To Aerial Is Divine

This is an aerial photo our place, taken just before we started in1989.

People see all these trees and probably think it's "Natural."

'The trees have always been there; this has always been a forest.'

People, by "Nature," are delusional.

This is how it looked in 1948, **only 41 years before.** The impacted hardwood forest being invaded by fir you first saw were grasslands and young brush fields invading a dying orchard. An earlier version of this chapter showed my guess of the extent of this orchard. Even after decades of detailed observations, I was way wrong. Even after over 30 years of forestry here, even after predicting in the chapter on managed succession that one could go from annuals to trees in stem exclusion in only 30 years, STILL the rate of change this photo makes obvious was a complete shock to me, because of the time I would have expected for higher order species to invade so far without an established seed bank or proximate seed trees. Oh, but it was a forest “before the white man came”? Right???

Wildergarten 6.3

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 4.6 4.7 5.2 5.3 5.4 5.6 5.8 6.2 6.3

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

Articles at Wildergarten Press: collected writings on Constitutional history and regulatory racketeering by tax-exempt "charitable" foundations

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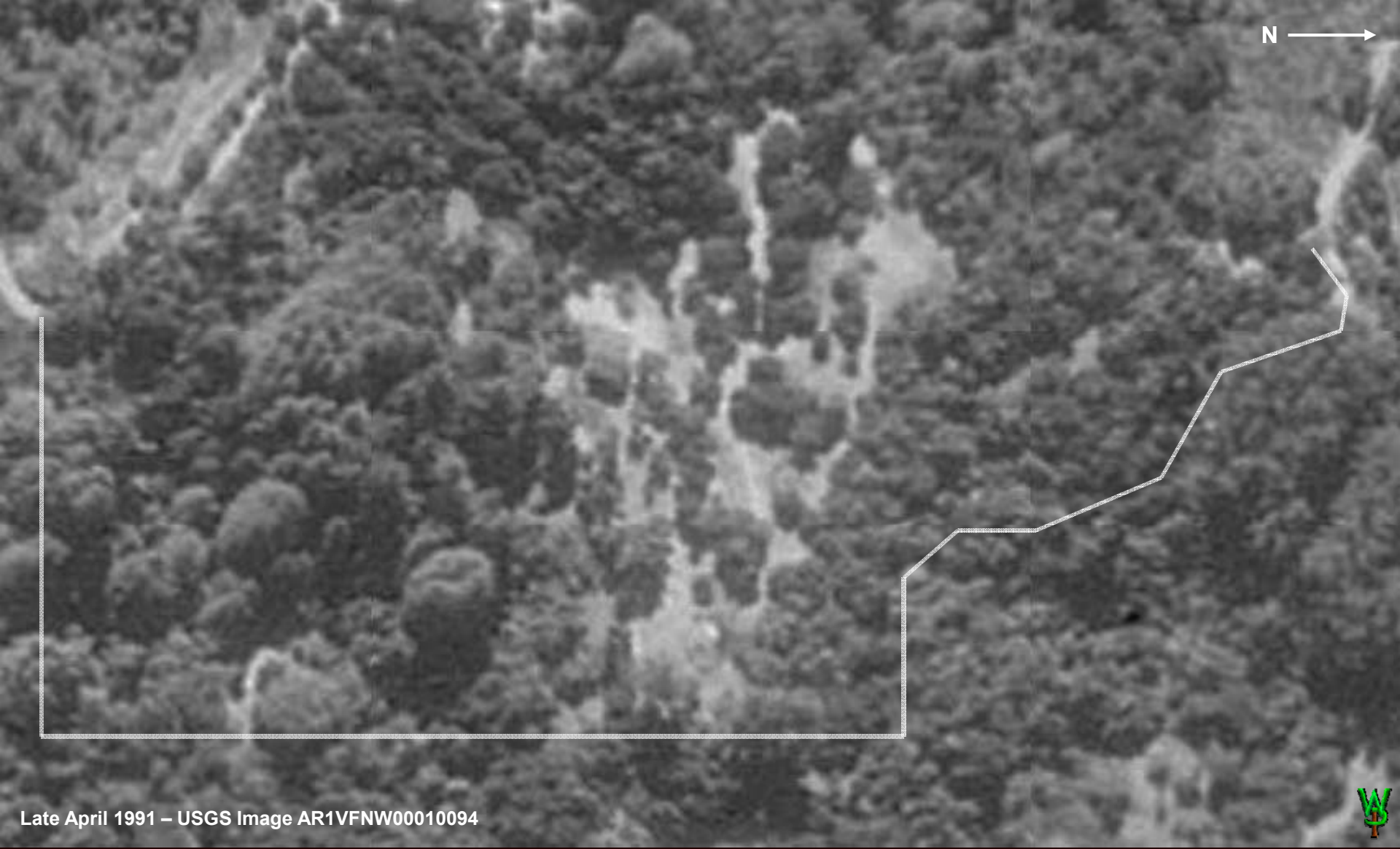
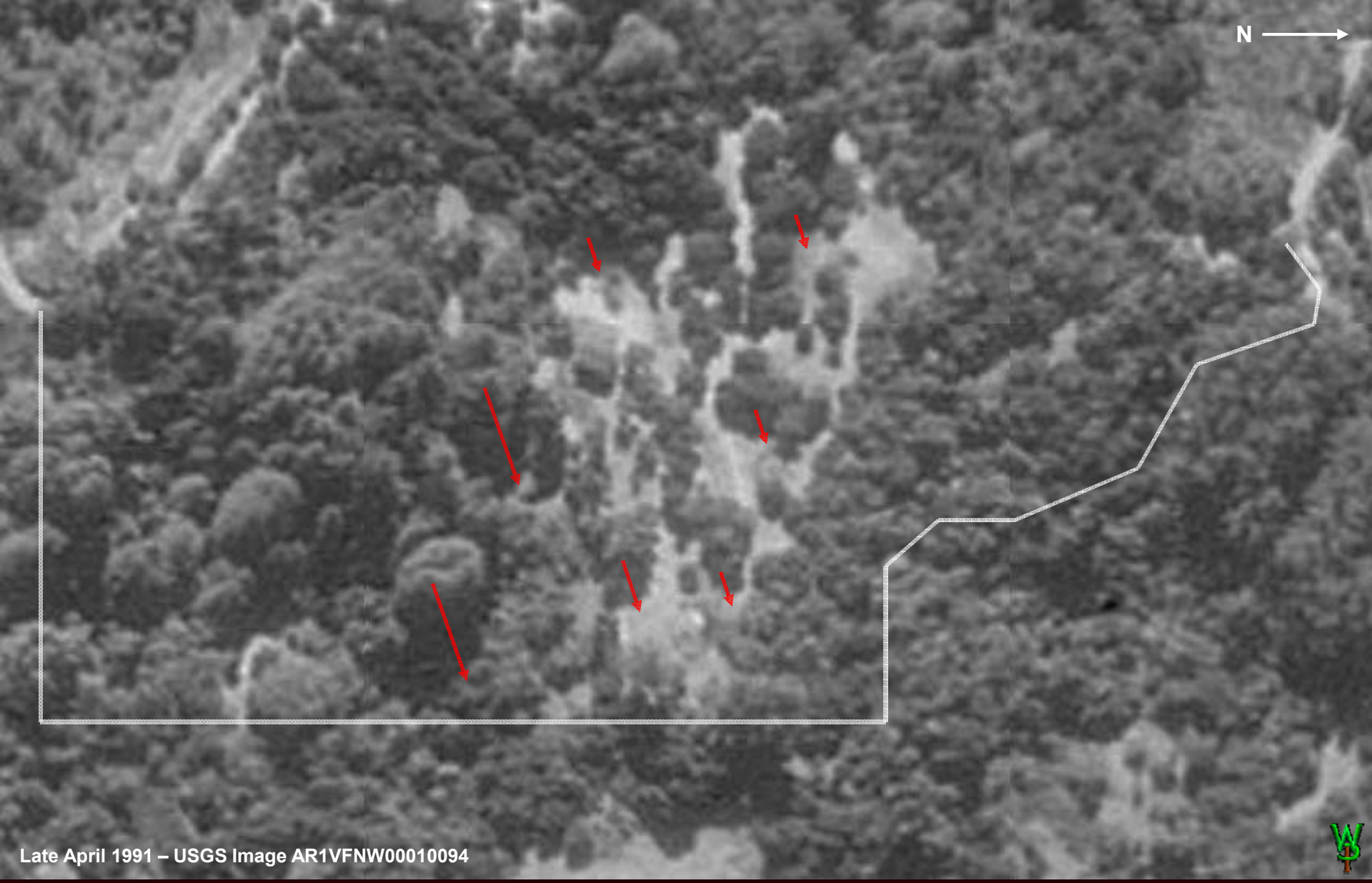


Late April 1991 – USGS Image AR1VFNW00010094

No, as the Spanish diaries and now this study of historic aerial photography reinforce, few IF ANY trees were up here when Indians managed this landscape. Stop frequent burning and things change fast, and "fast doesn't stop," but with a caveat**:**

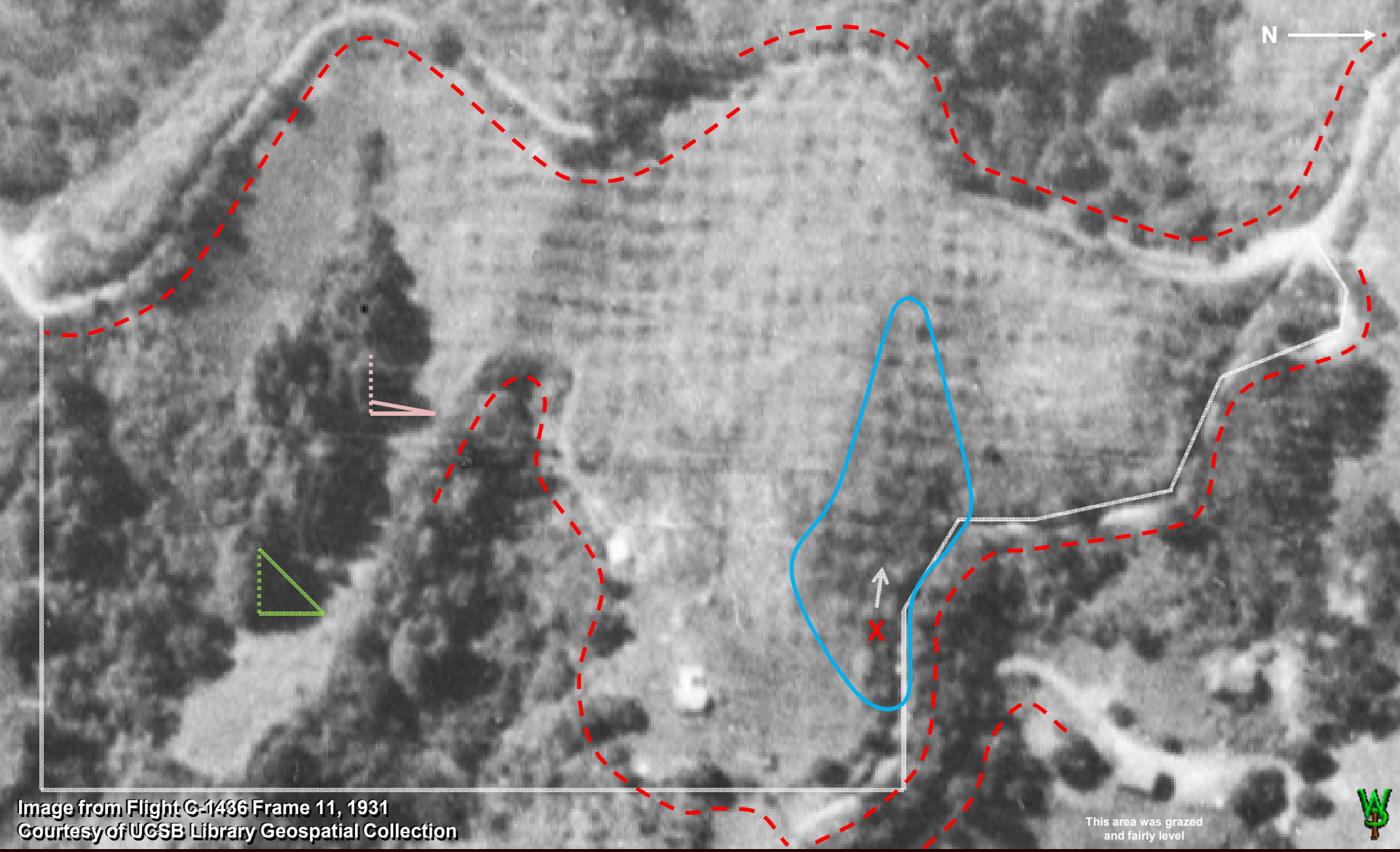
In 10,000 years, nobody had ever stopped burning before.

It takes a while for some seeds to get to where they can force transformation of a landscape. But once they do, things happen fast, just as with any other invasion by an exotic species (although genetically native they were "exotic" to this place). That delay induced a perception of permanence and "balance" that was completely unsupported by reality. It also takes a while to understand that.



Late April 1991 – USGS Image AR1VFNW00010094

In viewing these aerial photographs, shadows can be deceiving. They can look like part of the tree canopy and both ***overstate*** **tree cover** and ***understate*** **open area** (depending upon tree height, time of year, and time of day). The shadows in this image are short pointing eastward indicating that the photo was taken on a mid-spring afternoon. You may also notice that I compensate the property lines from image to image for differences in perspective due to the point from which the photo was taken. Remember too that as time progresses, shadows get longer because the trees get taller. Yeah, same problem. "Fast" doesn't stop.

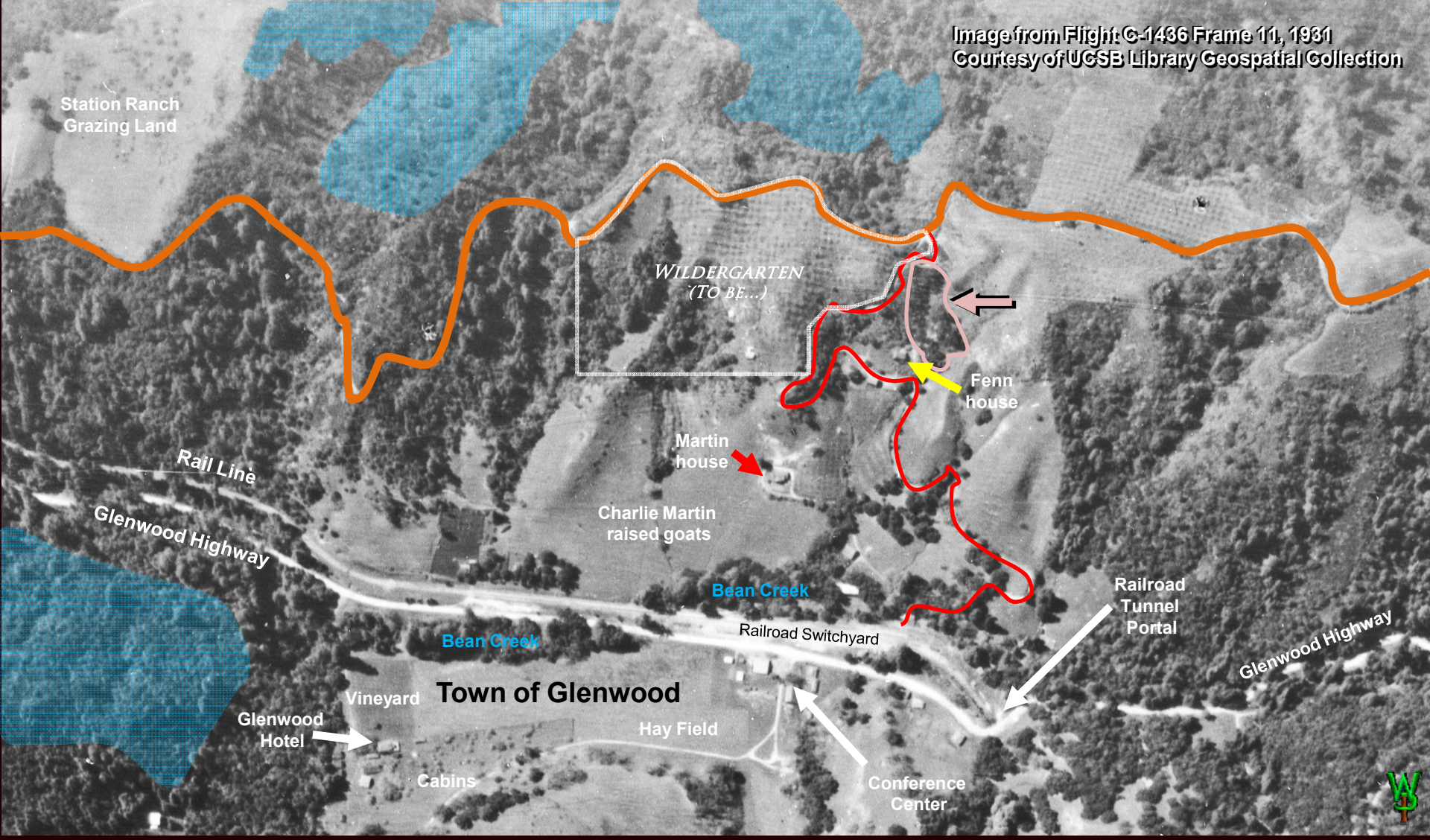


Let's start from the very beginning… the first that I could find so far… This was 1931 while the orchard was still in full production. Note the trees along the County road, which was yet unpaved. Regular road grading had spread the acorns and provided soft dirt for them to establish on the downhill sides of the roads. From the azimuth of the shadows, this was photographed at about noon. From their length and my knowledge of the topography, I am guessing the solar elevation was about 40°. Now, look at the area with low light angle at right. Those slopes are so steep today that there is no way there would be light on them at that time of year but an aerial photo today could not yield that information because there are too many trees. I doubt the powered equipment of that day could cut terraces on these slopes, but horses??? In any case, the surface sheet erosion had to be massive.

At right is the slope from the point marked with the "**X**" at the lower right on the previous slide, with the arrow indicating its direction. With this much vegetation, it is very difficult photograph so that you can see it well but I was standing on what was probably one of Ed Fenn's old terraces for his orchard. Outside of some of these "walkways" are effectively vertical drops of about 8 feet. Road grading had changed this slope considerably.

Did I tell you Ed Fenn must have been crazy? To run horse-drawn grading equipment here on a slope like this so that his customers could have apples? I have used these "terraces" on this slope as weeding trails for thirty years wondering if they were artificial because they just didn't make geological sense. But the slope is so hairy, I just couldn't imagine making them. That had to be one hell of a horse! Look at his chest!!!

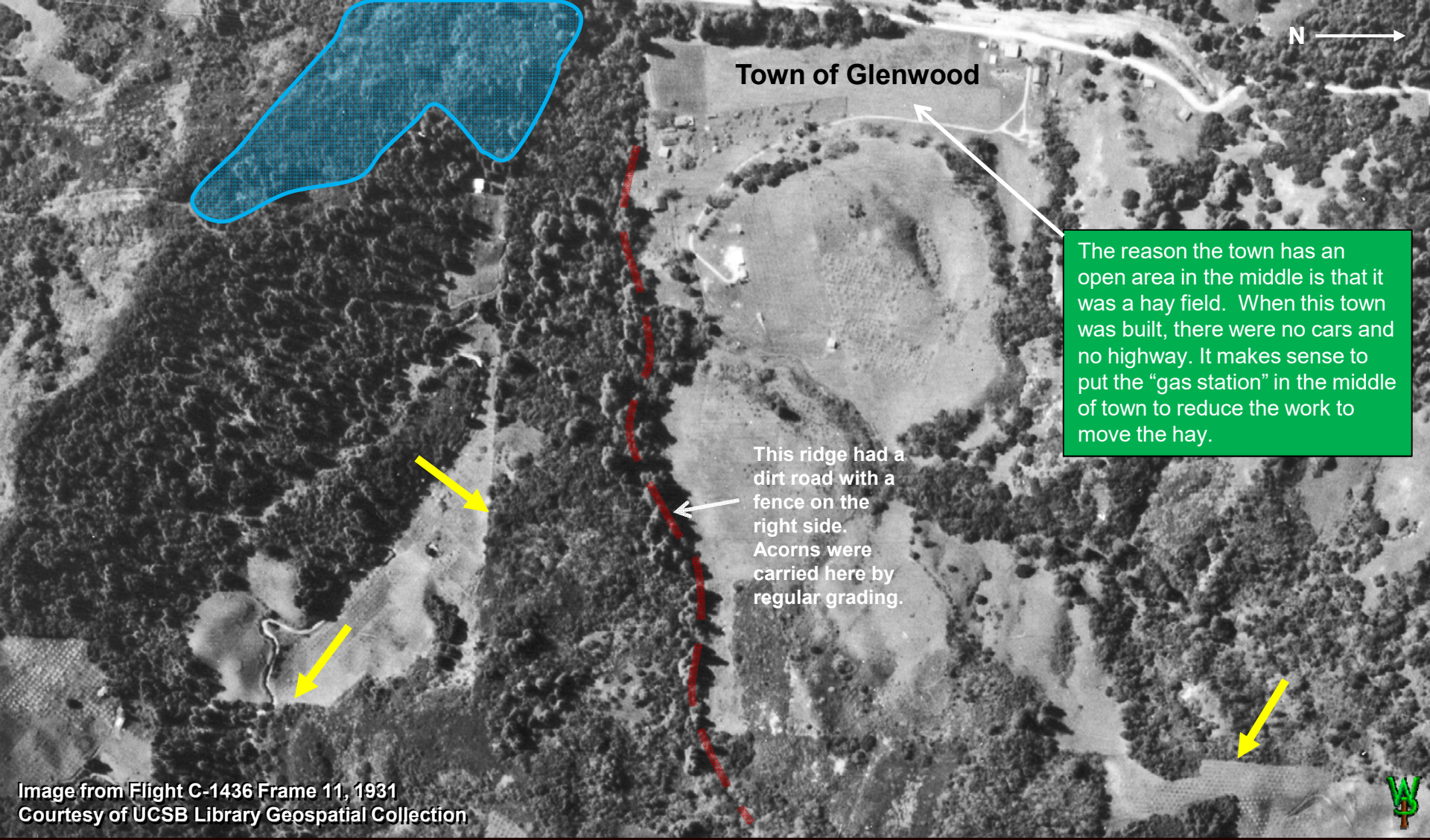
When I met Ed he was 104, and therefore a good bit stooped. But I could tell he'd never been a big man, I'm guessing probably once about 5'8" and definitely of slender build. But look at the arms on him too. We seldom appreciate how hard our forebears worked.



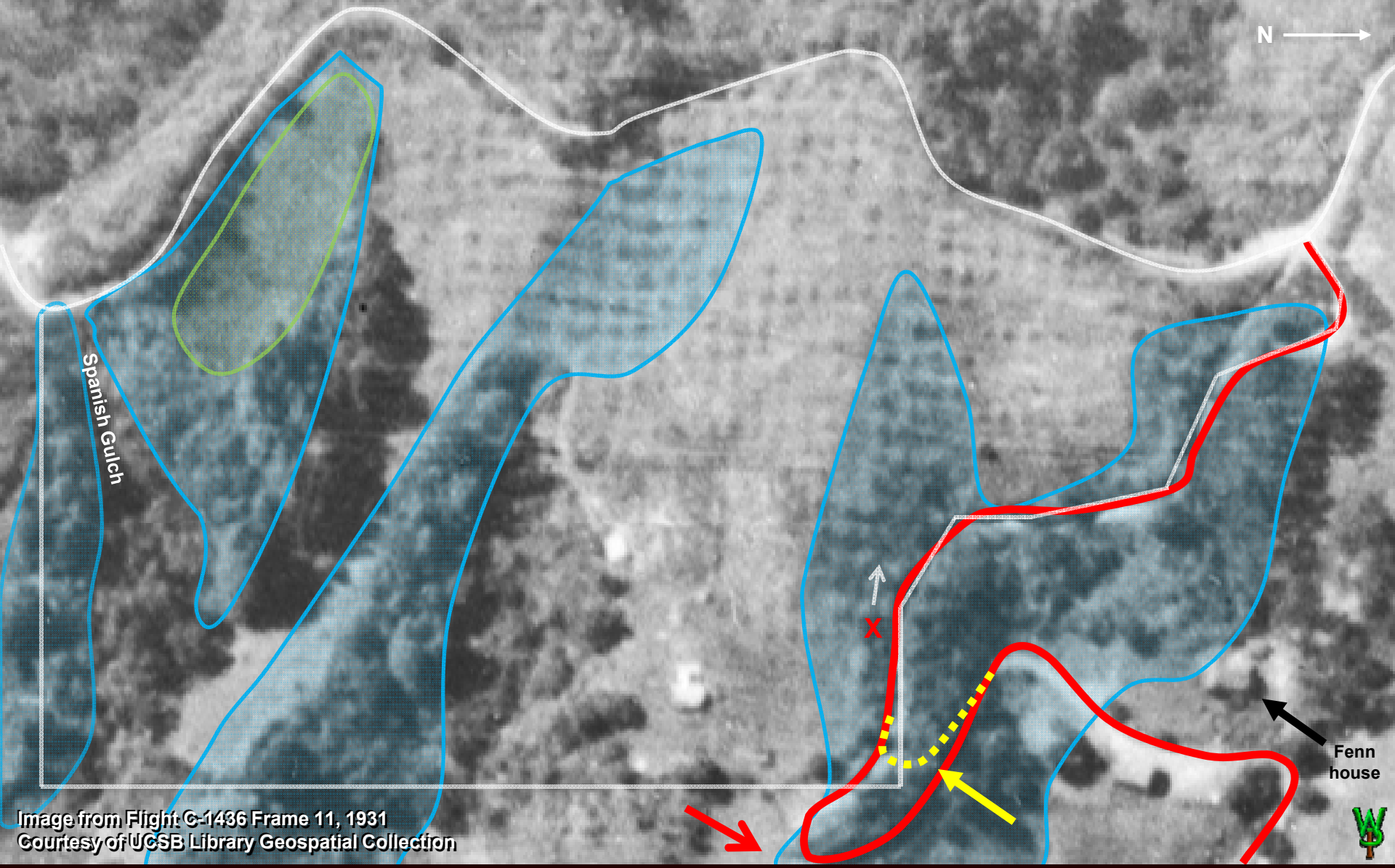
Charlie McKiernan's road opened in 1851. It was the only way to get from Santa Cruz to the Santa Clara Valley. Orchards soon dotted the area to take advantage of the road and extra rainfall compared to inland. Charlie Martin added his access road to his Glenwood resort town a few years later. The railroad came in 1890 with a station at Glenwood serving its hotels and vacation cabins. The lower transportation costs the railroad offered put some orchards out of business. Martin swung the US War Department into to building the Glenwood Highway in 1915. As part of that project, Eucalyptus, was planted to reduce erosion from McKeirnan's road. Ed Fenn moved in to grow apples just above the train station shipping via Martin's road. Here in 1931, 80 years after Martin started, look what is happening with forests! Conifers were only in drainages surrounded with brush fields being invaded by young trees, both invading abandoned orchards. Large oaks were very few, most along drainages surrounded with brush on land too steep for regular grazing.

Photo about 1890, just south of the Glenwood Train Station. Image from santacruztrains.com

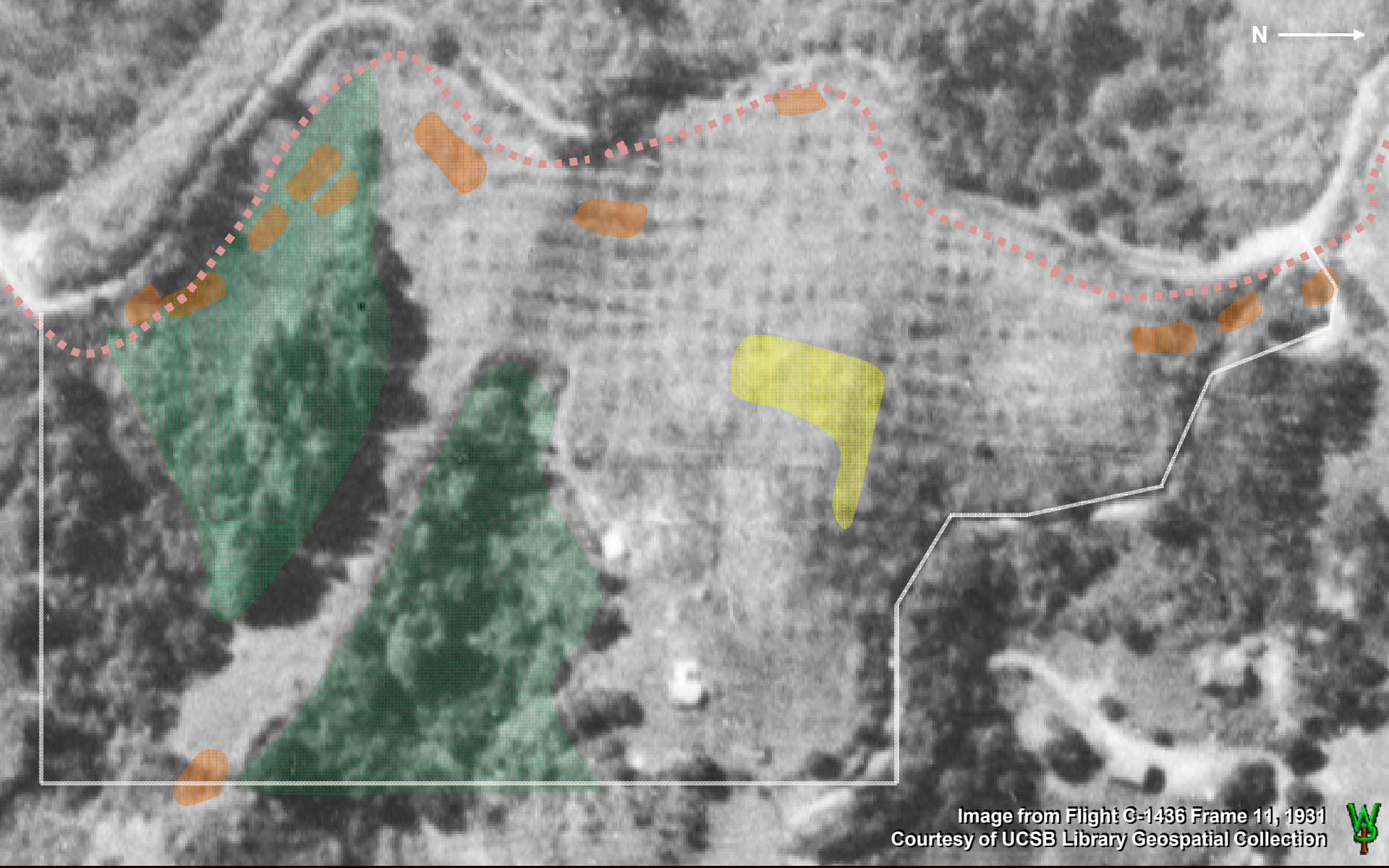
If you still believe these mountains were originally forested and harbor doubts about my inference of “abandoned orchards” along Charlie McKiernan’s road, look at this hillside above Glenwood in 1890. That is the same area shown at the upper left of the next aerial image. The factors of production that brought agriculture to these mountains were available summer moisture, cheap land, and transportation. It would have been economically impossible with trees already there. Getting rid of stumps was not cheap; there was no time or money for that. The transportation McKiernan’s road offered made orchards and vineyards more valuable than marginal grazing land. As to whether there ever were trees at all along the ridge, consider that Indians had more than one good reason to avoid growing oaks up here. It would be insane to grow acorns along a trade route along a dry ridge lacking either hard stone for mortars or the significant water needed for leaching the mash in order to make acorns edible for people. Acorns were also attractive to grizzly bears. Once the Spanish had arrived, pack animals eliminated the need to maintain food crops along the tribal trail.



