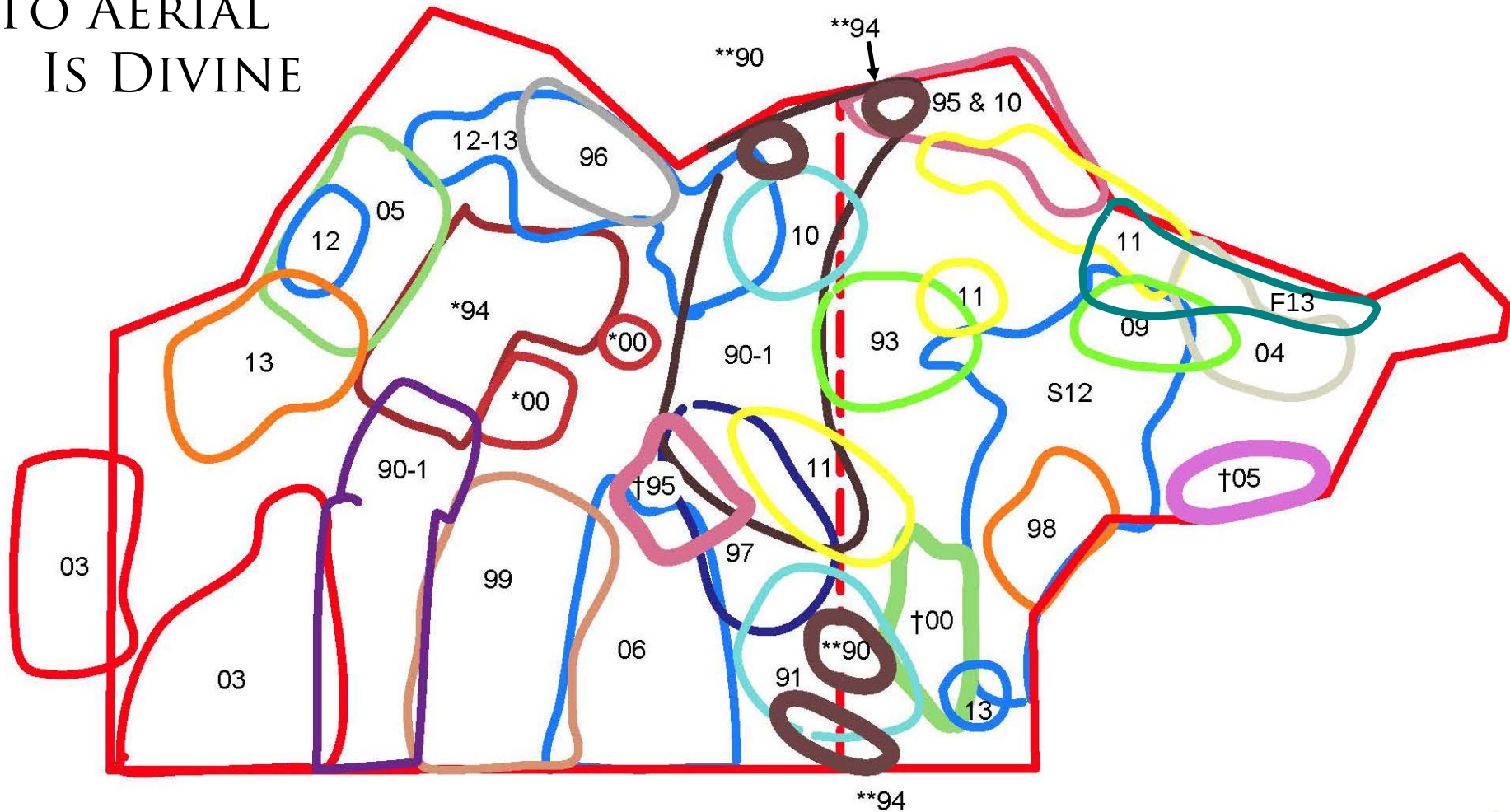
