

Controlling common invasive weeds along Codornices Creek between Sixth and Eighth Streets

Site History: When European settlers arrived in the early 19th Century, Codornices, like many other small creeks flowing from hills around San Francisco Bay, petered out before it reached the Bay. It probably filtered through a moist grassland into a large salt marsh, through which a slough meandered north to the Bay, behind the hill that now is the site of Golden Gate Fields racetrack. The channel may have been dug through in the 1870s, when the transcontinental railroad was built north, more or less along the shoreline. Meanders may have been straightened as late as the 1960s. .

The creek was badly polluted by sewage in the 20th Century. Its lower reaches, including this site, were a channelized industrial area. Some of the creek was piped under a paint factory; water sometimes ran red or green. The loss of industry and improved water quality due to the federal Clean Water Act made the creek more attractive to wildlife. Steelhead began to explore and spawn upstream probably in the 1980s or 1990s. The formerly straight channel between 6th and 8th was naturalized in 2010-11, with a new, somewhat meandering course and diverse plantings native to the East Bay. The intention was to leave the north side of the creek, in Albany and adjacent to Albany Village, as habitat, while the south side, with a pedestrian-bicycle trail above the flood plain and a small “outdoor classroom,” would be more welcoming to people.

Current challenges: As with virtually all attempts to re-naturalize urban creeks, maintenance has been a challenge. Graffiti, litter, camping, intoxicants, feral cats, and undesired and overgrown vegetation can interact to spoil these areas for both people and wildlife. The capital-projects grants that paid for these projects did not include ongoing maintenance, which has often been left to minimal and untrained staff and volunteers hobbled by unrealistic rules and expectations – for example, requiring costly permits and approval of multiple state agencies in order to trim trees.

These notes on vegetation management address the situation in 2016. Needs will change as this project matures. In general, work should get lighter over time, especially if weeds are kept under control. However, allowing serious invasives to take over large areas could lead to intractable if not insoluble difficulties, as can be observed with the summer tangles of hedge bindweed and spreading pepperweed in the two blocks downstream.

For more information:

CalFlora, www.calflora.org, has a **searchable database of California native and non-native plants with photos**. Free cell-phone apps can be used for mapping.

California Invasive Plant Council, Cal-IPC, has a **searchable list of serious invaders in wild lands (not necessarily perfect for urban areas) with profiles including origin and mode of spread**, plus links to more info.

Weed Workers' Handbook, published by Cal-IPC, can be purchased as a book or downloaded at <http://www.cal-ipc.org/ip/management/wwh/>. It has **information on tools, safety, and organizing work parties, as well as advice on controlling many common invasives**.

Invasives worth focusing on in 2016-2017 are hedge bindweed, Himalayan blackberry, fennel, and bristly ox tongue. It's also important to keep an eye on other weeds so that they don't become major problems. Wind and water will always bring new propagules. **Many problems can be avoided by careful inspection, especially after winter rains end, combined with early removal of potential problem weeds.**

Hedge bindweed, *Calystegia sepium* or *sylvatica* or *Convulvulus arvensis*. These are not the same, but all have large, bright green, heart-shaped leaves and attractive white "morning glory" trumpet flowers. They spread by fleshy underground rhizomes that can extend several meters in a season, often growing much farther, with much more biomass, than the aboveground vine. They twine up and over all vegetation including small trees. And they release abundant seed that can survive many years in soil.



Hedge bindweed can be controlled in two ways:

- (a) Dig out and bag every bit of root. Carefully follow the vine to where it goes into soil. Then carefully follow the branching, often multi-level, white to pinkish, fleshy rhizomes. If the root breaks, or where it seems to stop or go down into the ground, dig to try to pick up the trail again. Soil knives, dandelion diggers, and spading forks all work well. Bag roots for disposal in commercial (hot, pulverized) compost. Vines on trees, without seed, can be left to wither.
- (b) Cover for 3-5 years or more, several feet beyond the infestation, with impermeable, lightproof tarp or plastic held in place by U-nails or duckbilled anchors. You can cover these with wood chips or even, after a time, soil. But watch around the edges – roots will explore.

