

MV Veg Literature Notes

Ancient Woodlands

1872 - W Chop – 1st proposed development “lands mostly covered with forest trees”;

1969- SGF sold 32-ac along Indian Hill Road up both sides of Christiantown Road... Land known as “Harry Peakes Wood Lot” “In early days each householder found it essential to have his own wood lot to supply him with winter fuel. Similarly, the Indians required wood lots, and much of the Indian Hill area was so classified. The nearby land now belonging to Amos J. Amaral, for example, was once all Indian wood lots.” VG 12-12-1969

Other

Using soil $\delta^{13}\text{C}$ to detect the historic presence of *schizachyrium scoparium* (little bluestem) grasslands on Martha's vineyard. GG Peterson... - Restoration ecology, 2003 –

Abstract We used differences in soil carbon $\delta^{13}\text{C}$ values between forested sites and grasslands dominated by the C_4 grass *Schizachyrium scoparium* (little bluestem) to detect the presence of former grasslands in the historical landscape of the coastal sand plain of Martha's Vineyard, Massachusetts, U.S.A. Soil $\delta^{13}\text{C}$ was measured at (1) sites with long-term forest or grassland vegetation and (2) sites with known histories where forest vegetation invaded grassland and where forest converted to grassland. The $\delta^{13}\text{C}$ of soil under long-term grassland was -24.1‰ at 0 to 2 cm depth and -23.4‰ at 2 to 10 cm and was enriched by 3.4‰ and 2.8‰ compared with soil under long-term forest. In forests that invaded grasslands dominated by *S. scoparium*, soil $\delta^{13}\text{C}$ decreased as C derived from trees replaced C from *S. scoparium*. This decline occurred faster in surface soils and in the light soil organic matter fraction than in the mineral soil. In forests that converted to grasslands, soil $\delta^{13}\text{C}$ increased and the rate of increase was similar in surface and mineral soil and in the different soil organic matter fractions. Rates of change indicated that soil $\delta^{13}\text{C}$ could be used to detect changes in vegetation involving the presence or absence of *S. scoparium* during the last 150 years. Application of this model to a potential grassland restoration site on Martha's Vineyard where the landscape history was not known indicated that the site was previously unoccupied by *S. scoparium* during this time. The $\delta^{13}\text{C}$ of surface mineral soil can be useful for detecting the presence of historic *S. scoparium* grasslands but only in the period well after European settlement of these coastal sand plain landscapes.

Abstract

Aim The influence of physiographic and historical factors on species richness of native and non-native vascular plants on 22 coastal islands was examined.

Location Islands off the coast of north-eastern USA and south-eastern Canada between 41° and 45° N latitude were studied. Island size ranges from 3 to 26,668 ha. All islands were deglaciated between 15,000 and 11,000 yr BP; all but the four New Brunswick islands were attached to the mainland until rising sea level isolated them between 14,000 and 3800 yr BP.

Methods Island species richness was determined from floras compiled or revised since 1969. Simple and multiple regression and rank correlation analysis were employed to assess the relative influence of independent variables on species richness. Potential predictors included island area, latitude, elevation, distance from the mainland, distance from the nearest larger island, number of soil types, years since isolation, years since deglaciation, and human population density.

Factors influencing vascular plant diversity on 22 islands off the coast of eastern North America
[RT McMaster - Journal of biogeography, 2005 –

Results Native vascular plant species richness for the 22 islands in this study is influenced most strongly by island area, latitude, and distance from the nearest larger island; richness increases with island area, but decreases with latitude and distance from the nearest larger island as hypothesized. That a similar model employing distance from the mainland does not meet the critical value of P confirms the importance of the stepping-stone effect. Habitat diversity as measured by number of soil types is also an important predictor of native plant species richness, but at least half of its influence can be attributed to island area, with which it is correlated. Two historical factors, years since deglaciation and years since isolation, also appear to be highly correlated with native species richness, but their influence cannot be separated from that of latitude for the present sample size. Non-native vascular plant species richness is influenced primarily by island area and present-day human population density, although human population density may be a surrogate for the cumulative effect of several centuries of anthropogenic impacts related to agriculture, hunting, fishing, whaling, tourism, and residential development. Very high densities of ground-nesting pelagic birds may account for the high percentage of non-native species on several small northern islands.