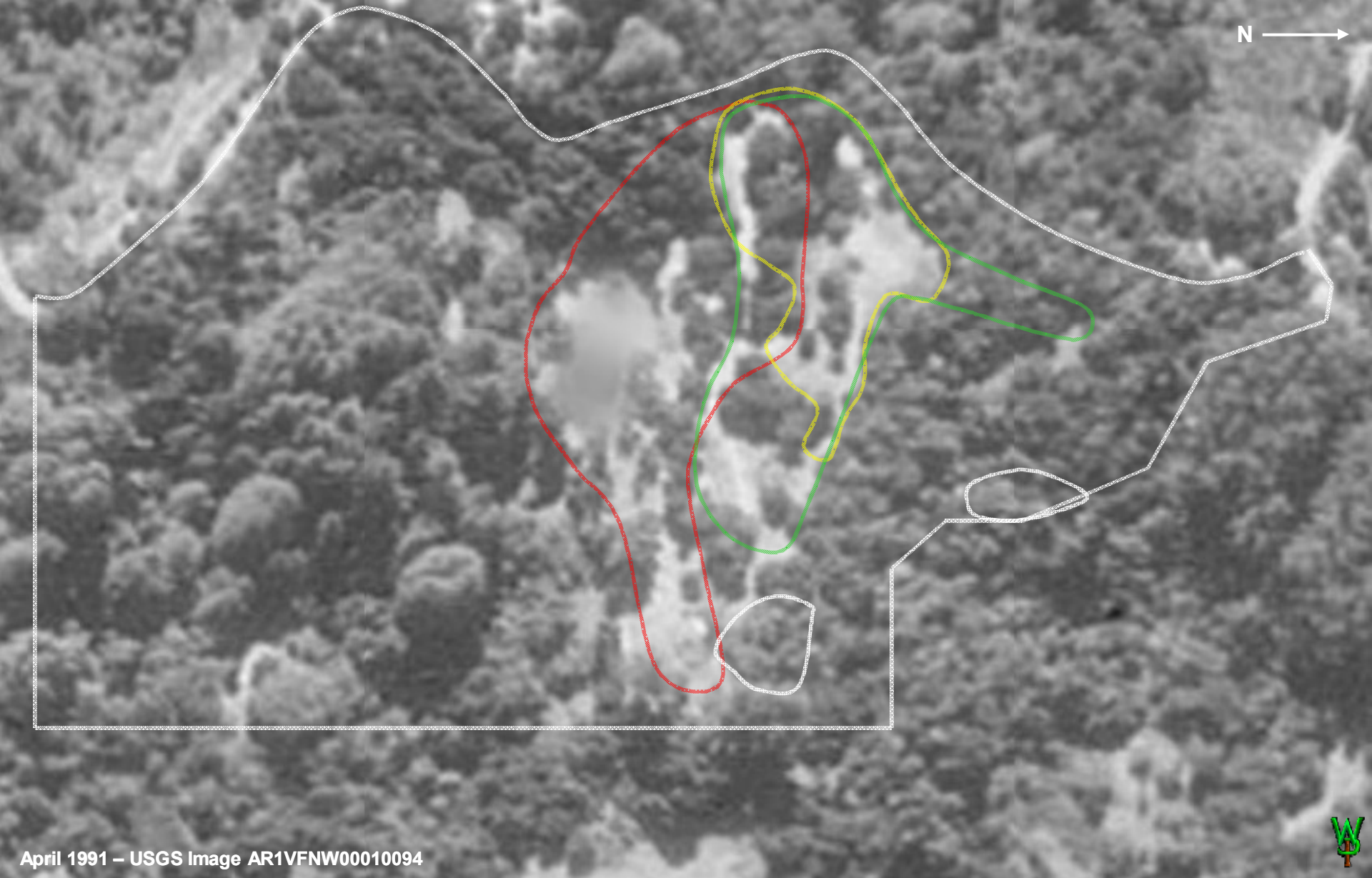


