



GRASSLANDS

The Newsletter of the California Native Grass Association (complimentary copy) Vol. 1 Issue 1 April 1991

WORKING WITH NATIVE PERENNIAL GRASSES

by David Amme

One thing which a good farmer quickly learns is that in fighting nature he will always be defeated but that in working with her, he can make remarkable and immensely profitable progress.

Louis Bromfield - Malabar Farm Designers, landscape architects, planners and land managers are seeking solutions to the challenging and difficult problems of slope stabilization and erosion control, noxious weed invasion, habitat mitigation and restoration, fire hazard, sustainable production, and the dwindling water resources. It is the designer's fondest dream to create a stable landscape that requires little or no maintenance. Indeed, the closer the landscape design approaches the potential natural vegetation the more stable that landscape is. The restorationist learns that by working with or following the natural processes of vegetation establishment less inputs and costs are required. As this awareness grows, more and more landscape architects, environmental consultants, farmers, and agricultural researchers are discovering the utility and benefits of native perennial grasses.

The fast and loose techniques of broadcast seeding and spray-on hydroseeding with exotic annual grasses and "native" wildflowers are not fulfilling long-range landscape goals. Annual grasses, especially Blando brome (*Bromus mollis*) and Italian ryegrass (*Lolium multiflorum*), grow quickly and efficiently exploit the soil moisture near the surface making it difficult for perennial species to establish. Seeded wildflowers rarely persist past the first year. Annual and biennial weeds such as rippgut brome (*B. diandrus*) and yellow starthistle (*Centaurea solstitialis*) soon invade, increasing abatement problems and the potential for fire hazard. There is no "silver bullet" single species or seed mix for establishing a stable grassland landscape. Proper species selection, seed bank evaluation, seed bed preparation, seeding techniques, and especially

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DIRECTIONS

1. Reports from each action committee.
2. Goals and project status.
3. Editorial and commentary.
4. Education, field trips, seminars.
5. Quotations.

Discoveries:

1. Current research.
2. Collection sites.
3. Grassland observations.
4. Grassland specie I.D. and Taxonomy.
5. Field trials.

Trends:

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2. Grassland restoration projects.
3. National and regional information.
4. Vision for the future (uses and end user expectations.)

Contributions,
Membership,
Recognition

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PRESIDENT'S MESSAGE



by: Robert Delzell

The Association was born with the dream to make native grasses available for restoration of natural plant communities. Land management agencies receive increasing public pressure to use native grasses for wildfire burns,

roadside revegetation, and landscape plant material. Until recently, native grass plant material was unavailable to meet the increasing demand. Interest from agencies and others has sparked research efforts, public education, and the associated technology to select, produce, and promote native grasses.

On February 19, 1990, public and private organizations met at the Lockford SCS Plant Materials Center to explore opportunities and "figure out a way to meet challenges which the organizations faced." In the fall of 1991, we became the California Native Grass Association. The purposes of our organization are: (1) to promote native grass technology as needed to restore ecosystems (includes selection, evaluation, and establishment of California native grasses and associated plants), (2) to coordinate and support the production and marketing of commercial quantities of native grass seed and other plant materials (includes storage and preservation of these materials, and guidelines for marketing and using them, and (3) to educate our communities on the economic and environmental values of native grasses and associated species. (4) to endorse conservation efforts to preserve existing native grassland habitat. Individual participation in the association comes from more than 20 public and private organizations.

"We promote the use of native grasses and associated plants with concern for genetic integrity and biodiversity within an end-use perspective. If ecosystem restoration is the goal, use of site-specific native species is essential. If a native plant is to be used for special purposes such as revegetating eroded soils along a highway, weed control, or urban landscaping, then selection and volume production of a variety within a species' population may be appropriate."

The CNGA will pursue a network approach to exchange information among its members through our newsletter, workshops, tours, and field trips. The ideas, experience, and enthusiasm of our membership points to a bright future for the revitalization of California grassland ecosystems.

post-establishment management are critical factors in attaining vegetation stability.

