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California Native Grasslands Association

Grasslands

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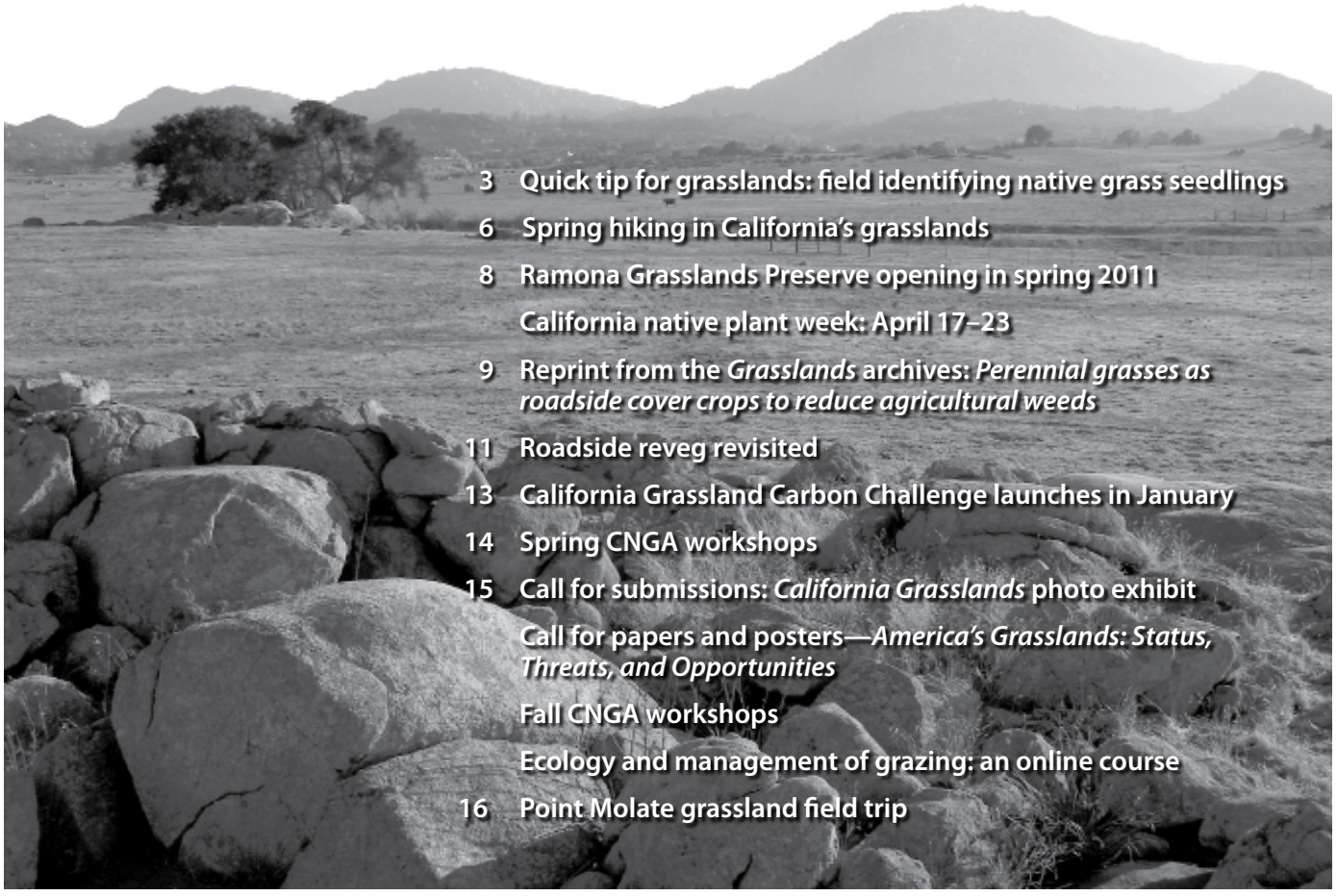
CNGA 20th Anniversary

What have we learned about grasses or grasslands in the past 20 years? *part 2* 4



California Native Grasslands Association

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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.

For advertising rates and instructions, or membership and other organizational information, contact CNGA Administrative Director: **ADMIN@CNGA.ORG.**

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Grasslands Submission Guidelines

Send submissions to:
Editorial Committee Chair: GRASSLANDS@CNGA.ORG

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

All submissions are reviewed by the *Grasslands* Editorial Committee for suitability for publication.

Submissions are accepted as e-mail attachments. Contact the Editorial Committee Chair for formatting specifications.

Submission deadlines for articles:
Spring 2011: Feb. 15, 2011; **Summer 2011:** May 15, 2011; **Fall 2011:** Aug. 15, 2011; **Winter 2012:** Nov. 15, 2011

From the President's Keyboard

Wade Belew

Spring is a busy time of the year for us at CNGA, as well as many of you working in the field. Grasses are growing and flowering, which makes it the ideal time for many of our workshops. The Field Day at Hedgerow Farms is an event not to be missed, and this year it will be held on April 15. Now in its fourth year, Field Day has become one of our most popular events. You will have a chance to tour production fields growing native grasses and forbs for seed harvest, revegetated roadsides and irrigation canals, and beautiful namesake hedgerows.

You will be informed and inspired, and have a chance to meet other members from around the state. David Amme will be offering a grass ID workshop the day before on April 14, which will be the perfect compliment to the Field Day. In response to popular demand, we are offering a new workshop on Grassland Monitoring on May 27.

I also want to plug a new workshop that I am developing and will present for the first time on June 11 at Pepperwood Preserve in Santa Rosa, entitled "Introduction to California Grasslands and Grass Identification." One of my goals as President is to add entry-level programs that reach people who are interested in grasslands but don't have a background in botany or professional experience with grasses.

This workshop is the perfect opportunity to learn about this important ecosystem. Pepperwood is an ideal venue, with a new education facility and an uncommon abundance of native grasses on the property. We are offering this workshop at a very reasonable price to make it affordable for everyone.

I am also pleased to announce the formation of a new Research Committee. We have all recognized the need for more research, and better access to existing knowledge to inform our decisions in grassland management. It is part of our mission, but not something we have been actively addressing.

During this last board election, we had two more candidates than positions available. We asked two who did not receive enough votes to be elected to serve as Board Alternates. Barbara Going and Elise Tulloss, both Ph.D. students at Davis, are our new Board Alternates, and they have offered to spearhead the fledgling Research Committee. We welcome and thank them for their help on this important issue. Expect to hear from them during the course of the year as they explore this subject.

We have renamed the Advocacy and Collaboration Committee; it's now the Conservation Committee. This new name is more concise, and more accurately reflects the goals of that committee. Jim Hanson is continuing as Chair.

Zach Principe is now Chair of the Development and Outreach Committee, and is no longer our sole Board member from Southern California. New Board member Dan Blankenship is also from the southland and will help Zach increase the presence of CNGA in that part of the state.