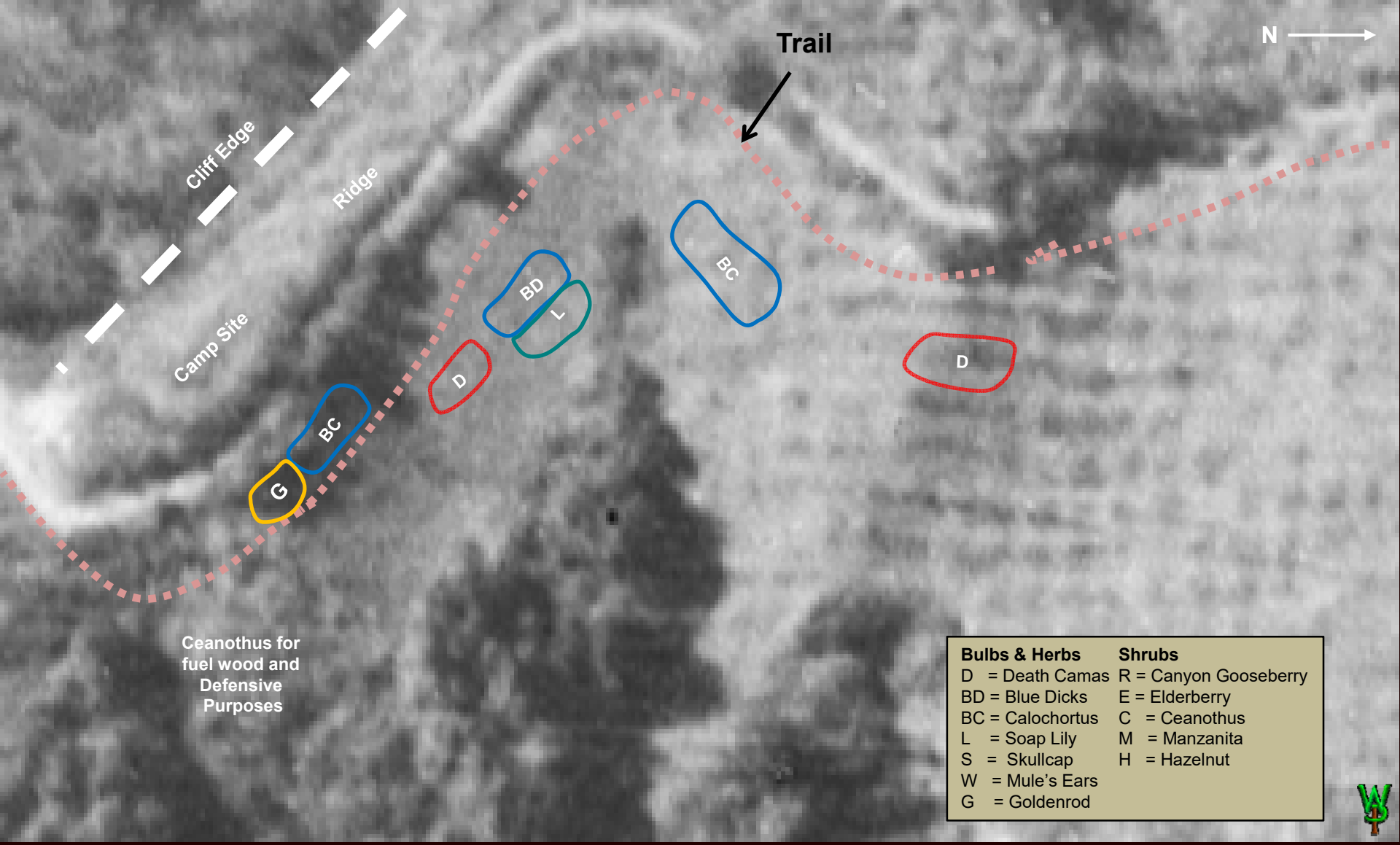
If this system can convert from bare ground to total forest cover in only 30-40 years, then WHY, 140 years after the Spanish burn ban, why wasn't it already forested? In a word, Cows. Cows eat acorns. The Spanish let them roam everywhere. Americans built **fences**. Above is from the same 1931 aerial photo The shaded area is the hillside behind the train in the previous slide 40 years earlier. Here, it has nice straight rows, interspersed with growing trees. If you zoom, you will see patches of row crops in open areas. The straight lines of vegetative change are fence lines. Together these features show what barbed wire, tilling, and herbivory (cows and goats) can do AND what happens if they stop. Toss in fire and you will appreciate the power of the tools humans wield, for good or ill. If what you want is biodiversity for birds, bugs, and wildlife, we MUST learn how to use these tools, but first we MUST get the land back to health without a catastrophe. That takes people with chainsaws, heavy equipment, and burn piles, people armed with tools and information.



Over half of our property had been terraced for the apple orchard by the time Ed Fenn abandoned it in the late 1930s. Note that fruit tree growth was best on north-facing slopes (with one exception we'll get to in a bit). When the brush first populated the open field remains unknown, but its establishment was in phases. What also is fascinating is that only north-facing slopes are forested and those slopes are generally steeper. It could well be that the reason for the more rapid erosion of those slopes is because trees hold slopes just fine until they fail, and when they do they tear out a big chunk of soil. Between these images, you might see some "migration" of the property lines because both perspective and (until 1983) they were defined by roads that moved subject to grading.



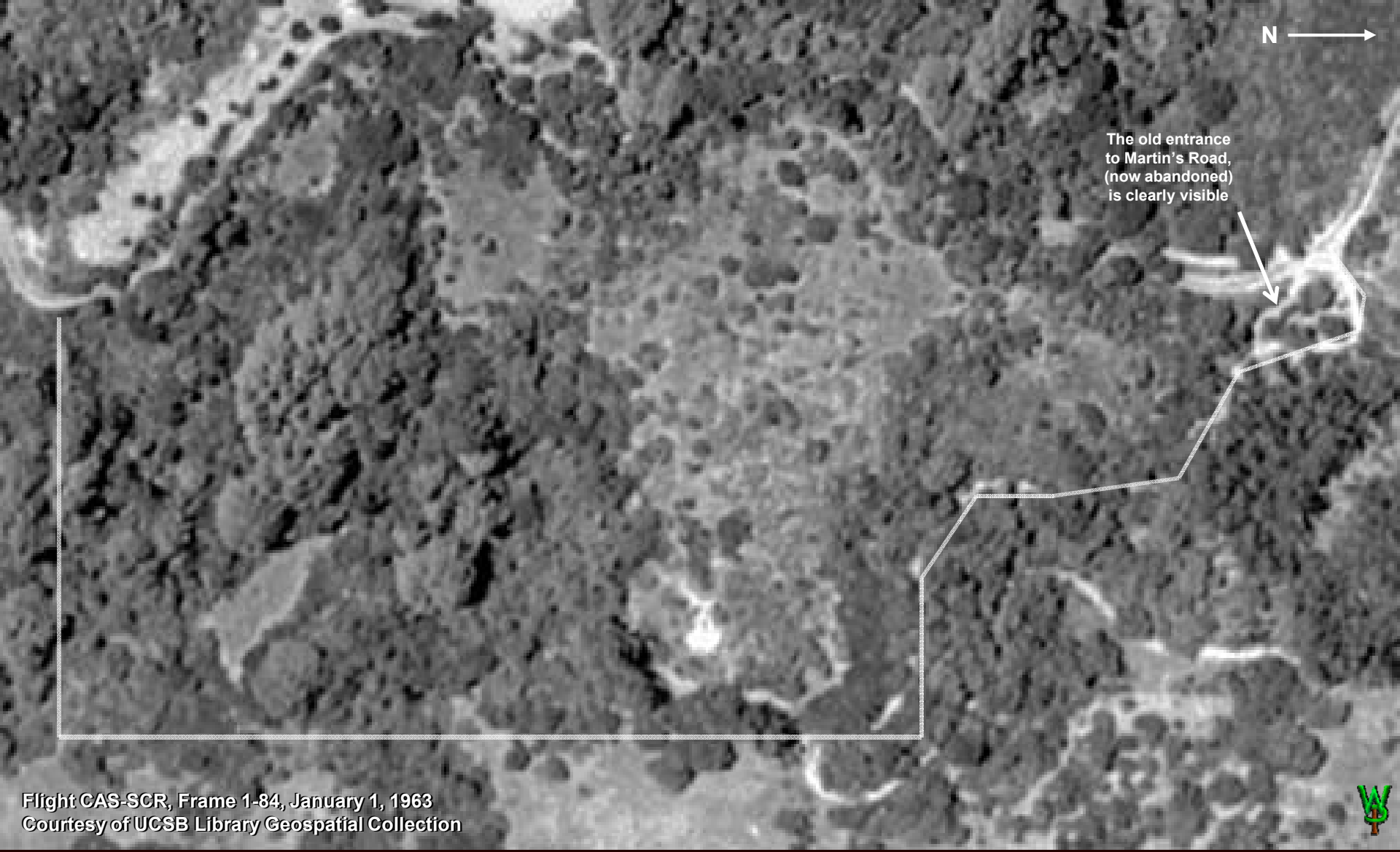
A second thing stood out from this extremely useful image: My earlier estimate of the areas with soils that had remained undisturbed by grading or plowing since the Spanish conquest had been reasonably accurate. Those undisturbed soils have shown analytically higher organic content and nitrate while showing remarkable resistance to invasion. In those areas, aboriginal proto-agricultural crop patches along the old Sayante tribal trail came up in a more orderly configuration (see **maps**). This is not to say that other areas don't exhibit similar arrangement, but I first noted an orderly array of reappearing native species there. Yet where I have recently been a little braver about tree removals, I have seen new signs of aboriginal crop development. There could yet be more surprises to come.



The distribution of these proto-agricultural patches suggests a hypothesis for why Indians avoided growing oaks along a trade route (discussed at length in the **site history**)**:** Grizzly bears eat acorns. Why grow big patches of high-protein bear food on a dry ridge with no stone for grinding acorns or water to leach the meal? Nor would one want bears hanging out along a trail inclined to protect "their food" resources. Instead, the food patches along the trail were distributed to avoid having all of them destroyed by bears, and possibly more. Each patch of roots was too small to feed or hydrate a bear, but if bears did find one, they would keep at it until it was gone. So, perhaps the Indians planted an adjacent handy dandy patch of similar looking bulbs of death camas for bears to discover and consume, with inedible (without 18 hours of cooking) soap lilies planted alongside the edible bulbs to tell people which was which.

By the end of this chapter, it will be obvious that, with the possible exception of what was growing in drainages, under Indian management, these hills were primarily grasslands due to aboriginal burning and intensive herbivory in specific areas. The Spanish diaries note huge numbers of both elk and antelope, (effectively cows and goats) fully capable of precluding the spread of evergreen oaks. During Spanish rule, the only real factor that could have abetted oak invasion would have been predation. In that respect, the well documented Spanish infatuation with hunting predators for sport and to protect their principal source of revenue (selling cattle hides) would have suppressed that predatory population. Hence, invasion of woody vegetation after the Spanish burn ban of 1793 was at first very slow, because most of the trade between missions was by pack train. Those animals do not move acorns and other seed effectively, nor was there fire to stimulate brush germination. So how did the oak trees get here? With the construction of Charlie McKiernan's road came American horse-drawn steel grading blades. To keep the road passable for wagons, that work had to be frequent. Hold that thought, because with the time series of these aerial photos, you will get to see that oak invasion in action!

This 1948 image illustrates a very interesting property. Note the brush on about half of the slope on the upper left. Both trees and brush were above that slope for decades starting along the road, but part of it resisted invasion, even until we got here in 1989. One reason may be that *Ceanothus cuneatus* germinates like crazy after a fire. I have been told by a scion of the Martin family that the last fire here was in 1941, and have confirmed by tree ring analysis that bay trees were coppiced at about that time. I have observed how fast brush fields can develop after a burn, but I have not been able to find an aerial image depicting the extent of the fire or its exact date. My guess is that because intact perennial grasslands resist brush and tree invasion and the fact that this slope had retained undisturbed soils is why it had been so successful in resisting brush and tree invasion for so long with but part of it burning in that fire.



Flight CAS-SCR, Frame 1-84, January 1, 1963
Courtesy of UCSB Library Geospatial Collection

This is probably the most valuable of these old aerial photos specifically for showing the invasion of brush and oak-madrone woodland into the orchard from the County road. Vestiges of the orchard rows are still barely visible. Patches of maturing Ceanothus some of which had started in the 1941 fire, are now distinct and correspond by location with what I encountered. The larger oaks are known to me now as individuals. Again, there are more trees along the County road (which was still not yet paved, as you can see the stripe of grass down the middle) and on north-facing slopes. Notice that the property line sometimes doesn't align with Martin's road on the right. One is because of perspective from the aircraft, but the other is more interesting. For nearly a century, the road was the property line, but now lawyers think that lines are set in stone to which the roads must comply, whether that is sensible or not.

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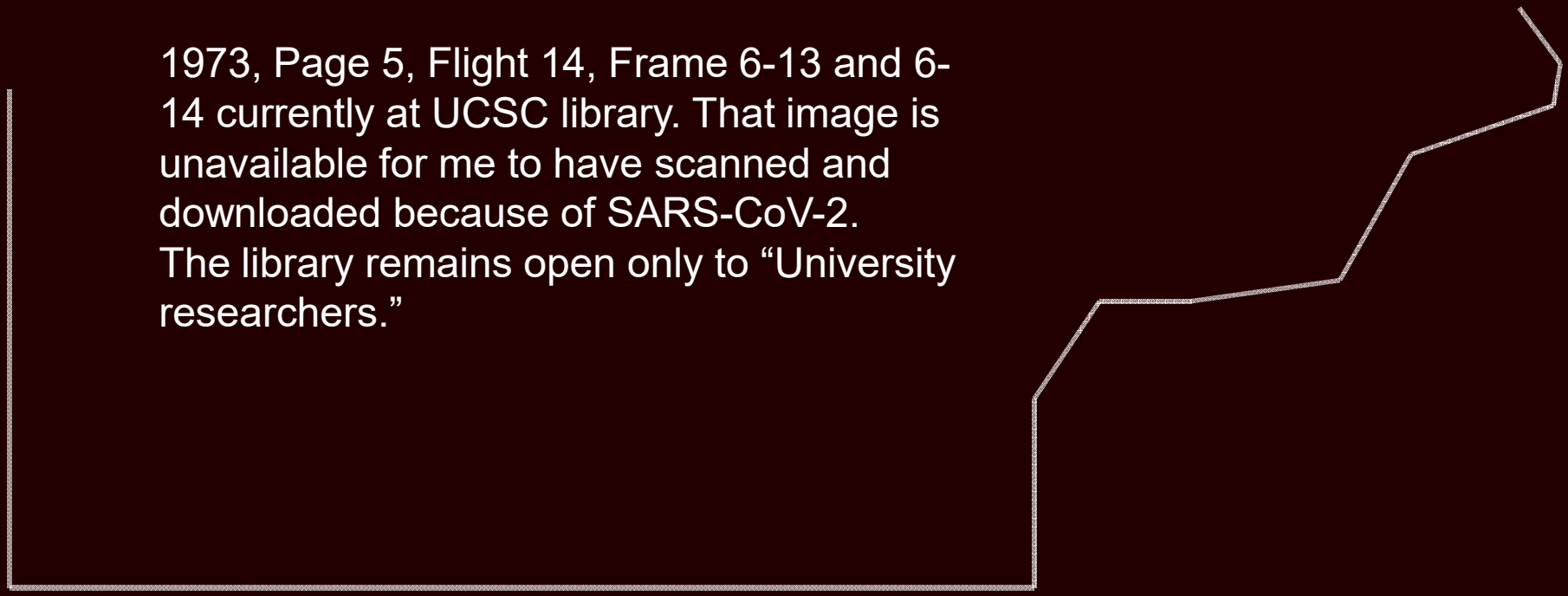
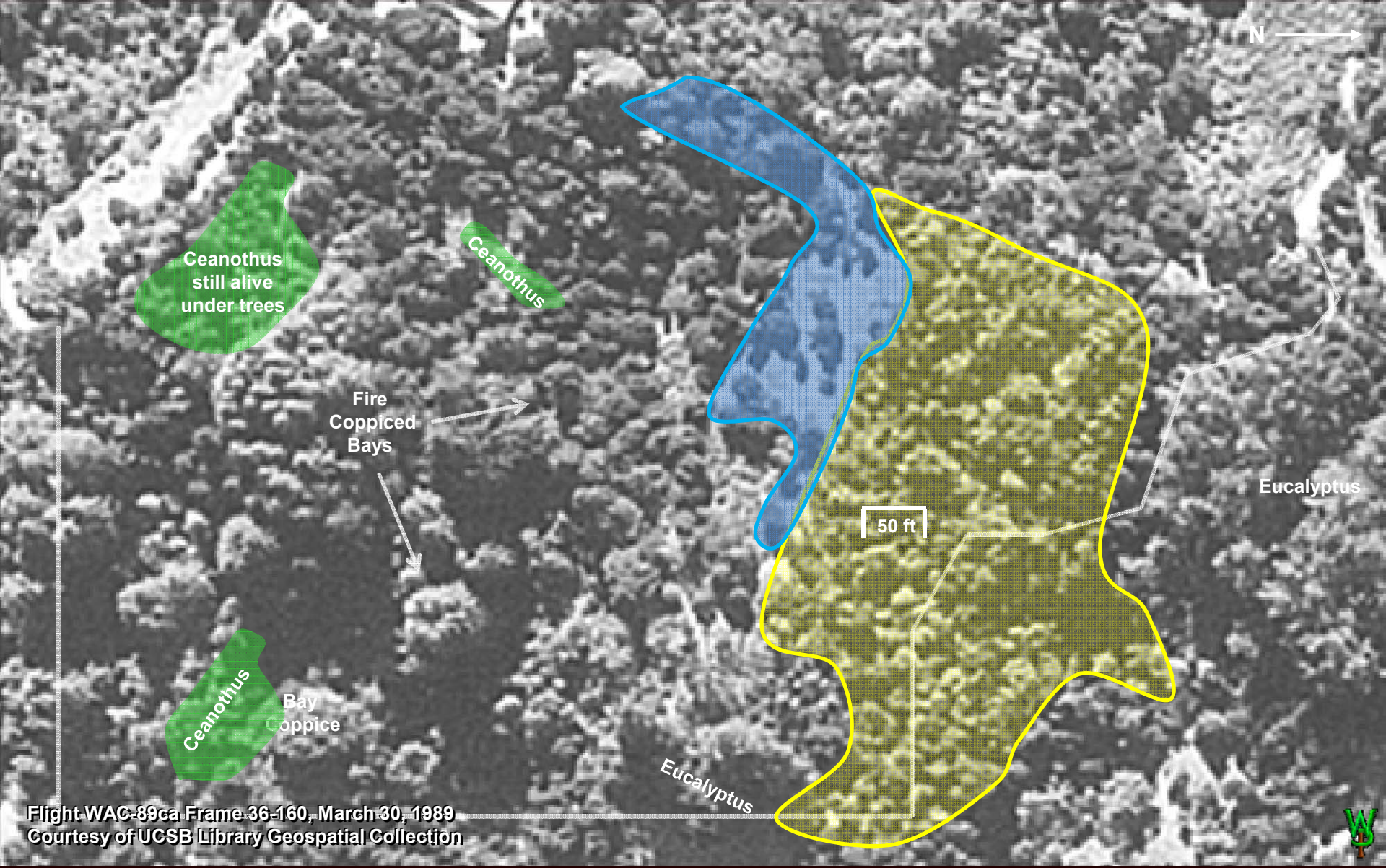
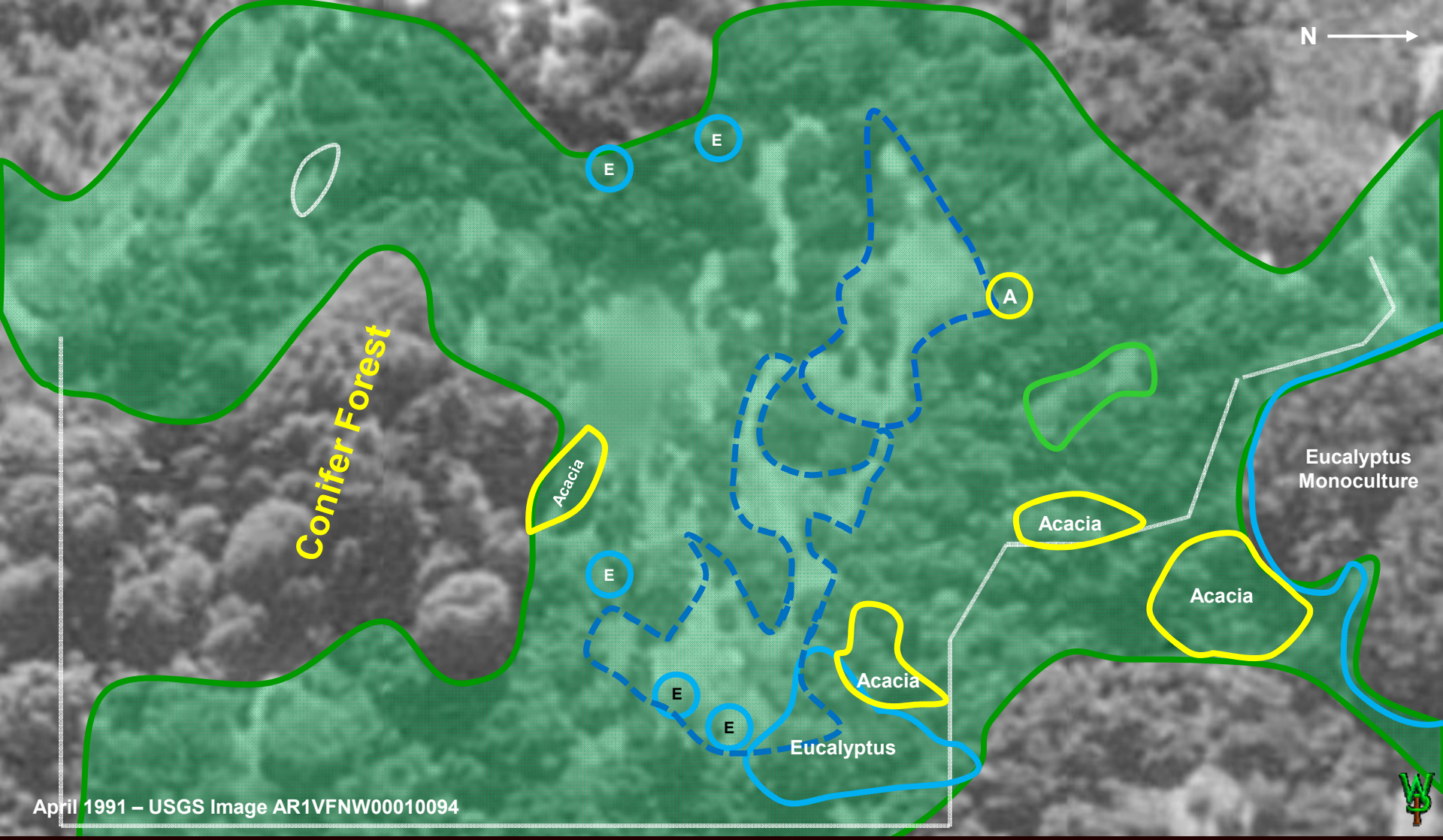
1973, Page 5, Flight 14, Frame 6-13 and 6-14 currently at UCSC library. That image is unavailable for me to have scanned and downloaded because of SARS-CoV-2.
The library remains open only to “University researchers.”



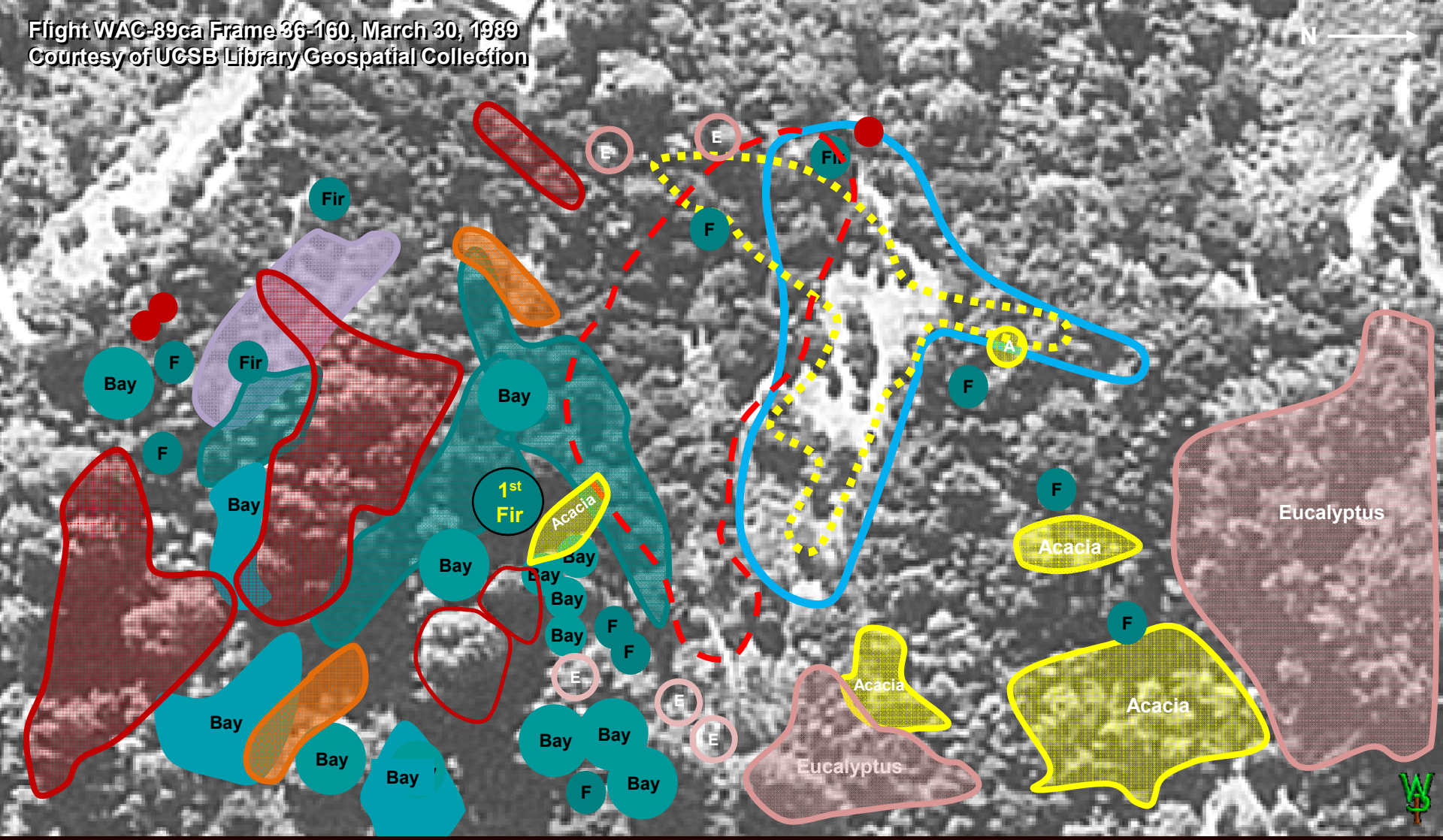
Oh but this isn’t research that brings in money to the University, except that it would if they let me pay for the scans.
If I had this one, I might be able to discern the beginnings of the French broom invasion.



In 1989, all we could see of Ed Fenn's orchard was one apple tree full of termites. With the exception of 3 patches, the native brush was under trees or dead and gone. Poison oak was only in trees. The brush understory was French broom cleared only on the hill top. There were many oaks over 40 feet tall with 18" trunks. Note also how even is the gray-scale of the "texture" within the enclosed area and how the majority of the crowns are about the same size and much less than the 50-foot scale marker across their tops indicating two things: These are young hardwoods, about the same age struggling with each other for space. The Eucalyptus on the right has also filled in to make a monoculture forest. The broom understory was nearing monoculture as well. But how much broom was there?

