

new edition

RARE AND ENDANGERED VASCULAR PLANT SPECIES IN MASSACHUSETTS



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**Jonathan Coddington
&
Katharine G. Field**

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RARE OR DECLINING VASCULAR PLANTS OF MASSACHUSETTS

JONATHAN CODDINGTON

AND

KATHARINE G. FIELD

Committee for Rare and Endangered Species
of the **New** England Botanical Club

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Cover: Amelanchier nantucketensis Bicknell, by Emily Hoffman

Rare or Declining Vascular
Plants of Massachusetts

by
Jonathan Coddington
and
Katharine G. Field

INTRODUCTION: The purpose of this list is to catalogue the status and distribution of indigenous vascular plants believed to be rare, vulnerable, or declining in the Commonwealth of Massachusetts. The topic was first considered by Isgur (1973), and the present list extends his work considerably. The current status of the flora of the Commonwealth is very poorly known, however, and we expect this list to change in future years.

The plant taxa are listed alphabetically by genus and species within the order of families used in Gray's Manual Of Botany, 8th ed. (Fernald, 1950). Nomenclature generally follows Fernald (1950), although considerable effort has been made to include nomenclatural changes since that time. Taxonomic changes have not always been followed, especially if they involved taxa for which there is convincing evidence of endemism. Parts of Massachusetts have concentrations of endemic or relictual forms. Taxonomic research on these taxa which is based solely on examination of herbarium specimens may not be as conclusive as studies from a biosystematic point of view. Until the latter sort of work is done, we prefer to recognize the taxa concerned as named entities. In the list of plants alternative names for the same entity are given in parentheses.

With the common exceptions of Linnaeus (L.), Britton, Sterns and Poggenburg (BSP.), Augustin de Candolle (DC.), and Alphonse de Candolle (A.DC.) the names of authors of species have not been abbreviated. Following the name of each species is a description of its habitat, when possible synthesized from Massachusetts voucher specimens. Next, the Massachusetts counties where the species has been observed are listed, followed by the total number of vouchered towns in the state. County abbreviations are listed on Map 1.

Our criteria for inclusion of a species on the list are given in Table 1. These were adapted from criteria developed by a committee of the New England Botanical Club (Countryman et al., 1972). In the table, the criteria are listed roughly in the order of biological significance. Thus, the most important fact about a rare species is whether its numbers are declining or are likely to decline. Next is the size of its range, the pattern of its occurrence, and other miscellaneous criteria. This hierarchy, plus the total number of criteria listed for each species, allows some estimate of how critical the status of a given species is relative to that of other species.

The COMMENTS column explains or amplifies information presented in the other columns, and gives our knowledge of the current distribution of the species in the state. It is important to note that the COUNTIES column records only historical distribution and abundance in the state, and that this is

not necessarily the same as current distribution or abundance. We presume that many of the species we list have declined since the heyday of botanical collecting in the first quarter of the century.

The list was compiled from information from local botanists, herbarium records, and the literature. Both regional floras (Hoffmann, 1922; Fernald, 1950; Gleason, 1952; McKeever, 1968; Seymour, 1969; Eaton, 1974; Harris, 1975), and primary literature were used. Most species have been checked in all major New England herbaria. The only exceptions are late additions. In all cases distribution records are based at least on the herbarium of the New England Botanical Club, which has the most representative collection of the state's flora. No species was included without at least one Massachusetts voucher specimen.

The most important source of information for the list was local botanists, collectively referred to as "collaborators" in the text, and identified individually in the acknowledgments. Our thanks to these botanists, themselves a rare group, cannot be overemphasized; without exception they were generous with their time and knowledge in helping to make this work as accurate and effective as possible. During the field season of 1978 the Office of Endangered Species, U.S. Fish and Wildlife Service, funded fieldwork for this project. A primary goal was to assess the current status of the ten species proposed as endangered or threatened under the Endangered Species Act of 1973, but considerable fieldwork was also done on other species we consider to be declining in the state.

THE ENDANGERED SPECIES ACT: The 1973 Endangered Species Act has had a long, if somewhat latent, background. Predecessors that may be mentioned are the Fish and Wildlife Coordination Act of 1934, its subsequent expansions in 1946 and 1958, and the emergence in 1966 of legislation specifically addressing the question of endangered species, the Endangered Species Preservation Act. However, the 1966 Act applied only to fish and wildlife. The Endangered Species Conservation Act of 1969 established a list of animals (no plants) threatened with world-wide extinction. Listed species were protected by bans on importation, authorization for habitat acquisition within the United States, and the establishment of sound management practices. By 1973 it became apparent that these existing laws were insufficient, and, on December 23, Congress passed the Endangered Species Act of 1973. For the first time plants were specifically included, but, in contrast to fish and wildlife, there was no provision in the 1973 Act prohibiting the taking of an endangered or threatened plant by an individual citizen. In retrospect the major effect of the Act has been to compel governmental agencies or federally funded projects to consider the effect of their activities on species the Fish and Wildlife Service determined to be threatened or endangered, and to emend the project if the effects might be deleterious. In June, 1976, the Service proposed 1,783 species of plants for official listing under the Act. Of these, eleven are indigenous to Massachusetts. The Service's list of species was based almost completely on the Smithsonian

Institution's Report on Endangered and Threatened Plant Species of the United States (House Document 94-51), presented to Congress in 1975. The Smithsonian list has been revised by Ayensu and DeFilipps (1978). One of the unfortunate byproducts of the 1973 Act has been to create the impression that conservation of endangered species is contrary to human or economic welfare. Actually, the preservation of species is usually a harmonious matter of accommodation, not confrontation, and most of the Fish and Wildlife Service consultations have been both effective and satisfactory to all parties concerned.

In the 1973 Act both "**endangered**" and "**threatened**" species have equal status under the law. The species must be endangered or threatened throughout all or a significant portion of its range. Few of the taxa we list will qualify for the Federal listing. Since Massachusetts currently has no endangered species legislation, the application of these terms to species rare within the state might create misimpressions. If pertinent legislation is ever passed in Massachusetts, we hope that the state will accept this report as a basis for developing a list of critical plant species. Until then, there is no point in anticipating legal interpretations of biological status. Hence we prefer to avoid the terms "**endangered**" and "**threatened**" in favor of the criteria explained in Table 1, which we trust convey information more than attitude.

HERBARIUM DATA: There are several problems inherent in a project of this scope. One is the over- or under-representation of certain groups in collections. Aquatics, grasses, sedges, and taxonomically difficult groups are under-collected; they may be more common in the Commonwealth than records show. Orchids, ferns and other conspicuous taxa are more intensively collected; existing records are probably a fair indication of their historical distribution and abundance. Positive identification of old herbarium specimens is not always possible. Two genera, Crataegus and Rubus, were not considered because of unsettled taxonomic and nomenclatural problems in each group. The most important and obvious problem was the lack of current information about most candidate species.

A more subtle problem is the definition of the "**equilibrium flora**" of Massachusetts. Nineteen seventy-eight is only a single year; it is not even representative of the period in which the flora of Massachusetts is best known. Although one has no choice but to use all herbarium records for a species as an indication of its abundance in an undisturbed ecosystem, the majority of herbarium specimens of Massachusetts plants were collected between 1900 and 1930. In the early part of this century the New England flora was not only the focus of many professional botanists in the region, but also of a large and **extremely** competent group of amateurs. Today, professional botanists are often obliged to work in far away places, and botany as a serious amateur hobby is nearly extinct. Consequently the baseline data for this project is skewed in favor of one period of intensive collecting 75 years ago. As discussed below, the flora of the state at that time was rather different from that of today.

PRESERVATION OF CRITICAL HABITATS: Our philosophy of plant conservation emphasizes preservation of diversity through preservation of habitat. Preservation of habitat means not only preserving the physical space a species occupies, but also the natural community-regulation processes that maintain the habitat. For example, it is pointless to prevent fire in an ecosystem if it is a fire-maintained ecosystem. For some plant communities in New England, fire is a consistently important ecological factor (Little, 1974). If rare species are adapted to fire, the elimination of fire simply makes them rarer. It seems likely that an important reason for the recent decline of the rare members of the coastal plain flora in southeastern Massachusetts is the reduction of natural fires by humans. Man has changed the environment to which these species are adapted. This situation is not unlike the hard lesson conservationists have learned about the necessary role predators play in maintaining the vigor and abundance of prey. Present day management practices throughout the state emphasize fire control without consideration of its effects on habitat diversity. If the native flora is to be preserved, this policy may require modification in some parts of the state.

European colonization also affected the natural water table. The kettlehole ponds of southeastern Massachusetts, to use the same example, depend for their existence on seasonal run off because there are no inlets or outlets. Water depth depends upon the height of the water table, and such ponds apparently exhibit a natural cycle of flooding in the spring and a gradual lowering of water level throughout the summer to a rather shallow depth in the fall (Sinnott, 1912). The natural fluctuation of the water level results in the restriction of the dry-ground plants to areas above the extreme high water mark, while low water levels expose an expanse of sandy, peaty beach, an open habitat to which many rare plants on this list are adapted. Because industrial or residential development can affect the height of the water table, humans again are unconsciously modifying natural community-regulation processes, perhaps to the detriment of this particular plant community. Certainly the number of ponds in Plymouth and Barnstable counties displaying this sandy beach habitat has decreased since the early part of the 20th century. The cause of the trend has not been studied, but we note here the potential role that either fire control or water table alteration might have played in reducing naturally open habitat in the area. Of course, other abiotic factors, such as hurricanes, geological weathering, floods, droughts, and ice storms are not under human control and still tend to preserve open habitat.

Natural biotic factors are also important in preserving open habitats. Disease or pest epidemics can change the character of an entire phytogeographic region. There is evidence of a hemlock blight 4,800 years ago (Davis, 1977). More recently, *Nectria* fungus on beech, Dutch elm disease, and the elimination of American chestnut as a canopy species have altered the composition of what were previously thought to be stable "climax" communities. Additional important biotic factors include dominant, largely

herbivorous species, such as beaver, moose, and Amerindians. All of these were important parts of the New England ecosystem during the post-glacial era. Beaver and moose create and maintain open habitats. Indians created large clearings, although it is likely that their activities were confined to coasts and waterways (Day, 1953). Certainly reduction of beavers, moose, and Amerindians has had a profound effect on the natural habitat diversity in the state.

Consequently, it seems likely that the pre-colonial forest had some extensive open patches. All of the above factors operated to prevent numerous areas from ever attaining the "climax" status hypothesized by ecologists of the 1930's. Succession and the "climax" community are only one part of a natural cycle (Drury and Nisbet, 1973). Present-day ecologists and palynologists are only beginning to be able to analyze which side of the cycle was more prevalent for a given region. Indeed, the entire concept of succession and the climax community is pernicious in conservation work. It focuses attention on stasis (which may be naturally rare) rather than on change, an equally important but neglected trend. It has also made some workers believe doggedly in an association that may be edaphically inappropriate to the site under consideration (Davis, 1976). Moreover, many conservationists are conditioned to view only old-growth forest and the associated community as worth saving. Native species adapted to frequently disturbed but nevertheless natural habitats are viewed as weeds and therefore somehow less worthy than associates of mature forest. Many of the rare species we list are not characteristic of old-growth forests, but of windthrows, sand bars, dunes, landslides, stream sides, cliffs, tidal flats, flood plains, blowdowns, or other naturally occurring "early seral stage" habitats. Conservationists must recognize the native status of these species and work to preserve their habitats in a natural state as well.

Since pre-colonial times, humans have cut the forests of Massachusetts twice. By the mid-nineteenth century 85% of Massachusetts was cleared (Raup and Carlson, 1941). After a period of farm abandonment in the post-Civil War era, forests dominated by white pine developed over much of central Massachusetts and, to a lesser extent, in the Berkshires and on the Coastal Plain. This forest was again cut in the late nineteenth and early twentieth centuries. Despite a resurgence of rural development in the post-World War II era and the imposition of management and selective cutting regimes in some areas, most of the forests have been restoring themselves more or less unmolested since that time. It has been estimated that more of Massachusetts is forested now than has been for the past 175 years. Moreover, current interpretations suggest that the species composition of the present forests and the pre-colonial forests are roughly the same (Raup and Carlson, 1941; Westveld, et al., 1956; Goodlett, 1960). This view has been substantiated by comparison of modern and post-settlement pollen records in Massachusetts (Ogden, 1961), and by a parallel study in Michigan (Webb, 1973), a not dissimilar region. Of course, present forests are very different in the size and spacing of the trees, as well as the height of the canopy. Much of the present forest is

what foresters term "second growth sprout-hardwoods," but some extensive tracts, particularly in the western part of the state, are now over 100 years old. Left to themselves, forests similar to those of pre-colonial times will apparently be regenerated.

Massachusetts still lacks mature old-growth forest and natural open areas. The only solution to the former is patience, but the latter is not necessarily created as a by-product of development. If artificially disturbed habitats were adequate for many of the species listed here which are not typical of old-growth forest, then these species would not be as rare as they are. An effective way to preserve both kinds of rare species is to preserve the ecosystem which originally generated both kinds of habitats. In doing so habitat diversity is assured, the endangered species benefits, and the cost to the human population is minimized.

CAUSES OF RARITY: From the foregoing discussion it is obvious that more than just the flora of old-growth forests is vulnerable to human activities. The causes of rarity are not well understood. Rare species are often said to be "specialized" or poor competitors (Drury, 1974). An alternative approach to the question of rarity, and one which provides practical solutions to conservationists, emphasizes habitat. At least for plants rare in Massachusetts, it is helpful to think in terms of three factors: the distribution of the habitat, the ability of the species to colonize it, and the duration of the habitat relative to the generation time of the species. Common species are good colonizers that occupy common habitats which are long-lived vis à vis the generation time of the plant. Numerically and spatially large populations tend to accumulate in many places. "Weeds" are good colonizers that occupy common habitats which, unless artificially maintained by humans, are evanescent.