We can still use your help. Please consider joining a committee (see list, p. 3) to help further the important mission of CNGA. ☺

Quick tip for grasslands: *Field Identifying Native Grass Seedlings*

Bryan Young, *CNGA Board Member*

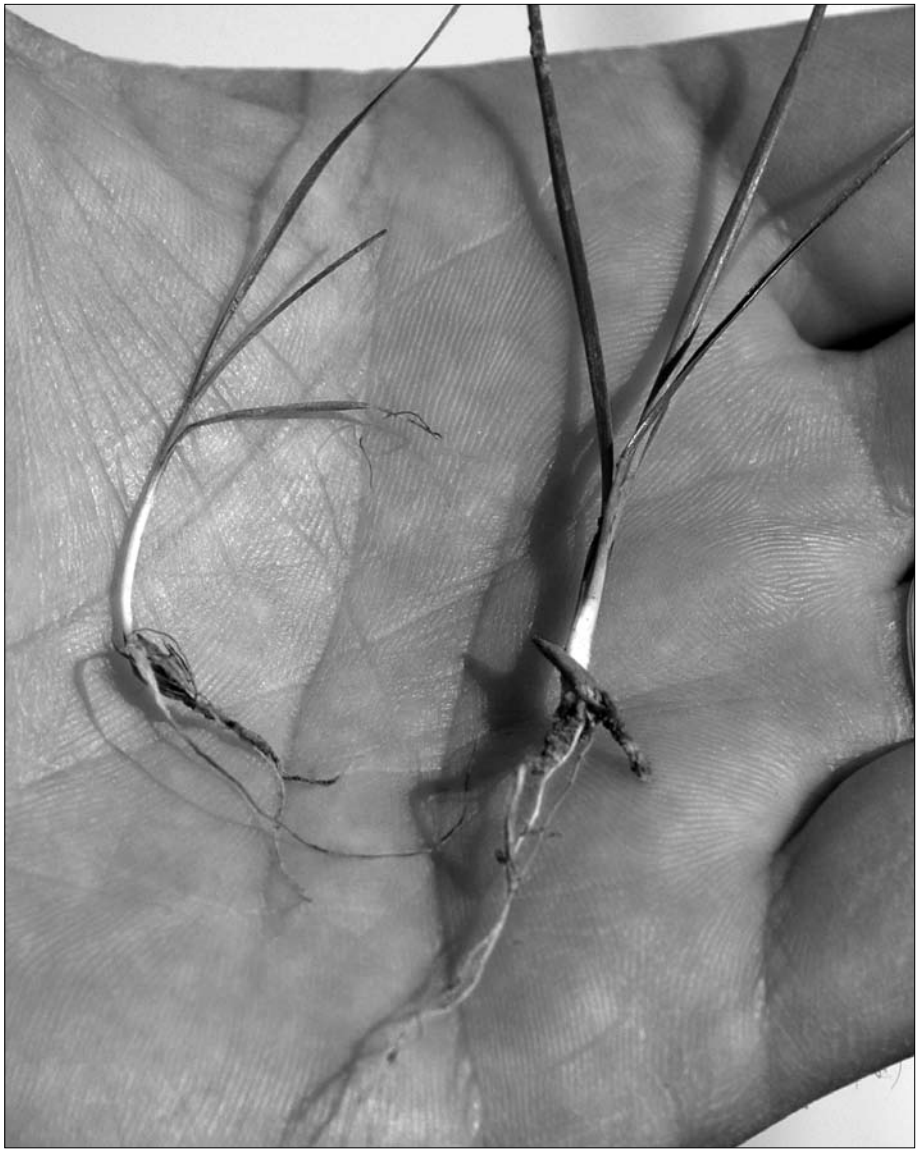
To the uninitiated, field identifying grasses to species can be challenging. Yet, by learning distinguishing traits such as size, growth form, inflorescence type, and other key components of plant anatomy, field ID of mature grasses is a skill that can be mastered (*Editor's note: there is still room in the April 14 workshop "Identifying and Appreciating the Native and Naturalized Grasses of California"*).

Where things really get difficult is learning to recognize grass seedlings. In grassland restoration, the ability to recognize your native seedlings amongst your grass weeds is critical to selecting the best management strategy for establishment of your project. Here are a couple of tips to help you identify your grass seedlings:

Tip 1: Destructive Sampling—Seeds are often easier to distinguish than seedlings. In the days or early weeks following seedling emergence, use a knife blade to extract the seedling from the ground along with a cubic inch or so of soil. Carefully, remove soil from the seedling roots.

At the point where the radical (primary root) first emerges from the seed, you will often find that the seed is still attached to the seedling. If you recognize the seed then you will know your seedling. This technique works best on larger-seeded species.

Tip 2: Reference Planting—Save a handful of seeds from your grassland restoration project. Sort your seeds by species. Using a separate container for each species, plant your seeds in weed-free potting soil. When your restoration project receives its first germinating rain, it is time to water your test containers and grow your reference plants. Ideally, your reference plants will grow at a similar rate to your plants in the field. You can bring your containers to the field to help you develop a search image that will allow you to quickly identify your desired species from the weeds.



***Hordeum brachyantherum californicum* and *Nassella pulchra* 11 weeks post planting.**
Photo: Bryan Young

CNGA Committees

Executive: *chair* Wade Belew; *members* Bryan Young, Liz Goebel, Sara Sweet, and Jon O'Brien

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Grasslands Editorial: *chair* Liz Goebel; *members* Richard King, Mary Rodgers; *on-call readers* Lindsay Dailey and Sara Sweet; *proofing* Judy G-Scott

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Conservation: *chair* Jim Hanson; *members* Andrew Fulks and Erik Gantenbein

Development/Outreach: *chair* Zach Principe; *members* Daniel Blankenship, Wade Belew, and Lindsay Dailey

Research: *co-chairs* Barbara Going and Elise Tulloss; *member* Cathy Little

CNGA 20th Anniversary

What have we learned about grasses or grasslands in the last 20 years?

CNGA members respond (#2)

For CNGA's 20th Anniversary, we asked our members what they have learned in the past 20 years about grasses or grasslands. Here is the second installment.

There are still functioning, intact native grasslands and prairies along our roadways and public right-of-ways. There is a healthy purple needlegrass and wildflower stand growing in serpentine soil above San Francisco's Crystal Springs reservoir (at northbound Highway 280 and Hwy 92-Half Moon Bay). Working with the San Francisco Bay Area CalTrans maintenance staff and crews, we put marker signs around the fragile serpentine to divert heavy right-of-way mowers during the wet periods.

California's native grass and wildflower areas receive little to no protection. Most native grass species are not listed for protection under the Endangered Species Act. Populations can be lost, sometimes unnecessarily, during project construction and land management. Yet, **it is neither difficult nor expensive to spot native bunchgrass and wildflower areas, mark and map them, and work with landscape mangers to set up a slightly different maintenance routine.** During highway construction or mitigation work, we have fenced a native prairie and diverted construction equipment parking to a section of already compacted and disturbed annual weeds.

Public agencies and districts manage thousands of acres of California's landscape. Grasslands offer ecosystem services and are part of California's rich and beautiful natural heritage. **Adoption of a simple agency policy or best management practice to conserve areas of native grassland during design, construction, and management would help retain these natural systems**.

–Jim Hanson, Landscape Architect, Caltrans Construction Division, San Francisco Bay Area

Planting/horticulture

- The ***Fundamental Objective*** of post-planting native grass management is to ensure direct sunlight hits the native grass seedlings.
- High levels of pre-planting weed control will result in a corresponding high survival of native grasses.
- In the Central Valley, after planting, a broadleaf herbicide applied in mid-February is essential for successful establishment.
- Non-uniformity of soils and hydrology requires a grass mix so species can sort accordingly.
- Fertilizer applied at the time of planting is of no visible benefit when establishing native grasses.
- Annual mowing/grazing/burning will benefit native grasses.

Native grass/grasslands ecology

- Invasive annual grasses win competition by *shading* native grass seedlings and mature plants.
- Grass plantings on floodplains survive flooding (weeks and months) if seed was collected locally.