The Healing Grasses

Native perennial grasses have many applications in farm, urban, and wildland settings. Farmers are finding native perennial grasses useful in sustainable agricultural systems as low input perennial hay crops, as cover crop plant material in orchards and vineyards, and as harbingers of beneficial insects. Drought tolerant perennial grasses are ideal for transition areas surrounding high-use turf areas of urban parks and golf courses fairways. Perennial grasses can be used in habitat restoration and creation settings, including open-space areas, woodlands, riparian corridors, and wetland margins. Native perennial grasses and the associated native grassland community offer an alternative to the noxious weeds along the thousands of miles of the right-of-ways of the state's highway system. The faster growing, short-lived perennial grasses have similar seedling vigor and growth rates to the exotic annual grasses and are useful in erosion control mixes on disturbed sites and in reseeding areas burned by wildfires. One distinct advantage to using native grasses after fire and disturbance is that they are not so competitive that they eliminate the local native flora of flowering herb, shrub, and tree species and allow the surrounding native plant community to reestablish. There are many different kinds of native perennial grasses in California. There are short-lived and long-lived perennials, both tall and short in stature. Some perennials spread by underground rhizomes but most of California's perennial grasses are bunchgrasses. Many perennials die back completely in the summer regardless of summer water and some will regrow with occasional supplemental irrigation. The majority of California's perennial grasses are the cool-season types. These grasses generally germinate in the fall, grow vigorously in the late winter and spring, and produce their seed by the end of May. Warm-season grasses grow in the late spring and summer and flower in the fall. The most important warm-season perennial grasses in California are alkali sacaton (*Sporobolus airoides*), deergrass (*Muhlenbergia rigens*), saltgrass (*Distichlis spicata*), and prairie threeawn (*Aristida* spp).

The 1991 Perennial Grass Portfolio

The interest in native perennial grasses has led to the production, albeit small, of several species and varieties. The following native perennial grasses are currently being produced in commercial quantities and can be purchased from seed houses in California.

These species are a "short list" of over eighteen native perennial grasses currently being reviewed by the California Native Grass Association.

Meadow Barley (*Hordeum brachyantherum*). Meadow barley is a medium sized, short-lived bunchgrass with strong seedling vigor. Meadow barley can be found in meadows, bottom lands, salt marshes and on grassy slopes from sea level to 7000 feet where rainfall ranges between 12-36 inches annually. It is tolerant alkaline soils and will establish on infertile and compacted sites. Generally, meadow barley will not persist on dry sites. Because of these characteristics, meadow barley is an ideal nurse crop with other long-lived perennial grasses.

California Brome (*Bromus carinatus*). California brome is a large, leafy, short-lived bunchgrass with strong seedling vigor. It grows in woodland sites throughout California which receive between 12 and 40 inches of rainfall per year. California brome is a very productive grass on fertile sites and provides good groundcover for wildlife and waterfowl. It is an excellent, general-purpose grass that is very competitive with herbaceous weeds. California brome is quite variable throughout its range. There are varieties that are annual or biennial (*B. arizonicus*, Cucamonga Brome). Mountain brome (*B. marginatus*), that is sold under the name Bromar, is similar to California brome. Bromar is adapted to the mid-elevation mountains of the Northwest. Deborah Brome (described as a P.V.P. "native type" *B. carinatus*) is not a native North American brome but rather a long-lived South American brome developed in Great Britain for irrigated pasture and hay production. Taxonomically all of these grasses and their forms are difficult to distinguish.

Blue Wildrye (*Elymus glaucus*). Blue wildrye is a large, short-lived bunchgrass with good seedling vigor. Generally, blue wildrye is an upright, tall grass that inhabit woodland areas of the foothills and high mountains, however, there are more compact, leafy varieties adapted to sunny grassland habitats. Blue wildrye grows where annual rainfall ranges between 10 and 40 inches annually and is generally more drought tolerant than common meadow barley and California brome. Blue wildrye provides excellent wildlife habitat for both mammals, birds and waterfowl. Blue wildrye is an excellent grass for reseeding burned and disturbed areas in the oak woodland and forested habitats. There are several varieties of blue wildrye presently available and adapted to different elevations and regions in California.

