



Increasing Farm Diversity

TIMELINE AND STEPS FOR HEDGEROWS,
WINDBREAKS AND RIPARIAN AREAS

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Farmscaping is not just about planting the habitat—the more upfront planning and afterward maintenance and monitoring, the more successful the project.

Introduction

Planning and installing a new native plant conservation area on the farm is a major management decision that, from start to finish, can be pleasurable and exciting. Besides adding biodiversity and beauty to the farm, climate benefits accrue—shrubs and trees can store significant amounts of carbon in their tissues and the soil.

Growers often plant hedgerows for their support of pollinators and natural enemy insects. These plantings also support beneficial birds and other wildlife, and can function as a living fence. With tall trees, windbreaks protect crops, livestock, and soil from wind ten times the height of the planting. Riparian vegetation strengthens areas under the influence of water; it can protect water quality, diminish water temperature, and reduce stream bank erosion. These linear plantings also serve as wildlife corridors, fostering wildlife movement best when they are connected to other habitat on and off the farm.

It is estimated that it would take 16 years of pesticide cost savings to recoup a \$4,000 investment of installing 1,000' hedgerow, based on pest control benefits, and only 7 years when pollination benefits are included (Morandin et al. 2016). This means a grower is banking \$571/year ($\$4,000/7\text{years}$) for both benefits. If growers obtain financial support (see resources), payback is even sooner.

Six Months to a Year Before Planting

PLANNING IS CRITICAL

Carefully assess the farm's opportunities for the best location to add native plant diversity. For help deciding where to install habitat, see the [Beneficial Bird Habitat Assessment and Native Plant Tool](#). When beneficial birds are supported, they can reduce pest insects, rodents and pest birds that cause harm. Because the tool gives a high rating to native plants with long flowering periods, it encourages plantings that also support natural enemy insects and pollinators. For more general planning guidelines that include site analysis and suitable plant species for other situations, see [Hedgerows and Farmscaping for California Agriculture](#).

Depending on the weed pressure at the site, you may need to work on reducing weeds before planting to increase the success of your project. Several publications listed in the resource section address weed abatement.



When preparing the site, creating an elevated berm is helpful for root aeration. If space is available, planting two or three beds will provide for more biodiversity. Plantings with trees require wider areas.

One Week Before Planting

PREPARING THE SITE

Remove weeds and rip if necessary. Typical weed removal can be done with disking or solarization (see resources for how to do that). Make a berm or bed, elevated above the ground level, that will provide good aeration for root crowns. If space is available, two or three beds can be formed. A wider and taller planting provides more benefits. In a riparian zone, disk or berm creation may not be possible.

PURCHASING AND PICKING UP PLANTS FROM THE NURSERY

It is best to visit the native plant nursery before purchase to ensure quality plants are provided. While this is not always possible, it helps to avoid small, old or damaged stock.

Count plants against the invoice as you load them to avoid returning to the farm with the wrong species or incorrect numbers. While this seems obvious, too often, mistakes happen.



Preventing the wind from damaging plants when transporting from the nursery can be done by securing a tarp over their top of them as they are laid down inside the bed of the truck. These hardy plants can be stacked without damage, with the more fragile ones placed on the top layer.



Transporting Plants in an Open Truck or Trailer: Laydown-Tarp Method

Avoid wind damage to the plants in a pickup or open trailer by laying them down and covering them with a tarp.

1. Lay the tarp over the front of the truck leaving about 2' of tarp inside the bed of the truck.
2. Load the tough plants first, laying all down on their sides on the bed, with the heavy containers, on the 2' of tarp that's inside the bed. The largest and longest plants should be on the bottom layer. This is the most critical part-the plants are holding down the tarp from the wind so that when all the plants are loaded, you will pull the tarp back over all the rest of the bed.
3. Continue stacking one layer on top of the other. Most plants are very hardy with stiff leaves and strong trunks, but some are more fragile, particularly the sages (*Salvia* species). Carefully lay down any sages or other fragile plants on the top layer so as not to damage their leaves or branches.
4. Pull the tarp back over the bed and lay heavy chains, blocks of wood or shovels across the top of the tarp to keep the wind from blowing it up. If you don't have chains, you can anchor the tarp by tying a long rope back and forth over the top of the tarp.