–Tom Griggs, Restoration Ecologist; Helen Swagerty, Restoration Biologist, River Partners

Important things I learned over the past 38 years about grasses or grasslands

1. **Active and widespread preservation.** We need to acknowledge that California is probably the most weed-infested place on the planet, and below 3,000-foot elevation only a tiny bit of our perennial native grasses remains. Therefore, we need to start actively preserving from hundreds to maybe a thousand widespread examples of native grassland populations immediately, like one example for every 100–200 square miles throughout the state, to be able to preserve the diversity that we have left of the species and ecotypes, for the future.
2. **You can get 100-percent native grassland cover** in 8 years or less in upland California. The 74-acre Michael Shaw property ecological restoration was started by a private land developer near Santa Cruz, and I got involved in 1992 when the owner wanted to turn his 99-percent weed-covered property into 100-percent native cover within his lifetime. Fortunately, it only took 8 years (see the June 2002 *Ecological Restoration,* at HTTP://WWW.LIBERTYGARDEN.COM/DOCUMENTS/ECOLGICALRESTORATION.PDF). It was all done by releasing the dormant native seeds that were in the soil underneath the exotics. You can see the list of weeds that are all gone today, and the natives that sprouted up, at HTTP://WWW.ECOSEEDS.COM/SHAWLIST.HTML

WHAT HAVE WE LEARNED? continued on page 5

WHAT HAVE WE LEARNED? from page 4

3. **Ancient dormant native seeds in the soil everywhere**. After seeing the possibilities on the Shaw property, I started seeing dormant native seeds everywhere I looked in California. For example, in Central Valley alfalfa fields that had been in continuous production since the 1890s, when BLM bought the fields and turned off the water, native seeds started sprouting like crazy. We are estimating that the seeds at Shaw's and under the alfalfa fields have laid dormant for 100+ years, so if we are going to utilize them on other sites in California, it must be very soon, while they are still viable.
4. **Annual Weeds Are Your Friend and Restoration Project Teacher.** Annual weeds in California are our friends, because they have been holding the topsoil in place for us, after we let our cattle graze all the bunchgrasses in the state to dust in 1864–1865—otherwise we would just have bare soil with no cover, probably blowing like a big dust bowl every summer. Even the annual thistles like YST and Italian thistles are some of our best of friends ecologically, because they act as "Cow Antibodies" as a friend of mine calls them. The thistles keep cover on the soil in summer where there are grazing animals, whereas the annual grasses might get eaten down to the dust in those areas. The weedy annuals also come and correct our grassland projects, like a elementary teacher with a red pen, and tell us where we need to do more work in certain areas, to get the right answer. NEEDS TO IMPROVE or UNSATISFACTORY they sometimes stamp on our projects.
5. **Public agencies want to use grasses and need help.** Public agencies sometimes have a need or a desire to use native grasses, like Caltrans along its roadsides. However, after teaching classes to Caltrans and getting 228 questions about how to use California native grasses, all those questions indicate that there are still major gaps in the information. And when an agency wants to use native grasses, they usually want to spend less than $225,000 an acre to get those grasses established—so we need to create businesses whose sole purpose in life, is to invent, develop, and license to these public agencies, the successful methods to get the grasses established the first time, 100 percent and permanently.
6. **100 more california native grasses out there.** 100 new species need to be described and named. Dr. Stebbins and I co-authored a *Grasslands* paper outlining that fact. When our grasses got their scientific names in the 1800s, the namers had no clue about genetics, and 100 look-alike species were batched together, and the taxonomists of a century ago boiled down 400 species into 300. Now that we know about genetics, we need to tease our those 100 and describe and name them.
7. **Grass ecotypes and evolution.** Regarding the native grass genetics here in California, the ecotypes of widespread species like *Bromus carinatus* can show us evolution in progress, and allow us to see evolution in four dimensions. Most geneticists study animal species to see evolution forming a new species, but it is going on all around us all the time in our grass populations, and can be clearly seen in the *Bromus carinatus* populations.
8. **Start a language and describe the hundreds of grass ecotypes in California.** Edward Greene in 1905 wrote in *Revision of Eschscholzia* (Pittonia 5:205–293) that he thought that there were 112 different species of California poppy, but what he was describing was the hundred or more ecotypes of California poppies, and he noted their physical differences. For each of our native grasses, we need to give them the Edward Greene treatment on their ecotypes, give them names and write descriptions for them, while there are still original populations in situ.
9. **Grasses alone do not make a grassland.** We are severely missing many key plant families and species, even in our relict grasslands, like native clovers and other legumes, native herbaceous perennial and annual members of the sunflower family, native lily family, Indian paintbrush and owl's clover family, native *Plantago*, miners lettuce, tarweeds, etc., that hold key niches in the grassland ecosystem. When we replant a grassland and leave those important members out, we leave vacancies for the exotics to move in and start a slow-motion destruction of our hard work.
10. **Age-pyramid to check existing stands for reproduction.** Some of our populations of the longer-lived full-sun species like *Danthonia, Fescue, Hilaria, Poa, Stipa*, etc., may be old plants and may not be producing seedlings, and we need to go out periodically and do age-pyramids on 100 individuals in each population, and see if there are any seedlings, or does the population consist mostly of old-timers. This is especially important on our BLM and USFS public rangelands, and should be an important part of range health analysis.
11. **Always include local Native California people** when replanting California native grasslands. The local California Native American people are still there, like the 600 Muwekma Ohlones in the San Francisco Bay Area, for example. Ever have lunch with them, or go on a native grass walk? Every time I see a grassland project that looks weak, or has failed into a big giant weed patch, I never see any evidence that any local Native peoples were involved in the project—no physical evidence on the site. I always ask—Did you invite some of the local native people when you did that project? *–Craig Dremann*

Spring hiking in California's grasslands

Compiled by Lindsay Dailey, *CNGA Board Member*

Tuesday, April 12: *Taylor Mountain Grassland* guided hike 5–8 p.m.
The Taylor Mountain Open Space Preserve offers spectacular vistas from its wide open grasslands. Enjoy a beautiful evening hike at this 1,106-acre property that is not yet opened to the general public. Moderate hiking; uneven footing; 2–3 miles; BYO picnic dinner. To register for this free outing visit www.landpaths.org, or call 707.524.9318.

Saturday, April 30: *Tolay Lake Grassland* guided hike 9 a.m.–Noon
Tolay Lake is a 1,737-acre property with a human history spanning over 8,000 years. This lake has been identified as a historic spiritual center for Native Americans from across California. Burrowing owls, golden eagles, and tricolored blackbirds are just a few of the birds inhabiting this future Sonoma County Regional Park. For reservations, call 707.565.2041 For information on Tolay Lake, go to http://www.sonoma-county.org/parks/index.htm.

Bee on *Blennosperma nanum* at Howard Ranch Trail *Photo: Sara Sweet, TNC*

***Cosumnes River Preserve: Howard Ranch Trail* guided walks in April and May** 8:45 a.m.
Docents for the Preserve lead a series of springtime guided walks featuring the magnificent vernal pool habitat along the Rancho Seco Howard Ranch Trail. The hikes take visitors on a 7-mile trek through open grasslands where wildflowers carpet the landscapes. In 2011, guided walks will take place on April 2, 10, 16, and 23; and May 1.

Walks begin at at the trailhead and generally last 3.5 to 4 hours. The trailhead is located at the North Dam parking lot in the Rancho Seco Recreational Area off Highway 104/Twin Cities Road. There is a $10 entrance fee per vehicle to the Recreational Area, but the walks themselves are free. For more information, visit www.cosumnes.org.

***Mather Field Vernal Pools* docent-led tours available in April** 10:00 a.m. and 1:00 p.m.
Vernal pools hold a unique variety of plants and animals. The Mather Fields vernal pools are located near Mather Regional Park, near Highway 50 east of Sacramento. There are no fees for self-guided tours, and the area is accessible from sunrise to sunset.

