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California Native Grasslands Association

Grasslands

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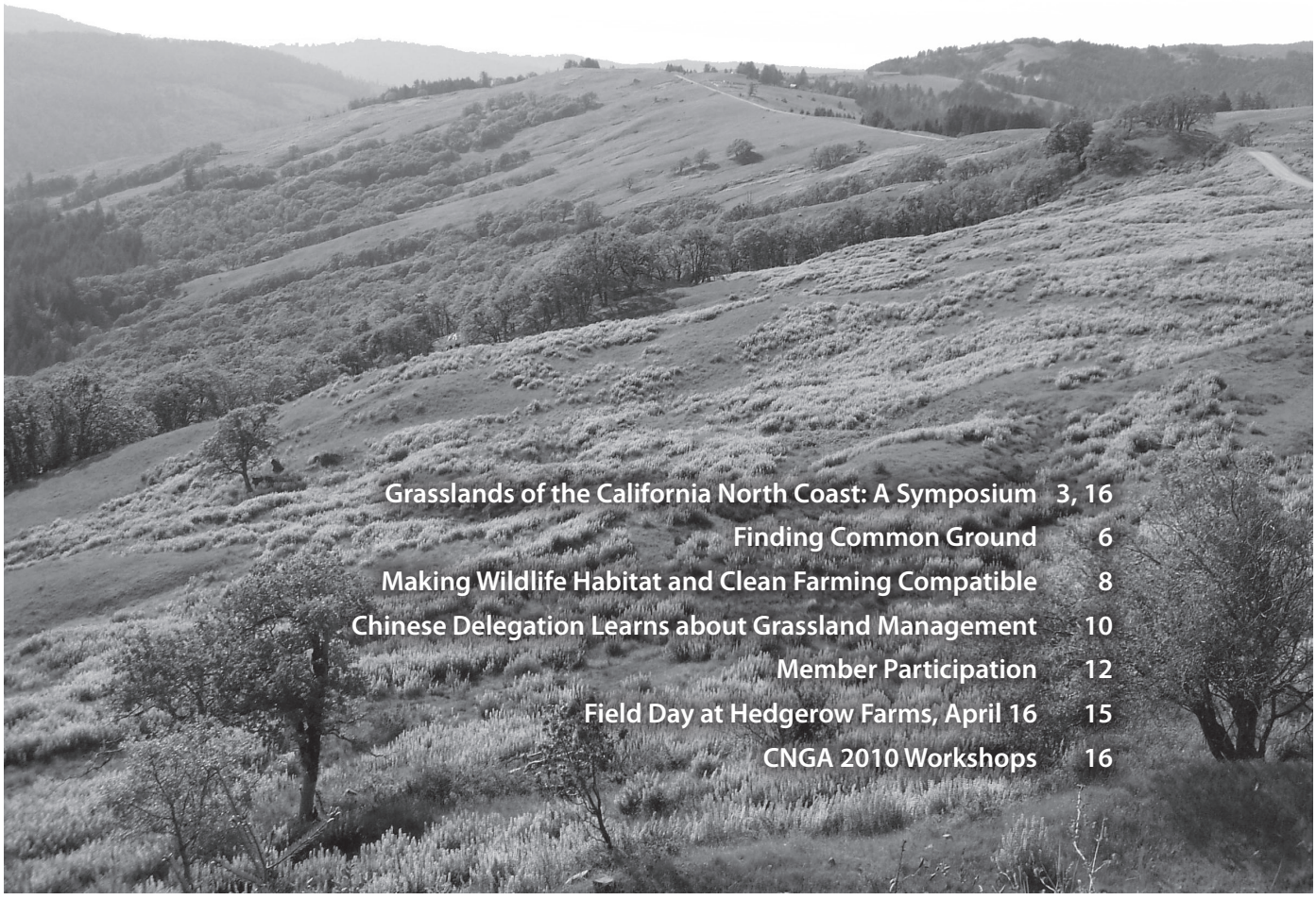
Putting Down Roots:

Regenerating Disturbed Soils to Sustain Vegetation 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.

For program information related to tours or training workshops, contact CNGA Administrative Director: ADMIN@CNGA.ORG.

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Grasslands Submission Guidelines

Send submissions to:
Editor: MRODGERS@MACNEXUS.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 electronically as e-mail attachments. Contact the editor for formatting specifications.

Submission deadlines for articles:
Spring 2010: Feb. 15, 2010 ; **Summer 2010:** May 15, 2010; **Fall 2010:** Aug. 15, 2010; **Winter 2011:** Nov. 15, 2010

From the President's Keyboard

WADE BELEW

While I've never studied psychology, it's a subject that fascinates me to no end. I always enjoy hearing about some study that sheds light on human behavior. One subject I find particularly interesting is what makes people happy and fulfilled in their lives. I've learned that one of the most consistent measures of a person's happiness is how much they give away!

That seems to counter our consumer society that has placed such high value on the accumulation of money and stuff. Remember when we used to refer to people as "people" or "citizens"? Now we refer to people as "consumers," not a particularly dignified title.

Yet time and again, when people are asked to assess their own level of happiness, fulfillment, and contentment, the most important things are family, community, and sense of contribution to a greater cause. The good news is that volunteering with CNGA offers opportunities to satisfy the latter two. By getting involved with CNGA, you're engaging in a broader community of like-minded individuals that share your passion for the natural world.

One of the most interesting behavior studies I learned about found that freely giving of oneself led to stimulation in the pleasure centers of the brain that are also engaged during actions such as eating delicious food! Just think, volunteering comes with all the satisfaction, but none of the calories!

If you're like me, one of the favorite things about attending a CNGA (or similar) event is the chance to mingle with old friends and make new ones. Since joining CNGA I have a whole new circle of friends and colleagues that I would have never known otherwise, and I'm a richer person for it.

Besides the personal satisfaction of helping, CNGA can have these direct benefits for you:

1. Increase opportunities for education. Volunteering with CNGA means you'll often be "rubbing elbows" with the best people in the business of grassland management. Years ago when I was learning how to water ski, I asked a friend, who was a competitive skier, how I could become better. I was expecting some feedback on my technique or suggestion for training. Instead his response was, "Surround yourself with people that are better at it than you." Good advice indeed.
2. Networking for career opportunities. Everyone knows the importance of personal connections in finding employment. CNGA can help you connect with resource management agencies and organizations throughout the state.
3. Your agency or organization can benefit by your networking, exposing them to potential collaborators or employees.

PRESIDENT'S KEYBOARD, continued on page 3

PRESIDENT'S KEYBOARD, continued from page 2

4. Professional development. Learn to work as a team, stage events, negotiate agreements, and work collaboratively.
5. Résumé building. Employers are increasingly recognizing and supporting participation in nonprofit organizations. For example, the employers of some of our Board members allow them to conduct Board business as part of their staff time.

Much of the vital program effort of CNGA is done through the work of committees that are made up of our 15 volunteer Board of Directors members. We have six standing committees: Executive (comprised of the President, Past President, Treasurer, Secretary, and one other Board member), *Grasslands* Editorial (newsletter), Workshop, Advocacy and Collaboration, Development and Outreach, and Conference.

During the next year we'll be raising the profile of our committees with regular Committee Updates in future issues of *Grasslands*. These articles will feature the role of individual committees, what they do, and how you can help. My goal is to have an equal number of CNGA member volunteers serving on our committees with our Board members.

Successful nonprofit organizations are those in which the Board has time to handle routine program issues *and* have time to engage in long-term planning and fund-raising. This forward-looking approach is necessary for an organization to thrive, and reminds me of a favorite saying. *If you don't know where you're going, all roads lead there.*

The Board needs to keep an eye on the horizon, have long-term goals and a plan to achieve them, but we can only do so with help from our membership. By volunteering with CNGA, you can help us grow and increase our ability to implement our mission. We know where we're going, we just need your help to get there!

The California Native Grasslands Association presents:

Grasslands of the California North Coast

A Two-Day Symposium with Field Trips and Optional Two-Day Grass ID Workshop

Thu & Fri, June 3–4, 2010

Symposium: Humboldt Area Foundation, Bayside
$175/CNGA members; $215/nonmembers*; $100/students w ID

Sat & Sun, June 5–6

Grass ID Workshop: Humboldt State University, Arcata (more details at www.CNGA.org.)
(TAKE $20 OFF FEE IF YOU ALSO REGISTER FOR SYMPOSIUM)
$220/CNGA members; $260/nonmembers; $135/students w ID

Join us as we explore native grassland habitats "behind the Redwood Curtain." The Symposium will include guest speakers, field trips to the Lanphere Dunes and the Bald Hills, exhibitors, panel presentation, Q&A's, networking opportunities, and a no-host evening dinner with speaker David Amme on "Creating a Native Meadow."