TO AERIAL IS DIVINE



This graphic represents my sketchy recollection of where I thinned and when. It includes both hardwood and conifer forestry. Unless indicated otherwise (see key), these are primarily oak-madrone woodland, usually to include bay. There is no color code per se but heavier lines indicate exotics. It does not show how much was removed. It does not suggest what Phase was achieved (although most often I went from Phase 0 to Phase 2). Overlaid harvests usually indicate achieving Phase 3 on the later date. There is no accounting for growth-induced reversion from (for example) Phase 2 back to Phase 1 (it happened). The one 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?



April 1991 – USGS Image AR1VFNW00010094

This is a 1991 satellite image of the general cover of our property just as we were starting construction. As was stated in the site history, the seller to us had done considerable clearing (**green line**), for the most part in the area scraped off by a bulldozer in the early 1980s (**yellow line** - my guess). I had removed a significant amount of forest by this time (within the **red line**), including some eucalyptus, fir, and acacia at the bottom of the **red** area. Acacia is in white.



This was scanned from an image by a [custom aerial photography company](#) taken in the spring of 1995 (I contracted for a photograph for explicitly mapping and management purposes; they thought I wanted pictures of my house). It wasn't terribly useful, as it views down the hill in the afternoon, so I had to rotate, crop, and stretch the image to fit the property boundaries. Note how much the oaks have broadened in the thinned areas in only four years.



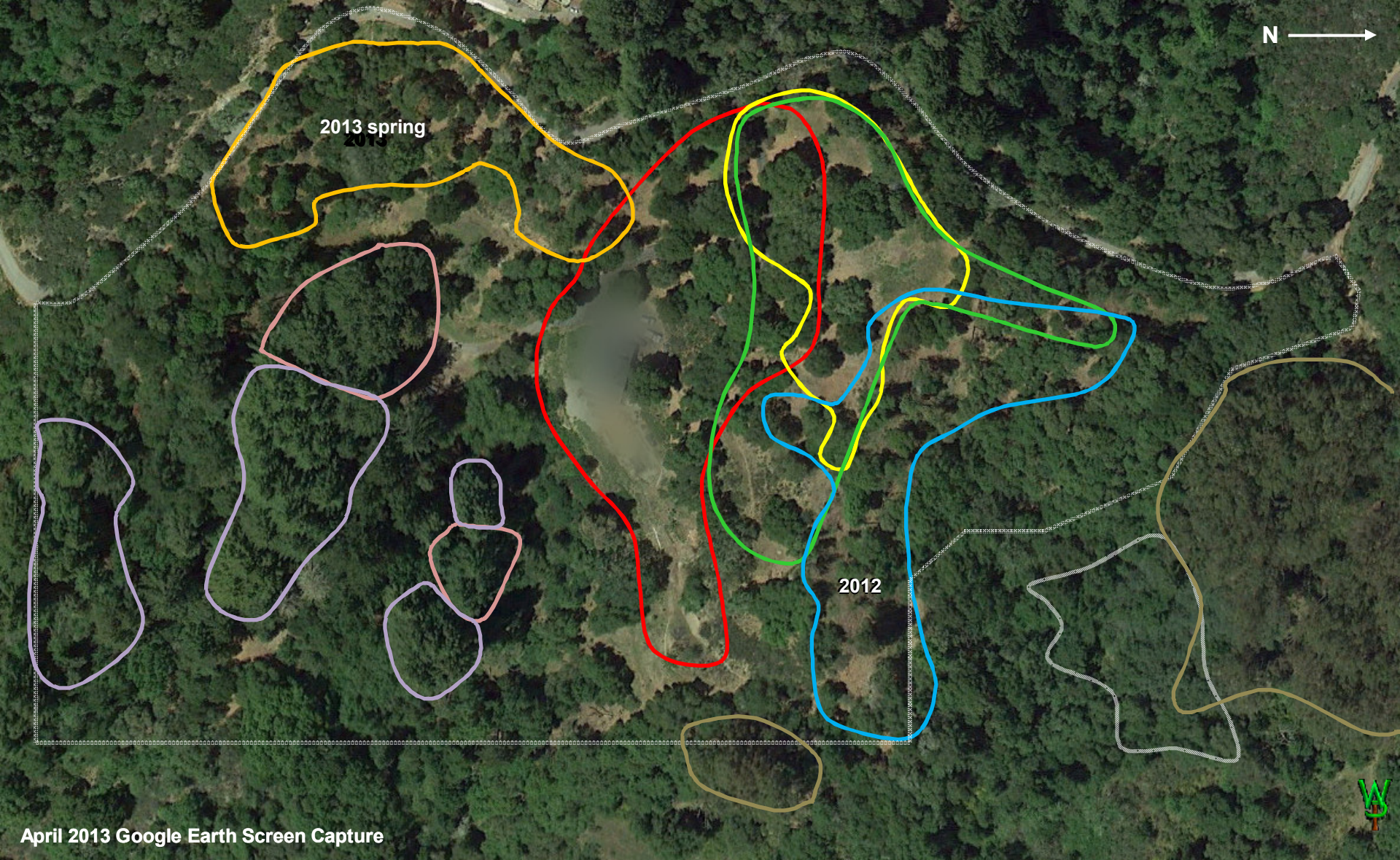
This is a screen shot from my computer of a 2003 Graphical Information System (GIS) image. Note how much the cover had increased in the area that had been thinned the most aggressively in 1991. Up until this time, most of the hardwood forestry had been exotic tree removal (the acacia at the bottom is gone), understory thinning and diseased tree removal. This image represents the state of affairs when grassland restoration began in earnest.



