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**Recent Changes in Plant Species Diversity in Pelham Bay Park, Bronx County,  
New York City, 1947-1998**

**by**

**Robert DeCandido**

A dissertation submitted to the Graduate Faculty in Biology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

2001

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This manuscript has been read and accepted for the Graduate Faculty in Biology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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**Abstract****Recent Changes in Plant Species Diversity in Pelham Bay Park, Bronx County**

1946-1998

by

Robert DeCandido

Adviser: Professor Janis Roze

Changes in plant species diversity from 1947-1998 of Pelham Bay Park, Bronx County, New York City were evaluated. In a baseline study of the flora compiled in 1946-47 by Harry E. Ahles (1924-1981), 668 plant species in 108 families were collected. The vast majority of these (477 or 71.4%) were native species, while 188 (28.1%) were non-native (alien) species. In the intervening fifty-one years the plant diversity of Pelham Bay Park (PBPK) significantly changed. By 1998, 792 species from 117 families were documented. Of these, 440 species (55.6%) were considered native and 302 (38.1%) considered non-native. This was a net increase of 136 non-native species (+ 37.1%) and a net loss of 141 native species (- 25.3%). The vast majority of the extirpated native species were herbaceous plants such as wildflowers, grasses, sedges and rushes.

Similar patterns of extirpation have affected parks and other natural areas throughout New York City from 1925-2000. Of the 1,356 native plant species ever documented from New York City, 582 have been extirpated, a loss of 43% of the native flora. Altogether, 91.2% of the plant species extirpated were herbaceous species, primarily from meadow-type habitats. Ten families containing only native

herbaceous species have been lost from New York City. By comparison, no families of woody plants, and only 51 total native woody species have been extirpated. Overall, the pattern of plant extirpations in natural areas of New York City and PBPK were similar: native herbaceous species of meadow-type habitats were significantly more likely to be extirpated than native woody species or any type of non-native species. Two primary factors are associated with changes in plant species diversity in natural areas: development including the placement of landfills, parking lots, recreational areas and highways; and to a lesser degree natural processes such as ecological succession.

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The research and writing of this dissertation would not have been possible were it not for the encouragement and sage advice of Dr. Jess Hanks of City College. Similarly, the many years of field work and help with difficult plant identifications were made easier with the assistance and companionship of Mr. Howard Becker of the Bronx.

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## **Introduction**

Biodiversity is a measure of the species richness of an area, as well as the genetic variability of those organisms (Groombridge, 1992). The study of biodiversity also encompasses a strong interest in the safe management and sustainable utilization of those species (Margules and Pressey, 2000; Reid and Miller, 1989). While determining the total number of species at a study site is of scientific interest, the preservation of biological diversity within a larger area can also have positive tangible effects for people both locally and globally (Chapin et al., 2000). These include new pharmaceutical drugs (Grifo and Rosenthal, 1997), environmental stability and quality (Hobbs and Huenneke, 1992; Myers, 1993; Tilman, 2000; Tilman and Downing, 1994), ecotourism (Dobson, 1996), and aesthetic values, including the protection of biodiversity for its own sake (Kellert and Wilson, 1993). Ultimately, the degree to which a nation values its biological heritage will determine the future of those species, and in some measure, the preservation of all species on this earth (Kellert, 1996; Norton, 1994). Although other environmental problems such as ozone depletion or desertification are reversible in a finite amount of time, when a particular species is lost from the earth, it is lost forever (Wilson, 1992).

Rather than solely being a philosophical argument for preserving species for their own sake, the preservation of biodiversity is of economic and ecological importance (Gillis, 1991; McNeely, 1988; Myers, 1994; Randall, 1991). Indeed, species may have values that are unused or unknown at present but could enhance the material well-being of mankind in the future. Several studies have documented the importance of formerly not well-known plant species in the development of prescription drugs (Grifo and

Rosenthal, 1997). Ecological research has also indicated that the more species in an ecosystem, the more stable or productive it is (Baskin, 1994; McCann, 2000; Naeem et al., 1994; Tilman and Downing, 1994). Interestingly, some of the poorest countries on the earth such as Haiti and Bangladesh are those in which the environment has been devastated, and a number of species have declined or have been extirpated. In such degraded environments, the decline of biodiversity has directly affected human health (Hardoy et al., 1992; World Resources Institute, 1996).

The emerging field of biochemical prospecting for new drugs derived from rain forests and coral reef species will provide health benefits for people. It is believed that pharmaceutical companies will earn as much as several billion dollars in revenue each year for successfully developing and marketing those drugs (Artuso, 1996). Biodiversity from natural areas provides other economic benefits as well. A study by the New York Botanical Gardens (Peters et al., 1989) of a patch of Amazonian rain forest demonstrated the value of fruit, latex and timber to the local economy. The researchers found that the value of a hectare of rain forest for its raw products was ten times more than if the patch was cut for timber, and three times greater than if converted to cattle pasture. Not included in this economic evaluation was the value the forest provided in terms of local watershed maintenance or mitigating the larger effects of global warming.

A stable and species rich environment provides a degree of economic security, and also supports the social fabric of a society. Cairncross (1992) reported the importance of wild (non-domesticated) foods in developing countries such as Ghana where over 75%

of the animal protein that people consume comes directly from forests and other natural lands. Others have documented the importance of species rich areas in traditional health systems (e.g., Cox and Balick, 1994). Loss of these natural areas would lead to temporary, if not long-term hardship for many people living in the third world. Part of the difficulty in assessing the importance of these natural areas is determining their economic impact. The money exchanged (or goods bartered) is part of an invisible economy, and may seem small by western standards. However, several hundred dollars earned in a rural area of a third world country can sustain a family for a year. For example, by selling the fruit of wild Piquia (*Caryocar villosum*) and Bacuri trees (*Platonia insignis*), women in the Brazilian Amazon were able to purchase enough clothes for their families for one year (Shanely, 1999). One sack of fruit sold at market brought ten times the value of a sack of cassava flour produced from nearby clearings in the forest (Shanely, 1999). Conversely, Myers (1994) has documented the great increase in emigration to cities and even other nations when formerly productive agricultural land in these tropical countries was sufficiently degraded so that the land could no longer support people who depended upon it. The economic cost of providing even basic health care or nutrition for these emigrants to cities in the Third World, or after their arrival in developed nations, is unknown.

A study for the World Wildlife Fund determined that ecotourists spent more per capita than all other types of tourists (Boo, 1990). Ecotourism, often spawned by an area's biological richness appears to be the tourist industry's fastest growing sector (Alpine 1986; Groom et al., 1991). Here in the United States non-consumptive users of wildlife now eclipse the numbers of hunters and anglers (USDI, 1993). For example, bird

watching is among the most popular of non-consumptive wildlife activities, and the United States Fish and Wildlife Service estimated that by 1991, more than 76 million people were engaged in bird-related recreation (USDI, 1993). Payne (1991) in a survey of the active members of the Texas Ornithological Society, found that members spent an average of more than \$2,000 annually on bird watching related travel. Not included in this study were other expenditures for bird watching related items such as equipment, memberships in birding or environmental organizations, subscriptions to nature magazines or the purchase of field guides. Also not included in this economic assessment was money spent on land acquisition for the establishment of wildlife sanctuaries, site maintenance or facility construction and repair. At Cape May in New Jersey the net economic impact of bird watching was approximately 10 million dollars in 1992, and at the Hawk Mountain Sanctuary in Pennsylvania, bird watchers spent about 2.4 million dollars in that same year (Kerlinger and Brett, 1996). Overall, Kerlinger and Wiedner (1990) estimated that total expenditures by bird watchers in one year (1981) in the United States amounted to 20 billion dollars. Clearly, the full economic impact of ecotourism both in the United States and the world is much greater.

While there are a few economists who question the urgency of biodiversity protection (Easterbrook, 1995; Simon, 1984; Simon, 1996; Simon and Wildavsky, 1984) there is no organized, scientifically reputable group that advocates for the destruction of species, nor are there even serious advocates of a do nothing approach to the problem of species extinctions (Norton, 1994). However, although the economic argument is an important one, ultimately the preservation of biodiversity will depend on ethics: the

degree to which we as humans value the natural world in which we evolved, and how we view our relation to it (Wilson, 1992). Other factors such as public education and political maneuvering are and will be important in the conservation of species (Heywood, 1994; Tobin, 1990).

To date, an estimated 1.7 million species have been described and named, while there remain an estimated five to 100 million species yet to be discovered on earth (Balkwill, 1989; Hawksworth, 1991; May, 1990; Wilson, 1988). Surprisingly, we do not even know to within an order of magnitude the total number of species on this planet. Some taxonomists believe that there may be in excess of 100 million species, while others consider a figure of 8-12 million to be more likely (Erwin, 1988; Gaston, 1992; Stork, 1993; Van Dover, 1990). Surveying those groups with the greatest number of described species, it is apparent that invertebrates dominate the faunas of all environments. For example of the multicellular animals, there are approximately 950,000 described species of insects, with at least several million more yet to be discovered (Gaston, 1992). Of described species of insects held in collections throughout the world, the order Coleoptera has the greatest number of species followed by the Lepidoptera and Diptera (Brusca and Brusca, 1990). Of the higher (vascular) plants the order with the greatest diversity is the angiosperms, with approximately 250,000 species. Within this order, the orchid family (Orchidaceae) has the most species with approximately 25,000-35,000 species held in museum collections and described in scientific journals (Cronquist, 1981). Generally, for both plants and animals, species richness increases as one moves closer to the tropics (Purvis and Hector, 2000), although

important exceptions do exist (Grassle and Maciolek, 1992; Rex et al., 1993; Schall and Pianka, 1978). Finally, as censusing of previously inaccessible areas such as the deep-sea benthos continues, scientists may revise the estimated number of organisms upward once again (Grassle and Maciolek, 1992).

The area for greatest arthropod diversity, indeed the greatest richness of all species, is the canopy of the tropical rainforest (Bibby, 1992; Dobson, 1996; Erwin, 1982; 1988). Although these tropical forests cover only about 6% of the world's surface, they are believed to contain at least as many species as the rest of the world. Myers (1990; 1994) has pointed out that there are certain areas within the tropics that are especially rich in species diversity. These 14 "hot-spot" areas taken together comprise less than one per cent of the earth's surface, but contain an estimated 50,000 or 20% of earth's plant species and a still larger proportion of animal species. If, as anticipated, these locations undergo widespread environmental destruction within the foreseeable future, there will likely be a mass extinction greater than any since the dinosaurs disappeared some 65 million years ago (Wilson, 1992).

It is at the species or alpha level of diversity that scientists share more agreement than for other taxonomic categories (such as the genus or family level). However, the concept of exactly what constitutes a species varies among taxonomists, while others have difficulty defining any basic taxonomic unit of evolution (Nelson, 1989). In turn, the definition of a species one adopts to a large degree determines how many total species are believed to exist. Perhaps the most difficult aspect of this problem is that of variation.

All animals and plants show variation or subtle differences such that every individual within a population is unique. For example, within a population variation can be continuous (such as length or weight) or discontinuous (such as sex). The difficulty with determining what is variation within a population and the differences between discrete groups constitutes the species problem. Scientists are divided into two major camps in their definition of what constitutes a species. Those that favor a biological species concept, such as Ernst Mayr, emphasize reproductive isolation as the defining character of a species. That is, a species is a group of interbreeding (or potentially interbreeding) individuals that are reproductively isolated from other such groups (Mayr, 1970; Mayr, 1982). The biological species concept or some variant of it, is probably the most widely accepted view of the species held today. By comparison, in the phylogenetic species concept, species are "the smallest aggregation of populations (in the case of sexually reproducing species) or lineages (in those reproducing asexually) that are diagnosable by a unique combination of character states in comparable individuals" (Nixon and Wheeler, 1990). This view of a species places the emphasis not on the reproductive process but upon differentiation of form. Evidence of reproductive isolation then becomes only one of a suite of characters used to define a given species. However, it does solve the problem of defining exactly what constitutes a species in those groups that reproduce asexually. A potential difficulty with the phylogenetic species concept if taken to its logical conclusion is that any unique population or morph could be elevated to separate species status. One consequence of applying the phylogenetic species concept would be a very large increase in the number of species recognized (Nelson and Platnick, 1981). In turn, this would move the total number of species believed to exist on the earth

closer to the 100 million estimate.

It was Whittaker (1972) who was the first to distinguish three different types of biodiversity: alpha, beta and gamma diversity. Alpha diversity is the number of species in a single area (species richness) and their relative abundance. The beta and gamma diversity concepts relate to changes in diversity between sites at the local or habitat level (beta) and geographical (gamma) or continental scales. An essential part of these related but different definitions of biodiversity is the degree to which species present at one site are replaced by others at different sites. However, there are problems with developing an index of biodiversity which integrates all three levels into a comprehensive measurement. For example, species richness takes no account of the differences between species (taxonomic uniqueness) nor their relative abundance. That is, a habitat which contains four species of sparrows would be considered as diverse as one which contains four species from different classes. Similarly, abundance is not a fixed property of species, as it varies widely from time to time and place to place (Rosenzweig, 1995). On a practical level, determining a biodiversity index for a complex environment such as a patch of rainforest is virtually impossible, since most taxa are small, cryptic or highly seasonal in abundance. Similarly, in other areas where regional floras and faunas have been completed such as in the northeastern United States, the actual field work of determining what exists within a specific patch of forest, field or lake has not been yet been comprehensively attempted.

How has biodiversity been produced? What is the history of diversity through time? What factors (such as geological forces, as well as biological and ecological interactions) can account for the production of so many species? Has diversity remained constant, or have there been times of even greater species diversity in the geologic past? Do times of increased speciation rates follow extinction spasms, or are speciation and extinction only fortuitously linked? Why are tropical moist forests believed to hold so many more species than other habitats of similar size? Do tropical rain forests or coral reefs contain more species? Which is more diverse, a similar-sized patch of rainforest in South America, Asia or Central Africa? Which orders have a greater diversity in the rainforests of South America than in Africa? Which orders are more diverse in the temperate regions of the world than the tropics? These are some of the theoretical questions which biodiversity research addresses (Gaston, 2000; Plotkin et al., 2000; Rosenzweig, 1995).

In the history of science, one of the most spirited debates is centered on the history of diversity including the geographical origin of species, and the biogeographical provinces and areas of endemism of the earth. These debates can be traced back at least to the 18th century in the writings of Linnaeus, Buffon and Humboldt (Larson, 1986). More recently, research has been directed at understanding the historical (Signor, 1990), evolutionary (Cracraft, 1985) and ecological (Vermeij, 1987) factors that contribute to high levels of species' richness. Using evidence primarily from the fossil record, some scientists have argued that diversity has essentially remained unchanged for millennia (see Rudwick, 1972). Others have found evidence for a pattern of peaks and declines in

the past (e.g. Bambach, 1985; Valentine et al., 1990). Many scientists of the eighteenth century believed that it was impossible for an entire species to become extinct since this would leave a gap in the perfect creation of the earth by God. Others maintained that species were too adaptively flexible to disappear, and instead were transformed to higher states (Rudwick, 1972). Interestingly, as recently as twenty years ago, several prominent paleobiologists believed that the diversity of marine metazoa has been at equilibrium for the past 600 million years (see Signor, 1990). Other researchers during this time cited evidence from the fossil record for an overall increase in global diversity (Sepkowski and Hulver, 1985). This debate about levels of biodiversity, and equilibrium versus directional change through time, is a central theme in evolutionary paleontology (Valentine, 1990). However, the inherent fragmentary nature of the fossil record must be stressed when evaluating the different positions adopted by scientists (Valentine, 1989). For example, more species are known from the modern world than from the entire fossil record (Jablonski, 1993; Signor, 1990).

Currently, most scientists believe that change in species diversity has been directional and increasing through time from the Cambrian Period (575-525 mya) to the present, punctuated by periodic extinction spasms (Jablonski, 1993). However, taxonomic diversity, as measured by the number of recognized phyla of organisms was greater in the Cambrian than in any later period (Gould, 1990; Morris, 1989). A combination of abiotic and biological factors have been important in determining this pattern both in the marine and terrestrial realms. One abiotic force on the global scale operating over long time periods that has led to an increase in species

diversity is continental drift. There is an extensive body of evidence derived from cladistic analysis of fauna inhabiting different continents, particularly for terrestrial vertebrates. This indicates that plate tectonics, the drift and re-arrangement of continental plates, has had a profound impact on biological diversity. Such an increase in biodiversity has occurred primarily through increasing the number of biogeographic provinces that isolated previously continuous floras and faunas (Signor, 1990). For example, the distribution of important families of fish such as the cichlids in the tropics of Africa, Asia and South America indicates that these regions once comprised a single, continuous land mass. Similarly, the movement of land masses determines the environmental complexity by promoting the number of uplands or barriers such as mountain chains (Cracraft, 1985; Tiffney and Niklas, 1990).

Other factors that promote species or alpha diversification are climate and sea-level change which are important factors in the short-term, from hundreds to a few million years. In turn, biological processes including predator-prey interactions (Vermeij, 1977; 1987) and coevolutionary forces such as cooperation (Lovelock, 1988; Margulis and Fester, 1991; Roughgarden, 1983) have led to increased species richness, especially in terrestrial communities (Signor, 1990). For the angiosperms, which have the highest rate of diversification of the extant plant groups, the evolution of new modes of reproduction (seeds, flowers) and other innovations (wood), combined with biological interactions with terrestrial arthropods (primarily insects), have enhanced the capacity of plants to invade new habitats and increased the number of species within communities (Niklas et al., 1983; 1985). On the other hand according to

Valentine (1989; 1990) and Sepkowski and Hulver (1985), the increase in beta diversity (within habitat diversity) may be the result of ecological specialization. This scenario seems most likely when the beta diversity of benthic marine species is evaluated. Finally, while mass extinctions reduce diversity, extinctions in and of themselves do not cause diversification. Rather the role seems to be a second order effect, primarily by eliminating some groups such as the dinosaurs, and providing the evolutionary opportunity to diversify for those that remain (Sloan et al., 1986).

The geological record indicates that in the history of the earth, there have been at least five major extinction episodes (Raup and Sepkowski, 1982). The most severe which occurred at the end of the Permian Period, eliminating an estimated 96% of all species from the face of the earth (Erwin, 1994). The causes of these extinction waves fall into two major camps: stochastic processes and global cooling. In the former, it is hypothesized that random events cause cataclysmic changes in the biosphere. Such an event may have occurred, and may have been the cause of the decline of the dinosaurs at the end of the Cretaceous Period. This mass extinction is generally agreed to be the result of a comet striking the earth combined with increased volcanic activity (Bakker, 1986). The second key factor correlated with a major extinction spasm is global climate cooling in the extreme, such as at the end of the Pliocene Period some 2.5 mya (Stanely, 1984; 1986). Cooling probably acts to reduce rates of productivity and reduce population size, thereby making species more vulnerable to extinction. Stanely (1984) has argued that cooling may not harm temperate faunas, as these species can migrate to warmer latitudes, but tropical faunas have no geographic escape and are more likely to become

extinct.

Overall, extinction is inevitable for most, if not all species. Indeed, the vast majority of species that have ever existed are now extinct, suggesting that extinction is a natural process (Jablonski, 1993). However since the late Pleistocene, most extinctions that have occurred have been directly or indirectly the result of human activity through hunting or the introduction of non-native species (Martin, 1984). This is especially true on oceanic islands such as Cuba, Hawaii and other islands of the Pacific Ocean (Burney, 1993; Diamond, 1989; Paulay, 1994). In many scientific studies of the last 30 years, probably the most often cited cause of extinction is habitat modification such as forest fragmentation (Sisk et al., 1994). Land use change is projected to have the largest global impact on biodiversity by the year 2100 (Chapin et al., 2000). Smaller habitat patches support fewer individuals and species than contiguous habitats (MacArthur and Wilson, 1967). There are however, certain ecological correlates (life history traits) which make one species more prone to extinction than another. These include: rarity, dispersal ability, degree of specialization, trophic status, adult survival rate, and intrinsic rate of population increase (Groombridge, 1992). Each is briefly described below:

- a.) Rarity - species that are confined to small, isolated and often patchily distributed populations, are more likely to become extinct through both deterministic and stochastic effects.
- b) Dispersal ability - species that have difficulty moving or migrating between habitat patches and are confined to a given area, are more prone to extinction than those which are

good dispersers.

- c) Degree of specialization - Ecological specialists either in food acquisition or habitat utilization, for example, often utilize resources which are patchily distributed in space and/or time. Such species tend to be rare in a given habitat, and are at further risk from stochastic environmental factors.
- d) Trophic status - animals which are higher on the food chain usually have smaller populations than the species they consume. Often such predatory species are also hunted by man putting them at an even greater risk of extinction.
- e) Adult survival rate - species with low fecundity, long gestation periods and/or low survival rates for adults are more likely to become extinct.
- f) Intrinsic rate of population increase - populations which can expand rapidly are more likely to recover after population declines than those which do not. Similarly, species with relatively stable populations are less vulnerable than species with pronounced population fluctuations, since they are less likely to decline below some threshold from which recovery becomes unlikely.

It is assumed that the current rate of extinction for the species of the world is the highest it has been since the last major extinction wave at the transition

from the late Pleistocene to the Holocene some 12,000 years ago. During that time when humans first appeared in the new world, North America lost 73% of its genera of large mammals (greater than 15 kilograms) and South America lost 80%, due to overkill by humans (Barnosky, 1994; Martin and Klein, 1984). During the present time, humans are directly and indirectly responsible for the extinction of most plants and animals. Compared to other mechanisms of extermination, overkill is much less important now than formerly, simply because many of the preferred or susceptible victims have already been eliminated (Diamond, 1989). However, the scale at which humans are altering habitats throughout the world in order to obtain resources is unprecedented. There are more people alive now than ever before, and they have more potent tools of extermination than ever before (World Resources Institute, 1993). In addition, the introduction of alien species that humans intentionally or unintentionally release into new environments has had a major effect in reducing and eliminating native populations. For example, on oceanic islands, introduced predators (rats, cats) have accounted for approximately half of all island bird species extinctions (Diamond, 1989). Similarly, up to 300 species of cichlid fish may have been extirpated from Lake Victoria in East Africa when the Nile Perch, a large predatory fish, was introduced into the lake in the early 1960's (Barel et al., 1991; Echelle and Kornfield, 1984). Introduced diseases (such as avian malaria to Hawaii) have also led to severe declines in populations. Combining this with other factors, chains of extinction may result. For example, in Hawaii extinctions of the Hawaiian honeycreepers led to the extinction or near-extinction of endemic plants of the genus *Hibiscadelphus*, which depended on the honeycreepers for pollination (van Riper et al., 1986). Similarly, on

Panama's Barro Colorado Island, the loss of top predators (jaguar, pumas and harpy eagles) resulted in a population explosion of their prey such as monkeys and coatimundis, which in turn proceeded to exterminate several species of ground nesting birds (Rosenzweig, 1995).

While scientists debate the mechanisms that have produced areas of great biological diversity, or try to determine the phyla and orders with the greatest species richness, we have yet to fully catalogue the living resources of this country. It is only since 1993 that the Department of Interior of the Federal Government has begun developing an initiative to catalogue and map the biodiversity of the United States and its territories. Even in the urban parks of New York City, we do not yet have comprehensive faunal lists of many classes of animals, including the arthropods. Similarly, there are only a handful of in-depth studies of the flora of most city parks. Several of these were completed more than two decades ago. While several parks in and around New York City have been the focus of research (e.g., Greller, 1972; Hanks, 1985; Horenstein, 1989; Lamont and Stalter, 1991; Lefkowitz and Greller, 1973; Loeb, 1993; Simon, 1979), the Bronx has largely been neglected. There are currently no published comprehensive floras for Pelham Bay Park, Van Cortlandt Park or the natural areas along the Bronx River within the New York Zoological Society or the New York Botanical Gardens. In any plan for conservation, either on a local or a national scale, one needs to know what lives in a place before a plan is formulated. Fortunately during the last century, significant collections were made in the New York City region that are now held in such institutions as the American Museum of Natural History, the New York Botanical Garden and the

Museum of the State of New York. For example, in the Bronx, Harry Ahles made an intensive botanical investigation of Pelham Bay Park in 1946-47, but never published the results of this research (Tippo, 1982). Others such as Profous and Loeb (1984), Rudnicky and McDonnell (1989), and McDonnell and Picket (1990), while documenting the presence of certain species at their study sites in the Bronx, have directed their research at determining changes primarily in tree species composition of remnant forest patches in the borough. As a result, by examining museum collections and comparing past to extant species diversity, it is possible to assess historical changes in biodiversity in our area.

Urban parks are significant habitats to study. Here in New York City, these parks still harbor an abundance of resident species that have yet to be completely documented. In addition, many migratory species such as birds and certain insects cannot avoid cities on their long journeys. For these migrants, urban parks constitute important stopover areas for foraging and resting. Globally, it is expected that by the year 2025, two-thirds of the world's people will live in an urban area (United Nations Population Division, 1995). Since more than 75% of the people of this nation already live in or within a few miles of a city (Fox, 1987; Haub and Kent, 1989), urban parks may provide the most significant contact with the environment available for many persons. These parks are typically the ones that most Americans encounter each day. On a purely scientific level, documenting patterns of species extirpations, and understanding the life history traits of alien and recently introduced species is especially relevant for preserving biodiversity in natural areas currently undergoing rapid development or

increased recreational use by visitors (Stohlgren et al., 1999).

New York City natural areas are a mixture of public and private woodlands. Many of the more famous parks in the city system, such Central Park and Prospect Park, were acquired in the mid- to late 19<sup>th</sup> century (Jackson, 1995). In New York City, public parklands alone cover approximately 37,000 acres (20% of the city). These are managed primarily by the City of New York Department of Parks and Recreation, although important small woodlands are also found on institutional ground (McDonnell, 1988). One other significant natural area, the Jamaica Bay Wildlife Refuge (JBWR), the largest park in New York City, is managed by the federal government. Overall, perhaps up to 50% of the acreage protected in public parks can be classified as a “natural area”, specifically set aside to protect the flora and fauna found therein.

Pelham Bay Park and the surrounding area, including parts of lower Westchester County, originally were purchased by Thomas Pell in 1654 from the Siwanoy Indians (Bolton, 1922). During the 19<sup>th</sup> century, the land was further sub-divided. In 1804, John Hunter purchased the large island within Pelham Bay Park that has since been named after him. The Hunter family built a mansion on the property, and landscaped the surrounding woods. The building stood until the 1930's, and to this day evidence of stone walls, cobblestone roads, and gardens can still be seen. In 1839, the Bartow-Pell Mansion was built (Jenkins, 1912). This building still stands along with its formal gardens in the west-central portion of the park. It is now maintained by the International Gardening Club of America. At 2,764 acres, Pelham Bay Park is the largest

park operated by the New York City Department of Parks and Recreation, and the second largest park after the Jamaica Bay Wildlife Refuge in the city. Overall, it is the eighth largest urban park in the United States (Pons, 1987).

Until the 20<sup>th</sup> century, working class people in New York City utilized cemeteries as recreational areas, such as Greenwood Cemetery in Brooklyn. By 1880, there were several wards in New York City where the average population per square mile was approximately 539,713 persons (Schnitz and Loeb, 1984). As a result there was a movement to obtain open space for use by the public. In 1884, the passage of the New Parks Act provided funds for the acquisition of most of the major Bronx parks and parkways: Pelham Bay Park, Van Cortlandt Park, Bronx Park, Crotona Park, St. Mary's Park, Claremont Park, Crotona Parkway, Mosholu Parkway and Bronx and Pelham Parkway (Jenkins, 1912). At the forefront of the movement to acquire parkland for the Bronx was Mr. John Mullaly, an author and editorial writer for the *New York Herald* (Schnitz and Loeb, 1984). At that time what is now the Bronx was a rural area, containing several small villages, farms and abandoned estates. Only the area west of the Bronx River was part of New York City (the 23<sup>rd</sup> and 24<sup>th</sup> Wards), while the area east of the river was still part of Westchester County (Loeb, 1983).

As part of the New Parks Act of 1884, approximately \$2.75 million dollars were appropriated for the acquisition of 1,756 acres of Pelham Bay Park, then part of Westchester County (Schnitz and Loeb, 1984). Originally the park was to contain an aquarium and a zoological garden, as well as an astronomical observatory and a museum

of science and industry (Schnitz and Loeb, 1984). However, opposition was directed against the establishment of a park outside the city limits and beyond municipal jurisdiction (Schnitz and Loeb, 1984). Taxation was another important concern in the discussion about acquiring Pelham Bay Park and other new parks (Schnitz and Loeb, 1984). The tax scheme proposed would have had the 23<sup>rd</sup> and 24<sup>th</sup> Ward residents paying half the cost of the new parks, thereby increasing taxation by more than 90% to residents of those two Wards (Schnitz and Loeb, 1984). Many felt that the cost should be paid by residents of all 24 Wards of the Bronx (Schnitz and Loeb, 1984). The mayors of New York City took strong positions on the new parks issue as well. One objection put forward by the administration of Mayor Franklin Edson to purchasing the land for Pelham Bay Park was that it was not increasing in value, and was not likely to increase for some time (Schnitz and Loeb, 1984). In this view, it was more important to annex the land where the property was situated and decide the park question afterward. Others in the administration wanted more small parks that would be nearer to the working populace than Pelham Bay Park (Schnitz and Loeb, 1984). In 1885, Mayor William R. Grace attempted to employ the debt-limiting New York State Constitutional Amendment of 1885 to block the acquisition of the Bronx parks, maintaining that the city was already past its debt limit (Schnitz and Loeb, 1984). The 1885 amendment limited a city's debt to 10% of its assessed property (Schnitz and Loeb, 1984). This ploy failed on two scores. First, the Mayor used an accounting trick that undervalued the city's assets. Also, the 1885 Amendment came after the 1884 bill for parkland acquisition (Schnitz and Loeb, 1984). Other attacks soon followed by the Grace administration. For example, the new parks movement was accused of being a land swindle with public funds. However,

proponents of the Bronx parks pointed out that the cost for 120 acres comprising Riverside and Morningside Parks in Manhattan were \$60,000 an acre, (for a total of \$7.2 million dollars), and this land was still not accessible to the public (Schnitz and Loeb, 1984). This was three times more costly than the proposed Bronx parkland purchase, and more acreage would be acquired as well. When the opponents' strategy failed (largely because of the efforts of editorials written by John Mullaly in the *New York Herald*), the Grace administration attempted to amend the New Parks Act of 1884 to exclude the purchase funds for Pelham Bay Park (Schnitz and Loeb, 1984). In addition, the administration hired agents to visit tenement houses with false petitions for the occupants to sign that asserted rents would be increased steeply to pay for the new parks (Schnitz and Loeb, 1984). Again, editorials in the *New York Herald* and the *New York Times* defeated these efforts (Schnitz and Loeb, 1984).

By late 1885, the Grace administration's attempted to have the head of the Bureau of Vital Statistics of the Health Department persuade the Real Estate Exchange to drop their support for the new parks (Schnitz and Loeb, 1984). However, the Exchange was in favor of parks because of the positive effect the establishment of parkland had upon nearby land prices (Schnitz and Loeb, 1984). In 1886, the New York City Board of Aldermen petitioned the State Legislature to exclude funds for the purchase of Pelham Bay Park (Schnitz and Loeb, 1984). In the Legislature, one Senator attempted to dispose of the entire issue by presenting a bill, which would repeal the 1884 New Parks Act (Schnitz and Loeb, 1984). Both efforts failed in committee. The last attack on the New Parks Act occurred in 1887 when some eighty residents from the town of Pelham,

Westchester County, presented a petition to the Mayor of New York City, as well as the Aldermen of the Commonality, to repeal the funds for the acquisition of Pelham Bay Park (Schnitz and Loeb, 1984). The appeal was made on the grounds that the appropriation of so much land (about one-half the entire area of Pelham) would, if taxes were not paid by the City of New York, prohibitively increase the tax burden upon Pelham residents. It was then discovered that of the eighty petitioners, only thirty were actually residents of Pelham (Schnitz and Loeb, 1984). Also, of the \$36,957.03 levied in taxes on the town, the thirty residents had paid only \$567.77 of this amount. Ultimately, the 1884 New Parks Act that was passed by both houses of the New York State legislature and signed into law by Governor Grover S. Cleveland prevailed (Schnitz and Loeb, 1984). Pelham Bay Park was officially established as a New York City park in 1888 (Jackson, 1995). In this century, Pelham Bay Park has undergone important changes. Beginning in the 1930's, New York City Department of Parks Commissioner Robert Moses began to transform the park from a series of large islands interspersed with salt marshes and bays to a single contiguous land mass. For example to build Orchard Beach, the rocky New England coast composed of the Hartland Formation (Merguerian and Sanders, 1991; 1993) was removed and covered with sand transported from Brooklyn (Caro, 1974). Pelham Bay itself was filled with refuse of all types and then paved over to make the parking lot adjacent to Orchard Beach and Hunter Island (Caro, 1974). Other areas of Pelham Bay Park were enhanced with amenities such as golf courses, playgrounds, and two highways: the Hutchinson River Parkway and the New England Thruway.

The other significant factor in land transformation that has affected Pelham Bay Park and several other parks in New York City over the last 60 years has been the placement of sanitary landfills or garbage dumps on parkland. In 1934, the United States Supreme Court ruled that New York State's dumping at sea was a nuisance, and ordered it halted (Caro, 1974). This began the land grab of significant portions of New York City parks for the placement of refuse. In effect, elected officials in city government found it less expensive and more convenient to put garbage in parks. Sites selected were usually salt marshes or fresh water wetlands since these areas were viewed as waste areas or places that harbored disease-carrying mosquitoes. According to Pons (1987) sanitary filling was started in all the outlying boros on New York City: Marine Park in Brooklyn (1940); Great Kills Park in Staten Island (1940); Soundview and Ferry Point Parks in the Bronx (1941) and in Kissena Park in Queens (1948). During these years, Parks Commissioner Robert Moses felt that by filling in wetlands with garbage, he could then develop these areas with playgrounds, baseball fields, etc. (Moses, 1950). By 1964, Pelham Bay Park was selected as an appropriate site for a landfill. Although incineration of trash had been instituted in New York City in the 1950's, this option was in jeopardy because clean air laws were being seriously considered in the New York City Council during the early 1960's. As a result, the Department of Sanitation felt that it would be necessary to acquire additional parkland for landfills if incineration of garbage was banned (Pons, 1987).

In 1964, work on an 80-acre site for a landfill in Pelham Bay Park began without much prior notification of the local community or the greater Bronx (Pons, 1987).

Originally, there were plans for approximately 750 acres in various parts of the park to be converted into landfill. As a result, a coalition of environmental groups, Bronx activists and City Island residents joined together to stop further expansion of landfill operations in the park. In addition, the work performed in defense of Pelham Bay Park by such individuals as Virginia Gallagher of City Island, Bronx historian and archeologist Theodore Kazimiroff, and newly elected City Councilman Mario Merola had another important outcome: Most (but not all) of Pelham Bay Park was declared a nature sanctuary by the New York City Council in 1967. However, it would not be until January 1<sup>st</sup>, 1979 that the landfill was finally closed. By this time it had reached 164 feet in height. Since that time New York City has shifted most its landfill operations to the Fresh Kills landfill on Staten Island (Pons, 1987).

Although today the Bronx must seem to many people to represent the worst elements of urbanization, the boro has played an important role in field sciences. Beginning in the early 1920's, a group of approximately nine High School boys banded together to form the Bronx County Bird Club (Kastner, 1986). A few other individuals were given honorary membership during subsequent years, membership was exclusive: one had to live in the Bronx to belong to the Bronx County Bird Club (BCBC). Of the nine original members, several made significant contributions to professional and amateur ornithology. These included Joseph J. Hickey who studied peregrine falcons first in New York City, and then elsewhere (Hickey, 1969). Hickey would later become a professor at the University of Wisconsin, working with and then replacing Aldo Leopold. Two other members of the BCBC would become important figures in amateur

ornithology: Alan Cruickshank and Roger Tory Peterson. Cruickshank would become an accomplished nature photographer, teacher and conservationist for the National Audubon Society. The latter, R.T. Peterson (although born in Jamestown, New York), designed and wrote a field guide to the birds that was published in 1934 which is still in wide use today. His drawings and notes in that book are credited with helping make birdwatching one of the most popular hobbies in North America today.

Other amateurs were also at work on birds and such field sciences as botany and collecting lepidoptera in the Bronx and the New York City region during this time. Although Hickey, Cruickshank and Peterson would become famous nationally, members of the BCBC authored articles that appeared in peer-review journals (Herbert, 1965), local natural history publications (e.g., Kuerzi, 1926), or were cited by authors (e.g., Bull, 1964; Chapman, 1931) for these amateur ornithologists' observations and contributions. Even before the 1920's, Bronx natives were making important natural history contributions. Botanist and ornithologist Eugene (E.P.) Bicknell (1859-1925), born in the Riverdale section of the Bronx was one of the ten founding members of the Linnaean Society (Griscom, 1926). (The Linnaean Society is one of the oldest natural history organizations in North America and still meets twice monthly at the American Museum of Natural History). Bicknell made daily sojourns from his home in the Bronx for approximately 30 years (Griscom, 1926). During this time he made many important ornithological observations (see Bicknell, 1884; 1928), and even had a species of bird named for him (Bicknell's Thrush). However, Bicknell preferred botany to ornithology, and collected plants extensively in the eastern United States (Griscom, 1926). Several

plant species have been named for him including Bicknell's sedge (*Carex bicknellii*). A second botanist from the Bronx in the mid- to late 1940's, Harry Ahles, collected extensively throughout the boro (see Ahles, 1951), and especially in Pelham Bay Park. Ahles, though never earning an advanced degree, went on to be the major contributor to The Flora of North Carolina (Tippo, 1982). His collections made in Pelham Bay Park are now held at the New York State Museum, and have been integral to this research. Another important source for plant species seen in Pelham Bay Park was the field trip reports published in the Bulletin of the Torrey Botanical Club. (For example see: Kaltman 1966a; Kazimiroff, 1977; Moldenke, 1947; Monachino, 1957.)

Beginning in the late 19<sup>th</sup> century, a number of people were collecting Lepidoptera (butterflies and moths) in and around New York City. Some of the primary collectors of moths were J. Angus (Bronx County), T. Bird (Rye in Westchester County), A. Klotts (Pelham in Westchester County and also Connecticut), and R. Latham (Long Island, especially Suffolk County). The collections these individuals made are now housed in the Department of Entomology at the American Museum of Natural History. The time period from approximately 1880 to 1940 was a golden era when field collecting and publishing lists of the local Lepidoptera were important activities of researchers, (Beutenmuller, 1890; 1902; Klotts, 1931; 1932; White, 1894) with occasional publications since that time (Shapiro, 1973).

To briefly sum up, urban parks represent an excellent opportunity to study extant levels of biodiversity in the temperate northeastern United States. These parks are easily

accessible to the scientist and the public, making a unique combination of research and education possible. By studying the urban environment, the habitat in which most Americans live (as well as a growing number of the world's people), we are studying the places in which people spend some of their free time. On a scientific level, many discoveries are still being made in urban parks. For example, it was only recently learned that a significant number of raptors (hawks, eagles and their allies) migrate over New York City, and often stop to feed in New York City parks (DeCandido, 1991a; 1991b). Similarly, several species of plants that are classified as rare in New York State can be found in New York City parks. Such research into extant levels of biodiversity in New York City can then be compared to the extensive collections made in this area primarily from 1880-1960 held at the American Museum and the New York Botanical Garden. In this way one can assess changes in historical levels of biodiversity, and explore other research questions including the biology of rare species, the effect of alien species upon native fauna and flora, and factors contributing to the extirpation and extinction of species.

By developing databases on the distribution and ecological correlates of extant and extirpated species it will be possible to address the following questions: first, are species which are confined to only one habitat type (e.g. forest, meadow, salt marsh) more prone to extirpation than more widespread species? Second, which habitats show the greatest percentage of invasion by non-natives? Do non-native species make up a greater portion of the flora now than in the years prior to 1950? Which species are new to Pelham Bay Park since 1947? Is the rate of extirpation significantly different for

native or non-native species? Is the loss of native species in each habitat compensated for by the colonization of new species? Is the earliest flowering time of extant alien species significantly different than native species? Third, are perennial species and/or woody species more likely to persist in the flora because of these life history traits? Does a species' means of dispersal play an important role in its persistence in the landscape? That is, are fleshy-fruited plants (which are dispersed by birds) less likely to be extirpated than species with other dispersal modes? Fourth, how many species have been recently extirpated in Pelham Bay Park since the initial census begun by the author in 1994? What factor(s) have been responsible for their recent extirpation?

By examining each of these questions it will be possible to formulate a management plan for maintaining extant levels of native plant species diversity at Pelham Bay Park. Currently there is no publication or comprehensive reference that exists that members of the Parks Department can review to learn which native species are uncommon or rare at Pelham Bay. Indeed, there are very few botanical studies that measure the actual rate of decline and loss of plant species diversity at a study site. By documenting how many species are now rare at Pelham Bay (and others that have been extirpated), it will be possible to provide such data. Determining certain life history characteristics (such as herbaceousness) that make species more vulnerable to extirpation, may help make park managers better able to identify populations that are particularly vulnerable in the park. Examining structural changes in the forest that have occurred through succession, fire, etc., just in the past two decades may provide park managers with important information on the processes contributing to the elimination of certain

species. Finally, the opportunity to do this research with members of the public will promote environmental awareness in New York City and build a coordinated network of scientists able to undertake further local investigations.

**The Historical Vascular Flora of Pelham Bay Park,  
Bronx County, New York City as Compiled by H.E. Ahles in 1946-47**

**Introduction.** From the late 19<sup>th</sup> century and continuing through the 1950's, the flora and fauna of Bronx County, New York City, was often studied by field biologists born and raised in the borough. Scientific papers documenting the natural history of the Bronx were published in several scientific publications of the time including the Journal of the New York Botanical Society, Nautilus, Proceedings of the Linnaean Society of New York, Soil Science, The Bulletin of the Torrey Botanical Club, The Kingbird, and Transactions of the Bronx Historical Society (Pouyat and McDonnell, 1991). Well-known scientists such as the botanists E.P. Bicknell and N.L. Britton, and the members of the Bronx County Bird Club including Alan Cruickshank, Joseph Hickey and Richard Kuerzi published studies of the plants and birds of the Bronx (Bicknell, 1878; 1898; Britton, 1906; Griscom, 1927; Kastner, 1986; Kuerzi, 1926; Ridl, 1989). Less well-known scientists made important contributions documenting the initial effects of the chestnut disease that began in the Bronx (Murrill, 1906), bird species composition before, during and after the filling of a salt marsh in the borough (Buckley, 1958), and the natural history of the Bronx and New York City (Kieran, 1959).

In the 1940's, a young botanist, Harry E. Ahles (1924-1981), made plant species collections in the largest park of the Bronx, Pelham Bay Park (PBPK). Ahles was born in the Bronx and raised within two miles of PBPK. After completing High School, he began working as a gardener at The New York Botanical Garden, while making many

forays in the tri-state area collecting and identifying plants. In his late twenties, he accepted a position at the herbarium of the University of Illinois. He then moved to the University of North Carolina at Chapel Hill, where he was the curator of the herbarium for ten years. In subsequent years, Ahles worked at the herbarium at the University of Massachusetts where he taught undergraduate field botany courses. He was one of the authors of the Manual of the Vascular Flora of the Carolinas (Radford, Ahles and Bell, 1964) and during the research for the book personally collected over 200,000 specimens for the herbarium (Tippe, 1982). Mr. Ahles never published any papers based upon the collections he made at PBPK, and published only one paper that incorporated specimens from the Bronx (Ahles, 1951). However, none of the 46 specimens cited in that paper were collected in PBPK. The 1531 specimens used as reference material in this paper were made in 1946-47 when Ahles was in his early twenties. These are part of a larger collection of approximately 9,836 mounted and unmounted specimens Ahles donated to the New York State Museum in 1974.

The study area, Pelham Bay Park, New York City, is located at the southwestern portion of the Long Island Sound (Lat. 40 deg. 52 min. N, Long. 73 deg. 47 min. W). The underlying geology of PBPK is primarily metamorphic in origin. Rock outcroppings in the park show felsic gneisses, sillimanite schists and amphibolites with extensive veins of quartz (Leveson and Seyfert, 1969). These rocks are part of the Hutchinson River Group (early Paleozoic Era origin, approximately 550 million years old) that is correlative with the Hartland Formation of western Connecticut and southeastern New York (Merguerian and Sanders, 1993). Soils samples that have been analyzed from one

section of the park (Hunter Island) indicate that there is little or no organic horizon in the well-drained sandy to silt loams (Loeb, 1998b).

PBPK was established in 1888 and at 2764 acres is the second largest park in New York City, and the largest park under the jurisdiction of the New York City Department of Parks and Recreation (Pons, 1987). In 1946 when Ahles began making his collections in the park, the area immediately to the north and west of the park was mostly undeveloped (Figure 1). Since that time, a large housing development and an interstate thruway have been constructed through these areas. These developments, with their associated large-scale disturbances, affected natural areas within PBPK. Long-term, successional changes have been slowly changing the park as well. Loeb (1998) studied the ecological history of the park by analyzing pollen deposition through time from a salt marsh extracted from the Hunter Island Sanctuary in PBPK. He believed that human activities from approximately 1175 A.D. (+/- 100 years) until 1885 kept Hunter Island primarily in open field vegetation. From 1885 till the present, broadleaf forest has been increasing, and this trend has accelerated since 1940. Similarly, Sisinni and Anderson (1993) concluded that in PBPK, the amount of land classified as meadow declined by 85% from 1885 to 1984. During this 100-year interval, forest cover increased by 173%. By the late 1990's it was estimated that 67% of the park was natural area dominated by unmanaged vegetation: 28% of the natural area left in the park was mixed deciduous woods, 24% marine, 7% salt marsh, 6% salt flats, 3% meadows, and 2% shrub or scrub land (Wells, 1998). The remainder of the park (33%) has been classified as developed

including golf courses, parking lots, buildings, a Police Department pistol range and the man-made Orchard Beach (Wells, 1998).

Since the flora of PBPK had been collected by H.E. Ahles, but neither analyzed nor published, the author initiated this study as part of a larger project assessing changes in plant species diversity in the park since 1947. The objectives of the current study were to obtain an historical record of the vegetation of PBPK by determining the number of species, genera and families of plants found in the park in 1946-47. Also, since Ahles recorded the section of the park that each species was collected, it has been possible to reconstruct the plant species distribution in the park during 1946-47.

By compiling an historical flora of PBPK, several research questions can be addressed including: What was the relative proportion of native and non-native species by habitat in PBPK in 1946-47? What species were common or uncommon at that time? How many species collected in the park by Ahles would today be classified as rare or uncommon in New York State? Which non-native species were present in 1946-47, and which are new to the park since 1947? Determining answers to such questions would help park managers protect the remaining native plant species diversity in PBPK, and in parks throughout New York City. The Ahles collection constitutes a significant historical record of New York City's second largest urban park. Analyzing the historical collection and assessing changes in the flora since 1947 could serve as an example of what types of changes to expect in parks throughout the world that are vulnerable to anthropogenic

large-scale disturbance events, the effects of natural processes such as forest succession and the introduction of non-native species.

**Methods.** The plant specimens of PBPK that H.E. Ahles collected in 1946-47 and deposited at the New York State Museum at Albany were examined by the author along with Ahles' field notes (Ahles, 1947; 1948) during the late summer of 1998. Ahles had spent a total of 33 days during the 1946 field season making his specimen collections (from 10 March to 6 October) in PBPK. During 1947, Ahles did not record the specific date a species was collected, so it is not known how many total days he spent in the field that year. However, for both 1946 and 1947 Ahles recorded the section of the park (from 1 through 29) in which he collected each of the 1531 specimens, and frequently, the type of habitat where each specimen was collected. Figure 1 is based upon the original map Ahles included in his field notes. This figure depicts each of the 29 sections of PBPK that Ahles' made his collections, and the major topographical features of the park in 1946-47.

After studying Ahles' field notes and examining his plant collection, an historical flora of PBPK was compiled that is presented in Appendix A. The different sections of the park (and their collection numbers) are also included. Appendix B lists each species collected by section by its common name. Nomenclature and common names follow those employed by Mitchell (2000) and Mitchell and Tucker (1997). Occasionally, Newcomb (1977) was used to find an alternate common name.

