

MEETING MEADOWS



In these mountains, fire-suppression has allowed forests to become overgrown. Meadows end up as very occasional openings, usually made by a bulldozer or as maintained by domestic grazing animals. Meadows with large quantities of native forbs are virtually non-existent. Here at the Wildergarten meadows are maintained by hand and are by far more demanding than any other type of habitat. Larger plants hide tiny weeds, requiring time-consuming inspection and removal at least five times per year (weeds crop up after rain). In 2011, the patch at left got 14 visits. Meadow soils are more tangled with roots, making effective removal more difficult.

This meadow is a mix of small-flowered lotus, Spanish lotus, pinpoint clover (*T. gracilentum*) tree clover (*T. ciliolatum*), thimble clover (*T. microdon*), small-flowered needle-grass (*Stipa lepida*), blue wild-rye (*Elymus glaucus*), California brome (*B. carinatus*), hedge nettle (*Stachys ajugoides*; they don't sting), and about 20 others. Interestingly, most of this meadow is succeeding to grasses, while patches of it are going the other way.

Note the three native shrubs, yerba santa (*Eriodictyon californica* - the leafy thing in the mid-ground), monkey-flower (*Diplacus aurantiacus* on the right), and deer weed (*Acmispon glaber*) behind my trusty dog. If I don't remove these natives too, this meadow (also a road) would succeed to chaparral in about five years. Now, that isn't a bad thing in terms of native plants, but it is a bad thing in terms of management if the goal is to maintain grasslands to learn about how each one of these systems works.

Although this site is cleaner than some other locations on our property, disturbance still brings up non-native Dwarf Wood Sorrel (*Oxalis micrantha*), nit grass (*Gastridium pheloides*), bur clover (*Medicago polymorpha*), and French Broom, even though they were all under control here for over 10 years before this photo.



WILDERGARTEN 4.0

Wildergarten, ©2014 by Mark Edward Vande Pol & Wildergarten Press, All rights reserved. All photos and illustrations except as noted are by Mark Edward Vande Pol.

You are permitted to download the public portions of this book without charge for your personal education. You may not edit, or otherwise alter its content in any way. Fair use quoting is considered one page of text and must include reference to the source URL. Content may not be copied, reposted, republished, or transmitted without written permission.

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

Wildergarten Press
P.O. Box 98
Redwood Estates, CA 95044-0098
www.wildergarten.com





May 2010



Native meadows vary spatially and over time. Their management requires adapting to each individual system. This one is a mix of California brome (*B. carinatus*), blue wild rye (*Elymus glaucus*), and the usual lotuses, clovers, tarweeds, and cudweed.



April 2012
Besides being variable, meadows are intensely complicated. This one, in addition to the grasses, has strange perennials like cinquefoil (*Potentilla glandulosa*), blue witch (*Solanum umbelliferum*), strawberries (*Fragaria vesca*), blackberries (*Rubus ursinus*), and pink cudweed (*Gnaphalium ramosissimum*), annuals that can get five or six feet tall and as wide (if I let them). This is right in front of the house. I keep thinking from time to time that I should landscape it but maybe not just yet. I do mow it at the end of the year though.



May 2013

Meadows here also have their uses. Like the first image, this one is a road. Here are slender hair grass, (*Deschampsia elongata*), blue wild rye (*Elymus glaucus*), (*Bromus carinatus*), miner's lettuce (*Claytonia perfoliata*), monkey flower, Santa Barbara sedge (*Carex barbarae*), foothill sedge (*C. tumulicola*), and of course weeds, the worst of which is now chickweed (*Stellaria media*).



December 2014

Now, one might think that chickweed is not a big deal with all these bodacious grasses around, but it does inhibit the germination of and development of more productive plants like this miner's lettuce. A meadow is a lot more than grasses; it is the soil that makes things grow. We simply do not know what small native annual forbs did to make a soil that works. So what I am doing is simply cleaning out the weeds, learning what the natives do, perturbing the system repeatedly to see how it responds, weed it again...



February 1, 2009

Note the size of these grasses so early in the season! Perennials can respond to early rains much more powerfully than do annuals. Productive forbs make a big difference in the forage value of this California brome (*B. carinatus*). More importantly, they exert a powerful influence upon the grasses. This miner's lettuce (*Claytonia perfoliata*) will drop seed and die back long before the grasses reach full maturity. Indeed, there can be what is effectively a second forb crop here, particularly tarweeds (*Madia* spp.).



October 16, 2014



Meadows here have their seasons. It starts in late September or early October with perennial grasses greening up from the first rain.



November 2014

Yes, this is when I start weeding. This is mostly clover, in particular *T. microdon*. If one knows the cotyledons, the weeds are easy to spot when separated like this.