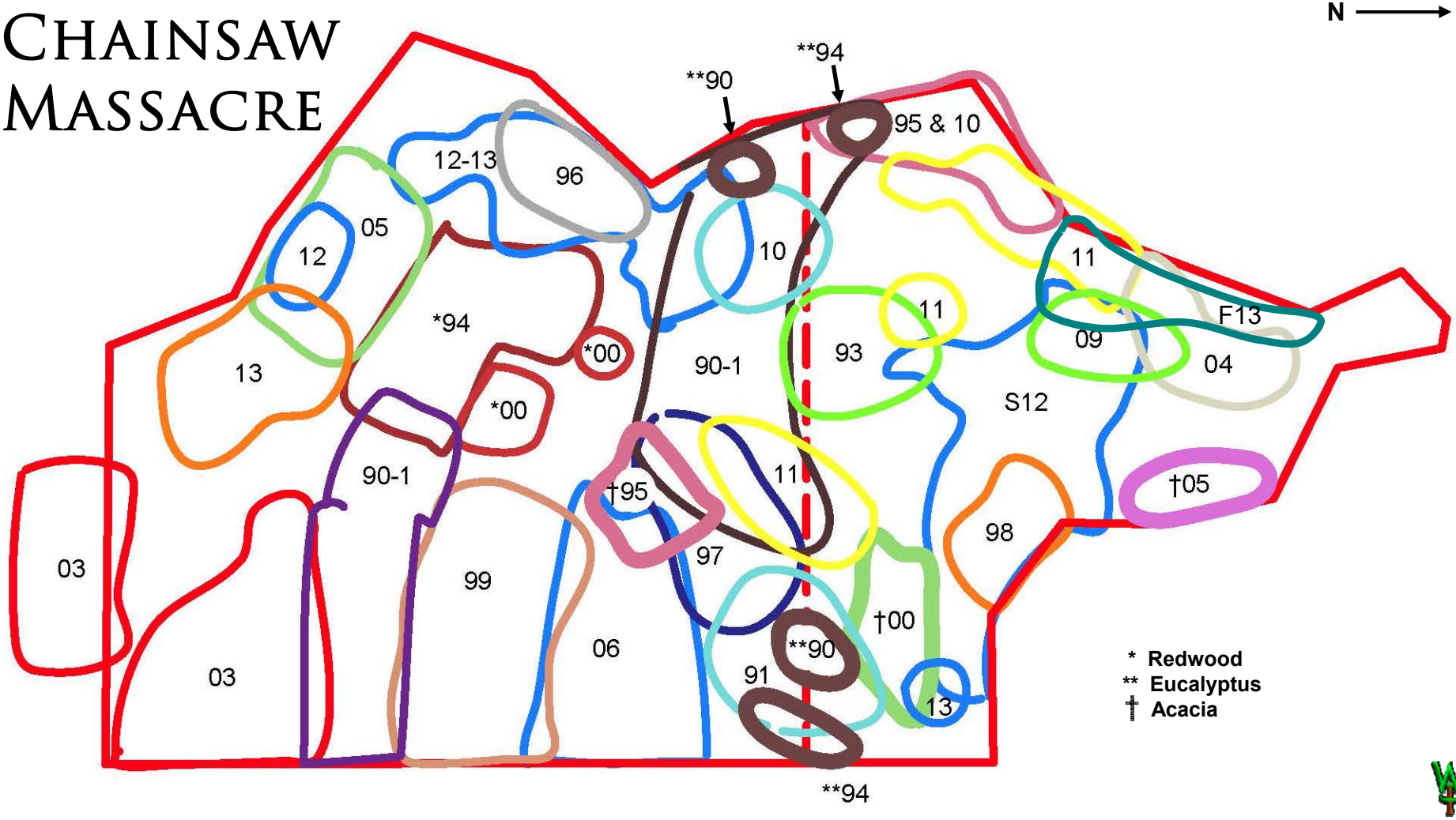


There were **10 acres** of mixed hardwood forests impacted with exotic French broom *(Genista monspessulana)* which dominated all exotics present except trees. By the time we closed the purchase, the seller had cut more broom than in the previous image, the bulk of which were later converted to grasslands. He had cut no trees. Dealing with broom growing four-feet per year and getting rid of Eucalyptus, Acacia, and upland fir were all I could handle between 1991 and 1998 as a project engineer with two babies-to-school-age kids. From 1998-2002, writing *Natural Process* was all consuming but for cutting fuel wood and spraying/mowing broom. Thereafter, grasslands and kids' education became the focus from 2002-2012, with forestry confined to thinning patches for fire control, fuel wood, and preserving sanity. Once grasslands were under control, I went back to forestry in 2012 and opened up significant area to the residual weed bank for purposes of establishing native grasses, forbs, and brush in a forest savannah.

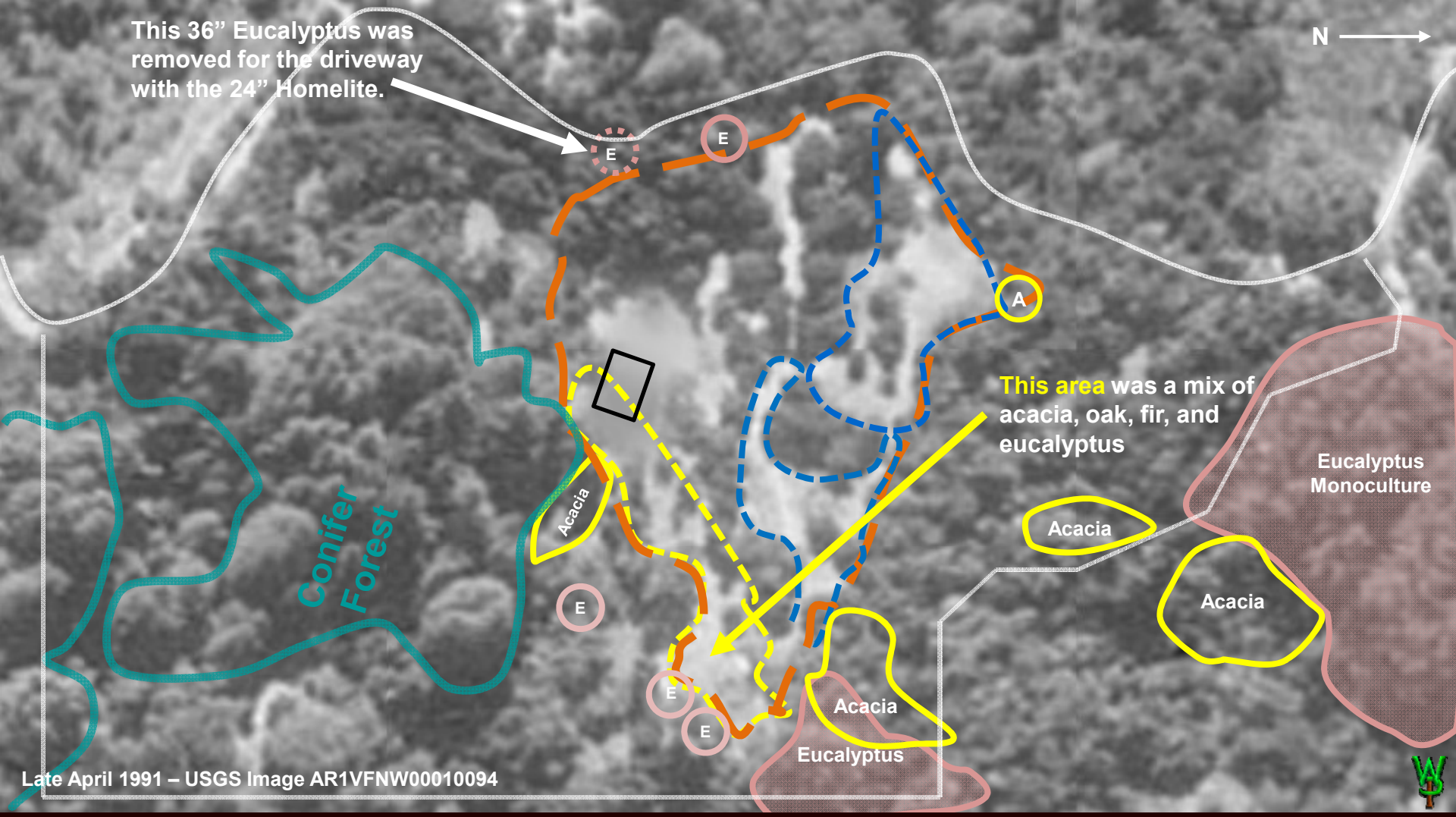


This is the same 1989 aerial photo mapping tree species. Anything unmarked is oak/madrone woodland. Mixed oak/fir **stands** are in shaded green, redwood red. When we started, the area in dashed red was totally forested; this photo was taken and after I had cleared for house construction, primarily to reduce the fire hazard. As to the remaining area that appears to be open, as noted in the site history, the seller to us had done considerable clearing of French broom (blue line), most of it inside the dotted line had been scraped off 8-10 years prior by a bulldozer clearing broom and other brush from which the piles were still there, one was 60ft long. Other than three impacted patches of decadent *Ceanothus* (one with tree cover, two with broken cover), there was virtually no other native brush left, as most brush under forest cover was ether broom or was dead from tree shade. Ceanothus burns like diesel. There were no grasslands, anywhere. Yes, there were clearings, but that was a pavement of cut French broom and broom seedlings.

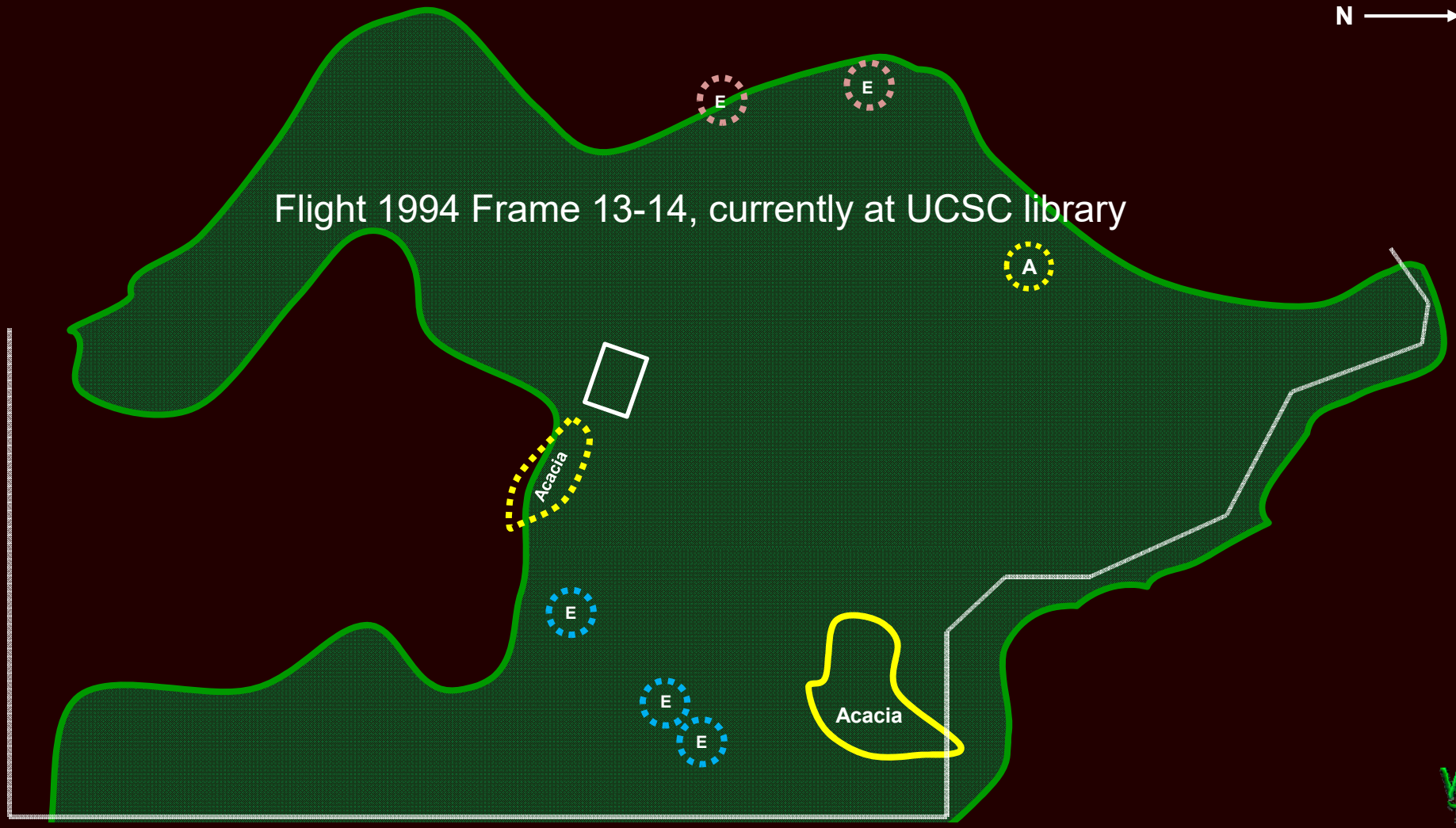
Chainsaw Massacre



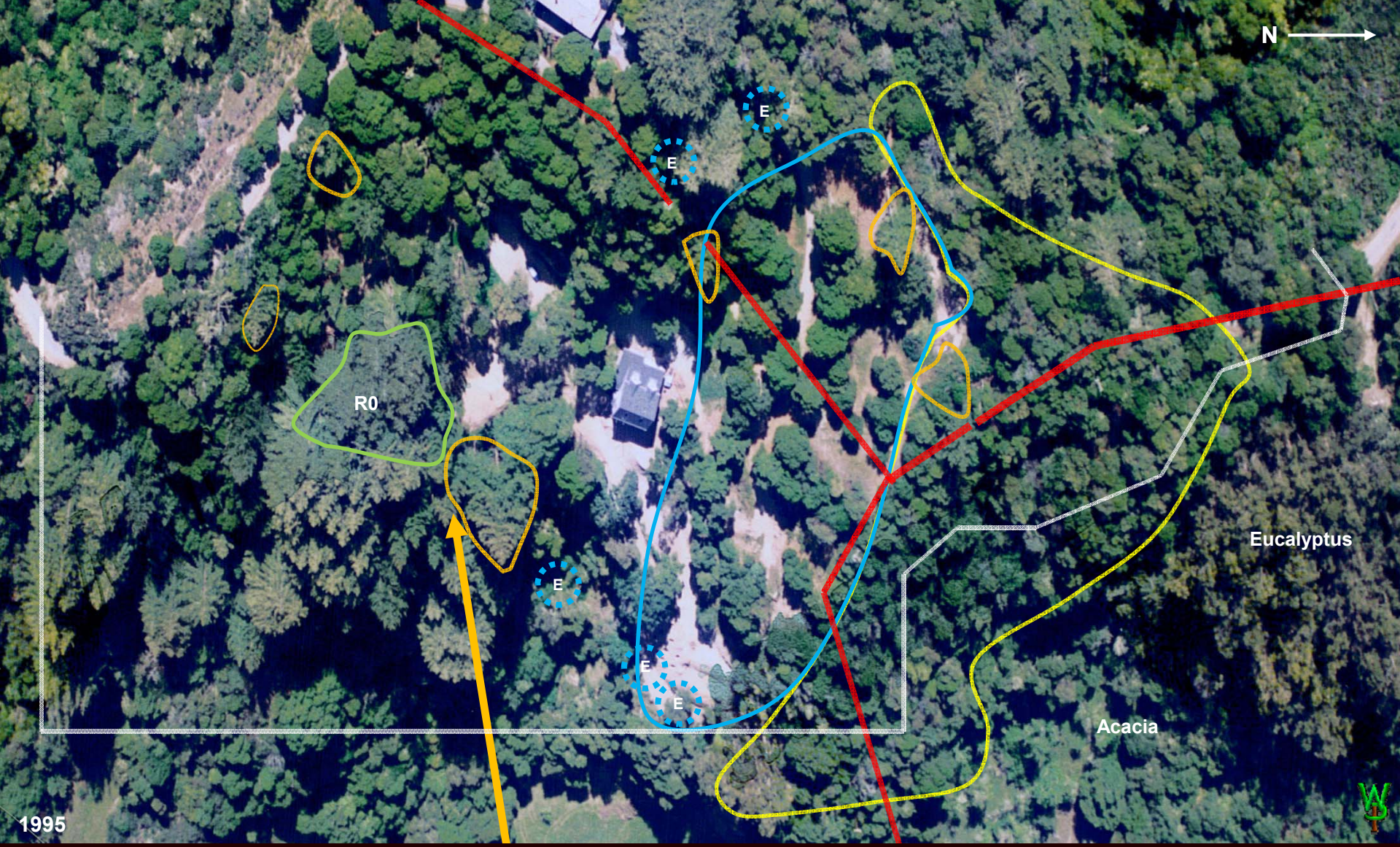
Now that we have covered initial conditions, we will address what was done to alleviate those impacted conditions and how that changed the landscape over time. This graphic represents my likely-errant dim recollection of where and when I had thinned **up to 2012-13**, the year I returned to forestry in a more serious and impactful way. This graphic includes both hardwood and conifer forestry. Unless indicated otherwise (see key), these are primarily oak-madrone woodland, usually to include bay (not much maple here). There is no color code per se but heavier lines indicate exotic trees. It does not show how much was removed. Overlaid thinning projects usually indicate achieving Phase 3 on the later date (see chapter on Phased Forestry). There is no accounting for growth-induced reversion from (for example) Phase 2 back to Phase 1 (it happened). The first excursion outside the property line in 2003 was by permission of the landowner to construct a shaded fuel break in a spot so rugged and remote that no material was removed (I just chopped it up where it fell). Yep, I logged just about everywhere. Looks like I hit it hard, doesn't it?



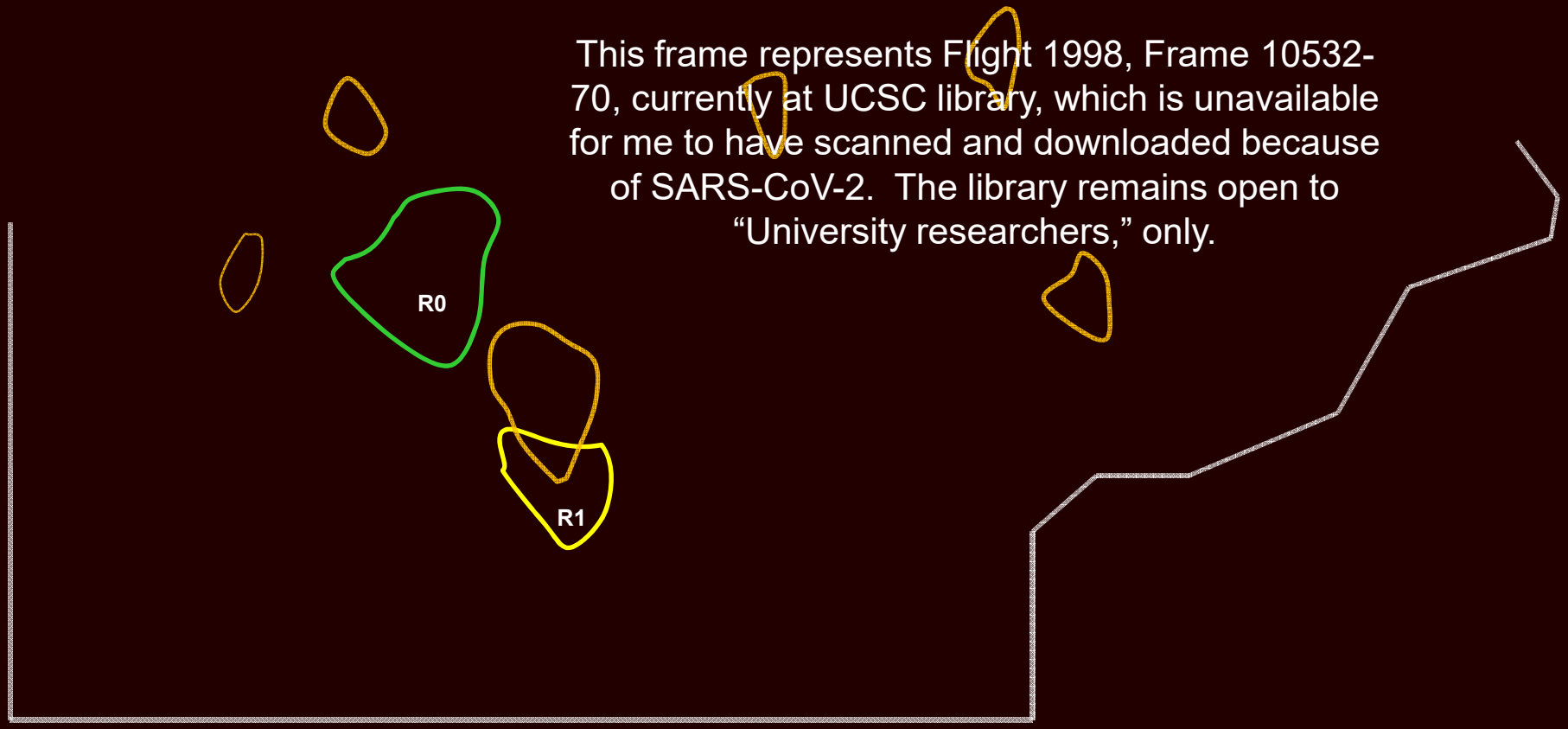
Yes, I DID massacre chainsaws! The first was a (POS) Homelite 240 my father in law gave me, followed by a destructible Echo 302S (former rental my Dad gave me; it ran like a banshee until it broke a crank). The third was a Stihl 011AV no better than the Homelite. Once my mom’s estate backed us barely off the financial brink, I was finally able to afford a real saw, a Stihl 044 I still have today. Even so, crappy tools got a lot done in those early years. The above image shows the forestry I did the first year (without the broom overlay). The area I had attacked for house construction was almost entirely oak and madrone, with one fir overlooking a power line I could only limb up at the time. As to the house, I was the builder and Diane was pregnant. This was a race between the house and the baby that ended in a tie (to the day!!!). I hired grading and ditching, foundation, rough frame, roof, drywall, plumbing, rough electrical, and did the rest myself. The 3-4 acres of broom the seller and I had cut was coming back so fast that all I could do is cut more with the Homelite until one of the construction guys loaned me his brush cutter (probably out of a mix of respect and pity).



It took three years to get that 10 acres of broom cut. At the time I built the house, all the permit required was a 30ft fuel clearance. I had obviously regarded that spec as insanely sub-optimal, which put me on good footing with the local firefighters, although the smoke from all the burning I was doing had prompted complaints (thank you Mike Biddle and Hank Epling). Once the house was done, I extended the clearances. First to go were the Acacia in the gully below the house and the remaining, Eucalyptus. The Acacia was a VERY dangerous job, as the “stand” was a tangle of fallen trees making a mat that bridged a gully too steep to walk in. Once the gully was filled with a 15 x 70 x 4-6ft thick pile, I called in CDF. The Burrell Station fire captain (Steve Beechman) wrote the permit, loaning me a 100ft hose with the words, “I don’t care what YOU do” (I didn’t question whether that was a vote of confidence or acknowledgement that any resulting disaster would be on my neck, not his). The coals in that pile burned for a week. Pulling down the Eucalyptus took a D-6 cat with a 7/8” cable. After bucking the log, getting rid of the wood took a loader bucket and a dump truck.



This image was scanned from a custom aerial photo we hired in the spring of 1995. I told them I needed a map: noon in June, from directly overhead. They take pictures of houses, so this looks down hill in the afternoon. So the image is cropped, and stretched to fit the rotated squished property boundaries. The Eucalyptus was gone by 1994. Fir trees on ridge tops were next, many with multiple tops, or capable of falling on power lines. The huge fir in the middle was the first to invade the property in about 1920. It was 180 feet tall. Again, the north-facing stand at right is almost uniformly young trees while on the south-facing slope they are more dispersed in age with broader crowns thus showing signs of earlier thinning (in the area marked R0) where I had performed my first redwood thinning job in 1994. Note that the color of these trees remains darker thereafter and through the rest of these photos.

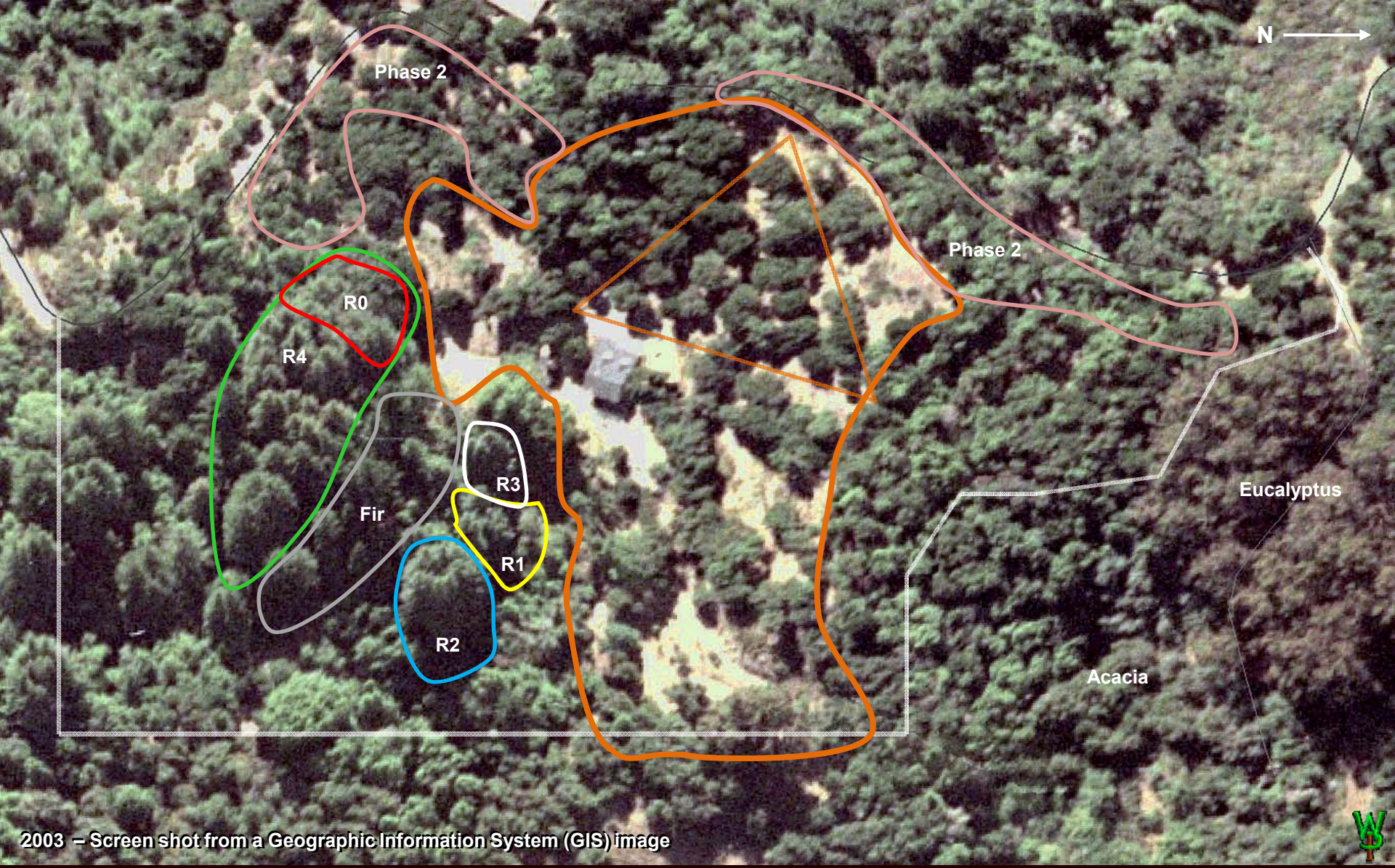


With the exception of that 180' fir, by 1998, all of the upland fir was gone. I'd quit my engineering career to write *Natural Process*, exchanging one 90hr per week job for 100 (at least). Within that, I kept at forestry just to keep my sanity, eventually taking on the job marked R1 in 2000. Steve had just come off surgery with fiberglass rods put into his back after a bad fall. He didn't know for certain if he could ever work again. Setting chokers to cable out those logs was the most exhausting work I've ever done, but the job was a rare pleasure. It's truly special to work with someone with whom you don't need speech to communicate but that wasn't all of it. It was a job in which every move was dedicated to the pleasure of making a healthier forest. Neither Steve nor I will ever forget it.

2000 – Despite his denials, on the right is Steve Liebenberg looking at the ground from 40 feet up

These images of that huge fir are for scale. It was only 80 years old, and almost five feet in diameter and 180 feet tall. Bringing down that tree was an over-taking but it had already been hit by lightning once and the branches went almost all the way to the ground. Steve climbed this beast. He then clambered down a 150% slope and dropped it right on target. Just getting the butt log back from hanging over a cliff took a massive loader. I walked out the log to the end too. It was a heck of a view on a beautiful spring day.

In this 2000 image, the treated hardwood area is obvious but still within the orchard the oak had invaded. Conifer removals, especially large trees on uplands near power lines, are less apparent, but were still a big job because of their size and the threat they posed to the lines. By 2001, the necessary obsessive attention to writing *Natural Process* had allowed a mass invasion of our grasslands with cat's ear *(Hypochoeris spp.)* and Italian thistle *(Carduus pycnocephalus)*. Cat's ear was everywhere there was sun, in places as thick as grass. The experience with cat's ear taught me that "restoration" could not be partial, that no matter what, the forage base would suffer and my claim of a better way to manage the environment would be worthless unless I could fully restore the land to native plants. Forestry then took a back seat to grasslands. Indeed, I chose to retain areas of closed canopy between grassy areas to inhibit weed transmission. Note the area inside the orange triangle for future reference: Here it resembles a savannah. Not for long!



By 2003, hardwoods continue to broaden in the area that had been thinned most aggressively before 1995 compared to the rest of the forest thinned more recently. Note also there is little indication of a difference in redwood density other than color between the R0 stand I had thinned by 25% (R0) versus the R4 section of the same stand that only underwent stand improvement (a difference that becomes more evident in coming slides as satellite photography improved). The redwood stump cluster in R1 is the job with the vertical 'before and after" photos from underneath of the canopy in the conifer forestry chapter. Compare that density (now 6 trees) with the R2 stump cluster (31 trees from four stumps) or the 14 stems from a double stump in R3. The remaining firs run down the spine of the spur.

The difference inside the orange triangle from 7 years prior is now obvious. 2007 was amid an 11-year term in which I focused on grasslands. I was still deciding how much native annual cover I could tolerate as limiting what I could do with the property. I needed forest cover because the labor to maintain native groundcover in forest is a quarter of that for grasslands with annuals. An example is power line rights-of-way. Their locations traversing slopes on the northern leg inhibited both a forest above and below because those areas were too narrow to thin and reforest. Rerouting the lines in 2020 allowed forest cover on those slopes. Note the burn piles at right-center. Finding an adequate number of safe places to dump tree tops for later burning also limits how much forestry I can do.