Seed lasts in soil and new seeds will wash downstream, so keep an eye out for new infestations.

Himalayan blackberry, *Rubus armeniacus*: It's pretty easy to distinguish the three types of blackberry in our area, even though all have 3-5 ribbed, toothed leaves with prominent veins, and long woody canes that sprout at the tips, and form dense thickets.

- Native blackberry, *Rubus ursinus*, has closely-spaced prickles. You can grasp the stem with your bare hand. It does not spread as fast or grow as tall as the others.
- **Himalayan blackberry, *Rubus armeniacus*, has thorns.** Grasping it bare handed will hurt, and probably draw blood. Using heavy gloves, cut the canes with loppers. Then dig out the knobby,



swollen root crown (sometimes buried) and as many lateral roots as you can. Mattocks or related tools, spading forks, and shovels all do the job. You sometimes can grasp the base of the plant and pull out the root crown by hand. Bag roots for commercial compost. Woody canes can be chopped for mulch.

- Evergreen thornless or elm-leaved blackberry, *Rubus ulmifolia*, has no thorns but is even more invasive and hard to get rid of than Himalayan blackberry. The canes are longer and root more readily at the tips, and small fragments re-sprout even more readily. Thickets can be 15' high, and canes easily span creeks. This pest doesn't seem to have reached lower Codornices Creek, but if you see it, dig it out!

Bristly ox tongue, *Picris echioides*: Bristly ox tongue is easily distinguished from other weeds with dandelion-like flowers – look for the rough, hairy warts that stud the leaves and give the plant its name. If in doubt, rub one against your cheek.



From a rosette of dark-green oval leaves, vertical stems with scattered leaves can rise 5' or more, tipped with flowers that soon give way to white tufts of seeds that float away on parachute-like white threads.

For control, (a) don't let plants set seed and (b) dig them out – including small plants that spring from root fragments left in the soil. Bristly ox tongue can bloom at small sizes, and almost year-round in our area. Control is easiest and most fruitful in late spring while soil is still moist, but continual vigilance is the key.



Almost any tool will do for digging out the roots. Small tools minimize soil disturbance, but bigger ones, like shovels, will get more of the roots. They are not deep. Shake off loose soil and bag the plants, being especially careful not to let seeds blow away. Uprooted plants may pour their energy into maturing seeds, so it's better to now leave these on the ground or put them into garden compost.



Fennel, *Foeniculum vulgare* (and poison hemlock, *Conium maculatum*):

Both of these grow tall, with ferny leaves. Novices may confuse them, although they are easy to tell apart by smell, leaves, and flowers. Fennel is the more serious problem on Codornices between 6th and 8th.

Fennel, *Foeniculum vulgare*, is the wild version of domestic fennel. Leaves are ferny, but individual leaflets are round and threadlike, smelling strongly of anise (licorice). Tall stems bear big flat clusters of tiny bright-yellow flowers. Wild fennel does not form large bulbs, but the carrot-like root is edible when young, and people use the fronds, stems, pollen, and licorice-tasting seeds as flavoring. Fennel also is a favorite plant of the beautiful anise swallowtail butterfly. Because fennel is so common, this butterfly has several more "flights," or generations, each year than it did before European settlement. (Plant other carrot relatives, such as yampah, for the butterflies.)

The problem is that fennel can form dense and persistent monocultures that exclude other plants. When dry, these can be a fire hazard. Fennel lined much of the channel before re-naturalization, so a “seed bank” and probably some older plants remain.



Small plants are easily dug out by the roots, but with older ones, the only hope is pick and/or shovel when soil is either wet or very dry and crumbly. Get as deep as you can, dig year after year. Meanwhile, cut the flowering stems to keep seed from maturing. (Use them as cut flowers or collect pollen as spice.) Bag the heads once seed forms. I don't recommend foraging for seed – it's too easy to gather poison hemlock seed instead.

Poison hemlock, *Conium maculatum*, is a short-lived perennial in the carrot family. Divided flat leaflets form a ferny triangular leaf. Crushed leaves smell somewhat medicinal – not like anise – and stems often have reddish-purple markings – hence the common name “Socrates' blood.” From low rosettes, stems can shoot up six feet or more, bearing flat clusters of tiny white flowers (umbels) and forming abundant seed by late summer.

