

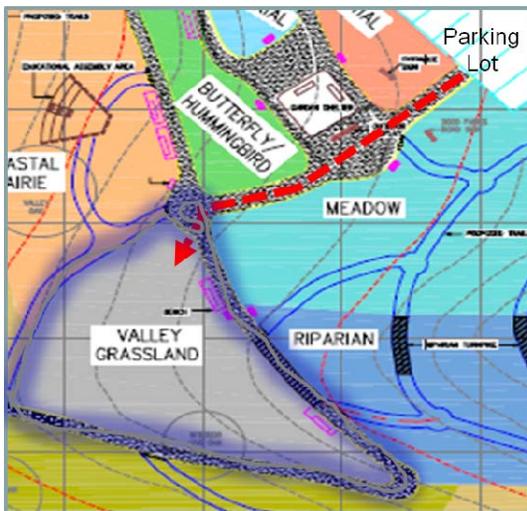


Garden Learning – Valley Grasslands

The Garden Learning program provides volunteers information about a specific area in the Forrest Deaner Native Plant Botanic Garden. As we learned in the September edition, there are six demonstration gardens and 5 plant community areas. This month we will focus on the Valley Grassland community area.

As the name implies, this community area is devoted to grass. In fact, over a dozen species of grasses have been planted to demonstrate the variety and beauty of these monocot perennial herbs.

What is exciting about grass? We see it every day when walking, hiking, biking, and horseback riding around our county. Every hilltop and valley is covered with grass! Well, it turns out that the grasses surrounding our community are different from the grasses in the Native Botanic Garden.



When you first approach the Garden’s Valley Grassland area, you immediately notice that there is a large variety of grasses. Some are tall or thin and some grow in bunches. There

are over 300 California native species of grasses.

In the book “A State of Change, *Forgotten Landscapes of California*”, Laura Cunningham describes the history of California grasslands from prairies dominated by bunchgrass, rhizomatous natives, and wildflowers to what we see today: mostly annual grasses from the Mediterranean region. With the introduction of livestock by the Spanish around 1860 native grasses began to decline. In 1848 there were approximately 1 million cattle grazing in California and by 1970 there were 5 million head of cattle. Faster growing non-native grasses were first introduced to California from seeds in the ballast of sailing ships. As the non-natives flourished, they soon replaced the native grasses..

Around the turn of the century (1900), the Department of Agriculture and the Forrest Service started to investigate the decline of native grasses in the west. The California Native Grass Association has a wonderful archive of historical research starting in 1906 (see chart on next page for a distribution of articles over time). From 1906 to 1960, the articles center on range-management and restoring grasses for agriculture (cattle).

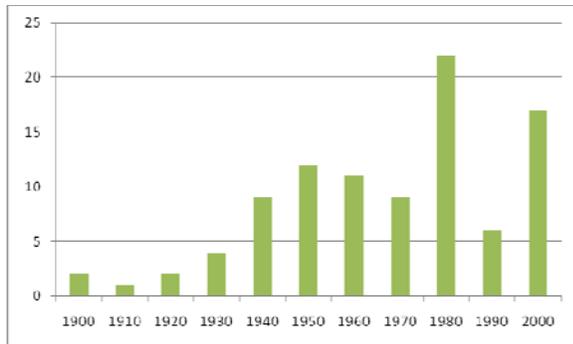
A University of Davis research paper from 1951 states that over 90 species of grasses and forbs were brought into California in 1950 from other parts of the world to see if they could grow on the grass depleted ranges:

“Other introductions that have demonstrated their usefulness on the California range include: Harding grass..”

- Merton Love, UC Davis,
California Agriculture, 1951

Hey, wait a minute, wasn't Harding Grass
last month's Weed of the Month!

*Note: Forbs are broad-leaved herbs
other than a grasses*



(Count of Articles on the CNGA archive by decade)

From the 1960s to 1980s, the literature focuses on understanding native grasses and the beginning of restoration. These studies lead to the understanding that native grasses offer a longer green forage season when managed properly. A 1981 paper outlines the use of native bunch grass as a barrier between recreational grass fields and native landscapes.

From 1980 to present, research has been conducted to understand the complexity of native grasses and the importance of biodiversity.

Based on the papers, the decline of diversity of grasses can be attributed to:

- Cultivation
- Grazing

- Urbanization
- Wild fire management
- Introduction of invasive non-native grasses and forbs.