December 2014

In particular I am inspecting old burn piles closely to see what is coming up, while building new ones for burning in early spring.



January 2015
This is the time when weeds grow slowly and are easy to distinguish and pull. The grasses are *Stipas lepida* and *pulchra.*, the fabaceae are *A. americanus* and *T. ciliolatum v. ciliolatum*, and the dandelions are *Agoseris gradiflora*.



February 2015

By February, the weed war is on full. Here I'm searching for bitter cress (*Cardamine hirsuta*, red arrows for a few...) hidden among various clovers (*Trifolium wildenovii*, *T. oliganthum*, *T. bifidum*, *T. midrodon*), lotus (*A. americanus*) and willowherb (*Epilobium minutum*). The grass weeds are rat tail fescue (*F. myuros*) and rip gut brome (*B. diandrus*). This is "Hidden Pictures" on steroids.





February 2015

The spring germination also begins in February to early March.



February 2015

It is also when the bulbs start to come up.





March 2015



March is simply frantic here. I don't get many pictures.



April 2015

This having been an almost catastrophically dry spring, the first crop of clovers was pretty much done by April.



April 2015

This having been an almost catastrophically dry spring, the first crop of forbs was pretty much done by April. This slope had been exposed only three years prior. In this image one can observe brush species such as deerweed and monkey flower getting started.



June 2015

The needle grasses typically drop seed in late May. After the harvest, the lotus and verbena are still in bloom until late July.



June 2015



The brome and rye grasses are ready in June. If I mow them now, they'll put up fresh growth.



July 2015

This *Calamagrostis rubescens* in a forest grassland typically waits to drop seed until at least late July but seeds so seldom that its one of its common names is “seven year” grass.



April 2015



By mid July, the second crop of forbs really gets going; these *Madia gracilis* are about three feet tall flowering from June to August. It is not hard to envision that a second crop like this would represent a great deal of seed or forage over a large area.



August 11, 2014

Here in August, one can see that this needle grass is still green. It would look better if I had mowed it after the harvest as it would have forced up fresh growth.



Cudweed

These trees
were irrigated

Cudweed

Blue curls

September 2014

In August and September until the first rain, blue curls and cudweed rule the day wherever the soil had been bare enough for them to germinate in the first place. I treated this flat with pre-emergence herbicides because I had moved these weed composting piles and was concerned about the seed I had surely dropped besides having the need to maintain it as a working area. Lacking competition after the oryzalin had petered out, the blue curls and cudweed came up in profusion, growing to four feet across without irrigation.



September 2012



Everywhere else, all is dry and barely clinging to life until that first rain. This was mowed.



May 2010



When you get them right, native meadows can be immensely productive despite very poor parent material for making soil. This is almost all California brome (*B. carinatus*) about 4' tall with a bit of blue wild rye. We will now get to what you can't see that makes it go.



February 2015

As to nitrogen fixers there are of at least three major kinds, two of which are represented here. In addition to the usual lotuses and clovers (*Trifolium microdon*) that host Rhizobial bacteria in nodules, the leafy *Stachys rigida* produces root exudates in the rhizosphere that feed loose nitrogen fixing bacteria. Yet there may be a result of the site history at work here that reduces the capacity of that nitrogen fixing system. Soil tests here are unusually deficient in molybdenum.



May 2013

Stachys, lotus, and clover are usual in the grass understory here. But there are other nitrogen fixers. Did you know that those annuals can have yet *another* understory of plants beneath them? Here are *Aphanes occidentalis* (arrows), a member of the rose family which host nodules of actinomycetes on its roots to process nitrogenase.



M. exigua



May 2015

Many plants here at the Wildergarten like these *Psilocauphus tenellus* (slender wooly heads) germinate late, typically in March. Virtually everywhere else they don't get the chance because the weeds get there first. Among them are slender tarweed (*Madia gracilis*) and sanicle (*Sanicula crassicaulis*). Nobody really knows how these plants get along because they have been suppressed by weeds for over a century here. Here also is *Madia exigua*, that smells like cherry cough syrup when weeding.



M. exigua



February 2015

This is how *Madia exigua* starts in and among tomcat clover (*Trifolium wildenovii*). They have quite the relationship.



February 2009



This is *Madia exigua* (yellow) growing in *Verbena*. Native grasslands can be so varied it's hard to call them "grasslands" in places (which is why I prefer "meadows"). The plants even take on different personalities in combination with their various cohorts.



February 2009

This is *Madia exigua* and tomcat clover (*T. wildenovii*), consummating that relationship.





Land Trust of Santa Cruz property near Scotts Valley, CA, June 05 2015

As to how to distinguish a truly native grassland from one that isn't, that difference is not so hard to recognize as one might think. You've probably never seen one, including in parks, conservancies, wilderness, and land trusts. What? They didn't tell you? The green stuff in the foreground is a pennyroyal, an exotic weed that is very difficult to control.



