So, What Does It Feel Like to Be an Axe Murderer?

November 2017 – Seventeen years after logging

The commitment to deal with the problems from centuries of fire suppression, abuse, and neglect can save a conifer forest.

Refusal to deal with old problems and “let Nature take its course” after a centuries of fire suppression, abuse. and neglect, is a way to kill one.

Conifer forestry has been a big part of this project over its entire 34 years and yet we still have not done its climax operations. Why so long? Conifer trees get big. Moving big trees takes heavy equipment, which takes big money. Heavy equipment produces large scale disturbances, the responses to which demand intensive weed management for years thereafter. Like the hardwood forestry chapters, the first priority in conifer forestry here was to reduce fuels abetted by fire suppression. Douglas Fir came off the uplands first. Then I thinned the highest stand of redwood as a learning experience. There was removing trash at the bases of redwoods on steep slopes. I undertook R0 in 2000 as a pilot project, pulling taller trees up a scarp to learn more about actual logging. Then followed preparations for three larger-scale logging operations, of which R4 will entail an exemption. That project has involved extensive hardwood control, particularly bay. All that material had to be bucked, yarded, split, piled, burned, given away, converted to charcoal… Then there was also creating space to deck, transport, and mill big logs. Getting the land ready for real logging took decades, and we're almost there. Along the way was learning to treat redwood crown sprouts. Managing the aftermath will probably take the rest of my working life.

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.

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Other writings by Mark Edward Vande Pol:

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

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

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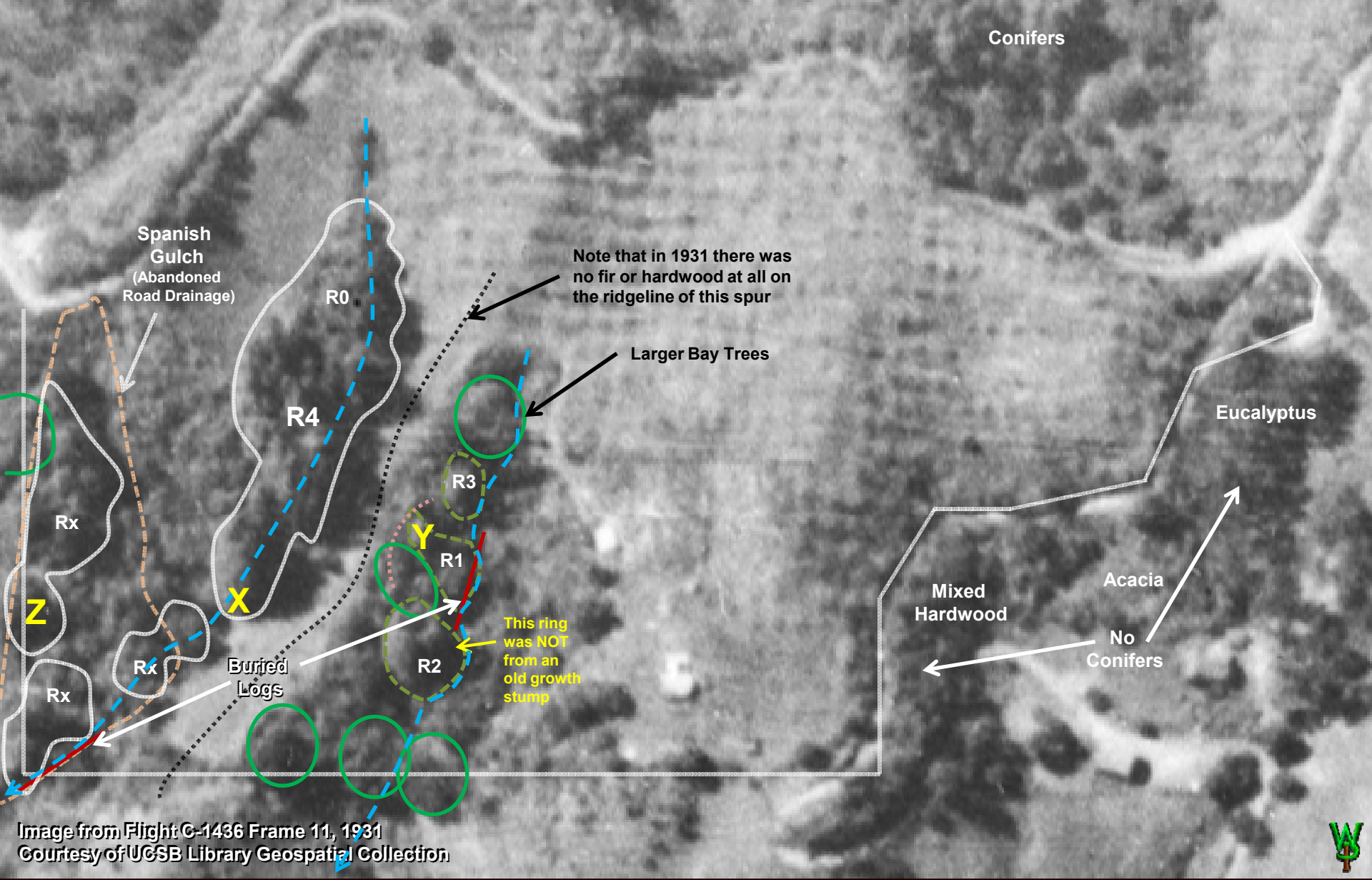
Our conifer stands grow within the dashed curves on 3 acres (laid flat; blue lines are seasonal drainages) in the southeast corner of the property. Redwood I have logged or plan to log is in green, totaling about 90,000 board feet, some on 200% slopes (60°) nearly 100' high. Between those stands on the crest of the spur is Douglas fir. Note the designations with the R prefix: These are jobs numbered in the order they were done. In 1993, I cut about 10,000bft of redwood (**R0**), for fire hazard reduction. I had the logs milled in 1998 for landscaping. In 2000, **R1** was a logging job as part of writing *Natural Process* for stand improvement but also to reduce the risk of slope failure and to improve riparian drainage. I gave those logs away. **R2**-**R4** are yet to come and **Rx** will be left untouched. In 2015, the regulatory climate improved such that we can **sell** logs from trees within 300ft of the house, so now we can afford to get equipment in here to thin our monoculture stand to improve its diversity. Unfortunately, the small size of these jobs still means that it is likely to cost more than the proceeds are worth but for the house siding from R2 we need badly and otherwise would have to buy. In the orange area I am removing all conifers atop the south-facing slope to retain that forest's biodiversity.



The site history and aerial photos chapters make clear there were *maybe* three (**3**) pre-colonial redwoods here (**X-Z**) and no fir. Yet redwood removal back to that point is not a goal here as part of "restoration." I want this place to be a laboratory to learn how to manage native species and habitats found in this immediate area. Besides, I like redwoods too; I just want *healthy* forests. Yet there is another reason to maintain these different types of forest. I don't have the time, money, or energy to remove 10 acres of redwood and manage it as grasslands under constant bombardment. Best we learn how to make the most of what we have within our means.

Note the density of this stand as compared to one of ours in the next slide. The common belief that redwoods tolerate fire easily is a myth of the "fire-retarded." *How* a redwood **forest** responds to fire depends upon the conditions when it burns**:** age distribution, stand density, winds, moisture, species composition, solar aspect, slopes, and weather history (i.e., the history of the seed bank influenced by weather conditions after the fire). Above was photographed the year after the 2020 CZU Lightning Complex Fire which got within 7 miles of our place. Above, the clusters of trees from crown sprouts after the 19th Century clear-cut are at the bottom. Most of the trees on the slope above them were probably from seed after the usual slash fire, as followed by a century of fire suppression (didn't work, did it?). Note that some of the trees are sprouting new branches on the far side. That means their near sides are likely dead. Redwoods wrap growth from the far side around the injury, leaving a damaged core in the middle of the trunk that can rot. Now look at the crown sprouts at the base of the trunks. After 20 years or so, how much ground fuel would that represent? Will anyone thin this out so that this can be fixed and it doesn't happen again? Indians never let a stand like this develop in the first place.

August 2003 – Rainforest in Hoh River Valley, Olympic National Park

Obviously, I had goals in mind before I started cutting trees, yet my preferences in forests are probably much like yours. This 'primeval' forest (above) has never been logged, but then for over a century it hasn't been burned regularly either (like it was under aboriginal management). Note the spacing between the trees that were here before the Park and how much light there is supporting a rich groundcover. Even if the path wasn't there, this is a forest that just invites you to take a walk to enjoy, immersed in life. The ferns are obvious, but did you note the shrubs and low groundcovers? I like them too. Now, this being the Olympic Peninsula, there is a lot more rain, but what I am trying to tell you is that we WON'T get a redwood **forest** with rich groundcovers and shrubs like this by simply waiting, nor will this one stay this way without disturbance. Sitka Spruce doesn't crown sprout. Redwood won't stop. But that difference doesn't mean things are OK above. This is a LOT of understory fuel. Notice that the young trees here aren't doing well. Fire suppression in the Park still has its effects but the site history here is different and so is the biology.

Image Source: Wikimedia Commons

Muir Woods National Monument is what I remember from childhood as “a redwood forest,” probably because we came here once a week over the summer of 1963 (I was 8yo) and again as a teen in 1970. Compared to ours, this is a spacious forest, in places with intense groundcovers. Note that there are relatively few suckers off the root crown of main stems of these trees.

November 1989 – Not a thing alive on the ground

But that is not what you see here, as we first saw it in 1989. There are no stump clusters here; this monoculture stand (R4) is of seed trees.

The size, spacing, and ring counts of even the skinny "junk" trees you see here, were all the same age as the larger trees. The "junk" I removed are fence posts now.

I am starting with the initial conditions of R4 (the last stand I have yet to log) as it circumscribes R0, which was the first to be thinned.

As discussed in the site history chapter, before the Spanish conquest, Indian fires had confined redwoods to wetter areas, primarily Bean Creek below us with a few outliers up here. When the Spanish banned Indian burning in 1793, forests in general started to escape their former limits, moving from the drainages up the slopes.

We also know from recovering plants after thinning hardwood forest that most of our property was grassland as was later confirmed by historic aerial photos. A study of the pattern of stump diameters, spacing, ring counts, and the "fairy ring" cluster dead center in this drainage, together indicated that, when the Indians had this place, there was only one (1) redwood in the upper part of this channel.

In other words, before the Spanish conquest this stand was not here.

There is no biodiversity here. There are no groundcovers. It is a stand of trees. It is not what I call "a forest." I knew this was a problem, and that the stand was at risk of a crown fire, but what I didn't know was how it had happened. That learning process took over 30 years.

The first thing I did in R0 was to take out the “junk.” These were thin, scraggly, bent, broken, or obviously structurally defective trees. One had a nest on top (probably great horned owls) so I left that until the nest came down by itself. The goal of that process was to reduce fuel density eventually to preclude a crown fire. At that point, a couple of small old stumps were evident. Those I cut flush with the slope to reduce the chance of breaking a log that might hang up on it when falling or yarding. Then I brought in a bulldozer to repair an existing road that crossed the drainage and wrapped around the stand and a backhoe to install a new culvert. For the privilege of doing all that work, I spent a lot of money and got a lot of crown sprouts off the junk I’d cut (above).

December 2015 – This is in R0, just after I had brush cut the crown sprouts coming up around the callus

This is similar to the stumps I had cut. Pursuant to growing suspicions about their origins, in 2015 we found and measured some 26 old stumps in our seed-tree stand (R4), but none was bigger than this one. Whether I had cut it as a crown sucker in 1993 or whether it was here before we got here, I do not know. Almost all of these small stumps are still alive, with a significant callus, having tons of sprouts, and totally rotten inside, which with redwood takes many years. Sadly, it is impossible to get an age off the callus.

November 1989 – Again, nothing alive on the ground.

I suspect the original pre-colonial tree "**X**" was under this "fairy ring," dead center in the drainage, as photographed the first day we saw the property. There is obviously no stump visible from "logging old growth" here. What was really interesting about it is that the drainage channel is not incised here, as are most of our drainage channels; it is nearly flat at the bottom with the floor extending some 80 feet back up the channel.

Below the cluster, the channel drops off into a large hole that then runs out to the next cluster of much smaller redwoods, after which the channel drops again only slightly. Together, these stump wads makes a "stair step" grade in the channel bottom, which slows the forward momentum of water, reducing incision.

When I toured the local chief of forestry for CalFire (then CDF) to see my prospective logging job (tiny by his standards), he asked me about why the channel had this profile. It had not yet occurred to me to even *ask* why, so it took a day for such a cool question to sink in and to get out of that residual habit of thinking of forests as permanent things to realize what had happened. Whether he knew why and had asked me rhetorically to prompt my thinking or whether he was simply curious, he has not since let on. Rich can be subtle that way.

So the hypothesis is that, if there was a large stump here, then, after the tree was felled, there were probably a great many sprouts acting as a filter. They grew and captured debris from broken branches, then buried in silt captured by the many sprouts. Redwood is an unusual tree species in that it can tolerate sediment burying its root crown without suffocation and will simply sprout roots from up the trunk and continue on. *Sequoia 'semper-virens*,' means "always lives." The species is almost indestructible.

To confirm whether this process is substantiated underground would require either excavation or possibly ground-penetrating radar. Please?

But HOW did we get those other trees from this one? It's simple.

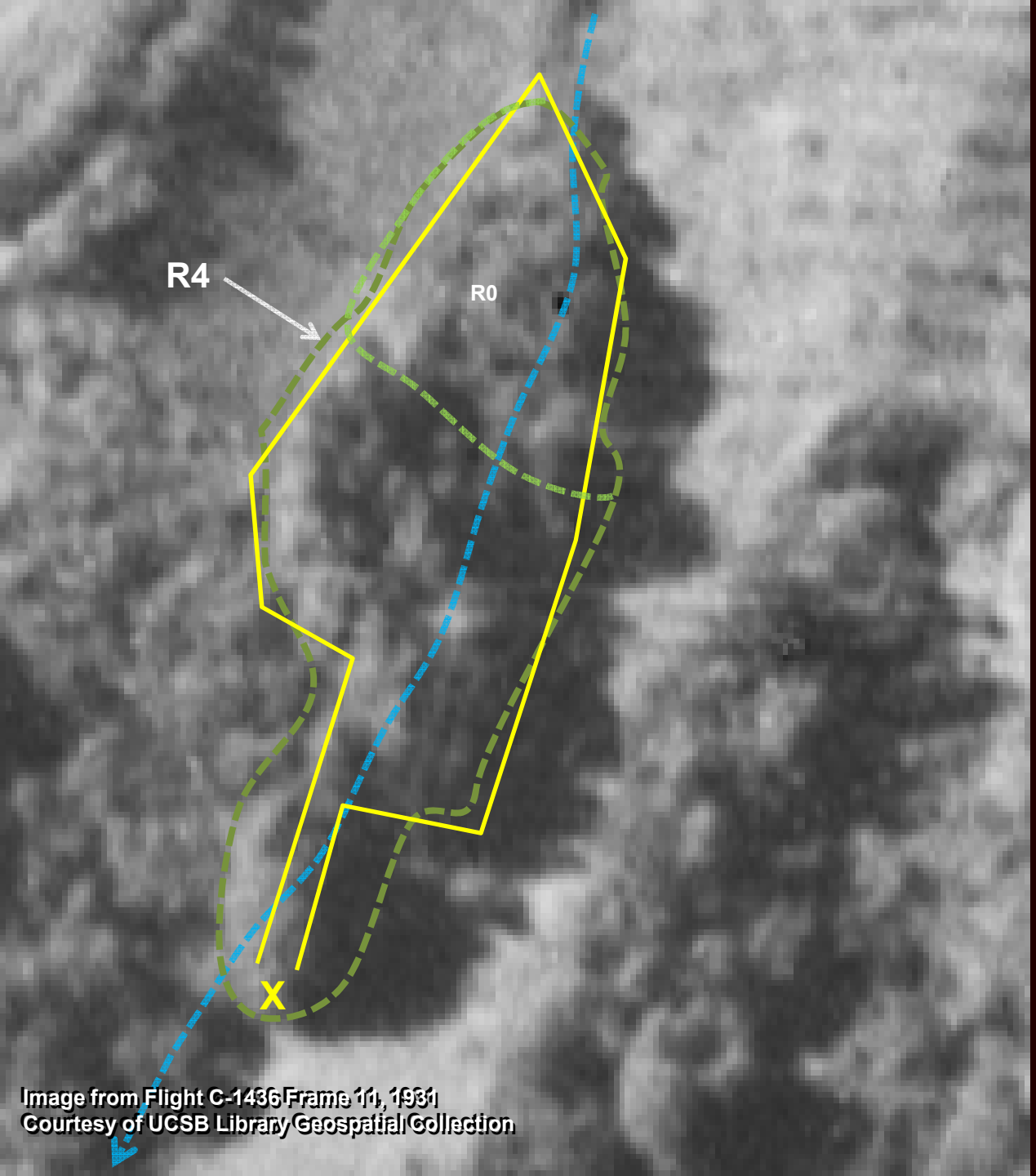


Image from Flight C-1436 Frame 11, 1931
Courtesy of UCSB Library Geospatial Collection

The R4 stand are all (with the sole exception of the fairy ring at "**X**") single-aged seed-trees (R0 is inside the limits of R4). Redwood seed does not have "wings" like pine does; it doesn't fall very far. So how could it have dispersed, germinated, and established so evenly so far across and up that slope? It's really simple; indeed, once one sees it, one gets to feel pretty stupid.

