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# GRASSLANDS

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California  
Native  
Grasslands  
Association





## Mission Statement

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

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## From the President's Keyboard

### Our understanding of California grasslands is growing *by Jim Hanson, President*

We are moving toward a more sophisticated view of California's grasslands. An enlarged view of the nature and ecological roles of California grasslands was particularly evident in 2012. Important presentations were made and new scientific findings became available.

#### Conferences

At four major conferences in 2012 — the San Diego CNPS Conservation conference, the California Rangeland Conservation Coalition conference, the California Society for Ecological Restoration (SERCAL) conference, and the California Invasive Plant Council (Cal-IPC) conference — several presenters talked about grassland ecological services, restoration, and weed management.

#### Workshops

The 5th Annual CNGA Field Day at Hedgerow Farms focused on ecology with presentations on grassland wildlife by Melanie Truan and on soils by Vic Claassen of UC Davis. Jessa Guisse of the Xerces Society gave us a close look at pollinators using the forb areas planted at Hedgerow Farms. CNGA also hosted its second workshop on the regional grasslands of the North Bay Area at Santa Rosa's Pepperwood Preserve and offered a workshop at the UC Sedgwick Reserve in Santa Ynez and in Elk Grove on grassland restoration and revegetation.

The Coastal Prairie Working Group organized a full-day program at the UC Davis Bodega Marine Lab to share the results of coastal prairie educational, mapping, and management research initiatives developed under a grant from the California Coastal Conservancy. The coastal region has experienced rapid invasion by velvet grass (*Holcus lanatus*). The initial results of the velvet grass management trials were presented, Ayzik Solomeshch of UC Davis displayed large coastal prairie vegetation maps of the region,

*continued next page*

## Grasslands Submission Guidelines

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

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

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

**Submission deadlines for articles:**

**Spring 2013** — Feb 15, 2013

**Summer 2013** — May 15, 2013

**Fall 2013** — Aug 15, 2013

**Winter 2014** — Nov 15, 2013

## President's Keyboard *continued*

and a remarkable regional website on the coastal prairie has been made available online: [www.sonoma.edu/preserves/prairie/index.shtml](http://www.sonoma.edu/preserves/prairie/index.shtml)

The Central Coast Rangeland Coalition brought participants to the Pt. Reyes National Seashore to examine how coyote bush (*Baccharis pilularis* ssp. *consanguinea*) expansion into coastal prairie is changing plant and animal species composition and reducing forage for ranchers. Abstracts are available at: [www.elkhornsloughctp.org/uploads/files/1349909971Abstracts.pdf](http://www.elkhornsloughctp.org/uploads/files/1349909971Abstracts.pdf)

### Literature

Published science is also broadening the way we look at grassland ecosystems.

Six years ago, *California Grasslands* (2007, Stromberg, Corbin, & D'Antonio, eds.) gave us the first modern look at the ecology and management of "one of the state's most important natural resources both from the perspective of biodiversity and economic values." In 2009, CNPS and the California Department of Fish and Wildlife released the updated *Manual of California Vegetation*, which classifies native grass and forb plant community associations, both common and rare. These classifications are being bolstered by extensive field research by the CNPS "Grasslands Initiative" in the southern San Joaquin Valley and in other locations across the state.

In 2012, CNGA's Grasslands reported on important new research on the ecology and ecological services of native grasslands including an evaluation of water use by grasses (*Grasslands* 22(1)); a study on net loss of soil carbon, beneficial insect use of hedgerows, and native seed survival and reproductive success (*Grasslands* 22(2)); nitrogen deposition effects on grass and oak woodland community and an investigation into quantifying grassland restoration effects on beneficial ecosystem services (*Grasslands* 22(4)).

The year closed with a stunning CNPS *Fremontia* issue on "California's Prairies and Grasslands." In addition to articles on the rich forb and annual wildflower variety within California prairies, the issue includes sections on the amphibians, reptiles, birds, mammals, invertebrates, and native bees that inhabit California prairies and grasslands.

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## Meet the 2013 CNGA Board of Directors

CNGA members have voted, and the results are in!

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CNGA extends deep appreciation and thanks to the following retiring Board members.

Daniel Blankenship  
Kathleen Kraft  
Elise Tulloss



## In this issue

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## President's Keyboard

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In partnership with local CNPS chapters and citizens, CNGA is advocating for the conservation of exemplar native prairie stands where they are threatened by development or land management practices. CNGA has submitted CEQA comments on several proposed public sector projects that would damage rare, high-quality native grass communities. As our view of dynamic, complex, and regionally unique grassland ecosystems is broadening, I am struck by a corollary need to hold onto them. As we are finding out more about the services they provide, let us keep these amazing native plant communities secure and wisely managed.

### Native Grassland Conservation Update

In the November 2012 elections, Alameda County voters defeated a broadly written parcel tax measure that could have helped the Oakland Zoo's plans to expand onto 56 acres of rare native plant and wildlife habitat in Knowland Park. The Zoo states it still has plans to develop into the park. CNGA will continue to monitor and report on this topic and readers also can receive updates at [www.saveknowland.org](http://www.saveknowland.org).



Fruits of *Poa sierrae*. Photo: Belinda Lo

## Searching the Foothills for *Poa sierrae*, a Rare Grass in the Northern Sierra Nevada

by Danny Slakey<sup>1</sup>, Rare Plant Treasure Hunt Coordinator, California Native Plant Society, [dslakey@cnps.org](mailto:dslakey@cnps.org)

The grasses are one of California's most diverse plant families, with over 150 genera and over 600 species represented. It follows logically, then, that grasses would make up a significant component of our rare plant flora, and a quick search of the CNPS Rare Plant Inventory (online at [www.rareplants.cnps.org](http://www.rareplants.cnps.org)) confirms this: 69 members of the Poaceae family are CNPS-ranked as rare, and 23 of those grasses are California Rare Plant Rank 1B plants (Rank 1B is reserved for our state's most restricted plant species; many Rank 1B plants are endemic to California).

