

# Improving Plant Diversity on Coastal Sand Dunes

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In the mid 1960's, the USDA Soil Conservation Service (now the Natural Resources Conservation Service) established a plant testing facility in Cape May Court House, NJ to develop vegetative solutions erosion problems of the mid-Atlantic coastal plain. Initially all efforts were focused on addressing storm damage to sand dunes. This facility soon identified and tested a collection of American beachgrass (*Ammophila breviligulata*) which performed extremely well on sand dunes along the oceanfront. The selection was given the cultivar name 'Cape' after its place of origin, Cape Cod, MA. This plant cultivar has performed almost too well for nearly thirty years. Its near perfect performance and ease of establishment has escalated this plant to being literally the only species extensively planted on coastal sand dunes from Maine to North Carolina.

Coastal communities with fixed sand dune maintenance and replenishment budgets often choose the short-term convenience of working with one species, over long-term ecologically correct approaches. However, it is short sighted to plant only American beachgrass (*Ammophila breviligulata*). Beachgrass is an aggressive pioneer species (4 to 6 ft. or lateral spread annually); surviving the sterile environment of newly formed sand dunes. Very few additional species can survive this harsh niche of the environment. However, as dunes mature and advance seaward, sand accumulation slows, depriving established beachgrass their needed nutrients. Often the result is a decline in the health of plants in older stands. This is a naturally occurring process where additional light seeded native species would then typically drift into these backdune areas and become established, but houses now stand in the place where this needed seed bank once grew. Unfortunately, the ease by which Am. beachgrass planting units establish and its short-term effectiveness have made it difficult to persuade landowners and municipalities to consider the use of other plant species for sand dune restoration.

Over the years (30 to 40 years) it has been observed that throughout its native range Am. beachgrass is susceptible to decline after six to eight years when artificially established. In response, the Cape May PMC has been focusing on developing additional plant species and educating and encouraging the public of the advantages of diversifying the plant species of their sand dunes rather than relying on the traditional beachgrass monocultures. This process has and will continue to result in additional dune species becoming commercially available in coming years through efforts of the Cape May Plant Materials Center.

American beachgrass (*Ammophila breveligulata*) is best adapted in the foredune where sands are constantly shifting and occasional overwash occurs. Interplanting other adapted species on the backside of the foredune, provides a seed source of additional plants to

assist in the successional process. These species may include 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 japonicus*), trailing wild bean (*Strophostyles helvola*). These plant species are available from specialized nurseries as potted and/or bareroot plants. Seeding technology is also being developed 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. Within three to five years, coastal panicgrass dominates much of the backdunes where beachgrass has lost vigor.

For dunes where adequate width is achieved (greater than 100 feet), shrubs such as bayberry (*Myrica pensylvanica*), beach plum (*Prunus maritima*) winged sumac (*Rhus copallina*) and Groundsel (*Baccharis halimifolia*) can be added for long-term stabilization. These species are generally planted as containerized material. Shrubs need not be planted on a tight spacing as the herbaceous plants but rather scattered throughout the planting area in more natural groupings to provide a seed source.

The challenge in promoting a species rich restoration does not hinge on quality of plant materials. It seems most communities are content with the materials and methods traditionally utilized on their sand dunes until failure strikes. To correct pathological outbreaks, beach front managers seek simple quick-fixes, rather than adjust planning philosophy. To assist beach front communities in becoming aware of improved techniques for protecting their sand dunes with diversification methods will be a hard up-hill struggle. Sand dune restoration is not as simple as establishing a native community of plants, but involves managing the sand budget (the ocean gives it and takes it away). True coastal dune restoration must consider the natural dynamics of this ecosystem, The plant species inhabiting certain niches have evolved and adapted to these locations, and require specific environmental conditions to survive establishment and persist.

For years, residents and municipalities of the Mid-Atlantic & Southern NE coastal areas have accepted the use of American beachgrass as the sole protector of their expensive properties from ocean born storms. With thirty years of test and development experience, the USDA-NRCS Cape May Plant Materials Center staff has taken a position to change the approach and attitude the public has towards protecting their valuable coastal sand dunes. It will be challenging, but through creative marketing and promotional tactics the information hopefully will be accepted.

The first step in promoting a new and improved technology must be successful demonstrations for beach managers. However, demonstrations alone will not win the confidence and support of the public administrators. Continuing public education programs and presentations on sand dune restoration are needed to clarify and reinforce concepts initiated in demonstrations. The audience spoken to must be understood; most beach managers are not plant scientists or ecologists. These local and state administrators decide what will happen on their dunes. Helping these resource managers understand the concepts and forces of succession will assist them in grasping new ideas and approaches. The Cape May PMC staff is readily available to discuss and promote plant species diversity for the Mid-Atlantic and Southern New England sand dunes.

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