Almost all of these monoculture seed trees in R4 are distributed about the length and width of one big tree. The key is "**X**," the "fairy ring," of clone trees at the bottom of the stand. Yes, they are taller and bigger than the others in R4, but clones from stumps grow much faster than seed trees. They are probably all the same age.

So, *how* did this happen? In the 1880s, my guess is that Charlie Martin logged the tree under clone "**X**," the cones opened, the seed hit the ground and the slash was later burned, leaving a perfect seed bed for redwood germination with minimal competition. The result is this overstocked monoculture forest chocked with skinny poles.

As to germination and establishment, redwoods don't produce root hairs. Seedlings are therefore not highly-competitive and are thus prone to drought mortality. All of our redwood stands are on steep north-facing slopes shading deep gullies.

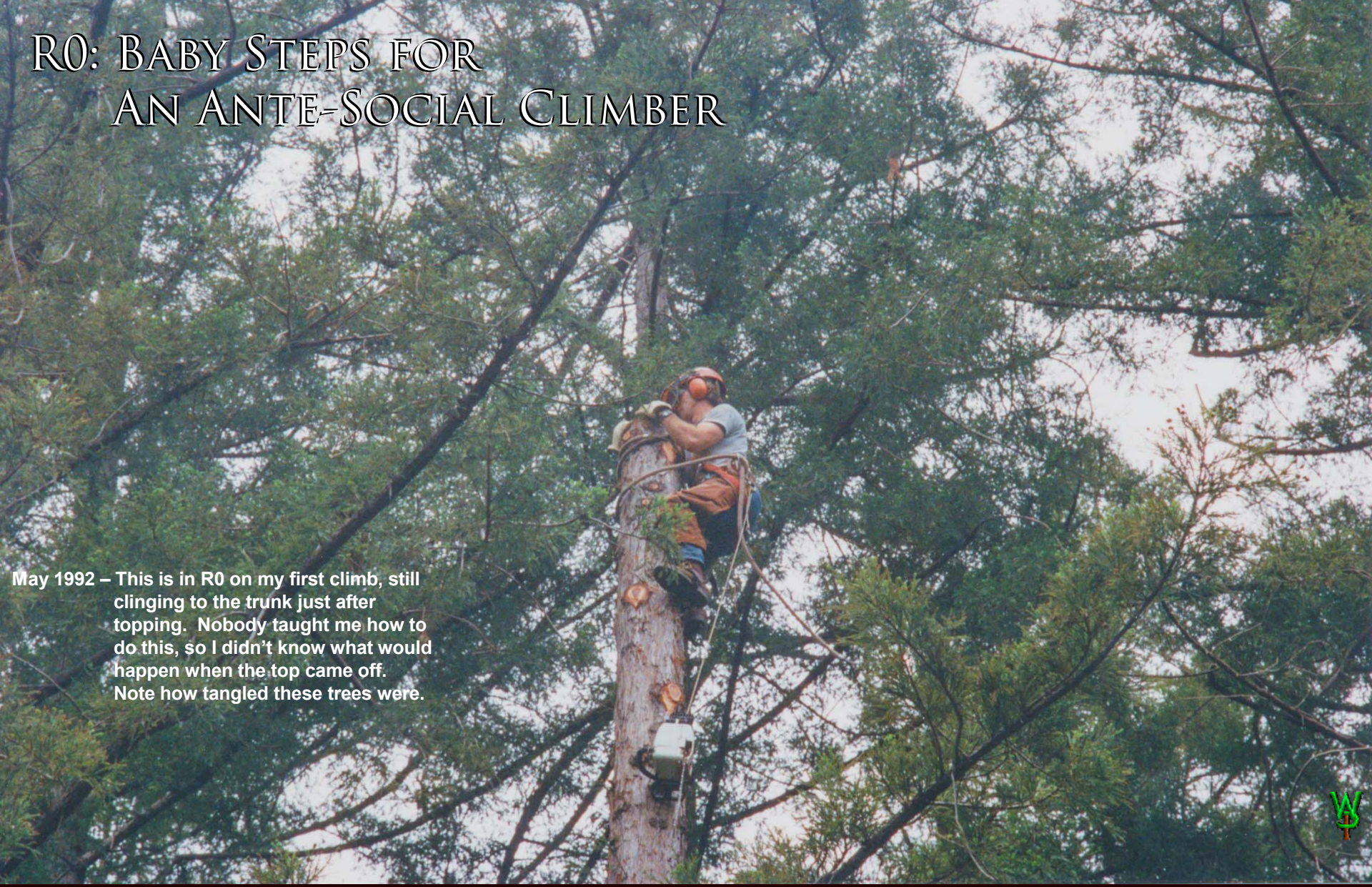
Different now, isn't it? I can't repeat the photo exactly because there are so many new trees in the way …and roses, hazelnuts, lilies, larkspur, violets, grasses, seedling trees… and more of those damned crown sprouts. Light started the sprouts again.

The reason I was able to guess at that connection between a buried stump and the channel grade is that I had seen that “filter” process elsewhere from trees I had logged in 2000 (R1, discussed later). There were so many crown sprouts that, by 2006 when I went in to cut them back, they had captured almost a foot of sediment and caused the stream channel to revert to its old grade before logging (See forestry chapter on drainage). But the real reason I could infer this hypothetical crown-sprouts-acting-as-a-filter process is more subtle: If I had not lived here, fooling around with how things worked for 30 years, cutting trees and watching what happened, I would never have recognized the consequences of the process long after the cause was gone. Local, multigenerational knowledge is something few urban environmentalists appreciate. It may be occasionally mistaken, but it matters.

At right is not an exact repeat of our original photo because there are so many young trees in the foreground now. On the right is what the stand looks like after removing the "junk." Note all the crown sprouts; while the fire hazard is certainly reduced, it won't stay that way. So far, all I have done is to take a brush cutter to them. But do that in the fall when (treatment might work), and one gets attacked by forest yellow jackets *(Vespula acadica)* which are particularly aggressive, nasty, and tenacious.

As to the foreground, it is obviously past time for me to make choices, but the pending removal of dead and dying fir trees due to water competition and shading from the redwood will do a lot of damage to these saplings, making selecting keepers problematic. Originally, there were no groundcovers in here at all. Now they are luxuriant and diverse. This situation points out an obvious long term problem: How do I keep the groundcovers and reduce the rate of invasion of tree seedlings? I am suspecting grasses may be that answer. In here, we have *Melica torreyana* and could support both *Calamagrostis spp.* and *Festuca californica* without posing any fire hazard.

R0: Baby Steps for An Ante-Social Climber



May 1992 – This is in R0 on my first climb, still clinging to the trunk just after topping. Nobody taught me how to do this, so I didn't know what would happen when the top came off. Note how tangled these trees were.

Like the rest of the place when we started, our redwood stands were all at serious risk of a catastrophic crown fire. Like hardwoods, thinning conifers here starts with clearing the junky trees to see the others well enough to make choices. "Junky" are usually either suckers, strongly curved, forked, severely kinked, having a major defect weakening the tree, having multiple tops which eventually blow apart... Again, like hardwoods, once that first phase of thinning junk is done, there is then more room to drop others for proper spacing without getting hung up or crunching into anything you want to keep. That entails climbing.

I'm guessing I was about 8 when Mom took this picture.
Yeah, I was crazy about climbing trees even then.

The trick Is to remove larger trees in a manner that minimizes injury to the keepers. This often involves putting on spikes and a cable-belt, climbing 80 to 100 feet up one of these weak spindly beasts to cut the top off in a way that is safest for the other trees to make adequate spacing. What happens frequently is that falling junk can hang up in the branches of those remaining instead of going to the ground. Lacking the force available from heavy equipment to pull them down, one then has the joy of climbing said keepers to cut off the branches retaining the troublemaker, as working from underneath a "widow maker" is not an option.

They say that topping it higher is safer. "They" say that when they are standing on the ground. You see, when one tops a conifer tree, there is this little matter of Newton's Third Law**:** When the top starts to fall, its mass shifts to the side in the direction of the fall. The trunk reacts to that lateral load by bending like a big leaf spring (pun intended). Once fully loaded, it whips back, and tosses off the top, with the perpetrator (hopefully) still up there waving around like a flag on what's left (previous page). The Doppler-shifted warble of miscellaneous expletives echoes through the forest…

Then you clamber down (shaking) and get out the trusty felling saw. Now drop the trunk where you can get it out and not hurt anything. Often that process involves setting a choker cable on it to pull it over, and once it falls, bless you if you can keep it from sliding back down the hill! Rather than harm a "leave tree," at times you drop it in such a way that you know it will shatter. For your trouble and risk it is not unusual to get a kinked log, with lots of knots and… a rotten core inside that tree you just climbed (typically from fire damage). It really gives you a warm feeling about the risk you just took and gets you all jacked up for swinging around on top of the next one!

So, although I do love forestry, there is always a certain amount of trepidation involved. Then there's the labor dealing with the top**:** removing the branches, bucking the stem, and piling it all for burning once it's dried out. Then there's getting the logs out.

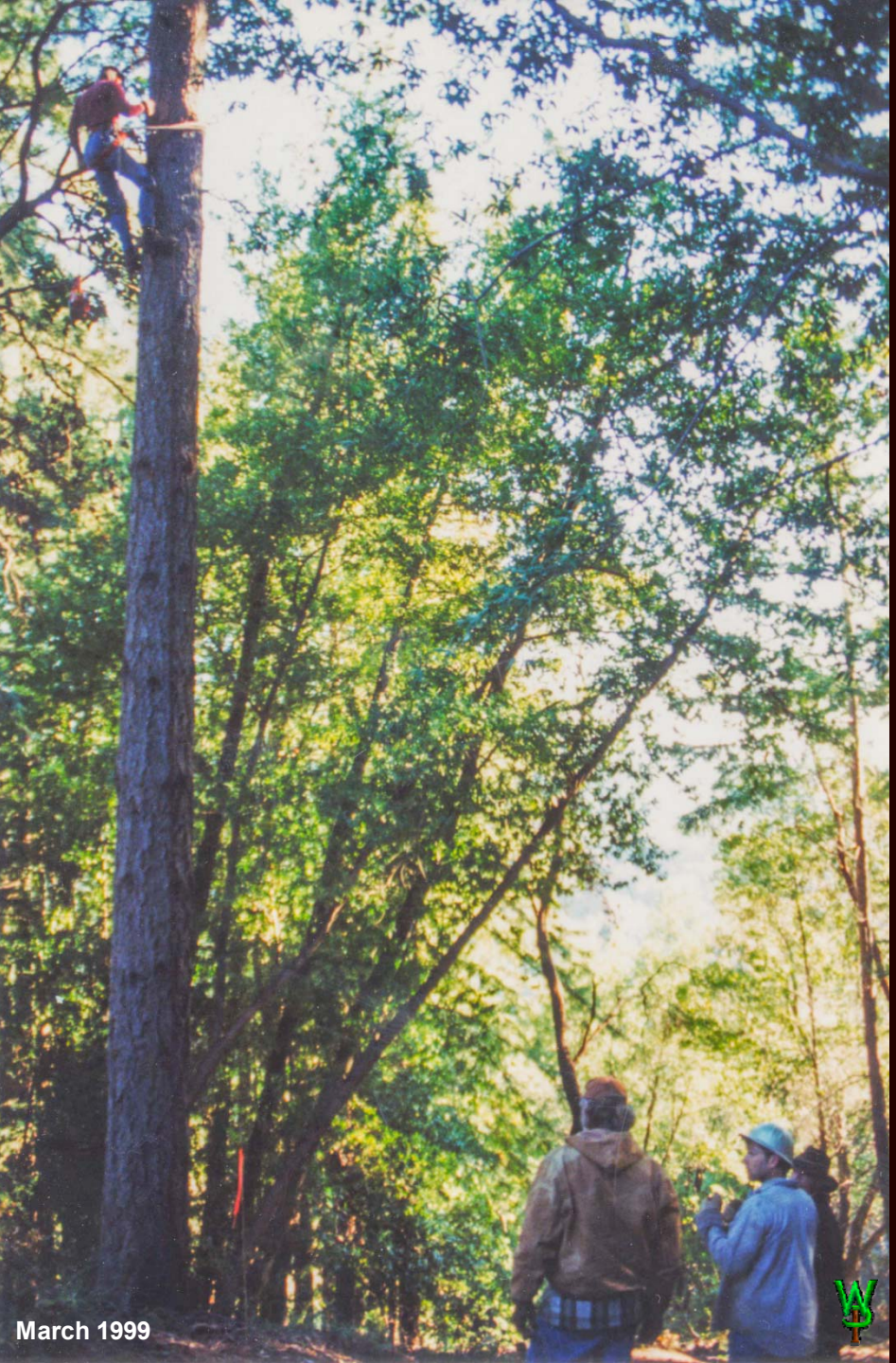
March 2022 – It might be fun to make this into a nesting tree, but one would have to climb it to take off the lower branches to reduce the fire hazard. It wouldn't last long that way.

At the apex of "junky" conifers around here, Douglas fir easily takes the cake. They grow so fast in this climate that the ring structure is weak compared to the Pacific Northwest (half-inch rings are not unusual). They grow so much taller than hardwoods that they keep their lower branches which can then get huge, making very weak trunks producing knotty lumber. It's not even good enough for posts.

But the worst thing that happens is when fir trees lose their central leader (topmost stem) in winds, at which point multiple branches just below the top bend upward in the great race for light as "co-dominant leaders" (left).

These "co-dom" trees are often infected with rot at the crotch where they eventually blow apart. The one at left did just that a decade ago (at least), at which point it started going for a second round! It really does illustrate magnificently all the features just described.

Said "tops" (I've seen 60-footers) do considerable damage on the way down. It's a lot of work dealing with a tree like this (on a neighbor's land). I didn't have any photos of one of our own, because they were gone before I realized they should have been documented in film.



