



## TECHNICAL BULLETIN 03-2

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### SUBJECT: Plant Salvage

Salvaging plant material from a construction site can be done in two methods:

1. Removing selected existing vegetation from the limits of construction and transplanting directly to another location OR:
2. Removing the vegetation, transplanting to appropriate containers and caring for it in a temporary **shaded** holding area. The materials will then be transplanted back into the area when construction is complete and the site is ready for planting.

### General

Initially the area to be salvaged may have its boundaries delineated with tape, flagging, etc. Typically individual trees to be salvaged will be marked as well.

- Plants that depend on long tap roots do not transplant as well as plants with a fibrous root system. If planning salvage, dig up a sampling of the species and examine the root systems. If the root ball is well developed and within the top foot of soil, the species is a good candidate for salvage.
- Salvaging and reusing the duff from the area keeps the moisture in the soil after they are planted or while being held at the nursery. It also provides a seed source for the planting site and may contain important microorganisms that the plants rely on for recovery from transplant shock.

### Grasses and Forbs

The grasses and forbs to be salvaged and transplanted are perennials. Grasses have fibrous root systems that are dense and near the surface of the soil. They can be salvaged anytime of year as long as they receive sufficient water, however, they do especially well when planted in the fall.

Depending on plant size, one person can salvage about thirty grasses or forbs per hour.

Method and Techniques:

1. With a sharp shovel, cut a slit around the plant approximately 2 inches larger than the circumference of the plant's base. The slit should be deep enough to ensure as much root will be salvaged as possible. A depth the full length of the shovel blade is usually more than sufficient.
2. Working around the plant, use the shovel as a lever to force the plant and attached soil out of the hole.
3. Examine the root ball and use the edge of the shovel to shave off excess soil beyond the mass of fibrous roots (or tap root in the case of some forbs) on the bottom. Leave as much soil attached to the roots as possible. In the case of grasses, the result should be a product similar to a piece of sod.

4. Clip off at least ½ of the plant's top. It is vital to eliminate transpiration pressure until roots can adjust to replanting. This will help the plant compensate for the shock of lifting. Possible root loss and exposure to the air.
5. If the plants are going to be directly replanted to another site, they can be placed in deep flats, immediately watered, transported to site and planted. Pack them tightly in the container so the minimum amount of roots are exposed to air and sunlight.

Tools (includes but not limited to):

- Tarps or flats, to transport the grass clumps
- Sharp clean shovels
- Wheelbarrow – Optional, depends on size of salvage area and distance to vehicles
- Water source – the grasses need to be soaked when lifted **and** planted
- Water buckets
- Hand pruners/clippers

### **Hand Salvage Trees and Shrubs-**

In general, only plants 2 ft or less in height are considered appropriate for hand salvaging.

- The best time for hand salvaging trees and shrubs is during the fall and early winter. Spring is fine, before the trees leaf out (do not transplant once the new growth is visible).
- Unless there is no other option. Salvage **should not** be performed during the summer months. If this is the only time possible, the critical element is water. They must be watered deep and often (once a week).
- An attempt is made to remove as much of the root mass as possible with minimal damage to the tap root and root hairs.
- Small trees and shrubs can be salvaged at the rate of approximately fifteen per hour.

Tools (includes but not limited to):

- Sharp-shooters and shovels
- Loppers (various sizes)
- Hand pruners
- Small hand tools
- Water buckets
- Water tank
- Vitamin B1

### **Method and Techniques**

1. With a sharp shovel, cut a slit around the plant approximately the same circumference as the plant's canopy. The slit should be deep enough to ensure as much root will be salvaged as possible. A depth the full length of the shovel blade is usually sufficient.
2. Working around the plant, use the shovel as a lever to force the plant and attached soil out of the hole.
3. Examine the root ball and use the edge of the shovel to shave off excess soil beyond the mass of fibrous roots (or tap root in the case of some forbs).
4. When deep tap-roots are present, lift the root ball manually, pulling up as much of the tap root as possible.

