

Honey, I Shrunk the Lawn!

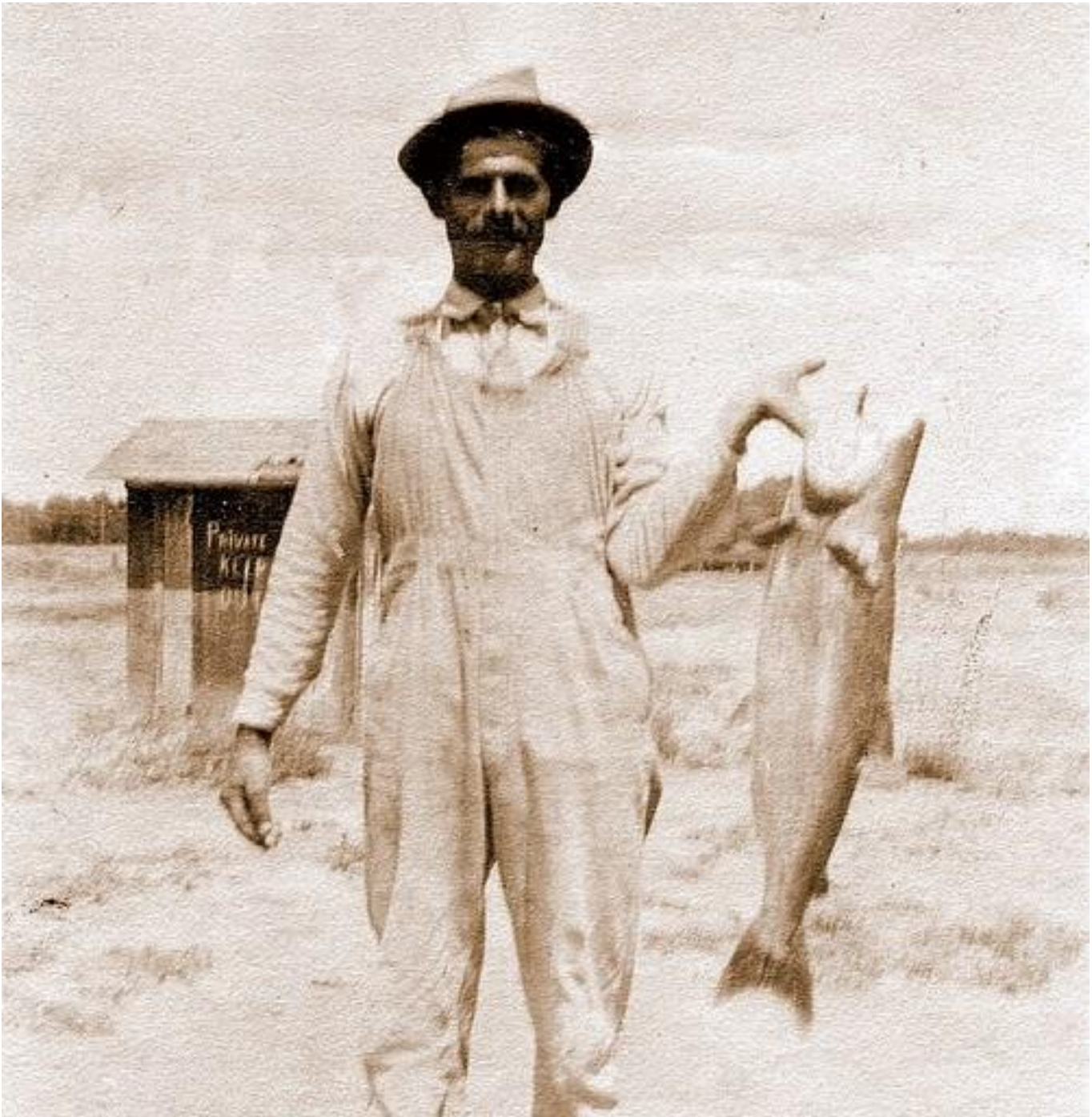
My first memory of water was when I was 2 years old and my parents took me to Millerton Lake, which is a local man-made reservoir near Fresno. The lake was created in 1941 by the Army Corp of Engineers as a flood control and irrigation storage reservoir by the construction of Friant Dam, Today the reservoir also serves as a main supply for agricultural water for Valley farmers through the Friant-Kern Canal. It is also the closest boating, skiing and fishing lake to the hordes of hot, dry Fresnans and Clovisians.



