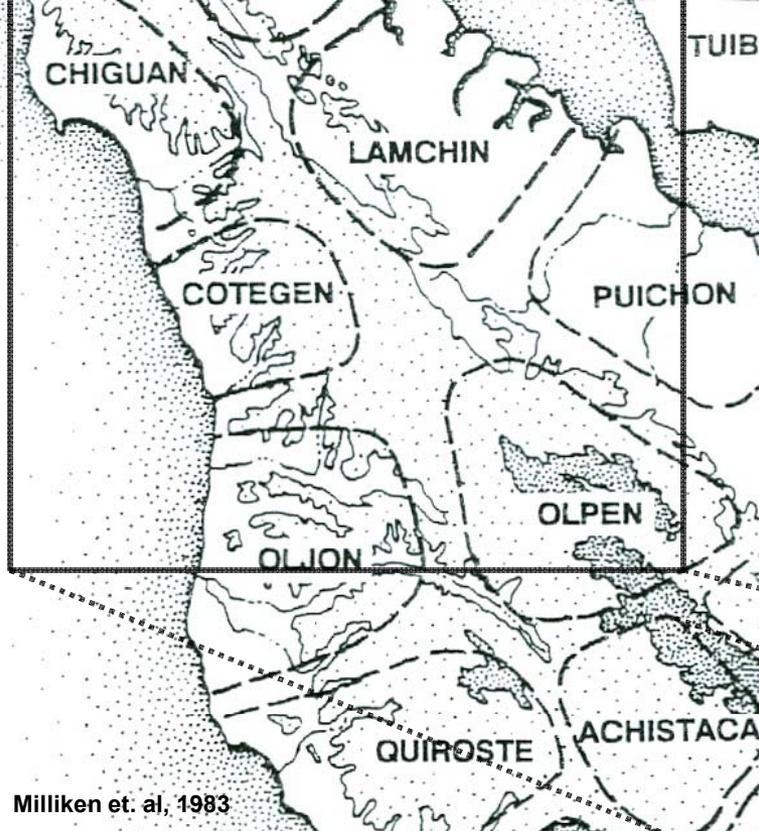
In boggy areas, fire was apparently less frequent, with the Spanish describing “lush plants” making it more difficult to burn bears with hunting fires, lighting their fur to induce fatal infections. The Spanish repeatedly described both bears, bear tracks, and other large game being found near wetlands. These were possibly at least seasonal “bear zones”: wetter areas between villages and avoided by Indians unless in a larger hunting, harvesting, or trading party both to avoid bears and intertribal conflict. These were still fairly open because of grazing, and rooting by bears, all being forms of disturbance.



### Camas characterized against a color standard.

Surveying camas (*Camassia spp.*) color by location is indicating that there may be a correlation between color and tribe, possibly indicating a territorial claim.

Photo courtesy of Dr. Bob Zybach, Oregon Websites and Watersheds Project, Inc.



The map at left of the San Francisco Peninsula depicts a rough outline of linguistic tribal territories at the time the Spanish arrived.

Unrecognizably different dialects at this spatial frequency would be totally unworkable with the distances people travel today, an inverse “proof” that for Indian languages to be so different so close by, indicates relatively little intertribal travel for a period so long that languages from the same Costanoan parent group could drift apart to that degree. Historically, the cause has been assumed to be cultural. The Spanish did document that most tribes warned of ‘wicked and dangerous people,’ assuming they meant other tribes.

While there are certainly evidences of frequent intertribal war, there may be another reason for that warning we’ll get to in a bit.

The map at right shows the distribution of archaeological sites spanning a very long period including long droughts and other climate variations. The area in pink, showing relatively few archaeological sites, is similar in shape to the unoccupied area at left, yet this is one of the most climatically desirable places to live in the entire Bay Area! Along San Francisquito Creek (lower right), note that the dense population ends abruptly where the stream penetrates a range of hills (red dashed lines) that define the eastern wall of a San Andreas Valley (along the famous fault) some of which was too wet to burn (green). From what I can tell, parts of the valley possibly constituted a seasonal “bear zone,” in a sense, functioning analogous to a geophysical feature rendering the area relatively uninhabitable. The mountains above may have also been hostile to humans but for different reasons in that the grades are very steep and less suitable for either harvesting or acorns, also having scarce water resources in summer and early fall. And what do you know but there were areas described with “many bears” sharing similar topography in the East Bay along the Hayward fault.

The Bay itself was a huge marine protein resource: especially clams and snails, fishing being more common along rivers and streams. For Indians of this region farther inland, acorns were the principal source of protein, with significant trade in acorns even across the Sierra Nevada. Yet to this day, virtually every hunter-gatherer tribe in the world with access to red meat prefers for protein. With all that game available, one then wonders why there is so much archaeological indications of a borderline vegetarian diet in so many California Indians, from analysis of trace isotopes in teeth to indications of developmental rickets.

It turns out that the more meat a people eats as a fraction of their total intake, the taller they are. Plains Indians such as the Pawnee or the Cheyenne tribes consuming a steady diet of buffalo meat were taller even than Euro-Americans of that same time period. Although height varied greatly among California tribes, they were on average about two inches shorter than plains Indians. Juan Crespí's diary frequently reported his general impressions of tribal health, with multiple instances wherein he commented that the Indians he encountered were relatively short in stature.

Why, in a landscape abounding in meat, would people not hunt for it as aggressively and utilize animal materials as elsewhere in North America unless there was a very serious reason not to do so? Hence is my conclusion that big game hunting in coastal California was usually a group event as a matter of safety, with the meat consumed immediately (the usual among hunter-gatherer tribes) lest a troupe of bears join the party. Other than bonito drying atop huts in large Chumash villages, the Spanish saw no indication of infrastructure for drying meat. Nor is there a reliable way to detect how much of the animal materials used (skins, bone, sinew, antlers, etc.) were from carrion, which would certainly be easy to obtain. Much of what the Spanish records say Indians were wearing other than skirts on women were feathers or skins of small game. My guess is that some of that meat went to dogs, a critical ally in defense against bears (and people), a way to clean up human feces, and a meat resource in themselves. Dogs can harass and distract a bear from a human with little risk to themselves. Their acute senses are also an alarm system, day or night.

Similarly, both acorns and those bulbs that are edible without cooking (such as blue dicks), would need to be grown and collected at a safe distance from the village because they are also bear food. Acorns, being seasonal, would require expensive storage (right) also subject to weevils.



**Miwok Acorn Granary (no date). Acorns were the most important source of protein in the diet of most California Indians. Image from the Smithsonian Institution**



*Salmon weir at Quamichan Village on the Cowichan River, Vancouver Island, ca 1866.*

If there had been any such weirs in the Central Coast streams of California, Crespí would have mentioned them. He did note one southward, and estimated every stream flow rate. Why did Indians make such large structures here, and not in central-southern California?

When spawning season arrives, eagles, seals, bears, and people, **all** want those fish. Yet with the exception of Drake and only in passing, mentions of seals (“sea wolves”) in this area were few. With grizzlies and humans competing for food, clearly pinnipeds were few in all but more protected locations (the archaeological record indicates they were dwindling before the Spanish arrived). The Portolá expedition passed along the Central coast from early November to late December, which would be at the start of the salmonid spawning run. Yet the Spanish diaries make no mention of such a fishery, despite that Crespí went on at length about “bonito” in southern California. He did make one (1) note of a fish weir on the Santa Ana River in the midst of a huge plain (Anaheim) far from any village. So while there was hook, spear, and net fishing, there was clearly not an obvious fixed infrastructure with which to take advantage of, ‘so many fish one could walk across their backs;’ else Crespí would have noted it as a resource. Why did Indians not make weirs in central California? What would a band of grizzlies do to a weir full of fish? Would you defend it at night?



Yes, it's a black bear, not a grizzly...  
...but it's such a cool photo!  
See note in the photo reference section.

So, no fixed fishing infrastructure. Similarly, and despite the wildly favorable growing conditions in a coastal Mediterranean climate, California Indians never farmed for food. Why not? Farming is fixed infrastructure. Just imagine tilling, seeding, and tending a crop for a season with your family depending upon the harvest to stay alive. A troop of bears saunters in, gorging themselves on the crop, napping... and willing to kill anything that threatens *their* food. Bears are sympatric *competitors* with humans, that is, they eat the same foods: roots, berries, bulbs, acorns, nuts, fish, clams, and occasionally big game. As long as there is some other way to get by, at that point, why bother with farming? **Turning the entire landscape into a food resource might keep the bears away while producing more food with less labor.** How? Remember that the Indians lacked beasts of burden for plowing just as much as for transportation? Crespí's diary had observed grizzly bears tearing up the ground for square miles at a time "as if it had been plowed." Don't think for a minute that the benefits of such disturbance would go unnoticed by the Indians. Tilled earth made digging sticks a useful tool.

This lack of farming was clearly not due to a lack of knowledge. Within the Uto-Aztecan language group, coastal Luiseños did not farm, while Paiutes 250 miles to the north clearly did. Within the Yuman language group, the coastal Típal did not farm, but the tribes along the Colorado River 130 miles to the east also did. To the north and east, grizzly bears would have to hibernate in cold Great Basin winters which did allow for irrigated aboriginal agriculture.

Archaeological digs of coastal Indians show no maize, no squash, and no beans. There were few tribes within coastal California that even had words for those foods in their languages, for which no satisfactory explanation exists.

Anthropologists and archaeologists have posited ample game or sufficient acorns to make farming unnecessary, offering even laziness as the reason; none of which make any demographic sense. More food makes more babies, which increases the power of the polity, and therefore its survival in war.

To the south into Baja California, I would not be surprised to see the same lack of proto-agriculture extending about half way down the peninsular coast. To the north, people farmed camas bulbs on a huge scale, which require cooking to be made edible. Bears won't touch camas. The practice was effectively area denial. Here in the Bay Area, growing small seeds may have performed the same function. Bears can not eat foods requiring processing.



This gray-shaded overlay has montane climate, less suitable for crops. East of that area, wherever there is summer water, proto-agriculture was not unusual.

Within the two language groups are darker shaded areas depicting the political boundaries of the tribes known to have practiced agriculture. The areas within the dotted lines are those where proto-agricultural growing activity has been reported. Prior to 1500 AD, the Colorado actually flowed through the "Salton Sea" basin forming a much larger freshwater "Lake Cahuilla" that emptied into the Gulf of California, so that outline reflects the shoreline of that lake where people had knowledge of agriculture. For the Yumans along the Colorado, the river was the obvious source of water.



May 2014 – Dry farm near Virgin, Utah

Lack of water is not the reason for the lack of farming. This farmer grows squash, pistachios, and watermelons in southwestern Utah, on 13 inches of annual precipitation and without irrigation.

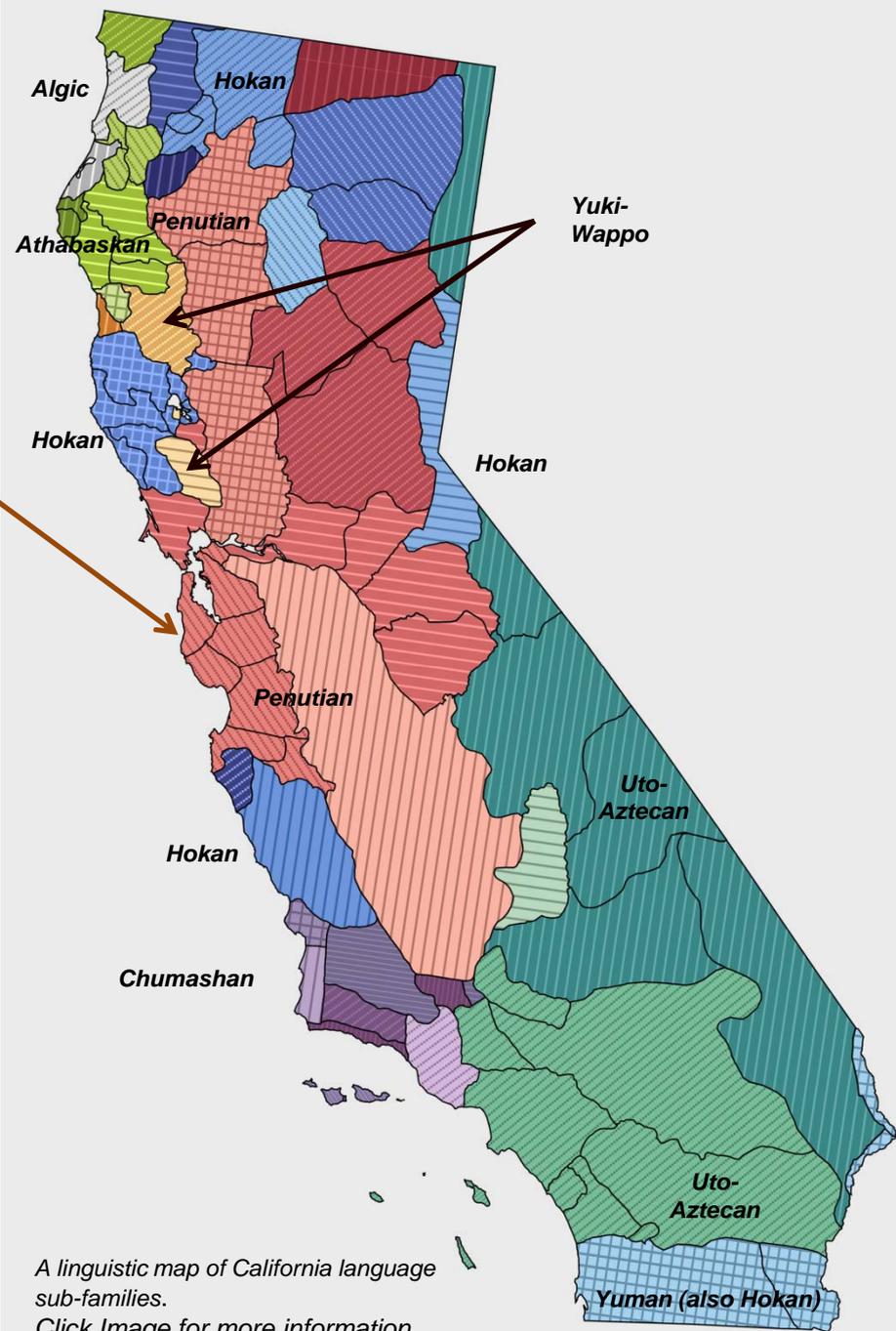


There are six linguistic super-families among North American Indians, each differing *more* than Hindi and Chinese. Of those, five were found in California, with 78 unintelligible languages among them, one third of all native languages in North America. Inland areas with colder winters were more linguistically dynamic and homogeneous, while coastal tongues were more stable and differentiated. In *the Costanoan nation* alone, there were 41 separate “tribelets,” many speaking mutually unintelligible dialects. That spatial linguistic diversity ceases North of Cape Blanco in southern Oregon, not far from the northern limits of the range of coast redwood. Redwood cannot tolerate hard freezing. No accepted explanation exists for why the density of Indian language differences along the California coast exceeded that of any other region in North America.

It takes time for speech to differentiate within groups. Hence, these large and numerous differences suggest either that the tribes had remained stable for longer than elsewhere or had less interaction among them. That observation is reinforced by the diaries’ reports of major differences in appearance among even adjacent tribes, some fair skinned, some darker, different hair color, stature, some with beards...