Main conclusions Many of the principles of island biogeography that have been applied to oceanic islands apply equally to the 22 islands in this study. Native vascular plant species richness for these islands is strongly influenced by physiographic factors. Influence of two historical factors, years since deglaciation and years since isolation, cannot be assessed with the present sample size. Non-native vascular plant species richness is influenced by island area as well as by human population density; human population density may be a surrogate for other anthropogenic impacts.

[Interpreting and conserving the openland habitats of coastal New England: insights from landscape history.](#) DR Foster... - Forest Ecology and Management, 2003 –

Abstract

Maintenance and restoration of grasslands, heathlands, and shrublands are high priorities for conservation due to their diversity of uncommon species and assemblages and their ongoing decline resulting from invasion by shrubs and trees. Much of the literature and management concerning openlands emphasizes burning to control woody growth, based on the interpretation that these habitats and their species assemblages were widespread during the pre-European period as a consequence of natural disturbance and Native American land use. By focusing on the coastal region of New England–New York, which harbors excellent examples of these habitats, is characterized by many natural disturbances (e.g. hurricanes, fire, salt spray), and supported relatively dense Native American populations, we assess the paleoecological, archaeological, historical, and modern ecological evidence supporting this perspective.

We conclude that: (1) pre-European uplands, including coastal areas, were predominantly forested and that openland habitats were uncommon because natural and human disturbance was infrequent and local; (2) extensive openland vegetation developed only with widespread European forest clearance and land use; (3) assemblages occupying grasslands, shrublands, and heathlands apparently have no lengthy history and are comprised of species that combined opportunistically over recent centuries; (4) the decline of grasslands, heathlands, and shrublands is a century-old phenomena related to a decline in agricultural land use, especially grazing, mowing, plowing and burning; (5) effectively all conservation areas supporting these openland assemblages experienced intensive historical land use; and (6) the modern distribution, composition, and structure of these habitats are largely determined by European land use.

Recognition that openland assemblages have cultural origins does not diminish the biological, cultural, or aesthetic value of these habitats. However, it does suggest that grasslands, heathlands and shrublands may be best managed using a combination of approaches that replicate the effects of historical land use. Conservationists should recognize that most of these landscapes have cultural origins and are inherently dynamic; that some vegetation structures and communities cannot be maintained continuously on a given site; and that management is most

effective when based on historical and ecological studies leading to clearly defined objectives and rigorous long-term measurement and re-evaluation.

The fate of alien conifers in long-term plantings in the USA

SG Mortenson... - Diversity and distributions, 2006 For more than 100 years, non-native conifers have been introduced into habitats in the USA that already support native conifers. These introductions have yielded few naturalizations and even less evidence of invasions. We investigated the specific fates of nine non-native conifers in an array of introduction sites across the USA (Priest River, Idaho, Wind River, Washington, Cedar Creek, Minnesota, and Nantucket Is. and Martha's Vineyard, Massachusetts) through tree-ring analyses, comparisons of growth with adjacent native conifer populations, and surveys for regeneration and spread. Most of the original non-native tree plantings have died (e.g. *Abies veitchii*, *Pinus densiflora*, and *Pinus halepensis* at Wind River, WA); a few have survived but display low vigour and are not regenerating (e.g. *Larix decidua*, *Pinus mugo*, and *Picea abies* stands at Priest River, ID). *Pinus sylvestris* recruitment is apparent at all sites examined. *Pinus thunbergii* appears to be invasive on Nantucket Is., although the native *Bursaphelenchus xylophilus* (pinewood nematode) causes high mortality in mature trees. Non-native *Pinus* spp. at the Eddy Arboretum, California and Pack Forest, Washington also experienced high mortality. Dendroclimatic analyses revealed no difference in the effect of climate on the annual growth of native and non-native conifers. Plantations of introduced conifers in the south-eastern USA have died *en masse* (e.g. Harrison Experimental Forest, Mississippi, Olustee Arboretum, Florida). Such widespread extirpations are in sharp contrast to the fate of native conifers in adjacent stands as well as the multiple cases of large-scale conifer invasions in the Southern Hemisphere. Given the diversity of alien plant species that have invaded the USA, the circumstances surrounding the lack of persistence of introduced conifers becomes an important line of inquiry for understanding the factors and circumstances that facilitate or thwart biological invasions.

