



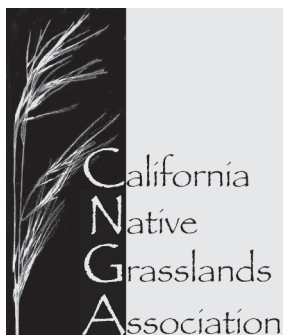
California
Native
Grasslands
Association

GRASSLANDS

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Mission Statement

The mission of the California Native Grasslands Association is to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship.

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From the President's Keyboard

CNGA Goes Statewide! *by Jon O'Brien, President*

The California Native Grasslands Association is in the process of going statewide!

Some may find this odd and may ask, "Hasn't CNGA always been a statewide organization?" The answer is technically yes, although our emphasis and membership have primarily been focused around the Bay Area/Sacramento corridor. And although we have offered multiple workshops and symposia in different parts of the state, CNGA has typically been focused on North Coast and Sacramento Valley grasslands.

During the next year, CNGA will be expanding beyond these boundaries into the Central Coast and San Joaquin Valley, the more northern parts of the state, and southern California. Our plan is to work with organizations, communities, and agencies in these regions to identify needs related to California grasslands and restoration in these particular areas, and to develop workshops and generate articles in *Grasslands* that specifically relate to these topics. Our goal is to service scientists, land managers, and other interested parties in all parts of the state and truly be the California Native Grasslands Association.

To begin this effort, the CNGA Board is asking you, the membership, to send us ideas for more regionally focused workshops. We have a proven track record of presenting workshops related to grass identification, using native grasses in the built environment, and grassland restoration, and we are interested in expanding our current palette to include more regionally specific workshops. The Board will be spending a lot of time in the near future brainstorming new ideas, and we would appreciate any ideas or recommendations from you!

Please email your suggestions to admin@cnga.org

Thank you for your help, and CNGA looks forward to seeing you across the state soon!



Grasslands Submission Guidelines

Send written submissions, as email attachments, to grasslands@cnga.org. All submissions are reviewed by the *Grasslands* Editorial Committee for suitability for publication. Contact the Editorial Committee Chair for formatting specifications: grasslands@cnga.org.

Written submissions include peer-reviewed research reports and non-refereed articles, such as progress reports, observations, field notes, interviews, book reviews, and opinions.

Also considered for publication are high-resolution color photographs. For each issue, the Editorial Committee votes on photos that will be featured on our full-color covers. Photos are selected to reflect the season of each issue. Send photo submissions, as email attachments, to Ingrid Morken at grasslands@cnga.org. Include a caption and credited photographer's name.

Submission deadlines for articles: **Fall 2014** — Aug 15, 2014
Spring 2015 — Feb 15, 2015

Winter 2015 — Nov 15, 2014
Summer 2015 — May 15, 2015

Upcoming CNGA Workshops



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This 1-day workshop will provide participants with in-depth information for converting high-water-use conventional lawns into beautiful low-water-use native California landscapes. Participants will receive detailed information on native species (grasses, flowering herbaceous plants, trees, and shrubs) that work best in urban and residential landscapes. Participants will also gain firsthand knowledge of the steps required to convert a traditional lawn to a low-water-use landscape, including low-water-use irrigation and maintenance. There will be a morning classroom session and an afternoon field session to look at successful, local turf conversion projects. Material will be relevant for both professionals and enthusiasts.

Details on date and location forthcoming.

Look for these and other possible workshops coming this Fall:

- * Grassland Restoration Field Practices
- * Soils of California
- * Native Grasses in the Built Environment

Let us know which of these you would like to see, and suggest others!

Creating a Better Grazing Plan

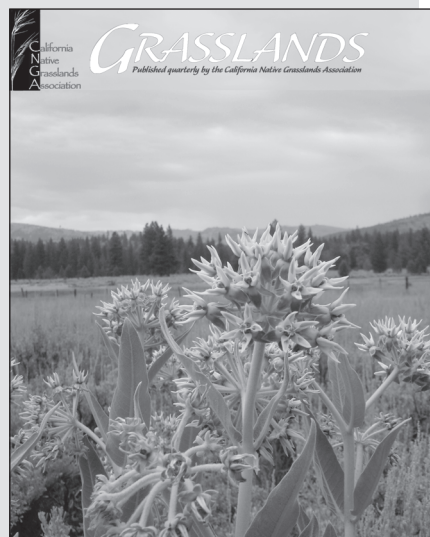
Build Soil Health, Increase Profit, and Grow More Feed with Less Rain — A Workshop for Ranchers, October 2014

Learn Allan Savory's step-by-step planning process to create the best possible grazing plan for your land.