Conservationists tend to favor species which occupy rare but long-lived habitats. If the species is a good colonizer, then wherever appropriate habitat is located, the rare species is also found. This seems to be true of a variety of rare species and their habitats, suggesting that their rarity is caused simply by the rarity of suitable habitat. Examples of species which exhibit this pattern of rarity in Massachusetts include Asplenium Ruta-muraria, Cryptogramma Stelleri, Diplazium pycnocarpon, Sagittaria teres, Alnus crispa var. mollis, and Drosera filiformis. In contrast, poor colonizers may not be able to colonize successfully all available habitats. The pattern presented can be enigmatic; a species occurs at some sites, but not at other, apparently suitable, locations. One infers that even though unoccupied, suitable, long-lived habitat exists, the species either has not reached, or perhaps been able to colonize the site successfully. There is evidence that orchids are poor colonizers (although their populations may be widely dispersed) either due to their exacting mycorrhizal requirements when young or their specialized pollinator requirements when mature. Examples are Aplectrum hyemale, Isotria medeoloides, Platanthera ciliaris, and Triphora trianthophora. Other examples of this pattern of rarity in the

Commonwealth may be Orontium aquaticum, Betula pumila, Cimicifuga racemosa, Clematis verticillaris, and Amelanchier sanguinea. Of course in all of these cases there is the supposition that unoccupied suitable habitat exists. While this may seem obvious to the naturalist, the critical habitat for a species may vary from one stage of its life to another, and any of the habitats may actually be rare microhabitats that humans cannot easily perceive. The often very different requirements of the gametophyte and sporophyte generations of a pteridophyte are an example.

Species adapted to evanescent habitats can also be rare. If the duration of the suitable habitat is short, the probability of a propagule reaching the habitat is low. Similarly, once colonized, an evanescent habitat obviously allows only ephemeral populations. Species exhibiting this pattern of rarity are rare, not only in a spatial sense (few populations per unit area), but also in a temporal sense (few populations per unit time). Moreover, the persistence of the habitat relative to the generation time of the species may determine the size of the population. Annuals producing many seeds in one season sometimes build large populations before they are out-competed by other colonizers or before the habitat is destroyed, and thus these species can be locally abundant. Other annuals usually do not occur in large populations, and the populations themselves are ephemeral. Species exhibiting either of these patterns of rarity include Ophioglossum vulgatum, Aristida tuberculosa, Panicum Gattingeri, P. philadelphicum, Polygonum glaucum, Gentiana crinita, Isanthus brachiatus, and Agalinis acuta. Perennials may behave the same way, although generation time and habitat longevity are usually longer. Examples are Equisetum variegatum, Panicum longifolium, P. polyanthes, Linum sulcatum, Asclepias tuberosa, Mertensia maritima, and Onosmodium virginianum. If disturbance to the habitat is sufficiently frequent and of the appropriate intensity, either annuals or perennials may persist for long periods of time. Examples of this pattern are Salix interior, Prunus depressa, Opuntia compressa, and Corema Conradii.

Lygodium palmatum, Cypripedium reginae, Panax quinquefolius, and Rhododendron maximum are examples of plants whose rarity was caused by over-picking. The pattern of rarity of other species is inexplicable, in the sense that no choice can be made between alternative explanations. Examples include Psilocarya scirpoides, Rhynchospora inundata, Arisaema Dracontium, Juncus biflorus, Helianthemum dumosum, Rhexia mariana, Ludwigia polycarpa, and Eupatorium leucolepis var. novae-angliae. Presumably these species are poor colonizers, whether intrinsically or because they compete poorly at the edges of their ranges. In some cases further research could show that the required suitable habitat may not be widespread. These examples could be expanded to include other subsets of rare plants, but without quantitative information on habitat distribution, duration, and colonization ability of the species, explanations for some patterns of rarity remain speculative.

MASSACHUSETTS FLORISTIC PROVINCES: Massachusetts is a part of the New England Physiographic Province (Fenneman, 1938). Because the flora of Massachusetts is in a transition zone between southern and northern elements, and because of the east to west topographic diversity of the **Commonwealth**, the distribution of rare plants effectively divides the Commonwealth into floristic provinces. We suggest six recognizable provinces without attempting to set sharp boundaries between them, or to recognize smaller areas which are unusual on only a local scale. Most of the regions we discuss are considered natural units by Fenneman (1938).

The Berkshire Hills: Included here are the southern extensions of the Taconic range and the Green Mountains. This is a high, cold region, parts of which may still support remnants of presettlement spruce-fir forest (Starr, 1926). Characteristic rare species include Equisetum scirpoides, Lycopodium Selago, Polystichum Braunii, Luzula parviflora var. melanocarpa, Listera cordata, Alnus crispa var. mollis, Ribes lacustre, Pyrola asarifolia, and Solidano macrophylla. Isolated portions of this flora occurred as far east as Worcester County and also on the Holyoke Range in Hampshire County, but the flora is best expressed in northern Berkshire and western Franklin counties.

Housatonic Limestone Valley: This region is the lowland created by the Hoosac and Housatonic Rivers. Much of the bedrock is Ordovician limestone. The valley floor is rich calcareous alluvium, and characteristic limestone knobs crop out from beneath the schist that forms the valley walls. Alkaline bogs, swamps and ponds are frequent. Characteristic rare species include Pellaea atropurpurea, Potamogeton Hillii, a number of Carex species, Chamaelirium luteum, Salix candida, S. serissima, Betula pumila, Quercus Muhlenbergii, Q. macrocarpa, Ilex montana, Claytonia virginica, and Virburnum ~ aiuesquianum.

Connecticut River Valley: A third region is the Connecticut River valley trap rock ridges and alluvial plains, including habitats such as sand bars, islands, and riverbanks actually created by the Connecticut River and its tributaries. Characteristic rare species are Lygodium palmatum, Cryptogramma Stelleri, Arisaema Dracontium, Cypripedium arietinum, C. reginae, Salix interior, Podostemum ceratophyllum, Prunus depressa, Ludwigia polycarpa, Panax quinquefolius, and Aster ptarmicoides. This flora is naturally similar to that of the Housatonic Limestone Valley, although not as frequently calciphilic. Many rare plants of both regions have northern affinities and, especially adjacent to the river itself, may persist in Massachusetts because of continual dispersal southward via the river.

New England Upland and Seaboard Lowland: This region is hard to define geographically, but basically includes the **mesic** rich hardwood forests and the low hills east of the Connecticut River, and their extension eastward to Boston. It comprises most of Worcester and Middlesex counties, and parts of Essex and Norfolk counties. Characteristic rare species include Lygodium palmatum,

Echinodorus tenellus, Cyperus Engelmannii, Scirpus fluviatilis, S. Longii, Platanthera flava var. herbiola, Viola adunca, Rhododendron maximum, Pycnanthemum clinopodioides, Aster infirmus, and Solidago erecta.

White Mountain Extension: The fifth region is a southern outlier of White Mountain and coastal Maine vegetation in northeastern Essex County. It includes Equisetum scirpoides, Calamagrostis Pickeringii, Carex salina, Salix candida, Paronychia argyrocoma var. albimontana, Sagina nodosa ssp. nodosa, and Vaccinium Vitis-Idaea var. minus.

Atlantic Coastal Plain: This is the best defined floristic province in the Commonwealth, perhaps because it is so characteristic of, but disjunct from, the rest of the Coastal Plain southwards. In Massachusetts it includes all of Nantucket, Dukes, Barnstable, and Plymouth counties, and parts of Bristol County. It has outliers on the coast of Essex County and a curious disjunct community on the sand plains of glacial Lake Hitchcock in Hampden County. Many species such as Panicum longifolium, Scirpus Longii, Lachnanthes tinctoria, Sisyrinchium arenicola, Corema Conradii, and Sabatia Kennedyana are disjunct from New Jersey northwards, occurring in southern New England, and again in Nova Scotia. Other rare species typical of this region in Massachusetts include Sagittaria teres, Panicum Wrightianum, Eleocharis melanocarpa, E. tricostata, Fuirena pumila, Psilocarya scirpoides, P. nitens, Rhynchospora inundata, R. Torreyana, Orontium aquaticum, Juncus biflorus, Platanthera cristata, Drosera filiformis, Helianthemum dumosum, Rhexia mariana, Sabatia campanulata, S. stellaris, Stachys hyssopifolia, Utricularia fibrosa, Aster concolor, and Eupatorium leucolepis var. novae-angliae. The outlier of this flora in Hampden County, mentioned above, formerly included Sagittaria teres, Fuirena pumila, Psilocarya scirpoides, Scleris reticularis, Orontium aquaticum, and Utricularia fibrosa.

ENDEMICS AND GEOGRAPHICALLY RESTRICTED TAXA: Nearly all of the taxa occurring in Massachusetts which could be considered New England endemics, or plants with comparably restricted ranges, are plants associated with the Coastal Plain. Most of them have been accorded species rank in the past but have either been submerged entirely or given varietal or subspecies rank in modern revisions. In this list they are sometimes given under the species name (with the **infra-specific** name in parentheses) because we feel that this is the simplest way to call attention to the significant evolutionary divergence of these forms from their closest relatives. Singly, each case may seem like an instance of Massachusetts chauvinism, but taken together they are evidence of an evolutionary event, presumably late Pleistocene in occurrence, which is an important feature of the Massachusetts flora. It is a fascinating problem, much discussed in the older literature (Fernald, 1918, 1925, 1942), and we think that it is by no means adequately explained or documented.

The taxa concerned are Sagittaria teres, Scirpus Longii, Polygonum puritanorum, Amelanchier nantucketensis, Helianthemum dumosum, Sabatia Kennedyana, Agalinis acuta, and Eupatorium leucolepis var. novae-angliae.

The simplest hypothesis is that they evolved on the exposed Continental Shelf during Pleistocene times as a "northern Coastal Plain" assemblage and then were largely exterminated and isolated by the postglacial sea level rise. There is good evidence that an exposed strip of Continental Shelf at least 80 miles wide off the coast of Massachusetts and a wider strip both north and south of the Commonwealth existed during the last glacial period (Edwards and Merrill, 1977). Whether the plants in question could have survived in the prevailing climate is a major problem. Palynologists have generally assumed that a tundra community was ubiquitous along the southern front of the Wisconsin ice sheet, but some authors (Morisset, 1971) cite evidence of an offshore warm current, analogous to the present day Gulf Current, which could have ameliorated the climate along the coast to a considerable extent.

The alternative hypothesis is that the entire Coastal Plain flora of southeastern Massachusetts, including the restricted elements listed above, migrated northward at the end of the Pleistocene. Some of these species would have had to reach Nova Scotia before the rise in sea level drowned the coastal migration corridor. Presumably all southern populations of these restricted species were exterminated by competition or other factors.

Saiaittaria teres, Polygonum puritanorum, Sabatia Kennedyana, and Eupatorium leucolepis var. novae-angliae grow on the sandy margins of ponds (i.e., "freshwater beaches"). They are adapted to an emergent zone in which both strictly terrestrial and strictly aquatic plants cannot survive. The soil is very sandy, poor, acid, and always damp. Amelanchier nantucketensis, Helianthemum dumosum, and Agalinis acuta are plants of dry sandy barrens and moors, a very different habitat, but one no less characteristic of the Coastal Plain. Of course, many other rare coastal plain species, usually at the northern limit of their ranges, are also limited to these habitats in the state.

The existence of restricted coastal plain taxa suggests that the habitats to which they are adapted must have existed for quite a while. It is a puzzle because both moors and open pond margins are disappearing in southeastern Massachusetts as the scrub oak-pitch pine community matures. The existence of endemic taxa is a major reason for suggesting that current management regimes, or unrecognized effects of human overpopulation, in the area tend to eliminate rather than restore the natural post-glacial flora.

Scirpus Longii is another species with a disjunct and restricted range, occurring in Nova Scotia, Maine, Massachusetts, Connecticut and New Jersey (Schuyler, 1963, 1967). It occurs near the coast in freshwater marshes, but not on moors or in kettlehole ponds. Paronychia agyrocoma var. albimontana is an endemic taxon of New Hampshire and Maine. There is one station in Massachusetts, probably the result of dispersal southwards via the Merrimac River drainage system.

Juncus pervetus is a problem. Only one population was ever found, in a saline swamp on Cape Cod. The site can be accurately located, but the natural vegetation has been destroyed by developments. Whether Juncus pervetus referred to a reproductively isolated species or to an ecotype of some other Juncus species perhaps cannot be settled by reference to an herbarium. Since the only known population has been extirpated the question of its genetic distinctness is moot. We list the taxon as extinct to emphasize the problem of conservation in the Commonwealth.

Some other endemic taxa are so poorly known that meaningful discussion is impossible until their relationships have been sorted out. These include Isoetes Eatonii, I. foveolata, I. saccharata var. Amesii, and Bidens hyperborea var. colpophila. These taxa we list without further comment.

SUMMARY: 242 taxa are included in the list (Appendix 1). At least 45 taxa have declined in abundance since the turn of the century. Eighteen taxa are either endemic or highly restricted in range. Two counties, Barnstable and Berkshire, stand out as having unusually numbers of rare plants. The former is the northern limit for many southern species; the latter the southern limit for many northern species. About 120 species are at the edge of their range in Massachusetts. The Commonwealth is truly in a transition zone; if any single feature characterizes its flora, it is the juxtaposition of strikingly different plant communities.

To the best of our ability, the species on this list represent that segment of the indigenous flora of Massachusetts which has always been rare, or has become so because of human activity. We hope that the publication of this list will give conservationists in the Commonwealth the facts necessary to choose appropriate habitats to preserve and to argue effectively for their preservation.

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Table 1. Criteria for inclusion of species on the list.

