

# RESTORATION OF DISTURBED SITES

by Darrel G. Morrison

*(Darrel Morrison, Chairman of the Dept. of Landscape Architecture at the University of Wisconsin, presented a talk and slides on the restoration of prairie vegetation at the FNPS Conference in Naples. By changing the word "prairie" to "ecosystem" the resulting discussion of restoring disturbed sites seems to apply more universally. Here are excerpts from his paper, as published in the Transportation Research Board Record, 1982, Washington, D.C.)*

Technically, restoration is the re-establishment of the ecosystem to sites which once supported that system, but from which all or nearly all of the original vegetation has been removed through a series of disturbances or manipulative actions over time, such as those associated with agriculturization and urbanization. It is unrealistic, however, to expect that a complex ecosystem can be totally reinstated on sites that have been dramatically altered. Hence, in practice, and in this paper, restoration refers to the establishment of native plant species to disturbed sites which can reasonably be expected to support them, whether or not the sites were covered by that same vegetation originally. Such plantings will almost always be simplifications in that there will initially be fewer species than in a natural ecosystem, but the goal is usually to achieve the outward appearance of true native ecosystem within five to ten years.

## Design and Establishment of Native Vegetation

While restoration efforts have increased markedly during the last decade, there is not, and indeed there cannot be, a single "recipe" or formula for design and implementation of a successful ecosystem planting. To begin with, the goals and objectives vary with different projects. Some may be educationally-oriented, with a

primary goal of introducing people to a large number of native species. Some may be functionally-oriented, with a primary goal of controlling erosion and runoff. Some may be aesthetically-oriented, with a primary goal of recreating the "visual essence" of the ecosystem. Whatever the goal, however, the likelihood of attaining it is enhanced by a basic understanding of the natural ecosystem, its structure and composition.

In designing an ecosystem planting, there are two major considerations. First, there is species selection and determination of relative proportions of species. Second, there is the placement or distribution of them relative to each other and to the varied micro-environments which may occur on the site. The logical place to begin to determine appropriate species composition and distribution for restoration is from the natural stands that have been studied.

1. Species selection. One of the initial questions to explore relates to the number of species typically growing in natural stands. A natural effect can be achieved without having extremely large species numbers.

2. Species distribution. Closely related to the species selection for an ecosystem planting is a determination of the placement or distribution patterns within a stand. A starting point

for determining this is to look at patterns in natural models. Two major categories of factors influence the distribution patterns: 1. environmental factors, such as soil moisture, soil depth, and biotic competition, including allelopathic relationships; and 2. the individual species' manner of reproduction and spreading.

Typically, the "zoning" of species are not sharply defined, but in some cases, they may be quite apparent. Sometimes these environmental differences, such as differences in soil depth, may not be apparent at the surface.

In addition to environmental factors affecting distribution, reproduction methods may have a noticeable effect. Those species which depend primarily on vegetative reproduction means, such as underground rhizomes, tend to exhibit tightly aggregated colonies. On the other hand, randomly-distributed species were typically annuals, biennials, or non-spreading taprooted perennials.

All of the above reinforces the idea that an ecosystem is not a homogeneous blend of species randomly or equally spaced, but instead has a highly complex organization with certain areas dominated by closely spaced individuals of one or a few species, and with contrasts in color and texture resulting.



*Speakers' panel on Friday afternoon: L to R, Dick Workman, Joe Cascio, John Popenoe, Byron Kost, Linda Duever, Taylor Alexander, and Darrel Morrison.*

Bill Partington