Volunteer docents provide tours of the amazing vernal pools at Mather Field on April 10, 17, and 24. The cost is $5 per adult and $2 per child (6–18). Reservations are required and can be made at www.sacsplash.org or 916-364-2437.

***Jepson Prairie Preserve* ongoing tours available in spring** 10 a.m. every Saturday and Sunday in spring
The Jepson Prairie Reserve is an island of remnant natural prairie in a wide Sacramento Valley alluvial floodplain used primarily for agriculture. The Reserve protects a portion of the last remaining vernal pool grasslands of the Central Valley, as well as precious remnants of native bunchgrass prairie that may once have covered large areas of California. Altogether, over 400 species and 64 families of plants, including 15 rare and endangered plants, are found on-site.

Walking tours are held each year from mid-March to early May at Jepson Prairie, south of Dixon in Solano County. Easy, docent-guided walks will yield glimpses of the past with views of rare and endangered vernal pool shrimp while pools are in the aquatic phase, and colorful flower displays after ponded water has dried. Remnant stands of native perennial bunchgrasses cover the mound-dotted uplands. For an up-to-date schedule, please visit www.solanolandtrust.org. There is also a guide for a self-guided hike on the website.

***Lynch Canyon to High Bridge Trail* self-guided hike**
This route passes through Solano County meadows that have proven to be most spectacular in previous years. The hike is moderate, at 7 miles and less than 800-feet elevation gain. It starts off easy enough (downhill), with some uphill in the middle, and downhill at the

SPRING HIKING, continued on page 7

SPRING HIKING, from page 6

end. There is one major creek crossing at Bear Creek and a minor one after the Roadkill Café. For a description of both legs of the hike, visit: HTTP://WWW.YOLOHIKER.ORG/TRAILS/CCNA/HIGHBRIDGE/INDEX.HTML and HTTP://WWW.YOLOHIKER.ORG/TRAILS/CCNA/LYNCH/INDEX.HTML.

Cosumnes River Preserve: River Walk Trail self-guided tour

The main portion of the Cosumnes River Preserve is located off I-5 between Sacramento and Stockton. The three trailheads connect to trails open for self-guided tours daily, sunrise to sunset. The Visitor Center is open and staffed by volunteer naturalists on weekends and holidays from 9 a.m. to 5 p.m.

***Koleria macrantha* at Santa Rosa Plateau Ecological Preserve** *Photo: Zach Principe, TNC*

The River Walk trail is approximately 3 miles round-trip, accessible from the bridge just north of the Visitor Center. It is located primarily on old levees that wind through a variety of habitats. The valley oak savannah contains creeping wildrye and meadow barley, plus numerous wildflowers. Additional habitats include buttonbush thickets, valley oak riparian forest, cottonwood/willow riparian forest, tule marsh, and managed waterfowl wetlands.

During spring and winter months, the natural flood cycle often results in complete or partial inundation of the trail. Visitors may wish to confirm the trails' availability in the rainy months by visiting WWW.COSUMNES.ORG.

Fremont Weir State Wildlife Area self-led walk

A Department of Fish and Game–managed wildlife area that also serves as the floodway entrance to the Yolo Bypass flood control project. Restored and native grasslands can be visited in this wildlife area located next to the Sacramento River, north of Woodland. Visit WWW.YOLOHIKER.ORG for directions and maps.

Frog Pond Trail, Yolo County's Cache Creek Canyon Regional Park self-led hike

A 5-mile loop trail passes through blue, live, and black oak woodlands and associated native grasslands. Purple needlegrass, California oniongrass, and blue wildrye can all be seen alongside the trail. Visit WWW.YOLOHIKER.ORG for directions and maps.

Visit the CNGA website and download *Guide to California's Grasslands*

The guide includes details for visiting the following grasslands:

- ***Alkali Sacaton Grassland:*** San Luis National Wildlife Refuge Complex, Kesterson Unit
- ***Coastal Grassland:*** Tilden and Wildcat Canyon Regional Parks
- ***Inner Coast Range Prairie:*** Bear Creek Botanical Management Area
- ***Native Dune Grasslands:*** Asilomar State Beach
- ***Purple Needlegrass Grassland:*** L ake Chabot Regional Park, Fairmont Ridge
- ***Purple Needlegrass Grassland:*** Pacheco State Park, Pig Pond
- ***Santa Rosa Plateau Ecological Reserve:*** Southwestern Riverside County
- ***Serpentine Grassland:*** Redwood Regional Park, Skyline Serpentine Prairie
- ***Tufted Hairgrass Grassland:*** Point Reyes National Seashore, "F" Ranch
- ***Vernal Pool Grassland:*** Pixley Vernal Pools Preserve
- ***Wagon Creek Research Natural Area:*** Los Padres National Forest

Where are YOUR favorite grassland hikes?

Let us know so others can discover and enjoy them!

Send your submissions to: GRASSLANDS@CNGA.ORG.

Ramona Grasslands Preserve Opening in Spring 2011

Zachary Principe, *CNGA Board Member*

San Diego County Department of Parks and Recreation, The Nature Conservancy, and the Wildlife Research Institute partnered to create the Ramona Grasslands Preserve over the last decade.

Although grasslands is in the name, the Preserve supports many other plant communities, including chaparral, vernal pools, coastal sage scrub, riparian woodland and scrub, alkali playas, and coast live oak woodland. Over 100 animal species and roughly 250 plant species have been observed on the preserve. This includes 22 animals and 8 plants classified as rare, threatened, or endangered.

This spring, a portion of the Preserve will open to the public for the first time and give visitors the opportunity to experience its many treasures. The trail meanders through grasslands, oak woodlands, and chaparral, and has views of riparian woodland and scrub along Santa Maria Creek.

The Preserve is well known locally for its high diversity of hawks, eagles, and falcons, especially in winter. Ferruginous hawks winter in the grasslands and golden eagles are year-round residents. Red-tailed hawks, red-shouldered hawks, northern harriers, white-tailed kites, and American kestrels also frequent the Preserve.

There is an ongoing effort to establish a breeding population of burrowing owls in the greater grassland area, so hopefully this rare diurnal owl will become a common sight for visitors.

Other rare animals found on the Preserve include three endangered species: the arroyo toad, Stephens kangaroo rat, and San Diego fairy shrimp.

Eight rare plant species have been documented in the greater grassland area, including southern tarplant, graceful tarplant, and Engelmann oak; all three should be visible from the trail in late spring.

Common native species observed in the grasslands and in the opening in the oak woodlands and chaparral include purple needlegrass, saltgrass, blue-eyed grass, vinegar weed, Johnny-jump-up, California aster, blue dicks, dwarf checkerbloom, miniature lupine, red maids, popcorn flowers, and pygmyweed.

For updates on the opening of the southwest portion of the Preserve, check the San Diego County Parks website (http://www.co.san-diego.ca.us/parks/openspace/Ramona_Grasslands.html) and enjoy the wildflowers later this spring and the hawks, eagles, and falcons next winter.

Typical habitat mosaic of grasslands and oak woodlands found at the Ramona Grasslands *Photos: Zachary Principe*

California native plant week: April 17–23

The California State Assembly and Senate last year approved Resolution ACR 173 (Evans) establishing California Native Plant Week, beginning April 17–23, 2011.

During the 3rd week of April , community groups, schools, and citizens are encouraged to undertake appropriate activities to promote the conservation, restoration, and appreciation of California's native plants.

