ENVIRONMENTAL LANDSCAPE CONSULTANTS

Talbot Ecological Land Care

Certified Consulting Arborists, Horticulturists and Restoration Ecologists
Natural Landscape Design, Conservation Permitting and Restoration
Consultation, Education, Design, Installation and Management

Edible Landscaping: Landscaping for Beauty, Function, and Healthy, Fresh Vegetables, Herbs, Fruits, and Nuts

Think about it: wouldn't it be great to have your cake and eat it too? We are promoting "edible landscaping", which incorporates food-producing plants into the ecological landscape. Talbot Ecological Land Care is a recognized pioneer of Edible Landscaping. Edible landscaping includes incorporating fruit and nut producing trees and shrubs—including some interesting and attractive native plants that produce food, like hazelnuts, blueberries, persimmons and table grapes—like the grape covered pergola in the second photo (left) of an edible landscape. It can also include integrating edible flowers, herbs, and vegetables into ornamental garden beds, like in the photo above. We also add attractive and colorful habitat for important pollinators, like birds, native bees and butterflies—while adding low maintenance color, year-round interest, beauty, and value to your greenspaces. With this philosophy of design, your greenspace-public or private - can be a part of the restoration process by helping to mitigate the adverse effects of excess lawn fertilizer, over-development, the suppression of fire, and the loss of wildlife habitat on the Cape.

Edible landscaping allows you to snack on your landscape—and share some with wildlife—or even help feed your family in a significant way with fresh, wholesome, organically-grown food.

Contact us to set up a site assessment and consultation to determine what kind of edible landscape is right for you—based on your site and soils, your budget, and how much effort you want to put into producing food. Edible landscaping is one of several great ways to replace lawn areas with an interesting, ecological and productive landscape.

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Open Space, Meadow and Woodland Understory Trees, Shrubs and Groundcovers for the Cape, the Islands and Southeastern Massachusetts: A Designer's Guide

Naturally vegetated areas, including woodland, shrubland and meadow/grassland buffers to natural resource areas such as ponds, streams, wetlands, salt bays, dunes and marshes, should be preserved. These areas protect important community interests, such as surface and drinking water, wildlife habitat, fisheries, flood protection and pollution prevention. They also enhance the ecological character of our region, a unique ecosystem known as the Atlantic Coastal Plain that dominates the Cape and Islands and some of the coastal areas along the South Shore, the South Coast, and Rhode Island. The great diversity of plant species and wildlife within these naturally vegetated areas--as well as the "layers" of plants in what ecologists call "plant communities"--provide enjoyment to people as well. Thus, beneath our woodland canopy of oaks, pines, and other large trees, is an understory of small and sapling trees, shrubs, vines, groundcovers, and herbaceous plants including grasses, forbs and wildflowers--many of which are adapted to grow in sunny areas. Meadow habitats are dominated by grasses, generally very attractive plants, but also include flowering forbs, woody groundcover plants and shrubs. Grassland habitats are disappearing in our region and need our protection. They help provide excellent habitat for key pollinators, as well.

We as owners, managers and developers of land in this region should enhance woodland edges or, importantly, restore woodlands where trees remain but the understory of small trees, shrubs, groundcovers and herbaceous plants have been mowed, removed or replaced with turf. We should especially restore or re-create our disappearing meadow habitats that add unique beauty and wildlife habitat to our properties and our region--including for key pollinators, such as butterflies and native bees. Do this by using plants tolerant of the site conditions and by designing plantings in a way that reflects these native plant communities—what we call "Naturescaping". Our mission at Environmental Landscape Consultants is to preserve and enhance our fragile environment. We work with you and your greenspace to add beauty and interest, reduce maintenance, protect family and pets, prevent pollution and attract wildlife. These efforts in your landscape do help to mitigate the habitat losses from over-development, invasive species, suppression of fire, and other human impacts.

Meadow plantings are best for sunny areas or open woodlands and can be designed to grow in the dry, sandy, acid soils found in this region, as well as for other sites. Woodland understory plantings generally need to tolerate partial to moderate shade and may need to tolerate poor dry soils in much of the Cape and Islands as well. These plantings can work as screens, frame an attractive view or be a foreground planting. With proper design and installation, we can create an attractive, diverse transition border from our native forests to our human built landscapes, while enhancing both habitats.

Natural plantings can provide four seasons of interest, as well as new and interesting points of beauty to your landscape. This includes creating habitat for birds, butterflies and other interesting wildlife, as well as habitat for beneficial organisms that help control landscape pests naturally and provide food for predators like fox, owls and hawks. These features can be further enhanced with an attractive, restful

water feature. And, of course, a well-designed woodland, pond edge, shrub border or meadow planting can add great value and enjoyment to your landscape and to your property.

Here is a working list of plants to enhance or create a woodland understory, coastal shrubland or flowering meadow habitat. Other plants may work for you, but we are emphasizing available native plants of this region, including some attractive cultivars and selections. We have also included some attractive non-native plants that are appropriate to this area--and are not invasive. We recommend that only regionally native plants be used within a native stand of forest to protect our environment. *As a reminder, plantings within 100 feet of a wetland, pond, inland or coastal bank, dune or other resource area may require approval by your local Conservation Commission. Call us for details on your site.*

Small and medium trees (and a few canopy trees) for restoration plantings:

("*****" indicates a plant species native to the Eastern United States--unless otherwise noted)

--American holly* (*Ilex opaca*) our beautiful, upright-growing, half-shade tolerant, evergreen understory tree of the Cape and region; grows slowly but responds to care (irrigation, fertilizer, etc.); plant females *and* a male to get attractive red berries on females (best berry display and density in full sun)--unless American hollies are growing within 100 feet; tolerates some drought and moist soils once established, but not windy or very wet sites; tolerates salt; improved cultivars may be available.

--Longstalk holly (*Ilex pedunculosa*) lovely, underutilized Japanese holly with lustrous, non-spiny, evergreen foliage (much like a mountain laurel); grows as a loose pyramid to about 12-20 feet; bright red berries on females with a male pollinator nearby; berries on stalks (pedicels) is unusual and interesting; fruits eaten by birds; this plant is not invasive, is more cold tolerant and is best on moist soil in a more protected site.

--Other non-native evergreen hollies for woodland or shrubland edges include **'San Jose'**--upright, broad and compact; **'Nellie Stevens'**--vigorous, handsome upright pyramid that can grow rapidly to over 20', '**Dragon Lady**'--more cold-tolerant than other hollies, attractive, narrow-growing, pyramidal upright holly, and **'Castle Wall'--**upright and compact (use '**Blue Stallion'** or '**Blue Prince**' as a male pollinator).

--Common witch hazel* (*Hamamelis virginiana*) shade tolerant small tree or large shrub; unique, yellow, strap-like flowers appear in late fall when little else is blooming; may have spectacular, yellow fall color; interesting, spreading form and attractive bark; allow room to spread; great in a (moist) woodland border.

--Winter-blooming witch hazels include various species and cultivars from Asia, especially the attractive hybrids (*Hamamelis x intermedia*) of the Chinese (*Hamamelis mollis*) and Japanese witch hazels. These hybrid cultivars (generally 8-12' high and wide) are easily grown in average, medium moisture, well-drained, acidic soils in full sun to part shade (best flowering in full sun); include '**Jelena**' with copper-red-yellow flowers, '**Arnold Promise**' (to 15') with bright yellow flowers, and '**Pallida**' with abundant yellow flowers. **Ozark witch hazel*** (*Hamamelis vernalis*) with fragrant blooms from January to April and generally nice form and fall color; native to the Ozark Mountains of the Central U.S. The Ozark witch hazel is lower (6-8') and more spreading (8-14'); usually blooms are red at the base transitioning to copper orange at the tip; nice golden-yellow fall color; irrigate in dry periods.

--Sourwood or **Lily-of-the-valley tree*** (*Oxydendrum arboreum*) found from Long Island and Pennsylvania south; grows well in the acid soils of southern New England; an all-season ornamental and great specimen tree; nice pyramidal shape, especially as it ages; rich, lustrous foliage becomes spectacular red in the fall; excellent flowering tree with panicles of lily-of-the-valley like blooms for weeks in early summer; interesting fruits (of relatively low wildlife value); tolerates shade and dry soils; best in sun with moist soils; related to blueberries and azaleas. I consider this a "must-have" tree for the landscape.

--Eastern redbud* (*Cercis canadensis*) found from Pennsylvania south; an attractive, small, shade tolerant tree with striking pink-purple flowers in the spring; there is a white-flowered form, '**Alba**' and red leaf forms: '**Forest Pansy'** and **'Merlot' (**more drought tolerant); blooms around the time of flowering dogwoods; generally has attractive foliage; nice, yellow fall color; tolerates dry, poor soils and windy sites.

--Flowering dogwood* (*Benthamidia florida*) perhaps our most beautiful native tree with high wildlife value (attractive red fruits are nutritious to birds) and four seasons of interest; "dogwood anthracnose" disease

has killed many native trees in the rich, well-drained forest understory where they once thrived; suitable in open, sunny sites with good soils; mulch and irrigate to avoid drought stress—*all tree dogwoods are drought intolerant and slow to recover from decline*. Disease treatment may be required. '**Appalachian Spring**' is anthracnose resistant; '**Cherokee Princess**' is somewhat resistant. Sterile, non-fruiting hybrids of flowering dogwood and Asian **Kousa dogwood** (*Cornus kousa*) can be substituted--especially **'Ruth Ellen'**, which has the horizontal branching of the native dogwood. Native dogwoods are best for wildlife.

