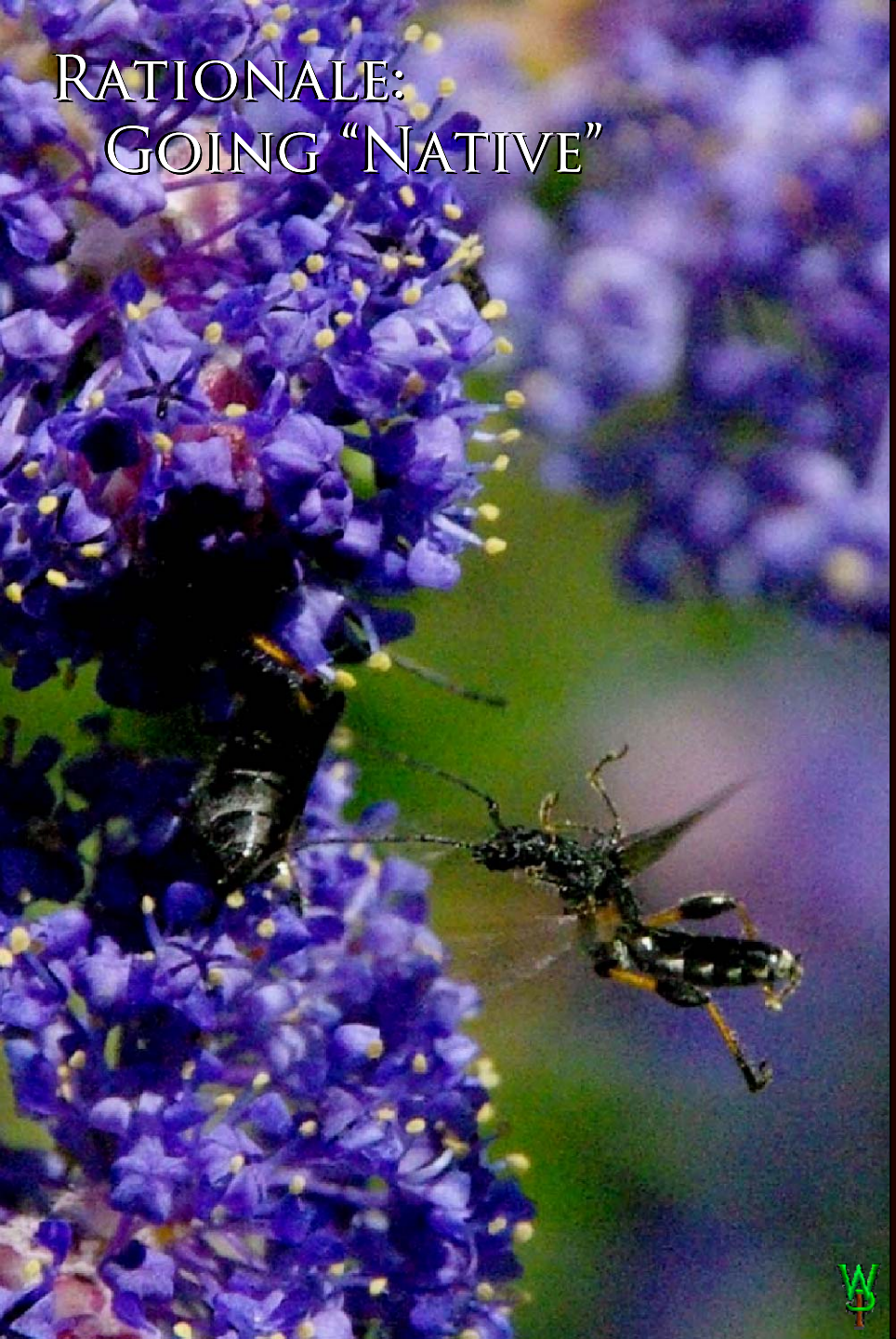

Rationale: Going "Native"

Plants are the most accessible means for people to manipulate the biological world. They have few defenses, stay put, and are relatively easy to propagate, develop, and multiply. Besides providing the bulk of food and materials for insects, people, and animals, they process nutrients for rivers and lakes that feed the estuaries that breed so much marine life. The ocean in turn processes 80% of the oxygen in the atmosphere, mostly along coastlines. Learn to manipulate plants and one can indeed hold sway over every bird of the air, fish of the water, and animals roaming in in swarms upon the earth, for better or for worse.