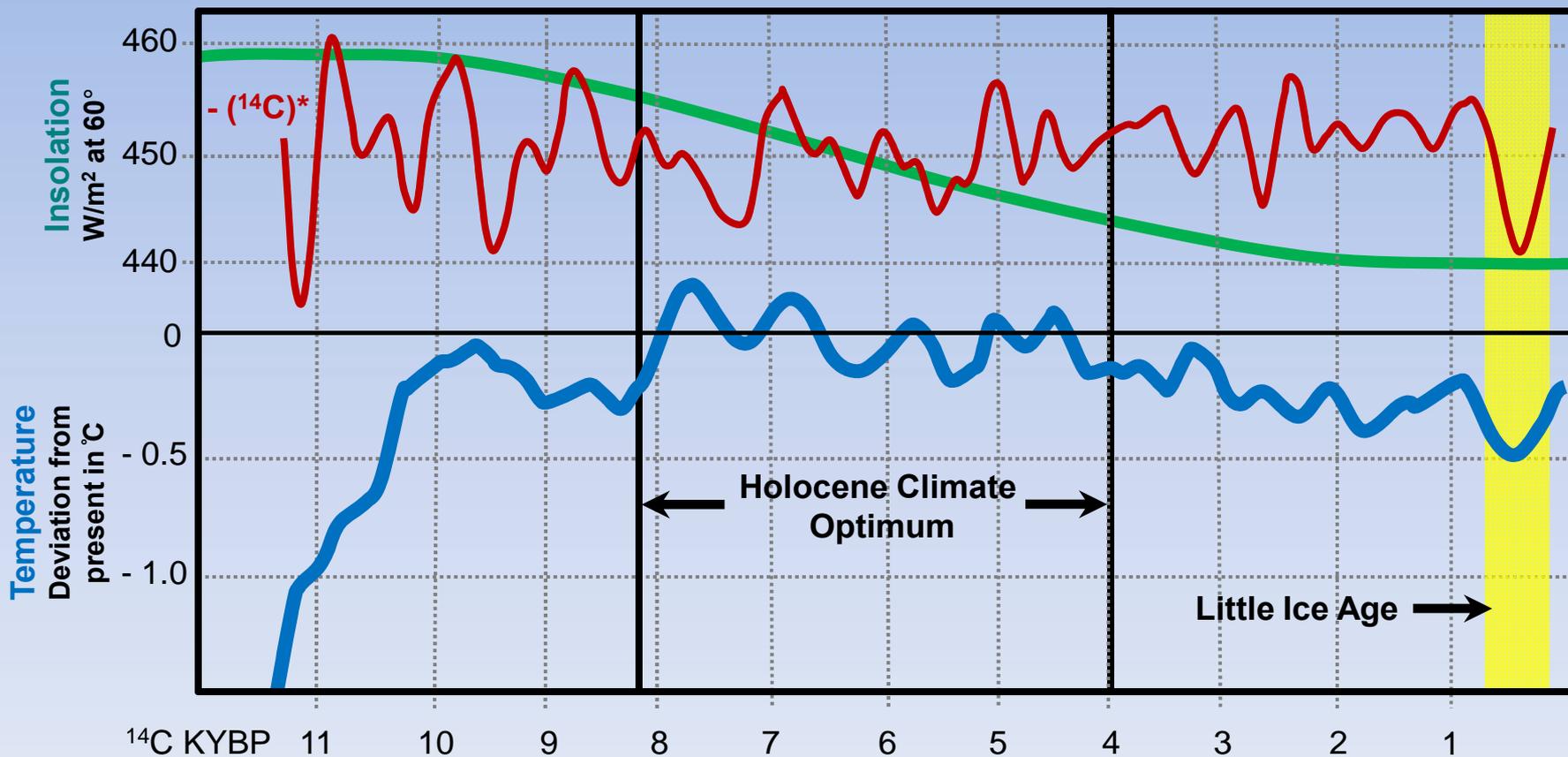
Increased isolation preserves and abets both linguistic drift and genetic distance. Two physical factors inhibit tribal interchange: (1) plentiful food all year-long renders exchanges less necessary and (2) transportation hazards inhibit exchange. Grizzly bears add to the hazards of travel (as do wars), which were frequent in California. However, wars disrupt language stability. Group interchanges, although safer, were less frequent because they require more preparation. Sometimes a whole village would go for a festival, which would obviously make travel safer.

Infrequent intertribal contact could explain why in California there was so little sign of smallpox compared to elsewhere in North America. In effect, the grizzly bear may have helped save coastal California tribes from the first wave of highly contagious European crowd diseases because of less frequent contact.



# Holocene Temperature Variation with Solar Insolation and <sup>14</sup>C Production\*

\*Production of <sup>14</sup>C is inversely related to solar intensity, so I inverted and reversed Bond's (2001) <sup>14</sup>C graph to show the correlation between solar minima, **insolation**, and "temperatures" derived from ice cores. "Temperature" is an average of various proxy estimates from Wikipedia



Some archaeologists cite an increase of large game in Indian middens in the late 1,500s as indication that smallpox had wrecked havoc among California tribes. This "bear hypothesis" offers another explanation: Colder winters during the 1,350-1850 Little Ice Age (yellow bar) meant that grizzlies may have hibernated over more of the region because more snow and extended hard freezing reduced the amount of available food. This in turn may have allowed Indians in cooler areas to the north and east to whack hibernating bears more safely and then turn to hunting large game.

It might be possible to discern bear hibernation boundaries over time from pollen studies, as correlated with the content of middens. So not only are there no explorers observations of a pandemic or evidence of European diseases in analyses of archaeological digs, there is no doubt of lower winter temperatures during the pre-colonial period. So, how cold was it?

Juan Crespí, Diarist of the Portolá Expedition, 24, **September** 1769 in Jolon, San Antonio Valley, 25 miles northwest of Paso Robles , elevation 800 feet, behind two ridges of coastal mountains inland from Santa Barbara:

It is a very cold spot, **with snow and heavy frosts** [in September?]. Through the heathens belonging to this spot, we understand that in some years **the snow falls a quarter, a half, or three quarters of a yard deep**.

It almost never snows there now except occasionally on the mountains thereabout, which rise to over 5,000 feet.

From the Diary of Gaspar de Portolá amid the Santa Lucia Mountains:

Dec. 19 ...we travelled for three hours, passing the most difficult part of the range **on which there was not a little snow** [snip]

The 17<sup>th</sup> [January] we proceeded for about five hours, making [the same distance as] two marches on the previous journey, and came out on the Llano de la Puente, **opposite the great sierra of snow-covered [San Gabriel] mountains...**

From the 1769 account of the Portolá Expedition Engineer, Miguel Costansó:

Thursday, December 7. There were some at the meeting who thought it best to remain at the Punta de Pinos [Monterey] until the provisions on hand should be entirely consumed, and finally to start upon the return march when these provisions were exhausted, submitting to the necessity of eating mule's meat for the rest of the journey. All these things, however, having been considered - in view of the few provisions that remained, the excessive cold, and, above all, **the snow that was beginning to cover the mountain range** - our commander himself resolved upon the return, believing that if the passage over the mountains became impossible we should all perish.

They were planning to cross mountains in **coastal Southern California**. Why were they afraid of snow? The Diary notes that the packet *San Carlos* had supplied the expedition. From the ship's log of Vicente Vila the prior spring, April 26 to May 1, 1769:

At sunrise, I was between four islands [in the Santa Barbara Channel] and the mainland the country high and mountainous with several high ridges extending northwest to southeast, **all of them covered with snow, like the Sierras Nevadas [meaning Snowy Mountains] of Granada** on the coast between Motril and Salobreña near the Mediterranean. Following the notes of the sea pilot, Cabrera Bueno, I decided that they might be the ridges which the Philippine sailors call Sierras de Santa Lucia above Cape Concepción [those along the channel are the Santa Ynez Mountains]. [snip]

Turning toward the mainland, I noted the extremity of it visible furthest to the westward, bearing WNW. **The shore turned toward the southeast, high and broken by several high, snow-covered ridges** [probably the Santa Ana Mountains; the entry also notes San Clemente Island]. The country inland, as I have said above, runs southeast.

These "snow covered ridges" (1,200–2,500 feet in elevation) extended all the way to San Diego Bay as visible from the ocean (deep water sailors were not fond of hugging the coast) **at the end of April** ... in Southern California? It takes a lot of snow to cover ridges above Southern California beaches for over a week, where sea breezes should have kept temperatures warm, or rain should have melted it immediately. Yet this was mid-spring. Things were colder in California during the Little Ice Age.



**POMO BEAR DOCTOR'S SUIT  
MODEL IN PEABODY MUSEUM**  
from *Pomo Bear Doctors*,  
by S.A. Barrett,  
Plate 7, p443.



Another indicator of this “grizzly hypothesis” is spiritual. In many if not most tribes, eating bear meat was forbidden. This taboo showed up across extended “national” language boundaries (such as Uto-Aztecan, to Hokan, to Algic...) despite stark differences among religious narratives between even adjacent “tribelets” (such as among Luiseños). One grizzly could have fed a small village for a week and made a dandy blanket to boot (it was certainly cold enough). Simultaneously, it was a privilege to wear bear claws around the neck all over the State, so this is clearly not a prohibition against *killing* bears or using their body parts, but against taking their spiritual substance into one’s body. Many Indians considered eating bear meat akin to cannibalism.

Concurrently, many tribes believed in an afterlife. For good Indians, there was an Indian paradise: beautiful weather, plentiful meat, and also meat that’s sweet... *Bad* Indians became demons! REALLY bad people returned to this world embodied as... grizzly bears. Readings of tribal ethnographies and discussions with both a distinguished Indian linguist and various archaeologists report that Indians feared leaving their villages for three reasons: “bad people,” demons, and grizzly bears (in that order).

Also among many tribes spanning linguistic boundaries there was a special class of shamans known as “bear doctors.” These men secretly dressed in bear suits in which to kill unsuspecting Indians who had not paid for “protection.” These were “bad people” too.

Could it be that grizzly bears embodied all three? Essentially, the proscription against bear meat may have been a way of avoiding taking into one’s body the evil spirits of REALLY bad people, perhaps to avoid becoming one. Might bears also have been those ‘wicked and dangerous people’ of ‘that other tribe’?



***John Peabody Harrington was a genius, astonishingly-dedicated, yet also clearly paranoid. He published little; instead he hid his notes from his peers. Yet unlike other anthropologists of his day, Harrington not only archived over 150 languages, but replicated subsistence crafts from boatbuilding to botany, from fishing to religion. Scholars are still digging through his massive trove, over a million pages of notes, photographs, and recordings, most of which remained undiscovered until his recent death. Photo courtesy of the Smithsonian Institution.***

Late 19<sup>th</sup> to early 20<sup>th</sup> Century linguists of aboriginal languages were in a great hurry to find the last few “speakers” of their dying tongues before they were lost forever. Unfortunately, as an academic fad, this emphasis upon language was at the expense of the more tragic loss of what Indians knew about managing the land they loved. The academics of that time were trained to capture pronunciations and translate word-for-word what they were told. Few ever got as deep as to fathom idiom. They were academics, not hunters, gardeners, or shamans.

Indians might well have unified all three bear embodiments as wrapped in mysticism. It was perhaps a way of offsetting fear of being eaten alive with the more tolerable idea of murder. In the case of grizzlies, this potential conflation of idiomatic terms would represent a very reasonable coping mechanism in a tough situation. Similar treatments and taboos existed for rattlesnakes and mountain lions. There were “rattlesnake doctors” as well.

For Indians struggling to survive day-to-day, such risks were part of life. It is very hard to appreciate today what it would be like to compete with grizzlies for food, in part because **modern weapons and agriculture have changed bear behavior**. Grizzlies no longer see humans as competitors for food **and fear us where we hunt**.

In all my research, I never read about weaponry with the power to kill a grizzly easily, neither nets nor strong snares, and few signs of spears. Nor would anything less than a fatal blow deter one. Even if the shot was lucky enough to penetrate the heart (and it’s a long way in past very sturdy ribs), the bear still has 20 seconds to live. The effective range of a sinew bow or atlatl was no more than 50 yards. A grizzly can cover that distance in 3 seconds. Unless the warriors could distract the animal sufficiently that it would die before reaching the attacker, said “brave” would earn his title. Yes, they could have used dogs or fire to distract the bear, but it is still an awful risk. It is undisputed that Indians did kill bears in California, but the combined evidences indicate that the lack of hibernation made managing grizzlies much more difficult than elsewhere in North America.



Mid-June 2015

Another correlation with this idea of bear refugia for herbivorous animals is found in the attributes of California plants, many of which exhibit features making them unpalatable to or tolerant of grazing animals: toxicity, mechanical features (such as spines), or concentrated smells in late season. For example, the needle grass above (*Stipa lepida*) shows itself as adapted to grazing in that its seed is very sharp and it recovers strongly when mowed to the ground after seeding in late May (unlike its analogue in the Great Basin). We have skunkweeds, spine-flowers, vinegar weed, scads of mints and sages, water hemlock, and lots of cacti. All yucky.

To summarize the early emphasis upon bears in this background, we have Explorer Accounts:

Locations of bear scat, tracks, numbers, behavior, size, and attacks that became predictable with topography, proximity of bears to settlements with no fear of people, either huge amounts of game or a near total dearth varying by topography but not by linguistic family or managing tribe, indications of predatory pressure in grazing animal behavior (prey for bears as well as people), large amounts of unconsumed forage within inhabited areas that was edible by people but inedible to bears, variations in vegetation by area that were otherwise inexplicable by weather or soil, areas burned or not, with frequency indicated by types of vegetation observed, Indian celebration of a successful Spanish bear hunt, the Spanish were treated with either celebration or abject fear, type of food offerings with only one instance of red meat offered during the entire Portolá Expedition, evidences of diet, clothing (or its lack), lack of observations of weirs, drying racks, or skin processing equipment, ubiquitous warnings about “bad people” offered by multiple tribes up the entire coast, nakedness despite heavy snow or latitudes at which people began to be fully clothed, Indians expressed great desire for clothing, wide variation in Indians’ physical appearance, number and types of weapons, almost no hunting observed, with only one very large hunting party seen.

#### Scientifically Measurable Data:

Indications of southern limits of hard coastal freezing in range of redwood, multiple demographic indications of the lack of a pre-colonial onset of smallpox, relatively low amounts of large bodied animal bone in middens, spatial distributions of agriculture v. its lack in coastal areas, the spatial distribution and scale of vegetable food processing and storage technology, fire scars, tree rings, and ash strata together indicating local point and composite frequencies of fire events, spatial distributions of pollen as indicators of aboriginal burning and climate change, grizzly bear diet does not include soap root, blue camas, or small seeds which were most common around village sites and trade routes, genetic adaptations in plants to intensive herbivory, and skeletal stature and analytical data on bone composition as indicates Indian diet offered little red meat.

#### Ethnographic Data:

Distribution, number, spatial and stability of language families, divergence of linguistic sub groups, material technology largely dependent upon vegetation when animal products would be preferable, multiple Indian religions holding both bears and demons as reincarnated “bad people,” a common racket selling protection against bears, rattlesnakes, and mountain lions, ubiquitous nakedness where the weather is uniformly cool or cold, first-hand tribal accounts of bear interactions, few spears, commonality of hunting practices and many weapons too small for big game, taboo on eating bear meat.