--Pagoda dogwood* (*Swida alternifolia*) a unique, shade tolerant, understory tree with a strikingly horizontal branching pattern; spring flowers and dull red fall color; attractive fruits and very high wildlife value (as do all native members of the dogwood family); tolerates wet and moist soils; but is not drought or wind tolerant; prefers deep, rich, woodland soils in partial shade.

--Eastern red cedar* (*Juniperus virginiana*) is not an understory tree, as it demands full sun. However, this tough, attractive needle evergreen has very high wildlife value and grows in hot, dry, poor, sandy soils and windy sites; good seashore and screen plant, although it can suffer wind burn in strong winter storms; '**Emerald Sentinel'**, **'Taylor'** and '**Manhattan Blue**' are among improved, female (cone producing) cultivars that maintain good winter color; '**Hillspire**' is a male clone for pollination if no cedars are nearby.

--Eastern arborvitae* or **white cedar** (*Thuja occidentalis*) upright evergreen found mostly in northern New England; will tolerate some dryness in *light* shade (more shade tolerant than eastern red cedar); best in organic, amended, moist soils; selections with better year-round foliage include **'Techny'** and **'Nigra'**.

--Western arborvitae or **western red cedar*** (*Thuja plicata*) narrow, pyramidal, evergreen tree to 50' tall and 15-25' wide with dense, glossy, attractive foliage native to the west coast from northern California north; seems to do better than the Eastern arborvitae on the Cape and grows faster and is more shade tolerant; pH tolerant; prefers deep, moist loam but tolerates a variety of soil types including somewhat wet and somewhat dry sites--once established; may have better deer resistance then Eastern arborvitae. **'Green Giant'** is a hybrid that is narrower, even faster growing (up to 3'-4' a year with irrigation and feeding) and generally good green color all winter; readily available; a good screen plant and specimen—*and a good substitute for the problematic Leyland cypress*, which should no longer be planted.

--Blackhaw viburnum* (*Viburnum prunifolium*) attractive large shrub for a sunny, woodland edge or understory; tolerates droughty soils; can be pruned as a small tree; showy spring blooms; relatively pest free, lustrous foliage; nice scarlet red to crimson fall color; attractive fruit of high wildlife value; a possible flowering dogwood substitute. ***All viburnums need pollinators that are not an exact clone to set fruit***.

--Nannyberry* (*Viburnum lentago*) small understory tree or large shrub; nice fall color, attractive fruits and high wildlife value; tolerates light shade and dry soils; susceptible to leaf spot disease.

--Shadblow juneberry or **serviceberry*** (*Amelanchier spp.*) attractive, shade tolerant, understory trees or large shrubs with four seasons of interest--including lovely, early spring flowers, nice foliage, yellow or red fall color, edible blue fruits (birds love them) and attractive gray winter bark color; tolerates moist soil and sun, but not especially drought tolerant; can tolerate seaside conditions; several species can grow to 30' high and wide; a number of attractive hybrid cultivars with good, red fall color and greater flower displays include **'Princess Diana'** and **'Autumn Brilliance'**. **Shadblow juneberry** *(Amelanchier canadensis)* will grow at the edge of brackish water and is more shrublike and may be more disease resistant. Some serviceberries susceptible to various rust diseases, one of which can cause tip dieback; if used as a specimen plant may need several disease treatments each spring—but this great native plant is worth it! Very high wildlife value.

--Siebold viburnum (*Viburnum sieboldii*) shade tolerant, pest-free small tree from Japan to 20' or more; spring blossoms, attractive foliage much like a large leaf evergreen species; provides good screening; red to blue-black fruits taken by birds leaving attractive, red stalks; tolerant of dry soils; *potentially invasive--remove seedlings if found in woods*; **'Seneca'** is an improved cultivar.

--Sassafras* (*Sassafras albidum*) attractive, pyramidal to irregular large understory tree of New England with picturesque horizontal branching, green twigs, gray bark, and handsome, subtle yellow blooms in early spring; worth preserving; pest free; interesting foliage and striking fall foliage in many years; blue fruit quickly eaten by songbirds leaving a red pedicel (stem); can root sucker, so remove those you don't want.

--Sweetbay magnolia* (*Magnolia virginiana*) lovely, semi-evergreen, shade tolerant large shrub or small tree with mildly fragrant, white flowers in late spring and interesting fruits; should be used more, as it has nearly disappeared from SE Mass. where it once occurred naturally; tolerates wet soils, but not drought; tolerates salt and more protected seaside locations.

--White fringetree* (*Chionanthus virginicus*) unique, showy, white fringe-like flowers; yellow fall foliage and attractive blue fruits (plant a second tree as pollinator); intermediate wildlife value; few pest problems; shade tolerant understory tree; best in moist to average soils; not drought tolerant; *very unusual*; native to the southeastern U.S.

--Pussy willow* (*Salix discolor*) native small tree for sunny borders; grows in wetlands but not shade; some drought tolerance; best in moist to wet sites; very early, silky soft catkins a sign of spring; important early wildlife food source; similar to the invasive grey willow (*Salix cinerea*), which is spreading in the region.

--Eastern hophornbeam* (*Ostrya virginiana*) very graceful, understory tree found on the Cape; birch-like foliage (it is a birch relative) generally turns yellow in the fall; male catkins in threes visible through the winter; quietly interesting bark and fruits; nice form; prefers moist soils, but tolerates dry sites; shade tolerant and useful in the understory.

--Washington hawthorn* (*Crataegus phaenopyrum*) excellent, small understory tree from southeastern US; lustrous, dark green, relatively disease free foliage--unlike most hawthorns; orange-red fall color in many plants; white flowers in late spring; shiny, bright red, showy fruit clusters appear in large numbers and may last into the winter; horizontal branching; tolerates dry soils, salt and windy sites, including seashores; prefers full sun; thorny—*so avoid high traffic areas*.

--Winter King hawthorn* (*Crataegus viridis* 'Winter King') another relatively disease resistant, thorny hawthorn that grows well in sun and both wet and dry sites; four seasons of interest--white blossoms, bright green lustrous foliage and fall color, bright red fruit of large size (1/2") and retention, and attractive rounded shape, stems and branching; tolerates wind and seashores; high wildlife habitat.

--Persian ironwood or **Parrotia** (*Parrotia persica*) is an underutilized, adaptable, small-to-medium, single trunk, deciduous tree eventually growing 20-40' tall (but typically 10' after 7-8 years) or a large, multi-stemmed shrub growing to 15' tall. Early spring flowers with dense, red stamens surrounded by brownish bracts appear before the foliage. Oval to oblong leaves (to 4" long) emerge reddish-purple in spring, mature to a lustrous, medium to dark green in summer and change to variable shades of yellow, orange and red in fall. Bark of mature trees exfoliates to show green, white or tan patches beneath and provides good winter interest. A nearly extinct tree in its native Iran; **'Ruby Vase'** is narrower than the species (to 16' wide) with red-tipped leaves in spring and good orange-red fall color. Good lawn or street tree.

--River birch* (*Betula nigra*) really a taller, medium-sized canopy tree best in full sun, with mulch and irrigation; use in a sunny border or landscape; very attractive off-white to salmon colored, exfoliating bark and yellow fall color; resistant to drought and to the birch leaf miner and the deadly bronze birch borer--pests that plague more commonly used white-barked birches; tolerates wet sites. **'Heritage'** holds the nice bark color longer; **'Fox Valley'** grows to only 10'.

--Red mulberry* (*Morus rubra*) large understory tree native as far north as western-central Massachusetts; large, dark green foliage generally turns golden yellow in the fall; large, juicy, edible fruit turns a variety of colors until it becomes almost black; birds relish them so much they can be eaten before ripening; fruit does stain--avoid trafficked areas; tolerates dry sites and part shade; not easy to find in nurseries.

--Tupelo or **black gum*** (*Nyssa sylvatica*) medium canopy tree for sunny, woodland or pond side edges; tolerates salt and may be appropriate for seaside/salt marsh edge locations; very attractive, early fall color, interesting, horizontal branching and narrow, columnar form; prefers wet sites in nature where it spreads by root suckers to form "colonies"; tolerates dry, upland sites; high wildlife value as birds relish the highly nutritious blue fruits and take them quickly; good nest tree; one of my favorite native trees.

--Red or **swamp maple*** (*Acer rubrum*) native canopy tree for sunny or partly shady sites that are not extremely dry; tolerant of wet or compacted soils; good shade tree; some outstanding new cultivars with spectacular fall color include **'Red Sunset'** and **'October Glory'**; may become a large tree, even on the Cape and Islands, but useful in the understory; very high wildlife value.

--White spruce* (*Picea glauca*) evergreen spruce with green, medium textured foliage and a broad, dense pyramidal habit in youth; native in northern New England; has naturalized as an understory tree on the Cape; light shade tolerant and adaptable, including somewhat dry, sandy soils; tolerates wind, some salt and protected seashore conditions; best in acidic, loamy, moist, sandy, well-drained and clay soils. It has some drought tolerance; high wildlife value; treat with dormant oil in spring to manage spruce gall adelgid.