Details on date and location forthcoming.

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Creeping Wildrye and Conservation of the Riparian Brush Rabbit

by Andrew Rayburn¹, Patrick Kelly², Julie Renter³, Tristan Edgarian⁴, Jeff Holt⁵, and Jennifer Banbury⁶

The riparian brush rabbit (*Sylvilagus bachmani riparius*; Figure 1) is an endemic California mammal found in riparian forests and shrub communities in the San Joaquin Valley (Orr 1940, Williams et al. 2008). Generally restricted to thick, brushy habitat along rivers and tributaries, riparian brush rabbits rely on dense cover for protection from predators (Orr 1940, Chapman 1971, Phillips et al. 2005). Conventional wisdom has held that rabbits rarely venture farther than a few meters from dense cover (Orr 1940, Chapman 1974, Phillips et al. 2005) and then only to forage on grasses and other herbaceous plants. According to local anecdote, prior to the development of flood control levees along the lower San Joaquin River and habitat conversion to cropland, riparian brush rabbit numbers were highest in dense, brushy upland habitat adjacent to the river. The constriction of flood flows between levees and the subsequent loss of dense, brushy uplands adjacent to river corridors eliminated much of the suitable habitat for rabbits.

Due to this widespread habitat loss in the San Joaquin Valley (Williams et al. 2008), the riparian brush rabbit is both a state- and federally listed endangered species (USFWS 2000), and only two

small natural populations are known to remain (Williams et al. 2002). Both populations are at risk of extinction from flooding, wildfire, habitat conversion, inbreeding depression, disease, predation, and other factors.

Flooding is a significant threat to population viability because it happens fairly frequently (most recently in 1997, 2006, and 2011), and riparian brush rabbits generally cannot survive unless they have access to suitable habitat on high ground. Repopulation of flood-prone habitat patches relies upon the ability of surviving populations to spread across the landscape. It is unknown how far rabbits may travel to find suitable habitat; however, recent telemetry efforts have tracked rabbit movements over 1 mile. The movement of riparian brush rabbits between patches of suitable habitat may be an important conservation factor, as it can provide demographic and genetic benefits and thus population resiliency in the face of variable environmental conditions.

In 2001, the Endangered Species Recovery Program (ESRP) based at the California State University, Stanislaus, began a captive breeding program as part of a cooperative effort to establish new populations and to protect the species from extinction (Williams et al. 2002). Since 2002, captive-bred rabbits have been released into remnant and restored riparian habitat at the San Joaquin River National Wildlife Refuge, along the Stanislaus River adjacent to one of the two remnant natural populations (Caswell Memorial State Park), and along the west side of the San Joaquin River near its confluence with the Tuolumne River.

In November 2005, to gain insight into rabbit habitat usage and population dynamics, ESRP established 18 live-trapping transects that were monitored biannually each spring and fall (Figure 2).

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Figure 1. Riparian brush rabbit at the San Joaquin River National Wildlife Refuge during the Spring 2009 census. Photo: CSU Stanislaus, Endangered Species Recovery Program

¹Andrew Rayburn is a Certified Ecologist (Ecological Society of America) and a Restoration Ecologist for River Partners. ²Patrick Kelly is Coordinator of the Endangered Species Recovery Program and Professor of Zoology at California State University, Stanislaus. ³Julie Renter is Director of Special Projects for River Partners. ⁴Tristan Edgarian is a Wildlife Biologist with the Endangered Species Recovery Program at California State University, Stanislaus. ⁵Jeff Holt is a Restoration Biologist for River Partners. ⁶Jennifer Banbury is a Wildlife Biologist with the Endangered Species Recovery Program at California State University, Stanislaus.

