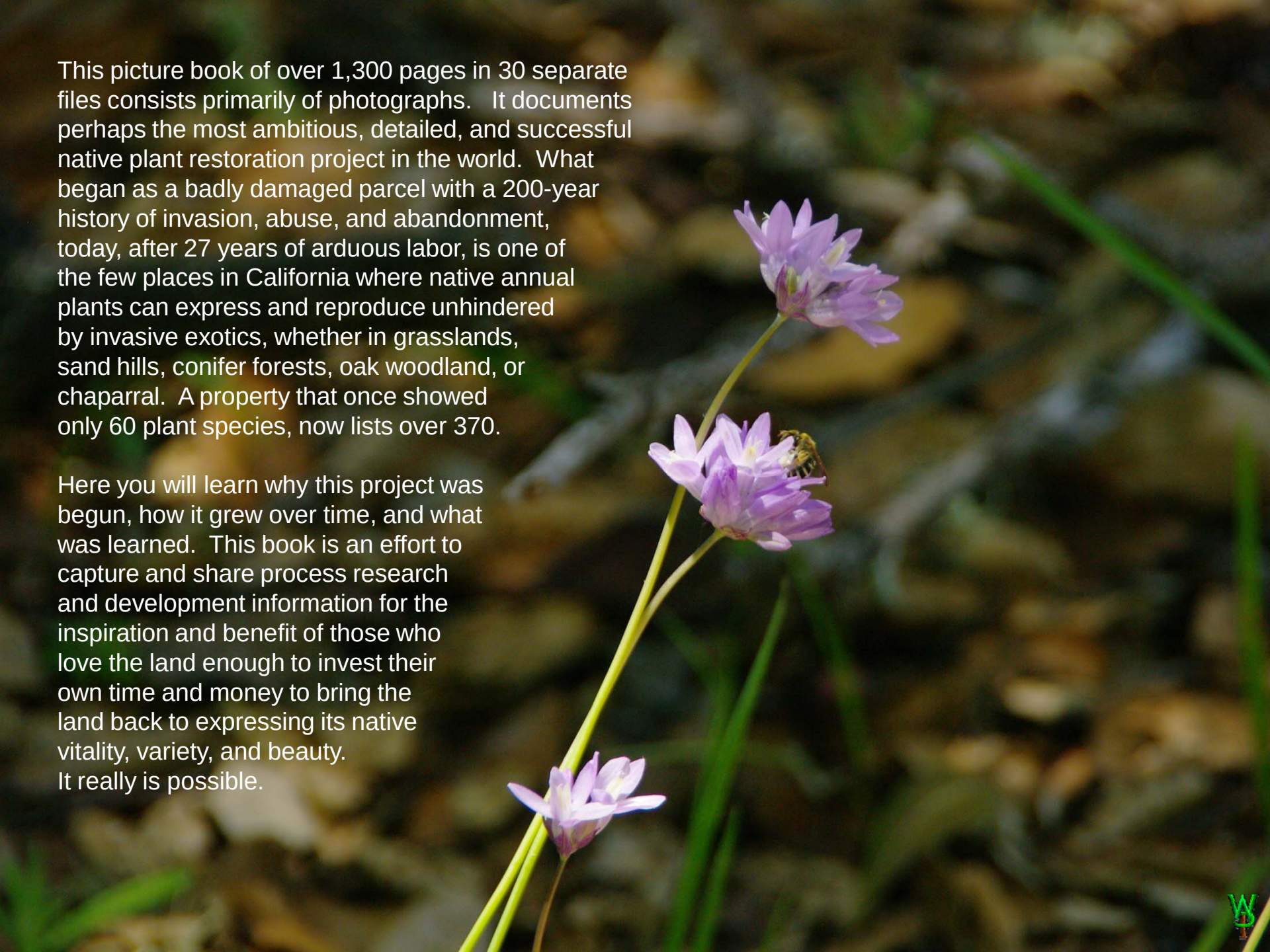
Wildergarten



This picture book of over 1,300 pages in 30 separate files consists primarily of photographs. It documents perhaps the most ambitious, detailed, and successful native plant restoration project in the world. What began as a badly damaged parcel with a 200-year history of invasion, abuse, and abandonment, today, after 27 years of arduous labor, is one of the few places in California where native annual plants can express and reproduce unhindered by invasive exotics, whether in grasslands, sand hills, conifer forests, oak woodland, or chaparral. A property that once showed only 60 plant species, now lists over 370.

Here you will learn why this project was begun, how it grew over time, and what was learned. This book is an effort to capture and share process research and development information for the inspiration and benefit of those who love the land enough to invest their own time and money to bring the land back to expressing its native vitality, variety, and beauty.
It really is possible.

Wildergarten 5.4

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. Directories for back rev chapters are viewable at the numbered links below.