During the past 2 years, I have been organizing the CNPS Rare Plant Treasure Hunt program, in which volunteers search for and document rare plants. Until recently, we had not searched for a rare grass because like many other botanists, I found this vastly diverse group of plants to be daunting. So when Jade Paget-Seekins and Belinda Lo, seasonal botanists from the El Dorado National Forest, offered to help lead a survey for *Poa sierrae*, a rare grass endemic to the northern Sierra Nevada and southern Cascades, I jumped at the opportunity to expand my botanical repertoire and contribute to our knowledge of this California endemic.

The story of how *Poa sierrae* was discovered in the El Dorado National Forest is in itself interesting. While on a lunch break this past June, Jade Paget-Seekins, like any good botanist, was keying out a grass that she had found at a few of her survey sites. She identified it as *Poa sierrae*, commonly known as Sierra blue grass, without too much difficulty and went on with her workday.

continued next page

<sup>1</sup>For the past 2 years, Danny Slakey has organized the CNPS Rare Plant Treasure, with a focus in 2012 on California's national forests. He also assists the CNPS Rare Plant Program by performing research for rare plant status reviews.

## Searching for a rare grass *continued*

Only later in the day, while looking for pictures of it on Calflora, did she discover that it was a rare, Rank 1B plant. No one in the El Dorado National Forest had this plant on their radar, so finding it was quite the discovery. In fact, very few California botanists were familiar with this grass; prior to summer 2012, it had only been collected a few times in the past 20 years.

Jade then brought it to the attention of the Forest Botanist, Matt Brown, who was not aware of the grass or that it was listed and might grow in the forest. Because of the find, *Poa sierrae* was added to the El Dorado National Forest Service's sensitive species list. Other forest botanists are now keeping an eye out for the grass, and we are finding out a lot more about it than we previously knew.

By the time we had planned a trip to the Leonardi Falls Botanical Area to search for *Poa sierrae*, it was mid-September, rather late for a plant that flowers from April to June. Admittedly, I am not a grass-ID expert, so I was a bit worried about my ability to recognize a completely vegetative grass. We began our hike near Leonardi Falls, and within a half-mile, Jade and Belinda pointed out some *Poa sierrae*. They showed us a few key characters to look for when the plants are vegetative, and we soon realized that it was just as easy to recognize as the dogwood trees that were scattered in the understory. After the flowers and fruits of this grass have fallen off, the main things that make it unique are:

- 1) It is rhizomatous, and the purple rhizome buds will sometimes protrude above the duff layer.
- 2) It has a very short leaf sheath, leaving the stem exposed in many places.
- 3) The narrow leaf blades turn brown and curl up as they dry, while the stem and leaf sheaths stay green late into the season.

Once we began seeing the plant, we knew exactly where to look for it. It was only growing on steep (often 45 degrees or more) north-facing slopes, usually in the forest understory, and it never grew under the dogwoods (*Cornus nuttallii*). Seeking out those specific habitats meant for a difficult hike — we were mostly off trail, and continued our survey all the way to the slopes of the Rubicon River Canyon.

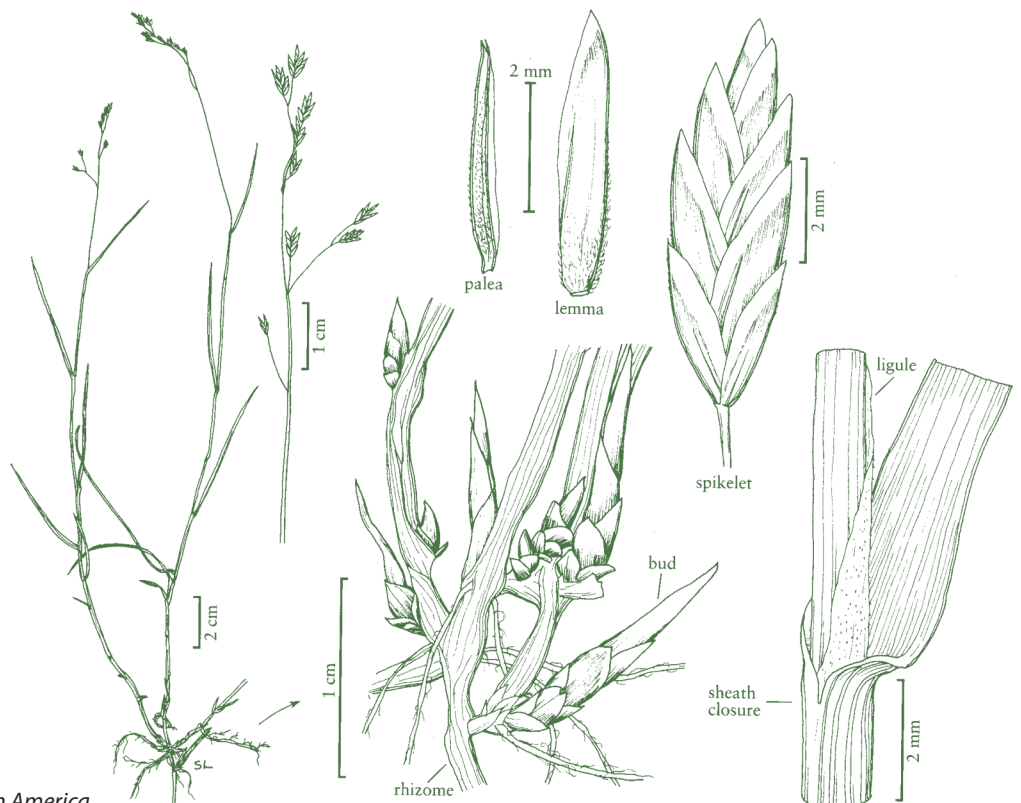
The steepness of those slopes ultimately stopped us from continuing to follow the

population of *Poa sierrae*, which we could see over 100 feet below us on the 60+ degree rocky slopes. Those habitat requirements may seem rather specific, but there is a lot of that habitat type where we were hiking. With only a single day to spend in the area, we could not map the full extent of *Poa sierrae* at this site. Besides, we needed to leave some areas for Rare Plant Treasure Hunters to explore next year.

