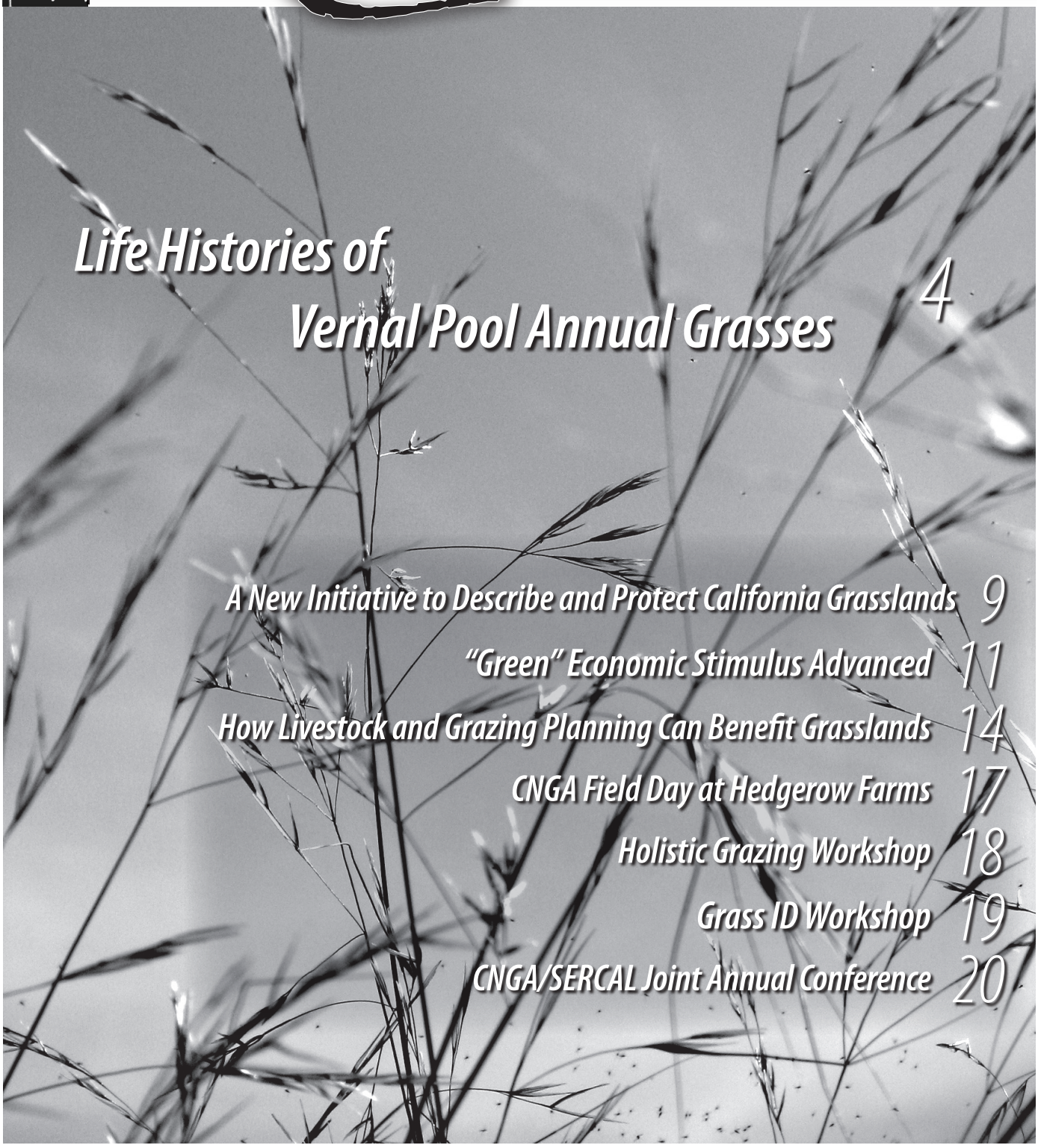
Vol. XVIIII, No. 1 | Winter 2009

California Native Grasslands Association

Grasslands

Published quarterly by the California Native Grasslands Association



Life Histories of Vernal Pool Annual Grasses 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.

Grasslands **is published quarterly by CNGA.**

ISSN No. 1540-6857

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, 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 2009: Feb. 15, 2009; **Summer 2009:** May 15, 2009; **Fall 2009:** Aug. 15, 2009; **Winter 2010:** Nov. 15, 2009

From the President's Keyboard

DAVE AMME

The last year has been a banner year of growth and accomplishments for CNGA, due in great part to Randi Paris's steady hand on the tiller, coupled with a super-active Board. Unfortunately, our Administrative Director, Suzanne Ullensvang, left CNGA this fall to take a great job with the UC Davis Arboretum. The Executive Committee advertised the position and hired Judith G-Scott, a CNGA member who lives on a "grass" ranch in Woodland. With Suzanne's help, we hardly missed a beat, and Judy is now set up in her new office and working closely with the Board. Welcome aboard, Judy G-Scott!

Aside from putting on one of our most successful annual conferences in Santa Rosa this past year, we also made great strides in developing the curriculum for two Conservation Grazing Workshops focusing on livestock planning that benefits grassland diversity and health (see pp. 18, 26). This has taken place with the synergy of two of our current Board members, Richard King and Kent Reeves. Richard, just starting his second Board term, works for the Natural Resources Conservation Service (NRCS) in Petaluma and is a Certified Educator in Holistic Management. Kent, formerly a wildlife biologist for East Bay Municipal Utility District (EBMUD) and a longtime CNGA activist, now works as a Resource Manager for Yolo County. Richard and Kent collaborated to teach a hands-on class for developing a site-specific grazing plan for Pepperwood Preserve, north of Santa Rosa. Michael Gillogly, the Preserve Manager, has been working diligently to convince Sonoma County to ease off on charging exorbitant taxes for using livestock to manage the Pepperwood grasslands. Without some kind of conservation grazing program, the Pepperwood grasslands had deteriorated significantly with a tremendous loss of both plant and wildlife species diversity. In response to a groundswell of support from the community, the Sonoma County Board of Supervisors reversed their decision and approved a new policy that will allow Pepperwood to initiate a livestock conservation grazing program sans taxes. With Kent and Richard's help, Pepperwood now has a great grazing plan.

2009 Conferences: The 2009 Annual Conference is just ahead. CNGA is sharing this conference with one of our sister organizations, the California Society of Ecological Restoration (SERCAL). It will be held at the Lake Natoma Inn on the American River in Folsom from April 29 through May 3, 2009 (see p. 20). It promises to be an exciting conference, including Wednesday workshops and nine technical sessions on Thursday and Friday focusing on habitat restoration in California's Central Valley. The Conference will be capped off with four Saturday field trips and will also include a weekend CNGA

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Grass Identification Workshop, in the lab on Saturday and in the field on Sunday, exploring the grasslands of Yolo County.

Coming up this January 17–19 at the Sacramento Convention Center, the California Native Plant Society (CNPS) will present a bellwether Conservation Conference: *Strategies and Solutions.* CNGA Board members will attend the conference with our educational display booth. CNPS has also implemented an important Grassland Initiative this past year. Check out the article in this issue of Grasslands (p. 9), and be sure to check the Web site at: ‹http://www.cnps.org/cnps/vegetation/grassland.php›. The Web site has a detailed Grassland Initiative outline, an excellent bibliography, plus a PDF of Chapter 3 on "Community Classification and Nomenclature" from the recent publication, *California Grasslands*: *Ecology and Management*, edited by Mark Stromberg, Jeffrey Corbin, and Carla D'Antonio.

A Board committee established in 2008, the Advocacy and Collaboration Committee, includes Jim Hanson, Zach Principe, Wade Belew, and Andrew Fulks.With the support of the committee, Jim Hanson penned a great letter (see p. 13) supporting a "Green" Economic Stimulus proposal to go along with the giant infrastructure proposals planned to lift the country out of the current recession. Almost immediately, SERCAL, Cal-IPC, and the Salmonid Restoration Federation signed on. CNGA is circulating the letter to additional organizations. Good work, Jim!

Concurrently, The Nature Conservancy is also calling for funds to be set aside for the states to implement high-priority restoration projects: "As a provision for economic stimulus funding, construction projects should incorporate recycled materials, wildlife corridors, invasive weed control, and native plants whenever appropriate to increase the sustainability of these projects."

Meet Our New AD!

Please join the Board members and staff in welcoming Judith G-Scott to CNGA! Judy started as our Administrative Director (AD) in November 2008. In addition to having excellent skills for handling the operation of the organization, she is also personally committed to native grasslands.

Judy's past work experience prepared her quite well for the diverse tasks of the AD position. Most recently, she served as the Director of Volunteer Services and Office Manager for another nonprofit organization, Habitat for Humanity of Yolo County. This job required careful financial record keeping, impeccable planning skills, and a love for interacting with people—all indispensable qualities for Judy's new role in CNGA. Before Habitat for Humanity, Judy held various positions forming a nexus of communications, plant biology, and education. For example, she served the National Academy of Sciences and the Smithsonian Institution as a professional editor of scientific manuscripts, she provided horticultural advice on lawn and garden care, and she taught English and drama to high school students.

Judy G-Scott

Judy's lifelong involvement with the natural world and humans has taken a more personal turn in the last several years. Since the acquisition of a historic sheep ranch in the Dunnigan Hills in Yolo County, she and her husband have been managing both ecological and architectural restoration of this working landscape. Native grasses already feature prominently in the garden areas, especially the seven-circuit Cretan labyrinth. Restoration of the pasture requires longer-term planning and negotiations, but Judy and her husband are well into discussions with water agencies, NRCS, and a local nonprofit, the Center for Land-Based Learning. The eventual goal is a native grassland and pollination reserve managed by cattle grazing.

CNGA is grateful to have found such a competent, dedicated, outgoing person as Judy. Please give her a heartfelt welcome!

Thanks, Erik and Tom

CNGA would like to extend it's thanks to two retiring Board members who have served tirelessly for the good of the organization.

Erik Gantenbien is finally completing his term as past president. Elected as president-elect in 2005, Erik actually served as president two years, 2006 and 2007, when the elected president in 2007 was unable to serve. Erik stepped in and filled the gap, sheparding us through the retirement of our long-term Administrative Director, Janice Bridge, with a quiet strength and good humor.

Tom Annese, who is completing a two-year board term, has been an insightful contributor to board discussions and to *Grasslands,* and has made himself available to help when called, especially assisting with our grass identification workshops held in the Bay Area.

We hope that Erik and Tom will continue their contributions to CNGA committees, and we wish them all the best in 2009.

Life Histories of Vernal Pool Annual Grasses

Thomas Griggs

Life Histories of Vernal Pool Annual Grasses **by Tom Griggs was originally published in the California Native Plant Society's journal, *Fremontia*, in April 1981*. This was one of the first *Fremontia* issues devoted to California's native grasslands. *Grasslands* is republishing this article because after 28 years it remains one of the best articles on California vernal pool vegetation and processes.**

In 1981, Tom had just finished his Ph.D. thesis on the population biology of the native grass genus *Orcuttia*, one of the more widespread vernal pool native grass genera. Later, Tom joined The Nature Conservancy and pioneered vernal pool research and management at the Santa Rosa Plateau and all the vernal pool preserves in the Sacramento and San Joaquin Valleys. Today, Tom is a Senior Restoration Ecologist at River Partners and an adjunct professor at California State University, Chico, where he leads an ecological restoration field studies program.