Together, these indicators form a cohesive data set supporting the hypothesis that niche dominance of grizzlies explains much of why and how California vegetation adapted to human and animal inputs over time. The records and measurements correlate with local climate and soil conditions as determines whether the vegetation in a particular area would burn or not, usually determined by topography. If it was wet enough or the ground was so torn up that would not burn, bears had refuge from death by fire and subsequent skin infections. Similarly, conditions supporting large amounts of edible bulbs could be a place that bears would dig up such that it would not burn. If it was cold enough to force bears to hibernate, people would kill them and the vegetation would be different. The distributions of people, bears, and vegetation arrayed accordingly have yet to be mapped but it may be doable.

To the point: the model suggests that we had a bifurcated landscape, areas where humans burned annually in which Crespí reports “not a tree or shrub was to be seen” and areas with at most seasonal visitation, with more woody vegetation, due primarily to less frequent fire. There the Spanish saw lakes, aquatic birds, fruit-bearing shrubs, and game, and signs of human travel but rarely Indians. Burning around village sites for thousands of years would exclude leafy perennials except along streams because fire kills seedlings. Fire-scars on conifers show burning in forests was less frequent than around villages. There were probably also areas that were under either dominion on a seasonal basis, such as the hazelnut or acorn harvests when Indians and bears went in groups to gather.

It's a model, reality surely being more complex. If bears did provide ungulates refuge from Indians, it would explain why Indian meat consumption was usually small game despite large animals nearby grouped in herds (a behavior indicative of predatory pressure). Apparently ungulates preferred to take their chances with bears and mountain lions rather than people, which fits with the lack of game elsewhere on the continent where Indians could kill hibernating bears more easily and were thus uncontested apex predators.

Crespí also reported higher coastal stream flows at the end of the dry season than what we see today, even in areas with virtually no human use (right). Particularly important is that this was during a near century-long drought during the Little Ice Age! Today, without burning or grazing, vegetative competition for moisture renders most of those streams dry in late season. Burning ironically reduces vegetative water competition such that late season riparian vegetation might well be “lush” as described. These would be areas that could function as animal refugia from Indian hunting fires, places that would not burn in all but unusually dry conditions and only with sufficient fuel loads (hence redwood forests).



June 2002, near Davenport, CA





© Anne Thierman

Part of a Mural in the UC Santa Cruz Ethnic Studies Building (Courtesy of Anne Thierman). It depicts the Quiroste village (map prior page) as described by Juan Crespí in his diary entry from the 23<sup>rd</sup> of October, 1769. Click anywhere for a pdf of the full image.



These fruit trees were irrigated

(dry) Blue Curls

Pink Cudweed

Verbena

Blue Curls

Sedges

Blue Curls

Verbena

September 2014 –The piles are for composting weeds

It is possible to grow large “lush” **annual** plants well into dry late-summer California. Here at the *Wildergarten*, we have lush blue curls (*Trichostema lanceolatum*) and pink cudweed (*Pseudognaphalium ramosissimum*) in September (the dry ground-cover is perennial *Verbena lasiostachys*). The blue curls are 1-2 feet high, while the cudweed reaches over four feet. Neither has received any water in five months, and this was a drought year. Neither germinates well in competition with grasses.



So, why has scholarship missed bears being such a big factor in Indian life here for so long? In the early 1900s the University of California sponsored a major project to translate the accounts of early Spanish explorers. The obvious first target was the Memoir of Francisco Palóu, four volumes containing a transcribed and edited diary of the Portolá Expedition by Fr. Juan Crespí. For nearly a century, Palou's Memoir was the only English account of first contact until Alan Brown's masterful translation of both Crespí's original manuscripts (Rome and Mexico City) and subsequent journeys published in 2001. With Brown's at \$60 and Palóu's at \$600, which one I bought was an easy choice.

Because of my interest in original vegetative conditions, I was curious about Brown's translation of both *sacates* and *empastadas* as "grasses" (as opposed to the latter being "pasture"). So I obtained Palóu. It wasn't until reading the two, side-by-side, that I noticed the redactions of bears, burning, etc.

Unfortunately, unlike the faithful and diligent Crespí, Palóu was a bureaucrat. At that time the Spanish were having a very difficult time inducing ranchers in Mexico to relocate to California. With all the forage up here, one wonders why, but for the likely rumor of nine-foot tall bears weighing over half a ton! Palóu had carefully redacted all but one mention of bears from Fr. Crespí's original, California's first documented case of real estate fraud. Effectively, I am the first hands-on multidisciplinary ecologist to have studied both sources. That's why it was missed.





Mission Santa Cruz, by Léon Troussel, oil on canvas, 1876  
This was painted 14 years after the mission had collapsed  
in an earthquake and is thus not considered an exact rendition.  
Image courtesy Sr. Betty Pedrazzi, Holy Cross Church, Santa Cruz, CA.

Under Palóu, the Franciscans enticed the Indians with food and clothing in return for labor to build Mission Santa Cruz in 1791. They were housed in close quarters, the women occasionally “interacting” with the dregs of soldiers from the nearby Presidio at Branciforte. Indian escapees carried European diseases back to their tribes, notably syphilis, measles, and tuberculosis. The Franciscans did their best to both “elevate” the Indians and grow the mission program with what little they had or knew about the land. They introduced and eventually learned how to grow more productive crop plants, especially once they channeled irrigation water. Cattle hides were to be their main cash export. With the cattle and horses came “slender oat” (*Avena spp.*) and other weeds. The animals traveled and fed wherever they wanted, sowing their “wild oats” wherever they went, badly overgrazing coastal and riparian grasslands. The Spanish also banned Indian burning in 1793, in order to maintain more dry season forage. After 80 years of weeds, grazing and fire exclusion, primary succession changed the landscape completely, transforming the soil in the process.

Nobody knew what was going to happen, as the rapid introduction of alien plant species was a relatively new thing in the world. Reverend T. Starr King, an itinerant preacher from the American East, recorded his impressions of the Bay Area in 1859. They are quoted here in full so that you can get a sense of a landscape already in massive change, how much has changed since that time, and what that portends for the future. After this quote, I will discuss some technical conclusions from Reverend King's observations and then get back to pictures covering what has since transpired. I wish I could offer a photo to show you how things might have looked like back then, but sadly, I know of no place where this is possible. His words, I think, are adequate.

### "AROUND THE BAY" IN THE SEASON OF FLOWERS ([source link](#))

*In the early part of May, a week after my arrival in California, I was invited by a very intelligent gentleman in San Francisco, to take a seat in his carriage for a "drive around the bay." This means around the Bay of San Francisco, which extends southerly about fifty miles from the Golden Gate, where the tides of the Pacific force their way inland. The bay is, therefore, a large salt-water lake, about eight miles broad and six times as long. It is dotted with islands, and lies placid in the embrace of some of the richest lands of California. In making the tour around it, we drive down along the narrow county of San Mateo, whose hills divide the dreamy bay from the billows of the Pacific, then across the county of Santa Clara, and up, on the eastern side, through Alameda county to Oakland, where the ferry-boat returns us to the metropolis of wind and fog, whose climate in summer is exhaustively stated in the phrase, "gust and dust" [at that time, much of what now comprises San Francisco was then open sand dunes – ed.]*

*Early in May is the true time to make this excursion, for then the country is at the height of its brief bloom. California has often been compared with Palestine and Syria for scenery. The passages in the Psalms and the New Testament which describe the fleeting beauty of the flowers and the grass, are certainly applicable here. "For the sun is no sooner risen with a burning heat, than it withereth the grass, and the flower thereof falleth, and the grace of the fashion of it perisheth" [James 1:10-11]. Indeed, **there is no grass**, properly speaking, native to the landscape. **The green of early May on the uncultivated plains and slopes is mostly that of the wild oats.** As the summer sun rises, and the rains cease, they ripen into a golden tinge, which, at a distance, is the hue of sand, and their seed drops into the parched and crackling ground for new crops when the rain returns. By the middle of June all the wild fields that are destitute of trees, look sandy with this harvest of indigenous and self-sowed grain [this is how much of California looks to this day, indicating how early, rapid, and complete was the change wrought by the early Spanish introduction of exotic wild oats]; and it is only in May that the plains and hill-sides which the plowshare has not broken are clad in their vesture of embroidered green.*

*But the beauty is as captivating as it is evanescent. Some travelers have written of the marvelous effect of the air of California on the spirits. Bayard Taylor tells us that, on this very drive, he felt in breathing the air like Julius Caesar, Milo of Crotona and General Jackson rolled into one. I cannot honestly say that the vivifying quality was any greater than I have experienced in the Pinkham woods, or the forests of Mount Adams, or on the heights of Randolph. Oxygen is oxygen, and will General Jacksonize a man as quickly in Coos county, New Hampshire, as when it blows over the coast range of*



*California, fresh from the Pacific. But there was a great exhilaration in the first acquaintance with the scenery of a strange land, especially when made in a luxurious carriage and with the accompaniment of pleasant companions and a very spirited team.*

*The first thing that arrested attention after leaving the sandy shores of San Francisco was the flowers. Early in May, in New England, people hunt for flowers. A bunch of violets, or a sprig or two of brilliant color, intermixed with green, is a sufficient trophy of a tramp that chills you, damps your feet, and possibly leaves the seed of consumption. Here they have flowers in May, not shy, but rampant, as if nothing else had the right to be; flowers by the acre, flowers by the square mile, flowers as the visible carpet of an immense mountain wall. You can gather them in clumps, a dozen varieties at one pull. You can fill a bushel-basket in five minutes. You can reap them into mounds. And the colors are as charming as the numbers are profuse. Yellow, purple, violet, pink and pied, are spread around you, now in separate level masses, now two or three combined in a swelling knoll, now intermixed in gorgeous confusion. Imagine yourself looking across a hundred acres of wild meadow, stretching to the base of hills nearly two thousand feet high the whole expanse swarming with little straw-colored wild sun-flowers, orange poppies, squadrons of purple beauties, battalions of pink and then the mountain, unbroken by a tree or a rock, glowing with the investiture of all these hues, softened and kneaded by distance. This is what I saw on the road to San Mateo.*

*The orange and purple seemed to predominate in the mountain robe. But on the lower slopes, and reaching midway its height, was a strange sprinkling of blue, gathered here and there into intenser stripes, and running now and then into sharp points, as if over the general basis of purple, orange and yellow, there had fallen a violet snow, which lay tenderly around the base, but in a few places on the side had been blown into drifts and points.*

*The wild poppy of California, in May, is the most fascinating of all the flowers. It does not have a striped or spotty leaf, but is stained with a color which is a compromise between a tea-rose and an orange, and is as delicately flushed and graduated in hue as a perfect rose. I never tire in studying their color, in masses or singly. While driving to San Mateo, we came upon little clumps of them, springing out of the rocks on the edge of the road that overhangs the bay, and their vivid orange, upheld on graceful stems, and contrasted with the grey stones and the blue of the bay, gave me a joy which comes up as fresh while I write as when I saw it first. Another piece of cheer intrudes itself between my eyes and the paper, and insists that a pote shall be made of it. I mean a California blackbird, perched on a mustard stalk ten feet high. The wild mustard [also introduced] grows luxuriantly on the lands at the foot of the bay. It is a great trouble to the farmers, for if the cows eat even a little of it and they seem to like it for seasoning it gives a pungent flavor to the milk and makes the butter bite. But a field of it in brilliant yellow is decidedly a pleasing condiment to the general feast of colors. And when a blackbird with a large spot of scarlet on each wing flutters over a tall spear of it and then alights with a cheery twitter, one has a picture before him which gives two-fold delight by making him repeat the couplet of Holmes:*

*The crack-brained bobolink courts his crazy mate,  
Poised on a bulrush tipsy with his weight.*



*If I quote wrongly, may the genial and always accurate Professor forgive me. I repeat from memory, and must wait till the Mameluke arrives from Boston with my books, before I can verify a dozen passages of his, which the Californian scenery sets to music again in my brain.*

*And yet the old Californians, " forty-niners," sigh when you speak in praise of the May-luxuriance around the bay. They say that the glory is over now. "Ichabod" is written on the landscape. They rode over the same districts when there were no roads, or ranches, or fences, between San Francisco and San Jose, and when the horses wallowed and galloped through an ocean of floral splendor [already covered in oat grasses as described above]. The visitor cannot help noticing, when he leaves the base of the mountains, and comes to the farms, how civilization has tamed the land. The barley and wheat, and bearded sweeps of simple green, look cool and unromantic in contrast with the natural coat of many colors which the unploughed districts wear. The brindled leopard has taken the hue of the cat. It is only when, here and there, we come upon a garden, and see the blaze of roses which bloom the year through, that we see how superior art is to nature.*

OK, anyone familiar with the current appearance of northern California should be seriously circumspect, in that the lands "our" open space districts, parks, and conservancies are currently "protecting" bear no botanical resemblance whatsoever to what was "Natural" when white explorers first beheld the Bay Area. So if this was May and these were seed crops, the "sunflowers" were probably tarweeds (*Madia spp.*) and mule's ears (*Wyethia spp.*), the purple and blue maybe *Gilia*, lupine, or bulbs such as *Brodiaea elegans*, *Tritelaea laxa*, and *Dichelostemma capitatum*. The pink and white might be buckwheats (*Eriogonum spp.*)...

King's account of these plants suggests that the populated area around the Bay had long been burned at least annually, similar to what Crespí and the other Spanish diarists had noted. Accordingly, this was NOT a "Natural" landscape, but a relic wild garden, regularly and heavily impacted by between 15,000 to 30,000 Indians, people who lived here and depended upon it for food, building materials, and craft goods. Most of these plants produce very small seed. Hence, the burned flatlands and low hills had to be dominated by flowering plants harvested for seed to make a usable amount of food. My experience here suggests that without fire, native perennial grasses (which bear very poor grain) would have taken over wildflowers even if the oats had not been introduced. So why it was still in flowers when King saw it 60 years after the Spanish burn ban is a mystery. Perhaps it was simply a lack of seed where it had been burned for so long. Many of those hills are too steep to graze.

We cannot go back to what it was. We cannot burn the landscape annually. We do not harvest tiny seeds as staples. We do not dig bulbs for food. **Yet we still have the responsibility to keep the genetic constituents of this system reproducing**; else they will go extinct. We will then lack means with which to increase production of those plants and insects should that become economically and technically achievable or desired. *Wildergarten* is the first project, ever, to achieve a substantial fraction of that initial goal, proving that restoring a native plant landscape, one with meadows including large numbers of native annuals but still dominated by grasses, is at least technically possible. We are maintaining reproducing cohorts of post-disturbance annual plant systems and we are cleansing the seed bank such that, in many locations if it does burn the plants come up native. We do not have all the plants that once grew here, nor are they distributed as they probably once were. So now that we have proven that restoration is at least within reach, we are improving our processes to render such results financially affordable while playing with the system.