James S. Grinnell. 1883. Annual Report of the Secretary of the Board of Agriculture. *Martha's Vineyard Agricultural Society*.

There is a great amount of good wood, largely of oak, on the northern and western parts of the island, and in the lower, moister and less exposed localities I noticed many grand oaks that would girt quite six feet.

On the south-eastern part of the Vineyard some hundreds of acres have been sown with the seed of the common pitch pine, and carry trees thirty and forty feet high, showing well what might be done with enterprise and patience. These have not suffered from a fungoid growth, destroying the foliage and trees, as have the pines on the neighboring island of Nantucket. Whether they were the same variety no one could inform me.

Remains of submarine forests have been found at Vine yard Haven and in other places, showing that the island was once heavily wooded, as also Gosnold, the first discoverer, so states.

Griffiths and Orians 2003

Salt spray possible role in heathland development and location. Examined *Solidago nemoralis*, *Myrica pensylvanica*, *Pinus rigida* and *Quercus* spp distribution and response in greenhouse.

Solidago in narrow strip 100-175m from dune crest. Myrica grows within 25 m of crest – not limited. Q ilicifolia 175 m away and pine/oak more than 200m. They interpret zonation as causal.

Common heathland forbs grew closer to ocean than successional woody spp. And spp differed in water status, necrosis and growth response. Solidago peaked closest to water; Myrica also but further away. Scrub oak next then oak and pine. (Zonation not causation).

Quercus consistently lowest xylem pressure. Quercus rubra also had severe necrosis., but Solidago and pine also did.

Pine and oaks more susceptible to salt spray than Myrica. Myrica showed no necrosis in greenhouse but does in field presumably because of other stress and breaks in leaf tissue etc.

Salt spray accumulation on plants – correlated with lowered predawn xylem pressure potential, increased necrosis and short size. Spray may also limit growth of pine (invasive tree species).

Salt spray may exclude or slow succession of woody spp.

They do acknowledge land use a possible structuring factor but probably not important at fine scale examined here.

Chase and Rothley 2007 – Suitable sites for sandplain grasslands/heathlands

Habitats on MV for unusual, rare and endangered spp. Used existing land cover patterns to train hierarchical tree classifier to model 10 biogeoclimatic and positional variables to predict suitable sites for establishment.

Many potential grassland sites are current ag lands, residential development,. Mowed grasslands, commercial development. Could increase area by 67%, buffer areas, join areas.

Many heathland possibilities have ag, residential and later successional forest like maritime forests and pitch pine.. Could increase heathland area by 25% and increase patch size.

Could use historic records to identify sites or models like this one.

Ecosystems occur primarily on exposed sites and near Native American settlements prior to Euro-American land clearing.. Increased dramatically due to ag disturbance through historical period.. Have decreased due to development, abandonment of traditional ag and fire suppression.

MV Grasslands – on excessively well-drained soils in fire-prone areas; dominated by Schizachyrium, Deschampsia and Danthonia. Heathlands – near ocean with influence of offshore winds and salt spray – Arctostaphylos, Hudsonia, Vaccinium, Gaylussaccia, Myrica.

Used bioclimatic factors and included x-y position to account for spatial distribution (near water) to account for land use. Soil wetness (from elevation), Soil perm and organic matter from soil map (?), salt spray-distance from water including salt ponds, fire frequency – based on amt of non-combustible land adjacent (water); frost map – based on expert knowledge and topo and Soak distribution.

Factor importance – discarded soil wetness and aspect; x position (24%), y position (20%), elevation (8%), frost frequency (6%), soil percent organic (4%), fire, soil perm, spray.

Most sites good for G and H were ag or residential. For H many also maritime forest. These should be both the best sites and the ones easiest to maintain.

If LU and disturbance are the main factors (Foster and Motzkin) then expect model will work poorer. But know that graminoids were common on S shore prior to European arrival – so places where G and H occur are either where they have been for a long time and or are easiest to manage. Thus should be expanded there. Not necessarily causal. Locational factors important but correlated with bioclimatic.

