GRASSLANDS

The Publication of the California Native Grass Association Volume V, No. 4 December 1995

Native Grass Restoration in Flood Zones

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Flood plain restorationists beware! Native grass restoration in flood prone areas can be a very tricky business. To achieve success one must pay close attention to historic site conditions, species selection, and the ecotypes of the species. This lesson is illustrated by a five year study of a grassland planted in a flood plain south of Sacramento and east of I-5.

In December of 1989, over 100 acres of the flood plain were seeded with a grass mix designed to provide nesting cover for waterfowl using an adjacent wetland. The grass mix contained four perennial grass species: meadow barley (*Hordeum brachyantherum*), blue wildrye (*Elymus glaucus*), California brome (*Bromus carinatus*), and tall fescue (*Festuca arrundinacea*). The mix also contained one annual species, rat tail fescue (*Vulpia myurros*). The mix was broadcast seeded and harrowed into a seed bed that had been prepared for winter wheat. The following rates were used:

Blue wildrye	5 lbs/acre
Meadow barley	14 lbs/acre
California brome	5 lbs/acre
Tall fescue	6 lbs/acre
Rat tail fescue	2 lbs/acre

No formal study was conducted in the summer of 1990, but observations following a winter with little flooding suggested that all target species were present throughout the project site. The project site ranges in elevation from about sea level to nine feet above. In the summer of 1991, permanent transects were established at various elevations throughout the project area, and data was taken from these transects using a line point method. The study was designed to evaluate the performance of the target species relative to winter flooding. Therefore, it was important to determine the elevations of the transects, for a difference of as little as one foot can correspond to additional weeks of inundation.

The winters preceding the 1991 and 1992 summer grassland sampling also recorded relatively low rainfalls and only flooded the lowest areas of the grassland for a short duration. During this time absolute percentages of California brome and rat tail fescue began to decrease at all elevations, blue wildrye and meadow barley began to increase at all but the highest elevations, and the tall fescue dropped out all together. The winter preceding the 1993 summer sampling period was considerably more severe, flooding all but the highest areas of the grassland. Data for that year showed that both the California brome and rat tail fescue had been lost while the absolute percentages of blue wildrye and meadow barley increased and decreased at different elevations. The blue wildrye suffered a decline at the lower elevations but continued to increase at the higher elevations and the meadow barley decreased at the upper elevations while it continued to increase at the lower elevations. The winter preceding the 1994 sampling again recorded below average precipitation and, in the absence of severe flooding, showed an increase in both blue wildrye and meadow barley, as well as the return of the annual rat tail fescue. However, during the next winter the degree of flooding was one of the most severe in recent history and it saw the entire project site flood twice through early spring. The inundation period in the low areas lasted as long as six weeks at a time and proved to be too long for most of our target species, as we only recorded a few scattered meadow barley plants on our transects. At the higher elevations meadow barley was found in greater numbers, but still only represented a couple of patches and the numbers were much lower than from the previous year. The blue wildrye was not detected on any of the transects, nor was the rat tail fescue that had began to reappear a year earlier.

The above is very brief summary of the

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study's results. A much more detailed report describes the specific elevations, inundation lengths, inundation timing, and absolute and relative percentages of the target species as well as their competitors. This report is not yet available. However, what appears to be occurring is that the blue wildrye and meadow barley used on this project can tolerate some degree of flooding, with the meadow barley being more flood tolerant than the blue wildrye. Yet, once inundation periods reach a certain length at a particular timing both species will succumb. Because this grassland project site occurs in a designated flood plain, frequent and sometimes lengthy inundation periods should be expected and taken into careful consideration before redesigning a new grassland restoration project for the area. Use of more flood tolerant species such as *Lamas triticoides, Distichlis spicata,* and several *Carex* and *Juncus* species should be tested at different elevations to determine success relative to inundation periods. Also, flood tolerant accessions of meadow barley, blue wildrye, and purple needle grass should be examined, as the accessions of the previously tested grasses were unknown. Such testing is currently under way in small areas of this flood plain. So, with continued evaluation of these tests as well as those from similar restoration projects and with the information that can be drawn from studying natural flood plains, the knowledge base available for flood plain restoration will soon allow these projects to be as successful as upland grass restoration sites.

There are no "pristine" grasslands in California.

