UC Turf Demonstration Project:
The First Year

By Marianne Mueller, MG ’07. Unless noted, photos from UC Turf Demonstration Project webpage.

We all know that landscaping is by far the single largest residential use of water in California and that lawns are the biggest irrigated crop in our country in terms of surface area – the acreage devoted to lawns is more than three times the acreage grown with corn, and it’s five times the size of Vermont!

Killing the lawn isn’t hard … but what to do next?

Homeowners ask Master Gardeners about lawn replacements that mimic the look of a lawn and that allow foot traffic for children, pets, backyard volleyball games … and now UCCE in Sacramento County and the Sacramento Master Gardeners are conducting turf demonstrations to help answer that question. The wonderful old-fashioned word “greensward” has been resurrected by the authors of the new book Reimagining the California Lawn to describe “a sweep of grass, sedge or other grasslike plants that provide a surface accessible to varying degrees of foot traffic.” At root, “greensward” means “the grass-covered skin of the earth” and has been used to mean “sod, turf” since at least the 14th century. Greensward certainly sounds more lovely than “turf” or “lawn replacement” but since it needs to be defined when you use it in conversation, it might not catch on for a while.

A greensward can be mowed or left to grow into a short “meadow” with a more tousled look. If unmowed, wildflowers and short perennial flowers and bulbs can be mixed in to provide color, interest and habitat for beneficial insects. And of course, a greensward is not the only turf replacement possible!

The UC Turf Demonstration Project, as the name implies, focuses on turf replacement. By Marianne Mueller, MG ’07.

Setup: Selecting Grasses, Preparing Soil, Planting, Watering, Weeding, Mowing and Measuring

For the turf demonstration, the researchers prepared nine 12’x12’ beds: three types of turf each watered in three ways – regular, medium or low-water. They also prepared three beds to test native grass mixes, and created a simple meadow that includes ornamental grasses and patches of native grasses.

The researchers chose sedges (Carex panosa and Carex praegracilis), UC Verde Buffalograss and a Tall Fescue/Bluegrass blend to test for suitability as low-water low-mow turf. The Tall Fescue/Bluegrass blend is one that might be used in a “traditional” lawn. The two native grass mixes they tested are a Native Preservation Mix and a Native Mow-Free Mix (species listed on page 7). The meadow they planted includes Purple Needlegrass, Molate Red Fescue and Junegrass, grown as ornamental grasses. The beds were watered at 80%, 60% and 40% of the evapotranspiration rate of the species being trialed, using evapotranspiration data for Sacramento.

The hard, cracked clay loam soil was watered thoroughly, rototilled, and amended with 2” of compost and three pounds of organic nitrogen fertilizer per 1,000 sq. ft. Then it was rototilled again and smoothed with a roller. The researchers note the soil cracks when dry and has slow permeability, hence the importance of amending with compost.

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Five irrigation zones were installed: one for each of the watering regimes; one for the patches of native grasses; and one for the simple meadow. (The meadow and native grass patches are not shown in the Irrigation Trial diagram on the left.) Six-inch pop-up sprayers were installed at the corner of each bed, using Hunter MP1000 rotator nozzles. They also installed perforated drain tubing one foot deep under the two east-west paths through the planting area, which drain toward the barely lower area to the west. Presumably this helps with drainage, or perhaps it helps mitigate the cemented hardpan two feet under the surface.

Master Gardeners helped with seeding (Seashore Bentgrass, Molate Red Fescue), planting plugs (Carex spp., UC Verde Buffalograss, Hall’s Bentgrass, Tufted Hairgrass, Junegrass, Blue Grama Grass) and laying sod (native grasses mixes, Tall Fescue/Blugrass blend). Plugs were planted 9” on center (exception: UC Verde Buffalograss was planted 12” on center). Seeds were sown at the rate of 1.5-3.0 pounds of seed per 1,000 sq. ft.

Afterwards, the beds were mulched with ¼” compost and watered regularly. Weeds – lots of them – presented the biggest challenge. In addition to pre-existing weed seeds, brought to life with the now-rich soil and regular watering, both seed mixes and plugs come with weeds.

