BMPs for Replanting Treated Dunes with Native Dune Plants
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Background

'Cape' American beachgrass (*Ammophila breviligulata*) is currently the species which is most often utilized in dune plantings in New Jersey and elsewhere in the US North East (Miller and Petersen 2006). Unfortunately, this species has very specific growth requirements and tends to thrive only in actively accreting dune regions (Seliskar 1994). After a few years, when the sand has become stabilized, the *Ammophila breviligulata* usually dies, yielding to other species that provide long-term dune coverage, if present, or leaving bare sand if no alternative "volunteer" species have colonized the area or been planted there in the interim. In response to this problem as well as to an increased understanding of the potential negative effects of monoculture plantings on ecosystem resiliency and function in recent years, Cape May PMC has been developing additional plant species available for planting on dunes. Available species now include local haplotypes of grasses such as; bitter panicgrass (*Panicum amarum*), coastal panicgrass (*Panicum amarum var. amarulum*), switchgrass (*Panicum virgatum*), saltmeadow cordgrass (*Spartina patens*), coastal little bluestem (*Schizachyrum scoparium var. littoralis*), dune wildrye (*Elymus virginicus*) and forbs such as; seaside goldenrod (*Solidago sempervirens*), partridge pea (*Chamaecrista fasciculata*), evening primrose (*Onethera humifusa*), beach pea (*Lathyrus maritimus*)) and trailing wild bean (*Strophostyles helvola*) (Miller and Skaradek ND).

These plant species are now available from specialized nurseries as potted and/or bareroot plants. Cape May PMC has also been working to develop seeding technology for many of these species. For instance, coastal panicgrass (*Panicum amarum var. amarulum*) has been successfully seeded between rows of beachgrass on beach replenishment projects in the Mid-Atlantic coast (Miller and Skaradek 2007). This study found that three to five years after seeding, coastal panicgrass dominated backdune areas, while the beachgrass plugs were starting to die. In areas where secondary and tertiary dune habitats are available for plantings, local haplotypes of shrubs such as bayberry (*Myrica pensylvanica*), beach plum (*Prunus maritima*) winged sumac (*Rhus copallina*) and groundsel (*Baccharis halimifolia*) can be added to the mix to provide long-term stabilization. These shrubs should be planted in clumps within the planting area to create more natural groupings that will then provide a seed source (Miller and Skaradek ND).

Thus, for the restoration effort described here we propose using a three-tiered replanting effort (Figure 4). Since it is the only species that really thrives the extreme physical stresses of the primary dune ecosystem, a single species planting using *A. breviligulata* will be used to replant any primary dunes from which invasive *Carex* species are removed. However, as soon as conditions permit (essentially landward of the dune crest), a mixed planting of dune grasses and salt tolerant forbs will be used. Finally, mixed plantings of grasses, forbs and dune shrubs will be used to restore suitable areas of secondary and tertiary dune from which invasive *Carex* species are removed.

Suggested Methods

1. Foredune areas should be replanted with "Cape" (Miller and Petersen 2006) American beachgrass (*Ammophila breviligulata*) culms in late winter to early spring, to maximize plant survivability and productivity. Following the recommendations of Miller and Peterson (2006), culms should be planted in groups of three in a staggered pattern, approximately 24 inches apart, 7-9 inches deep, throughout designated planting area(s).

   Secondary dune areas should be planted in late winter to early spring with a mix of grass and forb root stocks. Locally derived (genetically appropriate) clones of native dune grasses should be obtained from local nurseries and / or Cape May Plant Materials Center. These are the same nursery stock sources that supply the plant materials routinely used in both parks for other planting activities. Plants suggested for use in this habitat include "Cape" American beachgrass (*Ammophila breviligulata)*, "Avalon" (Skaradek 2006a) saltmeadow cordgrass (*Spartina patens)*, "Atlantic" (Skaradek 2006b) coastal panicgrass (*Panicum amarum* var. *amarulum*), "Dune Crest" (Skaradek 2007) coastal little bluestem (*Schizachyrium littorale*) , "Monarch Germplasm" (Miller and Skaradek 2000) seaside goldenrod *(Solidago sempervirens)* and beach pea *(Lathyrus japonicus).* If a denser cover is desired, these plantings can be supplemented with distribution of a local seed mixture of switchgrass (*Panicum virgatum*) and coastal panicgrass (*Panicum amarum* var. *amarulum*) salt marsh hay (*Spartina patens)*, and coastal little bluestem (*Schizachyrium scoparium*) at a seeding rate of approximately 12 lbs/acre. Again, following the recommendations of USDA NRCS Plant Materials Program Staff (Chris Miller, Personal Communication), where rootstock are used, two to three culms should be planted per hole. Plants should be spaced 18" by 18" unless wind erosion is severe, then spacing should be reduced to 12" by 12". Plantings should be staggered in alternate rows to provide maximum erosion control.