Presenters include:

- **Keynote Speaker: James P. Smith, Jr.,** Emeritus Professor of Botany, Humboldt State University
- **Julie Evens,** Vegetation Program Director, California Native Plant Society
- **Todd Keeler-Wolf,** Vegetation Classification and Mapping Senior Biologist, Department of Fish and Game
- **Gordon Leppig,** Environmental Scientist/Botanist, Department of Fish and Game
- **Andrea Pickart,** Ecologist, Humboldt Bay National Wildlife Refuge
- **Leonel Arguello,** Supervisory Botanist, Redwood National and State Parks
- **Jennifer Wheeler,** Botanist, Bureau of Land Management
- **John Anderson,** Owner–Operator, Hedgerow Farms
- **Bryan Young,** Manager, Bufferlands, Sacramento Regional Wastewater Treatment Plant
- **David Amme,** Wildlands Vegetation Program Manager, East Bay Regional Park District

Register online at www.CNGA.org or use form on page 19.

Putting Down Roots

Photo credits: Jim Hanson

Regenerating Disturbed Soils to Sustain Vegetation

Vic Claassen, Research Scientist, Soil and Revegetation
Jim Hanson, Landscape Architect

Shoreline native grass and coastal shrubs along roadside at San Francisco Bay. Grasses were seeded after roadside construction, but first the soil was treated to increase rooting depth and provide a minimal amount of organics.

Soils disturbed by construction or other heavy disturbance can be changed dramatically. Erosion resistance and desirable vegetative cover must be regenerated at the project's end. However, the functioning soil system needed to attain these objectives is usually lost following excavation and removal, or is altered by compaction or burial of preexisting project-site soils. Research into California's resilient native soils and plant communities suggests that appropriate treatments can return disturbed substrates into functioning soils that infiltrate stormwater, resist erosion, and sustain desirable vegetation cover without ongoing supplemental irrigation.

Because native grass and other native plant species have adapted to survive in extreme conditions—from mudflats to mountaintops—native plants may appear to be ideally suited to provide cover on highly disturbed and degraded soils. Yet, the self-sufficiency of these plants is not solely due to inherent plant characteristics, but comes in large part from the ability of native plants to partner with natural soil system processes that start at the surface and extend deep into the earth.

A series of UC Davis Soil and Revegetation Lab research projects, highlighted below, evaluates how robust and regionally appropriate native plant communities are supported by the natural soils on which they grow. The premise of this research is that these plants are sustained by basic, essential soil processes, including soil–water relations, nutrient cycling, and soil biology. If these same processes could be regenerated on a disturbed, barren, erosive substrate, then, logically, a regionally appropriate plant community could also be regenerated.

Although some lab-based tests conducted for the research evaluated individual plant–soil interactions, most of the research tests of soil resource treatments took place on actual disturbed construction sites. The field trials have been installed on sloped sites in Contra Costa, Lake, Mendocino, Mono, Placer, San Diego, Shasta, and Sutter Counties. Commonly available construction equipment and materials were used. In all cases, plants grew to mature size without irrigation.

Soils are complex systems. However, a functioning soil must, at minimum, be able to infiltrate rainwater, store it, allow deep rooting, cycle nutrients, and support microbial activity to allow for sustained plant growth (Singer and Munns 2006). An understanding of these basic soil resources and processes was synthesized into a five-step "Soil Resource Evaluation System" to help guide when and how to treat harsh, drastically disturbed sites (as well as how to know when conditions are adequate and treatment is *not* required) (UC Davis 2008). Field trials using the general strategy outlined below resulted in

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successful revegetation and erosion resistance on a variety of barren, erosive problem slopes in California. Although observations are drawn from highly sloped field trials, the intent here is to evaluate the potential benefits of restoring basic soil processes on common disturbed, degraded soil situations with grades of less than 3:1 (h:v).

Step 1. Identifying the Reference Site: A Functioning Soil–Plant System

A reference site is an indispensable tool to indicate what will grow on a drastically disturbed landscape. It is important to locate reference site examples, walk them, and document how their characteristics relate to the revegetation project plan.

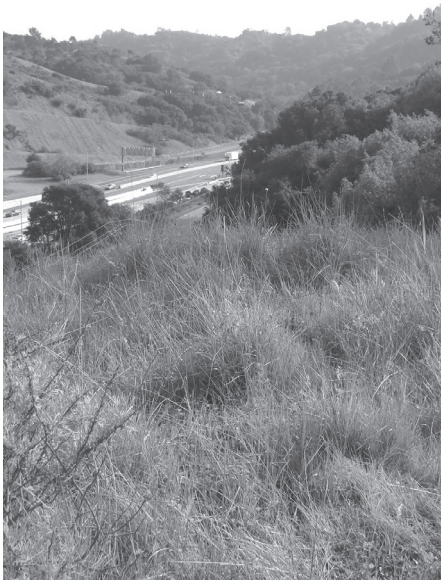
The reference site does not have to represent a fully diverse, undisturbed, intact plant community from a botanical reserve or state park. In fact, the site is especially useful if the area had been previously denuded and had reestablished on its own with native species. This "disturbed-but-revegetated" condition keeps one from trying to copy and re-create a natural soil that may have been centuries in the making.

Although it is possible to build up a harsh, barren site into one of a range of revegetated community types, it is best to take an example of existing, acceptable vegetative types and investigate the soil resources that are needed to support them. Identifying this reference plant community guides expectations to what might be sustainable under regional site conditions because the reference site has, evidently, persisted through a range of good and bad growth seasons.

The practical, empirical example of a working soil–plant system is an invaluable guide for identifying needed soil treatments. Look for a reference site with an acceptable vegetative cover and similar aspect, gradient, and geology to the project site. Then look for signs of successful erosion resistance, such as an accumulated duff layer and evidence of soil regeneration of the upper soil (or "A") horizon. A dark upper layer can be an indicator of soil organic development. Sites that are "bleeding" from erosion will show a bare mineral surface, gullies, or sediment fans. Also, contrast the texture between the two sites (e.g., sandy loam, heavy clay, gravels). Soil texture can be evaluated visually, and by learning to manually "feel" the clay or sand content of different soils.

If the reference site is an acceptable example, start looking for soil characteristics that need to be regenerated on the impacted site, including rooting depth and compaction. If access to a nuclear gauge compaction test, such as engineers would use, is lacking, compaction can be roughly assessed by simply noting the level of resistance on the reference and disturbed sites when swinging a pointed pick into the ground. Soil structure and rooting depth may be difficult to determine without digging a soil pit, but the soil profile can sometimes be observed in nearby excavations or road cuts.

The reference site findings are then compared to soil characteristics on the degraded project site to identify any of the basic soil deficiencies, discussed below, that need to be corrected.



Potential reference site: purple needlegrass (*Nassella pulchra*), coastal sage (*Artemisia californica*), and coast live oak (*Quercus agrifolia*) on a north slope bench cut, Highway 24 near Orinda in Contra Costa County.

Step 2a. Regenerating Site and Soil Hydrology: Soil Water Infiltration and Retention

Natural plant–soil systems infiltrate winter storms and hold moisture that sustains vegetation over the summer. For disturbed soils, the first step to regenerating soil hydrologic processes is to keep exposed soils protected and stabilized while replacement vegetation cover gets established. Surface erosion control measures are typically applied at the completion of construction and development work on disturbed, exposed soils to protect the soil surface particles from dislodging from winter rain impact. Coupling surface erosion-control measures with site-appropriate treatments to restore infiltration, as reviewed below, significantly increases the ability of the site to manage winter storm inputs. This infiltrated soil water also plays a critical role in establishing and sustaining vegetation by providing moisture during the dry summer season.

From short-term erosion control to long-term erosion resistance

Site construction changes the pre-existing site topography. Cutting portions of existing slopes steepens them and removes part of the lower slope. The resulting steeper slope is exposed to the erosive potential of the same flow from above and rainfall on the bare surface. Therefore, the first concern of disturbed site regeneration is diverting "run-on" stormwater from above, away from the exposed, steepened slope. This is typically accomplished by routing the "run-on" through or around the project site in hardened/strengthened flow paths built as coir-lined swales or rock or concrete ditches.

The second concern is protecting any exposed, bare soils from raindrop impact. The most common approach to erosion control is to apply a surface protective layer—compost, seeded grasses, and

