

Revegetation with Native Grasses, Sedges, Rushes, and Forbs Competition and Control of Weeds, Soil Stabilization, and Enhancement of Biodiversity

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Weeds impact thousands of acres of managed landscapes. These landscapes include:

- transportation corridors such as roadsides and highway interchanges
- drainage systems including ditches, swales, and sloughs
- storm water retention basins
- stream and rivers banks
- levees
- irrigation canals and reservoirs
- farmland edges and non-farmed corners
- parks and open space
- constructed wetlands and wildlife refuges



Management techniques used on these landscapes include tillage, herbicides, intensive mowing, burning, and in many instances an attempt to keep the ground free of vegetation. Left unmanaged, a huge number of exotic non-native weeds become established in a short period of time. Many miles of storm water sloughs and swales are now dominated with some of the worst weeds that have infiltrated California. These include perennial pepper weed, Johnson grass, and yellow star thistle and hundreds more.

When ground is kept bare, usually with herbicides, problems include soil erosion and the required continuous spraying. Bare ground also eliminates potential wildlife habitat for a wide variety of birds, reptiles, amphibians, small mammals, beneficial insects (including pollinators) and a host of others. The emergence of herbicide resistant weeds is another increasingly common problem.

Over the past 30 years we have been testing and implementing vegetation practices using California native plants on many of the areas listed above. After initially recognizing and using the weed-eliminating feature of some of the exotic perennial grasses (i.e. tall wheat grass, perla grass, berber orchard grass) we began exploring the potential of native perennial plants in our habitat restoration programs. Over the years we have identified a multitude of native perennials and annuals that, once established, provide excellent cover and wildlife habitat while suppressing and eliminating weeds. Most of the species are adapted to the Mediterranean climate of California and require no water during our dry season in late spring and summer.

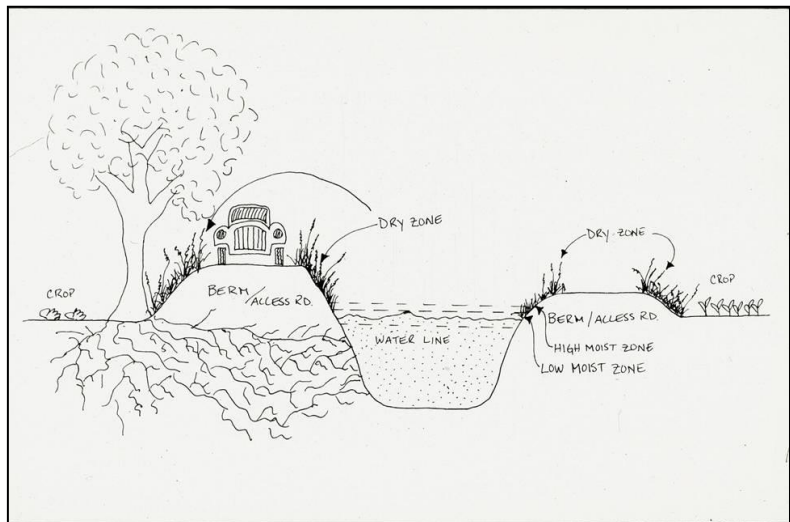
In addition, the ecosystem services they provide include:

- soil stabilization and erosion control
- enhanced water infiltration facilitated by extensive root systems that may go as deep as 6-8 feet or more
- bio-remediation of pollutants and pathogens
- carbon sequestration
- diverse habitat for many wildlife species

Over the past 10 years many of these plant species have become readily available either as seed or transplants. Now there are over 30 species of native grasses, 11 species of sedges and rushes, 40 species of forbs including many perennials available. There is also increased emphasis on using bioregional ecotypes in many projects, and origin-known seed and plants are more widely available. Included here (see end of document) is a list of the most commonly used species. For plant descriptions, see the USDA Plants Database (plants.usda.gov) or CalFlora (www.calflora.org). Information on what to use where and seed mixes can be found on some of the seed supplier web sites and on the California Native Plant Link Exchange (CNPLX) web site (cnplx.info). CNPLX also has a searchable database showing which seed companies and nurseries carry which species.