Native plants, and especially post-disturbance annuals, are like the foundation of a house; they set up the soil for the perennial systems that succeed them. Insects and animals need them for food while the plants need the bugs for pollination and animals for soil fertility. Many of these relationships among insects, bacteria, fungi, and plants host/consumer specific: pollination in return for food or for insect larvae accustomed to the toxins the host plant produces. Soil bacteria and fungi upon which we depend for processing nitrogen and other nutrients also have specific relationships with various native hosts, and often not their exotic counterparts. Migratory birds not only consume insects, but many require plants that produce the fruits or seeds for which they are suited. Hence, if that botanical foundation changes composition, the basis of the food pyramid will be disrupted significantly over the long run, particularly if non-native plants take over after a disturbance such as a major flood or fire.

This Ceanothus papillosus (a.k.a. "tick bush") is a fruit-bearing shrub popular with birds during the fall migration. When we bought our place, between overcrowded forests and weeds, it had been suppressed so completely that none were left alive. They came back when we thinned the forest, removed the non-native brush, and burned the piles. The Ceanothus came up and I transplanted them. The bugs seem to like the idea.

Wildergarten 4.0

There is a reason for this. This is a dynamic work that will be updated over time. I have no intention of defending conditions that no longer exist or explanations that have since been relieved of unintentional ambiguity or error.

Please, use a link. Thank you.

Revision History 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.

1.0 2.0 3.0 3.1 3.2 3.3 3.4 3.5 4.0

Vande Pol, Mark Edward, 1954 –

Other writings by Mark Edward Vande Pol:

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

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

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

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P.O. Box 98
Redwood Estates, CA 95044-0098
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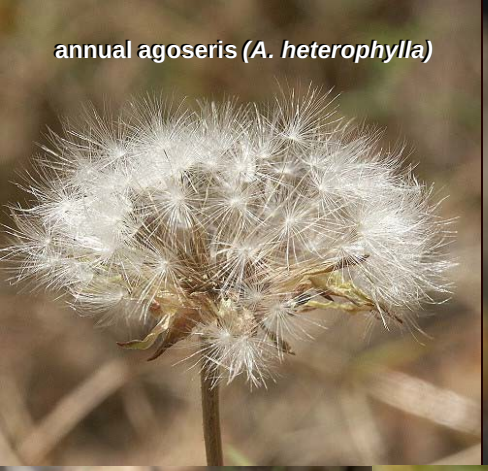
annual agoseris *(A. heterophylla)*



silver puff dandelion *(Uropappus lindleyi)*

smooth cat's ear *(Hypochoeris glabrosa)*

Of these dandelions, only cat's ear (on this row) is non-native.

If you think that native v. exotic is a distinction without a difference, please consult the images on the next page

grand mountain dandelion *(Agoseris grandiflora)*

People often ask me how we even know whether or not a plant is native. In some cases the determinants are easy: Some plants, such as redwoods, occur without human propagation in only one region of the world. Some evidences are more subtle but still definitive, such as fossils or pollen in annual mud strata found in stable ponds and lakes. A few cases are not much more than educated guesses; in fact, I have identified a few possible errors in the botanical record. Still, I would hazard that the determination of whether a species is native or not is probably better than 99% accurate overall. Unfortunately, that less than1% was nearly disastrous for us and continues to be an annoyance.

As an extension of that question, it is certain that we do ***not*** know how native plant systems were configured before European colonization. We do know which plants we tend to find together, but as regards how they might have appeared under aboriginal management, there is very little data beyond archaeological analyses and oral traditions. The records of first encounters by the Spanish are very sketchy but do offer inferences I will discuss. Brewer's diary of the 1860's US Geological Survey was more detailed but by that time the system had already changed radically. Upon those and similar bases, how *could* we reconstruct whole systems, much less assess their value, given the many unknowns and the obvious dominance of introduced species?