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At the 1993 CNGA Annual Meeting, Kevin Rice challenged anyone in the audience to provide an example of a pristine remnant of California grassland. By pristine, Kevin indicated that he meant a grassland that could be considered to have the general form of a grassland of 200 years ago, that is, with high diversity of native species and no aliens. By extension, this implies that grassland *functions* have been preserved as well (e.g. soil processes, nutrient cycling, interactions with pollinators, etc.) Although several people waved their hands with knowing looks on their faces, in the subsequent two years no one has offered the location of such a remnant. Simply put, it's because there aren't any.

At the first CNGA Annual Meeting, David Amme admonished the audience to get used to alien grasses because they are here to stay. He was right although I am certainly not resigning myself to that fact without a struggle. The European and Mediterranean annual grasses have insinuated themselves so thoroughly into all California grassland ecosystems that the non-native component is not separable from the native aspect.

In five years of research at Jepson Prairie and in looking at research results from other places around California, it is abundantly clear to me that we cannot simultaneously manage for biodiversity and the management of all non-native grasses (or other species). It is possible, as John Anderson for one is showing, to manage for perennial grasses and eliminate virtually all unwanted weeds. With a couple more years of treatments, especially with fire, it seems he could have a pure stand of native perennial grass, a virtual prairie. But it won't be a true prairie, it will be a managed stand of native grasses. A true prairie, especially in California, had a tremendous diversity of spring annual dicots, summer annual dicots, perennial dicots, perennial monocots, and annual grasses (some say more, some say less).

In truth the intent at Hedgerow Farms is to add some of these components into the grass stand once the weeds have been controlled and the situation has stabilized somewhat. However, I predict from what has been seen all around the state that it will be impossible to create a fully diverse prairie without the presence of significant numbers of non-native species, particularly annual grasses. To manage for all of the life forms that would be present in a true prairie, one would have to manage tor annual grasses because there are native annual grasses that were present throughout California. Allowing native annual grasses will mean allowing non-native annual grasses, allowing summer annual dicots such as tarweeds will mean allowing starthistle. Techniques for managing a certain type of alien will also manage the natives of the same life-form.

At Jepson Prairie, we have found that it is possible to target one or a few species with a particular management technique and apparently succeed. The spring burn conducted in 1994 appears to have eliminated virtually all medusahead (*Taeniatherum caput-medusae*) and a great deal of the ripgut (*Bromus diandrus*) and foxtail barley (*Hordeum murinum*). However, we did get expanses of silver hairgrass (*Aira caryophyllea*), little rattlesnake grass (*Briza minor*), and chickweed (*Cerastium* sp.) instead. Perhaps it was the incredible rainfall in 1995 or perhaps it was the fact that these species routinely become more abundant whenever the more dominant species are removed.

Labor Day burns have been applied to study plots at Jepson every three years since 1988 (three times now). The fire does a good job on the wild oat species (*Avena* sp.), ripgut, and foxtail barley, but the conditions created by the hot summer fire seem to favor filaree (*Erodium* sp.) and annual fescues (*Vulpia* sp.) and, of course, medusahead

always sneaks in. In fact, no matter what we do at Jepson, it appears there is always a weed or two waiting to take advantage of the subsequent post-treatment conditions. And with over 1050 non-natives in California of which over 170 are grasses, I suppose this shouldn't come as a surprise.

So our grasslands are not pristine in composition. What do we have? We have relicts of grassland that for one reason or another have not been destroyed for agriculture, roads, or cities and which have relatively good stands of a few to many native species. These remnants can act as our models for restoration of the grassland system, but even with management we will never restore them to a pre-European settlement condition (unless, of course they are so small that someone can go in and pull out every weed, but that is impractical at any reasonable scale). We also havc millions of acres of degraded grassland which is primarily used as rangeland. By definition, in the early days of the West, rangeland was anything that couldn't be converted to agriculture; it was a place to feed livestock. We also have roadcuts, ditches, and waste places that have been recolonized by or seeded with natives; these places are not prairie remnants.

Places like Jepson Prairie and other isolated fragments are often called "pristine" remnants of California prairie, but they are not. Although the soil may never have been disturbed and the original biodiversity may be mostly intact, the abundance, richness, and proportions of native species have changed, and of course there are the overwhelming numbers of aliens present. Time will tell whether we can manage these prairie remnants back into some semblance of our vision of a pristine grassland, but one fact remains: There are no "pristine" grasslands in California.

"STATEWIDE POLICIES AND TRENDS IN THE MANAGEMENT AND RESTORATION OF NATIVE VEGETATION" CNGA/SRM JOINT ANNUAL MEMBERSHIP MEETING

BY PHIL HOGAN
NRCS DISTRICT CONSERVATIONIST, WOODLAND

The California Native Grass Association and the Society for Range Management co-sponsored their first-ever Joint Annual General Membership Meeting November 3 at the Beverly Garland Hotel in Sacramento.

