An Under-Stated Understory

October 2013, this is a neighbor's property.
Mine is long gone. I whack this annually anyway as a buffer.

Of the five types of habitat on our property, two are forests. The redwood type is essentially weed free (at least for now) because of shade plus 70 years of accumulated tannnin-loaded mulch without a fire. On the other hand, our oak/madrone woodland forests suffered terribly, primarily from three truly dominant weeds: French Broom *(Genista monspessluanus),* hedge parsley *(Torilis arvensis)*, and bedstraw *(Galium aparine)*. Mind you, those three were quite enough, and took some 6-7 years to get to a sane level of hand control, but fewer target species did simplify the control process considerably when it came to methods and timing. The foreground in this image has been whacked with a brush cutter. In it, you can see several fir seedlings that can reach 100 feet in height in 40 years... That close together? They'll try! I took this photograph in the fall so that the broom would be thinner. Otherwise, it would be a wall.

Like this. These “walls” line a County road. Simply because you have not seen much full-sized French broom in the repeat images of our property, do not under-estimate what we faced with this awful weed. Just recall the number of seedlings on the ground in the “before” pictures, scale, and multiply. It was 10 acres of this with 30 years worth of seed.

By 1993, I had cut all of our French broom and either chopped it in place or gathered it in piles and burned it. I mowed for 1-2 years thereafter, allowing the seedlings to concentrate and shade the sprouting natives. Then I sprayed 10 acres of it in one year. Then I mowed for 2-3 years, allowing more broom to sprout and cover the natives from the spray. Then spray again, and so on. This way, it took a total of but 3 gallons of triclopyr concentrate to get control of a 10-acre disaster. To this day, I push that perimeter back even on my neighbors' land (above). This French broom sprouted after five years of mowing. I had sprayed it for the first time the prior year (the dead stems you see in the foreground), yet there is more native yerba buena on the ground than the prior year and it is doing just fine. I will wait for more broom to come up and thicken to cover the natives before spraying again. Here, it is 2-4 feet tall, in flower, and ready for mowing. Altogether, controlling French broom is now a relatively easy problem to manage.

June 2010

This broom is about fifty feet beyond our eastern property line. Note that it is ranked in two heights**:** the front rank is about 3-4 feet tall and the back one about 6-8 feet tall. This photograph depicts a history in which I beat the broom back in “stripes “ parallel to the property line. The face of the back rank is the point to which I had brush-cut the broom the prior year. The front rank is about 8-10 feet in depth, which is about how far they can pop seed here.

Only a few years prior, the grassland in the foreground was broom. Every few years, I took another stripe and moved the control boundary backward toward a location of better tactical advantage. I whack it for a couple of years, allowing the natives to establish and then, in the spring when the broom is about 2 feet tall and covering those natives, I spray it with a weak triclopyr formulation of my own design. The reason you see grass (mostly small-flowered needle grass *(Stipa lepida)*) and not broom is that triclopyr does not kill grasses and they do a good job of suppressing broom germination. Over the succeeding couple of years, I will either mow until it is thick enough to justify spraying again or pull it if I don’t see that much germination. One or two applications is all it usually takes to get the numbers down to where the situation is manageable by hand. With good ground cover, there is little soil disturbance that might bring up new broom seed when I pull the seedlings.

As of 2013, the broom you see here is gone, as I chased it back under some bay trees where it is so dark that it does not do well and the bay puts out hormones that suppress the broom, thus making it a stable boundary (until the bay burns or dies). Sometimes you get lucky and find a reasonable habitat gradient like this one that can maintain a relatively stable boundary to an infestation (unless it burns).

October 2013

Sometimes you can't. I used to whack this broom all the way up this slope until the kids went to college. Lacking their seasonal assistance elsewhere, I had to retreat to a closer defensive boundary. Well, there isn't one here. So now I'm pushing it back again.

This is hedge parsley *(Torilis arvensis),* another awful forest weed. It usually grows about 6-12 inches tall but can grow to four feet. It produces tenacious burs that get into everything (inset). I really feel for every mouse, squirrel, and deer that has to deal with this stuff, but I'm not exactly thrilled when they come here to clean themselves off (which they do).

There are a number of weed infestations of which I do not have good pictures and this is one. It is simply very hard to photograph a large number of small plants dispersed over big areas mixed in with other vegetation. They require high contrast lighting to even see well in a forest with patchy light intensity. Once you get a shot close enough to show the plants, you can't show the infestation over a large enough area to communicate the magnitude of the problem. Sorry, but until I get HD video with optimal lighting, a way to pan big distances without vibration, and very expensive lenses, photos like this were all I could afford, especially in terms of time.