If Ahles did not identify a specimen to species (e.g., *Vaccinium*), the author chose to list the specimen in this way and did not make a definitive identification. The author also did not attempt to check the veracity of Ahles' identifications. However, in one instance a paper by Lamont (1994) was consulted for information regarding a species collected by Ahles in 1946. If the nomenclature by which a species was known and listed by Ahles in 1946-47 had been changed, the author made the appropriate updates to those adopted by Mitchell (2000) and Mitchell and Tucker (1997). Vascular plant species that were collected by Ahles but not collected or observed by the author in 1994-98 are considered to be extirpated from the park and designated in Appendix A by a leading exclamation point (!). All introduced (i.e., non-native) species are designated by a leading asterisk (\*). Species that may be native to the area but are known to have been planted at PBPK (e.g., *Pinus strobus*) are listed with a leading cross (+). Species that are native to the park and region are preceded by no symbol. For the data analysis, in the case of three species on the list with two sub-species, each of the sub-species is treated as a full species.

Each species (and its corresponding genus and family) was classified into one of four groups: pteridophyte, conifer, dicot or monocot. In this way a comparison could be made to determine the relative abundance of each these groups in the park in 1946-47. In addition, each species was placed into one of four general plant communities: Maritime beach and salt marsh, upland forest, meadows/grasslands and disturbed/wasteland. (For a description of each of these plant communities, see Reschke, 1990). By placing each species in a general habitat, it is then possible to provide a description of these habitats at

PBPK in 1946-47, and indicate the most common and/or unique species that Ahles would have encountered for each habitat in the park. Finally, each plant species of the flora was categorized as woody or herbaceous, and as perennial or annual based upon the information in Gleason and Cronquist (1991). In this way, it is possible to determine the relative proportion of species with different life history traits, and facilitate comparisons between the Ahles' collection of 1946-47 and a flora compiled by the author in 1994-98.

Where appropriate, current (2000) status (endangered, threatened or rare) as listed and described in Mitchell (2000) is included for each species collected by Ahles in 1946-47. Status classification in New York State follows the system developed by The Nature Conservancy G1 (globally imperiled) through S1 (state imperiled) through G5 (globally secure) through S5 (secure in NYS).

**E** - Endangered species: Exists in 5 or fewer sites with fewer than 1,000 individuals known in total.

**T** - Threatened species: Exists in 6 to 10 sites in the state with fewer than 3,000 individuals known in total.

**R** - Rare species: Exists in 20-35 extant sites with 3,000 to 5,000 individuals known.

**Results.** The historical vascular flora of PBPK collected by H.E. Ahles during 1946-47 consists of 108 families, 354 genera and 668 plant species including three species with two subspecies. Of these 668 species, 478 (71.6%) are classified as native and 187 (27.9%) are non-native (alien) species and three (0.5%) are considered planted in PBPK

in 1946-47 (Table 1). The vast majority of the plants collected by H.E. Ahles were perennial, herbaceous species (Table 4). Several species are unique to the Ahles' flora and have not been seen or collected by the author in PBPK during 1994-98. In all, 166 species collected by Ahles have not been re-located (DeCandido, 2001). These include 141 native and 25 non-native species. That is, 24.8% of the flora of PBPK documented in 1946-47 had been extirpated by 1994.

According to the Ahles' flora, the families that contain the most genera and species include the Asteraceae with 42 genera and 96 species, the Poaceae with 35 genera and 76 species, and the Cyperaceae with 6 genera and 48 species (Table 3). Together they comprise 23.4% of all genera and 32.3% of all species. Other large families listed in Table 3 are the Rosaceae (15 gen., 30 spp.), Fabaceae (15 gen., 29 spp.), Brassicaceae (15 gen., 23 spp.), Scrophulariaceae (12 gen., 19 spp.), Polygonaceae (2 gen., 19 spp.), and the Liliaceae (13 gen., 18 spp.). Taken together these 9 families comprise 43.7% of all genera and 53.7% of all species that Ahles collected in 1946-47. The largest genera are *Carex* (34 spp.), *Aster* (15 spp.), *Panicum* (15 spp.), *Polygonum* (14 spp.), *Solidago* (11 spp.), *Juncus* (8 spp.) and *Viola* (8 spp.). Table 5 lists the largest families of plants collected in 1946-47 in PBPK and the largest families of plants ever collected in New York City. In both PBPK in 1946-47 and New York City to date, the largest families are the same, and occur in the same sequential order. The Ahles plant collection of 1946-47 represents 35.2 % of the entire native flora known from New York City and 48.6% of the native species ever collected in Bronx County. Table 6 presents a numerical summary of

the PBPK flora collected by Ahles in 1946-47 compared to both the complete flora of Bronx County and New York City.

According to current criteria used by New York State, 28 native plant species (5.9% of the native flora on the Ahles' list) would be considered either endangered, threatened or extirpated in New York State if Ahles' had made his collection today (Mitchell, 2000). The majority of these species are herbaceous (25 of 28 or 89.3%). Since 1947, two of these species collected by Ahles have been extirpated in New York State: *Carex polymorpha* and *Polygonum erectum*. Table 2 lists each of these 28 plant species, its current status in New York State, and whether the species was still present in PBPK in 1994-98. The majority of these plants (18 of 28 or 64.3%) have been extirpated in the intervening years. Each of the extirpated plants in Table 2 is an herbaceous species.

When the Ahles' flora is analyzed by habitat (see Reschke 1990), it is noted that approximately 28 species are consistently present in the marine community, 37 occur in the freshwater swale/riparian area community, 101 occur in various wasteland/disturbed sites, 237 in the woodland community, and 265 in meadows and fields. Figure 2 presents the number of native and non-native species in each of these five plant communities. In 1946-47, except for the wasteland habitat, Ahles collected many more native than alien species in PBPK.

According to Appendix B, Ahles collected the most specimens (443) in just four sections of PBPk (Sections 5; 13; 22 and 28). Of these 443 specimens, 160 species (36.1%) were only collected in these four areas. Most of these species are native (115 or 71.9%), and they represent 24.1% of all native species of the park. Since 1946–47, three of these sections (5; 13; 22) remain intact. However, ecological succession and some disturbance (especially in Sections 13 and 22) have affected the plant species diversity there. On the other hand, Section 28 has been completely lost to development when the New England Thruway was built beginning in the late 1950's.

Families that have lost the most species of plants and native species since Ahles made his collections include the Cyperaceae (27 spp.; 27 native), the Asteraceae (22 spp.; 18 native), the Poaceae (19 spp; 16 native), the Rosaceae (8 spp.; 7 native), the Fabaceae (7 spp.; 5 native), the Violaceae (6 spp.; 6 native), and the Scrophulariaceae (5 spp.; 5 native). Overall six families of plants comprised exclusively of native species were extirpated from PBPk since 1947: Callitrichaceae, Gentianaceae, Hydrophyllaceae, Ophioglossaceae, Santalaceae, and Selaginellaceae. However, only one of these (Selaginaceae) was represented by more than one species in PBPk.

Ahles reported 166 species from PBPk not seen or collected by the author in 1994–98 (DeCandido, 2001). The vast majority (141 or 84.9%) of these extirpated species are native plants. Of these 166 extirpated species, 114 (69.1%) were only collected in one section of the park (Appendix A). Ahles collected 88 of these species for which he briefly describes the habitat in which the plant was found. According to Ahles'

collection notes, 61 (69.3%) of these 88 species were collected in an open area including: 28 species collected in a meadow/field; 9 from the area in or at the edge of a salt marsh; 8 from along roadsides or the area of the railroad tracks; 5 from rocky ledges; 5 from sandy shores; and 6 from miscellaneous open areas). By comparison, 15 species (17.1%) were collected in woodland areas, and 12 species (13.6%) from a variety of other habitats (e.g., along or in swamps/streams).

**Discussion.** In 1946-47, Pelham Bay Park was a significantly different place than the park one finds today. At that time, H.E. Ahles collected plants from 108 families and 354 genera throughout PBPK. Altogether, 668 plant species were identified including three species with two subspecies. Of these 668 species, 478 (71.6%) are classified as native and 187 (27.9%) are non-native (alien) species and three (0.5%) are considered planted in PBPK in 1946-47 (Table 1). Since that time, 24.8% of the flora of PBPK collected by Ahles has been extirpated. This includes 141 native and 25 non-native species. Ahles made his plant collections in a park that had more open areas than PBPK today including large and small meadows where herbaceous species were abundant. Many of these habitats have been developed or changed in the intervening years. As a result, the proportion of native plants in the flora of PBPK has declined from the 71% collected by Ahles to the 59% collected in 1994-98 (DeCandido, 2001). The number of new species collected at PBPK since the Ahles' flora is 247. These include 101 native species and 136 non-native species (DeCandido, 2001). Overall, the proportion of native species in the 1946-47 flora of PBPK was greater than that known from either collections made in Bronx County or New York City (Table 6).

The historical vegetation of Pelham Bay Park can be classified into five general plant communities: Maritime including gravelly shores, beach and salt marsh; forest including lowland and upland woods; freshwater riparian areas; meadows/grasslands; and wasteland/disturbed sites. Each of these habitats (except for wasteland/disturbed) contained more native than non-native species in 1946-47 (Figure 2). Three of these habitats are discussed below. By far most of the species Ahles collected came from two communities: the upland forest and meadows/grasslands.

**MARITIME PLANT COMMUNITY.** Bordering the Long Island Sound, plant species typical of the beach and/or sand dunes are not well represented at PBPK. Currently, small (< 30 meters in length) often gravelly beaches occur in Sections 3, 4, 13 and 14. Even in 1946-47 Ahles most likely encountered this habitat only occasionally, and this is confirmed by the paucity of descriptions in his field notes for plants collected in these areas. In the few narrow stretches along drift lines of the gravelly shore and areas of occasional overwash, typical (primarily annual) species Ahles collected included: *Atriplex patula*, *Cakile edentula*, and *Salsola kali*. Moving further back from the high tide line Ahles encountered: *Panicum virgatum* var. *virgatum*, *Solidago sempervirens* var. *mexicana* and *Spartina pectinata*. Ahles never collected species typical of other nearby beach communities such as at Orient Beach State Park on the north shore of Long Island. Such common species would have included: *Ammophila breviligulata*, *Artemisia stelleriana*, *Chamaesyce polygonifolia*, and *Honckenya peploides* (Lamont and Stalter, 1991). However, there is no primary dune system at PBPK such as those found in parks

on the south shore of Long Island that border the Atlantic Ocean such as the Fire Island National Seashore (Stalter et al., 1986).

Interspersed between the small beaches are significant salt marsh communities. The most extensive one in which Ahles made collections is the Goose Creek Salt Marsh (within Sections 22 and 23). The vegetation of the low salt marsh is comprised mostly of *Spartina alterniflora*. The high salt marsh is dominated by *Spartina patens*, *Distichlis spicata* and *Juncus gerardii*. Ahles collected other species of the upper reaches of the high marsh including: *Agalinis maritima*, *Aster subulatus*, *Aster tenuifolius*, *Limonium carolinianum*, and *Plantago maritima* ssp. *juncooides*. Salt pannes occur in both low and high salt marshes where the marsh is poorly drained. Pannes in the low marsh are mostly devoid of vegetation. In pannes of the high marsh, Ahles collected species such as *Pluchea odorata* var. *succulenta*, *Salicornia europaea*, and *S. virginica*. A shrubland community composed of *Baccharis halimifolia* and *Iva frutescens* forms the ecotone between the salt marsh and upland vegetation. Where freshwater is found along the high marsh, Ahles collected *Hibiscus moscheutos*, *Phragmites australis*, *Polygonum ramosissimum* and *Teucrium canadense* var. *canadense*. By comparison, in drier areas of the ecotone at the back of the salt marsh, Ahles collected *Myrica pensylvanica* and *Tripsacum dactyloides*.

Moving landward up from the beach and the salt marsh, elevated, exposed rocky ground is commonly encountered. Beyond this the upland forest begins. Typical plants that Ahles collected from rocky areas above the beach and salt marsh include

*Amelanchier stolonifera*, *Aronia melanocarpa*, *Lechea pulchella* var. *pulchella*,  
*Parthanocissus quinquefolia*, *Quercus stellata*, *Silene caroliniana* var. *pensylvanica* and  
*Toxicodendron radicans*.

WOODLAND COMMUNITY. The forest at PBPK consists of the typical oak/hickory mixed deciduous woods of the northeastern United States. Even by 1946-47, the few conifers of the park were planted or introduced, while the lone native species (*Juniperus virginiana*) was only collected once and has since been extirpated from the park. In other parks of New York City such as Inwood Hill Park, Manhattan (Loeb, 1986) and Cunningham Park, northern Queens (Lefkowitz and Greller, 1973), oak/hickory forests occur on well-drained usually elevated sites especially south- and southwest facing slopes. The soils are usually loams (or sandy loams) and slightly acidic. In each of these parks including PBPK, *Quercus rubra*, *Q. alba*, *Q. velutina* (in that order) occupy overlapping zones of increasing aridity often corresponding to changes in elevation. Overall, Ahles seems to have favored two sections of the park for woodland collections: Sections 5 and 13. In mature dry forests within these sections important woody species collected by Ahles included: *Betula lenta*, *Carya ovata* and *C. tomentosa*, *Sassafras albidum* and *Viburnum acerifolium*. On more mesic soils Ahles collected *Fagus grandifolia*, *Lindera benzoin*, and *Liriodendron tulipifera*. Typical herbaceous species of the understory collected by Ahles included *Agrimonia gryposepala*, *Alliaria petiolata*, *Dicentra cucullaria*, *Erythronium americanum*, *Fragaria virginica*, *Geranium maculatum*, *Helianthus divaricatus*, *Hieracium venosum*, *Impatiens capensis*, *Polygonatum commutatum* as well as several species of *Aster* and *Solidago*.

A unique aspect of the oak-hickory forest in New York City Parks is that at PBPK it sometimes extends out in hillocks into the salt marsh (e.g., Section 21). These hillocks can also occasionally be found as lone islands surrounded by the salt marsh. Typical understory species collected by Ahles in this habitat included *Andropogon gerardii*, *Aralia nudicaulis*, *Aster macrophyllus*, *Aster paternus*, *Aureolaria flava* var. *flava*, *Baptisia tinctoria*, *Helianthemum canadense*, *Lespedeza hirta*, *L. virginica*, *Lysimachia quadrifolia*, *Pteridium aquilinum* var. *latiusculum*, *Smilax glauca*, *S. rotundifolia*, and *Solidago odora*.

MEADOW/GRASSLAND COMMUNITY. Although today meadows and grasslands comprise only 3% (82.9 acres) of parkland, in 1946-47 there was more of this type of habitat. For example, Ahles collected several species in Sections 8, 22, 28 and 29 in which his notes (included with the voucher specimen) indicate that it was found in a meadow. He uses a variety of terms to distinguish between different types of meadows including: moist meadow, dry meadow, dry and rocky meadow, open meadow, sandy meadow, and dry field. However, the meadows he visited in these four sections no longer exist either because the area has been completely eliminated (Section 28), expansion of existing recreational activities (Section 29, the Golf Course), or because of natural ecological succession into deciduous shrub and woodland (Sections 8 and 22). As a result species such as *Asclepias tuberosa*, *Desmodium canadense*, *Eupatorium sessilifolium*, and *Hypericum gentianoides* now have a much more restricted range and were found in only one section of PBPK of 1994-98. Other species Ahles collected in meadows have been completely extirpated from the park. These include: *Agalinis*

*purpurea*, *Anaphalis margaritacea*, *Aster puniceus* var. *puniceus*, *Carex normalis*, *Cirsium pumilium*, *Crotolaria sagittalis*, *Desmodium glabellum*, *Fimbristylis autumnalis*, *Hypericum boreale*, *Juncus articulatus*, *Juncus dudleyi*, *Juncus scirpoides*, *Lobelia spicata*, *Linum virginianum*, *Platanthera lacera*, *Panicum oloigosanthes* var. *scribnerianum*, *Panicum depauperatum*, *Polygala sanguinea*, *Prunus pumila*, *Spiranthes cernua*, *Spiranthes vernalis*, *Viola sagittata*, and *Vulpia octoflora*. All of these extirpated species are herbaceous plants with one exception (*Prunus pumila*).

Today, the one remaining extensive meadow (Section 7) is dominated primarily by *Lythrum salicaria*, *Myrica pensylvanica* and *Tripsacum dactyloides*, and in the drier areas by *Sorghastrum nutans*. This meadow was created in the 1930's when much of the topsoil was removed for filling Pelham Bay. This exposed the bedrock and as a result, adventive woody species have had difficulty becoming established. In this meadow Ahles collected several species, all of which were collected in another location of PBPK. Overall, Ahles collected the most unique meadow species from Sections 8, 22, 28 and 29 of the park, and the occasional small meadow patch surrounded by woodlands.

**RARE PLANTS AND EXTIRPATED SPECIES.** Ahles collected 28 native species that would be considered either endangered, extirpated or threatened in New York State according to current designation in New York State (Mitchell, 2000). These are listed in Table 2. Of these 28 native species, 25 are herbaceous and three are woody species. In all, 68% (17 of the 25) of the herbaceous species have been extirpated from PBPK in the intervening 50 years. Ahles collected only four of these species in more than one section

of PBPK. Rare species collected by Ahles which can still be found at PBPK include all three woody species listed in Table 2, as well as 8 of the herbaceous species listed. Ahles collected three of these herbs (*Aster subulatus*, *Cyperus echinatus*, *Iris primatica*) in more than one section of PBPK, and another (*Tripsacum dactyloides*) is widespread today. This indicates that widespread and/or woody species are less prone to extirpation than species occupying a limited range. However, exceptions do exist. The genus *Zizia* (*Z. aurea* and *Z. aptera*) as well as *Desmodium canadense* and *Saxifraga virginensis* were collected by Ahles in more than one section of PBPK, yet only *D. canadense* (for which one lone plant could be found in 1997) still can be found at PBPK. The extirpation of these species from PBPK is most likely the result of overall ecological changes in habitat in the park through forest succession.

Besides the extirpation of certain rare species and the invasion of others, the ecological structure of PBPK has also changed in the last fifty years. By reading over the collection notes that Ahles provided with most specimens he obtained, and then re-visiting specific sections of the park, it was possible to document changes in plant species diversity. For example, in Sections 8, 22, 28 and 29, Ahles mentions "meadow" for the area in which several specimens were collected. These areas had become entirely shrubland or woodland by 1994. As a consequence a number of species that Ahles collected in these areas including common ones (*Solidago ulmifolia*) and others that are currently listed as rare in New York State (*Crotolaria sagittalis*, *Spiranthes vernalis*), have been extirpated from PBPK. Similarly, other meadow-like habitats that herbaceous species might find refuge within, such as along the railroad tracks in Sections 18, 19, 22

and 24, were sprayed with herbicide each year from 1994-98. As a result of habitat loss, forest succession and management practices, species of certain families of plants were particularly prone to extirpation at PBPK (Table 5). Analysis of the habitat requirements of plants of these families indicates that species of riparian areas (Cyperaceae) and open, meadow-type habitats (Asteraceae, Poaceae) were most vulnerable to extirpation.

**NON-NATIVE SPECIES.** Ahles recorded a variety of non-native species that were still present and common in PBPK during a survey of the flora done 1994-98 (DeCandido, 2001). The most pernicious of these were *Acer plantanoides*, *Alliaria petiolata*, *Artemisia vulgaris*, and *Populus alba*. On the other hand, several non-native species were not collected by Ahles in 1946-47, and these may have invaded the park since that time. These include *Ampelopsis brevipedunculata* var. *brevipedunculata*, *Celastrus orbiculata*, *Polygonum cuspidatum* and *Rhamnus frangula*. Since Ahles also did not collect several native species that were found in 1994-98, it is possible that he simply overlooked these alien species as well. However, given the number of major disturbances in PBPK since 1947, it may be that these alien species arrived in PBPK from 1948 to 1994, or have significantly expanded their distribution in the park when certain habitats were disturbed during this time.

**Summary.** The flora of Pelham Bay Park as collected by H.E. Ahles in 1946-47 indicates that Pelham Bay Park still had a number of important salt marshes, meadows, and open woodlands. Since that time, loss of habitat to development in and around the park contributed to the extirpation of many native plants, especially herbaceous species

of meadow-type habitats. Also, natural ecological processes such as forest succession eliminated the smaller meadows and clearings where herbaceous species could have found refuge. These dual forces, disturbance and forest succession, are responsible for the changes in both species composition and the habitat structure in many of the remaining undeveloped areas of PBPK.

The flora compiled by H.E. Ahles in 1946-47 provides an important historical glimpse of the parks in New York City just after the conclusion of World War II. In the ensuing years of economic boom and increasing population, natural areas within parks throughout New York City were lost to highway expansion, the placement of sanitary landfills and other types of development. This suggests that the designation of an area as a park is not sufficient for the protection of the species contained therein, and more importantly, for the natural areas themselves. Rather, biologists interested in preserving species and natural areas must work to build support for parks with the general public. This would include an ongoing commitment to informing the public via nature walks and classroom activities about the wealth of biological diversity still found in New York City parkland. Currently, very few scientists at the college-level in New York City conduct research in city parks. Similarly, only a small minority of teachers at either the college, high school or grammar school level are familiar with natural areas in New York City or species found in these parks.

Even in the Bronx today development of parkland continues. Part of the second largest park in the Bronx (Van Cortlandt Park) is being developed with a water treatment

plant, while the fourth largest park (Ferry Point Park) in the borough will soon be converted into a golf course. Pelham Bay Park is facing serious proposals to build year-round sports facilities in a meadow habitat. In order to preserve natural areas and stop development in public parks, biologists and conservationists must form coalitions to lobby against development schemes and to provide alternative ideas to save the few remaining natural areas in the Bronx and New York City.

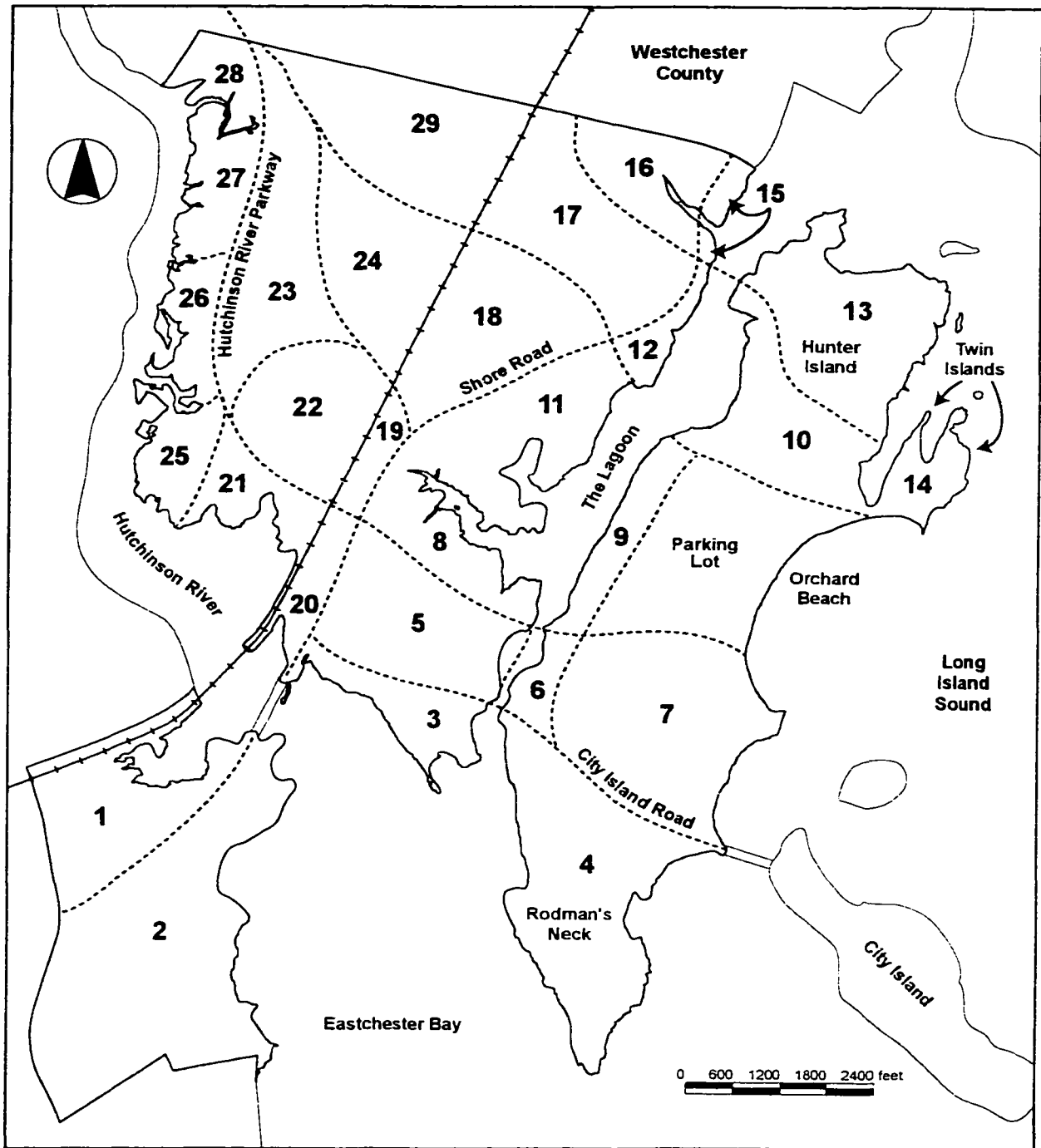
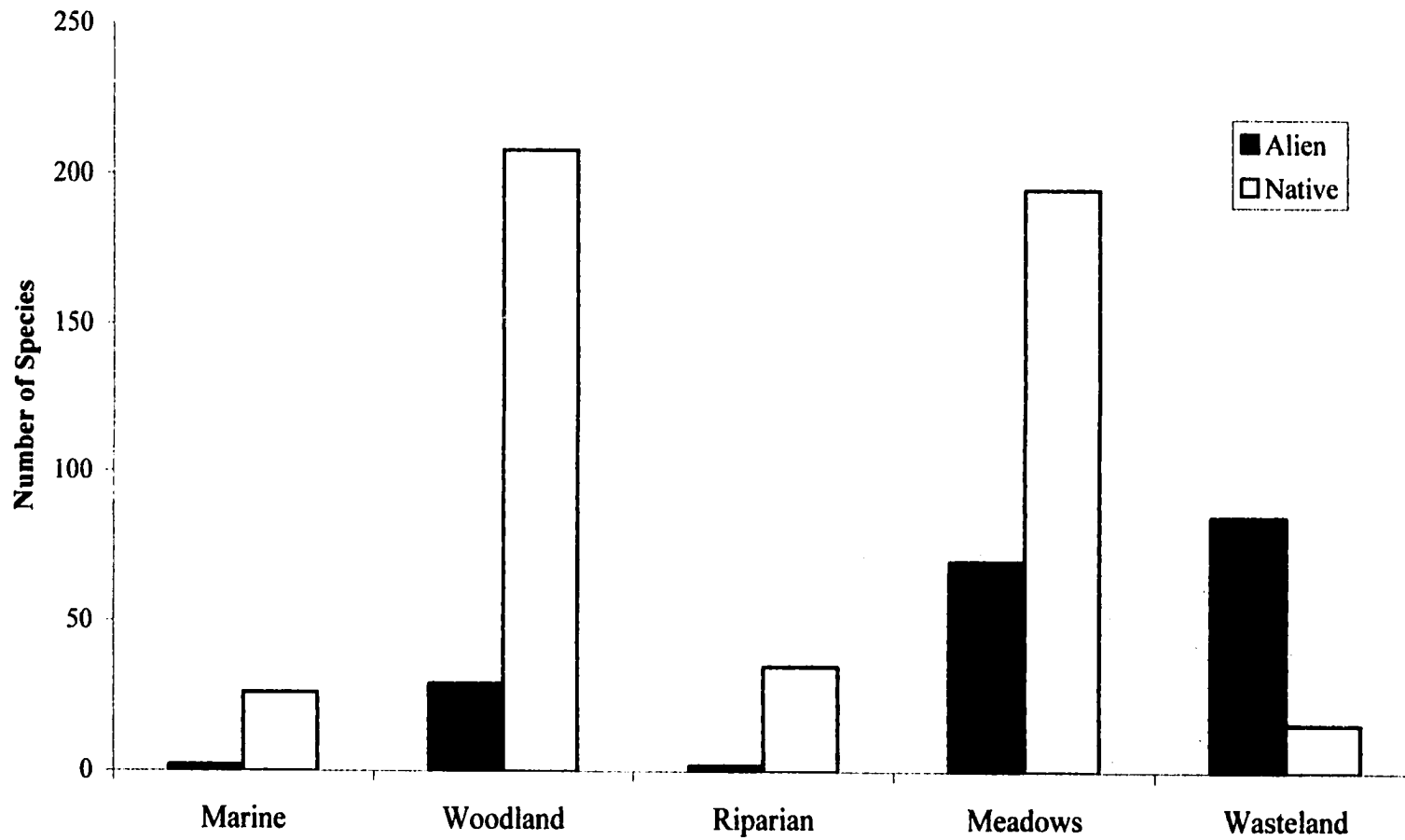


Figure 1. Map of Pelham Bay Park in 1946-47

Fig. 2. Number of Alien and Native Plant Species by Habitat at PBPK, Bronx Co., NY, Collected By H.E. Ahles in 1946-47



	Pterid.	Conifers	Dicots	Monocots	Total
Native Spp.	15	1	326	139	480
Non-native Spp	0	2	154	31	188
Planted Spp.	0	1	2	0	3
Total Species	15	4	482	170	671
Genera	11	2	268	73	354
Families	7	2	85	14	108

Table 1. Statistical Summary of the 1946-47 Flora collected by H.E. Ahles, of Pelham Bay Park, Bronx County, New York City

Table 2. New York State Listed Rare Plants Collected by H.E. Ahles in Pelham Bay Park 1946-47 and Their Status in New York State in 2000.

Family	Species	Common Name	Present 1994-98	New York State Status
Ranunculaceae	<i>Ranunculus hispidus</i> var. <i>nitidus</i>	Swamp Buttercup	Yes	Endangered G5 S1
Chenopodiaceae	<i>Salicornia bigelovii</i>	Glasswort	No	Threatened G5 S1S3
	<i>Suaeda linearis</i>	Southern Sea-blite	Yes	Endangered G5 S1
Polygonaceae	<i>Polygonum erectum</i>	Erect Smartweed	No	Extirpated NYS G5 SX
Ebenaceae	<i>Diospyros virginiana</i>	Persimmon	Yes	Threatened G5 S2
Fabaceae	<i>Crotalaria sagittalis</i>	Rattlebox	No	Endangered G5 S1
	<i>Desmodium humifusum</i>	Tall Tick-trefoil	No	Endangered G1G2 S1
Rutaceae	<i>Ptelea trifoliata</i>	Hop-tree	Yes	Endangered G5 S1
Oxalidaceae	<i>Oxalis violacea</i>	Violet Wood-Sorrell	No	Threatened G5 S1S2
Lamiaceae	<i>Agastache nepetoides</i>	Yellow Giant Hyssop	Yes	Threatened G5 S2S3
Plantaginaceae	<i>Plantago maritima</i> ssp. <i>juncoides</i>	Seaside Plantain	No	Threatened G5T5 S2S3
Caprifoliaceae	<i>Viburnum dentatum</i> var. <i>venosum</i>	Southern Arrowwood	Yes	Threatened G5T4? S2

Table 2 (cont.). New York State Listed Rare Plants Collected by H.E. Ahles in Pelham Bay Park 1946-47 and Their Status in New York State in 2000.

Family	Species	Common Name	Present 1994-98	New York State Status
Asteraceae	<i>Aster subulatus</i>	Annual Salt Marsh Aster	Yes	Unprotected G5 S2
	<i>Solidago sempervirens var. mexicana</i>	Seaside Goldenrod	No	Endangered G5T? S1
Juncaceae	<i>Juncus scirpoides</i>	Sedge Rush	No	Endangered G5 S1
Cyperaceae	<i>Carex buxbaumii</i>	Sedge	No	Threatened G5 S2
	<i>Carex polymorpha</i>	Sedge	No	Extirpated G3 SX
	<i>Carex seorsa</i>	Sedge	No	Threatened G4 S2
	<i>Cyperus echinatus</i>	Globose Sedge	Yes	Endangered G5 S1
	<i>Cyperus flavescens</i>	Cyperus	No	Endangered G5 T? S1
	<i>Cyperus lupulinus ssp. lupulinus</i>	Flat Sedge	No	Threatened G5 T? S2
	<i>Eleocharis elliptica var. pseudoptera</i>	Slender Spikerush	Yes	Threatened G5T? S1
	<i>Eleocharis halophila</i>	Spikerush	No	Threatened G4 S2

Table 2 (cont.). New York State Listed Rare Plants Collected by H.E. Ahles in Pelham Bay Park 1946-47 and Their Status in New York State in 2000.

Family	Species	Common Name	Present 1994-98	New York State Status
Poaceae	<i>Panicum scabriusculum</i>	Panic Grass	No	Endangered G4 S1
	<i>Paspalum setaceum var. setaceum</i>	Slender Beadgrass	No	Threatened G5 T5 S2
	<i>Tripsacum dactyloides</i>	Gamma Grass	Yes	Threatened G5 S2
Iridaceae	<i>Iris prismatica</i>	Slender Blue Flag Iris	Yes	Threatened G4G5 S2
Orchidaceae	<i>Spiranthes vernalis</i>	Spring Lady's Tresses	No	Endangered G5 S1

<b>Family</b>	<b>No. Genera</b>	<b>No. Species</b>	<b>No. Native</b>
Asteraceae	42	95	67 (70.5%)
Poaceae	36	76	49 (64.5%)
Cyperaceae	6	47	47 (100%)
Rosaceae	14	30	21 (70%)
Fabaceae	15	29	14 (48.3%)
Brassicaceae	15	23	7 (30.4%)
Scrophulariaceae	13	19	13 (68.4%)
Polygonaceae	2	19	8 (42.1%)
Liliaceae	13	18	12 (66.7%)
<b>Total</b>	156	356	237 (66.6%)

Table 3. The Largest Families of Plants Collected in Pelham Bay Park During 1946-47, the Number of Genera, Species and Native Species

	<b>Woody</b>	<b>Herbaceous</b>	<b>Perennial</b>	<b>Annual</b>
<b>Native</b>	89	392	405	76
<b>Non-native</b>	27	163	129	61
<b>Total</b>	116 (17.3%)	555 (82.7%)	534 (79.6%)	137 (20.4%)

Table 4. The Number of Woody vs. Herbaceous, and Perennial vs. Annual Species in PBPK, 1946-47.

Family	Number of Species			
	Total	Alien	Native	Native Extirpated
Asteraceae NYC	226	90	136	28 (21%)
Asteraceae PBPK	96	29	67	18 (27%)
Poaceae NYC	199	76	123	52 (42%)
Poaceae PBPK	76	27	49	16 (33%)
Cyperaceae NYC	184	7	177	115 (65%)
Cyperaceae PBPK	48	0	48	27 (56%)
Rosaceae NYC	88	25	53	19 (36%)
Rosaceae PBPK	30	9	21	7 (33%)
Brassicaceae NYC	50	34	16	5 (31%)
Brassicaceae PBPK	23	16	7	1 (14%)

Table 5. The Largest Families of Plants in NYC and PBPK in 1946-47, the Number of Native and Alien Species, and the Number Extirpated.

Locale	Families	Number of Species			
		Native	Alien	Escaped	Total
PBPK 1946-47	108	481 (71.7%)	187 (27.9%)	3 (0.4%)	671
BX	146	988 (65.4%)	417(27.6%)	106 (7.0%)	1511
NYC	161	1359 (62.4%)	610(28.0%)	210 (9.6%)	2179

Table 6. Statistical Summary of Plant Species Diversity in PBPK 1946-47, the Entire Bronx and New York City

## **The Vascular Flora of Pelham Bay Park, Bronx County, New York 1994-1998**

**Introduction.** Pelham Bay Park (PBPk), Bronx County, New York is located at the southwestern part of the Long Island Sound (Lat. 40 deg. 52 min. N, Long. 73 deg. 47 min. W), north of Manhattan and south of New Rochelle, Westchester County. At 2764 acres, it is the second largest park in New York City, and the largest one under the jurisdiction of the New York City Department of Parks and Recreation. The park was established in 1884 through the efforts of the New Parks Movement (Schnitz and Loeb, 1984; Pons, 1987). In the late 19<sup>th</sup> century, Frederic Law Olmstead surveyed the park and appreciating its natural features, did not subsequently re-shape the area in any significant way. Since the 1930's, there have been numerous development projects that have transformed much of the park. After a sanitation landfill was constructed in the park beginning in 1964, concerned citizens successfully lobbied for the establishment of the Thomas Pell and Hunter Island Sanctuaries (Kazimiroff, 1977). However, much of the remainder of the park remains unprotected, and is increasingly the target of developers interested in building recreational facilities in scenic, low-cost parkland. Fortunately, there remain several natural areas representing a diversity of habitats in PBPk. Here many native plant and animal species can still be found.

PBPk is mostly isolated from the surrounding communities by several large water bodies and roadways including the Long Island Sound, Hutchinson River, and the New England Thruway (Figure 1). The park (especially the Orchard Beach area) is heavily used by the public from June through August, but except for areas immediately adjacent to the water, the natural areas are not as frequently visited. The natural areas of the park

are utilized throughout the year by fishermen angling for flounder in winter, and declining bluefish and more abundant striped-bass in spring through early autumn. In fall and winter, the park has been visited by birdwatchers at least since the 1920's, primarily in search of raptors such as saw-whet, long-eared, great-horned, barn and short-eared owls, and more recently for viewing the autumn migration of hawks (Kuerzi, 1926; Kieran, 1959; Bull, 1964; DeCandido, 1991b). The only extensive plant survey of PBPK was done in 1946-47 by Harry E. Ahles. In his two-year field study of PBPK, Ahles collected 1531 specimens, eventually donating these to the New York State Museum (DeCandido, 2001a). His research in PBPK remains unpublished (Tipppo, 1982).

Landform in PBPK was largely determined by several glacial flows during the Pleistocene Period with the ice moving over PBPK and the entire New York City region from several directions. Evidence for these glaciers in the park is in the form of roche moutonees, rock erratics, and striae and groove markings. With the melting of the last of these glaciers at the end of the Holocene Period, the nearby Long Island Sound was formed (Mergurian and Sanders, 1991; 1993). The underlying geology of PBPK is primarily metamorphic in origin and includes felsic gneisses, sillimanite schists and amphibolites with extensive veins of quartz (Schubert, 1968; Leveson and Seyfert, 1969). The resulting formations of mixed igneous and metamorphic rocks have been named migmatites (Mergurian and Sanders, 1991). As interpreted by Merguerian and Sanders (1993), the rock formations of PBPK are remnants of an ocean basin that was adjacent to the continental shelf of ancient North America during the early Paleozoic Era

approximately 550 million years ago. These rocks are classified as part of the Hutchinson River Group that is correlative with the Hartland Formation of western Connecticut and southeastern New York (Merguerian and Sanders, 1993).

Pre-historical evidence of Native American land use exists in the form of recovered Indian artifacts as well as oyster and clam middens, remnants of which can still be found today (Bolton, 1922; Kaeser, 1970). Recovered *Zea mays* pollen indicates that Native Americans were utilizing PBPK at least by 1175 A.D., +/- 100 years (Loeb, 1998a). Since the 18th century, at least three large estates and two traveler's inns have been established in the park (Jenkins, 1912), but only one mansion is still extant. From 1888-1934, trees were selectively removed by the City of New York Department of Parks and Recreation from Hunter Island and certain other areas of PBPK (Loeb, 1998b). This practice may have promoted species diversity of herbaceous plant species within the forest. Other more grand scale projects, such as those undertaken by the WPA in the 1930's, changed water flow patterns through the larger salt marshes and even some of the woodlands of PBPK. From 1934-1948, the New York City Department of Parks under the direction of Robert Moses made significant changes to the park by filling in the original Pelham Bay for use as a parking lot, and creating Orchard Beach (Caro, 1974). Beginning in 1964, approximately 105 acres in the southern portion of the park were taken over by the Department of Sanitation and converted into a landfill. This site was eventually closed in the 1970's, but not before it had become the highest point in the eastern Bronx. During the last fifty years one major roadway (the New England Thruway) has been built through PBPK, while another (the Hutchinson River Parkway)

has been expanded to handle an increased volume of vehicular traffic. The most serious forms of disturbance today are anthropogenic in nature including intentionally set fires, abandonment of stolen cars, off-trail dirt biking and jet-skiing in the water bodies adjacent to the park.

In the natural areas of PBPK, the most important herbivores are small vertebrates such as voles (*Microtus* spp.) and rabbits (*Sylvilagus floridanus*), as well as invertebrates such as caterpillars (Lepidoptera) and termites (Isoptera). It is only since 1995 that large herbivores such as deer and turkey, have returned to the park in small numbers. Since approximately 1985, Canada Geese are a nuisance on golf courses and other managed areas of the park, especially in winter. Currently it is estimated that 28% of the PBPK is mixed deciduous woods, 24% marine, 7% salt marsh, 6% salt flats, 3% meadows and 2% shrub or scrub land (Wells, 1998). The remaining 33% of the park is classified as developed, including golf courses, parking lots, buildings, a New York City Police Department Pistol Range and the man-made Orchard Beach (Wells, 1998).

Since no comprehensive flora of PBPK had ever been published, and no systematic collections have been made in fifty years, the author initiated the present study. The objectives of this research were to identify each species collected, determine its relative status (rare, uncommon, common), and to describe several of the most distinctive habitats in the park. Also, a flowering phenology has been compiled by earliest period of bloom (see Anderson and Hubricht, 1940) for almost every species of the Magnoliophyta found in 1994-98. By compiling these data, it should be possible

for future researchers to assess changes in plant species diversity in PBPK; to evaluate the expected effects of global warming by documenting changes in the flowering time of plants in PBPK; and to facilitate comparisons to other parks in the region.

**Methods.** Pelham Bay Park was sampled at minimum two times per week, from April through August, and at least once per week in February and March, as well as September and October, from 1994 to 1998 (inclusive) for a minimum total of 200 field days over five years. The park was walked on average for five hours at each visit, in such a way that all areas of the park were sampled at least every other week. Herbarium voucher specimens of each taxon with collection notes were prepared and delivered to the New York State Museum in Albany.

The species checklist of PBPK (Appendix C) contains an inventory of the vascular plants that were found in PBPK for at least one season in the years from 1994-1998 with one exception (see DeCandido, 1991a). Identification of specimens was made using Gleason and Cronquist (1991). Nomenclature follows Mitchell and Tucker (1997) and Mitchell (2000). The list includes native species, naturalized alien species, species that have escaped from cultivation and have become established in the park, and species planted by the New York City Department of Parks and Recreation. Vascular plants collected at PBPK as part of this study, but not collected or reported by Ahles are designated in the checklist by an exclamation mark (!). All non-native species are designated by an asterisk (\*). All planted or escaped species (those not reproducing

to any significant degree) are indicated by a leading addition sign (+). Native species are preceded by no symbol, unless they were not collected by Ahles. For the data analysis, sub-species and varieties are treated as full species. Mitchell (1990) was the primary reference used to verify the historical occurrence(s) of particular species in the Bronx and New York City listed in Table 2.

Following the scientific name of all native and non-native species is the current status in PBPK as follows. Rare: if an herbaceous species then it must only be present at three different sites or fewer, with no more than 25 individuals present at any one site; or, present at one site with no more than 50 total plants. If a tree or shrub, it must only be present at six or fewer locations, with no site having more than five individuals; or present at one site with no more than 10 individuals at that location. Uncommon: if an herbaceous species then it must be present at four to six sites with no more than 50 individuals at any one of those sites; or present at one locality only, with no more than 100 individuals at that site. If a tree or shrub, the species must be present at 7 to 10 sites with no stand greater than five individuals; or, present at one site only with 15 or fewer individuals. A species is listed as extirpated if it was found during one or more field seasons, but not seen subsequently despite several attempts at relocating the species at the site or in other likely areas of PBPK. Species that are abundant or common are not designated with any symbol on this list. Species that are indicated as planted on the list have not been evaluated regarding their status in the park.

Following the status of uncommon and rare species or following the scientific name of common species, the earliest blooming time is recorded for species of the Magnoliophyta and the earliest spring date for all Pteridophyta. In a handful of instances no flowering date is noted for a species, and this is indicated on the list. Months have been divided into three time frames: early (first ten days of the month); mid (from day 11 to day 20, inclusive); and late (from day 21 till the end of the month). Finally, a notation is made if a species is considered to be endangered, threatened or rare in New York State according to criteria developed by the New York State Department of Environmental Conservation, The Nature Conservancy and the New York Natural Heritage Program as described in Mitchell (2000). The coding system is as follows: Endangered (E): if a species currently exists in five or fewer sites in the state with fewer than 1,000 total individuals known. Threatened (T): if a species exists in 6 to 19 sites with fewer than 3,000 total individuals known. Rare (R): if a species exists in 20-35 sites with 3,000 to 5,000 individuals known. In addition, 2000 species status classification in New York State is listed where appropriate for endangered, threatened or rare plants on the PBPK flora following the system developed by The Nature Conservancy as described in Mitchell (2000): G1 (globally imperiled) through G5 (globally secure) and S1 (state imperiled) through S5 (secure in NYS).

**Results.** The current vascular flora of PBPK consists of 117 families, 431 genera and 792 species of which 441 (55.7%) are native, 301 (38.0%) are non-native and 50 (6.3%) are planted and not spreading to any degree (Table 1). One species, *Hibiscus laevis*, originally collected in 1991 (DeCandido, 1991a) and since extirpated, is new to New

York State (Mitchell, 2000; Mitchell and Tucker, 1997). In addition, PBPK is the only known remaining site in New York State for one other species (*Lactuca floridana*), previously believed to have been extirpated in the state.

New records for the park (as compared to the 1946-47 unpublished flora compiled by H.E. Ahles) number 284 species. These include 101 native species that Ahles probably overlooked, 136 non-native species, and 47 species that have been planted and are not reproducing in the park. By comparison, 141 native and 25 non-native species were collected by Ahles and not found during the course of this study. Most likely, these 166 species have been extirpated from PBPK in the last 50 years (DeCandido, 2001b). The total number of species reported by all investigators in 1946-47 combined with this study is 955 species including 581 native, 322 non-native and 52 planted species. A comparison of numbers of species from PBPK collected by Ahles (1946-47) and the current author during 1994-1998 is presented in Table 1. Also, a statistical summary of all plant species ever collected in the Bronx and New York City and kept at the State Museum at Albany is presented in Table 2 (Mitchell, 1990).

The families in this flora with the greatest species richness are the Asteraceae with 45 genera and 101 species, and the Poaceae, with 48 genera and 88 species. Together, they compose 21.8% of all genera and 23.9% of all species. Other large families are the Fabaceae (21 gen., 35 spp.), Rosaceae (15 gen., 33 spp.), Brassicaceae (18 gen., 29 spp.), Cyperaceae (5 gen., 29 spp.), Liliaceae (18 gen., 23 spp.) and the Caryophyllaceae (11 gen., 20 spp.). The largest genera are: *Carex*, *Polygonum* (each

with 16 spp.), *Aster* (15 spp.), *Quercus* (10 spp.), *Eupatorium*, *Solidago* (each with 8 spp.), and *Acer*, *Panicum* (each with 7 spp.). When extant flora is analyzed by habitat, (see Reschke, 1990), at PBPK, 30 species are primarily found in the maritime plant community that is periodically inundated with brackish or marine water. By comparison 255 species occur mostly in the woodland community including gaps within the forest; 288 species usually occur in the grassland/meadow community; 139 species occur in sites that have been disturbed in the recent past such as roadsides, parking lots and areas adjacent to buildings and other structures. A further 30 species are primarily confined to freshwater riparian areas distributed throughout PBPK.