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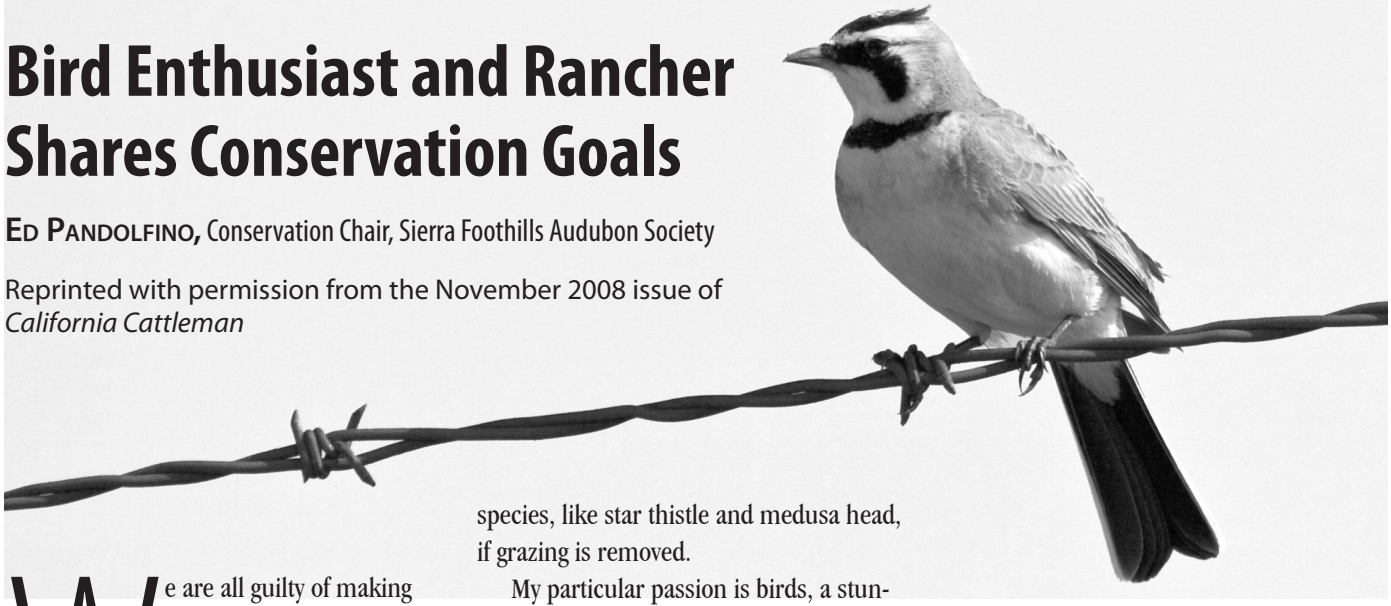
FINDING COMMON GROUND:

Bird Enthusiast and Rancher Shares Conservation Goals

Ed Pandolfino, Conservation Chair, Sierra Foothills Audubon Society

Reprinted with permission from the November 2008 issue of *California Cattleman*



Horned lark **Photo: Phil Robertson**

We are all guilty of making assumptions about other people based on limited information. Sometimes those assumptions turn out to be right, sometimes not.

For example, if I told you that I am the conservation chair of the Sierra Foothills Audubon Society and was on the executive committee of the local chapter of the Sierra Club you would probably assume certain things about what I believe.

You might assume that I think that the needs of wildlife should be considered equal to the needs of humans and that the Endangered Species Act is one of the most valuable pieces of legislation in American history … and you would be right!

You might also assume that I think that grazing in general and cattle ranching in particular are scourges upon the landscape. There, you would be absolutely mistaken.

In fact, most of us involved with conservation of native wildlife and plants in California recognize that, in many of our grasslands, grazing is required to maintain habitat quality. In particular, the rangelands of the Central Valley and its foothills and the interior Coast Ranges quickly become dominated by aggressive, invasive species, like star thistle and medusa head, if grazing is removed.

My particular passion is birds, a stunning variety and abundance of which thrive in California's rangelands. However, one of the issues I constantly struggle with is getting the public in general, and even other conservation-minded folks, to recognize how important these areas are as wildlife habitat.

It's pretty easy to get people worked up about saving majestic stands of old growth forest or wetlands teeming with ducks and geese. Show them a vast expanse of open grassland (especially in summer when everything is brown) and too many may think, "That looks a great place to build another golf course."

MORE GRASSLAND-DEPENDENT BIRD SPECIES ARE IN SERIOUS DECLINE THAN ANY OTHER GROUP

The under-appreciated fact is that California's rangelands support more bird species of conservation concern than any of those other, more popular habitats. Combine that with accelerating conversion of grasslands to urban or more intense agricultural uses and one can make a solid argument that our rangelands are the most crucial conservation priority in the state.

Winter is probably the easiest time to demonstrate just how important these rangelands are for birds. Raptors from all over North America migrate to California's grasslands for the winter. No place on the continent supports the numbers and variety of hawks that we have in winter. Seeing 10 to 12 species of hawks and owls in a single day is not at all unusual.

Red-tailed hawks and American kestrels, birds that live here year-round, see their numbers swell with visitors from further north. Close cousins of the red-tail, like the rough-legged hawk, leave their breeding grounds inside the Arctic Circle to spend the winter hunting rodents in our rangelands. Ferruginous hawks, arguably one of the most beautiful raptors in North America, fly from the Great Plains to winter in California.

Swift and powerful prairie falcons arrive to terrorize small birds and rodents alike in

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our open grasslands. You can sometimes detect the approach of a golden eagle by listening for the string of panic calls from the ground squirrels.

All day, northern harriers cruise low over the ground hoping to surprise a mouse and, as the daylight fades, short-eared owls take over from the harriers, using the same hunting style in the increasing darkness.

In spring and summer, the bird life may be less conspicuous, but just as vibrant. Western meadowlarks sing enthusiastically from any perch they can find. The handsome black, gray, and white loggerhead shrike will go after grasshoppers, lizards, and even songbirds nearly as large as itself to feed a hungry brood.

Western kingbirds, having flown to our area from their wintering grounds in Mexico, perch along fence lines showing off their lemon-yellow bellies and sallying out to grab insects on the fly. Burrowing owls comically bob up and down as they stand next to an old ground squirrel burrow. A white-tailed kite hovers in place waiting to plunge feet first on an unsuspecting mouse.

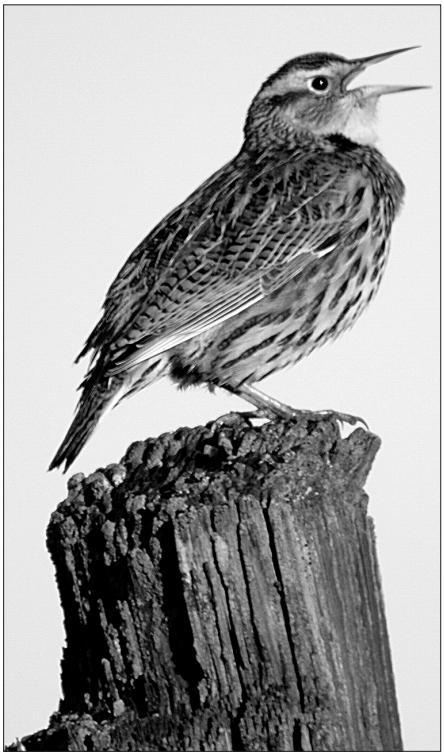
Recent reviews of more than three decades of monitoring studies in the breeding season and in winter show that more grassland-dependent bird species are in serious decline than any other group. Even abundant and widespread species like western meadowlarks and American kestrels show alarming long-term downward population trends.

Over this period, we have lost hundreds of thousands of acres of California rangeland to vineyards, orchards, and housing developments, and the birds that use this habitat are feeling the impact.

The importance of cattle ranching to protecting this habitat goes beyond simply preventing conversion to other uses. In general, when grazers are taken off the land, grassland birds suffer. Bird species of particular conservation concern, like

Northern harrier **Photo: Jack Ferrante**

OUR RANGELANDS ARE THE MOST CRITICAL CONSERVATION PRIORITY IN THE STATE.



Western meadowlark **Photo: Tom Roach**

burrowing owls, mountain plovers, and horned larks, all prefer habitats where the grasses are kept very short.

Wintering raptors cannot find their rodent prey in lands dominated by thick mats of invasive grasses or dense stands of thistle. Much recent research also supports the value of grazing to maintaining many native plant species and, no doubt, these plants species are important to maintenance of the quality of the habitat for many bird species, as well.

Most of California's characteristic grassland birds are still common. They persist not in spite of, but largely because of ranching. As more and more of this ranchland is converted to sprawling housing developments or acres and acres of vineyards, we will see many of these species become uncommon.

While, in my wildest fantasy, I might like to see all of our state's grasslands preserved and managed primarily for the benefit of wildlife, I know that is never going to happen. The simple fact is that the only practical way we will retain sufficient habitat for the rangeland wildlife of this state is through the maintenance of viable cattle ranching operations.

I am spending a great deal of my time and energy trying to educate people about the critical importance of preserving California's rangelands and the role cattle ranching must play if these habitats are to survive.

So, next time you see someone's vehicle sporting either an Audubon Society or a Cattleman's Association bumper sticker, you may have a lot in common with *both* of them."

The Sierra Foothills Audubon Society is a signatory partner of the California Rangeland Conservation Coalition. Without the efforts of its more than 90 partners, the Rangeland Coalition would not be able to succeed in its goal of enhancing California's rangeland for species of special concern, while supporting the long-term viability of the ranching industry. For more information about this local Audubon chapter, visit WWW.SIERRAFOOTHILLSAUDUBON.COM.

Making Wildlife Habitat and Clean Farming Compatible

John Anderson, Owner/Operator, Hedgerow Farms, Winters, CA
Liz Goebel, Product Operations and Outreach Coordinator, Hedgerow Farms, Winters, CA

Photo credits: John Anderson

Canal planted with *Carex* species and *Muhlenbergia rigens,* native grass and sedge species that reduce bank erosion and increase water quality

Updated and adapted from *Bringing Farm Edges Back to Life: Landowner Conservation Handbook*, with permission from the Yolo County Resource Conservation District

Farmers, land managers and agricultural advisors have begun to realize the long-term impacts of the traditional approach of "clean farming." The practice of keeping all land that isn't planted to a crop either disced or sprayed clean has resulted in cumulative soil and organic matter losses and sediment buildup in unwanted areas. In many cases, attempts to keep ground "clean and bare" are unsuccessful, and they instead turn into reservoirs of unwanted weeds and thus seeds that then spread into the cropland. Bare ground also results in a reduction in surface and groundwater quality and quantity as runoff increases.