Now, you may wonder about that, but here it is**: Any weed you miss reproduces and spreads next year. It is only as you approach zero that you gain anything in subsequent years.** In the heat of this fight, there was never a time at which it was not a desperate battle. In the case of hedge parsley (at left), my two girls and I took out 37 garbage bags of this little beast (most under 6" tall) in one year, by hand, in addition to what I sprayed. Hedge parsley was a family victory. We no longer experience what you see at left.

Accordingly, some of these photos were taken outside our property, typically along public roads. However, those pictures do not express the dominance these pests exert invading a native habitat because in these outside locations they are competing with other weeds or an overgrown forest. Once you thin the forest up they come. Then you get to learn the unpleasant truth about its real condition. Effectively, **what little is left of the native biodiversity of this area is beneath multiple "layers" of powerful enemies**, each capable of taking over, each must be removed for many years before what is left of native seed begins to express itself or colonizes from outside.

They are not any easier to see in full sun. Amid this hedge parsley infestation along with rip gut and bedstraw is a native lookalike: mountain sweet cicely *(Osmorhiza berteroi)*. Glare wears one down either weeding or spot spraying. There are more in this picture.

This is catchweed bedstraw getting started among native blackberry, snowberry, hedge nettle, and rough leaved aster. This infestation was originally brought in by the garbage company. My first weed book, *Weeds of the West,* said it was native. Given that I was overwhelmed with cat's ear, I let it go. Two years later, we had mats of 6-10ft long tendrils killing other native vegetation. We rolled it into 3ft balls with rakes while slashing roots. Unfortunately, I had to nuke a lot of it with Roundup®, which took a lot of natives with it.

I do not believe that this bedstraw is native here. As to why, consider this example:

Among the madder tribe (which includes all bedstraw species) we have two natives and four exotics. At right is one of the natives, Sweet California Bedstraw *(G. trifidum)*. This bedstraw is no problem; it is about a quarter the size of the weed, tends to stay put, and does not displace other species.

Among the four exotic madders, three just cannot get along. At left is a single *G. aparine* (the photo spans about two feet). It's grows just about anywhere, and buries most natives.

Although it exhibits totally dominant behavior here now, it was not anywhere to be seen, for miles, for ten years after we arrived. When it did get here, it took over in just a couple of years (until I went to war) and has been spreading in the area for miles exhibiting similarly dominant behavior. I don't believe native plants do that.

The other two virulent exotics are Field Madder *(Sherardia arvensis)* and Wall Bedstraw *(G. parisiense)*. Both were dormant in the soil until we started thinning. When they did come up, they suppressed the native groundcovers in two meadows and a chaparral. After taking them down, the *G. parisiense* has been a constant but decreasing battle, as it is capable of breeding at less than ¼" tall.

This patch of bedstraw is on my neighbor's property battling it out with exotic oats. Catch-weed bedstraw is so dominant, ubiquitous, and destructive, that if it was native, there is no way that it would not have inhabited this area when we arrived. There are still places I exposed to light recently for the first time that were good bedstraw habitat, yet none came up. Even now, it is spreading along the County road infesting places I have not seen it for 25 years. I simply do not believe that it is native here.

June 2004

This could have been a horror story, but turned out to be a big success instead. This is Sticky Eupatorium, *(Ageratina adenophora)*. This plant grew 5ft tall the first year. It had colonized in a drainage and was starting to set wind-blown seed (see inset). After getting it identified the same day (thanks to a digital camera, email, and Dr. Grey Hayes), I wrote the local control expert in Monterey for advice. He told me they were losing. Perhaps you can guess why.

After fifteen years' investment, I couldn't afford to lose; the risk of seed washing down the drainage in the first rain to germinate for the next half-mile was just too great. So I did some homework.

Eupatorium is a tropical plant, while most natives produce seed that need exposure to cold weather to germinate. So, after very carefully bagging all the seed I could (I lost some) and pulling the bush, I hosed the area with oryzalin, a pre-emergence herbicide that kills germinating seed. Then I ran 500 ft of polyethylene tubing, tie-wrapped a sprinkler- head to a t-post, and watered it occasionally over the summer.

Next spring there was none, done, zero, nada...

ERADICATED!!! I have never seen it again.

After treatment, the natives present were completely unharmed. So, I wrote the expert with my results. He intoned ominously that he could never use an herbicide because it might harm a native plant (as if native plants were not being harmed by the weed). By the winter, most of the herbicide had already decomposed and it is not particularly mobile anyway. I'm certain he is still taking a paycheck to fight it. He might even know that the weed is toxic to animals.