They compared number of mowings, weight of clippings and the health and aesthetics of the turf. Since part of sustainability is reducing energy use, turf that requires fewer mowings to maintain a clipped look like the “outfield of Dodger stadium” (Bart O’Brien’s wonderful phrase) are desirable. Clippings that weigh less mean less greenwaste to haul away or compost on-site although a frequently mowed turf could leave clippings in place for the many benefits of grasscycling those clippings. And if the lawn isn’t healthy and beautiful, it will be a hard sell among California homeowners.

Rust disease can attack C. pansa or C. praegracilis in late summer or during winter; in the UC trial, C. praegracilis fared worse (right). David Amme of Bay Natives Nursery comments: “[Rust] can be prevented by applying a light application of a soluble NPK fertilizer, mowing, and/or curtailing the irrigation.”

Two months after planting Hall’s Bentgrass from plugs (left) and seeding Seashore Bentgrass (right). The Seashore Bentgrass was mowed for the first time only three weeks after planting!

Molate Red Fescue approx. four months after planting. It is one of the most vigorous and dense native grasses and can be planted in many different soils including soils with poor fertility. Red Fescue is so named because there is red coloring at the base of the stems.

Try Achillea millefolium ‘Sonoma Coast’ in a no-mow low-water lawn … this cultivar stays short and has big, fluffy leaves.
Observations

The goal of the ongoing project is to identify low-water, low-mow (or no-mow) turf we can recommend to homeowners. Please check out the UC Turf Demonstration Project website – a great project report – for nitty gritty details of mowings, clipping weights and more irrigation particulars than are described here. They also list sources for seed, sod and plugs. Go to http://tinyurl.com/uc-turf. Elkhorn Nursery, located between Santa Cruz and Monterey, sells grass and wildflower seed in bulk; see http://tinyurl.com/elkhorn-turf. They are near the ocean and overlook Elkhorn Slough, a 1,700-acre nature reserve (research, docent tours, hikes, more). And with apologies for TMU (Too Many URLs): see elkhornslough.org.

Mowed turfgrass These California native grasses have excellent potential. The label “plug,” “seed” or “sod” indicates how they were planted.

• Seashore Bentgrass (Agrostis pallens) seed
• ‘Molate’ Red Fescue (Festuca rubra) seed
• Tufted Hairgrass (Deschampsia caespitosa) plug

Meadow grasses (there are many, many more!)

• Purple Needlegrass (Nassella pulchra) plug
• Molate Red Fescue (Festuca rubra) plug
• Junegrass (Koeleria macrantha) plug
• Blue Grama Grass plug

Native seed mixes

• Native Preservation Mix sod
(Koeleria macrantha, Nassella pulchra,
Nassella cernua, and Festuca rubra)

• Native Mow-Free Mix sod
(Festuca occidentalis, Festuca idahoensis, and
Festuca rubra)

Weeds were a major problem except with the sod, which had very few weeds at the beginning, and almost none after established. Plots were hand-weeded. Persistent weeding is necessary until the turf is established, to battle both pre-existing weeds and new weeds that arrive with the plugs or seeds. In retrospect, the researchers would have mulched more than ¼”.

Planting Season They planted in September. They concluded they should have spent the winter killing weeds, and then planted in May. This implies we can take an easy route – sheet mulch our lawns now, and plant in May!

Comments on individual species

• Carex praegracilis is lighter green and taller (12”) than Carex pansa (6-8”). C. pansa seems to be spreading a bit more rapidly. Dog urine is known to damage Carex pansa and UC researchers suspect dog(s) got on some of their plantings! Both C. praegracilis and C. pansa became very stressed with deficit irrigation and required supplemental hand watering. Even with full watering (80% ETO), Carex spp. underwent some summer dormancy. (Note: these conclusions relate to the Sacramento climate and may differ wildly from how Carex grows here or along the coast.)

• No obvious drought stress developed with UC Verde Buffalograss. The 40% ETO plot remained green after two months of extreme stress and clipping weights were not much less in this time period. Mow only every 2-3 weeks for a clipped lawn look, or once a year for a naturalistic look; it grows 4-6” tall. It uses 50%-75% less water than Tall Fescue, is very competitive with weeds, and is highly resistant to diseases and insect pests. What’s the catch?! It can go dormant starting around the beginning of December, and definitely after a hard frost.