DCLN	Declining in number in recent years,
VULN	Species especially vulnerable to depletion from collection and/or habitat destruction.
ENMA	Endemic to Massachusetts.
ENNE	Endemic to the political region of the six New England States.
RSTR	Restricted range, Species with a total range about the size of New England or smaller, although not necessarily endemic to New England.
DSJCT	Disjunct distribution in New England. Populations apparently reproductively isolated, or (as a working approximation) separated by at least 50 miles from main range or nearest population.
SNES	Single New England station.
SMAS	Single Massachusetts station.
LC/RE	Both local and rare.
RARE	Usually occurring as single or very few individuals per population.
LCAL	Local. A species which occurs in very few places in the state, although populations may be large where they occur.
FEW	Known from five or fewer vouchered stations in Massachusetts.
SLR, NLR, WLR, ELR	Southern, northern, western, eastern limit of range. A population at the periphery of its distribution.

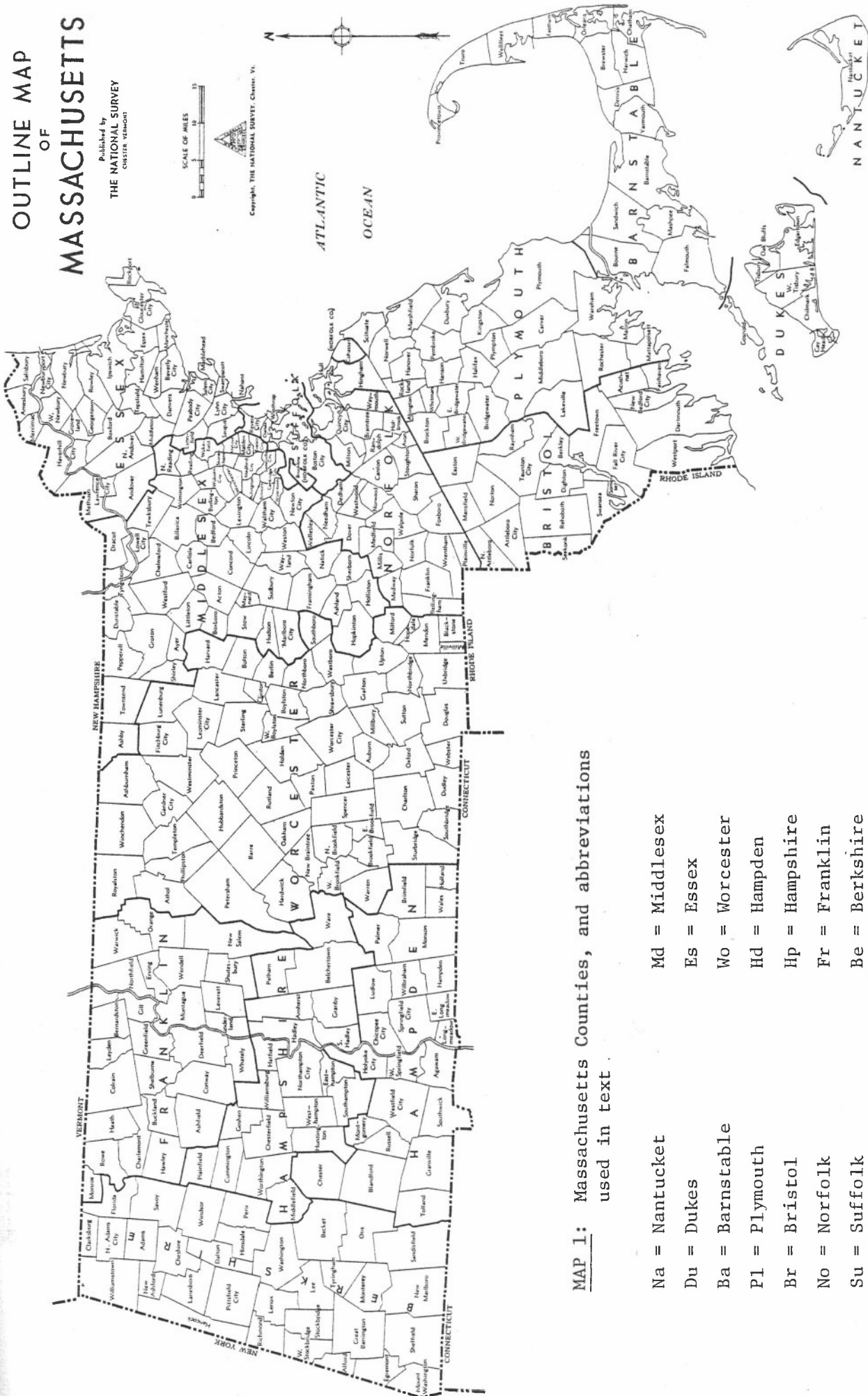
The species

OUTLINE MAP OF MASSACHUSETTS

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MAP 1: Massachusetts Counties, and abbreviations used in text.

- Na = Nantucket
- Du = Dukes
- Ba = Barnstable
- P1 = Plymouth
- Br = Bristol
- No = Norfolk
- Su = Suffolk
- Md = Middlesex
- Es = Essex
- Wo = Worcester
- Hd = Hampden
- Hp = Hampshire
- Fr = Franklin
- Be = Berkshire

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>PTERIDOPHYTA</u>				
<u>Equisetaceae</u>				
<i>Equisetum palustre</i> L.	calcareous river shores	Hp (1)	SMAS	Determination of the single existing specimen is very questionable, but the species occurs in CT, NH, VT, and ME so a MA population is not unlikely.
<i>E. scirpoides</i> Michaux	damp spots or streambanks in rich, often old-growth, forest	Es, Hd, Fr, Be (13)	DCLN LC/RE	Approaching its southern limit. Essex and Hampden Co. populations probably extirpated, and some collaborators suggest it is declining in the state. A few stable extant populations are known from Franklin Co. and the species is much more common in n. New England.
<i>E. variegatum</i> Schleicher	river or stream banks; roadsides	Fr, Be (5)	LCAL	Natural habitat probably open sandy banks of streams, although no populations currently known from other than ruderal habitats. Persists along roadsides in Franklin and Berkshire Co.
<u>Lycopodiaceae</u>				
<i>Lycopodium alopecuroides</i> L.	sandy shores; swales	Na (1)	DCLN SMAS NLR DSJCT	There is also one rather dubious record from Plymouth Co. Last verified extant on Nantucket in 1914.
<i>L. carolinianum</i> L.	usually on the coastal plain, in pine barrens or peaty soil	Hp (1)	SNES NLR DSJCT WLN	Newly discovered in the state. A single vigorous colony, but the site is threatened. Population may be adventive.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
L. Selago L.	mountains	Hp (1)	SMAS DSJCT LCAL WLN	Last verified extant 1931. Hampshire Co. station almost certainly extirpated. Unsubstantiated reports from Franklin and Berkshire Co. Approaching southern limit of the range. Cf. Rhodora 5: 290 (1903).
<u>Selaginellaceae</u>				
Selaginella rupestris (L.) Spring	dry, exposed rocks	P1, Br, No, Md, Es, Wo, Hd, Hp, Fr, Be (42)	DCLN	Collaborators suggest the species is severely declining. Many old stations known to be gone. Probably eliminated in part by natural succession of old fields, and possibly affected by trampling or pollution. Extant populations persist in Middlesex and Franklin Co.
<u>Isoëtaceae</u>				
Isoëtes Eatonii Dodge	ponds	No, Es (2)	DSJCT RSIR	Total range s. NH, MA and NJ. Both historical MA stations may have been extirpated, but the species has been found at a pond in Bristol Co. Also reported by Pfeiffer (1922) from Essex Co. Listed by Ayensu & DeFilipps (1978).
I. foveolata A. A. Eaton var. plenospora A. A. Eaton	pond shores	Br (1)	SLR SMAS ENNE DSJCT	Not listed by Pfeiffer (1922) as occurring in MA, although a specimen collected in Bristol Co. in 1903 by A. A. Eaton exists. Severe taxonomic problem.
I. macrospora Durieu	shores	P1, Md, Hd (4)	FEW SLR RARE	Two additional stations reported in Middlesex and Worcester Co. Last verified extant 1967.
I. saccharata Englemann var. Amesii A. A. Eaton	ponds	Br (1)	RSIR DSJCT SMAS NR	This variety only in s. New England and s. NY. Typical variety only north to DC. Collected several times in 1903.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Ophioglossaceae</u>				
<u>Ophioglossum vulgatum</u> L.	meadows; dry soils; thickets	all counties in the state (65-70)	RARE	An extremely widespread but rare species. Despite its representation in herbaria, few field botanists have seen it. Characteristic of early successional habitats. Extant populations in Berkshire and Hampshire Co.
<u>Schizaeaceae</u>				
<u>Lygodium palmatum</u> (Bernhardi) Swartz	moist, acid soils	Ba, Br, Md, Wo, Hd, Hp, Fr (16)	VULN LCAL	Nearly exterminated in the 19th century. Only about five populations persist in the state, several of which are threatened by development. Sometimes abundant where found.
<u>Polypodiaceae</u>				
<u>Asplenium montanum</u> Willdenow	shady rocks; acid soils	Wo, Be (4)	NLR DSJCT HEW VULN LC/RE	A few plants reported extant in Berkshire Co. No recent information on the Worcester Co. population. Cf. <u>Rhodora</u> 50: 20 (1948).
<u>A. Ruta-muraria</u> L. (= <u>A. cryptolepis</u> Fernald)	limestone ledges	IFr, Be (4)	HEW LC/RE VULN	Seems to prefer sunny exposures, and so possibly eliminated by succession of its habitat. Extant in Franklin and Berkshire Co. Reported to be occasional in the Taconic mountains.
<u>Cryptogramma Stelleri</u> (Gmelin) Prantl	limestone ledges	Fr, Be (6)	LC/RE HEW DCLN	One small population seen in 1978. Colonies that were vigorous around 1910 could not be found in 1978. Definitely declining.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>Diplazium pycnocarpon</i> (Sprengel) Broun (= <i>Athyrium pycnocarpon</i> (Sprengel) Tidestrom)	calcareous rich woods	Es, Hd, Hp, Fr, Be (15)	LCAL VULN	Clones are often vigorous if the habitat is right, although populations are never very large. Currently known from Franklin and Berkshire Co.
<i>Pellaea atropurpurea</i> (L.) Link	dry limestone ledges	Wo, Hd, Fr, Be (6)	WLN LC/RE	Apparently declining in the state. Currently known from Berkshire Co., and reliably reported from Franklin Co. Approaching its northern limit.
<i>Polystichum Braunii</i> (Spenner) Fée	rich damp woods	Be (3)	HEW VULN SLR LC/RE	Last verified extant 1920. Despite searches in-1978, none of the vouchered populations could be relocated, although there is a reliable report of a population in Franklin Co.
<u>SPERMATOPHYTA</u>				
<u>MONOCOTYLEDONEAE</u>				
<u>Sparganiaceae</u>				
<i>Sparganium minimum</i> (Hartman) Fries	pools; brooks; springs	Md, Be (3)	HEW	Seems quite rare but possibly under-collected. One extant station in Middlesex Co. Cf. <i>Rhodora</i> <u>24</u> : 35 (1922).
<u>Zosteraceae</u>				
<i>Potamogeton Friesii</i> Ruprecht	alkaline ponds or streams	Be (1)	SMAS LC/RE	Occurred at Fresh Pond in Cambridge, but population extirpated. Last verified extant 1973.
<i>P. Hillii</i> Morong	ponds	Be (4)	HEW LCAL ELR SLR	Local and sporadic throughout its range. Last verified extant 1976. Cf. <i>Rhodora</i> <u>79</u> : 445 (1977). Listed by Ayensu and DeFilipps (1978).

