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Center for Grassland Studies

Winter 1996 Newsletter

Volume 2, No. 1

From the Director

As I pen this column, we are just beginning the new 1996 calendar year. That is an appropriate time to pause for reflection on the past and anticipate the future.

The Center for Grassland Studies continued to grow and develop during the past year. Significant accomplishments during 1995 included: identification and formation of a group of Associates of the Center (currently numbering 127) whose expertise and contact information are detailed in a directory published in December; a workshop for Associates to meet and make brief presentations on their current activities, the proceedings of which were published in the spring; formation of a 50-member Citizens Advisory Committee which met twice in 1995; publication and wide distribution of a brochure and our first newsletter; development of an exhibit to showcase the Center at various meetings and events; co-sponsorship of meetings, tours and field days; submission of six interdisciplinary grant proposals, three of which were funded; initiation and coordination of a fall seminar series available for student credit and open to the public at which UNL faculty, students, and guest speakers presented a variety of topics related to grasslands; acceptance of responsibility for administration of the Arthur William Sampson Fellowship in Pasture and/or Range Management; acquisition of reference materials (books, reports, newsletters, slides and photos) for our reference center; and initiation of a World Wide Web home page. As you can see, it has been a busy and productive year, and these accomplishments would not have been possible without the excellent work of our Center's staff and the volunteer assistance of many others who are associated with the center.

The 1996 year promises to be equally interesting, productive, and exciting. Early in the year, we will gather a number of faculty from Agronomy, Animal Science, Agricultural Economics and other interested disciplines for review of the entire forage_beef cattle system to determine where we need to search for greater efficiencies in order to be more competitive. There will be a continuing effort of working with commercial seed companies and growers to develop a grass seed industry in western Nebraska. Also, we look forward to working with the Nebraska Golf Association, Nebraska Section of the Professional Golf Association, Nebraska Golf Course Superintendent's Association, Nebraska Sod Producers Association, Nebraska Turfgrass Foundation and others in furthering the interests of turf improvement and turfgrass uses. In addition, we will be interacting with several conservation, wildlife and environmental groups relating to a more holistic view of grasslands. Also, we will assist a number of our Associates in developing new and novel projects. Overall, it will be another busy year.

Turfgrasses Benefit People and Their Environment

by Robert (Bob) C. Shearman

Department of Horticulture, UNL and Exec. Director of the National Turfgrass Evaluation Program

It is important that we are good stewards of our environment. We should be judicious about the materials we

apply to maintain plants used for food, feed, fiber, recreation and aesthetics. We are all concerned about our mental and physical well-being, and the quality of our environment. Agriculture, in particular farming and livestock production, has received a great deal of press regarding its potential detrimental impacts on water quality and the environment.

The turfgrass industry has not been immune from this scrutiny. Recently, the public has expressed concern about turfgrass maintenance inputs, and their potential health risks and detrimental impacts on water quality and the environment. Considerable research has been done to evaluate turfgrass maintenance practices and their relationship to the environment. Turfgrasses play a beneficial role to humans, wildlife and our environment. This article highlights a few of those benefits.

Wind and water cause considerable erosion of valuable topsoil, which is not readily renewed. Once the topsoil is gone it will not be replaced in our lifetimes. Turfgrasses control wind and water erosion through their dense, fibrous root systems and tight, uniform plant canopies. During a typical rainstorm, very little soil is eroded from well-maintained turfgrass sites, but considerable soil loss occurs from similarly exposed bare ground sites. Studies have demonstrated that, during intense rainfall of three or more inches per hour, traditional row-crop sites can lose up to 20 times the amount of soil lost from a turfgrass covered site.

In turn, turfgrasses capture rainwater in their dense canopies, slowing runoff and enhancing water adsorption. Thus turfgrasses can serve to reduce surface water contamination by minimizing runoff and sediment entry into lakes and streams. Turfgrasses serve as a filtering system that removes nitrate nitrogen and harmful chemicals prior to their reaching ground water sources. Turfs are often used as sites to receive effluent water sources for irrigation. The organic layer, called thatch, associated with turfs adsorbs many organic chemicals that are applied to turfgrasses. Thatch contains numerous microorganisms, such as bacteria and fungi, that can use these organic chemicals as carbon sources, breaking them down to unharmed constituents in the process.