We are addressing that latter question. By ridding so much of the property of introduced plants, we not only get to witness how natives congregate, but how they colonize an open niche and work it out with their new cohorts. In many cases, the native seed bank had long been exhausted and we had to wait for birds and animals to bring something in. In most cases, those "somethings" had long been known to be local natives. The associations they form are qutie different from what you see with exotic plants.

There are two ways to amend a soil**:** chemical and biological. Chemical amendment denotes mining, which is finite. Biological sources regenerate from plentiful atmospheric gases but still require trace minerals to work. However, even native species vary considerably in their productivity with site conditions and over time. Improving our understanding and our results then requires having the genetic raw material with which to research site-specific behavior. That means somebody has to have a place to do that research with full compliments of native plants with minimal disruption from exotics. In this region of California, Wildergarten is as close as it gets.

As you look at these photographs, you will see that native plants usually form complex arrays of numerous species, whereas non-native plants tend toward monocultures. Diverse systems are thought to be more adaptive, as with many elements there is a higher probability that some will be more suited to respond to a change in environmental conditions, whether light and soil chemistry after a fire, inundation by flood, pathogen, or pest attack. For multiple species to get along in one spot, no one native can be exclusive in its niche (there are exceptions). It is that lack of dominance leaves them wide open to invasion.

Non-native plants, by contrast, are hardy and do form stabile systems, but they are also more subject to the risk of catastrophic failure because their lack of variants leaves them less adaptive to a significant change in external conditions. Most of them wreck soil productivity.

First among native successional systems are post-disturbance annual forbs. These are among the most genetically adaptive plant species. They prepare the chemical, bacterial, and mechanical conditions for the perennials that succeed them. Unfortunately, post-disturbance annuals are also the most likely to be displaced by exotic species.

Cat’s ear was such a disaster that I wanted you to appreciate this mess. 25-50 seeds per head. Imagine acres of it. It’s toxic too.

Besides, I just like the grand mountain dandelion better.

I guess I’m just prejudiced.

May 2010 – Wildergarten

Our property is amazingly varietal even for this region, and especially for a parcel this small. It is home to five distinct types of habitat**:** redwood conifer forest, oak and madrone woodland, native meadows of several types, scrub/chaparral, and the unique “Santa Cruz Sand Hill” habitat. It is a wonderful laboratory for observing dynamic behaviors among these plant communities over long periods of time. The only thing we’re missing is a pond or running stream.

All told, as of 2015 we manage 350 observed plant species, of which 224 are native, an impressive degree of “species richness” for only 14 acres in a place no botanist would call a “biological hot spot." According to at least seven local botanists and restoration experts (three of whom had been presidents of the local chapter of the California Native Plant Society), the Wildergarten now has the purest collections of native plants to be found anywhere on the Central Coast of California and perhaps in North America. Virtually every park, preserve, or “pristine area” in the region is significantly infested with exotic plants by comparison.

Much of this book centers upon what it took to achieve these results. Not surprisingly, it has demanded a huge investment of time, money, and labor that is not over by any means.

Consider this little meadow close-up. Within ten feet, I have counted over twenty species (there are seven in the photo; several more have been weeded out). When I started the project, there were four species in this area, total. Now, imagine looking for 10-15 different target weeds amid this tangle, as fast as you can go. Hour after hour, day after day, year after year.

The goal here is simply to see how full compliments of native plants behave with minimal exotic intrusion. It has never been done on this scale before. What we have learned is that this system is quite different than the usual landscape in California. These plants exhibit complex interactions with each other and soil that are not described in the literature.


Verbena lasiostachys


Stachys rigida

Another typical question is if there is anything inherently superior about native plants. To the surprise of many, I would argue that, on an individual basis, in most cases the answer is no. However, when one looks at how individuals behave within total systems, I would argue natives are generally better. The reasons are subtle and demand some explanation.

There are two ways to obtain materials with which to produce the physical products you buy**:** agriculture and mining. The first is in some respects the second, in that whatever soil minerals leave the site as products are also effectively mined. So, any process that tends to increase the productivity of soils or makes them more resistant to problems would seem to be a good thing.