If this grass was really a rare plant, I wondered, why did we find so much of it on our hike? Some rare plants can be locally common, but have a very restricted range, and this could be the case with *Poa sierrae*. However, Jade and Belinda had told me that they had discovered 12 new occurrences of the grass in the 2012 field season alone. Jade commented: "I feel that the grass is probably not as rare as it was thought to be, but people, even botanists, tend to ignore grasses, and this one blooms early so it might be ignored more than others."

Our hike to search for *Poa sierrae* was one of the most difficult hikes I have experienced in recent years. We were not climbing mountains, but we were hiking off-trail on very steep slopes, sometimes covered in slippery organic debris. So it is no surprise that few botanists, in fact few people, have been to this remote part of El Dorado County. Perhaps this grass, I thought, has a particular affinity for habitats that people tend to avoid. That habitat

*continued next page*



Right: *Poa sierrae*. Taken from *Flora of North America* 2007, Vol. 24 Poaceae, Part I. Illustrator: Sandy Long

*P. sierrae*



## Searching for a rare grass *continued*

preference, coupled with a taxonomic bias among botanists against challenging plant groups, could also explain why *Poa sierrae* has received so little attention in the past

It may take a few more field seasons before we have a better picture of just how extensive and abundant *Poa sierrae* really is. It is possible that it would fit better on California Rare Plant Rank 4, which serves as a watch list for plants that are currently uncommon and could become rarer in the future. Regardless of how abundant *Poa sierrae* turns out to be, its discovery by the El Dorado botanists illustrates an important point: No matter how daunting some taxonomic groups may be, it is important to make botanical surveys floristic in nature, meaning that all plants, not just target species, should be identified.

Had Jade and Belinda gone through the field season seeing the strange grass but never taking the time to identify it, we may not have even known it to occur in the El Dorado National Forest. Even in difficult groups like the grasses, some taxa are distinctive enough to key out easily, and *Poa sierrae*'s unique features are a perfect example of this. Although California is a densely populated state, in which botanists have worked tirelessly for over a century to catalog our flora, important botanical discoveries still await the inquisitive botanist.



Rare Plant Treasure Hunters take a break from their challenging hike at the Leonardi Falls Botanical Area. Photo: Danny Slakey

The Rare Plant Treasure Hunt is funded in part through a grant from the U.S. Forest Service. For more information on the project, please visit [www.cnps.org/cnps/rareplants/treasurehunt](http://www.cnps.org/cnps/rareplants/treasurehunt).



## References

- Callaway, R.M., and N.M. Nadkarni. 1991. "Seasonal patterns of nutrient deposition in a *Quercus douglasii* woodland in Central California." *Plant and Soil* 137(2): 209-222.
- Fenn, M.E., R Hauber, G.S. Tonnesen, J.S. Baron, S. Grossman-Clark, D. Hope, D.A. Jaffe, S. Copeland, L. Geiser, H.M. Rueth, and J.O. Sickman. 2003. "Nitrogen emissions, deposition, and monitoring in the Western United States." *BioScience* 53: 391-403.
- Franchi, B.W., A.H. Goldstein, and R.C. Cohen. 2011. "Observations of the temperature dependent response of ozone to NO<sub>x</sub> reductions in the Sacramento, CA urban plume." *Atmospheric Chemistry and Physics* 11(14): 6945-6960.
- Paoletti, E., and N.E. Grulke. 2010. "Ozone exposure and stomatal sluggishness in different plant physiognomic classes." *Environmental Pollution* 158(8): 2664-2671.
- Patterson, M.T., and P.W. Rundel. 1995. "Stand characteristics of ozone-stressed populations of *Pinus jeffreyi* (Pinaceae) – extent, development, and physiological consequences of visible injury." *American Journal of Botany* 82(2): 150-158.
- Vitousek, P.M., J.D. Aber, R.H. Howarth, G.E. Likens, P.A. Matson, D.W. Schindler, W.H. Schlesinger, and D.G. Tilman. 1997. "Human alteration of the global nitrogen cycle: Source and consequences." *Ecological Applications* 7(3): 737-750.
- Weiss, S.B. 1999. "Cars, cows, and checkerspot butterflies: Nitrogen deposition and management of nutrient-poor grasslands for a threatened species." *Conservation Biology* 13(6): 1476-1486.

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# Visiting California Grasslands: *The Santa Rosa Plateau Ecological Reserve*

by Zachary Principe, Ecologist, The Nature Conservancy,  
[zprincipe@tnc.org](mailto:zprincipe@tnc.org)



The Santa Rosa Plateau Ecological Reserve offers a great opportunity to see an amazing diversity of plants and animals throughout the year. This 9,000-acre reserve protects sensitive ecosystems, such as Engelmann oak woodlands, riparian wetlands, coastal sage scrub, chaparral, bunchgrass prairie, vernal pools, and more than 200 species of native birds and numerous endangered, threatened, or rare animal and plant species.

Although late spring provides the best opportunity to view the greatest diversity and number of wildflowers in the grasslands, winter and early spring provide chances to view other amazing features at the plateau. The vernal pool boardwalk offers visitors a unique opportunity to view a vernal pool from an elevated walkway only inches above water teeming with life during the winter and early spring. Fairy shrimp, tadpoles, and a large variety of small invertebrates are common at various times when the pool holds water (generally December through May, but this varies each year). Lucky visitors will see adult Baja California tree frogs or California toads as they look for food and mates. Later in the spring when tadpoles are nearing their transformation to adult frogs and toads, the two-striped garter snake is commonly seen hunting for its favorite food. A diverse array of birds can also be observed at the vernal pool, including the American widgeon, northern pintail, cinnamon teal, northern shoveler, and green-winged teal. An amazing array of plants start growing while submerged in the pool and are seen beneath the swarms of tiny swimming animals. California water starwort, goldfields, prostrate navarretia, and hairy waterclover are among these unique amphibious plants that finish growing once the pool has dried.