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Revision History 1.0 2.0 3.0 3.1 3.2 3.3 3.4 3.5 4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 5.3 5.4

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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www.wildergarten.com

Table of Content

You will find a TOC at the end of every chapter

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**

References are **HERE**

People Who Helped

People Who Taught Me Something

Dr. Grey Hayes, Elkhorn Slough Native Plant Reserve, who did more than anyone else in teaching me how to identify the plants we have here; Randy Morgan and Dylan Neubauer, botanists extraordinaire; Barrie Coate, Certified Arborist; Mark Hylkema, Archaeologist, California State Parks; Steve Rich, Rangeland Restoration Academy; Josh Fodor, Ecological Concerns, Inc.; Dr. Charles Kay, Utah State University (a hunter and generalist in Native American archaeology, and wildlife biology); Al Keuter, oak geneticist; Christian Schwarz, fungus wizard, Fred Emery introduced me to Dr. Karl Butzer's ecological archaeology; Mike Duguay and Jerry Cone Registered Professional Foresters, and Natalie Vande Pol, one of my two wonderful daughters, who shared what she was learning and dug up papers for me.

People Who Encouraged Me (in addition to the above)

John Fund, *The Wall Street Journal*; Steve Staub, RPF; Pat Regan, (then Rana Creek Habitat Restoration); Dr. Kat Anderson, UC Davis Ethnobotanist; Brett Hall, UC Santa Cruz Arboretum; Craig Dremann, Redwood City Seed Company; Dr. John Menke, Professor Emeritus Rangeland Ecology, UC Davis; Robert Alverts, President, Society of American Foresters; Karl Duff, People for the USA; Dr. Vic Kaczynski, Consulting Fisheries Biologist; Jim Hanson & David Amme, California Native Grasslands Association; Jeffrey Caldwell, grasslands consultant; Henry Lamb, *Eco-Logic Magazine;* Dr. Kevin Rice, Grasslands Ecology and Dr. Sharon Strauss, Restoration Ecology, both at UC Davis; Jan Jacobsen, Director, Everglades Institute, who offered a willing and educated ear and constant encouragement.

People Who Worked Their Tails Off

My two daughters Natalie & Katherine, both of whom have become outstanding people and now as graduate students for PhD degrees, for 3-4 years did much detailed weeding in spring in lieu of a summer vacation; Roger Wicht (RIP), an artist with a bulldozer and the guy who did more than anyone to get me involved and thence find my purpose of life; David Wicht, ditto with a backhoe; Steve Liebenberg, chainsaw genius; Howard Liebenberg, maker of magic with base-rock and oil; Dick Rose, the man who framed my house.

The Lady Who Paid for It

My Dear Sweet Wife, Diane who had the faith in me to tell me to go for it, with no idea what that would entail.

