

PART IV

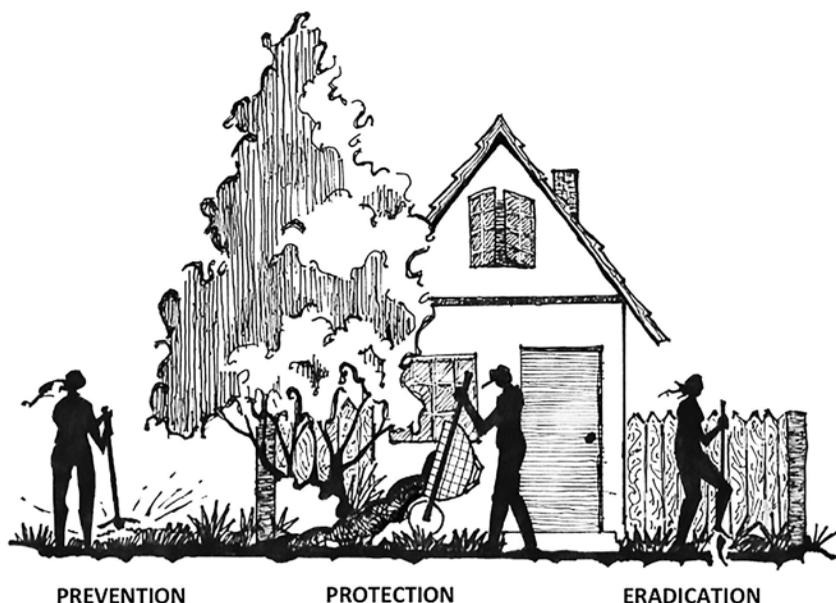
Pests

10

Weed Control

Southern California is fertile. Weeds love it here. Weeding is the most frequent job in our gardens by far, and we chop, pull and spray for a variety of reasons. We weed to maintain aesthetic integrity, ensure that the water and fertilizers we give to a landscape goes to the plants we select, and help plants and landscapes fulfill their designated functions, such as shading, erosion control or food production.

This chapter is built around the three phases of weed control: prevention, protection and eradication. Prevention stops unwanted plants from getting onto property. Protection stops unwanted plants from either sprouting or spreading on a property. And eradication involves all the techniques and tools used to physically remove weeds.



PREVENTION

PROTECTION

ERADICATION

Weeds occupy particular niches, and understanding them helps the gardener understand the animals, insects and processes that are interacting with the landscape. Weeds are also a good way to read soil conditions. At the end of this chapter is a list of weeds and the conditions each prefers.

Prevention

Prevention helps stop weeds from either travelling onto a property or germinating on a property. The techniques used to prevent weeds from spreading are ensuring no weeds onsite go to seed, putting up barriers to the migration of seeds, cleaning equipment that travels between properties, and going beyond property lines to tackle offsite sources of weeds.

No Seeds Onsite

It is okay to let weeds grow for a while; in fact, sometimes it can even be beneficial. Weeds help break up dense soil, enrich poor soil, and attract pollinators. It is never okay, however, to let weeds go to seed. Letting weeds produce seed guarantees next year's crop will be larger.

If the weeds are high, such as grasses, mow or weed-whack them before they go to seed. If the weeds are low, such as bindweed and spurge, scrap them off the soil. The timing of this task hinges on observation. The goal is to cut back after the plant has flowered but before it has set seed.

Barriers

Weed seeds are designed to travel. They flit and tumble down streets and sidewalks; hitch rides on birds and lizards; and catch air currents, take flight and soar above shrubs and trees. Barriers help block this constant migration.