Over 200 members of both CNGA and SRM attended the day-long event that had several speakers addressing the themes of Policies and Trends in Native Vegetation Restoration and Management and Research Trends in the Restoration and Management of Native Vegetation.

Session I: Policies and Trends in Native Vegetation Restoration and Management

Jim Morrison, Bureau of Land Management, moderated this Session. Saying that the presence of native species is an indicator of the health of the land and that agencies are increasingly looking at policies of introducing native species and maintaining native plant communities, he introduced the first speaker, David Diaz of the U.S. Forest Service.

In his presentation, "Recently Enacted USFS and BLM Policies Regarding the Use of Native Plants," David described the policy history of the USFS regarding the use of native vegetation. Region 5 of the USFS has had a longstanding policy regarding commercial timber trees, but it was not until 1994 that other vegetation types were considered. Goals of this policy are: 1) Reduction of adverse impacts of USFS activities on native species; 2) Improvement of water quality; 3) Prevent displacement of native species; 4) Use genetically local native plants on post-fire burns when appropriate; 5) If at all possible, encourage natural regeneration of native plants on post-fire burn land; 6) Documentation is needed when non-native seeds are used on postfire revegetation work; 7) Do nothing to a burn site if there is adequate vegetation and there is little to no erosion potential.

Rick Rayburn of the of the California State Department of Parks and Recreation, in his presentation "Reestablishing Native Environmental Complexes in California State Parks," stated that within the 265-unit State Park System the highest priorities are to preserve the natural and cultural resources, protect biodiversity, and provide for recreational opportunities. "We are looking at preserving the natural processes," stated Rayburn. We have a preservation mission on a watershed basis."

Programs that the State Park System uses to carry out this mission are aggressive prescribed burns, taking out cattle ponds on old ranches because they are not part of the natural wetland complex, road restoration back to natural contours, and removal of exotic species.

John Haynes from CALTRANS, in his presentation, "CALTRANS Policies, Practices and Procedures in the Use of Native Plants" surprised the audience by stating that after looking through all of their manuals, CALTRANS currently has no official policy regarding the use of native vegetation. "The types of plantings that we currently use on highway projects have to address aesthetics, safety, and erosion control," stated Haynes. "Our only real requirement is the use of wildflowers on some projects."

Federal guidelines that CALTRANS is affected by address the following points: 1) use of native plants when possible; 2) pollution prevention; 3) sustainable landscape design and management;

and 4) the concept that human civilization is a part of the natural world.

John stated that in California, native grasslands are often the climax community. "On our roadsides, we no longer have the requisite soil and associated microorganisms as we do in these climax communities," described John. John concluded that research is needed regarding the massive input of organics to create or mimic quality topsoil.

Margy Lindquist of the USDA Natural Resources Conservation Service in Paso Robles described the "Conservation Reserve Program in San Luis Obispo County." Margy explained that the primary intent of this program was to reduce erosion on Highly Erodible Land and to reduce the production of surplus commodity crops. Landowners receive about $50/acre for a ten-year contract to keep this land retired from farming and grazing. Landowners had the opportunity at the beginning of their contracts to establish permanent vegetative cover such as native grasses, oaks, and other natives such as Atriplex. However, uncertainty about the program at the beginning of the contracts on the part of the landowners in terms of what they were going to do with the land after the contract was a big reason for not much of anything else growing on CRP except for resident annual volunteer grasses and broadleaf weeds.

Margy described that in San Luis Obispo County, thatch layers are building up on CRP lands from the resident annual volunteer vegetation. This affects the ability of native grasses to get a foothold. Also, with vineyards being established adjacent to CRP areas, weeds are tougher to control due to spraying restrictions next to these vineyards.

Session II: Research Trends in the Restoration and Management of Native Vegetation

Charlice Danielsen of the Native Here Nursery moderated Session II. John Menke of UC Davis compared the advantages of perennial grasses over the annuals in a rangeland feed situation in his presentation, "Grassland Restoration and Management - Research Trends Past to Present." Perennials offer late Spring and early Fall feed, where annuals do not. "Perennials are an early forage source," stated John. "However, seed handling of perennials is more difficult, leading early researchers to prefer working with introduced perennials such as Palestine Orchardgrass, Berber Orchardgrass, and Hardgingrass."