Simple meadow with native grasses, 12’x24’
Planted/seeded in fall 2010; photo taken in late spring 2011.

Back triangle: Purple Needlegrass
Left triangle: Junegrass
Right triangle: Molate Red Fescue

Front left: Native Preservation Mix
Front right: Native Mow-Free Mix

These native grasses will be allowed to grow to their natural heights and forms.

UC Verde Buffalograss – June vs. February. UC Verde Buffalograss is planted from plugs only since one of its features is few flowers/little pollen/few seeds.

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UC Turf Demonstration Project, continued

UC researchers are planning to try using a green biodegradable dye in the winter (note: this practice is controversial) and also overplanting with annual ryegrass, to see if the problem of winter dormancy can be easily overcome. The dye should last about three months. Ryegrass is recommended only where summer temperatures regularly reach 90 degrees or more; other annual grasses would be better in Santa Clara County. The “cover up the dormancy” grasses should die down as the Buffalo grass grows and outcompetes it. One supplier, FloraSource Ltd., advises we can “Reduce the dormancy period by mowing to 1” height mid-November and feeding with a balanced, slow-release fertilizer. Follow up in early February, with an application of a high nitrogen lawn fertilizer.” (Note: plenty of organic lawn fertilizers are available – or regular grasscycling might supply enough supplemental nitrogen that this step isn’t necessary.)

One more option is sowing wildflower seed in November for a green foliage cover in January followed by a wildflower display in late winter/early spring. You can wait to mow the Buffalo grass until after the wildflowers have bloomed; it will be growing slowly in this time, and in any case, doesn’t need to be mowed more than once every three weeks or so for a clipped look. See MG Cayce Hill’s article, “Lawn Alternatives: Meadows,” in the November 2009 Gardeners’ Gazette for a plant list of suggested wildflowers and tips on establishing them in a meadow. Find a link to this issue in the table of newsletters at http://mastergardeners.org/mgsonly. The November 2009 issue also includes articles on HOW fourteen MGs removed their lawns and comments on “losing the lawn” from Frank Niccoli who addressed this topic at an Advanced Training in 2009.

Do plant UC Verde Buffalograss in May, since it won’t be able to get well established over winter when dormant! Another note: at least one Master Gardener in our midst grows UC Verde Buffalograss and reports it’s evergreen for her … perhaps our weather is warm enough over winter that it doesn’t go dormant, or at least not for as long a time.

- Tall Fescue will not thrive at 40% ETO irrigation and even at 60% ETO shows drought stress. With full irrigation, Tall Fescue/Bluegrass sod maintained a consistent dark-green color but does poorly at the lowest irrigation level. It had very few weeds but required frequent mowing. Nice looking but – not worth the water, mowing, air pollution and energy usage!

- Surprisingly, the gorgeous ornamental grass Tufted Hairgrass (Deschampsia caespitosa) takes to mowing well and is a good candidate for a low-water low-mow lawn.

- Blue grama grass (Bouteloua gracilis) needs to be planted more densely to use as a mowed turf, since it spreads slowly. It is fully dormant in winter in the Central Valley and dies back, but maintains its color in warmer coastal areas. It is a wonderful ornamental grass.

- Junegrass (Koeleria macrantha) has a stiff, upright habit, whether short and mowed or left to grow to its natural height. Mowing Junegrass is a problem as the hairy clippings can clog the mower, so it is less desirable as a mowed turf. Looks great as an ornamental grass!

- Hall’s Bentgrass (Agrostis hallii), planted from plugs, did not perform well and will be replaced this fall with Purple Needlegrass (Nasella pulchra).

- The native grass patches were mowed a couple of times last fall (2010) but were never mowed this year. Chuck Ingels commented that they are great mixes, but Molate Red Fescue, which is in both the Native Preservation Mix and the Native No-Mow mix, is by far the dominant species. The supplier, Delta Bluegrass, is looking at different ratios for the native grass mixes that would let other species grow.