Vegetative Barrier

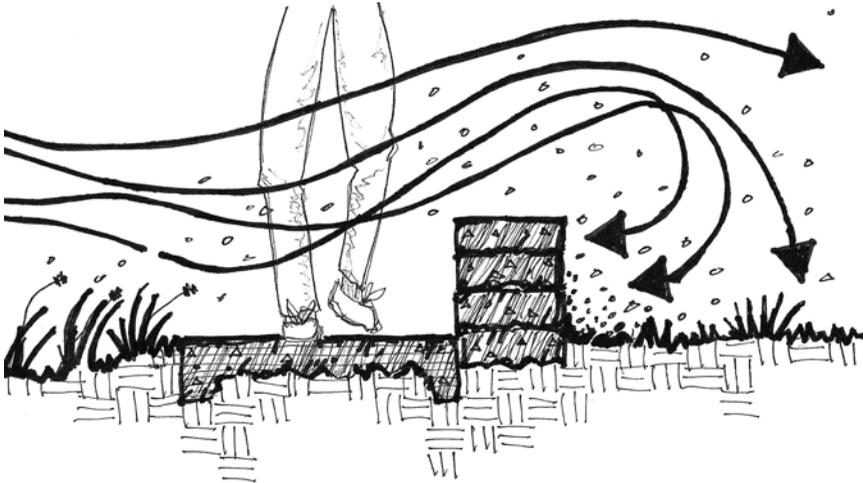
Whether 1' tall or 10', vegetation is fantastic at pulling seeds and particulates out of the air. The most effective plants have key characteristics: leaves are small but the plant is dense; leaves are sticky or oily; and leaves are more stiff than flexible. Some of the best barrier plants include arborvitae, *Ceanothus*, coyote brush, cypress, juniper, *Justicia*, lantana, lavender, myrtle, rockrose, rosemary, *Santolina*, sumac, *Teucrium*, and *Westringia*.



A low hedge of rosemary has visibly trapped debris and weed seeds from blowing on to the property.

Barrier Wall

Whether a small wall or tall fence, any type of barrier affects wind patterns and the places where weed seeds get deposited.



A small barrier can help reduce the amount of weed seeds being blown across a property. As wind rushes over a small wall a wind eddy is created, causing the wind to circle behind the wall and deposit its seeds and debris.

Clean Travelling Gear

Boots, edgers, mowers, tarps, tires and weed-whackers are some of the ways people unwittingly transport weed seeds between properties. If going from a particularly weedy property to one that is well maintained, quickly cleaning machinery and gear is a high priority. A blast of air from a compressor is a quick substitute for using water.

Look Beyond the Property

Simply putting up barriers and weeding your own property may not be enough to stop the constant migration of weed seeds. Sometimes your efforts will be needed in the landscapes outside of your own. Removing weeds from adjacent properties or creating a buffer zone around your own property can reduce the amount of time needed to weed your own landscape.

Protection

Providing protection helps stop weeds from either germinating or spreading. The techniques used to protect a landscape from weed seeds include planting aggressive plants and laying down mulches, and in the worst case, using a weed barrier as a short-term solution.

Weed Truisms

Southern California has no problem growing weeds. This abundance creates two inescapable truisms:

1. You either pick your weeds or they pick you.

Weeds flourish when they don't have competition. Any small patch of bare soil is a opportunity. One of the most successful strategies for weed control is planting plants that can outcompete the weeds. Instead of letting birds or wind currents determine which weeds will dominate an area, the gardener chooses the plants that will dominate. The landscaping plants, in essence, become the weeds. Below is a more detailed discussion on aggressive plants.

2. You either have to prune a lot or weed a lot.

Landscapes that require little weeding because of the aggressive plants that dominate it generally need more pruning. Some ground covers, like primrose, sundrops and wild strawberry, are incredibly effective at weed suppression, but they need constant corralling. Always budget time for one of the two— weeding or pruning.



Some types of landscapes struggle to keep weeds at bay. In the case of this succulent landscape the increase in weeding is offset by the decrease in pruning and cleaning.



The star jasmine pictured is a good example of a pruning landscape. This rooting vine has suppressed weeds in this bed for over eight years. The tradeoff is an increase in pruning. Containing the plant is necessary once a month.