Slender Wheatgrass (*Agropyron trachycaulum* var. *majus*). Slender wheatgrass is a com-

Guest Speaker Announcement:

David Amme



May 2nd 1991 nine p.m. Room 500 State Library and Courts Building at 914 Capital Mall, Sacramento. see editor's notes for directions and map.

David Amme will give a talk and slide show presentation on native California grasses. Featured will be ten species targeted for CNGA research agenda. David's work focuses on restoration, resource management, and native grass selection and breeding research. David will be available for questions following his presentation.

mon bunchgrass in the higher elevational areas of the intermountain west. Variety *majus* is native to California's lower elevation central and coastal valley region and is much more robust and faster growing than typical western plant material. Variety *majus* is very similar to blue wildrye in form and stature.

Creeping Wildrye (*Elymus triticoides*). Creeping wildrye is a tall, strongly rhizomatous perennial grass that grows on good soils and bottomlands from the coastal marshes to high Sierra valleys. Creeping wildrye is adapted to alkaline soils and is tolerant to high summer temperatures. It stays green longer into the summer dry season than any other cool-season perennial grass and spreads vigorously with underground rhizomes. With proper management creeping wildrye will form large colonies and patches. Despite poor seedling vigor and delayed germination, creeping wildrye is competitive

Amme continued...

enough with weeds and annual grasses that it will dominate a properly seeded and managed site the second year. The Soil Conservation Service is currently developing a variety of creeping wildrye (named Rio) from material collected in the central San Joaquin Valley near Fresno. Seed is not available now but plants are available as cut rhizomes and liners.

Purple Needlegrass (*Stipa pulchra*). Purple needlegrass is a large, long-lived bunchgrass well adapted to clay and loamy soils. It grows primarily in the lower elevations between sea level and 2000 feet in areas receiving between 12 and 30 inches annual rainfall. As with many of the long-lived bunchgrasses, purple needlegrass grows slowly as a seedling and is susceptible to competition from weeds and fast growing annual grasses. When seeded, it generally takes two years to get a viable established stand. Fertilization during seeding generally favors the weeds and ultimately suppresses good stand establishment. Purple needlegrass is tolerant to summer drought and heat. Purple needlegrass will establish on disturbed cut slopes and in thin soils, making it an excellent perennial grass component in revegetation and restoration seed mixes. In addition, purple needlegrass is adapted to serpentine soils.



Nodding Needlegrass (*S. cernua*). Nodding needlegrass is often difficult to distinguish from purple needlegrass in the field. Nodding needlegrass is generally smaller with a finer leaf. It has strong seedling vigor, and is adapted to sandy, well-drained, loamy soils.

Red Fescue (*Festuca rubra*). Red fescue is a medium sized, loosely tufted, fine-leaved grass that spreads with short underground rhizomes. Many forms of red fescue have been introduced to California as turf seed. Hardy native selections of red fescue have recently been made along the central coast and in the mountain regions of California. Native red fescue is a very attractive ornamental grass that is aesthetically pleasing whether mown or not. Its fine foliage and spreading character make it ideally suited to natural landscapes and low-input buffer

ABSTRACT

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

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

Abstract:

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

The current schemes for managing California roadside vegetation include frequent mowing, blading, and herbicidal application, which are time-consuming and expensive. Yolo County currently spends over \$40,000 a year for herbicides applied along some 800 miles of county roads. Blading costs are over \$100 per mile treated (Garrison, 1989). Existing practices for roadside maintenance and control of erosion encourage invasion and domination by noxious, undesirable, and highly invasive

weeds. Thus, roadsides have become significant reservoirs for such agricultural weeds as yellow starthistle (*Centaurea solstitialis*) and various other thistles, wild oats (*Avena fatua*), rigput brome (*Bromus rigidus*), field bindweed (*Convolvulus arvensis*), redroot pigweed (*Amaranthus retroflexus*), and others. The current practices have also led to unsightly ditches, and much erosion and siltation. In the long run, these practices discriminate against desirable plant species. Moreover, the general public is increasingly concerned with the roadside use of herbicides and possible implications for health. The authors believe that California could benefit from developing alternative management schemes.