In the last 30 years, there has been surge in interest in California Native Grasses. The understanding of the benefits of native grasses has been a major part of this surge:

- ✓ Native Grasses stabilize the dirt/soil
- ✓ Native Grasses increase water infiltration which cleans the water as it goes into rivers that flow into the bay
- ✓ Native Grasses recycle nutrients because they capture minerals and other materials that would have washed away. When grasses die off in the fall they tend to stay in the area of growth, recycling the nutrients back into the soil.

Now that we have reviewed a brief history of Grasslands in California let's return to the present and learn about the plants in the Valley Grassland Plant Community in the next sections.

Biodiversity Note: *Richness, Rarity, Endemism*

90% of California's rare and endangered species inhabit the state's grassland ecosystems.

Native Plants of the Valley Grassland Community

The Valley Grassland community consists of **29** species of annuals, grasses, perennials, shrubs, and trees native to California. There are 13 species of native grasses! All of these grasses are listed in CAL-FLORA monocot perennial herbs. They are all native to California and most are found outside North America. A few are special in that they are only found in the western region of North America. These are notated in the lists below with the following symbol:

w Found in western North America Only

Annuals:

Scientific Name	Common Name	Family
Bromus carinatus	California Brome	Poaceae

Grasses:

Scientific Name		Common Name	Family
Agrostis exarata		Spike Bentgrass	Poaceae
Carex barbarae	w	Santa Barbara Sedge	Cyperaceae
Carex praeegracilis		Slender Sedge	Cyperaceae
Deschampsia cespitosa		Tufted Hairgrass	Poaceae
Deschampsia elongate		Slender Hairgrass	Poaceae
Distichlis spicata		Saltgrass	Poaceae
Festuca idahoensis		Idaho fescue	Poaceae
Juncus balticus		Baltic Rush	Juncaceae
Juncus effuses	w	Common Rush	Juncaceae
Koeleria macrantha		June Grass	Poaceae
Leymus triticoides	w	Alkali Rye Grass	Poaceae
Muhlenbergia rigens	w	Deer Grass	Poaceae
Nassella pulchra	w	Purple Needlegrass	Poaceae



Bentgrass
(*Agrostis exarata*)
© 2008 Keir Morse



Alkali Rye Grass
(*Leymus triticoides*)
© 2011 Ryan Batten

Scientific Name	Common Name	Family
<i>Elymus glaucus</i>	Blue Wild Rye	Poaceae
<i>Eriophyllum confertiflorum</i>	Yellow Yarrow	Asteraceae
<i>Euthamia occidentalis</i>	Western Goldenrod	Asteraceae
<i>Grindelia camporum</i> v. <i>camporum</i>	Great Valley Gumweed	Asteraceae
<i>Mimulus aurantiacus</i>	Sticky Monkeyflower	Scrophulariaceae
<i>Mimulus guttatus</i>	Seep Monkeyflower	Scrophulariaceae
<i>Sisyrinchium bellum</i>	Blue-eyed-grass	Iridaceae
<i>Sisyrinchium californica</i>	Yellow-eyed-grass	Iridaceae
<i>Wyethia angustifolia</i>	Narrow-Leaf Mule-Ears	Asteraceae

Shrubs:

Scientific Name	Common Name	Family
<i>Atriplex lentiformis</i>	Quailbush	Chenopodiaceae

Trees:

Scientific Name	Common Name	Family
<i>Acer negundo</i>	Box Elder	Aceraceae
<i>Quercus douglasii</i>	Blue Oak	Fagaceae
<i>Quercus wislizeni</i>	Interior Live Oak	Fagaceae
<i>Salix laevigata</i>	Red Willow	Salicaceae
<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific Willow	Salicaceae



© 2011 Dan Jensen
Common Rush in the Forrest Deaner
Native Plant Botanic Garden



© 2011 Dan Jensen
Slender Sedge in the Forrest Deaner
Native Plant Botanic Garden

Native Plant Featured this Month

This month's Native Plant of Month is "Nassella pulchra", known by its common name as "Purple Needlegrass" and is the California State Grass. From the CALFLORA website, we find that Purple Needlegrass is a monocot perennial herb that is native to California and is confined to western North America. This means it has not been found anywhere else in the world except on the western North American Continent.

The Hasting Reserve Organization has a nice write up on their website about Purple Needle Grass (<http://www.hastingsreserve.org/nativegrass/natives.html>):

California's best known native bunchgrass, purple needlegrass occurs over most of the state. Tough basal leaves in this bunchgrass stay green most of the year. Roots extend down **20 feet** and can tap the soil moisture in a drought so effectively that large, old plants can out-compete any nearby young plants. These plants clearly can live 200 years and maybe many hundreds more. Eventually, they space themselves relatively far apart so that all can survive droughts. Each year, mature plants produce a few seeds, shaped like a torpedo. Each seed has a long, thread-like awn attached, so the seed resembles a needle and thread. It grows well in dry, clay soils, on hillside and in forest openings. It thrives in deep, well-drained soils.