Winter and spring are the best times to see the many raptors that inhabit the plateau during some or all of the year. On your walk to the vernal pool or one of the many other destinations on the plateau, you can see white-tailed kite, northern harrier, and American kestrel foraging over the grasslands or perched atop an Engelmann oak or an old ranch gate post. Less common species



From top: A spring hike in the Santa Rosa Plateau Ecological Reserve, 2010. Junegrass (*Koeleria macrantha*) at the Santa Rosa Plateau Ecological Reserve. Photos: Zachary Principe

present on the plateau only during the winter and spring include the Swainson's hawk, ferruginous hawk, and prairie falcon.

Although late winter and early spring are far from peak wildflower season, there are many species that reliably bloom in January and February. Shooting star, western buttercup, ground pink, coast jepsonia, and chocolate lily are among the first wildflowers to initiate the show as the grasslands begin to change from faded brown to brilliant green. They are joined

by a variety of shrubs, including Eastwood manzanita, bush lupine, and mission manzanita. The clumps of purple needlegrass still dominate the grasslands at this time, as the non-native grasses wait for warmer days for their return to dominance. Stands of giant wild rye and creeping wild rye are also easily visible at this time in the openings of the oak woodlands.

You can enjoy a vast trail system that meanders through the grasslands, oak woodlands, and chaparral at the Santa Rosa Plateau. The vernal pool boardwalk is approximately 0.75 miles from the parking lot; the boardwalk trail connects to the rest of the trail system and allows for both short, easy hikes on the flat mesa and longer, more strenuous hikes through the diverse reserve.

The Santa Rosa Plateau Ecological Reserve is at the southern end of the Santa Ana Mountains near Murrieta. From I-15, take the Clinton Keith Road exit and go west (left from I-15 North; right from I-15 South) about 4 miles. The Visitor Center is on the left about 0.1 miles past La Cresta Road and is open Tuesday-Sunday 9:00 am - 5:00 pm. The reserve is open to hiking daily from sunrise to sunset. More information is available at: [www.rivcoparks.org/education/santa-rosa-plateau/santa-rosa-plateau/](http://www.rivcoparks.org/education/santa-rosa-plateau/santa-rosa-plateau/)





# New Resources for Coastal Prairie Education and Land Management Training

by Suzanne DeCoursey<sup>1</sup>, Education and Reservations Manager, Sonoma State University's Field Stations and Nature Preserves, [ssu.preserves@sonoma.edu](mailto:ssu.preserves@sonoma.edu)

Ask most nature-lovers — even the most botanically inclined — about the importance of California's native coastal grasslands, and you will likely receive a blank stare. Although globally rare and supporting more endemic plant species than many more well-known grasslands such as those of the North American Great Plains, California's coastal prairies do not have the immediate visibility and charisma of the state's towering redwoods or venerable bristlecone pines. And even those who already know the value these grasslands — landowners, land managers, educators, and community members — may not have the knowledge or personnel to effectively manage and restore them.

These concerns emerged in surveys conducted among local grasslands educators and land managers during the Coastal Prairie Enhancement Feasibility Study, funded by the California State Coastal Conservancy, the Sonoma County Agricultural Preservation and Open Space District, the UC Natural Reserve System, and the UC Davis Office of Research. When asked what would be most helpful to their coastal prairie education and management projects, survey respondents suggested a skilled, well-educated team that could regularly travel to grasslands sites to undertake management and restoration activities.

To this end, staff from the California Native Plant Society, Ocean Song Farm and Wilderness Center, Jeffery Consulting, and Sonoma State University's (SSU) Field Stations and Nature Preserves created a 4-day, hands-on curriculum that trains volunteers in land management skills and increases their understanding and appreciation of coastal prairies. The training was conducted at SSU's Fairfield Osborn Preserve during the spring of 2011 and 2012, giving program developers an opportunity to produce a test-driven curriculum incorporating best teaching practices as well as lessons learned from two seasons of implementation.

The 4-day program introduces participants to grassland plants and California grasslands ecology, provides information for field identification of selected species, provides orientation to and hands-on practice with management tools, and involves participants in management planning efforts. Activities are structured to provide students with step-by-step illumination of expert approaches.

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<sup>1</sup>Suzanne DeCoursey develops and implements programs for the SSU Field Stations and Nature Preserves, a group of properties administered by SSU as a campus-wide resource for researchers, educators, and community members.



Left to right: Kathleen Kraft of Ocean Song Farm and Wilderness Center demonstrates a grasslands management technique for Sonoma State University students Thomas Nguyen, Monica Dimson, Tammie Lindstrom, and Eliot Bilecki. Photo: Diana Jeffery

Research has shown that experts often become so practiced in their fields that they view intricate (or even, to the layperson, totally counterintuitive) concepts as simple and self-evident, causing them to assume certain worldviews and expertise on the part of their students and thereby rendering the students lost, puzzled, or suspicious during instruction (Bransford et al. 2000, Hmelo-Silver 2004, LeMay 2008–2009). In this kind of learning environment, students often construct mental models that may partially incorporate new information yet simultaneously conform to their preconceived ideas of the material, thus remaining inaccurate or at best incomplete (Blank 2000, Stewart et al. 2005, White and Frederiksen 2005). The 4-day program at SSU addresses these issues by utilizing instructional “scaffolding” — learning experiences that build upon and transform students’ pre-existing ideas, providing temporary informational structures that support new knowledge acquisition, contextualization, and use — and activities that clarify student and instructor thinking, allowing participants to engage in metacognitive reflections (“thinking about thinking”) to guide learning and mark progress.