Bob enjoying Millerton Lake during those carefree Eisenhower years, summer 1959

Unfortunately the dam also effectively caused the extinction of the San Joaquin River species of fall and spring-run Chinook salmon. No fish-ladders or bypass was created to allow the salmon to return to their historic spawning beds in the San Joaquin.

What were they thinking? Well, that's progress for ya – after all, it was just a fish. There were plenty more to be had if you went to San Francisco or Fort Bragg or Morro Bay and chartered a boat. Alaskan canned salmon was as cheap as tuna fish, and was actually used in pet foods.



Bob's great uncle Charlie, with a San Joaquin River Chinook, near Mendota, 1922

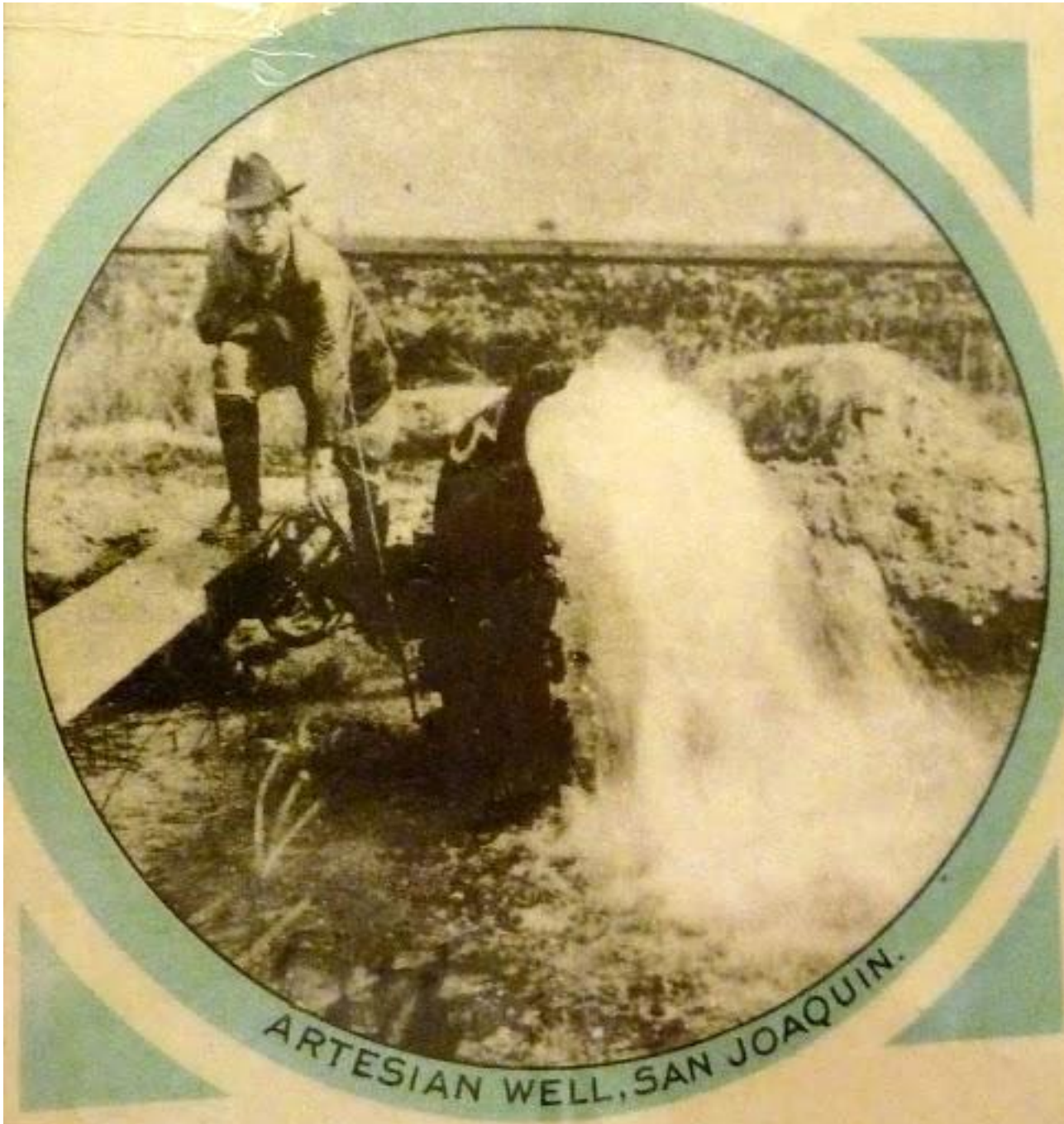
Looking back, it seems that a great deal of my childhood growing up in Fresno was water-related. Fresno, besides being the in the center of the greatest agricultural producing region in the US, gets pretty darn hot. Basically no rain from May to October, and frequent summer temps in the 100's focus one's mind on summer water activities, including the now-infamous Slip-N-Slide. Probably half of Fresno's population had some type of swimming pool – in ground, above ground or wading.