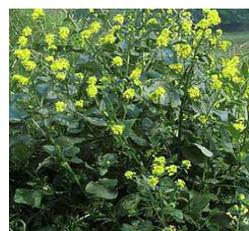


Poison hemlock pioneers in disturbed areas and can form monocultures. But probably the main reason to control it is that it's deadly poison.

The white, carrot-like root is easily dug out. Plants can usually be left to compost if they have not yet bloomed. Seeds usually don't persist in soil for more than a few years.

Field weeds: Anyone who works in a garden in our area is likely to be familiar with our common “field weeds,” some of them feral versions of domestic plants and edible. The most common are cheeseweed (*Malva parviflora*), wild radish (*Raphanus sativa*), wild mustard (*Brassica* spp.), thistles (*Cirsium* spp., *Carduus pycnocephalus*, *Sylibum marianum*), sow thistle (*Sonchus* spp.), and prickly lettuce (*Lactuca saligna*, *serriola*, *virosa*).

These are mostly perennials, though some are annuals, biennials, or otherwise short lived. They are not huge problems along Codornices Creek, but it's good to keep them under control. Sometimes they can be pulled out of soil by hand. (Grasp thistles at the base, where spines are usually few.) Otherwise, dig roots out and don't let them set seed. Young plants can be left to compost, but if there are buds or flowers it's safest to bag them for disposal as commercial green waste. Thistles especially will pour all their energy into setting seed.



Along with the field weeds, it's worth trying to control these two:

Curly dock, *Rumex crispus*, and various other non-native docks, including clustered dock, bitter dock, and toothed dock, are common perennials in damp places. Rosettes of tough, dark-green leaves send up showy heads of abundant rust-colored seeds that survive for decades in the soil. Cut and bag the seed heads and dig out the woody, often carrot-like roots. (Only experts can distinguish non-native from native docks, but the natives are not found on Codornices Creek.)



Japanese hedge parsley, *Torilis arvensis*, seems to be increasingly common. It has ferny leaves, rather wiry stems, and pretty little flat heads of pinkish white flowers that seem to turn into clinging burrs overnight. Woe to your socks and any clothing that is not smooth!



Herbaceous invaders to look out for – few or not yet found on the site, but could cause serious problems:

Pepperweed, *Lepidium latifolium*: This perennial has a long history of medicinal use around the Mediterranean, but in wetlands in the American West, including the Bay shore, it forms huge monocultures with dense masses of roots. It is spreading north of the creek near the railroad tracks. It is very difficult to control without chemicals. Tarping may be the best bet. Because the plant bolts from a basal rosette to a meter, several photos are needed to recognize it.

Egg-leaf or oblong spurge, *Euphorbia oblongata*, is one of the prettiest and most harmful invasives in our area, with flat heads of bright yellow-green, flower-like bracts and red stems especially in fall and winter. It is toxic to animals, inhibits other plants, and has a milky sap that irritates skin and can be painfully though temporarily blinding. Spreading by roots and seed, which it spits several feet, it can quickly form dense monocultures. Dig it out, following connecting roots if you can. Watch for re-sprouts from bits of root. Eradication can take years.



Stinkwort, *Dittrichia graveolens*, is a recent invader whose sticky seeds spread on truck tires and clothing. Plants sprout in summer and bloom late, into November. They have a strong smell if crushed, feel sticky, and often resemble small Christmas trees. Roots are small; usually plants can be easily pulled out or dug with a soil knife. Bag everything and use gloves – the sticky sap irritates some people's skin.



Pellitory (*Parietaria Judaica*): Some people are allergic to the pollen and fine hairs, so don't ask untested volunteers to remove it. It is easily dug out, but can re-sprout from root fragments in soil. Probably best bagged for commercial composting.



Vines and groundcovers:

Cape ivy, *Delairia odorata* or *Senecio mikanoides*, is fairly rare in its South African home, but in our area forms dense mats that smother all other vegetation, even toppling trees with its weight. Shiny, bright green, hairless leaves have pointed lobes like those of English or Algerian ivy. But they are lighter in color and thinner, with a distinctive medicinal smell. Native wild cucumber (*Marah*) also has leaves this shape, but they are grayer and slightly fuzzy. *Marah* climbs by tendrils – short branches that tighten in a corkscrew, pulling the plant upward. With cape ivy, the vine itself twines.