Turfgrasses trap particulate matter, such as dust and pollen. Turfs are used around airport runways to keep dust and particulate matter to a minimum, thus protecting jet engines from undue wear. Turfgrass canopies absorb light and reduce visual glare, making it less stressful on our eyes than pavement or other highly reflective materials. Turfgrasses significantly abate heat. Urban sites would be considerably hotter than they are during summer months if it were not for the cooling effects of turfs and allied plant materials. For example, a July air temperature at five feet in Lincoln, Nebraska was 95° F. At the same time, the surface temperatures of a paved street surface and an adjacent turfgrass surface were 131° F and 104° F, respectively. If we look closer, the heat load differences between turf and asphalt become even greater. A probe placed in the asphalt indicated that the internal temperature was the same as the surface, while the temperature in the turfgrass canopy was 84° F and at the one-inch soil depth below the turfgrass canopy was 73° F. Turfgrass evapotranspiration serves to dissipate the high heat loads associated with urban environments. Air conditioning units operate more efficiently in association with turfgrasses and their allied plant materials than they do where concrete and asphalt are the prevalent materials.

Turfgrasses and allied plant materials improve the quality of the air we breathe. They remove carbon dioxide, and in some cases carbon monoxide, and release oxygen during photosynthesis and respiration. It has been estimated that a 10,000 ft² turfgrass area can supply enough oxygen for four people for one year. They can play an important role for environmental quality in high traffic areas, where carbon monoxide levels are especially elevated.

Turfgrasses are helpful in improving soil quality. Their dense fibrous root system and dense canopy contribute organic matter to the soil. The added organic matter improves soil structure, infiltration rate, moisture holding capacity, and nutrient retention. Over time the organic matter content of soils covered by turfgrasses increases due to the extensive production of root and shoot materials, and their subsequent recycling to the soil. Golf courses and parks have been used extensively to stabilize and reclaim landfill sites. The turfgrasses used on these facilities improve the appearance and provide an excellent surface for recreation and

relaxation.

Turfgrasses contribute to our psychological and physical well-being. Studies have demonstrated that individuals working in stressful environments were less stressed and more productive when exposed to landscapes with turfgrasses, ornamentals, and trees. Lawns, sports turfs, and golf courses provide recreational opportunities for people of all ages. This recreation contributes to their physical and psychological health.

It is easy to see that turfgrasses provide more than beauty and a pleasing atmosphere. They also enhance the quality of our lives through their positive contributions to our environment, and physical and mental well-being.

Conservation Reserve Program Entering an Unknown Phase

by Richard T. Clark

Department of Agricultural Economics, UNL West Central Research and Extension Center

History and current situation

The Conservation Reserve Program (CRP) was authorized under the Conservation Title of the 1985 Food Security Act. Since that time producers, nationwide, have enrolled about 36.4 million acres under mostly 10-year contracts; Nebraska producers have enrolled nearly 1.4 million acres. The first of the 10-year contracts were scheduled to expire in 1995 but Congress authorized a voluntary, one-year extension so that those producers would be able to know the content of the 1995 farm bill and thus make more informed decisions about future use of the CRP land. At the same time, producers who wished were able to choose an early release from any CRP contract. Producers with contracts on about 24,000 acres of CRP land in Nebraska chose the early-out option. Producers extended 87 percent of the contracts due to expire in 1995 for the one-year period. The 13th CRP sign-up was authorized in 1995 to replace CRP land that left due to the early-out provisions. As of January 1996 not all details of the 14th sign-up are available, but it appears that Nebraska producers will have successfully enrolled more than the 24,000 acres that opted out. The balance still leaves Nebraska total CRP enrollment near the 1.4 million acre mark.

It is unclear how CRP will be handled in the 1995 farm bill. The budget reconciliation act passed by the House and Senate, and subsequently vetoed by President Clinton, said very little about CRP. It placed a maximum of 36.4 million acres on the program and banned entering land into the program in 1997 but did little else. Current legislation (1990 farm bill) authorizes extension of contracts, but Congress must allocate money for that to happen.

Nature of enrollment

Approximate acres of land enrolled by year of contract expiration for Nebraska are shown in Table 1. Contracts on about 50 percent of Nebraska's CRP will expire October 1, 1996 unless the federal government acts to extend contracts or enroll new land.

The majority of Nebraska's CRP land was established to grass_about 40 percent to introduced grasses and legumes and nearly 56 percent to native grass mixtures.