Because just about anything would grow in the Valley, just about anything that could take the heat (and winter freezes) got planted, including sub-tropical, Mediterranean, Australian, and plants and trees from various other climates and locals, but the common denominator was the lawn. The only people who didn't plant grass everywhere seemed to be some of the older generation, most typically

immigrants like Mrs. Kushigian, who lived down the block and who we kids thought was a little nutty because she had planted her parking strip in vegetables. People who had endured the Great Depression knew the value of a buck, and of a tomato.

Where's the water? Look down.

Fresno's entire water supply comes from underground aquifers and is pumped from an ever-dropping water table. 100 years ago artesian wells were not uncommon - now the *average* pumping depth is well over 120 feet. In addition, the city fathers in their wisdom never thought that water meters were a useful or necessary addition to the mid-century, modern lifestyle. Not only were Fresnoans using 40,000 year old crystal clear, glacial-borne, delicious tasting water to wash their diapers, flush their toilets, and overwater their lawns, but thought it too cheap to meter, if they thought about it at all.



Look ma, no pump! Water just coming right out of the ground on its own, Fresno County, 1920

A Change in Perspective

It was in this atmosphere that I spent my formative years. Fast forward to the dawn of the 21st century. By 2001, I was a bit bewildered and shocked to learn that the second well that we just dug at Riding Ranch, (our property east of town, where we “ranched” 30 chickens and a turkey), still wasn’t producing enough water for our 1960’s inspired landscape choices. We had planted over 700 eucalyptus trees, ¼ acre of Bermuda-grass lawn, and numerous varieties of water-loving flora such as redwoods, willows, roses, and white alders. The worst of it was during the summer where the water would stop flowing for hours at a time with no warning - quite exciting during showers, and a bit of handicap when you rely on water for evaporative cooling and water pressure to flush the toilets. We struggled through three more summers and then decided that enough was enough.



The back forty (actually four) acres with plenty of water-sucking leaf makers.

Demand Side Management – What a Concept!

Since increasing supply wasn’t the answer, decreasing demand was our only option. I had been practicing and preaching energy-demand side management myself and to my customers for 20-odd years, so I knew what I needed to do. It soon became evident that 12,000 sq ft of lawn and 700 eucalyptus trees were our first targets. The trees, being dry-climate evolved, didn’t really have a problem with no summer irrigation - they were well established and had fairly extensive root systems, but even Bermuda grass lawn needs some water between May and October (quite a lot, it turns out). So, we just stopped watering it.

It turned brown and it died.

After living with an ugly dry lawn for one summer, we decided that we needed to do something different.

In 2004 we visited the Clovis Botanical Garden, which featured dry-adapted, local native plants laid out in a park-like atmosphere and we were impressed. A friend of ours, Joseph Oldham, who is very knowledgeable on native and California plants, gave us more suggestions and so we formulated a plan. We would try to create a smaller-scale version of the Clovis Botanical Garden at Riding Ranch.



A beautiful place to go native.

Water Wars: A New Beginning

Our new landscape had to meet three criteria:

1. It had to be water-stingy
2. It should be low maintenance
3. It should be attractive

After reading all about native and drought adapted plants and trees and paying visits to Intermountain Nursery near Auberry and Las Pilitas Nursery near Atascadero, – excellent sources for native and drought adapted plants, we realized that fall is the ideal time to begin planting. Our son Andy, a media

arts major, helped us design the layout, and we hired out the drilling of 100 holes through the old desiccated lawn. We added a drip irrigation system and voila! Instant native landscape – or so we thought.



100 holes drilled for native plants. 2001



Looking and smelling good. 2005

6 Years Later . . .

It's now 2011 and our landscape has matured a bit, as have we. Although we are very happy with what we created, we learned that a truly natural landscape with all its benefits is much more than picking the right plants and leaving them alone.

Lessons Learned – Plants Can Be Smarter Than a 5th Grader

Here are 9 things we learned to keep our landscape healthy, and some quick background facts that important to understand (botanists can skip this part)

Fungi and Bacteria – Mycorrhiza, Your-corrhiza, Our-chorrhiza.