June 2014

“As the summer sun rises, and the rains cease, they [the oats] ripen into a golden tinge, which, at a distance, is the hue of sand, and their seed drops into the parched and crackling ground.” This is what that invasion in King’s description looks like now. These are “wild oats” (*Avena barbata*) and not much else. The Journal of Zenas Leonard reports that “oats” (what a Euro American would recognize as such) were dominant in the east San Joaquin Valley by 1833, only 60 years after the Portolá expedition. The Spanish managed horses as a commons. Horses also dig the ground. Horse herds multiplied so fast that the Spanish were running them off cliffs to reduce the damage to the range. With oats and overgrazing, the land quickly changed beyond recognition. Then came the Americans.



Photo courtesy of Tejon Ranch Company

Remnants of what King described can still be found, although degraded from their original magnitude and variety. Like regular Indian burning around San Francisco Bay, this landscape in Tejon Ranch in southern California is maintained in an early successional stage by regular disturbance: periodic cattle grazing. Hopefully, a way can be found to maintain these unbroken views under the financial pressure to seek more profitable land uses; namely development. Either way, the weeds will win unless somebody cares for it.

# DISTURBING HISTORY



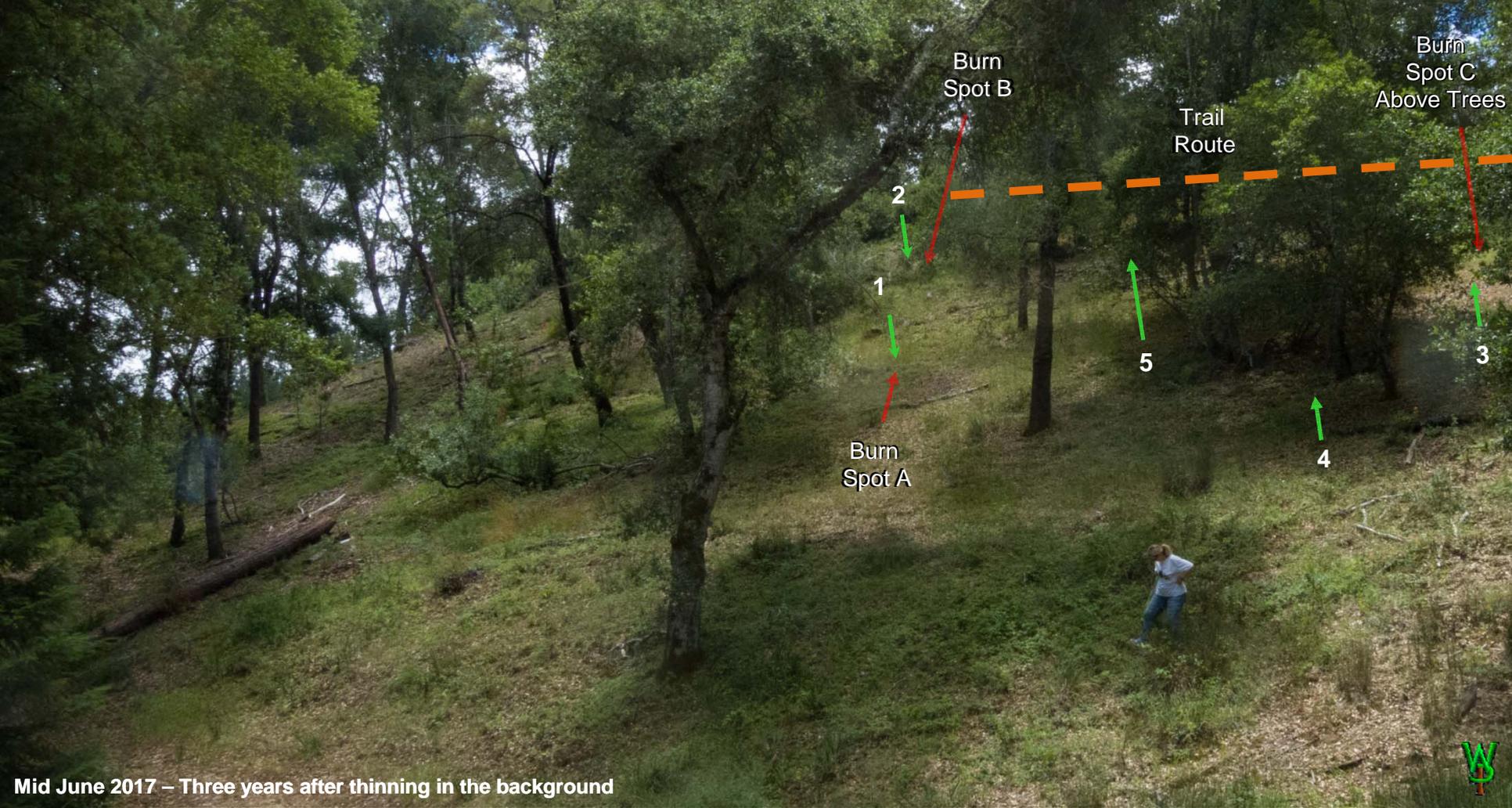
Our property adjoins what was once a trade route of the *Awawas Sayante* Indian “tribelet.” For over 12,000 years, the trail ran between what is now Santa Clara Valley to the north and Scotts Valley to the south. This ridge has always been steep, hot, dry, and erosive with very poor soil, making even temporary survival for aboriginal traders lacking pack animals a challenge. Just behind the cabin at left, there is a spring-fed pond near a pass along the highest ridge in the region.

In 1791, the Spanish Franciscans at Mission Santa Clara conscripted 500 Indians to improve the trail to build and supply the new Mission Santa Cruz. That August, they brought oxen, sheep, horses, and cattle over the trail, and the weeds came with them. For 130 years, this route was the principal commercial transport corridor between Santa Clara and Santa Cruz. Since the trail was built, this ridge has endured a tumultuous botanical history.

The arrival of Charles McKiernan in 1850 accelerated that rate of change. He blasted and graded the trail into a road, thence traveled by James Brewer of the US Geological Survey in 1861. Brewer rhapsodized about the road in his diary *Up and Down California* as “the most picturesque road we have yet driven.” He went on at some length about the scenery, which was quite different than what we see today.

Development sprang up alongside the road, both to facilitate transportation and to take advantage of it. Our place had harness repair, milling redwood moldings, even an apple orchard (the eroded terraces and trashed equipment are still visible). There are also signs of sand quarrying. The place was logged and burned some time around 1900. Lacking a trash pickup and to slow erosion, they tossed their junk into the gullies (including a car). It even sheltered hippies growing marijuana nearby, during which time the cabin on the property burned down in 1979.





Mid June 2017 – Three years after thinning in the background

For at least 12,000 years, Indians burned frequently along this trail (it traversed this slope) in part to maintain clear sight lines against potential threats. They had no pack animals. Hence, to increase payload, they had to obtain reliable and expedient supplies of food and water along the way. The trick then is to figure out what resource plants the tribes grew along the trail and why. Accordingly, I have long used fire-response as a diagnostic tool to indicate what once grew in each spot (applicable only to areas like this that were *not* terraced, as grading can move things around). The results can be surprising, particularly in an area this small, suggesting that this immediate area once supported at least four Indian crop patches (green arrows 1-4). The first is the clover at Patch #1 (“Burn Spot A”). I have used “Burn Spot A” two to three times and it only comes up in clover. Burn spot B is less than fifty feet from Spot A (behind trees in this image) where up came “tick bush” (*Ceanothus papillosus*) forming Patch #2. At Burn spot C I up came blue dicks as Patch #3 (*Dichelostemma capitatum*) and immediately below that are soap lilies (*Chlorogalum pomerindianum*) forming Patch #4. In Patch #5 between Patches 2 & 3 we have death camas (*Toxicoscordion fremontii*; was *Zigadenus*). I turns out there may be a pattern here.



February 2015

This is the clover in at Patch #1 on Burn Spot A, almost all of which is *Trifolium microdon*. What is indicative of cultivation here is that there is very little lotus (either *Acmispon americanus* or *A. parviflorus*), which is unusual on this property as the lotus is usually the more dominant groundcover. Clover is more palatable than lotus and is a high-protein forage plant that was an important source of green vegetable matter in the Sayante diet.



October 2013

Patch #2 is Burn Spot B: a dense stand of *Ceanothus papillosus* shrubs. *Ceanothus* is twiggy, dense, oily, and burns wonderfully hot and long, an important source of cooking fuel for the local tribes. It is a nitrogen fixer and thus grows fast, but it is hard to confine to patches. It is an attractive forage for deer and antelope but would provide cover for lurking mountain lions and bears, the kind of thing one would want to confine along a trail used as a trade route. *Ceanothus* is a fire follower and its seed can remain viable for many years. That it has *never* shown itself at any of the other burn spots on this slope is significant. It suggests that the other locations on this slope which did *not* have a *Ceanothus* response had a stable vegetative configuration with no succession from forbs to chaparral for many years, indicating a long history of regular disturbance. So, If this was for fuel, where was the camp? I suspect it was on the end of the ridge above. It has a great view and would be an easy spot for a small party to defend.



February 2013

Patch #3 is at Burn Spot C. In this location, once we removed the weeds again clover came up. Then, a few years later, up came “blue dicks” a lily with starchy bulbs. This was the first instance in which I recognized possible evidence of aboriginal proto-agriculture. Here there has *never* been a sprout from any shrub, soap lily, or death camas in 10 years since we got rid of the weeds, suggesting that succession to chaparral has probably not happened here for a very long time. These (at the time of this photo) four-year-old sprouts from seed have yet to mature sufficiently to flower. In this soil, it took two more years and warm rains to bloom in 2015.



March 2014 – The root is about 8 inches in length

The Indian trail follows a ridge that is very hot and dry in summertime. The nearest stream is about a half mile down a steep hill (and then back up) but in the summer it is only a sluggish dribble, hardly what one would expect to be safe drinking water with animals using it too. Importantly, besides starch, blue dicks produce a “contractile root,” effectively a crunchy bag of fresh and safe water. No wonder early American explorers disparagingly called the Indians “diggers,” probably while suffering diarrhea due to drinking from streams.



February 2015

In Patch #3 just below the blue dicks at Burn Spot C are soap lilies. This plant was a staple of the Sayante diet, albeit the bulbs required roasting for some 18 hours to be edible, so one wonders why they would be grown here along a trade route where people normally would not wish to tarry and regular burning would render adequate fuel wood a scarce commodity. Although the *Ceanothus* is a wonderful fuel, additional cover would increase the hazards of travel by offering food to ungulates and cover for large predators lurking to eat them. So, why grow them here?



February 2015

W

A clue to the soap lily riddle is Patch #5 between Burn Spots B&C. Here we have the “death camas.” Note that it grows in a tight patch that just stops on the left with no residual signs of native brush (although at one time there was a ton of Ceanothus nearby). I have scoped this region well beyond our property and with one exception the only place where death camas is commonly found is in patches along the old trail. So if these patches were to supply a trade route, why would Indians grow a plant so poisonous that it kills herbivores tougher than we are in serum concentrations of 5 parts per million of body weight? Predator control. This route was not used frequently but it was likely to be burned clean so as to see threats along the way, two of which were grizzly bears and mountain lions. The local archaeologists inform me that the local tribes did not use poisoned arrows and this toxin is too slow acting to be useful for that anyway. Most predators (except bears) cannot digest vegetable matter efficiently, so they get that part of their diet digested for them by eating the guts of herbivores. Hence, one way to deal with the threat of being eaten would be simply to load the guts of an occasional carcass with the mashed pulp of these poisonous bulbs. Effectively, I think it was used as cheap strychnine in baits.



March 2009

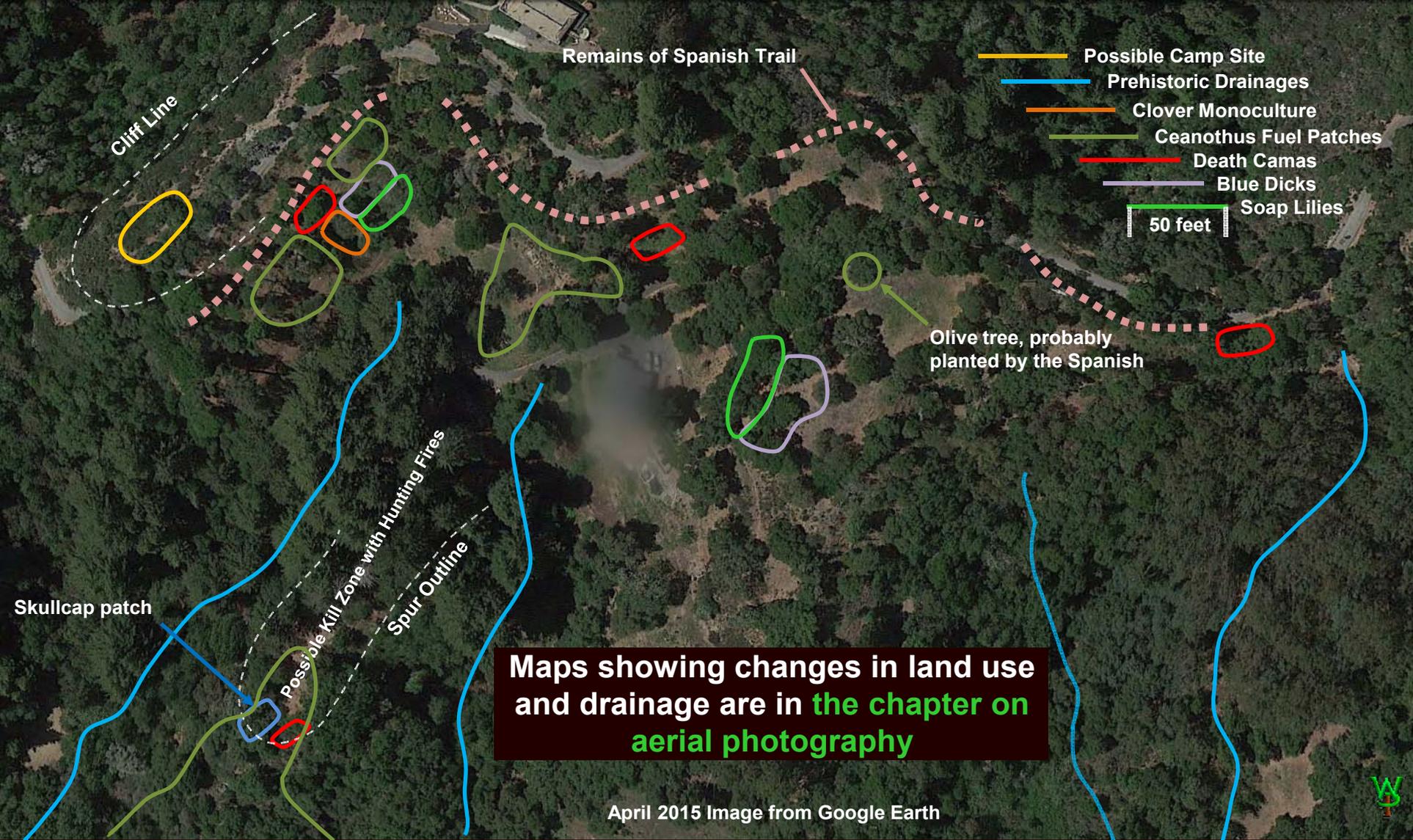


We have other patches of death camas along the trail, among which one also finds no blue dicks or soap lilies. No Indian in his or her right mind would want to mistake death camas bulbs for blue dicks, and in all but the flowering season it can be easy to do. One must keep them separate. As confirming indication, nowhere on the Santa Barbara Channel Islands are there any large predators, and there are also very few death camas. With no need to grow it, there is no way an Indian would want these plants where they gather food.