During the course of this study, 53 of the 325 (16.3 %) native herbaceous species (exclusive of planted species) were judged to be rare at PBPK, while 27 native herbaceous species (8.3%) were considered uncommon. For the woody species, 15 of the 116 native species (12.9%) are classified as rare, while 5 (4.8%) are considered uncommon. In all, of the 742 native and non-native species of PBPK, 142 (19.1%) have been judged to be rare or uncommon in the park. Another 21 species (5 native; 16 non-native) were extirpated from PBPK during the five years of field work that compose this research. Overall, 18 native species (4.1% of the native flora) of PBPK collected in 1994-98 are considered endangered, threatened or rare in New York State (Mitchell, 2000). These include 15 herbaceous and 3 woody species (Appendix C).

According to Figure 2, most species of the Magnoliophyta have their initial flowering from 10 May to 31 May at PBPK. For the wildflowers, a second peak occurs in late July and again in late August. These latter two peaks are composed primarily by species in the Asteraceae and the Fabaceae. By comparison, most species of shrubs have their initial flowering in early May, while sedges and rushes as well as grasses peak in early June. For the grasses, a second minor bloom peak occurs from late July through mid-August. According to Figure 3, most native and non-native species have an initial peak bloom from mid-May through early June. Native species have a second peak in late July. This latter peak is composed primarily of species found in two distinct habitats: salt marshes and grassland/meadows.

As compared to a recent list of the 20 most serious invasive plants in the state (New York State Ad Hoc Invasive Plant Group, 1998), PBPK currently has 14 of the species on the list. At least 8 of these have established themselves in natural areas of the park, or have formed monodominant stands in disturbed areas. (An exclamation mark, !, indicates that the species was not collected in 1946-47.) These are: *Acer platanoides*, *Alliaria petiolata*, !*Ampelopsis brevipedunculata* var. *brevipedunculata*, !*Celastrus orbiculata*, *Lonicera japonica*, !*Lonicera morrowii*, *Phragmites australis*, and *Rhamnus frangula*. In addition, three other species not on the state list: *Populus alba*, *Viburnum dilatatum* and !*Viburnum sieboldii* (for the last of these, see Kunstler, 1993), have also established themselves in some of the natural areas of PBPK. These 11 species pose the greatest threat to natural communities in PBPK.

**Discussion.** The vascular flora of PBPK is composed of 792 species in 431 genera and 117 families. Compared to an unpublished flora of PBPK by H.E. Ahles in 1946-47, there were more total species, genera and families collected in 1994-98. However, there were fewer native species collected during 1994-98 than Ahles' study of 1946-47 (Table 1). In the intervening years, the proportion of native plant species declined from 71.7% in 1946-47 to 59.4% in this study. As the absolute and proportional number of native species declined, the number of non-native species increased from the 187 collected by Ahles to 301 collected in 1994-98 (Table 1). Overall according to Table 2, 44.6% of all the native plant species ever collected in Bronx County were found in this study. Also, 72.2% of all non-native species ever collected in Bronx County were present in PBPK in 1994-98. Similarly, almost half (49.2%) of all the non-native species ever collected in New York City were collected in PBPK as part of this study.

At PBPK in 1994-98, the greatest number of plant species first came into bloom in mid-May through early June (May 10-June 10), with a decided peak in mid-May (Figure 2). During mid-May, the greatest number of both native and non-native wildflower and tree species first came into bloom (Figure 3). A second minor peak occurs in late July when species of open areas such as the salt marsh, and meadows and fields, begin to flower. Most of these plants are wildflowers in the Asteraceae and Fabaceae. In each of the five years of this study, weather played an important role in the initial flowering of many species. For example in 1994, snow cover lingered later into the winter than in other years, and early spring species were delayed in flowering for up

to one month. In 1995, a severe summer drought caused a few species not to flower. Another species, *Spiranthes cernua*, was extirpated in that year as well. In the 1990's, PBPK has been subjected to several severe "northeaster" storms, which have caused considerable erosion in the areas immediately adjacent to the Long Island Sound (Merguerian and Sanders, 1993). However, the upland forests have not suffered any major damage, except in December 1992 when many of the trees in a Norway spruce (*Picea abies*) grove that was established in 1918 were toppled.

The flora of Pelham Bay Park from 1994-1998 can be classified into five general plant communities based upon descriptions developed by Reschke (1990): Maritime including intertidal marine, gravelly shores, beach and salt marsh; forest including lowland and upland woods; freshwater riparian areas; meadows/grasslands; and wasteland/disturbed sites. Each of these habitats (except for wasteland/disturbed) contained more non-native than native species compared with the same habitat in 1946-47 (DeCandido, 2001b). Four of these habitats are discussed below. By far most of the species in this study came from two communities: The upland forest and grasslands/meadows.

**MARITIME PLANT COMMUNITY.** Salt marshes flourish where the Long Island Sound or the Hutchinson River estuary borders PBPK. The vegetation of the low salt marsh consists primarily of *Spartina alterniflora*, while the high marsh is dominated by *Spartina patens*, *Distichlis spicata* and *Juncus gerardii*. In this marine plant community four herbaceous species that are disappearing from many other salt marshes in southern

New York State are fairly common: *Aster subulatus*, *Aster tenuifolius*, *Limonium carolinianum* and *Suaeda linearis*. Salt pannes are interspersed throughout the salt marsh. In these poorly drained areas, especially in the high marsh, species such as *Salicornia europaea* and *S. perennis*, *Pluchea odorata*, *Spergularia salina*, and *S. rubra* can be found.

Although gravelly shores are not uncommon at PBPK, there is no extensive beach plant community typical of the nearby north shore of Long Island as described by Lamont and Stalter (1991). Also, there is no primary dune system at PBPK such as those found in parks on the south shore of Long Island that border the Atlantic Ocean such as the Fire Island National Seashore (Stalter et al., 1986). However, the underlying metamorphic rocks of PBPK are best seen in the coastal zone of the park.

Moving landward from the high salt marsh, one encounters a transition zone before the upland forest begins. This area is often dominated by stands of *Tripsacum dactyloides*. Here also can be found *Hibiscus moscheutos*, *Phragmites australis*, *Polygonum ramosissimum* and *Teucrium canadense* var. *canadense*. In other places, especially where the terrain is slightly elevated or the bedrock is exposed, a salt shrub and grass community is located. Species of this drier zone include *Baccharis halimifolia*, *Iva frutescens* ssp. *oraria* and *Myrica pensylvanica*. Typical herbaceous species include *Panicum virgatum* var. *virgatum*, *Euthamia graminifolia*, *Solidago sempervirens* and rarely, *Spartina pectinata*. In more rocky and slightly elevated areas, species that can be found are *Amelanchier stolonifera*, *Aronia x prunifolia*, *Lechea mucronata*,

*Parthenocissus quinquefolia*, *Quercus stellata*, and *Silene caroliniana* var. *pensylvanica*.

WOODLAND PLANT COMMUNITY. The upland forest community occurs on well-drained acidic soils beginning approximately 3 meters above sea level. The amount of land classified as forest in one section of the park (Hunter Island) increased by more than 2.5 times from 1888-1984 (Loeb, 1998a). The upland woodland community in PBPK most closely resembles an Appalachian oak-hickory forest of the northeastern United States that has been described from other parks in New York City (Lefkowitz and Greller, 1973; Loeb, 1986). Most trees in the canopy are between 15 and 25 meters high though certain individuals (such as specimens of *Liriodendron tulipifera*) were estimated to be 45 meters in height. The dominant trees in the two largest patches of mature forest in PBPK (Hunter Island and the Central Woodlands) are *Quercus alba*, *Q. rubra*, and *Q. velutina*. Mixed with the oaks but less frequently encountered are *Betula lenta*, *Carya* spp. and *Fraxinus americana*. Occasional stems of *Castanea dentata* still emerge from stumps of dead trees. In the sub-canopy, species such as *Cornus florida* and *Sassafras albidum* predominate, while *Amelanchier arborea* and *Hammamelis virginiana* occur to a lesser extent. Common low shrubs include *Cornus sericea*, *Gaylussacia baccata*, *Rubus allegheniensis*, *Vaccinium pallidum*, and *Viburnum acerifolium*. The ground layer herbaceous flora is diverse and includes such species as *Alliaria petiolata*, *Aster divaricatus*, *Circaea lutetiana* ssp. *canadensis*, *Geranium maculata*, *Helianthus divaricatus*, *Maianthemum canadensis*, *Monotropa uniflora*, *Pedicularis canadensis*, *Solidago bicolor*, *S. caesia* and *S. canadensis* var. *scabra*.

In richer and moister soils of the forest, species such as *Betula alleghaniensis*, *Carpinus caroliniana* ssp. *virginiana*, *Cornus alternifolia*, *Liquidamber styraciflua*, *Platanus occidentalis*, *Quercus bicolor*, and *Ostrya virginiana* may be found. Beneath this canopy layer, certain shrub species become more abundant such as *Corylus americana*, *Ilex verticillata* and *Lindera benzoin*. Herbaceous species include *Agrimonia gryposepala*, *Arisaema triphyllum* ssp. *triphyllum*, *Cardamine cocatenata*, *Impatiens capensis*, *Osmunda cinnamomea*, *Phyrma leptostachya*, *Piptochaetium avenaceum*, and *Thalictrum pubescens*.

A unique aspect of the upland forest for New York City Parks is at that at PBPK this forest extends out in hillocks into the salt marsh in some areas. These hillocks can also occasionally be found as lone islands surrounded by the salt marsh. Typical understorey species in this habitat include *Andropogon gerardii*, *Aralia nudicaulis*, *Aster macrophyllus*, *Aster paternus*, *Aureolaria flava* var. *flava*, *Chimaphila maculata*, *Gaylussacia baccata*, *Helianthus divaricatus*, *Lespedeza hirta*, *L. virginica*, *Lysimachia quadrifolia*, *Pteridium aquilinum* var. *latiusculum*, *Smilax glauca*, *Smilacina racemosa*, *Sorghastrum nutans* and *Tripsacum dactyloides*.

Many of the herbaceous species that are rare and uncommon within PBPK are now confined to forest edges and isolated small gaps within the forest. In the latter case, the canopy gaps are usually produced and maintained because of elevated, rocky areas of the forest floor overlain with thin soils. In addition, gaps are formed at PBPK when freshwater collects to form small pools within the forest, above which few trees have

grown. Since these areas are too difficult to maintain by mowing or artificial plantings, this has resulted in isolated havens for several species that are rare or uncommon in the park. These include: *Agastache nepetoides*, *Ceanothus americana*, *Desmodium canadense*, *Dicentra cucullaria*, *Diervilla lonicera*, *Eupatorium sessilifolium* var. *sessilifolium*, *Mimulus alatus*, *Mitchella repens*, *Paronychia canadensis*, *Polypodium virginianum*, *Pyrola americana* and *Viola pubescens*.

GRASSLAND/MEADOW PLANT COMMUNITY. From 1885-1984, the amount of land classified as meadow declined by 85%, from 172.3 acres to 26.0 acres (Sisinni and Anderson, 1993). Compared to habitat descriptions provided by Ahles in his 1946-47 plant collections (Ahles 1947; 1948), there were many fewer grasslands, meadows and fields in 1994-98 (DeCandido, 2001a). In the last fifty years at PBPK, the remaining open areas have frequently become dominated by shrubs and young trees. The only "natural" meadow (the topsoil was removed for fill in the 1930's) with a high diversity of native herbaceous species in PBPK is composed primarily of *Tripsacum dactyloides*. Other important species of this meadow are *Lythrum salicaria*, *Pycnanthemum* spp., *Solidago speciosa*, *Viburnum dentatum* var. *lucidum* and *V. dentatum* var. *venosum*. Elsewhere, fields and shrub lands are often dominated by non-native species such as *Ampelopsis brevipedunculata* var. *brevipedunculata*, *Artemisia vulgaris*, *Bromus* spp., *Centaurea* spp., *Cynanchum louiseae*, *Linaria vulgaris*, *Lonicera japonica*, *Prunus* spp., *Trifolium pratense*, and *Vicia* spp.

**WASTELAND/DISTURBED HABITAT.** Plants inhabiting frequently disturbed or artificially maintained areas include species that are often non-native in origin. Such species occur primarily in and around buildings, parking lots, golf courses, highways and railway and the abandoned landfill. Typical species of these habitats include *Hieracium* spp., *Mazus pumilus*, *Poa pratensis*, *Taraxacum officinale*, *Veronica* spp., as well as many of the non-native species that may also invade successional old fields and shrub lands. If these disturbed sites are left alone, over time woodlands with a limited number of plant species can develop. These habitats are then frequently dominated by woody species such as *Acer platanoides*, *Acer pseudoplatanus* and *Populus alba*.

**RARE PLANTS AND EXTIRPATED SPECIES.** Eighteen species currently found at PBPK are considered rare in New York State (Mitchell, 2000; Mitchell and Tucker, 1997). Seven of these species are at or near the northern limits of their range at PBPK. These are: *Cyperus echinatus*, *Diospyros virginiana*, *Eupatorium hyssopifolium* var. *laciniatum*, *Lactuca floridana*, *Lechea racemulosa*, *Ptelea trifoliata* and *Viburnum dentatum* var. *venosum*.

Other New York State listed species are indicative of habitats (e.g., salt marshes) that have a limited distribution in the state, or are found in a habitat that has declined in New York City (grasslands). These are: *Aster subulatus*, *Iris prismatica*, *Oenothera laciniata*, *Oenothera parviflora* var. *oakesiana*, *Paspalum setaceum* var. *muhlenbergii*, *Suaeda linearis*, and *Tripsacum dactyloides*. Finally there are four New York State rare species found in PBPK for which no discernible pattern of occurrence could be

determined. These are: *Agastache nepetoides*, *Eleocharis elliptica* var. *pseudoptera*, *Polygonum hydropiperoides* var. *opelousanum* and *Ranunculus hispidus* var. *nitidus*.

There were also two important discoveries of plant species not known from New York State, or thought to have been extirpated in New York State. One of these (*Hibiscus laevis*) was first seen in flower in July of 1990 (DeCandido, 1991a). It was subsequently extirpated due to repeated mowing of the area in the summer of 1992. The second species, *Lactuca floridana*, was found in the same location it was originally discovered in 1954 (Monachino, 1955). This species was previously thought to have been extirpated in New York State.

During the course of this five-year study, a total of 21 plant species were extirpated (5 native; 16 non-native) from PBPK. The five native species are: *Aster patens*, *Desmodium cuspidatum*, *Hibiscus laevis*, *Oenothera laciniata* and *Spiranthes cernua*. Each of these five species had been reduced to a small population of less than three individuals when it was initially discovered. It is difficult to determine if proximate or long-term factors were the decisive cause of a particular native plant species extirpation in PBPK. Overall, 100 of 440 (22.7%) native species identified in this study are considered rare or uncommon at PBPK (Appendix C). The majority of the native species at greatest risk of extirpation are herbaceous ones. Two factors are at work in the decline of herbaceous species: Successional ecological forces and the loss of open habitat such as meadows/grasslands to development (DeCandido, 2001b).

**NON-NATIVE SPECIES.** Compared to the 1946–47 study of the flora of PBPK, there were 116 more non-native species collected in the park in 1994–98. Since the earlier study, significant disturbance events have affected PBPK (e.g., Kaltman, 1968; Monachino, 1958). These include the placement of a sanitary landfill in the southern region of the park, the expansion of highways through the park and other, small-scale disturbance events such construction of buildings or even natural area restoration efforts. In the woodlands, the most pernicious of these alien species are: *Acer platanoides*, *Alliaria petiolata*, *Celastrus orbiculatus*, *Lonicera japonica*, *Lonicera morrowii*, and *Rhamnus frangula*. The most widespread alien species in open habitats are *Ampelopsis brevipedunculata* var. *brevipedunculata*, *Artemisia vulgaris*, *Lythrum salicaria*, and *Populus alba*.

**Summary.** The 1994–98 flora of Pelham Bay Park contains an interesting assemblage of native and non-native species. This diversity is due in large measure to the varied habitats of the park: salt marsh, upland woods including freshwater riparian areas, as well as successional meadows, shrub lands, and areas that have been significantly altered during the last 75 years by humans. Some of these building projects, such as the construction of Orchard Beach, made it possible for a greater number of people to enjoy nature. Other projects, such as the placement of highways through the park or the establishment of a landfill, have eliminated habitats with the result that a number of native species have been extirpated from PBPK only in the last fifty years. These large-scale construction projects have also allowed non-native species to invade and dominate certain areas of the park. In addition, loss of native plant species diversity is in part due

to normal ecological succession, as fields and meadows have become mixed woodlands and forests (DeCandido, 2001b).

As we enter a new millennium with open space at a premium in New York City and a prospering local and national economy, parks are low-cost land that developers and city officials seek to build recreational facilities, expand highways or site water treatment facilities. At Pelham Bay Park in the 1990's there have been proposals for placing an ice-skating rink, bicycle paths, tennis courts, and baseball fields in natural areas. Meanwhile, recreational activities such as all-terrain biking through the forests and jet-skiing in the waters of the park have negatively impacted habitats and wildlife. In this 21<sup>st</sup> century, the future of the natural areas of PBPK is inexorably tied to those people who believe that biologically significant habitats for plants, wildlife (and humans) still exist in New York City. The degree to which biologists and educators create opportunities for people to appropriately enjoy these remaining natural areas will determine the level of popular support, and in turn, the future of natural areas in PBPK and New York City.

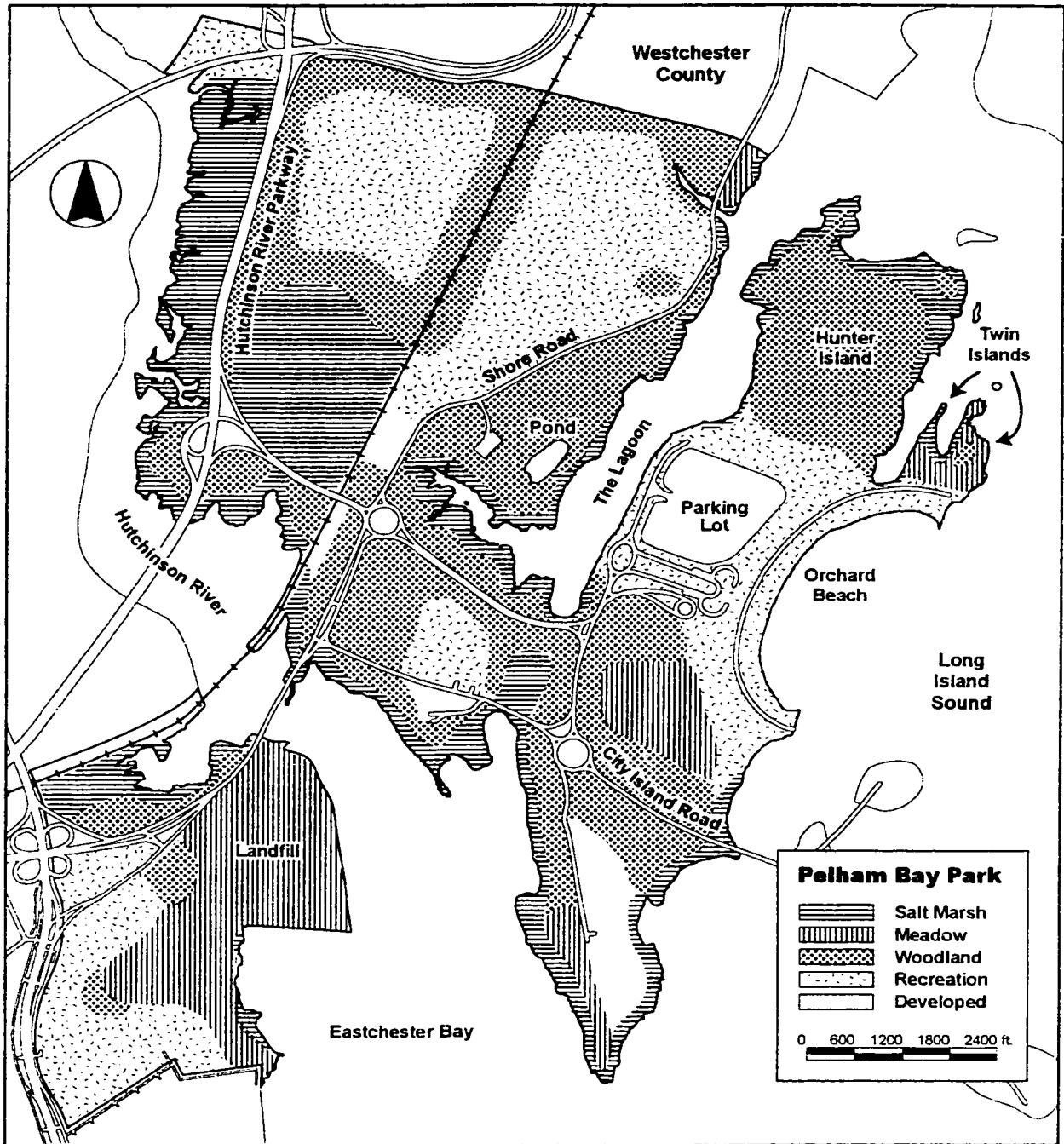


Figure 1. Habitat Map of Pelham Bay Park in 2000

Figure 2. Flowering Phenology of Pelham Bay Park, Bronx County, New York 1994-98

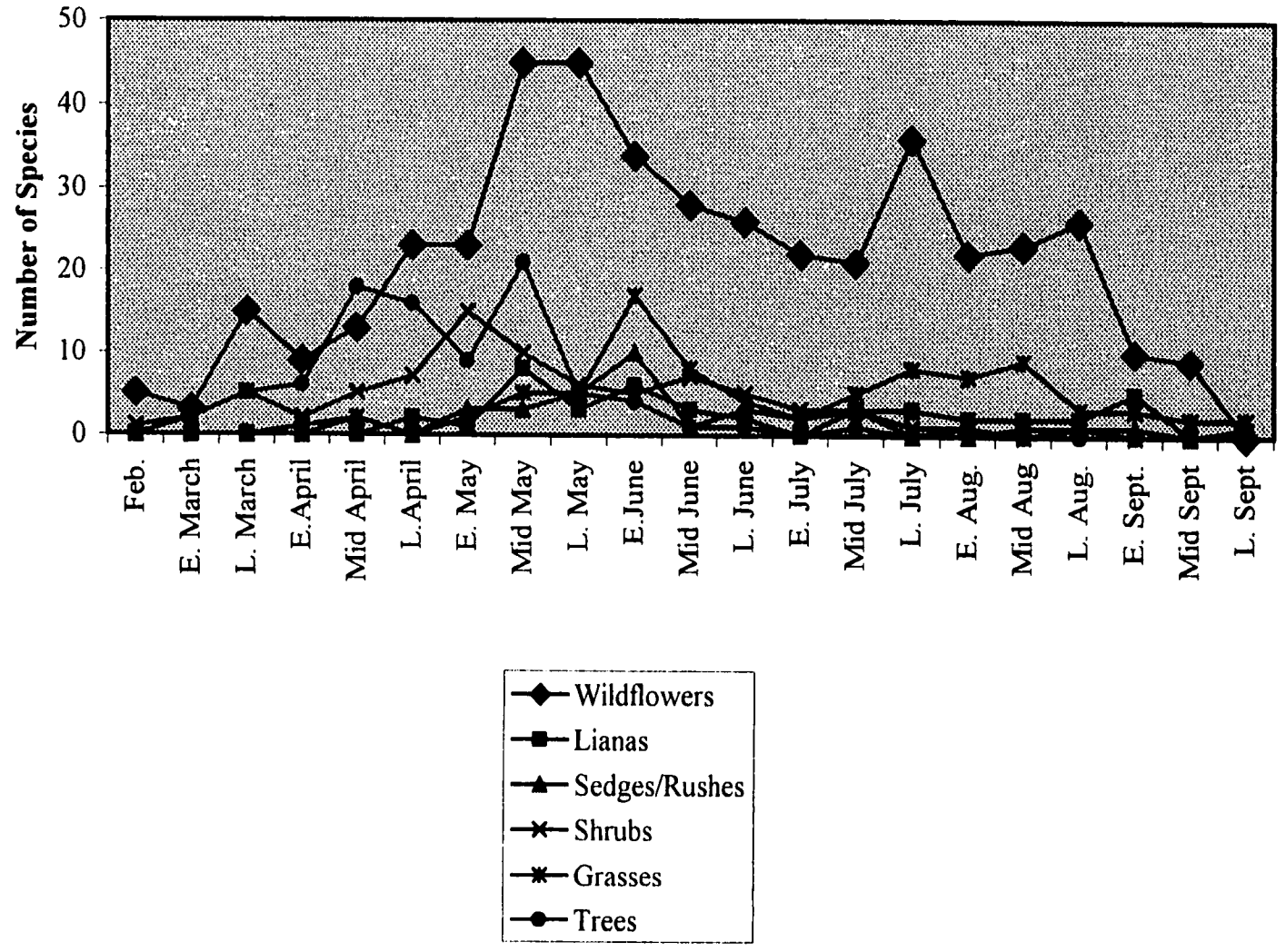


Figure 3. Flowering Phenology of Pelham Bay Park 1994-98: Native vs. Non-Native Species

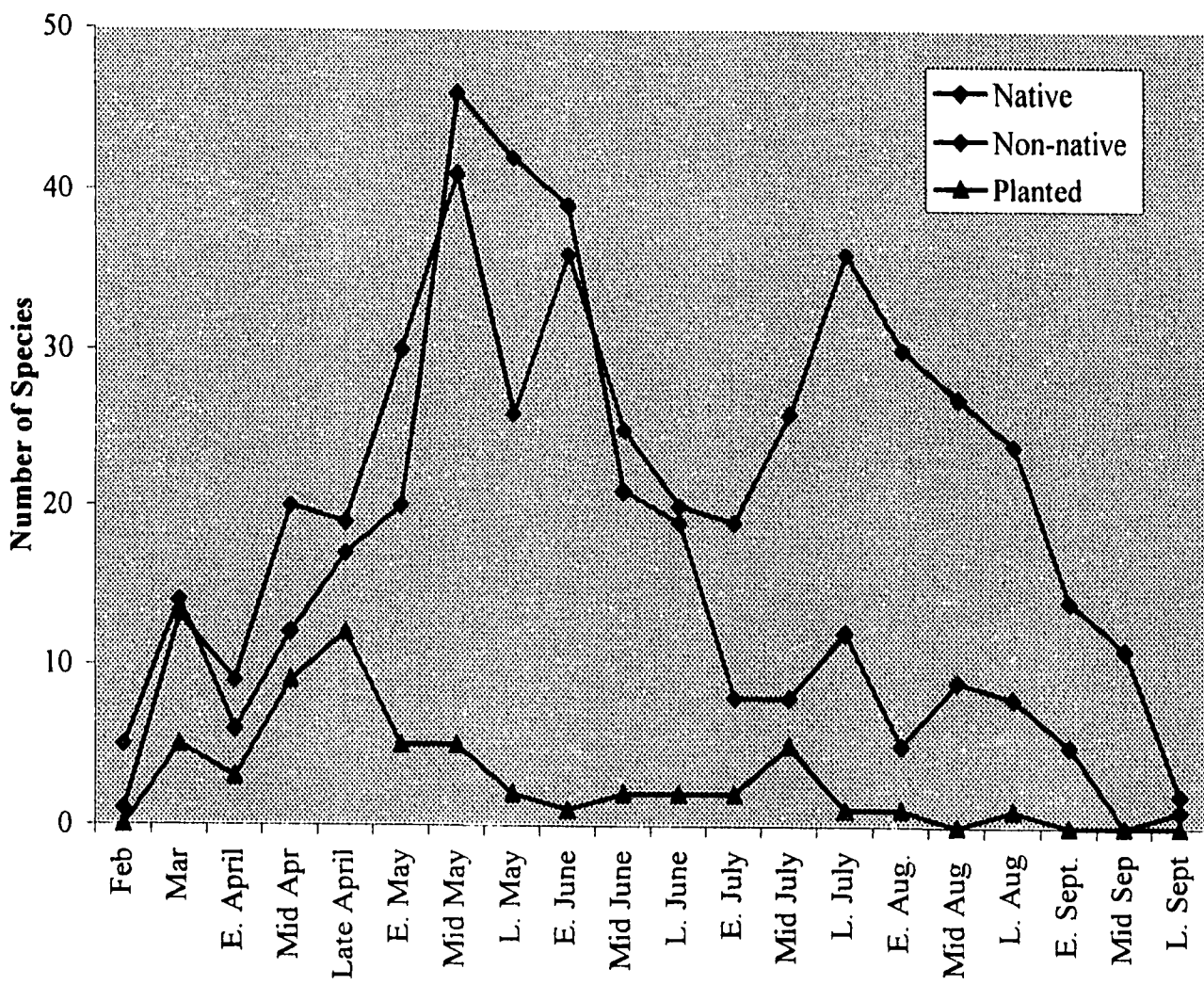


Table 1. Comparison of Plant Species Diversity between the 1946-47 Study by Ahles and the 1994-1998 Flora by the Author

	<b>Pteridophytes</b>		<b>Conifers</b>		<b>Dicots</b>		<b>Monocots</b>		<b>Total</b>		<b>Total 47/98</b>
	1947	1998	1947	1998	1947	1998	1947	1998	1947	1998	
<b>Native Species</b>	15	12	1	2	326	325	139	102	481	441	581
<b>Non-native Species</b>	0	0	2	1	154	241	31	59	187	301	322
<b>Planted Species</b>	0	0	1	7	2	43	0	0	3	50	52
<b>Total Species</b>	15	12	4	10	482	609	170	161	671	792	955
<b>Genera</b>	11	9	2	5	268	345	73	72	354	431	471
<b>Families</b>	7	6	2	5	85	96	14	10	108	117	123

Locale	Families	Number of Species			
		Native	Alien	Planted	Total
PBPK 1946-47	108	481 (71.7%)	187 (27.9%)	3 (0.4%)	671
PBPK 1994-98	117	441 (55.7%)	301 (38.0%)	50 (6.3%)	792
BX	146	988 (65.3%)	417 (27.7%)	106 (7.0%)	1511
NYC	161	1357 (62.3%)	612 (28.1%)	210 (9.6%)	2177

Table 2. Statistical Summary of the Plant Species Diversity in Pelham Bay Park in 1946-47 and 1994-98, the Entire Bronx and New York City.

**Recent Changes in Plant Species Diversity in  
Pelham Bay Park 1947-1998, Bronx County, New York**

**Introduction** - During the last seventy years, substantial changes have been made to the landscape of New York City. Development has affected both privately owned and publicly held land such as parks whose natural areas have often been fragmented by highways or otherwise significantly disturbed (Kieran, 1959; Loeb, 1989). This development has been larger in scale and different in nature than anthropogenic changes made to the landscape prior to the 20<sup>th</sup> century. As a result of this massive development and large-scale disturbance, the flora of New York City has been significantly affected as the number of native species declined from the 1356 once found in the city to the 774 species extant today, a net loss of approximately 43% of the native flora (DeCandido, 2001c). Fortunately, since many of the parks of New York City were established prior to 1940, important tracts of natural areas can still be found and studied (Greller, 1975; Mittelbach and Crewdson, 1997; Profous and Loeb, 1984; Stalter, 1981).

Perhaps the single most important person that shaped the city's natural areas in the 20<sup>th</sup> century was Robert Moses. From 1934 through 1960 as Commissioner of New York City Parks he re-shaped many of the parks of New York City by adding amenities such as playgrounds, ball fields, beaches, comfort stations, parking lots, and an array of other structures (Caro, 1974). Although Moses added much land to the Parks Department, he also planned the development of significant portions of the largest parks in New York City. These parks included Van Cortlandt and Pelham Bay Parks in the Bronx, Randall's

Island in Manhattan, Great Kills Park in Staten Island, Marine Park in Brooklyn and the (now federally owned) Jamaica Bay Wildlife Reserve in Queens/Brooklyn. During his tenure as New York City Parks Commissioner, highways were expanded or added in each of these parks, sub-dividing natural tracts and introducing an assortment of other problems into natural areas (altered water flow patterns, increased nutrient run-off, the introduction of non-native species). In addition, each of these largest parks in the city (except for Van Cortlandt Park) had significant acreage of natural areas converted into sanitary landfills while Moses was Commissioner.

This conversion of natural areas to sanitary landfill was considered a positive improvement at the time by the Parks Department (Moses, 1950). In 1934, New York City had been ordered by the Supreme Court of the United States to stop dumping garbage at sea, since this refuse was greatly affecting Long Island and New Jersey shore communities. At that time, New York City did not want to spend the necessary amount of money to construct incinerators. As an alternate solution, the dumping of refuse and sewage sludge in low-lying city parks and some private land was increased. This had the combined effect of eliminating both fresh and salt water marshes, while in some measure controlling disease transmitting insects (Pons, 1987). Many of these marshes were then landscaped into recreational use areas such as sports fields, beaches, parking lots and playgrounds. This type of development and its effects upon native species in the parklands of New York City can be seen at Pelham Bay Park, Bronx County, located at the southwestern end of the Long Island Sound (Figure 1).

At approximately 2,700 acres, Pelham Bay Park (PBPK) is the second largest park in New York City, and the largest tract of land under the jurisdiction of the NYC Department of Parks and Recreation. The land for the park was originally set aside in 1884 during the New Parks Movement and received official status as a park in 1888 (Schnitz and Loeb, 1984). In 1988 it was estimated that on Hunter Island, a 90.5ha natural area of PBPK, deciduous woodlands accounted for 65% of the area, and shrubland for another 12.6%. Field or meadow-type herbaceous vegetation was found on only 20.6% of the island (Rogers and Rowntree, 1988). Loeb (1998b) used palynological analysis to assess the vegetational history of Hunter Island. He concluded that human activities from approximately 1175 A.D. (+/- 100 years) until 1885 kept the study area primarily in open field vegetation. From 1885 to the present, the local vegetation has slowly been reverting to broadleaf forest, and this trend has accelerated since 1940 (Loeb, 1998a). Currently it is estimated that of the 67% of the park in natural area: 28% is mixed deciduous woods, 22% marine, 7% salt marsh, 5% salt flats, 3% meadows, and 2% shrub or scrub land. The remainder (33%) is classified as developed including golf courses, parking lots, buildings, a Police Department pistol range and the man-made Orchard Beach (Wells, 1998).

Pelham Bay Park and the Bronx have spawned a number of scientists interested in the local environment from the late 19<sup>th</sup> to the present. These have included the botanist E.P. Bicknell, and the members of the Bronx County Bird Club such as Alan Cruickshank, Joseph Hickey and R.T. Peterson. These well-known scientists and others began their careers by studying the borough's flora and fauna (Bicknell, 1878; 1898;

Griscom, 1927; Kastner, 1986; Kuerzi, 1926; Ridl, 1989). In the 1940's, PBPK served as a plant collecting area for Harry E. Ahles (1924-1981), who would later assist in compiling several floras in eastern North America including the seminal book on the flora of North Carolina (Radford, Ahles and Bell, 1964). During his two years of collecting in PBPK during 1946-47, Ahles collected 1531 specimens and would later donate them to the herbarium at the New York State Museum in Albany (Ahles, 1947; 1948). He left the Bronx by the early 1950's, publishing only one short paper on the Bronx and New York City (Ahles, 1951; Tipppo, 1982).

The present study was undertaken to assess recent changes in the flora of PBPK by comparing the unpublished Ahles flora to one compiled by the author from 1994-98. PBPK provided an ideal opportunity to assess the effects that increasing urbanization has had upon a large natural area that was accessible on a regular basis in all seasons. Within the park are a variety of habitats (salt marsh, dry and wet meadows, lowland and upland woods) where it was possible to investigate how native and alien plant species have fared during a time of major development and disturbance. Specific research questions included: Have native species been more likely to be extirpated than non-native (alien) species? Were certain types of native plants (woody or herbaceous, annual or perennial), and certain families of plants, more vulnerable to extirpation than others? Were certain habitats such as meadows and other open areas significantly more likely to lose native species than forest-type habitats? What are the likely causes of the changes in plant species diversity, and what can be learned from them?

From a broader perspective, PBPK presented an opportunity to study a type of ecosystem that is increasing in the world. Currently, most people in North America, South America, Australia and Europe live in a city; this will also be true of Africa and Asia within the next quarter century (World Resources Institute, 1996). By studying an urban ecosystem, one is able to examine the habitat that most Americans encounter on a regular basis, and assess the effects of human activities upon that landscape (McDonnell and Pickett, 1990). Many conservation areas, nature reserves, and other protected areas are becoming isolated habitat fragments as land around them is developed.

Understanding the effects of rapid development and urbanization upon plant species diversity in a fragmented urban park will help biologists decide which kinds of species and habitats to watch carefully in the coming years, as development and urban sprawl affects natural areas throughout the world (Thompson, 1994).

**Materials and Methods** - A recensus of the flora of Pelham Bay Park, Bronx County, New York (40 deg.52'30"N, 73 deg.47'30"W) was undertaken from 1994-1998 and compared to an unpublished flora of the park compiled by H.E. Ahles in 1946-47 (Ahles, 1947; 1948). For convenience, comparisons between the two floras were made in a fifty-year interval (1947 to 1997), even though the actual time frame in question was slightly longer. For the modern flora, Pelham Bay Park (PBPK) was sampled at minimum two times per week, from April through August, and at least once per week in February and March, as well as September and October, from 1994 to 1998 (inclusive). In all, a minimum total of 200 field days over five years were spent actively looking for plants in PBPK. The park was walked on average for five hours at each visit, in such a way that

all areas of the park were sampled at least every other week. Herbarium voucher specimens of each taxon with collection notes were prepared and sent to the New York State Museum in Albany. One voucher specimen collected in 1991, *Hibiscus laevis* (formerly *Hibiscus militaris*), was deposited in the herbarium at the New York Botanical Garden (DeCandido, 1991). Nomenclature follows Mitchell and Tucker (1997) and Mitchell (2000). For the purposes of this study, a natural area is defined as one that is comprised predominately of unmanaged vegetation. Typically, such lands have never been developed, although significant disturbances may have occurred in the past. Vegetation is predominantly native species typical of the region, with (occasionally) a large contingent of non-native species as well. In some cases, such as the landfill at PBPK, a natural area can have a recent history of significant disturbance and be dominated by non-native species.

For the 1946-47 flora compiled by H.E. Ahles, his notes and herbarium specimens that are held at the New York State Museum in Albany were examined and analyzed. Ahles spent a total of at least 33 days during 1946, from 10 March to 6 October, making these collections (Ahles, 1947). In 1947, Ahles did not record the specific date a specimen was collected, so it is unknown how many days he spent collecting plants at PBPK in that year (Ahles, 1948). From examining these specimens and collection notes, a flora was compiled that lists the section of the park (from 1 through 29) in which Ahles collected each of the 1531 specimens (DeCandido, 2001a). The identification that Ahles made for each specimen he collected has been used for this analysis, and no corrections were made to his species identifications. (However, in one instance a paper by Lamont

(1994) was consulted for information regarding a species collected by Ahles in 1946.) If the nomenclature by which a species was known and listed by Ahles in 1946-47 had been changed, the appropriate updates were made to those used by Mitchell and Tucker (1997) and Mitchell (2000). For the statistical analysis, native species found in 1994-98 and not collected by Ahles in 1946-47 have been listed as present in the earlier flora of PBPK, since such species were most likely overlooked by Ahles at that time. However for Table 1, numbers of species represent actual totals compiled by Ahles in 1946-47 and the author in 1994-98.

For the database, plant species were listed as native, non-native or rare escape (and not reproducing to any significant degree). In addition, the status of each native and non-native species was evaluated during the 1994-98 re-census. For the purposes of this paper a rare species in 1994-98 is defined as follows: If an herbaceous species then it must only be present at three different sites or fewer, with no more than 25 individuals present at any one site; or, present at one site with no more than 50 total plants. If a tree or shrub, it must only be present at six or fewer locations, with no site having more than five individuals; or present at one site with no more than 10 individuals at that location.

All taxa were classified as woody or herbaceous, and as perennial or annual based upon the information in Gleason and Cronquist (1991). In addition, the dispersal modes of plants were given a separate classification (spores, fruits) when such information could be determined. Each species was assigned to one of seven habitat categories: (1) marine (salt marsh, beach, gravelly shore) (2) freshwater marsh, (3) dry

forest (upland wooded areas), (4) wet forest (lowland wooded areas), (5) dry meadow, (6) wet meadow (including riparian areas along streams), and (7) wasteland (including landfill, roadsides, and recently disturbed areas). Categories for species recorded in 1994-98 were determined by field observation regarding where a plant was found growing. For species that have been extirpated since the Ahles flora of 1946-47, his field notes were used to determine the habitat of the species in question. If questions arose, habitat information published in books (e.g., Gleason and Cronquist, 1991; Newcomb, 1977) was consulted. Each species was assigned to only one habitat type. For the database, even though some species may be found in more than one habitat, only the one most typical for that species was selected. For the purposes of the statistical analyses, there are 13 species on the database that have more than one variety or subspecies. Each of these varieties and subspecies were treated as a full species for the statistical analyses.

The Ahles' flora of 1946-47 was compared to the 1994-98 flora with respect to the number of species lost or retained. Chi Square tests were employed with one degree of freedom. It was hypothesized that the rate of extirpation for non-native species would be significantly less than the rate of extirpation for native species. Similarly, a comparison was also made between the rate of extirpation for all species and the rate for species that utilize fleshy-fruit to disperse seeds. In previous research, Robinson and Handel (1993) had suggested that dispersal by birds of fleshy-fruited species such as members of the Rosaceae had made these species less prone to extirpation. We also tested whether non-native wasteland species known from 1946-47 were more persistent in the flora compared to all other species known from that time.

Next, characteristics of both native and non-native species (woody or herbaceous, annual or perennial) appearing only on the Ahles' flora but not seen subsequently were compared to the entire flora. The percentage of all woody species extirpated from the Ahles' flora was compared to the rate for all herbaceous species. The rate of extirpation for non-native herbaceous species was tested against the rate for native herbaceous species. By performing these analyses it might be possible to determine if large-scale changes to the park as a whole were equally eliminating both native and non-native herbaceous species, or if native species (especially herbaceous ones) have been significantly more vulnerable to extirpation. It was hypothesized that herbaceous species would be more vulnerable to a variety of disturbances prevalent near the ground and have a significantly higher rate of extirpation. Also, the percentage of native and non-native herbaceous perennial species extirpated from the 1946-47 flora was compared to the percentage of extirpated herbaceous annuals (and biennials). It was hypothesized that longer-lived herbaceous species might be more vulnerable to extirpation than shorter-lived ephemerals. In order to have a better understanding of the declines in native species over the last 50 years at Pelham Bay Park, non-native species (which are often aggressive and persistent) were excluded from the following analyses, because they may not be representative of the ecological characteristics of natives. The rate of extirpation of native woody species was compared to the rate for native herbaceous species. Native woody species were further separated into trees, shrubs and woody vines, and the percentage of extirpation for each of these was compared to the percentage of extirpation of native herbaceous species.

In order to evaluate whether certain habitats were more likely to lose native species, the rate of extirpation for all natives preferring dry habitats (upland forest and dry meadow) versus those found in wet habitats (rich forest, wet meadow, freshwater marsh and marine) was evaluated. Native species of wasteland habitats were excluded from this analysis. Finally, the rate of extirpation of herbaceous species from dry habitats (upland forest, dry meadow) was compared to the rate for herbaceous species from wet habitats (rich forest, wet meadow, freshwater marsh and marine).

**Results** - There have been 942 species (with an additional 12 varieties and 1 subspecies) collected in Pelham Bay Park when the Ahles' flora of 1946-47 and the 1994-98 flora are combined (Table 1). These include native plant species (569), non-native (alien) species that have been established and reproducing in the park (321), and species that have escaped from cultivation but are not reproducing to any great degree (52). If only native and established alien species are considered, then 890 species have been identified in the park. However, PBPK has lost 18.4% of known flora in the last fifty years. At the species level, 25.3% of the native plants (144 of 569) have been extirpated in the intervening fifty years, while only 10.6% of non-native species (34 of 321) have been eliminated during this same time (Table 1). The proportion of native species in the flora has declined from 71.6% in 1946-47 to 55.5% in 1994-98, as the absolute number of native species has declined from the 474 collected by Ahles to the 439 found in 1994-98 (Table 1). In all, 101 native species and/or subspecies and varieties were discovered in this survey that were most likely overlooked by Ahles. These have not been classified as new arrivals to the park for the purposes of this study, since they were probably

overlooked by Ahles in his survey. At higher taxonomic levels, 22 native genera (of 253 total genera) were extirpated from PBPK. Six families (of 106) composed entirely of native herbaceous species (Callitrichaceae, Gentianaceae, Hydrophyllaceae, Ophioglossaceae, Santalaceae, and Selaginellaceae) were extirpated from PBPK from 1947 to 1994.

Over the fifty years encompassed by this study, native species have been lost at the rate of 2.9 species per year (or 0.36% per year). During this same time, the number of non-native species have established themselves in PBPK at the rate of 2.7 species per year, as the absolute number of non-natives has increased from 187 on the Ahles' flora to the 298 species collected in 1994-98 (Table 2). This is an increase of 37.2% in fifty years. Each of the seven habitats at PBPK has a greater proportion of non-native species now than in 1946-47 (Figure 2).

At PBPK, certain plant families had a higher rate of native species extirpation than the extirpation rate for native species in the entire park. Native plant families with rates of native species' extirpation equal to or exceeding 25% include: Cistaceae (4 native spp; 2 extirpated); Cyperaceae (55 native spp; 27 extirpated); Fabaceae (18; 5 ex.); Juncaceae (9; 4 ex.); Orchidaceae (3; 2 ex.); Poaceae (59; 16 ex.); Polygalaceae (3; 2 ex.); Saxafragaceae (3; 2 ex.); Scrophulariaceae (16; 5 ex.); Violaceae (8; 6 ex.). All of the native species extirpated from these 10 families were herbaceous species. By comparison, native species in certain families were less prone to extirpation. There were 12 families that did not have a single native species extirpated from PBPK in the last fifty

years. These are Araceae (3 native spp.); Asclepiadaceae (5 native spp.); Betulaceae (7); Brassicaceae (9); Caprifoliaceae (9); Cornaceae (5); Fagaceae (10); Juglandaceae (6); Osmundaceae (3); Salicaceae (5); Smilacaceae (3); Ulmaceae (3). Six of these families are comprised entirely of woody species in the park. Overall, only eight native woody species were extirpated from PBPK in the last fifty years. Appendix D lists those native plant species that were extirpated from PBPK in the last half-century including the type if a woody species (tree, shrub or woody liana).

Results of the Chi Square tests show that native species were significantly more likely to be extirpated than non-native species ( $X^2 = 26.9, p < 0.05$ ). Similarly, native herbaceous species were significantly more likely to be extirpated than non-native herbaceous species ( $X^2 = 20.4, p < 0.05$ ). There was no significant difference in the rate of extirpation of species with fleshy-fruits compared to the rate of extirpation for all species ( $X^2 = 0.002, p < 0.05$ ). There was no significant difference between the number of species extirpated from wasteland habitats and the total number of species extirpated from the entire park ( $X^2 = 0.01, p < 0.05$ ). Overall, herbaceous species were significantly more likely to be extirpated than woody species ( $X^2 = 15.8, p < 0.05$ ). There was a significant difference between the rate of extirpation for native herbaceous species and the rates for each of the following native woody groups: shrubs ( $X^2 = 14.1, p < 0.05$ ), lianas ( $X^2 = 7.7, p < 0.05$ ) and trees ( $X^2 = 11.9, p < 0.05$ ). There was no significant difference between the rate of extirpation of native perennial species vs. native annual species ( $X^2 = 0.6, p < 0.05$ ). There was no significant difference in the rate of extirpation for native species of wet habitats vs. native species of dry habitats ( $X^2 =$

0.001,  $p < 0.05$ ). There was also no significant difference in the rate of extirpation between native herbaceous species of wet habitats and native herbaceous species of dry habitats ( $X^2 = 0.02$ ,  $p < 0.05$ ). However, there was a significant difference in the rate of extirpation of native species from open areas (freshwater marsh, wet meadow, dry meadow and marine) versus native species from woodlands ( $X^2 = 5.1$ ,  $p < 0.05$ ).