Transporting Plants in a Covered Truck or Van

If you have a covered box truck or van, you do not need the tarp method, but you will need to be very careful that the plants don't fall over and roll around, which could damage them. You can either lay them down and secure them inside the box, or leave them standing, but secure them with ropes or boxes so they don't fall over.

Keeping Plants Healthy Until Planting

Place plants in a shady area and keep them watered, checking more often when temperatures are high and no rain has occurred, so that they are in peak condition when you are ready to plant.



Sort plants by species before laying them out on the beds.



Planting the hedgerow: dig the hole, not too deep; add a shovelful of compost, a bucketful of water, a gopher basket if necessary, and carefully plant the plant, loosening any root-bound roots. Stand back, and watch the lady beetles and others come to inspect their new home.

On the Planting Day

PLANTING A DIVERSITY OF NATIVE PLANTS

1. Plant spacing should be: small plants 2.5' apart, shrubs 5-6' apart and trees 10' apart.
 - Group all plants by species and count them to ensure you have the correct number of plants before arranging on the bed.
 - Start by placing your “backbone plants”—such as coyote brush (*Baccharis pilularis*) or quailbush (*Atriplex lentiformis*) for a hedgerow and any native trees used in a windbreak or riparian planting. These are the survivors that will likely be there in the future no matter what hardships the planting endures. Knowing how many you have and the total length of the planting, evenly space these along the entire length.
 - Place medium-sized shrubs between each backbone plant. When locating these, try to put two of the same species together.
 - Distribute the smaller plants in between the larger ones. These are the forbs, grasses and small shrubs.
 - Fill in any particularly sparse areas with any extra plants left over. In theory, knowing the length of the planting and ordering the correct number of plants should fill in the entire area. In reality, there are sometimes sparse areas.
 - For long plantings, it is a good idea to start from the middle and lay plants out to the edges, rather than going from one side to the other in one swoop. Any small spacing mistakes will be compounded in very long plantings.
2. Dig holes deep enough so that the top of the soil from the potted plant will be flush with the surface of the surrounding farm soil.
3. Lay out $\frac{1}{2}$ " solid irrigation tubing for lengths 500' or less; use $\frac{3}{4}$ " or 1" tubing for longer stretches to compensate for low pressure. Use pressure-compensating emitters, especially on uneven ground. It is best to get advice from an irrigation specialist on how to achieve the pressure required. Do NOT install emitters yet.
4. Fill the hole completely with water (this gives plants a good start) using a water truck.
5. Put in a shovelful of compost. It inoculates the soil with microbes, which can help plants access more nutrients and water. No fertilizer is necessary unless the soil is excessively sterile. If too much fertilizer is used, the native plants will grow too fast and fall over.
6. Remove plants from their pots very gently by squeezing the sides and tapping the bottom. Never pull them out by their stems—this can severely injure the plants.



Placing emitters into irrigation tubing at 6-inches to either side of the plant gives a wide zone of moisture and corrects for contraction and expansion of the tubing with temperature changes.



Putting down a 6-inch layer of mulch helps smother weeds and creates a moist living layer at the soil surface.

7. If plants are rootbound, with the roots winding around the sides or bunching up in the bottom of the pot, loosen the roots with a knife so they will grow out from the base instead of continuing to wind or bunch. Most plants can handle some root fluffing. However, buckwheats (*Eriogonum* species) are sensitive and do not respond well to this treatment.
8. Put a gopher basket (if necessary) around the plant as it goes in the hole. Gopher "Speed Baskets" are an alternative to standard chicken wire baskets that are less expensive and easier to install.
9. Weave the tubing in and out of the plants to keep it nestled next to the plants if the length is 500' or less. If longer, the tubing is too unwieldy for this process, and it is better to use staples to hold the tubing in place.
10. After tubing is in place, install emitters.
 - Make sure emitter installation only occurs after the plants are in the ground and the tubing is in place—otherwise, the emitters will not line up with the plants.
 - Use two emitters for medium and large shrubs and trees, placing each one 6 inches to either side of the plant. For shrubs, use two ½ gallon per hour (GPH) emitters; for trees, use two 1 GPH emitters.
 - Use one ½ GPH emitter right next to smaller plants (grasses and forbs).
 - Put emitters directly into the tubing; no need for spaghetti tubing.

