Dune/Sand Stabilization

Description

Dune/sand stabilization involves using structural controls and native vegetation to stabilize, build, or repair dunes. This BMP is used to stabilize sandy areas disturbed by construction activities, and to protect roads, buildings and valued areas from encroachment by blowing sand.

There are 275,000 acres of designated dune areas in Michigan, 70,000 acres of which are critical dunes. Critical dunes are unique, sensitive and easily erodible dunes which are protected under the amendments (P.A. 146 and 147) to the Sand Dune Protection and Management Act. Almost all activities conducted in critical dunes will require permits from the Michigan Department of Natural Resources, Land and Water Management Division.

Other Terms Used to Describe

Live clumps of grasses are also referred to as sprigs. Planting these clumps of grasses can be referred to as sprigging, plugging, or wattling.

Pollutants Controlled and Impacts

Stabilization of dunes and other sandy areas can prevent shoreline and stream bank erosion. In areas subject to strong winds, this BMP will also keep soil from blowing off the ground and potentially being deposited in nearby wetlands, watercourses, roads, and sewers.

Application

Land Use
This BMP is most applicable to recreation areas, open areas, transportation, golf courses and construction sites.

Soil/Topography/Climate
Only certain plant species may be used to stabilize dunes. See the "Specifications" portion of this BMP.

When to Apply
When possible, this BMP should be applied before serious dune/sand erosion problems occur.

Where to Apply
Apply on coastal foredunes and any other areas where stabilization of sand is necessary.

Relationship With Other BMPs

Slope/Shoreline Stabilization and Trees, Shrubs and GroundCovers are used to stabilize dune/sand. Fences (see Construction Barriers BMP) are also useful in protecting dunes.

Specifications

Planning Considerations:

It is important to remember that dunes are unique and sensitive ecosystems. While stabilizing a dune, every effort should be made to protect the integrity of the natural dune ecology.

Below are several practices which can be used to stabilize dunes. Refer to the underlined BMP for additional information.

1. Vegetative establishment can be done by planting native grasses, trees, shrubs or ground covers.

   American beech grass is the most commonly used dune grass in Michigan and has proved to be the best plant for initial stabilization of moving sand. It and any other **native species** should be purchased commercially from a reputable Michigan supplier. Dune grass should be planted after September 1 and before the ground becomes frozen. Spring plantings before May 1 are also possible. Planting procedures are discussed below.

   Select appropriate trees, shrubs, and ground covers following the guidance provided in county soil surveys. If soil surveys are not available, follow the general guidance below:

   In loamy sand, plant Red pine, White pine and Jack pine. In sand, use Jack pine.

   Trees and shrubs that can be used on wet spots of shifting sands are: Cottonwood, Shrub willow, and Dogwoods.

   Tree species adapted to sand dune plantings adjacent to large lakes are: Cottonwood, Birch, White pine, White oak, and bigtooth aspen.

   Select individual trees, shrubs and ground covers following specifications in the Trees, Shrubs and Ground Covers BMP. Plants and protective material should be kept moist and protected from drying until the time of planting. Each plant should have at least one live rhizome and sufficient root stock to ensure continued growth following transplanting. Planting procedures are discussed below.

2. Stabilization using revetments, seawalls, groins and breakwalls should be done following specifications in the Slope/Shoreline Stabilization BMP.

3. Snow fencing or other similar fences may be used to help protect eroding areas, either alone or in conjunction with vegetative and other structural controls. Fences are also used to protect newly sprigged areas. Follow specifications in the Construction Barriers BMP.

Planting Dune Grasses:

1. Except for smoothing areas which have been impacted by construction activities, no other ground preparation is usually required. Liming and other soil amendments are also not usually needed prior to planting.

2. A narrow tile spade, planting bar, or tree planter may be used for planting trees in large areas. Sand must be moist enough that it will not run back into the hole before the plant is set.

3. Grass should be planted in a staggered or diamond pattern for maximum erosion control. Holes should be spaced 18" apart in areas where wind velocities and sand movement are high. This equates to about 40,000-60,000 culms per acre. (A culm is a single stem with roots attached). Space culms 24" apart in areas not directly exposed to strong wind (about 22,000-33,000 culms per acre).

4. The holes for plants should be between 8-10 inches deep. This depth is important to prevent the base of the stem from drying out, and to prevent the entire plant from blowing out. The plant should be placed in the resulting opening, with the crown slightly below the surrounding ground. (See Exhibit 1). Be sure dry surface sand doesn't enter the freshly opened hole.

5. Plant 2-3 culms per hole. On large areas which will be planted over several years, start plantings on the windward side.