The results are a monetary cost to the farmer, a cost to the land in the proliferation of weeds and other problems, and an overall loss of valuable habitat. Are there farm-friendly solutions to these challenges that do not threaten productivity and that help reduce erosion, improve water quality, and save labor or chemical costs in the long run? Have we forgotten that the goal of "clean" farming should be weed-free, not vegetation-free?

Current farming practices in most of California's intensively farmed areas have dramatically reduced or eliminated wildlife habitat within agricultural systems. The impulse to maintain borders, berms, and roadsides without vegetation, as well as use all available farmland for production, results in a brown, barren landscape that lasts from plowdown in the fall until spring planting. One impact of successful farming is the unfortunate, lifeless state of vast acres once so important to the myriad species that inhabited our most productive farming areas. More and more, "productivity" is judged by measuring only intensively cultivated monocultures, not whole agricultural ecosystems.

In our view there is no inevitable, long-term conflict between good farming and biodiversity. Threats to biodiversity come not so much from increased agricultural traffic, but from a lack of natural habitat. When farmers believe that only one version of "clean farming" is economically viable, the result is a lack of habitat.

The number-one reason for bare-dirt clean farming is to control the invasion of noxious weeds. This is certainly a valid concern since any area of bare and disturbed soil will be rapidly colonized by a host of nasty and unsightly vegetation. Several

Roadside planting of *Nassella pulchra, Grindelia camporum,* and very few weeds

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species of weeds have also developed resistance to commonly used herbicides, making their eradication even more difficult. Star thistle, annual ryegrass, puncture vine, Johnson grass, bindweed, and mustard are but a few of the undesirables we continually spray and disc to eliminate.

The number-two reason for bare-dirt farming is the idea that habitat borders will harbor pest insects and rodents that can harm crop yields. Habitat borders also come under attack because of food safety issues stemming from the presence of wildlife (for example, *E. coli* and *salmonella*).

Lastly, bare-dirt farming has become the accepted, automatic practice. Border vegetation implies sloppy farming—what will the landlords, neighbors, or bankers think?

What can be done to reverse the current scenario without impacting the agricultural livelihood of California? Certainly most farmers appreciate wildlife, and evidence suggests that a biodiverse border of plant species provides habitat for many beneficial insects, pollinators, and predators (such as raptors, bats, and reptiles).

Instead of a high maintenance, bare-dirt system, we propose a balanced, self-sustaining multispecies perennial grassland that outcompetes any weedy invasion. Corridors of mixed native perennial grasses and forbs along roadsides, berms, ditchbanks, canals, field borders and any non-cropped areas provide excellent year-round habitat for wildlife without a negative impact on overall farming practices. Incorporating patches of native shrubs and/or trees into these corridors greatly increases biodiversity and habitat value. More recently, perennial flowering forbs are being incorporated into the system to provide pollen and nectar for beneficial insects and pollinators year-round.

The Yolo County Resource Conservation District works closely with landowners to plan and install hedgerow, roadside, and tailwater pond plantings and promote good stewardship of our farmland. Audubon California also has a Yolo and Solano County-based program, the Landowner Stewardship Program, which installs and maintains similar restoration projects on privately owned land. The success of both programs illustrates that habitat and clean farming are compatible. Without question, native grassland habitat areas provide weed and erosion control, reduce maintenance, and greatly enhance the biodiversity and aesthetics of farm landscapes.

Tailwater ponds like this one in Yolo County provide habitat for terrestrial and aquatic creatures and improve agricultural runoff water quality.

Bruce and Rich Rominger, who farm ground adjacent to established corridors, have not seen any significant negative impact on their crop production. In fact, the most difficult aspect of farming with corridors is training tractor drivers to recognize the borders and avoid discing

WILDLIFE HABITAT, continued on p. 10

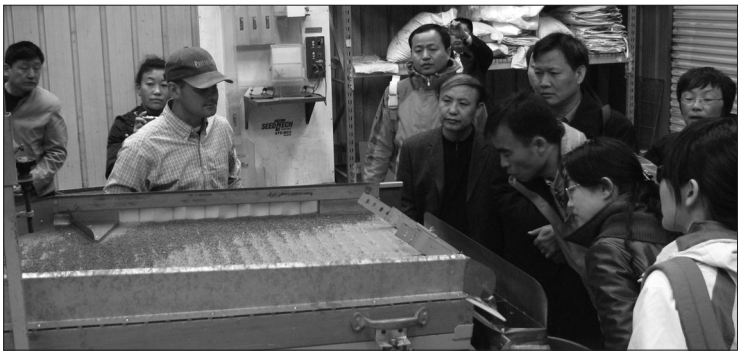
Roadside planting and hedgerow form a habitat corridor useful to birds, mammals, and insects.

Chinese Delegation Learns about Grassland Management

Liz Goebel, Product Operations and Outreach Coordinator, Hedgerow Farms, Winters, CA

Photo credits: Liz Goebel

In early March, a Delegation from the Chinese Ministry of Agriculture visited John Wick's Nicasio Native Grass Ranch in Marin County and Hedgerow Farms in Yolo County. The Delegation consisted of directors, senior agronomists, and researchers from the Grassland Monitoring and Supervision Center of China. The purpose of their visit was to study grassland management practices and strategies developed in the United States.



Chris Place (third from left, with cap), Hedgerow Farm Operations Manager, demonstrates how a gravity table works in the seed cleaning process.

At the Native Grass Ranch, the Delegation learned about the Marin Carbon Project. This Project has experiments currently underway on the ranch that aim to increase soil carbon sequestration using compost additions and grazing management techniques. Before visiting the experimental plots and touring John Wick's ranch, UC Berkeley researcher Whendee Silver gave a presentation about this 5-year project, which has already been underway for 1 year.

At Hedgerow Farms, Owner–Operator John Anderson, who is also a founding member of CNGA, gave an overview of the native seed production process that included a demonstration of plug planting for initial seed increases. On the field tour, John and his staff showed the Delegation native grass seed production fields of *Nassella pulchra* and *Leymus triticoides* while discussing the growth characteristics and attributes of both species. They also toured habitat areas, including a vegetated canal, hedgerows, and a tailwater pond. Chris Place, Hedgerow Farms' Operations Manager, gave a review of the seed cleaning process and demonstrated the use of an elevator and gravity table.

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over newly established vegetation. The steps toward shifting away from a clean-farming approach are easy, especially for a farmer. It is simply a matter of using farming practices to get native vegetation established.

A wide variety of native grassland seed is now available, and establishing a stand is similar to growing wheat or alfalfa. Because perennial grasses grow more slowly, weed management in the first year is very important, and timing of planting, selective herbicide application, and mowing are all important tools for success.

The slow-growing establishment period explains why these grasses are not invasive weeds, and perhaps why they disappeared from much of California's agriculturally impacted areas. Seed mixes of flowering forbs that bloom year-round are being developed to provide habitat for beneficial insects and pollinators during every season within these grassland plantings.

In short, mixed native plant field corridors are certainly a reasonable, workable compromise that could become normal, cost-effective practices for good farmland stewardship.

There are literally thousands of miles of edges, roadsides, drains, borders, canals, and odd corners that could be performing valuable ecosystem services to improve the function and health of our watersheds. The visual image of clean farming for the future should be borders of perennial grasslands, shrublands, and riparian buffers, not lifeless borders of bare dirt.

Weed-free does not mean vegetation-free. With the use of mixed native plant corridors, both environmental quality and quality of life would be significantly enhanced, especially for those of us who live and work in the agricultural landscape.

A wealth of up-to-date information is available to assist farmers and landowners who want to create multispecies habitat on farmland edges. A few websites are:

- WWW.NRCS.USDA.GOV (Natural Resource Conservation Service),
- www.yolorcd.org (Yolo County Resource Conservation Disstrict)
- WWW.WILDFARMALLIANCE.ORG (Wild Farm Alliance),
- WWW.XERCES.ORG (Xerces Society for Invertebrate Conservation), and
- WWW.CAFF.ORG (Community Alliance with Family Farmers).

About the authors: John Anderson is a past president and founding member of CNGA. Liz Goebel is a CNGA board member and the Chair of the *Grasslands* Editorial Committee.

For a complete copy of *Bringing Farm Edges Back to Life: Landowner Conservation Handbook*, please call the Yolo RCD at 530-662-2037.

PUTTING DOWN ROOTS, continued from p. 5

most common approach to erosion control is to apply a surface protective layer—compost, seed, and protective mulch—to the bare soil surfaces. This is usually achieved with seeded and planted vegetation and by moderating surface water flows with straw, wattles, check dams, mulches, and organic blankets. California native grasses and forbs are often used with hydromulching applications because they are adapted to the state's climates and soils and will, if the right conditions are provided, root deeply into the soil profile. Native grasses and forbs also offer social and environmental benefits of habitat, aesthetics, and sequestration of carbon. Container native shrub and tree species may be planted concurrently or later.