Use Aggressive Plants

The best defense is often a strong offense. Using plants that can out-compete weeds is one of the greatest time-savers in maintaining a landscape. The plants most likely to beat weeds share some general characteristics:

- They trail and root across the top of the soil.
- They are self-repairing and spring back from injury.
- Their foliage blocks the sun from striking the soil.
- They may have aggressive roots near the surface that hog water and nutrients.
- They may be prolific seeders.

Many of the plants listed in the *Low-Growing and Rooting* sections of the Perennial and Shrub chapters are aggressive enough to outcompete weeds. Some of the plants that can be seeded, and then reseed prolifically on their own, are alyssum, baby blue eyes, blue-eyed grass, California poppy, *Clarkia*, forget-me-nots, golden yarrow, goldfields, *Silene*, tidy tips, and yarrow.



Santa Barbara Daisy (*Erigeron karvinskianus*) can be an aggressive spreader and successfully out-compete a variety of weeds.

Mulches

Controlling weeds by using mulches is a universally recommended method of control. Mulch suppresses growth by blanketing existing weeds and preventing incoming seeds from touching soil and rooting. Mulches can be divided between organic or inorganic.

Organic Mulches

Not all mulches are equally effective at suppressing weeds. Finely decomposed mulches are great for growing plants, but not for weed suppression. Recently chipped plant material is great for weed protection, but not for nourishing plants (at least not initially). Recently chipped material from plants high in oils typically offers the best suppression. Wood chips of this sort can chemically inhibit germination, bind soils, and help to slow fast-moving water.

The most effective mulches for weed suppression are recently chipped *Acacia*, camphor, *Eucalyptus*, juniper, oak, pine and *Pittosporum*. Large, thick mulches are preferred over fine, thin mulches.



Thick, woody and coarse mulch will help suppress weeds until the shrubs, grasses and succulents in this landscape mature. Irvine Valley College, Irvine.

Inorganic Mulches

Inorganic mulches, such as decomposed granite, gravel and river rock, can help suppress weeds, but do not get rid of them. The biggest benefit of using inorganic mulch is the ease of eradicating weeds. Whatever weeding method you use—be it flaming pulling, scraping or spraying, inorganic mulches can make the task easier.



River rock mulch

That said, decomposed granite—the popular mulch and path material—has some drawbacks as a weed suppressant. First, it is the perfect rooting medium for many weeds, so they might increase in number. Second, the increase in weeds increases the number of people walking on the mulch to control them. And third, decomposed granite compacts easily under human weight, which then creates a mulch that is quick to produce runoff, but slow to allow the soil to exchange its

gases, which then leads to diminishing plant health. For these reasons, decomposed granite is not universally recommended; pea gravel or small rock chips are usually more effective.



Unless DG has been treated with a binding agent or compacted, it will attract weeds. It has neutral pH, is disease free, and creates just enough air space for rooting. Pictured above is a young crop of horseweed and spurge.

Mulching For Success

Follow these tips to get the greatest impact from your mulching endeavors:

- Keep all mulches away from the crown of plants. Smothering the crown can lead to rot and death.
- Avoid fine mulches for weed suppression because they break down too quickly.
- Spread nothing less than a 2" layer of material if trying to suppress weeds, a 4" layer is better.
- Beware of giving too much organic mulch to tough Mediterranean plants. Organics provide nutrients and overtime routinely mulched areas can become too rich to favor plants adapted to nutrient poor environments.
- Only use thick, compactable organic mulches in fire hazard areas. Fine mulches, like gorilla hair, are much too ignitable.
- Always examine the soil before irrigating mulched areas. Mulches have a tendency to make an area look dry, even if the soil is wet.

Weed Fabric/Barriers

Weed barriers are short-term solutions only. Cardboard, newspaper, plastic sheets and weed fabric are laid over soil to prevent underlying weeds from sprouting. Usually a thick layer of mulch is laid over these materials. These materials are highly effective in the short-term. However in the long-term these materials can increase maintenance costs. Weed barriers can be divided between organic and inorganic types.

Organic: Organic materials, such as cardboard and mulch, will certainly smother the weeds that lay beneath them. Over time, though, organics break down and provide an ideal environment for a greater range of weeds, including some that are more aggressive. Organic barriers are an excellent way to prepare an area for future planting, but they are not good for long-term weed suppression.

