

## CHAPTER 7. The Vegetation of Plum Island

### 7.1. Types of plants occurring in the Plum Island Sound region

A number of notable botanists, such as Jacob Bigelow, John Robinson, Arthur Stanley Pease, and Stuart K. Harris included plants from Plum Island in their surveys and writings (e.g., Harris, 1975). Up until the 1970s, only Harris had made a rigorous attempt to do a complete floral inventory of the island. His *Flora of Essex County* notes 320 plant taxa occurring on Plum Island (cited in McConnell, 1979). The 1968 DMF monograph contained a plant and seaweed list developed from collections made at each seashore fish sampling station and “at other locations throughout the study area.” Additional information was obtained from a vegetative transect made by Waldo Kennedy, a student assistant on the Parker River National Wildlife Refuge in 1950. These lists reflected the most common species and were not intended to be comprehensive.

The most complete survey of plants on Plum Island was carried out in the late 1970s by Mark McConnell of the University of New Hampshire for his master’s thesis (McConnell, 1979). McConnell compiled a total of 514 taxa from Plum Island. This included his own collections as well as verified records of others. His voucher specimens were deposited at the Hodgdon Herbarium, University of New Hampshire. McConnell described a number of plant associations and the dominant plants in each (Table 7.1). He notes that the vegetation community of the backdune is “very diverse.”

Table 7.1. Major habitats and dominant vegetation on Plum Island. Based on McConnell (1979).

#### Beach

<i>Ammophila breviligulata</i>	Beach grass
<i>Salsola kali</i>	Saltwort
<i>Cakile edentula</i>	Sea-rocket
<i>Raphanus raphanistrum</i>	Wild radish

#### Foredune

<i>Ammophila breviligulata</i>	Beach grass
<i>Salsola kali</i>	Saltwort
<i>Lathyrus japonicus</i>	Beach pea
<i>Euphorbia polygonifolia</i>	Seaside spurge
<i>Artemisia stelleriana</i>	Dusty miller
<i>Solidago sempervirens</i>	Seaside goldenrod

#### Interdune

<i>Ammophila breviligulata</i>	Beach grass
<i>Andropogon scoparius</i>	Blue-stem
<i>Scirpus cyperinus</i>	Wool-grass
<i>Cyperus</i> spp.	Sedge

<i>Xyris torta</i>	Yellow-eyed grass
<i>Juncus balticus</i>	Rush
<i>Salix</i> spp.	Willow
<i>Populus tremuloides</i>	Trembling aspen
<i>Myrica pensylvanica</i>	Bayberry
<i>Alnus</i> spp.	Alder
<i>Polygonella articulata</i>	Jointweed
<i>Drosera intermedia</i>	Sundew
<i>Spiraea tomentosa</i>	Steeple-bush
<i>Prunus</i> spp.	Wild cherry
<i>Amelanchier canadensis</i>	Shadbush
<i>Pyrus arbutifolia</i>	Red chokeberry
<i>Lathyrus japonicus</i>	Beach pea
<i>Euphorbia polygonifolia</i>	Seaside spurge
<i>Toxicodendron radicans</i>	Poison ivy
<i>Ilex verticillata</i>	Winterberry
<i>Acer rubrum</i>	Red maple
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Hypericum boreale</i>	St. John's-wort
<i>Hudsonia tomentosa</i>	False heather
<i>Lechea maritima</i>	Pinweed
<i>Vaccinium corymbosum</i>	Highbush blueberry
<i>Vaccinium macrocarpon</i>	Cranberry
<i>Lyonia ligustrina</i>	Maleberry
<i>Viburnum recognitum</i>	Arrow-wood
<i>Artemisia stellariana</i>	Dusty miller
<i>Solidago sempervirens</i>	Seaside goldenrod
<i>Aster linariifolius</i>	Aster

### Backdune

<i>Pinus nigra</i>	Austrian pine
<i>Pinus strobus</i>	White pine
<i>Pinus rigida</i>	Pitch pine
<i>Agropyron repens</i>	Witch grass
<i>Lolium perenne</i>	Common darnel
<i>Phleum pratense</i>	Timothy
<i>Poa</i> spp.	Bluegrass
<i>Agrostis</i> spp.	Bentgrass
<i>Festuca</i> spp.	Fescue
<i>Secale cereale</i>	Rye
<i>Carex pensylvanica</i>	Sedge
<i>Maianthemum canadense</i>	Canada mayflower
<i>Smilax rotundifolia</i>	Common greenbrier
<i>Myrica pensylvanica</i>	Bayberry
<i>Quercus velutina</i>	Black oak
<i>Celtis occidentalis</i>	Hackberry
<i>Rumex acetosella</i>	Sheep sorrel
<i>Arenaria lateriflora</i>	Grave sandwort
<i>Ranunculus repens</i>	Creeping buttercup
<i>Sassafras albidum</i>	Sassafras
<i>Ribes hirtellum</i>	Gooseberry
<i>Rosa carolina</i>	Rose
<i>Rosa</i> spp.	Rose
<i>Rubus</i> spp.	Blackberry
<i>Prunus maritima</i>	Beach plum

<i>Prunus serotina</i>	Black cherry
<i>Amelanchier canadensis</i>	Shadbush
<i>Vicia</i> spp.	Vetch
<i>Trifolium</i> spp.	Clover
<i>Toxicodendron radicans</i>	Poison ivy
<i>Celastrus scandens</i>	Bittersweet
<i>Acer rubrum</i>	Red maple
<i>Vitis</i> spp.	Wild grape
<i>Nyssa sylvatica</i>	Black gum
<i>Aralia nudicaulis</i>	Wild sarsaparilla
<i>Daucus carota</i>	Wild carrot
<i>Vaccinium</i> spp.	Blueberry
<i>Arctostaphylos uva-ursi</i>	Bearberry
<i>Trientalis borealis</i>	Star flower
<i>Convolvulus sepium</i>	Hedge bindweed
<i>Teucrium canadense</i>	Wood-sage
<i>Lonicera morrowi</i>	Honeysuckle