This is a Google Earth™ screen shot from 5/31/2007. Note that the cover had increased from 1991 despite that I was still removing trees for firewood and thinning smaller, dead, and dying trees in various patches. This image was taken amid that long quiescent period during which I was more focused upon grasslands, much of which appears as shadows in this image or was under partial tree cover. One of the big problems with this kind of photography is that one does not have one's choice of time of day or day of year.



This is another Google Earth screen capture of an image taken 6-5-2010. This was taken near the end of that long period during which I was focused upon grasslands. This images penetrates the tree cover better than most others. Keep that difference in mind as we move into those to come, because I am about to begin some serious thinning of the forest, starting at the southeast (lower right) and working my way counterclockwise across the top of the property.



April 2013 Google Earth Screen Capture

This photo was taken April, 2013. Again, the **green line** was seller clearing in 1988-89, the **yellow line** is the bulldozed area in the early 1980s, and the **red line** is removals I did prior to construction. This image was taken just as I was thinning the area in the **gold** patch at the top left. I had also thinned the **blue area** in 2012. Within these two areas you can see that I am accelerating Phase 3 thinning. When viewed from above, Phases 1 and 2 are not really that distinguishable from the totally untouched forest that surrounds the property except as 'point count density,' or trees-per-area (next image). Note also the difference in point count density between **logged** and **unlogged** redwood. The **tan lines** enclose my neighbors' eucalyptus, with acacia in white.



April 1991 – USGS Image AR1VFNW00010094

Back to 1991. It is hard to distinguish individual trees in this image, but the high stem count is unmistakable. The gray-circled areas are Phase 3 projects to be completed in but three years (“planned” areas are in dashed lines). This reflects the change in priorities discussed in the forestry overview re accelerating thinning both because of (1) our control over grasslands and (2) because of the approaching decline of my physical working lifespan. The red arrow indicates a small opening within the stand where the blue dicks first came up. Somehow, the forest had never closed in that spot, nor had brush invaded it.

Note also the spacing between trees in the center area in white.



February 2014 Google Earth Screen Capture

You can see how much the canopy in the white area has closed since 1991, some of those oaks having almost doubled in size! The rate at which I have been thinning recently is less obvious. In a way, it is somewhat frustrating seeing it from this aerial perspective, especially with the shadows of February. On the ground, the differences are far more profound with the groundcovers just taking off with more light. I cut a bunch of trees, worried that I might have hit it too hard, then when I see it here, it looks like I had not done that much. Yet the change on the ground is amazing when the grasses and forbs take off. The one area that is “iffy” is the eucalyptus at the bottom edge (*tan*). Those trees are so big that the owner is unlikely to participate in their removal. It’s expensive.