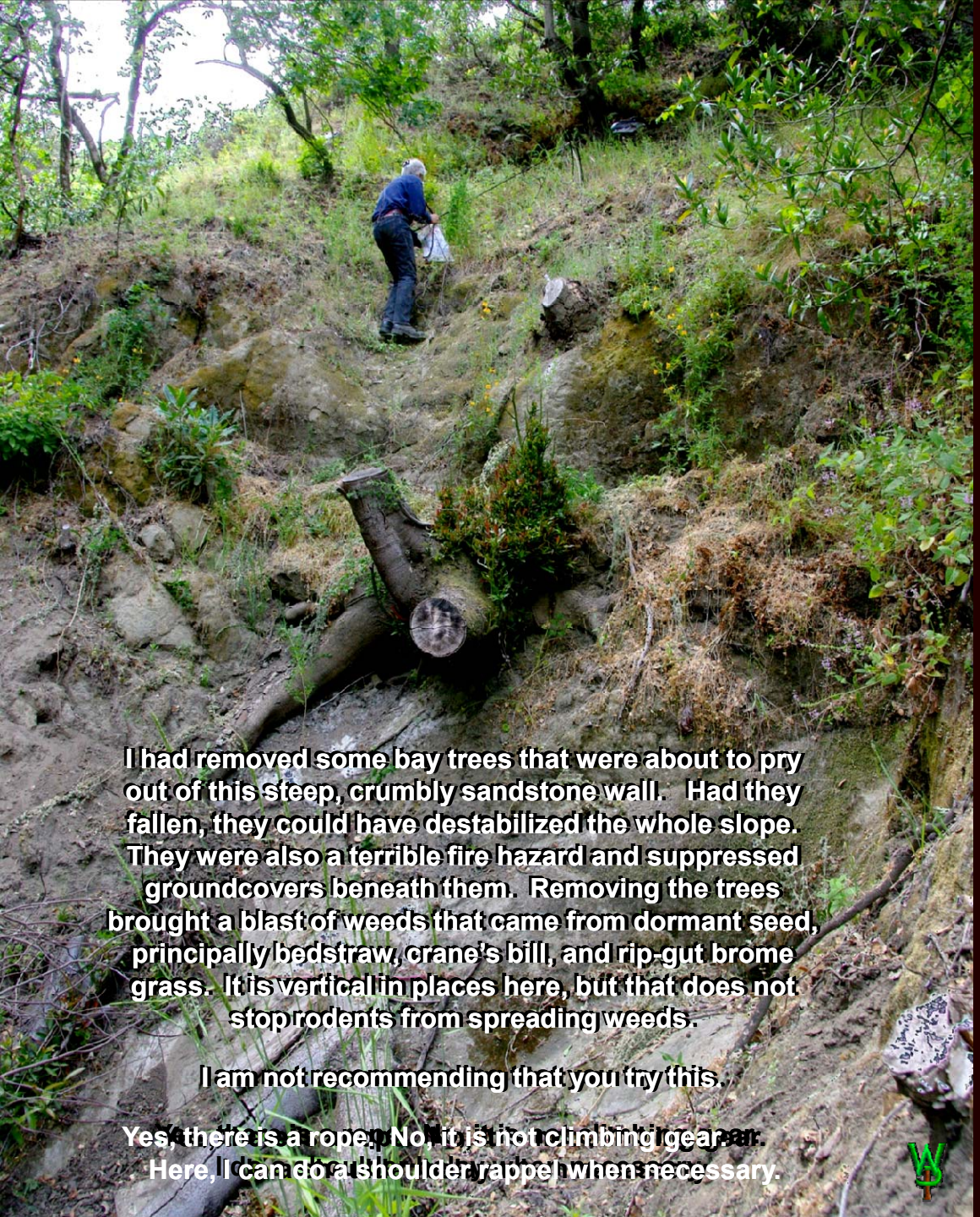
Wildergarten

For over 27 years, out of what could only be called Pyrrhic sentimentality (or extreme hubris), our family has been converting our mere 14 acres back to native plant habitat ("Wildergarten" was the name on the plot plan when we applied for a building permit in 1990).

Habitat restoration is an all-consuming occupation, a physically, mentally, and financially demanding enterprise, sometimes as much engineering as it is biology. Most of what little has been attempted has been confined to *very* expensive government or corporate-funded projects, most showing debatable results or worse (including total failure). Altogether, since the year 2000, California tax-payers have spent over **$24 billion** "protecting habitat." Yet after all that money, there is only one (1) place that has returned long-infested grasslands to 99.6% or better native purity including small annuals, and yet this project hasn't cost you a dime.

That place is the Wildergarten.

When we began this project, I was not what any rational person would call an expert in restoration ecology, but then neither was anyone else. The first formal college classes in the subject were offered not long after we began. As things are now, experts in the field have brought their students here to witness what can be accomplished, and yet we are far from done.



I had removed some bay trees that were about to pry out of this steep, crumbly sandstone wall. Had they fallen, they could have destabilized the whole slope. They were also a terrible fire hazard and suppressed groundcovers beneath them. Removing the trees brought a blast of weeds that came from dormant seed, principally bedstraw, crane's bill, and rip-gut brome grass. It is vertical in places here, but that does not stop rodents from spreading weeds.

I am not recommending that you try this.

Yes, there is a rope. No, it is not climbing gear. Here, I can do a shoulder rappel when necessary.

This is a love story about our little piece of heaven. It tells the history of our project and the innovations it has brought. It contrasts our restoration of native plant habitat with the surrounding area and details the threats to its continuity.