At the time of the article, there were eight known vernal pool grasses in the tribe Orcuttieae that are comprised in two genera (*Orcuttia* and *Neostapfia*). *Neostapfia* has only one species (*N. colusana*). Later, two of the *Orcuttia* species were moved to a new genus *Tuctoria* (*T. greenei and T. mucronata*). "*Tuctoria*" is an anagram of *Orcuttia*, reflecting their close relationship. These are all warm-season annual grasses in the subfamily Chloridoideae. All three species are exclusively vernal pool grasses and listed as rare or endangered because of the loss of vernal pool habitat.

The article also highlights six other cool-season native annual grasses that are found in California's vernal pools and moist open meadows: *Pleuropogon californica, Deschampsia danthonioides, Alopercurus saccatus, Phalaris lemmonii, Agrostis microphylla,* and *Agrostis exigua.* Illustrations of these grasses and three of the Orcuttieae tribe genera supplement the article's original photographs and illustration.

Pleuropogon californica **(annual semaphore grass), with its unique one-sided racemes, is found in marshy grasslands and ditches from Humboldt County south to San Luis Obispo County and east to Amador County and the Sacramento–San Joaquin Delta region.**

Deschampsia danthonioides **(annual hairgrass) inhabits vernal ponds, meadows, and wet areas throughout California, from sea level to the higher mountains (8,000 ft).**

Alopecurus saccatus **(meadow foxtail) inhabits moist, open meadows and vernal pools below 2,000 ft from Washington State to California.**

Phalaris lemmonii **(Lemmon's canarygrass) is found in vernal pools and wet areas at lower elevations along the central California coastal and inland valleys from Mendocino to San Diego County.**

Agrostis microphylla **(small-leaf bent) inhabits wet habitat similar to Lemmon's canarygrass but also extends up to Washington State.**

Agrostis exigua **has now been submerged into *A. elliottiana* (Elliott's bent), an annual bentgrass that also extends into southern Arizona, Texas, and the southeastern United States. In California, *Agrostis exigua* is limited in its range, inhabiting vernal pools in the Sacramento Valley and Napa County.**

—Dave Amme

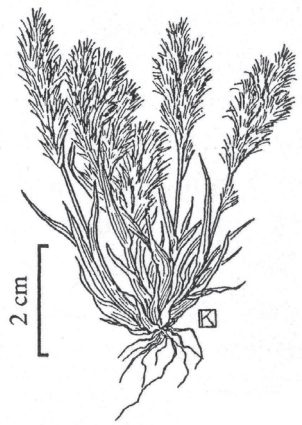
**** Reprinted with permission***

Annual grasses are the common cover of uncultivated, low-elevation lands throughout cismontane California. However, nearly all of these are exotic species introduced from Europe during the 18th and 19th centuries. The common wild oats (*Avena barbata*), foxtail barley (*Hordeum* spp.), wild rye (*Lolium multiflorum*), annual brome grasses (*Bromus* spp.), and several of the annual fescues (*Vulpia* spp. [formerly *Festuca*]) arrived in California with the introduction of livestock during the Mission Era of California history. These grasses were adapted to the nearly identical climates of California and the Mediterranean region. Since they had evolved along with human agricultural practices in the Old World, they were already adapted to the types of disturbance (cultivated soil and heavy livestock grazing) wrought upon the pristine California landscape by European colonization.

The dominance of exotic annual grasses, even on unplowed valley lands, stops at the edge of the vernal pools. For various reasons the non-native grasses have been unable to colonize and grow in vernal pools. As a result, the vernal pool flora has been lightly impacted by the non-

Orcuttia californica* var. *viscida

Photo: Peter Sands



***Orcuttia viscida,* Flora of North America (2003),** © Utah State University

Illustrators: Linda A. Vorobik and Karen Klitz

LIFE HISTORIES, continued from page 4

native intrusion compared to the surrounding grassland. Only nine percent of the flora of California's vernal pools is exotic.

Seven Vernal Pool Genera

Annual hairgrass, Hitchcock (1951)

Species of seven genera of native annual grasses persist today in California's vernal pools. The most widespread species, growing in nearly every vernal pool in California, is **annual hairgrass *(Deschampsia danthonioides).*** The dried beds of vernal pools are often circumscribed during the early summer by the bright yellow-brown inflorescences of annual hairgrass still standing from the preceding spring growth.

Vernal pool foxtail, Hitchcock (1951)

Vernal pool foxtail (*Alopecurus saccatus*) rarely grows in the densities found with the hairgrass, but can be found about the margins of vernal pools in mid to late spring. The compact, cylindrical inflorescence of foxtail grows upward from the extraordinarily inflated sheath of the uppermost leaf, making this grass easily recognizable in the field. At anthesis, anthers filled with bright orange pollen protrude from the lemmas of the inflorescence.

Semaphore grass *(Pleuropogon californicus*) grows in vernal pools of the north coast ranges and on the Jepson Prairie in Solano County. This grass receives its name from the arrangement of the spikelets on the inflorescence—widely spaced and attached at 45° to 90° angles to the rachis of the inflorescence, resembling the semaphore signals formerly used along railroad tracks. Semaphore grass is one of the few California natives which responds well to human-caused disturbance. On the Jepson Prairie it forms dense stands (to the exclusion of all other vernal pool plants) where annually maintained firebreaks cross vernal pools.

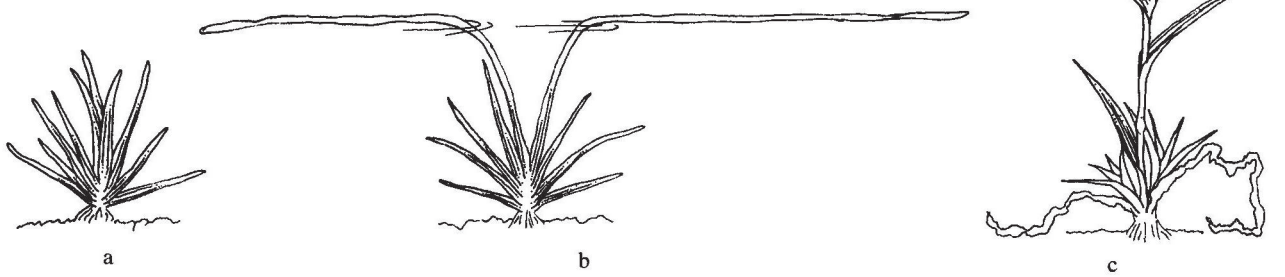
Semaphore grass, Hitchcock (1951)

***Orcuttia tenuis* spikelet attached to the rachis of the inflorescence. Note teeth at the tip of the lemmas and the droplets of the viscid secretion. Style branches and anther filaments extend from the lowest two florets.**

Photo: Thomas Griggs

Seven species of *Orcuttia* grow in the larger vernal ponds of the Central Valley and the coastal mesas of southern California. Plants of the genus *Orcuttia* and the monotypic genus *Neostapfia* form a distinct group within the grass family with no apparent affinities to any other grasses. The implication is of an ancient origin for this unique tribe. Unlike any other North American grasses, orcuttia and neostapfia are covered by stalked glandular hairs which secrete a droplet of sticky, aromatic, bitter-tasting substance. The

LIFE HISTORIES, continued on page 6



Developmental stages of *Orcuttia viscida*: (a) Submerged aquatic seedling; (b) Seedling with floating leaves; (c) Terrestrial stage with aerial leaves and the first inflorescence. Note the withered floating leaves.

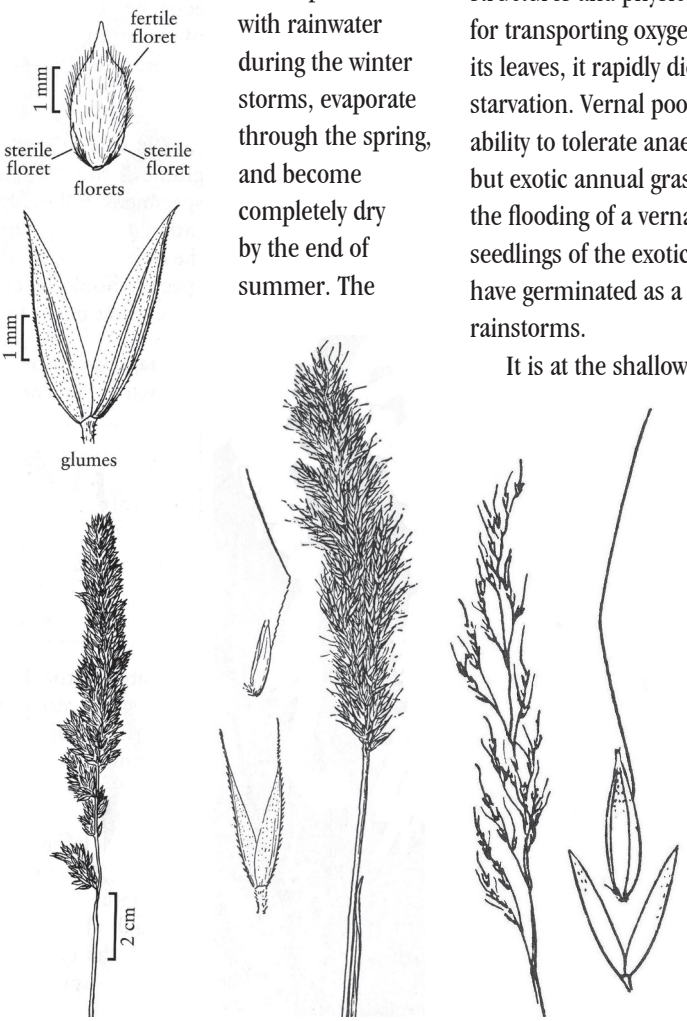
Illustration: Holly Hauptli

LIFE HISTORIES, continued from page 5

secretion functions to repel the voracious grasshoppers which are often present in large number at the time orcuttia is flowering in the early summer. The life history of orcuttia will be examined in detail later.

Other species of annual grasses occasionally found in vernal pools, but rarely forming dense stands, include **Lemmon's canary grass (*Phalaris lemmonii*), small-leaved bent grass (*Agrostis microphylla*),** and **six-week bent grass (*Agrostis exigua*).**

Vernal pools are dynamic habitats. Plant and animal life living in them must be adapted to extreme seasonal fluctuations in environmental conditions. Vernal pools fill with rainwater during the winter storms, evaporate through the spring, and become completely dry by the end of summer. The ability to live and persist from year to year under these conditions requires a highly refined life history. Because of this, vernal pool species of plants are rarely found growing very far upslope from the high-water line of the pool, and grassland species rarely grow down to the water line.



Adaptations to Flooding

The margin of a vernal pool is a very different habitat from the surrounding uplands. The margin rarely experiences drought stress during the winter, yet it does occasionally become flooded. Flooding causes the soil microbes to consume all of the tree oxygen in the soil, resulting in anaerobic conditions around the root zone. Plant roots need oxygen to respire. Unless a plant possesses the anatomical structures and physiological capabilities for transporting oxygen to its roots from its leaves, it rapidly dies from oxygen starvation. Vernal pool species possess this ability to tolerate anaerobic soil conditions, but exotic annual grasses do not. Hence, the flooding of a vernal pool drowns the seedlings of the exotic grasses which have germinated as a result of earlier rainstorms.