Cape ivy's shallow stems and roots are often almost fluorescent violet, although older stems become woody. It is easily dug or pulled out. Use a soil knife or any small tool – dandelion digger, small garden fork – to get the roots. The challenge is that leaves and stems break easily, and any node can start a new plant. Woody stems can resprout even after weeks of drying. Bag everything for disposal in commercial compost. If you are removing a large mass, it may help to pile it on a tarp first. Vines that have climbed trees may be best left in place once you have cut their connection to the ground.

English or Algerian ivy (*Hedera helix* or *canariensis*): Most people know these invasive creepers, with woody stems, dark-green leaves with pointed lobes, and the ability to climb by rootlets. They cover whole city parks, climb and engulf huge trees, and provide habitat for almost nothing except rats. Fortunately, they are not common along Codornices Creek, but we want to keep it that way. Check for new seedlings along the creek, and dig out as much as you can of the established plants. A soil knife or similar small digging tool will work. (Large infestations can often be rolled up like a carpet, and where vines have crept up trees, just cut them close to the ground and again about a foot higher up. Leave the rest on the tree.)

Periwinkle (*Vinca major*): This evergreen vine with small glossy leaves is an escaped garden groundcover that can take over large areas. It is shallow-rooted and generally easy to dig or even pull out, but bag it – fragments can start new plants.

Shrubs and trees:

Juniper: Wood chips brought in for restoration must have contained seed from garden juniper (*Juniperus* spp.) because it sprouted in abundance. These are easily dug out with a soil knife if small or pulled with a weed wrench.

Acacia, especially blackwood acacia, *Acacia melanoxylon*: These fast-growing Australian natives grew along the creek before restoration, and continue to sprout from roots and seed. They can form dense clumps that seed prolifically, don't do much for local wildlife, and release abundant pollen that is a common cause of "hay fever."



Young leaves are ferny, with many small leaflets on a single stem. On blackwood acacia, these give way to leathery, slightly grayish ovals, with veins running the length of the leaf. (This is one way to tell them from otherwise superficially similar willows.) Dig or cut out as much as you can, following roots. Don't leave long roots lying on the ground.

French broom, *Genista monspessulana*: This familiar yellow-flowered invader is uncommon on the site, but it's good to keep an eye out, as seeds can wash in every year. Look for vertical growth; small, slightly furry and grayish leaves in threes; and of course, the bright yellow pea flowers. Pull broom out by hand or with a weed wrench. Plants without seed can be left on the ground. You often can strip off the seeds and dispose of them separately.



Cotoneaster, most commonly *C. franchetii*, **Curly-leaved pittosporum, *Pittosporum eugenoides*** or *undulatum*, and **Privet, *Ligustrum spp.***, are prolific, tough, big garden escapees whose seeds can wash downstream and be carried by birds. Check for seedlings, especially along banks that flood, and remove them while it's easy.



Grasses: Identification can be difficult, especially when grasses lack flowers or seed. Control is probably best done by those with experience. Top priorities probably are digging out three that grow to 4' or more:

- Pampas or jubata grass, *Cortaderia sp.* (below left): Shallow rooted; bag seeds, dig out roots and turn clump over. Does not readily sprout from bits of root left in ground.
- Harding grass, *Phalaris aquatica* (below center): Do not allow seed to mature, dig out as much root as possible, keep cut low if removal is impractical, and plant competing plants to shade out seedlings.
- Smilo grass, *Piptatherum miliaceum* (below right): Feathery seed fertile from the start. Dig out roots, bag everything, repeat when bits of root or new seedlings sprout.

Not illustrated: Keep a lookout for velvet grass (*Holcus lanatus*) and Kikuyu grass (*Pennisetum clandestinum*) to keep these from taking hold. Johnson grass, *Sorghum halepense*, and wild oats, *Avena spp.*, may be beyond control except by mowing.