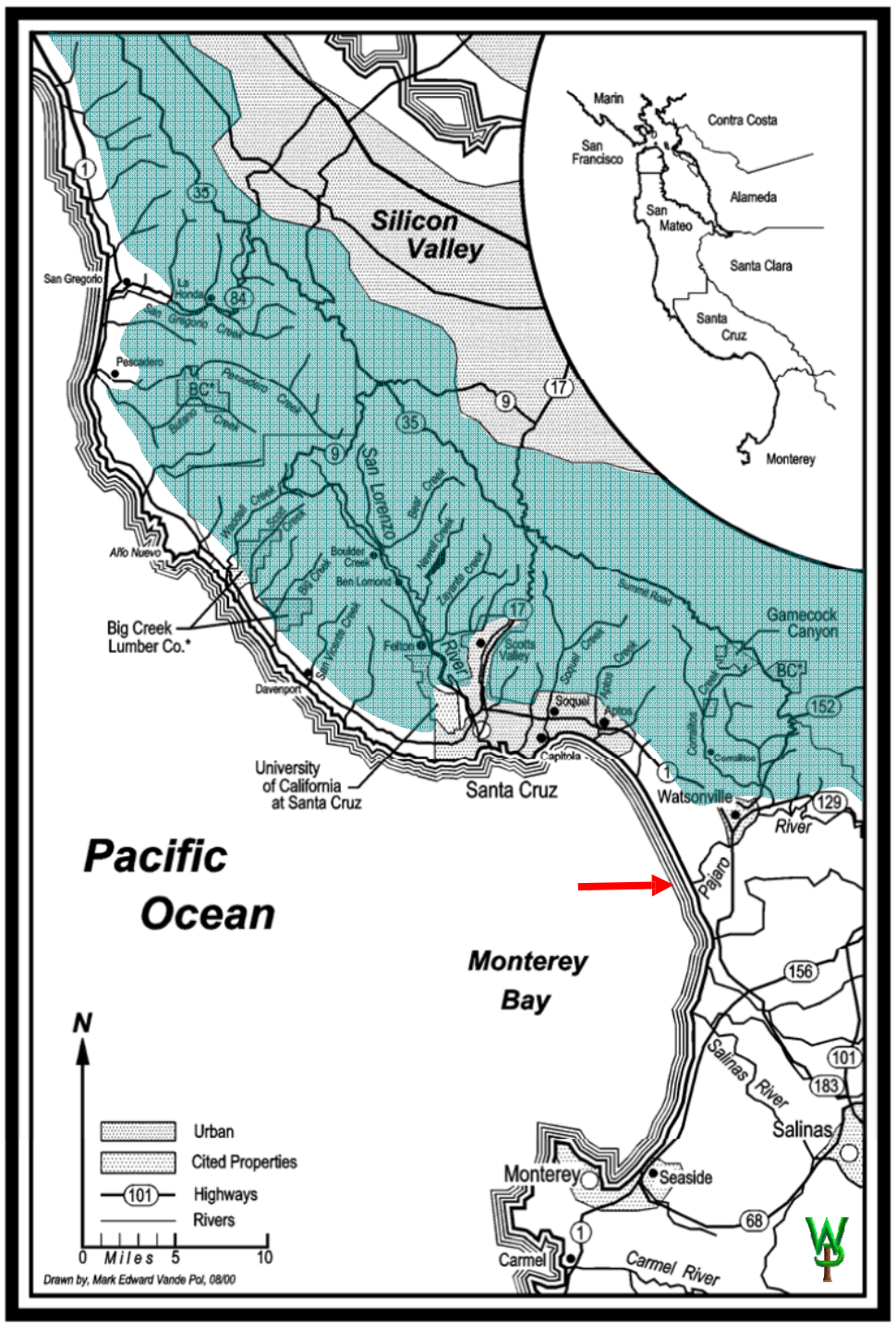
This book is not the usual green alarmism. It is not a call for more government control, conservancies, land trusts, conservation easements, or wildland preservation. I am not advocating mandates, rules, regulations, permits, or subsidies; indeed, quite the opposite. This is about restoring native function to damaged land, not "preserving Nature."

The principal goals are two**:**

1. To learn how to restore and sustain native plant systems under various management methods and conditions
2. To learn how to optimize human use with native habitat, large or small, rural or urban.

This is about sustained efforts to learn-by-doing, to undo the damage of ignorance and neglect, and to restore functional, productive, and varied plant, soil, and insect habitats. It is a process of discovery of how the world around us really works. It is a wonderful motivator for both children and adults. Join me in this walk, as we explore how things look in our back yard!

This book consists of 30 chapters in separate Adobe reader files. Some get rather technical, so you might not be interested in them all. Hence, the seven introductory chapters discuss history, rationale, results, and project organization. Each chapter has a Table of Content page at the end accessible by clicking any logo.



The setting for this story is in the Santa Cruz Mountains (shaded area on map) of California, a range of steep and densely-faulted hills parallel to the Pacific coastline, extending from San Francisco south to the Pajaro River (red arrow at left). It is a highly erosive and geologically active system. The seismic activity of the area produces a complex array of soil types which vary frequently from crumbly sandstone, to clay, to shale, or to decomposed granite. Most stream beds are deeply incised. Steep canyon walls receive a wide range of sun and shade conditions depending upon orientation.

The climate is coastal Mediterranean. Summers are almost entirely dry with temperatures sometimes varying 50°F the same day. The coastal hills complicate onshore winds inducing inland summer temperatures on ridges that often rise to over 100°F, while canyons 150' below can have a marine climate 15° cooler. The winters can produce anything from 8.5 to 125 inches of rain in five months (20-50 inches being “usual”).