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>P. lateralis</i> Morong	ponds; rivers	No (1)	SMAS LCAL ELR	The Massachusetts locality was the type station for the species. The population is probably extirpated. Last verified extant 1880. Also occurs in NH.
<i>P. strictifolius</i> Ar. Bennett	alkaline ponds or lakes	Be (3)	HEW LCAL	Last verified extant 1974.
<u>Najadaceae</u>				
<i>Najas guadalupensis</i> (Sprengel) Magnus	ponds	Na, Ba, No, Wo (4)	HEW NR	Known currently from 4 stations in MA Cf. Rhodora 79: 445 (1977). An annual at its northern range limit, and very common southward.
<u>Alismataceae</u>				
<i>Echinodorus tenellus</i> (Martius) Buchenau	pond shores	Md (4)	HEW DCIN LC/RE DSJCT	Most of the known populations are probably extirpated. Last verified extant 1971. Only locality in New England. Cf. Rhodora 10: 42 (1908).
<i>Sagittaria cuneata</i> Sheldon	muddy river shores	Hd, Be (2)	HEW	Approaching its southern limit. Hoffmann (1922) reported it from additional towns in Berkshire Co. Seen in Hampden Co. in 1978.
<i>S. teres</i> S. Watson (= <i>S. graminea</i> var. <i>teres</i> (S. Watson) Bogin)	fresh water beaches	Ba, Pl, Md, Hd (10)	NLR RSIR WLN LCAL	Although its taxonomic rank has varied, <i>S. teres</i> is distinct and separable from <i>S. graminea</i> Michaux with which it is occasionally sympatric. Extant in Barnstable and Plymouth Co. but its habitat is threatened by human activity.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>S. montevidensis</i> Chamisso & Schlecht ssp. <i>spongiosa</i> (Engelmann) Bogin (= <i>Lophotocarpus spongiosus</i> (Engelmann) J. G. Smith)	tidal mud flats	Es (3)	HEW LCAL NR	Includes the type station. Last verified extant 1921.
<u>Gramineae</u>				
<i>Aristida purpurascens</i> Poiret	dry, sandy fields; woods	Na, Du, Ba, P1, Br, No, Md, Es (22)	DCLN	Although formerly abundant and last seen in 1955, this species has not been seen since. Reported to be in serious decline
<i>A. tuberculosa</i> Nuttall	sand dunes; beaches	P1, Su, Md, Es (4)	NLR HEW	An annual. Currently known only from Essex Co.
<i>Calamagrostis Pickeringii</i> Gray var. <i>Pickeringii</i> , and var. <i>debilis</i> (Kearney) Fernald & Wiegand	acid peats and sands; moist meadows	Md, Es (2)	DCLN HEW	The Essex Co. station persisted from 1880-1913. Several recent attempts to find the species were unsuccessful.
<i>Elymus arenarius</i> L. var. <i>villosus</i> Meyer	sea beaches	Ba, Es (2)	SLR DSJCT HEW	Also reported from Dukes Co. Cf. <i>Rhodora</i> 15: 218 (1918).
<i>Milium effusum</i> L.	rich, cold, often calcareous woods	Hp, Be (3)	HEW	Last verified extant 1920; possibly overlooked.
<i>Muhlenbergia capillaris</i> (Lamarck) Trinius	dry ledges; hilltops	P1, Hp (2)	NLR HEW	Probably extirpated; last verified extant 1887.
<i>Panicum auberne</i> Ashe	fresh water beaches	Na, Du, Ba (5)	NLR DSJCT HEW	A coastal plain species at its northern limit. Nearest population on Long Island Ours the only population in New England.
<i>P. Boscii</i> Poiret var. <i>Boscii</i>	rocky woods; thickets	Md (1)	SMAS DSJCT	Collected twice, in 1908 and 1913. Probably adventive.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>P. Commonsianum</i> Ashe var. <i>Commonsianum</i> , and var. <i>Addisonii</i> (Nash) Fernald	dry, sandy clearings; pitch pine woods	Du, Ba (7)	NLR DSJCT	A coastal plain species at its northern limit. Nearest population is in CT.
<i>P. Gattingeri</i> Nash	roadsides; right of ways	Hp, Be (2)	HW DSJCT	A native element of our flora but presently seems to occupy a weedy habitat. An annual. Last verified extant 1973.
<i>P. longifolium</i> Torrey var. <i>longifolium</i>	peaty or grassy bogs; fields	Du, Pl, Br (4)	HW	A characteristic coastal plain plant at its northern limit (but a population in Nova Scotia).
<i>P. philadelphicum</i> Bernhardt	sandy, exposed soils; wood roads	Pl, No, Wc, Be (7)	RARE	A rare but weedy annual usually found in wood roads and cart tracks. Cf. Rhodora 21: 110 (1919).
<i>P. polyanthes</i> Schultes	pond edges; sandy soils in paths	Ba (3)	HW DSJCT NLR	Last verified extant 1970. Characteristic of early successional communities.
<i>P. scoparium</i> Lamarck	damp, sandy soils	Du, Ba (4)	HW DSJCT NR	Last verified extant 1927.
<i>P. Wrightianum</i> Scribner	fresh water beaches	Ba, Pl (6)	NR	A characteristic coastal plain species at its northern limit. Extant in Barnstable Co.
<i>Paspalum laeve</i> Michaux var. <i>circulare</i> (Nash) Fernald	meadows	Du (1)	SMAS DSJCT NR	Appeared briefly on Martha's Vineyard around 1918. Not seen since. Probably adventive.
<i>Puccinellia paupercula</i> (Holm) Fernald & Weatherby var. <i>alaskana</i> (Scribner & Merrill) Fernald & Weatherby	salt marshes; brackish sandy or muddy shores	Na, Du, Ba. (5)	LCAL HW	Approaching its southern limit. Last verified extant 1928.
<i>Setaria geniculata</i> (Lamarck) Beauvois	dry, sandy soils; hillsides; salt marshes	Du, Ba, Pl (11)	NLR LCAL	Last verified extant 1927. May be much more common.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
Spartina cynosuroides (L.) Roth var. cynosuroides and var. polystachya (Michaux) Beal	salt marshes	Ba, P1 (5)	HBW NLR	A coastal plain species at its northern limit.
Sporobolus heterolepis Gray	rocky hills; trap rock	Wo (1)	SMAS DSJCT	Probably extirpated. Collected once in 1879. Rather restricted range on east coast, (Fernald 1950).
Tripsacum dactyloides L.	shores; salt marsh borders	Br (1)	SMAS NLR LCAL	Much more common in CT.
<u>Cyperaceae</u>				
Carex alopecoidea Tuckerman	river-meadows; swales	Wo, Be (3)	HBW	Last verified extant 1944.
C. Baileyi Britton	wet slides; clearings	Be (1)	SMAS	Reported from another town in Berkshire Co. (Hoffman, 1922). Last verified extant 1916. A northern species, found in mountains south to VA and TN.
C. Bushii Mackenzie	meadows	Hp (1)	SMAS NLR	Fernald (1950) gives its range as w. MA, so there may be more stations. One extant population in Hampshire Co.
C. Davisii Schweinitz & Torrey	river thickets; meadows	Be (1)	SMAS ELR	Last verified extant 1919. Reported from another station in Berkshire Co. (Hoffmann, 1922). Type station.
C. flaccosperma Dewey var. glaucodea Tuckerman	woods	No, Md, Hp (3)	NLR HBW	Last verified extant 1913. Typical var. from s.e. U.S. only.
C. formosa Dewey	paths; moist woods or meadows	Be (2)	HBW	Includes type station. Approaching southern limit of its range.
C. Grayi Carey	calcareous soils in swampy woods	Be (2)	HBW	Last verified extant 1920.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
C. Hitchcockiana Dewey	rich woods in limestone areas	Fr, Be (5)	HW	Type locality in Williamstown as reported by Hoffmann (1922). Last verified extant 1921.
C. lenticularis Michaux var. lenticularis and var. Blakei Dewey	pond or river shores	Md, Wq, Be (5)	SLR HW	Var. Blakei from Berkshire Co. Middlesex Co. station probably extirpated.
C. livida (Wahlenberg) Willdenow var. Grayana (Dewey) Fernald	swamps; bogs	Es (2)	HW DSJCT	Typical var. only in n. Canada
C. Michauxiana Boeckeler	swamps; bogs	Wq, Pr, Be (3)	SLR HW	Last verified extant 1972.
C. molesta Mackensie	open ground	Md (1)	SMAS ELR NR	Collected 1934 and 1959. Possibly adventive.
C. oligocarpa Schkuhr	rich woods	Be (2)	HW	Last verified extant 1912. Hoffmann (1922) reported another station in Berkshire Co. Approaching northern limit of range.
C. pauciflora Lightfoot	bogs; sphagnum swamps	Fr, Be (3)	HW	Seems to grow only in high, cold bogs. Extant population in Franklin Co.
C. polymorpha Muhlenberg	dry, sandy soils	No, Be (2)	LCAL DSJCT HW	Very local throughout its range. Last verified extant 1909.
C. salina Wahlenberg var. kattegatensis (Fries) Almquist	shores; brackish and salt marshes	No, Md, Es (6)	SLR DCLN	Once found in Boston area, along Alewife Brook and Mystic River, but not collected here since 1883 and probably now extirpated.
C. Schweinitzii Dewey	swales; calcareous areas	Be (2)	RARE HW	Last verified extant 1901. According to Hoffmann (1922) includes the type station

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>C. sterilis</i> Willdenow	calcareous bogs; marshes	Es, Hp, Be (3)	DSJCT HEW LCAL	Known from Canada, w. MA, w. CT, n. NJ, and PA,
<i>C. striatula</i> Michaux	banks; ledges in rich woods	Md, Wb (3)	NLR HEW	Specimens all recent (1932-1952). May be adventive in the state.
<i>C. tetanica</i> Schkuhr var. <i>tetanica</i> , and var. <i>Woodii</i> Dewey	peat bogs; meadows	Md, Be (2)	NLR HEW	Last verified extant 1919.
<i>C. trichocarpa</i> Muhlenberg	calcareous swales near streams or rivers	Md, Be (4)	HEW	Last verified extant 1920.
<i>C. typhina</i> Michaux	calcareous meadows; river swales	Hp, Be (4)	HEW	Last verified extant 1927. Also reported from Essex Co. (Harris, 1975).
<i>C. Walteriana</i> Bailey var. <i>brevis</i> Bailey	wet ground; sandy quagmires	Na, Pl (3)	HEW NLR DSJCT	A coastal plain species at its northern limit. Last verified extant 1975.
<i>C. Willdenowii</i> Schkuhr	dry woods	No, Ml (2)	HEW DSJCT LC/RE	Last verified extant 1897. Local throughout its range and approaching its northern limit.
<i>Cyperus Engelmannii</i> Steudel	pond shores; swampy low ground	Md (3)	HEW DCIN LCAL	Last verified extant 1913. All stations were within the greater Boston area. Likely to have been extirpated. An annual.
<i>C. ferruginescens</i> Boeckeler	lake and river shores	Br (2)	HEW DSJCT LC/RE	Last verified extant 1925. An annual.
<i>Eleocharis ambigens</i> Fernald	peaty pond margins	Du (1)	NLR SNES DSJCT	A coastal plain species at its northern limit. Collected once, in 1927.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>E. calva</i> Torrey (= <i>E. erythropoda</i> Steudel)	river banks; bogs	Hp, Be (4)	HBW	Not uncommon in VT and NH. A few stations in CT. Probably overlooked.
<i>E. equisetoides</i> (Elliot) Torrey	lake shores	No (1)	SMAS NR DSJCT	Checked in 1978, but species could not be relocated.
<i>E. intermedia</i> (Muhlenberg) Schultes	muddy, often calcareous shores	Fr, Be (3)	HBW RARE	Apparently more common in VT and CT. Widespread but rare. Hoffmann (1922) reported it from several other localities. Extant populations in Hampshire Co.
<i>E. melanocarpa</i> Torrey	fresh water beaches	Ba, P1, Es (11)	DCN LCAL NR	Occasional on Cape Cod but vulnerable to pondside development. A coastal plain species at its northern limit. Many vouchered stations have been extirpated.
<i>E. ovata</i> (Roth) Roemer & Schultes	sandy pond shores	Fr (1)	SMAS DSJCT	More common in n. New England and CT. An annual.
<i>E. quadrangulata</i> (Michaux) Roemer & Schultes	shallow water of river or lake shores	No (1)	SMAS DSJCT NLR	Last verified extant 1908. Possibly planted or adventive at this site. Could not be relocated in 1978.
<i>E. tricostata</i> Torrey	fresh water beaches; swales	Na, Ba (2)	NLR HBW VULN	A coastal plain species at its northern limit. Last verified extant 1914.
<i>Fuirena pumila</i> Torrey (= <i>F. squarrosa</i> Michaux var. <i>pumila</i> Torrey)	fresh water beaches; peaty quagmires	Ba, P1, Md, Hl (13)	NLR VULN LCAL	Extirpated from many of its former stations. Still extant in three towns in s.e. MA. Habitat is vulnerable to human activity.
<i>Psilocarya nitens</i> (Vahl) Wood	muddy pond shores	P1 (1)	SMAS NR DSJCT LC/RE VULN	Recently rediscovered. Presently known from very few sites in s.e. MA. An annual. Cf. <i>Rhodora</i> 79: 163 (1977).