### Freshwater Habitats

<i>Onoclea sensibilis</i>	Sensitive fern
<i>Thelypteris palustris</i>	Marsh fern
<i>Typha</i> spp.	Cat-tail
<i>Potamogeton perfoliatus</i>	Pondweed
<i>Potamogeton pectinatus</i>	Sago pondweed
<i>Sagittaria latifolia</i>	Arrowhead
<i>Phragmites australis</i>	Reed grass
<i>Eleocharis parvula</i>	Spike rush
<i>Lemna minor</i>	Duckweed
<i>Iris versicolor</i>	Blue flag
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Lythrum hyssopifolia</i>	Hyssop-leaved loosestrife
<i>Ludwigia palustris</i>	Water purslane
<i>Lycopus</i> spp.	Water-horehound
<i>Bidens</i> spp.	Beggar-ticks

### Salt Marsh

<i>Triglochin maritima</i>	Arrow-grass
<i>Spartina alterniflora</i>	Saltwater cordgrass
<i>S. patens</i>	Saltmeadow grass
<i>S. pectinata</i>	Freshwater cordgrass
<i>Puccinellia maritima</i>	Goosegrass
<i>Bassia hirsuta</i>	
<i>Salicornia europaea</i>	Samphire
<i>Suaeda</i> spp.	Sea-blite
<i>Spergularia marina</i>	Sand-spurrey
<i>Potentilla egedei</i>	
<i>Glaux maritima</i>	Sea milkwort
<i>Limonium carolinianum</i>	Sea lavender
<i>Gerardia maritima</i>	Gerardia
<i>Plantago oliganthos</i>	Seaside plantain
<i>Iva frutescens</i>	Marsh-elder
<i>Aster subulatus</i>	Salt marsh aster

### Roadsides and Disturbed Areas

<i>Bromus tectorum</i>	Wild oats
<i>Mullugo verticillata</i>	Carpetweed
<i>Saponaria officinalis</i>	Soapwort
<i>Spergularia rubra</i>	Sand-spurrey
<i>Euphorbia esula</i>	Leafy spurge
<i>Oenothera biennis</i>	Evening primrose
<i>Asclepias syriaca</i>	Common milkweed
<i>Lepidium virginicum</i>	Poor-man's pepper
<i>Verbascum thapsus</i>	Common mullein
<i>Achillea lanulosa</i>	Yarrow
<i>Ambrosia artemisiifolia</i>	Ragweed
<i>Artemisia vulgaris</i>	Common mugwort
<i>Solidago</i> spp.	Goldenrod
<i>Chrysanthemum leucanthemum</i>	White daisy

## 7.2. The Salt Hay Industry

Jerome et al. (1968) gave a brief review of salt marsh haying that is still relevant:

Salt hay, primarily high water cord grass [e.g., salt marsh hay, *Spartina patens*], has long been valued by residents of the area. It was used by the early settlers for thatching roofs, and for cattle bedding and fodder. Although still used for the latter two purposes, it is much in demand as a mulch for gardens and areas freshly seeded for grass. Salt hay makes an excellent mulch because its seeds do not germinate under conditions normally found in upland areas.

For many years, the hay was cut, raked and stacked by hand on hay staddles in the marsh. Later, horses with "bog shoes" to prevent them from sinking into the marsh were used to draw mowing machines. Huge scows or gundalows were poled and floated up the creeks to reach many areas of salt marsh which were inaccessible from the upland. The gundalows were often floated over the marsh on extreme high tides, filled with hay, and floated out on the next high tide. In recent years, tractors pulling mowers and mechanical hay balers have been used for harvesting salt hay.

An excellent, entertaining history of the old method of salt marsh haying is given in Jewett (1949).

Bird (1999) provided a comprehensive review of current haying practices and also described some of the potential ecological consequences of salt marsh haying. These include potential effects on marsh surface elevation, succession and species diversity, primary production, nutrient dynamics, and impacts on higher trophic levels. She suggested a number of studies that would address these issues. From a management perspective, it is important to determine whether haying at different levels of intensity is compatible with other marsh values.

The Plum Island Ecosystems Long Term Ecological Research Project (PIE LTER) was examining salt marsh haying at the time of this writing. From an ecological perspective, haying is analogous to large scale herbivory, something that does not normally occur in New England salt marshes. Haying removes large amounts of vegetation that would otherwise go into the detritus-based food chain and ultimately into the surrounding estuary, a major energetic pathway in many salt marsh-estuarine ecosystems. Haying may also stimulate plant and algal productivity by allowing greater light penetration to the marsh surface through removal of standing dead plant material. By reducing the build up of litter, haying may also increase the foraging efficiency of fish and birds on salt marsh invertebrates. In addition to direct removal of plant material, hayers usually manipulate water levels in areas they routinely hay, thus causing localized changes in hydrology.

At least five individuals harvested salt hay from the marshes of the Parker River-Plum Island Sound area in 1965 (Jerome et al., 1968). In the late 1990s, there were three individuals carrying out haying on a relatively large scale. Based on conversations with local hayers, at least 400 hectares of the salt marsh are hayed on a regular basis, usually once every two years (PIE LTER, unpublished results).