

# Project Site Preparation, Planting and Maintenance

The following information provides an overview of site preparation, planting and maintenance strategies that are commonly used for restoration and conservation practices. More detailed information about site preparation, planting and maintenance can be found in the Minnesota Wetland Restoration Guide at [www.bwsr.state.mn.us/publications/restoration\\_guide.html](http://www.bwsr.state.mn.us/publications/restoration_guide.html). A summary of practitioner “What’s Working” information can be found at <http://www.bwsr.state.mn.us/grants/WhatsWorking.html>.

## Site Preparation Methods

### Transitioning from Other Uses

Effective site preparation is essential to getting a conservation practice or restoration project off to a good start. Primary goals of site preparation are to control weed species and to provide ideal growing conditions for the seed or plants to be installed. Site preparation methods vary depending on past uses of the site and the weed species that are present. The protection of microorganism populations and native seedbanks, preventing soil erosion, and managing weed establishment are all considerations during the site preparation process. In most cases, non-herbicide methods are preferred over herbicide intensive methods to protect aquatic organisms and soil microfauna, but herbicides may be the most efficient method of controlling some invasive perennial species.



Field prepared for broadcast seeding

It is common for many conservation plantings to transition from corn or soybean production. Fields that are in agriculture often have control of most weeds, though additional control of species such as Canada thistle is sometimes needed in the fall after harvest. Another consideration is that several chemicals being used for weed control along with Glyphosate in Glyphosate resistant crops act as pre-emergents or post-emergents (designed to inhibit germination) and can be a problem for native vegetation establishment from seed. Temporary cover crops planted for one or two seasons can also allow time for these chemicals to break down in the soil if they have been used. Investigate prior chemical use and labels to help define probability of having chemical carryover that could/should be addressed by using temporary cover crops. If in doubt seek consultation from others with applicable experience.

If a site is in perennial weeds such as smooth brome, quack grass or bluegrass and cannot be put into agricultural production for one or two seasons intensive site preparation may be needed for the control of perennial invasive species with extensive rhizomes. Herbicide application is often recommended, as tilling alone may re-suspend the rhizomes, allowing them to continue growing. For species such as reed canarygrass and giant reed grass combinations of mowing, herbicide application, prescribed burning, and tilling (or possibly additional herbicide application may be needed). The [Minnesota Wetland Restoration Guide](#) provides detailed management recommendations for a wide range of species.

For small lakeshore or stormwater projects perennial weeds can often be dug with shovels or garden forks, making sure to remove all of the rhizomes. Heavy mulches or clear plastic (solarization) have also been used as part of site preparation for small areas. When removing sod for lakeshores or raingardens sod kickers, sod cutters or other mechanical equipment can be used to remove roots and weed seeds.

Scraping with backhoes and bulldozers is sometimes conducted for species such as reed canary grass and giant reed grass, or to remove fill materials or sediment that has deposited in wetlands or along shorelines. Sediment removal can be expensive and there must be a plan for the disposal of scraped material. An advantage of sediment removal is that it can remove accumulated nutrients and expose remnant native seedbank. Shallow scraping, mechanical raking or brushing, or other means to remove the duff layer from a site can also aid the control of species such as cattails, giant reed grass and reed canary grass.

Inundation can also be used for the control of perennial weeds such as cattails, giant reed grass and reed canary grass. This technique requires the ability to retain water. Inundation should be initiated early in the season when the target species is short and snowmelt is contributing to water levels. Mowing to decrease vegetation height is recommended if inundation is started during other times of year. It may take a full growing season at a depth of one to two feet to accomplish full removal, making sufficient hydrology is necessary. Reed canary grass on the edges of the inundated areas will likely require herbicide treatment. A plan should be in place to control seedlings following inundation.

### ***Seedbed Preparation***

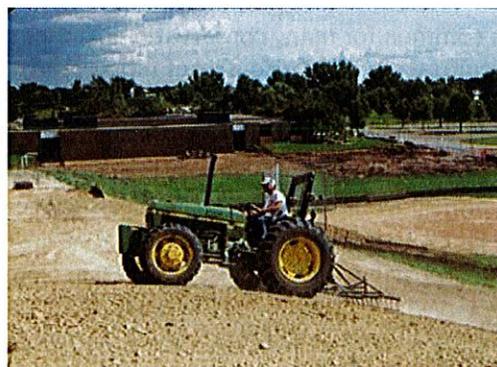
Methods that are used to prepare a seedbed can vary depending on the type of seeding equipment to be used. If a traditional native seed drill will be used, a smooth, firm seedbed is required. Soybean fields generally are sufficiently prepared for a native seed drill, but sites that were recently tilled will require additional soil treatment such as harrowing and rolling to prepare an adequate seedbed and prevent seed from being buried too deep. Broadcast seeding can be conducted on soybean or corn fields, or fields that have been disked, as long as the soil is allowed to settle before seeding. Some practitioners have found that broadcast seeding on a smooth surface (not tilled or disked) leads to the establishment of higher diversity. It is important that the soil surface is not too hard packed, so cultipacking or light harrowing of crop fields before broadcast seeding may be needed. Seed can be lost on smooth surfaces, so it is recommended to seed into temporary cover crops or to roll sites after seeding.