From CALFLORA:

Nassella pulchra (A. Hitchc.) Barkworth

Purple stipa, purple needlegrass, purple tussockgrass

Nassella pulchra, a monocot, is a **perennial herb** that is **native** to California and is also found outside of California, but is confined to western North America.

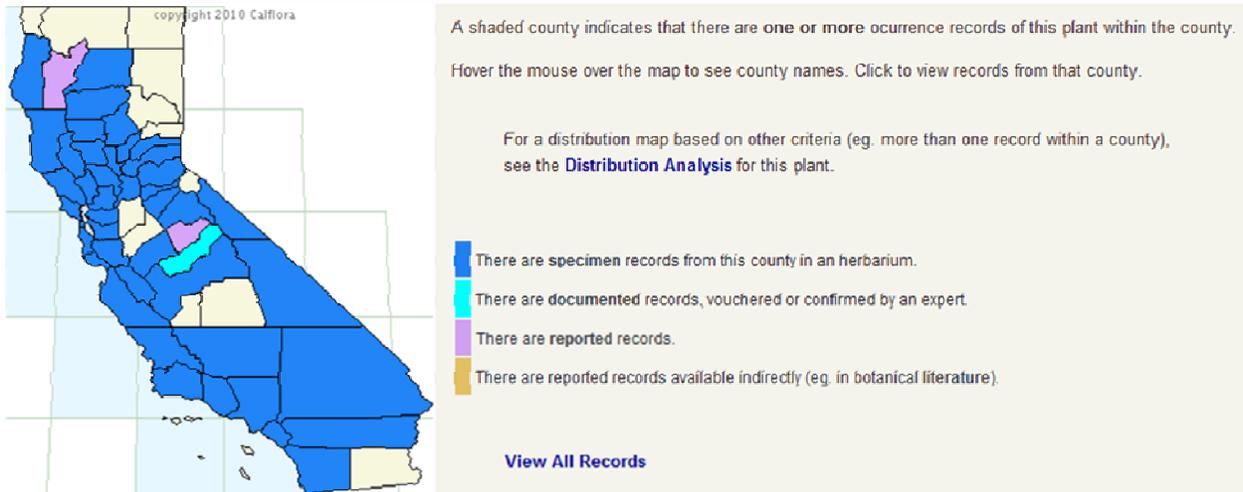
Communities: Chaparral, Coastal Sage Scrub, Foothill Woodland
Habitat: slopes [Walker]
Elevation: between 0 and 5000 feet
Family: [Poaceae](#)



Purple Needle Grass
© 2003 Brent Miller

Also on CALFLORA you can see the distribution of reported specimens/recorded findings by county for each plant. The diagram below shows the distribution for Purple Needle Grass:

Distribution in California from available records:



This map is shaded by county depending on the type of record documented about a specific plant. For example the blue shaded counties have records for Purple Needle Grass stored in a herbarium. This is the highest level of documentation because this means a Botanist or associated researcher under the direction of a Botanist reviewed specimens of Purple Needle Grass for that county and placed the specimen (with notes/documentation) in one of the state's herbaria (plural for herbarium). Herbarium is a fun word to say. A herbarium is a collection of preserved plant specimens. It's like a plant museum! There are 17 of these listed on the website for the Consortium of California Herbaria and the Forrest Deaner Native Plant Botanic Garden is located right in between 2 of them (<http://ucjeps.berkeley.edu/consortium/participants.html>).



Purple Needlegrass (*Nassella pulchra*)
© 2006 Brent Miller



Purple Needlegrass (*Nassella pulchra*)
© 2005 George W. Hartwell

Invasive Plant Featured this Month, otherwise known as “Weed of the Month”

This month’s weed of the month is the “*Lolium multiflorum*” known, by its common name as “Italian rye grass”. From CALFLORA, the description says it is a monocot and is an **annual or biennial herb** that is **not** native to California. Here we go again! In the December edition we learned that herb plants are categorized into annual, biennial or perennial. Now it seems this grass can be either annual or biennial? I wonder if it has to do with how much water, soil, and light it gets. Environment conditions (water, soil, light) can cause changes in biologic processes. I was not able to find the exact answer for this edition so this little riddle will be left to the reader.

Italian rye grass is fast growing and short lived. It grows in the cold season and likes wetlands, grasslands, and like all invasive, grows on disturbed sites. A disturbed site is a location where the ground is turned up by construction (road building or other digging) or even flash water erosion. The leaf blades are flat. Look for a reddish tint at the base for identification. Also this grass, just like the mustard weed, is “Allelopathic” – it interferes with neighboring plants so they cannot grow or propagate. Nasty Grass!