ACR 173, introduced by Assemblywoman Noreen Evans (D–Napa), was sponsored by the California Native Plant Society, and garnered the support of horticulturalists, conservation organizations, and nurseries throughout California.

ACR 173 recognizes the vital historical, artistic, and economic contributions California's native plants have made to our State, and points out that California native plant gardening and landscaping provide tremendous positive impacts to our watersheds and to habitat recovery, and help to curb catastrophic wildfires.

In particular, the resolution recognizes that home landscaping and gardening with native plants can cut residential water use from 60 to 90 percent over conventional gardening.

The full text of Resolution ACR 173 can be accessed at: http://cnps.org/cnps/conservation/legislation/acr173.php.

REPRINT: From the *Grasslands* archives

April 1991, Vol. 1, issue 1

ABSTRACT

Authors: Bugg, R.L., Anderson, J.H., Menke, J.W., Crompton, K., Lanini, W.T.

Institution: Sustainable Agriculture Research and Education Program, University of California, Davis, CA 95616

Adapted from article written for *Components,* Technical Notes for UC Sustainable Research and Education Program, Vol. 2, No. 1, 1991

Title: Perennial grasses as roadside cover crops to reduce agricultural weeds in Yolo County

Abstract

There are now experiments underway to establish perennial grasses, including native California species, in various monocultural and polycultural schemes along roadsides amid Yolo County agricultural lands. The aim of these studies is to determine the relative effectiveness and expense of these schemes at suppressing roadside weed communities, particularly major agricultural weeds, as compared to conventional herbiciding, mowing, and plowing.

The current schemes for managing California roadside vegetation include frequent mowing, blading, and herbicidal application, which are time-consuming and expensive. Yolo County currently spends over $40,000 a year for herbicides applied along some 800 miles of county roads. Blading costs are over $100 per mile treated (Garrison 1989). Existing practices for roadside maintenance and control of erosion encourage invasion and domination by noxious, undesirable, and highly invasive weeds. Thus, roadsides have become significant reservoirs for such agricultural weeds as yellow starthistle (*Centaurea solstitialis*) and various other thistles, wild oats (*Avena fatua*), ripgut brome (*Bromus rigidus*), field bindweed (*Convolvulus arvensis*), redroot pigweed (*Amaranthus retroflexus*), and others.

The current practices have also led to unsightly ditches, and much erosion and siltation. In the long run, these practices discriminate aganist desirable plant species. Moreover, the general public is increasingly concerned with the roadside use of herbicides and possible implications for heath. The authors believe that California could benefit from developing alternative management schemes.

In much of California, including the Sacramento Valley and the surrounding foothills, the dominant plants were once the perennial sod-forming grasses and bunchgrasses (Crampton 1974). Many of these remained green well into the dry summer and gave the landscape a soft, tufted appearance. However, the native grasses were nearly wiped out during the mid-1800s through drought, overgrazing by cattle, and competition from weedy annual grasses and forbs introduced from the Mediterranean area (Dassman 1973; Menke 1989).

There are now opportunities to reestablish portions of the native prairie. There are several large producers of California native grass seed, and there is increasing public awareness of native grasses and interest in restoring them for improved biodiversity (Meyer 1989; Anonymous 1990; Bugg 1990; Northington 1990).

In several states, particularly in the Midwest, native grasses are being used successfully along highway corridors (Harrington 1989) and ditches (Bright 1988). Once established, perennial grasses reduce erosion and fire hazard, and preclude the establishment of seedlings of most agricultural weeds. Maintenance can be reduced to a single timely mowing per year (see Gillespie 1989).

There are numerous perennial grasses, both native and introduced, that appear particularly useful along rights-of-way, because they thrive under existing rainfall and soil regimes. They green up earlier in fall and remain green later into the spring than do the introduced annuals.

Trials in Yolo County, including elaborate and extensive demonstration plots at Hedgerow Farms (owned by John H. Anderson), clearly show that perennial grasses can be efficiently established on roadsides and thereafter suppress most noxious weeds. Our observations also suggest that ground squirrel population densities are greatly reduced when perennial grasses dominate roadsides (see Daar et al. 1984). On the other hand, desirable wildlife such as pheasant can be greatly increased (see Duxbury and McKenna 1990).

Cover crops have long been known to be useful in suppressing weeds.

REPRINT: ROADSIDE COVER CROPS, continued on page 10

Looking back: 20 years later

For CNGA's 20th Anniversary, the *Grasslands* Editorial Committee decided to reprint two articles from our archives, both from the first *Grasslands* issue, printed in April 1991. In the Winter 2011 issue, we reprinted David Amme's article about the use of native grasses and the various species commonly used. This issue's reprint is the Robert Bugg (et al.) article on using perennial grasses as roadside cover crops.

Bob's update, *Roadside Inaction?,* follows his original "vintage" article (see p. 11).

REPRINT: ROADSIDE COVER CROPS, from page 9

Weed-suppressive cover crops have sometimes been termed "smother crops," and modes of action can include competition for resources or exudation of allelopathic compounds. In the case of perennial grasses, both mechanisms can be at work in the suppression of weed seedlings (see Tilman 1988). Ecological studies have shown that perennial bunchgrasses have root masses that extend laterally, leading to suppression of weed seedlings at some distance (Ornduff 1974).

The approach developed by one of the authors (Anderson) involves selective herbicides for weed suppression during the first two years of bunchgrass establishment. Thereafter, herbicides can be discontinued, and management will be by mowing or control burning as needed. In many instances, no management at all will be required. Native grasses are slow to establish, and will not invade the farmers' fields like the noxious weeds that currently dominate roadsides in most agricultural lands (Crampton 1974).

These studies are intended to test whether established perennial grasses can preempt and greatly reduce roadside weeds. The study will also clarify the types of planting arrangements that are most advantageous. Ideally, this will assist in developing statewide erosion-control specifications that include perennial grasses. It would also provide information on ecologically based, long-term control of noxious weeds to landowners and governmental agencies. Such an approach will become particularly important with increasing regulatory restrictions on herbicide use.

Projections by one of the authors (Anderson) indicate that roadside maintenance costs and herbicide use could be greatly reduced through the establishment of perennial grasses.

Rural roadsides typically include several topographic zones (Fig. 1): (1) pavement edge; (2) berm or shoulder; (3) inner ditchbank: (4) ditch bed; (5) outer ditchbank; and (6) field edge. These zones present a range of environmental conditions, and require a range of plant materials.

Fortunately, various perennial grasses have different environmental optima and tolerances and varying growth habits. Low-statured, non-rhizomatous species (e.g., sheep fescue* [*Festuca ovina* cv 'Covar']) and pine bluegrass (*Poa scabrella*[1]) are desired for the pavement edge, because they permit maximum visibility by motorists, are unlikely to break up pavement, and, although they tolerate close mowing, require no mowing in many cases. Red fescue (*Festuca rubra*), pubescent wheatgrass* (*Agropyron trichophorum*[1]), and lower-growing forms of blue wildrye (*Elymus glaucus*) are intermediate in height and are appropriate on the berm or shoulder.

Short-lived, moisture-loving perennials like meadow barley (*Hordeum brachyatherum*) are well suited for inner and outer ditch banks and the ditch bed if ditches only have water intermittently. If ditches contain water most of the time, spike rushes (*Eleocharis* spp.) would be better adapted. The outer ditchbank can be assigned to taller-statured grasses, such as tall wheatgrass* (*Agropyron elongatum*[1]), slender wheatgrass (*Agropyron trachycaulum* var. *majus*[1]), blue wildrye (*Elymus glaucus*), or orchardgrass* (*Dactylis glomerata* cv 'Berber'). If mowing is frequent, these species can also be used on the inner ditchbanks and on the beds of intermittently flooded ditches. The field-edge niche is subject to inadvertent damage by herbicides and agricultural implements. Therefore, tough, resilient, rhizomatous grasses such as creeping wildrye (*Elymus triticoides*[1]) are particularly appropriate. This species is tall statured, recovers rapidly from mechanical damage, and shows resistance to a commonly used herbicide, glyphosate.