Mortenson and Mack 2006 -- Alien conifers

Little evidence of invasion, few naturalizations. Most did not persist. Priest R ID, Wind R WA, Cedar Creek MN, ACK, MV.

Picea abies is regenerating at MFCSF – up to 46 m from side of plot. *Ps* trees significantly larger than *Picea glauca* despite younger. *P sylvestris* recruiting at all sites – at MV many dead branches and many with heavy infestation of *Diplodia pinea*. *Ps* recruits under highest light. Same growth as *P rigida*. . South Beach – one *Pinus Thubergii* population.

30% of growth variation in *Pinus* at MFCSF explained by climate – PDSI – but no other spp. PAR under *P sylvestris* high at MFCSF

P thunbergii invasive at ACK but native nematode causing mortality – *Bursaphelenchus xylophilus*. *Pt* growing around periphery of ACK, spreading in maritime shrublands. Also form ornamentals in yards. Adults heavily parasitized. Few native colonize under the adults – *Carex* and *Rhus radicans*. *Pt* unrestricted by light in regen. Can threaten natives by competitive exclusion and high litter production.

Conifers – low seed mass, young age of reproduction, and large seed crops frequently.

Time lag is spread in S Hemisphere conifer invasions. Same at ACK – *Pt* planted in 1890s, three generations by 1930.

In general seems unlikely that conifers will become invasive with rare exceptions. Many native pests and parasites though not major cause of failure. Probably not mycorrhizae limited as native conifers have them. Possible founder effect – do well where most abundantly planted.

Not fully understood – as many species, sites, climates etc.

McMaster 2005 Vascular plant diversity islands off East Coast

Island area, latitude and distance for nearest larger island; not distance from mainland – stepping stone hypothesis; yrs since deglaciation and yrs since isolation also important but not able to differentiate from latitude. Nonnatives influenced by size mostly and current human population, which may be a surrogate for history of settlement.

ME islands – bedrock and some high elevations so peaks were left as islands when postglacial submergence – have risen since; then lowstand of 60M at 11,400 BP and so many reconnected.

Assumes that all islands lost spp once islands – loss of area; decline in habitat diversity; and reductions in immigration. Expect that further frag and alteration/destruction of habitat left to other losses.

Dunwiddie – most coastal heathlands on ACK not present before Euroeapn settlement. Many spp associated with heathlands not found elsewhere on the island. PPine present in early Holocene, may have been absent by 19th C. Intentionally reintroduced.

Bird nesting important for non-natives on ME small islands.

3000 BP – Naushon, Penikese, Cuttyhunk connected to mainland by narrow peninsula.

Need to track coastal history and use that to infer.

May get high levels of immigration/extinction today that mask historuical patterns – Penikese turnover of 53-61% over three surveys (!). May not be typical.

High mortality of many invasives at many sites.. No difference in climate response from natives.

Neill et al. 2007. Historical influences on MV veg and soils.

Only 5 plots per type.

Compared dominant 7 veg types on outwash – pine plantations on tilled and untilled; scrub oak, tree oak, burned tree oak and sandplain grasslands. Broad overlap in spp composition. Few non natives. Whereas ag grasslands had high richness and many invasives – Plantago, Holcus, Daucus, . Woodlands, shrub and grasslands had similar soils but ag grasslands had higher pH, Ca and Mg and N nitrification.

So, no major barriers to conversion among these. But nonnative spp and soils may provide barrier to expand sandplain grasslands or shrublands on these. Could remove plantations to create good sandplain communities with no impact on nonnatives. Nontilled plantations best candidates for this. Need to balance sandplain grassland with rare Leps need for oak woodland and shrubland.

Disturbance dependent and early successional habitats are declining – regional conservation concern.. Sandplain grasslands etc. regional priority. Expanded during land clearance. Can persist through management or restoration and expansion of these habitats. From existing woodlands or ag grasslands. Not clear what impact soil fertility plays.

Sites from High School to EGP and throughout Pohogonot. Coupel of sites on TGP on northeast side.

Ag grasslands – lower richness of natives than sandplain grasslands. Tilled plantations had more but not statistically sig nonnatives.