Creeping Wildrye

continued

Each transect consisted of 15 trap stations spaced 15 meters apart. Transects were established in three general habitat types: riparian, transitional, and grassland, with six transects per type. Vegetation classes were categorized using satellite imagery and ground surveys of the refuge prior to the first riparian brush rabbit census. Riparian transects were characterized by dense California wild rose (*Rosa californica*) and/or California blackberry (*Rubus ursinus*) with secondary valley oaks (*Quercus lobata*), sandbar willows (*Salix exigua*), and/or other herbaceous species. Transitional transects were characterized by willow thickets, with secondary rose, blackberry, and/or herbaceous species. Grassland transects were characterized by herbaceous species with no canopy and were established in open habitat, some distance away from the dense shrub thickets that riparian brush rabbits generally prefer. Since establishment of transects in 2005, some variation in vegetation community composition has likely occurred following flood events in 2006 and 2011, although the basic vegetation structure has remained relatively constant.

Some grassland transects were largely dominated by naturally occurring stands of the native California grass *Elymus triticoides* (creeping wildrye; Figure 3). A common species in natural and restored riparian understory communities throughout California's Central Valley, creeping wildrye is a hardy perennial grass that typically grows to 0.5–1 m in height, reproduces via seeds and rhizomes, and tolerates a wide range of site and environmental conditions. Creeping wildrye tends to form dense mats and is known to be strongly competitive with weeds when used in wetland and riparian restoration projects (Kamansky et al. 2006, Tjarks 2012).



Figure 2. ESRP volunteer T.J. Balogh (left) and staff member Tristan Edgarian (right) working on a grassland trapping transect during the Fall 2010 census. Photo: Meg Laws, USFWS

As expected, rabbit capture rates were highest along riparian and transitional transects characterized by dense shrubs, matching the known habitat preference for the species. However, rabbits were also captured on multiple occasions along relatively open grassland transects and apparently on those with a high percentage of creeping wildrye cover. For example, along the grassland transect with the most captures, a 2012 mid-summer survey found that approximately 60% percent of the vegetation was creeping wildrye, with the native forb *Grindelia camporum* (gum plant) comprising the bulk of the remainder (River Partners 2012). Interestingly, there was also abundant creeping wildrye thatch from previous years' growth present on the ground along this transect and along other grassland transects with rabbit captures, which suggests that under certain circumstances thatch may provide cover to rabbits moving through more open, grassy areas. Vegetation height may also influence rabbit

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Creeping Wildrye

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movement, as creeping wildrye was visually taller along grassland transects that had more captures.

In contrast, ESRP staff reported that grassland transects dominated in 2012 by invasive annual species, such as soft chess (*Bromus hordeaceus*), black mustard (*Brassica nigra*), non-native barleys (*Hordeum* sp.) and wild oat (*Avena fatua*), had few if any rabbit captures. Less thatch was observed along these transects as well, and vegetation appeared to be less homogenous compared with creeping wildrye-dominated grassland transects. Taken together, these in-field observations suggest that the cover afforded to riparian brush rabbits in creeping wildrye-dominated grasslands may be sufficient for rabbits to utilize grassland areas as movement corridors between disjunct patches of suitable brush habitat. In addition, the opposite may be true for exotic annual grasslands; i.e., vegetation density, height, and resulting cover may be insufficient to afford the level of protection from predation necessary to facilitate rabbit movement. Future studies should delve deeper into riparian brush rabbit habitat preferences and explore the forage value for rabbits of creeping wildrye and other native herbaceous species as compared with exotic annuals. The influence of other factors, such as the proximity of open grassland areas to rabbit release points and dense shrub cover, should also be examined.

