

LANDSCAPE SUITABILITY OF COASTAL VEGETATION

Many species that grow naturally in coastal areas are suitable as landscape material on coastal dunes in the northeastern United States. The environment of coastal dunes is characterized by bright sunlight, coarse porous sandy soil, drought, high air temperature, and salt spray. Of the above factors, salt spray is most important in affecting the distribution of vegetation on coastal dunes. Plants that grow in this hostile water-stressed environment have evolved many adaptations that enable them to thrive in dry coastal habitats. Among the adaptations are: succulence Sea Rocket (*Cakile edentula*); fibrous roots Dune Grass (*Ammophila breviligulata*) and other monocots; thick waxy leaves, Sea Rocket, (*Cakile edentula*), Sandwort (*Arenaria peploides*) and many others; sunken stomates (Dune Grass) and other grasses; hairy stems and leaves that retard water loss by transpiration Dusty Miller (*Artemisia stelleriana*); and many additional adaptations.

In the present chapter information is presented on the suitability of coastal vegetation as landscape material and/or dune stabilizers. These species vary in their suitability as landscape material size and tolerance to salt spray. Twenty-two common coastal species are presented as possible candidates as coastal plantings (Table 1). Five species are rated excellent, while sixteen species are rated fair or better. Native species are often overlooked or under utilized as landscape material on Fire Island; but after all, they have evolved adaptations to the physical conditions of Fire Island that have enabled them to persist.

Coastal species vary widely in their tolerance of salt spray. Some species such as Dune Grass (*Ammophila breviligulata*), Dusty Miller (*Artemisia stelleriana*), and Seaside Goldenrod (*Solidago sempervirens*) can tolerate high concentrations of salt spray (Table 2). American Holly (*Ilex opaca*), Red Cedar, (*Juniperus virginiana*) and Bearberry (*Arctostaphylos uva-ursi*) can tolerate moderate amounts of salt spray while other species such as Beach Heather (*Hudsonia tomentosa*) and Virginia Creeper (*Parthenocissus quinquefolia*) are very sensitive to salt spray.

The data in Table 2 are derived from research by Stalter (1979b). Frequency data is valuable since high frequency values reflect habitat preference and success at a site. Dune Grass (*Ammophila breviligulata*) favors sites where salt spray is highest and is the most common species on the primary dune (Table 2). Species that tolerate high concentrations of salt spray e.g. Sea Rocket (*Cakile edentula*) cannot compete with perennial species like Dune Grass. Sea Rocket generally grows on the rarely tidal flooded strand in front of the primary dune where Dune Grass is not established. Beach Heather (*Hudsonia tomentosa*) is adversely affected by salt spray and grows best in the swale between the primary and secondary dune (Table 2). American Holly (*Ilex opaca*), the dominant tree of the Sunken Forest, is fairly tolerant of salt spray.

Many plants found in the Sunken Forest are very sensitive to salt spray such as Arrow-Wood (*Viburnum dentatum*) (Table 2). However some species of the Sunken Forest e.g. Black Cherry (*Prunus serotina*) can tolerate small amounts of salt spray. For additional information on salt tolerance of coastal species and species distribution in coastal environments the reader is directed to Martin (1959) Art (1976) and Stalter and Kincaid (1985).

Salt spray is most concentrated on the ocean-facing side of the primary dune and crest of the primary dune (Figure 1). Only species with a salt spray tolerance level rating of A should be planted in the above areas where salt spray concentration

is high. Salt spray is also quite concentrated at the crest of the secondary dune at Fire Island, New York, even though the crest of the secondary dune is approximately one quarter of a mile from the Atlantic Ocean (Figure 1). Species with a rating of B will do well on the crest of the secondary dune, but only if the crest is located one quarter of a mile or more from the ocean as it is on Fire Island. Plants with salt tolerance ratings of B and C might fare well if planted in the swale between the primary and secondary dune. Salt spray sensitive species might be planted behind the secondary dune where salt spray is minimal. (It might be mentioned that the crowns of American Holly in the vicinity of the Sunken Forest on Fire Island are occasionally subjected to high concentrations of salt spray when strong northwest winds churn up the Great South Bay and carry salt spray from the bay to the hollies.)

Homeowners, landscape designers and architects should use the information presented in Tables 1 and 2 when selecting plants for aesthetic and utilitarian reasons for coastal plantings. Additional information on several coastal species follows.