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
P. scirpoides Torrey	peaty quagmires; pond shores	Ba, Pl, Hl (4)	HEW NLR RSTR DSJCT LCAL VULN	Ours is part of a locally distributed east coast population from s.e. MA to MD. There are also populations in MI and IN. Extant populations in Plymouth and Barnstable Co.
Rhynchospora inundata (Oakes) Fernald	pond margins; quagmires	Ba, Pl (2)	DCLN LCAL NLR HEW	The type station is in Plymouth Co. Also a doubtful record from Franklin Co. A few small populations still extant in Plymouth Co. Very local throughout its range.
R. Torreyana Gray	fresh water beaches; dry sandy soil	Na, Ba (3)	HEW NLR DSJCT DCLN	A coastal plain species at its northern limit. Only one small population persist at a pond in Barnstable Co.
Scirpus ancistrochaetus Schuyler	swales; pond shores	Fr (1)	SMAS RSTR	A newly described species. Total range VT, MA, NY, PA.
S. fluviatilis (Torrey) Gray	tidal shores; marshes	Md, Es (3)	SMAS DSJCT LC/RE	A large total range but apparently rare in our area. Extant in Middlesex Co.
S. Aalli Gray	pond shores	Md, Es (2)	LC/RE DSJCT NLR HEW DCLN	According to Fernald (1950) this species is known from GA and FL to e. TX; MA; one station in IL; and a few in MO. The one famous station for the species in Middlesex Co. has been much altered by development and pollution. The population is almost certainly extirpated.
S. lineatus Michaux	swampy bogs; wet meadows	Hp, Be (4)	HEW	Last verified extant in 1978 in Hampshire Co. May be much more common in Berkshire Co.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>S. Longii</i> Fernald	marshes; meadows	Br, No, Su, Md (6)	DSJCT LCAL DCLN	Schuyler (1967) said the species was locally abundant in marshes near the Atlantic Coast from Nova Scotia to NJ. All MA populations were from populous areas, and probably have been extirpated by development or competition with <u>Lythrum Salicaria</u> . Listed as threatened by Ayensu & DeFilipps (1978).
<i>Scleria reticularis</i> Michaux	sandy or peaty pond shores	Du, Ba, Pl, Md, Hi (7)	LCAL NR WLN	An annual species that may be locally abundant, but its fresh water beach habitat is vulnerable to development. Still extant at several ponds in s.e. MA.
<i>S. triglomerata</i> Michaux	banks; meadows	Na, Md, Hd, Fr (6)	NR	Last verified extant in 1920. May be under-collected.
<u>Araceae</u>				
<i>Arisaema Dracontium</i> (L.) Schott	swamps; meadows; rich alluvial woods	Md, Hp, Fr, Be (7)	LC/RE DCLN	Currently known only from a few very small populations in Hampshire and Franklin Co.
<i>Orontium aquaticum</i> L.	pond edges; sphagnum swamps	Ba, Pl, Wo, Hp, Be (10)	NR LCAL DCLN	Although the causes are unknown, this species has severely declined. Currently known from only three populations in Worcester and Barnstable Co.
<u>Eriocaulaceae</u>				
<i>Eriocaulon Parkeri</i> Robinson	muddy tidal shores	Pl, Es (2)	DSJCT IFEW	Last verified extant 1929. Probably overlooked.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Juncaceae</u>				
Juncus biflorus Elliott	pond shores	Na, Ba (2)	DSJCT NR HBW	Currently known from only one small population on Cape Cod. All others as well as the Nantucket population have apparently been extirpated.
J. pervetus Fernald	brackish swales	Ba (1)	ENMA SMAS	Type and only locality. The species is presumed extinct, due to development of its habitat. Listed as extinct by Ayensu & DeFilipps (1978).
Luzula parviflora (Ehrhart) Desvaux var. melanocarpa (Michaux) Buchenau	open spots at high elevations	Be (1)	SLR SMAS RARE	Although there are vouchers from two towns, they are undoubtedly the same population on the top of one peak. Extant in 1978.
<u>Liliaceae</u>				
Chamaelirium luteum (L.) Gray	dry woods	Be (3)	NR HBW	Last verified extant 1920. Reported by Hoffmann (1922) from several south Berkshire towns.
Smilax Bona-nox L. var. hederaefolia (Beyrich) Fernald	dry to moist sand dunes; fields; thickets	Na (1)	NR DSJCT SNES	According to Fernald (1950), only occurs n. to VA & MD. Nantucket is the only station in New England. Last verified extant 1904, probably extirpated.
Streptopus amplexifolius (L.) DC. var. americanus Schultes	rich soils in moist, old growth woods	Hp, Fr, Be (7)	DCLN RARE	Still extant in Franklin Co. Seems to be declining, but may be overlooked.
Uvularia grandiflora Smith	rich old growth woods	Wq, Be (7)	LCAL	May be calciphilic. Hoffmann reports "common in the valley" in Berkshire Co.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Haemodoraceae</u>				
<i>Lachnanthes tinctoria</i> (Walter) Elliott	sandy or peaty pond shores	Ba, P1 (9)	LCAL DSJCT VULN	Many of its pond stations on Cape Cod and Plymouth Co. have already been developed or are threatened by succession. Approaching its northern limit; a disjunct population in Nova Scotia.
<u>Iridaceae</u>				
<i>Sisyrinchium arenicola</i> Bicknell	sandy soil; turf	Na, Du, Ba, No (5)	LCAL HEW DSJCT	Last verified extant 1958. Reported to be still on Nantucket. Approaching its northern limit; a disjunct population in Nova Scotia.
<u>Orchidaceae</u>				
<i>Aplectrum hyemale</i> (Muhlenberg) Torrey	rocky woods; slopes	Hp, Fr (4)	LC/RE HEW DCLN	All historical stations have been extirpated. Possibly one extant station remains in Franklin Co.
<i>Arethusa bulbosa</i> L.	sphagnum bogs; swamps	all counties (55)	DCLN	Reported from 3 other stations in Berkshire Co. by Hoffmann (1922). Easily overlooked unless in flower. Formerly frequent but severely reduced by habitat destruction and exploitation by florists, gardeners, botanists, etc. Suggested by nearly all collaborators as declining.
<i>Cypripedium arietinum</i> R. Brown	shaded hillsides; rich swampy woods	Hp, Fr, Be (4)	LC/RE DCLN HEW	Last verified extant 1964. Since then the last known population has apparently been extirpated, although rumors of extant populations persist. Also reliably reported from Worcester Co. Cf. <i>Rhodora</i> 31: 223 (1929). Listed as threatened by Ayensu & DeFilipps (1978).

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>C. reginae</i> Walter	swamps; bogs	Md, Es, Wo, Hp, Fr, Be (14)	LCAL DCLN	Rare through habitat destruction and exploitation. Calciphilic, so habitat limited. A few populations still extant in 1978.
<i>Isotria medeoloides</i> (Pursh) Rafinesque	rich woods	Hp (1)	SMAS LC/RE DCLN	Rare, local, and in small colonies throughout its range. Only collection 1899. Probably extirpated. Listed as threatened by Ayensu & DeFilipps (1978).
<i>I. verticillata</i> (Willdenow) Rafinesque	moist to dry deciduous woods	Pl, Br, No, Su, Md, Es, Wo, Hd, Hp, Fr (25)	DCLN	Populations still persist in the CT River Valley and the eastern part of the state, but definitely much reduced from its former abundance.
<i>Listera cordata</i> (L.) R. Brown	wet woods; sphagnum bogs	Ba, Br, Md, Es, Be (7)	LC/RE	Last verified extant 1916. Boreal; common elsewhere.
<i>Malaxis monophyllos</i> (L.) Swartz var. <i>brachypoda</i> (Gray) Morris & Eames (= <i>M. brachypoda</i> (Gray) Fernald)	swamps or cold bogs	Hp, Fr, Be (5)	LC/RE HBW	Calciphilic. Hoffmann reports it from other Berkshire towns. One extant population in Franklin Co.
<i>Platanthera ciliaris</i> (L.) Lindley (= <i>Habenaria ciliaris</i> (L.) R. Brown)	bogs; swales; woods	Na, Pl, No, Hp (5)	NLR LC/RE DCLN	Last verified extant 1899, although a plant was reportedly seen and photographed within the last ten years in Plymouth Co.
<i>P. cristata</i> (Michaux) Lindley (= <i>Habenaria cristata</i> (Michaux) R. Brown)	thickets; woods; bogs	Br (1)	SMAS RARE DCLN NR	Last verified extant in 1908. Rare throughout its range. Fernald (1950) believed MA station extirpated. Cf. <i>Rhodora</i> 25: 47 (1923).
<i>P. dilatata</i> (Pursh) Lindley (= <i>Habenaria dilatata</i> (Pursh) Hooker)	springy woods; bogs	Ba, Md, Wo, Fr, Be (11)	LC/RE DCLN	One small population persists on Cape Cod, but it has been partially extirpated by a nearby development.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<p>P. flava (L.) Lindley var. herbiola (R. Brown) Luer (= Habenaria flava (L.) R. Brown var. herbiola (R. Brown) Ames & Correll)</p> <p>P. obtustata (Banks ex Pursh) Lindley (= Habenaria obtustata (Pursh) Richardson)</p> <p>Spiranthes vernalis Engelmann & Gray</p>	<p>springy meadows; swales; forest edges</p> <p>bogs</p> <p>grassland; gravelly fields</p> <p>rich oak, holly woods</p> <p>humus of hardwood forests</p> <p>swamps; calcareous swamps; bogs</p>	<p>Du, Pl, Br, No, Su, Md, Wo, Fr, Be, (42)</p> <p>Be (2)</p> <p>Ba, Br, No, Wo (5)</p> <p>Ba (1)</p> <p>Fr (1)</p> <p>Es, Be (8)</p>	<p>DCLN</p> <p>SLR LC/RE DCLN FEW</p> <p>NLR RARE FEW</p> <p>NLR DSJCT SMAS DCLN LC/RE</p> <p>SMAS LC/RE</p> <p>DSJCT LCAL DCLN</p>	<p>Formerly abundant in the state. Despite repeated searches in 1978, no populations could be found. Apparently declining due to development of its habitat. Listed as threatened by Ayensu & DeFilipps (1978).</p> <p>Last verified extant 1879. May be extirpated in state.</p> <p>One extant population reported 1978.</p> <p>Very old collection reported from Dukes Co. Cape Cod station discovered in 1974. Cf. Rhodora 32: 114 (1930).</p> <p>Although the species has not been seen in 50 years, extant populations are not unlikely; easily overlooked.</p> <p>Two extant populations in Berkshire Co., both threatened by beaver activity. Essex Co. station apparently gone.</p>
<p><u>DICOTYLEDONAE</u></p> <p><u>Salicaceae</u></p> <p>Salix candida Flügge <i>very rare in Be.</i></p>				

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
S. interior Rowlee	islands; river banks	Hp, Fr (2)	DSJCT FEW RARE	Three extant populations in Hampshire and Franklin Co.
S. serissima (Bailey) Fernald	shores; calcareous swamps	Be (7)	LCAL	Last verified extant 1920.
<u>Corylaceae</u>				
Alnus crispa (Aiton) Pursh var. mollis Fernald	hills; rocky river banks	Fr, Be (11)	SLR LCAL	Southern limit of range, except for a disjunct population in NC. Fairly large extant populations in Franklin Co.
Betula pumila L. - also by Main Feltus, Stockbridge, s. of Center.	swamps; bogs	Be (1)	DSJCT SMAS	The vouchered locality has apparently been extirpated, but a small population was discovered in 1978 in Berkshire Co. It is threatened by beaver activity.
<u>Fagaceae</u>				
Quercus macrocarpa Michaux	calcareous hill-sides; meadows	Be (4)	FEW LCAL	A calciphile. Last verified extant 1920.
Q. Muehlenbergii Engelmann	calcareous ridges	Wo, Be (4)	FEW	The Worcester Co. station was discovered recently (1974) and there is at least one extant population in Berkshire Co. A southern species approaching its northern range limit.
Q. stellata Wangenheim	dry open woods; sandy barrens	Na, Du, Ba, Br (8)	NLR LCAL	Although reduced by development, there is still a fairly large extant population in Barnstable Co.
<u>Loranthaceae</u>				
Arceuthobium pusillum Peck	parasitic on <u>Picea mariana</u>	Md, Es, Wo, Hd, Be (10)	LCAL	An interesting, rarely seen parasite on black spruce. In MA, black spruce is limited to bogs. A. <u>pusillum</u> probably under-collected. Cf. Rhodora <u>33</u> : 92 (1931). 3