The fact that riparian brush rabbits sometimes utilize more open habitat—for example, grasslands dominated by creeping wildrye—is relevant to the ongoing debate over vegetation on flood-protection levees in the Central Valley. Riparian brush rabbits require habitat on high ground to which they can retreat during floods, but high ground is extremely rare in the generally flat agricultural landscape of California's Central Valley. To make matters worse, rare remnant



Figure 3. San Joaquin River National Wildlife Refuge field dominated by creeping wildrye (*Elymus triticoides*) in June 2011 after the spring flood waters receded and vegetation flourished. Photo: CSU Stanislaus, Endangered Species Recovery Program

habitat patches may lack sufficient connectivity to support viable populations. If possible, flood refugia should be constructed or provided for during conservation and restoration projects (e.g., vegetated “bunny mounds” and berms; restoration of retired levees). To increase the utility of such refugia, flood-protection levees can be planted with creeping wildrye and other suitable herbaceous species to provide upland movement corridors connecting the restored refugia with dry upland habitat outside of the levees. Federal levee maintenance guidelines and the California Water Code (CCR Title 23, Section 131) expressly prohibit the purposeful establishment of trees and shrubs on levee slopes, partly due to the difficulty of conducting levee inspections through dense cover. Establishment and cultivation of native grass communities, especially creeping wildrye on levee slopes, may provide movement corridors for riparian brush rabbits while facilitating necessary levee inspections

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Creeping Wildrye *continued*

and complying with state and federal maintenance regulations. Creeping wildrye could also help minimize levee erosion caused by wind/wave action during flood events, reduce fire risk (due to its longer green season than annual vegetation), and reduce exotic weed coverage through resource competition.

Along river corridors, management decisions must be made with a keen interest in providing multiple benefits to many stakeholders. Historic flood management has dramatically affected the riparian brush rabbit, leading to regulatory conflicts and great frustration amongst flood managers and wildlife managers. Recent observations at the San Joaquin River National Wildlife Refuge have identified a possible compromise whereby levee slope management can both provide for the needed safety inspection visibility afforded by low stature vegetation (grasses) and provide suitable movement corridors for endangered riparian brush rabbits. More study and demonstration will be necessary to test this hypothesis. If viable, however, creeping wildrye on levee slopes may present a substantial conservation potential in the Lower San Joaquin riparian ecosystem.



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SPECIES SPOTLIGHT: **Narrow-Leaf Milkweed (*Asclepias fascicularis*)**

by Emily Allen, Sales Manager, Hedgerow Farms, Inc., eallen@hedgerowfarms.com

Fifteen milkweed species (*Asclepias* spp.) are native to California, and they can be found in a range of plant habitats, including deserts, riparian zones, forest clearings, and roadsides. Milkweeds are named for the milky, latex sap they produce when the plant is damaged. This sap contains alkaloids and cardenolides, and these chemicals make the plants unpalatable and toxic to most insects and animals, including livestock, but also give protection to the specialized species that can feed on them. When most people think of milkweeds, they immediately think of them as the host plant for monarch caterpillars, but they also provide food, nectar, and shelter for a diverse range of other insects including beetles, bugs, bees, wasps, flies, and other butterflies (Borders and Shepherd 2011; Figure 1).

The milkweed species that are native to California are perennial, and they generally go dormant over the winter and flower beginning in their second year. Milkweed flowers are an excellent and reliable source of nectar for pollinators, including hummingbirds, bees, and butterflies, and they have also been found to attract beneficial insects that are predators or parasitoids of agricultural and garden pests. Milkweed fruits, also known as pods, range in color, shape, and size and are generally elongated. When the seed pods are ripe, they split and release seeds with fluffy, silk-like attachments (Figure 2). These silky fibers, also known as “floss,” allow the seeds to be dispersed by the wind and, interestingly, were used to fill life-preserving equipment for U.S. soldiers during World War II. Milkweed floss is currently used to fill specialty pillows and comforters (Borders and Mader 2012).

Narrow-leaf milkweed (*Asclepias fascicularis*) has the widest range of the milkweeds native to California and is found in a variety of plant communities, including valley grasslands,

chaparral, and foothill woodlands. Outside of California, narrow-leaf milkweed can be found in Utah, Oregon, Nevada, Washington, and into Baja California, Mexico. Narrow-leaf milkweed has characteristically narrow, almost lacy, leaves and is a persistent and drought-tolerant perennial that dies back over the winter and emerges from seemingly bare soil in spring. It can reach 3 ft. in height and produces delicate pink and white flowers between May and October (Figure 3). Narrow-leaf milkweed seed pods are smooth, hairless, narrow, and between 2 and 4 inches long. They germinate in early spring and can produce flowers and seeds in the first year. The seeds require moist stratification to germinate, which usually takes place naturally in the ground over winter but can be simulated in a refrigerator if necessary. Transplants can also be used to establish milkweed successfully.