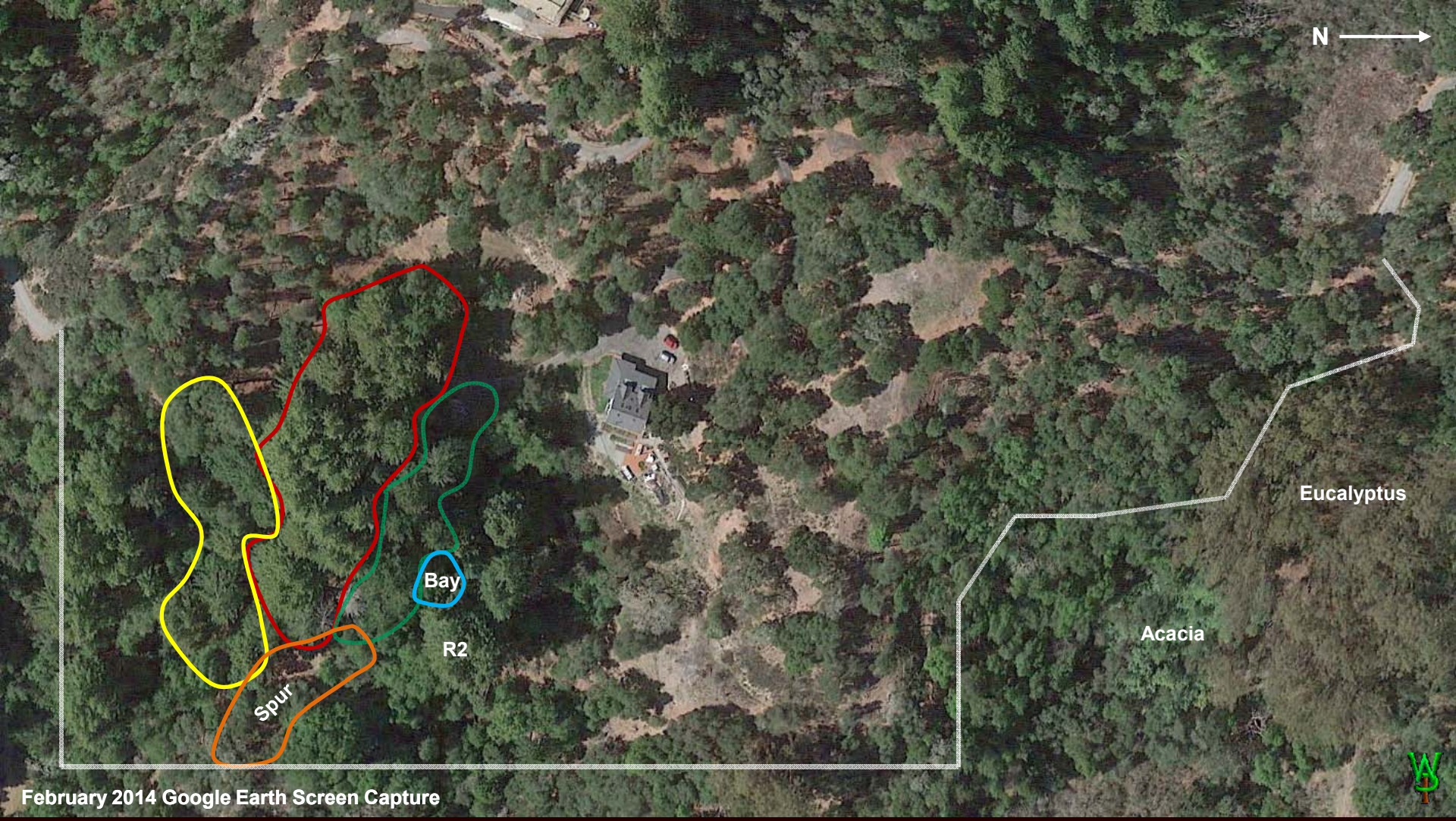
June 2010 – Google Earth™ screen capture

We are closing in on the end of that decade focusing on grasslands. 2010 was a fabulous year for clover, being warm and wet through May. We had another heavy rain in June that year, that had clovers blooming into July! This photo, being almost noon in June close to the summer solstice shows that, although you can see more of the groundcover between trees, those areas are still shrinking because the trees keep broadening. Unfortunately, the angle and time also flatten the conifers in the photo to the point of being almost indistinguishable. Keep that tradeoff with shadows in mind as we move into views to come, because I am about to begin some serious thinning of the hardwood, starting at the northeast (lower right) corner and working my way counterclockwise across the top of the property and then to the southeast.

In 2012, I realized that I had to get back to forestry before I became too old to do it. The grasslands were being encroached by spreading trees, and my efforts at grasslands had been sufficiently successful to afford the risk of weeds overwhelming my time to manage them. I started with the light blue area in 2012. This image was taken just as I was thinning the area in the **green** patch at top left. Note that the area I covered is larger than in years past. There are fewer trees than when I went through the first two times! Interestingly, as the trees grow into monsters, the process slows again because handling larger logs takes equipment. So there may be a "happy medium" in age distribution when it comes to thinning big areas. If I had to guess, it would be trees about 30-50 years old.

It took three years to bring 80% of what had been begun until I shifted to grasslands in 2001, up to Phase 3, but it was a big risk: The more light I put on the ground the more area there is to cover and the faster the weeds mature there. What blew open that big risk into a near catastrophe was the 2014 discovery (in which I participated) that botanists for the State had incorrectly identified bitter cress *(Cardamine hirsuta)* as a native. This is an inarguably invasive plant that I had demonstrated had been here for at least 50 years. In other words, it was everywhere. So just after opening up all that extra land, I was faced with a sometimes tiny enemy that could dominate both forest and grassland groundcovers and germinate and pop seed in six weeks. It was the combination of pre-emergence herbicides, squirt bottles capable of spraying a ½" spot of herbicide formulated for low temperature, burning with my newly developed backpack torch system, and aggressive hand weeding that saved the project. So, I was able to keep cutting trees without losing it.

There were still two areas of hardwood that had not yet been thinned beyond Phase 1 at opposite ends of the property. The untreated patch on the left is conifer cover, so far from a road that dragging logs out is a logistical nightmare. Beyond the demands for weeding, what limits the amount of forestry I can do is dealing with all the material. Besides heating the house and giving it away, for several years I split, stacked, and pyrolyzed the wood into a 10yd pile of charcoal for grassland soils. Then there remains dealing with my neighbor's Acacia and Eucalyptus monocultures (not something I relish). Besides dealing with logs there will be weeds result until that situation comes under control as the redwoods grow. But it must be done. In a fire, the radiation alone would incinerate the north slope of our property, much of which I had not yet thinned. I chose to deal with my remaining responsibilities first.

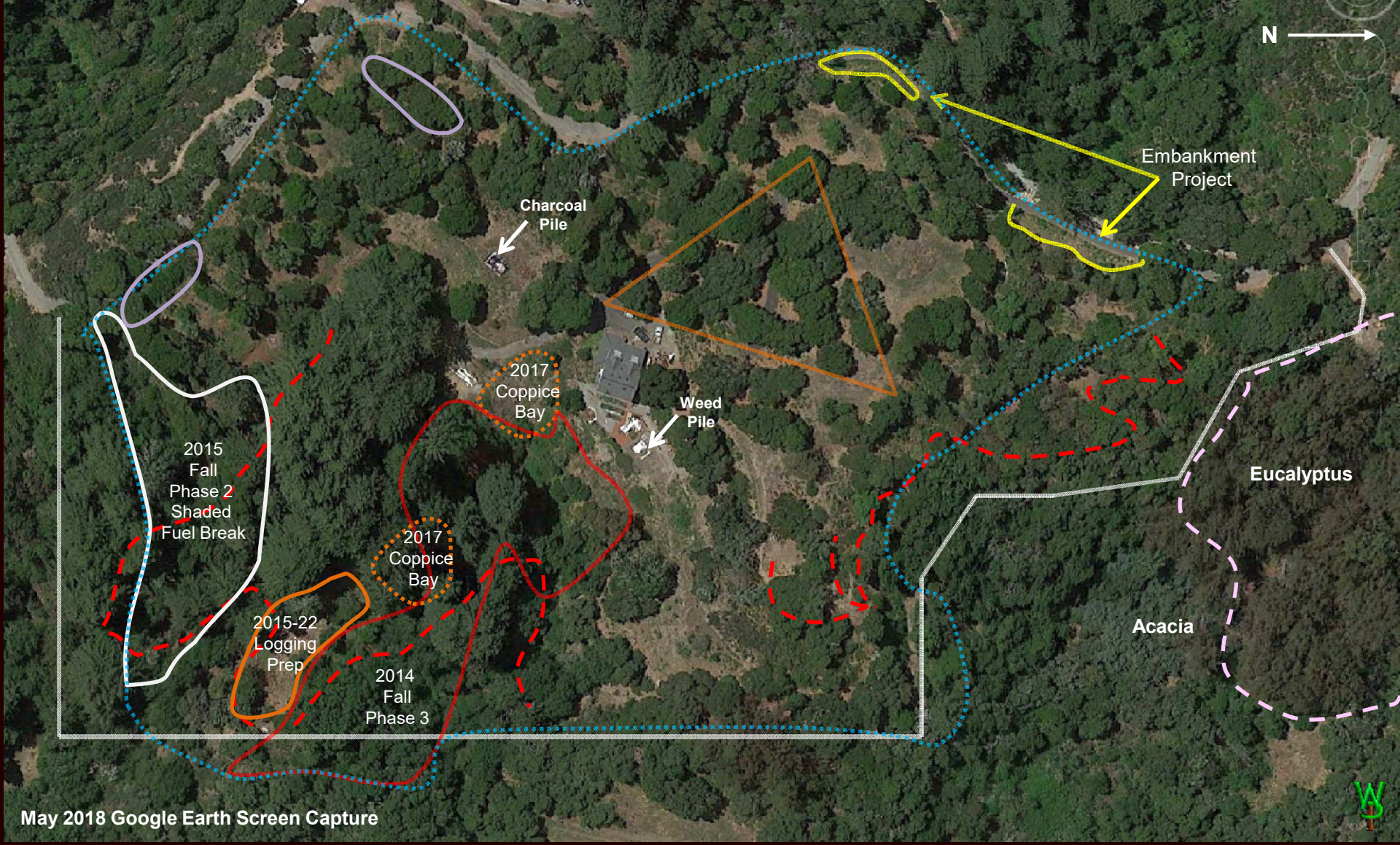


By of 2015 I was finally ready to consider conifer forestry, starting with a fuel break below the main redwood stand. This was removing mixed hardwoods and Douglas fir to protect our redwood from a crown fire. The Douglas fir between them was less of a threat to the redwood but was overstocked and suffering from beetle kill resulting from water competition. It also had a tortured hardwood understory. Recall from the 1931 photo that there were no trees on that spur ridge at all! So the first step was removing the hardwood (mostly gangly madrone) to make room for dropping the fir, but leaving a few of those for spar trees to harvesting redwood. The third simultaneous step in logging preparation was clearing room on the spur to mill logs, process waste material, and stack lumber for drying. Finally, there was clearing and processing a large bay coppice, which was in the way of thinning stump cluster R2. All of that material had to come down to the spur where it could be processed. The problem was that the canopy had closed to the point that I didn't have room for that many burn piles, nor did I have room for processing as many logs as I anticipate when we take the redwood.

When we built the house, we did not have the money to buy or time to make good siding and trim, despite that we had all this beautiful overstocked redwood. Federal Law allows me to remove trees for that. As of 2015, a new State law allows me to harvest and **sell** timber from within 300 feet of the house (yellow curve) to reduce fire hazards. This includes redwoods inside R4 (includes R0) to be sold to finance attaining a sane stand density (although I doubt it will yield a profit). The two jobs (R2-3 & R4) may need to be done successively for logistical reasons. The blue arrow indicates a junky curved and leaning fir “trap tree” (to help slow beetle kill). I felled it in 2015 to keep it from tearing out a hunk of the hillside. The shaded fuel break was cut at the same time. About half that fuel break material came up the hill to be given away. The rest went into the drainage to slow water down. Note also that I withdrew the oak/madrone canopy on the spur to make more room for processing logs. The rest of the preliminary work there is to process fir.

March 2020 – The puppy is “Katja”

This is about a quarter of the fir from dead or dying trees to buck, split, stack, and burn, much of which could have made good lumber. Unfortunately, the logs must be milled and the lumber used right away and it’s not worth bringing in a mill just for this. A log truck with a grapple could just drive up and load them out. Unfortunately, there isn’t enough of a lumber industry left that guys can drive around picking up random logs. The reason they can’t do that is government regulations supposedly “protecting” trees to death. So our forests burn instead of making something out of the material for less money. Guess who sells more expensive lumber from *their* logs? Big timber companies that can afford the paperwork, have log trucks, and mills. The good news here is that I dragged logs all over what was a precious native grassland with lots of clover I had weeded for years. In 2021 that part of this spur came up native. The burn piles sterilized the exposed soils so that the natives can invade those spots. That made less area for me to manage that year.

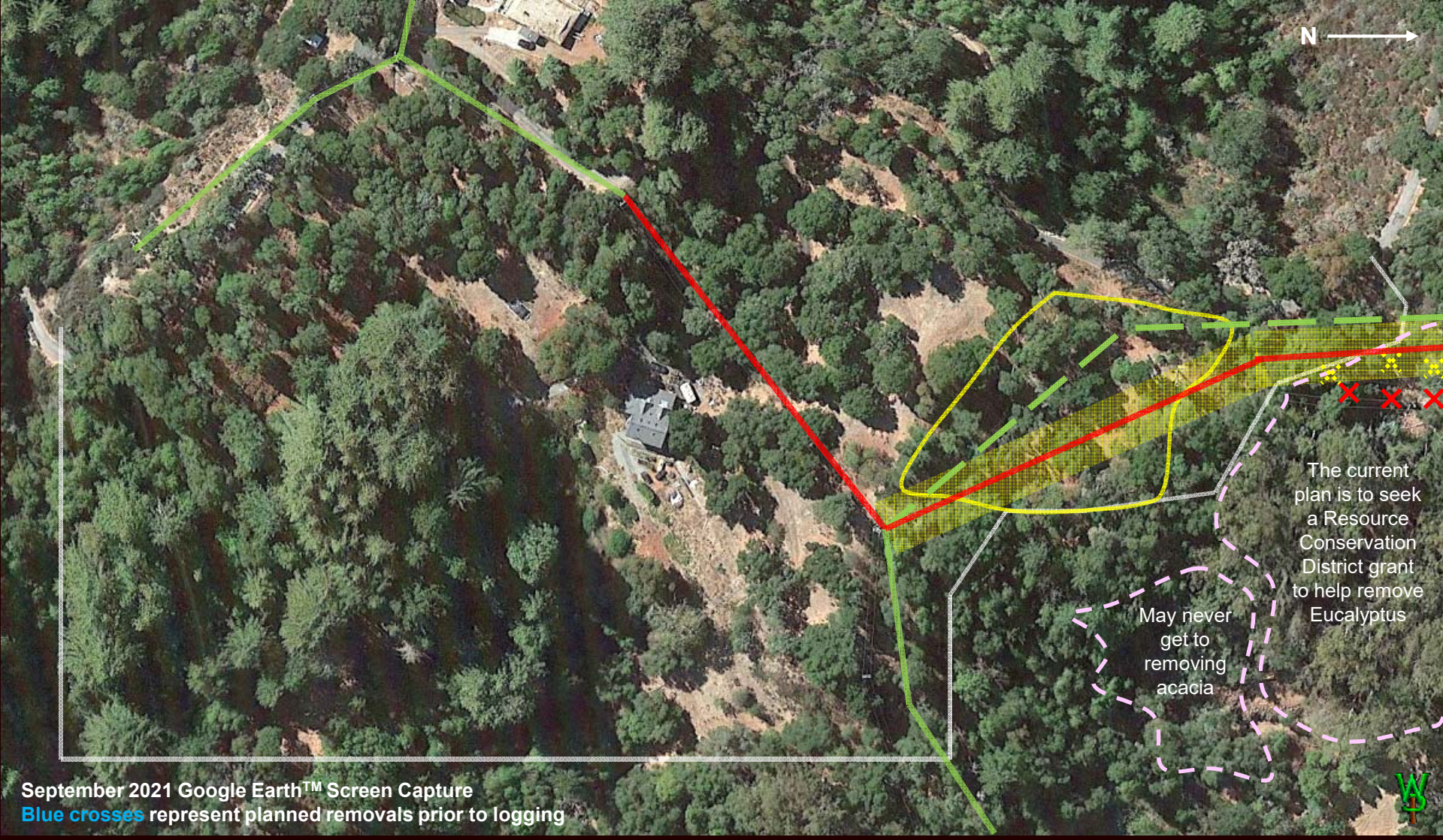


After 5 years, 80% of our broadleaf forest had been treated, much of it for the second or third time. 2016 was dedicated to the embankment project and trail-building (see roads chapter). The rate limitation was the material to drag, pile, and burn, logs split and given away or made into charcoal for grassland soils. I had left shade screens (one now gone) on the upper left to reduce sun scald on the remaining trees after spring thinning in 2013-14 (severe drought years). On the lower right, some of the work encroached my neighbor's land, with his agreement to improve road drainage. My neighbor has agreed to remove the Eucalyptus (which requires heavy equipment) to be reforested with redwood seedlings (too bad he can't harvest it later to cover the cost of conversion). It's all about time, money, limited equipment, my advancing age, and research and writing commitments, much of it documenting this work.

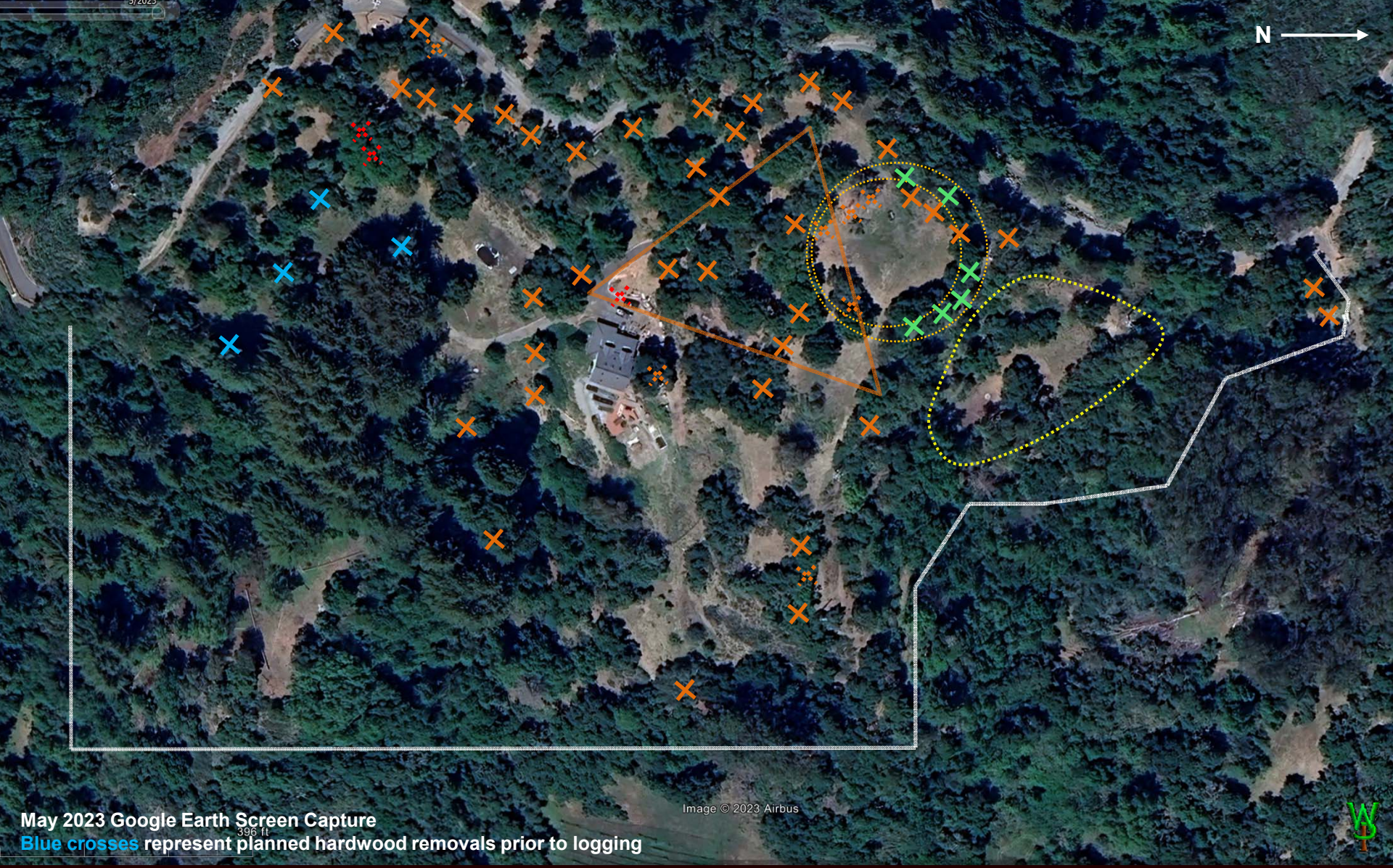
As the final preparation for logging, we need is to enlarge a flat to serve as a place to load log trucks. To make it big enough to both store and load logs from the R4 job, I need to move a 20yd pile of dirt. I have a place to put it, but there is a complication in doing that unique to this restoration project**:** These bunch grasses sprouted in this pile. It is *Calamagrostis nutkaensis*, a species was thought to be extinct in this area, and it's gorgeous. Unfortunately, I blew my chance to dig some out and propagate nodes in fall 2021. Nor have I been successful germinating the seed. So I dug some out, put the nodes in pots, and transplanted them to populate a slope nearby.

April 2016 Google Earth Screen Capture
Blue crosses represent planned hardwood removals prior to logging

From this point hardwood removals will focus upon individuals (in slides to come, ✕ means yet to do, ⁘ means they're done) as the first part of Phase 4, during which I will be planting more black oak and maple. Some were left to shade certain areas until the groundcover and shrubs had recovered from the shock of area thinning. Others are retarding shrubs as more valuable trees grow. In places, young trees are starting to take shape to replace the "lollypops" overstocking produced that then must come out. It does take time, but in a way it is surprising how fast the system responds, then necessitating tough decisions over spacing because removals do prompt weeds.

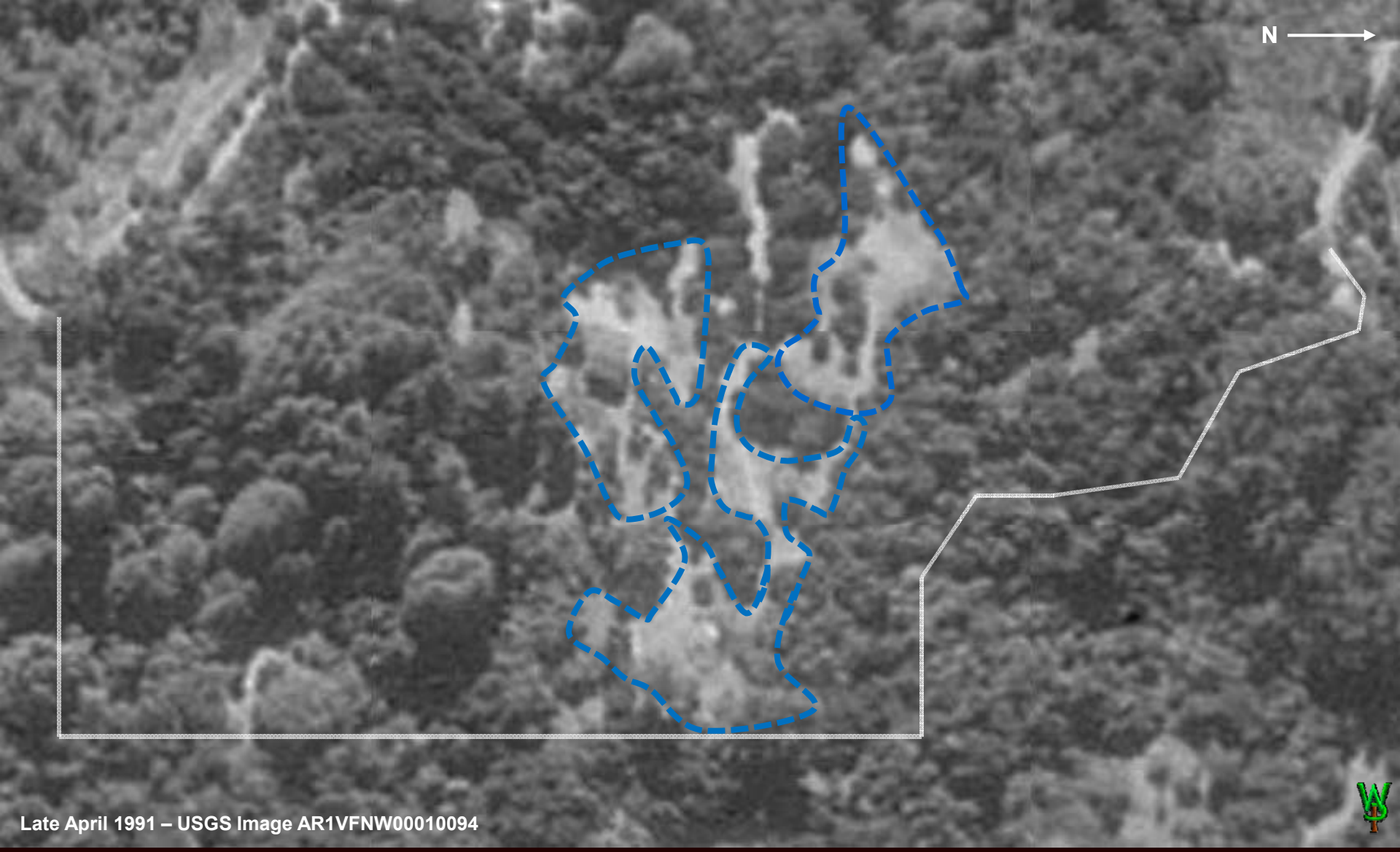


For decades, I had been begging PG&E to relocate their historic line route traversing slopes which made it impossible to grow forest above or below the corridor. In 2020, PG&E proposed to install new poles, making a perfect opportunity to address that problem with spans from taller poles running lines *over* trees that will never get that tall from the bottom of the 2 draws. The North Draw Project removed 15 large trees to make a new corridor. Some trees in the old corridor will be retained to shade the ground and slow things down while I plant and shape new trees for balance and finished height, then to remove what was left after that first cut. Three Eucalyptus on my neighbor's property were removed by PG&E to make more room for the power line right-of-way with three remaining hazard trees (sigh). An added constraint on forestry since 2017 has been that my old truck finally died. I'm building a new one.