Broad overlap in composition – e.g., *Myrica penn*, grass, *Carex pen*, cherry, scrub oak, and poison ivy in all seven and trailing arbutus, *Gaultheria*, huckleberry, bracken, white oak, *Quercus prinoides*, black oak, *Vacc angust*, *Vacc corymbosum*, *V pallidum* occurred in 6/7.

Sandplain grasslands most similar in plant communities to previously tilled pine plantations and ag grasslands.

Recent prescribed burning == no major impact on composition.

Sandplain grasslands more spp primarily due to increase grasses and forbs.

Lezberg et al. 2006 – mechanical land clearing for early succ grassland and shrub did not eliminate woodland spp but did add forbs and grasses.

Peterson and Neill 2003 Little Bluestem C-13

Sites with long term grassland was enriched by 2.8 – 3.4 % in C-13 at 0-2 and 2-10cm depth compared to forest. As trees invade it rapidly drops especially in surface soils. Could detect presence of grassland for 150 years in the mineral layer but only 25 years in the organic. SO can detect grassland after 1850 and has high spatial resolution. Only C-4 plants. Cannot detect other grasses or bluestem > 1850.

On MV grassland restoration site showed that site was not previously occupied by grassland in last 150 years.

2 sites dominated by forest (Smith Forest – TNC) , 2 by grassland (Katama), 2 former grass now forest (North Triangle) and 2 forest converted to grass (Kohlberg Meadow and Correlus firebreak) and unknown on Maiden Lane.

With grassland conversion on ly took 2 years to look like a grassland. Grass to forest change much slower.

“The absence of evidence for historical grassland at a site available for grassland and shrubland restoration raises interesting questions about the goal of vegetation manipulations for conservation of rare and declining species. Our results suggest that creating a *S. scoparium* grassland or *S. scoparium*-containing grassland-shrubland on this site may not be a restoration of former vegetation cover but a recreation on this site of vegetation that was formerly more common in other locations.”

A Few Notes on the Vegetation of the Morainal Portion of Martha's Vineyard

RE Zaremba; Chatham, MA- last update—Dec. 6, 2002

Note: These appear to have been taken as part of the effort by TNC to ground-truth the air photo mapping done on the moraine (and the outwash) in 2001-2. The files were located by Liz Loucks on a TNC server and refer to the air survey.

- 1- **Holly**- There are significant forested areas with holly as a subdominant along the northwest section of the island. Some of these hollies are very large, maybe 25-30 feet tall and are probably very old. Throughout these areas there is holly recruitment. I did not see holly growing in barrier beach sand, nor in extremely exposed areas. At no locations was holly a dominant. I have not seen this type of presence of holly in rich forest along the Northeast Coast. I have seen holly on LI on Fire Island where it is growing in barrier beach sand in a large swale and where it is a dominant. I believe that at Sandy Neck in Barnstable holly is also locally dominant as well. There are small areas on LI and on the Outer Cape where holly occurs as an occasional in the forest. There may be similar situation on the western part of Cape Cod, but I haven't seen them. Interesting that something we take for granted is uncommon.
- 2- **Hickory**- There are many sites in the northwestern part of the island on the moraine where *Carya tomentosa* is a subdominant with beech and oaks as dominants. Some of these hickories are very large, maybe 20" DBH and 60 feet tall. They were particularly easy to see in a mid November visit. In late November they had lost their leaves and were more difficult to see. I would not describe these woods as oak-hickory, although there was a high cover of oaks and hickory was frequent. These woods are more mesic than traditional oak-hickory woods and tended to have high forest cover. Beech was always a co-dominant. This forest does appear on Long Island and I believe has been described by David Hunt. I think it would be worth describing with plots to see if this is unusual in MA and along the Northeast Coast. I do not see as much hickory as he did.
- 3- **Black pine** was seen several times in small groves. It is naturalized only locally near where it appears to have been planted. Several stands mapped as Red cedar woodland or Pitch pine were Black pine. Only in the northern section of Gay Head does Black pine occur frequently as scattered plants. These too may have been planted, but they appear to be naturalized. Black pine does not occur on Martha's Vineyard as an invasive. It is easy to tell at close range. It has darker foliage than Pitch pine and has fascicles of two needles instead of the three you see in Pitch pine.
- 4- It was surprising to see **Scrub oak** at several sites: in the center of the Menemsha Hills and in the southern area near the Woods Preserve. In the Menemsha Hills, there are areas dominated by Scrub oak adjacent to areas where it cooccurs with Black oak which is stunted to the same height as very old Scrub oak. The Scrub oaks in the Menemsha Hills are very old and large, but have the characteristic gnarled look of old scrub oaks. In a few areas they are growing with disturbance vines and shrubs: grape, *Celastrus*, *Rubus*, and *Rhus copallinum*. Some of these are likely the scrub oaks recently cut and brush-whacked at Menemsha Hills in the "restoration" activity.
- 5- **Roads and the topographic layer**. There are many areas where it was very difficult to figure out where the polygon was located because the basemap with roads did not correspond to what I was seeing on the ground. Most of these were easy to understand reflecting that there were new roads as a result of development. In the area around Tea Lane and Tabor Road, there were very confusing road