Inorganic: Plastic sheets and weed fabrics are commonly sold as solutions to weed problems, and, for the first two years, they can be. But over time a fine layer of organic debris accumulates on their surfaces and weed seeds begin sprouting in this layer. Some of these roots will pierce the weed barriers, quickly rooting and growing. Now pulling or chopping the weed involves dealing with this fabric or plastic. Once these materials reach the surface there is little success in pushing them back down. Landscape fabric and plastic sheeting are ideal for separating different materials, such as river rock and soil, but as an effective weed barrier they are only good in the short-term.



Landscape fabric eventually becomes a landscape nuisance. Unless it is biodegradable, it is often better to avoid weed-blocking fabrics.

Eradication

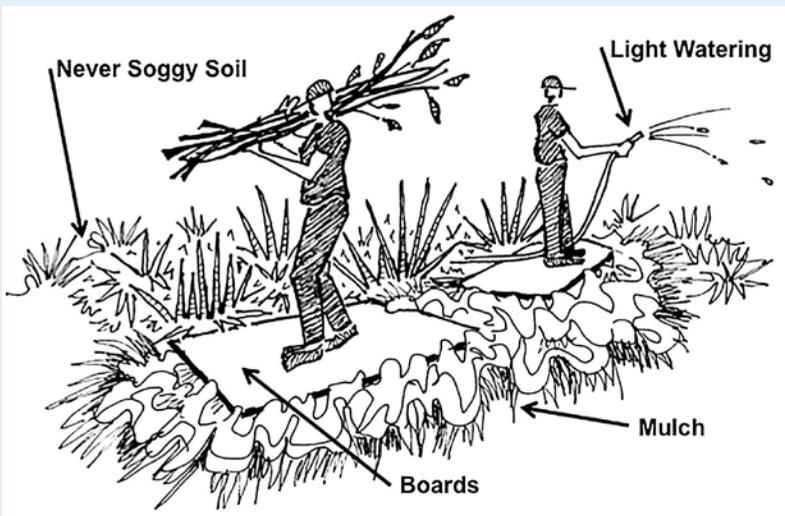
Removing weeds is never an easy task, and there is no easy way to do it. However the methods listed below have proven to be the most effective. Know, though, that simply yanking out a weed does not mean it has been controlled. In some situations that action can actually increase weeds, because it sows the next crop. Follow the suggestions below to get the most out of weeding time.

Most Common Weeding Mistakes

- Weeding after the plants have set seeds only sows the next crop. Instead, always try to weed before seed production.
- Spraying weeds with an herbicide before pulling them makes the task harder because dead plants are more prone to breakage. Instead, pull the weeds, let the remaining seeds and shoots sprout, and then either pull those or use a herbicide.
- Weeding when the soil is wet not only makes the task dirtier, it compacts the soil as well, undermining soil and plant health. Instead, wait until the area is only slightly moist before weeding.
- Weeding a massive infestation without a plan to come back in a month is a waste of time because there is always an immediate crop afterwards. Quick-growing weeds will set seed in 4 to 6 weeks. Without controlling this second surge of weeds the infestation will bounce right back. Instead, always plan to weed an infestation at least twice, about 4 weeks apart.

Protect Ecological Health

Everything coexists in a garden—bacteria and bugs, plants and animals—everything, including us. Hurt one and the others are damaged as well. Great care should be taken to minimize injury to these vital residents when weeding. Protect plants from falling and dragged debris. Lay boards and plywood over beds, grasses and soils to distribute the weight of repeated footsteps. If working in dry conditions, apply a light watering to help bind the soil and reduce topsoil loss. And never, ever, work in wet soils because of the oxygen-squeezing compaction it causes.



Chopping / Mowing

Tools: Brush-cutter, machete, sickle, weed-whacker

Best Plant(s): Any plant with a trunk diameter of 1" or less.