Future use of CRP

What will happen to CRP land if contracts are not extended? A 1993 national survey indicated that about 63 percent of Nebraska's CRP will be returned to annual cropping. A state survey also conducted in 1993

indicated that at that time producers on only 36 percent of Nebraska's CRP land would definitely return to annual crops. About one-fourth of the land would remain in grass. Producers on nearly 41 percent of Nebraska's CRP were undecided or were inconsistent in answering plans about future use. Producers in some parts of Nebraska were more definite. According to the 1993 state survey 58 and 54 percent of the CRP land would be returned to annual crops in northeast and eastern Nebraska, respectively. Over one-third of the CRP land in southwest and southeast Nebraska would remain in grass according to producer intentions in the same survey.

As contract expiration draws near, producers will be examining their options. For some it may be that contract extension will be possible depending on Congress. Others will examine their cropping versus livestock and wildlife options. Current price relationships do not bode well for those who would like to see CRP remain in permanent cover. Producers must realize, however, that the current high grain prices and low livestock prices will not maintain forever. Deciding to destroy CRP cover is a decision that should be made in light of longer term prices and options, not just current situations.

Editor's Note: Clark was a member of the team that assembled the *CRP Reference* notebook (see Resources).

Golf Growing in Popularity

Nebraska is no exception when it comes to the growing popularity of golf. According to UNL's Bureau of Business Research, the state's golf participation rate (percentage of those 5 and older who played at least once during a survey year) grew from 10.1 in 1985, to 12.0 in 1989, and to 17.4 in 1993. This is due in part to increased availability. Nebraskans now have twice as many (1.15) golf courses per 10,000 people as the nation (0.57).

Advisory Council Identifies Needs

The Center's Citizens Advisory Council met for the second time on November 2 in Lincoln. After 60 Council members and Center Associates met in three small groups to discuss needs, they reconvened to hear the group reports and discuss how the Center could best fulfill those needs. Below are highlights of the small group and at-large discussions (names in parentheses are the group facilitators, those who reported for their group at the reconvened session, and recorders).

Forage, Range and Livestock

(Steve Waller, Paul Meyer, Ken Vogel)

The lead topic was what to do about CRP land and associated small pastures. UNL staff commented that much information is available on converting CRP grasslands to productive pasturelands or to croplands. Decisions on what to do with land coming out of the CRP program will probably be made on an economic basis. Advisory Council members commented that current market conditions (low cattle prices and high grain prices) make wheat or other crops seem more favorable than pastureland at the present time. Another factor is the current age of the CRP landholders, who are now 10 years older than when the land went into the program and may not be willing to expand into livestock production. Is there some way to link landholders with expiring CRP contracts to livestock producers who could use the CRP land as grasslands?

One of the research needs identified was short- and long-term response to burning in western Nebraska in the shortgrass prairie region. The USDA-NCRS guidelines indicate shortgrass prairie should not be burned. A database is needed on response of different plants to burning at different times of the year. It was strongly

suggested that local fire district personnel be trained to conduct controlled burns so they understand how controlled fires are managed.

General comments/questions included: Is there a way to improve delivery of information to producers, as typical extension information does not seem to be meeting the needs of many people? We need to get more imaginative in our use of grasslands. We need to develop educational programs on grasslands, perhaps working with the Ag in the Classroom program for elementary and high school students. What about non-traditional cattle breeds in production systems? Dr. Klopfenstein indicated that genetic differences exist among cattle in marbling and is not due to forage consumption. The Japanese beef market is a tough market to penetrate. We need to develop a grass-based production system for beef cattle.

Regarding the Grassland Center's mission, when asked if the Center should become politically involved in such issues as CRP, 90 percent of Council members present indicated no. All agreed that the main mission of the Center should be education and information exchange.

Turf and Landscape Grasses

(Roch Gaussoin, Dick Neumann, Garald Horst)

The turfgrass industry suffers from a negative public perception. Turfgrass scientists need to work with various groups and focus on environmental issues. There are concerns from the general public regarding pesticide and fertilizer recommendations by the turf industry. Turfgrass managers need to consider environmental balance in their management practices to reduce external inputs. The turfgrass industry needs to be proactive on environmental issues rather than reactionary. Recent research has been documented which indicates that properly managed turf retains the majority of fertilizer and pesticides applied. This would appear to indicate that turf does not pose a significant environmental hazard when properly managed. This message and other environmental benefits of turf need to be conveyed to the public. One way to do this is to provide information, plant and educational materials to schools; perhaps a curriculum could be developed in cooperation with the public school system, 4-H, local NRDs, and others. The fact that The National Arbor Day Foundation is located in Nebraska presents unique opportunities for cooperative efforts. Areas on which to focus educational and public relations efforts include water quality/quantity/recharge, proper species selection, erosion control, integrated turfgrass management, and wildlife habitats.