patterns that did not correspond to an addition of new roads. It appears that either the general configuration of the old road was changed at some point or that the basemap road location was incorrect on the topo layer.

In a few cases, it appears that development has taken place where an old estate along the north shore has been chopped up into a few or many house lots and that the original road, shown on the topo, has been altered in location from the old estate arrangement. A few of these long winding roads were hard to follow on the old map.

- 6- **Seepy banks.** One of the most interesting plant associations that I encountered was along the northwest shore where there are clay deposits. At one location, there is a consistent wet seep where there is some tidal influence, either during very high tides or during periods with heavy salt spray. These areas are very small, but support *Limosella* along small ledges only a few decimeters wide in the clay. In one area there is a stand of cranberry growing on a 45 degree slope. Perched wetlands above and near the shore are pretty common. Some with *Phragmites*.
- 7- **Changes between 1993 and 2002.** Needless to say, there have been many changes on MV in the past nine years. Some of those changes were already underway at the time of the 1993 photos and played out rapidly during the next few years; others happened later. It would be interesting to add to the vegetation map a layer of recent development, if Dukes Co. has a GIS layer showing new development since 1993 including houses and roads. In a few cases large forested areas are now fragmented by networks of roads leading to large houses. There are a few areas with smaller houses along new roads, but for the most part the new houses are large--- some of them huge. There seems to be an interest in maintaining a forest matrix, but there is often forest tree removal or topping to maximize view. In many cases, stunted forests have been converted to shrublands or shrubby heathlands by tree removal. This is particularly true in the Menemsha village area, around the edges of the Menemsha Hills and along the immediate coast in the northwest part of the island and on hilltops in the NW. There are some very nice heathlands just NE of Menemsha village on hilltops where shrubs and trees have been removed.
- 8- A part of the vegetation change from 1993 to 2002 is that many areas typed as **COHe** (oak forest with a huckleberry understory) are now **COMS** (oak forest with a mixed shrub understory). Seems very unlikely that oak-huckleberry would change, especially rapidly or would be invaded. These are likely places where all these species were growing. The huckleberry understory is invaded by oaks (recruitment of the canopy trees), Pitch pines and a range of shrubs including native shrubs--- *Viburnum*, *Ilex verticillata* in damp areas, and weedy shrubs, including Russian olive and bittersweet. One of the clear impacts of fragmentation is that the oak-heath forest is converted to oak-mixed shrub and may further be converted to a more mixed forest in time with more strata. Fragmentation does not seem to facilitate rapid invasion in Oak-huckleberry unless the actual vegetation is busted up. Otherwise the margins of these areas are robust.
- 9- **Forest understory clearing.** There is a clear trend on the Vineyard to opening the understory of the forest, reducing diversity in some cases over large areas. It is unclear if this has lasting impact, but some of the areas are very large and appear to be creating parklike forests. In a few cases this is occurring on conservation land. By fire...and some cutting for "savannas". The lower limbs of a large *Nyssa* stand appear to be all removed and cleaned up on the Menemsha Hills property. In a similar move, a salt marsh or salt shrub thicket at Farm Pond is mowed, probably to