March 1999

Of the few pictures taken of me while working here, by far most have been while climbing. I really have no idea why, as I'd never asked for it. Makes one wonder what they were thinking to document (I don't want to know).

Logging is dangerous, by far the most dangerous job on land in the United States. What most people think of as "logging" is the guy with the big saw doing the dirty deed. It is an important job demanding serious skills and physical strength that does get people killed, but the fun part is by no means the most dangerous. Yet in my experience, the most hazardous job isn't the climbing topping, and felling, it's in the work on the ground after the trees are down: bucking, and branching logs, setting cables, and hauling them out ("yarding"). The forces involved are so much higher and more unpredictable in a tangle of logs with big cables from bigger winches tied to huge equipment far away, and the work itself is long, seemingly repetitive, and physically exhausting. So climbing and felling get lots of glamour, and yes it's a thrill, but I really do wish the guys on the ground got more credit for what actually makes things go.

This climb was to set a block up in this fir tree to pull out small (6-10") redwood logs from the stump wad down the slope below and to the left (later to become R1). We were donating the logs to be used to restore an historic cabin at the Brookdale Lodge. Why the gang came from 14 miles away all the way up here to get the logs wasn't clear to me, but we did have a substantial number of very skinny "junky" redwoods with very tight grain and almost no taper in the understory of our larger trees that made them perfect for that job. A typical timber property in production doesn't have trees like that left (they clear the junk just like I do), so in a way and for a very limited quantity, in this job the "junk" was highly prized. I made fence posts to be (I've never used) out of the rest.

It was very neat to go to the Lodge for breakfast one Sunday, see them in the wall, and remember this very pleasant day with friends, all volunteers, just doing something good to help a small but enduring local business.


May 2000 – R0 seven years later

By the time the junk was gone, 3-5% of the wood was down or about 1/3 of the trees by number representing about 25% of the wood volume. Count the rings. One was 90 years old and seven inches in diameter, bark and all. These were simply cut up on the forest floor laid across the slope to slow the rainwater and build some topsoil. Those that were sound were carried out in 12' pieces to become fence posts, someday, maybe (I still have that stack).

After junky trees are removed, the “next ones” are usually bigger. The purpose for this work was not to get logs; it was to improve the forest and get the logs out with the heavy equipment I had planned to have here for grading roads. There was no plan to sell or use the wood. So now that the logs were on the ground, before they were bucked off into lengths, the next job was to come up with a legal set of uses. At that time, it was illegal to sell the logs, not even in trade; the State holds that as commercial logging, for which they want a permit. Unfortunately, the cost of the permit has grown such that it exceeds the proceeds from the legal limit of what I could have logged ($60,000 in 2010). I’d have to cut more trees than they are worth just to pay for the State’s required paperwork.

Worse, in 2000, the County got into the act with a new zoning law that prohibited all commercial logging on all but parcels 40 acres and larger designated “Timber Production Zones” by the State. That zoning law was effectively a taking of timber value in this County of approximately $1.2 billion dollars. The purpose for this Ordinance was (supposedly) to protect “endangered” coho salmon and “threatened” steelhead.

The technical bases for those listings were fraudulent.

The process of adopting those laws by the County of Santa Cruz was documented extensively in my first book, *Natural Process: That Environmental Laws May Serve the Laws of Nature*. So why so many rules?

R1: Primary Education

April 2000 – There will be a repeat photo of this slope

People get all worried that thinning these trees on steep slopes can cause landslides. It's a theory. It's wrong too. In fact, careful logging of a second growth redwood forest may help to *prevent* landslides, of which there will be two examples of this hypothesis in this chapter from R1 and R3.

Big trees on steep slopes weigh enough to *cause* landslides. How do I know? You are looking at one that happened long before (called by geologists a "rotational failure"). I loosely estimate that 200 years ago, a single redwood on this slope (an "old growth**" tree "**Y**") became large enough to break loose and slide to the bottom of the ravine below.

The upper part of R1 is at left. The lower stump at left is almost four feet across (I want you to think about wielding a saw that big felling a log that big on a slope this steep, a log sure to come back down the hill after it drops). I let a professional cut these two.

How do I know? Well, when we logged the trees down below this one, we pulled out the old stump from which they had generated. I dug out ten yards of dirt full of roots to change the drainage path from around that stump cluster to through it as a means of stabilizing that drainage channel. In the process, I found that old log, buried underneath that old stump from said rotational failure.

The log was buried by the landslide that came down with it, just as with "old growth" tree "**Z.**" Whether the "**Y**" log sprouted from seed or was propagated vegetatively, I do not know, but the result was two full-sized trees, each about 24" dbh (diameter at breast height). Somewhere around 1880, white guys with steel tools came along and whacked them both.

Up sprouted 31 clone trees in a 20 ft diameter circle.

** **To be clear, what I call "old growth" are trees standing during pre-colonial times under aboriginal management; i.e., before the Spanish burn ban of 1793.**

October 1999 – This wad supplied the logs for the Brookdale Lodge

They looked like this. A third were dead, 16 were under 8” and 9 over 20.” There were 3-5 in the process of fusing together while being undercut by a drainage channel through the alluvial substrate. It was a wall of fuel wood with half a foundation.

What did I do with this mess? In 2000, (7 years after my first logging job), I got some help from my friend, Steve, whose family had been working in redwood for 60 years. Steve needed a low-key practice job to help figure out if he had a career left after back surgery from a serious fall. After I had whacked out the runts, the two of us set up to fell about a third of the larger trees. We planned to drop them all through a fifteen-foot gap between two trunks 40 and 60 feet away. One of those two would have been snagged and broken by the ones we were falling through the gap, so I climbed it (twice) to set a rope where it was about 5” across. Then Steve bent it about 25' out of the way. I climbed each of the others in turn to set the chokers. Steve pulled them back over center through the gap on a 300-foot-long, 5/8" high-lead cable over a snatch block in a fir we used as a “spar tree” up on the ridge. It was easy.

Once the trees were down, Steve and I got to climb that slope, branch, and buck the tangled logs. I set the chokers. There was no winching or skidding because Steve could back the loader down the ridge as a counterweight with the cable over the block in the fir.

Once the logs were out, then came the hard part: a week spent digging out that old double stump. There had been two trees perched on its twin tops: one held with but a few cable-like roots winding through rotting wood and the other was perched on top of the solid half of the old stump held by an arc of roots grown together down one side. I removed four feet of dirt with a hand shovel and a Pulaski (a combo ax and adz) with which to cut roots, redirecting the water away from the unsupported alluvium into the middle of the cluster where all the roots are. Then we sucked out the stump with a double purchase gun-tackle on said 5/8" cable, and popped out a dozen or more root suckers the same way. I set a choker 40' up a tree with a block on the end and we swung the stump out of the cluster and into the drainage.

Then Steve went up the hill on that insane slope and felled that monster clone tree from "**Y**" (two slides prior). When he cut that stump flush per my request, then God rolled it downhill into the drainage channel where it sits perfectly to this day, starting to sprout new trees, and capture sediment to fill an old 15-yard pocket eroded out of the alluvium. God makes a pretty good LTO when you really need one, and comes cheaper than heavy equipment.

It sprouted trees, because redwood is almost indestructible. It's on the cover of that first book.

I gave the logs to Steve. He did use some in his house that later burned to the ground in the CZU fire. Sue me. Neither of us had any intention of financial benefit and it shows. He said that this was like working with his Dad again, and to me, it was an honor. Les Liebenberg was God's gift to redwood in these parts. He died a bitter man for all the damage environmentalists are doing. Nobody around here knew and loved these trees, or risked his life to care for them, like Les did.

It wasn't like we were doing this in secret; I sent a copy of the book to CDF (CalFire today). They pored over it trying how to figure out how to make what I did legal. Nancy Drinkard decided to call it "research."

Why? Because they know a good job and real research when they see it, just like any human being with functioning synapses between their ears.

Where there were 31 trees, nine of them over 24", there are now six large trees, each about 10'–15' apart, with perfectly spaced tops. Unlike many coniferous trees, a redwood trunk puts out new branches in response to light and they would balance as you will see.


Cable Block
Fir Tree
Loader
Logs went this way
Trees felled this way
1
2
3
4
5
6
October 1999, The Wall of Wood (Before)
April 2000 , The Wall of Wood (After)

Now, how did I know about that 250-year history starting with the landslide? How did I know why these trees ended up where they did, and why did I think that the action I was taking had a good chance of preventing a problem? When that stump popped out, **I found that old log** from that original landslide still under the alluvium, dead, but still sound. I dug out that old stump and learned that history while I was doing the job. That is how I know what happened 250 years ago.

From what I have seen, the environmentalists have it dead wrong. They demand 'No logging on steep slopes' because the soils would be disturbed, which might cause a little sluffing that they fear will release sediment. That may be true, but the real question is, how much erosion is caused by thinning compared to not thinning? If we don't log steep slopes, the trees get large and heavy enough to apply sufficient load to the slope to break loose, just like that tree 250 years ago on my place. Landslides like that are all over these mountains (you'll see one later in this chapter, with a log underneath just like this one). Landslides choke with weeds and weep silt for years. By contrast, a redwood stump cut to the ground line will sprout, thus making a living retaining wall if need be. In other words, the biggest risk of sedimentation in streams from redwood is if we DON'T log big trees on steep slopes.

On the other hand, because I thinned the cluster that grew from that old stump, with the weaker trees removed, those that remained sprouted new branches into the gaps on the side that needs the weight. They thickened and straightened. The bark will continue to thicken to protect the trees from future fires. They will be more capable of forcing roots around their perimeter. It looks like this…

This is the same cluster from above (this second photo was taken from about 75 feet farther down the ridge to the right). One of the six trees is behind one of the two trees in the foreground that are not part of the sprouted cluster in the story.

Competition among crown sprouts makes them bolt for light into tall, skinny trees. When the wind blows, they sway big distances. Shearing and collision breaks off branches between trees while a lack of light starves branches toward the middle of the cluster. The branches they retain are either at the very top or directed away from the center of the original tree in the same direction in which they lean. That puts stress into the wood. The right thing to do was to thin them but that increases windage and allows them to swing farther. If the trunk doesn't break off entirely, then movement makes stronger wood. Variation in both sheltering hills and other trees makes the degree of thinning redwood can tolerate a site-dependent balance, a matter of judgment, experience, and pure luck.

In 2001, I wrote in *Natural Process* that these trees would sprout branches and straighten, but in 2009 I could hardly believe the change! Yes, this is the same cluster looking up (taken with different lenses) showing the recovery. They even realigned themselves to a degree in their race for light. After a decade or two, this cluster could be thinned down to three but at that time I can also allow a few of the sprouts to develop. Then it can probably go for another hundred. Slower growth makes better trees and better lumber.

Steve got some nice logs to mill for his house, a house that burned to the ground in the CZU Lightning Complex Fire, along with all of his tools. When the job was done, I wrote it up for *Natural Process,* as getting real-life experience of logging was the purpose for the timing of the job in the first place. When the book published, I sent a copy to a the local office of the California Department of Forestry and Fire Protection. As I said earlier, Nancy put it down to "research" (which it certainly was), but she also apparently gave Steve a word or two about how this was going "too far." Upon more than one occasion since, I have been thanked by CDF personnel and management both for doing the kind of forestry research that they are just not allowed to do. It doesn't take long working in a forest to know that the politics have made a mess of things. I was just happy that the logs were gone.

This is only nine years after the job. I've just whacked sprouts. For those of you who might be worried about logging releasing silt downstream, we had almost no groundcover before starting. Look at the stream channel now! Does this look like something that releases silt or is it a stream channel that captures silt? Does this look more like a healthy forest than when I started?

April 2000, The Wall of Wood (After)

November 2017 , The Wall of Wood (After “After”)


This tree
Is this tree
The trees on the outside of this cluster will go in R3
R3
April 2000
November 2017 – Not an exact repeat

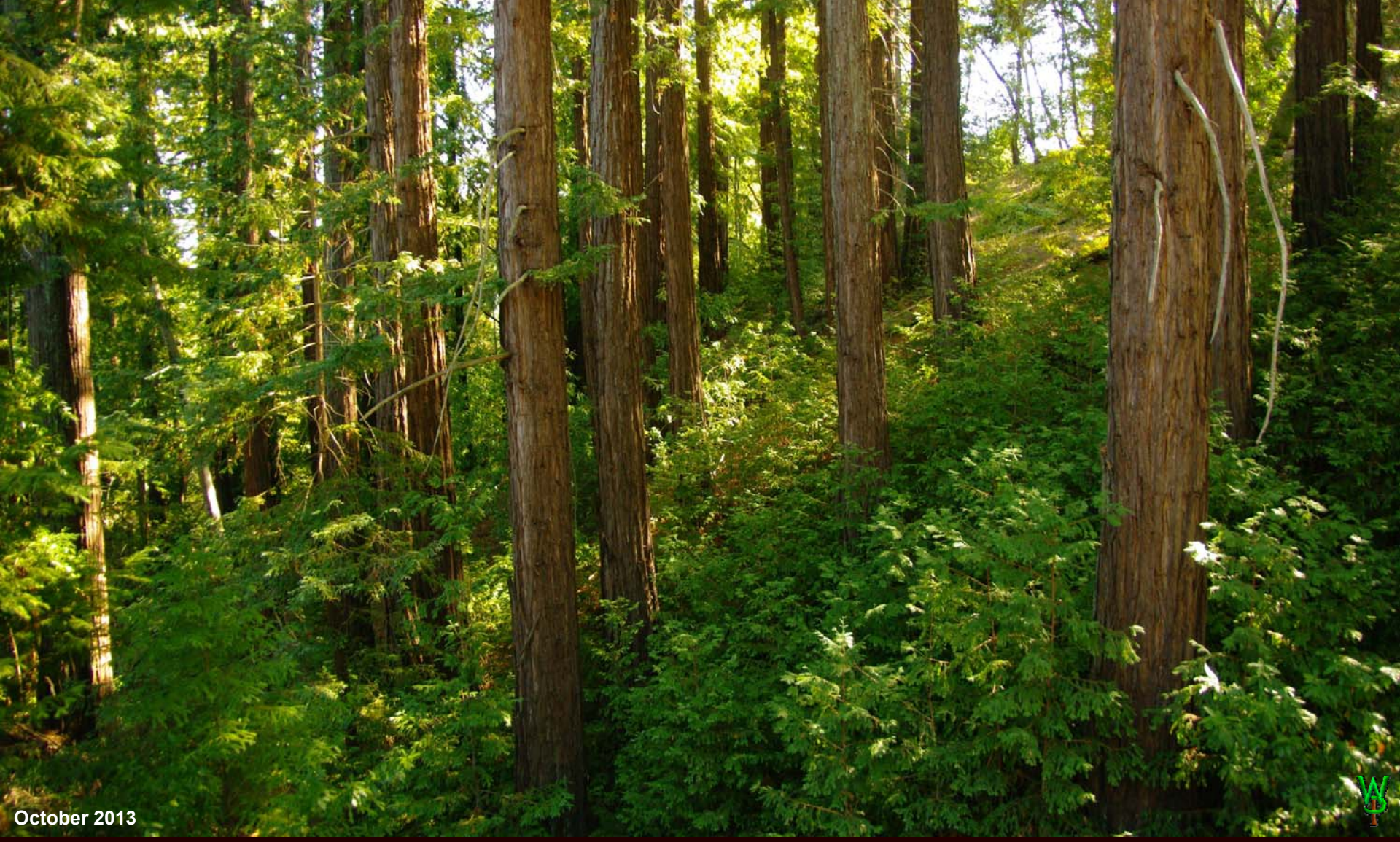
Crowning Glory Or Sucker Punch?