Natives live with fungi called mycorrhiza. These fungi live on or in their roots. These fungi also extend beyond the roots to collect nutrients and water for themselves and other plants hooked up to this mycorrhizal grid. Some mycorrhiza live in the top four inches of soil under the canopy of native trees, while others live in the soil zone from four inches below the surface to 20 feet down into the ground.



Fungus amongus – a tree's best friend.

Some natives like oaks need these fungi to live – they have a symbiotic relationship where the mycorrhizal fungi provide nutrients and water to the oak. In return, the oak provides carbohydrates - food the fungi cannot make because they do not contain chlorophyll, Only green plants such as the oak contain chlorophyll, and can make food from the sun's energy. Oaks also bring up deep water that the fungus can't get to.

Mycorrhiza can be a thousand times more efficient than the roots at extracting minerals and moisture. The fungi also act as the plants immune system by protecting them from disease and produce chemicals that inhibit bad bacteria, fungi and herbivores.

A smart grid

These fungi form connections underground from oak tree to oak tree and to other plants in the community, thereby interconnecting most of the plant community. If one area has excess nutrition or moisture the fungi will attempt to balance the whole.

What happens if the mycorrhizal grid is disturbed?

In native ecosystems there are many more fungi in the soil than bacteria; the numbers are usually 10 fungi to 1 bacterium. If the native ecosystem is severed, such as when a disturbance (like plowing) occurs, there can be a mass invasion of alien plants (weeds and grasses) that become the dominant species, and now more bacteria than fungi are present. This really screws things up. This phenomenon is called an ecological switch. It is as if all the numbers are automatically changed, just as if a light switch is turned on or off. The change in the ratio of fungi to bacteria highlights the fact that the change in the ecosystem occurs from the microscopic level up to the level of the massive oak trees.

9 Rules to keep the natives and fungus happy.

- 1.** Don't use commercial mycorrhizal inoculum (it's kind of a sourdough starter for fungus). The fungal spores are already in the soil. They are very hard to destroy. Just do things to encourage their growth.
- 2.** Don't allow grass or weeds! They will replace the leaf litter layer -fungi absorb nutrients from this mulch layer, and it is a nutrient sink for the oaks via the fungi.
- 3.** Don't water in the dry season under the drip line of the native trees- the fungi will disconnect from their grid.
- 4.** Don't till or disturb the soil- this encourages weeds, encourages bacterial growth, breaks fungal connections and destroys the body of the fungi
- 5.** Don't remove leaves under the drip line of native trees, especially oaks. Again, this is the nutrient sink for the fungi. It also helps discourage weeds, retains moisture, and keeps the soil healthy (not compacted)
- 6.** Don't fertilize! The mycorrhiza will disconnect. It encourages the invasion of competitive, alien species. The oaks will also be more susceptible to diseases.

7. Try to plant associated plants- those that occur naturally together such as Coffeeberry, Currant/Gooseberry, Ceanothus, Manzanita, and Honeysuckle. As a community of plants together, they can better resist the invasion of competitive, alien species.

8. Don't apply insecticides or fungicides- they are very destructive to fungi. (Duh!)

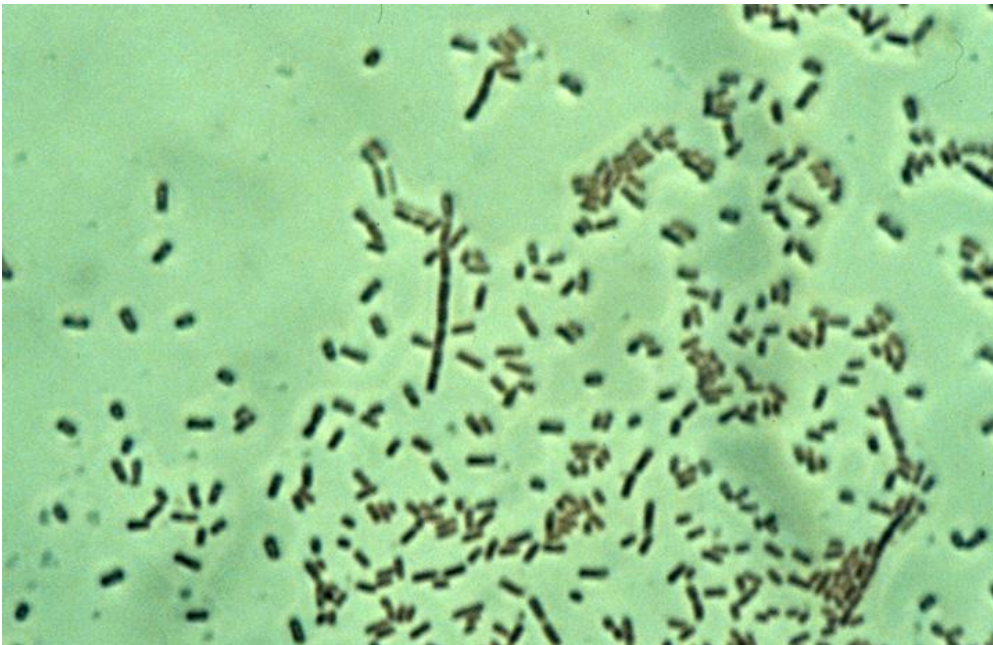
9. Certain herbicides are O.K. to inhibit grass and weeds. These are non-invasive methods that do not disturb the native ecosystem. Roundup has worked for the native plant experts; - it's neutral to the fungi directly and has little effect on mature natives because their defense is the fungi.