The root system can reach 3 feet, which is deep for a plant that doesn’t live long, and it can grow up to 3 feet tall. The seeds of this grass geminate quickly and it appears they are developing a resistance to herbicides. Now the good news is that the seeds of this grass are shade-intolerant and, better yet, native bunching grasses cast a shadow! So, I bet you know what I am thinking...

Mowing with a weed whacker can keep this grass in check by reducing the seed bank, but it is important to mow before the formation of seeds (early May).

From the Weed Workers Handbook:

Native to southern Europe, annual ryegrass was introduced to the States for its ability to provide high-quality forage. It is still sown to prolong the grazing season and reduce soil erosion. Research in the South Bay suggests nitrogen deposition from freeway pollution enables annual ryegrass to invade otherwise resistant, naturally nutrient-poor, serpentine soils.



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Puzzlers Page

Plant Riddle: What Plant am I?

Despite the royal color in my name, I am quite common and comfortable almost anywhere in California; especially in the center of the Valley Grasslands in the Garden. And now is a great time to find me. Thanks to the volunteers of the 10 x 10 program, all the brown/gray dead growth from last year has been removed. As Kermit the Frog says: "it's not easy being green" - at least not for long here in Benicia. But that is what I am right now during our rainy season - especially with that old growth removed. And don't let my common name fool you. You can't use me to darn your socks, stitch a seam or knit a sweater.

Word Search:

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G V J H O S P L S U C T Z E G S Y S I H R W T
D R H M N T R Z W S Y I P M N H C P C T E L R
J F S C T L K L I P A C I E M W E Q F O Y G D
J U S N Y T R T Y T T R I M K L F C V Y R B T
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|------------------|--------------------|-----------------|
| alkali rye grass | baltic rush | blue eyed |
| blue oak | blue wild rye | box elder |
| common rush | deer grass | idaho fescus |
| june grass | purple needlegrass | quailbush |
| saltgrass | slender sedge | spike bentgrass |
| yellow eyed | | |

Test your Learning

Question 1: How many cattle were grazing in California in 1848?

Question 2: List three major benefits of planting native grasses.

Question 3: What is the California State Grass, and how deep can its roots go into the earth seeking water?

Question 4: What is a good way to determine if a grass is an Italian rye grass?

Question 5: What is a good way to control Italian rye grass from spreading?

Read more about this Month's Topics at these References:

California Native Grass Association:

<http://www.cnga.org/>

History of research papers on Grasslands and Grassland Management:

<http://www.cnga.org/bibliography.html>

Hastings Natural History Reservation:

<http://www.hastingsreserve.org/nativegrass/natives.html>

Consortium of California Herbaria:

<http://ucjeps.berkeley.edu/consortium/participants.html>

The revegetation of overgrazed range areas, preliminary report (Sampson, A.W.)

U.S. Dept. of Agriculture, Forest Service, Circular 158. 21 pp. (1906)

A State of Change – Forgotten Landscapes of California, Laura Cunningham, 2010

Atlas of the Biodiversity of California, State of California, The Resources Agency, Department of Fish and Game, 2003

Answers to Last Month's "Test your Learning":

Answer 1: The two plants in the Butterfly Hummingbird Native American demonstration garden that attract both butterflies and hummingbirds and were used by Native Americans for building, food, and medicine are the Common Manzanita (*Arctostaphylos Manzanita*) and the Buck Brush (*Ceanothus cuneatus*).

Answer 2: The major difference between the winter and summer homes of the Patwin Native Americans was that the winter home had a sunken floor (3 to 4 feet into the ground). Another difference was that the covering was plastered with the famous Solano clay-dirt.

Answer 3: The difference between a shrub and a tree is that the shrubs tend to be less than 13 to 16 feet in height and trees tend to branch out from a single trunk that rises several feet above the soil level.

Answer 4: A dicot plant is a flowering plant which has 2 leaves inside its seed before it starts to grow.

Answer 5: The difference between Harding Grass and Foothill Fescue is that the seed stalk of the Harding Grass is bulky whereas the seed of the Foothill Fescue is delicate. Also the base root system of the Harding Grass is massive compare to that of the Foothill Fescue.

Puzzle Page Riddle: The Valley Oak is similar to the Blue Oak in that it also has Rose colored galls (used for eye wash), but also its acorns were used for mush and bread. The Black Oak is an alternate answer but why do you think I choice the Valley Oak?