It is at the shallow margin of the vernal pool that all of the vernal pool grasses, with the exception of orcuttia and neostafia, are found. The highest concentration of other species and numbers of individuals also occurs at the margin of the vernal pool. While there is usually sufficient soil moisture to support this high density of plants, competition for sunlight can sometimes be severe. Hairgrass, foxtail grass, and semaphore grass have solved this problem, however. During the late winter, seedlings of these grasses produce long, narrow floating leaves, which ride up and down with the fluctuations in the water level of the vernal pool as rainstorms add water and sunny days evaporate it. The floating leaves allow the plants to be in direct contact with the atmosphere—to receive maximum amounts of sunlight and for gas exchange—while the base of the plant is submerged under water.

As temperatures warm in the early spring the vernal pool begins to evaporate and the standing water disappears. While the soil is still moist, hairgrass, foxtail, and semaphore grass send up their inflorescences and flower. Sometimes foxtail and semaphore grass can be found flowering while the base of the plant is still submerged in water. Perhaps they are reflecting their close relationship to other totally aquatic members of their genera. By the time the soil at the margin of the vernal pool has dried sufficiently to no longer support plant life, the caryopses (seeds) have filled and ripened, ensuring a seed crop for future seasons.

Orcuttia and Neostapfia

All seven species of *Orcuttia* in California and *Neostapfia colusana* are considered rare and endangered by botanists, being on List 2 of CNPS Inventory of the Rare and Endangered Vascular Plants of California. Those of us who have searched for orcuttia on the barren beds of vernal ponds during the heat of July know it as a sticky, aromatic, little tuft of bristly, spike-like inflorescences. The inflorescences originate at the base of the plant and reach heights at maturity of from 5 to 15 cm (2 to 6 inches).

Orcuttia grows only in vernal ponds that retain standing water into the late spring or early summer. Orcuttia is usually found growing alone on the barren, cracked-mud

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***Left*: Lemmon's canary grass, Flora of North America (2003),** © Utah State University, *Illustrators: Linda A. Vorobik and Hana Pazdírková;* ***center*: small-leaved bent grass, Hitchcock (1951); *right*: six-week bent grass (Abrams 1940)**

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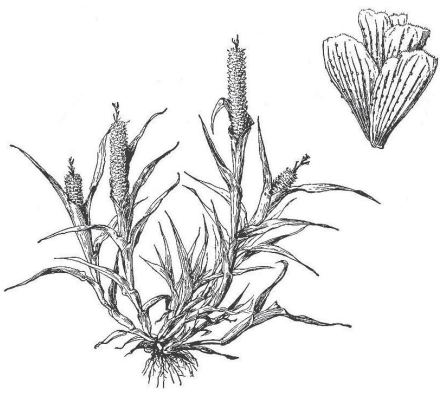
bed of its vernal pond, or with a sparse stand of coyote thistle (*Eryngium* spp.) or clover fern (*Marsilea vestita*). At a few ponds orcuttia grows where, earlier in the spring, masses of vernal pool flowers have been, their dried "skeletons" remain attached to the pond bed around the living orcuttia plants.

Photosynthesis Advantage

Orcuttia requires this hot, intensely bright environment to grow at peak efficiency. All species of the genus possess what is known to plant physiologists as the C4-photosynthetic pathway. This biochemical pathway, which converts sunlight and carbon dioxide to growth energy, functions best in hot, bright conditions, and is very efficient with regard to water lost by the plant through transpiration. Thus, C4-photosynthesis affords a considerable advantage for growing during a time of year when life-giving rainfall is virtually non-existent.

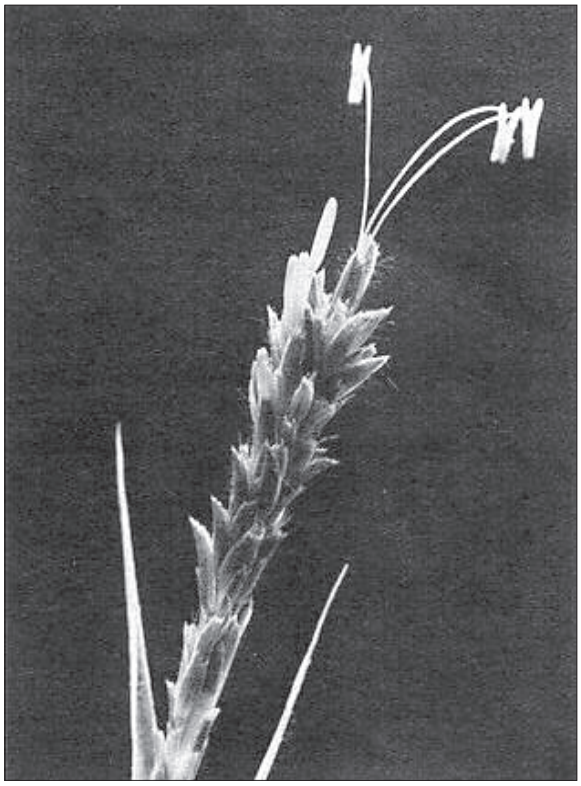
Orcuttia tenuis, of the northern Sacramento Valley, usually commences flowering in early May, while all other species typically reach the peak of flowering during June and July. Ponds which dry late in the season, or which contain deep soils (holding much water), will support flowering individuals into late August or early September.

When the water held in the mud of the vernal pond bed is completely consumed, the orcuttia plants die, but do not fall apart. Instead, they remain as intact, dried "skeletons" attached to the bottom of the vernal pond. The first heavy rainstorms of the fall cause the orcuttia plants to fall apart, dispersing the seed formed during the preceding summer. The seed may become firmly attached to the surface of the wet mud, or, if enough rainfall has flooded the pond, float around for a time before settling to the bottom.



***Neostaphia colusana,* Hitchcock (1951)**

By mid-winter (January) sufficient rainfall has usually filled the orcuttia pond with water. Soil fungi are now actively consuming the previous season's dead plant parts on the bottom of the flooded pond. The fungi grow over the sunken orcuttia seed as well. About two weeks later the orcuttia seed germinate. The growth of the fungi over the seed is a necessity for germination. In the laboratory numerous other methods were attempted in an effort to break the dormancy of the orcuttia seed. These methods were never successful. Only when the fungi were growing and abundant around the seeds was germination activated, often with 90 to 100 percent of the seeds germinating.



***Orcuttia greenei* inflorescence composed of spirally arranged spikelets. The first floret to reach anthesis extends three anthers into the air currents on 3-cm-long filaments.**

Photo: Thomas Griggs

A moment's reflection should reveal the great ecological significance of this adaptation. The fungi grow in abundance only after rainfall sufficient to flood the vernal pond. The vernal pond floods only after the mud has become fully charged with water. It is this soil water which will support the flowering and seed production of the orcuttia during the following summer. Even during drought years some amount of rain falls to moisten the soil. But the soil is not sufficiently charged with water to support the completion of the life cycle the following summer. Should insufficient rainfall not flood the pond, the orcuttia seeds simply remain dormant and wait for another, more favorable, year. Thus, the seeds of orcuttia are keyed to the growth of the soil fungi, which only become abundant after the soil is fully charged with water and the pond has flooded. This kind of symbiosis is a highly refined adaptation to the vernal pond habitat and implies a long association of orcuttia with vernal pools.

Aquatic Seedlings

Initial growth of the submerged seedling is manifested by the production of short (2-cm-long) leaves arranged in a distichous (two-ranked) manner. The seedling grows slowly throughout the remainder of the winter and early spring. As temperatures rise in mid-spring and the water level in the vernal pond begins to lower, the orcuttia seedling begins producing the long, narrow floating leaves. These sometimes reach lengths of 30 cm

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(12 in.). The floating leaf gives the seedling its first direct contact with the atmosphere and sunlight. The growth rate of the seedling now increases and it continues producing floating leaves for as long as the standing water remains.

The water level in the pond continues to drop as increasing temperatures evaporate it. By late spring or early summer the whole seedling is finally exposed to the atmosphere and direct sunlight. The orcuttia seedling now produces shorter, broader, more typical-appearing grass leaves. Within days of the complete evaporation of the standing water, the first inflorescence can be seen emerging from the uppermost leaf sheath.

Thus, the aquatic seedling stage allows the plant to establish its root system in the mud of the flooded vernal pond bed while soil moisture is abundant. When the standing water evaporates and soil moisture becomes limiting as the summer heat increases, the plant can direct its energy and remaining soil water reserves almost completely toward flowering and seed production. Occasionally, even this adaptation is not sufficient to ward off drought induced before seeds are produced, as occurred in 1976 for some populations of *Orcuttia tenuis.* Thus, orcuttia is a truly amphibious plant, with germination and seedling development best accomplished while submerged under water, but requiring hot, dry conditions to flower and set seed.

What happens during drought years when insufficient rainfall fails to flood the orcuttia pond? The seeds of orcuttia require very special conditions for germination. Seeds may remain dormant in the vernal pond mud for many years (perhaps even decades) before germinating. One population of *Orcuttia pilosa* in Stanislaus County did not grow during four consecutive years, but reappeared the fifth year as numerous as before its disappearance. Actual counts have revealed that there are from 10 to 50 seeds in the soil for every growing plant on the soil surface. This large seed bank allows populations of orcuttia to persist over the years regardless of occasional disaster seasons of the complete mortality of the seedling crop due to drought effects or grasshopper plagues.

The seven species of orcuttia are a mere fraction of the more than two hundred species of plants known to grow in California's vernal pools. The generalized life history of orcuttia as described above is only one strategy for growing and persisting in the vernal pool habitat. Every other species growing in the same pond with orcuttia has its own life-history strategy, most of them radically different from that of orcuttia, yet sufficient to allow them to persist in the same habitat. So the next time you are in the field enjoying the rich diversity of the California flora, take a moment to reflect upon the many different life histories, or ways of "making a living" of the plant species around you.

Acknowledgments

Thank you to Mary Barkworth and Utah State University for permission to reprint illustrations from *Flora of North America North of Mexico* (Vol 25, Oxford University Press, New York, 2003). Other illustration sources are: A.S. Hitchcock, *Manual of the Grasses of the United States,* USDA Miscellaneous Publication No. 200, 1951, and Leroy Abrams, *Illustrated flora of the Pacific States,* Vol 1, Stanford University Press, 1940.)

Suggested Reading

Crampton, Beecher. 1959. The Grass Genera *Orcuttia* and *Neostapfia*: A Study in Habitat and Morphological Specialization. Madroño 15:97–110.