--Eastern white pine* (*Pinus strobus*) our magnificent, native, evergreen pine with graceful foliage, texture and form can hardly be classified as a small or medium sized tree, however, it is shade tolerant when young, where it often grows as an understory tree providing screening, cover and very high wildlife value; adaptable to many sites, including dry soils; poor salt tolerance and subject to severe limb breakage in coastal storms--avoid seashore and very windy locations; '**Fastigiata**' is a more narrow and pyramidal form; dwarf and weeping forms are also available.

Shrubs for understory and coastal shrubland environments and natural landscapes:

--Highbush blueberry* (*Vaccinium corymbosum*) adaptable shrub for wet to *somewhat* dry, sunny to shady sites; tolerates salt and seashores; found native throughout our region, including edges of salt marshes; may have excellent, red fall color; some cultivars have attractive red twigs for winter interest; many good fruiting and compact cultivars available (talk to us)—including hybrids with lowbush blueberry that only grow two to three feet tall; very high wildlife value; plant in full sun and irrigate for good fruit production; provide netting to protect fruit, as the fruit of this plant is highly nutritious and sought-after by birds.

--Northern bayberry* (*Myrica pensylvanica*) attractive, easy care, native shrub for sun to part shade, moist or very dry sites; very salt and seashore tolerant; effective as a screen, growing 5 to 10 feet high--taller in average or amended, moist soils; low growing in dunes or poor, dry, sandy soils, fixes nitrogen; blends well with broadleaf evergreens; waxy fruits of high wildlife value--a critical food source for migrating (*Passerine*) songbirds; male and female flowers on separate plants (dioecious) so plant at least three or more to get male and female plants and fruits; both fruits and foliage are fragrant when crushed.

--Virginia rose* (*Rosa virginiana*) often found growing with bayberry in dune environments/exposed seaside locations; this attractive, native shrub rose has multi-season interest including single, pink fragrant flowers in June with attractive red rose hips (small enough for birds to eat); red stems in winter, and glossy, dark green, disease resistant foliage that turns orange-red in fall. A dense, clump-growing, 4 to 6 foot tall and wide shrub is suitable for a sunny border and will grow along salt marshes and in poor, dry, sandy soils; suckers in better soils with moisture, but not a badly as beach rose *(Rosa rugosa)*; rejuvenate by simply cutting it to the ground and letting it grow back; ***a good replacement for the invasive beach rose***.

--Beach plum* (*Prunus maritima*) rugged, low maintenance, large shrub member of the cherry-plum family; grow in full sun; tolerates very poor, dry and sandy soils; found naturally in dunes and seashore situations--tolerates salt well; nice, white spring blooms and attractive blue fruits use for jams, desserts, etc.

--Sweet pepperbush or **summersweet*** (*Clethra alnifolia*) upright, spreading shrub native to this region; fragrant, attractive summer flowers; nice yellow fall color in some years; pleasing winter form; adapted to sun or shade, wet or dry--but not extremely dry; improved cultivars include **'Hummingbird', 'Sixteen Candles'**, and **'Crystalina'** (2-4' tall; compact) and **'Ruby Spice'** (8-10' tall with nice red blossoms).

--Inkberry* (*Ilex glabra*) very attractive, native evergreen shrub holly with black berries on females; adapted to wet or dry, sun or shade, as well as salt; not as tolerant of very windy or dry sites; improved, compact cultivars include **'Nordic'**, **'Nigra'** (best of compact cultivars?) and **'Shamrock'**; **'Densa'** is a great screening cultivar to about 6' high and wide; holds lower foliage well; plant seedlings for male pollinators and fruit.

--Meserve shrub hollies (*Ilex x meserveae*) a popular collection of hardy, evergreen, somewhat low maintenance hollies for the shrub border (are subject to scale infestations); most cultivars have glossy, blue-green foliage; females have attractive red berries providing winter food for birds; plant a male for pollination; tolerant of many landscape situations, including moist sites; some drought tolerance; prefers moist soil; full sun to moderate shade; good cold and wind tolerance for an evergreen holly, avoid stressing them--like most hollies slow to recover; treat with dormant oil to manage scale infestations.

--Winterberry* (*Ilex verticillata*) deciduous, upright, spreading holly; selections for spectacular fall and winter red fruit display include **'Winter Red'** (tall growing to 7-9' with large bright red, persistent berries), **'Red Sprite'** (compact to 4-5' with excellent fruit display) and **'Sparkleberry'** (upright, vigorous and spectacular in fruit); plant with a male (i.e., **'Jim Dandy'** for **'Red Sprite'** and **'Berry Heavy'**, **'Southern Gentleman'** for others); best in moist, rich, acidic soils in part shade; very salt and wet soil tolerant, but they also have some drought tolerance and fruit well in sun; found naturally in wetlands and along salt marshes; best when massed in borders; good wildlife value--provides important winter food for overwintering birds.

--Red chokeberry* (*Aronia arbutifolia*) the variety **'Brilliantissima'** has excellent fruit and flower displays and fall color that rivals winged euonymus (*an invasive exotic that should not be planted*); especially effective when massed; tolerates wet or dry sites in sun or part shade; salt and wind resistant; few pests; gets leggy with age but has winter bark interest; plant lower facer shrubs in front to fill the lower canopy.

--Black chokeberry* (*A. melanocarpa*) is related to red chokeberry; shorter (generally 3-6') with black fruits relished by wildlife, and attractive, red fall color; suckers; excellent for wetland reclamation; also tolerates salt, heat, drought, wind, poor soil and part shade. **'Viking'** is an upright, multi-stemmed shrub that was developed in Europe as an orchard plant; attractive red leaves in fall; purplish black edible berries that ripen in late summer. The berries are high in nutrients and can be used for juice, pies and jellies or to provide food for birds and other wildlife**. 'Autumn Magic'** is heavy-blooming; **'Low Scape® Mound'** aronia is a tough, tolerant, tidy little mound (to 12-24 inches)of glossy green foliage, spring blooms and dark fruit.

--Redosier or **red twig dogwood*** (*Cornus sericea*) many seedlings have attractive red winter color on stems; variable growth to 7-12'; **'Flaviremea'** is a yellow stem cultivar; **'Cardinal'** is tall with good red stem color; **'Silver and Gold'** has leaves with white margins and attractive yellow winter stems; **'Farrow'** (Arctic Fire) grows to only 3-4' high with dense red stems—a nice compact cultivar. All are best in moist sites and full sun, but they have some drought and poor soil tolerance; soil stabilizer with very high wildlife value.

--Ninebark* (*Physocarpus opulifolius*) A medium to large native shrub easily grown in average, slightly acidic, dry to medium moisture, well-drained soil in full sun to part shade. Noted for its exfoliating bark (on mature branches) which peels in strips to reveal several layers of reddish to light brown inner bark (hence the common name of ninebark). Bark provides winter interest, but is usually hidden by the foliage during the growing season. Features small pink or white, five-petaled flowers appearing in dense, flat, rounded, 1-2" diameter, spiraea-like clusters (corymbs) in late spring. Flowers give way to drooping clusters of reddish fruit (inflated seed capsules). **'Summer Wine'** is noted for its deeply cut, wine-red foliage and its dense, free-branching, mounded growth habit; grows 4-6' tall and wide; unlike the species, this cultivar is noted for retaining compact form. **'Tiny Wine'** is similar but is a dwarf form that grows 3-4' tall and wide.

--Elderberry* (*Sambucus canadensis*) upright, suckering shrub with attractive white flowers and deep purple fruit with red or purple stems; food for 48 species of birds and other wildlife; adaptable: tolerates both wet and dry sites; sun or moderate shade; **'Adams'** and **'York'** are cultivars with large, edible fruit clusters; **'Eva'** is a cultivar of the European *Sambucus nigra* with purple, lacy leaves and large, pink flower clusters.

--American filbert* (*Corylus americana*) upright, spreading, thicket-forming shrub grows on dry, sandy, gravelly soils in full sun or part shade; attractive male and female catkins in spring; a few specimens may have attractive fall color; edible nut; some good, nut producing hybrids with the European filbert available from nut nurseries for better nut production and nicer plants; best use is for naturalizing on larger properties; intermediate wildlife value.

--Arrowwood viburnum* (*Viburnum dentatum*) is a rugged, adaptable shrub found on wet or dry, sunny or shady sites--even right on exposed coastal banks; salt and drought resistant; has three seasons of interest--spring blooms, fruit, maroon fall color; very high wildlife value; like bayberry, it is important for migrating birds in fall; good in borders or screens; can grow to 8' or more; **'Blue Muffin'** is a compact variety that grows to only 5' in height; *all viburnums need two different clones or seedlings to fruit*.