The authors are requesting funding from several agencies. If funded, the replicated trial will be conducted in Yolo County on County roadsides containing typical topography and weed flora. The experiment will test the weed-suppressive effects of the plant materials already mentioned when planted in various combinations and spatial arrangements. In future years of this study, the authors also plan to evaluate the following native grasses: California oniongrass (*Melica californica*), Idaho fescue (*Festuca idahoensis*), nodding stipa (*Stipa cernua*[1]), and squirrel tail (*Sitanion jubatum*[1]), and three awn (*Aristida hemulosa*[1]).

Cooperating and interested organizations are USDA-SCS Plant Materials Center[1], Yolo County Resource Conservation District, ConservaSeed, and the California Native Grass Association[1].

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REPRINT: ROADSIDE COVER CROPS, continued on page 11

*Non native species.

[1] Name changes since original publication: *Poa scabrella* is now *Poa secunda*, *Agropyron trichophorum* is now *Elytrigia intermedia* ssp. *intermedia*, *Agropyron elongatum* is now *Elytrigia elongata*, *Agropyron trachycaulum* var. *majus* is now *Elymus trachycaulus*, *Elymus triticoides* is now *Leymus triticoides*, *Stipa cernua* is *Nassella cernua* but will be changing back to *Stipa cernua* again.

The USDA-SCS was called the USDA Soil Conservation Service, but that organization is now the USDA Natural Resource Conservation Service (USDA-NRCS).

The California Native Grass Association is now the California Native Grasslands Association.

Roadside Inaction?

Robert L. Bugg, Ph.D., *Consulting Biologist, 1555 Pinnacles Place, Davis, CA 95616-6660, Robertbugg90@gmail.com, 530-219-7834*

The Bugg et al. (1991) *Grasslands* article laid out the conceptual framework for several years of field research, described in two articles published in *Restoration Ecology:* Bugg et al. (1997) and Brown and Bugg (2001). John Anderson, Cynthia Brown, and I led several tours and field days that were well attended and, seemingly, well received. Nevertheless, there have been few subsequent studies on California native herbaceous plants for roadsides, with an exception being O'Dell et al. (2007).

Due, perhaps, to lack of an effective "hand-off" to other researchers, several of the anticipated advantages of native grasses raised in the 1991 *Grasslands* article have not been addressed. For example, there is still no experimental evidence that perennial grasses planted to roadsides can reduce weed or rodent incidence in adjoining fields, nor whether roadside native grasses are less fire prone than exotic weeds.

To prepare for this article, I walked along several roadsides where native grasses have been established for over a decade, per protocols outlined in the *Grasslands* article. It looks as though the big successes have been blue wildrye (*Elymus glaucus*), creeping wildrye (*Leymus triticoides*), meadow barley (*Hordeum brachyantherum*), purple needlegrass (*Nassella pulchra*), and saltgrass (*Distichlis spicata*). But these informal observations suggest that the perennial grasses maintain their stands through time, but do not spread to adjoining, non-seeded areas. All these informal observations are consistent with the formal evaluation by O'Dell et al. (2007).

The Bugg et al. (1997) studies could be said to have anticipated two of the "winners" mentioned above: purple needlegrass and blue wildrye. However, the 1997 trial showed very poor early establishment of seeded creeping wildrye. We did some very limited transplanting and informal evaluation of saltgrass (it did establish). We did not have access at the time to some graminoid species that now are routinely

ROADSIDE INACTION? continued on page 12

REPRINT: ROADSIDE COVER CROPS, from page 10

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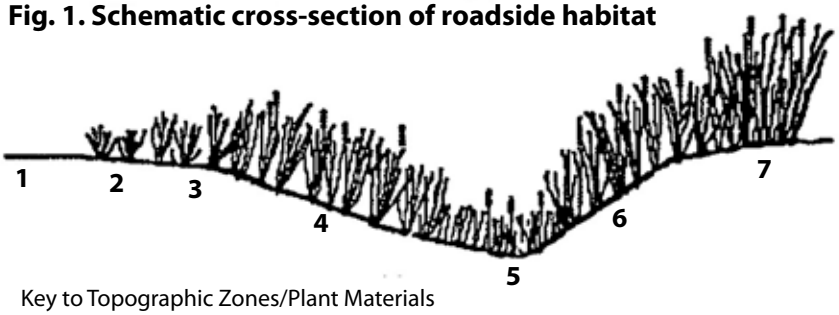
Fig. 1. Schematic cross-section of roadside habitat



Key to Topographic Zones/Plant Materials

1. Road
2. Pavement edge: 'Covar' sheep fescue* pine bluegrass
3. Berm or shoulder: blue wildrye, California brome, red fescue, pubescent wheatgrass*
4. Inner ditchbank: blue wildrye
5. Ditch bed: meadow barley, spike-rushes
6. Outer ditchbank: blue wildrye, orchardgrass*, tall wheatgrass*, slender wheatgrass
7. Field edge: creeping wildrye

* denotes non-native species

ROADSIDE INACTION? from page 11

used, including Baltic rush (*Juncus arcticus* ssp. *littorlais* [= *Juncus balticus*]), field sedge (*Carex praegracilis*), and Santa Barbara sedge (*Carex barbarae*), all of which now look promising.

Five of the seven species highlighted above as probable "winners" are creeping, rather than bunch, graminoids. Moreover, the observations that rhizomatous graminoids have fared rather well and that seeded bunchgrasses do not spread to new areas appear consistent with Glen Holstein's (2001) thesis that the Sacramento Valley floor was probably dominated by rhizomatous graminoids rather than bunchgrasses.

I saw very few native forbs when I inspected the old-established native grass stands. Obvious candidate native forbs for these niches in Yolo County include rhizomatous herbaceous perennials like alkali sida (*Malvella leprosa*), salt heliotrope (*Heliotropium curassavicum*), and American licorice (*Glycyrrhiza lepidodota*).

Leguminous forbs should be of special interest to roadside restoration ecologists, in part because several of them fix atmospheric nitrogen, which may aid the nutrition of the native grasses. In 1991, two native annual lupines were common on agricultural roadsides: the arroyo lupine (*Lupinus succulentus*) and chick lupine (*Lupinus microcarpus* var. *densiflorus*). These are seldom seen now, perhaps due to changes in herbicides applied to roadsides. Common vetch (*Vicia sativa*), an introduced annual legume, frequently volunteers amid roadside stands of perennial native grasses, even where the grass growth is thick.

When I studied biological control of arthropod pests at UC Berkeley in the 1970s, an emphasis was that it was important to avoid getting on "the pesticide treadmill." That is, use of pesticides can create conditions that seemingly necessitate continual applications. As noted by O'Dell et al. (2007), most of the old established roadside stands of native grasses have received follow-up applications of pesticides. Some of these herbicides prevent the establishment of broadleaf herbaceous plants, whether native or introduced. When, if ever, do we take native plants off herbicidal life support?

When do we relax enough to tolerate the nonnative but naturalized plants that, xenophobia notwithstanding, are likely to persist in roadside niches? Why not explore the value of mixtures of native and naturalized plants on roadsides?