On many sites, however, this surface erosion control is not adequate to prevent erosion. Most rains provide enough water volume to more than saturate this hydromulch layer. After the hydromulch layer is saturated, additional rain must either infiltrate into the soil or be shed downslope. A compacted substrate reduces infiltration, generating excess overland flow that gains momentum and mobilizes sediment.

Restoring soil infiltration capacity can begin to take the site beyond short-term control to long-term erosion resistance. Many compacted soils can be treated so that stormwater infiltration into a slope is increased, resulting in no overland flow at all. The objective is to regenerate an infiltration rate in the soil that meets or exceeds the rate of precipitation. Incorporating 1–2 inches of wood chips or shreds into the top 200–250 mm (8–10 in.) of a compacted soil allows many short storm pulses to be retained in the soil horizon. On the test sites, a toothed scarifier (such as a backhoe bucket or short teeth on a toolbar) was used to coarsely mix soils and amendments. After the soils are amended and treated, the soil surface should be covered with another inch of chips, needles, or straw to keep raindrops from splattering the soil surface and forming a surface seal, or crust. These infiltration improvements and surface covers can solve most short storm erosion results, especially if the site is not steep.

Protection through the winter season

Containing larger volumes of stormwater from multiday storm events and accumulation of water late in winter is an additional challenge. Most natural soils are not harmed by this additional water because such soils have developed deep fractures and root channels that allow for deep infiltration. In natural soils, rates of infiltration are slower than at the soil surface, but they are steady enough to drain the soil in time for the next rain event.

The depth of a soil needed to avoid accumulation of water at the surface—and therefore avoid potential runoff—varies, but will be from 2 to 4 feet deep in many areas of California. This depth depends on underlying rock content, texture, water content, and soil structure, as well as the site location and rainfall patterns. Because these variables can be modeled using soil hydrologic modeling software, a set of maps could be developed to estimate general design guidelines for soil treatment depths on various soil types and locations in the state.

Restoring infiltration to a slope may seem counterintuitive, and is not appropriate in all situations, because water has weight, lubrication, and pore pressure qualities. At the same time, the deeper the soil, the greater the level of storm intensity that can be retained without developing saturation and positive pore pressure to form at depth and potentially causing shallow slips. On the test sites, the regeneration of soil–water infiltration capacity was designed to improve surface geotechnical stability in combination with geotechnical and surface erosion control measures. The greater soil capacity holds water with less overland flow, but whenever disturbed soils are at earth surface positions where they may become saturated, they must rest on a horizontal bench to avoid lateral slippage.

On the 2:1 horizontal:vertical (h:v) tests to repair slopes at Lake County, Los Angeles County, and the Sierra foothills, the

PUTTING DOWN ROOTS, continued on p. 13

CHINESE DELEGATION, continued from p. 10

After the farm tour, CNGA's President Wade Belew gave a presentation describing the invaded state of California's grasslands, the high level of grassland species diversity, and the importance of restoring and managing our grasslands.

John Anderson ended the visit with a bit of his own grassland philosophy, urging the Delegation to embrace the use of native species in China, so they do not repeat mistakes that were made in the Western United States with the introduction of non-native species that resulted in species composition change and degradation of rangeland biodiversity.

To learn more about the Delegation and carbon sequestration research in California, go to:

- http://www.marinij.com/marinnews/ci_14517322 "Study in West Marin fights global warming," *Marin Independent Journal,* March 4, 2010;
- www.kwmr.org/news "West Marin Report." See Monday and Tuesday March 8 and 9 (click the "Listen" Link next to the dates to hear the story.)

John Anderson (right) explains the use of native plantings in weed control while the Delegation was out touring Hedgerow Farms.

Member Participation: Get to Know Your CNGA Committees, and Get Involved!

Liz Goebel, Chair, *Grasslands* Editorial Committee

We hope this new column will increase CNGA member participation in Committee and Board activities. To start, I'd like to introduce myself as the new *Grasslands* Editorial Committee Chair and share some of the goals I have in this new role.

In my work at Hedgerow Farms, I talk with many types of folks involved in grassland restoration throughout Northern California. As such, I spend a lot of time enthusiastically educating these people about the basics of project installation and California grassland ecology. Our *Grasslands* publication is a fantastic resource for my colleagues and me, and I am excited to be a part of the production of each issue.

Our President Wade Belew shared his four main goals for CNGA in the winter issue. I'd like to follow Wade's lead to apply these goals to *Grasslands*:

Member involvement: This is my number-one goal: We need your help! I ask all CNGA members to get involved, not only with *Grasslands,* but with any CNGA committee. To that end, *Grasslands* will publish "Committee Updates" in upcoming issues. These articles will highlight ways in which members can be involved in each committee.

The Board and our committees can be more effective with input and assistance from the CNGA general membership, and we look forward to working with many of you soon. A list of committees and contact information accompanies this article.

Increasing efficiency of CNGA board operations and programs: For the *Grasslands* Editorial Committee, this means streamlining the production process, following deadlines, and reviewing each issue before it is printed.

Help from CNGA members with review and editing is a great way to become involved with *Grasslands*. Please contact me if you're interested.

Increasing education and outreach to people with general environmental interest: *Grasslands* has had fantastic content since I've been a reader. I'd like to continue to publish high-quality articles and add content, including mini book reviews, CNGA Committee updates, articles of interest to homeowners (such as landscaping and lawn replacement), and practical information on grassland restoration of use to people who do restoration for a living or as a hobby. We love receiving ideas and article submissions from the CNGA membership, so please let us know if you have an idea or article!

Top-down lobbying: Jim Hanson's Special Report on Pt. Molate (Winter 2010 issue) is a great example of how *Grasslands* can be *the* source of information on important grassland issues. We should aim to educate policy-makers and the general public with *Grasslands* articles, in combination with letter writing, public appearances, and news releases. CNGA membership is the eyes and ears of the Board, so let us know if you discover a grassland issue that needs our attention.

Being a CNGA committee member is a great résumé-builder and volunteer activity. The CNGA Board unanimously agrees that member involvement is critical for a sustainable and effective association. Please consider donating your time and talents to any of our committees!

Get Involved! Join a CNGA Committee.

The CNGA Board of Directors invites members to help us further CNGA's mission to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship.

Please consider joining one of the following committees:

Grasslands Editorial Committee (Liz Goebel, egoebel@hedgerowfarms.com). We need article ideas; article, photograph, and illustration submissions; help with editing and final review.

Workshop Committee (Bryan Young, youngb@sacsewer.com). We generate concepts for educational workshops that help to promote, preserve, and restore the health of native grassland systems. We then develop curriculum, find venues, recruit instructors, and make these workshop ideas come to life. We would welcome your fresh ideas and energy in the creation of new grassland workshops.

Advocacy and Collaboration Committee (Jim Hanson, greenhectare@yahoo.com). We encourage you to have your say about projects that affect the grasslands of California. This month, let your voice be heard concerning plans to establish a major casino project at Point Molate (see Winter 2010 *Grasslands*). E-mail Senators Boxer, Feinstein, and Secretary of the Interior Ken Salazar, and your House representative now! (The Interior Secretary will the final decision with input from our California representatives).

Development and Outreach Committee (Sara Sweet, ssweet@tnc.org). We connect the needs and interests of CNGA members to the Board. We also hope to develop Board finances via grants. We would appreciate the help of a volunteer with grant-writing experience. Also help us out by taking the upcoming member survey!

PUTTING DOWN ROOTS, continued from p. 11

and replacement; back-filled benches; or by hydraulic hammering. Disturbed soils on slopes steeper than approximately 3:1 (h:v) are usually rested on horizontal benches. Claypans, hard sedimentary strata, or volcanic lahar flow substrates are examples of impermeable substrates. Many Coast Range sites will already have natural fractures in the rock that take care of this function, thus it is often not necessary to excavate deeply—just open up the surface a foot or so.

The treatments needed to achieve deep infiltration also provide deep rooting and moisture access. Field plots around the state have shown that plants can be successfully grown only from moisture stored in the soil (Caltrans 2008b). This summer water availability generates increased plant growth, which also creates greater root strength and deeper root anchoring. The increased plant growth and organic matter production, in turn, increases infiltration and increases mulch cover. Such well-vegetated soils saturate less often and become increasingly erosion resistant with time.

Step 3. Regenerating Soil Nutrient Cycling

Soil nutrients on degraded sites are often out of balance, having too low a proportion of slowly available nitrogen (N) and too high a proportion of easily available N. High rates of available N encourage weed growth and can potentially leach to local watercourses. Thus, highly available N should be kept low enough that the native plantings are not overgrown by weeds.

Ripping of severly compacted soils on contour for seeding purple needlegrass (*Nassella pulchra*) following construction. "Compost overs" were incorporated prior to seeding.

Because N is cycled in and out of organic matter rather than extracted from local geological materials, organic amendments are a good way to address this concern. Yard waste composts are commonly applied to revegetation sites, and they tend to work well because they have a large amount of organically bound N that is only slowly available for release.