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

There are now opportunities to reestablish portions of the native prairie. There are several large producers of California native grass seed, and there is increasing public awareness of native grasses and interest in restoring them for improved biodiversity (Meyer, 1989; Anonymous, 1990; Bugg, 1990; Northington, 1990). In several states, particularly in the Midwest, native grasses are being used successfully along highway corridors (Harrington, 1989) and ditches (Bright, 1988). Once established, perennial grasses reduce erosion and fire hazard, and preclude the establishment of seedlings of most agricultural weeds. Maintenance can be reduced to a single timely mowing per year (see Gillespie, 1989).

There are numerous perennial grasses, both native and introduced, that appear particularly useful along rights-of-way, because they thrive under existing rainfall and soil regimes. They green up earlier in fall and remain green later into the spring than do the introduced annuals. Trials in Yolo County, including elaborate and extensive demonstration plots at Hedgerow Farms (owned by John H. Anderson), clearly show that perennial grasses can be efficiently established on roadsides and thereafter suppress most noxious weeds. Our observations also suggest that ground squirrel population densities are greatly reduced when perennial grasses dominate roadsides (see

Daar et al., 1984). On the other hand, desirable wildlife such as pheasant can be greatly increased (see Duxbury and McKenna, 1990).

Cover crops have long been known to be useful in suppressing weeds. Weed-suppressive cover crops have sometimes been termed "smother crops", and modes of action can include competition for resources or exudation of allelopathic compounds. In the case of perennial grasses, both mechanisms can be at work in the suppression of weed seedlings (see Tilman, 1988). Ecological studies have shown that perennial bunchgrasses have root masses that extend laterally, leading to suppression of weed seedlings at some distance (Ornduff, 1974). The approach developed by one of the authors (Anderson) involves selective herbicides for weed suppression during the first two years of bunchgrass establishment. Thereafter, herbicides can be discontinued, and management will be by mowing or control burning as needed. In many instances, no management at all will be required. Native grasses are slow to establish, and will not invade the farmers' fields like the noxious weeds that currently dominate roadsides in most agricultural lands (Crampton, 1974).

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

Rural roadsides typically include several topographic zones (Fig. 1): (1) pavement edge; (2) berm or shoulder; (3) inner ditchbank; (4) ditch bed; (5) outer ditchbank; and (6) field edge. These zones present a range of environmental conditions, and require a range of plant materials. Fortunately, various perennial grasses have different environmental optima and tolerances and varying growth habits. Low-statured, non-rhizomatous species (e.g., sheep fescue* (*Festuca ovina* cv 'Covar'), pine bluegrass (*Poa scabrella*) are desired for the pavement edge, because they permit maximum visibility by motorists, are unlike-

ly to break up pavement, and, although they tolerate close mowing, require no mowing in many cases. Red fescue (*Festuca rubra*), pubescent wheatgrass* (*Agropyron trichophorum*), and lower-growing forms of blue wildrye (*Elymus glaucus*) are intermediate in height and are appropriate on the berm or shoulder. Short-lived, moisture-loving perennials like meadow barley (*Hordeum brachyantherum*) are well suited for inner and outer ditch banks and the ditch bed if ditches only have water intermittently. If ditches contain water most of the time, spike-rushes (*Eleocharis* spp.) would be better adapted. The outer ditch bank can be assigned to taller-statured grasses, such as tall wheatgrass* (*Agropyron elongatum*), slender wheatgrass (*Agropyron trachycaulum* var. *majus*), blue wildrye (*Elymus glaucus*), or orchardgrass* (*Dactylis glomerata* cv 'Berber'). If mowing is frequent, these species can also be used on the inner ditchbanks and on the beds of intermittently-flooded ditches. The field-edge niche is subject to inadvertent damage by herbicides and agricultural implements. Therefore, tough, resilient, rhizomatous grasses such as creeping wildrye (*Elymus triticoides*) are particularly appropriate. This species is tall statured, recovers rapidly from mechanical damage, and shows resistance to a commonly-used herbicide, glyphosate.