Of the 955 species on the database for PBPBK, there are 31 native plant species once collected or still present at Pelham Bay Park that have received special designation by the Natural Heritage Program as being critically imperiled (S1) or imperiled (S2) in New York State (New York Natural Heritage Program, 1998). The majority (27 of 31) are herbaceous species. Of these, 13 species have been extirpated from PBPBK since 1947. These are rattlebox (*Crotalaria sagittalis*), tall tick-trefoil (*Desmodium humifusum*), panic grass (*Panicum scabriusculum*), seaside plantain (*Plantago maritima* ssp. *juncooides*), erect knotweed (*Polygonum erectum*), glasswort (*Salicornia bigelovii*), spring lady's tresses (*Spiranthes vernalis*), seaside goldenrod (*Solidago sempervirens* var. *mexicana*) as well as five species of sedges/rushes: *Carex buxbaumii*, *C. polymorpha*, *Cyperus lupulinus* ssp. *lupulinus*, *Eleocharis halophila* and *Juncus scirpoides*. Each of these 14 species is an herbaceous species (Gleason and Cronquist, 1991).

On the other hand, six pernicious non-native species that are now found at PBPBK were unknown to Ahles in 1946-47. These are: Porcelainberry (*Ampelopsis brevipedunculata* var. *brevipedunculata*), Asiatic bittersweet (*Celastrus orbiculata*), Japanese knotweed (*Polygonum cuspidatum*), kudzu vine (*Pueraria lobata*), buckthorn

(*Rhamnus frangula*), and Japanese viburnum (*Viburnum sieboldii*). Each of these is listed by the Nature Conservancy as being among the most serious invading species in New York State (New York State Ad Hoc Invasive Plant Group, 1998). Five of these six invasives are shrubs or woody vines, while one (*P. cuspidatum*) is a stout, perennial herb (Gleason and Cronquist, 1991).

**Discussion** - From 1947 to 1998, the plant species composition of Pelham Bay Park (PBPK), Bronx County, New York City significantly changed. Analysis of plant collections made by H.E. Ahles in 1946-47 indicate that both woodland species and herbaceous meadow plants typical of the region were present. By 1994, many of the native herbaceous species once found in the park had been eliminated (Appendix D). Also, by 1994-98, non-native species had invaded each of the habitat types to a greater degree than before (Figure 2). During the last fifty years, native species were lost at the rate of 2.9 species per year (Table 1). Most of the native extirpated species (63.5%) were lost from open habitats such as meadows and marshes, while 36.5% were lost from woodlands. Since 1947, of the 144 native plants extirpated from PBPK, 94.4% (136) were herbaceous species (Appendix D). Some of the native extirpated herbaceous species found in 1946-47 but not in 1994-98 were widely distributed and had been collected by Ahles in more than one section of the park. At higher taxonomic levels, six families and 22 genera comprised exclusively of native species were extirpated from PBPK during this time. The loss of native species is expected to continue since there are an additional 56 native species that were classified as being rare in PBPK during the 1994-98 survey (DeCandido, 2001b). Most of these extant rare plants (71%) are

herbaceous species that exist in discreet patches in one habitat. These rare species are vulnerable to a variety of factors including disturbance, abiotic events (drought), natural biological processes (succession) and chance events.

By comparison in the last fifty years, alien species have been much less prone to extirpation in PBPK. In all, 34 non-native species have been lost, a rate of 0.68 alien species lost per year. Differences in the rate of extirpation between alien and native species are statistically significant. No families or genera comprised entirely of non-native species have been eliminated. This disparity in the rate of extirpation between alien and native species has probably occurred since non-native species are widespread in distribution, hardy, able to expand their populations relatively quickly, and are often favored by disturbance events (Goodwin et al., 1999; Hobbs and Huenneke, 1992).

In recent studies of changes in plant species diversity in areas where population and/or human activity have increased, (see Drayton and Primack, 1996; Robinson et al., 1994; Thompson and Jones, 1997), native plant species declined while alien species increased. Land-use change by people has been identified as the primary global threat to biodiversity in this century (Chapin et al., 2000). What factors are responsible for the loss of a significant number of native species, especially herbaceous ones, from PBPK? In their study of the ecological characteristics of plant species extirpated from Staten Island, Robinson et al. (1994) were able to identify only one life history trait correlated with a high risk of extirpation: herbaceousness. That is, herbaceous species of plants fared much more poorly over time than woody species. Similarly in this study,

herbaceous plants, especially native herbaceous species, were significantly more likely to be extirpated than woody shrubs, vines or trees. Plant families that were either eliminated from the park or that had the highest rates of native plant species extirpations were comprised primarily of herbaceous species. This study also found that species collected from open habitats at PBPK were significantly more likely than woodland species to be extirpated. Life history traits of herbaceous species that contribute to extirpation are small (often discreet) populations and habitat specificity (Kruckeberg and Rabinowitz, 1985).

That a number of native species were lost from all habitats, and several native plant species eliminated from more than one section of the park points to large-scale events affecting the park. Man-made changes to PBPK from 1947 to 1994 included construction of roads and the placement of a sanitary landfill in the park. Biological processes that have led to a decline in native species are primarily succession; to a lesser degree, plant extirpations have probably occurred from summer drought, and small-scale disturbance events such as recreational use of the park by people for off-trail hiking, all-terrain biking or horseback riding. At PBPK, the use of herbicides, intensification of mowing, installation and expansion of sports fields, the construction of bicycle paths and other small-scale disturbance have certainly played a role in plant extirpations and invasions, but these are difficult to document precisely. Other biological factors operating in the park include: the introduction of non-native earthworms, the absence of large herbivores such as deer and woodchucks, and the high density of small mammals such as squirrels and rats. Abiotic factors include unfavorable environmental conditions

such as summer drought, the heat-island effect, arson, and pollution such as high soil levels of lead, nickel and copper (Bornstein, 1968; Sharpe, 1978; Volchok, 1967; White and McDonnell, 1988).

Beginning in the late 1950's two large development projects and several smaller ones transformed natural areas of PBPK to a greater degree than had occurred previously. As a result, the number of native species declined in the park and alien species increased. First, an interstate thruway was built through the northern portion of the park. (For a brief description of this area, see Monachino, 1958). Approximately 150 acres of parkland were lost, and several more acres were transformed into the present mixture of mostly alien species combined with a few hardy native ones. During his study in 1946-47, H.E. Ahles had collected 113 native herbaceous species in this area. These included *Agalinis tenuifolia* var. *tenuifolia*, *Crotolaria sagittalis*, *Juncus dudleyi*, *Physostegia virginiana*, and *Vulpia octoflora*. Second, in 1964 and continuing through 1978, a 90 acre parcel of the park was converted into a sanitary landfill. Ahles had collected 57 native herbaceous species in this area including *Eleocharis halophila*, *Hydrophyllum virginianum*, and *Sisyrinchium atlanticum*. Finally, smaller scale disturbance affected other areas of PBPK where Ahles made important collections. For example, at some point between 1947 and 1994, a natural area on the golf course was cleared. Ahles had collected 56 native herbaceous species from this area including *Actaea pachypoda*, *Krigia biflora*, and *Panax trifolius*. Each of the native herbaceous species from these three areas developed since 1946-47 could not be relocated in 1994-98. Other low-level disturbance events occurred from 1947 to 1994, but no direct links between the

disturbance and an extirpation could be determined.

Although the natural areas of PBPK had been affected by development in the 19th century through the establishment of two large estates in the park, land use at that time was primarily for agriculture (Jenkins, 1912; Loeb, 1998b; Pons, 1987). Forests were cleared for their wood, and this increased the area available to herbaceous plant species. Natural area refugia remained for both woody and herbaceous species in the park. The nearby region also contained numerous undeveloped areas (Bolton, 1905). Upon acquisition of PBPK by the City of New York Department of Parks and Recreation in 1888 and continuing until the 1960's, the practice of clearing woody plants in certain areas of the park continued, but the overall proportion of open areas declined (Loeb, 1998a). According to an analysis of changes in vegetation cover types of PBPK from 1885 to 1984, the amount of land classified as meadow declined by 85% from 172.3 hectares to 26.0 hectares. During this same one hundred year interval, forest cover increased by 173% from 133.1 hectares to 309.2 (Sisinni and Anderson, 1993). This decrease in meadow type habitat has particularly affected the herbaceous plants found in PBPK. For example, Ahles collected several herbaceous species such as *Saxifraga virginensis* from more than one section of the park in 1946-47. The extirpation of these species from the flora of PBPK indicates that larger processes such as succession are changing the plant species diversity in the park.

Evidence for a net loss in open habitats in PBPK also comes from two other sources. Young (1958) in a breeding bird survey of PBPK done in 1955, found four

species of grassland nesting sparrows (grasshopper, sharp-tailed, seaside and vesper) in the park that summer. By 1990, three of these species had been extirpated from the park. The fourth (sharp-tailed), a formerly common breeder at PBPK with at least 121 pairs discovered in 1955, had become an uncommon nesting species by 1990 (DeCandido, pers. obs.) Similarly, the field notes of H.E. Ahles briefly describe several types of meadows in PBPK where he collected plant specimens in 1946-47. These include six types of meadows and fields, as well as roadsides and railway lines, the edges of riparian areas, sandy shores, and rocky ledges (Ahles, 1947; 1948). The recensus of the park in 1994-98 indicated that many of these open areas no longer exist. For example, Ahles collected a total of 129 herbaceous species from two areas in the park that have both become mixed woodlands of shrubs and trees. Species found in these meadows such as *Aquilegia canadensis*, *Physalis heterophylla*, and *Plantanthera lacera* could not be re-located anywhere in PBPK in 1994-98. Other open areas such as the edge of the railway line that might have served as secondary habitat for native species were observed being sprayed with herbicides during the course of this study. Within the woodlands in 1994-98, the only real refugia for many herbaceous species were rocky areas that created canopy gaps in the overstorey, allowing light to penetrate to the forest floor.

Although Pelham Bay Park has become isolated from nearby populations of native species, many non-native plants have made their way into the park in the last fifty years. There are more non-native species in each of the seven habitat types now than in 1947 (Table 2), and their proportion in each of these habitats has increased as well. Probably, road building and the placement of the landfill were only two of the many

events that disturbed the soil to a degree that allowed these alien species to take hold and expand their populations in the park. Curiously, Ahles did not record several common alien plants found in PBPK today. Although Ahles may have simply not found many of these aliens (as he most likely did not for approximately 100 native species), it is just as likely that these invaders arrived in the park after 1947. It is also possible that small populations of the non-native species present in 1946-47 and overlooked by Ahles, rapidly increased after large-scale disturbance events. The four most important of the alien species that are the greatest threat to natural areas of the park are *Ampelopsis brevipedunculata* var. *brevipedunculata*, *Celastrus orbiculata*, *Polygonum cuspidatum*, and *Rhamnus frangula*.

The rapid loss of native plant species diversity in PBPK and throughout New York City is cause for alarm. Part of New York's natural heritage is being lost at a disturbing rate, and only a small minority of scientists and interested people are taking notice. This decline also points to a larger problem: the continuing loss and significant alteration of many of New York City's natural areas. Indeed, chunks of New York City's parks are still being lost to development. For example, in 1998 approval was granted for a water treatment facility to be built in the second largest park in the Bronx. Another Bronx park will be converted into a golf course beginning in 2001.

Although scientists tend to interpret plant species diversity and species' extirpations in terms of biological processes, the future of native species in New York City depends on seeing the issue from a different perspective. The critical factor in

preserving plant species diversity is developing public support for natural areas in parks. More effort needs to be directed at explaining why preserving native plant species diversity is important (Tilman, 2000). The degree to which biologists and educators create opportunities for people to appropriately enjoy the remaining natural areas will help determine the future of native species within them, and the natural areas themselves. Increased security presence such as trained enforcement/educators (e.g. Urban Park Rangers) is needed in park areas that receive high volume recreational use. Finally, a simultaneous commitment is needed by those in decision-making positions in government to value natural areas as much as ball fields, buildings and other "developed" areas in parks.

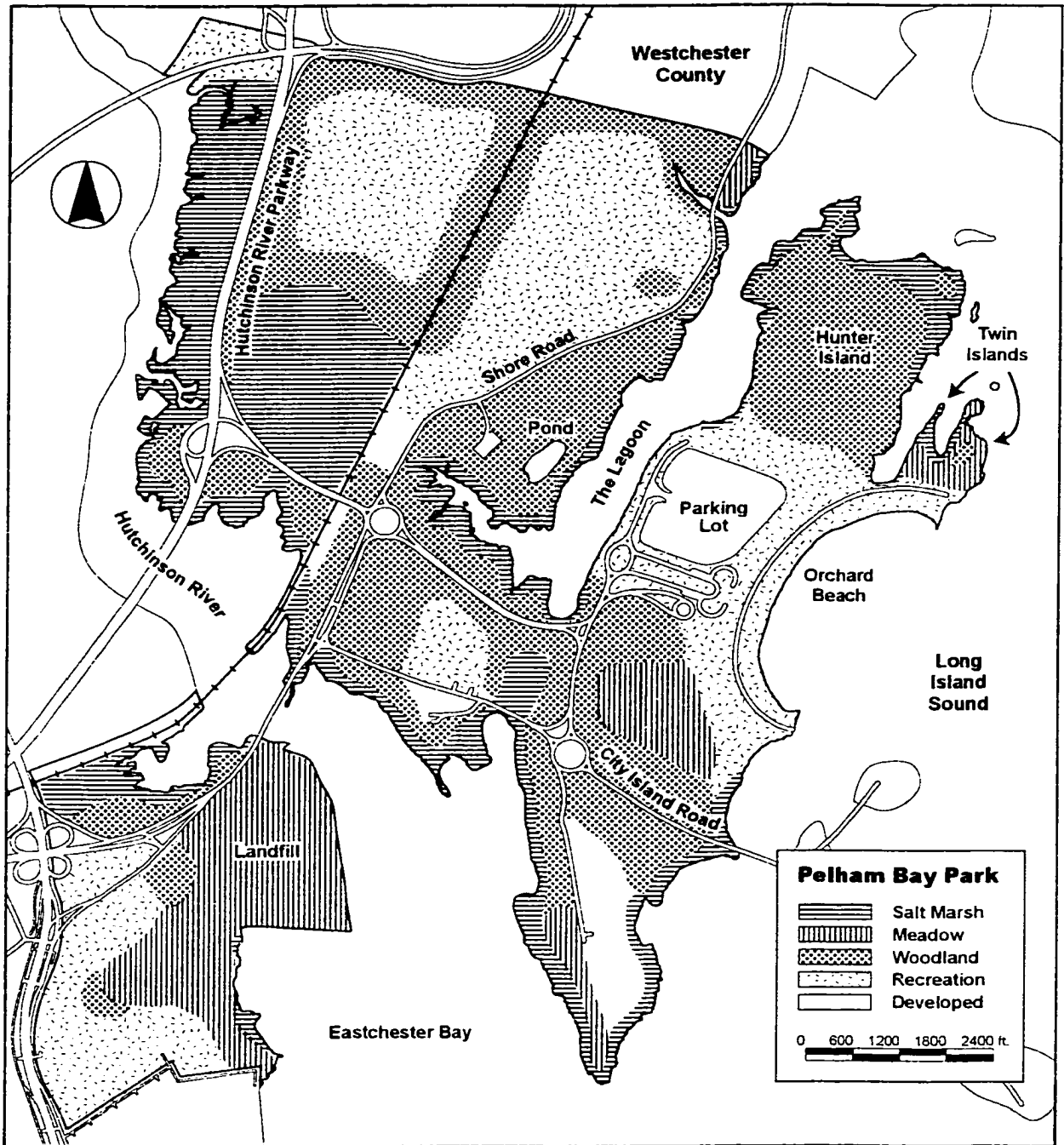


Figure 1. Habitat Map of Pelham Bay Park in 2000

Figure 2. Percent of Non-Native Species by Habitat at Pelham Bay Park, 1946-47 vs. 1994-98

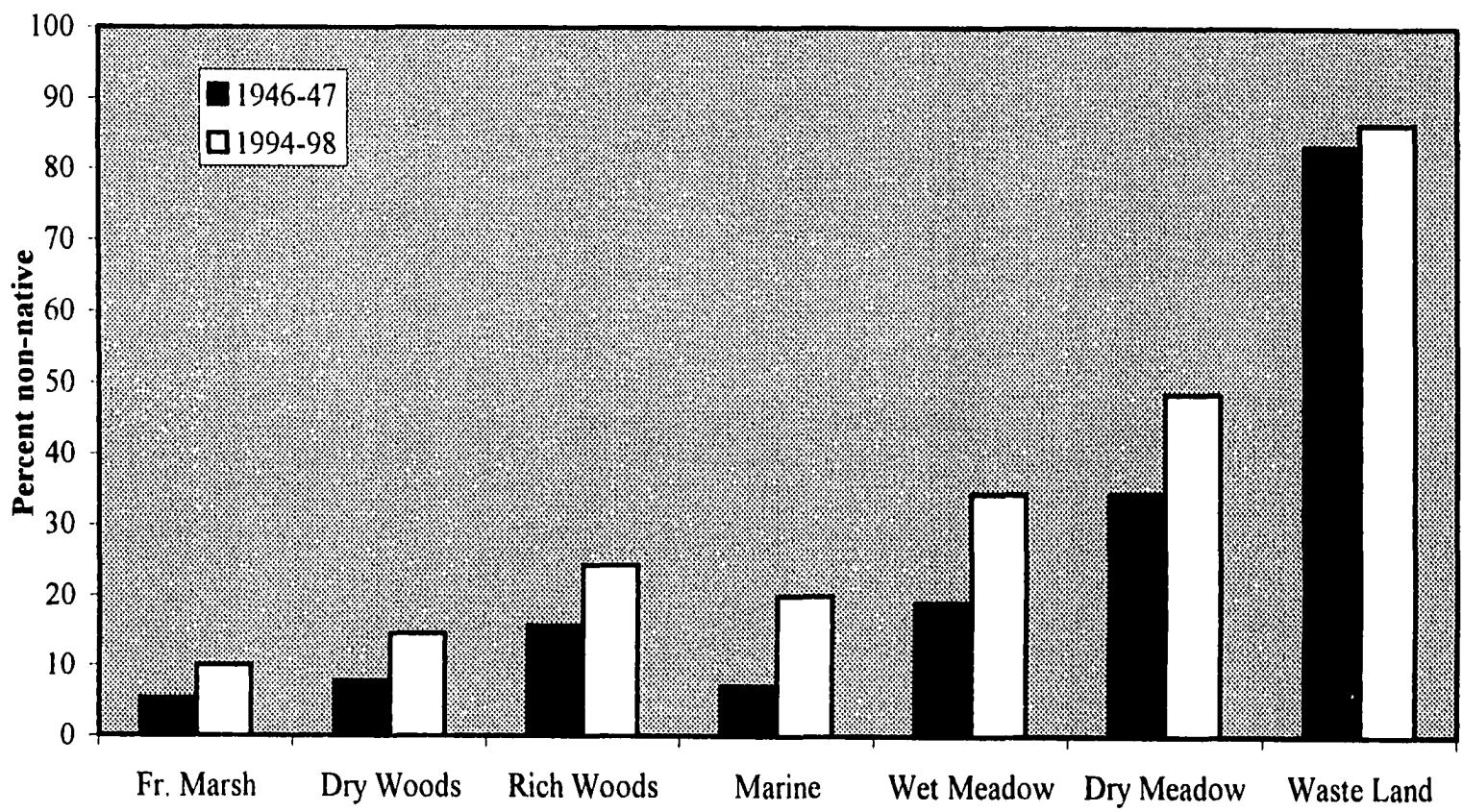


Table 1. The Number of Vascular Plant Species of the H.E. Ahles' Flora of 1946-47 Compared to the 1994-98 Flora of Pelham Bay Park, Bronx Co., NY.

	Native	Non-Native	Var./Ssp.	Planted	Total	No. of Extirpated Species
Ahles 1946-47	474	187	7	3	671	140 native / 25 alien = 165
1994-1998	439	298	13	49	789	4 native / 9 alien = 13
Total No. of Species	569	321	13	52	955	144 native / 34 alien = 178
Ahles Unique Spp.	140	25	1		166	Not Applicable
1994-98 Unique Spp.	101	136	6		243	Not Applicable
Shared Species	328	160	6		494	Not Applicable
Total	569	321	13		903	Not Applicable

	1946-47			1994-98		
	Alien	Total Spp.	% Alien	Alien	Total Spp.	% Alien
Marine	2	28	7.1%	6	30	20.0%
Fresh Marsh	2	38	5.3%	2	30	10.0%
Dry Woods	8	102	7.8%	15	103	14.6%
Rich Woods	21	134	15.7%	37	152	24.3%
Dry Meadow	44	128	34.4%	70	146	47.9%
Wet Meadow	26	136	19.1%	48	140	34.3%
Waste Land	84	102	83.3%	119	139	86.3%
<b>Total</b>	<b>187</b>	<b>668</b>	<b>28.0%</b>	<b>298</b>	<b>740</b>	<b>40.3%</b>

Table 2. Number and Percentage of Non-Native (Alien) Species in Pelham Bay Park, Bronx Co., NY by Habitat Type in 1946-1947 and 1994-1998.

## **Historical and Extant Vascular Flora of New York City: A Literature Review**

**Introduction** - Urban areas present opportunities to study historical changes in species diversity. There is often a history of plant species collected at particular sites documented in herbarium specimens, published papers or field trip accounts, as well as personal notebooks and lists that may extend back to the mid 19th century. In New York City, remaining natural areas are easily accessible and can be surveyed frequently, facilitating comparison between two time periods. From a broader perspective, the study of urban environments is important because most people in North America, Europe, South America, and Australia now live in a city. It is an environment overlooked by many ecologists, yet one that most people encounter on a daily basis (McDonnell and Pickett, 1990). By 2025 it is expected that almost two thirds of the world's people will live in an urban area (World Resources Institute, 1996).

The early success of New York City (40 deg. 47 min. N, 73 deg. 58 min. W) was due to its environment, namely its location and harbors. The first colonists were traders from the Dutch West India Company interested in obtaining furs from Native Americans. The formal study of the local environment began in the 19th century with the establishment of the American Museum of Natural History, and later the New York Zoological Society. Also about that time, the Torrey Botanical Society and the Linnaean Society of New York were founded primarily to study local natural history. Beginning in the 1880's with the creation of the New York (Bronx) Botanical Garden, a significant effort was made to collect plant species from the area (Rusby, 1906). Through the next 70 years, men such as Harry Ahles (Bronx), E.P. Bicknell (Bronx), William T. Davis

(Staten Island), Roy Latham (Queens, Nassau and Suffolk Counties), and Sam Yeaton (Queens) collected plant species in New York City and places further afield.

Historically throughout New York City, many plant species were found or collected from locales that were not park land at the time and these areas have since been developed (see Griscom, 1926; Kieran, 1959; Sefferien, 1932). In the Bronx and Manhattan most of the parks harboring the largest natural areas were established in the 19th century, while in Brooklyn, Queens and Staten Island, most parks were established in the 20th century (Table 1). In the late 19th and early 20th century, it was politically easier to set aside larger tracts of land for public parks. (However, for a discussion of the difficult political maneuverings to establish several Bronx parks during the late 19th century, see Schnitz and Loeb, 1984.) Significant portions of many of the natural areas of parks in the boroughs outside of Manhattan were converted into landfills from the 1930's through the 1970's (Caro, 1974; Pons, 1987). Development, though on a smaller scale, continues to the present. Today, the New York City Department of Parks and Recreation owns and maintains approximately 28,000 acres of parkland in the city, yet only those parks listed in Table 1 have significant tracts of natural areas. The Federal Government owns approximately 9,000 additional acres in Brooklyn, Queens and Staten Island as part of the Gateway National Recreation Area. Overall, approximately 20% of New York City is designated as park land, yet only a portion (perhaps 50%) of this acreage can be considered "natural area," specifically set aside to protect and maintain the flora and fauna found therein.

**Materials and Methods** - Data used in this research about historical (pre-1980) and/or extant (post 1980) occurrence of a particular species were compiled primarily from published papers and other literature sources. This paper is therefore a primarily a literature review of the flora of New York City. Research was supplemented by field work done by the author from 1985-2000, reports to agencies (e.g., Cramer et al., 1985; Natural Resources Group, 1988a, b, c; Young, 1998), and some examination of museum collections. In the case of a few herbaceous species (less than 100), verbal reports were accepted from reliable field workers (e.g., members of the Natural Resources Group of the New York City Department of Parks).

Table 1 provides a list of all parks in New York City greater than 100 acres in size that also contain a significant amount of natural areas, and the year in which the park was established. Also provided in Table 1 is the information source(s) where the most comprehensive data on extant plant species' occurrence for the park can be found. For the purposes of this study, a natural area is defined as one that is comprised mostly of unmanaged vegetation. Typically, such lands have never been developed, although significant disturbances may have occurred in the past. The vegetation consists of native species typical of the region, often with a large contingent of non-native species as well. In some cases, such as the abandoned landfills in parks throughout the five boroughs, a natural area can have a recent history of significant disturbance and be dominated by non-native species.

For the entire city and surrounding counties, Mitchell (1990) was the key reference for historical occurrence. Clemants (1990) was used as a secondary source for historical occurrence. For extant woody species in New York City, Clemants (1999) was the primary source for occurrence in New York City as well as Westchester, Nassau and Suffolk Counties. For the Gateway National Park areas in Queens, Brooklyn and Staten Island the key source was Venezia and Cook (1991). For Staten Island, the paper by Robinson et al. (1994) and the database used in that paper (Robinson, 1999), as well as a recent rare plant list of the borough (New York Natural History Program, 1999) were the primary sources of information.

There are several natural areas in New York City for which no comprehensive published flora is available (Table 1). These natural areas include parks as well as land owned by the private sector or agencies other than the New York City Department of Parks. Obtaining information for extant occurrence of many herbaceous species was difficult for these natural areas that are primarily concentrated in Brooklyn, Queens and Manhattan. Verbal reports regarding extant occurrence of plant species were accepted from reliable observers in some cases. For Queens, the flora compiled by Greller (1977) of Cunningham Park was treated as a post-1980 flora since he made updates and corrections to the list (Greller, 1985; Greller et al., 1991). By comparison, many natural areas have been well-studied in Staten Island and the Bronx in both the pre- and post 1980 time periods. For Staten Island, comprehensive information exists for most natural areas in the borough (see Robinson et al., 1994; Young, 1998). However, comprehensive floras for most individual parks and other natural areas have not yet been published for

either the historical or post -1980 time periods (Table 1). For the Bronx, DeCandido (2001a), Profous and Loeb (1986), the Natural Resources Group (1990), and Yost et al. (1991) were the primary sources for extant plant species occurrence.

For Long Island (Nassau and Suffolk Counties) and Westchester County, species are listed only if they also occur (or had occurred) in New York City. For the pre-1980 period, historical information provided by Mitchell (1990) was the key reference. For the post-1980 time frame, comprehensive information about woody species was available in Clemants (1999). For extant herbaceous species on Long Island, field work by the author as well as the range maps for several plant families published in the Long Island Botanical Society Newsletter were used (see LIBS Flora Committee, 1996). For Westchester County, published floras do not exist for the counties largest park (Ward Pound Ridge) and some smaller ones as well (e.g., Rye Marshlands). In this case, field observations by the author were supplemented by reports from reliable observers.

For the list, all nomenclature follows Mitchell and Tucker (1997) including designation as a native, non-native (alien) or escaped/introduced species. Designation of a species to woody or herbaceous status follows Gleason and Cronquist (1991). Most of the species from the historical period were collected beginning in the 1880's, though a few (less than 25) were collected as early as the 1860's. Symbols that precede the scientific (species) name indicate whether it is alien, escaped from cultivation or native according to the following key:

\* - A non-native (alien), uncultivated species that is established in the local flora.

**^** - Rare escape or introduced species that is not widespread and often does not persist in the local flora.

(No symbol) - A native species that is historically and/or currently found in that borough. Each species is classified using five different symbols that indicate occurrence in a particular borough:

**x** - A pre-1980 county record for the species is vouchered with a herbarium specimen.

The species is considered to be extirpated in New York City.

**XX** - A county record for a species is either vouchered with a herbarium specimen, listed in a published paper or a report, or seen by a reliable field worker since 1980. The species is considered extant in New York City.

**BB** - A woody species that was seen and/or collected by trained volunteers and scientists of the Metropolitan Flora Project of the Brooklyn Botanic Garden since 1990.

**C** - A species that has been seen and/or collected by members of the Metropolitan Flora Project of the Brooklyn Botanic Garden prior to 1990. The year in which the species was identified or collected was not published. The species is believed to be extirpated in New York City.

**RE** - Recently Extirpated. A species that has been extirpated from a particular borough or county since 1990.

Following indications of occurrence in New York City, the two counties on Long Island and Westchester County, rankings developed by The Nature Conservancy are provided for rare plant species status both globally (G1, imperiled through G5, secure) and statewide (S1, imperiled through S5, secure) as described in Mitchell and Tucker (1997).

Finally, the New York State legal status is given according to the following code developed by the Natural Heritage Program (1998):

- V - Exploitable and vulnerable. The species is likely to become threatened in the near future throughout all or a significant portion of its range within the state if causal factors continue unchecked.
- U - An unprotected species (Applies only to extirpated species).
- E - An endangered species exists in 5 or fewer sites with fewer than 1,000 individuals known in total.
- T - A threatened species exists in 6 to 10 sites in the state with fewer than 3,000 individuals known in total.
- R - A rare species exists in 20-35 extant sites with 3,000 to 5,000 individuals known.

**Results** - The complete list of plant species occurrence is presented in phylogenetic order in Appendix E. In New York City, there are 161 families with 779 genera and 2,179 species (Table 2). For each borough except Manhattan, as the number of families increases so do the number of native and non-native species (Table 2). According to Table 3, New York City still retains most of its native plant species diversity with 778 extant native species compared to 1357 ever recorded (57.3%). Of the 161 families ever found in New York City, 24 (14.9%) contain only non-native species (Appendix E). In addition, there are 10 families containing only native species that have been extirpated from New York City: Azollaceae, Ericaulaceae, Isoetaceae, Juncaginaceae, Limnanthaceae, Najadaceae, Ruppiaceae, Selaginaceae, Thymeliaceae, Zannichelliaceae.

Staten Island has the greatest number of families (154) and highest species count (1633) of each of the five boroughs, including the most native (1109) and alien (438) species (Table 3). However, Staten Island has also lost 31.9% of its native species (354) during the last 10 years (Appendix E). By comparison, Brooklyn has the fewest number of families (109), as well as the least number of plant species (695) including the lowest number of native (473) and alien (244) species. According to Table 3, Staten Island has the greatest number of extant native species (620), while Queens has the most extirpated native species (585). In each borough, the number of native species still exceeds the number of alien species. Of the five boroughs, only Staten Island has more native extant species than native extirpated species.

Table 4 presents the seven families of plants in New York City with the greatest number of species. These families contain 41% of the total known flora of New York City. According to Table 5, there are 10 plant families that have been particularly prone to extirpation of native species. Of these 10 families, 9 contain only herbaceous species. Of the 471 herbaceous species in these 9 families, 275 (58.4%) have been extirpated. One family (Orchidaceae) has lost 87% of its native species. By comparison, Table 6 presents 15 plant families that contain only woody species found in New York City. Of the 89 native woody species in these families, 10 (11.2%) have been extirpated. Only one family (Aquifoliaceae) has lost at least 50% of its species. Differences between the rate of extirpation for these 9 herbaceous families (Table 1) vs. the 15 woody plant families are significant (Chi Square = 71.2,  $P < 0.05$ ). Overall, of 1360 native species known from New York City, 1141 are herbaceous and 219 are woody species.

Differences between the rate of extirpation between herbaceous (531 extirpated) and woody (51 extirpated) species are significant (Chi Square = 41.9,  $P < 0.05$ ).

**Discussion** - This study has demonstrated the great diversity of the New York City flora with 2,179 species recorded in 779 genera and 161 families (Table 2). If escaped species are excluded from the list, then approximately 70% (1359 of 1967 species) of New York City's historical and extant flora are native species. Only in three boroughs (Queens, the Bronx and Richmond) are there more extant native than non-native species. Also according to Table 2, as the number of plant families increases, species diversity (of both native and alien species) increases linearly as well. Of the native species on the list, 124 (9.1%) are considered endangered, threatened or rare in New York State (Natural Heritage Program, 1998). New York City has 56.8% of the species ever recorded in New York State (2179 of 3835 reported in NYS), and 60.4% of the native species recorded in the state (1359 of 2250).

In the last fifteen years or so, several agencies have developed an interest in preserving New York City's native plant species diversity. With the establishment of the Urban Park Rangers, the Natural Resources Group and the Native Plant Propagation Center by the New York City Department of Parks, there is a movement to map (and protect) all natural areas in New York City, educate the public about the flora in the city's parks, locate rare or unique plant species in each of the five boroughs and propagate native plants to establish populations in different parks. Other organizations such as the New York Metropolitan Flora Project of the Brooklyn Botanic Garden (see Clemants, 1999) have mapped the occurrence of the historical and extant woody flora of New York

City. The Metro Forest Council, the Center for Biodiversity and Conservation (American Museum of Natural History), and the Torrey Botanical Society sponsor conferences and field trips to local parks. To preserve the remaining natural areas in New York City and the extant species diversity in them, scientific research of natural areas and investigations regarding the causes of extirpations must continue. However, there needs to be an effort to educate the public of the great diversity of plant species that still exist in New York City, and why preserving this biodiversity is important.

Although the pre-1980 era saw many changes that negatively impacted the natural areas of New York City, remnant areas of native plant species diversity are threatened even today. Ongoing threats include the conversion of natural areas into sports facilities and the loss of park land to highway expansion and infrastructure construction (water treatment facilities, parking lots, buildings, etc). This is especially true in the Bronx, Queens, and Staten Island. Increased recreational use of parks by people can have a negative impact as well. In New York City illegal fires, dumping, walking dogs off-leash, and off-trail (dirt and ATV) biking have had an adverse impact on many parks, particularly in riparian areas. Biotic factors have played a role in extirpations as well: areas that were once meadows or fields have succeeded to shrubs and forest. Disturbance has allowed non-native species to invade (and frequently dominate) large expanses of park land. Both succession and disturbance have caused a net loss of habitat for many species, especially herbaceous ones. As a result, small remnant patches of native species have become quite vulnerable to extirpation from a variety of other causes.

During the coming years, the proportion of non-native species will continue to grow as native species are extirpated. Over the last century this is most evident in Brooklyn and Manhattan where the combined average of native species extirpation is 69.6 %. Even Queens, where most parks were established from the 1920's to the 1950's has lost 62.2% of its native species (Table 3). Staten Island, the borough with the greatest extant native plant species diversity, is also the borough whose remaining natural areas are undergoing the most rapid development (Robinson et al., 1994). Only a few of the remaining natural areas have been protected as part of park land (often less than 100 acres in size), making herbaceous species in such tracts vulnerable to extirpation (Drayton and Primack, 1996).

According to data from Robinson (1999), Staten Island has lost 31.8% of its native species in the last 10 years (Appendix E). If trends for the other boroughs are any indication, then on Staten Island the number of extirpated native species will soon exceed extant native ones. This would mean the loss of at least another 60-70 native species from the borough in the coming years. Staten Island has the greatest number of endemic plant species (99) of any borough, as well as the most native extant species that have special rarity designations by New York State (84). The loss of remaining natural areas not yet protected in parks on Staten Island to development will be particularly unfortunate.

Even areas protected as park land have suffered significant losses of native plant species. Since 1948 in the largest city operated park (Pelham Bay Park in the Bronx),

141 native species (21% of the park's known flora at that time) have been extirpated, while 132 alien species have invaded the park in the same time period (DeCandido, 2001b). Most of these extirpations likely occurred because natural areas in the park were developed (with sports fields, a landfill, and highway expansion). Biological processes (succession) also played a role in eliminating many of the Pelham Bay Park's meadows and fields. Decline of these open habitats has led to the loss of plant species, especially herbaceous ones (DeCandido, 2001b). Invasions of alien species probably occurred with large-scale construction in the park from approximately 1955-1970. Clearly, the establishment of parks is neither sufficient to insure the preservation of native plant species diversity, nor the invasion of remaining habitats by non-native species. Rather, strategies to protect native plant species and natural areas are required. These include direct intervention through actively protecting natural areas, propagating rare native species and especially, educating the public about the importance of preserving native plant species diversity.

In New York City the largest plant families are those comprised primarily of herbaceous species (Table 4). Most of the extant diversity of the seven families in Table 4 is due to high numbers of native species, except in Brassicaceae in which 68% of the extant species are non-native. Certain families contain species that have been particularly prone to extirpation, and these are primarily herbaceous ones. Of the ten families of plants composed only of native species that have been extirpated from New York City, all were composed exclusively of herbaceous species (Appendix E). According to Table 5, of the nine families with more than 10 species, all except for one (Ericaceae) are

comprised of exclusively herbaceous species. Even in Ericaceae, most of the extirpations have been of herbaceous species (7 of 12). On Staten Island during the last decade, 92.7% (327) of the native plants that were extirpated were herbaceous species. Life history traits that further contribute to extirpation are small (often discreet) populations and habitat specificity (Kruckeberg and Rabinowitz, 1985). Analysis of the habitat requirements of species from families listed in Table 5 indicates that extirpated species were found primarily in freshwater/riparian/mesic areas (Cyperaceae, Juncaceae, Potamogetonaceae) or rich, mesic woodland (Aspleniaceae). Besides ecological factors, species from other families listed in Table 5 may simply have been the object of collectors such as Orchidaceae (see Denslow, 1924). Other species may not recover well from trampling. Finally, there are a number of native herbaceous species from several families listed in Appendix E (e.g., Poaceae) that are primarily found in meadows and open habitats. Meadows in New York City parks have declined in New York City primarily due to development to ball fields, buildings, etc. To a lesser degree, meadows are disappearing as these areas are invaded with shrubs and forest.

In New York City, native woody species have been significantly less prone to extirpation compared to herbaceous species. Overall, New York City has lost 23.7% of its woody species, while 46.6% of its native herbaceous species have been extirpated. Of 89 species from 15 families that contain only woody species, 10 species (11.2%) have been extirpated in New York City during the last century (Table 6). Only a single family (Aquilifoliaceae) lost as many as 50% of its native species. Herbaceous and woody species differ in life-history traits and their pattern of distribution across the landscape.

Once beyond the seedling stage, woody species are less prone to being trampled than herbaceous ones. Also, woody species are frequently distributed throughout natural areas rather than in discreet patches.

Although scientists tend to interpret diversity and species' extirpations in terms of biological processes, the future of native species in New York City depends on seeing the issue from a different perspective. On a practical level, involving the many landscape architects, gardeners and even horticulturists employed by the City of New York (e.g., the Housing Department, the Department of Highways) to use native plants is one strategy to reintroduce (or maintain) these plants in the urban environment. New York City has a number of landfills that are being restored, and grass strips and highway shoulders that are mowed regularly. If the largest of these could be planted with native herbaceous species as has been done in the Chicago area (Blumberg, 1998), it might be possible to both increase meadow-type habitats and re-establish species in the wild. However, a critical factor in preserving plant species diversity is developing public support for natural areas in parks. More effort needs to be directed at explaining why preserving native plant species diversity is important. The degree to which biologists and educators create opportunities for people to appropriately enjoy the remaining natural areas will help determine the future of native species within them. Increased security presence such as trained enforcement/educators (e.g. Urban Park Rangers) is needed in park areas that receive high volume recreational use. Finally, a simultaneous commitment is needed by those in decision-making capacities in government to value natural areas as much as ball fields, buildings and other "developed" areas in parks.

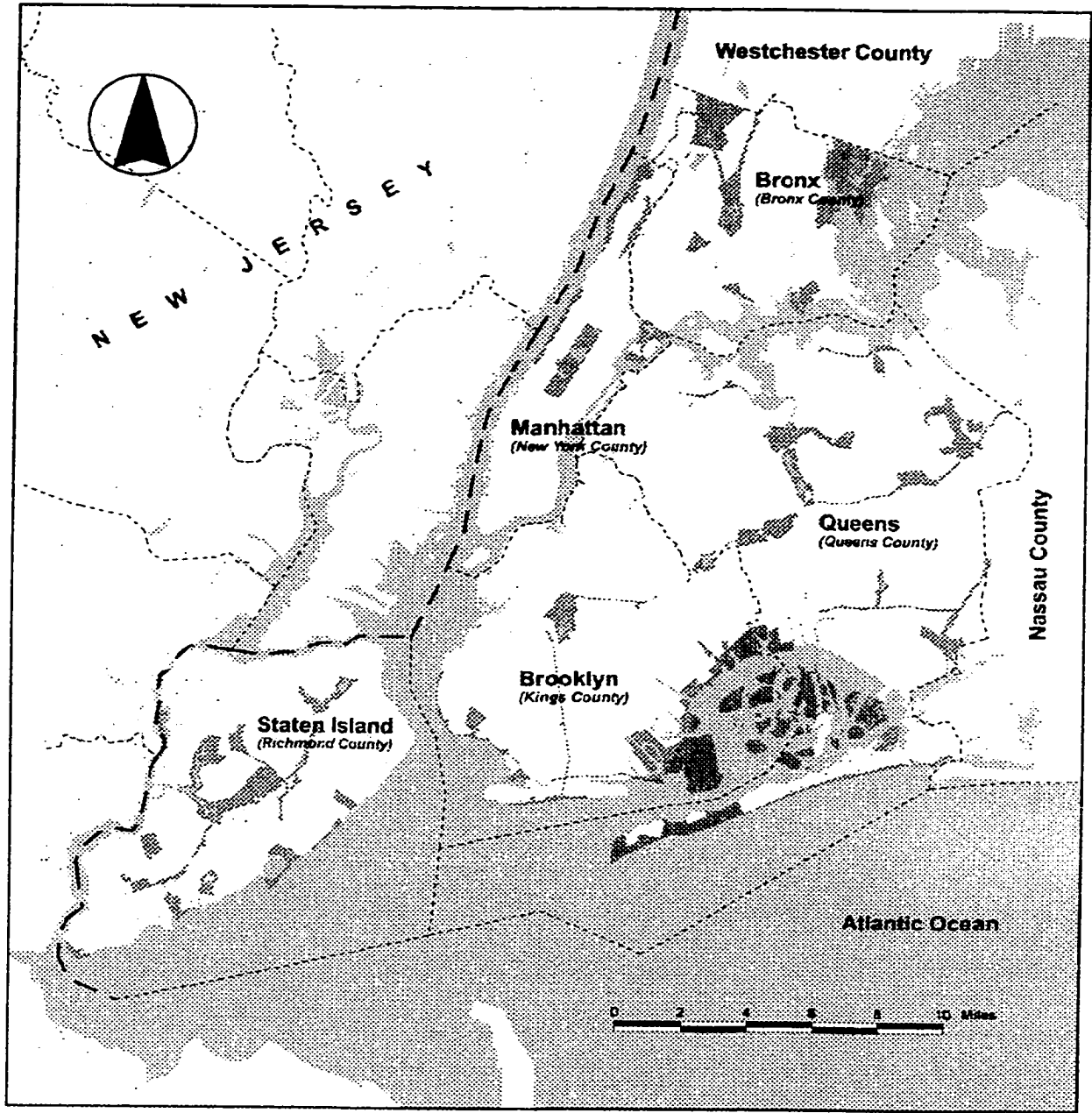


Figure 1. Natural Areas of New York City in 2001

Table 1. NYC Parks (>100 acres) with Significant Natural Areas, Year Established, and Literature Sources for Extant Plant Species' Occurrence

Boro	Park	Year	Status	Acres	Literature Source
Bronx (6,824)*	Bronx River Park	1888	NYC Dept. of Parks	721	Rudnicky and McDonnell (1989); Frankel (1978)
	Ferry Point Park	1937	NYC Dept. of Parks	413	
	Pelham Bay Park	1888	NYC Dept. of Parks	2764	DeCandido (1999)
	Van Cortlandt Park	1888	NYC Dept. of Parks	1,146	Natural Resources Group (1990)
N.Y. (2,630)*	Central Park	1863	NYC Dept. of Parks	843	Cramer et al. (1984); Loeb (1993)
	Inwood Hill Park	1916	NYC Dept. of Parks	196	Loeb (1986)
	Riverside Park	1872	NYC Dept. of Parks	324	
Kings (5,589)*	Gateway National Rec. Area	1954	U.S. Federal Government	ca. 1171	Venezia and Cook (1991)
	Marine Park	1917	NYC Dept. of Parks	798	Natural Resources Group (1988c)
	Prospect Park	1866	NYC Dept. of Parks	526	Andropogon Associates (1994)
Queens (11,751)*	Alley Pond Park	1935	NYC Dept. of Parks	655.3	Stalter (1981); Natural Resources Group (1988a)
	Baisley Pond Park	1931	NYC Dept. of Parks	110	
	Cunningham Park	1927	NYC Dept. of Parks	358	Greller (1977; 1985); Greller et al. (1991)
	Forest Park	1898	NYC Dept. of Parks	538	
	Gateway National Rec. Area	1954	U.S. Federal Government	ca. 4588	Venezia and Cook (1991)
	Idlewild Park	1956	NYC Dept. of Parks	225	
	Kissena Park	1927	NYC Dept. of Parks	234.8	Natural Resources Group (1988b)
	Rockaway Beach	1938	NYC Dept. of Parks	253	
S.I (8,206)*	Arden Heights Woods	1993	NYC Dept. of Parks	183	
	Blue Heron Park	1982	NYC Dept. of Parks	222	Bridges (1991)
	Bloomingtondale Park	1968	NYC Dept. of Parks	138	
	Clay Pit Pond	1974	New York State	250	
	Clove Lakes Park	1921	NYC Dept. of Parks	198.1	
	Conference House	1926	NYC Dept. of Parks	264.2	Greller et al. (1992); Anderson (Unpublished)
	Gateway National Rec. Area	1954	U.S. Federal Government	1217	Venezia and Cook (1991)

\* - the number of acres of parkland (exclusive of playgrounds) in the borough

Table 1 (cont.). NYC Parks (>100 acres) with Significant Natural Areas, Year Established, and Literature Sources for Extant Plant Species' Occurrence

<b>Boro</b>	<b>Park</b>	<b>Year</b>	<b>Status</b>	<b>Acres</b>	<b>Literature Source</b>
S.I (8,206)*	Great Kills Park	1964	NYC Dept. of Parks	306.3	
	Greenbelt	1924	NYC Dept. of Parks	ca.2500	Robinson et al. (1994)
	Lemon Creek	1964	NYC Dept. of Parks	105.8	
	Mariner's Marsh	1997	NYC Dept. of Parks	107.2	
	Saw Mill Creek Park	1994	NYC Dept. of Parks	111.7	
	Silver Lake	1971	NYC Dept. of Parks	209.4	
	Staten Island Industrial Park	1997	NYC Dept. of Parks	226	
	Wolfe's Pond Park	1929	NYC Dept. of Parks	341	
* - the number of acres of parkland (exclusive of playgrounds) in the borough					

County	Families	Number of Species				Native Endemic Species	
		Native	Alien	Escaped	Total Spp.	Total	Extirpated
<b>KINGS</b>	109	451	244	48	743	14	11 (78.6%)
<b>NY</b>	127	440	286	69	795	13	13 (100%)
<b>QU</b>	137	940	390	86	1416	57	13 (23%)
<b>BX</b>	146	988	417	106	1511	73	18 (25%)
<b>SI</b>	154	1109	438	86	1633	136	37 (27%)
<b>NYC</b>	161	1357	610	210	2177	x	x

Table 2. Total Plant Species Diversity of New York City by Borough.

County	No. of Extant Species			No. of Extirpated Species			Total All
	Native	Alien	Total	Native	Alien	Total	
<b>KINGS</b>	107	125	232	344	119	463	695
<b>NY</b>	103	126	229	337	160	497	726
<b>QU</b>	355	259	614	585	131	716	1330
<b>BX</b>	464	316	780	524	101	625	1405
<b>SI</b>	620	300	920	489	138	627	1547
<b>NYC</b>	775	411	1186	582	199	781	1967

Table 3. The Number of Extant and Extirpated Species (Exclusive of Planted/Escaped Species) in New York City

Family	Number of Species				
	Total	Alien	Alien Extirpated	Native	Native Extirpated
Asteraceae	226	90	27 (30%)	136	28 (20.6%)
Poaceae	199	76	25 (33%)	123	52 (43%)
Cyperaceae	184	7	5 (71%)	177	115 (65%)
Rosaceae	88	25	6 (24%)	53	19 (36%)
Fabaceae	86	44	14 (32%)	42	16 (38%)
Lamiaceae	63	28	18 (64%)	35	14 (40%)
Brassicaceae	50	34	7 (21%)	16	5 (31%)

Table 4. The Largest Families of Plants in New York City and the Proportion of Species Extirpated

Table 5. Plant Families (> 10 species) having the Highest Native Plant Species Extirpation Rates

Family	Number of Species		Family	Number of Species	
	Total Native	Ex. Native		Total Native	Ex. Native
Cyperaceae	177	115 (65%)	Ericaceae	28	12 (43%)
Poaceae	123	52 (43%)	Violaceae	26	15 (58%)
Orchidaceae	30	26 (87%)	Juncaceae	26	13 (50%)
Aspleniaceae	30	17 (57%)	Potamogetonaceae	12	10 (83%)
Scrophulariaceae	29	16 (55%)			

Table 6. Selected Woody Plant Families and Native Species Extirpations.