The N needs of various types of field sites can be addressed by adding compost products of different ages. A 1- to 2-inch layer of yard waste compost, tilled into the soil, will regenerate much of the nutrient reserves for low nutrient sites. Well-cured composts release their N faster than composts that are mature (thermophilic stage complete) but uncured. The latter hold their remaining organic N in reserve, slowly releasing it over multiple years. For sites where composts are impractical to deliver or apply, blends of wood shreds and commercial organic soil amendments can be selected that provide many of the same nutrient levels.

But, not all sites need nutrient amendment. Sites adjacent to roadways often do not need additional N inputs to support native plant stands because of high levels of N aerially deposited from automobile exhaust. Sites containing residual soil materials that tend to be darker, more friable, and have higher organic content also do not need N input.

Phosphorus, potassium, sulfur, calcium, magnesium, and micronutrients tend to remain in the soil until withdrawn by a root; therefore, chemical-based fertilizers can supply these nutrients if these needs are not met by the compost amendment.

The above-mentioned soil organic amendments and treatments work synergistically. Excavation, ripping, or fracturing to incorporate organics also appear to hold the soils open so storm water can infiltrate. The increased infiltration reduces runoff and stores water for summer plant use. Eventually, the developing soil–plant system takes over the functions of rainwater infiltration and storage, nutrient cycling, and soil biological processes. Within 5 to 10 years, natural soil aggregation gradually replaces the pores held open by the incorporated organics.

Step 4. Root and Microbial Biology: A Brief Note on Restrictions

Regenerated soil conditions allow a site to support a wide variety of native species. But, some natural soil conditions are still restrictive to all but a few uniquely adapted plant or microbial types. Some care should be given for special site conditions, such as serpentinite-derived soils, ultramafic substrates, acid or salty areas, or areas of excessive calcium. Commonly, several types of plants (and probably microbes) have adapted to each of these extreme substrate types, but the more extreme the substrate, the more likely it is that locally collected materials or known tolerant accessions should be used. Make friends with a good botanist and pay attention to plants already growing on similar, disturbed-but-revegetated reference sites.

Step 5. Monitoring and Maintenance Treatment Options

The first year of native plant establishment is critical to get right, although even relatively scattered individual plants can expand and fill the ecological space after several years if weed growth is actively controlled. Because access is often limited after a site has established, treatment options are often fewer and involve less intense methods (mainly, there is less opportunity for increasing infiltration and rooting with mechanical tillage). However, most plant growth problems (other than soil hydrology) can be corrected with relatively low-intensity treatments, such as nutrient amendments or surface water

PUTTING DOWN ROOTS, continued on p. 14

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routing. With adequate site hydrologic treatment, good stand establishment, and active weed control during the first few years, maintenance activities will be vastly reduced. As field successes occur, these demonstrated examples should be communicated with other revegetation workers and entered into easily accessible records.

Conclusion

Although specific prescriptions await further modeling and testing to fit California's widely diverse soil, climate, and geographical conditions, we know that, in general, these critical soil processes can be restored to soils that have been dispersed, stripped, or compacted through disturbance. When soils are adequately regenerated, plant growth can be vigorous, even on previously harsh sites.

Literature Cited

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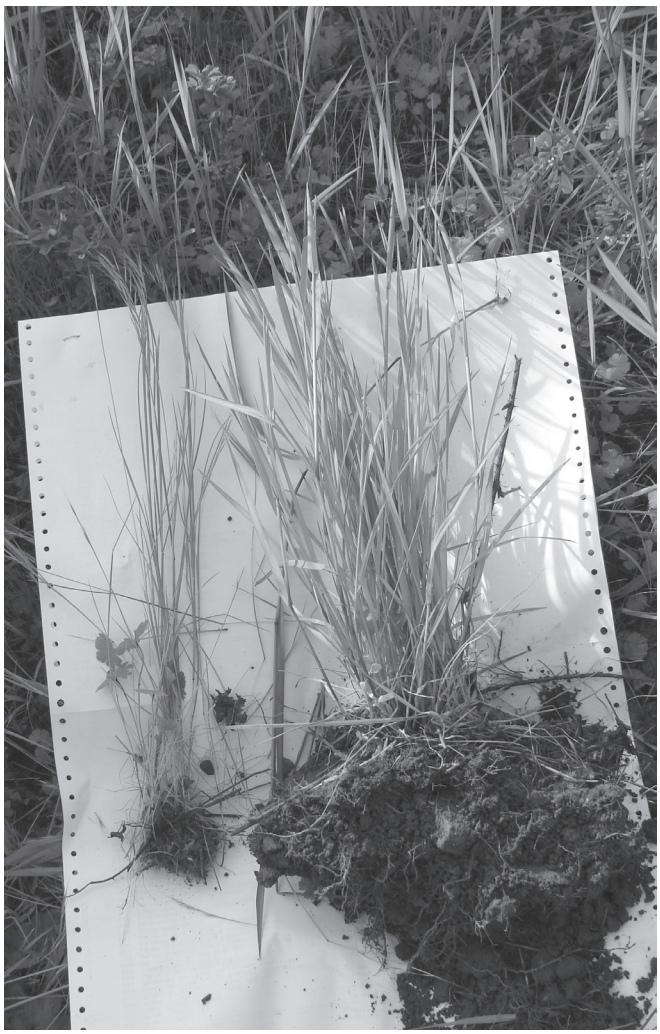
Vic Claassen runs the Soils and Revegetation Lab, University of California, Davis, Department of Land, Air and Water Resources. Vic can be reached at VPCLAASSEN@UCDAVIS.EDU.

Jim Hanson manages revegetation and highway planting projects for the California Department of Transportation. Jim can be reached at JIMH844@YAHOO.COM.

Regionally suited native grasses fill in San Francisco shoreline soils treated for rooting depth and with a few inches of organics prior to seeding. Shown are *Festuca rubra* 'Molate Point,' *Hordeum brachyantherum, Elymus glaucus, Nassella pulchra*, and a small amount of *Bromus carinatus.*



(Left) Weedy, shallow-rooted *Vulpia myuros* (rattail fescue), from the compacted road edge areas remaining after construction. (Right) Native *Hordeum branchyantherum* grass from the shoreline site shown in the adjacent photo. The native perennial's roots appear to be helping to reaggregate the soils.

PUTTING DOWN ROOTS, continued from p. 14

treatment, good stand establishment, and active weed control during the first few years, maintenance activities will be vastly reduced. As field successes occur, these demonstrated examples should be communicated with other revegetation workers and entered into easily accessible records.

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REGISTER ONLINE AT WWW.CNGA.ORG OR USE FORM ON PAGE 19.

The California Native Grasslands Association presents:

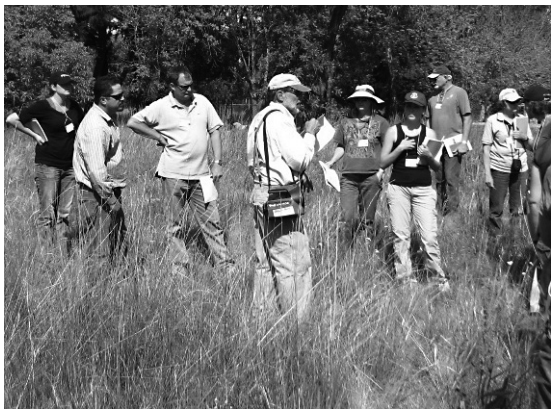
3rd Annual **Field Day at Hedgerow Farms**

Friday, April 16th, 8 a.m.–4:30 p.m. **21905 County Road 88, Winters**

A full day of practical, hands-on learning about native grasses and grassland restoration
A spectacular venue renowned for native grass seed production and numerous restoration sites

Featuring:

- Field identification of dozens of native grassland species and common grassland weeds. A great opportunity to take photos and collect specimens
- Tours of restoration sites, including grasslands, roadsides, hedgerows, orchards, canal banks, tailwater ponds, wetlands, and riparian forests
- Field presentations of grassland experimental trials, including pollinator plots and large-scale forb seeding
- Field demonstrations of grassland establishment and management tools and techniques
- Overview of a commercial seed production process
- Native landscaping options for homeowners
- Wildflower corridors for pollinators • DPR and SRM CEUs are pending.



Hedgerow Field Day 2009

Sponsored by: Hedgerow Farms, Pacific Coast Seed, S & S Seeds, Delta Bluegrass Co., and Dow AgroSciences

Lunchtime speakers: Joe Silveira, US Fish & Wildlife Service; Rachael Long, UC Cooperative Extension Service; and Beau Miller, Dow AgroSciences

Instructors: John Anderson, David Amme, Chris Rose, Bryan Young, Hedgerow Farms Staff, and CNGA Instructors TBA

Registration fees: $45/CNGA members; $65/nonmembers, $35/students w/ID

2010 CNGA Symposium Features the North Coast

Grasslands of the California North Coast: A Symposium

at a glance...

