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BIOLOGY TECHNICAL NOTE NO. 84
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Wetland Vegetative Technical Specifications

Enclosed are copies of five technical specifications for establishing vegetation in wetland plant communities. They are noted below:

- Transplanting Herbaceous Materials
- Sodmats and Plugs
- Mulching and Inoculating with Donor Topsoil
- Wild Hay
- Hardwood Cuttings

These technical specifications are noted within the Wetland Wildlife Habitat Management standard (644) and are useful when natural regeneration of the wetland seedbank is not suitable to meet the objectives for the site. In many cases, natural regeneration on existing wetland soils is acceptable for temporary or seasonal wetlands where fluctuating water levels result in a high level of annual plants within the plant community.

Traditional seeding of herbaceous plants or planting of woody species may be warranted to supplement natural regeneration. In those cases, refer to the Restoration and Management of Declining Habitats standard (643), Range Planting standard (550), and Tree/Shrub Planting standard (612) and associated specifications and design procedures.

The wetland vegetative technical specifications noted within this technical note are to be used when a more diverse, native plant community is desired and natural regeneration and traditional supplemental planting is not adequate. It is also recommended to use these methods when wetland creation is accomplished and not residual wetland seedbank exists.



Technical Specifications

Transplanting Herbaceous Materials

Method: _____ Sprigs _____ Rhizomes Spacing: _____ Foot Centers
_____ Tubers _____ Plants

Sprigs: Sprigs usually refer to small transplants that are obtained by breaking or cutting mulistemmed plants into smaller clumps containing one to five stems. Sprigs are often obtained from an entire plant dug from a natural wetland. Transplants should have root clumps no larger 10 to 15 cm in diameter, with top shoots of a compatible size. Much smaller clumps can be used if adequate roots are associated. Plant the sprig in a shallow hole made by hand and tamp in with either hand or foot. A trowel may be required to plant large sprigs.

Rhizomes: Rhizomes are underground stems that are capable of resprouting from pieces of rhizome that contain at least one meristem or node. Rhizomes can be collected and cut into several pieces. Often 5 cm or greater in length, that will each develop into an individual plant. Make sure that each fragment has at least one node to ensure new growth. Rhizomes should be stored under cool, dark, and moist conditions. Rhizomes should be planted just below the soil surface and tamped to ensure good contact between the rhizome and soil. In inundated areas, or in areas where the substrate is saturated, rhizomes can be pushed in by hand. In harder substrates, trowels or planting bars may be necessary.

Tubers: Tubers are underground storage organs produced by some plants. Large tubers should be planted in a hole at a depth of about twice the size of the tuber and covered with soil. Small tubers may be broadcast on a site and raked into the soil.

Whole Plants: Planting hole should be large enough so that the roots are not balled up, bent or twisted. After planting, firmly tamp the soil around the seedling roots.

Spacing: In general, plant on centers ranging from 2.0 to 5.0 feet.

Timing: Sprigs, rhizomes, and tubers should be planted in early spring. If predation is a problem, plant as late as early July. Plant whole plants during dormant season (fall, winter, and early spring).

Acclimation: Propagules stored inside a greenhouse should not be planted until temperatures at the field site will remain above freezing. Water should be added to the site at approximately 1 inch per week during the growing season. Cover no more than 80% of the plant at one time.

Technical Specifications

Sodmats and Plugs

- Techniques:** Large pieces or small plugs of wetland substrate from a donor wetland are placed into the wetland to be restored.
- Method of Establishment:** _____ Sodmats _____ Plugs
- Collecting Sodmats:** A sod mat, as large as 8 foot square and at least 6 inches deep, is cut from the wetland with shovels and a front-end loader modified with a sharp-edged steel plate, and loaded onto flatbed trucks for transport to the recipient wetland.
- Collecting Plugs:** Plugs may be obtained using a coring device such as a 4 to 6 inch diameter PVC pipe fitted with a handle. Plants can also be collected with a shovel and bucket. The weight of the plugs can quickly become a limiting factor. To minimize damage to the donor wetland, dig no deeper than 5 to 6 inches.
- Sodmats:** The sod pieces are placed in matching hydrological conditions from where they came and fit back together in the same manner as sodding a yard. Do not leave gaps between the sod mats. Best results are achieved if the soils are moist but well drained at the time of cutting. This reduces weight, helps the mat stay intact, and reduces "sticking" of the mat as it is being transferred on and off the transfer plate. Since relatively large areas of the donor wetlands are impacted, this method should be used primarily as a salvage technique.
- Plugs:** Plugs can be planted with the coring device used in their removal. The plug is placed into a newly formed hole and tamped well.
- Timing:** Sodmats and plugs from natural wetlands may be transplanted successfully at any time.