October 2013
Nearby, but not our property

In the first logging of this area (1860~1910), they didn't cut trees to the ground, but crown sprouts didn't matter because they burned the slash so hot that it killed the buds on the stump itself. That way, new trees sprouted farther from the stump with a better opportunity to develop structural support around their bases. You can infer from the hump how much soil was lost here.

The State banned slash burning, in part because people had not been burning as frequently as the Indians, thus allowing significant fuel accumulations to blow up into some huge fires. After that burn ban, redwoods which were not cut low enough sprouted shoots out of the side of the stump, bending upward in search of light, growing away from each other while hanging from a rotting foundation.

This burned stump holding these unstable trees is eight feet across. Fixing these old problems typically consumes 20% of the total revenue from a timber harvest. Worse, the wood from gravitationally stressed logs like these is apt to curl when it is milled. Lumber is what pays for timber management. Better lumber pays for better forestry. Better forestry is necessary for restoration.

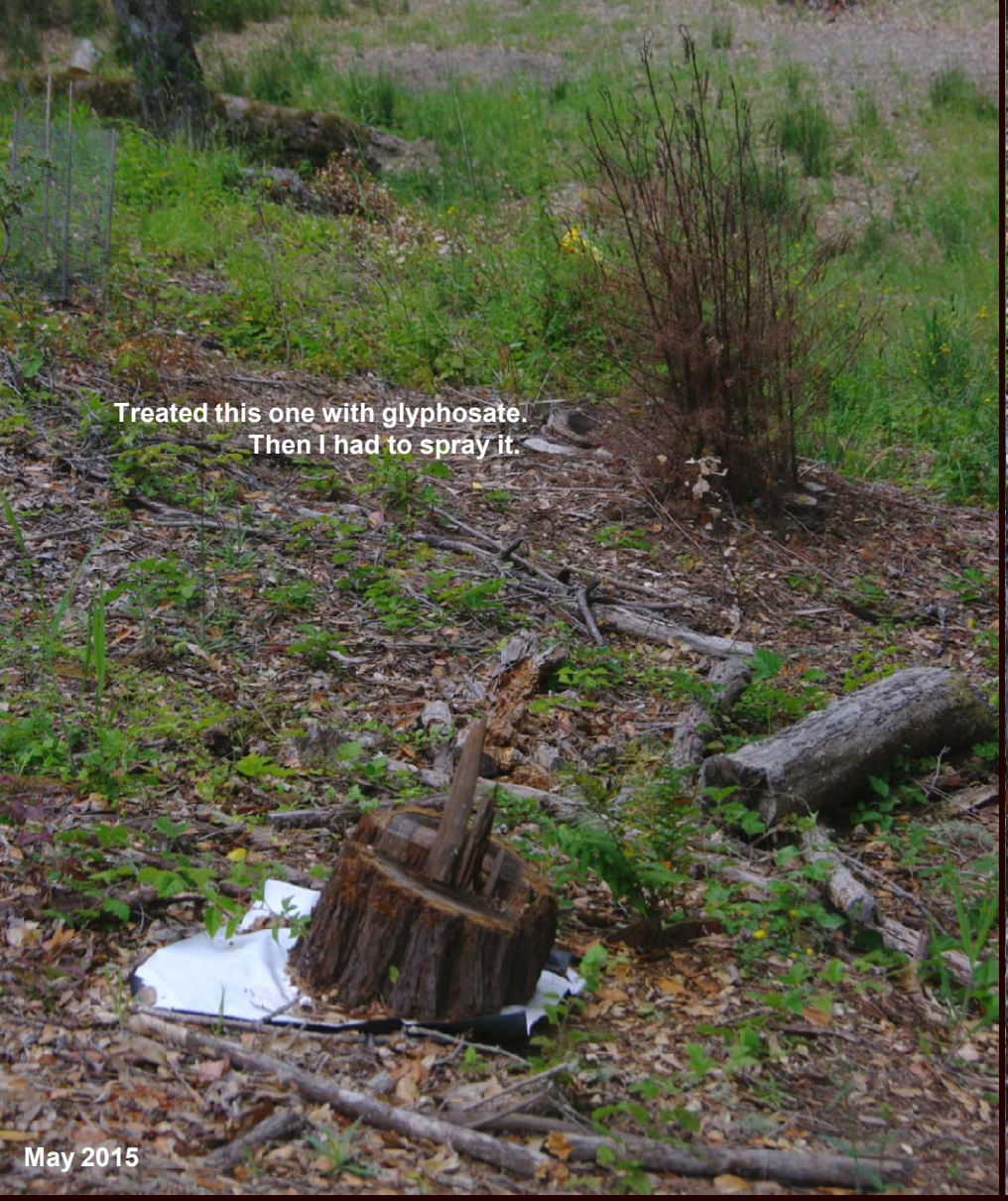


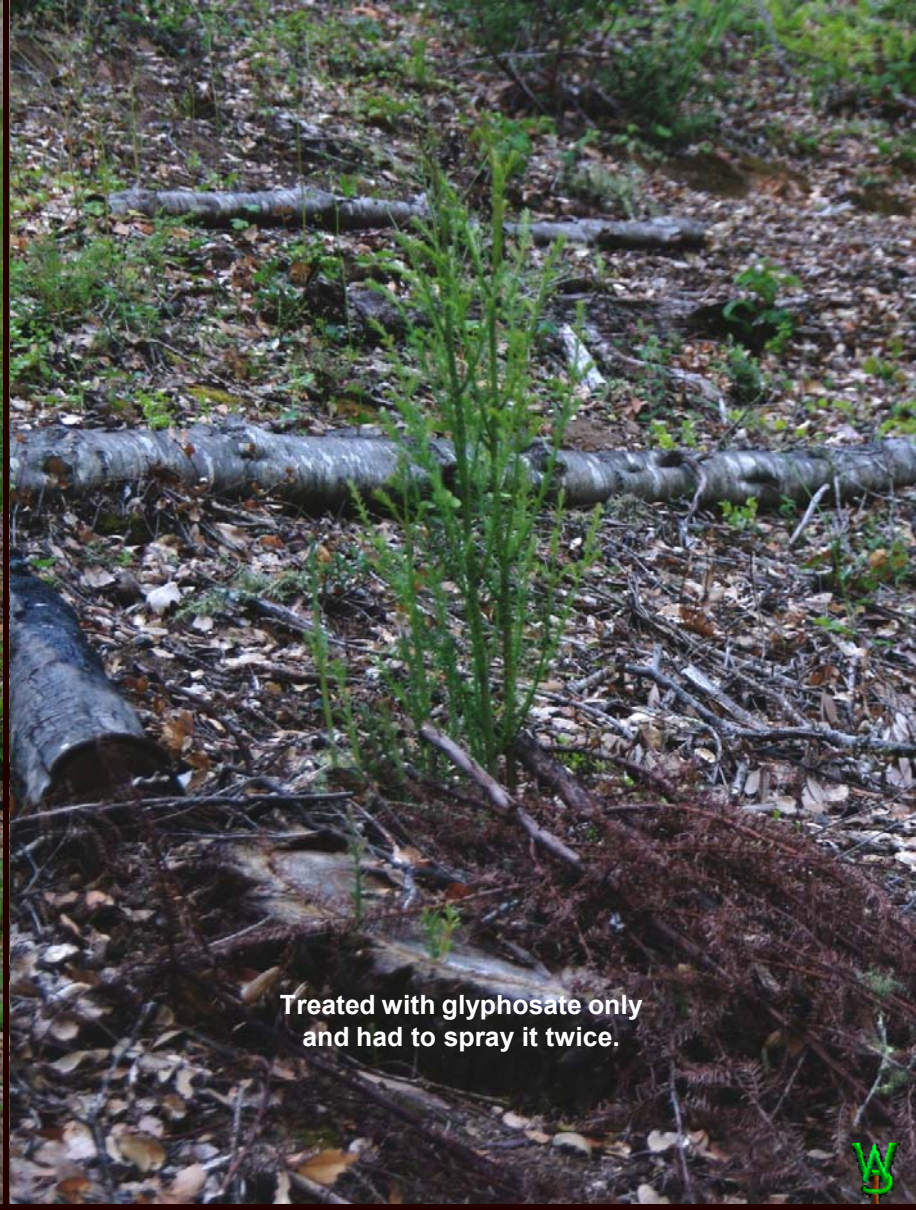
This (R0) is the part of our biggest stand I logged in 1993, primarily to reduce the fire hazard. It's a pretty picture and the trees are healthier, but it is still a MESS of a "forest". So by now you should see what the problem is: Redwood sprouting from the stumps I left made WAY too many trees to be sustainable as a forest. Crown sprouting is really a problem, and academic forestry does not take it seriously enough. As the stump sprouts grow, these will become "ladder fuels." I cut these sprouts with a brush cutter every 7-10 years. I want fewer trees, growing more slowly making wonderful fine-grained lumber, with lots of other kinds of life on the ground to feed wildlife. I want a healthy and beautiful forest. That means I needed to learn how to kill or suppress crown sprouts with minimal damage to anything else, but what do you know is that *Sequoia sempervirens* (means "lives forever") is really hard to kill.

Crown sprouts are fuel. So, I cut them back. After cutting crown sprouts for 30 years, what I got was sprouts from sprouts. If I could burn without restriction, fire would certainly be easier and less risk to big trees than using herbicides, but there's this "little problem" of the fuel surrounding this property with expensive houses that makes that plan a bit untenable. Worse, can you imagine what burning enough redwood to get a handle on this problem would do to air quality? That leaves chemical, mechanical, and animal. Deer and goats eat soft redwood sprouts 1-2 feet tall, but not with preferable forage available. Cut sprouts make more sprouts.

It doesn't matter how harsh the environment is or how frequently sprouts are removed, they just keep coming. The crown sprouts on this redwood in the parking lot of the Brookdale Lodge get whacked frequently and they're still coming up almost as thick as grass. Elsewhere in that lot (inset), they paved over a stump and a ring of sprouts still come up through cracks in the asphalt.

There are variations on this problem. Redwoods also sprout suckers directly from the root crown without cutting or burning the tree. Drought stress is the most common cause. If they are allowed to grow, the sprouts can get big enough to fall and tear out a chunk of trunk, thus damaging the roots anchoring the tree. As they grow, they also force the parent tree to deflect from vertical, which puts stresses into both stems, thus causing the lumber to bend into a curve when sawn. The regular burning Indians did likely cleaned off crown sprouts. We can’t do that, so I do experiments to learn how to deter, suppress, or kill root crown suckers.





The most effective way to kill a redwood **stump** is to treat it chemically within minutes after the cut as low to the ground as possible. Roundup (at 25% glyphosate) is the only chemical treatment that seems to work, but not terribly well. The best time to cut and treat is in the fall. Yet one can't always treat the stumps because some are connected to other trees by root grafting underground. In the case of seed trees (as opposed to clones), translocation of herbicide to others is a lower risk. Still, to reduce risks with herbicides, I am seeking alternatives to chemical treatment. At left I am trying a bit of used billboard material with the cutoff stump set on top to keep it from blowing away. The real test came when I removed the vinyl and let the sun hit the surface in 2021. Painful, but it worked.

August 2016 – It's my truck, but it's not me. I do have a grinder just like this one.

Could I just grind the old suckers? In principle, that would help. In practice, it would be brutal on the steep ground we have. I do have the portable grinder though. How many can I do in any one year? How far do I go? Will it weaken the roots and cause a fall? It might make a lot of holes… what about erosion? In reality, this is a matter of competing risks. It just so happens I am willing to own those risks, try various treatments, report what I find, and deal with the outcomes. After all, they are my trees.

September 2020 – Mid-afternoon during the CZU Lightning Complex Fire

What about using fire instead of chemicals? It works but… A recent prescribed burn in Wilder Ranch State Park treated only 300 acres over 5 days. People complained on chat boards the entire time from 15 miles away. Consider what the CZU Fire did to air quality (above) in the San Francisco Bay Area. Burning thousands of acres annually is simply not going to happen.

Yes, using chemicals is risky. I am more tentative about treating sprouts and stumps close to the keepers. But if this problem is allowed to progress, what we WILL get is what happened after the CZU Lightning Complex Fire. Now, what was that about risk?

This process began timidly (for good reason) but this 4'dbh tree (inset 1) is fairly undesirable in that it is strongly tapered, isolated, too close to a road having lots of larger low branches, and also had two huge suckers and about 20 smaller ones. It does do a good job of shading more desirable trees behind it but there is a young bay nearby to do that job. So I first treated all the smaller suckers with glyphosate in fall 2020. There were a few browning tips on the host tree that were gone the next year. There was one sucker the next year and two more in 2023. The next stem was the sucker-to-be-stump next to the road (inset 2) testing the absorption pattern from a collar-cut compared to a straight cut. The 24" backside sucker was cut straight across and treated on the outside only.

The next step was to treat sprouts on stumps I cut for thinning R0. Again, we are lucky that I am dealing with mostly seed trees that translocate the herbicide to others less efficiently but there are also sprouts off the crowns of suckers which I cut off or near the main trunks 30 years ago. Here is where the experiments treating suckers (prior slide) came in value. The challenge is that chemical treatment is best done in fall when it is most effective, but one attack from forest yellow jackets is enough to cure that ambition!

To this point, all I had done is to take a brush cutter to sprouts, but do that in summer or fall and one can be mercilessly attacked by the aggressive, nasty, and tenacious forest yellow jacket(s) *(Vespula acadica*) which take up residence in the holes produced by rotting stumps of cut "junk." Hence, before beginning any job in a redwood stand, I take out the nearby nests. I have refined a process for that using a modified commercial yellow jacket trap, replacing the interior cone with **screen**, and drilling 3/8" holes in the top. I lace the bait (shredded chicken) and wet the screen with fipronil at a low concentration such that they escape the trap to take the poisoned bait and what their bodies picked up back to the nest. It kills the whole nest in a couple of days. Since I am allowing them to escape the trap on the left, I place a second un-modified trap, baited with untreated chicken to validate that the first one is being visited. The treatment kills only yellow jackets, usually only one nest, and only for one year.

Given that I have so many small sprouts to treat (and redwood stumps to come), I needed a controllable and efficient way to apply the chemical treatment. And (as is too usual) there really isn't one available for my purposes. The above sprayer wand (**inset**) was designed for daubing weeds, but the sponge on the end emitted too much dripping herbicide. So I made a smaller, less drippy, and more rugged applicator tip (**above**) and tested it in October 2022. It worked to a degree (the groundcovers exploded) but there were clusters of a few cut and treated that re-sprouted (again). I think the key to managing risk of injury to the trees is to keep the basal areas of sprouts being treated small relative to the trees at risk from the treatment, but to also disperse the potential pathway.