Monarch butterflies (*Danaus plexippus*) are absolutely reliant on milkweeds. Female monarchs lay their eggs on milkweed species, which are the only food that monarch larvae can eat. Monarch larvae are able to sequester the harsh chemicals found in milkweed until adulthood, and this gives the monarch butterfly added protection against predators who find these chemicals unpalatable. The level of cardenolides in the plant and in the monarchs that feed on them varies widely among milkweed species. *Asclepias fascicularis* has one of the lowest concentrations of cardenolides, and the monarchs that feed on it also have low cardenolide concentrations in their bodies (Malcolm and Brower 1989).

North American monarch butterfly populations have undergone steep declines within the last 20 years (Monroe et al. 2014,

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Figure 1: Tarantula hawk wasp (*Pepsis grossa*) nectaring on narrow-leaf milkweed (*Asclepias fascicularis*). Photo: John Anderson

SPECIES SPOTLIGHT

continued

Rendón-Salinas and Tavera-Alonso 2014), and one of the contributing reasons is loss of milkweed habitat across the monarch's breeding range (Commission for Environmental Cooperation 2008). Milkweed populations have been declining due, in part, to the development and intensified management of agricultural lands, roadsides, and rangelands. Planting milkweeds that are native to a region in groupings of several plants can support monarchs and also add an additional nectar source to a site. These plantings should be done in areas that are not prone to disturbance so that the monarchs will have a reliable source of milkweed over several years.

A select number of insects other than the monarch caterpillar can also feed on milkweeds, and a few are considered pests and can cause substantial harm to the plant or seeds. Most milkweeds, including the narrow-leaf, are susceptible to oleander aphid (*Aphis nerii*) outbreaks (an introduced, invasive species), and these should be controlled so they do not overwhelm the plants. During early spring and summer, blue milkweed beetles (*Chrysochus colbaltinus*) can be found feasting on milkweed foliage, and if left unchecked they have been known to defoliate

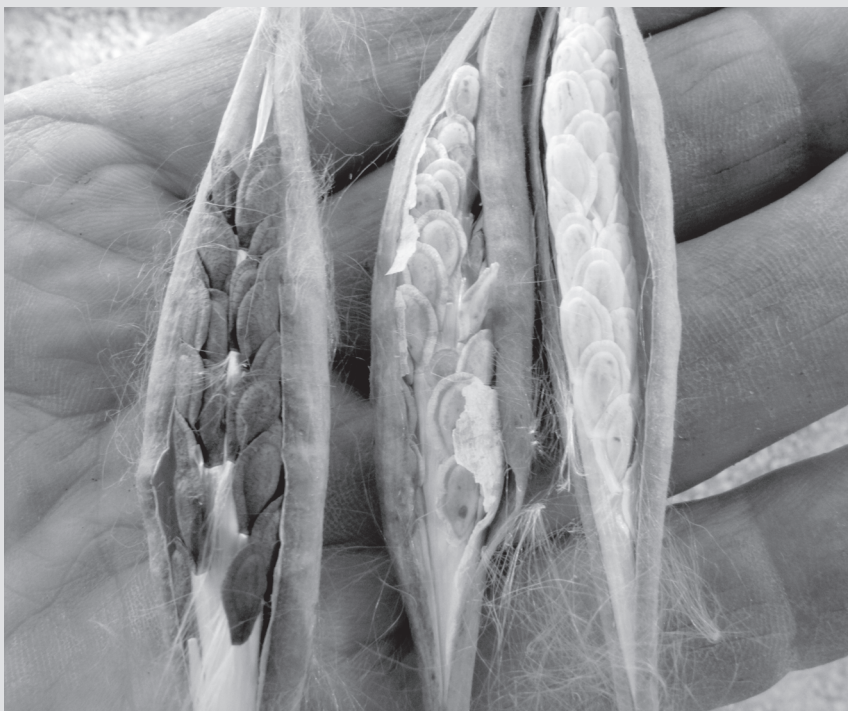


Figure 2: Narrow-leaf milkweed (*Asclepias fascicularis*) seed with pods at different stages of ripeness. Photo: John Anderson

a plant in a matter of days. Distinctive black and red milkweed bugs (*Lygaeus kalmii*, *Oncopeltus fasciatus*) can feed on milkweed seeds. Most milkweed pests are milkweed specialists and should not be a threat to agriculture. Livestock will generally avoid

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SPECIES SPOTLIGHT

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milkweeds if sufficient forage is available, but care should be taken that milkweed is not included in hay used for feed. Milkweed latex can also be toxic to humans, and contact with skin, eyes, and mouth should be avoided.