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Online photos of lawn replacements
- Acterra on flickr (http://tinyurl.com/acterra-turf, 24 photos)
- Sunset Magazine story with photos of 21 successful lawn conversions (http://tinyurl.com/sunset-turf, 22 photos)
- Go to http://images.google.com and search on “lawn replacement,” “ground cover lawn,” “California native grass lawn,” …
Learn more

1. UC Turf Demonstration Project (http://tinyurl.com/uc-turf) and Chuck Ingel’s presentation (http://tinyurl.com/ingels-turf)

2. How to grow UC Verde Buffalograss (http://ucverdebuffalograss.com)


4. Bay Friendly’s “Lose Your Lawn the Bay-Friendly Way” website, including short videos with how-to handouts to download, on how to sheet mulch and how to convert sprinklers to drip irrigation (http://tinyurl.com/sheet-mulch)

5. Sunset Magazine’s online article about 21 successful lawn conversions – great photos. (http://tinyurl.com/sunset-turf)

6. For oodles of fascinating data and analysis of water consumption and strategies for saving water in California, complete with detailed footnotes and an exhaustive bibliography of research papers, see “Lawns and Water Demand in California” by Ellen Hanak and Matthew Davis (http://tinyurl.com/hanak-turf). This article explains how a turf can need 160% of its ETO to look green.

7. See the charts and story behind the assertion there’s three times more lawn than corn, and the impact on our water supply and carbon cycles (http://tinyurl.com/milesi-turf)

8. California native grasses and grasslands (http://cnga.org). Excellent authoritative online articles listed in their Bibliography include “Notes on Planting and Maintenance of Bunchgrasses,” “Propagating Native Perennial Grasses,” “Native Perennial Grass Establishment and Management,” “Nasella Notes” and “Creating A Native California Meadow.” They also provide a “Guide to Visiting California Grasslands” so you can visit these grasses in the wild. (PDF downloads)


10. Join the Yahoo Group “Gardening With Natives” (caution: high-volume; consider daily digest). To join, go to http://groups.yahoo.com/group/GardeningWithNatives and click “Join this group.” Once a member, you can search the email archive with “replace lawn” and you’ll find many interesting tips and experiences in the email archive. The “Gardening With Natives” Yahoo Group is affiliated with CNPS.

And in addition to greenswards …

* Low-water, low-growing ground covers that flower over a period of months

* Carpets and tapestries, comprised of several ground covers and/or perennials to create a pattern of colors sweeping across the yard

* Meadows of mixed grasses, sedges, wildflowers and small flowering plants like *Sisyrinchium bellum* and *Achillea millefolium* ‘Sonoma Coast’

* Full-blown low-water landscapes with some combination of trees, shrubs, perennials, annuals, bulbs and ground covers, which offer the most diversity of color, year-round bloom, design possibilities and habitat

* Raised vegetable beds on part of the old lawn, and/or a mini home orchard

* Succulent gardens, rock gardens, Zen gardens and meditation gardens … wherever your imagination takes you
About the UC Master Gardeners

- We are volunteers educated by the University of California Cooperative Extension and provide scientific, research-based gardening information and advice.
- Gardening Questions? Call our hotline, 408-282-3105, or send email: mastergardeners.org/email.html
- See our website, mastergardeners.org, for gardening advice, seasonal tips, project reports, …
- Visit our demonstration gardens with hands-on monthly workshops in Gilroy, Palo Alto and Sunnyvale
- Come to a related follow-up talk: we have up to ten free talks or workshops each month listed on our Calendar, mastergardeners.org/events
- Keep an eye out to see if you’d like to take one of our multi-session courses: 2-, 3- and 6-week courses in Campbell, Palo Alto, San Jose, Sunnyvale (fee)
- We’re at many fairs and festivals with Hotline/Info tables and children’s activities, and more
- We have dozens of projects covering the gamut – see mastergardeners.org/projects

Keep in touch!

- **Tips & Events** – once-a-month email with seasonal gardening tips and list of month’s talks and events. Sign up online (mastergardeners.org) or today at the sign-up sheet.
- See our Calendar at mastergardeners.org/events
- Find us on Facebook!

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