This region is one of the great biodiversity enclaves of the world. The North Coast redwood ecotype ends at the southern tip of the range while the Central Coast ecotype extends north to San Francisco. There is even an island of Sierra Nevada foothill species! These three genetic overlays produce unique vegetative combinations that, because of the terrain, can change completely in a few feet. Habitats include grasslands, chaparral, forests, rivers, and an ocean interface with beaches, sand dunes, rocky tide pools, and estuaries.

Favorable weather conditions and a turbulent history of mining, timbering, farming, abandonment, and development have resulted in long-established and still spreading infestations of exotic species in very damaged soils. Our property alone once hosted over 120 exotic plant species. Fire-suppression has allowed forest to cover over much of that exotic seed bank, making the situation for native post-disturbance annuals particularly dire. It is a biological system much more damaged than is commonly understood and it is rapidly getting worse.

This view from in front of my office window is of the oak hardwood forest that covers about 3/5 of this property.
When the Awaswas Sayante tribe last managed it 225 years ago, there were probably few to no trees or shrubs here at all!

Note on photography: In mixed forest, lighting contrast levels on sunny days are very high. I try to shoot on days like this, with thin clouds or sometimes at dawn to reduce the contrast, but that is not always practicable. Dynamic variations in lighting then make adjusting white balance problematic.

Besides oak woodland, there are “Santa Cruz Sand Hills,” spread with a quilt of clover and strange little annuals with names like filago, fairy mist, navarretia, claytonia, cammissonia, miniature lupines, and tiny madia… In an area like this there are over fifty plant species. If the plants look “yellow” to you, it is real. Most of the soil here is fine sand, which has very poor capacity for nitrate retention.

Yet one hasn’t seen the intense biodiversity of a sand hill until one gets closer to the ground…

…really close.

Grasslands are also intensely varietal places, although this one contains a number of species also found in sand hills.

April 2015 – Turkey hen munching on miners' lettuce *(Claytonia perfoliata)*

But to many animals, leafy annual forbs that provide protein, seed, or feed bugs to eat are more important than grasses.

Several grasslands experts have told me that our focus on annual forbs is unique. One with 35 years' experience all over the American West said that he had *never* seen such an intense mix of perennials and annual forbs, calling it the "Best native grassland restoration in North America so far" (source). And as spring progresses, the forbs dry off and drop seed, bringing their own kind of "fall color."

April 2015 Chalcedon Checkerspot *(Euphydryas chalcedona v. chalcedona)* on *Dichelostemma capitatum* with *Sanicula crassicaulis* in back

Yes, there is “spring color” too, as the wildflowers make a comeback, and with them, their friends come to dine and show off.

Thinning forests and removing weeds has allowed evidences of Indian proto-agriculture to reappear! For example, we have dense patches of “death camas” *(Toxicoscordion fremontii)* that have not spread or diffused on the property in hundreds of years since the Indians managed the area. A survey of our species list for aboriginal crop plants suggests that 10-20% of the plant species here occur because of aboriginal influences alone. Hunter gatherers were once a significant source of native biodiversity.

Yet native or not, we cannot manage this place the same way the Indians did, if only because of (1) the weed history, (2) the fact that we can't burn in the summer because of surrounding fuel loads, (3) the degree to which the landscape has become forested, and (4) we eat or use little of what the land produces. Originally there were no trees here. These oak woodlands became so dense that there was no groundcover at all. Our forests have since been thinned in phases and weeded to develop intense native groundcovers.

April 2015

As the thinning process continues, there are now occasional openings supporting more fruit-bearing shrubs for birds and browsers.

May 2015

We also have stands of redwood, the second-growth trees in the mid-ground being over four feet in diameter and 205 feet tall. Yet as you will read in the site history, the “old growth” trees that were logged here may not have been here when Spanish explorers arrived! Second growth redwood forests can be so dense that the habitat to support wildlife is greatly reduced from what it once was.

The density of redwood sprouts is not only a problem for groundcover biodiversity. Untreated, they too can become a fire hazard. Monoculture forests are our future unless we do something to interdict the process.

April 2015 – The sprouts at right are from trees logged in 2000

In some cases logging *must* be done before the trees grow to sizes capable of taking out large chunks of the supporting hillside. The scarped grade at left suffered just such a rotational failure. The clump in the back is ready to do likewise.

Redwood makes wonderful lumber, but felling trees carries the risk of crunching up the adjacent oak woodland. It is very expensive to get the logs out carefully, requiring roads for heavy equipment and maintenance. There are chapters about roads and drainage too.

February 2015 – *Thelephora terrestris*

Here, relationships between plants and fungi are observed unhindered by weeds and overgrowth...

