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Overview of Vol.2, No.5 - Grasslands

Grassland Restoration

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Grasslands are the dominant biome of the continental United States, covering about forty percent of the land prior to European settlement. Thriving in a moisture regime which is drier than a forest but wetter than a desert, the sea of tallgrass prairie which met early explorers and settlers inspired in them both awe and despair. The area between the Mississippi and the Rocky Mountains was labeled the "Great Desert" on a map drawn in 1820, and it was assumed that crops could not be grown in a place which did not support trees.

In time, however, the combined forces of the Homestead Act and the steel moldboard plow brought about the settlement of this supposed wasteland, and its rich soils became highly productive crop land. Conversion to agriculture and overgrazing by cattle decimated the seas of grass, and today only scattered fragments of native prairie remain.

Grasslands are valued for their characteristic native perennial vegetation and the unique soil-forming and -holding capacity of that vegetation. They may provide habitat both for rare fauna and for game species. Many people also find grasslands to be places of tranquil beauty.

The six papers in this section consider techniques pertaining to grassland restoration. A review of these techniques illustrates some of the unique qualities of grassland habitats as well as some motifs which are common to restoration ecology.

Native seed is the fundamental ingredient of a prairie restoration. Darren Lochner explains the factors which govern the harvesting of prairie seed and describes several collection techniques. This paper portrays a recurrent theme in restoration technology: the advantages of many techniques are balanced by their disadvantages. In fact, the limitations of a restoration technique are sometimes inherent in its benefits. A painstaking, labor-intensive approach may yield a greater chance of success, but such a procedure also carries a greater cost. More mechanized methods increase efficiency, but these processes are less precise and may dissipate the resource we wish to enhance. As Lochner observes, the appropriate technique will depend on the goals and objectives of the restoration, and a combination of methods may yield the most desirable outcome.

Understanding the challenges of seed collection accentuates the importance of thoroughly preparing the restoration site in order to ensure the best chance of seedling survival. Two papers in this section propose techniques which can enhance the restoration site by making use of some of the unique properties of native prairie species. While our crop plants and horticultural cultivars depend upon copious additions of nitrogen fertilizers, nitrogen-rich soils also encourage the growth of invasive annual weeds. Invasive exotics are the greatest threat to restoration efforts in any setting. Heather Kaehler relates that increasing the ratio of carbon to nitrogen in the soil

benefits the establishment of prairie species, which have the capacity to thrive in nitrogen-poor soils.

Perhaps the ability of prairie plants to flourish in nutrient-impoverished soils is related to the frequent association of prairie plants with mycorrhizal fungi. These symbiotic organisms benefit their host plants by efficiently extracting nutrients from the soil, enabling mycorrhizal native prairie species to successfully compete with invasive weeds. However, these beneficial fungi may not have survived in soils where crops have long displaced native species. Joel Tallaksen compares methods to inoculate prairie restoration sites with mycorrhizae and offers guidelines for weighing the costs of such procedures against their potential benefits.

Native prairies contain a diverse mixture of grass and forb species, and restorationists often wish to emulate that historic richness. However, even careful site preparation and the planting of desired species will be followed by changes in species composition over time. Prior to European settlement, vast expanses of prairie were shaped and maintained by fire and grazing buffalo. Lisa Henrichs relates that grazing buffalo or cattle on restored prairies can be a useful component of prairie management. Her paper illustrates the difficulty of understanding and attempting to replicate the complexity of natural interactions that originated over extensive geographic regions. In contrast, restoration is usually confined to relatively small areas within human-dominated landscapes.

Do reclaimed grasslands provide wildlife habitat comparable to native? This question is explored by Mary Ann Cunningham in her analysis of grassland bird species composition and nesting success on Conservation Reserve Program (CRP) lands. These former agricultural fields, now planted in grass as part of a national program designed to reduce soil erosion, have a collateral benefit as refuges for some prairie bird species. As Cunningham shows, further investigation of the interactions between seasonal cover, food availability, stand size and geographic location will be necessary if the wildlife benefits of the CRP are to be maximized.

The establishment of grass is not merely the goal, but is also the technique described in Ann Olafson's paper concerning stabilizing coastal dunes. Olafson explains the advantages of using of vegetation as a stabilization tool and enumerates the factors that bear on the successful establishment of dune grasses. These fragile ecosystems exemplify the almost universal necessity of continued monitoring on restored sites, but they also remind us of the tenacity and value of native vegetation.

Far from being deserts or wastelands, grasslands are complex and productive landscapes. As our understanding of grassland ecology continues to grow, so will techniques for grassland restoration. At the same time, work in the emergent science of restoration ecology contributes basic knowledge that will aid in both the preservation and restoration of these unique ecosystems.