Consider the verbena at left (top). Although it is a perennial, it has the property of dying back every winter, leaving massive amounts of soil organic matter in the form of decaying roots and vegetation. Every spring, annual forbs germinate in that soil and die, leaving processed nitrogen, then to be covered over by the verbena. It then becomes a powerful moisture-retention blanket during the summer while providing an important source of pollen to hordes of bees for months. It is however not a palatable forage or competitive with weeds.

Consider hedge nettle *(Stachys rigida)*. This genus is known to produce root exudates upon which nitrogen-fixing bacteria in the root zone (rhizosphere) can multiply, much as they do in a nodule on a legume. These nettles do make beautiful soil and they don't sting. Such relationships may explain why we see so much growth here despite the fact that our sampled nitrate numbers are pitifully low. On the other hand, the site history (to come) explains why some of our soils lack sufficient molybdenum for nitrogen fixing (diazotrophic) bacteria to produce nitrogenase.

There is a lot of research to do, yet these and similar plants are in trouble. If you now realize that we do not know much about them, more significant is that we know a lot less about how they interact with each other without weeds and especially in soil, where microbial associations are very poorly understood.

So, do I think non-native plants always bad?

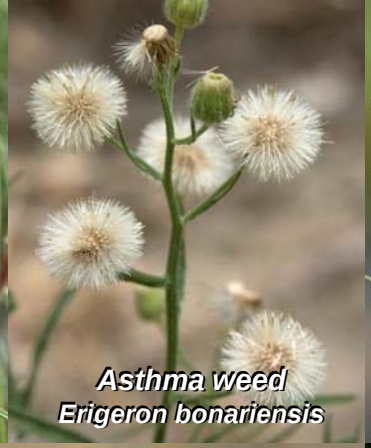
Well, of the 124 exotic species we have seen here, I have classified only ten (10) as benign, meaning that they do not displace natives and tend to stay put within the system; in the vernacular, “they know how to get along.” Examples are relic landscaping plants on the property**:** an oleander, a mission olive tree, a periwinkle every year or two, a juniper shrub, and a patch of “naked ladies” *(Amaryllis belladonna)*. The rest of the non-native plants we have here universally crowd out natives, in part because they can tolerate a far broader range of habitat conditions than the natives seek to colonize.

A good example is at left. Obviously, *Filago californica* (native, top) and *Filago gallica* (endemic to France, below) are related. The former lives only in sand hills. The latter lives anywhere there is full sun and bare soil. The non-native almost fully displaces the native, but it also displaces native clovers, lotuses, and *Navarretias* elsewhere too. The non-native once outnumbered the native in its preferred habitat, 50:1. After ten years of weeding, literally hundreds of thousands of removals, that ratio is now even. There is currently no way to separate the two other than by hand. It sucks.

But, don’t we want plants that are widely adaptable? Well, not necessarily**:**

- If we want systems capable of sustaining numerous species of insects and birds, the answer is no.
- If we do not want to displace numerous native plants in the wild, the answer is no.
- If we want varietal cohort species (such as soil bacteria) with which they are symbiotes, no.
- If we want the plants to get along with each other such that systems can perform multiple functions in the same spot, no.
- If we want adaptable systems as a whole, probably not.

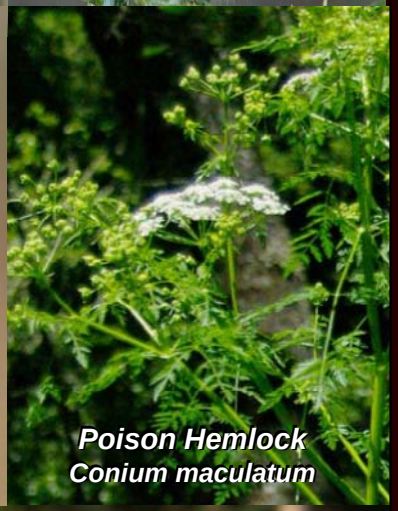
Spanish Brome
B. madritensis



Asthma weed
Erigeron bonariensis

Italian Thistle
Carduus pycnocephalus

Maltese Star Thistle
Centaurea melitensis



Poison Hemlock
Conium maculatum

Fox Tail Barley
Hordeum marinum

Rip Gut Brome
Bromus diandrus

As a final element to this, “Are non-natives always bad?” question, almost all of the exotic plants we *are* talking about are those that people have already found to be generally undesirable for residential or agricultural use. Most would be considered "bad plants" just about anywhere.