--American cranberrybush viburnum* (*V. opulus* var. *americanum*) an excellent screen or border plant with four seasons of interest, including very attractive, flat topped white blossoms (like climbing hydrangea), good, red fall color and large red fruits that can persist well into winter; deciduous; attractive, light gray bark; tolerates shade and wet soils; has *some* drought and heat resistance, but is best on moist, amended

soils—irrigate when dry, avoid drought stress; grows 12+' high and 8+' wide**;** '**Wentworth**' has high quality fruit--with a seedling pollinator; '**Compactum**' is smaller, but hard to find; other compact cultivars generally flower poorly—so avoid them.

--Witherod viburnum* (*V. nudum* var. *cassinoides*) an attractive Cape Cod viburnum to 6-10'; three season interest--effective spring flowers, attractive glossy foliage that develops good fall color, a very attractive multi-color fruit display; tolerates shade and wet sites, but also dry soils, salt and wind; high wildlife value.

--Possumhaw viburnum* (*V. nudum*) the counterpart to the witherod viburnum from Connecticut south; **'Winterthur'** is a superior selection to 8' with lustrous foliage, creamy-white flower clusters, wine-red fall color, and an attractive fruit display similar to the witherod--with three colors together in the same fruit cluster; must plant a pollinator: **'Brandywine'** is a compact, self-fertile cultivar with a superior fruit display.

--Doublefile viburnum (*V. plicatum tomentosum*) small tree or large shrub from Asia with nice horizontal branching that displays a strikingly beautiful floral display held above the branches in spring (could be a flowering dogwood substitute in the ornamental landscape); shade tolerant; said to be drought intolerant, preferring acid, rich, moist soils--yet, has done well in dry Cape Cod conditions; texturally interesting and relatively pest-free foliage turns a dull red in fall; fruits provide landscape interest, especially in the red phase before they turn blue-black and are quickly eaten by birds; for fruits plant two or more cultivars (clones); **'Mariesii'** grows about 10-12' wide and 12-15' high with large showy flowers and heavy fruiting; **'Shasta'** is a superb, 6-10' high shrub that can spread its horizontal branches as much as 14' wide; **'Summer Snowflake'** ('Watanabei') is narrow and columnar; 5-8' wide and 8-10' high with repeat bloom all season.

--Other non-native viburnums (*plant a related selection or seedling of any viburnum for fruit set*): **'Onondaga' viburnum** (*V. sargentii* 'Onondaga') related and similar to the American cranberrybush viburnum, but may be more drought tolerant; 6-8' high and wide dense globe of maroon tinged foliage that emerges dark maroon in spring; attractive buds and blossoms; **Koreanspice viburnum** (*Viburnum carlesii*) is a 6-8' wide and high, upright, sturdy, slow-growing deciduous shrub--red buds open in early April to pink-changing-to-white, 3" *very fragrant* snowball-like flowers; dense, gray-green, attractive foliage usually turns dull red in fall but may sometimes display attractive shades of wine-red to burgundy; **'Compactum'** is a nice, smaller selection of this viburnum. **Burkwood viburnum** (*Viburnum* × *burkwoodii*) is a hybrid, densely-branched, multi-stemmed shrub that grows 8-10' tall and 5-7' wide; it features wonderfully fragrant white flowers arranged in flat-topped clusters in April; ovate, glossy dark green leaves turn maroon in fall, but remain evergreen in warm southern climates. **'Mohawk' viburnum** (*V. burkwoodii* x *V. carlesii* cross) compact 7' by 8' shrub with abundant dark red flower buds opening to white petals; blossoms have *strong, spicy, clove fragrance*; glossy, dark green, disease resistant leaves turn brilliant orange-red in fall. **Linden viburnum** (*V. dilatatum*--monitor for invasion into woodlands) upright, dense-rounded to sometimes leggy shrub with three seasons of interest--especially the brilliant red, persisting fruit; best in moist to average soils; shade tolerant; **'Erie'** and **'Oneida'** are superior selections; **Wayfaringtree viburnum** (*V. lantana- this species is also escaping into woodlands in the Midwest*) drought tolerant, rounded shrub; **'Mohican'** is more compact (9' by 9') and disease resistant with effective, orange-red fruit display for a month; **'Emerald Triumph'** is more compact with superior, leathery, lustrous dark green foliage and good fruiting display. **Prague viburnum** (*V.* x *pragense*) vigorous, attractive, *evergreen*, oval-upright shrub (8' by 8') with pink buds and cream colored flowers in spring and lustrous dark green foliage--surprisingly drought tolerant and hardy for an evergreen viburnum; blends with broad-leaf evergreens; **'Alleghany' viburnum** is a cross of the 'Prague' and 'Mohican' viburnums; dark green, ornamental, semi-evergreen leaves; grows 10' by 10'to a dense plant; several bloom periods; attractive fruits.

--Dwarf fothergilla* (*Fothergilla gardenia*) native to the coastal plain of the southeast US; a dense, easy-care, multi-season, compact, slow-growing, suckering shrub, 3-6' wide and high with early, white, bottlebrush-shaped, slightly fragrant blooms, dark green to blue green pest resistant foliage and spectacular, late fall color of red, yellow, purple and orange; prefers moist, acid soils in sun or part shade, but tolerates drier soils in shade. The **large fothergilla** (*F. major*) is larger (to 10') but has similar attributes; '**Mt. Airy**' (F. x intermedia 'Mt. Airy') is an improved selection of the hybrid of the two species with even better fall color; about 4-6' high; **'Blue Shadow'** is similar but with very attractive powder blue foliage and great fail color.

--Oakleaf hydrangea* (*Hydrangea quercifolia*) attractive, oak-like leaves, rugged-looking, generally pest free foliage and rich, russet red fall color provide strong landscape interest; large, white, striking summer flower clusters bloom on new wood—thus blooming even after a cold winter spell that kills bigleaf hydrangea buds; exfoliating bark and form interesting in the winter; tolerates half shade; prefers moist to average (amended) soils; tolerates drought but not wet soils; **'Snow Queen'** is an excellent cultivar with flowers that don't flop; **'Pee Wee', 'Munchkin'** and other dwarf cultivars available; other good cultivars.

--Bigleaf hydrangea (*Hydrangea macrophylla*) a Japanese hydrangea that generally does well on the Cape--especially when grown in shade or with drip irrigation; best massed; consider use of lacecap varieties, such as **'Blue Wave'** or **'Blaumeise'**--they blend better in woodland borders; magnificent, generally large heads of blue or pink flower in summer; best in moist, amended, acid, cool soils, but we have seen them function in less than ideal conditions if planted in shade; tolerates salt. New types have longer bloom periods; generally, blooms on one-year old wood—which means vulnerable to winter kill. **Mountain hydrangea** (Hydrangea serrata) cultivars seems to have greater bud hardiness.

--Smooth hydrangea* (*Hydrangea arborescens*) is an eastern US native north to New York; grow 3-5' high and wide with white blooms in showy corymbs; blooms on new wood, so is a reliable bloomer each year; dark green leaves (2-6" long) with pale green undersides; leaves turn yellow in fall; **'Annabelle'** has much larger flowers, is a popular cultivar; **'Hans Halo'** is a new, lacecap-type cultivar; very attractive when massed.

--Spicebush* (*Lindera benzoin*) very early, delicate, yellow blossoms and interesting fruit and foliage; picturesque branching; tolerates shade but flowers better in sun; best in moist, rich woods; tolerates wet sites but not drought and heat; very high wildlife value; host of the Spicebush Swallowtail butterfly.

--Mountain laurel* (*Kalmia latifolia*) a lovely, native evergreen shrub with attractive blooms in late spring; better in garden soil (amended with ample organic matter to 8 inch depth) or rich, forest soils, rather than the poor, dry, disturbed soils found on Cape Cod construction sites; tolerates shade; blooms better in sun; intermediate tolerance of heat and drought; native to Cape Cod but generally not found naturally occurring on the Cape because of our poor, dry soils.

--Catawba rhododendron* (*Rhododendron catawbiense*) native to the southern Appalachians, beautiful, evergreen rhododendron; many cultivars with varying flower color; best in moist, rich, acid soils and part shade, but tolerates dry conditions *when in shade*--best with mulch and occasional irrigation; avoid poor, compacted soils and dry sites in full sun; avoid full winter sun, salty, poorly-drained or windy locations; not good near seashores unless in a very protected site.

--Carolina rhododendron* (*Rhododendron carolinianum*) also native to the southern Appalachians; an attractive evergreen rhododendron; pink flower clusters; thrives in moist, rich, acid soil in shade; best flowering in sun with moist soils; a parent to early-blooming small-leaf rhododendrons, i.e., **'PJM'**.

--Rosebay rhododendron* (*Rhododendron maximum*) native as far north as Mass.; grows larger than most large leaf rhododendrons and is impressive when massed; large, evergreen shrub may grow into a small, understory tree; should be protected from both summer and winter sun and wind; interesting bark and stem display when older; prefers moist, cool, shaded soils; the variety ***Roseum*** has attractive, pink flower clusters, instead of white, and is more vigorous.

--Pinxterbloom azalea* (*Rhododendron nudiflorum* or *R. periclymenoides*) light pink to purplish bloom in spring; picturesque branching; like all the native azaleas below, it is deciduous; this species tolerates wet or dry soils; shade tolerant but best in sunny sites.