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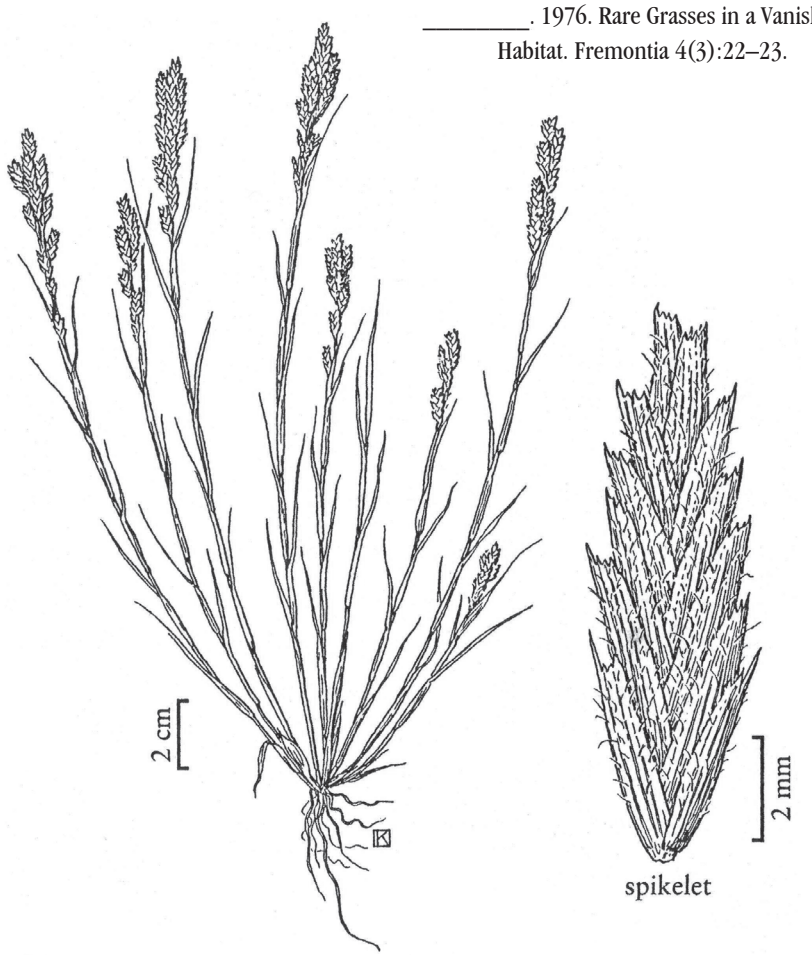

***Tuctoria greenei,* Flora of North America (2003),** © Utah State University

Illustrators: Linda A. Vorobik and Karen Klitz

A New Initiative to Describe and Protect California Grasslands

Jennifer Buck *and* **Julie Evens,** *California Native Plant Society*

The California Native Plant Society (CNPS) has launched a new initiative to categorize, map, and conserve California's grassland vegetation. Momentum is building for grassland protection in California toward numerous goals and objectives. Our vision for this project is highly collaborative, and we are working closely with a variety of agencies and organizations, including the California Department of Fish and Game, California Native Grasslands Association, California Rangeland Conservation Coalition, The Nature Conservancy, and the University of California.

The basic definition of California annual grasslands should highlight the importance of native species diversity in addition to species abundance. *Photo: Sau San*

This research- and conservation-focused initiative is especially timely for several reasons:

- We know less about upland grassland vegetation than any other major California ecosystem. As a result, most upland grasslands are carelessly termed "non-native grasslands" due to the abundance of exotic plants; however, these grasslands typically have high occurrence and sometimes high abundance of native plant and animal species.
- Grasslands need stronger protections because little remains of their historical extent. Conservative estimates place the loss of California's Mediterranean grasslands at more than 90 percent, and they continue to disappear at an alarming rate.
- We need to better understand the potential effects of global climate change in California. Monitoring and modeling of grasslands may reveal the influence of climate shifts on vegetation.
- Recent advances in research methodologies, especially GIS techniques and genetic analyses, give us tools to advance our knowledge of natural plant and animal communities. These tools provide better means to identify, protect, and restore a broader range of native species and ecological interactions than ever before.

The major goals of the CNPS Grassland Initiative are to:

1. Clarify the role and function of grasslands and associated herbaceous vegetation within the natural landscape of California.
2. Inventory and map grasslands, including an assessment and analysis of their natural range of variability (for more information see ⟨http://www.cnps.org/cnps/vegetation/protocol.php⟩).
3. Develop a strong framework for conservation and restoration of California grasslands.
4. Discuss our findings and educate the public on the values of grasslands.

To achieve these goals, we will use a four-step, integrated approach over the next five years.

The first step has been to amass and analyze the current body of existing literature, data, and research on California grassland systems. At present, we are writing an overview paper to evaluate the elements of "native" versus "non-native" grasslands and are working toward a basic definition of California annual and perennial grasslands that highlights the importance of native species diversity in addition to measures of species abundance. Interactively with Step 2, we hope to build upon the existing classification

Conservative estimates place the loss of California's Mediterranean grasslands at more than 90 percent, and they continue to disappear at an alarming rate.

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GRASSLANDS INITIATIVE, continued from page 9

system for grasslands, that is, the most recent version of the *Manual of California Vegetation*,* using a standardized nomenclature for known grassland types. An important result of this step is the identification of areas that lack sampling or representation.

The second step is to conduct additional sampling to categorize the variation and complexity of grassland types throughout the state. In concert, the first two steps will help us identify key biodiversity centers, threats facing those areas, and—most importantly—opportunities for conservation of upland grasslands that are rich in native plant species and wildlife. We believe it is important to collect data across different years and seasons to capture both temporal and climatic variation. We plan to start data analysis early in the process to derive a baseline classification in accordance with state and national standards. It will be imperative to translate a grassland classification into vegetation units that can be mapped using available aerial or satellite imagery and to correlate grassland types with geologic substrates, climatic zones, or other environmental factors. This step will allow us to better evaluate the rarity of grassland species and plant communities.

The first two steps will help us identify key biodiversity centers, threats facing those areas, and—most importantly—opportunities for conservation of upland grasslands that are rich in native plant species and wildlife.

The third step is to investigate the current and potential changes in grasslands since the European colonization of California. With great urgency, we will work toward understanding the consequences of global climate change to this vegetation type in California. Understanding floristic changes in light of history and climate change will allow us to develop a framework to conserve and restore a broad representation of California grasslands over a changing landscape. We will analyze spatial data in this step to look specifically at a number of factors, including the identification of key areas containing target wildlife species (e.g., birds, pronghorn antelope, kangaroo rats, kit fox) based on key floristic and structural elements. Other focused analyses may include identifying restoration potential in impacted grassland areas, and modeling of current and potential habitat for target (rare) species.

The final step will be to publicize our findings to local, regional, and statewide decision makers, stressing positive proposals for grassland conservation and restoration in different regions of the state. We will draw attention to the value of grasslands and the importance of grassland conservation through conferences and other educational approaches. We envision the development of interpretative booklets and reports that describe grassland resources at local and regional scales, as well as a broad illustrative guide to the major California grassland vegetation types.

Our initial focus area includes upland and mesic grassland habitats of the Central Valley, the surrounding foothills, and southern coastal California. Together these grasslands are part of a large and complex ecosystem in California, containing a diversity of annual and perennial herbaceous vegetation.

We invite you to collaborate with us in this effort whether you have baseline or monitoring data to share or contact information for others who have data.

We appreciate the importance of collaborating with organizations and individuals who have valuable knowledge of this topic. Hopefully, you share our interest in improving the understanding of California's grassland diversity. We invite you to collaborate with us in this effort whether you have baseline or monitoring data to share or contact information for others who have data.

Another way to contribute is to help us gain access to grasslands in our focus area for sampling. We are currently seeking grants from foundations and private donations, as well as formal partnerships with organizations that can match funds or provide in-kind contributions. As we develop this project, we value any information or guidance that you can share, as your knowledge and experience will assist us in shaping this project to better define, categorize, manage, and conserve California's grassland resources.

***Jennifer Buck** is a Vegetation Ecologist working in the CNPS Vegetation Program to survey, classify, and map vegetation in California. She earned B.S. and M.S. degrees from the University of California, Davis, in Plant Biology. **Julie Evens** is the CNPS Vegetation Program Director, working to inventory and assess vegetation across the state. She earned two B.A. degrees at the University of California, Santa Cruz, and an M.A. degree at Humboldt State University.*

For more information contact Jennifer at JBUCK@CNPS.ORG *or visit the CNPS Web site at* ⟨http://www.cnps.org/cnps/vegetation/grassland.php⟩.

**For an online version of the "Manual of California Vegetation" by Sawyer and Keeler-Wolf and published by CNPS, go to* ⟨http://www.cnps.org/cnps/vegetation/manual.php⟩.

"Green" Economic Stimulus Advanced

Jim Hanson
Member, CNGA Board of Directors,Oakland, CA; e-mail: GREENHECTARE@YAHOO.COM

The economy is in rough seas and the incoming President and Congress are working out a $600–800 billion roads and bridge infrastructure package to stimulate jobs and business activity.

Behind the Wall Street and Washington headlines is a growing awareness that, for any economy to function long term, the wetlands, grasslands, forests, and other plant communities—our "green infrastructure"—must be kept functioning and healthy, too.

Californians have always relied on the state's diverse natural landscapes to slow rainwater, replenish aquifers, buffer coastal erosion, store carbon, and attract tourism and convention business. Yet, in the last decade, the need for investment in the natural infrastructure has become increasingly evident in fuel-loaded forests and hillsides, aggressive, problematic weeds, and streams and uplands with less plant variety and fewer numbers of treasured native fish and bird species.

Last month The Nature Conservancy (TNC) presented a Green Economic Stimulus package to Capitol Hill lawmakers, agency staff, and members of President-Elect Obama's transition team. TNC proposes employing numerous crafts and professions to restore natural systems. Some of the planned economic stimulus would be directed to the backlog of environmental projects in existing federal programs (e.g., Army Corps, NOAA). TNC also proposes hiring people to minimize the environmental impacts of traditional hard infrastructure construction (see the TNC Web site: ‹http://www.nature.org/pressroom/news/news2930.html›).

Heavy fuel load in stand of blue gum eucalyptus (*Eucalyptus globulus*) in the Berkeley–Oakland Hills *Photo: Jim Hanson*

For any economy to function long term, the wetlands, grasslands, forests, and other plant communities—our "green infrastructure"—must be kept functioning and healthy.

Since native grasses play a significant role in the state's natural infrastructure, the CNGA Board of Directors is joining with other organizations, including the California Society for Ecological Restoration (SERCAL), Salmonid Restoration Federation (SRF), and California Invasive Plant

GREEN ECONOMIC STIMULUS, continued on page 12

GREEN ECONOMIC STIMULUS, continued from page 11

Since native grasses play a significant role in the state's natural infrastructure, the CNGA Board of Directors is joining with other organizations to urge that green infrastructure projects be a part of the economic stimulus and that a "sustainability provision" be included in all projects.

Council (Cal-IPC), to urge that green infrastructure projects be part of the economic stimulus and that a "sustainability provision" be included in all projects (see p. 13).

Green infrastructure funding in the stimulus package would provide jobs improving urban and rural watersheds by restoring streams, canal banks, forests, and grasslands. A sustainability provision in federal economic stimulus contracts would employ people to restore natural ecosystem function after hardscape construction by restoring soils, reversing weed invasions, protecting intact native plant communities, and improving wildlife and fishery corridors.

Since energy use is related to climate change and affects future water supplies, a sustainability provision would also provide for alternative transportation facilities (e.g., bicycle lanes and lockers), energy efficiency, and using recycled materials in economic stimulus projects whenever possible.

If you support including green infrastructure projects and a sustainability provision for a forward-looking, comprehensive investment in our national infrastructure, get a simple call, e-mail, or card to your House or Senate representative as soon as you put this newsletter down.

The forests, streams, and grasslands that provide us clean air, clean water, and productive soils need repair, too, and green infrastructure work provides employment to numerous professions and crafts. Both the TNC proposal and the joint letter of CNGA, SERCAL, Cal-IPC, and SRF urge that the time to invest in the natural foundation of our state and country is now.