Family	Number of Species		Representative Genera	Extirpated Species
	Total Nat.	Ex. Nat.		
Fagaceae	19	2	<i>Castanea, Fagus, Quercus</i>	<i>Quercus muhlenbergii, Q. x rudkinii</i>
Salicaceae	13	2	<i>Salix</i>	<i>Salix eriocephala, S. petiolaris</i>
Betulaceae	11	0	<i>Alnus, Betula, Corylus</i>	
Juglandaceae	8	1	<i>Carya, Juglans</i>	<i>Carya lacinosa</i>
Cornaceae	7	2	<i>Cornus</i>	<i>Cornus canadensis, C. rugosa</i>
Anacardiaceae	6	0	<i>Rhus, Toxicodendron</i>	
Aquifoliaceae	6	3	<i>Ilex, Neopanthus</i>	<i>Ilex laevigata, I. montana, N. mucronatus</i>
Aceraceae	4	0	<i>Acer</i>	
Magnoliaceae	3	0	<i>Liriodendron, Magnolia</i>	
Oleaceae	3	0	<i>Fraxinus</i>	
Ulmaceae	3	0	<i>Celtis, Ulmus</i>	

Table 6 (cont.). Selected Woody Plant Families and Native Species Extirpations.

Family	Number of Species		Representative Genera	Extirpated Species
	Total Nat.	Ex. Nat.		
Hamamelidaceae	2	0	<i>Hamamelis, Liquidamber</i>	
Lauraceae	2	0	<i>Lindera, Sassafras</i>	
Platanaceae	1	0	<i>Platanus</i>	
Tilaceae	1	0	<i>Tilia</i>	
<b>Total</b>	89	10	<b>Representative Genera</b>	<b>Extirpated Species</b>

## Appendix A

Checklist of the Vascular Flora of Pelham Bay Park, Bronx County, New York City as compiled from specimens collected by H.E. Ahles in 1946-47. Nomenclature follows that of Mitchell (2000) and Mitchell and Tucker (1997). Vascular plant species that were collected by Ahles but not collected or observed by the author (DeCandido, 2000) are designated in the checklist by a leading exclamation point (!). All introduced (i.e., non-native) species are designated by a leading asterisk (\*). Taxa that were collected by Ahles in 1946-47 as well the author in 1994-98 are preceded by no symbol, unless they are not native. Numbers following the common name of the species indicate the section of the park (from 1 through 29) where the specimen was collected. (Refer to Figure 1 of Chapter 1 for a map that shows the exact location of each of these 29 sections of the park.) The second number (following the colon) indicates Ahles' collection number (from 1 through 1531). In some cases multiple collections were made of the same species. These are listed in numerical order of collection, rather than by section.

### DIVISION: LYCOPODIOPHYTA

#### Family: SELAGINELLACEAE

!*Selaginella apoda* - Creeping Spikemoss; 28:1097

!*Selaginella rupestris* - Rock Spikemoss; 8:1082

### DIVISION: EQUISETOPHYTA

#### Family EQUISETACEAE

*Equisetum arvense* - Common Horsetail; 24:171

### DIVISION POLYPODIOPHYTA

#### Family OPHIOGLOSSACEAE

!*Botrychium dissectum* - Cut-leaf Grape Fern; 24:1128

#### Family OSMUNDACEAE

*Osmunda cinnamomea* - Cinnamon Fern; 22:115/22:176/10:1302

*Osmunda claytoniana* - Interrupted Fern; 22:114/22:196/10:1303

*Osmunda regalis* var. *spectabilis* - Royal Fern; 11:300/28:696

Family **DENNSTAEDTIACEAE**

- ! *Dennstaedtia punctiloba* - Hay-scented Fern; 28:560  
*Pteridium aquilinum* var. *latiusculum* - Bracken; 22:904

Family **THELYPTERIDACEAE**

- Thelypteris noveboracensis* - New York Fern; 13:572/28:680/18:928  
*Thelypteris palustris* var. *pubescens* - Marsh Fern; 28:892/8:1044

Family **DRYOPTERIDACEAE**

- ! *Athyrium filix-femina* var. *angustum* - Northern Lady Fern;  
 23:780/24:940/29:628/29:633/29:637  
*Athyrium filix-femina* var. *asplenioides* - Southern Lady Fern; 23: 781  
 ! *Dryopteris intermedia* - Common Wood Fern; 13:585  
*Onoclea sensibilis* - Sensitive Fern; 18:938  
 ! *Polystichum acrostichoides* - Christmas Fern; 17:428

**DIVISION: PINOPHYTA**

Family **PINACEAE**

- + *Pinus strobus* - White Pine; 13:1100  
 \* *Pinus sylvestris* - Scotch Pine; 8:2

Family **CUPRESSACEAE**

- ! *Juniperus virginiana* - Eastern Red Cedar; 3:1

**DIVISION: MAGNOLIOPHYTA**

Family **MAGNOLIACEAE**

- Liriodendron tulipifera* - Tulip Poplar; 18:1416

Family **LAURACEAE**

- Lindera benzoin* - Spicebush; 23:14/18:927/5:1103  
*Sassafras albidum* - Sassafras; 20:184

Family **SAURURACEAE**

- Saururus cernuus* - Lizard's Tail; 13:612

Family **ARISTOLOCHIACEAE**

*Asarum canadense* - Wild Ginger; 5:45

Family **RANUNCULACEAE**

! *Actaea pachypoda* - White Baneberry; 18:1474

*Anemone quinquefolia* - Wood Anemone; 5:59

*Anemone virginiana* var. *virginiana* - Thimbleweed; 13:818

! *Aquilegia canadensis* - Wild Columbine; 8:90

*Caltha palustris* - Marsh Marigold; 24:31

*Cimicifuga racemosa* - Black Snakeroot; 24:1452

*Ranunculus arbortivus* var. undetermined - Kidneyleaf Crowfoot; 18:110

\* *Ranunculus acris* - Tall Buttercup; 5:326

\* *Ranunculus bulbosus* - Bulbous Buttercup; 24:117

*Ranunculus hispidus* var. *nitidus* - Swamp Buttercup; 5:62/18:112;

Endangered G5 T1 S1

*Ranunculus recurvatus* - Hooked Crowfoot; 5:153/18:185

\* *Ranunculus sceleratus* - Cursed Crowfoot; 28:508/22:1385

! \* *Thalictrum aquilegifolium* - Garden Meadow-rue; 11:294

*Thalictrum dioicum* - Early Meadow-rue; 13:76/13:77/12:1299

! *Thalictrum thalictroides* - Rue anemone; 5:40/5:60/17:1121

Family **BERBERIDACEAE**

\* *Berberis thunbergii* - Japanese Barberry; 5:166

*Podophyllum peltatum* - May-Apple; 5:180

Family **MENISPERMACEAE**

*Menispermum canadense* - Moonseed; 8:660

Family **PAPAVERACEAE**

\* *Chelidonium majus* - Celandine; 11:295

*Sanguinaria canadensis* - Bloodroot; 23:23

Family **FUMARIACEAE**

*Dicentra cucullaria* - Dutchman's Breeches; 23:19

Family **PLATANACEAE**

*Platanus occidentalis* - Sycamore; 5:221

Family **HAMAMELIDACEAE**

*Hamamelis virginiana* - Witch-hazel; 10:1073

*Liquidambar styraciflua* - Sweet-gum; 24:173

Family **ULMACEAE**

*Celtis occidentalis* - Hackberry; 3:156/19:1011

*Ulmus americana* - American Elm; 10:1101

*Ulmus rubra* - Slippery Elm; 5:10/11:97/8:1093/11:1112

Family **CANNABACEAE**

!\**Humulus japonicus* - Japanese Hops; 28:758/19:1025

!\**Humulus lupulus* - Common Hops; 20:1498

Family **MORACEAE**

\**Broussonetia papyrifera* - Paper Mulberry; 13:594/13:1311

\**Morus alba* - White Mulberry; 3:154

*Morus rubra* - Red Mulberry; 24:181

Family **URTICACEAE**

*Boehmeria cylindrica* - False-Nettle; 28:708

!*Laportea canadensis* - Wood-nettle; 18:915

*Pilea pumila* - Richweed; 29:782

Family **JUGLANDACEAE**

*Carya cordiformis* - Bitternut; 28:707/8:1047

*Carya ovata* - Shagbark Hickory; 12:1519

*Carya tomentosa* - Mockernut Hickory; 8:1041/8:1048/14:1061/14:1307

*Juglans nigra* - Black Walnut; 24:179/21:1088

Family **MYRICACEAE**

!*Comptonia peregrina* - Sweet-fern; 23:547

*Myrica pensylvanica* - Bayberry; 29:125/28:778

Family **FAGACEAE**

*Castanea dentata* - American Chestnut; 10:259

*Fagus grandifolia* - American Beech; 17:1251

*Quercus alba* - White Oak; 14:1057/14:1063/14:1065

*Quercus bicolor* - Swamp White Oak; 8:1030

*Quercus coccinea* - Scarlet Oak; 14:1066  
*Quercus montana* - Chestnut Oak; 14:1058/14:1067  
*Quercus palustris* - Pin Oak; 8:1031  
*Quercus rubra* - Red Oak; 19:1083  
*Quercus stellata* - Post Oak; 8:1032  
*Quercus velutina* - Black Oak; 14:1062

#### Family **BETULACEAE**

\**Alnus glutinosa* - Black Alder; 4:4  
*Betula alleghaniensis* - Yellow Birch; 19:121  
*Betula lenta* - Sweet Birch; 13:79/8:1043  
*Betula populifolia* - Gray Birch; 28:744  
*Carpinus caroliniana* ssp. *virginiana* - Hornbeam; 5:43  
*Corylus americana* - Hazelnut; 20:3  
*Ostrya virginiana* - Hop Hornbeam; 10:1446

#### Family **PHYTOLACCACEAE**

*Phytolacca americana* - Pokeweed; 28:542

#### Family **NYCTAGINACEAE**

\**Mirabilis nyctaginea* - Umbrella-wort; 29:1413

#### Family **CHENOPODIACEAE**

*Atriplex patula* - Seaside Orach; 2:724  
 \**Chenopodium album* var. *album* - Lamb's-Quarters; 26:665/13:838/ 19:1024/9:1076  
 \**Chenopodium ambrosioides* - Mexican Tea; 19:1002  
 !*Salicornia bigelovii* - Glasswort; 13:819; Threatened NYS G5 S1S3  
*Salicornia europaea* - Annual Glasswort; 13:820  
*Salicornia perennis* - Woody Glasswort; 13:837/13:1068  
 \**Salsola kali* - Saltwort or Russian Thistle; 13:808/14:865  
*Suaeda calceoliformis* - Plains Sea-blite; 9:1050  
*Suaeda linearis* - Southern Sea-blite; 8:987; Endangered NYS G5 S1  
 !*Suaeda maritima* - Lesser Sea-blite; 14:844

#### Family **AMARANTHACEAE**

\**Amaranthus albus* - Tumbleweed; 19:1019

#### Family **PORTULACACEAE**

*Claytonia virginica* - Spring-beauty; 24:34/1:197/5:1102  
 \**Portulaca oleracea* - Purslane; 1:718/12:1513

Family **MOLLUGINACEAE**

\**Mollugo verticillata* - Carpetweed; 20:650

Family **CARYOPHYLLACEAE**

\**Arenaria serpyllifolia* - Thyme-leaf Sandwort; 8:306/2:373/2:1337

\**Cerastium fontanum* - Common Mouse-ear; 22:182/5:212

\**Cerastium glomeratum* - Mouse-ear Chickweed; 3:159/6:263

\**Dianthus armeria* - Deptford Pink; 22:362/19:564

!*Moehringia lateriflora* - Grove Sandwort; 20:380

\**Sagina procumbens* - Pearlwort; 29:1409

\**Saponaria officinalis* - Bouncing-Bet; 19:555/18:799/12:1476

\**Scleranthus annuus* - Knawel; 13:231/7:1423

*Silene antirrhina* - Sleepy Catchfly; 13:275/20:643/1:1360

*Silene caroliniana* var. *pennsylvanica* - Wild Pink; 8:67/22:1191

\**Silene latifolia* - White Campion; 21:376/22:377

*Silene stellata* - Starry Campion; 28:543/20:1504

\**Silene vulgaris* - Bladder Campion; 23:441

\**Stellaria graminea* - Lesser Stitchwort; 5:347/23:1331

!*Stellaria longifolia* - Needle-leaf Starwort; 22:1397

\**Stellaria media* - Chickweed; 9:258/5:1108

Family **POLYGONACEAE**

*Polygonum arifolium* - Arrowleaf Tearthumb; 18:914

\**Polygonum aviculare* - Knotweed; 14:617

\**Polygonum cespitosum* var. *longisetum* - Knotweed; 28:557

!\**Polygonum convolvulus* - Black Bindweed; 28:558/20:641

!*Polygonum erectum* - Erect Knotweed; 8:465; Extirpated from NYS G5

\**Polygonum hydropiper* - Water Pepper; 7:1078

!*Polygonum hydropiperoides* var. *hydropiperoides*; Mild Water-pepper; 21:677

\**Polygonum lapathifolium* - Pale Smartweed; 20:381/21:678

*Polygonum pennsylvanicum* - Pink Knotweed; 19:418/28:742/28:754/  
10:806/14:850/7:1418/18:1472

*Polygonum punctatum* var. *punctatum* - Water Smartweed; 29:952/24:1531

\**Polygonum ramosissimum* var. *prolificum* - Salt Marsh Knotweed; 28:631

*Polygonum sagittatum* - Tearthumb; 28:509

\**Polygonum scandens* var. *dumetorum* - Climbing False Buckwheat; 28:870

*Polygonum virginianum* - Jumpseed; 20:1503

\**Rumex acetosella* - Sheep Sorrel; 10:84/5:208/5:209/14:237

\**Rumex crispus* - Curly Dock; 4:342/23:531

\**Rumex obtusifolius* - Bitter Dock; 2:399/23:506

!\**Rumex patienta* - Patience Dock; 20:387/20:656

!\**Rumex salicifolius* var. *mexicanus* - Willow-leaf Dock; 2:1334

Family **PLUMBAGINACEAE**

*Limonium carolinianum* - Sea Lavender; 2:723

Family **CLUSIACEAE**

! *Hypericum boreale* - Northern Dwarf St. John's-wort; 28:773/29:957

*Hypericum gentianoides* - Orange-grass; 8:658

\* *Hypericum perforatum* - St. John's-wort; 28:539

*Hypericum punctatum* - Spotted St. John's-wort;  
22:624/29:783/13:823/28:1455

Family **TILIACEAE**

*Tilia americana* var. *americana* - Basswood; 10:1428

Family **MALVACEAE**

\* *Abutilon theophrasti* - Velvet-leaf; 9:1075

\* *Althaea officinalis* - Marsh-mallow; 13:583

*Hibiscus moscheutos* - Swamp Rose Mallow; 2:728

+ *Hibiscus syriacus* - Rose-of-Sharon; 11:1485-86

Family **CISTACEAE**

! *Helianthemum canadense* - Frostweed; 21:391/28:741

*Lechea mucronata* - Hairy Pinweed; 21:1086

! *Lechea pulchella* var. *pulchella* - Pinweed; 13:832/8:988/21:1087

Family **VIOLACEAE**

! *Viola affinis* - LeConte's Violet; 28:20

! *Viola conspersa* - American Dog Violet; 18:103

! *Viola cucullata* - Blue Marsh Violet; 18:102/14:1306

\* *Viola odorata* - English Violet; 11:1111/12:1114

! *Viola palmata* - Early Blue Violet; 21:101/1:127/1:195/5:219

! *Viola x porteriana* - Violet; 20:108

*Viola pubescens* - Smooth Yellow Violet; 5:57

! *Viola sagittata* - Arrow-leaf Violet; 5:170

*Viola sororia* - Common Blue Violet; 22:37/13:83/5:148/24:1127/22:1158

Family **CUCURBITACEAE**

*Sicyos angulatus* - One-seeded Bur-cucumber; 28:755

## Family SALICACEAE

- \**Populus alba* - White Poplar; 19:1094/11:1110
- Populus grandidentata* - Big-tooth Aspen; 8:168; 8:1107
- Populus* sp. - Poplar sp.; 28:12-13
- Populus tremuloides* - Quaking Aspen; 4:500
- Salix* sp. - Willow sp.; 28:11/ 22:15-17/ 5:18/ 28:24/ 10:71/ 19:99/  
29:116/ 29:118-19/ 29:122-24/ 2:131/ 24:203/ 11:278/  
4:333/ 19:422/ 24:1125-26/ 22:1175/ 22:1183/  
19:1219/ 11:1265/ 11:1268/ 18:1274/ 18:1292/  
18:1294/ 24:1295

## Family BRASSICACEAE

- \**Alliaria petiolata* - Garlic Mustard; 11:1264
- !\**Allysum alyssoides* - Alyssum; 9:1427
- \**Arabidopsis thaliana* - Mouse-ear Cress; 13:249
- \**Barbarea vulgaris* - Winter-cress; 13:74/5:217/4:341
- !\**Brassica nigra* - Black Mustard; 11:626
- Cakile edentula* var. *edentula* - Sea-Rocket; 10:817
- \**Capsella bursa-pastoris* - Shepherd's-purse; 5:217/11:1115
- Cardamine bulbosa* - Spring Cress; 5:155/5:194
- Cardamine concatenata* - Cut-leaf Toothwort; 5:41/22:54
- !*Cardamine x maxima* - Large Toothwort; 18:141/18:100a
- Cardamine diphylla* - Two-leaved Toothwort; 18:100
- Cardamine pennsylvanica* - Pennsylvania Bitter-cress; 14:64/5:170/18:1267
- !\**Erysimum repandum* - Treacle-mustard; 9:241
- \**Hesperis matronalis* - Dame's Rocket; 11:280/10:1312
- \**Lepidium campestre* - Field Peppergrass; 8:310/4:342
- Lepidium virginicum* - Wild Peppergrass; 1:128/6:254
- \**Raphanus raphanistrum* - Wild Radish; 8:350/23:1403
- \**Rorippa nasturtium-aquaticum* - Watercress; 18:408
- \**Rorippa palustris* ssp. *palustris* - Common Yellow-cress; 4:64/7:606/26:686/2:1357
- \**Rorippa sylvestris* - Creeping Yellow-cress; 7:348
- !\**Sisymbrium altissimum* - Tumble Mustard; 2:357/20:663
- \**Sisymbrium officinale* - Hedge Mustard; 2:651
- \**Thlaspi arvense* - Field Pennycress; 9:269/19:1376

## Family CLETHRACEAE

- Clethra alnifolia* - Sweet Pepperbush; 22:683/17:1473

## Family ERICACEAE

- !*Arctostaphylos uva-ursi* - Bearberry; 28:50

*Gaylussacia* sp. - Huckleberry sp; 21:138/19:145/13:595/23:710/  
 21:1146/21:1148/21:1154/ 22:1171/22:1173/8:1232/ 8:1235/18:1288  
*Lyonia ligustrina* - Maleberry; 29:198/29:1525  
*Monotropa uniflora* - Indian Pipe; 29:1462  
*Rhododendron periclymenoides* - Pinkster Azalea; 19:162/19:178  
*Rhododendron viscosum* - Clammy Azalea; 23:1180/22:1467  
*Vaccinium* sp. - Blueberry sp.; 22:38/22:61/8:66/13:81/  
 18:98/ 21:113/ 19:142-44/ 19:146-47/ 19:165/ 5:169/  
 13:590/21:1136-45/21:1147/ 21:1149-50/21:1152-53/  
 21:1155/22:1157/22:1163-70 / 22:1172/22:1174/22:1176-79/  
 23:1181/22:1185-90/22:1192-1203 / 22:1205-1217/  
 5:1220-1227/ 11:1229-32/8:1236-44/17:1246-50 / 18:1254-59/  
 16:1261-62/18:1269-73/ 18:1275-85/18:1287/18:1291/18:1293

#### Family **EBENACEAE**

*Diospyros virginiana* - Persimmon; 10:813; Threatened NYS G5 S2

#### Family **PRIMULACEAE**

\**Lysimachia nummularia* - Moneywort; 24:1129  
*Lysimachia quadrifolia* - Whorled Loosestrife; 4:344  
*Lysimachia terrestris* - Swamp Candles; 28:513/8:1045  
*Samolus valerandi* ssp. *parviflorus* - Brookweed; 28:889

#### Family **GROSSULARIACEAE**

\**Ribes rubrum* - Garden Red Currant; 17:95

#### Family **CRASSULACEAE**

!\**Sedum acre* - Yellow Sedum; 12:1478  
 \**Sedum album* - White-flowered Sedum; 12:1479  
 \**Sedum sarmentosum* - Stonecrop; 12:1480  
 \**Sedum telephium* - Live Forever; 19:657/5:1105

#### Family **SAXIFRAGEACEAE**

!*Chrysosplenium americanum* - Golden Saxifrage; 16:1298  
*Heuchera americana* - Alumroot; 5:317/13:593  
 !*Saxifraga virginiana* - Early Saxifrage; 8:48/7:272/8:1109/ 12:1117

#### Family **ROSACEAE**

*Agrimonia gryposepala* - Agrimony; 22:528  
 !*Amelanchier laevis* - Smooth Serviceberry; 19:163

*Amelanchier stolonifera* - Colonial Shadbush; 13:252/10:1304/ 10:1445/10:1448  
*Aronia x prunifolia* - Purple Chokeberry; 10:78/21:104/21:139/ 19:187/29:200/29:787  
 !*Aronia melanocarpa* - Black Chokeberry; 14:851  
 \**Crataegus monogyna* - English Hawthorn; 8:1049  
 \**Duchesnea indica* - Indian Strawberry; 5:210  
*Fragaria virginiana* - Wild Strawberry; 5:213/4:331  
*Geum canadense* - White Avens; 22:521/28:632  
 !\**Malus baccata* - Siberian Crab Apple; 11:636/10:1313  
 \**Malus pumila* - Apple; 13:73  
 !*Potentilla canadensis* - Dwarf Cinquefoil; 22:1162  
*Potentilla norvegica* ssp. *monspeliensis* - Rough Cinquefoil; 28:556/20:645  
*Potentilla simplex* - Old Field Cinquefoil; 1:199/5:211/ 4:497/2:1354  
*Prunus americana* - Wild Plum; 18:1296  
 \**Prunus avium* - Sweet Cherry; 23:27/5:431  
 \**Prunus persica* - Peach; 23:25/28:759  
 !*Prunus pumila* var. undetermined - Sand Cherry; 22:351/22:620/ 22:1160  
*Prunus serotina* - Black Cherry; 5:222/1:730  
 \**Rhodotypos scandens* - Jetbead; 17:91  
 !*Rosa carolina* var. undetermined - Pasture Rose; 18:409/28:479; 24:529/13:811  
 \**Rosa rugosa* - Wrinkled Rose; 11:283  
*Rosa setigera* var. *setigera* - Climbing Prairie Rose; 11:638  
*Rosa virginiana* - Virginia Rose; 23:978/22:1399/10:1431  
*Rubus allegheniensis* - Northern Blackberry; 5:329/20:392/23:625  
*Rubus flagellaris* - Northern Dewberry; 5:190/5:207/28:562  
 \**Rubus laciniatus* - Cut-leaf Blackberry; 28:769/22:1383  
*Rubus occidentalis* - Black Raspberry; 5:328/13:580  
 !*Rubus pensylvanicus* - Highbush Blackberry; 2:1346/1:1361  
 \**Rubus phoenicolasius* - Wineberry; 2:400  
*Rubus setosus* - Bog Blackberry; 28:477  
*Spiraea tomentosa* var. *tomentosa* - Steeplebush; 29:1095/22:1469

#### Family FABACEAE

*Amphicarpea bracteata* - Hog-Peanut; 28:712  
*Apios americana* - Groundnut; 14:1308/28:1458  
 !*Baptista tinctoria* - Yellow Wild Indigo; 19:554  
*Chamaecrista fasciculata* - Partridge-pea; 26:668  
 !*Crotalaria sagittalis* - Rattlebox; 28:671; Endangered NYS G5 S1  
*Desmodium canadense* - Showy Tick-trefoil; 28:690/18:802/19:1016  
 !*Desmodium humifusum* - Tall Tick-trefoil; 29:948; Endangered NYS G1G2 S1  
*Desmodium paniculatum* - Panicked Tick-trefoil; 28:754/14:862  
 !*Lathyrus japonicus* var. *maritimus* - Beach Pea; 14:236/13:577  
*Lespedeza capitata* - Round-headed Bush-clover; 22:901/8:1036  
*Lespedeza hirta* - Hairy Bush-clover; 13:829/14:1064  
 !*Lespedeza violacea* - Bush-clover; 24:1495/24:1528;  
*Lespedeza virginica* - Bush-clover; 19:1497

- \**Lotus corniculata* - Bird's-foot Trefoil; 1:330/7:1419
- \**Medicago lupulina* - Black Medic; 1:175/18:204/4:345
- \**Medicago sativa* ssp. *sativa* - Alfalfa; 5:468-69/5:473
- \**Melilotus alba* - White Sweet Clover; 2:370
- \**Melilotus officinalis* - Yellow Sweet Clover; 9:240
- Phaseolus polystachios* - Wild Bean; 13:814/13:1069
- \**Robinia pseudo-acacia* - Black Locust; 5:321/22:1085
- \**Trifolium arvense* - Rabbit's Foot Clover; 28:510
- !\**Trifolium aureum* - Yellow Clover; 23:439/7:1422
- \**Trifolium hybridum* - Alsike Clover; 9:239
- \**Trifolium pratense* - Red Clover; 9:238/2:662
- \**Trifolium repens* - White Clover; 22:140
- \**Vicia cracca* ssp. undetermined - Cow Vetch; 5:313/5:437/ 5:467/5:474
- \**Vicia sativa* ssp. *nigra* - Narrow-leaved Vetch; 11:287/2:1339
- !\**Vicia sepium* - Hedge Vetch; 28:487
- \**Vicia tetrasperma* - Slender Vetch; 28:490
- !\**Vicia villosa* ssp. *villosa* - Hairy Vetch; 5:475

#### Family ELAEAGNACEAE

- \**Elaeagnus umbellata* - Autumn Olive; 28:537

#### Family LYTHRACEAE

- \**Lythrum salicaria* - Purple Loosestrife; 26:672

#### Family ONAGRACEAE

- Circaea lutetiana* ssp. *canadensis* - Enchanter's Nightshade; 22:514
- Epilobium coloratum* - Purple-leaf Willow Herb; 29:960
- \**Epilobium hirsutum* - European Fireweed; 22:1496
- Oenothera biennis* - Evening Primrose; 20:644/18:800
- Oenothera perennis* - Sundrops; 22:1393

#### Family NYSSACEAE

- Nyssa sylvatica* - Black Tupelo; 11:301/18:933/2:1340

#### Family CORNACEAE

- Cornus amomum* ssp. *amomum* - Silky Dogwood; 28:471/29:786
- Cornus florida* - Flowering Dogwood; 10:63/5:89
- Cornus foemina* ssp. *racemosa* - Gray Dogwood; 5:412/22:443

Family **SANTALACEAE**

!*Comandra umbellata* - Bastard Toadflax; 11:1328

Family **CELASTRACEAE**

*Celastrus scandens* - American Bittersweet; 4:346/9:947

\**Euonymus europaeus* - European Spindle-tree; 8:305

Family **EUPHORBIACEAE**

!*Acalypha gracilens* - Three-seeded Mercury; 13:831/18:935

*Acalypha virginica* var. *rhomboidea* - Three-seeded Mercury; 22:675

*Chamaesyce maculata* - Milk-purslane; 20:652/20:661/20:986/24:1490

\**Euphorbia cyparissias* - Cypress Spurge; 15:96

Family **RHAMNACEAE**

*Ceanothus americanus* - New Jersey Tea; 28:538

\**Rhamnus frangula* - Smooth Buckthorn; 19:1465

Family **VITACEAE**

*Parthenocissus quinquefolia* - Virginia Creeper; 13:619

*Vitis labrusca* - Fox Grape; 24:405/18:425

Family **LINACEAE**

!*Linum virginianum* - Yellow Wild Flax; 29:958/29:1488

Family **POLYGALACEAE**

!*Polygala sanguinea* - Rose Milkwort; 29:622

!*Polygala verticillata* var. *ambigua* - Whorled Milkwort; 18:795/28:880

*Polygala verticillata* var. *isocycla* - Whorled Milkwort; 4:591

Family **ACERACEAE**

\**Acer platanoides* - Norway Maple; 21:47

\**Acer pseudoplatanus* - Sycamore-maple; 28:757

*Acer rubrum* var. *rubrum* - Red Maple; 4:6/23:191/18:1253

*Acer saccharinum* - Silver Maple; 4:5/18:202

Family **ANACARDIACEAE**

*Rhus copallinum* - Shining Sumac; 29:792

*Rhus glabra* - Smooth Sumac; 28:533  
*Rhus hirta* - Staghorn Sumac; 24:1491  
*Toxicodendron radicans* ssp. *radicans* - Poison Ivy; 13:230  
 !*Toxicodendron vernix* - Poison Sumac 29:454

Family **RUTACEAE**

*Ptelea trifoliata* - Hop-tree; 20:1500; Endangered NYS G5 S1

Family **OXALIDACEAE**

*Oxalis stricta* - Yellow Wood-sorrel; 21:369  
 !*Oxalis violacea* - Violet Wood-sorrel; 7:270/11:1327; Threatened NYS G5 S1/S2

Family **GERANIACEAE**

*Geranium carolinianum* var. *carolinianum* - Cranesbill; 8:302  
*Geranium maculatum* - Wild Geranium; 7:65/16:92(album)/5:129(album)

Family **BALSAMINACEAE**

*Impatiens capensis* - Jewelweed; 1:720

Family **ARALIACEAE**

*Aralia nudicaulis* - Wild Sarsaparilla; 19:164/22:1184/14:1310  
 !*Aralia racemosa* - Spikenard; 24:796  
 !*Panax trifolius* - Dwarf Ginseng; 18:111

Family **APIACEAE**

*Angelica venenosa* - Hairy Angelica; 13:822  
*Cicuta maculata* - Water Hemlock; 8:410  
*Cryptotaenia canadensis* - Honewort; 2:397  
 \**Daucus carota* - Queene Anne's Lace; 28:563  
*Heracleum maximum* - Cow-parsnip; 22:576  
*Osmorhiza longistylis* - Sweet Anise-root; 24:189/24:635  
 \**Pastinaca sativa* - Wild Parsnip; 7:615/11:1510  
 !*Ptilimnium capillaceum* - Mock Bishop's Weed; 28:888  
*Sanicula odorata* - Clustered Snakeroot; 5:216/21:394  
*Sanicula marilandica* - Black Snakeroot; 13:268/10:273/23:1400  
 !*Zizia aptera* - Golden Alexanders; 13:256  
 !*Zizia aurea* - Golden Alexanders; 14:80/13:247

Family **GENTIANACEAE**

! *Bartonia virginica* - Bartonian; 24:1489

Family **APOCYNACEAE**

*Apocynum androsaemifolium* - Spreading Dogbane; 22:530

*Apocynum cannabinum* var. undetermined - Indian Hemp; 28:545

\* *Vinca minor* - Periwinkle; 13:87/12:1113

Family **ASCLEPIADACEAE**

*Asclepias incarnata* var. *incarnata* - Swamp Milkweed; 28:512/13:616

*Asclepias purpurascens* - Purple Milkweed; 13:596/13:1432

*Asclepias syriaca* - Common Milkweed; 4:603

*Asclepias tuberosa* var. *interior* - Orange Milkweed; 22:515

\* *Cynanchum louiseae* - Black Swallow-wort; 13:276

Family **SOLANACEAE**

\* *Lycium barbarum* - Matrimony-vine; 21:367/21:1151

! *Physalis heterophylla* - Clammy Ground-Cherry; 22:364/23:714

*Solanum carolinense* - Horse-nettle; 28:546/2:649

\* *Solanum dulcamara* - Bittersweet Nightshade; 11:299

*Solanum ptycanthum* - Black Nightshade; 1:731/20:1502

Family **CONVOLVULACEAE**

\* *Calystegia sepium* ssp. undetermined - Hedge Bindweed; 4:492

\* *Convolvulus arvensis* - Field Bindweed; 19:435

Family **CUSCUTACEAE**

! *Cuscuta gronovii* - Dodder; 21:891

*Cuscuta pentagona* - Field Dodder; 13:836/22:905

Family **POLEMONIACEAE**

\* *Phlox paniculata* - Summer Phlox; 29:627

Family **HYDROPHYLLACEAE**

! *Hydrophyllum virginianum* - Virginia Waterleaf; 1:183

Family **VERBENACEAE**

*Verbena hastata* - Blue Vervain; 28:505/28:777

*Verbena urticifolia* var. undetermined - White Vervain; 13:581/20:653

Family **LAMIACEAE**

*Agastache nepetoides* - Yellow Giant Hyssop; 24:973; Threatened NYS G5 S2/S3

*Collinsonia canadensis* - Horse Balm; 13:835

\**Glechoma hederacea* - Gill-over-the-ground; 15:93

*Hedeoma pulegioides* - Mock-Pennyroyal; 19:1507

\**Leonurus cardiaca* - Motherwort; 28:634

*Lycopus americanus* - Bugleweed; 5:648/28:774/29:784

*Lycopus uniflorus* - Northern Bugleweed; 29:785/18:929

!\**Mentha arvensis* - Field Mint; 28:699/19:1028

*Monarda fistulosa* - Wild Bergamot; 24:803

!\**Nepeta cataria* - Catnip; 13:841

!\**Physostegia virginiana* - False Dragonhead; 28:1523

\**Prunella vulgaris* - Heal-all; 28:540/12:1517

*Pycnanthemum tenuifolium* - Narrow-leaved Mountain-mint;  
24:630/29:788/29:1459

*Pycnanthemum virginianum* - Virginia Mountain-mint; 29:791

*Scutellaria lateriflora* - Mad-dog Skullcap; 1:729

*Teucrium canadense* var. *canadense* - Seaside Germander; 13:575/22:1468/12:1483

*Trichostema dichotomum* - Blue-curls; 28:743

Family **CALLITRICHACEAE**

!\**Callitriche palustris* - Water-starwort; 24:1529

Family **PLANTAGINACEAE**

\**Plantago lanceolata* - English Plantain; 13:85

\**Plantago major* - Common Plantain; 19:550

!\**Plantago maritima* ssp. *juncooides* - Seaside Plantain; 11:1486;  
Threatened NYS G5 S2S3

*Plantago rugelii* - Pale Plantain; 19:549/29:962

!\**Plantago virginica* - Hoary Plantain; 19:548

Family **OLEACEAE**

*Fraxinus americana* - White Ash; 5:150/18:201/7:1077

*Fraxinus pennsylvanica* - Green Ash; 24:174/18:930

\**Ligustrum vulgare* - Privet; 10:1447

Family **SCROPHULARIACEAE**

- ! *Agalinis maritima* - Seaside Gerardia; 8:994  
 ! *Agalinis purpurea* - Gerardia; 22:897  
 ! *Agalinis tenuifolia* var. *tenuifolia* - Slender Gerardia; 28:879/18:932  
*Aureolaria flava* var. *flava* - Yellow False-foxglove; 14:861  
 ! *Aureolaria virginica* - Downy False-foxglove; 13:598  
*Chelone glabra* - White Turtlehead; 13:860  
*Gratiola neglecta* - Clammy Hedge-hyssop; 2:1343  
*Linaria canadensis* - Old Field Toadflax; 13:266/13:1434  
 \* *Linaria vulgaris* - Butter-and-Eggs; 28:541  
 ! *Lindernia dubia* var. *dubia* - False-pimpernel; 7:607  
*Pedicularis canadensis* - Lousewort; 18:106/21:378/18:407  
*Scrophularia lanceolata* - American Hare-figwort; 5:327  
 \* *Verbascum blatteria* - Moth-mullein; 19:436/19:553  
 \* *Verbascum thapsus* - Mullein; 28:532  
 \* *Veronica arvensis* - Corn Speedwell; 13:265/8:1324  
 \* *Veronica officinalis* - Speedwell; 10:262  
*Veronica peregrina* ssp. *peregrina* - Purslane Speedwell; 13:248  
 \* *Veronica serpyllifolia* ssp. *serpyllifolia* - Thyme-leaf Speedwell; 5:158  
*Veronicastrum virginicum* - Culver's Root; 24:629/19:640/1:721

Family **OROBANCHACEAE**

- ! *Epifagus virginiana* - Beech-drops; 18:926  
*Orobanche uniflora* - One-flowered Cancer-root; 8:161/5:218/ 3:40/7:1300/29:1462

Family **BIGNONIACEAE**

- \* *Campsis radicans* - Trumpet-creeper; 12:1483a  
 \* *Paulownia tomentosa* - Empress-tree; 5:319/4:1079

Family **CAMPANULACEAE**

- Lobelia inflata* - Indian Tobacco; 4:494/24:789  
 ! *Lobelia spicata* - Pale-spiked Lobelia; 22:519  
*Triodanis perfoliata* var. *perfoliata* - Venus' Looking Glass;  
 13:592/13:1440

Family **RUBIACEAE**

- Cephalanthus occidentalis* - Buttonbush; 13:569  
*Galium aparine* - Cleavers; 3:160/11:297  
 \* *Galium mollugo* - Wild Madder; 11:282/3:379/4:499  
 ! *Galium tinctorium* - Bedstraw; 5:402/2:1341

### Family CAPRIFOLIACEAE

- \**Lonicera japonica* - Japanese Honeysuckle; 20:358/24:971/10:1444
- Lonicera sempervirens* - Coral Honeysuckle; 13:868/8:1042
- Sambucus canadensis* - Common Elderberry; 18:424/28:764
- Triosteum perfoliatum* - Wild Coffee; 5:316/5:1081
- Viburnum acerifolium* - Maple-leaf Viburnum; 19:279/14:852
- Viburnum dentatum* var. *venosum* - Southern Arrowwood  
21:385/5:403/24:430/ 28:701/24:954 / 23:1396 Threatened NYS G5 S2
- \**Viburnum dilatatum* - Viburnum; 16:1260/17:1415
- Viburnum lentago* - Sweet Viburnum; 28:700
- !\**Viburnum molle* - Black Alder; 5:1522
- Viburnum prunifolium* - Black-haw; 3:151/22:188

### Family ASTERACEAE

- \**Achillea millefolium* var. undetermined - Yarrow; 5:322/13:1071
- Ambrosia artemisiifolia* - Ragweed; 28:738
- Ambrosia trifida* - Giant Ragweed; 19:1506
- !*Anaphalis margaritacea* - Pearly-everlasting; 28:871
- Antennaria* sp. - Pussy-toes sp.; 8:46/10:68-9/14:86/  
24:172/21:1156/11:1228/ 8:1233/8:1245/10:1301/14:1305
- \**Arctium minus* - Common Burdock; 28:749
- \**Artemisia vulgaris* - Mugwort; 10:1052
- Aster cordifolius* - Heart-leaf Aster; 19:1009/8:1046
- Aster divaricatus* - White Wood Aster; 13:833/14:863 1/8:919-20
- Aster ericoides* - Many-flowered Aster; 24:975/8:993/19:1004
- Aster laevis* var. undetermined - Smooth Aster; 22:902/24:972/ 8:989/19:1005
- Aster lanceolatus* var. *lanceolatus* - Eastern Lined Aster; 8:992/11:996
- Aster lateriflorus* var. *laterifolius* - Calico Aster; 18:921/8:990/19:1001
- Aster macrophyllus* var. *macrophyllus* - Bigleaf Aster;  
13:573/10:815/22:1466
- Aster novae-angliae* - New England Aster; 22:977
- Aster patens* - Late Purple Aster; 24:979
- Aster paternus* - Toothed White-topped Aster; 19:552
- !*Aster puniceus* var. *puniceus* - Purple-stemmed Aster; 5:1038/29:961
- Aster subulatus* - Annual Salt Marsh Aster; 19:1010/9:1051;  
Unprotected NYS G5 S2
- Aster tenuifolius* - Perennial Salt Marsh Aster; 13:866
- Aster umbellatus* var. *umbellatus* - Tall Flat White Top Aster; 18:939
- !*Aster undulatus* - Wavy-leaf Aster; 10:1055/13:1072
- Baccharis halimifolia* - Groundsel-tree; 22:906/23:976/10:1053
- Bidens bipinnata* - Spanish Needles; 19:1017
- Bidens frondosa* - Beggar-ticks; 14:867/19:1023
- !\**Centaurea nigra* - Black Knapweed; 2:1359/7:1417
- \**Centaurea nigrescens* - Short-fringed Knapweed; 24:974

- \**Cichorium intybus* - Chicory; 28:561  
 \**Cirsium arvense* - Canada Thistle; 7:600  
*Cirsium discolor* - Field Thistle; 7:804/7:826  
 \**Cirsium horridulum* - Yellow Thistle; 22:461  
 !*Cirsium pumilum* - Small Bull Thistle; 22:903  
*Cirsium vulgare* - Bull Thistle; 28:639  
*Conyza canadensis* var. *canadensis* - Horseweed; 28:739/19:1015  
 \**Coreopsis lanceolata* - Lance-leaved Coreopsis; 12:1477  
*Erechtites hieracifolia* var. *hieracifolia* - Pilewort; 18:801/13:824  
*Erigeron annuus* - Daisy Fleabane; 4:501/19:1379  
*Erigeron philadelphicus* - Fleabane; 2:1358  
 !*Erigeron pulchellus* - Robin's Plantain; 13:257  
 !*Eupatorium maculatum* - Spotted Joe Pye Weed; 28:706/28:768  
*Eupatorium perfoliatum* - Boneset; 28:770  
 !*Eupatorium pilosum* - Ragged Boneset; 24:1492  
*Eupatorium purpureum* - Sweet-scented Joe Pye Weed; 22:1470  
*Eupatorium rugosum* - White Snakeroot; 22:908  
*Eupatorium sessilifolium* var. *sessilifolium* - Upland Boneset;  
 13:812/22:909  
*Euthamia graminifolia* - Grass-leaved Goldenrod; 23:676/14:1059  
 \**Galinsoga parviflora* - Lesser Quickweed; 11:1521  
 \**Galinsoga quadriradiata* - Quickweed; 19:551  
*Gnaphalium obtusifolium* - Sweet Everlasting; 28:754  
 !*Helenium flexuosum* - Sneezeweed; 7:589  
*Helianthus divaricatus* - Woodland Sunflower; 13:582/28:767/14:849  
*Helianthus giganteus* - Giant Sunflower; 13:810/13:845/ 13:857/18:922  
 !*Helianthus strumosus* - Wood-sunflower; 22:685/28:766/  
 10:807/13:839/14:846  
 \**Helianthus tuberosus* - Jerusalem Artichoke; 11:998  
 !*Heliopsis helianthoides* - Ox-eye; 1:719  
 \**Hieracium aurantiacum* - Orange Hawkweed; 4:491  
 \**Hieracium caespitosum* - Field Hawkweed; 5:324  
 !*Hieracium paniculatum* - Hawkweed; 18:925  
 \**Hieracium pilosella* - Mouse-ear Hawkweed; 8:315  
 \**Hieracium piloselloides* - Smooth Hawkweed; 5:320/22:398  
*Hieracium scabrum* - Hawkweed; 28:895/18:924  
*Hieracium venosum* - Rattlesnake-weed; 11:290/21:393  
 \**Hypochaeris radicata* - Cat's Ear; 4:574  
*Iva frutescens* ssp. *oraria* - Marsh Elder; 2:727  
 !*Krigia biflora* - Two-flowered Cynthia; 18:1289  
*Krigia virginica* - Dwarf Dandelion; 8:304  
*Lactuca biennis* - Tall Blue Lettuce; 18:912-13  
*Lactuca canadensis* var. *canadensis* - Wild Lettuce;  
 18:797/13:825/23:1451  
*Lactuca canadensis* var. *undetermined* - Wild Lettuce; 24:511  
 \**Lactuca serriola* - Prickly Lettuce; 10:604

- \**Leucanthemum vulgare* - Ox-eye Daisy; 11:281/4:495/27:666  
 \**Matricaria discoidea* - Pineapple Weed; 4:335  
*Mikania scandens* - Climbing Boneset; 18:931  
*Pluchea odorata* var. *succulenta* - Salt Marsh Fleabane; 13:859/22:980  
*Prenanthes trifoliolata* - Tall Rattlesnake-root;  
 13:809/13:840/24:951/8:1033  
 \**Rudbeckia hirta* var. undetermined - Black-eyed Susan; 22:444  
 !*Rudbeckia laciniata* - Cut-leaf Coneflower; 18:934  
*Solidago bicolor* - Silver-rod; 13:834  
*Solidago caesia* - Blue-stemmed Goldenrod; 24:942  
*Solidago canadensis* var. undetermined - Canada Goldenrod;  
 18:1471/24:1493/28:1494  
*Solidago canadensis* var. *scabra* - Canada Goldenrod;  
 13:805/28:872/13:855  
*Solidago juncea* - Early Goldenrod; 23:517/23:623/8:659/ 28:746-  
 47/13:854/28:894  
 !*Solidago nemoralis* - Rough Goldenrod; 28:875a/29:965  
*Solidago odora* - Sweet Goldenrod; 22:621  
 !*Solidago patula* - Spreading Goldenrod; 24:955  
*Solidago rugosa* ssp. *rugosa* var. *rugosa* - Rough-stemmed Goldenrod;  
 13:847/13:856/22:907/ 11:997/8:1034  
*Solidago sempervirens* var. *mexicana* - Seaside Goldenrod 14:853;  
 Endangered NYS G5 S1  
*Solidago speciosa* - Showy Goldenrod; 24:970/19:985/19:1014  
 !*Solidago ulmifolia* - Elm-leaf Goldenrod; 13:827/28:873  
 !\**Sonchus arvensis* ssp. *arvensis* - Sow-thistle; 22:502  
 \**Sonchus oleraceus* - Common Sow Thistle; 13:570/1:732  
 \**Tanacetum vulgare* - Tansy; 1:736  
 \**Taraxacum officinale* - Dandelion; 28:21  
 \**Tragopogon pratensis* - Yellow Goat's-beard; 28:667  
 \**Tussilago farfara* - Coltsfoot; 5:1106  
*Vernonia noveboracensis* - Ironweed; 10:816  
*Xanthium strumarium* var. *canadense* - Clotbur; 19:1026

#### Family ALISMATACEAE

- Alisma subcordatum* - Water Plantain; 23:679  
*Sagittaria latifolia* - Common Arrowhead; 28:503

#### Family ARACEAE

- Acorus americanus* - Sweetflag; 28:689/2:1349  
*Arisaema triphyllum* ssp. *triphyllum* - Jack-in-the-Pulpit; 13:82  
*Symplocarpus foetidus* - Skunk-Cabbage; 10:8/22:137/5:1092

Family **LEMNACEAE**

*Lemna minor* - Lesser Duckweed; 24:1123

Family **COMMELINACEAE**

\**Commelina communis* var. undetermined - Asiatic Dayflower; 13:584

Family **JUNCACEAE**

- Juncus acuminatus* - Sharp-fruited Rush; 7:606/28:893  
 !*Juncus articulatus* - Jointed Rush; 28:489/2:1353  
 !*Juncus bufonius* - Toad-rush; 29:419  
 !*Juncus dudleyi* - Dudley's Rush; 28:478  
*Juncus effusus* var. undetermined - Soft Rush; 5:404/28:488/28:703  
*Juncus gerardii* - Black-grass; 8:314/20:654  
 !*Juncus scirpoides* – Sedge Rush; 29:959/29:1487;  
 Endangered NYS G5 S1  
*Juncus tenuis* - Path Rush; 11:298/4:339/7:618/ 28:713/28:1457  
*Luzula campestris* var. undetermined - Wood Rush; 5:44/13:88/5:214/  
 13:251/11:288/16:1118