--Roseshell azalea* (*Rhododendron roseum* or *R. prinophyllum*) bright, rosy pink or purple, bloom with clove-like scent in May; picturesque ascending branching; moist to dry soils; sun or part shade; **'Marie Hoffman'** has larger, clear pink blooms in late May; 8' by 8' in size.

--Sweet azalea* (*Rhododendron arborescens*) the most attractive of the native white azaleas for the region (found from the Pennsylvania mountains south); blooms white to pink in late spring; fragrant; deciduous with reddish fall color; best in rich, moist soils.

--Pinkshell azalea* (*Rhododendron vaseyi*), clear rose, bell shaped flowers before the leaves in May; can have good red fall color; deciduous; found in the southern Appalachians.

--Swamp azalea* (*Rhododendron viscosum*) last native azalea to bloom (July); fragrant; good fall color; found along wet areas on Cape Cod; best on moist soils, but tolerates some drought; part shade and sun (in moist soils); **'Pink Mist'** is a pink-flowered selection; many late-blooming cultivars with swamp azalea that are fragrant; varying flower colors, such as **'Lemon Drop', 'Pink and Sweet', 'Parade'** and **'Lollipop'**.

Groundcovers for understory, meadow and other plantings:

--Lowbush blueberry* (*Vaccinium angustifolium*) when grown on acid soils (a must), it is widely adapted as a low-growing groundcover to dry and somewhat wet sites in sun or shade; tolerant of seashore conditions; underutilized as a landscape plant; relatively slow to spread; good to outstanding red fall color; produces the famous "Maine blueberries" *in sun*; attractive, fruitful, taller cultivars (2-3' high hybrids with highbush blueberry) include **'Northsky'**, **'Top Hat'** and **'Northcountry'**; all have very high wildlife value.

--Black huckleberry* (*Gaylussacia bacata*) our common, low-growing, deciduous groundcover shrub, forming an important part of our woodland understory--but also found growing in shrubby heathlands and meadows in full sun; related to blueberries, this densely branched shrub spreads to form an excellent, low-maintenance groundcover about 3' high; bell-shaped blooms in spring are visited by many insects and pollinators; blue-purple fruits are eaten by humans and wildlife; excellent fall color; very drought tolerant; very high wildlife value; grows in dry shade and sun; just becoming available in native plant nurseries.

--Pennsylvania sedge* (*Carex pensylvanica*) most native sedges are wetland plants; this 8-12" tall, semi-evergreen, grass-like sedge is native to dry woodland areas and sunny meadows; if planted close it can be mowed as a no-maintenance lawn; tough, drought tolerant and adaptable; provides important wildlife habitat and is a key component of a disappearing meadow habitat on the Cape and Islands known as "sandplain grasslands" along with **Little bluestem** (see below).

--**Sweetfern*** (*Comptonia peregrina*) small, spreading shrub to 3'; graceful, dissected foliage; attractive form; grows on poor, sandy, infertile soils and covers slopes well; sun or light shade.

--**Native grasses** for sun or even part shade--both as ornamental garden grasses or as part of an attractive meadow habitat--include: **Little bluestem*** (*Schizachyrium scoparium*) is an attractive, clumping warm season grass often found in abandoned fields. Grows from about 2-4' high and adapted to poor, dry soils; best in full sun; mixes well with meadow wildflowers; looks good all winter; cultivars available. **Switchgrass*** (*Panicum virgatum*) grows in sun to about 4-6' high--wet or dry soil. It is a clumping, generally upright, warm season grass with attractive, reddish blooms and reddish or bluish foliage; stays attractive through the winter. Many excellent cultivars with red foliage and/or more compact or reliably taller growth habit; good *Miscanthus* substitute (*an invasive plant*). **Big bluestem*** (*Andropogon gerardii*) is a tall (4-6' high), attractive Cape Cod native; it may be grown as an ornamental grass because of its attractive foliage which changes color seasonally, its good architectural height and its interesting flower/seed head; **'Red October'** is a red-leaved cultivar. **Purple love grass*** (*Eragrostis spectabilis*) is tolerant of droughty, sandy and compacted soils; this low-growing grass produces volumes of fine-textured flowers like reddish clouds hovering about 1.5-2' above ground level; the foliage is coarse, so mix it with other grasses in drifts; self-sows readily. **Indian grass*** (*Sorghastrum nutans*) is a tall, blue-leaf native grass that mixes well and is found with the other grasses discussed above in meadow plantings. **Wavy hairgrass*** or **coastal hairgrass** (*Deschampsia flexuosa*) is effective when massed in woodland settings or naturalized areas--an important part of rare sandplain heathland habitats; the late spring-early summer bloom produces a delicate cloud of subtle colors hovering above the foliage about 18-24" high; best in average, amended soil in part shade, but grows in sunny sandplain heathlands (with bearberry and dewberry); high wildlife value; *one of my favorite grasses*. **Bottlebrush grass*** (*Hystrix patula*) is native to moist and rocky woods and is tolerant of dry shade; has coarse foliage with attractive bottlebrush-like blooms to 3" in height; best in informal settings and for naturalizing in woodland and shade gardens.

--Native flowering forbs for dry sunny meadows include **Black-eyed Susan*** (*Rudbeckia hirta* or *R. fulgida*), **Coneflower*** (*Echinacea purpurea*)--tolerates some shade, **Lanceleaf coreopsis*** (*Coreopsis lanceolata*), **Smooth aster*** (Symphyotrichum [*Aster*] *laeve*), **Showy aster*** (*Eurybia spectabilis*), **Butterfly milkweed*** (*Asclepias tuberosa*), **Blazingstar*** (*Liatris scariosa novae-angliae* or *L. spicata*), **Lupine*** (*Lupinus*

perennis), **Yarrow*** (*Achillea millefolium*), **Sweet goldenrod*** (*Solidago odora*)--tolerates some shade, **Rough goldenrod*** (*Solidago rugosa 'Fireworks'*); **Narrowleaf evening primrose*** (*Oenothera fruticosa*), **Columbine*** (*Aquilegia canadensis*)—tolerates shade, **Beardtongue*** (*Penstemon digitalis*)--tolerates some shade, and **Spotted beebalm*** (*Monarda punctata*)

--Other groundcovers for sunny borders and woodland edges include: **Bearberry*** (*Arctostaphylos uva-ursi*) low-growing, fine-textured, attractive evergreen groundcover found on acid, sandy heathlands and pine barrens; tolerates drought, wind and heat; intolerant of shade and wet soils; best on very sandy, weed-free soils; **Creeping juniper*** (*Juniperus horizontalis*); low-growing, spreading needle evergreen tolerates hot, dry, sandy slopes; there are improved cultivars, including some (i.e., '**Wiltonii**' or '**Blue Chip'**) that resist *Phomopsis* twig blight. Other good, disease resistant groundcover junipers from Japan include **Sargent's juniper** (*Juniperus chinensis sargentii*) and **Shore juniper** (*Juniperus conferta*)--especially '**Blue Pacific**'; tolerant of some shade; both of these species tolerate very sandy, poor, infertile, droughty soils in full sun; '**Grey Owl**'* is an attractive cultivar of the Eastern red cedar; grows to 3' high and 6' wide; nice gray-green foliage; fruits heavily.

--Other groundcovers for shade include: **Wild geranium*** (*Geranium maculatum*) native, spreading, attractive, pink-flowered forb to 2' high; **Appalachian barren strawberry*** (Geum fragarioides) bright, golden-yellow, 5-petaled flowers in early to late spring creating a striking accent against evergreen, trifoliate leaves; foliage spreads by rhizomes just below the soil surface; a multi-seasonal, ornamental groundcover native to Massachusetts; **Trailing arbutus*** (*Epigaea repens*) low-growing mat of leathery, evergreen foliage and fragrant, delicate pink flowers in early spring; state flower of Mass; found in dry, Cape Cod woodlands; **Wintergreen*** (*Gaultheria procumbens*) 6" high, spreading, evergreen groundcover with lustrous, bright green foliage and small, delicate, white, bell-shaped flowers in spring; small, bright red fruits have wintergreen flavor; adapted to dry woods; **Canby paxistima***(*Paxistima canbyi*) native to the Appalachians; neat, compact, evergreen; low maintenance, spreading shrub; 12-18": best on well-drained, amended soils; **Sheep laurel*** (*Kalmia angustifolium*) 1-2' evergreen shrub found in Cape woodlands; relative of Mountain laurel and has similar flowers (generally pink or purple in color); tolerates very wet sites; resists drought and useful even in dry woods; **'Candida'** is a white form; **Brambles*** (*Rubus spp.*) include raspberries, blackberries and dewberries; woodland edge plants with very high wildlife value and varying ornamental value; thorny; spreading—can be invasive; **Yellowroot*** (*Xanthorhiza simplicissima*) 3' high spreading, easy care shrub; handsome foliage and fall color; moist, acid soil best; tolerates some dryness; it was used as an understory plant for the Central Park restoration.