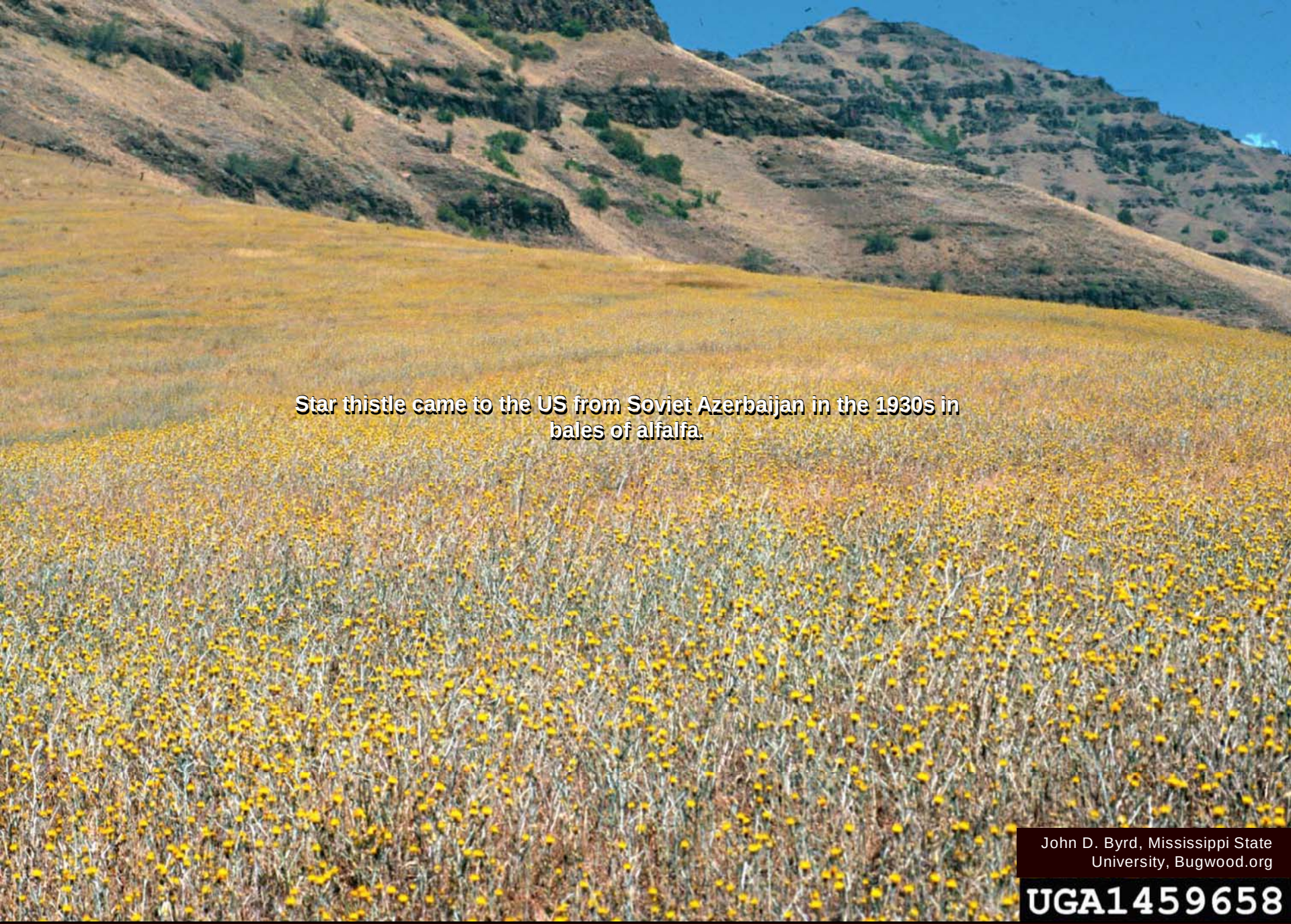
They are**:**

- Inedible to humans, beasts, or insects,
- Allergenic irritants,
- They displace forbs that produce protein in forage,
- Many are toxic,
- They are very destructive to soil fungi and microflora,
- Many cause mechanical injury to animals,
- Most have poor forage value,
- Many produce irritating burs,
- Most are water hogs,
- They are all virtually uncontrollable, and
- Most are fire hazards (at least they are here).