"Type conversions in chaparral are often successful because the annual grass seed source is not there," continued John. "There are opportunities today for native perennial grasses in type conversion work in chaparral." John is also completing his assessment on mountain meadows in the Sierra Nevada. As a result of his work, he has come up with a definition of "thresholds" when used within an ecosystem management context. "Thresholds are when systems can't come back, when there are no management options," stated John. "The Great Basin environment and the associated Cheatgrass invasion is one example. However, I feel that with riparian management, the news is better here."

Emily Roberson of the California Native Plant Society presented "A Research Overview of Revegetation After Fire." According to Emily, the controversy on post-fire seeding of wildland areas began in the late 1970's when ryegrass was shown to interfere with post-fire succession. She feels that without seeding, post-fire vegetation diversity is higher and that even some rare species occurrences are more frequent.

She is also concerned that annual ryegrass seeding does not seem to do a good job at erosion control. "We should compare erosion rates on post-fire areas that are naturally regenerating and on sites that are regenerating with annual ryegrass added," challenged Emily. She also pointed to a study done by a Soils Professor at Cal Poly San Luis Obispo that annual ryegrass seeding leads to increased gopher activity, leading to even more soil loss.

"Another problem with ryegrass and erosion control is that it generally does not germinate and provide cover fast enough to provide soil protection from the first rains," Emily stated. It often washes down the slope before it germinates as well." She pointed to the Old Topanga Fire in which there was often more cover on non-seed areas. Annual ryegrass, according to Emily, also does not impact the following: 1) soil loss from dry-ravel; 2) erosion before germination and establishment; and 3) release of sediment stored in local channels by high post-fire flows. "Other problems with ryegrass," continued Emily, "are that where ryegrass is established, shallow-rooted annuals do not provide as much erosion protection as the deeper-rooted perennial grasses. Also, the ryegrass presents a much higher fuel hazard when dry."

Tom Dudley of UC Berkeley, in his presentation "The Problem of NonIndigenous Plants and Animals in the Management and Restoration of Protected Wetlands," stated that aquatic habitats are particularly susceptible to invasion by non-indigenous species because water can carry seeds and propagules from one area to another. Several examples he gave were bermudagrass, Salt Cedar *(Tamarisk sp)* and *Arundo donax.*

"All of the bioregions in California are affected," declared Tom. "Many exotics are from other parts of the United States, and others are from areas within different parts of California. What we must understand is that aquatic systems are interconnected, and some of the more dangerous plants such as *Tamarisk* and *Arundo* can spread by both rhizomes and seeds."

Some advice to natural resource managers from Tom includes not concentrating on single species elimination for exotics. Rather, the best

approach is proper watershed management and more intelligent operation of our dams and water releases for aquatic habitat management downstream.

David Amme gave a special presentation during the lunch hour entitled "The Nuts and Bolts of Putting Together a Grazing Lease for the Benefit of Native Grasslands." David works for the California State Off-Highway Motor Vehicle Recreation Division, Hollister Hills, State Vehicle Recreation Area (SVRA). David described the process used to put together a grazing lease for the Hollister Hills SVRA.

David stated that grazing should be used to improve habitat, not just be used for fire control. Residual Dry Matter (RDM) should also be maintained at the correct level. David listed the processes that govern grasslands: 1) fire (or lack of); 2) grazing (or lack of); 3) absence of either results in a dramatic shift of species composition; 4) annuals have changed the rules; 5) using cattle as a tool really is not that big a leap of faith; 6) litter buildup tends to perpetuate annuals. This leads to the self-destruction of grasslands; 7) nutrient cycling has to be part of the system.

David was looking for a rancher that knew how to manage perennials. He wanted no fewer than four individual pastures, with 25-40 days rest for each pasture. There should be no fewer than thirty cows at any one time on each pasture. Rent would be charged for actual forage used.

David stated that eleven bids were submitted. The rancher that was awarded the grazing lease set about quickly to divide the 400 acres into eleven pastures. Each pasture would then be rested 28-40 days.

Some monitoring results from this grazing system show that the resident Tiger Salamanders are now completing their life cycle, indicating that aquatic systems are recovering. The native grasses have survived and are producing seed. For a copy of the preliminary report, contact David Amme at the Hollister Hills SVRA.