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIF- ICANCE	COMMENTS
<u>Polygonaceae</u>				
<i>Polygonum glaucum</i> Nuttall	sandy beaches	Na, Du, Ba (8)	NLR LCAL	An annual. Reported from Plymouth Co. Extant populations in Nantucket and Barnstable Co. Local throughout its range.
<i>P. puritanorum</i> Fernald (= <i>P. Persicaria</i> L.?)	fresh water beaches	Ba, Pl, Wo (10)	LCAL DSJCT RSTR VULN	Known from W. Nova Scotia, s.w. ME, MA, and s. RI. Most stations have been extirpated, but a few populations persist on Cape Cod. Cf. <i>Rhodora</i> 21: 141 (1919).
<i>P. setaceum</i> Baldwin var. <i>interjectum</i> Fernald	moist sandy thickets; shores	Ba, Hd (2)	DSJCT NLR HEW	Only variety this far north.
<i>Rumex pallidus</i> Bigelow	sea shores; rocky beaches	Na, Pl, Es (5)	LCAL DSJCT HEW	A coastal species extending from Newfoundland to ME, NH, MA. Extant population in Essex and Dukes Co.
<u>Chenopodiaceae</u>				
<i>Suaeda americana</i> (Persoon) Fernald	salt flats	Ba (1)	DSJCT SMAS SLR	Discovered in 1971, this is the southernmost station of this plant which is otherwise known from Quebec south to s. ME.
<i>S. Richii</i> Fernald	salt marshes; estuaries; beaches	Ba, Es (3)	SLR DSJCT HEW LCAL	Extant populations in Barnstable and Essex Co.
<u>Portulacaceae</u>				
<i>Claytonia virginica</i> L.	rich, damp, alluvial soils; swamps	Hd, Hp, Be (5)	HEW LC/RE	One extant population in Hampshire Co. reported.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Caryophyllaceae</u>				
<i>Arenaria macrophylla</i> Hooker	dry serpentine ledges	Hd, Hp, Be (3)	LCAL HBW	Last verified extant 1915. Restricted to serpentine and trap ledges. Nearing its southern range limit.
<i>A. stricta</i> Michaux	limestone or serpentine ledges	Hp, Fr, Be (6)	LCAL	One small population extant in Franklin Co. Prefers sunny ledges and may have declined due to reforestation.
<i>Paronychia argyrocoma</i> (Michaux) Nuttall var. <i>albimontana</i> Fernald	dry rock ledges	Es (1)	LCAL ENNE SMAS DSJCT SLR RSTR DCLN	The typical variety ranges from GA to VA and WV. Our variety is restricted to ME, NH, and MA. Essex Co. population still persists, but it has declined to a third of its abundance in 1945. Listed by Ayensu & DeFilipps (1978). Cf. Rhodora 47: 91 (1945).
<i>Sagina nodosa</i> (L.) Fenzl ssp. <i>nodosa</i> (= var. <i>pubescens</i> Mertens & Koch)	sea-side ledges; rocky sea shores	Es (1)	SMAS SLR LC/RE	See Rhodora 80: 25 (1978). Last verified extant 1944. The only known population has apparently been extirpated.
<u>Nymphaeaceae</u>				
<i>Nymphaea tuberosa</i> Paine	rivers; ponds; lakes	Md, Be (3)	HBW LCAL	Recently discovered in the state (1971, 1978) and probably under-collected.
<u>Ranunculaceae</u>				
<i>Cimicifuga racemosa</i> (L.) Nuttall	rich, shaded banks in woods	Wo, Fr, Be (4)	NR WLN HBW	One small population extant in Hampden Co. Probably still occurs in Franklin Co. as well. Cf. Rhodora 23: 201 (1921) 28: 17 (1926).
<i>Clematis verticillaris</i> DC.	rocky woods; ledges; often in calcareous soils	Md, Wo, Hd, Hp, Fr, Be (13)	RARE	Widespread but infrequent, often occurring as only one plant per station. Extant population reported from Hampshire and Berkshire Co.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
Ranunculus longirostris Godron	ponds; slow streams	Be (2)	HEW	May be restricted to calcareous waters. Was reported from lagoons of Housatonic R. (Hoffmann, 1922). Last verified extant 1971. Not recognized by Gleason (1952).
R. subrigidus W. B. Drew	ponds	Be (1)	SMAS SLR	Doubtfully distinct from <u>R. longirostris</u> . May be restricted to calcareous waters. Probably over-looked. Not recognized by Gleason (1952).
<u>Magnoliaceae</u>				
Magnolia virginiana L.	swamps	Es (1)	SNES NLR DSJCT	One extant, protected population in Essex Co. Only station in New England, and the northern limit of the species.
<u>Papaveraceae</u>				
Adlumia fungosa (Aiton) Greene	rocky woods; hills	Md, Es, Wo, Hd, Hp, Fr, Be (18-20)	DCLN RARE	An annual, widespread but infrequent. Formerly much picked and collected for gardens. Cf. Rhodora 32: 103. Reported from Hampshire Co. in 1975, and Franklin Co. in 1978.
<u>Cruciferae</u>				
Cardamine Douglassii (Torrey) Britton	rich, shaded banks	Be (1)	SMAS ELR	Last verified extant 1916. Known from CT and NY, but only 1 MA station.
<u>Droseraceae</u>				
Drosera filiformis Rafinesque	sandy pond shores; wet dunes	Na, Ba, Pl (15)	NLR LCAL DCLN DSJCT	Many stations have been extirpated by the widespread development or succession of ponds. Still extant in Plymouth, Barnstable, and Nantucket Co. A species of widely disjunct distribution.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Podostemaceae</u>				
Podostemum ceratophyllum Michaux	rocks in fast streams	Md, Hp (3)	LCAL HW	Probably under-collected. Extant in Hampshire and Franklin Co. May be sensitive to pollution.
<u>Saxifragaceae</u>				
Ribes americanum Miller	rich, wet thickets	Br, No, Su, Md, Wo, Fr, Be (39)	DCLN	The object of a former Government control program that was largely successful. One known extant station.
R. lacustre (Persoon) Poiret	cold, wet, rocky, northern woods	Fr, Be (3-4)	HW LCAL	Last verified extant 1968.
R. triste Pallas	wet woods; swamps; bogs	Wo, Be (6)	DSJCT LCAL	Worcester Co. station discovered 1944. Reported from Essex Co. (Harris, 1975).
<u>Rosaceae</u>				
Amelanchier Bartramiana (Tausch) Roemer	thickets; summits	Wo, Be (6)	LCAL	At its southern range limit here except for a disjunct population in n. PA. One extant population in Worcester Co.
A. nantucketensis Bicknell (= A. canadensis (L.) Medicus?) <i>gold leaves in fall</i>	pond margins; moors; fire barrens	Na, Du (2)	ENMA HW LCAL	Although sometimes not recognized, this is apparently a true-breeding, geographically isolated entity. Still extant on Nantucket.
A. sanguinea (Pursh) DC.	wooded slopes in calcareous soils	Md, Wo, Fr, Be (8)	LC/RE	A widespread but rare calciphilic species nearing the southern limit of its range.
Prunus depressa Pursh (= P. pumila L. var. depressa Pursh)	island spits; sandy river banks	Hd, Hp, Fr (5)	LCAL DSJCT HW	At its southern limit except for disjunct stations on the Delaware R. Extant populations in Franklin Co.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>Pyrus decora</i> (Sargent) Hyland (= <i>Sorbus decora</i> (Sargent) C. K. Schneider)	slopes at high altitudes; roadsides	Be (3)	HEW SLR DSJCT	Last verified extant 1920.
<i>Rosa acicularis</i> Lindley	slopes; thickets	Be (1)	SLR LCAL SMAS DSJCT	Found only once, in 1919, but the area is protected, so the population may still exist.
<i>Waldsteinia fragarioides</i> (Michaux) Trattinnick	rich woods; thickets; roadsides; banks	P1, Fr, Be (8)	LC/RE	Probably introduced to Plymouth Co. Earliest state record 1827. Extant population reported from Hampshire Co. Possibly over-looked.
<u>Leguminosae</u>				
<i>Desmodium sessilifolium</i> (Torrey) Torrey & Gray	dry, sandy soils; roadsides	Na, P1 (4)	NLR ELR LCAL HEW	Local throughout its range. Last verified extant 1906.
<u>Linaceae</u>				
<i>Linum intercursum</i> Bicknell	sandy or peaty beaches; dry gravels; scrub	Na, Du, Ba (7)	NLR LCAL DCLN	Although last verified extant in 1973, no populations could be located in 1978.
<i>L. sulcatum</i> Riddell	dry soils; roadsides	Su, Md, Be (4)	LC/RE HEW	Rare and local throughout its range. Last verified extant 1915. Suffolk Co. station undoubtedly extirpated.
<u>Polygalaceae</u>				
<i>Polygala Nuttallii</i> Torrey & Gray	dry, open barrens; roadsides; borders of cranberry bogs	Du, Ba, P1, No (12)	NLR DCLN LC/RE	Extant in Plymouth, Barnstable, and Norfolk Co. Declining due to reforestation of its habitat.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
P. Senega L.	marsh edges; dry, calcareous areas	Be (1)	SMAS	Collected only once, 'in 1919. Apparently a calciphile.
<u>Callitrichaceae</u>				
Callitriche deflexa A. Braun var. Austinii (Engelman)Hegelmaier	along lumber roads	Md (1)	SMAS NLR LCAL	Reported from Hampshire Co. Cf. Rhodora 32: 15 (1930).
<u>Empetraceae</u>				
Corema Conradii Torrey	dry, sandy, open moors and barrens	Na, Du, Ba, Pl (12)	LCAL DSJCT	A NS-NJ species with a highly disjunct range. Extant populations in Nantucket, Barnstable, and Plymouth Co.
<u>Limnanthaceae</u>				
Floerkea proserpinacoides Willdenow	wet woods along rivers	Fr (1)	SMAS	Small, probably overlooked. Only found once, in 1915.
<u>Aquifoliaceae</u>				
Ilex montana Torrey & Gray var. mollis (Gray) Britton	wooded slopes	Be (3)	NLR. DSJCT HW	The northern range limit of this Allegheny species. Two extant populations in Berkshire Co.
<u>Guttiferae</u>				
Ascyrum Hypericoides L. var. multicaule (Michaux) Fernald	dry thickets; near ponds	Na (1)	DSJCT LCAL SNES	Only variety in New England. Nearest occurrence apparently NJ. Last verified extant on Nantucket in 1962. Probably still extant on the island.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<p>Hypericum adpressum Barton <i>around 3 ponds NA</i> <i>Almanac</i> <i>10/19/1930</i></p>	<p>sandy or peaty pond edges</p>	<p>Na, Ba, Wo (3)</p>	<p>NLR FEW</p>	<p>Worcester Co. station found 1937 - possibly a misidentification. One small extant population reported from Nantucket</p>
<p>H. spathulatum (Spach) Steudel</p>	<p>sandy or peaty fields; thickets</p>	<p>Ba, P1, Md, Be (6)</p>	<p>DSJCT LG/RE</p>	<p>Last verified extant in 1934. Fernald (1950) felt the MA occurrences were garden escapes. Reported to be extant in Dukes Co.</p>
<p><u>Elatinaceae</u></p>				
<p>Elatine americana (Pursh) Arnott</p>	<p>pond shores and bottoms</p>	<p>Na, Ba, Md, Es, Wo, Hp (8)</p>	<p>LCAL</p>	<p>Possibly overlooked, but at least two stations in what is now urban Middlesex Co. are doubtless extirpated as well as the Essex and Hampshire Co. stations. Last verified extant 1929.</p>
<p><u>Cistaceae</u></p>				
<p>Helianthemum dumosum (Bicknell) Fernald</p>	<p>dry, open, sandy soils</p>	<p>Na, Du, Ba, P1 (21)</p>	<p>RSTR LCAL NLR DCLN</p>	<p>Total range s.e. MA, RI, CT, s.e. NY. Most MA populations have been extirpated by development or reforestation. Four populations are currently known totaling less than 200 plants. Listed by Ayensu & DeFilipps (1978).</p>
<p><u>Violaceae</u></p>				
<p>Viola adunca Smith</p>	<p>sandy soils, dry woods</p>	<p>Md, Wo (4)</p>	<p>FEW</p>	<p>Last verified extant 1953.</p>
<p>V. nephrophylla Green</p>	<p>Moist, cold woods; valleys; often in calcareous soils</p>	<p>Hp, Fr, Be (6)</p>	<p>RARE SLR</p>	<p>Hoffmann (1922) reported it in several Berkshire Co. towns, but there are no voucher specimens.</p>

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Cactaceae</u>				
Opuntia compressa (Salisbury) Macbride (= O. humifusa Rafinesque)	dry, sandy soils, in open spots	Na, Ba (3)	HEW NR DSJCT LC/RE	Introduced in Middlesex Co. Extant in Nantucket and Barnstable Co. Three small populations currently known.
<u>Lythraceae</u>				
Cuphea petiolata (L.) Koehne	pastures	Br, MI (2)	HEW NLR RARE	An annual that is nowhere abundant; , characteristic of early seral stages.
Rotala ramosior (L.) Koehne	pond edges	Br, No, Md, Es, HI (8)	LCAL	Last verified extant 1934. Small and probably overlooked.
<u>Melastomaceae</u>				
Rhexia mariana L. , <i>Weeks Pond Sandwick</i> <i>NW corner -> Black Pond, Chatham</i>	pond edges	Ba (6)	DSJCT NR ICAL DCLN	A coastal plain species at its northern limit. Habitat vulnerable to development. One small population persists in Barnstable Co.
<u>Onagraceae</u>				
Ludwigia polycarpa Short & Peter	pond edges	Md, Fr (2)	HEW DSJCT LCAL RSTR	North American distribution apparently consisting of two disjunct populations, the eastern one both sparse and restricted geographically. Still extant in Franklin Co, but the Middlesex Co. population has apparently been extirpated
L. sphaerocarpa Elliot var. macrocarpa Fernald & Griscom	sandy pond shores	P1, Br, MI (6)	NLR RARE	Last verified extant 1935. <i>Lake Nippinick, boat lands</i>

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Haloragaceae</u>				
<i>Myriophyllum alterniflorum</i> DC.	quiet ponds	Es, W6 (3)	HEW SLR RARE DCLN	Suggested as declining by several collaborators. Cf. Rhodora 12: 85 (1910)
<i>M. pinnatum</i> (Walter) BSP.	muddy borders of ponds and sloughs	Du, Ba, P1, Br, No, W6 (9)	NLR RARE DCLN	Suggested as declining by several collaborators. Still extant in Hampshire Co.
<u>Araliaceae</u>				
<i>Panax quinquefolius</i> L.	rich, mesic woods	Wo, Hd, Hp, Fr, Be (12)	LC/RE VULN	Formerly more common; now rare and local due to picking by root hunters. Listed by Ayensu & DeFilipps (1978). Extant populations in Hampshire, Franklin and Berkshire Co.
<u>Umbelliferae</u>				
<i>Angelica venenosa</i> (Greenway) Fernald	dry, rocky woods	Be (1)	SMAS	Last verified extant 1911.
<i>Conioselinum chinense</i> (L.) BSP.	swampy, calcareous woods	P1, No, Be (5)	HEW	The Plymouth Co. record is very old and almost certainly extirpated, and the Norfolk Co. station is definitely gone. Reported from Berkshire Co., 1978.
<i>Hydrocotyle verticillata</i> Thunberg	freshwater beaches	Du, Ba (3)	NLR HEW DSJCT	A coastal plain species at its northern limit.
<u>Ericaceae</u>				
<i>Pyrola asarifolia</i> Michaux var. <i>purpurea</i> (Bunge) Fernald	calcareous bogs	Be (1)	SMAS DSJCT SLR LC/RE	Last verified extant 1912. All known populations are probably extirpated.

*Naushon
Falmouth / Ketchicott Pond
lots like *verticillata**

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
Rhododendron maximum L.	swamps; deep woods	No, Wo, Hd (10)	VULN HEW LCAL	Of these old stations, perhaps 3 still exist. Formerly collected by gardeners. Cf. Rhodora 52: 215 (1950).
Vaccinium Vitus-Idaea L. var. minus Loddiges	moist woods	Es (1)	SMAS DSJCT DCLN SLR LC/RE	Apparently a native station. Last verified extant in 1897. Probably extirpated. A northern plant at the southern limit of its range.
<u>Ebenaceae</u>				
Diospyros virginiana L.	dry woods	Ba (1)	SMAS NLR LCAL	The Barnstable Co. population, which is still extant, may have been the result of an old introduction. Population no more than 200 individuals.
<u>Gentianaceae</u>				
Gentiana crinita Frölich	swampy meadows; pastures; wet roadsides	Ba, Pl, Br, No, Su, Md, Es, Wo, Hd, Hp, Fr, Be (55)	DCLN	This species undoubtedly used to occur in more than the 55 towns indicated. Many collaborators believe it is drastically declining, perhaps due to reforestation. Extant populations in Franklin and Plymouth Co., probably more.
Halenia deflexa (Smith) Grisebach	damp, cool woods	Hp (1)	SMAS DSJCT SLR	Collected once, in 1868. Probably extirpated. At the edge of its range.
Sabatia campanulata (L.) Torrey	fresh water beaches	Na, Ba (2)	HEW NLR RARE	A coastal plain species at its northern limit. Apparently extirpated on Nantucket, but a small population still persists in Barnstable Co. Cf. Rhodora 57: 52 (1955).