Caption *Photo: Robert Bugg?*

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Letter from a reader

Dear Liz,

Thank you for your wonderful summary of the "seasonality of grassland restoration" (Liz Goebel's response to "What have we learned about grasses or grasslands in the last 20 years?" Winter 2011 *Grasslands*). I am a CNGA member who has been slowly (and I do mean slowly) converting our acreage in Penngrove from Italian rye to native grasses.

After reading your summary I jumped on the mower and mowed an area where I had seeded *Nassella pulchra* in the fall. No one had ever mentioned mowing as early as Jan and Feb. When I read your summary I thought "Brilliant!" I've clipped your summary and have it posted by my desk.

Thanks again. It's people like you that give me that extra boost of encouragement when I seem to need it most. Sometimes I have to remind myself to "press on regardless" because that is what it seems to take when one battles the elements of restoration.

All the best,
Robyn Sherrill

California Grassland Carbon Challenge launches in January

Peter Donovan; *541-263-1888; info@soilcarboncoalition.org*

Introduction

Peter Donovan, who lives in eastern Oregon, spearheaded the "California Grassland Carbon Challenge" with a meeting in San Juan Bautista this past January. Joe Morris and family graciously hosted the meeting. An ad hoc group of over 55 people gathered, including ranchers, university and agency representatives, and a great diversity of other grassroots citizens from far and wide—all anxious to improve and sustain California grassland health.

Throughout the day, the group explored the power and importance of monitoring soil organic matter—a key indicator of how land management affects the global carbon cycle, other nutrient cycles, the water cycle, the diversity and productivity of life above and below ground, and whether our land management is moving toward something regenerative and sustainable for human life as well as our California native grasslands and farmed lands. After a morning meeting at the St. Francis Retreat, followed by a Morris grass-fed beef lunch, we spent the afternoon on a hillside where the rancher's use of holistic planning and decision-making has changed a small, inconspicuous patch of native needlegrass plants into over a thousand plants. I believe everyone enjoyed meeting, sharing, and learning from each other that day.

Peter Donovan's websites (http://soilcarboncoalition.org/; http://www.managingwholes.com/) are rich in user-friendly references, including brief videos. I asked Peter to share his thoughts with CNGA. Here is his report about the "California Grassland Carbon Challenge." –Richard King

Peter Donovan collecting baseline soil carbon data at Richard King's Sonoma County farm.

In January 2011, seven California grassland managers, from Red Bluff to Goleta, established monitoring sites as starting points for seeing whether, or how fast, they could turn atmospheric carbon into water-holding, fertility-enhancing soil organic matter.

These microsites or plots are geo-referenced, as well as located via permanent markers, compass, and tape. With the help of the land managers, Peter Donovan of the Soil Carbon Coalition (soilcarboncoalition.org) documented basic soil cover, including with photography, and took some measurements with a tension infiltrometer, as well as bulk density and carbon content for three soil layers, down to 40 cm. Carbon samples are currently being processed at Cal Poly.

Resampling of these microsites is projected for 2014, 2017, and 2021. The focus of the California Grassland Carbon Challenge is to provide practical and accurate feedback to managers interested in trying to increase soil organic matter, which is the number-one recommendation of the Natural Resources Conservation Service (NRCS) soil quality team to land managers.

The Challenge is not connected with any carbon market or offset scheme, but is about exploring what's possible, using the creativity, imagination, and skills of the land managers. The initial entrants plan to use, or continue to use, management of grazing to favor plant health, soil cover, and an increase in perennials.

In one case, soil carbon plots were established on sites measured by NRCS personnel in 2001 for perennial versus annual root mass, as well as soil carbon and bulk density. Data could emerge from this 10-year comparison.

The launch of the California Grassland Carbon Challenge, which remains open for entry, was highlighted by a day-long mini-conference hosted by the Morris Ranch in San Juan Bautista and facilitated by Jeff Goebel. Topics covered included:

1. The generally lower levels of carbon in soil, combined with higher levels in the atmosphere, were likely to exacerbate food and water issues such as flooding, drought, water scarcity and quality, food security, and biodiversity loss;
2. Continuing to manage against these eventualities was a losing proposition;
3. The carbon cycle is a process, not an event, and is driven mainly by the metabolisms of self-motivated organisms such as plants, fungi, and bacteria;
4. Soils are the terrestrial hub of the carbon cycle as they contain several times the carbon of atmosphere and vegetation combined;
5. Human management has enormous influence, not only on fossil fuels, but on how the carbon cycle functions through soils; and
6. Significant reversals of the general pattern of soil carbon loss have occurred as a result. Humans can manage for increased soil organic matter, which can be measured.

After a lunch of Morris Ranch grass-fed shortribs, Joe Morris led a discussion tour on his land, focusing on how planned grazing and direct marketing of grass-fed beef could enhance the carbon cycle, which in turn has enormous influence over the water cycle. Participants witnessed an infiltration demonstration of bare ground versus native perennial grass. The effects of plant material and soil organic matter on the soil's ability to accept water made a significant impression on many.

Registration is open for Spring 2011 CNGA workshops!

Register by mail, fax, phone, or online: 530-661-2280 | www.CNGA.org

1. April 14: Identifying the Native and Naturalized Grasses of California, a 1-day workshop

Participants receive an introduction to California's grassland ecology, learn the qualities of specific native grasses for restoration, and become skilled at recognizing the basic groups and common species of California's grasslands through work with plant samples in the classroom. While not a prerequisite, this course is a great precursor to the April 15 Field Day at Hedgerow Farms. There, you will have a great opportunity to use your ID skills as you experience a wide array of native and naturalized grassland species in the field.

Location: Hedgerow Farms, Winters **Fees:** $120 CNGA members / $140 non-members / $75 students w ID

2. April 15: 4th Annual CNGA Field Day at Hedgerow Farms, a 1-day event

For a 4th consecutive year, CNGA is teaming up with Hedgerow Farms to provide an excellent opportunity for practical, hands-on learning about native grasses and grassland restoration. Participants will learn from expert instructors, be immersed in a wide variety of grassland projects, and enjoy networking with a diverse group of people who share a common interest in California grasslands.

Location: Hedgerow Farms, Winters **Fees:** $60 CNGA members / $75 non-members / $35 students w ID

3. May 27: Grassland Monitoring Methods, a 1-day workshop

How do I determine if my grassland restoration project is a success? This workshop will focus on multiple grassland monitoring techniques, including how to monitor vegetation and wildlife within a grassland setting. The course will feature classroom instruction as well as field practice with a variety of monitoring techniques.

Location: Davis (specific location to be announced) **Fees:** $120 CNGA members / $140 non-members / $75 students w ID

4. June 11: Introduction to California Grasslands and Grass ID, a 1-day workshop

Take your first steps into learning about an important yet underrated ecosystem in this new workshop that features lecture, lab, and field components. The lecture will provide an overview of California grasses and grassland diversity, ecosystem values and services, management challenges and strategies, and restoration and landscaping with native grasses. During GrassLab, we will answer the question "What are grasses?"; learn the basics of grass taxonomy, morphology, and anatomy; and identify the common native and nonnative species with the help of dissecting microscopes. Then we will head into the field to examine and enjoy first-hand the bounty of native grasses at the Pepperwood Preserve!

Location: Pepperwood Preserve, Santa Rosa **Fees:** $30 CNGA members / $35 non-members / $25 students w ID

5. June 25–26: Identifying the Native and Naturalized Grasses of California, a 2-day workshop

On Day 1, participants learn about California's grassland ecology, the qualities of specific native grasses for restoration, and become skilled at recognizing the basic groups and common species through working with plant samples in the classroom. On Day 2, participants explore a local grassland, rich with a diverse assemblage of both native and naturalized grasses and make use of understanding and skills learned on Day 1.