March 2016

This is the lower corner of the prior death camas patch of about 40X80 feet. Note that despite having had centuries to spread, there are no outliers around it. The patch has probably not spread in 200 years. If one was growing death camas anywhere near food crops, one would not want the death camas to propagate efficiently by seed, as it might invade the food crop and contaminate it with a deadly poison. Hence, the Indians had to be aware of the principle of selecting and cultivating plants that **did not** spread by themselves. Indeed, such plants would be preferable for low input proto-agriculture simply because they would require less labor to manage them.



We have other areas on the property where there are blue dicks and soap lilies immediately below, also with little intermixing, also at a distance from a patch of death camas. The pattern appears too repeatable to anything but a human arrangement. If so, what would be the purpose? Bulbs of blue dicks and death camas are very similar as are the leaves, which do not last long into the summer. People might need to dig up blue dick bulbs for food or moisture at times when the leaves are long gone. At that point, a deadly mistake would be easy to make. Soap lilies have very distinctive curly leaves visible almost all year. So, dig up ONLY the bulbs that grow next to the soap lilies and you won't die from eating death camas by mistake! Interestingly, this may not be the only way these plants may have been used to demark where it is safe to dig and not. Note the arrangement on the lower left of this image.



February 2017

At the end of the spur on the prior slide overlooking the valley below I had cleared *Ceanothus cuneatis* in 1991, after which I had to weed it for fifteen years. So I had considerable experience with both the weeds in the seed bank in that area and the natives as well. In December 2015, I took out another 30 feet of that (75 year old) *Ceanothus* to widen the fuel reduction buffer along the property line. In one well-defined spot, up came a patch of skullcap (*Scutellaria tuberosa*), a native medicinal plant that makes tubers. It was so dense that it wouldn't allow weeds at all. Yet despite the density of that cover, there isn't another single skullcap plant anywhere on that spur ridge. Just opposite the skullcap, is... death camas, with what may become a line of soap lilies in between, possibly indicating a boundary between the two in summer time when neither death camas nor skullcap would be visible (skullcap, despite being a perennial does go "drought dormant" during summer in a sunny spot like this). Here again, we see a plant with aboriginal uses that does well, but it seems to be absolutely non-invasive, yet again indicating aboriginal introduction of plants with that specific property.



***Clarkia rubicunda*, which produce small seeds in pods, known to be an important constituent of the local Indian diet (pods are convenient containment), Mid-June 2015. Beautiful, aren't they?**

Yet another correlation with this pattern is the incontrovertible reliance of California Indians on processing small seeds for food. This is crazy from a labor input v. calories perspective, but from a defensive standpoint it makes perfect sense: Bears can't make it on small seeds because they don't have baskets, mortars, and fire with which to process them into food. Effectively, growing small seeds would be a form of area denial. In the Pacific Northwest on the other hand, the once-ubiquitous camas root (*Camassia spp.*) may represent a similar strategy in that it required cooking to render it non-toxic (the toxin in edible raw *Camassia* is inulin, not zigacin as with death camas). So, bulbs for starch, berries for fruits (share both with the bears), small game meats for animal fats, and leafy veggies for vitamins. The rest was comprised of seeds for oils and starch that bears could not eat and (rarely) big game. It's a diet.



June 2014 – Valley Oaks (*Q. lobata*) at the Jasper Ridge Biological Preserve

Consider these valley oaks (*Q. lobata*) near the Stanford campus. To this day, scientists wonder why they reproduce so few seedlings and are being invaded by live oaks. Yet if you were an Indian, you would prefer the sweeter acorn of valley oak and would especially prefer the understory herbs they would support because deciduous leaf drop increases sunlight on the ground in winter and composts leaves more quickly into better soil. Nor would an Indian want tons of oak seedlings in an understory dedicated to other crops such as roots and herbs. So one would choose a spot for deciduous oaks in which they would **not** reproduce efficiently without some form of aboriginal treatment. Yet once Indian oak cultivation ceased or once the live oaks had invaded, the regeneration of groundcover crop plants would eventually cease. The insect and bird life accustomed to those plants then would die out. Whole systems would slowly degrade, simply because to this day **Euro-Americans still fail to see the hands of people in what we think is "Natural."** So next time you hear of the wild claims as to the cause of a potential endangered species listing, please consider these more subtle possibilities:

“Nature,” over almost all of every habitable continent was shaped by hunter gatherers for over 10,000 years, managing plants and animals by regular programmatic disturbance, whether fire, horticulture, hunting, or directed grazing. In some cases, aboriginal peoples introduced plants and animals for their value as foods, materials, weapons, tools, and drugs. Unless the habitat was otherwise so harsh that little else useful could survive (such as North Africa), **introduced plants were selected or managed such that they would not displace other valued plants out of range or proportion** (one reason why native habitat is so open to weed invasion). In other words: **People were once an important source of what most now believe to be “natural” biodiversity**, developing and managing complex life *systems* for productive reasons.

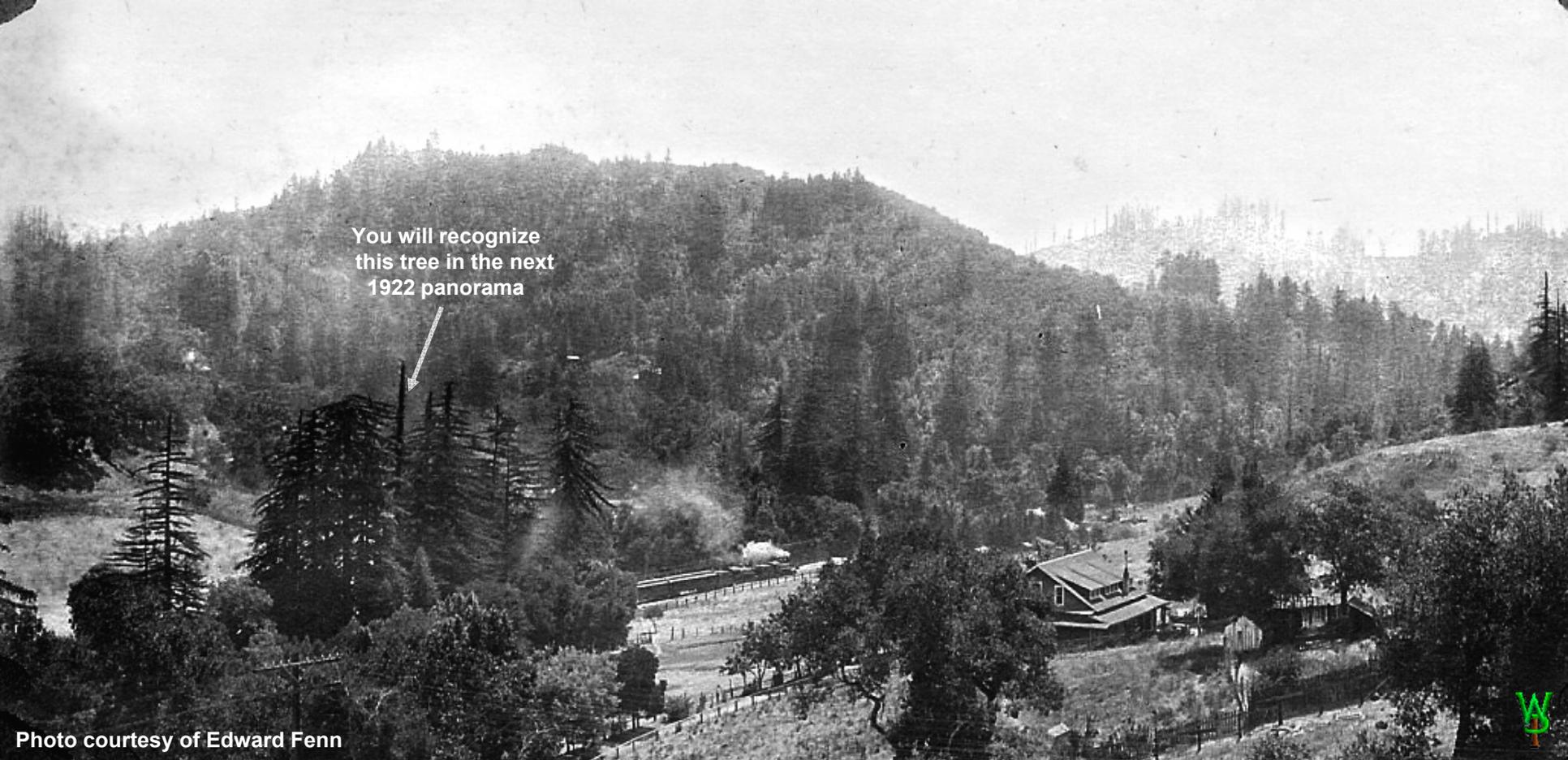
**Managed disturbance increases successional diversity and maintains system stability.** Fire inhibits plant senescence and eventual catastrophic fire. It stimulates plant germination and replacement. People used disturbance (fire, harvesting, herding, or hunting) to moderate herbivory or to constrain or force regeneration of perennials and stimulate reproduction of early successional plants, a significant component of herbivore diets having specific relationships with insect life that serves as a base of the animal food pyramid (particularly birds). Diverse, early successional plants also exhibit a larger number of specific symbioses with microbial life in soil, key to several nutrient cycles on a global scale. Managed disturbance thus stimulates more food, more variety, and a **wider range of genetics reproducing in closer proximity and in larger quantity.**

Managed disturbance increases genetic plasticity. Plant materials are mixed and mashed by animals, whether soil bacteria and fungi under hoof or masticated and incubated with bacteria in the animal gut. With increased plant and microbial diversity, these processes produce more unique combinations and greater quantities of loose DNA. That increases the success rate of horizontal gene transfer between species and therefore the probability of hybridization between more alleles at greater genetic distance, which in turn increases the rate of unique genetic trials with which to adapt to changing conditions. Hence, from an evolutionary perspective, managed systems are not only more diverse, they can be **genetically more adaptive.**

Effectively, **adaptive and productive wildland systems are a matter of human priorities**; we are *that* influential, whether we choose to do anything to improve system productivity or not. These conclusions are supported, not just by archaeological and anthropological evidence, but by an ongoing global experiment in which life systems developed over thousands of years to make them stable and harmonious have been displaced simply by eliminating wildland peoples, prohibiting programmatic disturbance, and allowing aggressive exotic plants, animals, and pathogens to spread. We all hear the excuses: ‘It’s Natural,’ ‘Nature takes care of itself; all we have to do is protect it,’ ‘That’s not my problem,’ ‘It’s too late to do anything about it’... **This is at least lazy and irresponsible thinking**, but in some cases it involves political corruption and/or genocide. Yet in all cases, **the cultural paradigm at root of these disasters is urban**; it is *not* innately human. While most urban people don’t want to do the hard dirty work of caring for the land, still they want to control it. Yet under collectivized control in which no one wants responsibility for doing harm, the only thing upon which everybody can then agree is to do nothing... and so the land slowly dies from mandated neglect. Yet with all the people looking for a job in a world of increasingly automated work, this dynamic is not just ecologically destructive, it is socio-economic suicide. True restoration is an opportunity, and a potential industry.

But these matters are for the next book (which is in the works). So let’s get back to history!





You will recognize  
this tree in the next  
1922 panorama



Photo courtesy of Edward Fenn

In 1853, Charlie Martin homesteaded the valley east of the road. He founded what became the **TOWN** of Glenwood (emphasis for the benefit of those thinking development in these mountains is 'invading an undisturbed Natural landscape'). Here there was a train station (there is a train in the picture), a rail yard with over a half mile of track, and a turntable to send engines back down to Felton.

There were three hotels, a lumber mill, a winery, a general store, a dance hall, a post office, stables, a campground, and over 20 cabins to house visitors. This photo was taken in 1922. By then there had been labor camps for the Chinese workers who built the railroad tunnels through the adjacent ridges along with animal handlers, craftsmen, cleaning women, cooks, and other workers that lived here. There was also electrical power and telephone service (pole in the left foreground). I have enhanced the sharpness and contrast of this image so that you can see individual trees. The pointed tops of the redwoods in the background, indicate that they are growing rapidly and are therefore younger than the old growth trees along the creek at the bottom of the valley in the left mid-ground. The relatively few clumps with pointed tops in the background had probably been logged. Individual young trees were likely from seed in burned slash (redwoods grow over 60 feet tall in 30 years). This photo shows that, although they did log up the draws, both Charlies, Martin and McKiernan, had retained their finest specimens for their customers to enjoy. Their advertising says so.

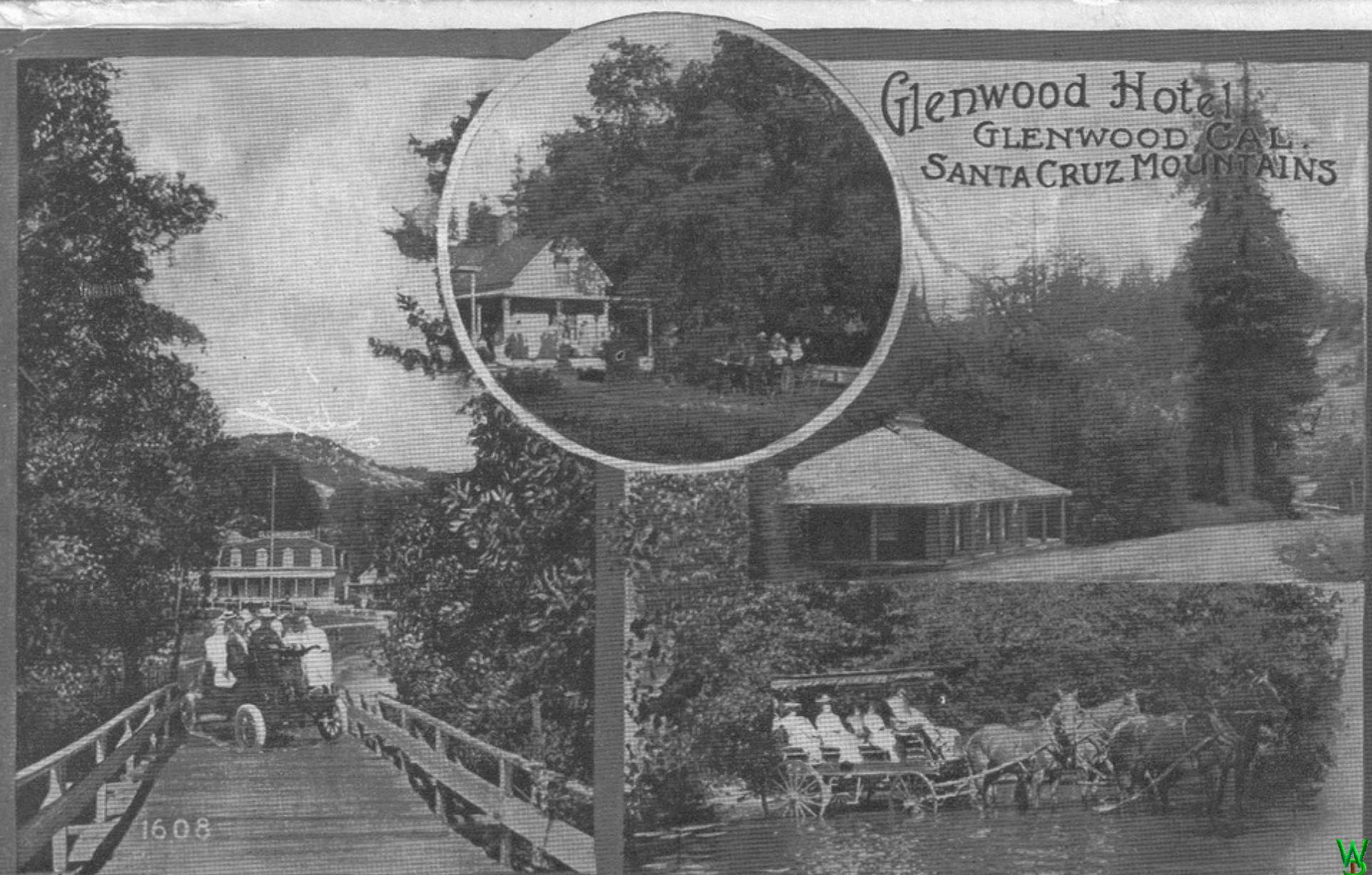


Image courtesy Edward Fenn, Source unknown. I suspect that the car at least was “cut and pasted” into the image, a “PhotoShop job” of its day.