Note: Your House or Senate representative's phone number, e-mail, and mailing address can be found in any number of Web sites, including ⟨govtrack.us⟩ and ⟨votesmart.org⟩.

Saltgrass (*Distichlis spicata*) and creeping wildrye (*Leymus triticoides*) planted at a restored seasonal freshwater wetland on the San Francisco Peninsula near Palo Alto *Photo: Jim Hanson*

Native oak remains in Berkeley's Claremont Canyon after blue gum eucalyptus trees are removed by interagency fuel reduction consortium. *Photo: Jim Hanson*

CNGA Spearheads Push for "Green Infrastructure" Legislation

The new Presidential Administration and the U.S. Congress are working on a plan to stimulate the U.S. economy by creating a large national infrastructure investment. CNGA and three fellow organizations—SERCAL, Cal-IPC, and SRF—worked together in late December to submit a joint letter urging that, along with investing in roads and bridges, our government should also invest in watersheds to keep them healthy and functioning (see article, p. 11).

The following letter was sent to the U.S. House and Senate Congressional delegations from California and to California's State legislative representatives. CNGA will continue to be a strong voice for protecting California's natural heritage through communications like these and continuing dialogue with those who will be deciding how infrastructure funds are used in California.

California Native Grasslands Association

Cal-IPC

SERCAL

Salmonid Restoration Federation

January 1, 2009

Re: A "Green" Economic Stimulus

Our groups represent professionals and volunteers working across California to protect our state's tremendous natural heritage. Keeping our landscape healthy not only preserves the beauty for which California is famous, it also returns recreation, tourism jobs, fisheries, carbon sequestration, and clean air and water.

Agencies like California State Parks now evaluate the condition of both the natural landscape and roads and buildings when budgeting for infrastructure needs. Protecting our natural resources requires ongoing stewardship. For instance, vigilant on-the-ground management is needed to stop the spread of invasive species like yellow starthistle and quagga mussel, which can devastate land and water resources. Forests, streams, and wetlands need to be restored to healthy functioning in order to increase rainfall infiltration in regional watersheds.

As the nation looks toward rebuilding infrastructure, we urge you to include both "green infrastructure" projects and a "sustainability provision" in all projects. Society depends on the ecosystem services provided by a healthy landscape, and there is much work to be done in stewarding these resources. Funding should be made available to appropriate federal programs, some of which have been identified recently by The Nature Conservancy, but funds should also be set aside for the states to implement high-priority restoration projects. As a provision for economic stimulus funding, construction projects should incorporate recycled materials, wildlife corridors, invasive weed control, and native plants whenever appropriate to increase the sustainability of these projects.

These programs are an excellent investment in the natural foundation of our state and country. We should take this opportunity to put people to work caring for the resources that make California great. Please include "green infrastructure" projects and a "sustainability provision" in all projects for a forward-looking, comprehensive investment in our national infrastructure.

Sincerely,

Judith G-Scott, Administrative Director
California Native Grasslands Association
www.cnga.org Woodland, CA
530.661.2280 ADMIN@CNGA.ORG

Doug Johnson, Executive Director
California Invasive Plant Council
www.cal-ipc.org Berkeley, CA
510.843.3902 DWJOHNSON@CAL-IPC.ORG

Harry Oakes, President
California Society for Ecological Restoration
www.sercal.org Bakersfield, CA
661.634.9228 SMCLARK@LIGHTSPEED.NET

Dana Stolzman, Executive Director
Salmonid Restoration Federation
www.calsalmon.org Redway, CA
707.923.7501 SRF@CALSALMON.ORG

CNGA's Developing a Sustainable Grazing Plan to Manage Native Grasslands Workshop

How Livestock and Grazing Planning Can Benefit Grasslands

Richard King, *USDA-Natural Resources Conservation Service*
Kent Reeves, *Yolo County Parks and Resources Department*
Tracy Schohr, *California Cattlemen's Association*

Co-instructor Richard King (center right) and workshop participants in California fescue (*Festuca californica*) at Pepperwood Preserve *Photo: Kent Reeves*

Virtually half of California is grassland or open woodland with grassland understory, making these habitats an incredibly important state resource. As a rancher, you value this land as providing livestock forage—a critical part of your economic viability. However, others see the value of these grasslands as scenic vistas with seasonal carpets of wildflowers and the other various life forms that make up the ecosystem. It may come as a surprise to you, but many are beginning to understand that these two views fit hand in hand.

Modern livestock production on California's grasslands is a relatively recent addition to the landscape. We know that long before the first livestock herds quickly expanded in California, large herds of wildlife once occupied these lands. They roamed the landscape, grazing and trampling their way along. The great variety of plant species and other life not only survived, they may have required those patterns of disturbance to remain vigorous and productive.

Our native grasslands evolved over millions of years with a grazing regime in place. The diversity of large herbivores and carnivores in California was once similar to that of Africa's plains. The state's grasslands supported the saber-toothed cat, American lions (larger than African lions), large dire wolves, cheetahs, and short-faced bears, not to mention the grizzly bear, grey wolves, and jaguars that still exist elsewhere.

Our native grasslands evolved over millions of years with a grazing regime in place. The diversity of large herbivores and carnivores in California was once similar to that of Africa's plains.

Modern-day livestock can be used to mimic the patterns, pulses, and effects on ecological processes with which all of California's native species evolved. California's native plants, insects, wildlife, and microorganisms did not evolve in isolation from each other—they co-evolved as incredibly complex communities of life. Whether working ranches or public preserves, removing the effects of large herding animals can result in the decline of the diversity of life for many grassland areas. Likewise, failing to properly plan livestock grazing can cause a decline in grassland health.

Excessive accumulation of standing litter occurs on some sites, preventing successful establishment of many annual and perennial plant species. Excessive removal of litter fails to protect the soil and habitat for many species. Excessive grazing/

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browsing during the growing season can suppress plant growth, vigor, reproduction, and even survival of some species. Only planning the sound use of livestock is likely to address whatever grassland health objectives the manager has identified.

Workshop participants sharing ideas at Pepperwood Preserve *Photo: Kent Reeves*

Classroom session on the veranda *Photo: Kent Reeves*

Research, ranging from the moist coastal prairies to the dry vernal pool landscapes in the Central Valley, supports the notion that excessive "rest" from herding animals, including livestock, can result in loss of native annual and perennial plant species in a wide array of California's ecological sites. Likewise, herding animals, whether livestock or wildlife, can cause decline or loss of native species when the plant physiological and ecological requirements for success are either ignored or may still be unknown to science or land managers.

The Workshop. The CNGA goal is to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship. Upholding their mission, and in collaboration with the California Cattlemen's Association (CCA), CNGA offered a workshop last fall for landowners, public land managers, open space districts, ranchers, and others interested in creating a grazing plan to manage grasslands. The sold-out two-day workshop, *Developing a Sustainable Grazing Plan to Manage Native Grasslands,* was held in Santa Rosa at the Pepperwood Preserve. The workshop attracted a diverse group of land managers, including ranch managers, staff of the California Department of Fish and Game, California State Parks, water districts, and local land trusts.

Kent Reeves, Yolo County Parks and Resources Department, the lead workshop architect, and Richard King, USDA-Natural Resources Conservation Service (NRCS), and Certified Educator in Holistic Management, were workshop instructors, emphasizing the importance of why and how livestock can be used to improve grassland health. Using well-managed grazing is fundamental to the future of California grassland health, and few other

WORKSHOP REPORT, continued on page 16

WORKSHOP REPORT, continued from page 15

tools besides domestic livestock are either available or practical to mimic natural processes and the complex interconnectedness of herding animals and grassland health.

A principal component of the workshop was the need to maintain flexibility when implementing a grazing program. Thinking like a team with clear and shared objectives is critical whenever more than one person is involved. For leased or rented land, the lack of flexibility can ruin the working relationship needed for a successful partnership between the land manager and the livestock producer. Without flexibility to adjust a grazing plan from year to year, and whenever needed as circumstances change, either the land manager or livestock producer (or both) will suffer a setback.

> **The workshop provided a great opportunity for participants to develop a site-specific grazing plan for the Pepperwood Preserve, yet remain flexible enough to adapt to a wide variety of ecological conditions. The workshop presenters covered a wide variety of concerns for those interested in utilizing grazing as a tool to manage grasslands. Participants were challenged to rethink approaches to grazing management to meet the ecological and social needs of land managers. Workshop presenters combined scientific research, real-life case studies, practical rancher experience, and a little humor and cowboy poetry to challenge participants to develop grazing plans that meet their ecological, financial, and societal needs. Beautiful weather, knowledgeable presenters, and a jovial group of participants made for a fun and transformative educational experience. I would recommend this workshop for anyone willing to challenge their preconceived notions of grazing management.**
>
> *Michael Gillogly, Preserve Manager*
> *Pepperwood Preserve*

The importance of a holistic perspective for a management program was stressed at the workshop. Not many land managers in California have developed sound and sustainable grazing plans—plans that are ecologically, socially, and financially sound. Whether a land management agency or a rancher, both face the reality of needing to manage their resources in a way that creates a win/win/win between the land, people, and money involved. Anything else will not be successful for very long.

Using the Pepperwood Preserve as an example, participants actually walked through the steps of planning a grazing program. Through a real scenario of developing a managed grazing plan for the preserve, workshop participants gained experience in using a step-by-step grazing planning process. This planning process helps ensure that the great complexity of variables affecting the land and livestock are remembered and addressed. It ensures livestock are in the right place, at the right time, and for the right reasons.

In addition to materials covered during the workshop, other sources of information and assistance were emphasized. Examples included CCA, Resource Conservation Districts, and USDA-NRCS. The University of California Cooperative Extension has livestock and natural resources specialists throughout the state who provide an excellent source of scientific expertise.

According to workshop participants, CCA member Tom Schene from Dixon, California, was a much appreciated component to the program. Schene shared with participants a rancher's perspective on grazing leases to achieve management objectives of nonprofit and government entities on open space lands, preserves, refuges, and water district properties. Participants very much appreciated his willingness to spend time explaining how both the rancher and land manager can more effectively work together to support common interests.

Whether working ranches or public preserves, removing the effects of large herding animals can result in the decline of the diversity of life for many grassland areas. Likewise, failing to properly plan livestock grazing can cause a decline in grassland health.

"This workshop was a unique opportunity to share with a variety of land mangers how grazing can be a successful management tool for California grasslands," stated Shene. "It was great that CCA worked with CNGA to provide the necessary training to those interested in reinstating grazing on lands under their jurisdiction."

Finding common ground leads to collaborative efforts to achieve common goals. CCA has been working with a variety of state agencies that own land that could financially and ecologically benefit from a managed grazing program. CNGA's educational program aligns with CCA's efforts, training staff of those agencies to create grazing programs that can contribute to meeting management objectives on properties around the state.

The California Native Grasslands Association ⟨www.cnga.org⟩ is a signatory partner of the California Rangeland Conservation Coalition. Dozens of partners play a critical role in the Rangeland Coalition's education and outreach on the benefits of well managed grazing for natural resource benefits. Please visit ⟨www.carangeland.org⟩ for more information.

CNGA Field Day at Hedgerow Farms

Winters, CA

Friday, April 17th, 2009 | 8 a.m.–4 p.m.