Timing: Though it is easier to mow in mid-spring when plants are tender, most professionals wait until just before the plant has set seed, ensuring the services of the plant without the burden of its offspring the following year.

Note: Chopping and mowing increases soil compaction, which in turn changes infiltration rates, gas exchange rates, and plant health. A good land manager will minimize the frequency of mowing by maximizing its impact through proper timing. Get to know the reproduction cycles of the plants you are trying to control.

Equipment and Fire

According to the California Department of Forestry the leading cause of wild-fires is equipment use. Mowers, weed-whackers and chainsaws are a constant source of friction, heat and sparks. To avoid starting a fire while working with machinery, the following precautions should be taken:

- Bring a fire extinguisher to the work site.
- Put spark arresters on all exhaust ports and repair holes in existing systems.
- Never lay a running or hot engine in grass or other ignitable vegetation.
- Check for a build-up of carbon in exhaust system and on spark plugs.
- Refuel only when the engine has cooled down.
- Avoid working past 10 am during the fire season.
- Avoid all work that involves machinery during extreme fire weather, those hot, dry and windy days.

Digging

Tools: Hand trowel, shovel, pry bar

Best Plant(s): Large grasses, plants with rhizomes, medium-sized shrubs.

Timing: Preferably late winter/early spring, when the soils are moist and pliable and the weeds have not set seed.

Note: Digging up a plant will scar and excite the seeds within the soil, increasing both weeds immediately and the following spring. Always plan to come back to control that first big surge of weeds.

Herbicides

Tools: Large array of chemicals

Best Plant(s): Plants under 2'. Whether applied as a contact, systemic, or preemergent, herbicides are effective against smaller plants. The exception to this general rule is controlling resprouting shrubs and trees. Dousing a freshly cut stump with a systemic non-selective herbicide will prevent it from resprouting.

Timing: Effectiveness depends on the material being used and the plant it is being used on. Even if the material is organic, read instructions carefully before applying. Never, ever, use a herbicide when it is rainy or windy.

Note: Chemical herbicides have advantages. They can be incredibly effective and they are not as disruptive as some of the other methods, such as digging and scraping. However, their long-term biological, cultural and public health costs can be significant. As a rule, herbicides are only used if the other prevention, protection and eradication strategies fail to work. Legally, an herbicide's label must be read before using.

The Bradley Method of Control

Is your landscape overrun by a large infestation of weeds? If so, try the Bradley Method. In this method the outlying, less infested areas are tackled first. This creates a greater chance that the plants you want to thrive and outcompete the weeds will be successful. Once the smaller, less infested areas are controlled, then, and only then, move on to the more severely impacted areas.

—*Invasive Plants of California's Wildlands*. Edited by Carla C. Bossard, John M. Randelland, Marc C. Husbovsky. University of California Press. 2000. p. 21.

Plowing / Tilling

Tools: Shovel, rototiller, tractor

Best Plant(s): Fleshy and young plants and roots.

Timing: Preferably before plants set seed.

Note: As a method of weed control tilling is a short-lived solution because it sows the next crop of weeds. While tilling crops, such as green manures, into a soil will enhance fertility, turning over soil without vegetative cover will degrade the soil, killing beneficial microbes and reducing fertility.

Pulling

Tools: Strong back and hands. Devices such as pry bars and weed-wrenches help, too.

Best Plant(s): Although, technically, any plant is a candidate, young plants are the easiest to pull.

Timing: Pliable, semi-moist and warming spring soils are the easiest to weed by hand. As a rule, the majority of weeds should be pulled before they have set seed because pulling sows seeds.

Note: Weeding by hand can increase soil compaction. Mulch regularly to reduce impact.

Scraping

Tools: Hand hoe, shovel, sod cutter, bulldozer, weed-whacker

Best Plant(s): Anything under a ¾" diameter is a candidate; the smaller the stem or trunk, the easier the job.

Timing: Scraping is easiest when plants are fleshy and growing, rather than brittle, dormant or dead. Spring is generally a good time. Never scrap dry, rocky landscapes near flammable vegetation during the fire season: scraping produces sparks.