American Holly (*Ilex opaca*) thrives in sandy soil in the coastal zone of the Northeastern United States. *Ilex opaca* is one of the most handsome of coastal trees. The glossy leaves and attractive red fruit have been prized by home owners for centuries. Only female trees produce fruit. American Holly is moderately tolerant of salt spray. *Ilex opaca* can be planted as a hedge or as a shrub border on beach property. A closed canopy of American Holly will usually protect beach houses from wind damage during hurricanes where winds do not exceed 100 MPH (163 Km/Hr).

Red Cedar (*Juniperus virginiana*) is also moderately tolerant of salt spray (Table 1). This plant produces fruit that is favored by many species of birds. This tree can also be used as a hedge or planted single like American Holly as a specimen tree. Dead trees produce aromatic wood which can be used as kindling. Cedar shavings can be placed in small bags and placed in clothes chests to keep moths away from woollens. Red Cedar also imparts a fresh scent to clothing.

Beach Plum (*Prunus maritima*) has many attractive qualities, yet cannot tolerate high concentrations of salt spray. Beach Plum will thrive in areas where it is given protection from salt spray. Rarely growing taller than 10 feet (3 meters) this attractive shrub produces edible fruit that can be eaten or used to make preserves or wine. Beach Plum can be planted around house foundations, or as a border plant.

Another shrub, Bayberry (*Myrica pensylvanica*), is moderately tolerant of salt spray. Bayberry can be planted as a hedge or as a shrub border around beach houses or as a property border especially if the plants are partially protected from salt spray. Bayberry produces attractive waxy berries (on female plants) in the fall which are a favorite food of many birds. The leaves are aromatic, and remain on the plant well into November. Berry-laden branches can be cut from the plant to be used in floral displays.

Bearberry, (*Arctostaphylos uva-ursi*), is a low-growing plant that is moderately tolerant of salt spray. It is very common in the interdunal swale between the primary and secondary dunes of Fire Island in the vicinity of the Sunken Forest. Bearberry produces small urn-shaped white flowers in the spring and bright red fruit in the fall. *Arctostaphylos uva-ursi* thrives in dry environments and is an excellent ground-cover plant in coastal areas if it is partially protected from salt

spray (Table 1).

Both Seaside Goldenrod (*Solidago sempervirens*) and Dusty Miller (*Artemisia stelleriana*) are subjectively rated fair to good as potential landscape material. Dusty Miller's white leaves and stems are very attractive, more so in fact than their flowers. It also has a high tolerance to salt spray. This forb, like Seaside Goldenrod, will thrive under very adverse conditions. Seaside Goldenrod is most attractive when in flower in the fall. In the spring, the plant produces a rosette of waxy green leaves. As the summer days lengthen, a flower stalk is produced. For those who enjoy a green vegetation to brighten dry sterile sands, Seaside Goldenrod might be their plant. Other individuals might not be impressed by a plant that flowers in the fall when the ocean is too cold for swimming though many in the northeast find September and October the finest months of the year to visit the beach.

Beach Heather (*Hudsonia tomentosa*) is another species that is well suited to coastal environments, but only where salt spray is minimal. Beach Heather produces bright yellow flowers in the spring. The tiny grey-green leaves are tightly packed on small stems that rarely grow more than six inches tall. This plant will thrive in sandy dry gardens that are protected from salt spray.

Sea Rocket (*Cakile edentula*) Russian Thistle (*Salsola Kali*) and several others can tolerate high concentrations of salt spray (see Table 1) yet because of their small size (e.g. Sea Rocket), or morphology (e.g. prickly leaves-Russian Thistle) are not suitable for planting. Other species such as Virginia Creeper (*Parthenocissus quinquefolia*) are attractive yet cannot tolerate high concentrations of salt spray. Virginia Creeper might be planted along fence rows in back of the primary and secondary dunes where salt spray is low. Beach Pea (*Lathyrus maritima*), can tolerate high concentrations of salt spray. Beach Pea might be used as planting material especially for homeowners with houses on the crest of the primary dune (Figure 1).

Rugose Rose (*Rosa rugosa*), an introduced east Asian species, can tolerate moderate amounts of salt spray but is very prickly and, therefore, should be given low priority as a landscape plant, especially for house owners with young children. However, Rugose Rose produces bright showy flowers and edible hips (high in vitamin C) which can be used in jams or for wine making.