ENVIRONMENTAL LANDSCAPE CONSULTANTS

Talbot Ecological Land Care

Certified Consulting Arborists, Horticulturists and Restoration Ecologists
Natural Landscape Design, Conservation Permitting and Restoration
Consultation, Education, Design, Installation and Management

NATIVE GRASSLAND/HEATHLAND/SHRUBLAND DESIGN PLANT LIST		
All plants native to Barnstable County except where noted; best for full sun sites. except as noted		
Botanical Name	**Common Name**	**Size**
Grasses and sedge		
Andropogon gerardii	Big bluestem	2.25" plug-1 gal
Carex pensylvanica	Pennsylvania sedge (sun-shade)	2.25" plug - 1 gal
Danthonia spicata	Poverty oatgrass	2.25" plug - 4" pot
Deschampsia flexuosa	Wavy hairgrass (sun-pt. shade)	2.25" plug
Eragrostis spectabilis	Purple lovegrass	2.25" plug - 1 gal
Panicum virgatum	Switchgrass (and cultivars)	2.25" plug - 1 gal
Schizachyrium scoparium	Little bluestem (and cultivars)	2.25" plug - 1 gal
Sorghastrum nutans	Indian grass (and cultivar)	2.25" plug-1 gal
Sporobolus heterolepis	Prairie dropseed*	3" pot-1 gallon
Native forbs for added diversity and habitat		
Achillea millefolium	Yarrow	2.25" plug - 1gal
Aquilegia canadensis	Native columbine	4" pot - 1 gallon
Asclepias purpurascens	Purple milkweed (T)**	seed - plug
Asclepias tuberosa	Butterfly milkweed**	2.25" plug - 1gal
Asclepias verticillata	Whorled milkweed (T)**	2.25" plug
Athyrium angustum (filix-femina)	Lady fern	1 gallon
Baptisia australis	Wild blue indigo*	1 gallon
Baptisia tinctoria	Yellow indigo	3" pot
Coreopsis lanceolata	Lanceleaf coreopsis	2.25" plug - 1gal
Echinacea purpurea	Coneflower*	2.25" plug - 1gal
Eupatorium hyssopifolium	Hyssop-leaved thoroughwort	2.25" plug
Eurybia (Aster) divaricata	White wood aster	pot - plug
Euthamia (Solidago) tenuifolia	Slender fragrant goldenrod	2.25" plug
Eutrochium (Eupatorium) dubium	Coastal Joe-pye weed	1 gallon
Geranium maculatum (native)	Geranium (cranesbill)-sun-shade	4" pot
Geum (Waldsteinia) fragarioides	Barren strawberry* (tolerates shade)	3" pot
Gnaphalium obtusifolium	Sweet everlasting	seed - plug
Ionactis (Aster) linariifolius	Stiff-leaved aster	2.25" plug
Liatris scariosa var. novae-angliae	New England blazingstar (SC)**	3" pot
Lupinus perennis	Lupine**	seed - plug
Maianthemum racemosum	False Solomon's seal (pt. shade)	seed - plug
Oenothera fruticosa	Narrowleaf evening-primrose	2.25" plug - 1gal
Opuntia humifusa	Prickly pear cactus (E)**	pad - pot
Penstemon digitalis	Foxglove beardtongue	2.25" plug - 1gal
Polygonatum biflorum	Solomon's seal	2.25" plug - 1gal
Pycnanthemum muticum	Mountain mint	pot - plug
Rudbeckia hirta	Black-eyed Susan-biennial	2.25" plug

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Rudbeckia fulgida var. fulgida	Black-eyed Susan-perennial	2.25” plug-1 gal
Solidago nemoralis	Gray goldenrod	2.25" plug
Solidago odora	Fragrant goldenrod	pot - plug
Solidago rugosa	Rough goldenrod	1 gallon
Solidago speciosa	Showy goldenrod	2.25" plug - 4" pot
Symphyotrichum (Aster) ericoides	White heath aster	2.25" plug
Symphyotrichum (Aster) laeve	Smooth aster	2.25" plug - 1gal
Symphyotrichum novae-angliae	New England aster (moist soil)	1 gallon
Tephrosia virginiana	Goat's rue	seed - plug
Viola pedata	Birdsfoot violet	3" pot
Sandplains grassland/heathland shrubs		
Arctostaphylos uva-ursi	Bearberry	4" pot - 1 gal
Ceanothus americanus	New Jersey tea	4" pot - 1 gal
Comptonia peregrina	Sweetfern	4" pot - 1 gal
Gaylussacia baccata	Black huckleberry (sun-shade)	1-3 gallon
Morella (Myrica) pensylvanica	Bayberry (sun- pt. shade)	1 - 3 gal
Prunus maritima	Beach plum	2-5 gallon
Rosa virginiana	Virginia rose	1-3 gallon
Vaccinium angustifolium	Lowbush blueberry (sun-shade)	4" pot - 1 gal
Coastal shrubland plants		
Amelanchier canadensis	Shadblow serviceberry	3-7 gallon
Clethra alnifolia	Summersweet	2-5 gallon
Corylus americana	American hazelnut	2 gallon
Dasiphora (Potentilla) fruticosa	Shrubby cinquefoil*	2-3 gallon
Ilex glabra	Inkberry	2-5 gallon
Quercus ilicifolia	Scrub oak	2 gallon
Vaccinium corymbosum	Highbush blueberry	1-3 gallon
Viburnum dentatum	Arrowwood viburnum	2-5 gallon
Viburnum nudum var. cassinoides	Witherod viburnum	1-3 gallon

* Native to Massachusetts; some native to New England

** On the endangered species or watch lists - Mass. Natural Heritage and Endangered Species Program

PRINCIPLES OF ECOLOGICAL LANDSCAPING: A Primer on Environmentally Sensitive Design, Installation and Care of Our Landscapes

© 2019 by Michael Talbot, Certified Ecological Restoration Practioner #0142- Society of Ecological Restoration, Massachusetts Certified Horticulturist and Landscape Designer, I.S.A. Certified Arborist and Tree Risk Assessment Qualified, Former Director- American Society of Consulting Arborists, Massachusetts Association of Conservation Commissions, Ecological Landscape Alliance

Whether it is called "conservation landscaping", "xeriscaping", "pollinator gardens", "edible landscapes", "organic lawn care", or "integrated pest management", new approaches to designing, installing and caring for our lawns, trees, gardens and landscapes (public and private) are part of a growing movement away from conventional landscape practices. More and more the public appreciates that our human built landscapes should enhance our natural world; and that our conventional landscapes use too much water, energy, pesticides and fertilizers. Our lawns and landscapes are also a source of pollution of both our groundwater and our surface waters. Finally, landscapes often do not serve us, or enhance our lives, as much as they should.

One concept that helps define ecological landscapes is the "*sustainable landscape*". Robert Thayer, Professor of Landscape Architecture at the Univ. of California, Davis, defines this as "those landscapes which tend toward ideal conditions by conserving resources (i.e., soil, energy, water, air quality, wildlife, diversity, etc.), as well as those which actually achieve a long-term regenerative capacity." Sustainability, then, means landscapes that are more self-managing and lower maintenance, more in tune with nature, and more drought, pest and stress resistant. They use fewer inputs, such as fertilizers, water and toxic pesticides that can have serious. unintended impacts.

We call our approach to ecological landscaping "**Naturescaping**." An appreciation of our natural landscape in our region encourages us to want to capture nature's beauty in our greenspaces. Naturescaping works with the natural character of the land and arranges native plants in a way similar to their arrangement in nature. To do this we use our knowledge of natural habitats and plant communities, as well as practices learned from our years of experience.

Key to development and management of an ecological landscape, then, is *knowledge*. With the right information we *can* reduce inputs and adverse impacts, while enjoying attractive landscapes that are more interesting and enjoyable. In other words we can "have our cake and eat it too". This may require the use of knowledgeable professionals, as well as books, the web and other guides to ecological design and plant selection, best lawn and landscape practices, natural fertility and least toxic pest control.

This guide is an outline of important concepts to improve the health, sustainability, environmental sensitivity, and beauty of our landscapes, while reducing adverse impacts on us and our environment. These concepts can help policy makers, homeowners, amateur and professional designers, gardeners, landscapers and caretakers get so much more from their greenspaces.

1. Ecological Design and Plant Selection starts with an understanding of our site, the regional environment, our present and preferred uses and management capabilities, and an appropriate design, restoration or transformation plan based on this information. Key concepts of ecological design include:

- **Assess your landscape and choose appropriate plants and components**: This is a principal concept of ecological design. Assess your site thoroughly, including: *site characteristics* (sun, shade, wind and salt exposure, condition of existing plants), *soils* (texture, structure, depth, drainage, pH), and *microclimates and other site variations* (frost pockets, protected sites, special

ecological features, natural areas). Determine your landscape's present and future use and care (amount and type of maintenance, amount and type of play, use by pets, traffic patterns). Assess landscape areas with different characteristics separately. Then choose plants, turf, paths and other landscape components better suited to those site characteristics. Plants and lawns, when grown where appropriate--a concept known as "right plant, right place"--are more sustainable and require less maintenance because they grow where conditions favor their health and vigor. This includes locating managed turf in areas where lawngrasses are more suited, such as in deep, moist, slightly acid, well-drained loams and not on hot, south-facing slopes or in heavy shade.