Family **CYPERACEAE**

- Bulbostylis capillaris* - Sand-rush; 20:646  
 !*Carex alata* - Sedge; 21:383  
 !*Carex amphibola* var. *turgida* - Sedge; 5:225/1:1135/5:1315/  
 5:1317/5:1320/22:1392/ 22:1395/22:1398/29:1407  
*Carex annectens* var. undetermined - Sedge; 28:1450  
 !*Carex aquatilis* - Sedge; 19:130/22:1390  
 !*Carex bebbii* - Sedge; 18:416  
*Carex blanda* - Sedge; 8:1322  
 !*Carex bushii* - Sedge; 10:260/19:421/22:1391/ 10:1430/29:1412  
 !*Carex buxbaumii* - Sedge; 22:1332; Threatened NYS G5 S2  
*Carex cephalophora* - Sedge; 13:274  
 !*Carex conoidea* - Sedge; 22:1386  
*Carex crinita* - Sedge; 13:571  
 !*Carex cristatella* - Sedge; 13:234-35/19:1381  
 !*Carex digitalis* - Sedge; 4:332  
 !*Carex granularis* var. *granularis* - Sedge; 7:498  
 !*Carex gynandra* - Sedge; 5:228-29/2:1356/19:1378/18:1463  
 !*Carex hirtifolia* - Sedge; 5:157/5:224  
*Carex lurida* - Sallow Sedge; 28:705  
 !*Carex normalis* - Sedge; 28:486  
 !*Carex pallescens* - Sedge; 8:1323/11:1326

- Carex pellita* - Sedge; 8:1321/22:1333/2:1355/ 19:1372/13:1438/  
22:1384/22:1387
- Carex pennsylvanica* - Wood Sedge; 8:36/24:117/1:1134
- ! *Carex polymorpha* - Sedge; 22:1161; G3 Extirpated from NYS G3
- ! *Carex projecta* - Sedge; 10:245/23:1402
- ! *Carex rosea* - Sedge; 4:1314/23:1401
- ! *Carex scoparia* var. *scoparia* - Sedge; 29:1410
- ! *Carex seorsa* - Sedge; 18:205/11:289/2:390; Threatened NYS G4 S2
- Carex squarrosa* - Squarrose Sedge; 11:286/5:401/1:722/ 5:1366/22:1394
- Carex stipata* - Sedge; 13:233/28:453/5:1316/ 5:1318/2:1348/12:1511
- Carex stricta* - Tussock Sedge; 28:472/2:1350/19:1370/22:1388
- Carex swanii* - Sedge; 11:293/2:355/1:1365/ 19:1373/22:1389/29:1411
- Carex tribuloides* - Sedge; 28:712
- ! *Carex trisperma* var. undetermined - Sedge; 28:682
- ! *Carex vestita* - Sedge; 19:1371
- Carex vulpinoidea* - Sedge; 5:149/5:223/13:267/ 28:695/28:711/19:1375
- Cyperus echinatus* - Globose Sedge; 1:716/11:1509;  
Endangered NYS G5 S1
- ! *Cyperus filicinus* - Flat Sedge; 27:693
- ! *Cyperus flavescens* - Cyperus; 11:995; Endangered NYS G5 T? S1
- ! *Cyperus lupulinus* ssp. *lupulinus* - Cyperus; 13:602;  
Threatened NYS G5 T? S2
- Cyperus strigosus* - False Nut Sedge; 14:864/19:1013/5:1037
- ! *Eleocharis elliptica* var. *elliptica* - Slender Spikerush; 13:232
- Eleocharis elliptica* var. *pseudoptera* - Slender Spikerush; 7:611;  
Threatened NYS G5 T? S1
- ! *Eleocharis halophila* - Spikerush; 2:1344; Threatened G4 S2
- Eleocharis obtusa* var. undetermined - Blunt Spike Rush; 7:579
- ! *Fimbristylis autumnalis* - Sedge; 29:964
- Scirpus americanus* - Three-square; 21:384/2:726
- Scirpus atrovirens* - Black Bulrush; 2:356/28:485
- Scirpus robustus* - Salt Marsh Bulrush; 28:559/22:983

## Family POACEAE

- \* *Agrostis gigantea* - Redtop; 21:368/28:694/28:704/28:874-75
- Agrostis hyemalis* - Ticklegrass; 24:941/14:1060/19:1369
- Andropogon gerardii* - Big Bluestem; 10:828/22:981
- Andropogon virginicus* - Broom-sedge; 10:1054
- Anthoxanthum nitens* - Sweet Vanilla Grass; 19:120
- \* *Anthoxanthum odoratum* - Sweet Vernal Grass; 2:133/11:292/1:303
- Aristida dichotoma* - Churchmouse Three-awn; 28:881/24:1527
- ! \* *Aristida oligantha* - Prairie Three-awn; 25:1090
- \* *Arrhenatherum elatius* - Tall Oatgrass; 11:296
- \* *Bromus commutatus* - Hairy Chess; 28:456
- \* *Bromus inermis* - Smooth Brome; 7:588/23:896

- \**Bromus tectorum* - Downy Chess; 1:192/10:253  
*Calamagrostis canadensis* var. undetermined - Bluejoint Grass; 23:692/21:1089  
 !*Calamagrostis cinnoides* - Reedgrass; 7:614  
*Cinna arundinacea* - Common Woodreed; 18:923/5:1040  
 !*Cinna latifolia* - Drooping Woodreed; 28:669  
 \**Dactylis glomerata* - Orchard Grass; 1:167/7:586  
 \**Digitaria ischaemum* - Smooth Crab-grass; 24:949  
 \**Digitaria sanguinalis* - Northern Crab-grass; 2:734/19:1027  
*Distichlis spicata* - Salt-grass; 28:886/22:982  
 \**Echinochloa crusgalli* ssp. *crusgalli* - Barnyard Grass; 28:740/10:842  
*Echinochloa muricata* var. *muricata* - Cockspur Grass; 24:953  
 \**Eleusine indica* - Goose-grass; 19:1022  
 !*Elymus canadensis* - Canada Wild-rye; 22:673  
 !*Elymus villosus* var. *arkansanus* - Wild-rye; 21:670  
*Elymus virginicus* var. undetermined - Virginia Wild-Rye;  
 23:681/2:725/28:884  
 !*Eragrostis capillaris* - Lacegrass; 20:664  
 \**Eragrostis cilianensis* - Stinkgrass; 20:647/19:1018  
*Eragrostis pectinacea* - Lovegrass; 28:737/28:748/19:1021  
*Eragrostis spectabilis* - Purple Lovegrass; 1:717/28:750  
 \**Festuca rubra* ssp. *rubra* - Red Fescue; 4:349/ 22:366/ 28:480/  
 19:1380/8:1449  
 !\**Festuca trachyphylla* - Sheep Fescue; 2:134/9:243/8:311/7:1424  
*Glyceria striata* - Fowl Mannagrass; 2:353/13:610/28:697  
 \**Holcus lanatus* - Common Velvet Grass; 8:323/2:354/4:601/10:1429  
*Leersia oryzoides* - Rice Cutgrass; 28:1524  
*Leersia virginica* - Whitegrass; 24:968/10:1070/10:1074  
 \**Lolium perenne* var. undetermined - Ryegrass; 5:440  
 \**Lolium pratense* - Meadow Fescue; 2:372/ 2:1335/ 23:1404/ 7:1421  
 !*Muhlenbergia mexicana* - Satin-grass; 24:969/28:1454/24:1526  
*Muhlenbergia schreberi* - Nimble-will; 19:1029  
*Panicum acuminatum* - Panic Grass; 20:395/18:414/28:455/  
 13:597/19:1374/7:1420 / 17:1414/13:1435/29:1456/29:1460  
 !*Panicum boscii* - Panic Grass; 13:1443  
*Panicum capillare* - Witchgrass; 19:1012/19:1020  
*Panicum clandestinum* - Deer-tongue Grass; 8:1035/24:1461  
 !*Panicum depauperatum* - Poverty Panic Grass; 20:382/28:483/13:1437  
*Panicum dichotomiflorum* var. *dichotomiflorum* - Smooth Panic Grass;  
 19:1007  
*Panicum dichotomum* - Panic Grass; 13:1442/29:1456/29:1460  
 !*Panicum latifolium* - Panic Grass; 18:415/24:943  
 !*Panicum oligosanthos* var. *scribnerianum* - Panic Grass;  
 13:255/4:337/22:363/ 18:413/28:449/ 29:1408/13:1433  
*Panicum rigidulum* var. *pubescens* - Panic Grass; 19:1368/23:1406  
 !*Panicum sabulorum* var. *thinum* - Panic Grass; 28:688  
 !*Panicum scabriusculum* - Panic Grass; 19:1367; Endangered NYS G4 S1

- Panicum sphaerocarpon* var. *sphaerocarpon* - Panic Grass; 7:1426  
 !*Panicum verrucosum* - Panic Grass; 18:936  
*Panicum virgatum* var. *virgatum* - Switch-grass; 22:442/22:446/  
 28:687/24:950  
 !*Paspalum setaceum* var. *setaceum* - Slender Beardgrass; 28:883;  
 Threatened NYS G5 T5 S2  
 \**Phleum pratense* var. *nodosum* - Timothy; 2:132/5:220  
*Phragmites australis* - Common Reed; 5:1080  
*Piptochaetium avenaceum* - Black Oatgrass; 13:1441  
 \**Poa annua* - Annual Bluegrass; 4:336  
 \**Poa compressa* - Canada Bluegrass; 22:898/11:1520  
 \**Poa pratensis* - Kentucky Bluegrass; 22:446/ 19:1377/ 23:1405/  
 7:1425/13:1439  
 \**Poa trivialis* - Rough Bluegrass; 5:1319  
*Schizachyrium scoparium* ssp. *scoparium* - Little Bluestem;  
 28:877/22:900/29:946  
 !\**Setaria italica* - Foxtail Millet; 21:910  
 \**Setaria pumila* - Yellow Foxtail; 21:911/11:1508  
 \**Setaria viridis* - Green Foxtail; 20:655  
*Sorghastrum nutans* - Indian Grass; 7:605/28:761  
*Spartina cynosuroides* - Salt Reedgrass; 28:887  
*Spartina patens* - Salt Meadow Cordgrass; 2:735/28:760  
*Spartina pectinata* - Prairie Cord Grass; 14:843  
*Sporobolus asper* - Dropseed; 19:1008  
*Tridens flavus* - Purpletop; 28:876/24:945  
*Tripsacum dactyloides* - Gamma Grass; 22:525; Threatened NYS G5 S2  
 \**Triticum aestivum* - Wheat; 28:565  
 !*Vulpia octoflora* - Six-weeks Fescue; 28:484

#### Family SPARGANIACEAE

- !*Sparganium americanum* - Bur-reed; 24:1530  
*Sparganium eurycarpum* - Giant Bur-reed; 13:613

#### Family TYPHACEAE

- Typha angustifolia* - Narrow-leaf Cat-tail; 22:460/22:524  
*Typha latifolia* - Common Cat-tail; 28:507/22:527

#### Family LILIACEAE

- Allium canadense* - Wild Garlic; 11:291/8:463/2:1336  
 !\**Allium schoenoprasum* - Wild Chives; 8:1325  
 \**Allium vineale* - Field Garlic; 28:544  
 \**Asparagus officinalis* - Asparagus; 13:250/22:516  
*Erythronium americanum* - Trout-lily; 24:35/5:206/5:1104

- \**Hemerocallis fulva* - Asiatic Day Lily; 28:535  
 \**Hosta ventricosa* - Blue Hosta Lily; 13:599  
*Hypoxis hirsuta* - Yellow Star-grass; 1:193  
*Lilium canadense* ssp. *canadense* - Canada Lily; 5:568  
*Lilium superbum* - Turk's Cap Lily; 22:684  
*Maianthemum canadense* - Canada Mayflower; 1:1133/18:1464  
*Maianthemum racemosum* - False Solomon's-seal; 21:642  
 !*Medeola virginiana* - Indian Cucumber-root; 17:1130/17:1297/17:1330  
 \**Muscari botryoides* - Grape Hyacinth; 13:75/12:1116  
*Polygonatum commutatum* - Large Solomon's Seal; 5:325/13:821  
*Uvularia perfoliata* - Bellwort; 13:246/14:1309  
*Uvularia sessilifolia* - Sessile-leaved Bellwort; 22:105/1:1132  
*Veratrum viride* - False Hellebore; 17:1122/18:1286

#### Family **IRIDACEAE**

- Iris prismatica* - Slender Blue Flag Iris; 22:361/29:423/29:427/  
 1:1362/2:1345; Threatened G4 S2  
*Iris versicolor* - Blue Flag Iris; 8:307/2:1351  
*Sisyrinchium angustifolium* - Stout Blue-eyed Grass; 13:242/10:277/  
 8:308/5:318/19:420/4:496  
 !*Sisyrinchium atlanticum* - Blue-eyed Grass; 4:338/2:1338

#### Family **SMILACACEAE**

- Smilax glauca* - Sawbrier; 8:406  
*Smilax herbacea* - Carrion-flower; 5:215/2:1352  
*Smilax rotundifolia* - Greenbrier; 28:1096

#### Family **DIOSCOREACEAE**

- Dioscorea villosa* - Wild Yamroot; 22:523/24:967/22:1453

#### Family **ORCHIDACEAE**

- !*Plantanthera lacera* - Ragged Fringed Orchis; 22:522  
*Spiranthes cernua* - Nodding Lady's Tresses; 13:1091  
 !*Spiranthes vernalis* - Spring Lady's Tresses; 28:878;  
 Endangered NYS G5 S1

## **Appendix B**

The following lists of plants have been compiled from examining the collection of plants (and the field notes) of H.E. Ahles that were made in Pelham Bay Park, Bronx County, New York in 1946-47. These plants are listed by section (1 through 29). For each section, plant species are listed in alphabetical order by common name. Also included is the collection number given by Ahles for each specimen. For the exact location of each section of the park where Ahles collected each specimen in 1946-47, refer to Figure 2. An asterisk (\*) preceding the scientific name indicates that the species is a non-native plant. An exclamation mark (!) indicates that the species is planted by the New York City Department of Parks and Recreation and was not spreading into other areas of the park.. No symbol preceding the common name indicates that the plant is native to the park and the region.

**Section 1.** The area opposite the closed landfill, from the New England Thruway to the Pelham Parkway Bridge west to Co-op City.

### Wildflowers

1. Beauty, Spring - *Claytonia virginica*; #197; woodlands
2. Bellwort - *Uvularia sessilifolia*; #1135
3. Bitter-cress, Pennsylvania - *Cardamine pensylvanica*; #1134
4. Blackberry, Highbush - *Rubus pensylvanicus*; #1361
- 5.\*Campion, White - *Silene latifolia*; #1363/1364
6. Catchfly, Sleepy - *Silene antirrhina*; #1360
7. Cinquefoil, Common - *Potentilla simplex*; #199; in lawn
- 8.\*Crowfoot, Bulbous - *Ranunculus bulbosus*; #177; on a lawn
9. Iris, Slender Blue Flag - *Iris prismatica*; #1362
10. Jewelweed, Spotted - *Impatiens capensis*; #720; moist woodland
11. Mayflower, Canada - *Maianthemum canadense*; #1136
- 12.\*Medic, Black - *Medicago lupulina*; #175; dry meadow
13. Nightshade, Black - *Solanum ptycanthum*; #731; open woodland
14. Ox-eye - *Heliopsis helianthoides*; #719; edge of woodland
15. Peppergrass, Wild - *Lepidium virginicum*; #128; open, dry field
- 16.\*Purslane - *Portulacca oleracea*; #718; waste land
17. Root, Culver's - *Veronicastrum virginicum*; #721; woodland
18. Skullcap, Mad-dog - *Scutellaria lateriflora*; #729; moist woodland
19. Star-grass, Yellow - *Hypoxis hirsuta*; #193; woodland
- 20.\*Tansy - *Tanacetum vulgare*; #736; edge of woodland
- 21.\*Thistle, Sow - *Sonchus oleraceus*; #732; edge of salt marsh
- 22.\*Trefoil, Bird's-foot - *Lotus corniculata*; #330; open field
23. Violet, Early Blue - *Viola palmata*; #127/195; thickets/edge of woods
24. Waterleaf, Virginia - *Hydrophyllum virginianum*; #183; edge of woodland on hillside

### Grasses

1. Chess, Downy - *Bromus tectorum*; #192; hillside and roadside
2. Lovegrass, Purple - *Eragrostis spectabilis*; #717; edge of woodland
- 3.\*Orchard Grass - *Dactylis glomerata*; #167; lawns
- 4.\*Vernalgrass, Sweet - *Anthoxanthum odoratum*; #303; open meadow

### Sedges and Rushes

1. Sedge - *Carex amphibola* var. *turgida*; #1135
2. Sedge - *Carex pensylvanica*; #1134
3. Sedge - *Carex squarrosa*; #722; moist woodland
4. Sedge - *Carex swanii*; #1365
5. Sedge, Flat - *Cyperus echinatus* - #716; edge of woodlands

## Trees

1. Cherry, Black - *Prunus serotina*; #730; woodland

## **Section 2. Landfill and surrounding areas up until the Pelham Parkway Bridge**

### Wildflowers

1. Bedstraw - *Galium tinctorum*; #1341
2. Blackberry, Highbush - *Rubus pensylvanicus*; #1346
3. Blackberry, Northern - *Rubus alleghaniensis*; #389; open field
4. Carrion-flower - *Smilax herbacea*; #1352
5. Cinquefoil, Common - *Potentilla simplex*; #1354
6. Cinquefoil, Sulfur - *Potentilla recta*; #375; dry hillside
- 7.\*Clover, Red - *Trifolium pratense*; #662; meadow
- 8.\*Clover, White Sweet - *Melilotus alba*; #370; open field
- 9.\*Dock, Bitter - *Rumex obtusifolius*; #399; open field
- 10.\*Dock, Willow-leaf - *Rumex salicifolius* var. *mexicanus*; #1334
11. Figwort - *Scrophularia leporella*; #1342
12. Fleabane - *Erigeron philadelphicus*; #1358
13. Garlic, Wild - *Allium canadense*; #1336
14. Grass, Blue-eyed - *Sisyrinchium atlanticum*; #1338
15. Hedge-hyssop - *Gratiola neglecta*; #1343
- 16.\*Hedge-mustard - *Sisymbrium officinale*; #651; meadow
17. Honewort - *Cryptotaenia canadensis*; #397; edge of woods
18. Iris, Blue-flag - *Iris versicolor*; #1351
19. Iris, Slender Blue-flag - *Iris prismatica*; #345
- 20.\*Knapweed, Black - *Centaurea nigra*; #1359
- 21.\*Mustard, Tumble - *Sisymbrium altissimum*; #357; dry hillside
22. Nightshade, Ball - *Solanum carolinense*; #649; field
23. Orach, Seabeach - *Atriplex patula*; #724/724b; salt marsh
24. Rose-mallow, Swamp - *Hibiscus moscheutos*; #728; salt marsh
- 25.\*Sandwort, Thyme-leaf - *Arenaria serpyllifolia*; #373/1337; dry path
26. Sea-lavender - *Limonium carolinianum*; #723; salt marsh
27. Sweet-flag - *Acorus calamus*; #1349
- 28.\*Vetch, Spring - *Vicia sativa* ssp. *nigra*; #371/1339; edge of salt marsh
- 29.\*Water-cress, Marsh - *Rorippa palustris* ssp. *palustris*; #1357
- 30.\*Wineberry - *Rubus phoenicolasius*; #400; thickets

### Grasses

- 1.\*Bluegrass, Kentucky - *Poa pratensis*; #396; salt marsh
- 2.\*Bluegrass, Rough - *Poa trivialis*; #374; salt marsh
- 3.\*Chess, Soft - *Bromus hordaceus*; #388; roadside

4. Cord-grass, Salt - *Spartina patens*; #735; salt marsh
5. Cord-grass - *Spartina stricta*; #733; salt marsh (often washed with the tide)
- 6.\*Crab-grass, Tall - *Digitaria sanguinale*; sand on shore (dry)
- 7.\*Fescue, Meadow - *Lolium pratense*; #372/1335; salt marsh
- 8.\*Fescue, Sheep - *Festuca trachyphylla*; #133; dry field
9. Grass - *Bromus asper*; #359; dry hillside
- 10.\*Grass, Velvet - *Holcus lanatus*; #354; thin woods
11. Mannagrass, Fowl - *Glyceria striata*; #353; thin woods
- 12.\*Ryegrass - *Lolium perenne* var. *perenne*; #352; thin woods
- 13.\*Timothy - *Phleum pratense* ssp. *pratense*; #132; dry, open field
- 14.\*Vernalgrass, Sweet - *Anthoxanthum odoratum*; #133; open meadow
15. Wild-rye, Virginia - *Elymus virginicus* no var.; #725; salt marsh (sandy)

### Sedges and Rushes

1. Bulrush - *Scirpus atrovirens*; #356; moist woods
2. Rush, Jointed - *Juncus articulatus*; #1353
3. Sedge - *Carex gynandra*; #1356
4. Sedge - *Carex pellita*; #1355
5. Sedge - *Carex serorsa*; #390; thickets
6. Sedge - *Carex stipata*; #1347/1348
7. Sedge - *Carex swanii*; #355; thin woods
8. Spikerush - *Eleocharis halophila*; #1344
9. Three-square - *Scirpus americanus*; #726; salt marsh (along ditch)
10. Tussock-sedge - *Carex stricta*; #1350

### Shrubs

1. Marsh-elder - *Iva frutescens* ssp. *oraria*; #727; salt marsh

### Trees

1. Gum, Black - *Nyassa sylvatica*; #1340
2. Willow sp. - *Salix* sp.; #131; large tree in meadow

**Section 3. From the Pelham Parkway Bridge to Turtle Cove (the road to the shore).**Wildflowers

1. \*Bedstraw, White - *Galium mollugo*; #1379; hillside
2. Chickweed - *Cerastium glomeratum*; 3159; weed in lawn
3. Cleavers - *Galium aparine*; #160; thin woods

Shrubs

1. Cedar, Eastern Red - *Juniperus virginiana*; #1; shore of bay
2. \*Mulberry, White - *Morus alba*; #154; thin woods

Trees

1. Hackberry - *Celtis occidentalis*; #156; thin woods
2. Haw, Black - *Viburnum prunifolium*; #151; thickets

## Section 4. Rodman's Neck to the City Island Bridge

### Wildflowers

1. \*Bedstraw, White - *Galium mollugo*; #499; meadow
2. Cancer-root - *Orobanche uniflora*; #340; open meadow
3. \*Cat's-ear - *Hypochaeris radicata*; #574; in lawns
4. Cinquefoil, Old-field - *Potentilla simplex*; #487; meadow
5. \*Daisy, Ox-eye - *Leucanthemum vulgare*; #495; meadow
6. \*Dock, Curly - *Rumex crispus*; #343; open meadow
7. \*Field-cress - *Lepidium campestre*; #342; roadside
8. Fleabane, Daisy - *Erigeron annuus*; #501; meadow
9. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #496; meadow
10. Grass, Blue-eyed - *Sisyrinchium atlanticum*; #338; open field
11. \*Hawkweed, Orange - *Hieracium auranticum*; #491; meadow
12. Loosestrife, Whorled - *Lysimachia quadrifolia*; #344; open field
13. \*Medic, Black - *Medicago lupulina*; #345; open field
14. Milkweed, Common - *Asclepias syriacus*; #603; dry meadow
15. Milkwort, Whorled - *Polygala verticillata* var. undetermined; #591, dry meadow
16. \*Pineapple-weed - *Matricaria discoidea*; #335; along dirt road
17. Strawberry, Wild - *Fragaria virginiana*; #331; open field
18. Sundrops - *Oenothera perennis*; #493; meadow
19. Tobacco, Indian - *Lobelia inflata*; #494; meadow
20. \*Winter-cress - *Barbarea vulgaris*; #341; open meadow (moist)

### Grasses

1. \*Bluegrass, Annual - *Poa annua*; #336; along dirt road
2. \*Fescue, Red - *Festuca rubra* ssp. *rubra*; #349; open field
3. Grass, Panic - *Panicum oligosanthes* var. *scribnerianum*; #337; open meadow
4. \*Grass, Velvet - *Holcus lanatus*; #601; dry meadow

### Sedges and Rushes

1. Rush, Path - *Juncus tenuis*; #339; open field
2. Sedge - *Carex digitalis*; #332; moist field
3. Sedge - *Carex* sp.; #334; open field

### Vines

1. Bindweed - *Convolvulus sepium* var. *pubescens*; #492; salt marsh
2. Bittersweet, American - *Celastrus scandens*; #346; thickets

### Shrubs

1. \*Alder, Black - *Alnus glutinosa*; #4; forming a natural woodland

### Trees

1. Aspen, Quaking - *Populus tremuloides*; #500; meadow
2. \*Empress-tree - *Paulownia tomentosa*; #1079; woodland
3. Maple, Red - *Acer rubrum*; #6; thin woodland
4. Maple, Silver - *Acer saccharinum*; #5; in open meadow
5. Poplar sp. - *Populus* sp.; #7; forming woodland
6. Willow - *Salix* sp.; #333; open field

## Section 5. Golf Driving Range (Miniature Golf) and the Central Woodlands

### Wildflowers

1. \*Alfalfa - *Medicago sativa* ssp. *sativa*; #468/469/473; meadow
2. Anemone, Rue - *Thalictrum thalictroides*; #40/60; woodlands/edge of woodland
3. Anemone, Wood - *Anemone quinquefolia*; #59; edge of woodland
4. Beauty, Spring - *Claytonia virginica*; 1102
5. Bedstraw - *Galium tinctorium*; #402; marsh
6. Bells, Choral - *Heuchera americana*; #317; thin woods
7. Bitter-cress, Pennsylvania - *Cardamine pensylvanica*; #170; swamps
8. Blackberry, Common - *Rubus allegheniensis*; #329; woodland
9. Buttercup - *Ranunculus hispidus* var. undetermined; #62; edge of woods
10. \*Buttercup, Common - *Ranunculus acris*; #326; open field
11. Buttercup, Hooked - *Ranunculus recurvatus*; #153; rich woodlands
12. Cabbage, Skunk - *Symplocarpus foetida*; #1092
13. Cancer-root - *Orobanche uniflora*; #218; open field
14. Carrion-flower - *Smilax herbacea*; #215; thin woods
15. \*Chickweed, Common - *Stellaria media*; #1108
16. Cinquefoil, Old-field - *Potentilla simplex*; #211; open field
17. Coffee, Wild - *Triosteum perfoliatum*; #316/1081; thin woods/woodland
18. \*Coltsfoot - *Tussilago farfara*; #1106
19. \*Cow-vetch - *Vicia cracca* ssp. undetermined; #313/437/467/ #474; open field/meadow
20. Cress, Spring - *Cardamine bulbosa*; #155/194; shady swamp
21. \*Devil, King - *Hieracium caespitosum*; #320; open meadow
22. Dewberry, Northern - *Rubus flagellaris*; #190/207; rocky ledge/edge of wood
23. Figwort, Hare - *Scrophularia lanceolata*; #327; thin woods
24. Geranium, Wild - *Geranium maculatum*; #129; thin woods
25. Ginger, Wild - *Asarum canadense*; #45; moist woodland
26. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #318; edge of a woodland
27. Greenbrier sp. - *Smilax racemosa*; #226; woods
28. Lettuce sp. - *Lactuca sagittifolia* (?); #1039; meadow
29. Lily, Canada - *Lilium canadense* var. *canadense*; #568; moist woodland
30. Lily, Trout - *Erythronium americanum*; #206; low woodland
31. \*Live-forever - *Sedum telephium*; 1105
32. May-apple - *Podophyllum peltatum*; #180; moist woodland
33. Meadow-rue, Tall - *Thalictrum pubescens*; #411; edge of woodland
34. \*Mouse-ear, Common - *Cerastium fontanum*; #212; open meadow
35. Raspberry, Black - *Rubus occidentalis*; #328; woodland
36. Sanicle - *Sanicula odorata*; #216; edge of woods
37. Solomon's-seal, Large - *Polygonatum commutatum*; #325; edge of woodland
38. \*Sorrel, Sheep - *Rumex acetosella*; #208/209; open meadow
39. \*Speedwell, Thyme-leaf - *Veronica serpyllifolia* ssp. *serpyllifolia*; #158; lawn (traffic circle)

40. \*Stitchwort, Lesser - *Stellaria graminea*; #347; open field
41. Strawberry, Wild - *Fragaria virginica*; #213; edge of woods
42. \*Strawberry, Indian - *Duchesnea indica*; #210; woodland
43. Toothwort, Cut-leaf - *Cardamine concatenata*; #41; thickets
44. \*Vetch, Hairy - *Vicia villosa* ssp. undetermined; #475; meadow
45. Violet, Common - *Viola sororia*; #148; edge of woods
46. Violet, Three-lobed - *Viola palmata*; #219; edge of woods
47. Violet, Yellow - *Viola pubescens*; #57; edge of woodland
48. Water-horehound - *Lycopus americanus*; #109; meadow
49. \*Winter-ress - *Barbarea vulgaris*; #217; meadow
50. Yarrow - *Achillea millefolium* var. undetermined; #332; open field

### Grasses

1. \*Bluegrass, Rough - *Poa trivialis*; #1319
2. Phragmites - *Phragmites australis*; #1080; salt marsh
3. Reed-grass, Wood - *Cinna arundinacea*; #1040; low woodland
4. \*Rye-grass, English - *Lolium perenne* var. undetermined; #440; growing at edge of path
5. \*Timothy - *Phleum pratense* ssp. *pratense*; #220; open meadow

### Sedges and Rushes

1. Rush, Soft - *Juncus effusus*; #404; marsh
2. Sedge - *Carex amphibola* var. *grisea*; #1315/1320
3. Sedge - *Carex amphibola* var. *turgida*; #225; thickets
4. Sedge - *Carex gynandra*; #228/229; wooded swamp
5. Sedge - *Carex hirtifolia*; #157/224; open field/traffic circle/thickets
6. Sedge - *Carex pallescens*; #227; meadow
7. Sedge - *Carex rosea*; #1314
8. Sedge - *Carex squarrosa*; #401/1366; marsh
9. Sedge - *Carex stipata*; #1316/1318
10. Sedge - *Carex vulpinoidea*; #149/223; edge of swamp/thickets
11. Wood-rush, Common - *Luzula campestris* var. *bulbosa*; #44/214; thin woods/open woods

### Shrubs

1. \*Alder, Black - *Viburnum molle*; #1522
2. Arrow-wood, Southern - *Viburnum dentatum* var. undetermined; #403; marsh
3. Blueberry sp. - *Vaccinium* sp.; #169/1220-1225; woodland
4. Dogwood, Gray - *Cornus racemosa* ssp. *foemina*; #412; open meadow
5. Spicebush - *Lindera benzoin*; #1103

### Trees

1. Ash, White - *Fraxinus americana*; #150; marshy woodland
2. Cherry, Black - *Prunus serotina*; #222; thin woods
3. Dogwood - *Cornus florida*; #89; woodland
4. Elm, Slippery - *Ulmus rubra*; #10/1093; woodland
5. \*Empress-tree - *Paulownia tomentosa*; #319; near salt marsh
6. Hornbeam - *Carpinus caroliniana* ssp. *virginiana*; #43; low woodlands
7. \*Locust, Black - *Robinia pseudoacacia*; #321; edge of wood
8. Sycamore - *Platanus occidentalis*; #221; edge of woods
9. Willow sp. - *Salix* sp.; #18; along brook

**Section 6.** Along Turtle Cove Pond (east side) from the Traffic Circle to entrance of the Orchard Beach Parking lot.

### Wildflowers

1. \*Chickweed, Mouse-ear - *Cerastium glomeratum*; #263; roadside
2. \*Radish - *Raphanus innocuum*; #261; roadside
3. Peppergrass, Wild - *Lepidium virginicum*; #254; along roadside

## Section 7. The meadow: South of the Orchard Beach Parking lot to City Island Road.

### Wildflowers

1. Cancer-root, One-flowered - *Orobanche uniflora*; #1300
- 2.\*Clover, Yellow - *Trifolium aureum*; #1422
3. False-pimpernel - *Lindernia dubia* var. *dubia*; #607; dried swamp
4. Fleabane, Daisy - *Erigeron ramosus*; #587; dry meadow
5. Geranium, Wild - *Geranium maculatum*; #65; woodland
- 6.\*Knawel - *Scleranthus annuus*; #1423
- 7.\*Knapweed, Black - *Centaurea nigra*; #1417
8. Knotweed, Pink - *Polygonum pennsylvanicum*; #1418
- 9.\*Parsnip, Wild - *Pastinaca sativa*; #615; meadow
10. Saxifrage, Early - *Saxifraga virginiana*; #48; rock crevices
- 11.\*Smartweed - *Polygonum hydropiper*; #1078; meadow
- 12.\*Sneezeweed - *Helenium flexuosum*; #589; meadow
- 13.\*Thistle, Canada - *Cirsium arvense*; #600; meadow
- 14.\*Thistle, Field - *Cirsium discolor*; #804/826; meadow
- 15.\*Trefoil, Bird's Foot - *Lotus corniculata*; #1419
- 16.\*Water-cress, Marsh - *Rorippa palustris* ssp. *palustris*; #608; dried swamp
17. Wood Sorrel, Violet - *Oxalis violacea*; #270; edge of woodland
- 18.\*Yellow-cress, Creeping - *Rorippa sylvestris*; #348; roadside

### Grasses

- 1.\*Bluegrass, Kentucky - *Poa pratensis*; #1424
- 2.\*Brome, Smooth - *Bromus inermis*; #588; dry meadow
- 3.\*Fescue, Meadow - *Lolium pratense*; #1421
- 4.\*Fescue, Sheep - *Festuca trachyphylla*; #1424
5. Grass, Indian - *Sorghastrum nutans*; 605; dry meadow
- 6.\*Grass, Orchard - *Dactylis glomerata*; #586; meadow
7. Grass, Panic - *Panicum acuminatum*; #1420
8. Grass, Panic - *Panicum sphaerocarpon* var. *sphaerocarpon*; #1426
9. Reedgrass - *Calamagrostis cinnoides*; #614; dry meadow

### Sedges and Rushes

1. Rush, Path - *Juncus tenuis*; #618; dried swamp
2. Rush, Sharp-fruited - *Juncus acuminatus*; #606; dried marsh
3. Sedge - *Carex granularis* var. *granularis*; #498; swamp
4. Spikerush - *Eleocharis obtusa* var. undetermined; #579; dried marsh
5. Spikerush, Slender - *Eleocharis elliptica* var. *pseudoptera*; #611; dried swamp

### Trees

1. Ash, White - *Fraxinus americana*; #1077; edge of woodland

**Section 8.** From Traffic Circle that leads to Shore Road, east past the airport signal shack until the entrance to Orchard Beach (north side of the road only)

### Wildflowers

1. Aster, Blue Wood - *Aster cordifolius*; #1046; woodland
2. Aster, Calico - *Aster lateriflorus* var. *lateriflorus*; #990; salt marsh
3. Aster, Heath - *Aster ericoides*; #993; drier parts of salt meadow  
(determined by E.J. Alexander)
4. Aster, Purple-stemmed - *Aster puniceus* var. *firmus*; #1038; meadow
5. Aster, Smooth Blue - *Aster laevis* var. undetermined; #989; salt marsh
6. Aster, Tall White - *Aster lanceolatus* var. *lanceolatus*; #992; edge of salt marsh
7. Bush-clover - *Lespedeza capitata*; #1036; meadow
8. Cancer-root - *Orobanche uniflora*; #161; hillside
9. Candles, Swamp - *Lysimachia terrestris*; #1045; moist meadow
10. \*Chives, Wild - *Allium schoenoprasum*; #1325
11. Columbine - *Aquilegia canadensis*; #90; rocky ledge
12. \*Cow-cress - *Lepidium campestre*; #310; thickets
13. Cranesbill, Carolina - *Geranium carolinianum* var. undet.; #302; dry,  
rocky edge of wood
14. Dandelion, Dwarf - *Krigia virginica*; #304; sunny, rocky crevices
15. Gall-of-the-Earth - *Prenanthes trifoliata*; #1033; in shade (det. by E.J.  
Alexander)
16. Garlic, Wild - *Allium canadense*; #463; dry areas of salt marsh
17. Gerardia, Seaside - *Agalinis maritima*; #994; salt marsh
18. Goldenrod, Early - *Solidago juncea*; #659; meadow
19. Goldenrod, Tall Hairy - *Solidago rugosa* ssp. *rugosa* var. *rugosa*;  
#1034; meadow
20. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #308; open meadow
21. \*Hawkweed, Mouse-ear - *Hieracium pilosella*; #315; open field
22. Hemlock, Water - *Cicuta maculata*; #410; moist meadow
23. Iris, Blue Flag - *Iris versicolor*; #307; swamp
24. Knotweed, Salt Marsh - *Polygonum ramosissimum*; #991; salt marsh
25. Knotweed, Upright - *Polygonum erectum*; #465; roadside
26. Orange-grass - *Hypericum gentianoides*; #658; dry field
27. Pink, Wild - *Silene caroliniana* var. *pennsylvanica*; #67; rocky ledge
28. Pinweed - *Lechea pulchella* var. *pulchella*; #988; rocky ledges in the  
salt marsh
29. Pussytoes sp. - *Antennaria* sp.; #46/1233/1245; thin, rocky woods
30. \*Radish, Wild - *Raphanus raphanistrum*; #350; open field
31. \*Sandwort, Thyme-leaf - *Arenaria serpyllifolia*; #306; dry, rocky,  
sunny place
32. Sawbrier - *Smilax glauca*; #406; thickets
33. Saxifrage, Early - *Saxifraga virginensis*; #48/1109; rock crevices
34. Sea-blite, Southern - *Suaeda linearis*; #987; salt marsh; Endangered  
NYS G5/S1

35. Sorrel sp. - *Oxalis cymosa*; #309; roadside
- 36.\*Speedwell, Corn - *Veronica arvensis*; #1324
- 37.\*Water-cress, Marsh - *Rorippa palustris* ssp. *palustris*; #464; waste ground

#### Grasses

- 1.\*Fescue, Red - *Festuca rubra* ssp. *rubra*; #1449
- 2.\*Fescue, Sheep - *Festuca trachyphylla*; #311; salt marsh
3. Grass, Deer-tongue - *Panicum clandestinum*; #1035; marsh
- 4.\*Grass, Velvet - *Holcus lanatus*; 323; open meadow

#### Sedges and Rushes

1. Galingale - *Cyperus strigosus*; #1037; meadow
2. Grass, Black - *Juncus gerardii*; #314; salt marsh
3. Sedge - *Carex blanda*; #1322
4. Sedge - *Carex pallescens*; #1323
5. Sedge - *Carex pellita*; #1321
6. Sedge - *Carex pensylvanicus*; #36; edge of woods

#### Pteridophytes

1. Fern, Marsh - *Thelypteris palustris* var. *pubescens*; #1044; moist meadow
2. Selaginella - *Selaginella rupestris*; #1082; rock ledges

#### Vines

1. Honeysuckle, Trumpet - *Lonicera sempervirens*; #1042; on rocky ledge
2. Moonseed - *Menispermum canadense*; #660; thickets

#### Shrubs

1. Blueberry - *Vaccinium* sp.; #66/1230-34/1236-44/1266-74; rock island in salt marsh
2. Huckleberry sp. - *Gaylussacia* sp.; #1232/1235
3. Rose, Pasture - *Rosa carolina*; #409; rock crevices

#### Trees

1. Aspen, Big-tooth - *Populus grandidentata*; #168/1107; edge of woods
2. Birch, Sweet - *Betula lenta*; #1043; rocky ledges
3. Elm, Slippery - *Ulmus fulva*; #1093
- 4.\*Hawthorn, English - *Crataegus monogyna*; #1049; open hill in meadow
5. Hickory, Bitternut - *Carya cordiformis*; #1047; open meadow

6. Hickory, Mockernut - *Carya tomentosa*; #1041/1048; open meadow; thin woodland
7. Oak, Pin - *Quercus palustris*; #1031; rocky mounds in salt meadow
8. Oak, Post - *Quercus stellata*; #1032; near salt marsh in rocky places
9. Oak, Swamp White - *Quercus bicolor*; #1030; edge of salt meadow
10. \*Pine, Scotch - *Pinus sylvestris*; #2; shore of bay
11. \*Spindle-tree, European - *Euonymus europaeus*; #305; rock ledge in partial shade

**Section 9.** From the entrance to Orchard Beach until Hunter Island along the lagoon

Wildflowers

1. \*Alyssum - *Alyssum alyssoides*; #1427
2. Aster, Salt Marsh - *Aster subulatus*; #1051; salt meadow
3. \*Chickweed, Common - *Stellaria media*; #258; roadside
4. \*Clover, Alsike - *Trifolium hybridum*; #239; roadside
5. \*Clover, Red - *Trifolium pratense*; #238; roadside
6. \*Clover, Yellow Sweet - *Melilotus officinalis*; #240; roadside
7. \*Penny-cress, Field - *Thlaspi arvense*; #269; roadside
8. \*Purse, Shepherd's - *Capsella bursa-pastoris*; #271; roadside
9. \*Quarter's, Lamb's - *Chenopodium album* var. *album*; #1076; in soil heap
10. Sea-blite - *Suaeda calceolariformis*; #1050; seashore
11. \*Treacle-mustard - *Erysimum repandum*; #241; in lawns
12. \*Velvet-leaf - *Abutilon theophrasti*; #1075; in soil heap

Grasses

1. \*Fescue, Sheep - *Festuca trachyphylla*; #243; roadside

**Section 10.** South side of Hunter Island, from the parking lot to cobblestone road that bisects the island

Wildflowers

1. Aster, Big-leaf - *Aster macrophyllus* var. *macrophyllus*; #815; woodland
2. Aster, Wavyleaf - *Aster undulatus*; 1055; thin woodland
3. Cabbage, Skunk - *Symplocarpus foetidus*; #8; swampy ground
4. \*Coltsfoot - *Tussilago farfara*; #9; in swamp
5. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #277; woodland
6. \*Herb, Felon - *Artemisia vulgaris*; #1052; dump
7. Ironweed - *Vernonia noveboracensis*; #816; edge of woodland
8. \*Lettuce, Prickly - *Lactuca serriola*; #604; waste ground
9. Pussytoes sp. - *Antennaria* sp.; #68/69/1301; thin woodland/dry rocky location
10. \*Rocket, Dame's - *Hesperis matronalis*; #1312

11. Sea-rocket - *Cakile edentula* var. *edentula*; #817; rubbish heap along the coast
12. Smartweed - *Polygonum pensylvanicum*; #806; meadow
13. Snakeroot, Black - *Sanicula marilandica*; #273; rich woods
- 14.\*Sorrel, Sheep - *Rumex acetosella*; #84; meadow
- 15.\*Speedwell - *Veronica officinalis*; #262; dry, open field
16. Sunflower, Wood - *Helianthus strumosus*; #807; thin woods
- 17.\*Tea, Mexican - *Chenopodium ambrosioides*; #869; along coast
- 18.\*William, Sweet - *Dianthus barbatus*; #1098

### Grasses

1. Bluestem, Big - *Andropogon gerardii*; #828; edge of salt marsh
2. Broom-sedge - *Andropogon virginicus*; #1054; meadow
- 3.\*Chess, Downy - *Bromus tectorum*; #253; in waste ground
- 4.\*Grass, Barnyard - *Echinochloa crusgalli* ssp. *crusgalli*; #842; meadow
- 5.\*Grass, Velvet - *Holcus lanatus*; #1429
6. Lovegrass - *Eragrostis major*; #609; along path
7. Whitegrass - *Leersia virginica*; #1070/1074; moist spot in woodland

### Sedges and Rushes

1. Sedge - *Carex bushii*; #260/1430; edge of woods
2. Sedge - *Carex projecta*; #245; swamp

### Pteridophytes

1. Fern, Cinnamon - *Osmunda cinnamomea*; #1302
2. Fern, Interrupted - *Osmunda claytoniana*; #1303

### Shrubs

1. Chokeberry, Purple - *Aronia x prunifolia*; #78; rocky ledge in inlet  
(appearing almost apetalous)
2. Groundsel-tree - *Baccharis halimifolia*; #1053; meadow
3. Hazel, Witch - *Hamamelis virginiana*; #1073; woodland
- 4.\*Honeysuckle, Japanese - *Lonicera japonica*; 1444
- 5.\*Privet - *Ligustrum vulgare*; #1447
6. Rose, Virginia - *Rosa virginiana*; #1431
7. Shadbush, Colonial - *Amelanchier stolonifera*; #1304/1445/1448

### Trees

1. Basswood - *Tilia americana* var. *americana*; #1428
2. Chestnut, American - *Castanea dentata*; #259; rich wood
- 3.\*Crab-apple, Siberian - *Malus baccata*; #1313
4. Dogwood, Flowering - *Cornus florida*; #63; woodland

5. Elm, American - *Ulmus americana*; #1101
6. Hornbeam, Hop - *Ostrya virginiana*; #1446
7. Persimmon - *Diospyros virginiana*; #813; along coast
8. Willow sp. - *Salix* sp.; #71; moist edge of woodland near salt marsh

**Section 11. Bartow-Pell Mansion from the lagoon out to Shore Road (i.e. until approximately 60 meters north of entrance road to the mansion)**

Wildflowers

1. \*Artichoke, Jerusalem - *Helianthus tuberosus*; #998; hillside
2. Aster, Tall White - *Aster lanceolatus* var. *lanceolatus*; #996; edge of salt meadow
3. \*Bedstraw, White - *Galium mollugo*; #282; sunny hillside
4. \*Celandine, Greater - *Chelidonium majus*; #295; thin woods
5. \*Cleavers - *Galium aparine*; #297; woodlands
6. \*Daisy, Ox-eye - *Leucanthemum vulgare*; #281; open field
7. Dandelion - *Krigia amplexicaulis*; #1329
8. Garlic, Wild - *Allium canadense*; #291; edge of salt marsh
9. Goldenrod, Tall Hairy - *Solidago rugosa* ssp. *rugosa* var. *rugosa*; #997; edge of salt marsh
10. \*Meadow-rue, Garden - *Thalictrum aquilegifolium*; #294; edge of woods (may have may have been planted years ago)
11. \*Mustard, Black - *Brassica nigra*; #626; edge of salt marsh
12. \*Mustard, Garlic - *Alliaria petiolata*; #1264
13. \*Nightshade - *Solanum dulcamara*; #299; edge of salt marsh
14. \*Parsnip, Wild - *Pastinaca sativa*; #1510
15. Plantain, Seaside - *Plantago maritima* ssp. *juncooides*; #1486; Threatened NYS T5 S2
16. \*Purse, Shepherd's - *Capsella bursa-pastoris*; #1115
17. Pussytoes sp. - *Antennaria* sp.; #1228
18. \*Quickweed - *Galinsoga parviflora*; #1521
19. Rattlesnake-weed - *Hieracium venosum*; #290; thin woods
20. \*Rocket, Dame's - *Hesperis matronalis*; #280; thin woods
21. Toadflax, Bastard - *Comandra umbellata*; #1328
22. \*Vetch, Common - *Vicia sativa* ssp. undetermined; #287; thin woods
23. \*Violet, English - *Viola odorata*; #1111
24. Wood Sorrel, Violet - *Oxalis violacea*; #1327

Grasses

1. \*Bluegrass, Canada - *Poa compressa*; #1520
2. \*Grass, Foxtail - *Setaria pumila*; #1508
3. \*Oatgrass, Tall - *Arrhenatherum elatius*; #296; woodlands
4. Vanilla-grass - *Anthoxanthum odoratum*; #292; salt marsh

Sedges and Rushes

1. Cyperus - *Cyperus flavescens*; #995; salt marsh
2. Rush, Path - *Juncus tenuis*; #298; salt marsh
3. Sedge - *Cyperus echinatus*; #1509