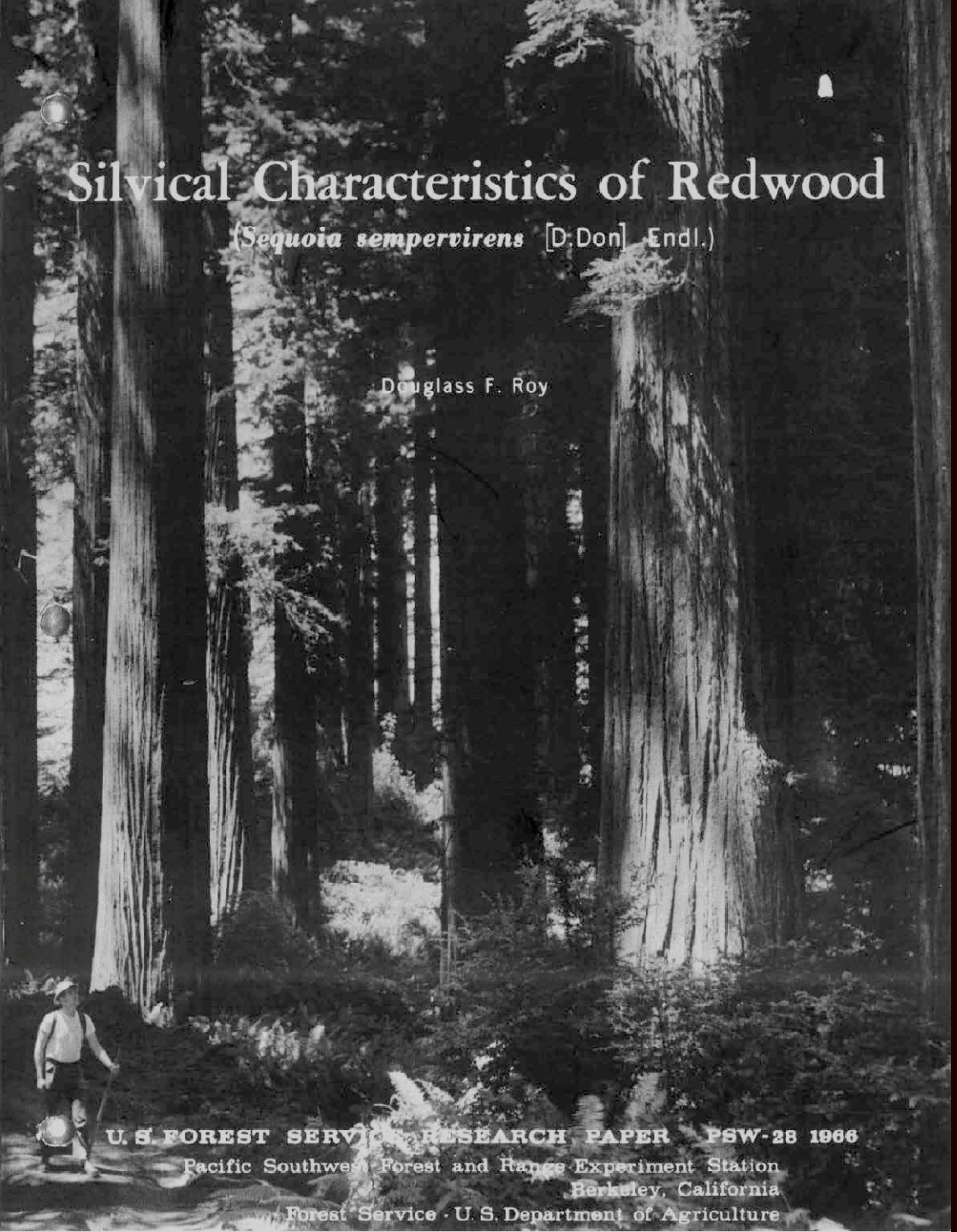
October 2023 – There are more small stems, but they were buried when cutting the callus

I had trimmed sprouts several times over decades. Each cut sprout had produced its own sprouts. So I had to treat them under the new “crowns” from which those sprouts emanated. Finding them is tedious: It takes about two hours per 400 square foot area (one battery). I cut stems and dead branches and removed duff with my fingers to find the callus and stems from older sprouts supporting new ones. I cut and treated those and then cut off the callus on the stump to treat that but that increases treated area substantially, possibly putting adjacent trees at more risk. On the other hand, it seems that the grain of the callus is less efficient at piping material into the crown. The applicator is still too drippy; it needs an o-ring and a layered sponge material to distribute it evenly such that compressing the end face is the only way it releases the material.

Above is a callus on the stump of what I thought was an isolated “junky” tree and a callused sucker visibly on a root crown (of which there were two on this tree). All three were sprouts off the crown of the tree at right, cut 30 years ago. One then runs into the following questions: How far does the crown extend from the stem? I asked a forester I know who occasionally plants root wads into creeks: 4-6 times the stem radius. Redwood roots extend far from the tree. Grafts do form in the web of roots underground. Twenty years ago, I treated a smallish redwood stump and another tree 20 feet away was critically affected the next year. The good news is that I wanted them both down, but it was a warning. Hence, insofar as the undesirable option of using glyphosate is concerned, whether it kills the sprouts or harms a tree comes down to dosage flowing toward the tree. Can that be determined by experiment?

I am guessing that it is better to do this is before logging, to use transpiration to suck more stray poison escaping target stems into trees to be removed (left). Cutting sprouts before logging also cleans up the stand to make it safer to do the falling, if only because of visibility. I have also tried shaping my cuts on root crown suckers to reduce sprouting (right) instead of leaving them cut straight across, in a manner analogous to cutting just beyond the branch collar when pruning hardwoods.

Even a marginally reliable answer to this would require a massive statistical experiment design with a huge sampling array. How much damage can one tree tolerate? Can one detect how far a root crown extends? Do transpiration rates as a function of the time of day of application matter? How many sucker crowns around any one tree can one treat per year? How does weather affect treatment response? How big can the treated crown sprouts be versus how they are distributed around the root crown? If the roots are grafted underground, is this a matter of aggregate basal area treated versus basal area of trees? How efficiently does a callus translocate the active into the root system compared to a cut stump? Must one treat only some of them in any one year? Is there a maximum aggregate sprout area one can treat within a stand? What is the minimally effective treatment? How would such specifications be communicated to an applicator? Is any of this truly knowable? Would hormones work instead? This calls for adventurous academic forestry. A possible source of answers is to analyze translocation of radioisotopes after a benign “treatment” (including surfactants and such).” This kind of work is done by Todd Dawson’s lab at UC Berkeley.



Finally, to anyone who thinks I like chemical treatment… obviously not. I don't like taking risks with my trees in a state of ignorance. But there is an important lesson and message here for the long term beyond treating stumps and the risk of harming good trees with chemical treatments:

The image at left is of a forester cruising an "old growth" stand of early middle aged redwoods, which are particularly prone to producing wads of suckers. Some are over 7' tall (do ferns suppress them?). In 1966, nobody did anything about suckers because they wanted regeneration after logging. Look at the spacing. These trees are 25-30ft apart. Is that what he'll get after logging? Is he thinking about the future forest and the wood he'll grow or the logs he'll get?

This has been a problem for a long time. Nobody is working on alternatives to chemical treatment or whacking back sprouts every ten years, which only makes more sprouts producing a catastrophic fuel load while inhibiting groundcover biodiversity.

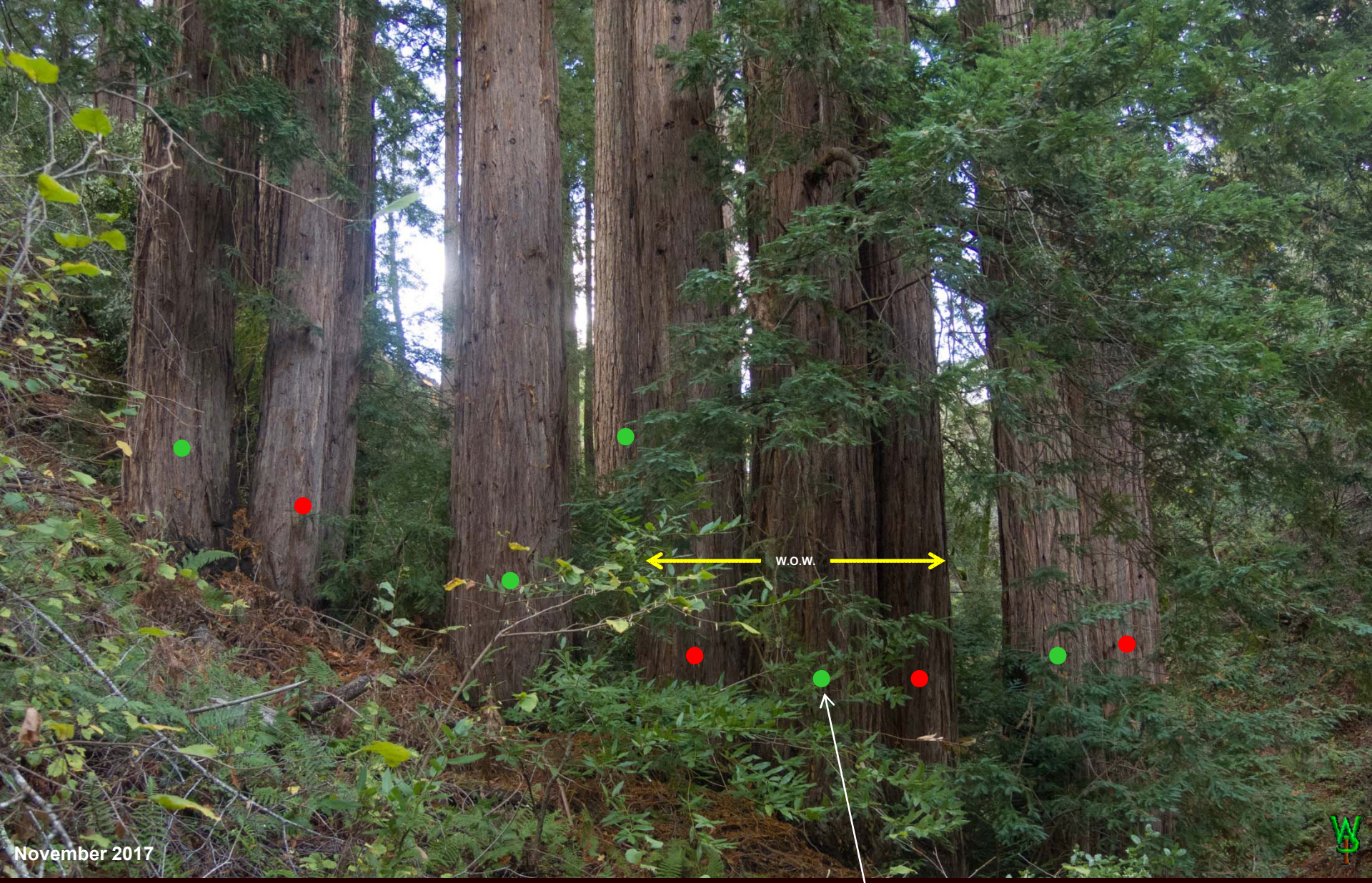
The main reason we get redwood suckers is the inevitable drought stress of characteristically-variable California rainfall. Yet to slow redwood growth to get fine ring structure takes cold temperatures and/or competition, the latter of which increases drought stress (and reduces groundcover diversity). Hence, as climate as warms and as enriching atmospheric carbon dioxide stimulates growth, the future of high-valued redwood forestry to pay for total forest restoration will hinge upon learning how to manage crown sprouts cleanly and efficiently. And yet, I could not find a single academic paper of any kind on chemical translocation from treated redwood crown sprouts, much less describing more benign means to inhibit them! It's expensive. This needs to be fixed.

The six-tree cluster on the left (R1) was logged in 2001, described above as originally 31 trees sprouted from a single double stump. The resulting crown sprouts (red) have been cut twice. Being in a drainage, they captured a foot of sediment, which makes that operation VERY hard on a chainsaw. At right is the larger cluster (R2) of what were originally four trees, now nearly 20 along with some smaller individuals above it. Correcting this overstocking and to give these trees room to grow big is the goal. I will be milling much of R2 on site for our house, and other timbers for landscaping and infrastructural purposes thereabout.

November 2017 – I am hoping to clean up this cluster and get better photos before the job

This cluster was originally 31 trees (R2) and are the largest on our property. The tallest here was measured at 205 feet. Twenty-five years ago, I removed the "junk" to line the stream bed immediately below them and cut up the four-foot-deep pile of dead branches lying around them to reduce the fire hazard. Inside were the burned remains of four old stumps. These trees are larger than those old stumps logged in the 1880s, estimated at 130-150 years old (I need a core drill). Hence, those "old growth" stumps were from trees that MUST have started *after* the Spanish burn ban of 1793. There were at most 3 redwoods on this property at that time.

This is R2 from the bottom. These trees are the largest on our property, larger than the four removed in 1890. They are exposed to more windage (the prevailing wind direction is from behind) than the other stands. I plan to remove 6 (red) to allow the 7 to remain (green) more room to grow while still (hopefully) growing slowly. I would rather go with fewer at a time, but cannot afford that financially. The two principal metrics for deciding which to take are spacing and minimizing damage in the path of fall.



On the other side of R2, we have another pending "Wall Of Wood," with the middle of the three being the biggest at 205 feet tall. Others are in pairs. The plan is 6 removals and 7 keepers from the original 4 stumps. I have pondered the consequences of climbing the keepers and removing branches, thus reducing windage and depressing the amount of "release growth" that otherwise causes broader rings due to the removal of so much of their competition. Besides giving them more room to get bigger, the goal is for the remaining trees to develop tougher grain against those winds as they grow more branches and increase in windage.

Inside was and is a total mess, including the four stumps mentioned earlier. You can still see the fire scarring. I cut them up as much as was reasonable (above is the only one left because the slope is so steep I'd have to bury the chainsaw into dirt to cut it out). I also removed a few of the older crown sprouts, (one of them over 12") but of course, now there are many more.

February 2022 – Note the dead branches intermixed with fresh growth

On the far side of the cluster, the branches are opposite the direction of fall, both inhibiting the pull and adding weight without a cushion. The hillside where they'll land is very steep, which reduces the speed of the fall at impact. The top flat is small, reducing the area to both process tops and branches and mill lumber. That indicates cutting them off first. That means climbing to reduce the weight and keep the material at the bottom of the hill. The trees are somewhat jammed in there. In order to open up the path for falling, we will have to remove one and climb another (again twice) to set a rope and bend it out of the way so that it doesn't tangle with others when falling them through that path. If I cut off most of the branches on that leave tree, it will slow the growth and also reduce the windage. When they swing, they will grow stronger wood to resist it, actually improving the future lumber (called "wind hardening"). On the other hand, they will put out new branches in what was potentially clear wood. That's a tradeoff one can suffer when growing a better forest over the long run, but we will get a healthier forest for it.

R3: Excising Stupidity

This cluster (R3) is also a coppice of two (not really) “old growth” trees. The stump had a double trunk removed around 1880, the larger of which was 36”. I estimate that the earliest date the tree had germinated was some time around 1810, 20 years after the 1793 Spanish burn ban.

It is a hazardous clamber to get down to this wad of stems. Last time I went in there to remove junk, there were 14 stems divided almost evenly in number into two groups, upslope and down, but with the larger diameters on the downhill side and leaning outward with most of their growth on the outside. It’s not stable.

The problem with letting this go is that it is somewhat isolated from the rest of the conifer stands, therefore with more light, higher wind exposure, and it sits on a slope of some 150% (rise over run) above. But the big structural problem with this clump is that below the stump the slope is nearly vertical. In other words, this clump has high windage and lots of weight leaning outward from the hill, having little support. In other words,

This is a rotational failure landslide waiting to happen.

Just like R1 did so long ago. If it goes, there is no telling which way the stems will go. It would pose a significant risk directly to the house. They would also be difficult to get out, hard on adjacent slopes, and equally hard on the equipment from all the dirt rubbed onto the trunks.

Finally, this clump also shades our veggie garden in the winter, thus reducing significantly the amount of food it produces over winter months. Altogether, I’d rather grow maple and buckeye there, but removing all the logs is not allowed under current law for a commercial job.

And what do you know but that the authority underlying these laws governing procedures for managing trees cites public health and safety in its enacting legislation. Sometimes the enforcers forget that.

If you look carefully, you'll see what I mean by "near vertical" below that R3 root crown.

This is the side of R3 facing the house. Cutting only outside trees will be a tricky drop and removal. The direction most of these logs will have to come out is between the coppiced bay and the maple.

Hence, an accurate drop is essential here, and the degree to which that will be influenced by tangling at the top is not obvious. To reduce that entanglement, it might be advisable to climb stem (1) on the right to remove its branches. That would reduce deflection when removing (2). Or we might pull (1) through the gap between (2) and (3). Leaving (1) until last would inhibit the others falling down into the gulley.