February 2015 – *Trifolium microdon* is known symbiote of the mycorrhizal fungus *(Glomus mosseae)* also known to exude gibberellic acid, which may have played a key role in stimulating the simultaneous germination of the surrounding *Dichelostemma capitatum*

It is only in recent years that science has started to grasp the crucial roles fungi and microbes play in soils as much more than nitrogen and carbon cycles. From digesting geological parent material into usable nutrients, to transporting those nutrients to plants, providing protective coatings, and literally cloud-seeding for rain, the life systems of this planet do not run without bacteria and fungi. Here at the Wildergarten, it looks as if fungi may also play a critical role in stimulating germination of native plants that feed wildlife as the clovers above can feed fungi that exude hormones known to accelerate germination. Yet without early successional plants to process solar energy into sugars, they may be unable to do that job. We may have got that process going again here, by thinning and weeding.

April 2015

Here, there are more interactions among plants and insects because there is plenty of habitat.
This checkerspot butterfly *(Euphydryas chalcedona)* is using this *Dichelostemma capitatum* as a perch to attract a mate.

Not to be outdone is this Acmon blue, performing a mating dance among lotuses and tarweeds.
The base of the food pyramid largely depends upon native plants, as also do native bees.

April 2015 – *Vanessa virginiensis* munching on *Gamochaeta ustulata*

This Painted Lady larva is lunching on a cudweed. This perennial native plant host sucks nitrate out of the soil to the point that it is toxic, also depriving nitrate to surrounding plants. Insect larvae are often host-specific because they can tolerate the toxins those plants produce. This kind of herbivory helps keep weedy native plants from destroying even native biodiversity. The total mass of insects wildly exceeds that of all higher order animals; they are essential to the wildlife food pyramid. No edible plants, no bugs.

March 2013, *Aphanes occidentalis* underlying *Acmispon parviflorus*, *A. americanus*, *Trifolium microdon*, *Bromus carinatus*, and *Stipa lepida*

No food, no animals. Food starts with converting gases into organic compounds in soil. At the Wildergarten, we can observe tiny nitrogen-fixing plants like this *Aphanes occidentalis* (the fan-shaped leaf), because they aren't overwhelmed by exotic competitors.

Photographed the Same Day February 2, 2014

Wet Season Conditions

Our Place		"Your" Place[Ω]
43.4"	Mean annual rainfall *	41.18"
4.6"	1/1-4/30/2013	4.82"
0.2"	5/1-8/31/2013	0.13"
2.5"	9/1/13-2/1/14	2.2"
15	Frost days	25

Dry Season Conditions

15-20	Fog days	100
10-15	100+° days	3-5
50	+90+° days	10
93°	Peak Monthly average high	86°

* Rainfall data on the right are for the City of Scotts Valley Wastewater Treatment Plant, two miles toward the coast from the image at right.

Ω This virtually 100% non-native disaster belongs to The Land Trust of Santa Cruz County. It's ALL "yours"

Establishing native grasslands results in a drought tolerance that ought to get your attention.
Such conditions as at right are the usual in the dwindling grasslands found in parks and open space districts in our area.

Ok, so maybe that comparison wasn't fair, because it was February in a drought year… This is one of our grasslands in July, 2104. The socialized land in July looks the same as it did in the prior slide (right side)**:** 4-5 months of death, every year, at least.

October 2013, an Acacia stand similar to what we had not far from here

We took this property from a pending inferno of exotic monocultures…

To a virtually 100% native landscape, expressing its variety…

…vitality,

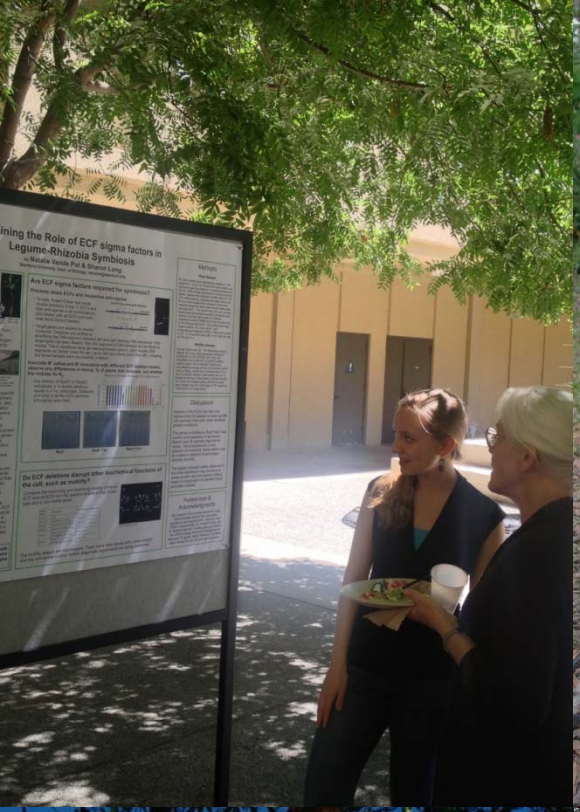
... and beauty,

March 2015

...in magnificent detail.