   In addition to plantings of grass and forbs, where there is suitable habitat (largely secondary and tertiary dunes), randomly distributed shrub clusters should also be planted about 25 feet apart from one another, as habitat features allow. Ideally, clusters should comprise of 3-6 shrubs planted within 5 feet of one another, and include species such as "Wildwood" (Miller and Skaradek 2008) northern bayberry (*Morella pensylvanica*) and "Oceanview" (Skaradek 2008) beach plum (*Prunus maritima*).

2. Applying fertilizer helps promote vigorous initial growth of newly planted American beachgrass (Miller and Petersen 2006) and other similar plants. Fertilizer stimulates growth, increases stems and accelerate the spread of rhizomes. Thus, following USDA NRCS Plant Materials Program recommendations, each of the plots should be fertilized using OceanGro fertilizer applied at a rate of 30 lbs. of nitrogen per acre using a handheld crank-operated spreader. To minimize losses to leaching, and maximize plant uptake of nutrients, wherever possible fertilizer application should be divided into two, with half of the recommended fertilizer being applied within 30 days of planting, and the other half being applied a month or so later (O'Connell 2008).

3. Wherever possible, a mix of arbuscular mycorrhizal fungi (AMF) spores should also be added to root stock plantings, since these also enhance planting success (Gemma and Koske 1997). Where warranted, terrasorb, a product that helps transplanted bareroot seedlings obtain water and improves water absorption to roots during dry periods (Miller and Skaradek 2007) may be applied at the recommended rate (1 lb in 30 gallons of water applied to 15,000 seedlings).

Following USDA NRCS Plant Materials Center's recommendations, plantings should be conducted between October and March 30 to maximize planting success. This also reduces negative impacts on shorebirds and other T+E species, since these species are absent from the habitat during this time.

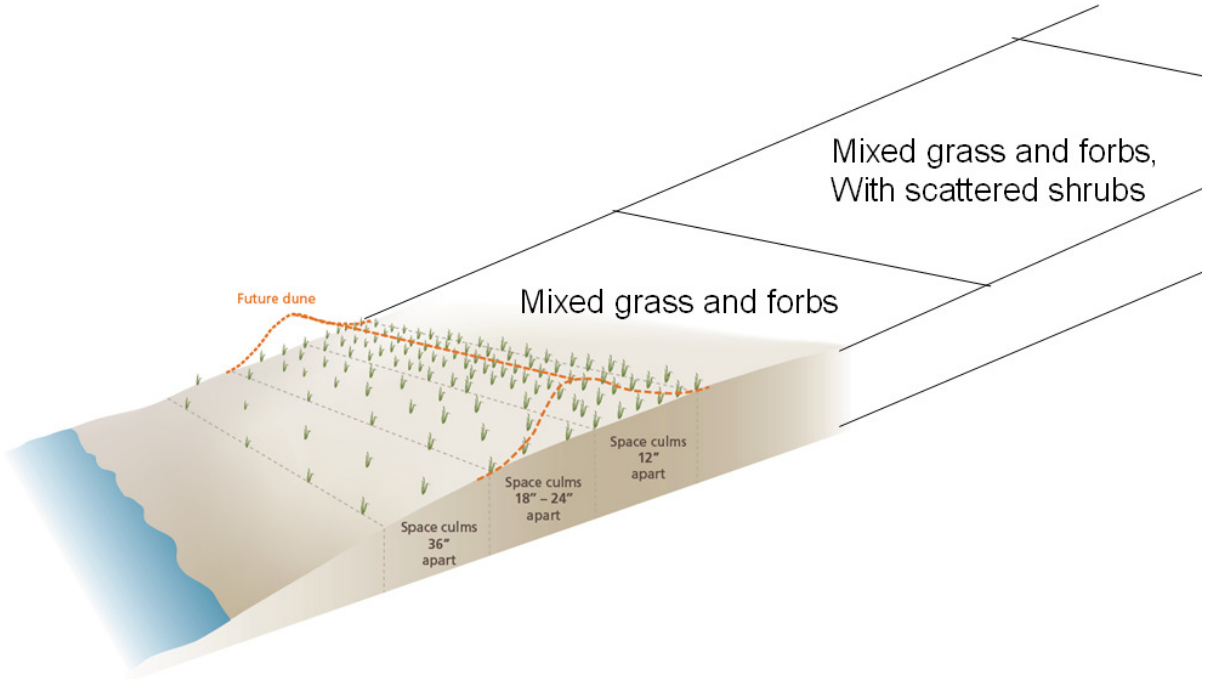

Figure 4. Schematic of proposed planting plan. (Modified from O'Connell 2008)