This was Charlie Martin’s idea of a private “park.” An ad in the San Francisco Call, July 1909 read, “*GLENWOOD HOTEL, Among the redwoods of Santa Cruz Mts. On the new short line, 2 hours from S. F. (just try making a weekend trip that fast in a car today). Write for circular. WM. MARTIN, Glenwood. Santa Cruz county, Cal.*” Another resort near the hotel (Glenwood Magnetic Springs) hosted a campground, cabins, picnic facilities, and a swimming pool. It was quite the attraction.



The town added a dance hall, a bowling alley, a billiard room, a smoking room, and a conference center capable of serving 250 guests, and yes, there was even electric lighting! This was a busy community built around the Glenwood Hotel which soon had a pair of competitors. The town's permanent population reached 500 residents. This was a product of grand ambition, vision, love of place, and an enormous amount of hard work.

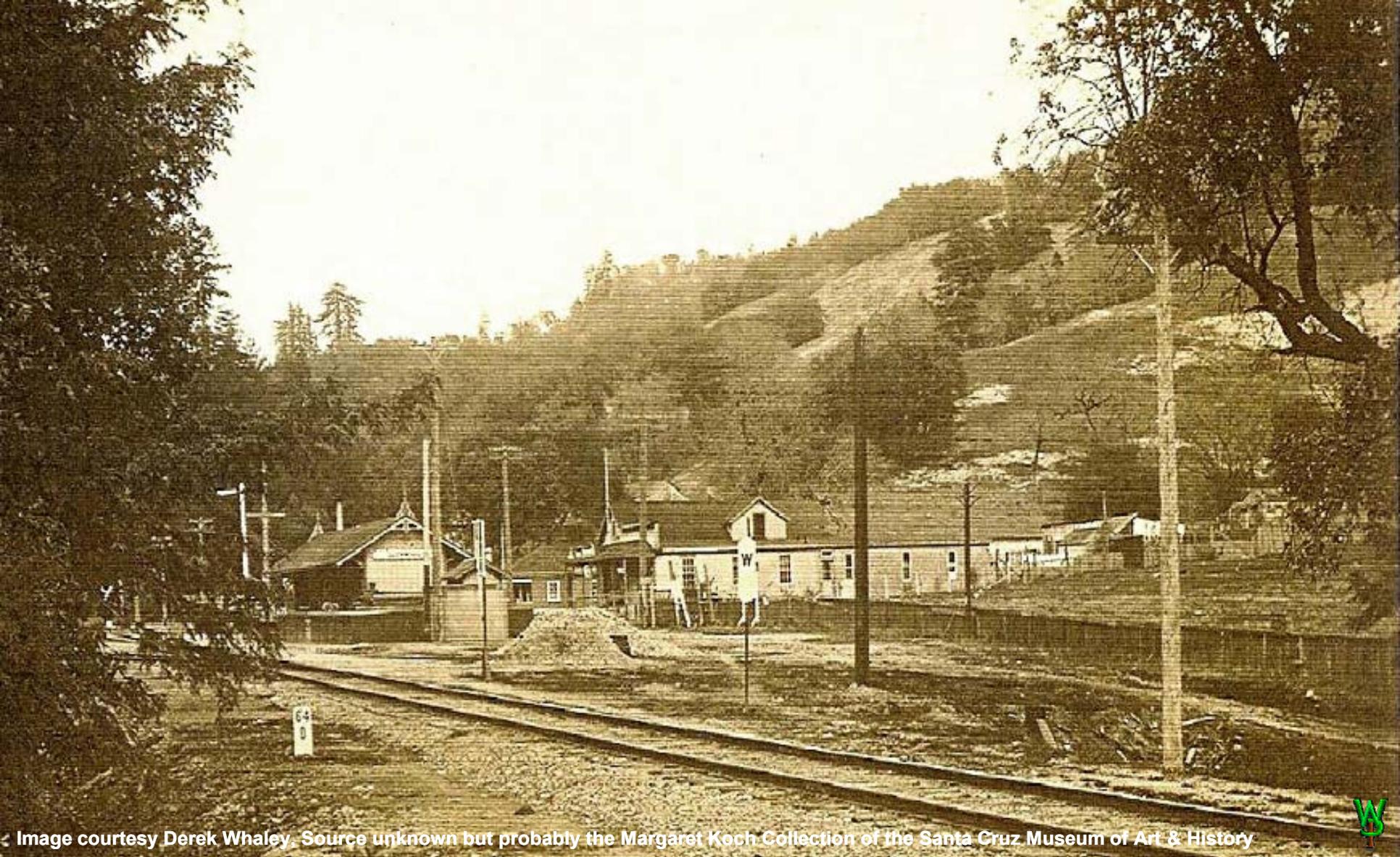


Image courtesy Derek Whaley. Source unknown but probably the Margaret Koch Collection of the Santa Cruz Museum of Art & History

This was the Glenwood train station. Effectively, this was eco-tourism by privately-funded rail mass-transit **long** before there was a decent road to the town! The two hours to get here by train from San Francisco is about how long it takes now (except during commute hours or on weekends). Note the bare patches of sand on the hillsides above. These soils are very poor. Because access was easy and because it was so well known, Glenwood was an early target for botanical surveys from the University of California that become important to the observations to come about local extinctions of early successional plants discussed in the next chapter. Even in the 1890s, this spot was noted for its biodiversity and unique combinations of grassland, riparian, and sand hill species.



Photo taken in Glenwood just south of the station ca1890s, from [santacruztrains.com](http://santacruztrains.com)



It was called, "The Picnic Train." On weekends in the early 1890s, hundreds of people **per day** debarked the train to escape the city and enjoy the landscape. If they wanted to stay, they had their choice of resorts: Glenwood Magnetic Springs, Summer Home Farm, or Villa Fontanay. Note how many fewer redwoods on the hillsides in the background there are than in the prior panorama 30 years later. Was it because of logging? No, the spacing is too open and the trees separate. The likely reason is much more interesting.



Early on, the only way to get to Glenwood by road was via Charles McKiernan's toll road on the ridge above. The State proposed to build a highway through the Santa Cruz Mountains for which Mr. Martin offered a free survey suggesting that the "best" possible route went right through his town! The Glenwood Highway opened in 1916. Three years later it was paved with 5" of steel-reinforced concrete (left), paid for out of the US military budget.

But alas, the gravy train for Glenwood was not to last. A concrete highway and falling prices of mass-produced automobiles and gasoline lured passengers away from train travel. With fewer rail passengers, ticket prices rose and customers chose. Drivers passed through Glenwood on their way to bigger resorts at the socialized beaches in Santa Cruz (where it is cooler in summer) and replete with amenities. The hotel closed five years later.

The State of California opened State Highway 17 from Los Gatos to Santa Cruz in 1934. The new "best" route bypassed Glenwood by about half a mile. Charlie Martin's gas station and store closed the same year. People were driving to the beach on weekends, a weekly traffic jam that continues to this day. The Picnic Train ran for the last time in 1940. Much of the route near Los Gatos lies under a reservoir today.

After the War, the State opened Henry Cowell Redwoods State Park not far down State Highway 9 from the end of State Highway 17. The option offered use of public campgrounds effectively for "Free!" The State pays nothing for liability insurance and has unlimited legal resources. The days of large private land entertainment resorts, like Glenwood, were doomed.

Within 15 years Glenwood had gone from boom to bust; 20<sup>th</sup> Century socialized roads and recreational land use had killed late 19<sup>th</sup> Century private roads and ecotourism by rail. Political influence on land use had played a role just as critical in the end of Glenwood as the Homestead Act had played in its beginning.

The hotel was torn down in 1970 and the land donated to the only organization at the time that could afford to keep it.



June 2014

The Catholic Church doesn't pay property taxes but it does hold land. Glenwood became "Marywood," a vacation spot for nuns it remains to this day. Local residents like it that way (including me). The grassland has no productive use; it feeds no large animals; it no longer makes hay. Instead, it is mowed to reduce the fire hazard. Unfortunately, the punch line for that story will have wait. Look at all the conifers! This is the "Logged gully" in the next photo.



Logged  
Gulley

This tree is  
the one in  
the prior  
panorama

This slope...

"Marywood" hay field

Photo ca1922 courtesy of Edward Fenn

This photo, also of Glenwood, was taken the same day as [the previous panoramic image](#) but from above and to the north. It shows the farms and outbuildings supporting the town. Obviously the area still in grassland is a significant fraction of the overall landscape with relatively little brush (it was grazed at the time). The rectangular hay field is the same as in the prior photo at the lower right.

From the slopes, it appears somebody got really energetic grading off the hillside to flatten the hayfield for mowing, baling, and hauling, but hopefully by now you recognize that this does not represent a 'landscape denuded by the white man.' In fact, there were once far fewer trees and brush due to the Indian preference for frequent burning. Again, note the spacing and shape of the redwoods on the slope of the gully on the upper right as compared to the inarguably old growth trees in the foreground along the creek. The gully had been logged about 30 years prior. The pointed tops there indicate the rapid growth of young trees compared to those in the right foreground. After 30 years they would have crown-sprouted, grown to about 40-60' feet, and are therefore observable in this image. Hence the stand density in the gully probably consists of crown sprouts and young trees from seed, and is therefore a much higher stand density than before it was logged. In other words, there simply were not many redwoods here before the area was settled by Charlie Martin and probably significantly fewer than that when the Sayante were in charge. My thanks to the former owner of our property, Mr. Edward Fenn, for his contribution of most of these old photographs. In 2011, he was 102 years old.



... is this slope

“Marywood” hay field



November 1989

This repeat photo was taken about 400 yards to the south of where the prior photos were taken (there is an abandoned Christmas tree farm up there now with fir and pine trees 100' tall making an exact repeat impossible). What you see here is primary succession run amok. What was a grassy hillside on the left in the prior photo now shows little grassland at all, nor has there been for many years. There are many more redwood trees in the gulley and elsewhere. The little grass that you do see at the lower right was a hayfield that is still mowed annually. Now, look what happens in only 23 more years.



April 2012

This is only 25 years later (although this repeat was taken lower down because my house is now in the way). Scroll back and forth with the previous two images. This is how fast things change, and it's not going to stop. How much forage for wildlife is left in this image compared to those previous? Do you have any questions now about why there used to be more wildlife when people in this area were ranching, farming, trimming vines, and pruning orchards? Yet even now, all we hear is how we must set aside more land to save wildlife? There won't be any food for animals unless they burn it, and if they burn it, they'll get is weeds. If they don't burn...



This second-growth redwood stand (when we bought the property), is a good example of what happens when success increases redwood density to the point of “stem exclusion.” There was no groundcover here. Note how these trees grow singly and not in clusters. These are mostly trees grown from seed. This area was burned after the initial logging about 125-135 years ago (1880-1900) and again in 1941. Burning slash killed the stump buds and forced new trees to come up from the roots or seed in bare soil. I logged about 25% of the standing volume. In the process, I also cut many of the few “old growth” stumps to the ground. As a result of that job, I learned something amazing.

Now, this is going to be hard for some people to absorb, but ecologically it is very important: **NONE** of those “old growth” stumps in this stand was larger than 24” across, meaning that **NONE** of these trees was over 50 years old when it was first logged in 1880. **There were NO redwoods on this slope when the Spanish first arrived in 1791.** There are simply a great many wildly errant presumptions made about the pre-Columbian prevalence of redwood in this area.

Why would redwoods have suddenly invaded this upland during the Spanish colonial period before the Americans arrived? Simple. Spanish Governor Arrillaga banned Indian burning in 1793 in order to maintain summer forage for cattle. **This forest, far from those ranchos, went from grassland to a redwood monoculture in less than 200 years.** That is how fast a system can change when regular anthropogenic disturbance is removed. Here, after 100 years of “recovery” there are no shrubs making berries, no forbs for animals, no seed for rodents that feed the owls. There is minimal habitat for insect life. It’s even too dense for birds to fly in to build a nest.

But hey, it is “Natural”!!! Or is it? Really??





December 2015

Our survey of the above stand identified some 26 old stumps, but none larger than this one. Almost all of these stumps are still alive and have built a significant callus. Almost all are totally rotten inside, which with redwood takes many years. THIS is “old growth,” [here](#). Sadly, it would be very difficult to get an age off the callus, as the ring structure is rather missing. At the time it was cut, my guess is that it was originally at most 16” in diameter at breast height. The tree behind this stump that now dwarfs it wasn’t there.



June 2014

These are the biggest trees we have today (at the bottom of our property in the next draw to the north), 205 feet tall and over 4' in diameter. They started from four of the largest "old growth" stumps on the property, probably logged and burned by Charlie Martin.

**Yet not one of those four original stumps is bigger than these second growth trees here today.** I estimate that the original stumps were no more than 120 years old when they were logged, probably less, as with fewer trees there was less competition than there is now. This evidence suggests that if there were any pre-colonial redwoods on our land, they were very few.



The “King of the Forest,” June 2014

It would be very interesting to core drill its nearby counterpart to analyze the burn scars.



Not far from our home is the [Mountain Charlie Tree](#), 18 feet in diameter. Mr. McKiernan learned from a similar specimen nearby how difficult it is to handle a log this big and decided to leave this one for posterity. THIS is inarguably an “old growth” tree. The few like it standing before European influence were along the perennial creeks where young redwoods with thinner bark were less likely to burn. After all, Indians were burning for millennia before this tree ever sprouted. Regular burning changes most everything because it kills seedlings. Our supposedly “old growth” redwoods and most of the trees around this one probably seeded after the Spanish burn ban.

So, what the heck happened? How would a redwood forest suddenly expand its range? This hypothesis is a synthesis of Indian behavior, fire, contagion, grizzly bears, and climate change. Indian tribes in California did conduct extensive trade. If grizzly bears were a significant hazard, then tribal trading parties had to be larger for mutual defense. Trading would be therefore less frequent and tribes more insular, an idea reinforced by differences among California Indian dialects and genetics.