Wildlife, Wetlands and Natural Habitats

(Dayle Williamson, Duane Hovorka, Rhae Drijber)

The focus group had a very productive and often times lively discussion on the linkage between terrestrial habitat and aquatic systems. Discussion centered on wetlands and the lack of understanding of the importance of such areas in the past. Reversing the trend of wetland destruction and improved wetland management was a key issue.

Among the research needs discussed was the continuing need to inform landowners of wetland values and the association with upland habitat areas. The need for identification of critical habitats for restoration, establishing criteria for restoration, and utilizing grazing as a management tool for wetland areas was also discussed. Other suggestions included tactics to manage for diversity and applying practices for the mutual good.

General comments were also directed at endangered species issues as well as problems relating to the invasion of exotic species in many natural habitat areas. Habitat management tied in with holistic management on a watershed basis was also discussed.

As a final caveat, the focus group felt that diverse interests and many stakeholders must be involved in supporting maintenance and preservation of natural habitats. This would reflect a good stewardship ethic.

Funding Opportunities

[Contact the CGS office for details.](#)

USDA-CSREES has announced its Rangeland Research Grants Program for Fiscal Year 1996. Proposals, due February 29, will be considered for basic research in the following specific areas: management of rangelands and agricultural land as integrated systems for more efficient utilization of crops and waste products in the production of food and fiber; methods of managing rangeland watersheds to maximize efficient use of water and improve water yield, water quality, and water conservation, to protect against onsite and offsite damage to rangeland resources from floods, erosion, and other detrimental influences, and to remedy unsatisfactory and unstable rangeland conditions; and revegetation and rehabilitation of rangelands including the control of undesirable species of plants. Grant limit is \$80,000.

The National Wildlife Federation offers an internship program for college graduates and graduate students with an interest in environmental issues to work in Washington, DC. One internship is available in each of the following areas: endangered species/biodiversity, water quality, wetlands, public and private lands, and international. The next open session is July 8-December 20, 1996. The stipend for the full-time position is \$275/week plus benefits.

The Bay Foundation funds research programs for preserving biodiversity. Proposals are accepted three times a year, postmarked March 15, September 1 and December 15. First-time grants are in the \$2,000 to \$6,000 range.

Another organization that deals with biodiversity is the W. Alton Jones Foundation. The primary focus is on activities leading toward policy change for preservation of biological diversity. Awards can range up to \$2.5 million.

Editors Note: The CGS office has fully indexed directories of foundations and corporate sponsors that are available for viewing or check-out. Complete up-to-date information and assistance with online searches are available at the UNL Research Grants and Contracts office.

CGS Associate News

The work of **Bob Masters** helped facilitate approval of the newly registered herbicide, Plateau, for use on roadsides, right-of-ways and non-grazing restored prairies. The company marketing Plateau, which is highly effective on leafy spurge, is pursuing registration for use on range and pasture land.

Ken Vogel was the lead scientist on a research project that led to the approval and release in 1995 of the switchgrass cultivar, Shawnee; it is the most widely tested switchgrass released to date and has the most potential in the Midwest for use as a biofuel.

A book released in December 1995 titled *The Changing Prairie: North American Grasslands* (see Resources) was edited by **Anthony Joern** and **Kathleen Keeler**.

In the last issue of this newsletter readers learned about the buffalograss story. The November 20, 1995 *The Wall Street Journal* carried an article on buffalograss in which it mentioned **Terry Riordan** and his work here at the University of Nebraska. Also, seed of *Cody*, the buffalograss cultivar developed by Terry, was included in a time capsule that the U.S. Golf Association buried at its headquarters in New Jersey to celebrate

its centennial. The USGA included buffalograss because it has had a major impact on providing the golf industry with an alternative species for roughs and out-of-play areas.