This shows how much got done in two years, almost a quarter of the property. When this photo was taken I was about half done with what you see on the upper left as "2014 winter." The rate limitation has been the volume of material to be dragged, piled, and burned, logs split and converted to charcoal. I have only so much space to accumulate and process material and only so much time. Note that I left a "shade screen" on the upper left to reduce the sun scald on the trees I left behind after thinning in a severe drought year.

On the right, some of the work encroaches on my neighbor's land, with his agreement. I will finally be dealing with some of the eucalyptus overhanging our property and clearing out some of the dead and dying material along Fenn's road. If I have the energy left, in 2015 it will be removing all of the remaining acacia on Fenn's former estate. My neighbor plans to remove the eucalyptus (which requires heavy equipment) and he will then reforest it with redwood seedlings. Too bad he can't harvest to pay for it.



February 2014 Google Earth Screen Capture

Once I'm done with the oak forest and the perimeter, what's left? Conifers. I'd really like to have done this sooner, but we just did not have the money. You see, when I built my house, I put cheesy siding on it because I had all this beautiful overstocked redwood with which to make siding. So once the kids are out of college, we can try to get this done and our forests will finally be to a sane stand density. Unfortunately, I will get a lot more logs than I can use, even if I build a barn or some other animal structure with which to start grazing experiments in my dotage. My County Government has forbidden me from selling a stick of it so I'll have to figure out what to do with it. The management goal will be to see if there is a way to inhibit the sprouting of new trees from the root crowns without harming the remaining standing trees. The two fir trees at the end of the arrow died of "shoe string root rot." My forester friends tell me, "It's one of those things that just happens." I'll see if I can entice some acorn woodpeckers to make a home of them.

FORESTRY OVERVIEW

If the section on conifer forestry on our property seemed limited in scope, that is because I have not done much of it (see timeline on the next page), certainly not nearly as much as is needed. The reasons are very simple:

1. We don't need that much wood for our own use, and
2. We cannot sell logs to offset the cost of rehabilitation. The State of California and the County of Santa Cruz have made that illegal, by deeming selling logs "commercial logging," even if it is done exclusively as an improvement, at a net loss on the cost of operations, or with all proceeds going back into the land. Hence, if we want to improve our forest, the money *must* come from our pockets and it's not cheap. Effectively, only big timber landowners are allowed to sell logs.

If I don't cut the trees, they'll eventually fall (if they make it to the ground without tangling up in their relatives), *definitely* making a substantial hole in the side of the hill. But timber operations are expensive, not so much in the cost of cutting trees but in getting the logs out, particularly in a benign manner. We do have potential uses for wood I cannot afford that would benefit the land and advance the science of native landscape management. For example, if I wanted to do experiments grazing grasses or browsing brush while weeding what comes up after them, I would need a small barn, and a corral to protect my goats or sheep from the government's predators. We have many more trees that need removal to give room for the others to grow into the monster redwoods everybody loves (including me). Thinning the trees could fund that construction. Moreover, the better a job I want to do, the more unaffordable it becomes. For example, I would love to grind out the stumps to make more room for the groundcovers and shrubs characteristic of a primeval forest. It might also reduce the regeneration of so blasted many trees. I have experiments in mind there too.

So, the trees sit there, too thick for their own good and definitely bad for the forest understory species I would like to reestablish. According to US Forest Service measurements, this county is growing five times, by volume, what is being harvested. It is unsustainably "sustainable." Worse, succession is starting to threaten even oak madrone woodland, as Douglas fir precedes redwood into colonizing what only 90 years ago were grasslands and forbs 120 years before that. Meanwhile, the regulatory process disinvests land ownership, eventually forcing the owner to sell, usually to a developer or to subsidize urban infill, an economic process discussed at length in *Natural Process*.

These laws are exemplary of the insanity the advocates of regulatory government have sold as beneficent, while in fact benefitting only large corporations, developers, and their dependent cadre of bureaucrats, activists, academics, and construction trade unions. Please, make it stop. If nothing else and as a temporary measure until risk management markets can displace the regulatory juggernaut, there should be a minimum size of non-commercial harvest for job to require a permit. That way, enough people could afford to do projects that we might all actually learn more than we do now.



FORESTRY OVERVIEW