Note: Scraping is quick and effective, but can remove or injure topsoil. If scraping is repetitive, then maintain a layer of organic mulch over the area. Scraping is especially effective on decomposed granite surfaces.

Smothering / Sheet Mulching

Tools: Smothering works by creating a barrier that the plants below cannot grow through. Materials used for smothering include cardboard, newspaper and landscape fabrics, all of which are protected by a layer of mulch about 4" thick. Mulch used by itself should be at least 6" thick.

Best Plant(s): Low growing annuals, biennials and perennials.

Timing: Mid-winter through late spring is the best time. The goal is to smother the plants during their growing season; there is little benefit in blanketing a dormant plant.

Note: Smothering is effective. It works against the plants and seeds already onsite and helps deter incoming seeds from rooting. However, the benefits of smothering rarely last longer than 2 years, at which point the soil may be more fertile and hospitable to a greater range of weeds.

Solarization

Tools: Rolls of clear plastic sheets and staples for the plastic. The goal with solarization is to cook the plants and soils below, killing plants, vegetative starts and seeds.

Best Plant(s): Low-growing annuals, biennials and perennials.

Timing: Solarization works best in the hotter months, late spring through mid-fall. The process of sterilization can take 1 to 3 months. Clear an area of vegetation before laying plastic so that the sheets can lie directly on the soil.

Notes: Solarization solves an immediate problem and can be effective at preparing an area for future planting. Its drawbacks are the length of time it takes, the fact it requires lots of plastic which is only used once, and its ineffectiveness in areas that are cool and/or shady.

Vinegar

Tools: Vinegar, undiluted or diluted with water up to 50%. Vinegar is an acidic solution that kills vegetative cells on contact.

Best Plant(s): Fleshy, green plants; twiggy, woody plants are not as susceptible.

Timing: Vinegar works best late winter to mid-spring when weeds are young and fleshy.

Notes: Vinegar only kills what it touches and will not kill the roots of re-sprouting weeds, like Bermuda grass.

Handling Weed Waste

Removing weeds often entails removing large piles of debris. There are three ways to remove weed waste: compost on site, burn or haul away.

Composting is an inexpensive method, but it requires the greatest amount of time and space. Weed waste needs the most extensive type of composting to ensure that the vegetative parts and seeds are dead. A site's ability to properly compost also hinges on its ability to absorb the product.

Burning is the quickest and least expensive method, but is not legal in the urban areas of Southern California. Burning used to be the most common method of disposal, but because of our region's air quality mandates not any more.

Hauling the debris is the most expensive method of removal, but it is the quickest, by far. The expense of hauling is related to weight and size, both of which will shrink if the pile is spread out and allowed to dry before hauling away.

What are the Weeds Telling You About Your Soil?

Below is a list of weeds and the soils they prefer. It is a good starting point for your observation and understanding. Along with decades of personal observation, this list was created with help from CalFlora's comprehensive catalog (www.calflora.org) and the extensive work of University of California, Agriculture and Natural Resources, Statewide Integrated Pest Management Program (www.ipm.ucdavis.edu).



A California Friendly landscape would rarely create the conditions that favor nutgrass (*Cyperus* spp.). This weed prefers moist and slightly acidic soils. In the situation pictured above the mulch should be scrapped off to warm the soil and the irrigation should be severely turned down.

Barley (*Hordeum* spp.)

Indicates: Dry, shallow soil, with some salt and low fertility. Many California natives.

Berry, black or rasp (*Rubus* spp.)

Indicates: Acidic soil with salts, low fertility, and the soil might be shallow. Prefers shade with a moist spring and dry summer. Some California natives.

Bermuda grass (*Cynodon dactylon*)

Indicates: Dry soil that might also be acidic with low salts.

Bindweed (*Convolvulus* spp.)

Indicates: Low nutrients and shallow soil; might also be acidic.

Black medic (*Medicago lupulina*)

Indicates: Slightly moist soils with low nutrients and nitrogen.