After students completed the 2011 and 2012 trainings, they participated in 20 restoration days (per training) at six Sonoma County sites. Outcomes were favorable: 75–100% of students

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## New Resources *continued*

indicated in surveys that they felt comfortable identifying grasslands species, providing information about grasslands to others, using management tools, and developing management strategies. Open-ended questions also documented the students' burgeoning interest in coastal prairies. One student laughingly reported that he crashed his bike after each training day, because he was so engrossed in the grassland plants on the side of the road. Since the 32 participants all attended SSU, these attitudinal changes suggest that a new generation of land managers will carry an appreciation of grasslands into their personal and professional lives.

Three trainings will be offered during the spring and summer of 2013; please view the SSU Preserves' website ([www.sonoma.edu/preserves](http://www.sonoma.edu/preserves)) for training dates and locations. To view the curriculum and create your own skilled grasslands team, please visit the Sonoma Marin Coastal Grasslands Working Group's new website: [www.sonoma.edu/preserves/prairie/index.shtml](http://www.sonoma.edu/preserves/prairie/index.shtml). The curriculum will be available starting April 1, 2013.



## References

- Blank, L.M. 2000. "A Metacognitive Learning Cycle: A Better Warranty for Student Understanding?" *Science Education* 84(4): 486-506.
- Bransford, J.D., A.L. Brown, and R.R. Cocking, Eds. 2000. "How People Learn: Brain, Mind, Experience and School." Washington, D.C.: National Academies Press.
- Hmelo-Silver, C.E. 2004. "Problem-Based Learning: What and How Do Students Learn?" *Educational Psychology Review* 16(3): 235-266.
- LeMay, E. 2008-2009. "How Did I Spend Two Hours Grading This Paper?!" Responding to Student Writing Without Losing Your Life." *Essays on Teaching Excellence: Toward the Best in the Academy* 20(2).
- Online: [www.podnetwork.org/publications/teaching-excellence/08-09/V20,%20N2%20LeMay.pdf](http://www.podnetwork.org/publications/teaching-excellence/08-09/V20,%20N2%20LeMay.pdf) (Accessed 12 November 2012).
- Stewart, J., J.L. Cartier and C.M. Passmore. 2005. "Developing Understanding through Model-Based Inquiry." Pp. 515-565 in *How Students Learn*, Eds. M.S. Donovan and J.D. Bransford. Washington, DC: National Research Council.
- White, B., and J. Frederiksen. 2005. "A Theoretical Framework and Approach for Fostering Metacognitive Development." *Educational Psychologist* 40(4): 211-223.

## SPECIES SPOTLIGHT: Ohlone Tiger Beetle

by Dana Terry, Wildlife Biologist, Garcia & Associates, [dterry@gmx.net](mailto:dterry@gmx.net)

California's grasslands harbor a host of wildlife species that depend greatly on the structure and distribution of our native grass species. One such species, the Ohlone tiger beetle (*Cicindela ohlone*), serves as an indicator for the subtle diversity of grassland habitats. Endemic to the coastal prairie terraces in Santa Cruz County, this highly range-restricted beetle remained unknown to science until its discovery and description in 1993 (Freitag et al. 1993). Under intense pressure from human development and invasive grasses altering its habitat, it was recognized at the time of its discovery as a species in dire need of protection, resulting in its listing as endangered by the federal government in 2001 (USFWS 2001). It is currently known from only eight sites near the City of Santa Cruz (Arnold et al. 2012).

Ohlone tiger beetles are bright, metallic green, with irregular bronze blotches on their elytra (wing covers). Like most *Cicindela* species, adults are fast-moving, highly active predators, chasing down small invertebrates that come into view. They have very large eyes and a well-developed sense of sight; long legs, which allow a fast running speed; and oversized, sickle-shaped mandibles for prey capture (Pearson



1988, Knisley 2011). In this way, they are adapted to hunting in the gaps of bare ground between individual bunches of native grasses, using long lines of sight available in these habitats to identify prey at a distance, then rapidly closing in to effect a successful capture. Bare ground also provides a warm, sunlit surface on which the beetle can thermoregulate and quickly attain the elevated body temperature necessary to maintain its high activity level (Knisley 2011). Larval Ohlone tiger beetles, too, are dependent on bare ground within grasslands. They dig burrows into the ground, typically near margins where vegetation acts as a natural drift line to channel small invertebrates toward them (Arnold et al. 2012). Waiting near the entrance, they lunge from the burrow to seize passing prey.

Unlike many insects that are dependent on the presence of specific plant species due to specialized food requirements, the Ohlone tiger beetle is instead dependent on the basic structural organization of native grasslands. Because of the species' reliance on bare ground between bunches of vegetation, one could say that the importance of native grasses is not so much where they grow, but where they do not grow. This leads to an all-too-familiar discussion of the loss of native grasslands to invasive Eurasian species such as French broom (*Genista monspessulana*), velvetgrass (*Holcus* sp.), and filaree (*Erodium* sp.), whose dense growth pattern shades or encroaches into the patches of bare ground so crucial to the beetle's life history (USFWS 1998).

In a recent study designed to inform management decisions, Arnold et al. (2012) found that grazing, if conducted in a non-intensive fashion, as well as moderate hiking and bicycle use, were all positively correlated with

*continued next page*

Above: Ohlone Tiger Beetle (*Cicindela ohlone*). Photo: U.S. Fish & Wildlife Service

## Ohlone Tiger Beetle *continued*

Ohlone tiger beetle occupancy at sites known to have harbored the species at some time since its discovery in 1993. These activities tend to maintain bare ground in the coastal prairie habitat within the species' range. Extirpations had occurred at many previously occupied sites, and it is noteworthy that while these sites all had been grazed when the beetle was first discovered on them, management practices had changed to either intensify grazing or to remove grazing altogether.