Yet when making any of those cuts, and especially (#1), the feller is in an exceptionally precarious position, with quite the fall below and a nasty clamber through stems above, thus possibly necessitating wearing a cumbersome harness, OR climbing it first to put a cable on it so that it can be pulled over from a safe distance by a machine big enough that the tree won't pull it down into the gulley! Else, the feller in said harness would have to duck behind the remaining stems, hopefully to avoid getting crunched.

The maple, being relatively close to the stump cluster, will be easier to miss than this photo suggests, but it will likely have to be bent out of the way to avoid catching its branches and dragging it under the redwoods as they fall. The bay coppice on the left is tough enough to break a redwood log, but was left that way to catch a log sliding sideways.

Sliding they will probably do, as the slope is very steep and the bottom of the gulley is a good 25ft below where they will be cut, which will get them started. I see no other way to get the logs out than with a big winch, which is slow, and I wouldn't want to be the setter in a saddle on the end of a line.

November 2017
From South From East

The State specification is that I can only remove 60% of the trees over 18”dbh. Is that within the cluster of trees or the whole job? The problem there is that not many of these stems are 18” while the big stems are those that pose the greatest risk.

The problem is that this is clearly a coppice, with all the trees sharing a common root mass. That means I cannot treat the stumps on the outside with chemicals without harming what I supposedly must keep. In other words, it may be VERY dangerous to manage the resulting crown sprouting in this location.

Repeat after me:

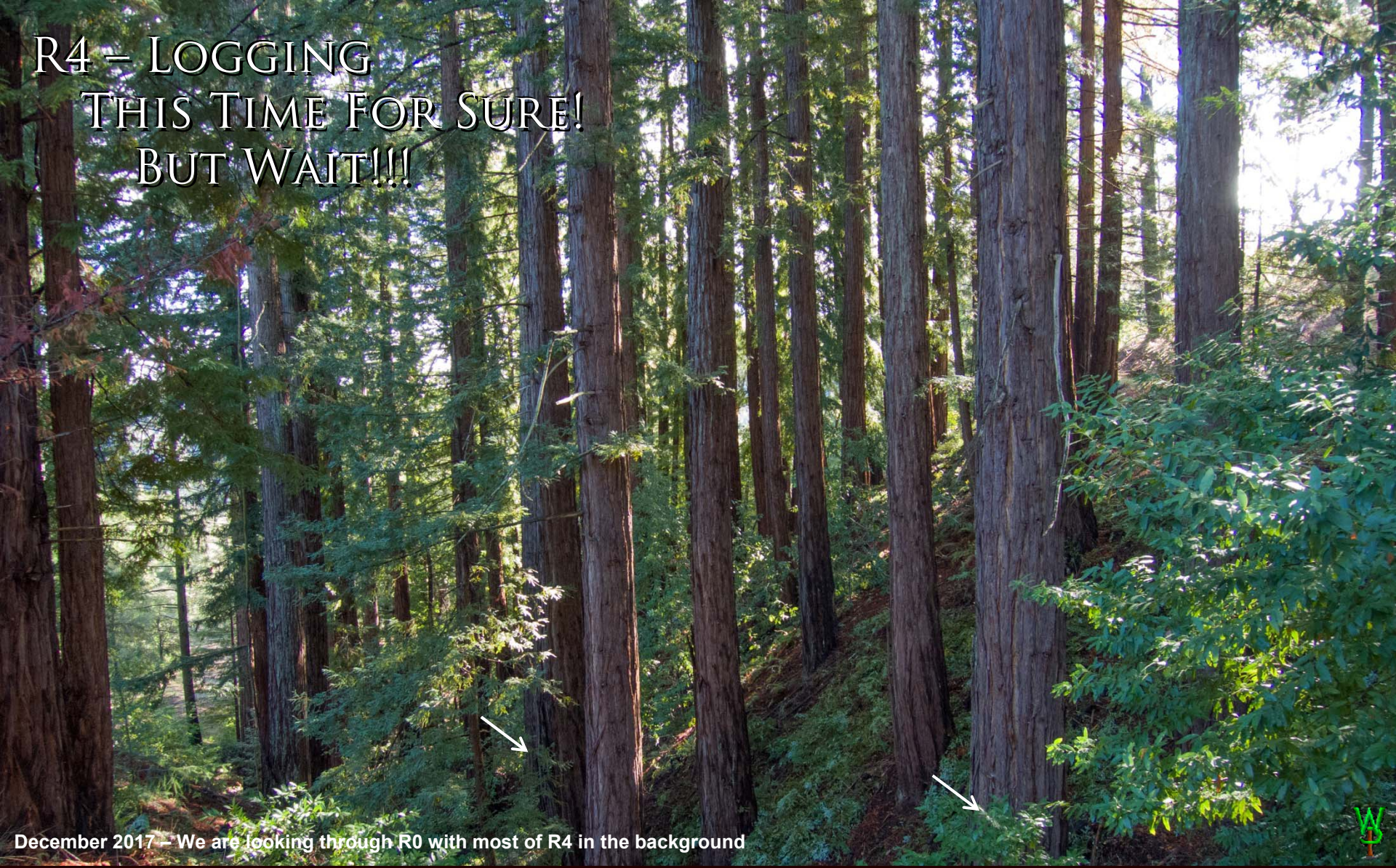
“Public health and safety.”

I guess my safety isn’t included. NONE of the people in charge of misapplying these rules would be caught dead doing that kind of work.

I would prefer to have buckeye, maple, and coffee berry growing here eventually, but that is just not within the regulatory cards.

Isn’t this fun? I’ve avoided this job for too long to let the trees get big enough to sell. They won’t be worth much. This part of the job will be expensive.

R4 – Logging
This Time For Sure!
But Wait!!!



December 2017 – We are looking through R0 with most of R4 in the background

R4 encompasses R0 (map) and is the last and biggest conifer timber job I will be doing here. The goal is to thin the remaining trees (marked with **white stripes**) for fire resiliency and to help get a groundcover going. Unless I am still short of clear material to make siding, trim, and deck for the house, these logs will be sold. Hence, this next discussion will center on preparations made over 34 years to be of benefit to both the forest and the job. I cleared brush to get there and restored the road in 1993, removed the junk in '94, and improved the road in 2006 (as material became available). I took down crown sprouts thrice. I thinned the fuel break in 2015 and completed the road work and removed some of the "dead and dying" fir in 2023. As a bonus, the trees are 30 years bigger.

Beyond the end of the redwood stand was one of two remaining areas on the property that by 2015 had not yet been thinned at all. The fuel on this slope represented a severe fire hazard to that redwood. The goal her is called a “shaded fuel break” to protect the redwood to the left from a crown fire. Unfortunately, decent trees adequate for shade were and are still few here.

With nothing on the ground one does not just thin precipitously, for several reasons. First, this is a VERY steep slope, most of it over 100% (45°), so it needs something growing on it to break the impact of rainfall. Second, although all the visible vegetation is native, there is probably also exotic seed in the soil. Weeding a steep slope like this is brutal. Third, it is adjacent to a redwood stand I want to keep. So my goal is to keep it as a forest, but with fewer trees so as to allow an herbaceous groundcover and a few shrubs of low fuel value such as hazelnut, toyon, coffeeberry, or huckleberry as food for wildlife, but without much grass (unless it is *Calamagrostis or Melica spp.*).

In the foreground at the top of the slope is essentially a Phase 2 thinning started in 2001. Dead brush (mostly Ceanothus) was chopped up and scraggly and dead oaks and madrones were thinned out.

I started at the top with light, inducing groundcovers that spread down the slope. What I am hoping is to gain some tree seedlings from which to select and thin them as I reduce the canopy from the top downward. In this case what came up are *Iris fernaldii* (lilies are one family of plants here that still had a viable native seed bank). Iris are perennials more accustomed to shade than most post-disturbance forbs. That meant that they were able to keep producing seed long after the forest began to take over from what had been burned off here in the 1940s. It also suggests that the cows found this area a bit steep for their liking (iris are poisonous).

Usually, once the groundcovers are growing securely at a spacing of one every one to two feet or so, I can then start taking down the large and unsound trees. Unfortunately, in this case there aren’t any structurally decent trees here.

After 30 years of observation, I was amazed this Douglas fir was still standing. Look at all that hanging fuel!!! This leaning tower of hell dominated the slope, shading the hardwood below and abetting other fir trees. This “fuel break” to be is in transition between hardwood and conifer, so I am taking it back to hardwood to reduce the elevation of crown fuels to well below the redwood canopy. Again, the solution here is shrubs at the top to shade the slope below and in this case, whatever low fuel value species I can get to grow here. Toyon does and is relatively low in fuel value. There is still too much California Bay which burns like gasoline.

Heck of a hinge, isn't it? I try to get to things eventually, but dealing with a 30" fir is a big job when done by hand.
Succession from broadleaf to conifer is a big problem on this steep slope.

November 2015 – It's a lot steeper than it looks in the photo.

As a leaner, this log was, so stressed that it would never make good lumber. It's one thing to cut trees down without crunching all sorts of others around them, but it's quite another to get the logs up a 60° slope to where equipment can pick them up and carry them out, and yet *another* thing to get them to a truck and load them out when nobody wants the wood! This is especially true when said log weighs upwards of five tons. Doing virtually anything with logs this big on a slope this steep by hand is very dangerous. So I bucked it into chunks, and rolled those down the hill into the drainage as rip rap to slow the water down. There was no other choice.

Make a “fuel break” out of this??? Impressive, isn’t it? A wall of flame coming up this slope would melt steel. Remember: this is so steep it’s hard to stand without kicking in your feet. I pulled these madrone logs uphill (the trunks are about 14”) and the fir went down.

This is the background of the previous image is more fuel (bay). It just went on, and on, and on…

Underneath the bay we also had young conifers (the redwood cluster at the bottom is the same as in p14). While I could just "play dumb" and grow more redwood, that would be missing the point, which is to learn how to manage these transitions. In this case, I have more than enough redwood in total, more than we could ever use. So, what do I grow here? There isn't an easy answer.

We really did need a fuel break here. The Spanish Gulch is just beyond the crest of this slope, which is a 60° furnace pointed at an evacuation route! To protect the redwood, the conifers here must go. When thinning a slope like this, gravity wins; if I can't yard it up to one of the spar trees (which I did with the top third), there is only one direction for the wood to go. It ended up being a lot.

The hardwood from the top third of the fuel break was yarded out on the farthest of the spar trees on p89. That worked great. The rest went downhill into the drainage to slow the water down (gravity works great too). Most of what you see here was dead madrone, which is dense and rots very slowly, and is thus unlikely to form a debris flow. If there is a fire here, this material would burn for days, thus making it unlikely CalFire would want to conduct a burn from the top down without a way to put it out before it gets here.

If you compare this photo with the one that began this section on p64, notice how much more light there is beyond the far edge of this R4 stand, especially near the top of the slope where you saw the iris. That are is our first whack at this shaded fuel break. The protection for this stand is now barely sufficient. It will need both some plantings and another thinning pass when I have established trees and shrubs to take over from the bay that remains. This is how it works in forestry: even if fast doesn't stop, it does take time.

Milling About

When I do mill lumber here, where? It takes a lot of space to deck logs, load them into the mill, stack lumber, and accumulate scrap. This is not enough. Perhaps you will recall this image taken in 1991 from the repeat photos chapter. Please note the redwood sapling. I had flattened it with a tree and my wife and I had stood it back up. It was about 1-1/2" in diameter and maybe six feet tall.

Twenty-three years later when I cut what was that 1-1/2” redwood sapling, it was 16” at the butt and over 60’ tall (**red arrow**). One thing different about the way I log here is the extent to which I prepare the forest to create room for processing logs with minimal damage to the trees I want to keep. Timber companies at times drop lumber trees into hardwoods to cushion the fall and thus minimize damage to the dropping log. Unfortunately, when one drops a log that way, it can catch other trees and slam them into each other, then making cleanup a tangled mess then requiring a bulldozer or lopping the slash, leaving it to rot for about 15 years. Leaving slash suppresses herbaceous recovery and inhibits purging the weed bank. So I thin the surrounding forest first and deal with the trash before beginning conifer removal and then climb the trees to be logged (if I must) to reduce their tendency to tangle as they fall. I take the hit when it comes to yield. This clearing will eventually make a nice spot for milling what I intend to use. Both of the **small oaks** that gave reference to the repeat photos will go for that reason.

Same spot. This was amid site preparation for milling. Both the hardwood and most of the dead and dying fir was dropped, bucked, split, and burned. Seems a shame to burn the fir, doesn't it? First, most of it is not of structural quality. They grow so fast here that there are big knots, the rings are broad, and they often harbor diseases. Second, there is not enough salable material being harvested to justify dedicating log trucks and a sawmill to making and distributing fir lumber. But the biggie with fir is that the lumber to be sold has to cover the cost of trucking it to a mill thirty miles away (and the only mill in the County). The fir we get is of insufficient quality and quantity to bother with it. At this point, I had a 7-8 more fir trees on this spur to go but questions remained about how many should be processed before v. after the redwood logging and milling jobs. The groundcover on this spur is almost pure native annuals of lotuses and clovers, as I have been hand weeding it for decades. It came up the same after this disturbance.

On the right side of this spur and below the redwood stand, is a south-facing slope of hardwood that was being invaded by three 10-14”dbh firs and one redwood of some 28”. I removed **all** the conifers on that slope to protect the hardwood cover from successional displacement. This being beyond the legal limit of a 300’ exemption permit, I must keep the redwood on site. This log will be used to make a trail bridge across the face of a rotational failure (a type of landslide) across the gulley to the right after the R4 job is done. Moving and placing it will take a helicopter. Helicopters are EXPENSIVE. I hope I can piggy-back that onto a neighbors’ job when they log their property. In the meantime, it’s drying and losing weight. I may have to move it a bit before milling the logs from R2.