Allen Steuter was awarded the Rangeman's Award at the 1995 Nebraska Section of the Society for Range Management Annual Meeting held in October in North Platte. Al recently moved from Johnstown to Ainsworth and can be reached at 402-387-1061. While still managing the Niobrara Valley Preserve, his duties have expanded to include conservation planning throughout the state for The Nature Conservancy.

Associates are encouraged to submit items on themselves or colleagues for possible inclusion in future issues. Send items to the newsletter editor, Pam Murray.

Info Tufts

In 1975 University of Nebraska researchers estimated a farmer could make a middle class living with 97 acres of corn or 461 acres of wheat. In 1991 University of Nebraska researchers estimated that same standard of living would require 1327 acres of corn or 3317 acres of wheat. Today a middle class living is still possible from only 100 acres of quality pasture.

Forage-fed beef has about 60% less fat and 30% less cholesterol.

Grazing can save \$.50-.60/day/cow compared to feeding hay.

The improved digestibility of Trailblazer switchgrass, an IANR/USDA release, adds about \$4 million a year to farmers' profits compared with Pathfinder, an earlier variety. Trailblazer has been planted on more than 100,000 Nebraska acres since its release in 1984. Research shows that every one percent increase in digestibility is worth \$10 per acre to farmers and ranchers.

90% of the original 58 million ha of tallgrass prairie in the Midwest and Great Plains has been destroyed (99% east and 85% west of the Missouri River); the remaining 10% is mostly in small fragments.

\$30 billion are spent annually on maintenance of the 48 million acres of turf grown in the U.S.

New CGS WWW Home Page

We invite you to explore our new home page on the World Wide Web. The address is:

<http://www.grassland.unl.edu/>

As with most home pages, the CGS home page will be under a constant state of growth and revision. Please provide plenty of feedback electronically or otherwise. In particular, let us know other sites to which you think our home page should link.

Resources

Directory of Professional Expertise for Associates of the Center for Grassland Studies, December 1995. Limited single copies available at no charge to those who believe the directory would be useful in their professional activities. Contact the CGS office.

CRP Reference, November 1995. Notebook of materials to help Extension Educators and Specialists deal

with issues surrounding expiring Conservation Reserve Program contracts. Limited single copies are available at \$15 + \$4 s&h. University of Nebraska-Lincoln West Central Research and Extension Center, Route 4, Box 46A, North Platte, NE 69101-9495, 308-532-3611.

Quality Pasture: How to Create It, Manage It, and Profit From It by Allan Nation, 1995. \$32.50 + \$3.50 s&h. Stockman Grass Farmer magazine, PO Box 9607, Jackson, MS 39286-9607, 1-800-748-9808.

Profitable DAIRY OPTIONS, November 1995. Free 8-page brochure focuses on rotational grazing, innovative marketing strategies, and nutrient management techniques for sustainable dairy production. Sustainable Agriculture Network, Room 304, National Agricultural Library, Beltsville, MD 20705-2351, 301-504-6426, e-mail: san@nalusda.gov.

The Stockman Grass Farmer. \$28/1 yr., \$44.50/2yrs. Monthly magazine. PO Box 9607, Jackson, MS 39286, 1-800-748-9808.

Toward an Integrated Regional Research Program on Global Change and the Nation's Major Grasslands, Second Annual Report of the Great Plains Regional Center for Global Environmental Change, Fall 1995. First and second annual reports available at no charge. GPRCGEC, PO Box 830725, University of Nebraska, Lincoln, NE 68583-0725, 402-472-7887.

TurfGrass TRENDS. \$180/yr. regular, \$120/yr. education/library rate. Monthly newsletter for turf managers. 1775 T St. NW, Washington, DC 20009-7124, 202-483-8873.

Breeding, Evaluation and Culture of Buffalograss for Golf Course Turf, Fall 1995. Progress Report to the USGA summarizing applied and basic research efforts of the UNL Turfgrass Science Team. Limited single copies available at no charge from the CGS office.

An Ecological Basis for Ecosystem Management, May 1994. Free. USDA Forest Service General Technical Report RM-246. USDA-FS, Rocky Mountain Station, Publications Dept., 3825 E. Mulberry, Fort Collins, CO 80524, 970-498-1719.

Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation, Feb. 1995. Free. Report contains excellent data, including a section on Midwest and Great Plains that gives percent losses of tallgrass prairie and other relevant statistics. U.S. Fish and Wildlife Service Publications Unit, 1849 C St. NW, Mail Stop 130, Webb Bldg., Washington, DC 20240, 703-358-1711.