Session III: Private Landowner Perspectives in Native Vegetation Restoration and Management

Mel George, UC Cooperative Extension, moderated the afternoon's Session III. Mel explained that there are 8.7 million acres of annual grasslands in California. Most of this is privately owned. He classified ranchers, managers of these private lands, into the following: 1) Small rancher: 15 - 25 head; 2) Commercial rancher: 200 -1000 head; and 3) Large rancher, 1000 or more head of cattle. He said that the commercial rancher is the one most at risk from economics of plummeting cattle prices, and that these are the people that need the most technical and financial assistance.

Frank Dawley, a Northern California rancher, gave his presentation entitled "Holistic Resource Management: If You Build It They Will Come (Back), Perennial Grasses in Productive Landscapes." Frank stated that with Holistic Resource Management (HRM), he has increased his grazing season 24-30 weeks. He has noticed more Purple Needlegrass coming back. His riparian areas are recovering. For him, perennial grasses and defining the goals of the ranch were the keys to a sustainable landscape. "You have to move the cattle with the rate of the perennial grass growth," stated Frank. "You cannot have a sustainable productive landscape without perennial grasses."

Orrin Sage of Sage Associates, in his presentation "Cattle Grazing Suitability: A Function of Environmental Impacts/Policy Consistency and Resource Enhancement," described the grazing plan set up on the 19,000 acre Rancho San Carlos. This large ranch had been overgrazed in some parts, and there was evidence of trampling in many of the riparian areas. Some of the ranch will be responsibly developed as a "community within a preserve." A seasonal stocker operation will be set up on 4,000 acres during February through June. Goals of the preserve, development, and cattle grazing will include native grassland improvement, fuel management, sensitive habitat protection, and eradication of exotics.

In "Changing Attitudes: Ecological Restoration in Ranching in Coastal California," Liza Prunuske of Prunuske-Chatham INC said that she has become an optimist because of her work with ranchers. She is working in the Stemple Creek Watershed in Marin County. "Ranchers realize that they are vastly outnumbered by urban people, that urban diets have changed, that there is an increased need to educate the public about agriculture," stated Liza. "Ranching has had to renegotiate its role in the community."

Robin Wills of The Nature Conservancy, Santa Rosa Plateau, concluded Session III with "The Nature Conservancy's Approach to the Restoration and Management of Native Plant Communities." Robin stated that there is no magical formula for the restoration of native grasslands. However, you must first identify what the natural processes are, and then try to reconstruct these processes. Robin ran through some slides of restoration work on Santa Cruz Island, the Dye Creek Preserve, the Carrizo Plain, the Santa Rosa Plateau, and the Jepson Prairie.

Dave Dyer of the USDA Natural Resources Conservation Service Plant Materials Center in Lockeford moderated the last session of the day, "Native Plant Producer/Marketer Roundtable.

Scott Stewart of Conservaseed, the first member of the Roundtable to speak, felt that the native grass industry is trouble because more native grass seed is being produced than what is being bought. Scott also feels that, in the recommendations being made for planting native grass, that some natural resource managers are being too microsite-specific with their concerns. "What assurance do we have that the native grass seed that we are collect-

ing originated from there," asked Scott. "Was it transported there in the first place from somewhere else? We are paralyzing the market by being too afraid to plant in certain areas without collecting the plant from there. Genetic isolation due to non-natives is more of a problem."

Jeff Chandler of Cornflower Farms explained that their forte is containerized plugged grasses. He described a "living wall" of Leymus triticoides that has been built along the frontage road at their nursery to keep out road noise.

John Anderson of Hedgerow Farms feels that the Central Valley, ecologically, is a wreck. "The agricultural land is in bad shape," stated John. He strongly feels that native grasses are the tool to help restore ecological balance in the Valley. He also agrees with Scott Stewart that native grass seed, of which he has 150-200 acres with 18 species in production, is not selling well enough. Other markets for native grass seed, according to John, include roadsides, agricultural borders, hedgerows, fencerows, equipment yards, canals, levees, vineyards and landfills, golf courses and Conservation Reserve Program lands.

Other speakers on this panel included Bruce Berlin of Pacific Coast Seed/S&S Seeds, David Kaplow of Pacific Open Space, INC., and Craig Dremann of Redwood City Seed Company.