5. It is difficult to maintain a root ball in loose or sandy soils. In these types of soils, plants can be moved as bare-root stock (with small amounts of soil clinging to the root hairs). The roots are kept moist by placing the plants on a tarp and covering them with moist soil from the excavated hole.
6. It is best to transplant species only once, so if any suitable planting sites are available, plants are immediately replaced into the ground.
7. If suitable sites are not available, it is necessary to store the salvaged material quickly and effectively, allowing for an easy recovery once permanent planting sites become available. This can be done by transplanting to containers or temporarily “heeling in” the plants.

## **Nursery**

Guidelines for grasses and forbs to be held at a nursery.

1. Immediately upon arrival, water thoroughly.
2. Plants can remain in the flats if they are to be replanted in the field within a few days. Otherwise, transplant them in the ground or in containers (see below).
3. It is essential that the roots are protected. Cover the roots with duff from their original location in order to retain moisture and protect from direct light.
4. If plants are not to be planted within a couple weeks, repot them or heel in.
5. Large clumps of some species can be carefully divided into small segments by hand or with a trowel and planted into D-cell or 1 gallon containers. D-cells allow for good vegetative growth and root development.
6. Potting medium should be some salvaged soil mixed with peat moss, vermiculite and perlite.
7. Water daily! It is the critical element in the plants survival.

## **Nursery Transplants and Containers**

1. Use containers and soil mixes that will develop a vigorous root system.
2. Consider a range of container sizes to maximize the chances for survival.
3. Inoculate with proper mycorrhizal fungi to improve growth and provide a shade structure and irrigation system into the nursery.

There are a variety of containers used for transplants. The following are the most commonly used for restoration projects.

- Supercells, 3.5cm x 20cm Ray leach containers. These are all small, easy to handle, lightweight, cheap and reusable. However, they require frequent water and temperature fluctuations more than in larger containers. These work well if plants will be outplanted while still small.
- Plastic bands. Many sizes are available from Pacific western Container and Monarch Manufacturing. Made from plastic or foil coated cardstock square tubes. Readily available and inexpensive but can be awkward to fill, move and hold.
- Plastic containers in 1 or 2 quart, 1 or 2 gallon sizes can be purchased through wholesale greenhouse supply catalogs. Taller pots (14” or deeper) are excellent for tap rooted species.

## **“Heeling-in” – an alternative to potting**

This method can be used in cases of short term storage of barefoot plants or where sandy soils do not allow a good root ball formation.

1. A site is identified based on the accessibility to trucks and water and inaccessibility to wildlife.
2. A straight trench is dug, with the fill from the trench windrowed along one edge or it.
3. Salvaged plant materials are then laid along the windrow, with roots extending down into the trench.

4. A second trench is dug, parallel to the first and right next to it, and the fill from the new trench is firmly compacted over the roots of the first row of plants.
5. This technique is repeated, with a new row of plants being placed with roots in the second trench, and a third trench dug parallel and adjacent to the second trench to provide soil to cover the roots, then another row of plants placed, etc.
6. Water deep and frequently (minimum of once a week).
7. If the trees are to overwinter heeled in, place straw or a mulch over the coil to prevent roots from freezing and keep them moist.

## Planting

### Method and Techniques

1. Prepare the hole to be 2 inches deeper and wider than the root ball. Fill the hole with several inches of water and allow it to percolate.
2. Place enough loose soil in the bottom of the hole so when placed in the hole, and planting complete, the root ball (or grass clump) will be level with the ground. Keep in mind that the tree will settle into the hole. Place the root ball gently in the hole. It is critical that the root ball is not buried too deep. The nose of the tree (swelled area connecting the trunk to the root system) needs to be above ground. This is critical and the number one cause of death.
3. As a crew member fills the hole with loose soil, another holds the plant steady and upright. Hand-pack the soil around the root ball, to ensure there are no air gaps or pockets around the ball. Pour a gallon bucket of water containing 135ml of Vitamin B-1 on top of the loose soil – allow this to settle. Fill in more soil and hand-pack until the entire hole is full.
4. Build a 2 inch high berm of soil around the edge of the tree (just beyond the width of the root ball). This should be big enough to hold a gallon of water. This is **critical**; otherwise the water will not reach the roots of the tree.
5. Test the berm; fix it if the water runs out.
6. Protect the base of the plant with light surface litter of shading. This mulch will preserve moisture in the summer and insulate in the winter.