Reading the Range, 1995. \$3.30 + \$1 s&h. A 23-page 4-H guide for range management projects. University of Nebraska, CIT Publications, 105 ACB, Lincoln, NE 68583-0918, 402-472-9713.

International Range News. \$10/yr. (\$5 for students). Semiannual newsletter is dedicated to increasing awareness of ongoing range management activities in developing countries. IRN, Society for Range Management, 1839 York St., Denver, CO 80206, 303-355-7070.

The Changing Prairie: North American Grasslands edited by A. Joern and K. Keeler. \$65. Describes the ecology of the North American prairie, and urges conservation measures to protect the remaining grasslands. Oxford University Press, 2001 Evans Road, Cary, NC 27513, 800-451-7556.

The new Great Plains International Data Network was developed with cooperation of the U.S. EPA, Province of Manitoba, The Nature Conservancy, and U.S. Geological Survey's EROS Data Center. Home page address:

<http://www.epa.gov/GPIDN>

A beef-forage selective grazing model called GRAZE incorporates physiologically-based plant and beef

animal submodels developed by scientists from 25 states working as part of three regional research projects. The effects of environment on both plants and animals are considered, as is animal selectivity of pasture. Output relates to plant growth, plant utilization and animal performance. This large model (15,000 lines of code) may be downloaded free via the University of Florida Agricultural & Biological Engineering Department (<http://www.agen.ufl.edu>). Supporting publications with diskettes may be obtained for \$4 from: Ag Publications, AGRI 110, University of Arkansas, Fayetteville, AR 72701. Efforts to expand GRAZE are continuing, and a windows version is being developed. For more information contact Otto Loewer at the University of Florida, 904-392-1864, e-mail: oloewer@agen.ufl.edu.

The Nebraska Legislature, now in session, has a new WWW site:

<http://unicam1.lcs.state.ne.us>

Calendar

[Contact the CGS for more information on these upcoming events:](#)

Feb. 6-7 Mid-America Alfalfa Expo, Hastings, NE

Feb. 10-15 Society for Range Management Annual Meeting, Wichita, KS

Feb. 15/16 Dairy Grazing Conferences, Hartington/Fairbury, NE

Feb. 20-22 1996 Nebraska Geographic Information Systems Symposium, Lincoln, NE

Feb. 26-28 Livestock/Big Game Management on Western Rangelands Symposium, Sparks, NV

Mar. 4-5 Alfalfa Symposium, East Lansing, MI

Mar. 5-6 The Great Plains Symposium 1996: The Ogallala Aquifer, Colby, KS

Mar. 7-8 Nutrient Cycling in Forage Systems, Columbia, MO

Mar. 13-14 Native Warm Season Grass Conference and Expo, Des Moines, IA

Mar. 18-20 Midwestern Section of the American Society of Animal Science, Des Moines, IA

Mar. 22-27 61st North American Wildlife and Natural Resources Conference, Tulsa, OK

Apr. 1-2 Southern Pasture and Forage Crop Improvement Conference, Oklahoma City, OK

Aug. 20-24 7th International Grouse Symposium, Fort Collins, CO

June 13-16 American Forage and Grassland Council Annual Conference, Vancouver, British Columbia

June 16-20 North American Alfalfa Improvement Conference, Oklahoma City, OK

June 19 Turfgrass Field Day, Ithaca, NE

July 14-17 American Dairy Science Association Annual Conference, Corvallis, OR

July 23-26 American Society of Animal Science Annual Meeting, Rapid City, SD

Sep. 14 Festival of Color (features many native plants and grasses), Ithaca, NE

Sep. 16-17 (tentative) 34th Grass Breeders Work Planning Conference, Griffin, GA

Oct. 1-6 3rd Annual Conference of the Wildlife Society, Cincinnati, OH

Oct. 21-24 New Zealand Grassland Association, Oamaru, North Otago, NZ

Nov. 3-8 American Society of Agronomy Annual Meeting, Indianapolis, IN

Dec. 8-11 58th Midwest Fish and Wildlife Conference, Omaha, NE

Dec. 9-10 National Alfalfa Symposium, San Diego, CA

If you have articles, events, resources, or other items you would like to submit for inclusion in future issues of this newsletter, please contact the editor, Pam Murray, at the CGS office.



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