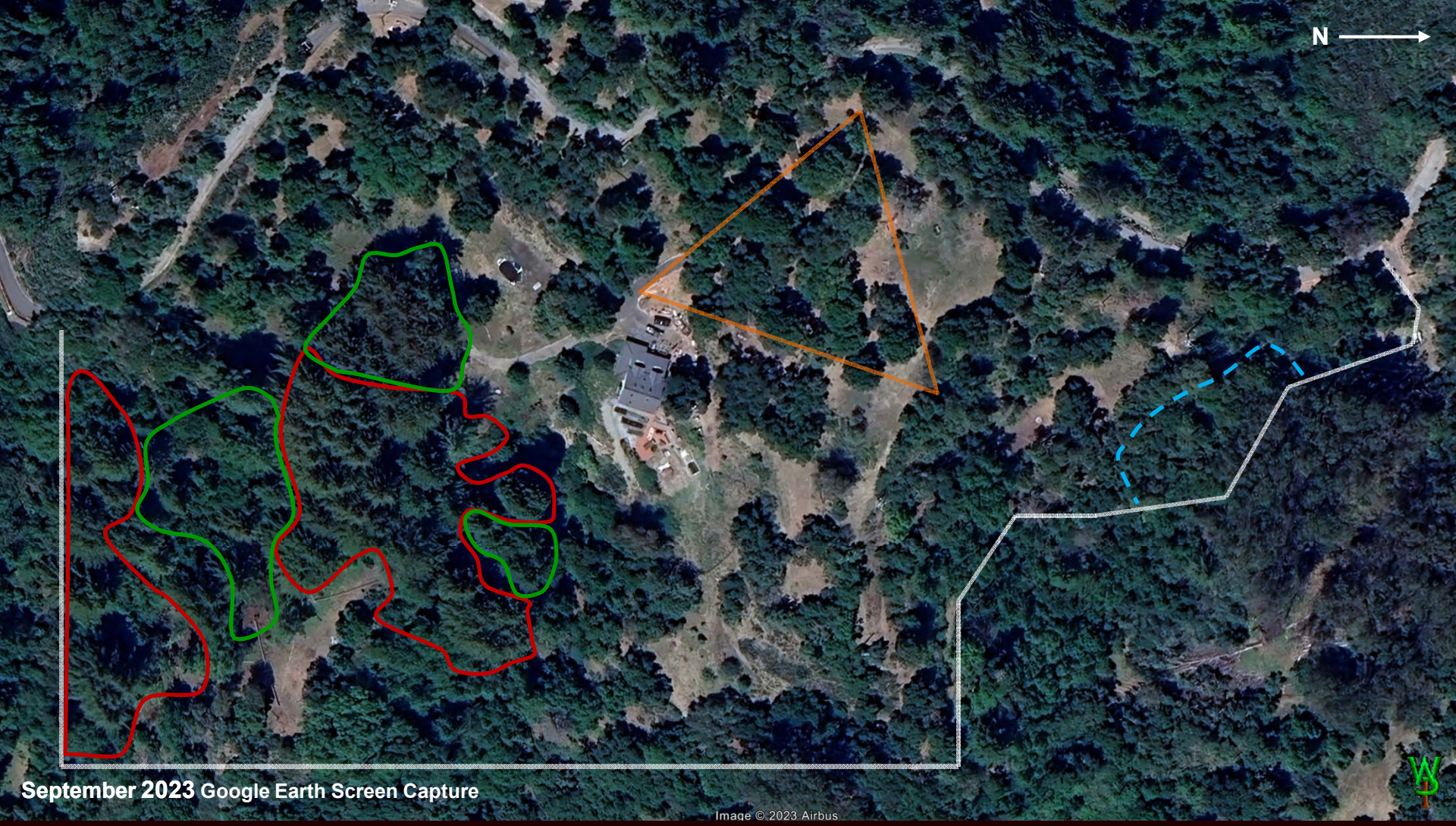


May 2023 Google Earth Screen Capture
Blue crosses represent planned hardwood removals prior to logging

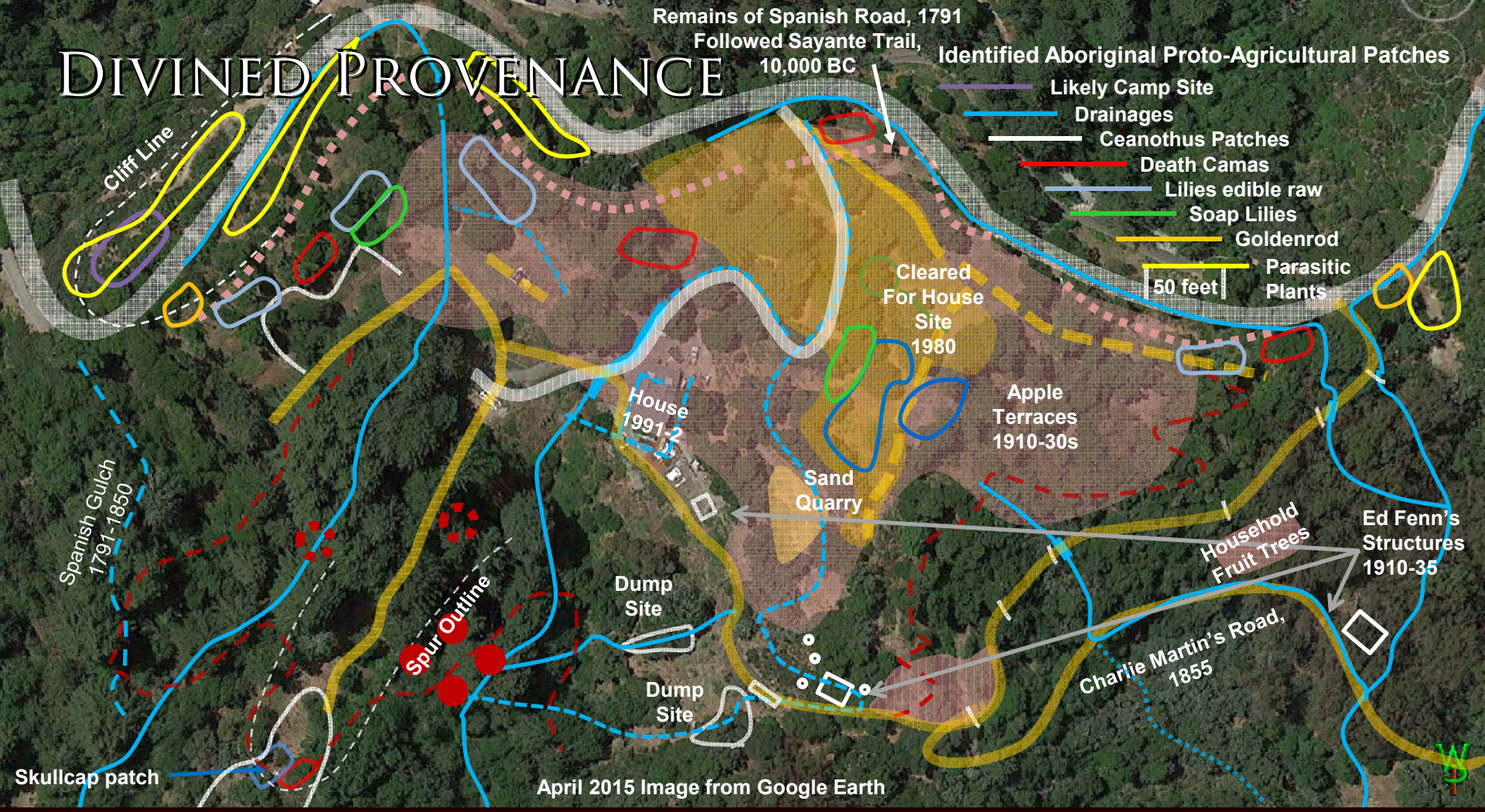
In 2023, we had a few losses due to snow marked as removals. The monster oak next to the house was removed as a resulting precaution. There were also four removals around the 125' CalFire minimum helicopter landing zone, with at least three left to go. If I remove those CalFire wants for a 160' diameter ✕, it will involve considerably more work. That removes shade from the old PG&E right of way and opens the North Draw to considerably more afternoon sun, thus increasing weed management demands there. The biggest change was thinning out the fir for the redwood logging job STILL to come. Said famed dirt pile was removed, roads graded and we blew $4 grand to get the fir logs removed for regulatory reasons already discussed.



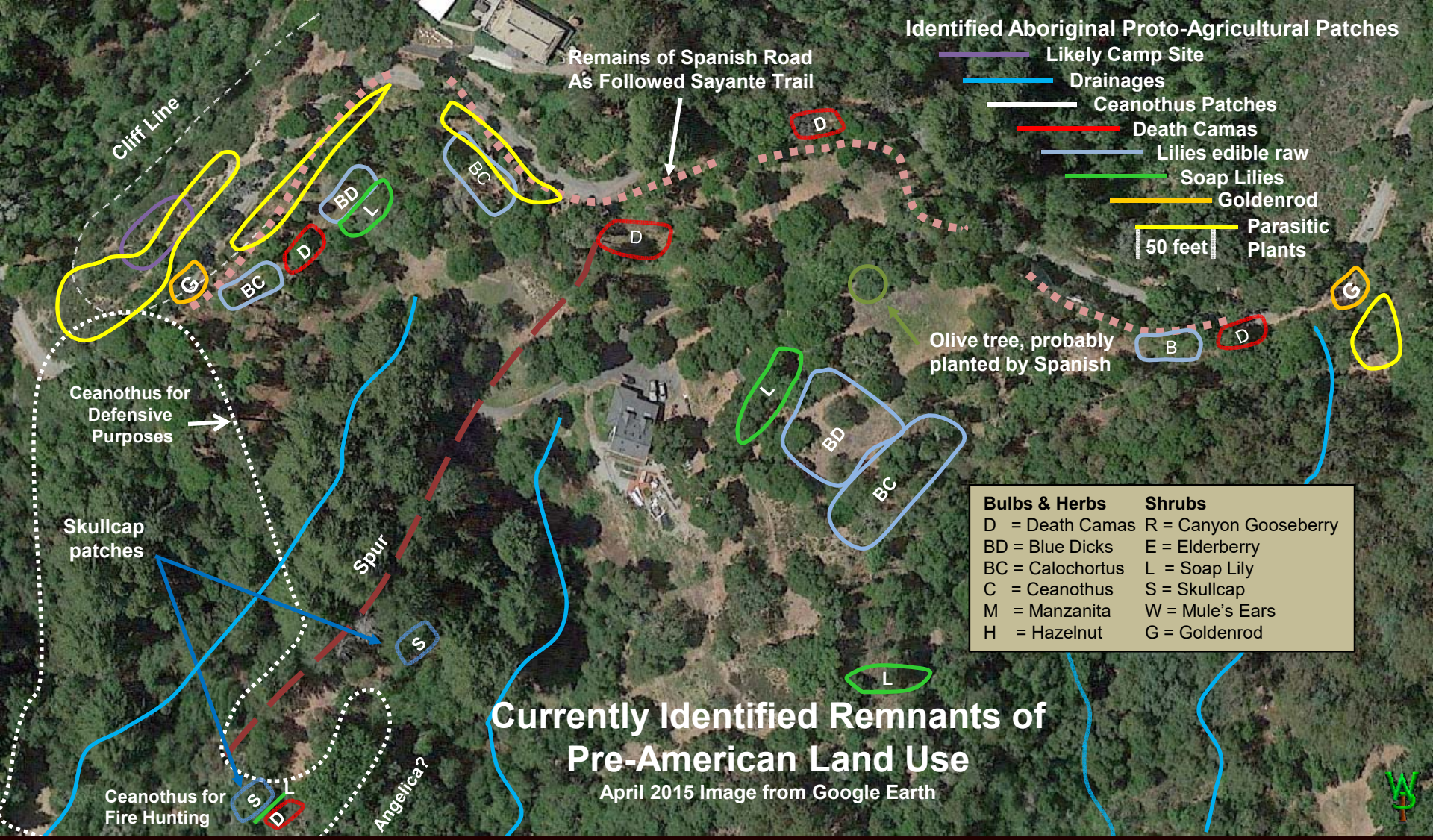
To recap, this is how things looked just starting out when I had cleared within the blue line. The enemies were broom, upland firs, then eucalyptus, and then acacia.



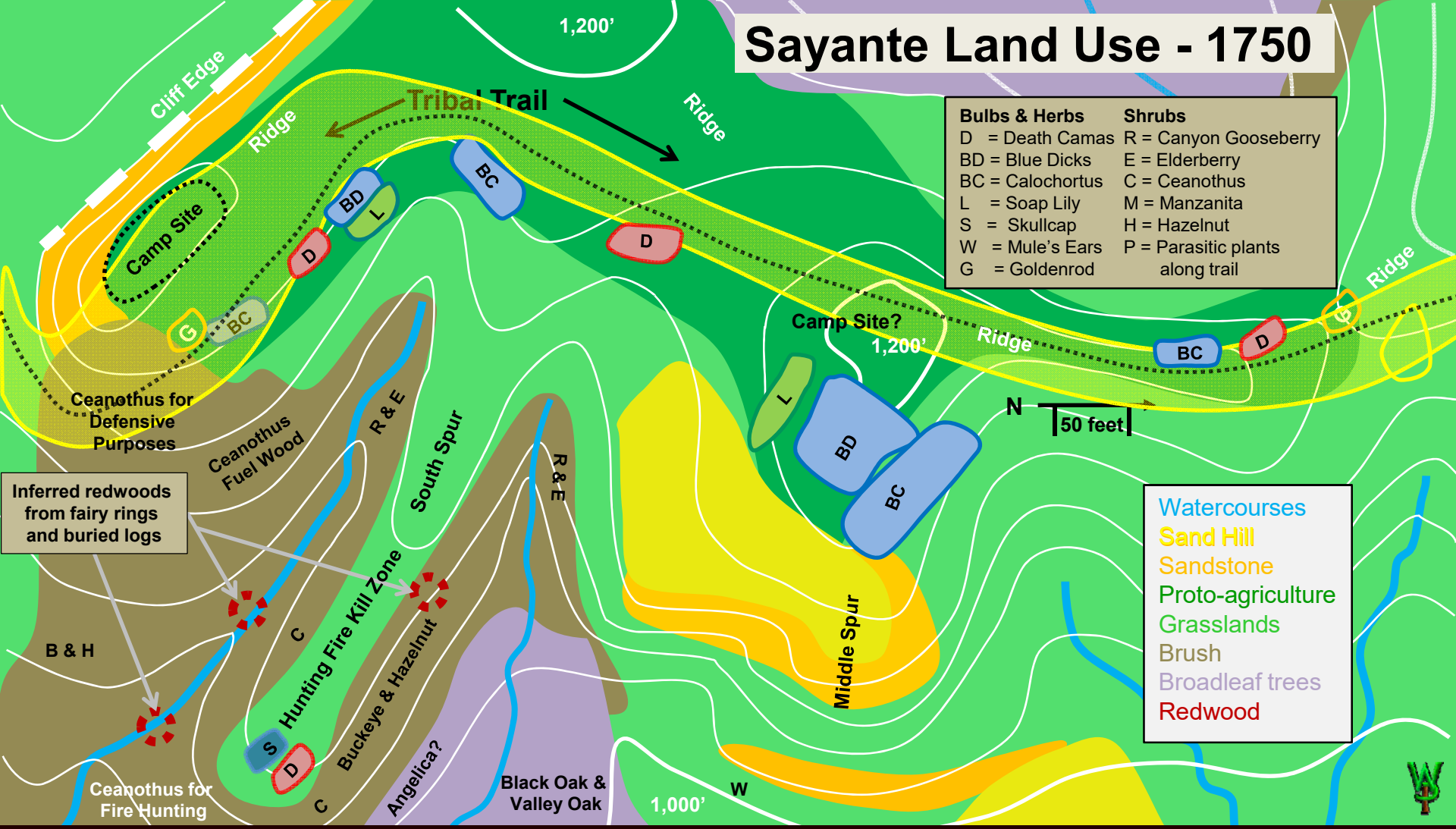
Considering 33 years of removals, it doesn't really look like I have reduced forest cover much because of how much broader remaining hardwoods have become. Yet now, with each subsequent removal a lot more bare ground is exposed for the same reason. We now have a fair number of young trees with good structure, where such trees were once almost non-existent. In the one area not yet thinned the tree crowns still form a more uniform "texture"; the degree of difference depending upon when thinning was done. Similarly, conifer stands that have been thinned have broader trees than conifer stands not yet thinned. Note also that trees in later images produce longer shadows because the trees are 30 years taller. Shadows cut the total of full sun hours, having a significant effect on grasses, and soften the vegetative transition to a forest/savannah. Spacing is what allows light to get under the trees to abet grassland forbs populating the forest, thus making more forage for animals which then eat acorns to help keep the oaks under control.
With 25 deer visiting per week, they do make a dent now, but it's still not nearly enough.



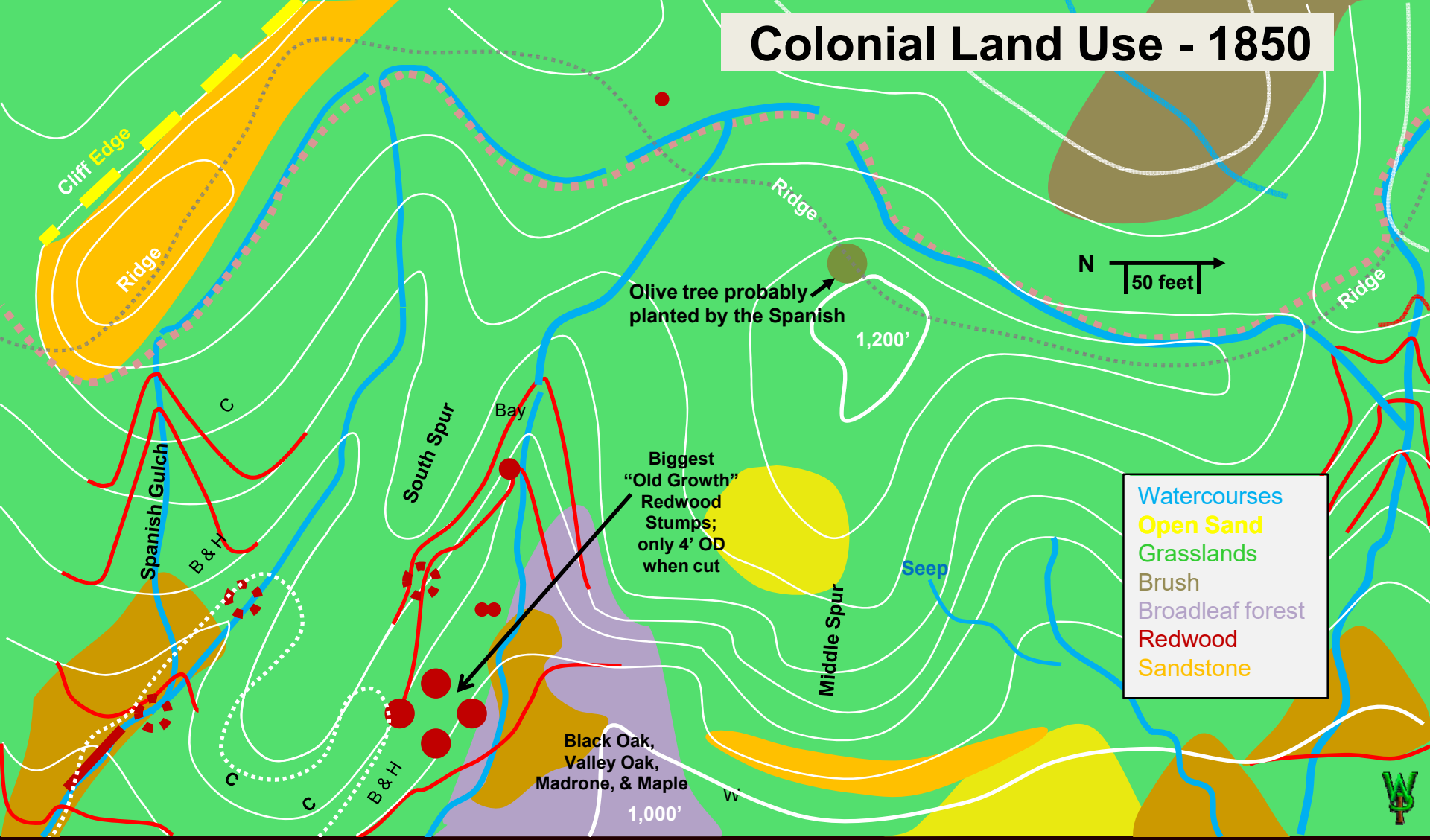
People harbor a sense of security by projecting stability onto what they see, a pretended familiarity that inhibits noticing the actual rate of change. Repeat photos, maps, and successive aerials impart reality to change over longer periods, lest wishful thinking (or denial) substitute for accuracy. This rate of change placed very difficult demands on this presentation because of a paradox resulting from that same subconscious preference for stability: We visualize the past in terms of how the land appears to us now. When the magnitude of change dwarfs what people can reasonably envision, it makes recognizing changes-over-time a bit challenging. In earlier revisions of this book, I confined this chapter to aerial photos taken since we began. Then, as the site history chapter developed, I started recognizing patterns indicating aboriginal proto-agriculture thus exposing an almost incomprehensible degree of change resulting from fire suppression, herbivory, early road construction and the consequences of road drainage. I then chose to integrate a graphical representation of that history into this chapter. Yet it was the 1931 aerial that forced me to reconsider the magnitude of change, and what precipitated it. The principal limit to the rate of change was the rate of seed distribution, but that was not all of it.



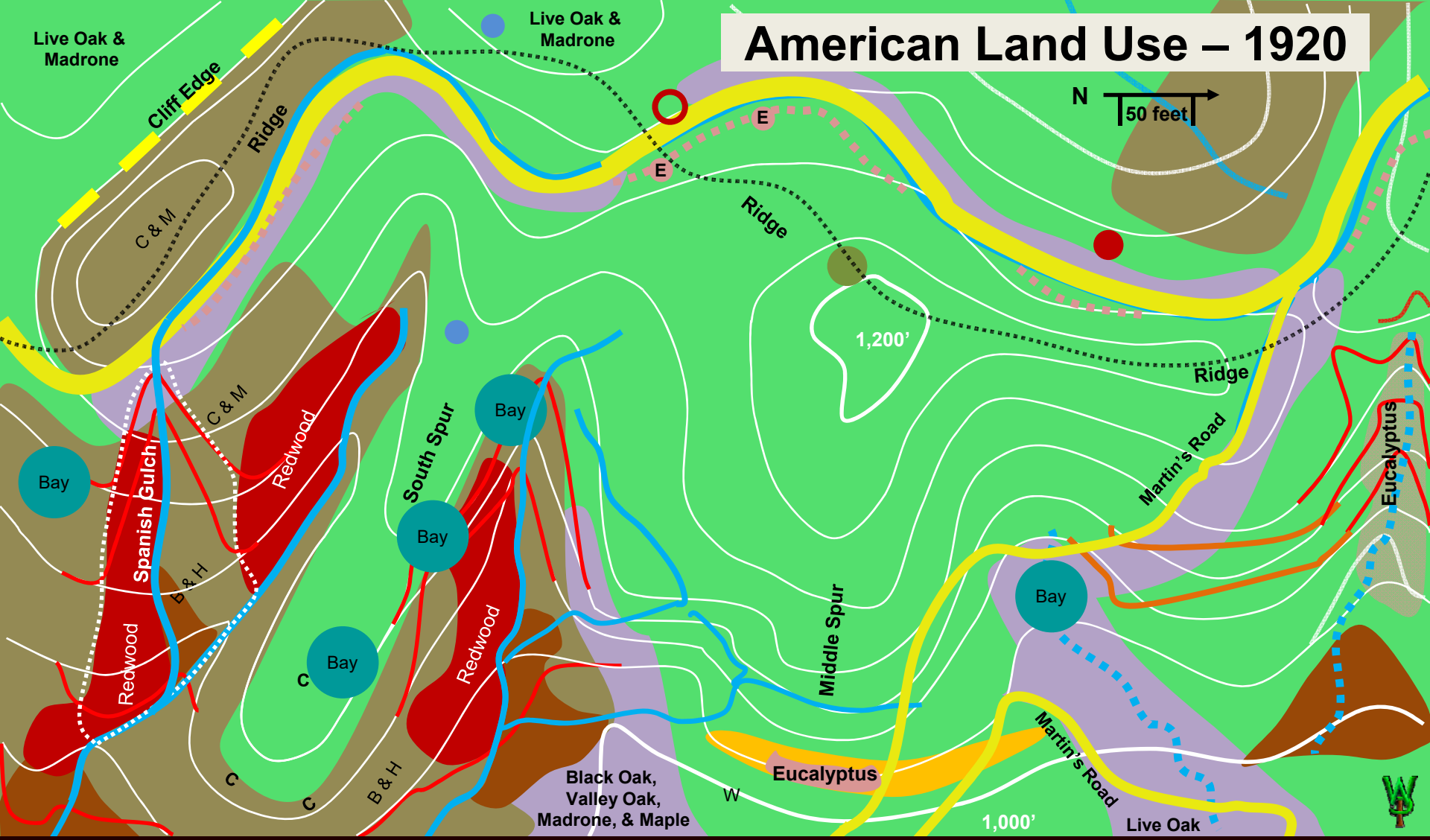
To recap the site history, the Spanish improved the Sayante tribal trail in 1791. Annual weeds came in immediately with the herds driven over the road. European diseases had wiped out the local tribe by 1794. The Spanish burn ban induced woody native plants to invades areas where they had never been in 10,000 years. The subsequent rates of invasion of this ridge, including higher order native plants, varied considerably by species. As explained in the chapter on succession: as long as there is seed within the immediate area, vegetation here can progress from bare sand to an impacted forest in only **30 years**. Succession was retarded by the distance from seed sources, slash fires, and grazing, a non-uniform set of processes. Yet between the ban on Indian burning and the arrival of the first American settler, it had been 70 years. By the time Ed Fenn got here, it had been 130 years. Yet even then, this property was still mostly open grassland. Over time, the big change agent was regular grading of the dirt road.



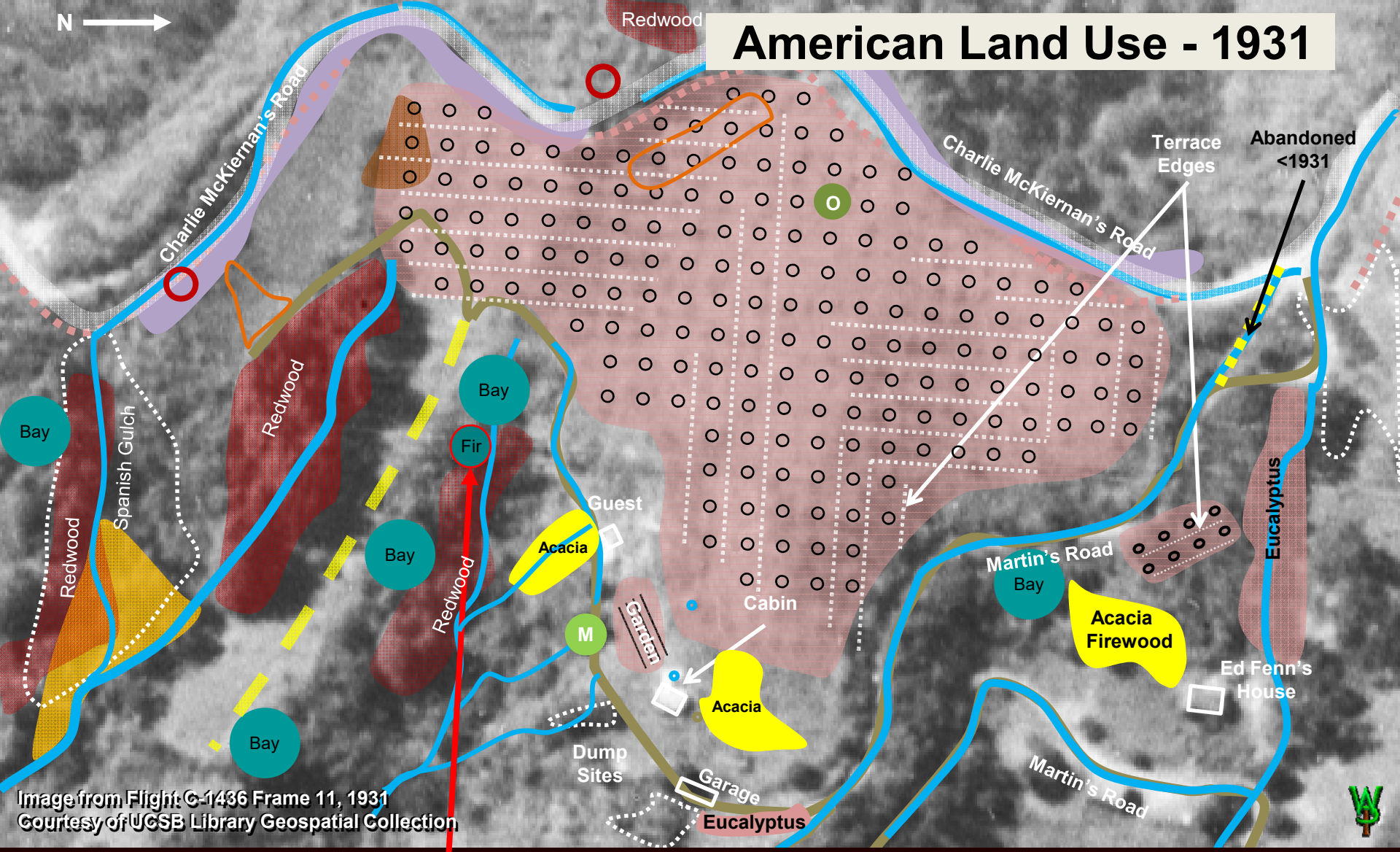
This is my estimate of Sayante tribal land use at about 1750 as superimposed upon what evidences have been found so far. Background colors depict my estimate of what the cover would have been among the categories here today (boxes). These maps were derived from compiled observations of patterns of returning plants, geology, springs, drainage, burning, and shading along with guesses of physical resource requirements to sustain trade along the trail (food, moisture, self-defense, and fuel) coupled with Spanish observations, horticultural experiments, ethnographic and archaeological readings, and experimental results on plant behavior. It is astonishing really, that proto-agricultural patches were so intricate in a parcel miles from any documented tribal settlement. Most significant, I don't think there was ANY live oak (currently the dominant tree on the property). There are more detailed evidences on the south (left) end of the property, probably because changes due to tilling the orchard were less profound. Even so, the arrangements of crop-species on the middle spur resemble those found to the south.



Other than grazing, colonial land use here was minimal. While unrestricted cattle grazing was the dominant land use (predation control + no fences), it was unlikely here due to its remote location. Indian conscripts constructed the Spanish road. That path supported little more than two wheeled ox-carts; material transport was by pack train. To get around the end of a cliff of harder rock to the south, the road traversed the ridge, collecting water that discharged at the corner, eroding the "Spanish Gulch," the loss of an eventual 30-40,000 cubic yards which left colluvial deposits below. Annual grasses invaded what had been perennial grasses, spiny forbs and bulb patches. With the ban on Indian burning, woody plants spread, each in its own way. Redwood invaded the north-facing slopes, particularly bare soils from fresh landslides, or alluvial deposits. There was not a single fir, maple or live oak tree.

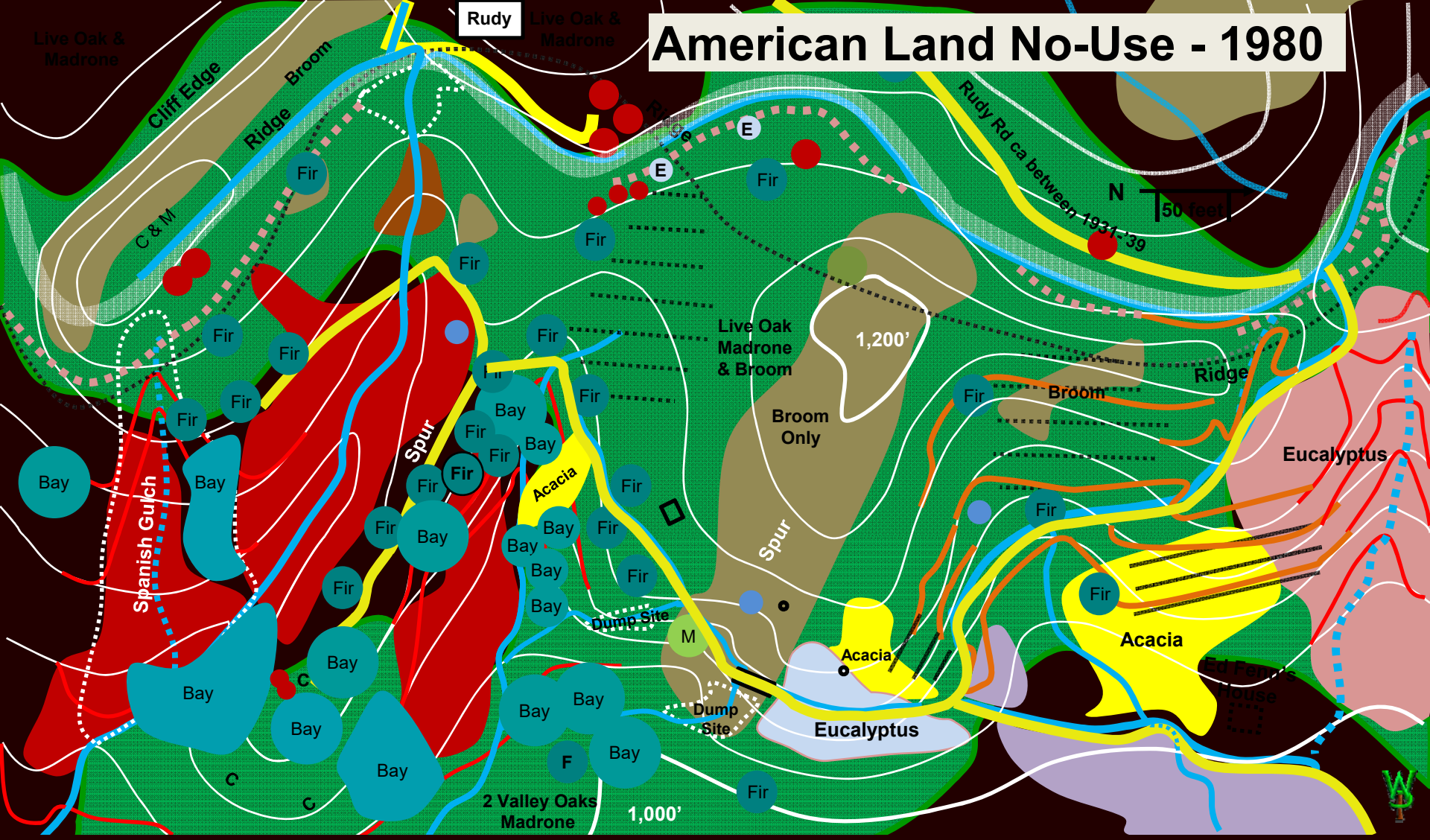


Then came Charlie McKiernan with dynamite and horse-drawn steel grading blades, blasting in a wagon road in 1851. Charlie Martin added his road up from Glenwood a few years later. Americans virtually ended predation. That and the road allowed development of orchards for which much of the area was too steep. Other land uses were cattle, vineyards and goats. Around 1880, whatever redwoods were cut and the slash was burned. That plus the Spanish Gulch produced three seed beds for redwood making the stands we have today. Many upland orchards were abandoned after the rail line was built through Glenwood in 1890. Live oak invaded via regular grading of both McKiernan's and Martin's roads but cows and orchard tilling constrained their spread. In 1915, Martin planted Eucalyptus for erosion control because McKiernan's road had doubled the collection area for that drainage. Martin was looking to make these lands more useful to prospective buyers like Ed Fenn.