Brome, ripgut (*Bromus diandrus*)

Indicates: Dry, disturbed and shallow soils with some fertility and salt.

Cape ivy (*Delairea odorata* (*Senecio mikanioides*))

Indicates: Shady moist areas with soils that are neutral pH or slightly acidic.

Carrot, wild (*Daucus pusillus*)

Indicates: Dry soils with low fertility that might be slightly alkaline. California native.

Castor bean (*Ricinus communis*)

Indicates: Dry, disturbed, and shallow soils with low fertility that might also be acidic with some salt.

Cheeseweed (*Malva parviflora*)

Indicates: Dry, slightly infertile, and disturbed soils that might be low in salts.

Chickweed (*Stellaria media*)

Indicates: Slightly moist soils with low fertility that might also be compacted.

Chicory (*Cichorium intybus*)

Indicates: Dry soils that might have some salts and a pH that is neutral to slightly acidic.

Cinquefoil, creeping (*Potentilla reptans*)

Indicates: Acidic and slightly moist soils.

Clover, red, rose, white (*Trifolium* spp.)

Indicates: Low to moderate levels of moisture, low fertility and nitrogen, and soil that might also be acidic; some clovers also indicate high levels of potassium.

Cocklebur (*Xanthium* spp.)

Indicates: Dry, shallow soils that might have salt. California native.

Cow parsnip (*Heracleum maximum*)

Indicates: A shady or cool area with dry, acidic, shallow soils with low fertility and some salts.

Crabgrass (*Digitaria* spp.)

Indicates: Soils that are dry with low to moderate fertility and some compaction.

Dandelion (*Taraxacum officinale*)

Indicates: Acidic, slightly moist, and the soil be might be compacted but deep.

Dichondra (*Dichondra micrantha*)

Indicates: Moist, fertile and slightly acidic soils.

Dock (*Rumex* spp.)

Indicates: Moist, acidic soils that may be slightly infertile.

English daisy (*Bellis perennis*)

Indicates: Acidic, slightly moist soils that might be compacted or else clay soil with salts.

Feather grass, Mexican (*Nassella tenuissima*)

Indicates: Dry soils with a little salt and neutral to slightly alkaline pH.

Fennel (*Foeniculum vulgare*)

Indicates: Disturbed soils that are dry, low in nutrients and may contain salt.

Fiddleneck (*Amsinckia intermedia*)

Indicates: Dry and shallow soils that might have salt.

Filaree (*Erodium moschatum*)

Indicates: Soils that are dry, shallow with low to a little fertility.

Fireweed (*Chamerion angustifolium*)

Indicates: Dry, acidic and coarse or sandy soils that have low nutrients with little salt. A California native.

Fountain grass, crimson (*Pennisetum setaceum*)

Indicates: Dry soils with moderate fertility and neutral pH.

Groundsel (*Senecio* spp.)

Indicates: Dry, disturbed, shallow soils with low to moderate fertility.

Horehound (*Marrubium vulgare*)

Indicates: Dry and semi-fertile soils that might have salt.

Horsetail (*Equisetum* spp.)

Indicates: Moist soils that are low in salts with neutral to acidic pH. Many California natives.

Horseweed (*Erigeron canadensis*)

Indicates: Dry, disturbed, shallow soils that might be alkaline.

Jupiter's beard (*Centranthus ruber*)

Indicates: Dry, slightly acidic and low fertility soil that is probably silty.

Knapweed (*Acrotilon* spp.)

Indicates: Dry and disturbed soils with low to moderate fertility that might be clay, alkaline and have salt.

Knotweed (*Polygonum* spp.)

Indicates: Disturbed soils that might be moist and acidic. Some California natives.

Lamb's quarters (*Chenopodium album*)

Indicates: Might be a shady area with soil that is disturbed, shallow and has some organics.

Mexican evening primrose (*Oenothera speciosa*)

Indicates: Dry and shallow soils with occasional moisture, little to a few nutrients, and may indicate some salts.

Mugwort (*Artemisia douglasiana*)

Indicates: Wet to dry, low fertility and probably acidic soils. California native.