April 2009

I want to say something important here. From time to time, I talk about what “I” did or what “we” did. For the most part it was me, but this is “we” and it was important. For about three years, these two girls were coerced by their home-schooling daddy to weed in the spring instead of getting a summer vacation. Neither one of them liked the work; it is tedious, repetitive, unrelenting, physically and visually exhausting, and seemingly endless and without benefit. Yet what they did, right here, has brought visiting botanists literally to their knees. Nobody knew what was going to happen or the contribution they had made. They just did what they were told, diligently, albeit occasionally begrudgingly and we all got to learn something important.

Most of the weeds here were either hedge parsley, mouse-eared chickweed *(Cerastium glomertum)*, or tiny grasses such as *Vulpia myuros* and *Briza minor,* and they were numerous. This patch took a couple of days, full time, at least twice a year, and then some.

Weeding season ended for them when they started at a local junior college as soon as I thought it safe for them to be there. The one who hated this the most went on to be *summa cum laude* valedictorian of the College of Agriculture and Animal Sciences at Utah State University at the age of 20. Imagine a kid with the discipline to take 21 units, run on the track team, be a teaching fellow, and go 4.0 (I can’t.) She has since entered an MS/PhD program at the University of Illinois Champagne-Urbana, one of five students in the program. The other went to Stanford, where the biologists simply could not believe that an 18 year-old kid could identify grasses. She became a resident advisor and an outstanding ballroom dancer. She is now in a PhD program at Michigan State University studying microbiology and biochemistry as applies to plant physiology.

I guess you can tell, I’m damned proud of them both, but in a way I’m more relieved than proud that the unrelenting toil I placed upon them did not make them bitter.

So, what is it that happened here that was such a big deal?

As we got rid of hedge parsley, bedstraw, and exotic grasses in this forest opening, an amazing thing started to happen. The slender leaves on the left might seem to be grass, but they are blue dicks *(Dichelostema capitata),* one of the few species on our property whose seed survived, perhaps after hundreds of years. Now that the weeds have been removed the blue dicks have started to express in patches extending over 70 feet. In fact, that breadth and density might be indication of historic Indian farming on this site. It can take a few years for them to get big enough to flower (right). Also present in the left photo is Pacific sanicle *(Sanicula crassicaulis)*. Both species were farmed by both Indians (and bears) for roots. We believe sanicle seed might make a nice cooking spice.

Blue dicks, as thick as grass. Not a single native plant expert around here had ever seen such a thing. They still don't flower, but they get bigger every year with more of them over a wider area. When I first realized why this was happening, I broke into tears. Everybody doing this kind of work wants to have the land "come back," but that wasn't it. What got to me was not the land, but this little bit of contact with *the people* who had traveled along this Indian trail, digging up something to eat, for thousands of years. It was something of their lives that was what was coming back, something I wanted to share. Accordingly, I contacted the Environmental Studies group at UC Santa Cruz which teaches ethnobotany, asking them if they wanted to do a little experimentation with native farming in a truly native habitat. I received no reply, neither a polite decline nor a referral. Nothing.

Note the difference between the size of the blue dick blades on the ground from the prior photo and these in a planter box (along with skullcap *(Scutellaria tuberosa)*). I was wondering about blue dicks' productive potential as food under cultivation. As it turns out, the bulbs do not get much bigger, they just divide, none being much more than a centimeter at its largest dimension. Both would make nice yard plants though. I was growing the skullcap tubers to be planted in the field during the winter of 2013-14.

So when I dug them out to plant, just look at what I found! One of the roots had swollen into this “bag” 6 inches long mostly consisting of safe drinking water. I had seen irises do this, but not on a scale even close to this. The important thing to note is that NONE of the academic ethnobotanists I contacted had ever seen this either. Nor is it to be found in the literature about this plant. Now we know why blue dicks were such an important food for Indians working their way along a hot dry ridge on a trading excursion. Apparently the borderline starving and thirsty white guys just called them “diggers” without really looking at what they were doing.

Just down the slope from the patch of blue dicks are dozens of soap lilies, another species Indians once farmed for food. The two patches share a well defined boundary extending at least 70, but perhaps 100 feet. There are few soap lilies in the blue dicks and no blue dicks in the soap lilies. It simply has the look of a human arrangement. From what I can tell, this slope grew death camas, sanicle, soap lilies, blue dicks, and maybe clover for food. There are plenty of herbs present, but they are farther down the slope. How these plants started expressing themselves simultaneously after all these years, over such a distance containing both meadow and redwood forest soils, represents another research opportunity. I suspect a soil fungus is somehow triggering the process.

Of all the groundcover types found here, this oak forest carpet is my favorite, particularly yerba buena *(Satureja douglasiana)*. This understory takes about a quarter of the time required to maintain even a pristine meadow. To keep it this way, I must remove some native plants**:** coyote brush, numerous fir trees, and many of the grasses that come in while slowly thinning trees; else it would soon become overgrown. An acre a day three times a year is about all that is necessary to keep it like this. Redwood forest is even easier.

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