There are many implementation techniques that are beyond the scope of this manuscript. Re-vegetation sites vary considerably. A list of the practices that need to be considered include:

- tillage
- initial weed control
- seeding
 - hydroseeding
 - broadcast seeding
 - drill seeding
 - imprint seeding
- transplanting
 - plug planting
 - native sod
- follow-up management
 - herbicides
 - ☞ post emergent
 - ☞ pre-emergent
 - mowing and swathing
 - grazing



Pre-seeding tillage can be very important, especially on heavily compacted sites. Initial weed control and continued weed control during early establishment is very important. Exotic weedy species can rapidly overwhelm and eliminate slow growing native seedlings; these native perennials may take up to 3 or 4 years to become well established and provide weed control function.

While these vegetation practices are generally recognized as the right thing to do, they are only practiced on a very small percentage of the landscape. Pest Control Advisors could play a valuable role in recognizing where to establish native plant corridors and marketing the concept for the entities that can provide the design and implementation expertise.

Information on restoration and revegetation, as well as training workshops offered, are available from: the California Native Grasslands Association (www.CNGA.org), The California Society for Ecological Restoration (www.SERCAL.org), California Invasive Plant Council (www.CalIPC.org) and several of the Resource Conservation Districts (including the Yolo County RCD, www.yolorcd.org).

Commonly Used Species Common name (Botanical name, # of ecotypes available from Hedgerow Farms)

Grasses

- Bentgrass (*Agrostis exarata*, 1)
- Blue wildrye (*Elymus glaucus*, 12)
- California barley (*Hordeum brachyantherum californicum*, 2)
- California brome (*Bromus carinatus*, 3)
- California Oniongrass (*Melica californica*, 5)
- Creeping wildrye (*Leymus triticoides*, 5)
- Deergrass (*Muhlenbergia rigens*, 1)
- Foothill needlegrass (*Nassella lepida*, 3)
- Idaho fescue (*Festuca idahoensis*, 1)
- Meadow barley (*Hordeum brachyantherum*, 7)
- Molate fescue (*Festuca rubra molate*, 1)
- Nodding needlegrass (*Nassella cernua*, 6)
- One sided bluegrass (*Poa secunda secunda*, 3)
- Purple needlegrass (*Nassella pulchra*, 17)
- Slender hairgrass (*Deschampsia elongata*, 1)
- Slender wheatgrass (*Elymus trachycaulus*, 4)
- Small fescue (*Vulpia microstachys*, 2)
- Squirrel tail (*Elymus multisetus*, 2)



Sedges and Rushes

- Baltic rush (*Juncus balticus*, 1)
- Bulrush (*Scirpus americanu*, 0)
- Common rush (*Juncus effusus*, 1)
- Fox sedge (*Carex vulpinoidea*, 1)
- Grey rush (*Juncus patens*, 2)
- Santa Barbara sedge (*Carex barberae*, 1)
- Slender sedge (*Carex praegracilis*, 3)
- Spike rush (*Eleocharis macrostachya*, 1)
- Torrent sedge (*Carex nudata*, 1)

Forbs

- Bolander's sunflower (*Helianthus bolanderi*, 2)
- California phacelia (*Phacelia californica*, 1)
- California poppy (*Eschscholzia californica*, 1)
- Common madia (*Madia elegans*, 1)
- Gum plant (*Grindelia camporum*, 4)
- Lupine species (*Lupinus*, 6 species carried each with 1 or 2 ecotypes)
- Milkweed (*Asclepias fascicularis*, 1)
- Mugwort (*Artemisia douglasiana*, 1)
- Spanish clover (*Lotus purshianus*, 1)
- Tomcat clover (*Trifolium willdenovii*, 1)
- Turkey mullein (*Croton setigerus*, 2)
- Vinegarweed (*Trichostema lanceolatum*, 1)