This does not mean that they have no *potential* use, as the examples of various vetches and poison hemlock (to come) demonstrate. One can make honey from star thistle. One can graze rip gut early. However, in this region, I really don’t know why anybody would *want* large amounts of them given their native alternatives.

Most people find exotics undesirable, but seem equally unwilling to do what it takes to bring them under control. In general, most people either do not know or care what is native versus exotic or do not possess the means to exercise their preferences.

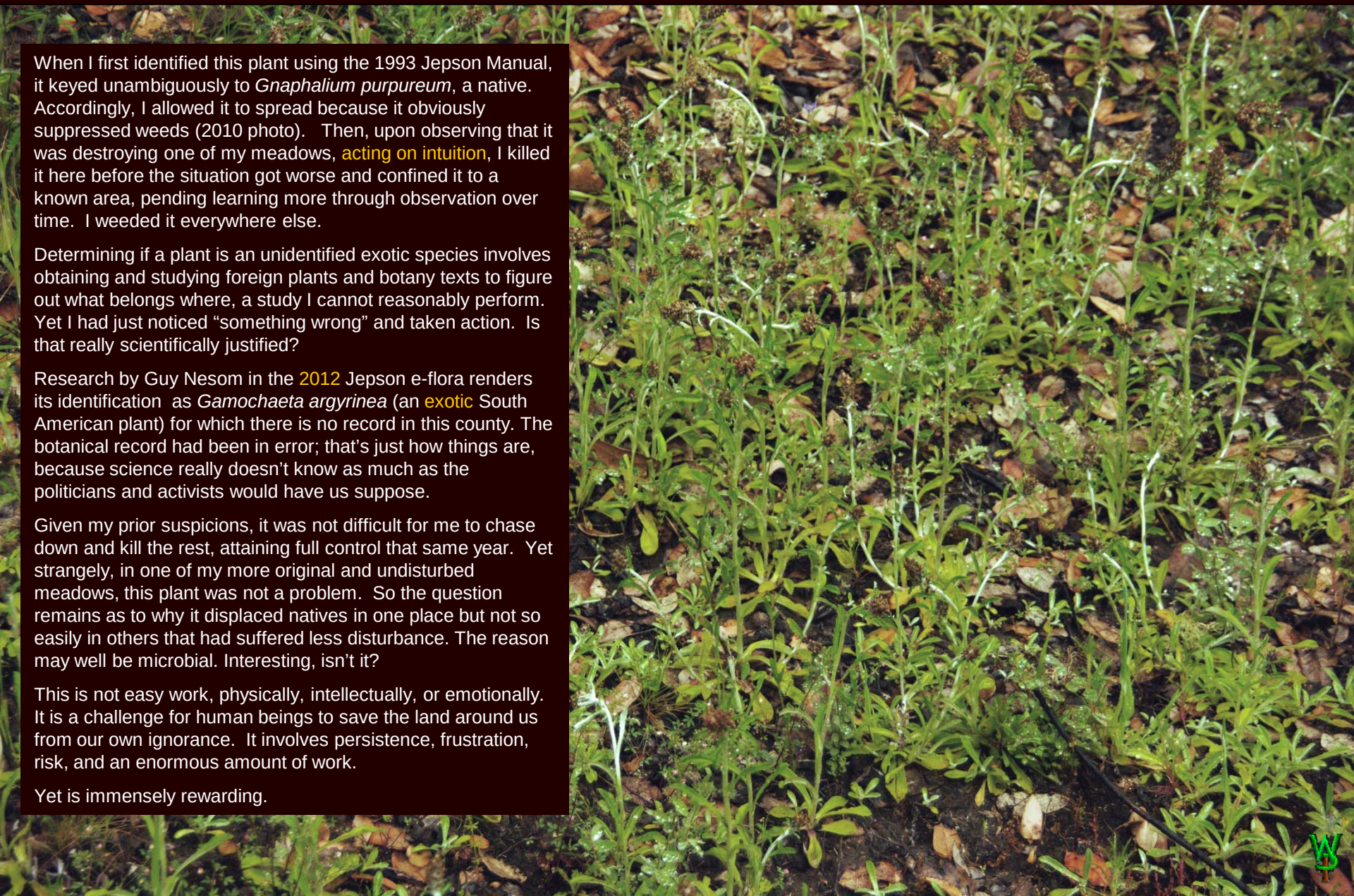
As a special subset of “bad plants,” *invasive* exotics build massive monocultures, meaning that they tend to exclude all other plants. These pests are displacing native plants, worldwide. The US Soils Conservation Service introduced kudzu as an erosion control… Well, it certainly worked for that.