This is an exciting opportunity for practical, hands-on learning about native grasses and grassland restoration. The event is set at Hedgerow Farms, a renowned Northern California native grassland seed production farm and home of numerous restoration sites. This full-day event will feature:

- Field identification of dozens of native grassland species and an overview of their characteristics and applications;
- Tours of restoration sites, including grasslands, roadsides, hedgerows, orchards, canal banks, tailwater ponds, wetlands, and riparian forests;
- Field presentations of several grassland experimental trials and academic studies;
- Field presentation on soils and site preparation;
- Field demonstrations of grassland establishment and management tools and techniques;
- An overview of the seed production process.

Continuing education hours for pesticide licensees are pending DPR approval.

California Native Grasslands Association

HEDGEROW FARMS

Sponsored by the California Native Grasslands Association. Hedgerow Farms is generously co-sponsoring this event and providing the venue and lunch for all attendees.

Instructors will include John Anderson, Hedgerow Farms staff, and CNGA instructors TBA

Registration fees: Students: $30; CNGA members: $40; Nonmembers: $50.

Registration Form: CNGA Field Day at Hedgerow Farms | April 17, 2009

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 or agency (optional) _____

Mailing Address: Street _____ City _____ State _____ Zip _____

Preferred phone _____ _____ Preferred e-mail _____

How shall CNGA contact you to confirm your registration? ☐ mail to above address ☐ e-mail to above address ☐ Fax to _____

Registration Fee ☐ $30/students; ☐ $40/CNGA members; ☐ $50/non-members

☐ 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_____/_____

Authorized signature _____

If you have questions concerning registration, please contact CNGA by phone/fax: 530-661-2280, or e-mail: ADMIN@CNGA.ORG.
Credit card registrations may be sent by fax. Please do not send credit card information in e-mail.

Holistic Grazing Planning Principles:

Unleashing California Native Perennial Grasses and Forbs

California Native Grasslands Association

Wednesday, April 29, 2009
8:00 a.m.–4:00 p.m.

Instructors: ***Richard J. King,*** USDA-NRCS, Certified Educator in Holistic Management
Kelly Mulville, Rancher/Grazier, Certified Educator in Holistic Management

Registration, in conjunction with the CNGA/SERCAL Annual Conference, will begin in late January. See ‹www.CNGA.org› and ‹www.sercal.org› for details.

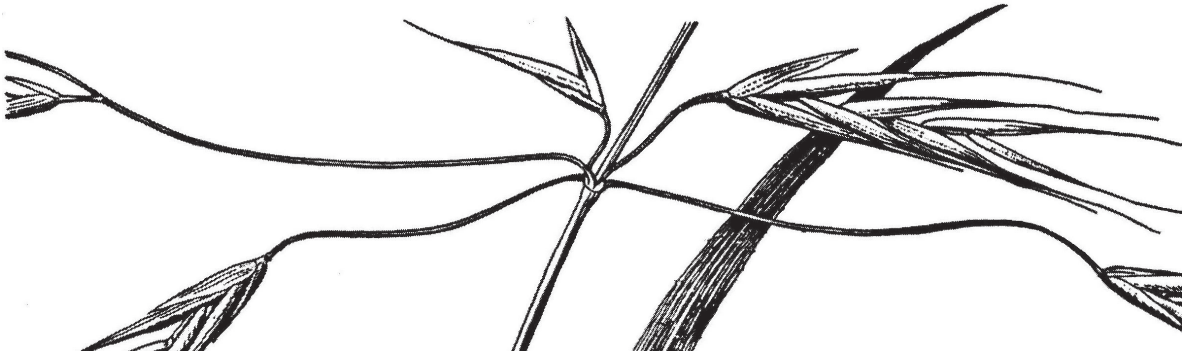
Whether you love cows or hate them, learn why and how livestock can either help protect and restore native species in our California grasslands or destroy them. The key is how they are managed. And that requires sound planning to ensure that livestock are in the right place at the right time and for the right reasons. Need help? This workshop is for you. A morning indoor session will explain the principles, and during an afternoon field trip you will see how they can be applied. Lunch provided.

Richard King has been employed by the USDA Natural Resources Conservation Service for over 30 years as a rangeland specialist. With a B.S. in Wildlife Management (minor Range Management) from Humboldt State University, and an M.S. in Biology from Northern Arizona University, he currently assists NRCS Field Offices in northern California. A life member of the Society for Range Management, Richard also became a certified educator in Holistic Management in 1999. He raises grass-fattened freezer beef while improving biodiversity, producing income, and building soil organic matter near Petaluma.

Kelly Mulville has worked in ecological restoration, farming, and livestock management throughout the Southwest. He currently manages Swallow Valley Farm in Valley Ford, California, manages sheep grazing on a number of vineyards, is a certified educator in Holistic Management, and helps design farms and vineyards.

When you realize life on both sides of the fence is suffering and begin to think there's got to be a better way, what will you do?

Identifying and Appreciating the Native and Naturalized Grasses of California



CNGA Spring Grass ID Workshop: two-day class and field course for the beginner

Central California Workshop

Saturday and Sunday, May 16–17, 2009

San Luis Obispo, CA

8:30 a.m. to 4:00 p.m.

Sign-up deadline: May 8, 2009

$220/members; $260 nonmembers

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

Day #1: we will 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 our work with plant samples in the classroom setting. We will review both the old Tribe method of identifying grasses as well as the artificial key methodology focusing on the important distinguishing traits. A valuable class syllabus binder and basic keys will be provided. Lunch included.

Day #2: we will explore local grasslands in the field, rich with a diverse assemblage of native and naturalized grasses, and make use of our new understanding and skills. Bring a 10× hand lens, notebook, scotch tape, and any field guides to grasses you may have. Recommended texts are the *Jepson Manual,* the *Hitchcock Manual,* and Beecher Crampton's *Grasses in California* (U.C. Press). Information and directions will be sent with paid registration.

Sign up early; the workshop is limited to 30 people.

Instructors: **David Amme**, Wildland Vegetation Program Manager, East Bay Regional Park District, and **Wade Belew**, Restorationist, Cotati Creek Critters

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Registration Form

Complete and return as soon as possible.

Mail to: CNGA, P.O. Box 8327, Woodland, California 95776; ***Fax to:*** (530) 661-2280

Yes, Sign me up for the San Luis Obispo Grass ID Workshop

Participant's name (type or print please) _____

Mailing address _____

City _____ State _____ Zip code _____

How shall CNGA contact you to confirm your registration?

☐ fax to _____ ☐ mail to above mailing address

☐ e-mail to _____

Registration fee: $220/members; $260 nonmembers

☐ Payment by check, payable to California Native Grasslands Association

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

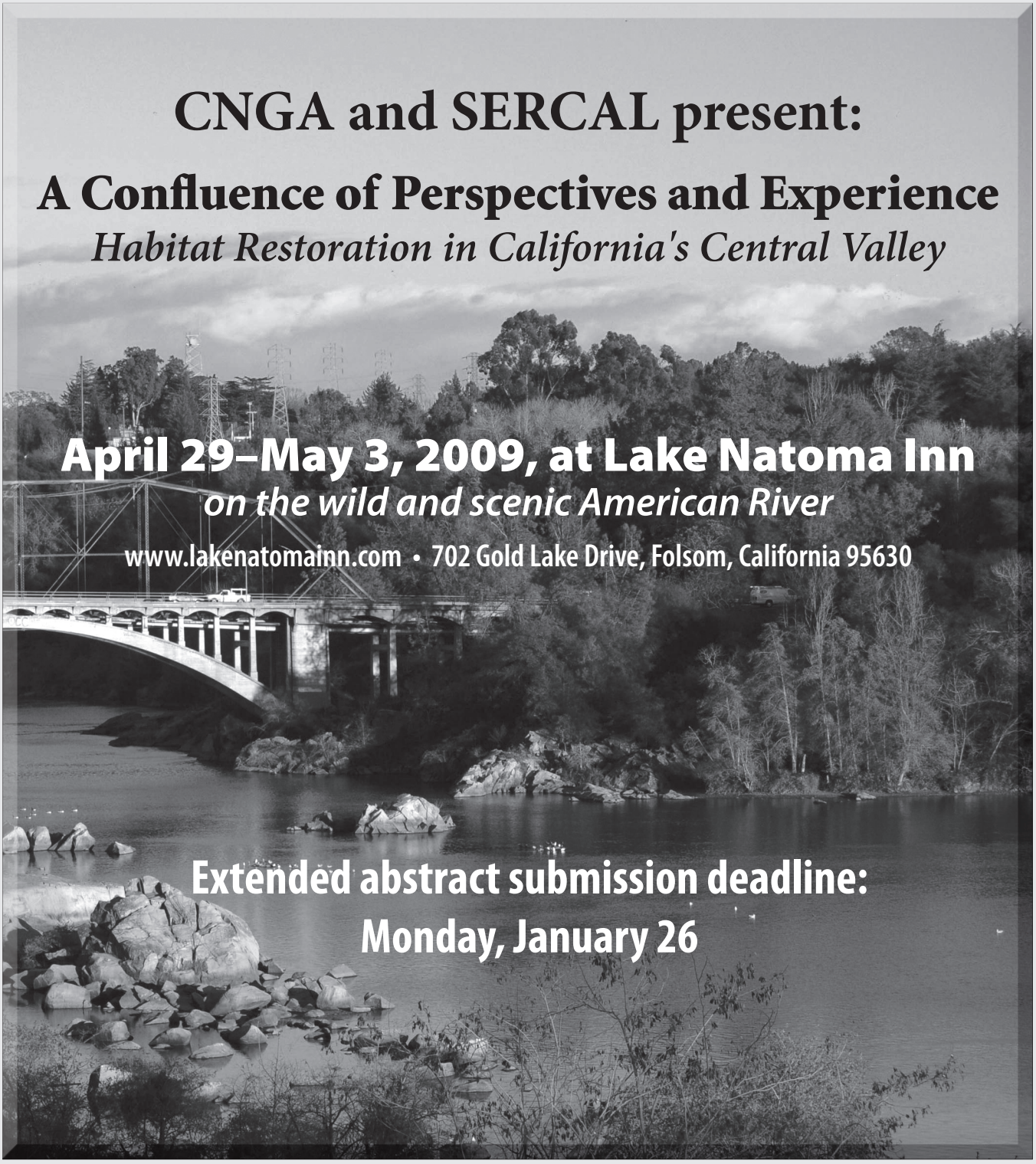
Card Number _____ Expiration date ____/____

Authorized signature _____

If you have questions concerning registration and venue, please contact:

Judy G-Scott, Administrative Director, CNGA, by *phone or fax*: (530) 661-2280; or *e-mail*: ADMIN@CNGA.ORG.

Register Early!