Native grasses associated with the beetle include California oatgrass (*Danthonia californica*) and purple needlegrass (*Stipa [Nassella] pulchra*), two species that are widespread in coastal California grasslands. Why then, is the Ohlone tiger beetle restricted to such a small area? Home to many microclimates, California offers abundant opportunities for species diversity among similar, but spatially separated habitats. Segmented off from other tiger beetle populations, possibly by the Santa Cruz Mountains, *Cicindela ohlone* evolved into a distinct species adapted to the moist, foggy coastal prairie terraces and developed a winter-spring adult active period distinct from the spring-summer active period found in closely related species (Freitag et al. 1993). Perhaps due to elevational restrictions or an inability to traverse the dense redwood forests surrounding its coastal prairie habitat, the beetle remained confined within the area that would one day become Santa Cruz County and held on through the stresses of human development and invasion by Eurasian annual grasses.

The Ohlone tiger beetle is only one example from a plethora of highly range-restricted grassland insect species within California. With the immense loss and modification of native grassland habitat, it is tempting to speculate that many endemic insects may have been lost in the early days of human settlement, before European naturalists arrived on the scene and began to document the region's biodiversity in ways still accessible to science today. Early entomological collections, such as those made by the Russian naturalist Johann Friedrich Eschscholtz in 1824, were largely from coastal areas with only limited penetration into Central Valley grasslands. In addition, many early specimens collected in California were lost to science when the California Academy of Sciences collections were destroyed during the Great Earthquake and Fire of 1906. Again, it is tempting to speculate that specimens of endemic species, unrecognized at the time and now extinct from habitat loss, may be a gap in current knowledge. Although many patches of native grasses survive in protected and well-managed areas today, we may never know what diversity was present when these habitats flourished at full strength in California, rich with subtle interactions that are irreproducible in the modern landscape. Yet species such as the Ohlone tiger beetle can serve as indicators to give us a window into how those interactions worked, because the microhabitats where it survives must share at least some similarity to the habitats that once were. Studying those factors that allow the beetle to persist may hint at how native grassland systems functioned and how we should shape our management practices.



### References

- Arnold, R.A., J.W. Bartolome, and L.D. Ford. 2012. "Review of historical and current land use practices, characterization of suitable habitat, and habitat management recommendations for the endangered Ohlone tiger beetle, *Cicindela ohlone* (Coleoptera: Cicindelidae)." Prepared for the Ventura Fish and Wildlife Office. 43 pp + Appendices.
- Freitag, R.D., H. Kavanaugh, and R. Morgan. 1993. "A new species of *Cicindela* (*Cicindela*) (Coleoptera: Carabidae: Cicindelini) from remnant native grassland in Santa Cruz County, California." *The Coleopterists Bulletin* 47(2): 113-120.
- Knisley, C.B. 2011. "Anthropogenic disturbances and rare tiger beetle habitats: Benefits, risks, and implications for conservation." *Terrestrial Arthropod Reviews* 4 (2011): 41-61.
- Pearson, D.L. 1988. "Biology of tiger beetles." *Annual Review of Entomology* 33:123-147.
- US Fish and Wildlife Service. 1998. *Recovery Plan for Insect and Plant Taxa from the Santa Cruz Mountains in California*. Portland, Oregon. 83 pp.
- US Fish and Wildlife Service. 2001. "Endangered and threatened wildlife and plants; Endangered status for the Ohlone tiger beetle (*Cicindela ohlone*)." *Federal Register* 66(192): 50340-50350. FR Doc. 01-24647. October 3.



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# Database of Management Trials to Provide Site-specific Tools for Restoration

by Valerie Eviner, UC Davis Department of Plant Sciences, [veviner@ucdavis.edu](mailto:veviner@ucdavis.edu)

- ❧ Why does one restoration project succeed, while a similar one does not?
- ❧ Which sites are most (or least) likely to achieve a management goal?
- ❧ What suites of goals are possible at a restoration site, and which management practices will be most effective in achieving the goals at a particular site?
- ❧ Given the variable weather each year, how do I alter my management practices to achieve my goals?
- ❧ How do I manage for long-term success of my projects?

These questions frustrate both managers and scientists; “it depends” often seems to be the one consistent generalization we can make. However, a new project at UC Davis seeks to answer these questions by compiling the results of thousands of on-the-ground management trials across California’s diverse climate, soil, and topographical conditions into a web-based searchable database. This will provide a powerful platform to tease apart the complex interactions among site conditions, management practices, and annual fluctuations in weather, which in turn, will improve our ability to make site-specific management recommendations. While the project will be able to explore the impacts of site conditions and management practices on a given goal (e.g., native species restoration, improving wildlife habitat), it will particularly focus on the relationships across multiple ecosystem services — the benefits that humans derive from ecosystems (e.g., clean water, flood control, erosion control, pest control).

The project will initially focus on California’s grasslands and oak woodlands, as well as the riparian areas found within these systems. It will work with a diverse group of land managers in these systems (e.g., ranchers, conservation groups, agencies, consultants) in order to consider how environmental conditions and management practices affect multiple goals, such as: forage quantity and quality, invasive species control, native species abundance, plant diversity, wildlife habitat, soil erosion control, soil fertility, soil water infiltration and storage, water quality, and soil carbon storage. In addition to assessing effectiveness/riskiness of given practices at specific sites, the project will also collect data on costs of implementing those projects.