Technical Specifications

Mulching and Inoculating With Donor Topsoil

Techniques: Mulching involves scraping up the donor topsoil and spreading it over the surface of the wetland to be restored. Inoculating involves spreading small amounts of topsoil onto one or more small areas within a restored wetland.

Method of

Establishment: Mulching Inoculating

Mulching: Using a front-end loader, scrape the top 8 to 10 inches of soil from the donor wetland. Transport the donor soil to the project site by dump truck. Using a small dozer or scraper, spread the soil carefully over the substrate carefully, with minimal handling, overturning or trampling. Spread the donor soil no more than 6 inches thick at the same hydrological zone from where it was donated. This will prevent the seed and fleshy propagules from being buried too deeply and ensure proper species placement.

Inoculating: Remove a few cubic feet of topsoil from the donor wetland. To increase plant diversity, topsoil for inoculating a restored wetland should be collected from several different wetlands in the area. Remove topsoil from each vegetative zone separately. Respread the soil thinly on the receiving site at the same hydrological zone from where it was donated. Inoculations should be done over several years. Changing environmental conditions will favor some species over others in a given year. Caution – weeds and invasive vegetation may be more of a problem since the restoration site will not be rapidly revegetated.

Timing: Mulching is best accomplished during late fall to early spring while the plants, seed, and propagules are in dormancy. If seed and other propagules are immature (fall) or have initiated germination (spring), success will be greatly diminished.

Stockpiling: If the donor topsoil cannot be placed immediately into the restoration site, the topsoil will need to be stockpiled. Stockpiling of wetland topsoil and its associated materials has had varied success. Because wetland topsoil contains the viable plant parts and seeds, these propagules may deteriorate from heat, freezing, aeration, desiccation, decomposition or salt buildup during storage. Do not stockpile soil during summer. It will compost and kill seed and fleshy propagules! However, be aware that composting can occur at any time of year. To maximize the chances for successful restoration and minimizing wetland impacts, stockpile soils in upland areas for less than 4 weeks. If stockpiling is done, the pile should be less than 3 x 3 ft (height/width) to avoid heat build up and composting. In addition, covering stockpiled soils with plastic sheeting may help reduce drying and contamination with wind-borne weed seeds.

Technical Specifications

Wild Hay

- Technique:** Cutting and collecting mature vegetative material from a natural wetland and spreading the material on a restoration site. This technique, which has been used successfully on upland prairie restoration sites, should work well for wetland restorations. The technique is best suited for wet prairie wetland types.
- Collecting:** Wild hay is collected in the late summer or fall when seeds of most species are ripe. Since sedges flower early in summer, hay may have to be collected in midsummer for these species.
- Method:** After collection, spread the hay within the appropriate hydrologic zone of the restoration site. To enhance species diversity, apply hay from several marshes over a number of years.

Technical Specifications

Hardwood Cuttings

Species Planted:

_____	_____
_____	_____
_____	_____
_____	_____

Seedling Specifications:

Length: _____ inches

Diameter: _____ millimeters

Buds: at least 1 well-developed bud

Handling Cuttings: Cuttings should be harvested from 1-5 year-old twigs (depending on the species) in the dormant season. Store cuttings in plastic bags just above freezing until planting in the spring. Maintain high humidity.

Fertilizer Requirements: Follow soil test recommendations.

Method of Establishment: Pre-soak cuttings in water for 1-7 days prior to planting. Hand Planting.

Spacing: _____ **Trees per Acre:** _____

Planting Time: March – April while still dormant.

Best Planting Conditions: Soil – moist; Weather – cloudy, cool, and little or no wind.

Site Preparation: To control residue and reduce weeds and competing vegetation, double disk 8 to 15 inches deep no more than 2 months prior to planting. If necessary, sub-soil to break plow pans and heavily compacted soils.

Planting: Cuttings can be pushed directly into soft soils. In hard soils, a hole should be made with a dibble bar or a 3/4 –inch diameter, 3 to 4-foot long pointed steel rod. The hole should be no deeper than the length of the cutting. The length of the cutting should extend to the bottom of the hole to avoid air pockets, which would allow the cuttings to dry. Plant cuttings vertically with buds pointing up. Leave at least one healthy bud about 1 inch above the soil surface.