CNGA and SERCAL present:

A Confluence of Perspectives and Experience

Habitat Restoration in California's Central Valley

April 29–May 3, 2009, at Lake Natoma Inn

on the wild and scenic American River

www.lakenatomainn.com • 702 Gold Lake Drive, Folsom, California 95630

Extended abstract submission deadline:
Monday, January 26

Information/Questions:

Contact: Susan Clark, Conference Coordinator: SMCLARK@LIGHTSPEED.NET or 661.634.9228

Judith G-Scott, CNGA Administrative Director: ADMIN@CNGA.ORG or 530.661.2280

Wed., April 29: *Optional Workshops*

Soil Based Approach to Sustainable Revegetation and Erosion Resistance

Instructor: Dr. Vic Claassen, Soil Scientist, UC Davis

Restoration Project Construction Oversight and Management

Instructors: Kevin MacKay, Senior Restoration Ecologist/Project Director, and *Steve Seville,* C.E., ICF Jones & Stokes

Holistic Grazing Planning Principles: Unleashing California Native Perennial Grasses and Forbs

Instructors: Richard King, USDA NRCS, Certified Educator in Holistic Management; *Kelly Mulville,* Rancher/Grazier, Certified Educator in Holistic Management

Thurs., April 30: *Conference*

Registration

Hosted Continental Breakfast

Plenary Session

Hosted Lunch

Poster and Exhibitor Sessions

Afternoon Concurrent Technical Sessions (3)

Evening Poster Reception ~ Appetizer Buffet and No-Host Cocktails

REGISTRATION

Registration materials will be available in late January at ‹www.CNGA.org› and ‹www.sercal.org›. CNGA members will receive membership packets in the mail.

Fri., May 1: *Conference*

Morning Concurrent Technical Sessions (3)

Poster and Exhibitor Sessions

Hosted Lunch, Membership Meeting, Poster Awards

Afternoon Concurrent Technical Sessions (3)

Sat., May 2: *Optional Field Trips*

Burke Ranch Playa Vernal Pools

Leader: Matt Gause, Senior Ecologist, Westervelt Ecological Services

UC Davis Russell Ranch: Integrating Research with Habitat Restoration and Management

Leader: Andrew Fulks, Manager, Putah Creek Riparian Reserve, UC Davis

Yolo County's Grassland Regional Park

Leader: Kent Reeves, Natural Resources Division Manager, Yolo County Parks and Resources Dept.

Central Valley Riparian and Wetland Restoration: Major Rivers to Managed Wetlands

Leader: Harry Oakes, Habitat Restoration Planner, ICF Jones & Stokes

Cornflower Farms Nursery Tour

Leader: Neal Funston, Cornflower Farms

Sat.–Sun., May 2–3: *Optional Workshop*

Identifying and Appreciating The Native and Naturalized Grasses of California (Day 1: Classroom; Day 2: Field Trip)

Instructors: David Amme, Wildland Vegetation Program Manager, East Bay Regional Park District; *Wade Belew,* Restorationist, Cotati Creek Critters

TECHNICAL SESSIONS

Technology in Habitat Restoration: Recent Advances in Restoring, Monitoring, and Managing Landscapes

Andrew Fulks, Chair—Manager, Putah Creek Riparian Reserve, UC Davis

Restoration Opportunities within Working Agricultural and Ranching Landscapes

Carol Presley, P.E., Chair—Pajaro River Regional Programs Manager, Santa Clara Valley Water District

Working Grasslands: Managing for Diversity

Kent Reeves, Chair—Natural Resources Division Manager, Yolo County Department of Parks and Natural Resources

Reclaiming the Sacramento–San Joaquin Delta: Wetland Restoration in the Delta and Bay Region

Kevin MacKay, Chair—Senior Restoration Ecologist/Project Director, ICF Jones & Stokes

Vernal Pool Restoration and Effectiveness Monitoring for Special-Status Species

Carl Jensen, Chair—Design-Build Director/ Landscape Architect, Wildlands, Inc.

Seed and Plant Material Techniques for Site Restoration

David Amme, Chair—Wildland Vegetation Program Manager, East Bay Regional Park District

Incorporating Civil Engineering and Modeling into Habitat Restoration

Steve Seville, P.E., Chair—Senior Habitat Restoration/Project Director, ICF Jones & Stokes

Climate Change: Issues, Impacts and Responses

Michael Hogan, Chair—Soil Scientist, President, Integrated Environmental Restoration Services, Inc.

Grassland Ecology and Restoration

Randi Paris, Chair—Forester, Klamath Basin Watershed Team, USDA–Natural Resource Conservation Service

2009 SERCAL / CNGA Annual Conference Sponsorship Opportunities

Without sponsorship support, we would not be able to keep conference registration fees at a reasonable level for our attendees, nor would we be able to generate the operating capital necessary to move our organizations forward.

Sponsor Levels

Student Scholarships	**$ 200 each**
Slender Orcutt Grass	**500**
Yellow-Billed Cuckoo	**1,000**
Downingia	**2,000**
Burrowing Owl	**3,000**
PREMIER Sponsor (Single sponsorship)	**5,000**

This year, more than ever, we need your help!

Complete details about sponsorship, exhibiting, and benefit packages will be available soon at ‹www.CNGA.org› and ‹www.sercal.org›.

Inside CNGA

Election Results/Board Bios

The election results for the 2009 CNGA Board of Directors are in! The 97 ballots received represent approximately 17 percent of the CNGA membership, well beyond the 5 percent minimum specified in the bylaws. Below are bios for the Board members who were voted in during this election. For a complete list of Board members, see the masthead on page 2 or the contact list on page 27.

Welcome and congratulations to the newest directors. An official welcome will take place at the January 23, 2009, Board meeting.

A huge thank you to outgoing Board members Tom Annese and Erik Gantenbein. We look forward to their continued participation in CNGA.

Officers

President-Elect

Wade Belew is Stewardship Coordinator for a volunteer-powered urban stream restoration project in Sonoma County. While playful in name, Cotati Creek Critters (WWW.COTATICREEKCRITTERS.INFO) is serious about engaging local residents in restoring the ecological infrastructure that serves their community. Two years ago, Wade joined CNGA as a member to expand his botanical knowledge necessary to complete an understory restoration project. Offering to help bring the Annual Conference to Santa Rosa, Wade became interested in joining the Board. The May 2008 Annual Conference allowed him to collaborate with local resource agencies to support CNGA with financial sponsorships and in-kind contributions.

During 2009, Wade would like to increase CNGA's capability to reach out to people who appreciate California grasslands, like birdwatchers or wildflower enthusiasts. Nature lovers who would support CNGA's mission may be less interested in the technical aspects that are the focus of most of the programming. As chair of the Advocacy and Collaboration Committee, he will continue to seek opportunities for CNGA to serve as a fiscal sponsor for restoration, education, planning, or any project or program that furthers the goals of the organization.

Secretary

Sara Sweet has served as Secretary for CNGA for the past 2 years and will continue her commitment to providing accurate and thorough records. Her detailed note-taking during Board meetings provides an important summary and synthesis of the many activities CNGA undertakes.

Sara is a Restoration Ecologist for The Nature Conservancy (TNC). Stationed at the Cosumnes River Preserve near Galt, her grassland-related duties include conducting manipulative experiments in vernal pool grasslands, preparing grassland seed palettes, and advising on grassland restoration and management. Other duties include conducting ongoing vegetation monitoring in floodplain and riparian habitats, writing resource monitoring/management plans, coordinating with all outside researchers, hiring and supervising seasonal technicians, conducting easement monitoring, and advising on non-grassland restoration and management.

Prior to joining TNC, Sara was a restoration ecologist for Restoration Resources, a design/build ecological restoration company near Sacramento. She earned a Master's degree in weed science from UC Davis. Her research focused on the use of prescribed burning to control three invasive exotic grasses: medusahead, barb goatgrass, and ripgut brome. However, her experience with grassland restoration extends even earlier, to her undergraduate years when she volunteered with a land stewardship program and did an undergraduate thesis on tidy tips.

Treasurer

Jim Hanson manages environmental mitigation and highway planting projects for the State Department of Transportation within the nine Bay Area counties. He has also designed and built landscape projects with a sustainable focus, using warm- and cool-season native grasses.

During this last year on the CNGA Board, Jim helped organize the annual meeting on native grassland conservation, wrote a grant application, helped develop the annual plan, and spearheaded a multi-association effort (CNGA, SERCAL, Cal-IPC, and SRF) to push for "green infrastructure" legislation at the U.S. Congressional level. As past CNGA Treasurer, Jim prepared an income and expense tracking program to forecast outlays for workshops and other CNGA educational efforts. He plans to continue this program in 2009.

Jim brings to the Board a belief that public agencies, as common practice, should protect and secure California's remaining native prairies and grasslands during project planning, construction, and long-term land management. He supports the organization's work in educating the public and policymakers on the value and conservation of California's native grassland resources.

Members at Large

Clare Golec is currently employed with the California Department of Transportation as a Revegetation Specialist with the Landscape Architecture Branch. She is involved with a new program and position in Caltrans to address roadside native revegetation, which includes developing appropriate planting palettes, implementing environmental revegetation mitigation, and promoting awareness of native plant genetic and diversity concerns. Clare previously worked for the Calif. Dept. of Fish and Game's Region 3 Timber Program at the Fort Bragg inland office. There she reviewed Timber Harvesting Plans with regard to natural resource protection, stream alteration agreements, and sensitive species. Past work experience also included staff botanist for a private consulting firm in Northwestern California, and as a survey and forestry technician with the U.S. Forest Service Northwest Experimental Station and three national forests.

Clare's overall work experience has included planning and implementing native revegetation; developing revegetation training for environmental staff; vegetation delineation, classification, and mapping; rare plant assessment, survey, mitigation, and monitoring; stream assessment and wetland delineation, mitigation, and monitoring; road and cadastral surveys; erosion control guidelines; marbled murrelet and northern spotted owl surveys; WHR and northern spotted owl habitat mapping; timber cruising, grading, inventory, and harvest layout; and botanical input for environmental and educational documents. Clare received a B.A. in Botany at Humboldt State University and continues her education through botanical societies and workshops.

Sarah Hoskinson became enthusiastic about plant conservation and restoration while growing up in the foothills of Adirondack Park in northern New York and witnessing the decline of the park's native plants at the hands of invasive plants and pests, poor land stewardship, and other threats. Sarah has been committed to understanding and mitigating these threats ever since. After finishing her degree in Environmental Science and Biology at Colby College in Maine, Sarah implemented grassland and forest restoration projects for The Nature Conservancy in Virginia. More recently, she worked for the State of Vermont Wetlands Protection and Restoration Program, where she organized a statewide outreach program for landowners and a system to prioritize restoration and conservation of wetlands.

As a second-year Ecology graduate student at UC Davis, Sarah is committed to finding ways to link academics and management. This connection is a priority in her research, which aims to develop techniques to manage soil conditions to enhance weed resistance in restored native grasslands. Sarah looks forward to strengthening the connections between CNGA and research groups through collaboration and information exchange by helping to:

- establish a research partnership where CNGA and academic collaborators work together to identify information gaps and research needs that would enhance the effectiveness of native grassland conservation and restoration.
- open regular communication among academic scientists, CNGA, managers, and the public to trade advice, ideas, and information.
- keep CNGA abreast of the most recent research in grassland management and conservation.

Richard King has 32 years of experience in USDA-NRCS as a rangeland and wildlife management specialist assisting landowners. He worked in Arizona, for 8 years and throughout Northern California since 1982. In 1999 he became a Certified Educator in Holistic Management and has a passion for practicing and helping others learn a new framework for decision-making that simultaneously addresses the short-term and long-term complexity of managing land, people, and money—successfully.

