BOARD OF WATER AND SOIL RESOURCES

Wetland Restoration for Conservation Programs

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Document Purpose – This fact sheet is a companion to BWSR's Native Vegetation Establishment and Enhancement Guidelines and provides detailed considerations for project planning and design with an emphasis on vegetation selection, installation and management.

Introduction – Native vegetation in restored and created wetlands plays an important role in the successful restoring wetland functions. Vegetation establishment takes careful planning of site preparation, installation and management strategies. Invasive species abundance and proposed control is often a major consideration. In addition to seeding native species, seed that establishes from the native seedbank can play an important role in revegetation efforts. Goals of wetland restoration projects can include water management, protection of downstream waterbodies, sediment control, pollution and nutrient management, carbon sequestration, and wildlife habitat.

Site Selection – It is important that individual projects be selected to meet specific program goals such as water quality improvement, flood reduction, wetland replacement and wildlife habitat. GIS analysis of watersheds, water quality testing, and wildlife habitat assessments are all useful tools that may be used to guide project selection. Multiple state and federal programs focus on wetland restoration and local conservation staff play a key role in working with landowners to identify projects.

Shallow marsh restoration

General Planning Considerations – Wetland restoration projects typically involve planning teams that include wetland specialists, project engineers, biologists/vegetation specialists and environmental planners. Individual conservation and mitigation programs provide guidance for goals related to native vegetation establishment in wetlands. Some projects may be designed to manage water volume within watersheds and these wetlands may have higher levels of water fluctuations after storm events than wetlands designed for wildlife habitat where water fluctuations may be a concern. Some programs primarily focus on the use of native seedbanks that are present in the soil for wetland vegetation establishment, while others focus more on seeding grasses, sedges, rushes, forbs and woody species. The viability of native seedbank can vary depending on the number of years a site has been in agricultural production, the amount of sediment that has accumulated and weed invasion. A wide variety of wetland species are also becoming commercially available for seeding wet meadows and shallow marshes and restoration professionals are learning how to effectively conduct wetland seeding. Invasive species such as reed canary grass, hybrid cattails and phragmites can be challenging for wetland projects but are commonly managed as part of conservation programs to allow native vegetation to thrive.

Structural Design Considerations – Engineers are often involved in the restoration of hydrology for wetland restoration projects which includes hydrologic modeling and planning for restoring methods such as ditch plugs, disabling tile or embankments to restore wetland hydrology. It is important that engineering and staff planning the restoration of vegetation work closely together.

Plant and Seed Selection – Wetland grasses, sedges, rushes and forbs all play important roles in providing habitat for a wide range of wildlife species. Some research has shown that higher diversity levels can also aid in water quality functions such as denitrification in open water areas and increased carbon sequestration rates. Ensuring sufficient control of invasive species will aid native species establishment and ensure long-term sustainability of ecological functions. Most wet meadow seed mixes contain around 20-40 species. Shallow marsh communities may be seeded with mixes of 10-25 species; it is also common to use containerized plants when establishing emergent species, as it is difficult for seedlings to grow from seed along the edge of open water where waves and water level fluctuations can inhibit growth. Specific conservation and mitigation programs will define diversity goals. Higher diversity mixes will help support pollinators and other invertebrates that play a key role in the health of wetland habitats.

Trees, shrubs, grasses, forbs, sedges, rushes and ferns are all commonly used as part of wetland restoration projects, and common species are shown in the table below. Species should be selected that are native to the area and well adapted to site conditions.

Commonly Used Native Species in Wetland Restoration

Trees:	Tamarack, Black spruce, Red maple, Silver Maple, Black ash
Shrubs:	Willows, Red-osier dogwoods, Nannyberry viburnum, Spiraea sp., High bush Cranberry, Bog birch, Blueberry, Buttonbush
Grasses:	American slough grass, Prairie cordgrass, Manna grasses, fowl bluegrass, rice-cut grass, Canada blue-joint grass
Forbs:	Marsh milkweed, Culver's root, Blue lobelia, Cup plant, Mountain mint, Grass-leaved goldenrod, Joe-pye weed, Boneset, Red-stemmed aster, Sneezeweed, Swamp aster, Marsh aster, Giant goldenrod, Giant-bur reed, Sweet flag, Wild iris
Sedges:	Tussock sedge, Bottlebrush sedge, Lake sedge, Slough sedge, Porcupine sedge, Pointed-broom sedge
Rushes:	Torrey's rush, Riverbulrush, Soft-stem bulrush, Spikerushes, Green bulrush, Soft rush, Three-square bulrush
Ferns:	Sensitive fern, Marsh fern

Plant Source Considerations – Local resource staff should be involved in decision making about source distance for individual projects and individual programs may have recommended source distances and seed specifications. The source sequence in Section 2 of the Native Vegetation Establishment and Enhancement Guidelines is recommended for BWSR funded projects and wetland mitigation projects.

Operations and Maintenance – Similar to prairies, wet meadow restorations also benefit from mowing during the first couple of years of establishment, particularly in dry conditions where agricultural weeds may be common. Mowing should not be conducted where rutting and soil disturbance will occur. It is common to spot treat problematic perennial weeds such as reed canary grass and Canada thistle with herbicide. Aquatic safe herbicides and surfactants should be used in areas of standing water. Biocontrol is commonly used for purple loosestrife. Cattails may be controlled depending on project diversity and wildlife goals.

Information Sources

Minnesota Wetland Restoration Guide www.bwsr.state.mn.us/publications/restoration_guide.html
BWSR What's Working for Conservation Webpage