For sites where containerized plants will be installed a firm, weed free surface is desirable to aid planting efforts and to ensure that soil will not bury seedlings after rainfall. For raingardens, shredded hardwood mulch is often applied before planting containerized plants to prevent compaction of the soil during planting. Lakeshore plantings commonly use wood mulch or erosion control blanket to suppress weeds and stabilize soils. Lakeshore plantings may also use bio-logs and/or wattles to decrease wave energy, fencing to deter geese and in some cases, wave break structures.



The removal of fill as part of a shoreline restoration project

Photo: Ramsey-Washington Metro Watershed District



Harrowing to prepare for seeding



Raingarden where mulch has been applied before planting to prevent compaction  
Photo: Metro Blooms



Shoreline restoration using wood mulch, coconut fiber bio-logs, wattles and fencing

## Planting Considerations

### *Seed Mixes*

Seed mixes for projects can include seed collected from the project site, or nearby natural areas, State seed mixes, private vendor mixes, or custom mixes developed for site conditions. State seed mixes have been developed for a variety of project types including wetlands, prairies, forest edges, roadsides, riparian areas, and stormwater treatment systems. These mixes have been designed to increase diversity, create competition for invasive species, and promote plant community resiliency. Cover crops are not recommended in addition to permanent state seed mixes, as they already contain oats or winter wheat (depending on the season of planting). The State seed mixes are available at [www.bwsr.state.mn.us/native\\_vegetation](http://www.bwsr.state.mn.us/native_vegetation)

The following website lists native seed vendors in Minnesota:  
<http://www.dnr.state.mn.us/gardens/nativeplants/suppliers.html>.

### *Temporary Cover Crops and Mulch*

The use of short lived temporary cover crops help stabilize project sites and minimize the need for additional mulch in preparation of planting native seed mixes. They can also provide time to observe weed problems, and to allow for proper weed control before fall seeding. Temporary cover crops such as oats or winter wheat (the two species most commonly used) should be mowed to 10-12 inches before seeds mature (or harvested upon maturity) to prevent re-seeding. Slough grass is a common cover crop for wet areas. Annual rye grass was commonly used but is generally avoided now due to its ability to inhibit germination of native species. Perennial species are discouraged as temporary cover crops, as they require herbicide application before conducting seedbed preparation and seeding. A variety of cover crops that are being used to stabilize soils in agricultural fields such as buckwheat, pennycress, and radishes may also have some potential uses as cover crops to help build soil quality or provide weed competition as part of restoration projects.



Wetland grass, forb, sedge and rush seeds



Slough grass established as a temporary cover crop

## ***Planting Dates***

Spring seeding is generally favored for native grass establishment, while fall seeding is often favored for planting forb, sedge, and rush seed to allow winter conditions to naturally break seed coats. Fall dormant seeding should be conducted after October 15<sup>th</sup> in the northern half of the state and November 1<sup>st</sup> in the southern half of the state, and before the soil freezes. Dormant seeding can also aid the establishment of forbs and sedges in uplands where grasses can become more dominant with spring plantings. Dormant seeding is also beneficial for pollinator projects with a high percentage of forbs and if hydrology will be restored in the fall, as it may be difficult to access the site after spring snowmelt. It is common to conduct dormant seeding shortly before snowmelt to ensure that seed is not lost from wind, birds or rodents.



If a wetland project will be constructed in the spring/early summer, or will have flowing or fluctuating water levels it may be better to seed later in the spring after water levels stabilize. Spring seeding of wetland and upland areas should be conducted before June 30<sup>th</sup>, as summer temperatures can lead to the loss of seedlings.

Containerized plants, vegetated mats, and bare root plants are most often planted in the spring when there is adequate rainfall and soil moisture. Containerized trees and shrubs can also be planted in late fall, before the ground freezes but frost heave is sometimes a problem in high moisture areas. The installation of woody plant cuttings is typically conducted from early spring until leaves start to develop.