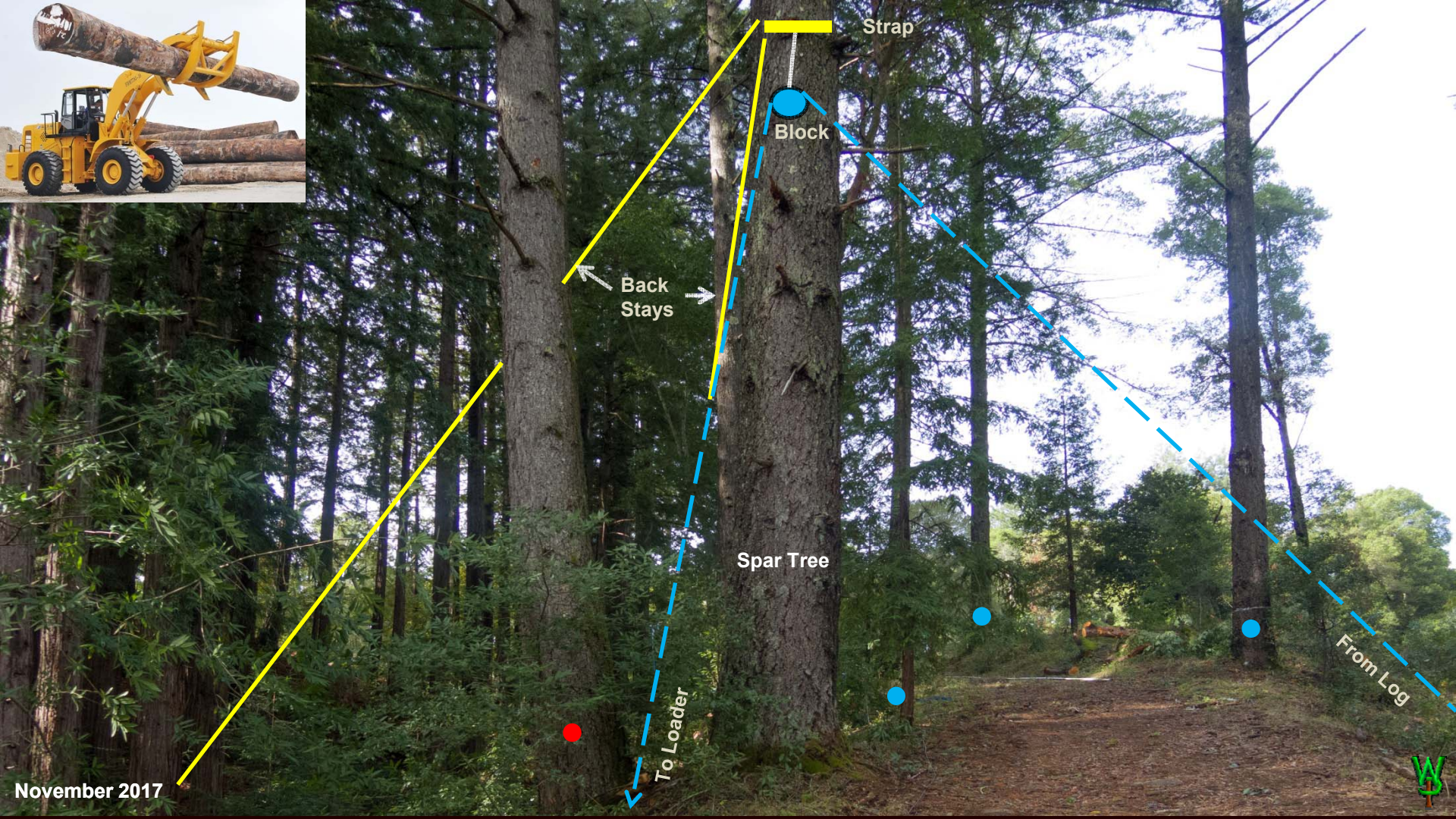
Moment of the Spur

We are STILL discussing preparations for R2, R3 & R4. The trees to be removed are at the bottom of both sides of this spur now with fir on top. The first problem is that, without fire, *everything* here grew under overstocked conditions with the fir invading before the hardwoods got big. This ridge is populated with skinny oak, fir, and madrone trees that bent back to the center for light and then tangled. This makes a very dangerous situation, as the direction of fall is unpredictable in some cases and obviously hazardous in others. The small firs came out in 2010. In 2015 it was taking out oak saplings (above). In 2017 it was these madrones, three bigger firs at the bottom, and two big bay coppices. In 2022, it was four firs on top. There are two more firs yet to go.

A big barrier to redwood removal was two large clusters of bay trees, coppiced by fire in 1941. The usual practice is to use them to cushion the fall of the redwood. These could catch and break the redwood, turning the tops into “widow makers” or break themselves to then fall down the slope. As described earlier, I am coppicing these trees such that they will grow back. Removing the stems was no fun (i.e., it scared the $#%t out of me). The slope above is too steep to walk without a line as below is near vertical. There is no place to get out of the way of a sliding or falling trunk. They are spring-loaded, brittle, and…

…imagine climbing one of those 70-90 foot long arching stems on the prior slide to set a cable and take the top off so as to pull it onto the ridge as it falls. This rot was on the *tension* side of one of those leaners. There is no way to know, but this kind of defect can happen naturally when a tree falls onto one of these bays and scars it, then to grow the defect with the top weight hanging from the end, possibly to fail unpredictably, someday. It's yet one more reason to coppice them before the logging job. The rot can run 10-20 feet below the visible defect, making cutting the stem totally unpredictable. I didn't know this stem was rotten while 40 feet up, overhanging a slope, and with the ground 100 feet below. My idea was to go high enough to drop a smaller top so that it wouldn't spring back so violently when the top came off. Worse, it could split, and kill me right there. Now, this is going to be hard for some people, but I was clearly **told** to stop climbing about three feet below this defect and cut it there. I didn't want to do it. If the stem splits before completing the cut, the result can be fatal. Some people think they're too smart to be people of faith. Some of us have learned that we're not that smart. I pray before dropping big trees and give thanks when I get it done safely. I didn't see this until after I had the tree down, pulled out the log, and bucked it. There are just so many things that can go wrong about which one cannot know in advance when doing this kind of work, that to pretend one can just apply force or technology is simply not tenable.

In 2017 I coppiced the R2 **bay** as a living retaining wall, albeit I have left the stubs about 3-4 feet long and could cut them flush before or during the job or retain them as necessary to keep logs from sliding. Access to the R2 cluster will be excellent once I take out these four smaller redwoods up above. I will kill those stumps to reduce the otherwise-eventual weight on the slope for reasons similar to what I would prefer with R3. To get the logs out is going to take a lot of climbing and a very long bull-line. This will be high-lead yarding through a massive snatch block in a fir behind where this photo was taken.



We will retain the fir marked “Spar Tree” for pulling out the redwood and as a windbreak to protect it because fir is a stronger tree. The fir behind it will be taken down. Given the weight of the logs (some well over four feet in diameter), we will put back-stays on it. Once they are up the hill and across the road, they will roll; chocks must be in place. Then get the logs to where they will be milled or loaded out. This raises another consideration in arranging the landscape before logging**:** The relationship between the landscape, available equipment, and the job, which is all about human relationships. Not everybody has the same kind of equipment. Do the owners available locally all get along? Are they too busy to take on a job like this? A rubber tired log loader (inset) is fast and makes a great counterweight for yarding, but it has to carry 20’ logs sideways up the hill. Fir trees alongside the road could make that difficult. If on the other hand, we mill 16’ logs on site, can hire a truck with an auto-loading arm, or an excavator with a grapple, then leaving these firs is fine but the process is much slower and therefore much more expensive. Then there is weather.

This road across the upper boundary of R4 was built for this purpose. In essence, both conifer and broadleaf forest at right are configured to facilitate thinning the redwood by two means: **First**, the two firs to the right of the road are to be "spar trees" (aka "gin poles") each capable of supporting a cable block placed about 40 feet up with which to pull the redwood logs up the slope to be bucked and loaded out by said articulated log loader. The hard part is to find trees behind them to rig backstays to oppose the force from the straps holding the block. The space is too narrow for a truck to be loaded here. Hence, a rubber tired loader to carry them to a road junction just behind the camera is so much faster that it saves a lot of money with much less damage.

Second, “felling pockets” have been cut into the hardwood stand into which to drop, buck and branch the redwood then pull the logs to the loader. I removed hardwood logs and stumps in these pockets so as to reduce redwood breakage when they fall and to preclude snagging when dragging logs down. All of this plan is subject to the equipment available.

Spar Tree

December 2022

Shade Tree

Spar Tree

September 2023

As it turned out, almost all of the fir I took off the spur had diseases, in most cases beetles or “white speck” rot defect (inset). The logs are still sound and would make good material for concrete forms, posts, or studs but do not have structural value to justify the cost of trucking. Instead, I dropped several and paid $4,000 to remove the logs. We can ask environmental activists, “Who gets to log their trees from agricultural forests instead with a fatter profit on lumber?” Given the problem diseases in fir cause long term, most of these will probably go after the redwood job is done as other trees develop to provide the necessary shade.

Effectively, there is a tradeoff on this spur between the amount of light necessary to get groundcovers going and the amount of fuel aloft. Thin trees to reduce the crown fire hazard aloft and get an understory started, and shrubs and tree saplings will become so intense as to be ladder fuels. I have two more firs yet to remove here, and should probably have taken them in the last job. Once completed, there will be no way for a now-unlikely crown fire to cross this ridge. With less water competition, the remaining firs will hopefully thicken canopy to suppress that growth until the maple and black oak I will plant can establish, but I will have to "dial back" that understory and its overhanging hardwood fuels (to my mind, best accomplished by herbivory such as goats). There is no stasis here without disturbance; the best one can hope for is reduced labor input for the maximum output of diverse native vitality.

Going TOO Fir?

August 2021 – This fir grew from 8”dbh to 24” in 20 years.

In a few cases, where I have had isolated fir trees standing well above the surrounding hardwood canopy, in an exposed location with a good view, and are unlikely to attract lightning, rather than allowing them to become huge trees that do a lot of damage coming down in places with bad access, I am converting them into snags. These are standing dead trees that, once dead, become great perches for raptors to sit, survey the scene, and launch (hopefully to kill gophers!!). This conversion is accomplished by girdling the tree. Make 2 circumferential cuts with a chainsaw about a foot apart, well into the xylem tissue, and peel the bark (inset).

October 2023

The standing log makes food for bugs that attract smaller birds too. When it finally does fall, rotting branches will do less damage, and the whole mass will be much lighter to handle having lost the water and much of the cellulose in the trunk to bugs and rot. But it is still best if I drop it before it falls so as not to do so much damage. (The weather station is a new addition.)

R4 – Real Logging
This Time For Sure!

What I mean by “real logging” is cutting more logs than I need to improve the stand and selling them to a mill. That means a Licensed Tiber Operator with a heavy equipment and access to logging trucks. That also means having a crew of people involved, some of them highly trained**:** a forester, fallers, setters, groundsmen, tractor drivers, and truckers, all with competing needs working under a degree of regulatory oversight.

Having now done much of almost all those jobs myself at one time or another, I hope this goes smoothly, with those involved seeing this job as a sort of “happening,” that instead of a clueless landowner, or an industrial operation breathing cost down their necks, this is part of a great experiment on how to do better work than is usual as a way to produce a healthier forest, long term.

This is a job to be done by a team, all of whom have known each other and worked together for decades. What will be unusual with this job is the degree of site preparation; i.e., the configuration of the forest and its groundcovers to facilitate that job, measures effected for over 30 years. There will be no thrashing their way through brush loaded with yellow jackets. There are trails in place to get to the respective work sites. There will be no need for brute force. The spar trees and anchors for the backstays are in the right places. The landings are clear. The roads are good. Everybody will be treated with a place that is a pleasure and a challenge. It is really steep here.

What most people worried about “logging” do not grasp is that EVERYBODY I have ever met who has done this kind of work for a very long time has a personal investment in producing a better forest. This work is risky. These people usually have suffered injuries over a career to do it. They deserve to be appreciated for the physical pain they have endured. Every one them has also endured fire-breathing idiots giving them a hard time for what they do, not to mention costing them a lot of money. They have watched their industry slowly die, killing opportunities for their sons and daughters to participate in and prosper from what they have learned. My hope is that this job will be a respite, with hope of renewal.

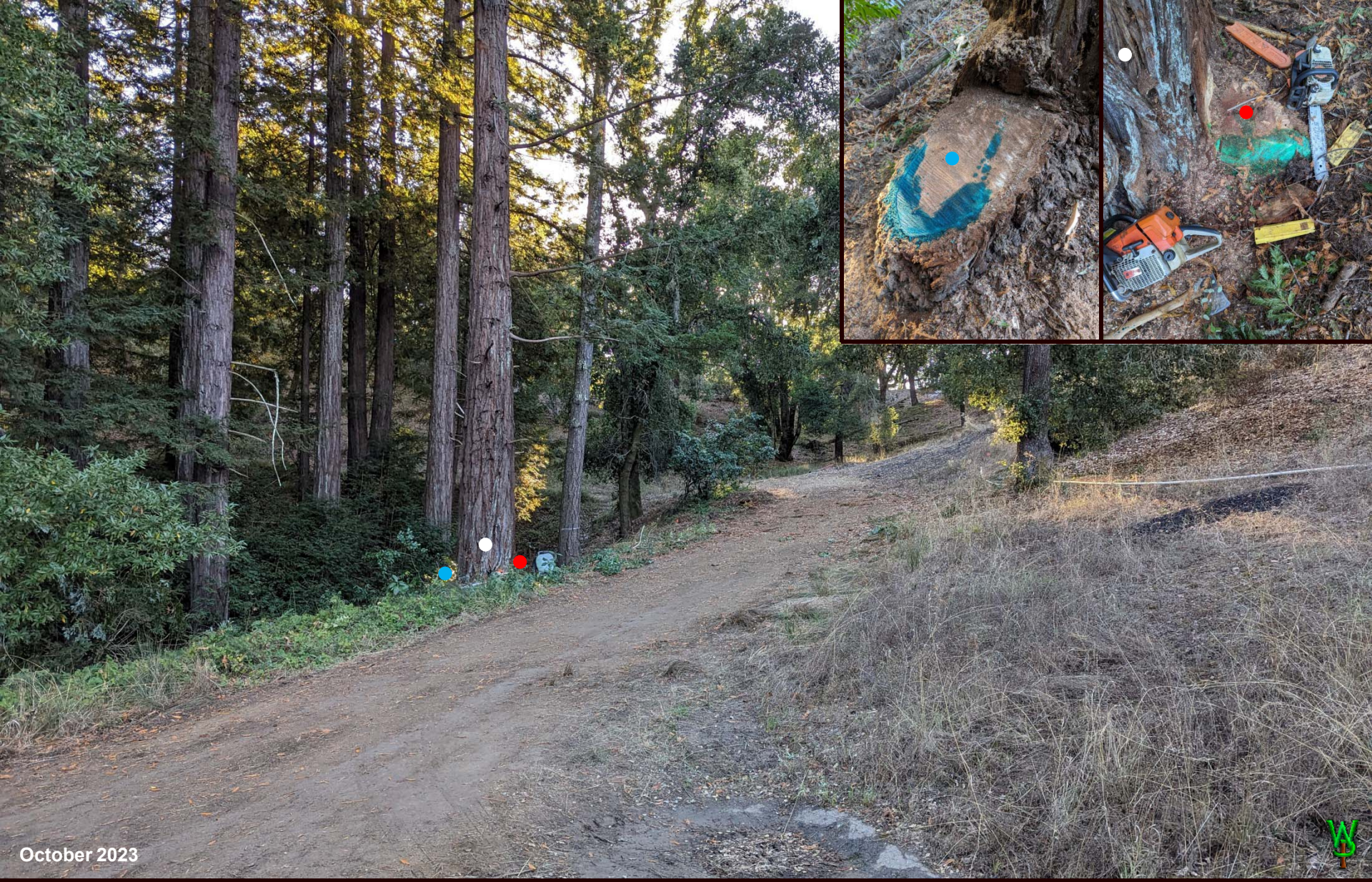
That loss they feel is a real Tragedy of the Commons, where people with no accountability for the long term outcomes of the both economically and environmentally destructive policies they force by the power of a distracted, equally stressed, and emotionally traumatized regulatory enterprise, one that has long operated in a manner that is clearly destructive to its purported ends, witlessly serving corrupt political purposes on behalf of the rich and powerful. It is long past time for the useful idiots to cease this pathetic and destructive breast beating over logging, hunting, ranching, and fishing. Let’s talk restoration instead.

I want something better for the workers, thinkers, and makers of this world. I want a future of hope for their children. I want a planet that produces better and more plentiful materials that are a pleasure to work into useful products while supporting more and diverse wildlife, in ever more complex, productive, and beautiful landscapes. I have given my life to producing and articulating that work. I do hope you enjoy the outcome to come.

R4 is where the end meets the beginning, as the job area includes a few trees in R0 from which I removed 25% back in 1993. Originally, I was planning to do R2, R3, and R4 all at the same time. That plan may split because I can do the milling on the first two here, thus keeping the material onsite. R4 will require oversight, but being within 300 feet of the house that will avoid that $60,000 minimum cost of a full Timber Harvest Permit. There were other reasons for splitting that original job having to do with the equipment needed. If we do go with a big bulldozer, the planning and preparation for that are considerable. Both the County road and our driveway are paved with a mere skin of oil and slurry-aggregate a big bulldozer would simply wreck.

