

Methods for Increasing Biodiversity in Wetland Creation and Restoration Efforts

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Abstract—Many wetland creation and restoration projects have successfully restored or created appropriate hydrologic conditions for the support of wetland ecosystems but have not been as successful in establishing a diverse biota of native wetland vegetation. Recent work in the propagation and transplanting of native wetland plant seedlings offers promise for increasing biodiversity while reducing the potential for invasive species to create monotypic stands of low habitat value.

In recent years the values of wetland ecosystems have been recognized on a global scale. Programs have been enacted which encourage or require the creation, enhancement, or restoration of wetland environments. While many wetland projects have been very successful in establishing fully functioning wetland ecosystems, others have met with limited success for a variety of reasons, including low biodiversity of flora resulting from domination by one or more “weedy” species.

Natural Colonization

The traditional approach to wetland vegetation establishment has been something on the order of “build it and they will come”. It has been assumed that by creating appropriate hydrology, the wetland flora will respond. While this method can be successful, especially in the instance where restoration is taking place at the former location of a wetland where extant seed banks are still viable (Dahm and others 1995), frequently the result is less than satisfactory. The natural colonization method gives the practitioner or wetland manager little control over the species composition at the site. One of the most common causes for low diversity of flora in created and restored wetlands is due to the rapid colonization of invasive species, many of which are persistent (Levine and Willard 1990). While some of these species may be locally native, others are either introduced exotics or recent arrivals from another region of the country. Some of the most troublesome species include: the genus *Typha* (cattails - four species occur in the southwest), *Phragmites communis* (common reed), *Phalarus arundinacea* (reed canary grass), *Arundo donax* (giant reed), *Lythrum salicaria* L. (purple loosestrife), and *Sorghum halepense* (Johnsongrass) (Whitson 1996, Corell and Correll 1972). It is not unusual for some of these species to create monotypic stands encompassing many hectares.

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The resulting wetland habitat is compromised with diminished wildlife, recreational, and aesthetic values.

Vegetation Establishment Via Seedlings

Innovations in plant propagation technology and wetland seed germination techniques have provided an alternative method for the establishment of wetland vegetation. Most common emergent macrophytes are now available commercially as container grown seedlings from a number of restoration and native plant nurseries. Some of these nurseries offer custom growing for seed collected near the project site or for rare plant materials. In recent years, wetland projects that have utilized seedling transplants have noted success in preventing or reducing domination by invasive species while increasing the diversity of wetland flora (Ballek 1998). Careful selection of plant materials for site climate, soil and water chemistry, and hydrologic variability is essential. An additional advantage to wetland vegetation establishment from seedlings is the rapid colonization rates from rhizomatous spreading. This is particularly important where soil erosion control is needed. Colonization from existing seed banks (often not present at wetland creation sites) or from intentional seeding can be very slow due to the notoriously low rates of germination for many wetland species (Hammer 1992). The use of genetically adapted container grown seedlings for wetland creation, reclamation, and restoration projects may enhance many of the functional values associated with wetlands. Some of these include: food chain support, sediment control, habitat for fish, shellfish, waterfowl and other wildlife, habitat for rare and endangered species, water quality improvement, education and research, and recreation (National Research Council 1992). Recent regulatory requirements for monitoring of wetland mitigation projects as well as independent research, may provide additional information useful in assessing the value of wetland plantings via containerized seedlings.

References

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