Thursday–Friday, June 3–4

Morning Presentations: Humboldt Area Foundation, Bayside
Afternoon Field Trips: the Lanphere Dunes and the Bald Hills
Thursday Evening (no-host) banquet with cash bar: Plaza Grill, on the Arcata Plaza; honored speaker, *David Amme: Creating a Native Meadow*

Fees: $175/CNGA members, $215/nonmembers, $100/students w ID; $38 per person /Thursday evening Banquet

Saturday–Sunday, June 5–6 (optional)

North Coast Grass ID Workshop
Day 1: Humboldt State University Herbarium, Arcata
Day 2: Field Sites

Fees: (take $20 off fee if you've also registered for Symposium)
$220/CNGA members; $260/nonmembers;
$135/students w ID

Morning Presentations (8:30 A.M.–Noon)

Thu, June 3

Session 1: Grasses and North Coast Grasslands

Grasses and Changing Views on Grass Systematics
Keynote Speaker: ***Dr. James P. Smith, Jr.,*** Emeritus Professor of Botany and Curator of Vascular Plants, Humboldt State University

Dr. Smith is Family Editor for the Grass Family in the forthcoming *Jepson Manual of Higher Plants of California,* Second Edition, and author of the forthcoming *Grasses of California,* a book in the UC Natural History Series.

Grasses are the most frequently encountered and economically important vascular plants. General features of the family, its defining technical characters, and its taxonomic position will be reviewed, as will our changing concepts of its subfamilies, tribes, and genera.

A preview of the family treatment in the second edition of the *Jepson Manual of Higher Plants of California* will be presented.

Grassland Vegetation of the California North Coast: A State of Knowledge Status Report
Todd Keeler-Wolf, Senior Vegetation Ecologist, Biogeographic Data Branch, California Department of Fish and Game, and ***Julie Evens,*** Vegetation Program Director, California Native Plant Society

Conserving California Native Grasslands: Effective Use of State and Local Policy and Regulation
Gordon Leppig, Environmental Scientist, Coastal Conservation Planning, California Department of Fish and Game

Session 2: Grasslands Restoration on the North Coast

King Range Native Perennial Grass Program
Jennifer Wheeler, Botanist, Bureau of Land Management, Arcata Field Office

Bald Hills: A Grassland Haven above the Solemn Redwoods
Leonel Arguello, Chief, Vegetation Management, Resource Management and Science Division, Redwood National and State Parks

Fri, June 4

Session 2, cont.: Grasslands Restoration on the North Coast

Dunes, Salt Marshes, and Invasive Grasses: What Makes a Grassland a Grassland, and How Do We Restore Them?
Andrea Pickart, Ecologist, Humboldt Bay National Wildlife Refuge

Session 3: What Have We Learned? Where Are We Going?

Bringing Native Seed into Commercial Production
John Anderson, Owner–Operator, Hedgerow Farms

Farming for Grassland Ecosystems
Bryan Young, Manager, Bufferlands, Sacramento Regional County Sanitation District

Panel discussion, Q&A, Summary, and Conclusions
All speakers, with audience participation

Afternoon Field Trips (1–5 P.M.)

Thu, June 3

The Bald Hills, Redwood National Park
Leonel Arguello, Field Trip Host

The eastern, inland section of Redwood National Park is bordered by the Coast Range mountains. The Bald Hills, foothills of the coastal mountains, are found in the southern section of the park, east of and above Redwood Creek as it runs in a north–south direction. These hills feature prairie and oak woodlands.

Fri, June 4

The Lanphere Dunes
Andrea Pickart, Field Trip Host

The most pristine remaining dune system in the Pacific Northwest, the Lanphere Dunes is the site of one of the most successful dune restoration projects on the West Coast, accomplished through the ongoing removal of invasive, non-native vegetation.

The Dunes Unit protects endangered and rare plants within rare dune plant communities.

Symposium No-Host Banquet

Thu, June 3, 6:00–9:30 P.M.

Honored Speaker: *David Amme,*
Creating a Native Meadow

Plaza Grill, View Room, Jacoby Storehouse, overlooking the beautiful Arcata Plaza

Cash bar opens at 6:00 p.m.; buffet banquet begins at 6:30 p.m.

Menu: Two entrees, chicken frascati and vegetarian lasagna al forno, with accompaniments of bread, spring mix salad, and seasonal vegetables. For dessert: chocolate mousse.

Cost: $38, includes tax, gratuity, and after-dinner presentation, with take-home notes provided. See description below.

GUESTS ARE WELCOME. ADVANCE REGISTRATION REQUIRED.

Special Bonus! During dessert, you'll hear a step-by-step native meadow presentation (handout with notes and bibliography provided) by one of CNGA's founders and our immediate Past-President, the "Grass Man," David Amme.

Photos: (left) Bald Hills, Gail Penso; (above) Lanphere Dunes, Andrea Pickart

Optional Two-Day Workshop

Sat–Sun, June 5–6

Identifying the Native and Naturalized Grass of California's North Coast
Location: Humboldt State University Herbarium and field sites

The theme of this workshop is "Grasses are fun and easy to identify." The goal is to learn the basic skills of identifying grasses.

Day 1: Learn about California's North Coast ecology and the qualities of specific native grasses for restoration, and learn to recognize basic groups and common species through work with plant samples in the classroom. Two methods of identification will be reviewed, focusing on the important distinguishing traits. A comprehensive workshop binder and basic key to identifying grasses will be provided.

Day 2: You will explore the coastal prairie of the North Coast, rich with an unparalleled diverse assemblage of native and naturalized grasses. You will also make good use of your new understanding and skills in grass identification.

Bring a 10× hand lens, notebook, transparent tape, and any field guides to grasses that you may have.

Fees: $220/Members, $260/Non-members, $135/Students with ID. $20 off if concurrently registered for *Grasslands of the California North Coast: A Symposium*

Your symposium registration includes:

- Continental breakfast
- Keynote Address
- Buffet lunch
- Refreshment breaks
- Moderator and President's Welcome
- Morning Presentations
- Afternoon Field Trips

Lodging

Group Room rate for nights of June 2–June 5 (check out either June 4 or June 6, depending on attendance at Symposium only, or Symposium + Workshop, or Workshop only)

Quality Inn Arcata
3535 Janes Road, Arcata, California 95521
Phone: 707-822-0409, WWW.CHOICEHOTELS.COM

$89 per night – 1 King bed
$98 per night – 2 queen beds
To reserve, call 800-549-3336, ask for CNGA room rate

The Quality Inn is within two miles of Humboldt State University, the Downtown Plaza, and the Arcata Marsh and Wildlife Sanctuary.

Recreational amenities include an outdoor pool, a spa tub, fitness facility, complimentary parking, and coffee in the lobby. Guestrooms have wireless internet, air conditioning, in-room safes, cable television, refrigerators, microwaves, and hair dryers.

Other accommodations in the same vicinity are:

Hampton Inn & Suites
ph 707-822-5896, WWW.HAMPTONINN.COM, avg. $125/night

Howard Johnson
ph 707-826-9660, WWW.HOJO.COM, avg. $120/night

Best Western Arcata
ph 707-826-0313, pet-friendly, $99/night

Days Inn
ph 707-822-4861, WWW.DAYSINNARCATA.COM

CNGA 2010 Workshops and Events

CNGA Field Day at Hedgerow Farms

Join us for this third annual opportunity for practical, hands-on learning about native grasses and grassland restoration.

Friday, April 16 • 8 a.m.– 4:30 p.m.

Instructors: TBA (will include John Anderson, David Amme, Chris Rose, Bryan Young, plus others)

Location: Hedgerow Farms, 21905 County Rd. 88, Winters

Registration Fees: $45/CNGA members, $65*/nonmembers; $35/students. (*Nonmember registrants entitled to 50% off 1-year CNGA membership.)

Identifying the Native and Naturalized Grasses of Southern California and the Santa Rosa Plateau

Learn about California's grassland ecology and the qualities of specific native grasses for restoration. Become skilled at recognizing the basic groups and common species through work with plant samples in the classroom on Day 1 and in the field on Day 2.

Friday–Saturday, April 30–May 1 • 8:30 a.m.– 4 p.m.

Instructors: David Amme and Zachary Principe

Locations: Fallbrook Public Utilities Building, 990 E. Mission Road, and the Santa Rosa Plateau

Enrollment: limited to 35

Registration Fees: $220/CNGA members; $260/nonmembers (includes 1-yr complimentary membership); $135/students.

Identifying the Native and Naturalized Grasses of Point Reyes

Learn about California's grassland ecology and the qualities of specific native grasses for restoration. Become skilled at recognizing the basic groups and common species through work with plant samples in the classroom on Day 1 and in the field on Day 2.

Saturday–Sunday, May 22–23 • 8:30 a.m.– 4 p.m.

Instructors: David Amme and Wade Belew

Locations: Point Reyes Dance Palace, 503 B Street, Point Reyes Station, and field sites

Enrollment: limited to 40

Registration Fees: $220/CNGA members; $260/nonmembers (includes 1-yr complimentary membership); $135/students.

OUR BIG EVENT! Grasslands of the California North Coast: A Symposium

Join us as we explore native grassland habitats behind the "Redwood Curtain." Two mornings include guest speakers, exhibitors, panel presentation, Q&As, and networking opportunities. Thursday features a no-host evening banquet with speaker David Amme on "Creating a Native Meadow." Two afternoons feature field trips to the Lanphere Dunes and the Bald Hills.

Thursday–Friday, June 3– 4 • 8:30 a.m.–5:00 p.m.