The general project plan is presented in Figure 1, and the gray boxes are where you can help get this project started. Over the next year, the database will be designed, large data sets will be entered, and a

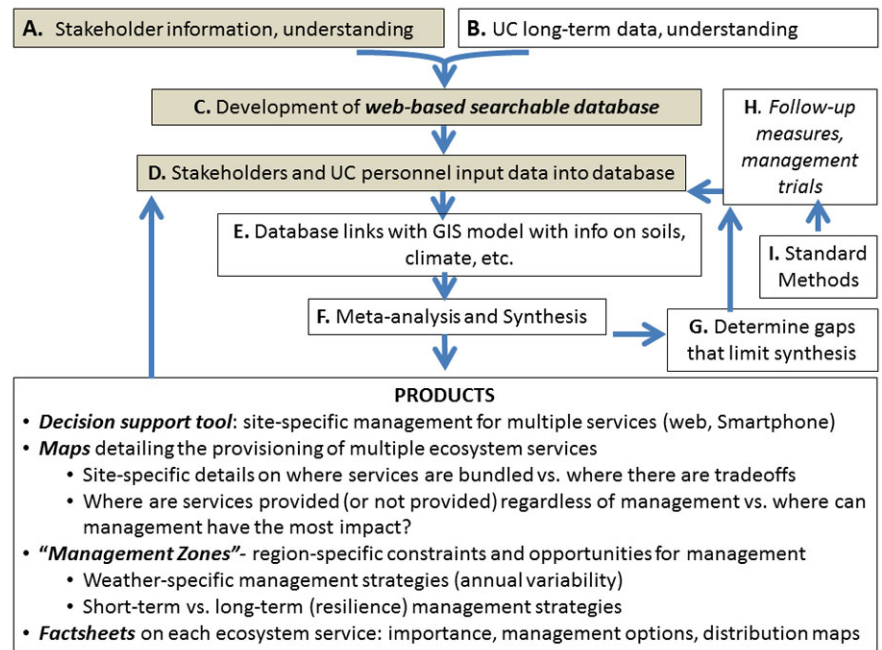


Figure 1

GIS tool will be developed to allow users to identify specific environmental conditions associated with each project entered into the database. Eventually, this study will result in a diversity of products that can facilitate management planning as demonstrated in Figure 1. For example, a web-searchable database will allow you to search for management projects based on environmental conditions, goals, and/or management practices. There will also be a decision support tool that allows you to enter your location and management goals and can synthesize the database for you — suggesting which goals are most feasible at your site and which management practices are most promising, based on your goals.

We are looking for your guidance to prioritize management practices, goals, and measurements, and we will seek these out through stakeholder workgroup meetings (also feel free to directly contact the project with your opinions). We are also looking for groups with records (formal or informal) of large numbers of management trials, and we can work with you to facilitate including them in the database. Once this database is established, it will be available on-line, and at that point, we will welcome individual projects to share their results through the database. In consultation with stakeholders, we will develop standardized measures of multiple ecosystem services, such as: native vs. invasive plant cover, soil fertility, erosion control, soil water storage, wildlife habitat, and soil carbon storage. A handbook will be developed to describe how to measure these multiple goals, and a lending library of measurement

*continued next page*

## Site-specific Tools *continued*

tools will be available from your local Natural Resources/Rangeland Farm Adviser. In addition, the project team will be available to take these measurements at your project sites.

If you have information from a restoration project that you would like to submit for inclusion in the database or if you are interested in joining the project collaborators, please contact Valerie Eviner via [veviner@ucdavis.edu](mailto:veviner@ucdavis.edu) or 530.752.8538.

Updated information on the project, as it develops, will be found at: [www.plantsciences.ucdavis.edu/plantsciences\\_faculty/eviner/main/current\\_research.htm](http://www.plantsciences.ucdavis.edu/plantsciences_faculty/eviner/main/current_research.htm)



*Project Funders:* UC Agriculture and Natural Resources (through the Kearney Endowment) and Western Sustainable Agriculture Research Education Program (for on-ranch work)

*Project PIs:* Valerie Eviner, Mel George, Andrew Latimer, David Lewis, Toby O'Geen, Kevin Rice, Ken Tate, Truman Young

*Project Collaborations:* UC Cooperative Extension Farm Advisors (Sheila Barry, Theresa Becchetti, Josh Davy, Morgan Doran, Julie Finzel, John Harper, Roger Ingram, Royce Larsen, Stephanie Larson, David Lile, Missy Merrill-Davies, Glenn Nader), Audubon's Bobcat Ranch, California Climate & Agriculture Network, California Farm Bureau, California Invasive Plant Council, California Native Grasslands Association, California Rangeland Conservation Coalition, Center for Natural Lands Management, Hedgerow Farms, Putah Creek Riparian Reserve, Solano Resource Conservation District, US Forest Service.



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# Some Peer-reviewed Grasslands Literature of Note, 2011-2012

Courtesy of the CNGA Research Committee

## 2011

Barclay, J.H., N.M. Korfanta, and M.J. Kauffman. 2011. "Long-term population dynamics of a managed burrowing owl colony." *Journal of Wildlife Management* 75(6): 1295-1306.

Bennett, A.E., M. Thomsen, and S.Y. Strauss. 2011. "Multiple mechanisms enable invasive species to suppress native species." *American Journal of Botany* 98(7): 1086-1094.

Doherty, J.M., J.C. Callaway, and J.B. Zedler. 2011. "Diversity-function relationships changed in a long-term restoration experiment." *Ecological Applications* 21(6): 2143-2155.

Duffy, W.G., and S.N. Kahara. 2011. "Wetland ecosystem services in California's central valley and implications for the wetland reserve program." *Ecological Applications* 21(3): S18-S30.

Germano, D. J., G.B. Rathbun, L.R. Saslaw, B.L. Cypher, E.A. Cypher, and L.M. Vredenburg. 2011. "The San Joaquin desert of California: Ecologically misunderstood and overlooked." *Natural Areas Journal* 31(2): 138-147.

Jepsen, E.P.B., J.J. Keane, and H.B. Ernest. 2011. "Winter distribution and conservation status of the Sierra Nevada great gray owl." *Journal of Wildlife Management* 75(8): 1678-1687.