…with the goal of fostering a new culture, focused upon developing new knowledge of the earth in intimate contact with it.

A working prototype, a living laboratory, a synthesis of archaeology, anthropology, linguistics, history, human and animal behavior, forestry, horticulture, hydrology, agronomy, microbiology, engineering, economics, law… and constant exhausting work…







…where PEOPLE, free to take risks and responsible for the consequences, learn how to find the answers and not be the problem.

December 2012 – Weeding exotic grasses among seedlings of *Trichostema lanceolatum*

A world of learning is in need of your hands...

Trichostema lanceolatum **breeding and feeding, this is an annual plant, blooming in September**

A Word on Citations

This work is an adjunct to several other books that refer to an overlapping sets of sources. Accordingly, and given that this work is dynamic in nature, I have chosen to maintain a single bibliography with the exception of the site history. No, I don't have an aversion to citations (the bibliography in my more recent book goes on for 21 pages), but this "picture book" format does make citations problematic. In this format, often a single character adds a new line, then necessitating a smaller photograph. So, footnotes and even endnotes were out because it would have otherwise been too destructive to the visual content. Even on pages of references only, adding a single reference can take a half-hour because in PowerPoint they can't roll over from page to page. With some ideas referring to multiple sources, links sufficient to meet an academic standard would have been similarly complicating. Worse, too many links makes reading disjointed because it interrupts the larger flow of ideas. I may put invisible links in some day, but only if interest or controversy warrants and time permits. I do have another and even more monstrous book to finish first.

Most units will be English, because that is what most people reading this will find understandable.

There are a few links that will open a new tab in your browser. I am not guaranteeing that they will be maintained but please do let me know if you find an invalid destination. There is a contact page at the Wildergarten.com web site upon which there is to be posted more than one reference bibliography.

Further (and unfortunately), many academic source documents are closed to most readers without paying *very* stiff "fees." I wish more scientific publications were open source (especially because they are usually at least subsidized by tax-payer supported government grants) for I could then simply offer direct links to academic sources. The good news for you is that the best kind of evidence will be before your eyes. This work represents my opinion and experience, which you can judge for yourself by the photographic evidence. Given that the photographs are the main confirmation of what I am saying and making them bigger helps with communicating detail, I have endeavored to maintain the text as brief as possible and only with critical links to keep them from becoming a distraction.

As should be obvious, I would be delighted to see someone repeat these experiments and methods. That is the best truly valid scientific confirmation anyway. It is when we identify and characterize the exceptions to the rule that questions arise. This is how we grow knowledge.

The process of writing "picture books" began well before 1080p was taking hold. Back then I still had a CRT monitor, so these books were constructed and formatted for 7.5"X10" PowerPoint slides so that people could easily print pages onto 8.5"X11" paper. Were I to do it over it would be 16:9. Sorry, that's another of those, "if time permits," sort of changes.

So, now that the necessary formalisms are done, let's get started!

This Is the End of the Beginning …of the Beginning

You have just completed the first of the seven introductory chapters in Part I:

Chapter 2 – A Site History that will blow your mind: how people brought the land to the conditions we found
Chapter 3 – How uninterrupted succession and weeds are causing mass extinctions
Chapter 4 – Going Native discusses why "native versus not" is more complicated than one might think
Chapter 5 – "Before and After" repeat photography
Chapter 6 – A demonstration of nearly pure germination of native annuals, a unique achievement in habitat restoration projects, worldwide
Chapter 7 – An overview of how this project has been directed toward its increasingly technical goals.

Accordingly, this picture book suggests two alternative paths:

1. Read this book linearly, going through the remaining 29 chapters, OR
2. Finish the first six chapters of Introductory Part I and then jump to Part V, the Project Context indicated with the "Globe" icon in the "Table of Content" two pages hence. These five closing chapters discuss how our project survives when inundated with weeds resulting from the large-scale damage being done to native habitat by the current public preference for politically or (failing that) legally-determined "environmental protection."

This project continues to progress over time while the book's chapters are arranged by topic. When possible, the topics in the detailed section are arranged in temporal order because our emphases changed over time both because conditions improved and because of what was learned. To avoid redundancy, the detailed path presumes that you have read each chapter in order.

Navigation

1. There is a Table of Content the end of every chapter (page after next).
2. Each line in the Table of Content is a link that opens the corresponding chapter in a new file.
3. The Wildergarten Press logo on any page is a link that takes you to the Table of Content at the end of that chapter.

Try it! →

How to Help

This has been an unrelenting, very expensive, and physically arduous process.