Incredibly, some pre-emergent herbicides such as Treflan and Surflan have proven to be very effective, while not harming the native plants or the mycorrhiza. They exterminate about 90% of the weed seeds, they affect only the top ½ inch of soil, and they do not disturb the essential litter layer or the soil. If you have only annuals, or a summer vegetable garden, pre-emergents would obviously be detrimental. Tomatoes no likey.

But what about soil bacteria?

Build a native garden correctly and the microorganisms will be stable and happy. Along with the mycorrhizae fungi are associated soil bacteria that are nearly as important. Encourage the good ones (that live in the sweet smelling garden or forest soil good gardeners know) and discourage the bad ones (that live in the soil that has no smell or smells like musty newspapers, sauerkraut, or has a sharp acrid smell). Smelling soil is as old as farming and has been a very reliable technique that's fairly unscientific but it seems to work.

Having said all that, agricultural soils also smell good, but you're smelling free living bacteria and fungi, a different system than a native system, but one that the agricultural crops want.



A ton of microscopic bacteria may be active in each acre of soil.

These are the good guys.

Makes you want to reach for that anti-bacterial gel, doesn't it?

Bees in our Bonnet

In the last year or so our friend, John Ballis, who owns and operates “Busy Bee Honey Farm, Sanger CA” has placed some bee boxes on our property because his bees were ending up here a 1/4 mile from their home hive anyway, due to all of the wildflower blossoms around our place. Needless to say, our wildflower honey is *sweet*.

The Lineup

Here are pictures of some of our favorite natives and water-thrifty plants currently starring at Riding Ranch:

Coyote Brush, (*Baccharis pilularis*)

Drought tolerant, very useful for hedges or fence lines, doesn't seem to be widely planted, except by Mother Nature. I see it on undeveloped hillsides when I'm in the Bay Area, and all over California. When the native vegetation is removed from an area by a bulldozer, tilling, grazing and trampling animals, one of the first natives that returns to the site, is Mr. Coyote Brush. *Baccharis* species are the nectar sources for most of the predatory (good) wasps, native butterflies and native flies.



You will see the weirdest bugs on these plants and apparently Bambi won't eat them!

Bush Anemone, (*Carpenteria californica*)

Carpenteria is an evergreen shrub native to the foothills of Fresno County, where it grows along the edges of seasonal creeks. It is stunningly beautiful when in flower and decent looking when not. We have given it limited water and it does just fine.



Carpenteria allowing itself to be pollinated by one of our domestic busy bees.

California Sagebrush (*Artemisia californica*)

Not actually a true sage, California sagebrush is an ever-green/gray shrub, three to four feet high. This sage brush is native to much of central and southern California. It likes full sun and little or no water after it's established. It's also a great wildlife plant- the quail love it. Native Americans made a tea that was used for fever, (from old accounts, you'd have to have a fever to drink it) while the smoke of the burning brush was used for removing skunk odor, although I'm not sure which would be worse.



Artemisia californica, - rugged looking, very drought-tolerant and rather fragrant when it's not on fire

Sagely Advice – Plant Sages!

There are 17 or 18 sages native to California and are loved by hummingbirds, bumblebees, wasps and bees. Hummingbirds kill for sages. They defend the sages in their territory like they are the only water source in the desert. Sages occur along the coastal areas, parts of the Sierra Nevada mountains and into the upper desert. Black sage sometimes grows along the west side of the San Joaquin Valley.