- maintain a view from the road. There may be weeds in the meadow, but most of it appears to be a brackish shrub thicket.
- 10- **Nyssa** is an unusual subdominant in many areas. It occurs in wetlands and along the edges of ponds and salt marshes and as a frequent subdominant in rich woods with oaks and beech. In these rich woods it often cooccur with Sassafras. In the wind-pruned woods on Gay Head it can be a codominant with Black oak and may be very stunted. It also occurs on the windswept (MFU) bluffs on the NW part of the island and can be clonal and very stunted. Some of these bluff communities may have originally formed in more protected areas that became more exposed as the cliff eroded back.
 - 11- There is a broad range of community types that are represented on the 2002 vegetation map as **CSH**, Coastal shrub thicket. These shrublands can be dominated by a range of species (e.g. *Viburnum*, *Ilex verticillata*, *Myrica*, *Rosa* spp, and *Prunus maritima*), can be somewhat wet or dry, and can be somewhat weedy. They are difficult to tell apart on air photos and deserve further description.
 - 12- There is a large amount of deciduous forest on the moraine with **beech**. Some of these forests have beech as a subdominant, some as a dominant, and some small areas are nearly monocultures of beech. Most of these areas are identified on the map as MDF, mixed deciduous forest. These forests overall are interesting on the Vineyard and, in terms of size and age, are unlike other coastal hardwood forests I have seen on LI or on the Outer Cape. There are similar beech forests at a few locations on LI, but these are generally small. There may be similar forests on the western part of Cape Cod or in Bristol or Plymouth Counties. Because this phase of this project took place in late October and November, I did not see any of the forb component of these forest. That too may be interesting. More description of this forest type on the Vineyard is warranted. There may be more than one forest type within the areas designated at MDF.
 - 13- I was very impressed with **the size of many of the trees** in the morainal deciduous forests. Some of the oldest forests appear to be on old estates in the northwest part of the island. It is unclear if these forests are very old or if soil conditions favor rapid growth. Some trees are up to 60 feet tall and 20-22 " DBH (estimated only). There are no comparable forests on Nantucket and none I know on the Outer Cape. Some LI forests may be as old, but trees are not as tall. These forests deserve more attention in terms of evaluation of extent, degree of protection, and inherent conservation value (e.g. associated insects).
 - 14- Extensive areas along the coast are **wind pruned**, resulting in modified forest types and heathlands maintained by tree and shrub reduction due to stress. If there has not been a study of these community types on the Vineyard, some effort should be made to identify these regionally significant communities. I have not seen similar communities on either LI or the Cape. Again there may be similar forest and shrubland communities on western Cape Cod, but I have not seen them. On Gay Head, the wind pruning extends far inland. Wind pruning along the higher elevation parts of the NW coast is impressive and also extends far back from the coast. The local impact of clay exposures further complicates the forests in this area.
 - 15- I did not see **deer browse** as a problem in any of the forests I visited. There appeared to be recruitment of canopy species in most communities with the exception of those with a dense huckleberry understory. At dusk there were numerous deer evident in grassy clearings, but browse appears to be less severe than in other parts of the NE.

- 16- To me there was a **surprising abundance of Viburnum recognitum** in many of these deciduous forests. There was a clear separation of forests with huckleberry and forests with Viburnum. I tend to think the Viburnum understory forests were more mesic and had more available nutrients. Most of these were mapped as MDF.
- 17- Overall the Island **did not look very weedy** to me. There was an abundance of Celastrus along roads and field edges and a fair amount of Eleagnus along some edges, but overall the Island seems to be without many weeds in the interior of natural areas--- even small natural areas. Locally I saw honeysuckle, Rosa multiflora, Rosa rugosa, Black pine, and locust. There were also some areas covered with some of the native species that can be weedy: grape, Rubus spp and Rhus copallinum. I did not spend very much time in fresh or saltwater marshes, so have little feeling for Phragmites or loosestrife, although I sense both are less abundant than in some other coastal areas. I also did not see any of the species that would not be very evident in late fall (e.g. Alliaria or Microstegium). Overall, the Island does not look weedy. Certainly nothing like LI or even the Outer Cape. Recent landscaping, however, does appear to include a broad range of invasives.

Peculiar things we do in the MV Woods

- Clear understory for ticks
- Plant non-natives – Rhododendrons, conifers etc – state forest, wind breaks, diversity, screening, to stop use of trails
- Savannas
- Fire
- grazing