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
S. Kennedyana Fernald	fresh water beaches	Na, Ba, Pl, Br, No (20)	RSTR LCAL DSJCT DCLN	Total range SC, NC; RI, MA; Nova Scotia. Large populations still persist in Barnstable Co., although it has been extirpated from many former stations.
S. stellaris Pursh	salt marshes	Du, Br (2)	HEW NLR RARE	A coastal plain species at its northern limit. The Bristol Co. population is still extant.
<u>Asclepiadaceae</u>				
Asclepias tuberosa L.	dry, open soils	all counties (35)	DCLN	Various collaborators report this species has declined drastically. Still extant in Nantucket, Dukes, Barnstable, Plymouth and possibly Hampshire Co. Current information needed.
<u>Hydrophyllaceae</u>				
Hydrophyllum canadense L.	stream sides; rich woods	Wo, Be (3)	HEW DSJCT LCAL	Possibly overlooked. Extant population reported in Berkshire Co. <i>also in Hampshire Co.</i>
<u>Boraginaceae</u>				
Cynoglossum boreale Fernald	rich, open woods	Wo, Hp, Fr, Be (4)	HEW	A northern species approaching its southern range limit. Last verified extant 1906.
Mertensia maritima (L.) S. F. Gray	beaches	Na, Ba, Hp (3)	HEW SLR DSJCT LCAL	A northern coastal species at its southern limit. Probably still extant in all three counties. <i>Susan Mitchell Coaticum Run.</i>
Onosmodium virginianum (L.) A. DC.	dry, sandy soils	Na, Du, Ba, Br (5)	HEW NLR LCAL	A coastal plain species at its northern limit. Last verified extant 1914.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Labiatae</u>				
<i>Agastache scrophulariifolia</i> (Willdenow) Kuntze	roadsides; fields	Su, Wo, Be (6)	RARE	The Suffolk Co. station is undoubtedly extirpated. Last verified extant 1949.
<i>Blephilia ciliata</i> (L.) Benth	roadsides; fields	Hp, Be (6)	RARE NR	Apparently a fugitive species approaching the northern limit of its range.
<i>B. hirsuta</i> (Pursh) Benth	moist areas; roadsides	Be (1)	SMAS	Last verified extant 1914.
<i>Isanthus brachiatus</i> (L.) BSP.	open fields; roadsides	Hp, Be (3)	LCAL EW	An annual, apparently a fugitive species. One population of several hundred plants was discovered in Hampshire Co. in 1978.
<i>Pycnanthemum clinopodioides</i> Torrey & Gray	wooded slopes	No, Mi (2)	LCAL EW NR	Total range is e. MA to WV, and very rarely south to NC. Local throughout. Last verified extant 1891.
<i>Scutellaria integrifolia</i> L.	field edges	Br, Wo (2)	EW IC/RE NR	Last verified extant 1970. Possibly adventive.
<i>Stachys hyssopifolia</i> Michaux	fresh water beaches	Na, Ba, Br, No (12)	LCAL NLR VULN	Suggested as declining by a collaborator. Several extant populations in Barnstable and Plymouth Co., but extirpated from many former locales.
<u>Scrophulariaceae</u>				
<i>Agalinis acuta</i> Pennell (= <i>Gerardia acuta</i> Pennell)	dry, sandy hills	Na, Du, Ba (7)	ENNE VULN LCAL	One of the very few s. New England endemics. Last verified extant 1944. Listed by Ayensu & DeFilipps (1978).
<i>Mimulus alatus</i> Aiton	muddy pond shores	No (1) No good ID	SMAS NR	One small population recently discovered in Hampshire Co.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>M. moschatus</i> Douglas	stream edges; ditches	Md, Fr (3)	HEW RARE	If native, approaching its southern limit Extant in Franklin Co.
<i>Pedicularis lanceolata</i> Michaux	rich, often calcareous meadows; swamps	Su, Hd, Hp, (5)	HEW RARE	Possibly overlooked. Suffolk Co. station extirpated. Last verified extant 1930.
<i>Schwalbea americana</i> L.	dry pastures; thin woods	Na, Du, Ba, Br, Nb (5)	HEW NLK LC/RE DCLN	Several collaborators suggest that this species is declining. Last verified extant 1961. Listed by Ayensu & DeFilipp (1978).
<i>Veronica comosa</i> Richter	calcareous soils; stream sides	Be (2)	HEW ELR LC/RE	Probably adventive east of its primarily midwestern distribution. Last verified extant 1920.
<u>Lentibulariaceae</u>				
<i>Utricularia biflora</i> Lamarck	ponds	Ba, Pl, Fr (5)	HEW NLR LCAL DSJCT	Distribution suggests it is overlooked. Last verified extant 1967.
<i>U. fibrosa</i> Walter	sandy ponds	Ba, Pl, Hl (4)	HEW NLR LCAL DSJCT	A coastal plain species at its northern limit. Probably overlooked.
<i>U. subulata</i>				
<u>Rubiaceae</u>				
<i>Galium labradoricum</i> Wiegand	calcareous bogs	Be (5)	HEW LCAL	A northern species approaching its southern limit.
<i>Houstonia lanceolata</i> (Poiret) Britton	sandy soils	Ba (1)	SMAS LC/RE DSJCT	A southern species near its northern limit. Some question whether it may be only an extreme of <i>H. longifolia</i> Gaertner. Last verified extant 1906.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<u>Caprifoliaceae</u>				
Lonicera hirsuta Eaton	wooded, calcareous ledges	Be (2)	HEW ELR LCAL	Hoffmann (1922) said one of the Berkshire Co. stations was probably the type locality. That particular one has been destroyed, but it was discovered at another site in 1967.
Viburnum Rafinesquianum Schultes <i>West Stockbridge Tln.</i>	thickets; calcareous ledges	Be, (1)	SMAS LCAL DSJCT	Hoffmann (1922) states it is common on limestone, but few botanists have ever seen it in Berkshire Co. A southern species.
<u>Compositae</u>				
Aster concolor L.	dry, sandy soils	Na, Du, Pl (5)	FEW NLR LCAL	A coastal plain species at its northern limit. Still extant on Nantucket.
A. infirmus Michaux	dry, open woods	Md (6)	NLR	Last verified extant 1931.
A. prenanthoides Muhlenberg	roadsides; thickets	Fr, Be (5)	HEW NLR LCAL ELR	Two extant populations in Berkshire Co.
A. ptarmicoides (Nees) Torrey & Gray	calcareous ledges	Hd (1)	SMAS SLR LC/RE	One small population discovered in 1978.
A. tardiflorus L.	roadsides; paths; open spots	Pl, Su, Hp, Be (13)	LCAL	The Plymouth and Suffolk Co. stations are doubtfully native. The species seems to be calciphilic.
A. Tradescantii L.	ledges	Hd, Fr (3)	HEW SLR LC/RE	Recently discovered in the state. All three populations extant.

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
<i>Bidens Eatonii</i> Fernald var. <i>Eatonii</i> , var. <i>fallax</i> Fernald, and var. <i>Kennebecensis</i> Fernald	tidal shores	Br, Es (5)	HW RSTR	A "locally segregated estuarine species" (Fernald, 1950). Taxonomic question.
<i>B. hyperborea</i> Greene var. <i>colpophila</i> (Fernald & St. John) Fernald	tidal mud flats	P1 (1)	RSTR SMAS SLR DSJCT	Collected only once in 1928. Although there is a taxonomic question involved, Fernald (1950) treated <i>B. hyperborea</i> as a polymorphic species with five varieties, each strikingly isolated.
<i>Eupatorium leucolepis</i> (DC.) Torrey & Gray var. <i>novae-angliae</i> Fernald	fresh water beaches; peaty pond margins	P1 (2)	ENNE HW NLR VULN	The typical variety comes as far north as Long Island. Our variety is known only from a few localities in Plymouth Co. and RI. It may be a good species. Listed by Ayensu & DeFilipps (1978).
<i>E. rotundifolium</i> L.	wet, sandy soils	No, Es, Hp (4)	HW NR	Fernald (1950) gives its northernmost location as Long Island. The latest collection, in Hampshire Co., was in 1975. Also extant on Nantucket. The species may be adventive this far north.
<i>Gnaphalium purpureum</i> L.	sandy soils; pond edges	Na, Du, Ba, Md (6)	NR	Like the above, this species may well be adventive this far north.
<i>Helianthus giganteus</i> L.	dry fields	Md (1)	SMAS ELR DSJCT	Collected once in 1885. Station is almost certainly extirpated.
<i>Petasites palmatus</i> (Aiton) Gray (= <i>P. frigidus</i> (L.) Fries var. <i>palmatus</i> (Aiton) Cronquist)	swamps; low wet woods; clearings	No, Wo, Hp, Fr, Be (7)	SLR LCAL	Last verified, extant 1916.
<i>Sclerolepis uniflora</i> (Walter) BSP.	springs; pond shores	Wo (1)	SMAS VULN DSJCT	Collected once in 1911. Its main range terminates in s. NJ, although there is one other disjunct station in s. NH. <i>Wallum Lake in Oxbridge?</i>

SPECIES	PREFERRED HABITAT	COUNTIES (# TOWNS)	SIGNIFICANCE	COMMENTS
Solidago erecta Pursh	moist fields; thin woods	No, Md (3)	NLR FEW VULN	Last verified extant 1970.
S. hispida Muhlenberg var. hispida <i>MSX</i>	woods; rivers	Fr, Be (4)	FEW	Last verified extant 1933.
S. macrophylla Pursh	mountain tops	Hp, Be (2)	FEW	Still extant in Berkshire Co. Hampshire Co. sStation apparently extirpated.
S. rigida L.	dry soils; hillsides; calcareous ledges	Be (1)	SMAS ELR	Last verified extant 1920.

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Appendix I: Summary by taxonomic categories, counties, and selected criteria.

	Pteridophytes	Monocots	Dicots	Total
# Families	7	13	46	66
# Genera	11	46	84	141
# Species	19	104	119	242

# species/county	# species in only that county	# species/county	# species in only that county
Nantucket	38	Middlesex	57
Dukes	30	Essex	37
Barnstable	63	Worcester	45
Plymouth	47	Hampden	32
Bristol	31	Hampshire	47
Norfolk	36	Franklin	52
Suffolk	13	Berkshire	102

<u>Single stations</u>		<u>Declining or vulnerable</u>		<u>Restricted Range</u>	
SNES	5	DLN	45	ENMA	2
SMAS	<u>51</u>	VUN	<u>24</u>	ENNE	4
	56		69	RSTR	<u>12</u>
					18

Appendix II: Common Names

Common names are the English or vernacular names in common use for plants. They can be confusing; they differ in different languages and between different areas, and different species can have the same common name. Therefore, when using common names, it is important to refer to the scientific names for clarity.

The common names given here are from Gray's Manual of Botany, eighth edition (Fernald, 1950). In cases where a plant is not well enough known to have a common name, the common name of the genus is given where appropriate. For example, Isoetes foveolata is listed as "a quill-wort; no common name". In most cases, botanical varieties do not have individual common names. Varieties are not given in this list.

Sometimes it is convenient or desirable to use an English name for a plant that does not have a common name. It is possible to translate the species epithet and use it as an adjective with the common name of the genus. For example, Eleocharis melanocarpa could be called "black-seeded spike-rush", and Polygala Nuttallii could be called "Nuttall's milkwort". For translations of species names, consult Gray's Manual of Botany, eighth edition (Fernald, 1950).

PTERIDOPHYTAEquisetaceae

Equisetum palustre

E. scirpoides

E. variegatum

Lycopodiaceae

Lycopodium alopecuroides

L. carolinianum

L. Selago

Selaginaceae

Selaginella rupestris

Isoetaceae

Isoetes Eatonii

I. foveolata

I. macrospora

I. saccharata

Ophioglossaceae

Ophioglossum vulgatum

Schizaeaceae

Lygodium palmatum

Polypodiaceae

Asplenium montanum

A. Ruta-muraria

Cryptogramma Stelleri

Diplazium pycnocarpon

Pellea atropurpurea

Polystichum Braunii

SPERMATOPHYTAMONOCOTYLEDONAESparganiaceae

Sparganium minimum

Zosteraceae

Potamogeton Friesii

P. Hillii

P. lateralis

P. strictifolius

FERNS AND FERN ALLIES

Horsetail or scouring-rush family

marsh horsetail

dwarf scouring-rush

variegated horsetail

Clubmoss family

fox-tail clubmoss

a clubmoss; no common name

mountain or fir clubmoss

Spikemoss family

a spikemoss; no common name

Quillwort family

a quillwort; no common name

a quillwort; no common name

a quillwort; no common name

a quillwort; no common name

Adder's tongue family

adder's tongue fern

Curly-grass family

climbing fern

Fern family

mountain spleenwort

wall-rue

fragile or slender cliff-brake

narrow-leaved spleenwort

purple cliff-brake

Braun's holly-fern

SEED PLANTSMONOCOTS

Bur-reed family

a bur-reed; no common name

Pondweed family

a pondweed; no common name

a pondweed; no common name

a pondweed; no common name

a pondweed; no common name

<u>Najadaceae</u>	Naiad family
<i>Najas guadalupensis</i>	a naiad; no common name
<u>Alismataceae</u>	Water-plantain family
<i>Echinodorus tenellus</i>	a burhead; no common name
<i>Sagittaria cuneata</i>	wapato
<i>S. teres</i>	an arrowhead; no common name
<i>Lophotocarpus spongiosa</i>	no common name
<u>Gramineae</u>	Grass family
<i>Aristida purpurascens</i>	a needlegrass; no common name
<i>A. tuberculosa</i>	sea-beach needlegrass
<i>Calamagrostis Pickeringii</i>	a reed-bentgrass; no common name
<i>Elymus arenarius</i>	sea lyme-grass, strand-wheat
<i>Milium effusum</i>	a millet-grass; no common name
<i>Muhlenbergia capillaris</i>	hairgrass
<i>Panicum auberne</i>	a panic-grass; no common name
<i>P. Boscii</i>	a panic-grass; no common name
<i>P. Commonsianum</i>	a panic-grass; no common name
<i>P. Gattingeri</i>	a panic-grass; no common name
<i>P. longifolium</i>	a panic-grass; no common name
<i>P. philadelphicum</i>	a panic-grass; no common name
<i>P. polyanthes</i>	a panic grass; no common name
<i>P. scoparium</i>	a panic grass; no common name
<i>P. Wrightianum</i>	a panic-grass; no common name
<i>Paspalum laeve</i>	no common name
<i>Puccinellia paupercula</i>	an alkali- or goose-grass; no common name
<i>Setaria geniculata</i>	a bristly fox-tail; no common name
<i>Spartina cynosuroides</i>	salt reed-grass
<i>Sporobolus heterolepis</i>	northern drop-seed
<i>Tripsacum dactyloides</i>	a gama- or sesame-grass; no common name
<u>Cyperaceae</u>	Sedge family
<i>Carex alopecoidea</i>	a sedge; no common name
<i>C. Baileyi</i>	a sedge; no common name
<i>C. Bushii</i>	a sedge; no common name
<i>C. Davisii</i>	a sedge; no common name