Location: The Dance Palace, Pt. Reyes Station **Fees:** $220 CNGA members / $240 non-members / $135 students w ID

Registration Form: CNGA Spring Workshops | 2011

Mail to: CNGA, P.O. Box 8327, Woodland, CA 95776 Fax to: 530-661-2280

Participant's name (print or type please) _____

Participant's organization/agency (optional) _____

Mailing Address _____ City _____ State ____ Zip _____

Preferred phone _____ Preferred e-mail _____

Fees:

1. Identifying the Native and Naturalized Grasses of California *(Winters, CA)*	☐ $120/CNGA members	☐ $140/non-members	☐ $75/students
2. CNGA Field Day at Hedgerow Farms *(Winters, CA)*	☐ $60/CNGA members	☐ $75/non-members	☐ $35/students
3. Grassland Monitoring Methods *(Davis, CA)*	☐ $120/CNGA members	☐ $140/non-members	☐ $75/students
4. Intro to California Grasslands and Grass ID *(Pepperwood Preserve, Santa Rosa, CA)*	☐ $30/CNGA members	☐ $35/non-members	☐ $25/students
5. Identifying the Native and Naturalized Grasses of California *(Pt. Reyes, CA)*	☐ $220/CNGA members	☐ $240/non-members	☐ $135/students

☐ Check made payable to California Native Grasslands Association ☐ Payment by credit card (please check type) ☐ Visa ☐ MasterCard ☐ American Express

Card number _____ Expiration date_____/_____

Street address for card _____ Zip _____ 3-digit code_____

Questions concerning registration? Please contact CNGA by phone/fax: 530-661-2280, or e-mail: admin@cnga.org.

Celebrating the 20th Anniversary of CNGA

California Grasslands Photo Exhibit: Call for Submissions

A picture tells a thousand words, and your photo can help tell the story of California grasslands. CNGA uses the Web, PowerPoint presentations, brochures, and printed educational materials to tell others about our important mission and the value of grasslands. You can help by participating in this contest and sending us your high-quality photos of grassland subjects. Photographers will be credited for their work when published.

Twenty-five finalists will be selected for exhibition at the 2012 CNGA Conference.

Conference attendees will vote for winners who will receive CNGA merchandise.

Subjects can include grasses, grasslands, associated species (including people!), and restoration projects.

Deadline for entries is December 31, 2011.

Check www.CNGA.org for submission information.

Call for Papers and Posters
(Deadline for Abstracts: April 8, 2011)

America's Grasslands: *Status, Threats, and Opportunities*

Co-hosted by the National Wildlife Federation and South Dakota State University

August 15–17, 2011, Sheraton Sioux Falls Hotel and Convention Center, Sioux Falls, South Dakota

Conference will bring together researchers, natural resource professionals, agricultural producers, policy experts and conservationists to discuss the status of North America's grassland ecosystems, current threats, opportunities for conservation, and the outlook for these ecosystems in a changing climate.

The conference will be immediately followed by a ***Grasslands Policy Summit on August 17–18,*** sponsored by the National Wildlife Federation and Ducks Unlimited.

For submission guidelines and other details, e-mail Aviva Glaser at GlaserA@nwf.org.

Look for these CNGA workshops, Fall 2011

www.CNGA.org, or call 530-661-2280

- **September 2011: Using California Native Grasses in the Water-Conserving Landscape**

Two separate 1-day workshops in Southern California; Locations TBA

You will learn how to use native grasses, sedges, and rushes successfully in a variety of settings to create beautiful residential, commercial, and public landscapes. Besides saving irrigation water, native grasses can rebuild soil and prevent erosion, enhance wildlife habitat, and lower maintenance costs. The latest applications of native grasses for treatment, attenuation, and infiltration of storm water in bio-swales will be addressed.

Fees: $120 member / $140 non-member / $75 student

- **October 2011: Sustainable Grazing Workshop**

1-day workshop; Location TBA

Ranchers and resource management professionals recognize the role of grazing in conserving remnant native grasslands and restoring annual grasslands sites. Learn to plan and implement a successful sustainable grazing program.

Fees: $120 member / $140 non-member / $75 student

Ecology And Management of Grazing: An Online Course

The California Rangeland Research and Information Center at UC Davis is offering all four modules of this online, science-based course. The course is organized in four modules that can be taken separately or sequentially:

1. Introduction to Ecology and Grazing,
2. Foraging Behavior and Livestock Distribution,
3. Forage Quality and Grazing Animal Nutrition, and
4. Ranching and Grazing Systems.

Registration fees are $200 per module or $600 for all four modules. Contact Mel George (mrgeorge@ucdavis.edu, phone 530-752-1720) for group discounts. Registration page: http://californiarangeland.ucdavis.edu/Grazing%20Management/online_course.htm

Each module is approved by the Society for Range Management for 16 CEUs.

Point Molate Grassland Field Trip

Sat., April 30, 10 a.m.–2 p.m.
Co-sponsored by CNGA and CNPS East Bay Chapter. David Amme will again lead a field trip to this lovely grassland on the Potrero Hills peninsula just north of the Richmond–San Rafael Bridge, a site with terrific views of San Francisco, Marin, and San Pablo Bay to the north. Its intact native coastal bunchgrass prairie is virtually the last of its kind within the Bay Area and boasts a unique mix of grasses: California oatgrass, purple needlegrass, squirreltail, junegrass, and red fescue adjacent to patches of California fescue, creeping wildrye, and Diego bentgrass. Part of our route is a steep climb and may be slippery.

The fate of Point Molate still hangs in the balance. Despite encouraging outcomes in November's election, it's too soon to let down our guard against the mega-casino development proposed for this area.

Be sure to bring lunch, sunscreen, a hat, and water; a hand lens and camera are also recommended. Very heavy rain cancels. (Contact: David Amme DAMME@EPIPHANY2000.COM or 510-432-6141).

Directions: From the Bay Bridge, head north on I-80, take the I-580 split on the right just before Albany Hill, and head toward the Richmond–San Rafael Bridge. Just before the toll plaza take the Western Drive/Point Molate exit. Continue on this road as it climbs a hill and curves north; as it descends the hill, park at the parking lot on the right before the Point Molate Restricted Area open gate/chain-link fence.

Membership Application

Detach and mail this form with a check made out to CNGA. | Send to: CNGA, P.O. Box 8327, Woodland, CA 95776. | Students, send photocopy of current ID.

Name _____ Title _____
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CNGA members have voting status, and receive the "Grasslands" newsletter, a monthly e-blast, and discounts to CNGA events.

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Individual Joint Membership

☐ **CNGA + SERCAL*:** $70/year ☐ **CNGA + CAL-IPC**:** $75/year ☐ **CNGA + SERCAL* + CAL-IPC**:** $105

*SERCAL = California Society for Ecological Restoration • **CAL-IPC = California Invasive Plant Council

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All employees of a corporate member receive member pricing when registering for CNGA events.
All membership benefits are good for 1 year from the month of purchase.
All copies of *Grasslands* will be sent to the main contact at the organization.

	Membership Level	Annual Cost	Online (Color) Ads (w/link to member website)*	Grasslands (B&W) Ads (currently 4 issues per year)	Employee Memberships**	Grasslands Subscriptions***
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☐	*Poa secunda*	$250	Business-card size: 4.25 x 2.75 inches (318 x 2 06 pixels) below *Nassella* listings	B&W version of online ad	4	2
☐	Associate/Agency	$125	Text listing below *Poa* sponsors for 1 calendar year	Text listing published in *Grasslands* for 1 calendar year	3	1

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