He is a lifetime member of the Society for Range Management and has long worked at helping the range profession shed old paradigms so that rangeland health in California "annual" grasslands can be greatly improved. Richard believes: (a) we underestimate how "native" perennial species on "annual" grasslands can be increased by mimicking the natural processes in which these species evolved; (b) the degree of invasiveness by an introduced species is typically a symptom of biodiversity loss due to past or current management rather than the species being the cause; thus, time and money should first be spent on the causal problem (management) not the symptom (invasive weeds); and (c) planning livestock use based on perennial species vigor and reproduction remains the most misunderstood and underutilized tool for grassland management or "restoration." He observes that genuine shifts in long-held paradigms are steadily occurring in California.

Since 1991, Richard enjoys raising grass-fattened beef, building biodiversity above and below ground, and increasing "native" perennial grassland species on 40 acres that were part of his great-grandparents' farm on the outskirts of Petaluma.

Bryan Young has been developing, promoting, preserving, and restoring California native grassland ecosystems since 1991, when he went to work for native grass seed producer John Anderson at Hedgerow Farms in Winters, CA. Bryan not only acquired a great amount of skill and knowledge identifying and establishing native grasslands, but he also picked up a healthy disdain for invasive exotics.

In 1992, Bryan completed a B.S. degree in Wildlife and Fisheries Biology from UC Davis. In 1993, he was hired by the Sacramento Regional County Sanitation District. He is currently the manager of the 2,650-acre Bufferlands, which surrounds the Sacramento Regional Wastewater Treatment Plant in Elk Grove. The Bufferlands are managed with an emphasis on wildlife habitat conservation. For 16 years, Bryan has been involved with many successful habitat restoration and management programs, including several hundred acres of grassland projects.

Bryan has been an active member of CNGA throughout his professional natural resource management career. He was first elected to the CNGA Board in 2004 and was reelected in 2006. During his second term, he served as chair of the CNGA Workshop Committee. Bryan looks forward to continuing to lead the efforts of this hardworking committee as well as use his enthusiasm for native grasslands and prudent decision-making to foster the continued growth of the Association and to further support its worthwhile mission.

Board Alternate

Dave Kaplow has been restoring and managing native grasslands and native plant communities for over 25 years. After receiving his M.S. from UC Berkeley in Wildland Resource Science in 1983, he helped found the Berkeley nonprofit DAWN (Design Associates Working with Nature). DAWN, which included such members as Dave Amme, Charlie Danielsen, and Dennis Martinez, pioneered the collection of native grass seed and the beginnings of native grassland restoration in California.

In 1987, Dave founded Pacific OpenSpace, Inc., in Petaluma, specializing in the management and restoration of native plant communities. Pacific OpenSpace owns and operates the North Coast Native Nursery, which grows plants for restoration projects and natural landscapes.

Dave has planned and implemented restoration projects on a wide variety of habitats, including native grasslands, wetlands, riparian zones, woodlands, and coastal bluffs. His native grassland restorations are usually small- to medium-sized projects near populated areas, where the grasses are maintained by mowing and other mechanical methods.

CNGA's Bunchgrass Circle

Life Members

Jack Alderson
Jane Anderson
John Anderson
Fred Ballerini
Sheila Barry
Bob Battagin
F. Thomas Biglione
Jack Booth
Janice Bridge
Cindy Burrascano
Sallie J. Calhoun
Sally Casey
Frank Chan
Vic Claassen
Mike Conner
Anne Corey
Duane Cornett
Charlice Danielsen
James Dekloe
Robert Delzell
Rene di Rosa
Jerome Domurat
Bruce Eisenman
John R. Ekhoff
David Gilpin
Jim Hanson
Barbara Herren
Lesley Hunt
Richard Ibarra
Ellie Insley
Joni Janecki
David Kaplow
David B. Kelley
Micki Kelly
Paul Kephart
Charlotte Kimball
Lenora Kirby
Ron Lutsko, Jr.
Rod MacDonald
Eugene Majerowicz
Carolyn Malmstrom
Tamia Marg
Rhonda and Bob Mark
Ron Martinolich
Ruth Mazur
Mary Kate McKenna
Richard Nichols
Paul Ostler
Carol Presley
Peggy Rathman
Paul Reeberg
Diane Renshaw
John Roberts
Warren Roberts
Craig S. Rust
Victor Schaff
Robert Schott
Susan Schwartz
Jon Shilling
Jacob Sigg
Diana Steidl
Robert Stephens
Scott Stewart
Lillian Vallee
MaryAnn Warmerdam
John Wick
Margaret Willits
Jeanne Wirka
David Yam

Corporate Members

***Muhlenbergia rigens* level**

Hedgerow Farms

***Nassella pulchra* level**

Delta Bluegrass • Pacific Coast Seed • S&S Seed

***Poa secunda* level**

Elkhorn Native Plant Nursery • Restoration Resources

Associate Members

American River Parkway Foundation
Audubon Canyon Ranch, Cypress Grove Research Center
City of Davis • Contra Costa Water District
County of Orange, RDMD/Harbors, Beaches and Parks
Hollister Ranch • Livermore Area Recreation and Park District
Los Angeles Chapter, California Native Plant Society
Oak Creek Energy Systems • Sacramento Regional County Sanitation District
San Luis National Wildlife Refuge • Sun City Lincoln Hills
Thomas Klope Associates. • Truax Company, Inc. • Wildlands, Inc.
Yolo County Resource Conservation District

Calendar

Send calendar entries and announcements for the spring '09 issue by March 29, to ADMIN@CNGA.ORG.

Sat., February 28

Introduction to Lichen Identification. Sponsored by the Friends of the Chico State Herbarium, Chico, CA. For registration form and a calendar of upcoming workshops, go to ⟨www.csuchico.edu/biol/Herb/Events.html⟩.

Sat., March 14

Introduction to Identifying Northern California Grasses (Poaceae). Sponsored by the Friends of the Chico State Herbarium, Chico, CA. For registration form and a calendar of upcoming workshops, go to ⟨www.csuchico.edu/biol/Herb/Events.html⟩.

Wed.–Fri., March 18–20

Developing a Sustainable Grazing Plan to Manage Native Grasslands, at Hastings Reserve, Monterey County. Instructors: Kent Reeves and Richard King. For registration information, contact Judy at ADMIN@CNGA.ORG.

Sat.–Sun., March 28–29

Growing Natives: ***Celebrating California's Beauty in Dry Times,*** Lafayette Community Center and Regional Parks Botanic Garden, Berkeley. For registration information, contact ⟨www.nativeplants.org⟩.

Fri., April 17

CNGA Field Day at Hedgerow Farms. Winters, CA. 8 a.m.–4 p.m. Practical, hands-on learning about native grasses and grassland restoration. Instructors: John Anderson, Hedgerow Farms staff, and CNGA instructors TBA. Registration fees: Students: $30; CNGA members: $40; Nonmembers: $50. For program details and registration, phone/fax Judy at 530-661-2280, or e-mail ADMIN@CNGA.ORG. See page 17.

Wed., Apr. 29

Holistic Grazing Planning Principles: ***Unleashing California Native Perennial Grasses and Forbs*****.** 8 a.m.–4 p.m., in conjunction with CNGA/SERCAL joint Annual Conference, Lake Natoma Inn, Folsom, CA. Instructors: Richard King and Kelly Mulville. See pages 20–21.

Wed. Apr. 29–Sun., May 3

CNGA/SERCAL Joint Annual Conference—*A Confluence of Perspectives and Experience: Habitat Restoration in California's Central Valley*. Lake Natoma Inn, Folsom, CA. Technical sessions, posters, workshops, field trips, more. See pages 20–21. Check ⟨www.CNGA.org⟩ for updates.

Sat.–Sun., May 2–3

CNGA Spring Grass ID Workshop–Northern California, in conjunction with CNGA/SERCAL joint Annual Conference, Lake Natoma Inn, Folsom, CA. 8:30 a.m.–4 p.m. Learn the basic skills of identifying grasses; classroom and field study. Instructors: Dave Amme and Wade Belew. See pp. 20–21.

Sat.–Sun., May 16–17

CNGA Spring Grass ID Workshop–Central California, San Luis Obispo, CA. 8:30 a.m.–4 p.m. Learn the basic skills of identifying grasses; classroom and field study. Instructors: Dave Amme and Wade Belew. Registration fees: $220/members; $260/nonmenbers, Registration deadline May 8. See p. 19.

Restoration Opportunities

Free Restoration Training Program

Back to Natives Restoration in San Juan Capistrano has partnered with the U.S. Forest Service to provide a 9-month restoration volunteer training program. Back to Natives will educate volunteers in dry restoration practices within the Cleveland National Forest. For additional information and to sign up for this ***free*** training program, please e-mail RESTORATION@BACKTONATIVES.ORG.

The 2008–2009 classes have already begun, but participants are welcome to join in at any time. The remaining dates are:

- February 21,
- March 21,
- April 25, and
- May 16.

Visit ⟨http://www.backtonatives.org/usfs.htm⟩ for a registration form and an event waiver.

Volunteer Habitat Restoration

Back to Natives also offers volunteer habitat restoration opportunities (weeding, planting, and seeding) in Southern California. RSVP for any of the events listed below at VOLUNTEER@BACKTONATIVES.ORG or 949-509-4787; BTN will send directions and more info. ***Always*** bring gloves, sunscreen, a re-useable water bottle, snacks, a hat, and closed toed shoes.

Upcoming dates:

- Jan. 26, 9 a.m.–12 p.m., Jeronimo Creek, Mission Viejo
- Jan. 26, 12:30–2:30 p.m., San Juan Elementary's Habitat Garden, San Juan Capistrano
- Feb. 8, 9 a.m.–12 p.m., Caspers Wilderness Park, San Juan Capistrano
- Feb. 9, 9 a.m.–12 p.m., Jeronimo Creek, Mission Viejo
- Feb. 9, 12:30–2:30 p.m., San Juan Elementary's Habitat Garden, San Juan Capistrano
- Feb. 22, 9 a.m.–12 p.m., Mason Regional Park, Irvine
- Mar. 8, 9 a.m.–12 p.m., Caspers Wilderness Park, San Juan Capistrano
- Mar. 22, 9 a.m.–12 p.m., Mason Regional Park, Irvine
- Apr. 12, 9 a.m.–12 p.m., Caspers Wilderness Park, San Juan Capistrano
- Apr. 26, 9 a.m.–12 p.m., Mason Regional Park, Irvine
- May 10, 9 a.m.–12 p.m., Caspers Wilderness Park, San Juan Capistrano
- May 24, 9 a.m.–12 p.m., Mason Regional Park, Irvine

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 "Grasslands" and discounts to CNGA events.

Individual Membership

☐ **Regular member:** $45/year ☐ **Student/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 members within the same small business or agency location.

☐ ***Poa secunda* level:** $300/yr. Includes a small (business-card size) ad for 1 year in *Grasslands*, a free booth at the Annual Conference, and two employee members.

☐ ***Nassella pulchra* level:** $500/yr. Includes a quarter-page ad in *Grasslands* for 1 year, a free booth at the Annual Conference, and five employee members.

☐ ***Muhlenbergia rigens* level:** $1,000/yr. Includes a half-page ad in *Grasslands* for 1 year, a free booth at the Annual Conference, and ten employee members.

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PAPER

Front cover: *Nassella pulchra* along Yolo County Rd 95A. *Photo: JP Marié, UC Davis*
Back cover: Vernal pool on Hwy 12 looking back at the mountains behind Fairfield. *Photo: Dave Amme*