Location: Humboldt Area Foundation Community Center, 373 Indianola Road, Bayside

Enrollment: limited to 65

Speakers and Instructors: See pp.16–17.

Registration Fees: $175/CNGA members; $215/nonmembers (includes 1-yr complimentary CNGA membership); $100/students

Banquet fees: $38 per person; guests welcome

Identifying the Native and Naturalized Grasses of California's North Coast

On Day 1, 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 work with plant samples in the classroom. On Day 2, visit field sites to identify grasses and view restoration practices firsthand.

Saturday–Sunday, June 5–6 • 8:30 a.m.– 4 p.m.

Instructor: David Amme

Locations: Humboldt State University, Arcata, and field sites.

Enrollment: limited to 30

Registration Fees: $220/CNGA members; $260/nonmembers (includes 1-yr complimentary membership); $135/students
($20 discount for this workshop if you register for June 3–4 Symposium!)

Register online at www.CNGA.org or use form on page 19.

And there's more!

Look for these workshops in the fall:

Half-day: **Creating a Native Meadow Lawn**

Homeowners: Are you fed up with your lawn and all the attention and water it requires? This workshop is for you! Whether starting from bare ground or looking to replace maintenance-hungry turf, learn how to develop and maintain a native meadow on your own property.

One-day: **Grassland Restoration Field Practices Workshop**

This field course will provide attendees with real-world experience in the preparation, planting, establishment, and maintenance of native grasslands. Instructors will demonstrate tools of the trade applicable to both large- and small-scale native grassland restoration projects.

One-day: **Grassland Monitoring Workshop**

Monitoring is a critical component of a grassland management program. This course will discuss goal setting for rangeland/grassland management as well as grassland restoration projects. Attendees will then learn grassland monitoring techniques that can be used to ascertain progress toward meeting those goals.

Grass ID consultation during CNGA field trip in Monterey, 2007

Watch our website

www.CNGA.org

for more details on these workshops as they are finalized.

Registration Form: CNGA Spring Workshops and Symposium | 2010

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

Participant's name (print or type please) _____

Participant's organization or agency (optional) _____

Mailing Address: Street _____ City _____ State _____ Zip _____

Preferred phone _____ _____ Preferred e-mail _____

Registration Fees :

1. ***CNGA Field Day at Hedgerow Farms*** ..... ☐ $45/CNGA members ☐ $65/nonmembers** ☐ $35/students
2. ***Identifying the Native and Naturalized Grasses of Southern California and the Santa Rosa Plateau*** ..... ☐ $220/CNGA members ☐ $260/nonmembers* ☐ $135/students
3. ***Identifying the Native and Naturalized Grasses of Point Reyes*** ..... ☐ $220/CNGA members ☐ $260/nonmembers* ☐ $135/students

4a. ***Grasslands of the California North Coast: A Symposium*** ..... ☐ $175/CNGA members ☐ $215/nonmembers* ☐ $100/students

4b. ***Symposium Banquet,*** June 3, features David Amme's presentation on ***Creating a Native Meadow.*** Guests welcome; cash bar ..... ☐ $38 per person

5. ***Identifying the Native and Naturalized Grasses of California's North Coast***
   Optional Symposium workshop..... ☐ $220/CNGA members ☐ $260/nonmembers* ☐ $135/students
   ($20 discount with Symposium registration)..... ☐ $200/CNGA members ☐ $240/nonmembers* ☐ $115/students

* One year of complimentary CNGA membership benefits is included with registration at nonmember rate.

**Nonmember registrants entitled to 50% off 1-year CNGA membership

☐ Payment by check made payable to California Native Grasslands Association

☐ Payment by credit card (please check type) ☐ Visa ☐ MasterCard ☐ American Express

Card number_____ Expiration date_____/_____

V Code _____ Billing Street Address _____ Zip_____

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

CNGA Merchandise Order Form

Phone/Fax: 530-661-2280 **Mail:** P.O. Box 8327, Woodland, CA 95776

Name _____

Mailing address _____

City, State, Zip _____

Day phone _____ **E-mail** _____

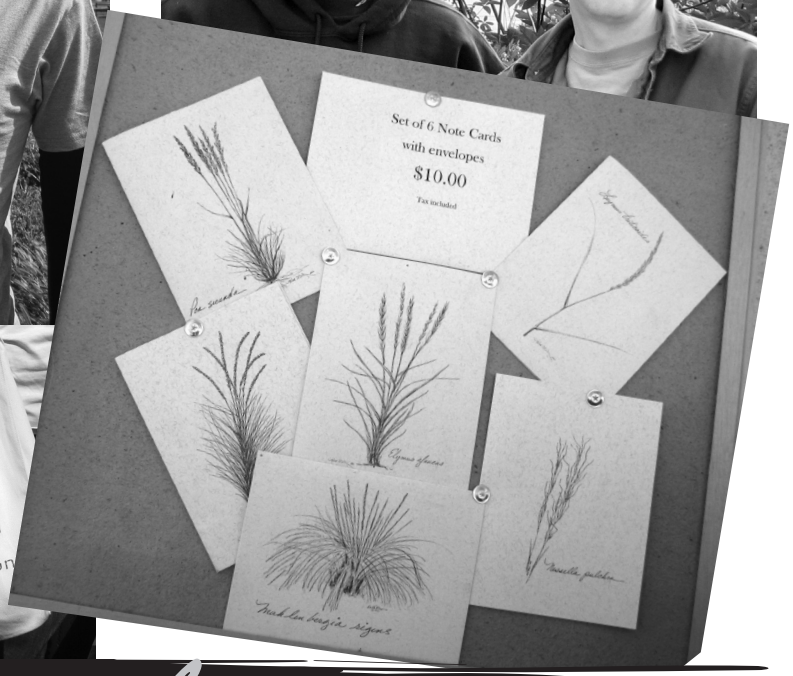
Item (All prices include tax. Call for combined shipping.)	Price	S/H	Qty	Total
CNGA Logo Items				
SALE! **Sturdy canvas tote,** natural w/green logo, 13x15x7	$15	$4	___	_____
SALE! **Baseball cap,** tan w/black logo, adjustable, was $20	$15	$4	___	_____
SALE! **Crush hat** (aka **bucket hat),** green, S/M only, was $20	$15	$4	___	_____
Tees unisex heather-green, short-sleeve (S/L/XXL/XXXL)	$15	$4	___	_____
NEW! unisex natural, short-sleeve (S/M/L/XL)	$20	$4	___	_____
NEW! women's, army-green, short-sleeve (S/M/L/XL/XXL)	$25	$4	___	_____
Long-sleeve unisex, olive green (S/M/XL/XXL/XXXL)	$25	$4	___	_____
CNGA Workshop Binders				
Restoration and Revegetation	$60	$6	___	_____
Ecology/Management Vernal Pool Grasslands (supply limited)	$35	$5	___	_____
Native Grasses/Graminoids Urban Landscape	$35	$5	___	_____
Grass Identification	$20	$4	___	_____
Posters: Grasses of CA 24x36, laminated	$25	$4	___	_____
(CNPS) set of 4, each different, 24x36, unlaminated	$20	$4	___	_____
SALE! **Notecards:** set of 6, with envelopes, was $10	$8	$2	___	_____
Grasslands				
Complete set of back issues (1991–2009)	$60	$10	___	_____
subtotals			$ _____	$_____

Total Enclosed $_____

Make check payable to California Native Grasslands Association (or CNGA)
or you may authorize payment by (circle one): Mastercard / Visa / AMEX

Card # _____ **Exp. date** _____

V Code _____ **Billing Street Address** _____



CNGA logo items for sale:

t-shirts, hats, totebags, note-cards, and more!

Order form on page 21.

CNGA Contact List

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Visit CNGA online at: www.CNGA.org

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 _____

Organization _____

Street _____

City_____ State_____ Zip_____

Phone _____ Fax _____ E-mail_____

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

Individual Membership

☐ **Regular member:** $45/year ☐ **Student:** $30/year ☐ **Retired:** $30/year ☐ **Life member:** (one-time payment) $500

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

Corporate Membership

☐ **Associate or Agency level:** $125/yr. Full membership benefits for three employees within the same small business or agency location. No benefits for CNGA major event.

☐ ***Poa secunda* level:** $300/yr. Full membership benefits for two employees, a business-card–sized ad for 1 year in *Grasslands*, and (with member payment of at least one registration) a free exhibit space at a major CNGA event.

☐ ***Nassella pulchra* level:** $500/yr. Full membership benefits for five employees, a quarter-page ad for 1 year in *Grasslands,* and one free registration and one free exhibit space at a major CNGA event.

☐ ***Muhlenbergia rigens* level:** $1,000/yr. Full membership benefits for ten employees, a half-page ad for 1 year in *Grasslands*, and two free registrations and a free exhibit space at a major CNGA event.

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CNGA Presents:

Grasslands of the California North Coast: A Symposium (see pp. 18–19)

Cover Photos: *Front:* Lupine in bloom, Bald Hills main ridge, Humboldt County *Gail Penso*

Back: Beach buckwheat and beach dunegrass, foredunes, Lanphere Dunes, Humboldt Bay National Wildlife Refuge *Andrea Pickart*