… but other invasive exotics came in accidentally, facilitated at an increasing rate by global trade with neither inspections nor treatment.

Some are subtle because we are so accustomed to their presence. “The Golden Hills of California” may be beautiful, but neither are these grasses native nor are they as productive for forage as others could be. Twenty-two million acres of annual grasses, particularly wild oat *(Avena spp.),* “poverty grass,” *(Festuca spp.*), and several exotic bromes such as rip-gut and Spanish brome *(B. diandrus & B. madritensis)* have displaced the perennials that would do as well or better. There are now very few annual forbs here at all.

As mentioned earlier, we have encountered instances for which there were legitimate questions as to nativity. Some of these (later found to be) exotics were very destructive. Others not so much. Yet that such ambiguity exists at this late date is indicative of serious problems in our environmental management model, one in which science responds to political and academic interests at the expense of distributing accurate and timely information to its users, for which, effectively, no one is accountable despite the costs.



When I first identified this plant using the 1993 Jepson Manual, it keyed unambiguously to *Gnaphalium purpureum*, a native. Accordingly, I allowed it to spread because it obviously suppressed weeds (2010 photo). Then, upon observing that it was destroying one of my meadows, acting on intuition, I killed it here before the situation got worse and confined it to a known area, pending learning more through observation over time. I weeded it everywhere else.

Determining if a plant is an unidentified exotic species involves obtaining and studying foreign plants and botany texts to figure out what belongs where, a study I cannot reasonably perform. Yet I had just noticed "something wrong" and taken action. Is that really scientifically justified?

Research by Guy Nesom in the 2012 Jepson e-flora renders its identification as *Gamochaeta argyrinea* (an exotic South American plant) for which there is no record in this county. The botanical record had been in error; that's just how things are, because science really doesn't know as much as the politicians and activists would have us suppose.

Given my prior suspicions, it was not difficult for me to chase down and kill the rest, attaining full control that same year. Yet strangely, in one of my more original and undisturbed meadows, this plant was not a problem. So the question remains as to why it displaced natives in one place but not so easily in others that had suffered less disturbance. The reason may well be microbial. Interesting, isn't it?

This is not easy work, physically, intellectually, or emotionally. It is a challenge for human beings to save the land around us from our own ignorance. It involves persistence, frustration, risk, and an enormous amount of work.

Yet is immensely rewarding.

June 2015 – This is *Carex divulsa,* which did not do very well on this "Green Roof" over the Stanford University Hospital parking garage. To Stanford's credit, the roof has since been replanted but it still has weed problems.

In 2004, I was in the throes of learning what was native and what was not. I was also in too much of a hurry. So I planted 200 *"Carex tumulicola"* (foothill sedge) plants from a native plant nursery specializing in large (and expensive) habitat restoration projects, usually for government agencies. Impressed with my efforts, I called in some botanists to look at the progress. Tim Hyland got out of his car, looked up the hill, and said (loudly), "There's that sedge Paul Kephardt is selling as *Carex tumulicola*." I asked him what it was and he said he didn't know, but it wasn't as advertised, to which the others agreed. I killed them all (the sedges, not the botanists), packaged samples, and sent them and some known *C. tumulicola* to the Jepson Herbarium at UC Berkeley. After a year goading them to do the ID work (sedges are very tricky), they punted them up to Dr. Eric Roalson at U. of Washington. By then I had guessed and he confirmed what they were: *Carex divulsa*, an exotic European sedge. That plant had been sold all over the State as a native, especially for said very spendy restoration projects and "green roofs" on government and university buildings. The interesting thing is**:** although the experts in the native plant nursery business had been fooled by appearances, this exotic species did not do very well.