- **Design plantings that use nature's "plant communities" as a guide**: Start by using more native plants. Many native plants are attractive and are generally well adapted to local soils, pests and weather conditions. Equally important, design plantings the way nature does using "plant communities": plants all similarly adapted to the same site, soils and management conditions you find. "Succession" in the forest ecosystems of North America is the process where natural areas evolve from a pioneer community of grasses and forbs (after a major disturbance) to a community of pioneer shrubs and trees to forest environments with "layers" of herbaceous plants and grasses, groundcovers, shrubs, understory and sapling trees, and canopy trees. A truly ecological design plans for the succession of a landscape through these stages, creating beauty, habitat for a variety of wildlife, and long-term regeneration and sustainability.
- **Seek more diversity in the landscape**: In nature biodiversity is an essential feature of most thriving ecosystems. In ecological human landscapes diversity may be the most important principle, and we can start by increasing the diversity of plant species. Diversity in a landscape can range from having many varieties and species of turf in your lawn seed mix to replacing as much lawn as possible with diverse plantings, to incorporating more mixed plantings of trees, shrubs, groundcovers, meadows and food-producing plants. A variety of plantings will make our landscapes more interesting and will attract a diversity of wildlife, including birds, butterflies, pollinators, and "beneficial organisms". One serious consequence of human impacts on nature (including overdevelopment, overuse of exotic plants, invasive species, and climate change) is the potentially serious reduction in insect populations—the basis of the "food web". Avoid monocultures, especially with plants that have potentially serious pest problems--what IPM professionals call "key plants" (more below). Create native habitat gardens that attract pollinators.
- **Include a range of "natural habitats" and edge environments into your landscape**: Biodiversity in nature includes not only diversity of species but also the variety of habitats that exist in our region of the world. To enhance diversity include, wherever feasible, a variety of landscape plantings and gardens that create woodland, shrubland, meadow, wetland and other habitats. For example, a planting of mixed native, ornamental grasses and wildflowers (forbs), or even a lawn area left un-mowed and interplanted with native forbs, reflects a meadow/grassland environment that can attract butterflies, native bees and other wildlife—and add color and interest at a time of year when landscapes typically aren't blooming. Add facer plants to a single-species hedge to create a more attractive and multifunctional screen or buffer, while adding habitat and cover for wildlife. Understory plantings and groundcovers beneath shade trees recreate the vertical layers of our forests, which enhances multi-season interest and habitat value, and reduces maintenance. Edges, which are areas where two different habitats meet, are the most productive and diversified environments in nature. In your landscape you can maximize edge environments by weaving different habitats and plantings among each other in interesting ways. If not disrupted by humans, pets or heavy pesticide use, this diversity of habitats and edges will attract a variety of beneficial animals, such as birds, insects, pollinators, reptiles, small mammals, and pest-eating spiders, to our landscapes.

- **Choose plants that need fewer inputs**: This important concept of ecological landscaping uses low maintenance, drought, stress and pest resistant species or cultivars of trees, shrubs, perennials, vegetables, flowers and turfgrasses. Reduce or eliminate high maintenance, irrigated turf. Seed lawns with lower maintenance tall and/or fine fescues resistant to pests. Avoid drought sensitive plants or those with serious pest problems, such as non-native birches and pines, tree dogwoods (unless properly sited), many cherries, roses, and crabapples, and bluegrass or bentgrass lawns.
- **Design your landscape to enhance its natural ability to keep pests in balance**: More and more we understand the value of natural pest control organisms, such as beneficial insects, mites, birds and spiders. While a variety of habitats and edges will entice a diversity of beneficials into your landscape, also include plants and features that provide food, shelter and habitat for important predators and parasites of pest organisms. Flower families that attract beneficials and pollinators include umbellifers (dill, yarrow, carrot family) and the aster family (daisy, goldenrod, coneflower.) Attract beneficial birds with habitat plantings, feeders and nest boxes—and add interest. Water is very important for attracting and supporting most beneficial organisms. Incorporate a water feature into your landscape, even if just a bird bath. Native groundcovers add habitat for beneficials. Most importantly, *conserve* beneficial organisms by reducing or eliminating the use of more toxic, broad-spectrum insecticides and fungicides—and appreciate the value of weeds in lawns.
- **Design for air circulation to reduce diseases**: Avoid crowding ornamental plants or plants too large for the site. Prune and maintain good air circulation through exotic plants and lawns.
- **Entice people into your landscape**: Finally, and very importantly, design your landscape to encourage people there to stroll, observe, pick or even just sit on a bench and enjoy. As you entice people into the landscape they may take a greater personal interest and role in its ecological management--and the more satisfying and pleasurable our landscapes will be! Landscapes should not be sterile and not a source of hassles, but a source of joy and peace.

2. Soil Improvement: This is very important for a sustainable lawn and landscape that has exotic (non-native) or high maintenance plants--on the other hand there are native plants suited to even the poorest and driest soils. A rich, biologically active soil, with a proper pH and mineral balance and good structure and texture, will grow more sustainable, drought and pest tolerant lawns, vegetables, flowers and other high-maintenance plants. Removal of or damage to topsoil by poor construction practices, soil compaction and other soil-depleting practices are often the underlying cause of plant and lawn problems. On the other hand, preserve intact native soils whenever possible. Appropriate plants can then be planted directly in such soils with minimal soil amending. Here are some practices that can enhance our soils:

- **Establish adequate depths of good topsoil, where appropriate:** Turf and many non-native ornamentals prefer four to six inches of loam topsoil; six. Or use alternative "lawn" mixtures with grasses tolerant of poor, dry, sandy soils—without using loam often stripped from old farmlands. Use loam-compost mixes when adding topsoil. Avoid heavy, clay soils over sand and mix added soil with existing soil to avoid poor drainage. Better yet, till in 2 to 4 inches of good compost into the top 6 to 8 inches of existing soils--even a very sandy soil can then grow many plants.
- **Soil examination and testing:** Take soil samples from different areas of your lawn and landscape and assess them. Mix and send samples to a good soil-testing laboratory for detailed soil analysis (i.e., your Cooperative Extension System). Use this information to…
- **Establish the proper soil pH and calcium-magnesium balance**: *This may be the most important, yet often overlooked, step in improving the sustainability of turf and other plantings*. Use your soil test results to determine the pH (acidity) of the soil. Learn the preferred pH ranges of your landscape plants and take steps to bring the soil pH in line with those preferences. Use lime to raise pH (use calcitic lime for turf, not dolomitic lime, where magnesium is high) and

garden sulfur and iron sulfate to lower pH. *Over-liming lawns can be worse than not liming*--always test soils before adding lime. Turf and most flowers, fruits and vegetables prefer a pH of 6.4 to 6.8. Rhododendrons, azaleas, hollies, dogwoods and blueberries want a pH less than 6.0.

- **Enhance the mineral content of your soils**: Again, a complete soil test is your guide. The addition of compost and/or rock minerals, such as rock phosphate and Jersey greensand, are good ways to enhance mineral deficient soils and increase plant health. A balance of eight parts calcium (as measured by "percent base saturation") to one part magnesium is best for turf soils; once pH is optimal switch from lime to horticultural gypsum (calcium sulfate) on lawns, which benefits many plants by adding available calcium and sulfur without raising the soil pH.
- **Improve soil drainage**: This can be very important for plant and lawn sustainability. In areas that do not drain well, you must either improve drainage or grow plants tolerant of poor drainage; this excludes turf and many ornamentals but includes many attractive native plants.
- **Enhance the biological health of your soils**: We have come to understand that a humus rich, biologically active soil (like most native and forest soils) not only grows healthier, more drought tolerant plants, but helps prevent pest problems with less added fertilizer. Follow the steps outlined above and adopt the best management and site preparation practices--and a natural fertility program--to improve the biological balance and organic matter of your soils.

3. Environmentally Sensitive Maintenance and Use of Our Landscapes: Many of the recommendations made under this category are just "best management practices" (BMPs). Proper care of our lawns, plants and soils, which encourages sustained growth and vigor, is the first and most important line of defense against insect and disease pests, against weed competition, against drought and other environmental stresses, and against stressful uses of our landscapes, such as heavy play.

- **Proper mowing is critical to ecological turf management**: Mow cool season turf as high as possible (at least 3 inches; 3.5 inches is better) and leave lawn clippings on the lawn to recycle. Proper mowing practices produce healthier, more attractive lawns at no additional cost to you. Returning lawn clippings improves the color, density, weed and pest resistance of turf and reduces the need for fertilizer. Mowing lawns higher increases drought, stress and pest tolerance, while enhancing root growth and *significantly reducing grub damage and weed infestations without pesticides*--including crabgrass and broadleaf weeds. Mowing high and mowing often encourages a naturally healthy, pest-and-weed-resistant fine lawn over time. Mow irrigated lawns *in summer* and the last mowing of the season at 2.5 inches to maximize irrigation effectiveness and reduce disease. Sharp mower blades also enhance turf and reduce diseases.
- **End excessive use of fertilizers and apply properly to protect ground and surface waters**: Excessive fertilizer use--including most of the 4, 5 and 6 application lawn fertilizer programs--tend to reduce a plant's natural ability to resist pests and stress, while polluting our ponds and estuaries. Fertilize lawns in spring after the first mowing and/or in late summer only. *Never* apply fertilizer before heavy rain, when soils are saturated or frozen, or when turf is not actively growing. *Never* apply fertilizer on roads, driveways or other hard surfaces without cleaning it up. These are all leading causes of nutrient pollution of and algae growth in ponds, streams, bays and estuaries. Trees and shrubs that are stressed or in poor soils may benefit from slow release fertilizers applied in the early fall; healthy, mature plants often need no feeding at all. Half or more of the nitrogen in your fertilizers should be "slow release" or "water insoluble nitrogen", which can be slow-release synthetic nitrogen or, preferably, natural-organic sources of lawn or plant nutrients.
- **Feed the soil and the soil will feed the plants**: This is an important principle of ecological land care and natural-organic fertility. Composts, organic mulches, rock minerals and natural-organic or natural-based fertilizers work to enhance soil mineral balances, biological activity and water-

holding organic matter. When fertilized this way plants tend not to grow too vigorously or overly lush--conditions that make plants more vulnerable to drought and pests. Slow release and natural-based fertilizers feed longer and significantly reduce the amount of fertilizer needed--you can cut fertilizer use on lawns by half or more with organic fertilizers versus cheaper, synthetic fertilizers, while enhancing overall lawn and plant sustainability. Liquid seaweed applications can enhance turf and high-maintenance annuals without potential nutrient pollution.