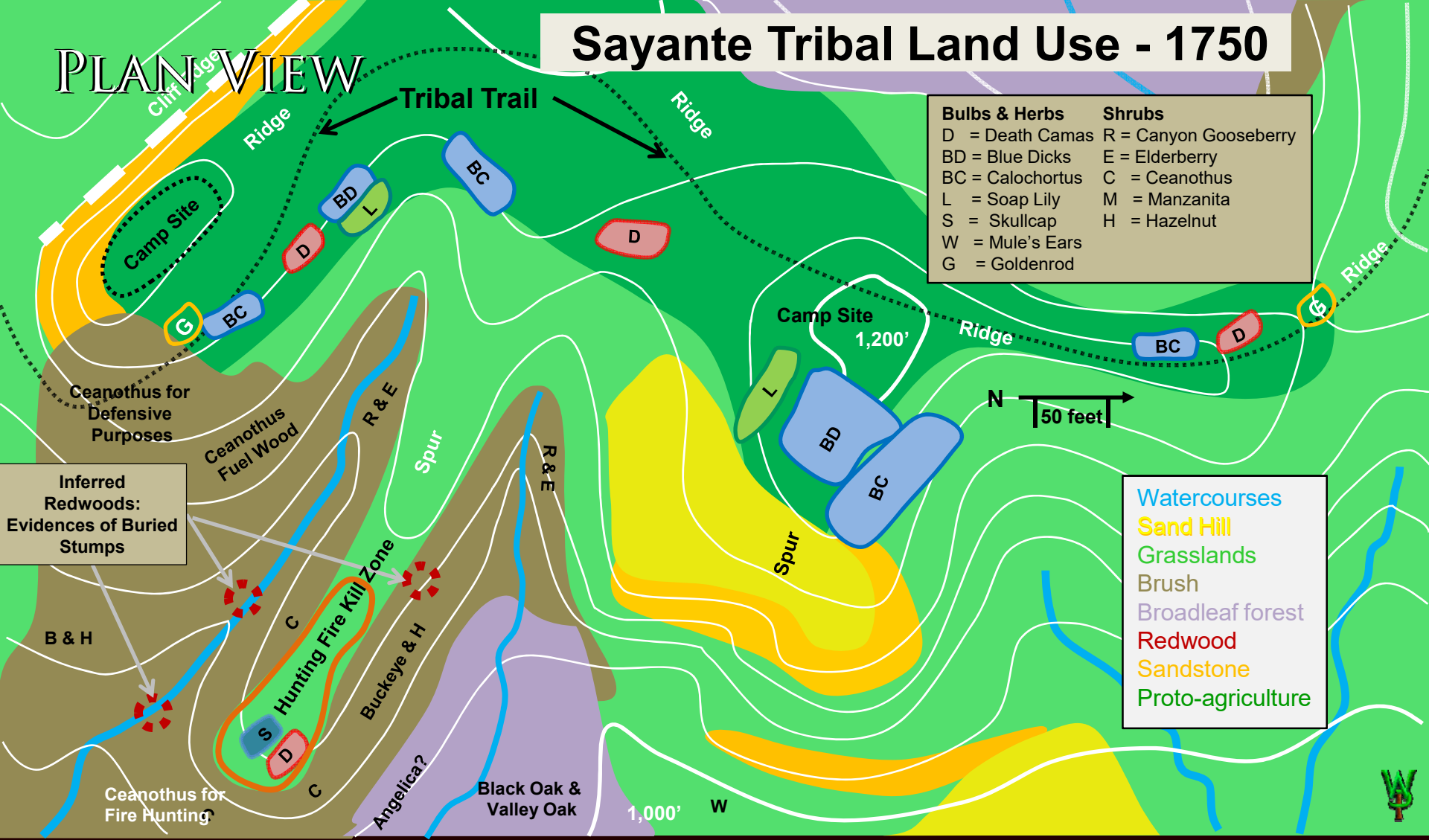


The railroad brought competition with the orchards along Charlie McKiernan's road but Charlie Martin's road offered better access to the railroad than most. Ed Fenn terraced slopes for his apple orchard. That induced sheet flow erosion off his orchard with roads collecting it into channeled torrents. Ed dumped *anything* he could get into the drainages to slow the channel incision: dead equipment, water tanks, pipes, a car... For the most part, that helped. There were NO trees growing on the ridge between the two stands of redwood (those are shadows). This fir was the first to invade the property in 1920. By the time we got here, that ridge was overpopulated with fir while the range of the redwood had hardly changed at all (with two exceptions, both just below the County road). Maple came in too, but has been less invasive. Ed added Acacia near cabins as fuel wood. I have no idea why buckeye established.

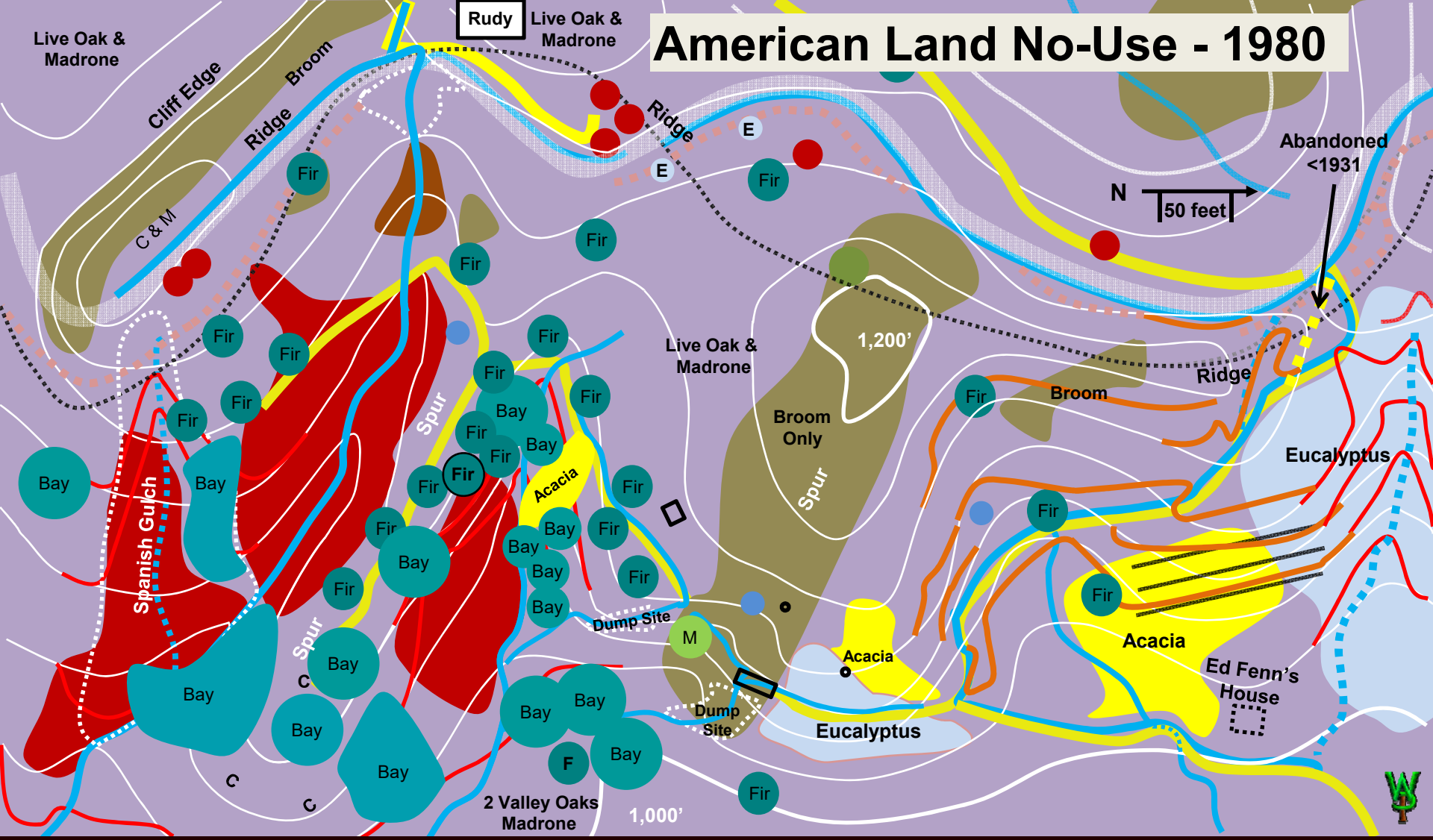
I think this photo was taken looking at our place from a parcel that is to the north of us on the other side of the road, but there are now so many trees along this road that one cannot see the contours of the land from that location. I wish I had been able to ask Ed about these images before meeting him in 2011, but he was 102 years old. His family had found our address and written me for permission to bring him up here from Fresno to see his old homestead for the last time. What is especially telling is that the land had changed so much Ed Fenn could not recognize where he was! He knew Martin's road, but it was in such disastrous condition farther down that they could not drive to his old house site he'd come to see. He was too frail to walk that far. Had I seen his photos in advance, I could have prepared to answer some of his questions but I too was confused by his description, until he mentioned the root cellar that had been behind his old home which is still there. Yes, his life here was that precious to him even after all that time! So I took some photos of that site (the house had burned down) and sent them to his niece, but I don't know if he ever saw them before he died. I hope so.



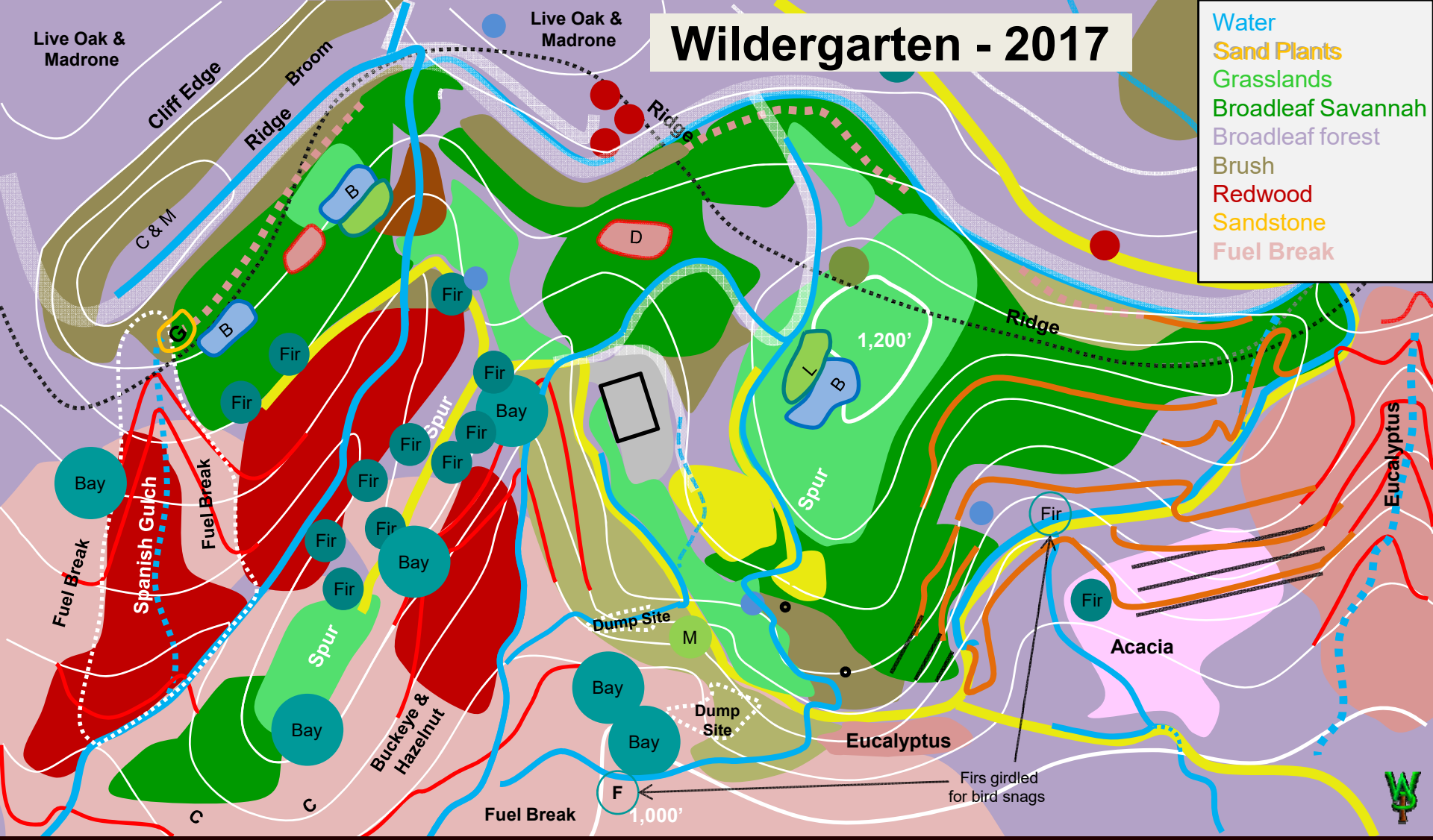
Note how fast fir spread once on the property and that they clustered around the pioneer tree. That they invade so rapidly and widely without having done so for so long indicates how far away the nearest tree must have been when regular burning ceased in 1793. Burning for 10,000 years would likely constrain the range of such a resinous and flammable tree, but I recognized the process only once I had mapped it out (that's what research can do to you). Just after 1930, "Old Man Rudy" bought the land across the now County road and built a house in the 1960s, dumping two acres of runoff onto the County road, which then ran down the road to Spanish Gulch. Somewhere around 1970 the County road was graded to reverse road drainage away from the gulch, forcing that flow into the "natural" drainage. To a degree, it worked. It stopped incision of the gulch but it also washed out the upper draw and built an alluvium below. I started laying out the contour changes due to Martin's road and gave up (it's really complicated).



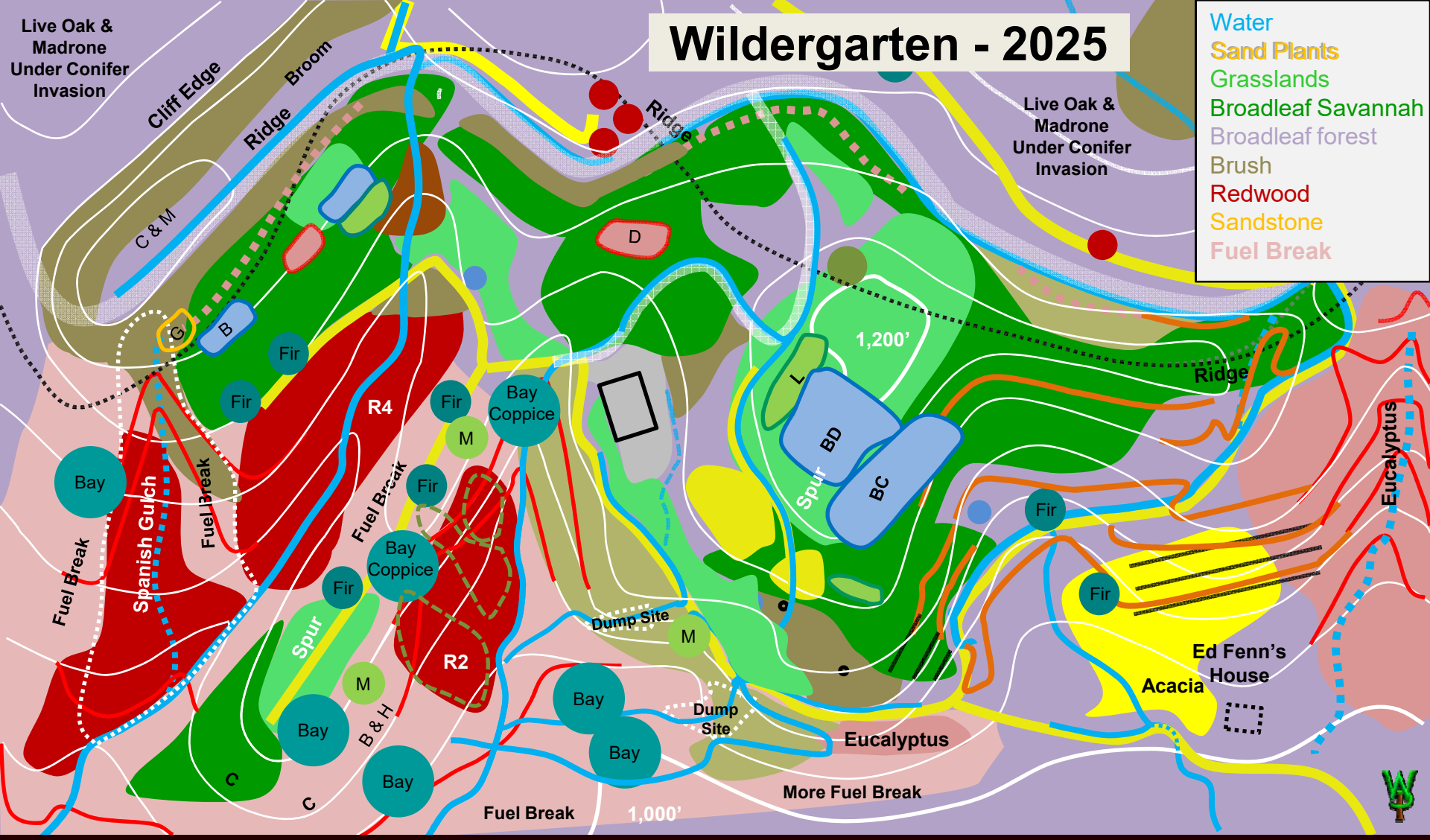
Next is a set of "before and after" maps to encapsulate what "restoration" means here. This slide is the first "before." Again, I want to emphasize: I am not trying to "restore" to "original conditions." First, with current technology it is humanly and financially impossible: grasslands require so much labor, there is so much deeply buried weed seed, and the seed barrage from outside the property is so constant, there is just no way to do that. Nor do we have the elk, antelope, and people to eat much of what those grasslands once produced nor grizzly bears to eat them! I simply don't think it possible or even ideal today, even if we could do it. I am producing a landscape configured for scientific study, maintained at all stages of succession to fully expresses the botanical, fungal, and insect variety Indians long habituated to this area to learn from them. I want food for us and for wildlife, and materials to support our project into the future, including lumber for construction, heating fuel, herbs, flowers, starter plants for others, firebreaks, shade, video…



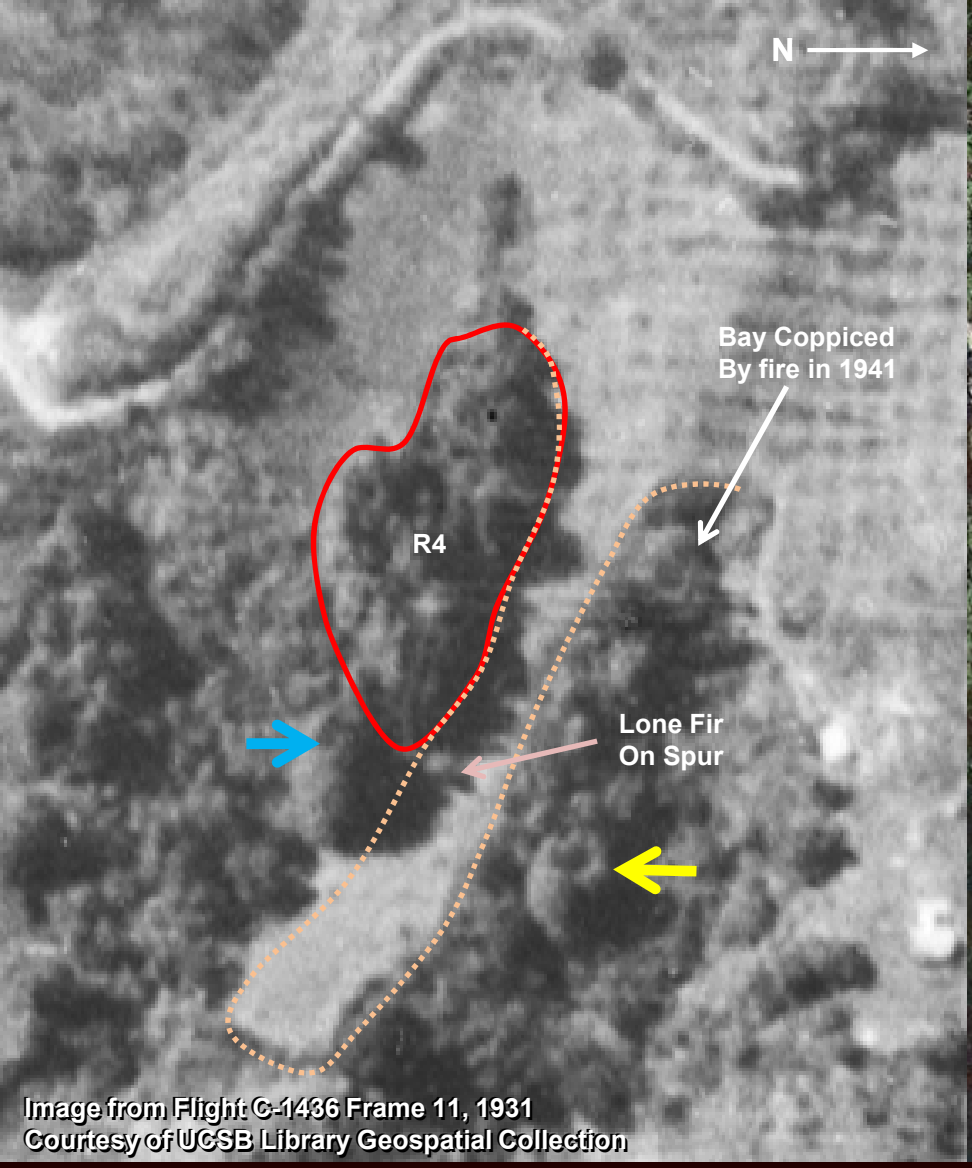
This is the second "before." In an odd sense, Mr. Fenn's goals were similar to the Sayante's and mine, in that he wanted the land to produce something. Failing that economically, abandoning his orchard business allowed a choking mess to ensue, to the point that there was virtually no groundcover, native or exotic. Eighty percent of the property was dominated by exotic brush and the rest was a redwood monoculture (still is). Ninety percent of the original native plant species were either dormant, extinct, or relegated to a very few individuals. Everything was either conifer forest, exotic eucalyptus (some of them huge) and acacia, choking oak/madrone woodland, or broom (some of it dead in massive piles made by a bulldozer) with virtually no groundcover. Much of the oak woodland was going decadent with conifers (particularly Douglas fir) invading and shading out the hardwood, with poison oak and honeysuckle vines climbing into the canopy and girdling the trunks. Some madrones were standing dead. It was a fuel bomb.

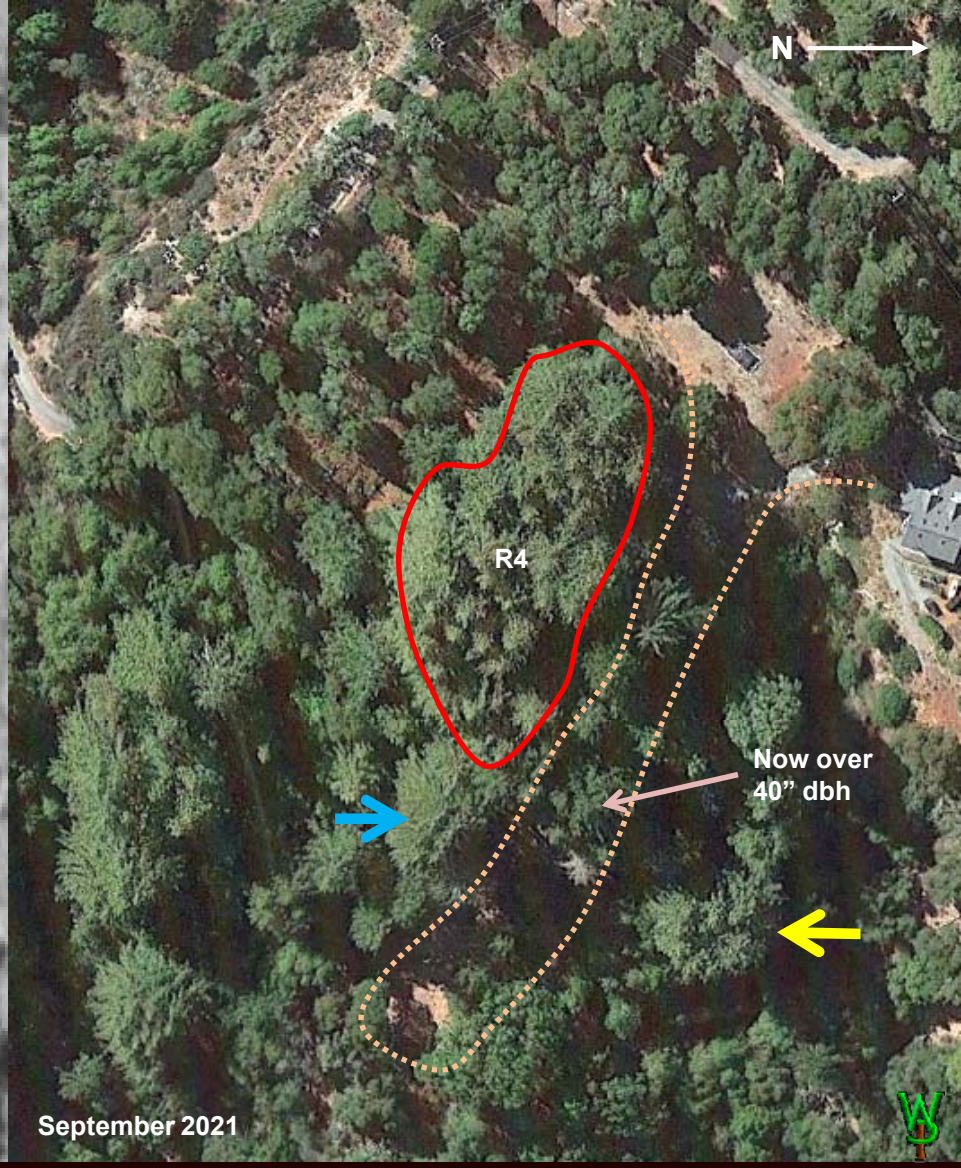


So, from a macroscopic perspective, first came broom and clearing for a house, then exotic trees, and conifers on the main ridge. I thinned the oak woodland for fire. I thinned a third of the main redwood stand. Then I got the grasslands under control and made an area for sand hill plants. Then I went back to whacking oak woodland into a savannah that could express forage plants and sustain a varietal and mostly perennial groundcover. Then came fuel breaks below the house and the conifers. Beyond making forestry here less laborious but still successionally diverse and aesthetically pleasant, the goal is to fund and construct the first research laboratory of its kind in the world to integrate forestry with early-successional native plant systems to learn how they work and how they might be managed at reduced cost (see Project Orientation for details). It may seem an obvious thing to do, but nobody else has the native test environment that allows researchers to instigate and investigate the kind of disturbance that has once again become frequent here.