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Figure 3: A monarch butterfly on narrow-leaf milkweed (*Asclepias fascicularis*). Photo: John Anderson



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Visiting California Grasslands:

Windy Hill and Monte Bello Open Space Preserves and Cache Creek Natural Area

by Andrew Fulks, Assistant Director, UC Davis Arboretum and Public Gardens; Director, Putah Creek Riparian Reserve and Campus Naturalized Lands; and Vice President, CNGA; amfulks@ucdavis.edu

In California, there are still places you can visit to enjoy remnant stands of native California grassland. Meadows in the high Sierra, located well above the snow line, are some of the best areas for viewing native California grasses without wading through the exotic annual grasses. The Sierra can be quite a trek for many, but luckily there are closer locations for hikes amongst the natives.

Windy Hill and Monte Bello Open Space Preserves

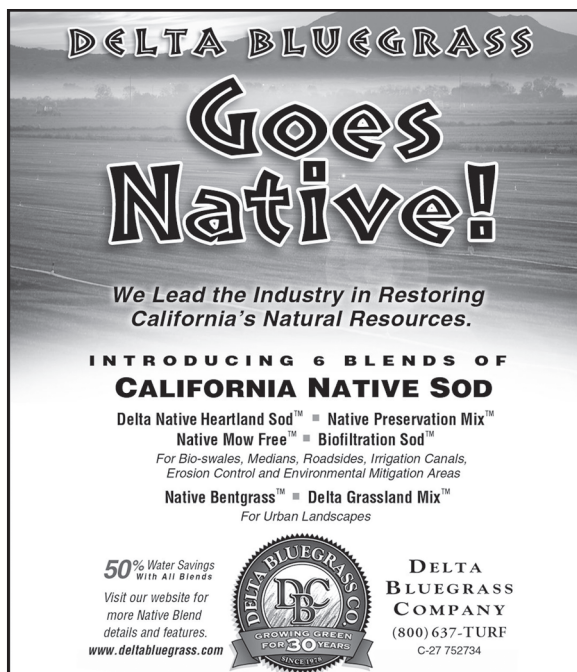
In the Bay Area, the Windy Hill Open Space Preserve and the Monte Bello Open Space Preserve are both filled with rolling grasslands and oak woodlands. Both preserves have gravel parking areas and restroom facilities. Windy Hill also has a universally accessible trail and allows for dogs on leash. Here, you can find both foothill and purple needle grass (*Stipa lepida* and *S. pulchra*), California and Torrey's melic (*Melica californica* and *M. torreyana*), as well as June grass (*Koeleria macrantha*). The real treat at these reserves are the spring wildflowers. Lupine and poppy abound, but keep your eyes open for spring blooms of pale baby blue-eyes (*Nemophila menziesii* var. *atomaria*), Purdy's foothill penstemon (*Penstemon heterophyllus* var. *purdyi*) and California buttercup (*Ranunculus californicus*). The

buttercup does well as a garden plant grown from seed, so remember that when planning your native meadow! In the late summer, the colors of the wildflowers are replaced with the sweet scents of tarweed and vinegarweed, two plants whose names connote something unwanted. In reality, these wonderful native "weeds" provide food for native bees and a pleasant aroma to signal the end of the summer.

At Monte Bello, the Stevens Creek Nature Trail is a good introduction to the area and passes through grassland, coast live oak woodland, and riparian areas. At Windy Hill, the Anniversary Trail or the Spring Ridge Trail are both good bets for native grassland and wildflower viewing.

To visit Monte Bello Preserve, take Page Mill Road out of Palo Alto, up to the top of the foothills. There is ample parking and a large sign to announce your arrival. Windy Hill Preserve is located off Skyline Boulevard (Highway 35), about 6 miles north of Monte Bello. You can download trail maps at openspace.org.