April 2015 – Bitter Cress along with hedge parsley on a site recently exposed by forest thinning

When I first keyed this plant (with the upright brown pods) to the flora, it was thought to be *Cardamine oligosperma* (native). In fact, it is "bitter cress," (*C. hirsuta*), an exotic and a headache to the nursery business nationwide. To this day, the University of California Jepson herbarium says the exotic is not present in most of the State. Yet our seed bank indicates that it has been here for over 50 years!!! This is indication of misplaced institutional priorities in the mundane business of management. There is no excuse for it.

February 2015 – Bedstraw, aka cleavers, catchweed, stickwilly… the tangle in the middle

This is believed to be *Galium aparine* (native), which I believe to be either *Galium spurium* (exotic) or a hybrid thereof. In this matter, there has been considerable attention to the question, not to mention disagreement. Nor is this matter a mere curiosity, as it is very destructive to agricultural crops. I kill it, because “it doesn’t know how to get along,” meaning that it is destructive to native habitat.

February 2015 – *T. ciliolatum v. ciliolatum* displacing *Acmispon parviflorus* and *Trifolium microdon*

This fourth example gets ethically murky! This is *Trifolium ciliolatum v. ciliolatum*, inarguably a California native plant. HOWEVER, this *variety* of *T. ciliolatum* has never been recorded this far south. It does "get along" with the local soil bacteria in that it forms profuse nodules containing nitrogen-fixing bacteria (inset). It is at least competitive with the native *Stipa* grasses (unlike most of our local clovers). HOWEVER, it also tends to form monoculture patches wiping out virtually all other native clovers (this is a relatively small patch but an obvious example). So, does this new "native plant" variety "belong here" or is it an alien? In some respects, it certainly *behaves* like an alien! This will be discussed at greater length in a chapter on native colonization behavior in Part III of this book.

April 2010 – This is the local *T. ciliolatum v. discolor* (the larger variegated leafed clover leaf) hanging out with friends

This “knows how to get along” thing, insofar as “native” plants are concerned, is important. In three of these instances, my personal and subjective intuition based upon observations of the behavior of the plant in question in and among indisputably native plants has been shown to be at least arguably correct despite “authoritative” documentation to the contrary. Nor am I alone among experts in the field in possessing these opinions. Even in the case of *T. ciliolatum*, I had noticed a potential “problem" well before I knew that this variety had never been seen in this area before. Effectively, there is something about a native system that speaks to human intuition before it can be resolved explicitly. Maybe there is hope for us after all. Yet ambiguity is not the only problem with “native.”

There are practical limits as to what one seeks to establish among native plants. According to the Jepson Manual, Chilean (aka “Coast) Tarweed *(Madia sativa)* is thought to be native. Upon observing its behavior, I have my doubts, as it readily builds monocultures here. The problem with *M. sativa* is that, after weeding in it, one literally feels as if coated in contact cement! It is such a pain of a plant that I have seen papers from both North and South America each accusing the other as the source! So, even if it is native (about which I have my doubts), I kill it for the simple reason that **making the guy who weeds this place miserable is bad for this place**. Everything this plant did in this system is accomplished just as well by Slender Tarweed *(Madia gracilis),* which is not nearly so sticky.

One of the key points in these introductory chapters is that just because one has "restored" a place to all native plants DOES NOT mean that the native *system* is restored. Over and over I see projects wherein perennials are installed in such intense density as one would NEVER see in the wild with the sole purpose of crowding out weeds. There is nothing wrong with this strategy of exclusion (I use it) as long as it is a temporary way to gain control of a location overrun with weeds. Yet eventually, there **will** be a disturbance (fire, flood, fallen tree) such that the niche will open and the weeds will reassert themselves. Accordingly, once one has achieved the preliminary goal, the next step is to establish post-disturbance plants, where the hard part of restoration actually begins. I will discuss that process in the technical chapters. But before we go there, best to show what happens if we pretend that "native" is good enough.

Table of Content

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These are LARGE files; they do take time to load

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