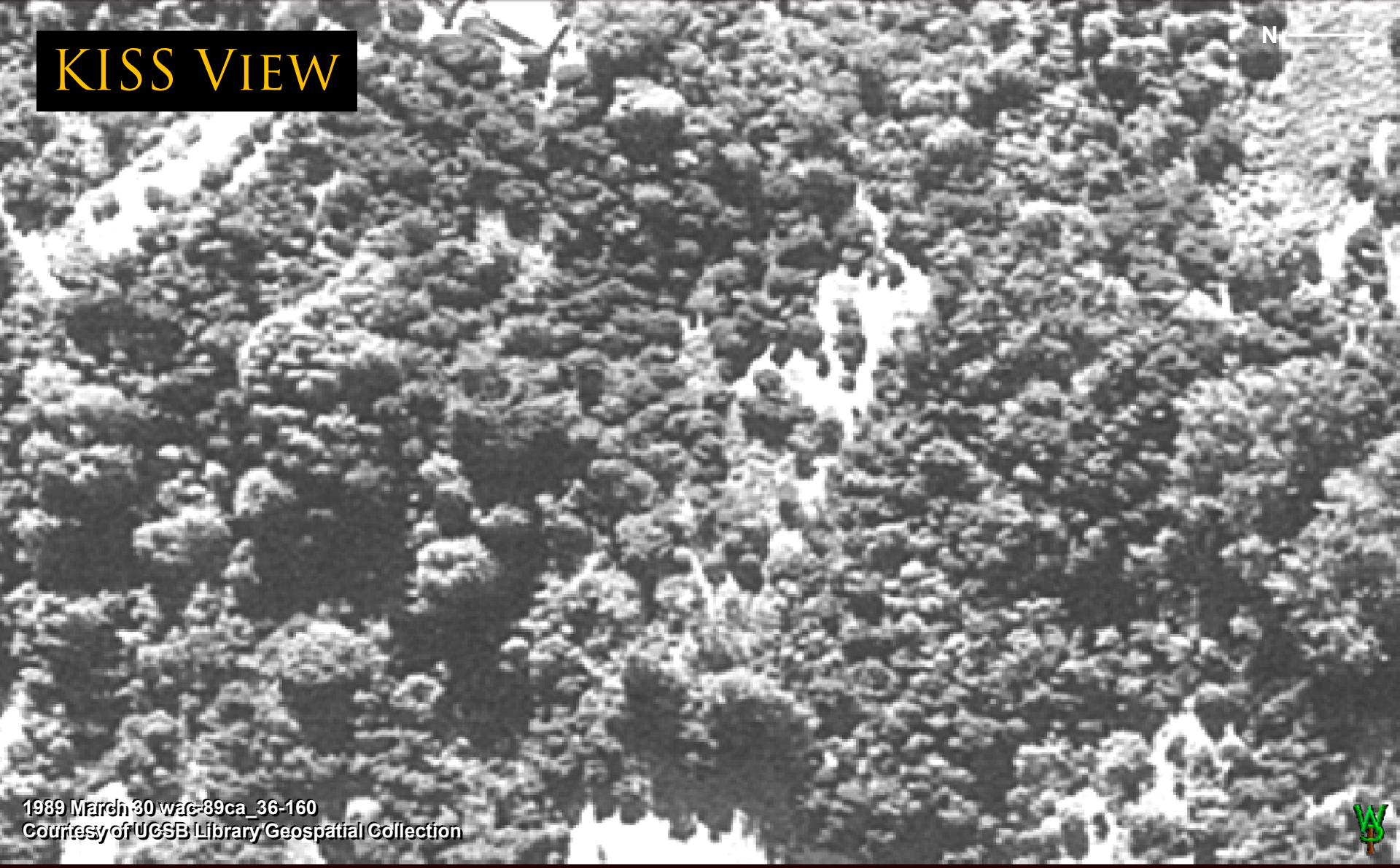
Redwood logging R2 is for house siding and trim. After that comes the main redwood stand R4 with the goal of a varietal understory, meaning I'm going to deal with redwood sprouts. Other science projects will continue, especially toward processes dedicated to cleansing the weed seed bank, stabilizing steep slopes with low fuel-value plants, using fire to manage succession, charcoal soil amendment to improve mineral and water retention and increase forage productivity, possibly reintroduce grazing, characterize novel nitrogen cycles, study fungal and insect relationships including a few introduced as native biocontrols, and continue to reduce the labor input necessary to maintain that forest and grassland cover while making it ever more beautiful with minimal requirements for harvesting (not as easy as one might think). Research and development have always been part of this job; else we never would have got this far, as you will learn in the coming chapters on grasslands. So before closing out forestry, we have one thing left to cover.





There is one more set of observations to extract from this amazingly useful 1931 photo (left). Note the open space on the narrow spur between the two young stands of redwood. My take is that the stand of seed trees south of the spur started about 1890 after logging one larger tree evidenced by the “fairy ring” of crown sprouts downstream. Another ring of crown sprouts is to the north from the four stumps about which I know for certain. Sixty years later, ALL of the conifers on top of that spur are Douglas fir trees which invaded that spur ridge *after* the redwood had been established. Both redwood and fir grow fast, but in this case the redwood shaded out the fir as both grew. The fir seem more drought tolerant, but lately they have been dying off from beetle kill. Don’t know what to do beyond removing the dead and dying, which is expensive. Hoping for hazelnut. Too much light will quickly make a mess of it.

KISS View



1989 March 30 wac-89ca_36-160
Courtesy of UCSB Library Geospatial Collection

We've covered how the land was configured, what I have done, where, when, and what the plan is long term. There were occasional surface views to facilitate learning how to envision what is involved on the ground from aerial photos of your area. The place is far more fire resilient than it was, but it is still at risk of catastrophe until I can get the conifer forestry done. This next series will repeat all the slides I could find in sequence and without comment so that you can better see how the land has changed over time. I did my best to reduce the way things jump around when you scroll these images, as the perspective, lenses, and angle of each shot differs.

There are two principal observables**: 1,** Fast Doesn't Stop, and **2,** What your land becomes is up to you.

Image from Flight C-1436 Frame 11, 1931
Courtesy of UCSB Library Geospatial Collection

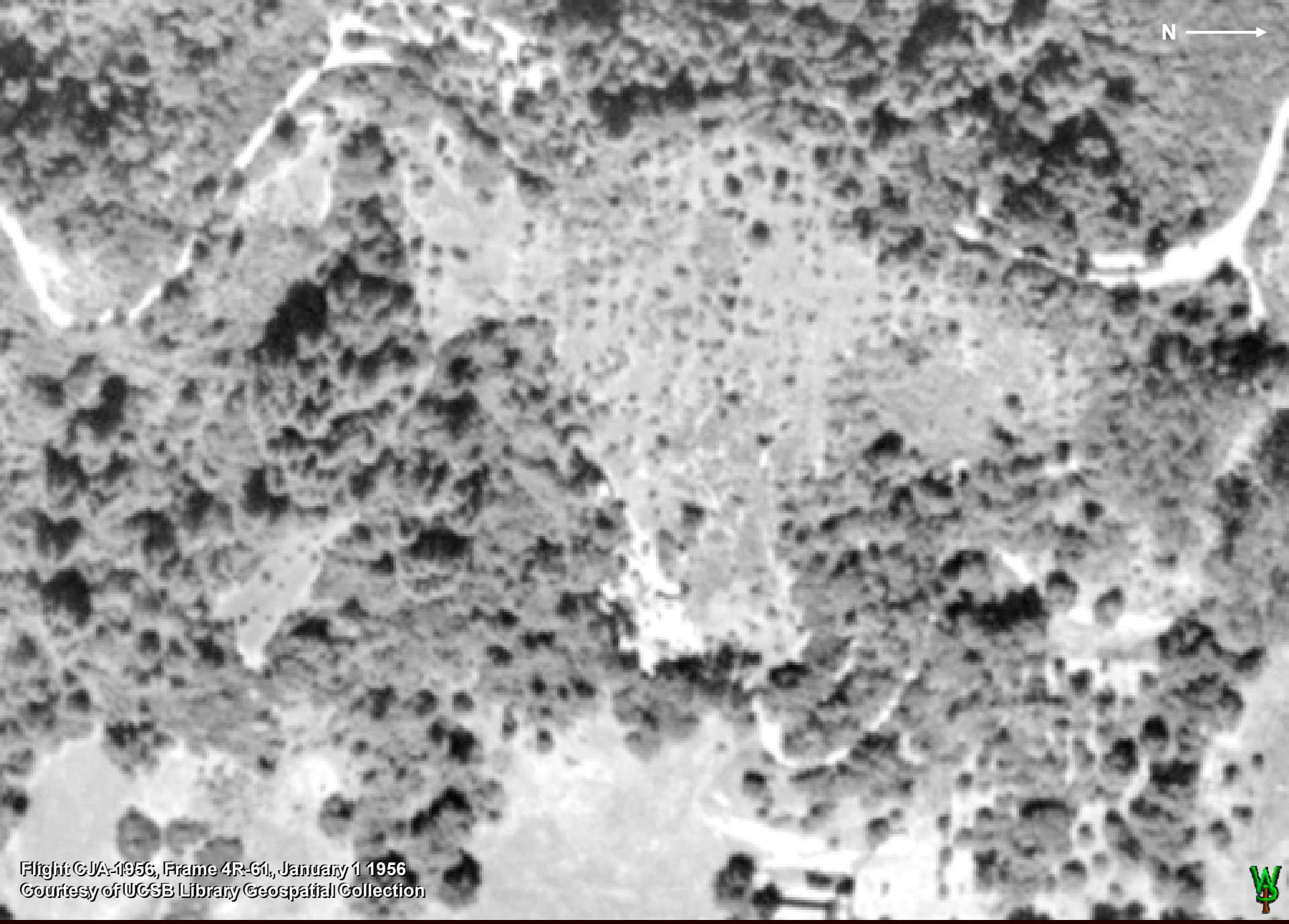
1931


N
Flight C-5750_287-25
Courtesy of UCSB Library Geospatial Collection

1939

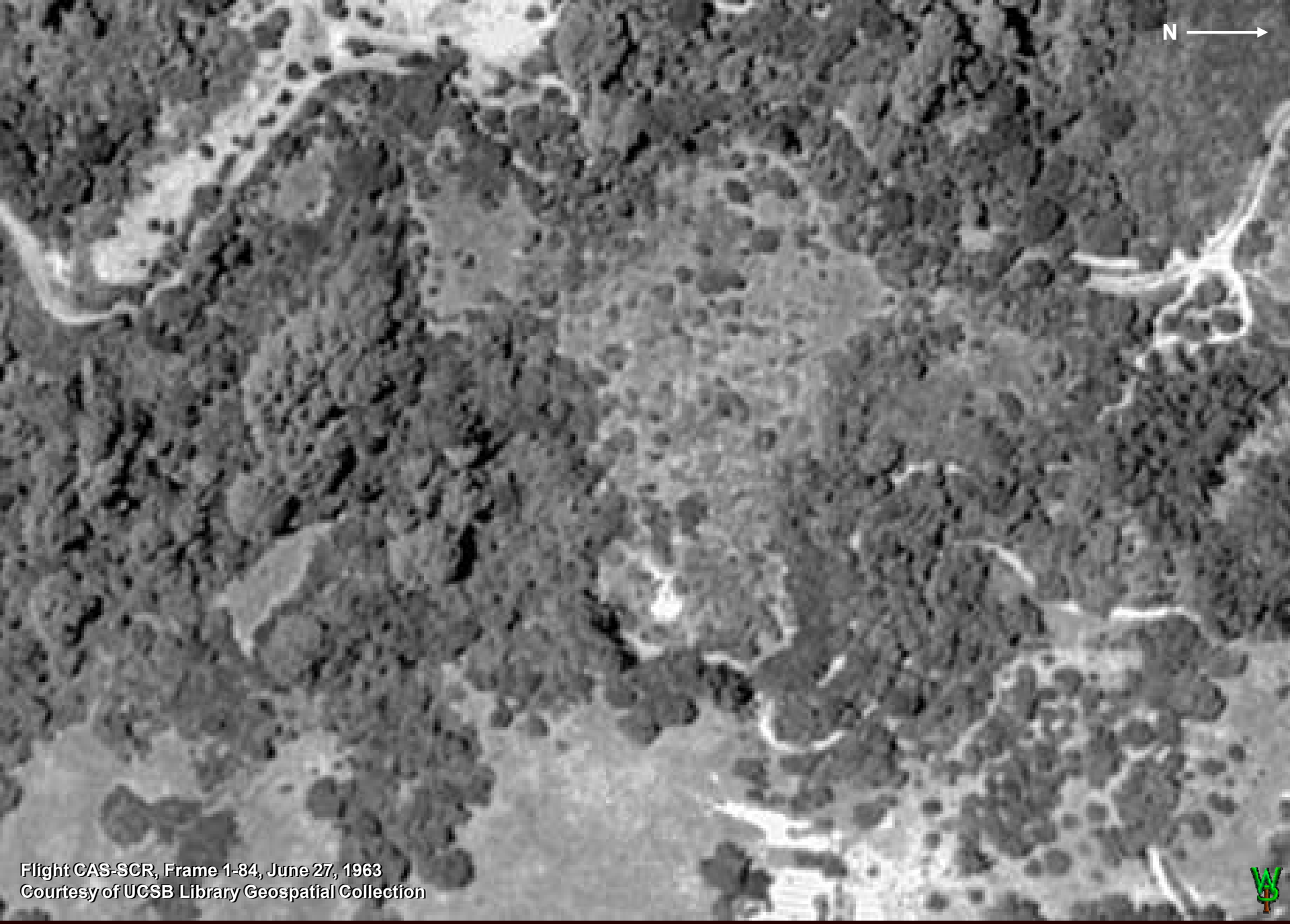

N
Flight CDF5, Frame 4-53, April 25, 1948
Courtesy of UCSB Library Geospatial Collection

1948

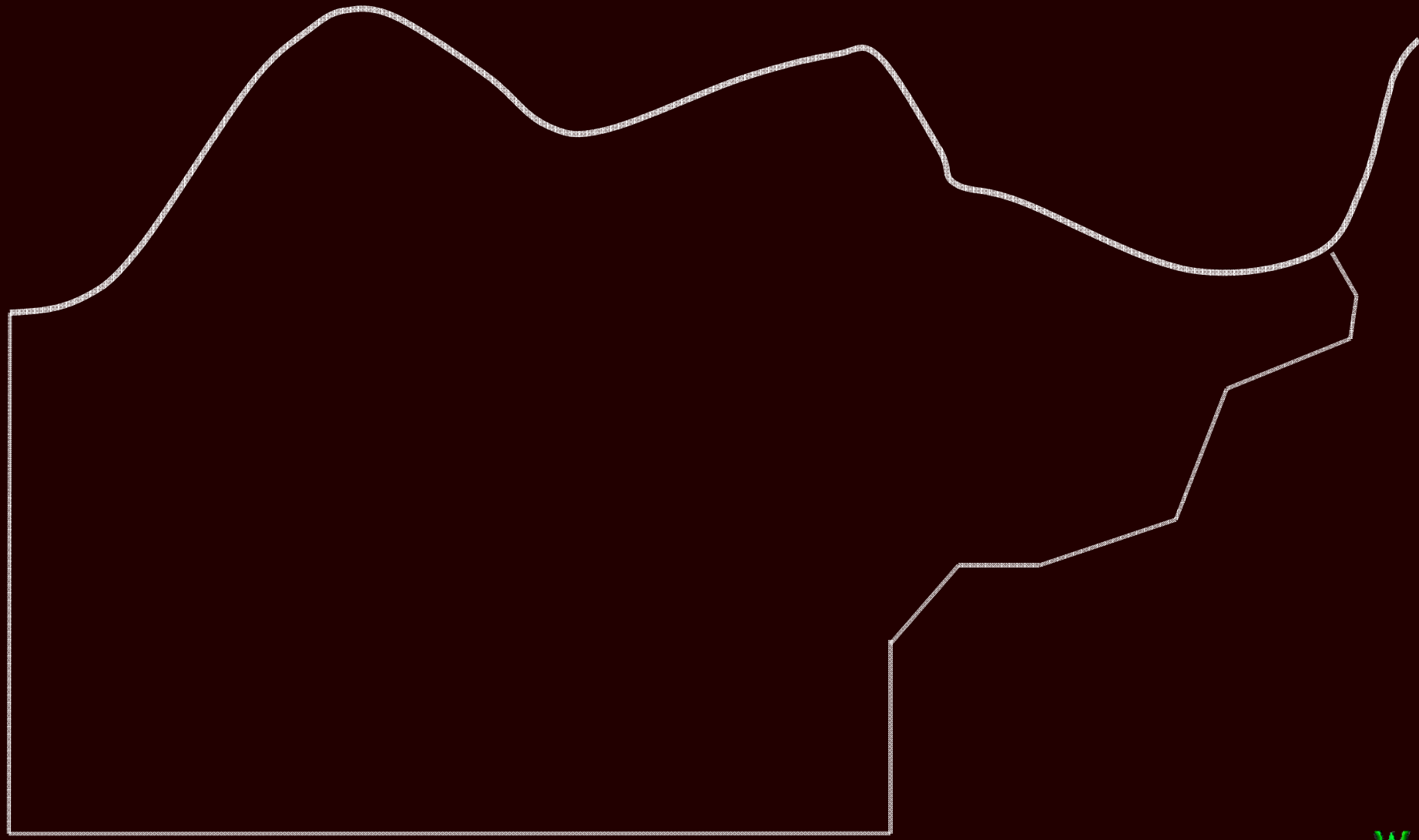


Flight CJA-1956, Frame 4R-61, January 1 1956
Courtesy of UCSB Library Geospatial Collection

1956


N
Flight CAS-SCR, Frame 1-84, June 27, 1963
Courtesy of UCSB Library Geospatial Collection

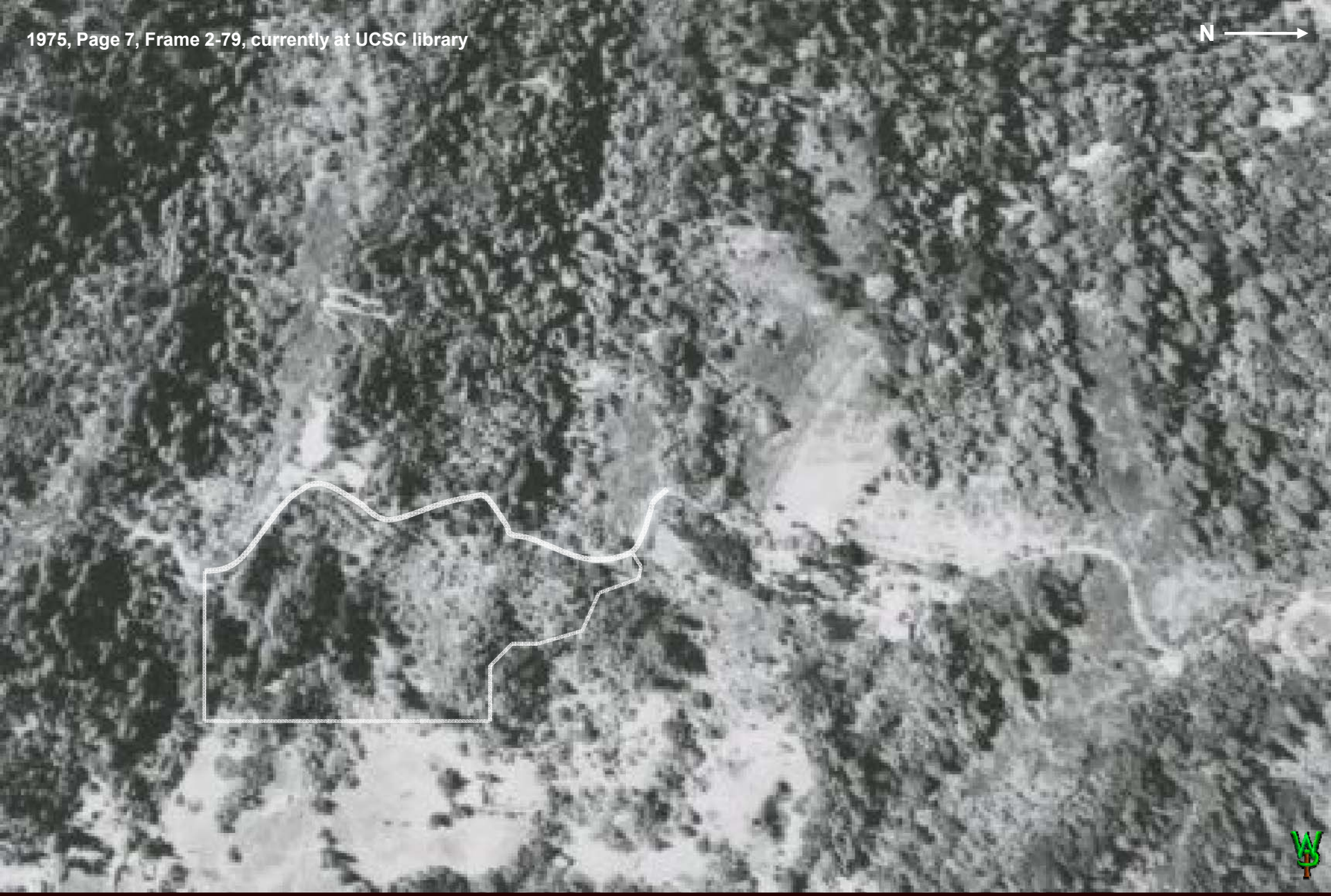
1963



This page represents an aerial photo from 1973, Page 5, Flight 14, Frames 6-13 and 6-14 currently at UCSC library. Those images are unavailable for me to have scanned and downloaded because of systemic fears of SARS-CoV-2.

The library remains open only “University researchers.”

I guess the students don’t need it either.



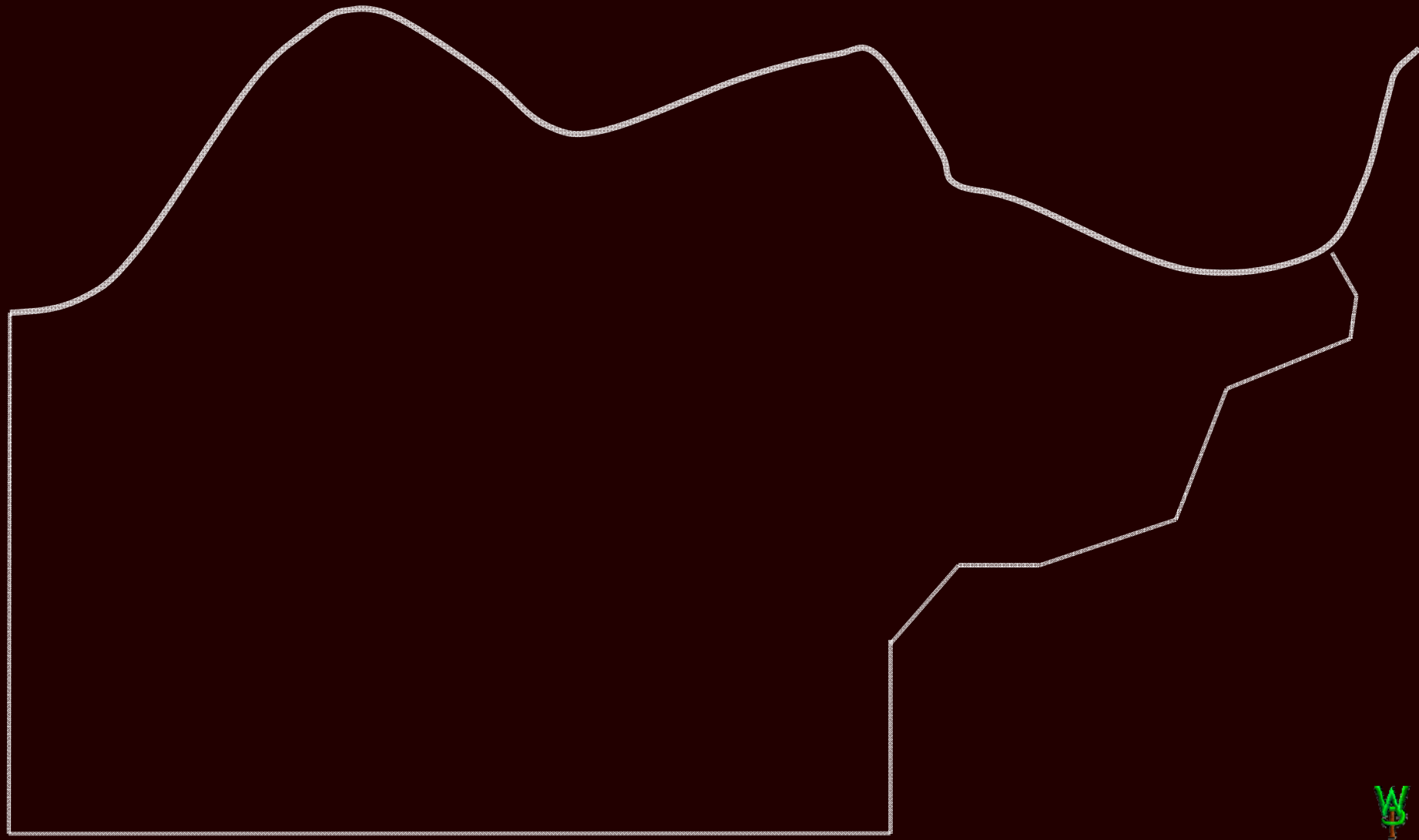
1975

Here you can see oak trees starting to pepper the landscape. Because of the brush, the place is already a severe fire hazard. This image is too coarse and grainy to enlarge further.