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

awn (*Aristida hemulosa*).

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

* Non native species

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1. Soil Conservation Service - Lockeford Plant Materials Center focus on Native Grasses. Dave Dyer, manager at the Center describes advance testing stage for two species of native grass. Eighty collections of (*Elymus glaucus*) Blue wild Rye have been tested. A superior selection from Mariposa is to be evaluated and is targeted for release in two years. Representing over eight years of testing are seventy collections of (*Distichlis spicata*) salt grass. Six collections are in the advanced testing stage. SCS personnel provide training in all phases of plant materials programs. For information write, Box 68, Lockeford, California. 95237

2. Hastings Natural History Reservation- Carmel Ranch Company Research. Research on Carmel Valley grasslands include complete plant species list and frequencies for dominant plants for a twenty year time span. Dr. Mark Stromburg, reserve manager, and Dr. James Griffin, are preparing a detailed paper. Initial results show native grasslands as remarkably stable. Restoration activities on "natural" ungrazed grasslands and grazed, managed grasslands of Carmel Valley is purposed. Species for seed collection and test plantings for study include, *Stipa pulchra*, *S. cernua*, *Bromus carinatus*, *Elymus glaucus*, and *Hordeum brachyantherum*. Grazing and clipping studies are planned. Vegetative analysis will be conducted by Dr. John Menke, U.C.Davis.Seed collection, test plantings, and clip plots assisted by Dave Amme.

3. University Arboretum at Davis design native grass plantings for renovated garden. Landscape architect, Cheryl Mihalko and Aboretum staff are working together to increase the role of Native grasses in plant collections and gardens of the Arboretum. Three species are chosen for the dominant components for the meadow garden. *Stipa pulchra* (Purple needlegrass), a grass many say carpeted vast areas of the Great Valley before the last century; *Melica californica* (California Melic grass), a tall beauty of more xeric sites with shimmering pearly bracts; and *Festuca californica* (California Fescue), a very large shade-tolerant bunchgrass whose flowering stalks arch five to six feet skyward. Patches of indiginous saltgrass, (*Distichlis spicata* var. *spicata*) will be conserved but constrained from spreading. As part of it's-formal Statement of Purpose, The University Arboretum has a

firm commitment to the horticultural use of California natives. Mary Burke, Curator, University Arboretum

4. Animal Impact at Cal Poly. Fifteen species of perennial grasses were planted in a two acre field left dry and heavily stocked to remove old forage. Seed was hand broadcast while 100 Suffolk sheep were brought in to create ground disturbance. Lima beans and sheep dogs exited the flock causing them to circle and further disturb the ground. Even with small amounts of moisture and the December freeze, some germination occurred. Identification and plant growth will be monitored and when appropriate, intensively grazed. The project is developing as an interdisciplinary exercise directed by Robert T. Rutherford, Animal Sciences and Industry, California Polytechnic State University, San Luis Obispo, Ca. 93407.

5. Native Grass Demonstration Garden Planned. Plots and gardens featuring legumes, specialty crops, heirloom varieties, and edible landscaping are part of the program at the Davis Student Experimental Farm. A native grass demonstration garden is planned for the student farm. Native grasses represent an important group of plants requiring evaluation for on the farm uses in agriculture. For information about the project: Craig Thomsen, Range Ecologist (916) 752 8810 or Mark Van Horn, Davis Student Farm Director (916) 752 7645.