Smallpox, measles, and influenza are highly contagious and have short incubation periods. In Indians unaccustomed to crowd diseases they were quickly followed by death. If these epidemics did hit California before the Spanish expeditions, I suspect they moved through any one village within a month or so killing virtually everyone, with the likelihood of a trading party visiting or leaving during that time being relatively small, as is reflected in the archaeological record. It is thus likely some tribes were not infected at all while others lost whole villages but perhaps not the entire tribe, with the diseases moving from village to village much like a mosaic burn in a forest with irregular fuel loads. Larger villages or groups of settlements in close proximity would be hit harder etc. The diseases would flash into the area and probably quit. This is why I believe that syphilis and tuberculosis were more devastating to the California Indian during the colonial period and after. The incubation period for both diseases is protracted; they are still transmissible but not debilitating for months or even years. Such would allow these later diseases to spread virtually everywhere before anybody realized their seriousness much less the causes of contagion. The population would crash almost completely, which it did.

If the first waves of disease had a scattered spatial impact, the tribes would then consolidate. Their aggregated territories would probably remain unchanged. As temperatures fell into the Little Ice Age, more bears would hibernate and people would hunt more productively for large game. This inference is reflected in the archaeological record, which shows increased consumption of higher ranked animals during this “pre-colonial” period between Columbus and Portolá. As the climate warmed out of the Little Ice Age, the bears would be more active and game numbers rebound, which is what I believe the Spanish land parties encountered and then Americans to a greater degree 80 years later.



**Regular grazing produces a bifurcation in vegetative distributions analogous in many respects to regular burning inhibited by wetter riparian areas.**



This poison oak vine was well over 125' tall. It died recently, probably of drought stress. We loved this plant if only because it was amazing, without a single leaf for 100 feet. It was probably as old as the redwood it was climbing, starting when there was still other poison oak in this stand on the ground. There is none today.

It may be possible to reconstruct an understanding of the pre-colonial and possibly the pre-Columbian distribution of redwood by a discontinuous age class distribution of trees and stumps in more remote places (in settled areas old stumps were removed with dynamite long ago). Genetics may also yield some information in that trees started from seed are probably less likely to be root clones than old growth trees. A sudden break in regular fire scars among older trees should be compared to the age classes of intermediate growth stands. The ring structure showing the early growth of old stumps can also suggest the degree of canopy present when those trees started.

Once the distribution of pre-Columbian redwood is established, spacing might then suggest its understory composition. Compare that to the archaeological data on the distribution of tribal settlements (including seasonal habitations) along with the Spanish accounts, and one might then be able to define the scope of “bear zones” versus areas that burned more frequently.

I do not have the time or resources to pursue this hypothesis, but I do think it would make for several very useful master’s theses. The study would best be a multidisciplinary team effort incorporating archaeology, botany, palynology, genetics, forestry, and soil analysis compared spatially to a detailed study of the Spanish diaries and possibly a reconstruction of regional temperatures.

Also at issue is a question as to how much of the landscape was dominated by grasses versus forbs. Archaeological remains from fire pits for cooking show predominately fire-parched grass seeds, possibly indicating a high percentage of grasses in food. Yet I have become suspicious of the translation from Spanish of variants on the word “pastro” as “grass,” when discussing feeding the mules. I suspect a better word would be “pasture” which would then include forbs. Visual descriptions such as King’s show leafy forbs to be dominant. With less disturbance, grasses are dominant over forbs. Unlike grasses, harvested seed from forbs would be ground without need for burning off the chaff, thus leaving far fewer residues in archaeological remains. Other analyses, such as the “straw” found in mission bricks indicate fewer grasses despite their desirability in brick manufacturing.

It remains an open question. The answer would reveal a great deal both about the impact burning might have had upon the landscape and what might or “should” be done with it from a systematic perspective. **Forbs are necessary as a primary food source for insects, birds, and mammals.**





This study has been a revelation to me, resolving observations that have bugged me for decades. Yet I have no intention of mowing down my forests to “make it like it was” (although I have become a little braver in the distribution of successional stages). I have loved redwood and sequoia forests since I was a child, pestering my parents to “go see the big trees” and weeping in the back of the car on the way home. So this is nothing other than the simple desire to understand and heal forests *as part of a whole*, not just the trees, but in relation to groundcovers, grasslands, chaparral, and broadleaf systems. I want to learn how to manage crown sprouting and get an understory going free from the popular stupidity that makes cutting a few trees far more expensive than it should be. I want a forest with birds, berries, and wildlife. I would like to be able to sell a few logs to finance that work, as there are more that need to be removed than I can use, much less afford to deal with.

There are likely more redwood trees in California now than at any time since the early Holocene. In most places, there are now too many for the good of the forest. Go to Redwood National Park and look. No, not the Lady Bird Johnson Grove, go to “the back 40” of the Park along Highway 101 where it was logged back in the 1960s. There, a young, vigorous, and overstocked second growth forest is competing for water with the few ancient trees the loggers left behind. In my opinion, if you want to save those ancient living things, if you want those young trees to get big with native groundcovers thereabout, in other words, if you want to restore that “primeval forest,” then, **we must thin some of those second growth trees**, learn how to control the crown sprouts, and let the logging pay for it. If we choose to wait for the forest to “thin itself” by attrition, then we stand a good chance of losing those surviving ancients to water competition when they would have otherwise been with us centuries longer, to inspire our children and theirs.

I don’t think anybody wants them to die prematurely. Please, we should at least learn *how* to do it should we finally learn that it is necessary. Should I live that long and find a way to afford it, this I will do, right here. This is the *Wildergarten*. My hope is that in reading this, you will be inspired to tend one of your own.

Sleepy Dog, Snow Plant, and me.  
Calaveras Big Trees State Park, June 1959



# UNDER OUR FEET



Photo 1922 courtesy of Edward Fenn



For 60 years, until the construction of the Glenwood Highway, Mr. McKiernan's road was an important transportation route from the town of Los Gatos over the mountains to Scotts Valley. Every horse, ox, wagon, and work crew passing through deposited their contributions of seed from the valleys below, native or not. Meanwhile, Mr. Martin's dream of a Glenwood resort deep in an isolated valley needed supplies with which to build it and bring in customers. The resort blew in a road on which to haul supplies to Glenwood up to Mr. McKiernan's road on the ridge to the west. In the 1920s Edward Fenn purchased a tract along Mr. McKiernan's road astride the junction of the road from Glenwood. Ed terraced this hillside with a tractor and planted apples he was only too happy to sell to in Glenwood. We will discuss Martin's road in more detail later in this picture book. Today, much of it is an impassable ditch.



November 1989, at which time this land was still grazed.  
Charlie Martin's great grand-daughter still lived in this home.

When we moved here, the heirs of Charlie Martin lived in what was once his second home (above), all that remained of his original homestead. This property adjoins ours today. You will see more of what that means to our land later in the book, as the influence of this history is not minor. The "wild oat" infestation from which we protect ourselves today, was once the grazed forage you see here.



One can still see the terraces of Ed Fenn's apple orchard on the upper northeast-facing slopes of our property (edges in red at right; there are about six or seven, of which five or six are visible in the photo). Orchards are usually tilled annually. One can only imagine how much sediment was lost on a 25-50% slope receiving 40 inches of rain in five months! Orchards are typically seeded with cover crops, in this case vetches I weed every year. Vetch seed, being a legume, is capable of remaining dormant and viable in soil for 100 years...

With the annual disturbance of disking the orchard, seeds brought in from the road found this tilled and fertilized soil to be a wonderful medium in which to establish. For decades, those weeds just kept right on multiplying and spreading.

Agricultural mechanization, truck transportation, and electrified irrigation in Santa Clara Valley ended widespread farming in these rugged mountains. The orchard was abandoned in the 1930s soon after the demise of the Glenwood Hotel. The orchard became overgrown.

In 1941, the property burned in a forest fire. Then brush started to take over. The heirs of Charlie Martin agreed to graze it to keep the brush down until a dispute arose. Because the land had been effectively tilled and fertilized, *everything* took off all at once.



May 2010





November 1989 The berm at the bottom was pushed up by ditch grading along the County road.

You are looking downward toward one of those terraces when we first bought the place. After the orchard was abandoned, the dominant brush species that invaded were native *Ceanothus* and manzanita. Fire-suppression allowed uninterrupted succession that progressed for decades. Oak and madrone trees sprang through the brush, but in a density only appropriate to an open area with small trees. They all bolted for light, many only a few feet apart, spindly and weak, leaning for light with included bark crotches.



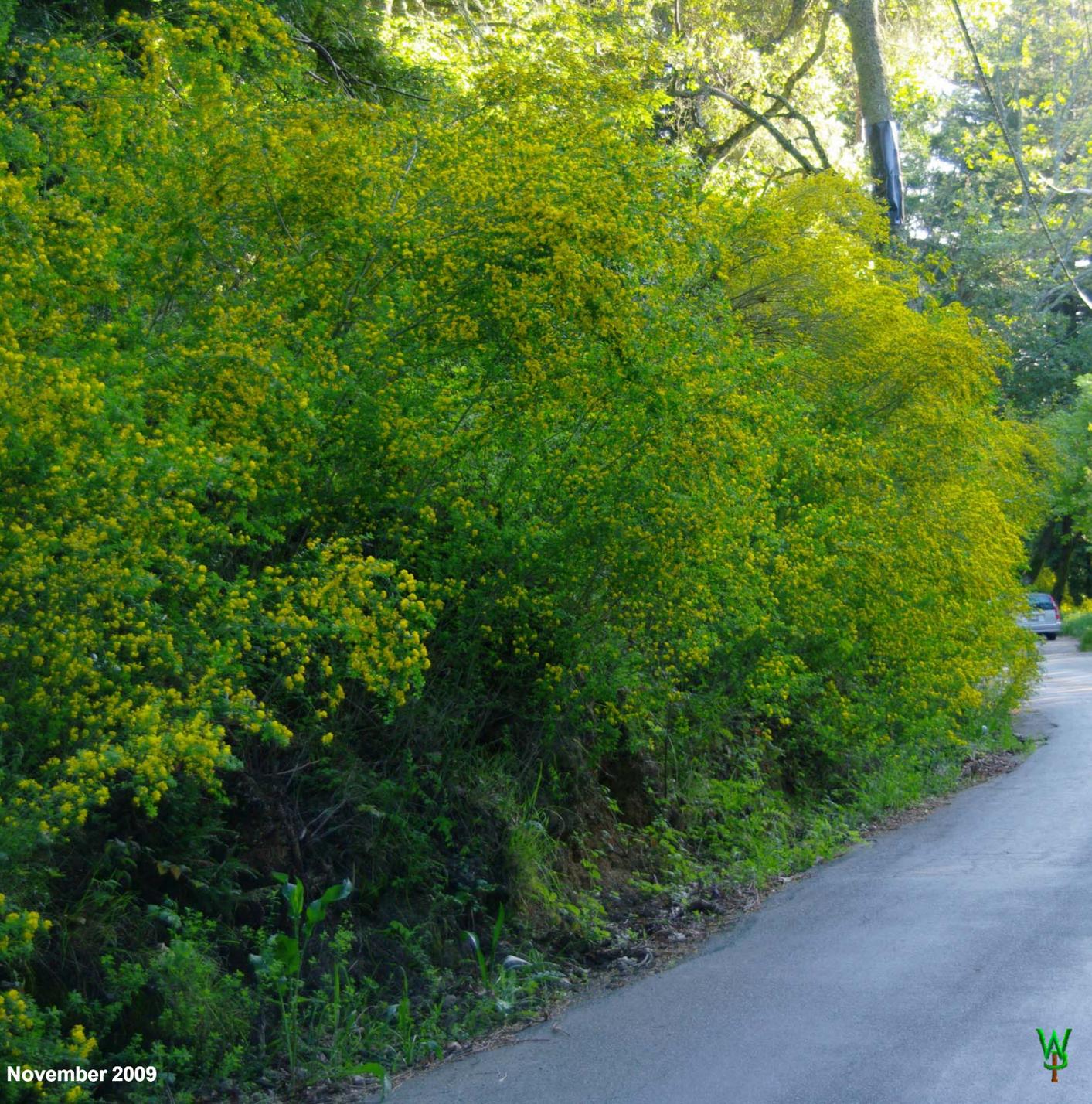
October 2014 - We had worse than this, but you get the idea.

In classic primary succession, then came Douglas fir, retaining massive resinous dying branches all the way to the ground. It was a fire-bomb, land that did not know how to be the way that it already was. Lacking a profitable use, the owners wanted to sell it. From time to time they cleared a "house site" on the top of the hill but without any takers ("the view" had a power pole in the middle of it). Some time around 1960, a bulldozer with French broom seed on it (*Genista monspessulana*) was brought in to clear it. The broom took off at once and (with the exception of the redwood stands) spread throughout the property.

This is French broom, 12-14 feet tall, introduced by County roadside mowing 15 years ago. This represents less than 2 years' growth after mowing. Imagine ten acres of it. Try to imagine forcing your body through it for hundreds of yards (I had to crawl). Without a bullozer, it takes a chainsaw or brush cutter to get through for any distance.

I wish I could take a photograph of what it is like to be inside a French broom infestation, but I cannot. A camera lens cannot capture sufficient depth-of-field to focus on all the twigs. So I tell people to go find a dense bush and climb inside (if they can). "What would you see?"

Each flower produces about eight seeds that can last 100 years in soil. The seed is carried by mud, cars, boots, water, birds, rabbits, and heavy equipment. It grows so fast that it can reach 27ft in four years. It soon goes twiggy and decadent. After every cycle of disturbance it gets more dense. By 1989, what was to become our place was a choking mess of broom, accelerated erosion, broom, dead native brush, broom, dying trees, broom, and no groundcover. And then there was the broom.



November 2009



So the end of this history begins with its beginning, in the words of Thomas Jefferson Mayfield. In 1850, at the age of six, he crossed the San Joaquin Valley with his family. They settled near the Kings River on the east side of the Valley. His mother died soon thereafter, leaving his father no choice but to leave the boy with a Yokuts tribe while he sought a way to survive with his two other sons. Ten years later, Mayfield returned as a young man to a more settled San Joaquin Valley, finding a general hatred for Indians. He thus told no one of his life with the tribe. At the age of 85, after a long and tumultuous life, Frank Latta, an amateur historian and ethnographer coaxed that life story out of Mayfield over a period of six months. Yet the old man never revealed what you are about to read; it was too personal, and too special. Then Mayfield came down with a stroke. Latta came to visit in the hospital, and thus recorded what was almost lost to history:

*Suddenly my daddy pointed over the tops of the bare hills ahead of us and exclaimed, "Look there!" And there in the distance, until then lost to us in the haze, was our valley. A shining thread of light marked El Rio de San Joaquin flowing, as my mother said, "through a crazy quilt of color." How excited we all were. Everyone wanted to talk at once. Then someone noticed, still farther to the east, that what we had at first taken for clouds was a high range of snow-covered peaks, their bases lost in the purple haze. Finally we started on and passed down the long ridge, which my daddy called a "hog's back," to the small valley below. There we found the grass we had seen from above to be wild oats. They stood as high as our stirrups and were as thick as they could grow...*

*Leaving the stream, we started across the plains in an easterly direction. We had been told at El Rancho de San Luis that we would in this way arrive at El Rio de San Joaquin where there was a ford. By this time we could see what had caused the mass of color so noticeable from the mountain the day before. The entire plain, as far as we could see, was covered with wild flowers. Almost all of the flowers were new to us. Along the creek were many blue lupines, some of them growing on bushes six and eight feet high. The low foothills were covered with two pretty, lily-like flowers, one tall and straight-stemmed with a cluster of lavender, bell-shaped flowers at the top (right)...*



***Triteleia laxa***



...and the other a purple, ball-shaped blossom on a similar stem (right).