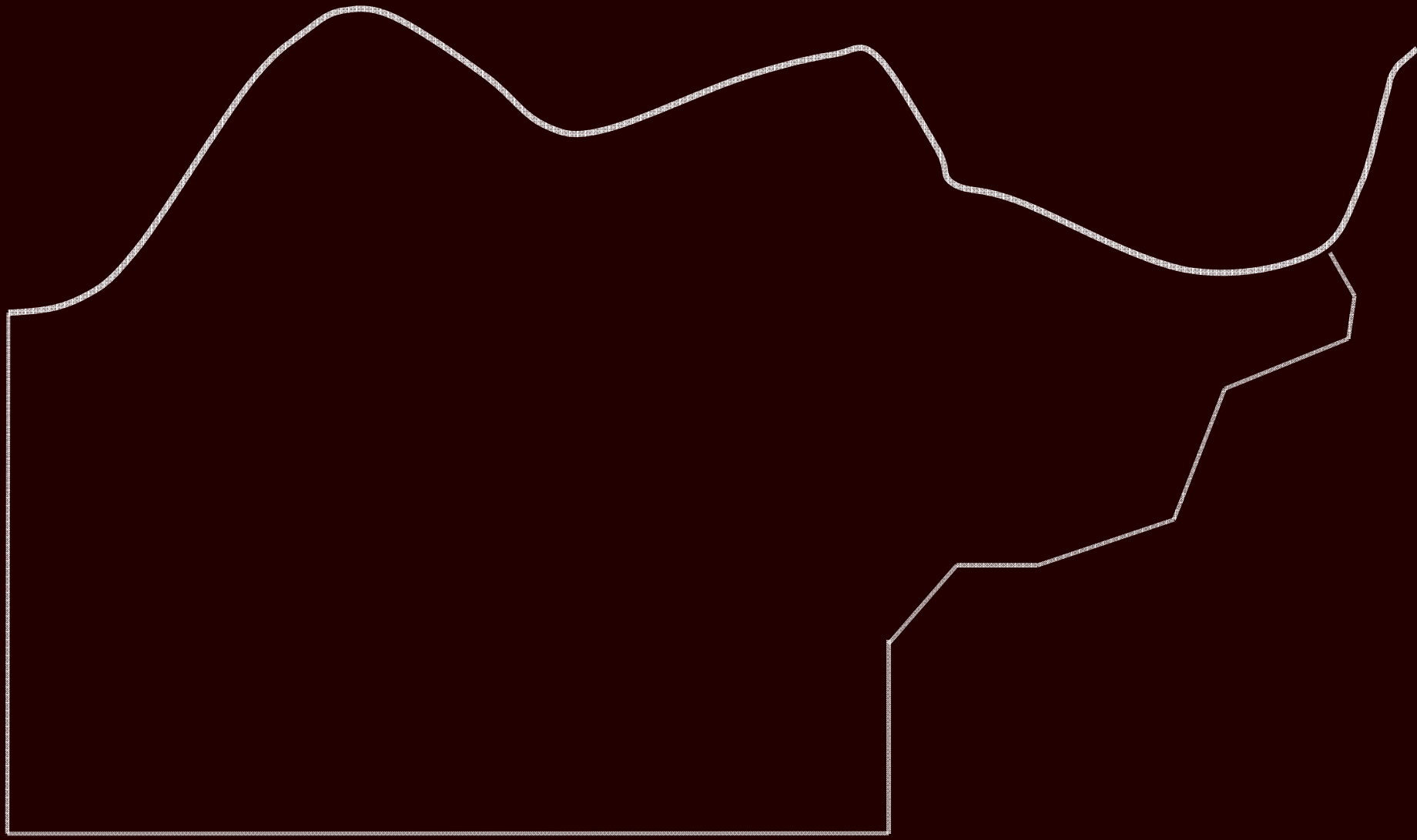

N
1989 March 30 wac-89ca_36-160
Courtesy of UCSB Library Geospatial Collection

1989

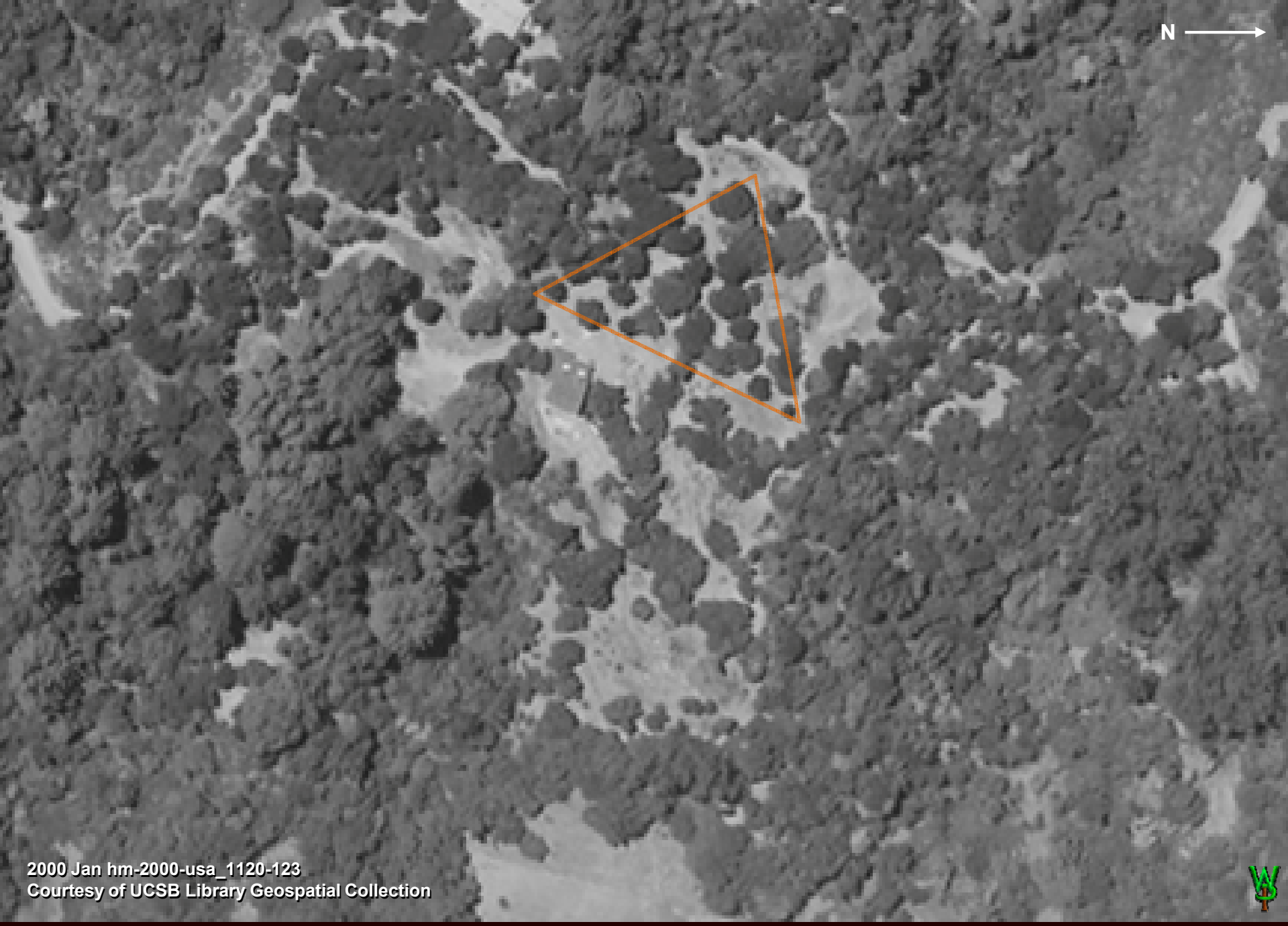
1991



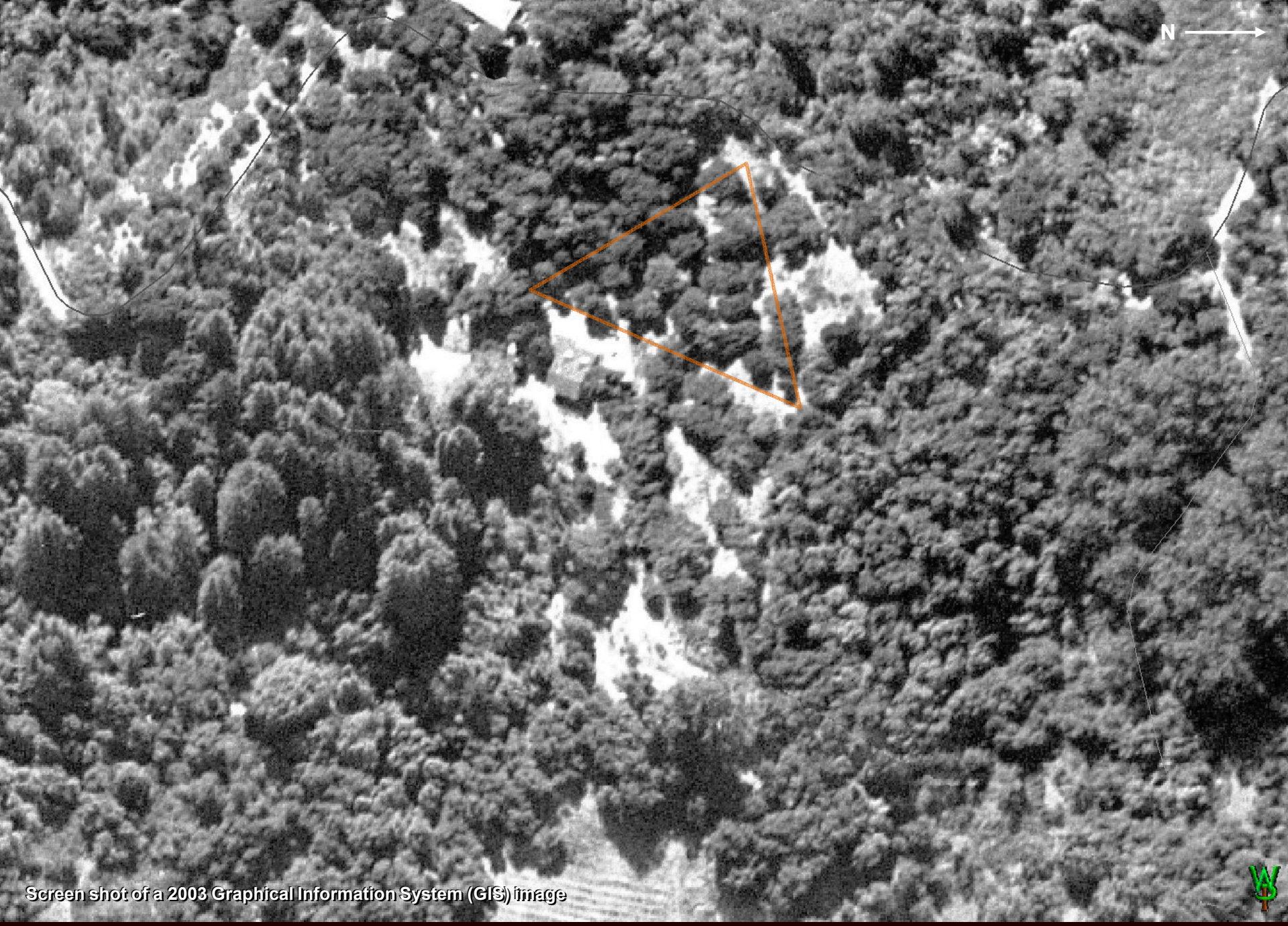
This frame represents Flight 1994 Frames 13-14, currently at UCSC library, which is which is unavailable for me to have scanned and downloaded because of systemic fears of SARS-CoV-2. The University Regents own the software. UCSB has the trained personnel and infrastructure to post it. I could email a request to UCSB for an image held at UCSC. UCSC personnel could simply scan the images and email a link to where they are filed to the UCSB library in return for a chunk of the fees. UCSB would then post them for public access as usual. Hence there would be NO risk of spreading a virus and no net cost to either University.



This frame represents Flight 1998, Frame 10532-70, currently at UCSC library, which is which is unavailable for me to have scanned and downloaded after nearly THREE YEARS of systemic fears of SARS-CoV-2. As if electrons could spread COVID.

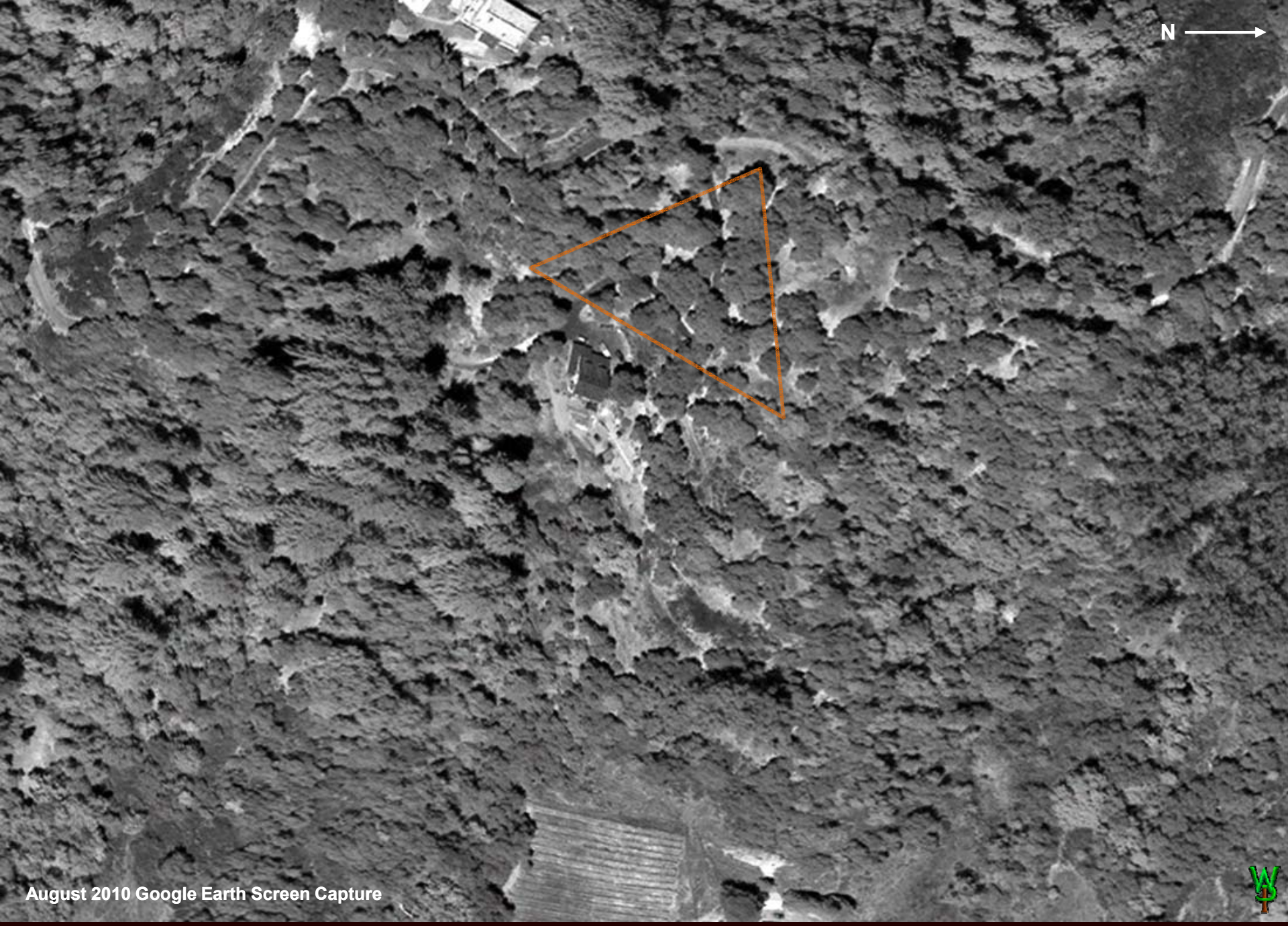

N
2000 Jan hm-2000-usa_1120-123
Courtesy of UCSB Library Geospatial Collection

2000


N
Screen shot of a 2003 Graphical Information System (GIS) image

2003

2007



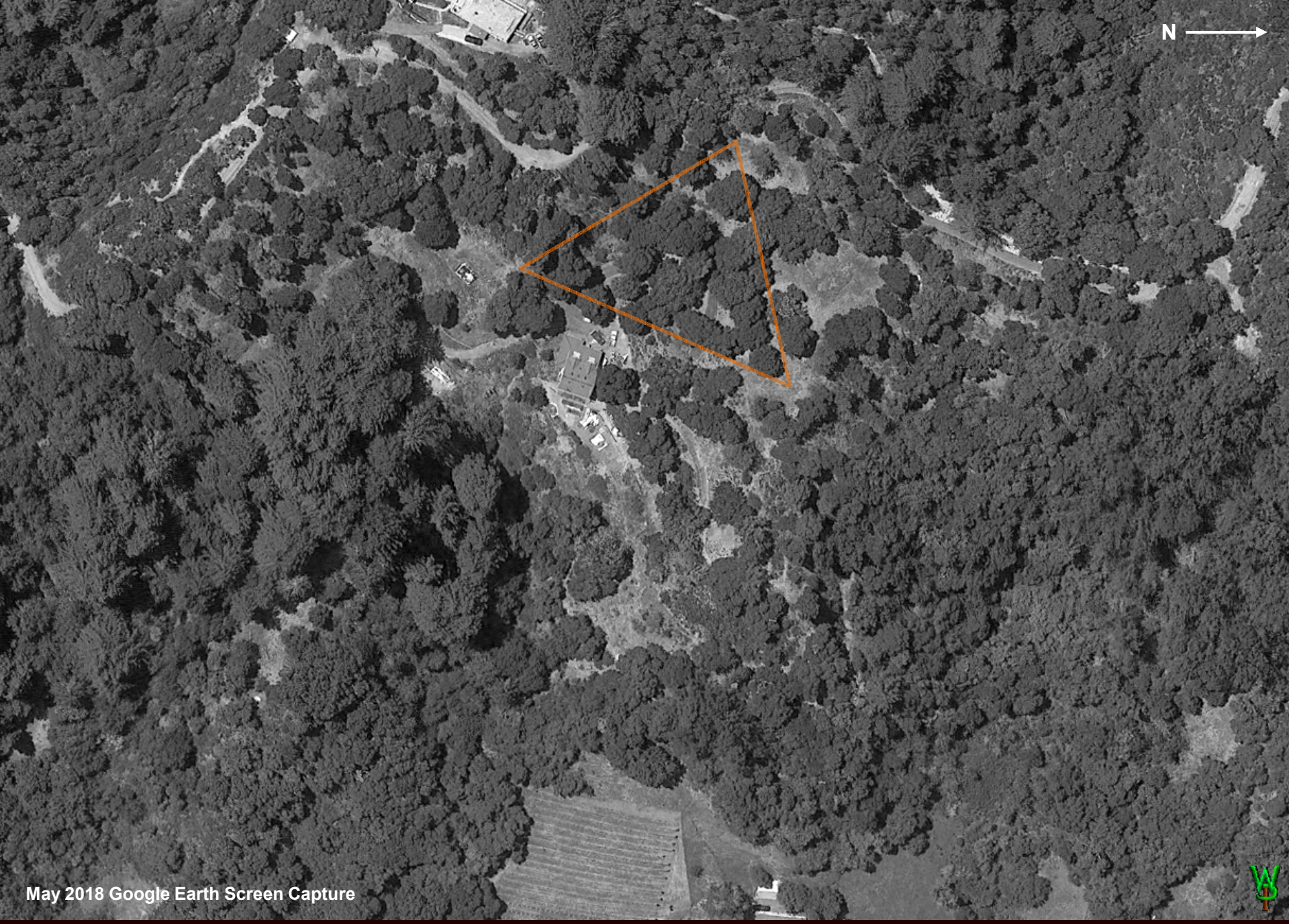
2010

2013

2014

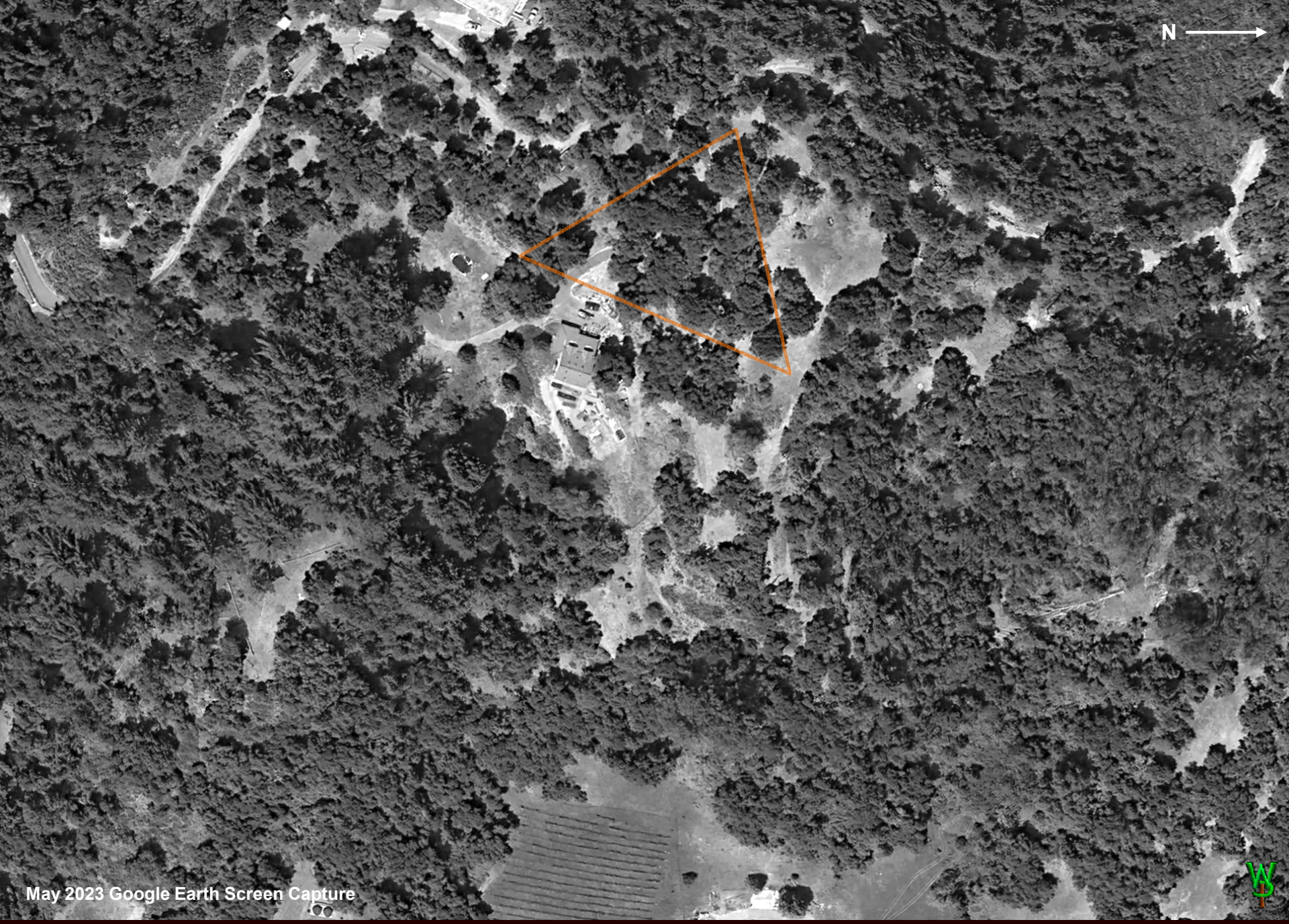
2015

2016

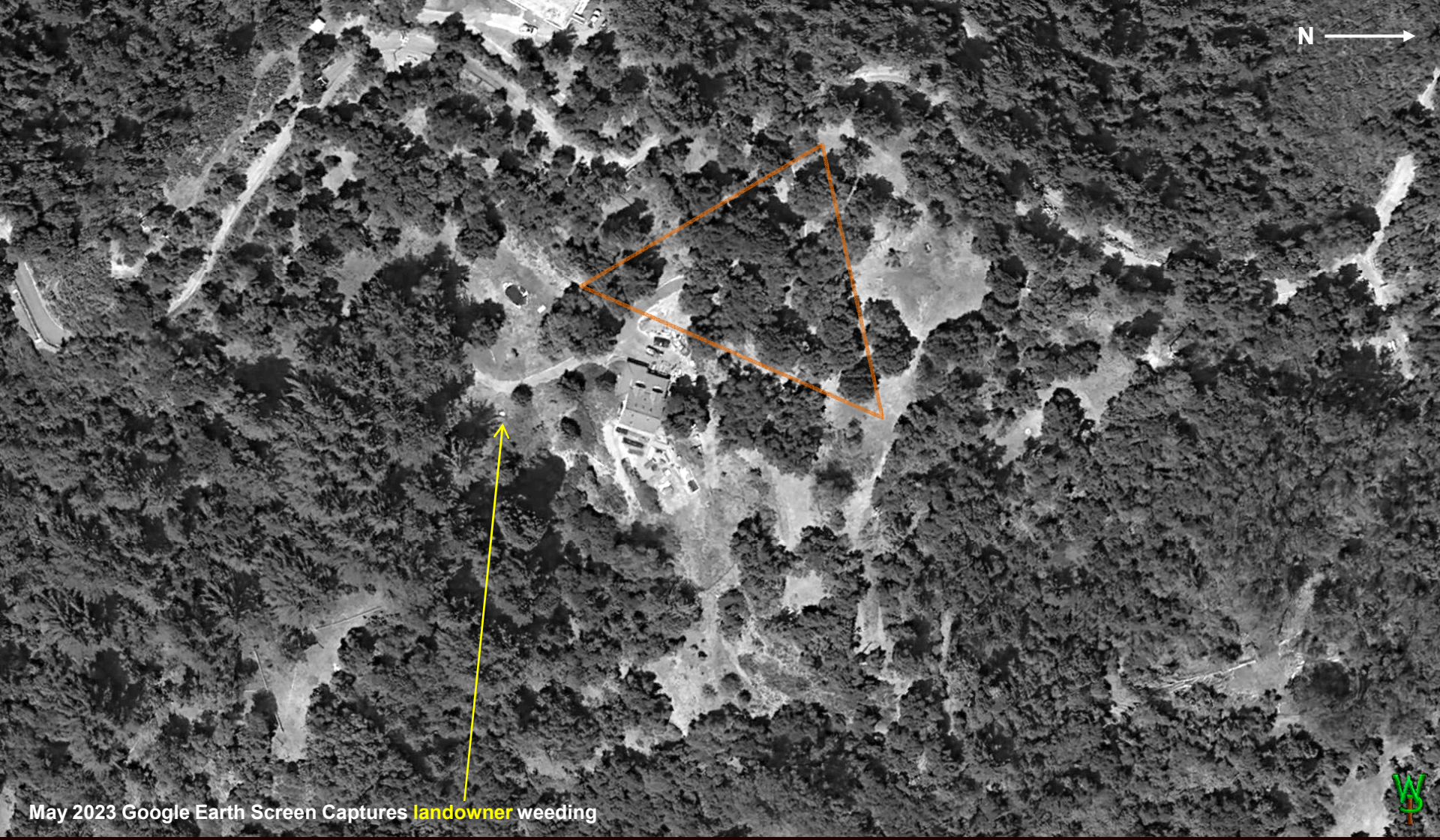


2018

2021



2023



The most important ecological lesson I have learned from forestry is to cull live oak seedlings relentlessly while I replace evergreen oaks with black oak and maple. I have known for over a decade that *Q. kellogii* allows more groundcovers and makes more bugs for birds while being not so damned invasive, but it was this exercise that taught me the importance of those conclusions over the long term unless I can get enough animal acorn consumption. The most important logistical lesson is that bigger trees make a LOT more acorns and more work to remove and process. In the last 30 years, many of the oaks here have doubled in size, making a bigger weed control job when they finally come out. Younger trees are easier to shape into healthy adults but they need room, and that makes more work dealing with weeds and seedlings. At the time, with the tools and information I had, I was correct to be cautious. If I knew then what I know now about both forestry and weed identification and control, I could have been more aggressive early on.

I hope you learned as much from these aerial photos as I did in assembling them, especially that shot from 1931. Although I already understood the coming essential forestry principles intellectually, I really hadn't integrated them into how I see from day to day, much less distilled them into hard operating guidelines compelling the degree of action they demanded**:**

EVERGREEN OAKS ARE INVASIVE AS HELL (here), one reason why Indians burned so often.
Douglas fir is INVASIVE AS HELL (here), and they make dandy Roman candles.
Redwood can be invasive, but only under specific conditions.
Bay trees are invasive too, but not as much. They do burn like gasoline.
Madrone somewhat, but the seedlings are easy to pull. The jury is out on maple but box elder beetles do eat the seed.

Now, are these species always invasive? No, they are invasive here. Somewhere else, things may be different. But if you want biodiversity, a productive landscape for wildlife, and to spend fewer weeks every year just killing trees, processing the material, and killing seedlings, all just for the minimum result of keeping it safe (never mind the arduous job of making it native), then these species do pose challenges in this area calling for the exercise of thoughtful management choices.

There are other native trees that are not so aggressive and provide much MORE food for wildlife… in this system. Black oak *(Quercus keloggii)* is the best candidate. It makes just as many acorns (and not as bitter) and bugs gnosh on it aggressively when they leaf out, making more food birds MUST have to feed their young (you should see the birds going bonkers in the one I planted in front of the house). We have only 4 mature black oak trees, but only one I didn't plant. Young trees make fewer acorns. That suggests that if I plant more black oak, I wouldn't have tons of seedlings and could focus more time on other tasks that make the system better. I would get more winter light on the ground abetting both weeds and brush. The soil would be more fertile because the leaves decompose rapidly, but you know, they do clog drains. Every species has advantages and disadvantages under specific conditions. Our job is to learn, effect, and maintain the best mix where we live. Hence, now that I have learned how invasive evergreen oaks can be and how beneficial black oak can be, I'll accelerate converting much of our oak forest to black oak.

Oh, but that isn't what is Natural!!! Oh yes it is, or at least as Natural as it ever was during the last ten or fifteen millennia.

Western civilization has been sold the delusion that "Nature" is self-optimizing, not realizing what aboriginal peoples made of it, despite the massive evidence to the contrary virtually everywhere. This place was literally dying due to weeds and trees. It was waiting for a catastrophe, after which the weeds would have become much worse, with the land and soil even more rapidly advancing toward systemic death of the native successional system. It is easy to see if one knows *how* to see.

The reality is that land has ALWAYS taken its shape as dictated by human economy. It has been that way, globally, for at least 15,000 years, and in places well over 100,000 years. There is no such thing as "Natural" without people taking action to care for the world around them. The difference between moderns and hunter gatherers is that the latter do everything they can to enrich every inch of their surroundings, while moderns tear things up with our tools, witlessly introduce invasive exotics, let them spread, and wring our hands about the damage, that is, if we even pay that much attention. That does NOT mean we should be replicating what Indians did. It does mean we should **LEARN** from what they did, and more.

Upon hearing information like this, most people usually ask me: “What should **we** do?”

First, “we” need to get our brains out of “we.” This is about “What should I do?” (meaning you) because just accountability can only be assigned to individual choices and circumstances. “We” were stupid. “We” pushed out ranchers and timber land-owners and demanded fire suppression in a mad pursuit of more park land, a cool place to live, corporate profit, tax revenue... “We” just let it go, denying our responsibilities, thinking things should “Natural,” and looked the other way while the plants ran over us.

Restoring an overgrown forest to include grasslands on very steep terrain is hard, dirty, and dangerous work, and it is **expensive**. My research is partly in making it safer and less expensive. I don’t do consulting or offer direct advice unless it is to relate how I did something, as opposed to telling people *what* to do. I don’t want responsibility for somebody else’s choices. I do love to teach. This is about saving lives, property, and wildlife by rebuilding badly damaged plant systems.

The first consideration is scale. The problem with overgrown forests in California is so vast that confining fire is generally nigh upon impossible. Simply burning them would be an enormous setback because of the weed responses alone. Many trees respond to fire as if they were weeds, leaving both the fuel levels and the botanical situation just as bad if not worse soon after the fire. For examples, please see the picture books on this site**:** *The Cone Fire*, *The Warm Fire*, and/or *Fire Aftermath: Mesa Verde National Park* (just for starters). “Let it burn,” as if that was enough, is simply a delusional ideology; it is not scientific.

Back in 1989, I started with cutting trees leaving tall stumps and called in the dozer to rip them out. Today, I cut them flush and treat the stump chemically (unless I want a coppice). Were I to confront again the situation we had, I wouldn’t start much differently but I would be more aggressive about trees and less aggressive with the dozer. I would pile tops and burn them as I did then and do now. I would burn the duff and treat the area between piles chemically with pre-emergence herbicides leaving as much area untreated as I could handle for hand weeding or spot spray with squirt bottles. I would not use pre-emergence herbicides around burn pile edges so that I cans see what comes up, let what I want to keep breed, and kill the rest knowing more about what I’m up against. Repeat mechanical treatment, chemical treatment, fire, weeding, and plantings, but only treat what I can handle. Once things are under control in terms of species distribution, only then bring in the animals and only if I have enough forage to keep them there.

To my mind, herbivory is the long-term solution to our vegetation management challenge, starting with deer, cows, sheep, and goats. BUT herding is economically impossible without controlling predation. On the scale that is needed now, there is neither a culture of animal husbandry capable of it nor infrastructure to support it (see *Living Sheepishly*). The good news is that habitat management produces better food, a healthier culture, a safer place for both people and wildlife, and a less hazardous and therefore more productive world. It is a way to employ so many soon to be displaced by AI and robotics. There is a huge amount of research and development to do to make that lifestyle less physically damaging. There is an equally huge amount of research to do on how to improve our results by understanding more about both weeds and native plant systems.

I don’t think this challenge lends itself well to collective organization (either government or corporate). Unlike collectivized systems, individuals can be held accountable. Networks of individuals would be more effective, creative, responsive, and appropriately scaled to the complexity of variation from site to site, effectively a small business association model.

September 2021 – Google Earth Screen Capture
I really do wish I could get such images taken at noon in June.

As to the future Wildergarten, it is human nature to want to be “done,” especially with a project that has become a life’s work, but that’s just not how things are. I guess the best compensation, besides working out on the land on a beautiful day with my dog, is that when people arrive here, no matter what, the first thing out of their mouths is, “What a beautiful place!” And you know, most of it is (we do have our eyesores at times). But oh how I so want to get “there,” to work here without that urgency of too much to do. But then, I’d probably have too much to do no matter what I was doing. The Wildergarten is a work of art, lumps, challenges and all, but it is best to remember: I am not the Artist; I am just the paintbrush.

Image from Flight C-1436 Frame 11, 1931
Courtesy of UCSB Library Geospatial Collection

I wish to thank the University of California Santa Barbara Library for dedicating the resources to conceive, develop, populate, and staff their **FrameFinder** online application. The site offers free downloads for scanned aerial photographs and scanning services at a fair price. This resource was of immense value in demonstrating both changes in land use economics over time and the oak invasion. Doing business with their people was a pleasure. I couldn't have asked for more.

Other Books by Mark Edward Vande Pol

Quick Read Picture Books

Range Management

Zion National Park

Canyonlands National Park

Deseret Ranch

Fuels Management, Succession Run Amok

The Cone Fire (the benefits of active forestry)

The Warm Fire (what happens without it)

Fire Aftermath: Mesa Verde National Park (weeds)

The Croy and Summit Fires (the wildland urban interface)

Socio-Ecological Paradigms

Environmental Consequences

Meadow Encroachment in Yosemite Valley

Why we can't accept how the original forest as it once was got that way

Living Sheepishly

Why we need a culture of animal husbandry

Sustained Development

Cities are becoming prisons

Katrina: What Did You Expect?

Environmental bureaucracy can be deadly

Natural Process: That Environmental Laws May Serve the Laws of Nature, ©Wildergarten Press, 2001, 454pp, ISBN: 0-9711793-0-1, LOC Control #2001092201. http://www.naturalprocess.net

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. http://www.shemitta.com

Articles at Wildergarten Press: collected writings on Constitutional history and regulatory racketeering by tax-exempt "charitable" foundations. http://www.wildergarten.com/wp_pages/articles.html

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These are LARGE files; they do take time to load

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