4. Sedge - *Carex pallescens*; #1326
5. Sedge - *Carex squarrosa*; #286; edge of salt marsh
6. Sedge - *Carex swanii*; #293; edge of woods

#### Pteridophytes

1. Fern, Royal - *Osmunda regalis* var. *spectabilis*; #300; salt marsh

#### Vines

1. Rose, Climbing Prairie - *Rosa setigera* var. *setigera*; #638; along bridle path

#### Shrubs

1. Blueberry sp. - *Vaccinium* sp.; #1226-30
- 2.\*Rose-of-Sharon - *Hibiscus syriacus*; #1484-85
- 3.\*Rose, Salt-spray - *Rosa rugosa*; #283; along bridle path (possibly planted at one time)

#### Trees

- 1.\*Crab-apple, Siberian - *Malus baccata*; #636; rocky outcrop in salt marsh
2. Elm, Slippery - *Ulmus fulva*; #97/1112; along shore
3. Gum, Black - *Nyassa sylvatica*; #301; woodland
- 4.\*Poplar, White - *Populus alba*; #1110
5. Willow sp. - *Salix* sp.; #278/1265/1268; edge of salt marsh

**Section 12.** From mid-Bartow-Pell Mansion (60 meters north of entrance) north along Shore Road to the parking lot at the northern boundary of the park and down to the lagoon

### Wildflowers

1. \*Bouncing-bet - *Saponaria officinalis*; #1476
2. \*Coreopsis, Lance-leaved - *Coreopsis lanceolata*; #1477
3. Germander, Seaside - *Teucrium canadense* var. *canadense*; #1483
4. Hibiscus sp. - *Hibiscus* sp.; #1475
5. \*Hyacinth, Grape - *Muscari botryoides*; #1116
6. \*Lily-of-the-Valley - *Convallaria majalis*; #1263
7. Meadow-rue, Early - *Thalictrum dioicum*; #1299
8. Milkweed sp. - *Asclepias* sp.; #1518
9. \*Periwinkle - *Vinca minor*; #1113
10. \*Purslane - *Portulaca oleracea*; #1513
11. Saxifrage, Early - *Saxifraga virginensis*; #1117
12. \*Sedum, White-flowered - *Sedum album*; #1479
13. \*Sedum, Yellow - *Sedum acre*; #1478
14. \*Self-heal - *Prunella vulgaris*; #1517
15. \*Sow-thistle sp. - *Sonchus* sp.; #1482
16. \*Violet, English - *Viola odorata*; #1114
17. \*Wall-pepper - *Sedum sarmentosum*; #1480

### Sedges and Rushes

1. Sedge - *Carex stipata*; #1511

### Vines

1. \*Trumpet-creeper - *Campsis radicans*; 12:1483a

### Shrubs

1. \*Barberry sp. - *Berberis* sp.; #1512

### Trees

1. Hickory, Shagbark - *Carya ovata*; #1519

**Section 13.** Hunter Island from the cobblestone road north (the complement to Section 10)

Wildflowers

1. Alexanders, Golden - *Zizia aptera*; #256; rich woods
2. Alexanders, Golden - *Zizia aurea*; #247; open woodland
3. Angelica, Hairy - *Angelica venenosa*; #822; woodland
4. \*Asparagus - *Asparagus officinalis*; #250; in sand along seashore
5. Aster, Big-leaf - *Aster macrophyllus* var. *macrophyllus*; #573; woodland
6. Aster, Slender Salt Marsh - *Aster tenuifolius*; #866
7. Aster, Wavy-leaf - *Aster undulatus*; #1072; woodland
8. Aster, White Wood - *Aster divaricatus*; #833; woodland
9. Bellwort - *Uvularia perfoliata*; #246; rich woods
10. Bells, Choral - *Heuchera americana*; #593; woodland
11. Boneset, Upland - *Eupatorium sessilifolium* var. *sessilifolium*; #812; thin woods
12. Bur-reed - *Sparganium eurycarpum*; #613; in ditch
13. Bush-clover - *Lespedeza hirta*; #829; thin woodland
14. Catch-fly, Sleepy - *Silene antirrhina*; #275; dry fields
15. \*Catnip - *Nepeta cataria*; #841; thin woods
16. \*Cinquefoil, Silvery - *Potentilla argentea*; #264; dry, rocky ledges
17. \*Cress, Mouse-ear - *Arabidopsis thaliana*; #249; rocky ledge
18. \*Dayflower, Asiatic - *Commelina communis* var. undetermined; #584; along path
19. False-foxglove, Downy - *Aureolaria virginica*; #598; rich woodland
20. Fleabane, Salt Marsh - *Pluchea odorata* var. *succulenta*; #859; salt marsh
21. Gall-of-the-Earth - *Prenanthes trifoliata*; #809/840; woodland
22. Germander, Seaside - *Teucrium canadense* var. *canadense*; #575; along salt marsh
23. Glasswort - *Salicornia bigelovii*; #819; sandy beach
24. Glasswort - *Salicornia europaea*; #820; salt marsh
25. Glasswort, Woody - *Salicornia perennis*; #837/1068; (Perennial but thicker than the usual *S. perennis*) / sandy beach
26. Goldenrod, Early - *Solidago juncea*; #854; open woodland
27. Goldenrod, Elm-leaf - *Solidago ulmifolia*; #827; thin woodland
28. Goldenrod, Tall - *Solidago canadensis* var. *scabra*; #805; along woodland path
29. Goldenrod, Tall Hairy - *Solidago rugosa* ssp. *rugosa* var. *rugosa*; #854/856; woodland (open)
30. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #242; edge of woodland
31. \*Hyacinth, Grape - *Muscari botryoides*; #75; thickets
32. Jack-in-the-Pulpit - *Arisaema triphyllum* ssp. *triphyllum*; #82; woodland
33. \*Knawel - *Scleranthus annuus*; #231; dry, rocky situation
34. Ladies-tresses, Nodding - *Spiranthes cernua*; #1091; meadow
35. Lettuce, Wild - *Lactuca canadensis* var. *canadensis*; #825; woodland
36. \*Lily, Hosta - *Hosta ventricosa*; #599; near old Hunter's Mansion

37. Looking-glass, Venus' - *Triodanis perfoliata* var. *perfoliata*; #592/1440; dry woodland
38. \*Marsh-mallow - *Althaea officinalis*; #583; along salt marsh
39. Meadow-rue, Early - *Thalictrum dioicum*; #76/77; woodland
40. Mercury, Three-seeded - *Acalypha gracilens*; #831; sandy beach
41. Milkweed, Purple - *Asclepias purpurascens*; #596/1432; woodland
42. Milkweed, Swamp - *Asclepias pulchra* var. *incarnata*; #616; swamp
43. Parsnip, Cow - *Heracleum maximum*; #576; woodland near salt marsh
44. \*Periwinkle - *Vinca minor*; #87; near old mansion
45. Pilewort - *Erechtites hieracifolia*; #824; along sea coast
46. Pinweed - *Lechea pulchella* var. *pulchella*; #832; open woodland
47. \*Plantain, English - *Plantago lanceolata*; #85; rocky meadows
48. Plantain, Robin's - *Erigeron pulchellus*; #257; rich woods
49. \*Quarter's, Lamb's - *Chenopodium album* var. *album*; 838; sandy beach
50. Raspberry, Black - *Rubus occidentalis*; #580; woodland
51. Richweed - *Collinsonia canadensis*; #835; woodland
52. Silver-rod - *Solidago bicolor*; #834; woodland
53. St. Johnswort - *Hypericum punctatum*; #823; along woodland path
54. Solomon's-seal, Large - *Polygonatum commutatum*; #821; woodland
55. \*Sow-thistle - *Sonchus oleraceus*; #570; along salt marsh
56. \*Speedwell, Purslane - *Veronica peregrina* ssp. *peregrina*; #248; dry, rocky place
57. Sunflower, Giant - *Helianthus giganteus*; #810/845/857; open woodland/thin woodland
58. Sunflower, Woodland - *Helianthus divaricatus*; #582/839; woodland
59. \*Swallow-wort, Black - *Cynanchum louiseae*; #276; roadside
60. Tail, Lizard's - *Saururus cernuus*; #612; marsh
61. Thimbleweed - *Anemone virginiana* var. *virginiana*; #818; woodland
62. \*Thistle, Russian - *Salsola kali*; #808; sand along shore
63. Turtlehead, White - *Chelone glabra*; #860; open woodland
64. Toadflax, Old-field - *Linaria canadensis*; #266/1434; thin woods
65. Vervain, White - *Verbena urticifolia* var. undetermined; #581; edge of woodland
66. Violet, Common - *Viola sororia*; #83; rich woods
67. \*Winter-ress - *Barbarea vulgaris*; #74; open meadow
68. Yarrow - *Achillea millefolium* ssp. undetermined; #1071; woodland path

### Grasses

1. \*Bluegrass, Kentucky - *Poa pratensis*; #1439
2. Grass, Panic - *Panicum acuminatum*; #597/1435; thin woods
3. Grass, Panic - *Panicum boscii*; #1443
4. Grass, Panic - *Panicum dichotomum*; #1442
5. Grass, Panic - *Panicum oligosanthos* var. *scribnerianum*; #255/1433; hillside
6. Grass, Poverty Panic - *Panicum depauperatum*; #1437
7. Mannagrass, Fowl - *Glyceria striata*; #610; woodland

8. Millet, Water - *Echinochloa walteri*; #858; salt marsh
9. Oatgrass, Black - *Piptochaetium avenaceum*; #1441

### Sedges and Rushes

1. Sedge - *Carex cephalophora*; #274; rocky crevices
2. Sedge - *Carex crinita*; #571; along salt marsh
3. Sedge - *Carex cristatella*; #234/235; salt marsh
4. Sedge - *Carex pellita*; #1438
5. Sedge - *Carex stipata*; #233; salt marsh
6. Sedge - *Carex vulpinoidea*; #267; swamp
7. Spikerush, Slender - *Eleocharis elliptica* var. *elliptica*; #232; salt marsh
8. Wood-rush, Common - *Luzula campestris* var. *bulbosa*; #88/251; thin woodland/rich woods

### Pteridophytes

1. Fern, New York - *Thelypteris novaboracensis*; #572; woodland near salt marsh
2. Fern, Wood - *Dryopteris intermedia*; #585; woodland

### Vines

1. Bean, Wild - *Phaseolus polystachios*; #814/1069; cleared woodland near the coast/thin woodland near the coast
2. Creeper, Virginia - *Parthenocissus quinquefolia*; #619; growing in rocks
3. Dodder, Field - *Cuscuta pentagona*; #836; salt marsh (*Iva*)
4. Honeysuckle, Trumpet - *Lonicera sempervirens*; #868; rocky bank
5. Ivy, Poison - *Toxicodendron radicans* var. *radicans*; #230; growing on rocks
6. Pea, Beach - *Lathyrus maritimus* var. *maritimus*; #577; along sandy shore

### Shrubs

1. Blueberry sp. - *Vaccinium* sp.; #81; rock ledges
2. Buttonbush - *Cephalanthus occidentalis*; #569; along salt marsh
3. Huckleberry sp. - *Gaylussacia* sp. #595; rocky ledges
4. Rose, Carolina - *Rosa carolina*; #811; rocky ledges on the shore
5. Rose sp. - *Rosa* sp.; #830; rock ledge, near coast
6. Shadbush, Colonial - *Amelanchier stolonifera*; #252/1436; rocky ledges

### Trees

- 1.\*Apple, Common - *Malus pumila*; #73; thickets
2. Birch, Black - *Betula lenta*; #79; woodland
- 3.\*Mulberry, Paper - *Broussonettia papyrifera*; #594; near old mansion
- 4.\*Pear - *Pyrus communis*; #72; near shore of inlet
- 5.\*Pine, White - *Pinus strobus*; #1100

## Section 14. Twin Island

### Wildflowers

1. Alexanders, Golden - *Zizia aurea*; #80; open woodland
2. Aster, White Wood - *Aster divaricatus*; #863; open woodland
3. Beggar-ticks - *Bidens frondosa*; #867; sandy shore
4. Bellwort - *Uvularia perfoliata*; #1309
5. Bitter-cress, Pennsylvania - *Cardamine pensylvanica*; #64; open, rocky woodland
6. Bush-clover - *Lespedeza hirta*; #1064; thin woodland
7. False-foxglove, Yellow - *Aureolaria flava* var. *flava*; #861; open woodland
8. Goldenrod, Grass-leaved - *Euthamia graminifolia*; #1059; edge of salt marsh
9. Goldenrod, Seaside - *Solidago sempervirens* var. *mexicana*; #853; sandy shore
10. \*Knotweed - *Polygonum aviculare*; #617; roadside
11. Lettuce sp. - *Lactuca sagittifolia*; #848; meadow
12. Pussytoes sp. - *Antennaria* sp.; #86/1305; thin woodland
13. Sarsaparilla, Wild - *Aralia nudicaulis*; #1310
14. Sea-blite, Lesser - *Suaeda maritima*; #844; sandy shore
15. \*Sorrel, Sheep - *Rumex acetosella*; #237; thin woods
16. Smartweed - *Polygonum pensylvanicum*; #850; sandy shore
17. Sunflower, Wood - *Helianthus strumosus*; #846; open woodland
18. Sunflower, Woodland - *Helianthus divaricatus*; #849; open woodland
19. \*Thistle, Russian - *Salsola kali*; #865; sandy shore
20. Tick-trefoil - *Desmodium paniculatum*; #862; open woodland
21. Violet, Northern Downy - *Viola fimbriatula*; #70; banks of shore of bay
22. Violet, Common Woolly - *Viola cucullata*; #1306

### Grasses

1. Cord-grass, Prairie - *Spartina pectinata*; #843; sandy shore
2. Hairgrass, Southern - *Agrostis hyemalis*; #1060; woodland (thin)

### Sedges and Rushes

1. Galingale - *Cyperus strigosus*; #864; sandy shore

### Vines

1. Groundnut - *Apios americana*; #1308
2. Pea, Beach - *Lathyrus japonicus* var. *maritimus*; #236; seashore in sand

### Shrubs

1. Chokeberry, Black - *Aronia melanocarpa*; #851; rocky ledges
2. Viburnum, Maple-leaf - *Viburnum acerifolium*; #852; open woodland

### Trees

1. Hickory, Mockernut - *Carya tomentosa*; #1061/1307; woodland (thin)
2. \*Mulberry, Paper - *Broussonetia papyrifera*; #1311
3. Oak, Black - *Quercus velutina*; #1062; thin woodland
4. Oak, Chestnut - *Quercus montana*; #1058/1067; woodland (thin)/woodland
5. Oak, Scarlet - *Quercus coccinea*; #1066; woodland
6. Oak, White - *Quercus alba*; #1057/1063/1065; wooded area/thin woodland/woodland

**Section 15.** The last section north of the Bartow-Pell Mansion: from the small parking lot on Shore Road that borders the lagoon north to the Westchester County border (about 65 meters)

### Wildflowers

1. \*Chickweed or \*Starwort sp. - *Alsine humifusa*(?); (Rottb.) Britton; #1119
2. \*Cypress-spurge - *Euphorbia cyparissias*; #96; roadside
3. \*Gill-over-the-Ground - *Glechoma hederacea*; #93; thickets
4. Lettuce sp. - *Lactuca* sp.; #1516
5. Thistle sp. - *Cirsium*; #1514

### Trees

1. Basswood sp. - *Tilia* sp.; #1515

**Section 16.** North end of the park from the west side of Shore Road (the fence of the Golf Course) to the Westchester County border

### Wildflowers

1. Geranium, Wild - *Geranium maculatum*; #92; woodland (a white form, very rare)
2. Saxifrage, Golden - *Chrysplenium americanum*; #1298
3. Violet, Early Blue (hybrid) - *Viola palmata* x; #94; woodland

### Sedges and Rushes

1. Wood-rush, Common - *Luzula campestris* var. *bulbosa*; #1118

### Shrubs

1. Blueberry sp. - *Vaccinium* sp.; 1261-62
2. \*Viburnum - *Viburnum dilatatum*; #1260

**Section 17.** From Shore Road to the railroad track including the northern half of the Pelham Golf Course

Wildflowers

1. Anemome, Rue - *Thalictrum thalictroides*; #1121
2. Cucumber-root, Indian - *Medeola virginiana*; #1130/1297/1330
3. \*Current, Garden Red - *Ribes rubrum*; #95; wooded hillside
4. Hellebore, False - *Veratrum viride*; #1122
5. \*Jetbead - *Rhodotypos scandens*; #91; woodland

Grasses

1. Grass, Panic - *Panicum acuminatum*; #1414

Pteridophytes

1. Fern, Christmas - *Polystichium acrostichoides*; #428; hillside

Shrubs

1. Blueberry sp. - *Vaccinium* sp.; #1246-50
2. Pepperbush, Sweet - *Clethra alnifolia*; #1473
3. \*Viburnum - *Viburnum dilatatum*; #1415

Trees

1. Beech, American - *Fagus grandifolia*; #1251

**Section 18.** West side of Shore Road from the entrance to the Golf Course at the Clubhouse proceeding north approximately 150 meters on the Pelham Course; and west to the railroad tracks inclusive

Wildflowers

1. Aster, Calico - *Aster lateriflorus*; #918; edge of woodland
2. Aster sp. - *Aster* sp.; #937; along railroad
3. Aster, Flat-topped White - *Aster umbellatus* var. *umbellatus*; #939; edge of woodland
4. Aster, White Wood - *Aster divaricatus*; #917; woodland
5. Baneberry, White - *Actaea pachypoda*; #1474
6. Beech-drops - *Epifagus virginiana*; #926; under beech tree in woodland
7. \*Bet, Bouncing - *Saponaria officinalis*; #799; along railroad
8. Betony, Wood - *Pedicularis canadensis*; #106/407; rich, moist woodland/interesting because the stem is so leafy
9. Bitter-cress, Pennsylvania - *Cardamine pensylvanicum*; #1267
10. Buttercup, Hooked - *Ranunculus recurvatus*; #185; woodland
11. Buttercup, Swamp - *Ranunculus hispidus* var. *nitidus*; #112; along stream
12. Cinquefoil, Old Field - *Potentilla simplex*; #186; along railroad track
13. Crowfoot, Kidney-leaf - *Ranunculus abortivus* var. undetermined; #110; woodland
14. Cynthia, Two-flowered - *Krigia biflora*; #1289
15. Evening-primrose - *Oenothera biennis*; #800; along railroad
16. Gerardia - *Agalinis tenuifolia* var. *tenuifolia*; #932; thin woodland
17. Ginseng, Dwarf - *Panax trifolius*; #111; rich woods
18. Goldenrod, Canada - *Solidago canadensis* var. undetermined; #1471
19. Hawkweed - *Hieracium scabrum*; #924; woodland
20. Hawkweed - *Hieracium paniculatum*; #925; woodland
21. Hellebore, False - *Veratrum viride*; #1286
22. Knotweed, Pink - *Polygonum pensylvanicum*; #1472
23. Lettuce, Blue - *Lactuca biennis*; #912-13; woodland
24. Lettuce, Wild - *Lactuca canadensis* var. *canadensis*; #797; along railroad
25. Mayflower, Canada - *Maianthemum canadense*; #1464
26. \*Medic, Black - *Medicago lupulina*; #204; meadow
27. Mercury, Three-seeded - *Acalypha gracilens*; #935; along rr
28. Milkwort, Whorled - *Polygala verticillata* var. *ambigua*; #795; along railroad
29. Nettle, Wood - *Laportea canadensis*; #915; along stream
30. Pilewort - *Erechtites hieracifolia* var. undetermined; #801; along railroad
31. Sunflower, Giant - *Helianthus giganteus*; #919; open woodland
32. Susan, Black-eyed - *Rudbeckia laciniata*; #934; open woodland
33. Tearthumb, Arrow-leaf - *Polygonum arifolium*; #914; along stream
34. Tick-trefoil, Showy - *Desmodium canadense*; #802; along rr
35. Toothwort, Large - *Cardamine x maxima*; #100a/141; rich, moist woods/collected with #100
36. Toothwort, Two-leaved - *Cardamine diphylla*; #100; rich, moist woods

37. Turtlehead, White - *Chelone glabra*; #916; moist, thin woodland
38. Violet, American Dog - *Viola conspersa*; #103; rich, moist woodland
39. Violet, Common Blue - *Viola cucullata*; #102; rich woodland
40. \*Water-cress - *Rorippa officinale-aquaticum*; #408; in stream
41. Water-horehound - *Lycopus uniflorus*; #929; along stream

### Grasses

1. Grass, Panic - *Panicum acuminatum*; #414; along railroad
2. Grass, Panic - *Panicum latifolium*; #415; along railroad
3. Grass, Panic - *Panicum oligosanthos* var. *scribnerianum*; #413; ash bank along railroad track
4. Grass, Panic - *Panicum verrucosum*; #936; along railraod
5. Woodreed, Stout - *Cinna arundinacea*; #923; woodland

### Sedges and Rushes

1. Sedge - *Carex bebbii*; #416; along railroad
2. Sedge - *Carex filiculmis* ssp. *lupulinus*; #429; along railroad
3. Sedge - *Carex gynandra*; #1463
4. Sedge - *Carex seorsa*; #205; edge of woodland

### Pteridophytes

1. Fern, New York - *Thelypteris noveboracensis*; #928; woodland
2. Fern, Sensitive - *Onoclea sensibilis*; #938; edge of woodland in a ditch

### Vines

1. Boneset, Climbing - *Mikania scandens*; #931; along stream
2. Grape, Fox - *Vitis labrusca*; #425; along railroad

### Shrubs

1. Blueberry sp. - *Vaccinium* sp. #98/1252/1254-59/1266/1269-73/1275-85/1287/1291/1293; moist woodland
2. Elderberry - *Sambucus canadensis*; #424; edge of woodlands
3. Huckleberry sp. - *Gaylussacia* sp.; #1288
4. Spicebush - *Lindera benzoin*; #927; along stream

### Trees

1. Ash, White - *Fraxinus americana*; #201; woodland
2. Gum, Black - *Nyassa sylvatica*; #933; woodland tree
3. Maple, Red - *Acer rubrum* var. *rubrum*; #1253

4. Maple, Silver - *Acer saccharinum*; #202; woodland
5. \*Pear - *Pyrus communis*; #798; meadow
6. Plum, American - *Prunus americana*; #1296
7. Tulip-poplar - *Liriodendron tulipifera*; #1416
8. Willow sp. - *Salix* sp.; #1274/1292/1294

**Section 19.** Just south of the Golf Course parking lot, on the west side of Shore Road, the woodland that is just west of the railroad tracks and north of the traffic circle

### Wildflowers

1. Aster, Blue Wood - *Aster cordifolius*; #1009; edge of woodland
2. Aster, Calico - *Aster lateriflorus* var. *lateriflorus*; #1001; edge of salt marsh and woodland (determined by EJA)
3. Aster, Heath - *Aster ericoides*; #1004; near salt marsh; (det. by EJA)
4. Aster, Salt Marsh - *Aster subulatus*; #1010; salt marsh
5. Aster, Smooth Blue - *Aster laevis* var. undetermined; #1005; waste ground
6. Aster, White-topped - *Aster paternus*; #552; woodland
7. Beggar-ticks - *Bidens frondosa*; #1023; along railroad
- 8.\*Bet, Bouncing - *Saponaria officinalis*; #555; along bridle path
9. Bush-clover - *Lespedeza virginica*; #1497
10. Clotbur - *Xanthium strumarium* var. *canadense*; #1026; along railroad
11. Fleabane, Daisy - *Erigeron annuus*; #1379
12. Goldenrod, Grass-leaved - *Euthamia graminifolia*; #1000; edge of salt marsh and woodland
13. Goldenrod, Showy - *Solidago speciosa*; #985/1014; meadow/waste ground
14. Grass, Blue-eyed - *Sisyrinchium angustifolium*; #420; open field
- 15.\*Hops, Japanese - *Humulus japonicus*; #1025; along railroad
16. Horseweed - *Conyza canadensis* var. *canadensis*; #1015; along railroad
17. Indigo, Wild - *Baptisia tinctoria*; #554; woodland
18. Knotweed - *Polygonum pennsylvanicum*; #418; edge of swamp
- 19.\*Lamb's-quarters - *Chenopodium album* var. *album*; #1024; along railroad
- 20.\*Live-forever - *Sedum telephium*; #657; thin woods
- 21.\*Mint, Field - *Mentha arvensis*; #1028; along railroad
- 22.\*Mullein, Moth - *Verbascum blattaria*; #436/553; along bribal path/(white form) along Shore Rd
23. Needles, Spanish - *Bidens bipinnata*; #1017; along railroad
- 24.\*Pennycress, Field - *Thlaspi arvense*; #1376
25. Pennyroyal, Mock - *Hedeoma pulegioides*; #1507
- 26.\*Pink, Deptford - *Dianthus armeria*; #564; along Shore Road
- 27.\*Plantain, Common - *Plantago major*; #550; along Shore Road
28. Plantain, Hoary - *Plantago virginica*; #548; along Shore Road
29. Plantain, Pale - *Plantago rugelii*; #549; along Shore Road
- 30.\*Quickweed - *Galinsoga quadriradiata*; #551; along Shore Rd
31. Ragweed, Giant - *Ambrosia trifida*; #1506
32. Root, Culver's - *Veronicastrum virginicum*; #640; thin woods
33. Sarsaparila, Wild - *Aralia nudicaulis*; #164; rich woods
34. Smartweed, Low - *Polygonum cespitosum* var. *longisetum*; #1003; waste ground
35. Tick-trefoil - *Desmodium* sp.; #1505
36. Tick-trefoil, Giant - *Desmodium canadense*; #1016; along railroad
- 37.\*Tea, Mexican - *Chenopodium ambrosioides*; #1002; near salt marsh

38.\*Tumbleweed - *Amaranthus albus*; #1019; along railroad

### Vines

1.\*Bindweed, Field - *Convolvulus arvensis*; #435; along bridle path

### Grasses

- 1.\*Bluegrass, Kentucky - *Poa pratensis*; #1377
- 2.\*Crab-grass, Tall - *Digitaria sanguinalis*; #1027; along railroad
3. Dropseed - *Sporobolus asper*; #1008; edge of salt marsh (dry)
- 4.\*Fescue, Red - *Festuca rubra* ssp. *rubra*; #1380
- 5.\*Goose-grass - *Eleusine indica*; #1022
6. Grass, Panic - *Panicum acuminatum*; #1374
7. Grass, Panic - *Panicum rigidulum* var. *pubescens*; #1367
8. Grass, Panic - *Panicum scabriusculum*; #1367
9. Grass, Smooth Panic - *Panicum dichotomiflorum* var. undetermined; #1007; rocky ledges
10. Grass, Switch - *Panicum virgatum* var. undetermined; #1006; rocky ledges
11. Hairgrass, Southern - *Agrostis hyemalis*; #1369
- 12.\*Lovegrass - *Eragrostis pectinacea*; #1021; along railroad
13. Nimble-will - *Muhlenbergia schreberi*; #1029; in lawn
- 14.\*Stinkgrass - *Eragrostis cilianensis*; #1018; along railroad
15. Vanilla-grass - *Anthoxanthum nitens*; #120; marshy ground
16. Witch-grass - *Panicum capillare*; #1012/1020; rock ledges/ along railroad

### Sedges and Rushes

1. Cyperus - *Cyperus strigosus*; #1013; waste ground
2. Sedge - *Carex aquatilis*; #130; marsh
3. Sedge - *Carex bushii*; #421; open field
4. Sedge - *Carex cristatella*; #1381
5. Sedge - *Carex gynandra*; #1378
6. Sedge - *Carex pellita*; #1372
7. Sedge - *Carex swanii*; #1373
8. Sedge - *Carex vestita*; #1371
9. Sedge - *Carex vulpinoidea*; #1375
10. Tussock-sedge - *Carex stricta*; #1370

### Shrubs

1. Azalea, Pinxster - *Rhododendron periclymenoides*; #162/178; rich woods/woodlands
2. Blueberry sp. - *Vaccinium* sp.; #142-144/146-47/165; woodland
3. Chokeberry, Purple - *Aronia x prunifolia*; #187; edge of swamp
4. Huckleberry sp. - *Gaylussacia* sp.; #145; woodland

5. Shadbush, Smooth - *Amelanchier laevis*; #163; rich woods
6. Viburnum, Maple-leaf - *Viburnum acerifolium*; #279; rocky ledge

### Trees

1. Birch, Yellow - *Betula alleghaniensis*; #121/1084; along stream
2. \*Buckthorn, Smooth - *Rhamnus frangula*; #1465
3. Hackberry - *Celtis occidentalis*; #1011; rock ledges
4. Oak, Red - *Quercus rubra*; #1083; woodland
5. \*Poplar, White - *Populus alba*; #1094
6. Willow sp. - *Salix* sp.; #99/422/1219; colony of large trees/small colony of large trees

**Section 20.** The area just over the Pelham Parkway Bridge on the west side of the road including the horse stable and former railroad station and continuing north until the Bartow Pell Traffic Circle

### Wildflowers

1. \*Bindweed, Black - *Polygonum convolvulus*; #641; along railroad
2. Blackberry, Northern - *Rubus allegheniensis*; #392; edge of moist woods
3. Campion, Starry - *Silene stellata*; #1504
4. \*Carpetweed - *Mollugo verticillata*; #650; along railroad
5. Catch-fly, Sleepy - *Silene antirrhina*; #643; along railroad
6. Cinquefoil, Rough - *Potentilla norvegica* ssp. *monspeliensis*; #645; along railroad
7. \*Dock, Patience - *Rumex patientia*; #387/656; edge of salt marsh
8. Hops, Common - *Humulus lupulus*; 20:1498
9. Jumpseed - *Polygonum virginianum*; #1503
10. \*Mustard, Tumble - *Sisymbrium altissimum*; #663; along railroad
11. Nightshade, Black - *Solanum ptycanthum*; #1502
12. Primrose, Evening - *Oenothera biennis*; #644; along railroad
13. Sandwort, Grove - *Moehringia lateriflora*; #380; moist woodland
14. Snowberry sp. - *Symphoricarpos* sp.; 20:1499
15. Spurge, Spotted - *Chamaesyce acuminatum*; #395/652/661; along road/along railroad
16. Thistle sp. - *Cirsium* sp.; #1501
17. Vervain, White - *Verbena urticifolia*; #653; meadow
18. Violet - *V. x porteriana* (= *V. cucullata* x *V. sagittata*); #108; woodland
19. \*Willow-weed - *Polygonum lapathifolium*; #381; along railroad in ashes

Grasses

1. \*Foxtail, Green - *Setaria viridis*; #655; along railroad
2. Grass, Panic - *Panicum acuminatum*; #395; woodlands
3. Grass, Poverty Panic - *Panicum depauperatum*; #382; along railroad in ashes
4. Lacegrass - *Eragrostis capillaris*; #664; along railroad
5. \*Lovegrass - *Eragrostis cilianensis*; #647; along railroad

Sedges and Rushes

1. Black-grass - *Juncus gerardii*; #654; salt marsh
2. Sand-rush - *Bulbostylis capillaris*; #646; along railroad

Shrubs

1. Hazelnut - *Corylus americana*; #3; rocky woods
2. \*Honeysuckle, Japanese - *Lonicera japonica*; #358; hillside

Trees

1. Hop-tree - *Ptelea trifoliata*; 20:1500
2. Sassafrass - *Sassafrass albidum*; #184; roadside

**Section 21.** Small woodland on west side of railroad track just across from old train station

Wildflowers

1. Betony, Wood - *Pedicularis canadensis*; #378; thin woods
2. \*Campion, White - *Silene latifolia*; #376; roadside
3. Frostweed - *Helianthus canadense*; #391; thin woods
4. Pinweed - *Lechea pulchella* var. *pulchella*; #1087; along path in woodland
5. Pinweed - *Lechea mucronata*; #1086; along path in woodland
6. Pussytoes sp. - *Antennaria* sp.; #1156
7. Rattlesnake-weed - *Hieracium venosum*; #393; thin, rich woods
8. Sanicle - *Sanicula odorata*; #394; thin woods
9. Solomon's-seal, False - *Maianthemum racemosum*; #642; woodland
10. Sorrel, Lady's - *Oxalis stricta*; #369; roadside
11. Violet, Early Blue - *Viola palmata*; #101; rich woodland
12. Walnut, Black - *Juglans nigra*; #1088; along path in woodland
13. Water-pepper, Mild - *Polygonum hydropiperoides* var. *hydropiperoides*; #677; swamp
14. \*Willow-weed - *Polygonum lapathifolium*; #678; (white flowered) in swamp growing with Mild Water-pepper)

Grasses

1. Grass, Bluejoint - *Calamagrostis canadensis* var. undetermined; #1089; woodland near salt marsh
2. \*Redtop - *Agrostis gigantea*; #368; roadside
3. \*Millet, Foxtail - *Setaria italica*; #910; roadside
4. \*Foxtail, Yellow - *Setaria pumila*; #911; roadside
5. Wild-rye - *Elymus villosus* var. *arkansansas*; #670; edge of woodland

Sedges and Rushes

1. Sedge - *Carex alata*; #383; section between 21 and 22 in thickets
2. Three-square - *Scirpus americanus*; #384; marsh

Shrubs

1. Arrowwood, Southern - *Viburnum dentatum* var. *venosum*; #385; marsh
2. Blueberry sp. - *Vaccinium* sp.; #113/1136-1145/1147/1149-50; along woodland margin
3. Chokeberry, Purple - *Aronia x prunifolia*; #104/139; rock ledge on Eastchester Creek/edge of salt marsh on rock ledge
4. Huckleberry sp. - *Gaylussacia* sp.; #138/1146/1148; edge of rocky woods
5. \*Matrimony-vine - *Lycium barbaratum*; #367/1151; edge of woods bordering on a salt marsh

## Trees

1. \*Maple, Norway - *Acer platanoides*; #47; looks as though planted and now neglected

**Section 22.** Along Goose Creek Marsh on south side from Traffic Circle to the entrance of the Hutchinson River Parkway

## Wildflowers

1. Agrimony - *Agrimonia gryposepala*; #528; woodland
2. \*Asparagus - *Asparagus officinalis*; #516; edge of salt marsh
3. Aster, Big-leaf - *Aster macrophyllus* var. *macrophyllus*; #1466
4. Aster, New England - *Aster novae-angliae*; #977; meadow
5. Aster, Smooth Blue - *Aster laevis* var. undetermined; #902; dry meadow
6. Aster sp. - *Aster* sp.; #899; meadow
7. Avens, White - *Geum canadense*; #521; woodland
8. Bellwort - *Uvularia sessilifolia*; #105; woodland
9. Blackberry, Cut-leaf - *Rubus laciniatus*; #1383
10. Boneset, Upland - *Eupatorium sessilifolium*; #909; meadow
11. Bush-clover - *Lespedeza capitata*; #901; dry meadow
12. Butterfly-weed - *Asclepias tuberosa* var. *interior*; #515; meadow
13. Cabbage, Skunk - *Symplocarpus foetidus*; #137; swamp
14. Cat-tail, Narrow-leaf - *Typha angustifolia*; #460/527; salt marsh
15. Cinquefoil, Dwarf - *Potentilla canadensis*; #1162
16. \*Clover, White - *Trifolium repens*; #140; in lawn
17. \*Crowfoot, Cursed - *Ranunculus scleratus*; #1385
18. Dogbane, Spreading - *Apocynum androsaemifolium*; #530; woodland
19. \*Fireweed, European - *Epilobium hirsutum*; #1496
20. Fleabane, Salt Marsh - *Pluchea camphorata*; #980; salt marsh
21. Fleabane sp. - *Erigeron ramosum*; #365; sunny hillside
22. Gerardia - *Agalinis purpurea*; #897; meadow
23. Germander, Seaside - *Teucrium canadense* var. *canadense*; #1468
24. Goldenrod, Tall Hairy - *Solidago rugosa* ssp. *rugosa* var. *rugosa*; #907; thin wood
25. Goldenrod, Sweet - *Solidago odora*; #621; woodland
26. Ground-Cherry, Clammy - *Physalis heterophylla*; #364; sunny hillside (perennial)
27. Iris, Slender Blue Flag - *Iris prismatica*; #361; along salt marsh
28. Joe Pye Weed, Sweet - *Eupatorium purpureum*; #1470
29. \*King-devil - *Hieracium piloselloides*; #398; edge of woods
30. Lily, Turk's Cap - *Lilium superbum*; #684; edge of salt marsh
31. Mercury, Three-seeded - *Acalypha virginica* var. *rhomboidea*; #675; along path
32. \*Mouse-ear, Common - *Cerastium fontanum*; #182; along path

33. Nightshade, Enchanter's - *Circaea lutetiana* ssp. *canadensis*; #514; woodland
34. Orchid, Ragged-fringed - *Platanthera lacera*; #522; open meadow
- 35.\*Pink, Deptford - *Dianthus armeria*; #362; dry meadow
36. Pink, Wild - *Silene caroliniana* var. *pennsylvanica*; #1191
37. St. Johnswort - *Hypericum punctatum*; #624; edge of woodland
38. Sarsaparilla, Wild - *Aralia nudicaulis*; #1184
39. Snakeroot, White - *Eupatorium rugosum*; #908; woodland
- 40.\*Sow-thistle - *Sonchus arvensis* ssp. *arvensis*; #502; salt marsh
41. Starwort, Needle-leaf - *Stellaria longifolia*; #1397
42. Sundrops - *Oenothera perennis*; #1393
43. Sunflower, Wood - *Helianthus strumosus*; #685; woodland
44. Susan, Black-eyed - *Rudbeckia hirta* var. undetermined; #444; open field
- 45.\*Thistle, Giant - *Cirsium horridulum*; #461; salt marsh
46. Thistle, Small Bull - *Cirsium pumilium*; #903; dry meadow
47. Tobacco, Pale-spiked Indian - *Lobelia spicata*; #519; open meadow
48. Toothwort, Cut-leaf - *Cardamine concatenata*; #54; thickets
49. Violet, Common - *Viola sororia*; #37/1158; along bridle path

#### Grasses

- 1.\*Bluegrass, Canada - *Poa compressa*; #898; meadow
- 2.\*Bluegrass, Kentucky - *Poa pratensis*; #446; open field
3. Bluestem, Big - *Andropogon gerardii*; #981; edge of woodland and salt marsh
4. Bluestem, Little - *Schizachyrium scoparium* ssp. *scoparium*; #900; meadow
- 5.\*Fescue, Red - *Festuca rubra* ssp. *rubra*; #366; edge of woods bordering on a salt marsh
6. Gama-grass - *Tripsacum dactyloides*; #525; edge of salt marsh
7. Grass, Panic - *Panicum oligosanthos* var. *scribnerianum*; #363; dry field, near edge of a salt marsh
8. Spike-grass - *Distichlis spicata*; #982; salt marsh
9. Switch-grass - *Panicum virgatum* var. *spissum*; #442/445; area with top soil removed/ open field (determined by J.R. Swallen)
- 10.\*Vernalgrass, Sweet - *Anthoxanthum odoratum*; #1204
11. Wild-rye, Canada - *Elymus canadensis*; #673; edge of salt marsh

#### Sedges and Rushes

1. Bulrush, Salt Marsh - *Scirpus robustus*; #983; salt marsh
2. Sedge - *Carex alata*; #383; section between 21 and 22 in thickets
3. Sedge - *Carex amphibola* var. *turgida*; #1392/1395/1398
4. Sedge - *Carex aquatilis*; #1390
5. Sedge - *Carex bushii*; #1391
6. Sedge - *Carex buxbaumii*; #1332
7. Sedge - *Carex conoidea*; #1386
8. Sedge - *Carex lanuginosa*; #1333
9. Sedge - *Carex pellita*; #1384/1387

10. Sedge - *Carex polymorpha*; #1161
11. Sedge - *Carex squarrosa*; #1394
12. Sedge - *Carex stricta*; #1388
13. Sedge - *Carex swanii*; #1389

#### Pteridophytes

1. Bracken - *Pteridium aquilinum* var. *latiusculum*; #904; woodland
2. Fern, Cinnamon - *Osmunda cinnamomea*; #115/176; marsh/low woodlands
3. Fern, Interrupted - *Osmunda claytoniana*; #114/196; marsh/swamps

#### Vines

1. Dodder, Field - *Cuscuta pentagona*; #905
2. Yam, Wild - *Dioscorea villosa*; #523/1453; woodland

#### Shrubs

1. Azalea, Clammy - *Rhododendron viscosum*; #1467
2. Black-haw - *Viburnum prunifolium*; #188; low woodland
3. Blueberry sp. - *Vaccinium* sp.; #38/61/1157/1163-1170/  
1172/1176-1179/1185-1190/1192-1203/1205-1217; woodlands
4. Dogwood, Gray - *Cornus foemina* ssp. *racemosa*; #443; open wood
5. Groundsel-tree - *Baccharis halimifolia*; #906; salt marsh
6. Huckleberry sp. - *Gaylussacia* sp.; #1171/1173
7. Pepperbush, Sweet - *Clethra alnifolia*; #83; edge of woodland
8. Rose, Virginia - *Rosa virginiana*; #1399
9. Sand-cherry - *Prunus pumila* var. undetermined; #351/620/ 1160; open  
field, edge of salt marsh/meadow, near salt marsh
10. Steeple-bush - *Spiraea tomentosa* var. *tomentosa*; #1470

#### Trees

- 1.\*Locust, Black - *Robinia pseudoacacia*; #1085; along railroad
2. Sassafras - *Sassafras albidum*; #1159
3. Willow sp. - *Salix* sp.; #15-17/1175/1183; swamps

**Section 23.** Along the Hutchinson River Parkway, north from the small stone bridge overlooking the Goose Creek Salt Marsh to Split Rock (including parts of the salt marsh)

### Wildflowers

1. Blackberry, Northern - *Rubus alleghaniensis*; #625; along bridle path
2. \*Bladder-campion - *Silene vulgaris*; #441; along bridle path
3. Bloodroot - *Sanguinaria canadensis*; #23; woodlands
4. Breeches, Dutchman's - *Dicentra cucullaria*; #19; wooded hillside
5. \*Clover, Yellow - *Trifolium aureum*; #439; edge of woodland
6. \*Dock, Bitter - *Rumex obtusifolius*; #506; along bridle path
7. \*Dock, Curly - *Rumex crispus*; #531; along bridle path
8. Goldenrod, Early - *Solidago juncea*; #517/623; along bridle path/woodland
9. Goldenrod, Flat-top - *Euthamia graminifolia*; #676; meadow
10. Ground-cherry, Clammy - *Physalis heterophylla*; #714; in lawn
11. Lettuce, Wild - *Lactuca canadensis* var. *canadensis*; #1451
12. \*Plantain, Common - *Plantago major*; #779; hillside
13. \*Radish, Wild - *Raphanus raphanistrum*; #1403
14. \*Stitchwort, Common - *Stellaria graminea*; #1331
15. Snakeroot, Black - *Sanicula marilandica*; #1400
16. Sweet-fern - *Comptonia peregrina*; #547; dry hillside near Split Rock
17. Water-plantain - *Alisma subcordatum*; #679; woodland swamp

### Grasses

1. \*Bluegrass, Kentucky - *Poa pratensis*; #1405
2. \*Brome, Smooth - *Bromus inermis*; #896; roadside
3. \*Fescue, Meadow - *Lolium pratense*; #1404
4. Grass, Panic - *Panicum rigidulum* var. *pubescens*; #1406
5. Grass, Bluejoint - *Calamagrostis canadensis* var. undetermined; #692; woodland swamp
6. Wild-rye, Virginia - *Elymus virginicus* var. undetermined; #681; edge of woodland

### Pteridophytes

1. Fern, Northern Lady - *Athyrium felix-femina* var. *angustum*; #780; hillside

### Shrubs

1. Arrowwood, Southern - *Viburnum dentatum* var. undetermined; #1396
2. Azalea, Clammy - *Rhododendron viscosum*; #1180
3. Blueberry sp. - *Vaccinium* sp.; #1181
4. Groundsel-tree - *Baccharis halimifolia*; #976; along bridle path

5. Huckleberry sp. - *Gaylussacia* sp.; #710; thin woodland
6. Rose, Virginia - *Rosa virginiana*; #978; along bridle path (Det. by E.J. Alexander)
7. Spicebush - *Lindera benzoin*; #14; swampy woods

### Trees

- 1.\*Cherry, Bird - *Prunus avium*; #27; woodlands
2. Maple, Red - *Acer rubrum* var. *rubrum*; #191; low woodlands
- 3.\*Peach - *Prunus persica*; #25; roadside

**Section 24.** Along railroad tracks including the Split Rock Golf Course west to the Hutchinson River Parkway, and north mid-way up the golf course

Wildflowers

1. Anise-root - *Osmorhiza longistylis*; #635; woodland
2. Aster, Heath - *Aster ericoides*; #975; along bridle path (determined by E.J. Alexander)
3. Aster, Late Purple - *Aster patens*; #979; meadow
4. Aster, Smooth Blue - *Aster laevis* var. undetermined; #972; meadow
5. Bartonian - *Bartonia virginica*; #1489
6. Bergamot, Wild - *Monarda fistulosa*; #803; edge of woodland
7. Boneset - *Eupatorium pilosum*; #1492
8. Bur-reed - *Sparganium americanum*; #1530
9. Bush-clover - *Lespedeza violacea*; #1495/1528
10. Cicely, Sweet - *Osmorhiza claytonii*; #189; edge of woods
11. Culver's-root - *Veronicastrum virginicum*; #629; meadow
12. Duckweed, Lesser - *Lemna minor*; #1123
13. Gall-of-the-Earth - *Prenanthes trifoliata*; #951; woodland
14. Giant-hyssop, Yellow - *Agastache nepetoides*; #973; edge of woodland
15. Goldenrod, Blue-stem - *Solidago caesia*; #942; woodland
16. Goldenrod, Canada - *Solidago canadensis* var. undetermined; #1493
17. Goldenrod, Showy - *Solidago speciosa*; #970; meadow
18. Goldenrod, Spreading - *Solidago patula*; #955; edge of woodland
19. \*Knapweed - *Centaurea nigrescens*; #974; edge of woodland
20. Lettuce, Wild - *Lactuca canadensis* var. undetermined; #511; along bridle path
21. Marigold, Marsh - *Caltha palustris*; #31; swamp
22. Milk-purslane - *Chamaesyce maculata*; #1490
23. \*Moneywort - *Lysimachia nummularia*; #1129
24. Mountain-mint, Narrow-leaf - *Pycnanthemum tenuifolium*; #630; meadow
25. Pussy-toes sp. - *Antennaria* sp.; #172; edge of woodland near railroad track
26. Smartweed, Water - *Polygonum punctatum* var. *punctatum*; #1531
27. Snakeroot, Black - *Cimicifuga racemosa*; #1452
28. Spikenard - *Aralia racemosa*; #796; along railroad track
29. Spring-beauty - *Claytonia virginica*; #34; open woods
30. Tobacco, Indian - *Lobelia inflata*; #789; along bridle path
31. Trout-lily - *Erythronium americanum*; #35; woodland
32. Violet, Common Blue - *Viola sororia*; #1124/1127
33. Water-starwort - *Callitriche palustris*; #1529

Grasses

1. \*Crab-grass, Smooth - *Digitaria ischaemum*; #949; along bridle path
2. Grass, Barnyard - *Echinochloa muricata* var. *muricata*; #953; along bridle path

3. Grass, Deer-tongue - *Panicum clandestinum*; #1461
4. Grass, Panic - *Panicum latifolium*; #943; woodland
5. Hairgrass, Southern - *Agrostis hyemalis*; #941; woodland
6. Poverty-grass - *Aristida dichotoma*; #1527
7. Purpletop - *Tridens flavus*; #945; meadow
8. Satin-grass - *Muhlenbergia mexicana*; #969/1526; edge of woodland
9. Switchgrass - *Panicum virgatum* var. *spissum*; #950; edge of woodland
10. Whitegrass - *Leersia virginica*; #968; edge of woodland

#### Sedges and Rushes

1. Sedge - *Carex pensylvanica*; #117; thin woods

#### Pteridophytes

1. Fern, Northern Lady - *Athyrium felix-femina* var. *angustum*; #940; woodland
2. Grape-fern, Cut-leaf - *Botrychium dissectum*; #1128
3. Horsetail, Common - *Equisetum arvense*; #171; along railroad track in ashes

#### Vines

1. Grape, Fox - *Vitis labrusca*; #405; along bridle path
2. Yam, Wild - *Dioscorea villosa*; #967; in thickets

#### Shrubs

1. Arrowwood, Southern - *Viburnum dentatum* var. undetermined; #430/954; woodlands
2. \*Honeysuckle, Japanese - *Lonicera japonica*; #971; woodland
3. Rose, Carolina - *Rosa carolina*; #529; marsh (mis-identification of *Rosa virginiana*)
4. Rose sp. - *Rosa valvella* (?); #518; along bridle path
5. Sumac, Staghorn - *Rhus hirta*; #1491

#### Trees

1. Ash, Green - *Fraxinus pennsylvanica*; #174; moist woodland
2. Mulberry, Red - *Morus rubra*; #181; edge of woods
3. Sweetgum - *Liquidambar styracifolia*; #173; woodland
4. Walnut, Black - *Juglans nigra*; #179; woodland
5. Willow sp. - *Salix* sp.; #203/1125-26/1295; along railroad

**Section 25.** The small patch of woods on the peninsula on the west side of the Hutchinson River Bridge

Grasses

1. \*Three-awn, Prairie - *Aristida oligantha*; #1090

**Section 26.** The woods going north along the salt marsh, bordering Eastchester Creek and the Hutchinson River Parkway to about 150 meters north of the bridge

Wildflowers

1. \*Lamb's-quarter's - *Chenopodium album* var. *album*; #665; sandy meadow near salt marsh
2. \*Loosestrife, Purple - *Lythrum salicaria*; #672; edge of salt marsh
3. Partridge-pea - *Chamaecristata fasciculata*; #668; sandy meadow, near salt marsh
4. \*Watercress, Marsh - *Rorippa islandica* ssp. *palustris*; #686; meadow

**Section 27.** Marsh along Eastchester Creek from 150 meters north of bridge (i.e., the north boundary of Section 26) to the northern border of the park at the New England Thruway)

Wildflowers

1. \*Daisy, Ox-eye - *Leucanthemum vulgare*; #666; roadside

Sedges and Rushes

1. Sedge - *Cyperus filiculmis*; #693; sandy meadow near salt marsh

**Section 28.** Area to the west of Split Rock that also borders the Eastchester Creek (Hutchinson River); this area is now the New England Thruway and the overpass (bridge) over the river.