ENSURING LOW MAINTENANCE

One of the most problematic issues with farmscaping is making enough time to actually take care of the plantings. So it is best to set up the site for low maintenance by using mulch, vertebrate protection and a timer for irrigation.

11. Add a 6" layer of mulch around the plants. This will help to smother weeds and retain moisture. Tree-cutting companies will often deliver mulch for free.
12. Use deer, rabbit or ground squirrel protection as necessary.
 - For deer, protect tall plants with similarly tall chicken wire cages, and for rabbits, use 3'-high cages.
 - For ground squirrels, use 3'-high silt fence fabric between the between the squirrels and the planting. These rodents won't go beyond what they cannot see over.
13. Irrigate plants properly.
 - For efficient irrigation, install a timer. If this is not possible, put planting on the same system as nearby crops so both are watered at the same time. Be able to isolate the new planting system to prevent overfertilization if crops are fertigated.



In some cases, rabbits or deer can severely damage new plantings, and they can be protected with staked chicken wire cages.



Replanting will help maintain the structure of the hedgerow. Some may be required due to inadequate watering or pest damage.

Over the Next Weeks and Years

MONITORING AND MAINTAINING

While the Planting Is Young, Treat it Like a Crop

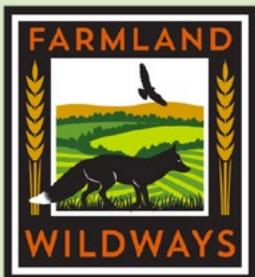
- The first six months are critical. You wouldn't allow orchard trees or vegetables to become so stressed that they become stunted, and likewise, you should do everything you can to make sure your native plants don't become stunted either. If you take care of the plants well in the beginning, you will have an excellent stand for many years to come.
- Conduct a critical weekly inspection of the planting to ensure that the irrigation system is functioning and that there are no severe weed, pest or water issues emerging.
- Control weeds. While some of the shrubs and trees will survive heavy weed pressure, many may become stunted.
- Keep out pests. Monitor the planting to make sure no pests, such as deer, rabbits or ground squirrels, are eating the plants.
- Maintain the irrigation system. Water once or twice a week, depending on soils and weather. Poor watering is the biggest cause of failure. Use your finger to determine if there is moisture for the roots. Hard, dry, caked soil around the stem is a sure sign of insufficient watering.

As Time Passes

- Irrigate the planting for 2–3 years, until the plants have become established. Native plants are more drought-tolerant than non-natives, and most will survive without being watered, once established. In some hot, dry areas where their roots will never reach the groundwater, the plants may need to be watered during months without rain.
- The period of routine inspection can change as the planting becomes established and grows well.
- Use photo documentation to create a record of the planting over time.
- Some replanting of areas where plants died may be necessary, as a 20% mortality rate in new hedgerows is not uncommon. Observing which surviving species are doing the best can be helpful in choosing replacement plants.



PHOTO: JO ANN BAUMGARTNER



Bringing Nature
Back to our Farms
and Ranches



Our mission is to
promote healthy,
viable agriculture
that protects and
restores wild nature.

Resources

ATTRA. Soil Solarization and Biosolarization
ATTRA.NCAT.org

Beneficial Bird Habitat Assessment and Native Plant Tool
<https://www.wildfarmalliance.org/tool>

Hedgerows and Farmscaping for California Agriculture
<https://hedgerowsunlimited.com/>

Hedgerows to the Moon and Back Video
https://www.wildfarmalliance.org/hedgerows_moon_and_back_video

Morandin, L.A., Long, R.F. and Kremen, C., 2016. Pest control and pollination cost–benefit analysis of hedgerow restoration in a simplified agricultural landscape. *Journal of Economic Entomology*, 109(3).

Vaughn et al. 2021. 422A Hedgerow Planting, Pollinators: Central Valley, Central Coast Southern California. Xerces Society.

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<https://www.nrcs.usda.gov/>

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