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Visiting California Grasslands

continued

Cache Creek Natural Area

If you are further north in California, a good place to visit is the Bureau of Land Management Bear Creek Unit public lands in the Cache Creek Natural Area. A nice introductory hike is the High Bridge Trail, located off of Highway 16, north of the Yolo County line. This trailhead has concrete pit toilets and ample parking, including spaces for horse trailers. The trail is a single-track route that winds up through oak woodlands and chaparral. The vistas of Cortina and Blue Ridge, as well as the rest of Bear Creek Canyon, are spectacular. Grasses include the usual complement of annual exotics that pepper the hillsides in the Inner Coast Range, but the abundance of native grasses and native forbs is outstanding. Spring is generally the best time to visit, with the green grasses putting out seed heads and the wildflowers in full bloom (Figure 1). In summer, you can see the seed stalks of the spring grasses, as well as grasses and sedges still green, down in the canyons. Common native grasses seen along the trail include California melic (*Melica californica*) and purple needlegrass (*Stipa pulchra*). Wildflowers also abound, though timing them is always difficult. Brodiaea, or Ithuriel's spear (*Triteleia laxa*) seems to be the most common, along with Indian warrior (*Pedicularis densiflora*), and mariposa lily (*Calochortus superbis*). These can be seen almost every year on the High Bridge Trail. Trail maps can be found at Tuleyome.org, under the "Get Outdoors" section.

When planning your outings this summer, be sure to visit a grassland!



Figure 1. Vista from High Bridge Trail in the Cache Creek Natural Area, with Ithuriel's spear (*Triteleia laxa*) in the foreground. Photo: Andrew Fuls



CNGA's Bunchgrass Circle

As a nonprofit organization, CNGA depends on the generous support of our Corporate and Associate members. Ads throughout the issue showcase levels of Corporate membership (\$1000, \$500, \$250). Associate members (\$125) are listed below. Visit www.cnga.org for more information on joining at the Corporate or Associate level.

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Carrizo Plain, spring 2011. Photo: Charles McClain

Not a member? That's easy to fix! You can also join online at www.cnga.org

CNGA members have voting status, and receive the quarterly *Grasslands* publication, discounts at workshops, and monthly email news.

- - - Detach and mail this form with check made out to CNGA. Send to CNGA, P.O. Box 72405, Davis, CA 95617 - - -

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	Membership Level	Annual Cost	Online (color) Ads w/link to member website ¹	Grasslands (b&w) Ads currently 4 issues per year	Employee Memberships ²	Grasslands Subscriptions ³
<input type="checkbox"/>	<i>Muhlenbergia rigens</i>	\$1,000	Half page (570 x 330 pixels) at top of CNGA sponsor page	Half page (7.625 x 4.375) 300 dpi jpeg, tif or pdf file	6	4
<input type="checkbox"/>	<i>Stipa pulchra</i>	\$500	Quarter page (256 x 296 pixels) below <i>Muhlenbergia</i> listings	Quarter page (3.75 x 4.375) 300 dpi jpeg, tif or pdf file	5	3
<input type="checkbox"/>	<i>Poa secunda</i>	\$250	Bus.-card size (129 x 200 pixels) below <i>Stipa</i> listings	Bus.-card size (3.5 x 2.25) below <i>Stipa</i> listings	4	2
<input type="checkbox"/>	Associate	\$125	Text listing below <i>Poa</i> sponsors for 1 calendar year	Text listing published in <i>Grasslands</i> for 1 calendar year	3	1

¹If there is more than one Corporate member per level, the members will be listed alphabetically. ²Employee memberships include all the benefits of a personal membership, the organization determines the recipients of *Grasslands* subscriptions. ³Company may opt for fewer subscriptions.



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***Don't miss CNGA's
Fall Workshops
See page 2***

*Front cover: Showy milkweed (*Asclepias speciosa*) in wet meadow outside of Sierraville, California. Photo: Aaron Arthur*

*Back cover: Flowering salt grass (*Distichlis spicata*) on Santa Rosa Island (of the Channel Islands), California. Photo: Morgan Triege*