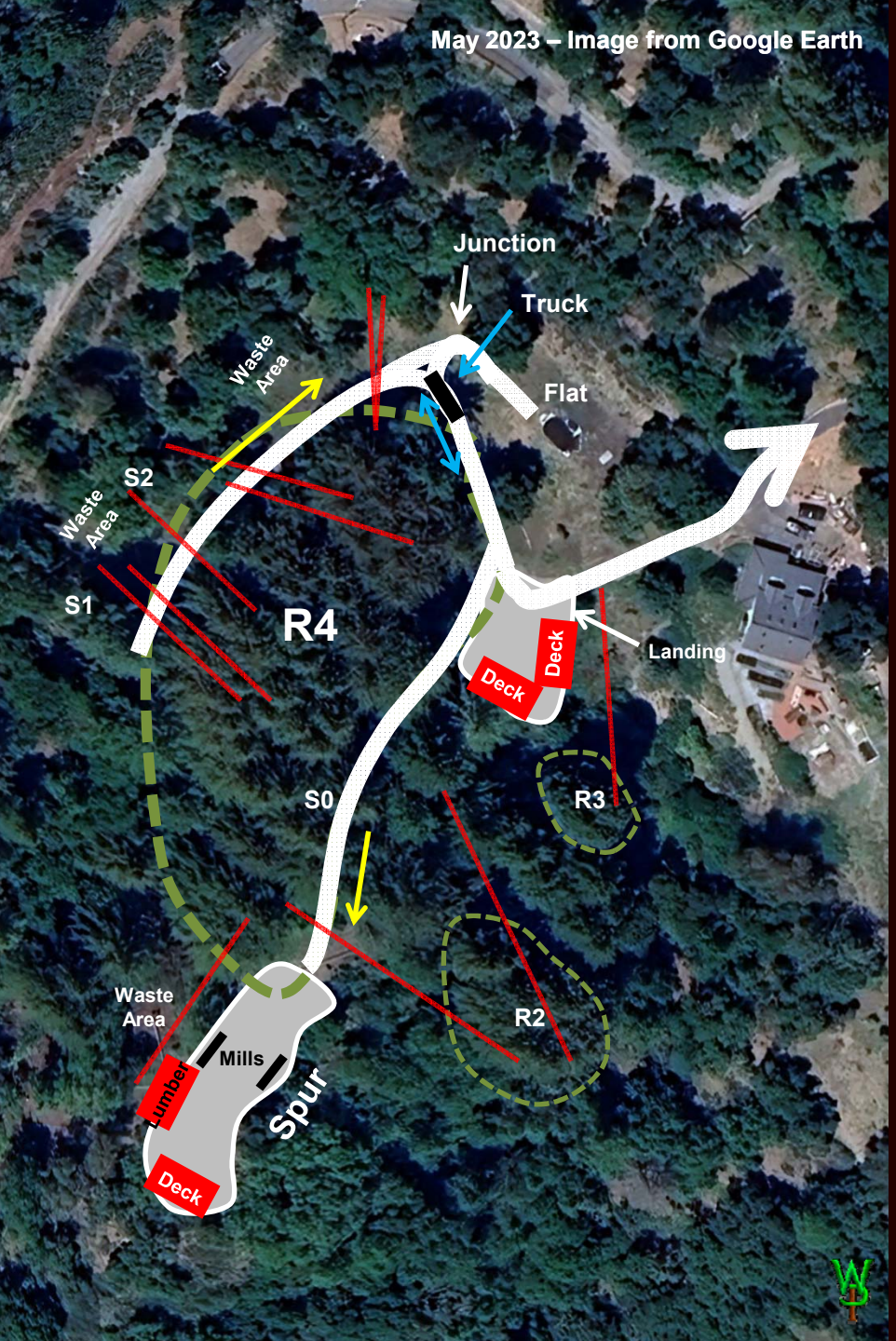
I don't want to bear the cost of repair. It is possible to unload a dozer onto used tires, but one wouldn't want to go very far that way. At $250 an hour, once the dozer is here, one wants to do all the work that could be done with it, such as dressing roads or cutting a turnout on the County road, a spot where it could be good to offload as it is just above the job location and would give drivers on the County road a place to pull off that one-lane road at a blind curve to facilitate opposing traffic or emergency vehicles.

As before with R2, one needs an appropriate place to deck R4 logs and load trucks. The flat opposite the house would do, but only if I can get this dirt pile out of the way. The “if” is that it had several grass bunches which just came up from the pile in 2018. This species *(Calamagrostis nutkaensis)* has been long thought to be extinct in this area! After waiting THREE YEARS for “scientists” to get the PCR work done, I dug them out, planted the nodes in pots, grew those for a year, and sprinkled them about the property to learn what they seem to want. Once I had confirmed that at least some of them had survived, I could then move the pile. Nobody made me do this, it was only a matter of ethics. It’s a good thing I had other preparations to make. My house needs new siding, badly.



Once the grass plugs were transplanted I used the dirt to improve the grade of a road that just so happens to be key to doing the R4 job. That will require yet *another* year to firm up unless we can get the job done before winter. Hence, finding this grass having developed from dormant seed could have cost this plan a delay of five years! Fortunately, there were other projects to do in parallel. The marked tree is the same that had two huge root crown suckers on p45. I intend to remove it anyway, so this is a free opportunity to see how different herbicide treatments translocate into the tree. There were quarter inch growth rings in those 24”

This is the landing for decking logs and loading them onto trucks. The road goes straight up the driveway. So, why would I prefer not to use it? With R4, the arrangement of roads suggests an interesting logistical dance. It all has to do with time, heavy equipment, and scaling the crew to the job. If we have a loader only, then we can load trucks directly off the road where they're bucked it as it accumulates logs. If we use an excavator with a grapple, then building the deck and using that to load trucks makes more sense.



The key is the **arrangement** of the roads, spar trees (S0-3), where the logs come down, and where they are either processed or loaded out. 16-foot R2 logs will go to the deck on the spur for processing into lumber. There is plenty of room there to turn around to stack the deck(s). I hope for a Lucas Mill to quarter saw timbers, a Woodmizer band saw to mill those into 1x boards and my Alaskan mill to make the front door of my dreams: a door with a raised panel that looks like it was split from a single log. I've always admired the sheen off a split piece of redwood, especially with the curls from within a stump.

Extra R2, R3, and R4 logs will be smaller but they'll be 20-footers for export. R3 logs are easily decked by the excavator with a grapple but it's a long drive to the landing with all the logs that will come out of R4, especially one at a time with the excavator. It would be MUCH easier for a fork loader to back down the road to yard them, buck the logs across the road as they come up, come forward to pick them up, back down the road beyond the end of the truck, the truck backs up, and the loader makes the drop directly into the bunks. This way, the loader never needs to turn around and the truck only once.

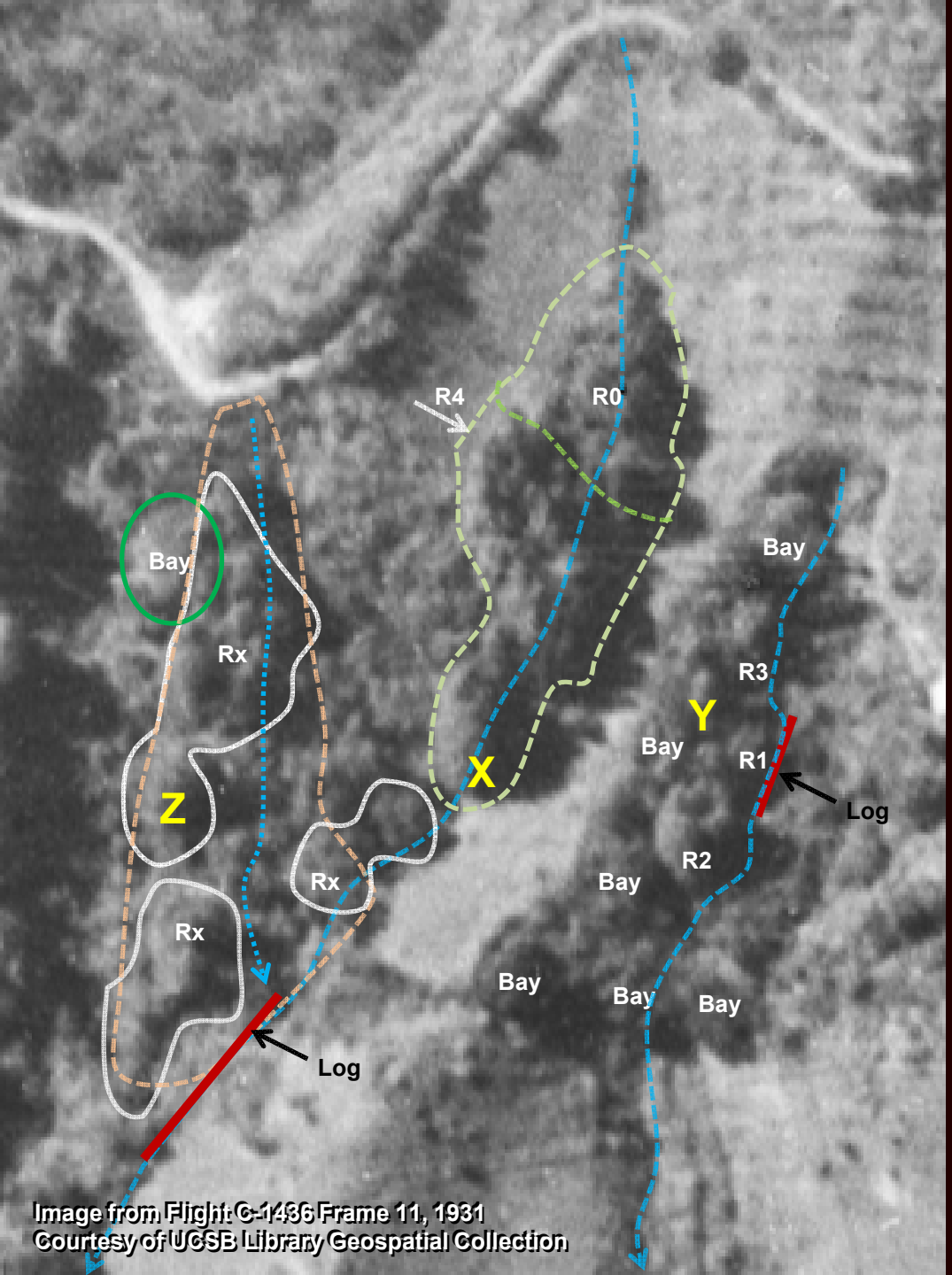
Hence if we can get good coordination between the loader, the setters, those bucking and lopping, and the trucker, R4 will go like greased lightning. There would be no need for decking and then loading the truck as a second operation. Hence, it would be best to yard quite a bit of material to process into logs as they come up accumulating 20-footers laying across the road before calling in the truck. That's a lot of dragging cables back to position and setting the next segment. It also may involve rolling the log so that the next doesn't catch on to the one before. It might make it faster to have a two-piece bull line so that the setters can be getting one hooked up on a log while the loader is filling the truck or an extra cable so that the loader can pull the log sideways directly, not through the overhead block.

It might make sense to start with R3 using the excavator/grapple to deck those logs so as to manage issues with filling the load.

Rx: A Forest of Transitions

March 2020

I have no plans to log the Rx area because it is so remote as to make weeding and maintaining the area beyond my present capability, the stand density is not catastrophic, and I can not either sell or have a use for the logs. This a second “ring” of trees farther down the same drainage as “**X**” that *could* be interpreted as being from another buried stump. Yet I think these are also seed trees unless they were from a much smaller tree than “**X**.” Note that there is no stump, the stream channel doesn’t drop off the same way after leaving the cluster despite that the slope is loose colluvium, nor are these stems nearly as big as the “**X**” stems. Hence, this “buried stump” inference can be tricky to apply if one is looking at just the arrangement of stems. My guess is that these are trees from seed, for which there is an evident reason after stepping back a bit to consider the others in Rx, with the site history and geology in mind.



Rx are those conifers that established on the north sidewalls of and the deposition at the end of the Spanish Gulch, as created by released drainage from the El Camino road built in 1791. The stream cut through the alluvium of the slope below creating a series of landslides of the sides falling into the incising stream.

The stand developed by somewhat different mechanics than did R0-4 in that I suspect tree "**Z**" had fallen due to landslides caused by the successive landslides and channel incision through the alluvium undermining the tree. There has been no stream of runoff in that channel since the County changed the road drainage.

There is what might be something of a clone where "**Z**" is marked on the map. I suspect these were from what was left of the root crown remaining on the slope.

As to the redwoods farther up the slope, and especially the two stands at the bottom, they too appear to be seed trees about the same age as those in R4. Yet in this case, I suspect the trees developed from seed arriving with the loose soil released by the successive landslides.

I also suspect the "Log" at the toe of the slide mass deposition is from "Z."

There are a few substantial fir trees more toward the top and southern wall of the Gulch.

December 2015 – Dax, not looking down from midway up Spanish Gulch

The soil masses on which both the **faux-cluster prior** and the next downstream form what geologists call “colluvial lenses,” each from the multiple landslides that came down from the road above. These provided the bare mineral surface of disturbed soil in which **Rx** redwoods established readily. It is hard to visualize the loss of the 30,000 cubic yards that made this channel, but that story will be covered in the forestry chapters on drainage and roads. There has been no stream here since the County road grade was changed.

Looking up the Spanish Gulch this is the redwood near the upper part of the scarp along the north-facing side. There are no conifers at all beyond the crest of the slide area; the alluvial slopes south of the crest are relatively gentle. It could use a ground fire, but would need significant work first. As it is, it's a chimney, and would be almost impossible to contain one.

At the bottom, I am standing atop one of several colluvial lenses looking across the mouth of the Spanish Gulch where it intersects the main channel. This stand is much more evidently atop a slide that crossed the channel which then cut through the toe of the slide mass involving old growth redwood “Z.” Again, these are not old trees and they are from seed. As to the buried log I promised…

At the bottom of the Gulch, a **buried log** (likely "old growth" tree **"Z"**) is holding the toe of the slide mass. Redwoods are on top but only to the left from which the slide came. From its radius and grain, I estimate the log to be pre-colonial. The trees on top are 70-90 years old. Hence the conclusion is that road construction above discharged water that cut aggressively through the alluvial slope. That deepening channel caused a series of landslides off the side walls of the resulting Gulch into this main channel. That process left exposed soil which allowed new redwoods to establish on the north facing side. When the slope failed under the tree, the slide mass carried down both the log and seed to establish at the bottom. The landslides continued until the County changed the road grade.

Looking back up the main channel, the clone of "**X**" is in the background. Why is this distinction of seed-trees v. crown-sprout-cluster important? It has to do with how I would manage stumps if I need to thin this cluster. If this is a clone, were it to be logged, the stumps might have to be ground out to inhibit crown sprouting, which is so expensive one best make a non-destructive determination.

June 2021 – From Swanton Road after the CZU Lightning Complex Fire

To conclude, Yes, this chapter had a lot of complaining about environmentalists, not because of my focus but because destroying forestry seems to have been at the top of theirs for many decades and is now bearing fruit. Once you've seen the long term damage their ideas really do to the forests they would "save," wouldn't you feel outraged? When they stand in the way of mitigating that damage while raising the cost beyond affordability, when that damage costs jobs, lives, and property, what should we say? When it becomes clear that the damage only serves as an opportunity for self-righteous breast beating and corporate profit… when have the rest of us had enough? I do hope somebody is collecting repeat photos of this "recovery" to demonstrate reality over the long run.

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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