Marushia, R.G. and E.B. Allen. 2011. "Control of exotic annual grasses to restore native forbs in abandoned agricultural land." *Restoration Ecology* 19(1): 45-54.

Moore, K.A., S.P. Harrison, and S.C. Elmendorf. 2011. "Can spatial isolation help predict dispersal-limited sites for native species restoration?" *Ecological Applications* 21(6): 2119-2128.

Nelson, K.S., E.M. Gray, and J.R. Evans. 2011. "Finding solutions for bird restoration and livestock management: Comparing grazing exclusion levels." *Ecological Applications* 21(2): 547-554.

Reiner, R., and A. Craig. 2011. "Conservation easements in California blue oak woodlands: Testing the assumption of livestock grazing as a compatible use." *Natural Areas Journal* 31(4): 408-413.

Seabloom, E.W., C.D. Benfield, E.T. Borer, A.G. Stanley, T.N. Kaye, and P.W. Dunwiddie. 2011. "Provenance, life span, and phylogeny do not affect grass species' responses to nitrogen and phosphorus." *Ecological Applications* 21:2129-2142.

Yelenik, S.G. and J.M. Levine. 2011. "The role of plant-soil feedbacks in driving native-species recovery." *Ecology* 92(1): 66-74.

Young, S.L., G.B. Kyser, J.N. Barney, V.P. Claassen, and J.M. Ditomaso. 2011. "The role of light and soil moisture in plant community resistance to invasion by yellow starthistle (*Centaurea solstitialis*)." *Restoration Ecology* 19(5): 599-606.

## 2012

Hulvey, K.B., and E.S. Zavaleta. 2012. "Abundance declines of a native forb have nonlinear impacts on grassland invasion resistance." *Ecology* 93(2): 378-388.

Parker, S. 2012. "Small reserves can successfully preserve rare plants despite management challenges." *Natural Areas Journal* 32(4): 403-411.

Porensky, L.M., K.J. Vaughn, and T.P. Young. 2012. "Can initial intraspecific spatial aggregation increase multi-year coexistence by creating temporal priority?" *Ecological Applications* 22(3): 927-936.

Selmants, P.C., E.S. Zavaleta, J.R. Pasari, and D.L. Hernandez. 2012. "Realistic plant species losses reduce invasion resistance in a California serpentine grassland." *Journal of Ecology* 100(3): 723-731.

Shuang, L., C. Potter, and C. Hiatt. 2012. "Monitoring of Net Primary Production in California Rangelands Using Landsat and MODIS Satellite Remote Sensing." *Natural Resources* 3(2): 56-65.

Wainwright, C.E., E. M. Wolkovich, and E.E. Cleland. 2012. "Seasonal priority effects: Implications for invasion and restoration in a semi-arid system." *Ecology* 93(2): 378-388.





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Front cover: Tule elk (*Cervus canadensis nannodes*) at Point Reyes National Seashore Elk Reserve at Tomales Point, June 2010. *Photo: Jim Coleman*

Back cover: Native grass seedlings, Bufferlands, Elk Grove. *Photo: Roger Jones*





# Register Now Online for CNGA's Spring Workshops

## April 18: **Basic Principles & Techniques for California Native Grass Identification**

Participants will receive an introduction to California's grassland ecology, learn the qualities of specific native grasses for restoration, and become skilled at recognizing the basic groups and common species of California's grasslands through work with plant samples in the classroom. While not a prerequisite to the April 19th Field Day at Hedgerow Farms, attendees of both days' events will have an immediate opportunity to put their native grass ID skills to use.

**Location:** Yolo County (specific location to be announced)

**Fees:** \$130 CNGA members / \$150 non-members / \$80 students w ID

## April 19: **Sixth Annual CNGA Field Day at Hedgerow Farms**

For the 6th consecutive year, CNGA is teaming up with Hedgerow Farms to provide an excellent opportunity for practical, hands-on learning about native grasses and grassland restoration. Participants will learn from expert instructors, be immersed in a wide variety of grassland projects, and enjoy a wonderful occasion to network with a diverse group of people that share a common interest in California grasslands.

**Location:** Hedgerow Farms, Winters, CA

**Fees:** \$65 CNGA members / \$80 non-members / \$40 students w ID

## May 10: **Grassland Monitoring Methods**

How do I tell if my grassland restoration project was a success? This workshop will focus on multiple grassland monitoring techniques including how to monitor vegetation and wildlife within a grassland setting. The course will feature an intensive classroom session where participants will learn the uses and theory of multiple monitoring techniques, as well as field session where participants will have an opportunity to practice the different techniques and ask questions to the instructors.

**Location:** Davis (specific location to be announced)

**Fees:** \$130 CNGA members / \$150 non-members / \$80 students w ID

## June 8 and 9: **Identifying the Native and Naturalized Grasses of California**

In Day 1, attendees 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 working with plant samples in the classroom. 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. Day 2: We will explore a local grasslands, rich with a diverse assemblage of both native and naturalized grasses and make use of our new understanding and skills. Bring a 10X hand lens, notebook, scotch tape, and any field guides to grasses you may have. Recommended texts: Jepson Manual, Hitchcock Manual, and Beecher Crampton's *Grasses in California* (UC Press).

**Location:** Marin or Sonoma Coast (specific location to be announced)

**Fees:** \$220 CNGA members / \$240 non-members / \$145 students w ID

## On the Horizon: **Using California Native Grasses in the Water-Conserving Landscape**

Participants will explore the use of California native grasses and graminoids in a broad range of urban settings. The course will also examine the cultural requirements and adaptability of key native grass and sedge species as they relate to the soil and site parameters in shaping a sustainable, native, drought-tolerant landscape.

**Location:** TBA

**Fees:** TBA

**Questions?** Please visit our website at [www.cnga.org](http://www.cnga.org) or contact Diane Crumley, Administrative Director, by phone/fax: 530.297.0500 or email [admin@cnga.org](mailto:admin@cnga.org)