Wildergarten, June 29 2015

As opposed to their flat bottomland in a marine climate in Scotts Valley at the beginning of June, you could try our sunny sandy hilltop in an inland climate at the *end* of June, where it is often 15° hotter than the valley the same day.



Wildergarten, June 13 2015

But there really is a difference anyone can see. Besides brome grasses (*B. carinatus*), needle grass (*Stipa pulchra*) blue wild rye (*Elymus glaucus*), and slender hair grass (*Deschampsia elongata*), this sward is populated with sedges (*Carex barbarae* & *C. tumulicola*), *Verbena lasiostachys*, tarweeds (*Madia gracilis* & *exigua*), *Camissonia contorta*, and silver puff dandelions (*Uropappus lindleyi*). Some of these perennials, such as the *Verbena* or the sedges, really increase the content of soil organic matter .



May 2010

There are 37 species of grasses, rushes, and sedges in meadows at the Wildergarten. This is (mostly) nodding Trisetum (*T. cernuum*), which is still spreading on the property. Where they first appear is not necessarily demonstrative of where they are best suited.



April 2009

Some meadows here have species characteristic of sand-hills present and vice versa, which is not surprising in a distribution of plants that is essentially representative of a successional transition.



April 2009

In fact, nailing down a sharp demarcation between grasslands, sand hills, or even chaparral can be a somewhat subjective exercise more determined by what stage of succession appears to be dominant at the time. You know when you are in the middle of one, but at the edges, not so much.



April 2009

When grassland species become so ubiquitous they start invading edges of forests, one has to wonder what is going on. This is notch-leaf clover (*Trifolium bifidum*) building a patch so dense one would be tempted to think it a weed. Nobody knows how this will work here, because when the Indians had this landscape, **there were no forests here**. This really IS unprecedented.



July 2015

The transition between grassland and forest is not so clear-cut as one might think.





July 2015

Especially because we have grasslands deep in the forest. This one used to be a broom patch with bare ground. This one is about a quarter acre of pine grass (*Calamagrostis rubescens*), and small-flowered needle grass (upper right) trimmed with roses, snowberry, hazelnuts, and ferns. But even as remote as it is, this meadow shares one thing in common with all the others: weeding every year.



May 2013



So, how did we end up with so many different meadows?
Sometimes it was happenstance, simply because of varied topography. Most of the time it was a matter of site history.



April 2005



Sometimes they are by design. These are planted plugs.



April 2013

A few times it was easy. I did this with a loader and pre-emergence herbicides.





February 2009

Most of the time, it was war. This is wall bedstraw (*Galium parisiense*) from the weed bank infesting needle grass and Spanish lotus. This weed has taken forever to cleanse from the exotic seed bank, but we've done it in most places.



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 into weeding during 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*), pimpernel (*Lysimachia arvensis*) or tiny grasses such as *Festuca myuros* and *Briza minor*. They were numerous. This patch took a couple of days, full time at least twice a year and then occasionally thereafter.

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 barely 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 a Master's program at Illinois Urbana-Champaign, one of five students in the program. The other went to Stanford, where the biologists simply could not believe that a 19 year-old kid could identify grasses. She is now in a PhD program at Michigan State University studying fungal microbiology and biochemistry as applies to plant physiology. She became a resident advisor and an outstanding ballroom dancer.

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?





April 2009

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 (*Dichelostemma capitatum*), one of the few species on our property whose seed survived, perhaps after hundreds of years. It can take a few years for them to get big enough to flower (right). Once weeds were removed the blue dicks 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. 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.



February 2013

Blue dicks came up as thick as grass, all the same size. Not a single native plant expert around here had ever seen such a thing.

They got bigger every year thereafter, so it was clearly from seed. When I first realized what 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 for thousands of years had traveled along this Indian trail, digging up something to eat and perhaps a little moisture. It was something of the hardship 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



March 2012

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 far as food is concerned, 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.



March 2014

So when I dug them out to plant, I found out that “food” value was not the whole picture! One of the roots had swollen into this “bag” 6 inches long mostly consisting of safe drinking water. I had seen irises do something similar, but not on a scale even close to this. The important thing to note is that NONE of the ethnobotanists or archaeologists I have 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 who often contracted dysentery drinking from the local streams just called them “diggers” without really looking at what they were doing, much less why.