<i>Carex flaccosperma</i>	a sedge; no common name
<i>C. formosa</i>	a sedge; no common name
<i>C. Grayi</i>	a sedge; no common name
<i>C. Hitchcockiana</i>	a sedge; no common name
<i>C. lenticularis</i>	a sedge; no common name
<i>C. livida</i>	a sedge; no common name
<i>C. Michauxiana</i>	a sedge; no common name
<i>C. molesta</i>	a sedge; no common name
<i>C. oligocarpa</i>	a sedge; no common name
<i>C. pauciflora</i>	a sedge; no common name
<i>C. polymorpha</i>	a sedge; no common name
<i>C. salina</i>	a sedge; no common name
<i>C. Schweinitzii</i>	a sedge; no common name
<i>C. sterilis</i>	a sedge; no common name
<i>C. striatula</i>	a sedge; no common name
<i>C. tetanica</i>	a sedge; no common name
<i>C. trichocarpa</i>	a sedge; no common name
<i>C. typhina</i>	a sedge; no common name
<i>C. Walteriana</i>	a sedge; no common name
<i>C. Willdenowii</i>	a sedge; no common name
<i>Cyperus Engelmannii</i>	an umbrella-sedge; no common name
<i>C. ferruginescens</i>	an umbrella-sedge; no common name
<i>Eleocharis ambigens</i>	a spike-rush; no common name
<i>E. calva</i>	a spike-rush; no common name
<i>E. equesitoides</i>	a spike-rush; no common name'
<i>E. intermedia</i>	a spike-rush; no common name
<i>E. melanocarpa</i>	a spike-rush; no common name
<i>E. ovata</i>	a spike-rush; no common name
<i>E. quadrangulata</i>	a spike-rush; no common name
<i>E. tricostata</i>	a spike-rush; no common name
<i>Fuisena pumila</i>	dwarf umbrella-grass
<i>Psilocary nitens</i>	a bald-rush; no common name
<i>P. scirpoides</i>	a bald-rush; no common name
<i>Rhynchospora inundata</i>	horned-rush

Rhynchospora Torreyana	a beak-rush; no common name
Scirpus ancistrochaetus	a bulrush; no common name
S. fluviatilis	river bulrush
S. Hallii	a bulrush; no common name
S. lineatus	a bulrush; no common name
S. Longii	a bulrush; no common name
Scleria reticulata	a nut-rush; no common name
S. triglomerata	a nut-rush; no common name
<u>Araceae</u>	Arum family
Arisaema dracontia	green dragon
Orontium aquaticum	golden club
<u>Eriocaulaceae</u>	Pipewort family
Eriocaulon Parkeri	a pipewort; no common name
<u>Juncaceae</u>	Rush family
Juncus biflorus	a rush; no common name
J. pervetus	a rush; no common name
Luzula parviflora	a wood-rush; no common name
<u>Liliaceae</u>	Lily family
Chamaelirium luteum	blazing-star, rattlesnake-root, fairy-wand
Smilax Bona-nox	a greenbriar or catbriar; no common name
Streptopus amplexifolius	white mandarin, twisted-stalk
Uvularia grandiflora	large-flowered bellwort or wild oats
<u>Haemodoraceae</u>	Redroot family
Lachnanthes tinctoria	redroot
<u>Iridaceae</u>	Iris family
Sisyrinchium arenicola	a blue-eyed grass; no common name
<u>Orchidaceae</u>	Orchis or orchid family
Aplectrum hyemale	putty-root
Arethusa bulbosa	swamp-pink
Cypripedium arietinum	ram's-head lady's-slipper
C. reginae	showy lady's-slipper
Isotria medeoloides	small whorled pogonia
Isotria verticillata	whorled pogonia
Listera cordata	heartleaf twayblade
Malaxis monophyllos	an adder's-mouth; no common name

<i>Platanthera ciliaris</i>	yellow fringed orchis
<i>P. cristata</i>	crested yellow orchis
<i>P. dilatata</i>	leafy white orchis
<i>P. flava</i>	pale green orchis
<i>P. obtusata</i>	blunt-leaf orchis
<i>Spiranthes vernalis</i>	a ladies'-tresses; no common name
<i>Tipularia discolor</i>	crane-fly orchis
<i>Triphora trianthophora</i>	nodding pogonia
<u>DICOTYLEDONAE</u>	<u>DICOTS</u>
<u>Salicaceae</u>	Willow family
<i>Salix candida</i>	hoary willow
<i>S. interior</i>	sandbar willow
<i>S. serissima</i>	autumn-willow
<u>Corylaceae</u>	Hazel family
<i>Alnus crispa</i>	green or mountain-alder
<i>Betula pumila</i>	low or swamp-birch
<u>Fagaceae</u>	beech family
<i>Quercus macrocarpa</i>	mossy-cup oak
<i>Q. Muehlenbergii</i>	yellow oak
<i>Q. stellata</i>	post-oak
<u>Loranthaceae</u>	Mistletoe family
<i>Arceuthobium pusillum</i>	dwarf mistletoe
<u>Polygonaceae</u>	Buckwheat family
<i>Polygonum glaucum</i>	sea-beach knotweed
<i>P. puritanorum</i>	a smart-weed; no common name
<i>P. setaceum</i>	a smartweed; no common name
<i>Rumex pallidus</i>	white dock, sea-beach dock
<u>Chenopodiaceae</u>	Goosefoot family
<i>Suaeda americana</i>	a sea-blite; no common name
<i>S. Richii</i>	a sea-blite; no common name
<u>Portulacaceae</u>	Purslane family
<i>Claytonia virginica</i>	spring-beauty
<u>Caryophyllaceae</u>	Pink family
<i>Arenaria macrophylla</i>	a sand-wort; no common name
<i>A. stricta</i>	rock sand-wort

Paronychia argyrochoma var. albi-montana	White Mountain silverling or silvery- whitlow-wort
Sagina nodosa	a pearlwort; no common name
<u>Nymphaeaceae</u>	Water-lily family
Nymphaea tuberosa	a water-lily; no common name
<u>Ranunculaceae</u>	Crow's-foot or buttercup family
Cimicifuga racemosa	black cohosh or snakeroot
Clematis verticillaris	purple clematis
Ranunculus longirostris	white water-crowfoot
R. subrigidus	white water-crowfoot
<u>Magnoliaceae</u>	Magnolia family
Magnolia virginiana	laurel-magnolia, sweet-bay magnolia
<u>Papaveraceae</u>	Poppy family
Adlumia fungosa	climbing fumitory
<u>Cruciferae</u>	Mustard family
Cardamine Douglassii	a bitter-cress; no common name
<u>Droseraceae</u>	Sundew family
Drosera filiformis	dew-thread or thread-leaf sundew
<u>Podostemaceae</u>	Riverweed family
Podostemum ceratophyllum	threadfoot
<u>Saxifragaceae</u>	Saxifrage family
Ribes americanum	wild black currant
R. lacustre	bristly black currant
R. triste	red currant
<u>Rosaceae</u>	Rose family
Amelanchier Bartramiana	mountain juneberry
A. nantucketensis	Nantucket juneberry
A. sanguinea	a juneberry or shadbush or service- berry; no common name
Prunus depressa	sand cherry
Pyrus decora	mountain-ash, roundweed, dogberry
Rosa acicularis	a rose; no common name
Waldsteinia fragarioides	barren strawberry
<u>Leguminosae</u>	Pulse, bean or pea family
Desmodium sessifolium	begger's-ticks or tick-trefoil
<u>Linaceae</u>	Flax family
Linum intercursum	a flax; no common name

Linum sulcatum	a flax; no common name
<u>Polygalaceae</u>	Milkwort family
Polygala Nuttallii	a milkwort; no common name
P. Senega	Seneca-snakeroot
<u>Callitrichaceae</u>	Water-starwort family
Callitriche deflexa	a water-starwort or water-chickweed
<u>Empetraceae</u>	Crowberry family
Corema Conradii	broom-crowberry
<u>Limnanthaceae</u>	False mermaid family
Floerkea proserpinacoides	false mermaid
<u>Aquifoliaceae</u>	Holly family
Ilex montana	mountain-holly
<u>Guttiferae</u>	St.-John's-wort family
Ascyrum Hypericoides	St. Andrew's cross
Hypericum adpressum	creeping St.-John's-wort
H. spathulatum	shrubby St.-John's-wort
<u>Elatinaceae</u>	Waterwort family
Elatine americana	a waterwort; no common name
<u>Cistaceae</u>	Rockrose family
Helianthemum dumosum	a rock-rose; no common name
<u>Violaceae</u>	Violet family
Viola adunca	a violet; no common name
V. nephrophylla	a violet; no common name
<u>Cactaceae</u>	Cactus family
Opuntia compressa	prickly-pear
<u>Lythraceae</u>	Loosestrife family
Cuphea petiolata	Clammy cuphea or blue waxweed
Rotala ramosior	tooth-cup
<u>Melastomaceae</u>	Melastoma family
Rhexia mariana	a deergrass or meadow-beauty; no common name
<u>Onagraceae</u>	Evening-primrose family
Ludwigia polycarpa	a false loosestrife; no common name
L. sphaerocarpa	a false loosestrife; no common name
<u>Haloragaceae</u>	Water-milfoil family
Myriophyllum alterniflorum	a water-milfoil; no common name

Myriophyllum pinnatum	a water-milfoil; no common name
<u>Araliaceae</u>	Ginseng family
Panax quinquefolius	ginseng
<u>Umbelliferae</u>	Parsley family
Angelica venenosa	angelica
Conioselinum chinense	hemlock-parsley
Hydrocotyle verticillata	water-pennywort
<u>Ericaceae</u>	Heath family
Pyrola asarifolia	pink pyrola or pink wintergreen
Rhododendron maximum	rosebay laurel
Vaccinium Vitis-Idaea	mountain cranberry
<u>Ebenaceae</u>	Ebony family
Diospyros virginiana	common persimmon
<u>Gentianaceae</u>	Gentian family
Gentiana crinita	fringed gentian
Halenia deflexa	spurred gentian
Sabatia campanulata	a sabatia; no common name
S. Kennedyana	Plymouth gentian
S. stellaris	sea-pink, marsh-pink
<u>Asclepiadaceae</u>	Milkweed family
Asclepias tuberosa	butterfly-weed
<u>Hydrophyllaceae</u>	Waterleaf family
Hydrophyllum canadense	a waterleaf; no common name
<u>Boraginaceae</u>	Borage family
Cynoglossum boreale	northern wild comfrey
Mertensia maritima	sea-lungwort or oysterleaf
Gnosmodium virginianum	a false-gromwell or marble-seed; no common name
<u>Labiatae</u>	Mint family
Agastache scrophulariifolia	purple giant hyssop
Blephila ciliata	no common name
B. hirsuta	wood-mint
Isanthus brachiatus	false pennyroyal
Pycnanthemum clinopodioides	a mountain-mint or basil; no common name
Scutellaria integrifolia	a skullcap; no common name

Stachys <i>hyssopifolia</i>	a hedge-nettle; no common name
<u>Scrophulariaceae</u>	Figwort or snapdragon family
<i>Agalinus acuta</i>	no common name
<i>Mimulus alatus</i>	monkey-flower
<i>M. moschatus</i>	musk-flower
<i>Pedicularis lanceolata</i>	a lousewort or wood-betony; no common name
<i>Schwalbea americana</i>	chaffseed
<i>Veronica comosa</i>	water-speedwell
<u>Lentibulariaceae</u>	Bladderwort family
<i>Utricularia biflora</i>	a bladderwort; no common name
<i>U. fibrosa</i>	a bladderwort; no common name
<u>Rubiaceae</u>	Madder family
<i>Galium labradoricum</i>	a bedstraw; no common name
<i>Houstonia lanceolata</i>	no common name
<u>Caprifoliaceae</u>	Honeysuckle family
<i>Lonicera hirsuta</i>	hairy honeysuckle
<i>Viburnum Rafinesquianum</i>	downy arrow-wood
<u>Compositae</u>	Composite family
<i>Aster concolor</i>	an aster; no common name
<i>A. infirmus</i>	an aster; no common name
<i>A. prenanthoides</i>	an aster; no common name
<i>A. ptarmicoides</i>	an aster; no common name
<i>A. tardifolius</i>	an aster; no common name
<i>A. Tradescantii</i>	an aster; no common name
<i>Bidens Eatonii</i>	a bur-marigold; no common name
<i>B. hyperborea</i>	estuary beggar-ticks
<i>Eupatorium leucolepis</i>	no common name
<i>E. rotundifolium</i>	no common name
<i>Gnaphalium purpureum</i>	purple cutweed
<i>Helianthus giganteus</i>	a sunflower; no common name
<i>Petasites palmatus</i>	a sweet coltsfoot; no common name
<i>Sclerolepis uniflora</i>	no common name
<i>Solidago erecta</i>	a goldenrod; no common name
<i>S. hispida</i>	a goldenrod; no common name
<i>S. macrophylla</i>	a goldenrod; no common name
<i>S. rigida</i>	a goldenrod; no common name

Places:

M. Dunn Pond
Winton Pond
Mt. Toby
Mt. Greylock
Kentucket

Species

L. Moxosodus
Lygodium - Hydrum sp
Asplenium montanum
Cryptogramma
P. Braunii
P. latifolius
P. strichfolius

RSTR:

S. teres*
H. dumosum
S. Kenney -
A. acuta
A. nantucketensis
P. agyrocama
S. Langii
E. leucolepis*
P. puritanorum*

RARE!

R. inundata
R. Treayana
J. biflorus
R. maxima
Orontium

Classics

Orontium
Lygodium