As we passed below the hills the whole plain was covered with great patches of rose, yellow, scarlet, orange and blue. The colors did not seem to mix to any great extent. Each kind of flower liked a certain kind of soil best and some of the patches of one color were a mile or more across.

I believe that we were more excited out there on the plains among the wild flowers than we had been when we saw the valley for the first time from the mountain the day before. Several times we stopped to pick the different kinds of flowers and soon we had our horses and packs decorated with masses of all colors.

My daddy had traveled a great deal and it was not easy to get him excited about wild flowers, or pretty scenery. But he said that he would not have believed that such a place existed if he had not seen it himself. And my mother cried with joy, and wanted to make a home right here in the midst of it all.

For my own part, I have never seen anything to equal the virgin San Joaquin Valley before there was a plow or a fence within it. I have always loved nature and have liked to live close to her. Many times when traveling alone and night has overtaken me, I have tied my horse and rolled up in my saddle blanket and slept under a bank, or among the wild flowers, or on the desert under a bush. I remember those experiences as the greatest in my life. The two most beautiful remembrances I have are the virgin San Joaquin and my mother. – [Source](#)

Seeing that the old man was tired, Latta bid him good night. Within fifteen minutes after he left the hospital, Mayfield lay dead, having finally told another human being about this childhood experience that enriched his life for 79 years.



What Mayfield was describing was likely *Dichelostemma congesta*, which has a spherical cluster of flowers similar to these (this is *D. capitatum*). Both were harvested for roots by both grizzly bears and people. Given the scale of the patches described as “a mile more across,” my guess is that much of the valley floor lacking running streams was bear territory. Even then, when Mayfield first saw it, the landscape had been seriously degraded. By 1850, horses had already overgrazed large portions of the San Joaquin Valley.

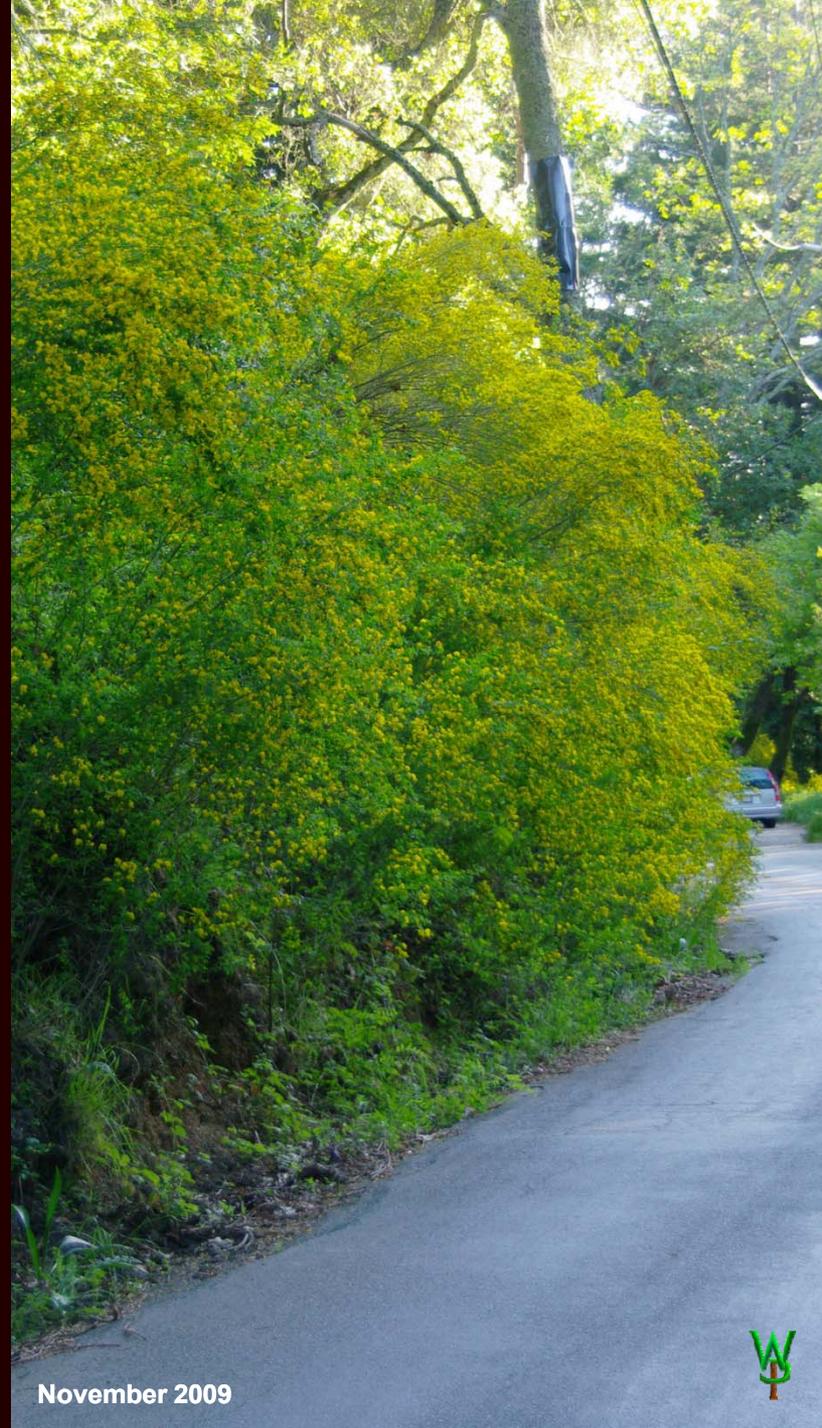
By 1850 (less than 70 years after the founding missions), that area below Pacheco Pass had exotic wild oats “up to our stirrups.” Today, they are less than half that tall and much more sparse, less than half of the original forage value. The difference is soil, the foundational resource of any civilization.

It all happened so fast. Glenwood was just getting going when my grandfather was born. By the time those Ed Fenn took those photos, Granpaw could have ridden a horse-drawn wagon or Model T down this road with orchards, farms, and ranches along the way. Our land changed from a rip-gut brome and wild oat grassland to an impacted and decadent oak woodland full of exotic brush with 100 foot tall invading fir trees within less than a lifetime. Had I come up here as a kid, I might have seen cows grazing not 50 yards from this photo. **“Fast” doesn’t stop.**

What we do not seem to incorporate is that while infestation and succession may slow down, there is no real ‘Balance of Nature.’ The broom you see at right wasn’t here when we first moved in. Yet somehow, when we see these, we unconsciously think ‘they have always been that way.’ Then, when it blows up in a fire, we act surprised, even though we knew what would happen with a fuel load like this. What will come up will be broom; It’s inevitable, just as inevitable as the belief that such a fire would be “Natural.” Given the thousands of years of people lighting fires, there never was any such thing.

This is the power of myth, sufficient to change the land beyond recognition. Our beliefs filter the way we “re-cognize” what we see and what we don’t. Many an expert has read those Spanish diaries and not seen the implications. I didn’t either, believing that Indians once dominated the landscape as they did elsewhere in America. It took a third reading for the alarm bells about bears to go off. We know so little about the system response to disturbance, that “consensus” scientific opinions about these ecological systems are out to lunch. With the rate new weeds are still coming in and with succession still progressing to more catastrophic fuel levels, I hope the prospects of policy driven by such beliefs (rather than by hard experimental data) are as alarming to you as to me. Were we to introduce grizzlies on these landscapes today, they would likely starve to death. We simply have too much yet to learn to be making such massive decisions by defaulting upon our responsibilities. The land needs study, experiment, and development work, not “preservation.”

Else, mystery repeats itself.



# BUT WHAT ABOUT THE *WILDERGARTEN*?

This book began with an overall impression, then regional pre-history, and then local history. Now it moves on to our place specifically.

The coming five chapters introduce the specifics of our project:

1. **When Environmental Protection = Mass Extinction** documents the slow extirpation of native plant species in our immediate area due to weeds and uninterrupted succession.
2. **What Is “Native,” Really?** discusses why native plants are important, how the question of whether or not a particular species is a local native is sometimes difficult, and why even some native species behave as if they were invasive exotics and sometimes must be managed as such in order to preserve functional biodiversity.
3. **Repeat Photography** shows the changes we have made on a landscape scale, as is appropriate to taking an overgrown forest back to a sane multi-aged stand structure with varietal groundcovers.
4. **Germination of Native Annuals** shows that some of the areas we took back to grasslands have been cleansed to the point that they now express an increasingly pure and varietal native annual groundcover in and among native perennial grasses. Effectively, it documents that we are succeeding at cleansing the seed bank of its exotic components while re-establishing a predominantly native seed bank, if not always one in a climax state from the perspective of its varietal potential.

These are followed by a closing introductory chapter, **Project Overview**, describing the philosophy, rationale, and organization of the project from a management resource allocation perspective, showing differences of emphasis in time commitment among various and changing priorities. There is also **a chapter in the forestry section with maps** depicting my educated guesses as to how the vegetation was arranged here from 1750 to today!

After the introductory chapters, the book then moves on to the major habitat types and management processes under the general headings of forestry, grasslands, and ‘other’ before discussing the ecological forces and political-economic context within which we operate. Whichever path you choose, I hope you have found this history sufficiently enriching to realize that there are similar nuggets to be found in every chapter.

A full **Table of Content** is at the end of this file. Specifically historical references immediately follow.

So, on to the gritty nitty! Enjoy!!!



# Wildergarten Site-History References

The following historical, anthropological, and archaeological sources pertain directly to this area. Other applicable references such as for general anthropology or habitat management can be found [here](#).

Because this section is less cross-linked to other work, there is a bibliography for this chapter here. Most of these sources are liable to remain stable because they are printed books, but several are so old that they are unlikely to be available unless obtained by inter-library loan. Some were recently rediscovered in the basement of an old bookstore, so they might still be available on Amazon. Others are only available as republications, but many of those are of absolutely horrible (unreadable) quality, much less suitable for corroborative research. So, good luck with that.

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Unless listed here, images are by Mark Edward Vande Pol per [conditions on p2](#).

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- P11 Wikipedia.org; *Holocene Temperature Variations* (graph), Retrieved, 2014 from: [http://commons.wikimedia.org/wiki/File:Holocene\\_Temperature\\_Variations.png](http://commons.wikimedia.org/wiki/File:Holocene_Temperature_Variations.png),  
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- P13 Author Unknown; *Image of Bear at Picnic Table* (Yogi, is that you? Where's Boo-boo??)  
This image is all over the Internet. I have looked for the source like crazy but have not identified it. As this is not for profit public education, it is surely fair use, but I would still like to have obtained a grant of use as I don't like using such images without asking. But it was SO COOL for this purpose, I just couldn't resist. My apologies to the photographer. If you are out there, I'd love to obtain permission and offer the credit. If you truly object, I'll take it down.
- P15 *Relief Map of California*; Retrieved from: [https://en.wikipedia.org/wiki/Donner\\_Pass#/media/File:Relief\\_map\\_of\\_California.png](https://en.wikipedia.org/wiki/Donner_Pass#/media/File:Relief_map_of_California.png) .
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- P24 Photograph of Oil on Canvas painting by Tomas Horrach Bibiloni of Palma, Mallorca, Spain: *Father Francisco Palóu, O.F.M. 1723-1789. Missionary to Mexico and the Californias, Founder of Mission San Francisco, Biographer of the Venerable Father J. Serra, Historian of Northern California*, Proclaimed illustrious son of Palma, December 31, 1975. Gift of the city of Palma to Mission Dolores, October 9, 1976." <http://www.ofmval.org/7/01ma/01/07.php>
- P25 Photograph of 1876 painting by Léon Troussel, *Mission Santa Cruz*; courtesy Sr. Betty Pedrazzi, Holy Cross Church, Santa Cruz, CA. Dated by Santa Cruz Sentinel newspaper articles on Aug. 12 & Aug. 19, 1876; oil on canvas. This was painted 14 years after the mission had collapsed in an earthquake and is thus not considered an exact rendition.
- P30 Image of Springtime Wildflowers obtained from Tejon Ranch Company, Inc.,.
- P39 Satellite Image of the Wildergarten from Google Earth.
- P46, 47, 53, 63  
Fenn, Ed; Images of Glenwood obtained directly from Ed Fenn.

## Wildergarten Site-History Image References – Continued (3)

- P48, 49 Images of Glenwood Hotel Dance Hall and Railroad Station Switching Yard courtesy Derek Whaley. Source unknown but probably the Margaret Koch Collection of the Santa Cruz Museum of Art & History.
- P50 Picnic Train at Glenwood, 1890s; Image courtesy of SantaCruzTrains.com.
- P51 Postcard: *Glenwood Highway, 1920*, Courtesy of Gil Pennington
- P60 Grazing and patterns of disturbance, San Gregorio, CA, March 2015, obtained from Google Earth. Google Maps Image URL:  
<https://www.google.com/maps/@37.3272788,-122.3230563,4817m/data=!3m1!1e3>.
- P62 Vande Pol, Alice (aka “Mom”); *Sleepy Dog, Snow Plant, and me; Calaveras Big Trees State Park, June 1959*, Kodachrome slide.

# TABLE OF CONTENT

Next

## Part I - Introduction

1. This is Wildergarten
2. A Site History Like No Other
3. When Environmental Protection = Mass Extinction
4. What Is "Native," Really?
5. Repeat Photography, Before & Afters
6. Proof: Pure Germination of Native Annuals
7. Project Overview

## Part II – Forestry

1. Phased Thinning of Broadleaf Forest
2. Making WOW! - Restoration of Forest Understory
3. Conifer Forestry – Thinking Really Big
4. Drainage – When Hill Goes Downhill
5. Roads – From Curse to Blessing
6. Vegetative Maps & Aerial Photography

## Part III - Grasslands

1. Grassland Variety in Meadows & Forests
2. "The Onion": Weed Management by Species
3. Colonization Behavior of Native Annual Forbs
4. Sand Hills: A Model Post-Disturbance Habitat
5. Grassland Restoration and Soils Rehab
6. Comprehensive Weed Management
7. Vegetative Identification & Weeding Technique
8. Pre-Emergence Selection for Native Germination
9. Drought Tolerance in a Pure Native Grassland

## Part IV - Miscellaneous

1. The Vegetable Garden as a Research Tool
2. Pollinators and Native Forbs
3. Fungi
4. Specialized Tool Development

## Part V – Project Context

1. Periodic Disturbance and Feed-Forward Stability
2. Weeds: A Tragedy of the Commons
3. Control Boundaries: Fragmentation Is Your Friend
4. Central Planning
5. Our "Ownerless" Backyard

Each line in the TOC is a link that opens the corresponding chapter in a new file

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