- **Proper watering, and reducing the need to water, is a critical ecological goal**: *Forty percent (40%) of municipal water now goes to watering lawns!* This is not sustainable or wise. If you establish an organically rich, moisture retentive soil, use appropriate, drought resistant plants with mulch, where appropriate, and mow your drought resistant grasses high, you can greatly reduce or eliminate the need for irrigation in a mature landscape. On the other hand, irrigation is vital to properly and quickly establish new lawns (keep soils moist till established) and plantings (watering deeply as needed during dry periods until established for 2 to 4 years).
- **Reduce or eliminate human stress factors--"People Pressure Diseases"--that may be damaging the landscape**: Often, decline in lawn or plant health is caused by human behavior, such as damaging use or play, compaction, improper use of heavy equipment—including heavy mowers, and poor pruning, pesticide use, mowing, mulching, watering, or fertilizing. Use "best practices" described here.

4. Use Ecological Means of Controlling Pest Imbalances: One of the biggest concerns of people looking to reduce or eliminate pesticide use in the landscape is, "Won't pests damage our landscapes?" Part of this fear is a lack of understanding of how effectively nature keeps most pests in balance.

It is estimated that 90 to 95% of pest control is done by naturally occurring organisms. In an ecological landscape, where pest-prone plants are avoided and natural pest control is enhanced--and not disrupted by improper, toxic pesticide use and other factors--you can approach 100% natural control.

Preventing pest problems is the key: design, establish and maintain your landscape as outlined above. Even then, some serious pest imbalances (pests may be diseases, weeds, insects, mites and vertebrate animals) may still occur. The question is how to manage them in an environmentally friendly way. Here is a brief list of recommendations--contact us for more information or guidance:

- **Adopt Integrated Pest Management (IPM) and Least Toxic techniques**: IPM was developed to reduce pesticide use and its negative impacts; a good IPM program includes the following:

  1. Monitor plants regularly for pests and other problems: monitoring is essential to an environmentally sensitive and safer pest management program. It helps you anticipate pest, drought and other problems, deal with them before serious damage occurs, and allow for the more effective use of "least toxic" treatment techniques and materials. Monitoring also helps determine precisely which pests on which plants or which turf areas require control measures--allowing you to spot treat pests and minimize both pesticide use and their unwanted side effects.

  2. Identify the pest: *this is a critical step!* Do not try to manage an insect or other pest without first being sure what it is. It may actually be beneficial or cause little real damage. If it is a pest, you cannot legally use a pesticide that is not registered for use on that pest. How can you manage a plant problem ecologically if you do not know what it is? Use whatever resources you need (the web, books, local experts, your local garden center), but identify the problem first.

  3. Evaluate the amount of damage and determine if action is needed: tolerance levels vary, as some plants are more valuable, more vulnerable, or become much less useful at certain levels of damage--like vegetables, for example. Lawn weeds are an example of an aesthetic pest: they do not hurt turf directly but are a matter of personal taste. Determine what number of which lawn weeds are truly unacceptable to you; then manage only these problem weeds and only when they become objectionable. Treat pests only when they reach a level or "threshold" that pose the risk

of enough damage to justify action, *and when no natural pest control organisms are present*. For our landscapes we have specific thresholds for only a few pests, so this is often a judgment call. *However, a "no-spray needed" judgment is the right one to make in many situations*.

4. Use a "least-toxic" pest management strategy: Once you have determined that some action is needed to reduce a potentially serious pest imbalance, use least toxic and least environmentally disruptive means of control first. Then evaluate how this has worked. Only if the control has failed to limit the pest to acceptable levels--elimination of pests is not a sustainable or desirable goal--do you then move on to more toxic and/or impactful pest controls.

- **Least toxic pest management tools**: Below is a list of pest control measures or materials--in order from least to most environmentally damaging and/or potentially unsafe to people or pets:

1. Cultural Controls: Includes using pest resistant plant species or varieties, and using the best management practices discussed above. *A healthy, well-sited plant is the first line of defense against pest problems* and is key to preventing lawn, tree and plant problems. For example, use disease resistant cultivars of roses, crabapples, apples, cherries, etc. to avoid pest damage from the start. Mowing high and leaving clippings on dense turf is the most effective means of preventing the germination of many weed species and can reduce potential damage from grubs. The use of "endophytic" grass seed cultivars or mixes is effective at preventing chinch bug damage and reducing disease damage to turf. With these measures, occasional overseeding of damaged turf areas is the only "pest management" needed for organic lawns.

2. Mechanical Controls: Includes hand picking insects, brushing scale insects, pruning diseased or insect-infested plant parts, hand weeding and a hard spray of water to control mites. Mechanical controls can often be effective and efficient but are not used enough.

3. Barriers: Includes sticky tapes, copper shields for slugs, deer fences, weed barrier cloths, Reemay® and other plant and row covers, and even groundcover plantings to crowd out weeds (and reduce mulching)--anything that physically prevents a pest from impacting your plants.

4. Traps: Generally effective and useful only for monitoring for the presence of a pest.

5. Biological Controls: natural enemies of pests include predators, parasites and pathogens. Attract and conserve beneficials in the landscape; some can be purchased and released to help manage certain pests. "Predatory" (entomopathogenic) nematodes can manage clear winged moth borers of lilacs, dogwoods and rhododendrons and lawn grubs (use a *Heterorhabditis* species only for lawns). Low toxic bio-fungicides, such as Serenade®, manage a variety of diseases.

6. Less Toxic Sprays and Dusts: These are "biorational" or low-impact controls, like insecticidal soaps, horticultural oils, diatomaceous earth, Bt, and baking soda and antitranspirants to manage diseases. They are effective at managing many pests, yet spare most beneficial organisms and have little impact on people or the environment. They should be used much more often.

7. Natural/Organic Broad Spectrum Pesticides: Pyrethrum, Neem (azadirachtin) and Spinosads are examples of insecticides derived from plants or other organisms. Sulfur and Copper are effective mineral fungicides. There are a variety of bio-fungicides, such as Serenade® and Actinovate®. These all tend to be less persistent and have a lower impact on "non-target organisms" than most synthetic pesticides--and they are effective against some important landscape and garden pests. There are also a range of organic herbicides best used on young, annual weeds, such as clove oil and citrus oil products. Follow all label instructions carefully.

8. Synthetic Chemical Pesticides: Often the first choice for pest control, these materials should be chosen last--if at all. They are generally more persistent and more damaging to the environment. They can diminish populations of beneficial organisms, leading to more damaging rebounds of the pest later or allowing other pests to become a significant problem. You can manage entire

landscapes without synthetic-chemical pesticides--with careful plant selection. Understand that invasive pests, like winter moth and gypsy moth caterpillars, emerald ash borer and more that are coming to your region, may well require intervention and treatment—even to native plants.

Herbicides are the most commonly used pesticides, and we can do many things, such as hand weeding, spot treatment of weeds, and proper mowing, mulching and fertilizing, to reduce the need for herbicides. In our lawns, where weeds are aesthetic pests, we can alter our image of weeds, what they are, what role they play ecologically--and learn to co-exist more with them.

There are certain pests where use of synthetic pesticides may be the only feasible, effective management option. At these times, choose the least toxic pesticide registered for that pest and spot treat only those plants and those areas with significant pest populations--and where there is no evidence of natural control. For example, sterol inhibitors (DMIs) are very low toxic fungicides--affecting fungi only--and provide both protective and curative qualities against many serious diseases. Use synthetic pyrethroids instead of organophosphates (such as Orthene®) or carbamates (such as Sevin®) when a more potent insecticide is warranted. Avoid or minimize the use of more controversial herbicides, such as paraquat, arsenates, 2-4D, MCPP or dicamba.

Preventative or broad-scale applications of pesticides--applications to the entire lawn or landscape whether you need it or not--are seldom necessary. Such applications are increasingly unpopular with the public and often do much more harm than good to our lawns and landscapes. We can significantly reduce or eliminate the use of more toxic pesticides in our lawns and landscapes and have attractive, worry free environments for our families and pets, our communities, and the wildlife and the environment around us. Contact us for more information.