The prior photos were taken in this clearing

Blue Dicks
on this side

Soap Lilies
on this side

March 2012



Just down the slope from the patch of blue dicks are hundreds of soap lilies, another species Indians once farmed for food. There is a well-defined boundary extending at least 70 feet between the two species. The two species are not intermixed, although the occasional stray shows that they clearly can tolerate each other. It simply has the look of a human arrangement. From what I can tell, this slope grew sanicle, soap lilies, blue dicks, and maybe clover for food, along with death camas, possibly for predator control. There are plenty of other herbs present, but they are farther down the slope. How is it that these plants started expressing themselves simultaneously after all these years, over such a distance containing both meadow and redwood forest soils? I suspect that once the weeds were removed and the clovers came up, mycorrhizal fungi associated with the clover began to exude gibberellic acid, a germination and growth promoting hormone. As I have since removed more trees, the pattern has extended too.



May 2010

At that point, one need only weed and wait. Then comes the reward. Then you start weeding natives. The sanicle is a problem.



May 2010



In one case native grassland developed and then died almost totally, taken over by another weed that at the time keyed out as a native plant but it turned out the botanists were wrong. Where it was going carried significant hazards; it did *not* look promising. So I got rid of it. I burned, and weeded “natives,” confining them to a narrow ridge below and found out that was correct four years later.



April 2015

Although the weed had taken nitrate levels here down to near zero, the area has now come back from the brink despite the drought. A few more years and I'll be back to kicking it around again to find out what can be made of it. Maybe I'll get lucky again, like this...



Clarkia rubicunda, June 2015



***Clarkia rubicunda*, June 2013**

“This” was no accident. The purpose of this chapter, unlike those in the introduction, was to give those with the willingness to read deeper a sense of what we have here, what I mean when I say this is a love story, to understand when I say it is varied, interesting, beautiful, and all native. The Wildergarten is all of that. But it also means that, upon occasion, disturbance makes things ugly. This is not a cherry-picked presentation. No, there is more to come. In fact, there are a lot of amazing little spots, each with its own story, each with its own curiosities and speculations for which there is no space here. Each must also go through a cleansing from time to time. I am getting old. I don’t know how much longer I can go on. I am doing this to help you carry on where you live.



Clarkia rubicunda, June 2014

But I wanted you to be invested in the Wildergarten, not to “preserve it” but to make one of your own, to understand how it was done, and not to scoff when you read how it was done. I felt you had to see that it truly is worth doing despite the pain and unpleasantness of dealing death for years on end without much to show for it. That is what it takes. That photo you saw represents years of work.

When I look at it, I start to get teary, in part because I feel forgiven. I’m doing all I can to help you do better than I did.



***Clarkia rubicunda*, June 2015**



But I wanted you to be invested in the Wildergarten, not to “preserve it” but to make one of your own, to want to learn how it was done, and not to scoff when you read how it was done. I felt you had to see that it truly is worth doing, despite the pain and unpleasantness of dealing death for years on end without much to show for it. That is what it takes. That photo represents years of work. When I look at it, I start to get teary, in part because I feel forgiven and hope for even better. I’m doing all I can to help you do better than I did.



May 2013



In any case, I have learned more from meadows than I have from any other type of habitat, simply because they do change so greatly from year to year. So, now that you've made your introductions, it's time to get started with what was really involved.

TABLE OF CONTENT

Part I - Introduction

1. This is Wildergarten
2. Going "Native"?
3. "Native" Is Not Enough
4. A Site History Like No Other
5. Repeat Photography, Before & After
6. Proof: Pure Germination of Native Annuals
7. Project Overview

Part II – Forestry

1. Phased Thinning of Broadleaf Forest
2. Conifer Forestry – Thinking Really Big
3. Drainage – When Hill Goes Downhill
4. Roads – From Curse to Blessing
5. Making WOW! - Restoration of Forest Understory
6. Aerial Photography over 25 Years

Part III - Grasslands

1. "The Onion": Weed Management by Species
2. Colonization Behavior of Native Annual Forbs
3. Sand Hills: A Model Post-Disturbance Habitat
4. Grassland Variety in Meadows & Forests
5. Grassland Restoration and Soils Rehab
6. Comprehensive Weed Management
7. Vegetative Identification & Weeding Technique
8. Pre-Emergence Selection for Native Germination
9. Drought Tolerance in a Pure Native Grassland

Next

Part IV - Miscellaneous

1. The Vegetable Garden as a Research Tool
2. Pollinators and Native Forbs
3. Fungi (not yet)
4. Specialized Tool Development

Part V – Project Context

1. Periodic Disturbance and Feed-Forward Stability
2. Weeds: A Tragedy of the Commons
3. Control Boundaries: Fragmentation Is Your Friend
4. Central Planning
5. Our "Ownerless" Backyard

Each line in the TOC is a link that opens the corresponding chapter in a new file

These are LARGE files; they do take time to load

Please offer suggestions and comments [HERE](#)