As to money, I have no time for (or interest in) managing the books for a non-profit corporation or begging for money, but I will gladly accept assistance you wish to offer**:** temporal, professional, or financial as long as the latter remains anonymous (accounts for laboratory services would be especially helpful). I cannot and will not accept corporate, foundation, or government grants, because our family wishes to retain a reputation for **total** independence and integrity.

I do love to teach, and would be delighted to have students working here on their projects. We have a need for many hands, both on the land and in producing the communications to come.

I do speak publicly upon occasion and will travel to do so if it doesn't inhibit managing the property.

As to professional help, we do have new and innovative ideas in the works, the most important of which is developing an engineering infrastructure to facilitate low-impact mobile communities dedicated to restoring the vitality of the world's "wildlands." Anything you can do to facilitate these projects would be appreciated as they do present some very interesting technical and logistical challenges.

Any assistance with video documentation is greatly desired.

I ask that you support the work, not me. No, we don't have a lot of money; it's just how things must be for now.

If you do wish to help or have constructive critical comments, please contact us at Wildergarten Press. Kudos, warm fuzzies, and criticisms are welcome, but please be polite. Qualified visitors by appointment only are welcome but please be advised: **If I catch you on our property without permission, then you will be arrested and prosecuted to the fullest extent of the law.** Sorry, but that had to be said; I have caught people representing the granddaddy of all real estate rackets trespassing here already (The Nature Conservancy, a tool of the major stockholders of British Petroleum) and have observed others seeking to establish a trespass easement. Both were tracking in exotic seed on their contaminated boots.

Please, respect our property. If you do wish to see it, please ask first.

Thank you.

Table of Content

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

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These are LARGE files; they do take time to load

Please offer suggestions and comments **HERE**

References are **HERE**

What Do I Mean by 99.6% Native Purity?

The first such measurement was performed by a third party who taught me the "toe-point-transect"**:** Take a step, record what plant is closest to your big toe 100 times. His was 100% native. He was giddy; in 35 years, he'd never seen more than 90%, anywhere. I repeated that test four times elsewhere on the property that year. That is how I got to three significant figures. That was July 2011 and it keeps getting better. At this point the difference between 99.9% and 100% is a matter of where and when one samples and how one does the test. I have objections to this technique, because with very small or interlaced plants one has their choice about which is "closest" to the toe, which means that it would be hard *not* to skew the test. More importantly, this distinction of "cover" is deceptive with a multi-layered groundcover, not to mention that it understates the damage that can be done by very small weeds that suppress the germination of a great many native plants. Hence, until I come up with a way to characterize native germination quickly over substantial area, the "toe point transect" is what I use because other people understand it.

In 2014, Randy Morgan (RIP, the best botanist in the area because of his integrity) brought to my attention that what was widely believed to be *Cardamine oligosperma* (native) was in fact *C. hirsuta* (not). Both are known as "bitter cress." The 1993 Jepson showed the exotic only in Siskiyou County, 500 miles north, with the 2012 Jepson showing it only along the coast. Every botanist who had visited here was so blown away as to conclude the same. Since 2007, there have been two reports of its presence in the County. Yet I am now certain it has long been ubiquitous and the botanists had made a mistake of inattention to a seemingly innocuous weed simply because other weeds suppress it. It is not innocuous at all; it is serious pest in the nursery business. When Randy (who hated "pop-weed" as much as I do) raised the question, I took a look with a magnifying glass because the definitive means to distinguish the two species is the number of pollen anthers on the flowers**:** *C. oligosperma* (usually) with five and *C. hirsuta* four. For management purposes, this is a useless key**:** this plant can go from flower to seeding in a week (imagine weeding acres of tiny plants, magnifying glass in hand). So I developed a vegetative key (the shape of the second pair of leaflets) by which to make the distinction earlier in the process. Not a single native so far.

Bitter cress is an annoying plant (it flicks seed in your face as you crawl along) so I have long culled it but not as an exotic (a strategy I call "resistance"). Without competition from other weeds, it does spread like wildfire. So, the plant never became a disaster because I just didn't like it and acted accordingly. It is however, an enormously difficult opponent as it can germinate and seed when only a fraction of an inch tall with almost no leaves in only six weeks. It lives to make seed, and they spread because they are sticky. Chances are that nobody visiting the property would know the difference, but I would know while leading them about, and I'm not going to let a nagging annoyance like that dilute the importance of what I am seeking to teach here. Pop-weed has been a raging battle for two years and it does look like I am slowly gaining the upper hand. In 2015 I did better than break even. In 2016 I effected what I call a "take-down," or a property-wide multi-strategy attack on a single species. As of this writing (7-17) it does look like I am slowly winning but for places I didn't know it inhabited until the 87 inches of rain we got this year. Nobody is perfect and certainly not me, but I try (oh hell do I ever try) because it's better than giving up. I will figure it out.