Editors Notes:

Meeting Announcements

OPEN TO ALL!! ATTEND CNGA MEETING: (May 2nd. 9-12 am.) Guest speaker, David Amme. Room 500 of the State Library and Courts Building at 914 Capital Mall (on the Capital Circle), Sacramento. For best parking use parking garage at 10th. and L. To reach garage: off ramp I-5 at J street, right turn (south) on 12th, right turn on L (west), right turn on 10th (north). Garage is first driveway on right.

CNGA Directors Meeting. (May 2nd. 2-5 pm.) President Robert Delzell will conduct meeting to be held at the Division of Mines and Geology Conference Room, 610 Bercut Drive, Sacramento. Directions from 10th st. parking garage are: drive west on L street-follow signs to I-5 north; off ramp Richards Blvd. Continue east. Turn left at first signal (North 3rd.). Turn left on Bercut. The conference room is located near the Pot Belly

Delhi and parking is free. Reserved spaces are available.

Many thanks to Gail Newton for meeting arrangements!

Look forward to your next issue of Grasslands.

SummerNewsletter Highlights: Considering Native Grasses? Here's a Checklist

by: Charlotte Glenn

Integrating Native Grasses into the Urban Landscape

by: Patricia Gouveia

Cherry Island Golf Course. Natives Doing Great

by Scott Stewart

Stipa Pulchra.

by Paul Kephart

Summer/fall newsletter deadline: July 20th 1991.

Thanks to all who contributed articles and information to Grasslands. Any photographs, articles, and news briefs send to: Grasslands Editor

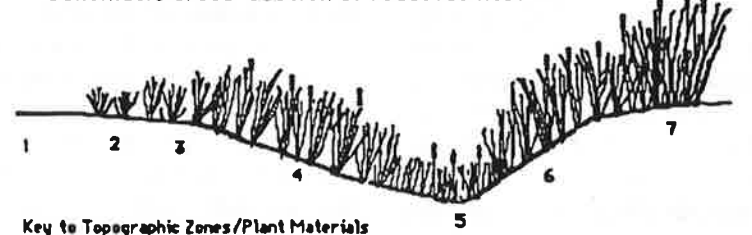
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New Members List

David Amme
John Anderson
Donald Betts
Sheila Bjornlie
D.E. Bowker
Mary T. Burke
Everett Butts
Robert Delzell
Dave Dyer
Eastlake Resource Conservation District
Charlotte Glenn
Chuck Goudey
Pacific SW Biological Services Inc.
Bob Slayback
Seven Talley
Craig Thomsen
Kirston Winter
Special thanks to Rod McDonald

Schematic cross-section of roadside habitat



Key to Topographic Zones/Plant Materials

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

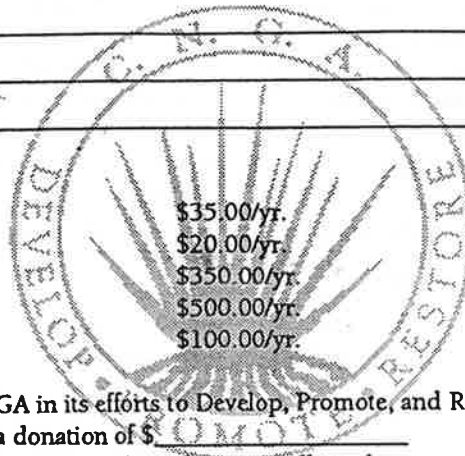
* denotes non native species



Join the Native Grass Association!

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Membership Status
regular
student
life
corporate
associate



\$35.00/yr.
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To support CNGA in its efforts to Develop, Promote, and Restore,
I am enclosing a donation of \$ _____
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Elected officers and addresses CNGA 1991.

President: Robert Delzell
Vice President: Chuck Goudy
Secretary: Bob Slayback
Treasurer: Charlotte Glenn

Board of Directors 1991

John Anderson
Dave Dyer
Mary Burke
Scott Stewart
Craig Thomsen
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*Grass is the forgiveness of
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