BFMI (Before Folks Moved In) to areas like Los Angeles and San Diego, as much as a third of the original vegetation may have been sages mixed with oaks, Toyons, Mountain lilac, and California sagebrush. Sages can live for 30 or more years and are very drought tolerant.

White Sage, (*Salvia apiana*)

White sage is a two to five foot evergreen perennial. The flowers emerge in summer and are white with a little lavender. White sage gives the bees fits because they can't get in and out very well. Bumblebees seem to be able to fight their way in and hummingbirds figure it out. This is the sage used in native American sweat lodges for cleansing and in modern homes as incense or smudge sticks.



Most of the White Sage sold in upscale, trendy places was ripped out of the wild; whole hillsides were stuffed into old vans and driven to San Francisco or Seattle or even New York so urban people could experience true peace and higher consciousness that breathing smoke from a smoldering salvia can impart.

Cleveland Sage, (*Salvia clevelandii*)

The most fragrant of the native sages is probably Cleveland or Musk Sage, *Salvia clevelandii*. You can sometimes find it growing on nasty, south facing rocky slopes that look like an old B movie western, or like Afghanistan does now. You couldn't plant these slopes because there's no soil, only rock. Cleveland sage looks good and flowers in areas that may only receive 5-7 inches of rainfall. It is a very drought tolerant plant. Don't water it much during the summer...it will won't like it!



Each flower can be visited by a hummingbird, butterfly, moth, and then, fifteen minutes later another hummingbird, butterfly and moth. The swallowtails are embarrassingly in love with the flowers. Eleven on the stun-o-meter.

Dara's Choice, (*Salvia*)

Dara's Choice grows very fast. It is been fairly drought tolerant. This sage tolerates once a week overhead watering, but dies on drip at about three years. (I know this from firsthand experience)



Useful to fill out a landscape for a house that needs to sell. In 2-3 months it can look landscaped.

California Lilacs, or Ceanothus, are some of our most fragrant and colorful shrubs here in our yard and in all of California. They are also evergreen and very drought tolerant.



According to the folks at Las Pilitas Nursery, (where a lot of the plants and info in this paper comes from), the myth of Ceanothus being short lived is primarily spread by incompetent gardeners that insist

on drip irrigation, summer water and soil amendments. California native plants hate all three. They say to expect a 20-25 year life from your Ceanothus in most gardens.

Sulfur Flower (*Eriogonum umbellatum*)

Actually a member of the buckwheat family, Sulfur flower is very low growing, and very yellow. It grows at high elevations, over 4000 ft, although we've had no problem with growing it in the Valley. It does well in decomposed granite and 110 deg. summers. Yellow flowers come on in late spring, gradually turn pink in summer, then rust colored in fall. The rusty flowers commonly stay on until the next spring.



Sulfur Buckwheat – not related to your Sunday pancake breakfast ingredient



The buckwheats are very important butterfly plants and one of the pillars of their communities. The flowers, leaves and seeds are all used by butterflies and small birds.

California Rose (Rosa californica)

California Rose is a deciduous shrub that is the wild rose seen over much of the state. *Rosa californica* has fragrant hips that are of good enough quality for tea. The wild rose is found in many roadside spots up and down the coast range from here to Oregon. Like most wild roses this variety tolerates some drought but likes moisture. An upright grower, it forms thickets on north slopes and next to streams and is a very important wildlife plant. If you are in an area of feral cats or wild dogs this plant should help. Its thorns are hooked, so cats may be able to walk under it but not get at animals or songbirds that are hiding in it.



You do not walk through *Rosa californica*- it is like thorny Velcro.

California Poppy (*Eschscholzia californica*)



As our official state flower, *Eschscholzia californica* is pictured on welcome signs at entry points to California. A common misconception is that the cutting or damaging of the California Poppy is illegal. There is no such law in California, outside of state law that makes it a misdemeanor to cut or remove any plant growing on state or county highways or public lands.

And no, smoking it will not get you high like its cousin the opium poppy. It's said that you will get a terrific headache, however.

2011 and Beyond

Well, twenty years after moving out to the country, the steep learning curve we first experienced has flattened out a bit - our landscape has matured to the point where you can't see the house from the street anymore, the natives have grown so much. The results met our original three criteria for 1) low-water 2) low maintenance, and 3) it's pretty nice to look at too. With all of the botanical names for the plants, my wife and I are now fluent in Latin and we use about 10% of the water that we used 10 years ago.



Wiktionary defines “going native” as “becoming less refined under the influence of a less cultured, more primitive, or simpler social environment”. I think I like that.