President's Address

Dan Strait

This will be my last address to you as President of the California Native Grass Association. As of January 1, Mark Stromberg will be your President and I will become Past-President. In that position my primary duty will be to organize the 1996 annual meeting. As I write this I am still coming down off the high I'm feeling from the 1995 annual meeting that we held on November 3 with the Society for Range Management. About 220 people attended, and I've had lots of positive feedback about the meeting. Perhaps the most interesting comment made to me was about how difficult it was to tell which of the speakers were brought in by CNGA and which were brought in by SRM. It was that good of a match. I knew that CNGA and SRM had similar interests and objectives, but I didn't realize how similar until we held the joint meeting. Everyone I've spoken with thought the experiment of holding the meeting with another organization was a success, and I've already gotten suggestions about whom we could join with next time. I'm thinking that a joint meeting with a different organization in 1997 is a good idea. CNGA needs to do a better job of networking with other sympathetic organizations. A joint meeting looks like one of the best ways of doing that.

As I finish my term as President I consider CNGA to be in good shape and moving forward. The number of active members is within reach of our all time high, and turn-outs at our annual meetings and events is always good. Without a doubt the interest in native grasses by the public is growing, and agencies are establishing policies requiring the use of native grasses. As that interest increases, the challenge for CNGA will be to figure out what our role is and how we can best contribute. I alluded to that point during the business meeting portion of the annual meeting. Currently we have "Topic Coordinators" (formerly Committee Chairs) for the following focus areas: Roadside Management, Research and Development, Urban Use and Landscaping, Public Information and Education, Ecosystem Restoration, Seed Production and Marketing, and Membership. After serving a year as President it is clear to me that we don't have the energy and resources to work in all of those areas at the same time. Today CNGA is focusing primarily on education and on promoting the use of native grasses by the public. During 1996 I anticipate that we will decide as an organization to no longer formally focus on one or more of those seven areas. We need to hear from CNGA members as to which "topics" are important and which we should let go. This is a healthy thing for our organization to be going through, and it will allow us to maximize the energy that we have to devote to CNGA. As we move into our sixth year it is the right time for us to decide how we can best develop, promote, and restore native grasses.

I'll close by saying that I've enjoyed being President and have gained a lot from the experience. From the beginning I've made no secret of the fact that I don't have a lot of knowledge and experience in the areas of native grass identification and restoration. The Board of Directors understood that going into my term. My primary job has been to help move CNGA forward and to keep it on track. I think I have been successful. I now leave you in the capable hands of Mark Stromberg and John Menke who will be your Presidents for 1996 and 1997, respectively.

ANNOUNCEMENTS

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Jan. 24-27
Asilomar, Pacific Grove
Workshops, organic farms tour, speakers. For information: CSA, P.O. Box 838, SanMartin, CA 95046, phone (408) 778-7366, fax (408) 778-7186, http://www.well.com/user/zea/EcoFarm.html.

COMMITTEE FOR SUSTAINABLE AGRICULTURE
Jan. 6: Tropical Farming (Hawaii)
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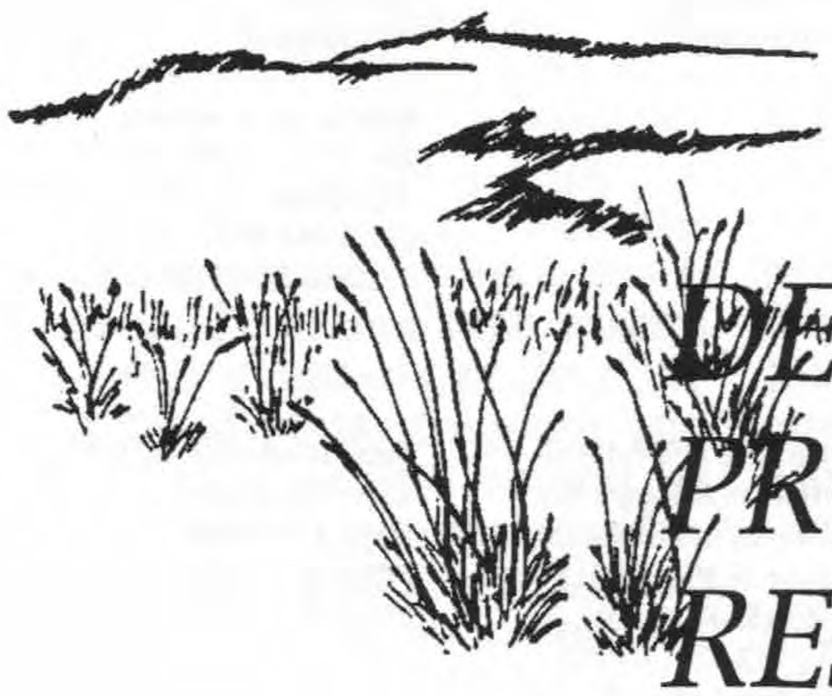

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