6. Once the plant is placed in the hole, tamp the soil as shown in Exhibit 1. Sand should be firm and moist around roots, with no air pockets near the base of the plants.

7. Do not trim freshly planted plants.

8. Mulch between plants to protect plantings against rain and wind. Mulch should be applied and anchored following specifications in the Mulching BMP.

Planting Dune Trees and Shrubs:

1. Trees can be hand planted in beachgrass after it has controlled sand movement, but before the grass becomes too dense. This may be done about 2 years after planting beachgrass. Space trees 6'x 6' to 8'x 8'.

2. When planting trees in open blow areas without beachgrass, apply a brush mulch. Lay the brush with the butts to the wind and the tops over the butts. Space trees as above.

3. Blowing areas can also be controlled by planting two or more rows of trees each year, beginning on the windward side and progressing across the area as it is stabilized. Space trees at 4'x 6', staggered in rows.

For the installation of structural dune stabilization techniques, refer to the appropriate BMP.

Maintenance

If any of the cover is lost or destroyed, replant immediately. Replace dead plants with native species following the procedures above. Do not mulch or mow dune vegetation. Keep pedestrians and traffic off the area being stabilized.

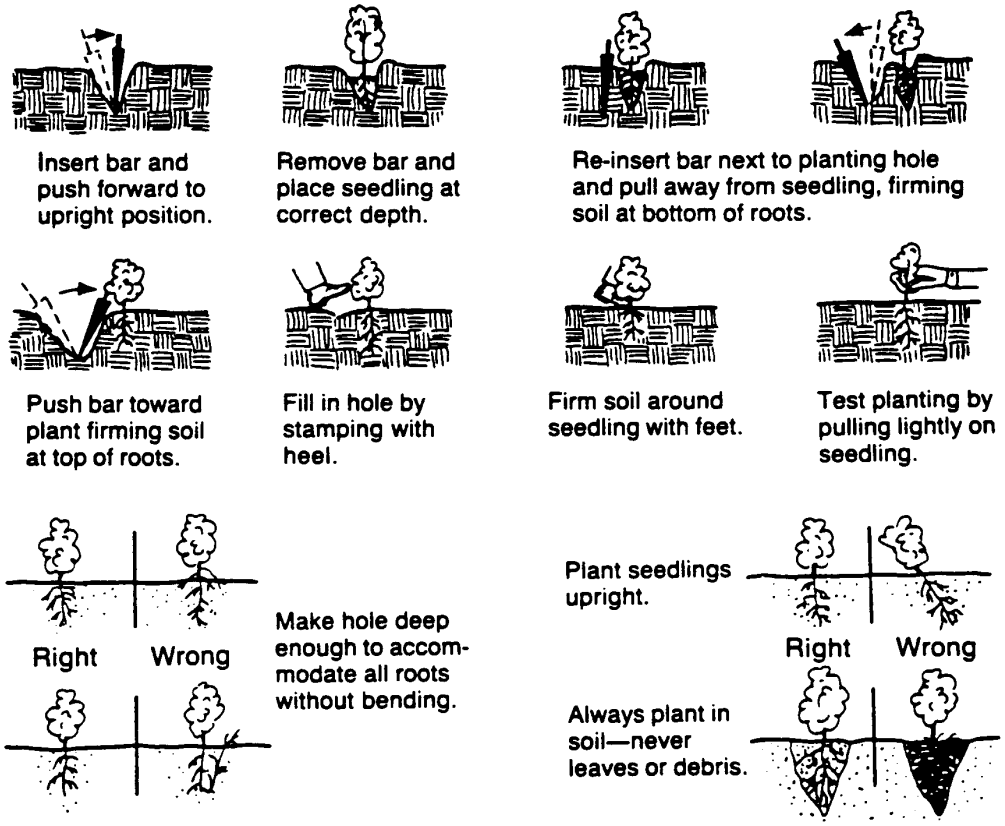
Exhibits

Exhibit 1: A Method for Planting Bare-Root Seedlings and Sprigs of Grasses. North Carolina Erosion and Sediment Control Planning and Design Manual.

Exhibit 1

A Method for Planting Bare-Root Seedlings and Sprigs of Grasses

A method of hand planting bare-root seedlings and sprigged grasses is shown below. With a planting bar/iron or shovel/spade, make a notch in the soil no less than 8 inches deep. Place the roots in the notch to the same depth as the plant was in its original growing container. Firm soil around the roots by pressing the notch closed. Water immediately, and mulch, where necessary, within 2 feet of the plant. Since fertilizers tend to dry out young seedlings, do not fertilize bare-root seedlings until the end of the first year.



Source: North Carolina Erosion and Sediment Control Planning and Design Manual, as modified from the Va. Div. of Forestry.