Two aliens, Black Pine (*Pinus thunbergii*), and Russian Olive (*Elaeagnus angustifolia*), have been widely planted in coastal environments. Both species can tolerate moderate amounts of salt spray. Black Pine is more uniform in its growth than our native Pitch Pine and for that reason is widely planted on Long Island. Russian Olive is widely planted and escapes as a common shrub in abandoned fields and in open interdunal areas and along roadsides at Robert Moses State Park. The scent of the flowers is sickly sweet. The fruit is a favorite food of many birds. Since both of these species are aliens I have rated them "fair" as landscape suitability.

Even Poison Ivy (*Toxicodendron radicans*) and Poison Oak (*Rhus toxicodendron*) are useful as they serve as dune builders and dune stabilizers. However, their usefulness is weighed against the severe allergic reaction they cause in many individuals.

The desirability rating of the species in Table 1 is very subjective. Most

individuals would classify Dune Grass and American Holly as excellent species for coastal planting. Other species such as Rugose Rose (*Rosa rugosa*) and Shadbush (*Amelanchier canadensis*) are more difficult to classify. For those individuals with no children, Rugose Rose would be an excellent plant for landscape material. People with small children might place a low value (poor or fair rating) on this plant because of the bristles on the stems and leaves of the plant. Shadbush produces snowy white blossoms in the spring and is a very attractive plant in flower. However, if the home owner spends little or no time at the beach in the spring when Shadbush is in flower, this positive character, showy flowers, would be meaningless. Since the fruit of Shadbush is eaten by birds, those who wish to attract birds to their property might plant this tree. Individuals with wooden decks might not want this tree in their yard since trees in fruit might attract birds which might "print" their decks with droppings.

Generally, the species rated excellent or good should be encouraged by the homeowner. If the plants are placed where they will have the best chance to grow (see Tables 1 & 2 for salt spray tolerance), the plants will thrive and will provide the home owner with attractive useful ground cover.

County Cooperative Extension Associations will be pleased to provide interested people with the names and addresses of florists and garden supply stores that carry native salt tolerant vegetation. The phone number of the County Cooperative Extension Association can be found in the White Pages of the phone book.

For additional information on coastal vegetation in National Parks the northeastern United States consult the excellent study of Fire Island, New York by Art (1976) Stalter and Lamont (1987); Sandy Hook (Chrysler 1930 Stalter 1979a); Fort Tilden, New York (Link 1981); and Floyd Bennett Field (Tanacredi 1983) Gateway National Recreation Area (Stalter and Greller 1988); Island Beach State Park, New Jersey (Martin 1959); and Assateague Island, Virginia (Stalter and Lamont 1990).

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Table 1 Suitability of dune vegetation as landscape material (column 1) height of vegetation in feet (column 2) and tolerance of species to salt spray (column 3). Letters indicate the species tolerance to salt spray. A= plant extremely tolerant i.e. plant experiences no salt spray damage; B= plant damaged by salt spray only during extreme conditions; F= plant sensitive to salt spray and damaged by infrequent light salt spray.

Species	Landscape suitability	Height of veg. in feet	Salt spray tolerance
Dune Grass	excellent	1-2	A
Beach Plum	excellent	2.5-15	A
Bayberry	excellent	2.5-10	A
Bearberry	excellent	0.3-0.5	B
American Holly	excellent	10.0-30.0	B
Red Cedar	good	15-30.0	B
Shadbush	good	6.0-20.0	C
Rugose Rose	good-fair	1.0-4.0	B
Beach Heather	fair-good	0.3-0.5	E
Seaside Goldenrod	fair-good	0.5-2.0	A
* Dusty Miller	fair-good	0.3-0.7	A
* Beach Pea	fair	0.5-2.0	A-
Winged Sumac	fair	5.0-12.0	D
Black Cherry	fair	8.0-30.0	C
* Black Pine	fair	6.0-25	B
* Russian Olive	fair	6.0-15	B
Virginia Creeper	poor-fair	climbing vine	E
Grape	poor-fair	climbing vine	F
Poison Ivy	poor	1.0-4.0 (vine)	E
Seaside spurge	poor	0.1-0.2	F
Sea Rocket	poor	0.3-1.3	A
* Russian Thistle	poor	0.3-2.0	A

* Non Native