Mullein (*Verbascum* spp.)

Indicates: Dry to occasionally damp soils, disturbed, acidic with low fertility.

Mustard, black (*Brassica* spp.)

Indicates: Dry, disturbed, dense and shallow soils that might be alkaline and possess a little nitrogen and phosphorus.

Mustard, common or field (*Brassica rapa*)

Indicates: Deep, dry and disturbed soils that might be acidic and low in nutrients.

Nutgrass, nut sedge, Flatgrass (*Cyperus* spp.)

Indicates: Slightly moist and shallow soils with neutral to slightly acidic pH and possibly compaction. Some California natives.

Orchard grass (*Dactylis glomerata*)

Indicates: Moderately deep acidic soils that might have salt and be compacted.

Oxalis or Creeping wood sorrel (*Oxalis* spp.)

Indicates: Acidic, slightly fertile and moist soils that may be shallow and compacted.

Pennywort (*Hydrocotyle* spp.)

Indicates: Moist, fertile, and neutral pH soils.

Pigweed (*Amaranthus retroflexus*)

Indicates: Dry and disturbed soils with some nitrogen.

Plantain, common (*Plantago major*)

Indicates: Clay and slightly moist soils with low fertility and neutral to slightly acidic pH.

Poison hemlock (*Conium maculatum*)

Indicates: Slightly moist soils that are shallow with neutral to slightly acidic pH and some salts and nutrients.

Poison oak (*Toxicodendron diversilobum*)

Indicates: Dry shade and shallow soils that may have some salt. California native.

Prickly lettuce (*Lactuca serriola*)

Indicates: Dry and shallow soils with low fertility and some salt.

Purslane (*Portulaca oleracea*)

Indicates: Dry and disturbed soil with a little phosphorus and maybe salt.

Radish, wild (*Raphanus sativus*)

Indicates: Dry, disturbed, shallow soils, with low to some fertility that might be alkaline.

Ryegrass, (*Lolium* spp.)

Indicates: Dry and shallow soils with neutral pH and a little salt.

Scarlet pimpernel (*Lysimachia arvensis*)

Indicates: Some shade with a soil that might be slightly moist, with neutral pH, and some fertility.

Shepherd's purse (*Capsella bursa-pastoris*)

Indicates: Slightly moist, low nutrients and low salt soils.

Sowthistle (*Sonchus* spp.)

Indicates: Dry and shallow soils with neutral pH, little fertility and possibly some salt.

Sorrel, sheep (*Rumex acetosella*)

Indicates: Acidic, slightly moist and semi-shallow soils.

Spotted spurge (*Euphorbia maculate*)

Indicates: Dry and compacted soils that are low in salts with neutral to alkaline pH.

Stinging nettle (*Urtica* spp.)

Indicates: Lightly shaded and dry soils with neutral pH. Some California natives.

Thistle, bull (*Cirsium vulgare*)

Indicates: Shallow and salty soils with some fertility.

Thistle, Italian (*Carduus pycnocephalus*)

Indicates: Dry, shallow and slightly acidic soils with some nutrients and salts.

Thistle, prickly sow (*Sonchus asper*)

Indicates: Shallow soils with neutral to acidic pH, low fertility and salts.

Thistle, milk (*Silybum marianum*)

Indicates: Dry, shallow and/or clay soils, low to some fertility, and some salts.

Tree of heaven (*Ailanthus altissima*)

Indicates: Dry, shallow and slightly compacted soils that might have some fertility, salts and be slightly acidic.

Tree tobacco (*Nicotiana glauca*)

Indicates: Dry, disturbed, and shallow soils with a little salt.

Tumbleweed (*Salsola tragus*)

Indicates Dry and disturbed soils that might have salt.

Vetch (*Vicia* spp.)

Indicates: Dry shade and shallow and slightly acidic soils with low nutrients and nitrogen.

Yarrow, common (*Achillea millefolium*)

Indicates: Soils that might be slightly acidic and low in nutrients and potassium, with the possibility of salts. A California native.