### Wildflowers

1. Arrowhead - *Sagittaria latifolia*; #503; salt marsh
2. \*Asparagus - *Asparagus officinalis*; #753; edge of salt marsh
3. Aster sp. - *Aster* sp.; #882; dry meadow
4. Avens, White - *Geum canadense*; #632; woodland
5. Bearberry - *Arctostaphylos uva-ursi*; #50; rocky area near creek
6. Bishop's Weed, Mock - *Ptilimnium capillaceum*; #888; salt marsh
7. Blackberry, Bog - *Rubus setosus*; #477; moist meadow
8. \*Blackberry, Cut-leaf - *Rubus laciniatus*; #769; meadow
9. Brookweed - *Samolus floribundus* ssp. *parviflorus*; #889; salt marsh (one plant)
10. \*Burdock, Common - *Arctium minus*; #749; sandy meadow
11. \*Butter-and-eggs - *Linaria vulgaris*; #541; dry meadow
12. Campion, Starry - *Silene stellata*; #543; woodland
13. Candles, Swamp - *Lysimachia terrestris*; #513; salt marsh
14. Cat-tail, Common - *Typha latifolia*; #507; salt marsh
15. \*Chicory - *Cichorium intybus*; #561; salt marsh
16. Cinquefoil, Common - *Potentilla simplex*; #51; open field
17. Cinqufoil, Rough - *Potentilla norvegica* ssp. *monspelliensis*; #556; waste land
18. \*Cinquefoil, Silvery - *Potentilla argentea*; #458; sandy meadow
19. \*Clover, Rabbit's Foot Clover - *Trifolium arvense*; #510; dry, sandy field
20. \*Crowfoot, Cursed - *Ranunculus scleratus*; #508; salt marsh
21. Cudweed - *Gnaphalium obtusifolium*; #755; sandy meadow
22. Curls, Blue - *Trichostema dichotomum*; #743; sandy meadow
23. \*Dandelion - *Taraxacum officinale*; #21; open meadow
24. Dewberry, Northern - *Rubus flagellaris*; #562; roadside
25. Dock, Pale - *Rumex altissimus*; #745; roadside
26. Dragonhead, False - *Physostegia virginiana*; #1523
27. Foxglove, False - *Agalinis tenuifolia* var. *tenuifolia*; #879; dry meadow
28. Frostweed - *Helianthemum canadense*; #741; rocky ledges
29. Garlic, Field - *Allium vineale*; #544; meadow
30. \*Goat's-beard, Yellow - *Tragopogon pratensis*; #667; roadside
31. Goldenrod, Canada - *Solidago canadensis* var. undetermined; #1450
32. Goldenrod, Early - *Solidago juncea*; #746-47/894; sandy meadow/meadow
33. Goldenrod, Elm-leaf - *Solidago ulmifolia*; #873; meadow
34. Goldenrod, Rough - *Solidago nemoralis*; #875a; dry meadow
35. Goldenrod, Tall - *Solidago canadensis* var. *scabra*; #872; meadow
36. Hawkweed - *Hieracium scabrum*; #895; thin wood
37. Hemp, Indian - *Apocynum cannabinum* var. undetermined; #447/545; hillside/meadow

38. Hemp, Salt Marsh - *Amaranthus cannabina*; #762/885; salt marsh along ditch/salt marsh
39. Jewelweed, Spotted - *Impatiens capensis*; #433; marsh
40. \*Knotweed, Salt Marsh - *Polygonum ramosissimum* var. *prolificum*; #631/890; salt marsh
41. \*Lace, Queen Anne's - *Daucus carota*; #563; meadow
42. Ladies-tresses, Spring - *Spiranthes vernalis*; #878; meadow
43. Looking-glass, Venus' - *Triodanis perfoliata* var. *perfoliata*; #459; edge of woodland
44. \*Lily, Asiatic Day - *Hemoracallis fulva*; #535; waste land
45. Milkweed, Swamp - *Asclepias incarnata* var. *pulchra*; #512; salt marsh
46. Milkwort, Whorled - *Polygala verticillata* var. *ambigua*; #880; dry meadow
47. \*Mint, Field - *Mentha arvensis*; #699; swamp
48. \*Motherwort - *Leonurus cardiaca*; #634; roadside
49. \*Mullein - *Verbascum thapsus*; #532; dry meadow
50. Nettle, False - *Boehmeria cylindrica*; #708; swamp
51. Nettle, Horse - *Solanum carolinense*; #546; along parkway
52. \*Nettle, Stinging - *Urtica dioica* ssp. *dioica*; #466; hillside
53. Pearly-everlasting - *Anaphalis margaritacea*; #871; dry meadow
54. Peppergrass, Wild - *Lepidium virginicum*; #457; along parkway
55. Pinkweed - *Polygonum pennsylvanicum*; #742/754; sandy meadow/salt marsh
56. Pokeberry - *Phytolacca americana*; #542; edge of wood
57. \*Purse, Shepherd's - *Capsella bursa-pastoris*; #22; roadside
58. Ragweed - *Ambrosia artemisiifolia*; #738; sandy meadow
59. Rattlebox - *Crotolaria sagittalis*; #671; dry meadow
60. \*St. Johnswort - *Hypericum perforatum*; #539; meadow
61. St. Johnswort - *Hypericum punctatum*; #1455
62. St. Johnswort, Northern Dwarf - *Hypericum boreale*; #773; moist meadow
63. \*Self-heal - *Prunella vulgaris*; #540/763; moist meadow/road
64. \*Smartweed, Common - *Polygonum hydropiper*; #765; roadside
65. \*Smartweed, Low - *Persicaria cespitosum* var. *longisetum*; #557/698; salt marsh/swamp
66. Strawberry, Wild - *Fragaria virginiana*; #52; open field
67. \*Spurrey, Salt Marsh Sand - *Spergularia salina*; #448; salt marsh
68. \*Spurrey, Sand - *Spergularia media*; #39; meadow
69. Sunflower, Wood - *Helianthus strumosus*; #766; sandy meadow
70. Sunflower, Woodland - *Helianthus divaricatus*; #767; sandy meadow
71. Sweetflag - *Acorus americanus*; #689; marsh
72. Tearthumb, Arrow-leaf - *Polygonum sagittatum*; #509; salt marsh
73. \*Thistle, Bull - *Cirsium vulgare*; #639; along bridle path
74. Thoroughwort - *Eupatorium perfoliatum*; #770; meadow
75. Tick-trefoil - *Desmodium paniculatum*; #754; meadow
76. Tick-trefoil, Showy - *Desmodium canadense*; #690; open meadow
77. Vervain, Blue - *Verbena hastata*; #505/777; moist meadow (cited by Dr. Moldenke in his monograph)
78. \*Vetch, Hedge - *Vicia sepium*; #487; thin woods

79. \*Vetch, Slender - *Vicia tetrasperma*; #490; moist meadow
80. Violet, Arrow-leaf - *Viola sagittata*; #53; open field
81. Violet, LeConte's - *Viola affinis*; #20; edge of woods
82. Water-horehound - *Lycopus americanus*; #774; moist meadow
83. Weed, Spotted Joe-Pye - *Eupatorium maculatum* var. undet; #706/768/775-76; meadow/moist meadow

### Grasses

1. Beardgrass, Slender - *Paspalum setaceum* var. *setaceum*; #883; dry meadow
2. Bluestem, Little - *Schizachyrium scoparium* ssp. *scoparium*; #877; dry meadow
3. \*Chess, Hairy - *Bromus commutatus*; #456; sandy meadow
4. Cutgrass, Rice - *Leersia oryzoides*; #1524
5. \*Fescue, Red - *Festuca rubra* ssp. *rubra*; #480; moist meadow
6. \*Fescue, Sheep - *Festuca trachyphylla*; #462; edge of salt marsh
7. Fescue, Six-weeks - *Vulpia octoflora*; #484; sandy meadow
8. \*Grass, Barnyard - *Echinochloa crusgalli* ssp. *crusgalli*; #740; sandy meadow
9. Grass, Indian - *Sorghastrum nutans*; #761; sandy meadow
10. Grass, Panic - *Panicum acuminatum*; #455; sandy meadow
11. Grass, Panic - *Panicum oligosanthos* var. *scribnerianum*; #449; open field
12. Grass, Panic - *Panicum sabulorum* var. *thinum*; #688; rocky meadow
13. Grass, Panic - *Panicum viridinale* (?); #702; dry, rocky meadow
14. Grass, Panic Poverty - *Panicum depauperatum*; #483; sandy meadow
15. Grass, Salt - *Spartina patens*; #760; salt marsh
16. Lovegrass - *Eragrostis pectinacea*; #737/748; sandy meadow
17. Lovegrass, Purple - *Eragrostis spectabilis*; #750; sandy meadow
18. Mannagrass, Fowl - *Glyceria striata*; #697; swamp
19. Oatgrass sp. - *Danthonia sericea* (?); #481; sandy meadow
20. Poverty-grass - *Aristida dichotoma*; #881; dry meadow
21. Purpletop - *Tridens flavus*; #876; dry meadow
22. Reedgrass, Salt - *Spartina cynosuroides*; #887; salt marsh
23. \*Redtop - *Agrostis gigantea*; #694/704/874-75; dry, rocky meadow/swamp/dry meadow
24. Satin-grass - *Muhlenbergia mexicana*; #1454
25. Spikegrass - *Distichlis spicata*; #886; salt marsh
26. Switchgrass - *Panicum virgatum* var. *virgatum*; #687; dry meadow (large clump)
27. \*Wheat - *Triticum aestivum*; #565/566; waste ground
28. Wild-rye, Virginia - *Elymus virginicus* var. undetermined; #884; edge of salt marsh
29. Woodreed, Drooping - *Cinna latifolia*; #669; partly shaded marsh

### Sedges and Rushes

1. Bulrush - *Scirpus atrovirens*; #485; moist meadow
2. Bulrush, Salt Marsh - *Scirpus robustus*; #559; salt marsh

3. Rush, Common - *Juncus effusus* var. undetermined; #488/703 moist meadow
4. Rush, Dudley's - *Juncus dudleyi*; #478; moist meadow
5. Rush, Jointed - *Juncus articulatus*; #489; moist meadow
6. Rush, Path - *Juncus tenuis*; #1457
7. Rush, Sharp-fruited - *Juncus acuminatus*; #893; salt marsh
8. Rush, Slender Path - *Juncus tenuis*; #713; moist meadow
9. Sedge - *Carex annectens* var. undetermined; #1454
10. Sedge - *Carex bushii*; #476; meadow
11. Sedge - *Carex lurida*; #451/705; salt marsh/moist meadow
12. Sedge - *Carex normalis*; #486; moist meadow
13. Sedge - *Carex stipata*; #453; salt marsh
14. Sedge - *Carex swanii*; #450; edge of salt marsh
15. Sedge - *Carex tribuloides*; #712; moist meadow
16. Sedge - *Carex trisperma* var. undetermined; #682; woodland
17. Sedge - *Carex vulpinoidea*; #695/711; moist meadow
18. Three-square - *Scirpus americanus*; #438/452; swamp/salt marsh
19. Tussock-sedge - *Carex stricta*; #472; salt marsh
20. Wood-rush, Common - *Luzula campestris* var. undetermined; #32; open woods

### Pteridophytes

1. Fern, Hay-scented - *Dennstaedtia punctiloba*; #560; meadow
2. Fern, Marsh - *Thelypteris palustris* var. *pubescens*; #892; salt marsh
3. Fern, New York - *Thelypteris novaboracensis*; #680; woodland
4. Fern, Royal - *Osmunda regalis* var. *spectabilis*; #696; swamp
5. Horse-tail, Common - *Equisetum arvense*; #29; open fields
6. Spikemoss, Creeping - *Selaginella apoda*; #1097

### Vines

1. \*Bindweed, Black - *Polygonum convolvulus*; #558; salt marsh
2. \*Bindweed, Hedge - *Convolvulus sepium* ssp. *sepium*; #432; swamp
3. \*Buckwheat, Climbing False - *Polygonum scandens* var. *dumetorum*; #870; edge of woodland and thicket
4. Bur-cucumber, One-seeded - *Sicyos angulatus*; #756; thin woodland in rubbish heap
5. Dodder - *Cuscuta gronovii*; #891; salt marsh (on Goldenrod)
6. Greenbrier - *Smilax rotundifolia*; #1096
7. Groundnut - *Apios americana*; #1458
8. \*Hops, Japanese - *Humulus japonicus*; #758; thin woodland in rubbish heap
9. Peanut, Hog - *Amphicarpaea comosa*; #712; edge of swampy woodland

Shrubs

1. Arrowwood, Southern - *Viburnum dentatum* var. undetermined; #701; swamp
2. Bayberry - *Myrica pensylvanica*; #778; rocky mound in meadow
3. Dogwood, Silky - *Cornus amomum* ssp. *amomum*; #471; edge of salt marsh
4. Elderberry - *Sambucus canadensis*; #764; roadside (discarded)
5. Nannyberry - *Viburnum lentago*; #700; marsh
6. \*Olive, Autumn - *Elaeagnus umbellata*; #537; thickets
7. Shadbush - *Amelanchier laevis*; #33/482; rocky ledge
8. Sumac, Poison - *Toxicodendron vernix*; #454; edge of salt marsh
9. Sumac, Smooth - *Rhus glabra*; #533/536; thickets
10. Tea, New Jersey - *Ceanothus americana*; #538; woodland
11. Winterberry - *Ilex verticillata*; #470; edge of salt marsh

Trees

1. Ash, White - *Fraxinus americana*; #28; woodlands
2. Birch, Gray - *Betula populifolia*; #56/744; rocky ledge/rocky hill
3. Cherry, Black - *Prunus serotina*; #709; woodland
4. \*Cherry, Sweet - *Prunus avium*; #26; woodland
5. Hickory, Bitternut - *Carya cordiformis*; #707; woodland
6. Hornbeam - *Carpinus caroliniana* ssp. *virginiana*; #58; low woodlands
7. \*Peach - *Prunus persicaria*; #30/759; roadsides/old dirt road
8. Poplar sp. - *Poplar* sp.; #12/13; thickets
9. Sassafras - *Sassafras albidum*; #55; woodlands
10. Sycamore-maple - *Acer pseudo-platanus*; #757; thin woodland
11. Willow sp. - *Salix* sp.; #11/24; open field/swamps

**Section 29.** The Split Rock Golf Course west of the railroad north to the top of the park (the northern complement of Section 24)

Wildflowers

1. Aster, Purple-stemmed - *Aster puniceus*; #961; meadow
2. Bugle-weed - *Lycopus uniflorus*; #785; along bridle path
3. Cancer-root, One-flowered - *Orobanche uniflora*; #1462
4. Flax, Yellow - *Linum virginianum*; #958/966/1488; meadow
5. Goldenrod, Rough or Gray - *Solidago nemoralis*; #965; meadow
6. Iris, Slender Blue Flag - *Iris prismatica*; #423/426/790; open dry field/meadow
7. Ladies-tresses, Spring - *Spiranthes vernalis*; #963; moist meadow
8. Milkwort, Rose - *Polygala sanguinea*; #623; open meadow

9. Mountain-mint, Narrow-leaf - *Pycnanthemum tenuifolium*; #788/1459; along bridle path
10. Mountain-mint, Virginia - *Pycnanthemum virginianum*; #791; along bridle path
11. \*Pearlwort - *Sagina procumbens*; #1409
12. \*Phlox, Summer - *Phlox paniculata*; #627; thin woods
13. Pipe, Indian - *Monotropa uniflora*; #1462
14. Plantain, Pale - *Plantago rugelii*; #962; swamp
15. Richweed - *Pilea pumila*; #782; wooded swamp
16. St. Johnswort - *Hypericum punctatum*; #783; along bridle path
17. St. Johnswort, Northern Dwarf - *Hypericum boreale*; #957; swamp
18. Smartweed, Water - *Polygonum punctatum* var. *punctatum*; #952; along bridle path
19. Tick-trefoil, Tall - *Desmodium humifusum*; #948; meadow
20. Tobacco, Indian - *Lobelia inflata*; #789; along bridle path
21. \*Umbrella-wort - *Mirabilis nyctaginea*; #1413
22. Water-horehound - *Lycopus americanus*; #784; along bridle path
23. Willow-herb, Purple-leaf - *Epilobium coloratum*; #960; swamp

#### Grasses

1. Bluestem, Little - *Schizachyrium scoparium* ssp. *scoparium*; #946; meadow
2. Grass, Panic - *Panicum dichotomum*; #1456/1460
3. Grass, Panic - *Panicum oligosanthes* var. *scribnerianum*; #1408

#### Sedges and Rushes

1. Sedge - *Carex amphibola* var. *turgida*; #1407
2. Sedge - *Carex bushii*; #1412
3. Sedge - *Carex scoparia* var. *scoparia*; #1410
4. Sedge - *Carex swanii*; #1411
5. Sedge - *Fimbristylis autumnalis*; #964; moist meadow
6. Sedge-rush - *Juncus scirpoides*; #959/1487; meadow
7. Toad-rush - *Juncus bufonius*; #419; along bridle path

#### Pteridophytes

1. Fern, Northern Lady - *Athyrium felix-femina* var. *angustum*; #628/633/637; woodland

#### Vines

1. Bittersweet, American - *Celastrus scandens*; #947; thickets

#### Shrubs

1. Bayberry, Northern - *Myrica pennsylvanica*; #125; banks of moist meadow

2. Chokeberry, Purple - *Aronia x prunifolia*; #200/787; along bridle path
3. Dogwood, Silky - *Cornus amomum* ssp. *amomum*; #786; along bridle path
4. Hardhack - *Spiraea tomentosa* var. *tomentosa*; #1095
5. Maleberry - *Lyonia ligustrina*; #198/1525; along bridle path
6. Sumac, Shining - *Rhus copallinum*; #792; along bridle path

### Trees

1. Willow sp. - *Salix* sp.; #116/118-19/122-24; wet meadow

## Appendix C

Checklist of the Vascular Flora of Pelham Bay Park (PBPK), Bronx County, New York State. Nomenclature follows that of Mitchell and Tucker (1997) and Mitchell (2000). An asterisk (\*) indicates a non-native taxon, and an addition sign (+) indicates a species planted in the park that is not reproducing to any great degree in any of the natural areas of PBPK. An exclamation mark indicates that H.E. Ahles did not collect the species in 1946-47. Native taxa collected by the author are preceded by no symbol unless the species was not collected by Ahles.

### DIVISION: EQUISETOPHYTA

#### Family EQUISETACEAE

*Equisetum arvense* - Common Horsetail; Spores in Mid-April

### DIVISION POLYPODIOPHYTA

#### Family OSMUNDACEAE

*Osmunda cinnamomea* - Cinnamon Fern; Spores in Early May

*Osmunda claytoniana* - Interrupted Fern; Spores in Early May; Rare

*Osmunda regalis* var. *spectabilis* - Royal Fern; Spores in Late May

#### Family DENNSTAEDTIACEAE

*Pteridium aquilinum* var. *latiusculum* - Bracken; Spores in Mid-August

#### Family THELYPTERIDACEAE

! *Phegopteris hexagonoptera* - Broad Beech Fern; Spores in Late July

*Thelypteris noveboracensis* - New York Fern; Spores in Early August

*Thelypteris palustris* var. *pubescens* - Marsh Fern; Spores in Early August

#### Family ASPLENIACEAE

! *Asplenium platyneuron* - Ebony Spleenwort; Spores in Mid-July; Rare

#### Family DRYOPTERIDACEAE

! *Athyrium filix-femina* var. *asplenioides* - Lady Fern; Spores in Mid-July

*Onoclea sensibilis* - Sensitive Fern; Spores in Early August

**Family POLYPODIACEAE**

! *Polypodium virginianum* - Rock Polypody; Spores in Mid-July; Uncommon

**DIVISION: PINOPHYTA****Family GINKGOACEAE**

+! *Ginkgo biloba* - Ginkgo; Late April

**Family TAXACEAE**

+! *Taxus cuspidata* - Japanese Yew; no flowering time noted

**Family PINACEAE**

+! *Picea abies* - Norway Spruce; no flowering time noted

+! *Pinus nigra* - Black Pine; no flowering time noted

+! *Pinus resinosa* - Red Pine; no flowering time noted

+ *Pinus strobus* - White Pine; no flowering time noted

\* *Pinus sylvestris* - Scotch Pine; no flowering time noted

**Family TAXODIACEAE**

+! *Taxodium distichum* - Bald Cypress; no flowering time noted

**Family CUPRESSACEAE**

! *Juniperus communis* var. *depressa* - Common Juniper; no flowering time noted; Rare

+ *Juniperus virginiana* - Eastern Red Cedar; no flowering time noted

**DIVISION: MAGNOLIOPHYTA****Family MAGNOLIACEAE**

*Liriodendron tulipifera* - Tulip Poplar; Late May

**Family LAURACEAE**

*Lindera benzoin* - Spicebush; Late March

*Sassafras albidum* - Sassafras; Late April

### Family SAURURACEAE

*Saururus cernuus* - Lizard's Tail; Early July

### Family ARISTOLOCHACEAE

\*!*Aristolochia clematidis* - Birthwort; Mid-May; Uncommon

*Asarum canadense* - Wild Ginger; Late April; Rare

### Family RANUNCULACEAE

*Anemone quinquefolia* - Wood Anemone; Mid-April

*Anemone virginiana* var. *virginiana* - Thimbleweed; Late June; Uncommon

\*!*Aquilegia vulgaris* - Garden Columbine; Early May

*Caltha palustris* - Marsh Marigold; Late March

*Cimicifuga racemosa* - Black Snakeroot; Mid-June

\*!*Clematis terniflora* - Yam-leaf Clematis; Early September

!*Clematis virginiana* - Virgin's Bower; Early September

*Ranunculus abortivus* var. *abortivus* - Kidneyleaf Crowfoot; Mid-April

\**Ranunculus acris* - Tall Buttercup; Mid-May

\**Ranunculus bulbosus* - Bulbous Buttercup; Early May

*Ranunculus hispidus* var. *nitidus* - Swamp Buttercup; Early May; Endan. NYS G5T5 S1

*Ranunculus recurvatus* - Hooked Crowfoot; Early May; Uncommon

\**Ranunculus sceleratus* - Cursed Crowfoot; Late April; Uncommon

*Thalictrum dioicum* - Early Meadow-rue; Late April

!*Thalictrum pubescens* - Tall Meadow-rue; Mid-May

!*Thalictrum revolutum* - Waxy Meadow-rue; Mid-May; Rare

### Family BERBERIDACEAE

\**Berberis thunbergii* - Japanese Barberry; Late April

*Podophyllum peltatum* - May-Apple; Early May

### Family MENISPERMACEAE

*Menispermum canadense* - Moonseed; Mid-June

### Family PAPAVERACEAE

\**Chelidonium majus* - Celandine; Late April

\*!*Macleaya cordata* - Plume-Poppy; Late June; Uncommon

*Sanguinaria canadensis* - Bloodroot; Early April; Uncommon

### Family FUMARIACEAE

*Dicentra cucullaria* - Dutchman's Breeches; Early April

Family **PLATANACEAE**

*Platanus occidentalis* - Sycamore; Early May

Family **HAMAMELIDACEAE**

*Hamamelis virginiana* - Witch-hazel; Late September

*Liquidambar styraciflua* - Sweet-gum; Early May

Family **ULMACEAE**

*Celtis occidentalis* - Hackberry; Late April; Uncommon

*Ulmus americana* - American Elm; Early March

+!*Ulmus minor* - English Elm; Early May

+!*Ulmus pumila* - Siberian Elm; Late March

*Ulmus rubra* - Slippery Elm; Late March

+*Zelkova serrata* - Japanese Zelkova; Early April

Family **CANNABACEAE**

+!*Cannabis sativa* - Marijuana; Late August (no specimen collected)

Family **MORACEAE**

\**Broussonetia papyrifera* - Paper Mulberry; Late April

\*!*Maclura pomifera* - Osage Orange; Mid-May; Uncommon

\**Morus alba* - White Mulberry; Mid-May

*Morus rubra* - Red Mulberry; Mid-May; Rare

Family **URTICACEAE**

*Boehmeria cylindrica* - False-Nettle; Late July

*Pilea pumila* - Richweed; Mid-August

\*!*Urtica dioica* ssp. *dioica* - Stinging Nettle; Late May

Family **JUGLANDACEAE**

*Carya cordiformis* - Bitternut Hickory; Mid-May

!*Carya glabra* - Pignut Hickory; Mid-May

*Carya ovata* - Shagbark Hickory; Mid-May

*Carya tomentosa* - Mockernut Hickory; Mid-May

!*Juglans cinerea* - Butternut; Mid-May; Rare

*Juglans nigra* - Black Walnut; Early May

### Family MYRICACEAE

*Myrica pensylvanica* - Bayberry; Mid-May

### Family FAGACEAE

*Castanea dentata* - American Chestnut; no flowering time noted

*Fagus grandifolia* - American Beech; Mid-April

+!*Fagus sylvatica* - European Beech; Mid-April

*Quercus alba* - White Oak; Mid-April

*Quercus bicolor* - Swamp White Oak; Late April; Uncommon

*Quercus coccinea* - Scarlet Oak; Late April

+!*Quercus macrocarpa* - Bur Oak; Late April

*Quercus montana* - Chestnut Oak; Mid-April

*Quercus palustris* - Pin Oak; Late April

+!*Quercus robur* - English Oak; Late April

*Quercus rubra* - Red Oak; Mid-April

*Quercus stellata* - Post Oak; Mid-April

*Quercus velutina* - Black Oak; Late April

### Family BETULACEAE

\**Alnus glutinosa* - Black Alder; Late March

!*Alnus incana* ssp. *rugosa* - Hazel Alder; Rare; no flowering time noted

*Betula alleghaniensis* - Yellow Birch; Late April; Rare

*Betula lenta* - Sweet Birch; Early May

*Betula populifolia* - Gray Birch; Mid-April

*Carpinus caroliniana* ssp. *virginiana* - Hornbeam; Mid-May

*Corylus americana* - Hazelnut; Late March

+!*Corylus avellana* - European Hazelnut; Mid to Late February

*Ostrya virginiana* - Hop Hornbeam; Late May; Rare

### Family PHYTOLACCACEAE

*Phytolacca americana* - Pokeweed; Early June

### Family NYCTAGINACEAE

\**Mirabilis nyctaginea* - Umbrella-wort; Late May

### Family CACTACEAE

!*Opuntia humifusa* - Prickly-pear Cactus; Late June; Rare

### Family CHENOPODIACEAE

- Atriplex patula* - Seaside Orach; Early August  
 \*!*Atriplex prostrata* - Orach; Early August  
 \*!*Bassia scoparia* - Summer-cypress; Mid-August  
 \**Chenopodium album* var. *album* - Lamb's-Quarters; Mid-July  
 \**Chenopodium ambrosioides* - Mexican Tea; Late July  
 \*!*Chenopodium glaucum* - Oak-leaf Goosefoot; Mid-August; Uncommon  
 !*Chenopodium simplex* - Maple-leaf Goosefoot; Mid-August  
 \*!*Cycloloma atriplicifolium* - Winged Pigweed; Late July; Rare  
*Salicornia europaea* - Annual Glassort; Late August  
*Salicornia perennis* - Woody Glasswort; Late August  
 \**Salsola kali* - Saltwort or Russian Thistle; Early August  
*Suaeda calceoliformis* - Plains Sea-blite; Mid-August  
*Suaeda linearis* - Narrow Sea-blite; Late July; Endangered NYS G5 S1

### Family AMARANTHACEAE

- \**Amaranthus albus* - Tumbleweed; Mid-August; Uncommon  
 \*!*Amaranthus blitum* - Livid Amaranth; Late July; Uncommon  
 \**Amaranthus cruentus* - Blood Amaranth; Late August  
 \**Amaranthus hybridus* - Smooth Amaranth; Late August  
 \*!*Amaranthus retroflexus* - Green Amaranth; Early July

### Family PORTULACACEAE

- Claytonia virginica* - Spring-beauty; Late March  
 \**Portulaca oleracea* - Purslane; Mid-June

### Family MOLLUGINACEAE

- \**Mollugo verticillata* - Carpetweed; Late June

### Family CARYOPHYLLACEAE

- \*!*Agrostemma githago* - Corn or Purple-cockle; Late May; Rare  
 \**Arenaria serpyllifolia* - Thyme-leaf Sandwort; Late May  
 \**Cerastium fontanum* - Common Mouse-ear; Early April  
 \**Cerastium glomeratum* - Mouse-ear Chickweed; Late April  
 \*!*Cerastium semidecandrum* - Small Mouse-ear Chickweed; Mid-May  
 \**Dianthus armeria* - Deptford Pink; Late May  
 +!*Lychnis coronaria* - Mullein-pink; Early July  
 !*Paronychia canadensis* - Forked Chickweed; Mid-August; Rare  
 \*!*Sagina japonica* - Japanese Pearlwort; Late May  
 \**Sagina procumbens* - Pearlwort; Late April  
 \**Saponaria officinalis* - Bouncing-Bet; Late June

- \**Scleranthus annuus* - Knawel; Mid-April
- Silene antirrhina* - Sleepy Catchfly; Mid-May; Uncommon
- Silene caroliniana* var. *pensylvanica* - Wild Pink; Late April
- \**Silene latifolia* - White Campion; Mid-May
- Silene stellata* - Starry Campion; Mid-July
- \**Silene vulgaris* - Bladder Campion; Early June; Rare
- \*!*Spergularia rubra* - Common Sand-Spurrey; Late April
- \*!*Spergularia salina* - Salt Marsh Sand-Spurrey; Late May
- \**Stellaria graminea* - Lesser Stitchwort; Late May
- \**Stellaria media* - Chickweed; Early February

#### Family **POLYGONACEAE**

- \*!*Polygonum arenastrum* - Doorweed; Early June
- Polygonum arifolium* - Arrow-leaf Tearthumb; Late August
- \**Polygonum aviculare* - Knotweed; Early June
- \*!*Polygonum bellardii* - Needle-leaf Knotweed; Early June
- \**Polygonum cespitosum* var. *longisetum* - Knotweed; Mid-May
- \*!*Polygonum cuspidatum* - Japanese Knotweed; Early July
- \**Polygonum hydropiper* - Water Pepper; Late July
- Polygonum hydropiperoides* var. *hydropiperoides* - Smartweed; Early August
- \**Polygonum lapathifolium* - Pale Smartweed; Late July
- Polygonum pensylvanicum* - Pink Knotweed; Early August
- \*!*Polygonum persicaria* - Lady's-thumb; Late May
- Polygonum punctatum* var. *punctatum* - Water Smartweed; Early September; Uncom.
- Polygonum ramosissimum* var. *ramosissimum* - Salt Marsh Knotweed; Ear. August; Rare
- Polygonum sagittatum* - Tearthumb; Early September
- \**Polygonum scandens* var. *dumetorum* - Climbing False Buckwheat; Mid-July
- Polygonum virginianum* - Jumpseed; Late July
- \**Rumex acetosella* - Sheep Sorrel; Late April
- \**Rumex crispus* - Curly Dock; Mid-May
- \**Rumex obtusifolius* - Bitter Dock; Early June

#### Family **PLUMBAGINACEAE**

- Limonium carolinianum* - Sea Lavender; Early August

#### Family **CLUSIACEAE**

- Hypericum gentianoides* - Orange-grass; Late August; Rare
- !*Hypericum mutilum* - Dwarf St. John's-wort; Mid-July
- \**Hypericum perforatum* - St. John's-wort; Early June
- Hypericum punctatum* - Spotted St. John's-wort; Early July

Family **TILIACEAE**

- Tilia americana* var. *americana* - Basswood; Late May  
 +!*Tilia cordata* - Little-leaf Linden; Late May

Family **MALVACEAE**

- \**Abutilon theophrasti* - Velvet-leaf; Mid-August  
 +!*Alcea rosea* - Hollyhock; Mid-June  
 \**Althaea officinalis* - Marsh-mallow; Late June  
 !*Hibiscus laevis* - Smooth Rose Mallow; Early August (Extirpated)  
*Hibiscus moscheutos* - Swamp Rose Mallow; Late July  
 +*Hibiscus syriacus* - Rose-of-Sharon; Mid-July  
 \*!*Malva moschata* - Musk-mallow; Mid-June (Extirpated)  
 \*!*Malva neglecta* - Cheeses; Mid-May

Family **CISTACEAE**

- Lechea mucronata* - Hairy Pinweed; Mid-July; Uncommon  
 !*Lechea racemulosa* - Whorled Pinweed; Early July; Rare NYS G5 S3

Family **VIOLACEAE**

- \**Viola odorata* - English Violet; Late March  
 +!*Viola pedata* - Bird's Foot Violet; Mid-May  
*Viola pubescens* - Smooth Yellow Violet; Mid-April; Rare  
*Viola sororia* - Common Blue Violet; Late March

Family **CUCURBITACEAE**

- \*!*Cucurbita* sp. - Squash; Late August  
 !*Echinocystis lobata* - Wild Balsam-Apple; Mid-August; Rare  
*Sicyos angulatus* - One-seeded Bur-cucumber; Late August

Family **SALICACEAE**

- \**Populus alba* - White Poplar; Early April  
 !*Populus deltoides* - Eastern Cottonwood; Early April  
*Populus grandidentata* - Big-tooth Aspen; Mid-March  
*Populus tremuloides* - Quaking Aspen; Early April  
 +!*Salix alba* - White Willow; Mid-April  
 +!*Salix babylonica* - Weeping Willow; Early April  
*Salix discolor* - Pussy Willow; Mid-March  
 +!*Salix fragilis* - Crack Willow; Mid-April  
 +!*Salix lucida* - Shining Willow; Mid-April  
 !*Salix nigra* - Black Willow; Mid-May; Rare

!*Salix sericea* - Silky Willow; Mid-April; Rare

#### Family CAPPARIDACEAE

+!*Cleome hassleriana* - Spider-flower; Mid-July (Extirpated)

#### Family BRASSICACEAE

\**Alliaria petiolata* - Garlic Mustard; Mid-April

\**Arabidopsis thaliana* - Mouse-ear Cress; Mid-April

\*!*Armoracia rusticana* - Horseradish; Mid-May (Extirpated)

\**Barbarea vulgaris* - Winter-cress; Mid-April

\*!*Brassica rapa* - Field Mustard; Early May

*Cakile edentula* var. *edentula* - Sea-Rocket; Late July

\**Capsella bursa-pastoris* - Shepherd's-purse; Late March

*Cardamine bulbosa* - Spring Cress; Early May

*Cardamine concatenata* - Cut-leaf Toothwort; Mid-April

*Cardamine diphylla* - Two-leaved Toothwort; Late April; Rare

\*!*Cardamine hirsuta* - Hairy Rock-cress; Late March

!*Cardamine parviflora* var. *arenicola* - Small-flowered Bittercress; Early April

*Cardamine pensylvanica* - Pennsylvania Bitter-cress; Mid-April

!*Cardamine pratensis* - Cuckoo-flower; Late April; Rare

\*!*Cardaria draba* - Hoary Cress; Mid-May

\*!*Diplotaxis muralis* - Sand-rocket; Mid-May

\*!*Diplotaxis tenuifolia* - Slimleaf Wall Rocket; Mid-May

\*!*Draba verna* - Whitlow-grass; Early March

\**Hesperis matronalis* - Dame's Rocket; Mid-May

\**Lepidium campestre* - Field Peppergrass; Late April

\*!*Lepidium ruderale* - Stinking Peppergrass; Mid-May

*Lepidium virginicum* - Wild Peppergrass; Late April

\**Raphanus raphanistrum* - Wild Radish; Late May

\**Rorippa nasturtium-aquaticum* - Watercress; Late May

\**Rorippa palustris* ssp. *palustris* - Common Yellow-cress; Early June

\**Rorippa sylvestris* - Creeping Yellow-cress; Late May

\*!*Sinapis alba* - White Mustard; Late May; (Extirpated)

\**Sisymbrium officinale* - Hedge Mustard; Late May

\**Thlaspi arvense* - Field Pennycress; Mid-June; Rare

#### Family CLETHRACEAE

*Clethra alnifolia* - Sweet Pepperbush; Mid-July

#### Family ERICACEAE

!*Chimaphila maculata* - Spotted Wintergreen; Late May

*Gaylussacia baccata* - Black Huckleberry; Early May

! *Kalmia latifolia* - Mountain Laurel; Late May  
*Lyonia ligustrina* - Maleberry; Mid-June; Rare  
*Monotropa uniflora* - Indian Pipe; Late June  
 ! *Pyrola americana* - Round-leaf Pyrola; Mid-June; Rare  
 +! *Rhododendron maximum* - Great Laurel or Rosebay; Early July  
*Rhododendron periclymenoides* - Pinkster Azalea; Early May  
*Rhododendron viscosum* - Clammy Azalea; Early June; Rare  
*Vaccinium corymbosum* - Highbush Blueberry; Mid-April  
*Vaccinium pallidum* - Low or Sweet Blueberry; Mid-April

#### Family **EBENACEAE**

*Diospyros virginiana* - Persimmon; Early June; Rare; Threatened NYS G5 S2

#### Family **PRIMULACEAE**

\*! *Anagallis arvensis* - Scarlet Pimpernel; Early June; (Extirpated)  
 ! *Lysimachia ciliata* - Fringed Loosestrife; Late June  
 \* *Lysimachia nummularia* - Moneywort; Mid-June  
*Lysimachia quadrifolia* - Whorled Loosestrife; Late May  
*Lysimachia terrestris* - Swamp Candles; Mid-June  
*Samolus valerandi* ssp. *parviflorus* - Brookweed; Early June; Rare

#### Family **HYDRANGEACEAE**

\*! *Philadelphus coronarius* - Mock-Orange; Late May

#### Family **GROSSULARIACEAE**

\* *Ribes rubrum* - Garden Red Currant; Mid-April

#### Family **CRASSULACEAE**

! *Penthorum sedoides* - Ditch-Stonecrop; Late July; Uncommon  
 \* *Sedum album* - White-flowered Sedum; Mid-June; Rare  
 \* *Sedum sarmentosum* - Stonecrop; Early June  
 \* *Sedum telephium* - Live Forever; Late July

#### Family **SAXIFRAGACEAE**

*Heuchera americana* - Alumroot; Early June

#### Family **ROSACEAE**

*Agrimonia gryposepala* - Agrimony; Early July  
 ! *Agrimonia pubescens* - Downy Agrimony; Late July; Uncommon

- ! *Amelanchier arborea* - Shadbush; Late March  
 ! *Amelanchier canadensis* - Oblongleaf Shadbush; Late March; Rare  
 + *Amelanchier laevis* - Smooth Serviceberry; Mid-April  
*Amelanchier stolonifera* - Colonial Shadbush; Early April  
*Aronia x prunifolia* - Purple Chokeberry; Mid-May  
 \*! *Aruncus dioicus* var. *acuminatus* - Goat's Beard; Early June  
 + *Crataegeus monogyna* - English Hawthorn; Early May  
 \* *Duchesnea indica* - Indian Strawberry; Mid-April  
*Fragaria virginiana* - Wild Strawberry; Mid-April  
*Geum canadense* - White Avens; Late June  
 \* *Malus pumila* - Apple; Late April  
 \*! *Potentilla argentea* - Silvery Cinquefoil; Mid-May  
*Potentilla norvegica* ssp. *monspeliensis* - Rough Cinquefoil; Mid-July  
 \*! *Potentilla recta* - Sulphur Cinquefoil; Early June  
*Potentilla simplex* - Old Field Cinquefoil; Mid-May  
*Prunus americana* - Wild Plum; Mid-April  
 \* *Prunus avium* - Sweet Cherry; Mid-April  
 ! *Prunus maritima* - Beach Plum; Early May; Rare  
 + *Prunus persica* - Peach; Late April  
*Prunus serotina* - Black Cherry; Mid-May  
 + *Prunus serrulata* - Japanese Cherry; Mid-April  
 + *Pyrus calleryana* 'Bradford' - Bradford Pear; Early April  
 + *Pyrus communis* - Pear; Mid-April  
 \* *Rhodotypos scandens* - Jetbead; Early May  
 \*! *Rosa multiflora* - Multiflora Rose; Mid-May  
 ! *Rosa palustris* - Swamp Rose; Late June  
 \* *Rosa rugosa* - Wrinkled Rose; Mid-May  
*Rosa setigera* var. *setigera* - Climbing Prairie Rose; Mid-June; Uncommon  
*Rosa virginiana* - Virginia Rose; Late May  
*Rubus allegheniensis* - Northern Blackberry; Mid-May  
*Rubus flagellaris* - Dewberry; Late April  
 \* *Rubus laciniatus* - Cut-leaf Blackberry; Mid-June; Rare  
*Rubus occidentalis* - Black Raspberry or Thimbleberry; Mid-May  
 \* *Rubus phoenicolasius* - Wineberry; Late May  
 ! *Spiraea alba* var. *latifolia* - Meadowsweet; Late June; Rare

#### Family **FABACEAE**

- \*! *Albizia julibrissin* - Silk Tree; Mid-July; Rare  
 \*! *Amorpha fruticosa* - False Indigo; Late May; Rare  
*Amphicarpea bracteata* - Hog-Peanut; Early September; Uncommon  
*Apios americana* - Groundnut; Late July  
 +! *Cercis canadensis* - Redbud; Late April  
*Chamaecrista fasciculata* - Partridge-pea; Early August  
 \*! *Coronilla varia* - Crown-vetch; Late May  
*Desmodium canadense* - Showy Tick-trefoil; Late July; Rare

- ! *Desmodium cuspidatum* - Pointed-leaf Tick-trefoil; Late August (Extirpated)  
*Desmodium paniculatum* - Panicked Tick-trefoil; Early August  
 \*! *Genista tinctoria* - Dyer's Greenweed; Late June  
 +! *Gleditsia triacanthos* - Honey Locust; Mid-May  
 +! *Gymnocladus dioica* - Kentucky Coffee Tree; Mid-May  
 +! *Lathyrus latifolius* - Everlasting-pea; Late June  
*Lespedeza capitata* - Round-headed Bush-clover; Late August  
*Lespedeza hirta* - Hairy Bush-clover; Mid-August  
 ! *Lespedeza intermedia* - Wand-like Bush-clover; Late August; Rare  
 ! *Lespedeza procumbens* - Trailing Bush-clover; Mid-August; Uncommon  
*Lespedeza virginica* - Slender Bush-clover; Late August  
 \* *Lotus corniculata* - Bird's-foot trefoil; Mid-May  
 \* *Medicago lupulina* - Black Medic; Late April  
 \* *Medicago sativa* ssp. *sativa* - Alfalfa; Early June  
 \* *Melilotus alba* - White Sweet Clover; Late May  
 \* *Melilotus officinalis* - Yellow Sweet Clover; Late May  
*Phaseolus polystachios* - Kidney Bean; Early August; Rare  
 \*! *Puereria lobata* - Kudzu Vine; Early September  
 \* *Robinia pseudo-acacia* - Black Locust; Mid-May  
 ! *Strophostyles helvula* - Wild Bean; Mid-July  
 \* *Trifolium arvense* - Rabbit's Foot Clover; Early May; Uncommon  
 \*! *Trifolium campestre* - Low Hop-clover; Late May  
 \* *Trifolium hybridum* - Alsike Clover; Early June  
 \* *Trifolium pratense* - Red Clover; Mid-May  
 \* *Trifolium repens* - White Clover; Mid-May  
 \* *Vicia cracca* ssp. *tenuifolia* - European Bird Vetch; Late May  
 \* *Vicia sativa* ssp. *nigra* - Narrow-leaved Vetch; Early June  
 \* *Vicia tetrasperma* - Slender Vetch; Mid-May; Rare  
 \*! *Wisteria sinensis* - Chinese Wisteria; Late April

#### Family ELAEAGNACEAE

- +! *Elaeagnus angustifolia* - Russian Olive; Mid-May (Extirpated)  
 \* *Elaeagnus umbellata* - Autumn Olive; Early May

#### Family LYTHRACEAE

- ! *Lythrum alatum* - Winged Loosestrife; Mid-June; Rare  
 \* *Lythrum salicaria* - Purple Loosestrife; Mid-June

#### Family ONAGRACEAE

- Circaea lutetiana* ssp. *canadensis* - Enchanter's Nightshade; Mid-June  
*Epilobium coloratum* - Purple-leaf Willow Herb; Late July  
 \* *Epilobium hirsutum* - Hairy Willow Herb; Late June; Rare  
 ! *Ludwigia alternifolia* - Seedbox; Mid-July

- ! *Ludwigia palustris* - Water Purslane; Early July  
*Oenothera biennis* - Evening Primrose; Late June  
 ! *Oenothera laciniata* - Cut-leaved Evening Primrose; Late June; (Ex);  
 Endangered NYS G5/S1  
 ! *Oenothera parviflora* var. *oakesiana* - Small-flowered Evening Primrose; Mid-August;  
 Rare; Threatened NYS G5/S2  
*Oenothera perennis* - Sundrops; Early June

#### Family NYSSACEAE

- Nyssa sylvatica* - Black Tupelo; Mid-May

#### Family CORNACEAE

- ! *Cornus alternifolia* - Alternate-leaf Dogwood; Mid-May; Rare  
*Cornus amomum* ssp. *amomum* - Silky Dogwood; Mid-June  
*Cornus florida* - Flowering Dogwood; Late April  
*Cornus foemina* ssp. *racemosa* - Gray Dogwood; Early June  
 +! *Cornus mas* - Cornelian Cherry; Mid-March  
 ! *Cornus sericea* - Red Osier Dogwood; Mid-May

#### Family CELASTRACEAE

- \*! *Celastrus orbiculata* - Asiatic Bittersweet; Mid-May  
*Celastrus scandens* - American Bittersweet; Mid-May; Rare  
 +! *Euonymus alata* - Winged Spindle-tree; Early May  
 \* *Euonymus europaeus* - European Spindle-tree; Early May  
 +! *Euonymus fortunei* var. *radicans* - Chinese Spindle-tree; Mid-May

#### Family AQUIFOLIACEAE

- +! *Ilex opaca* - American Holly; Mid-May  
 ! *Ilex verticillata* - Winterberry; Mid-June

#### Family BUXACEAE

- +! *Buxus sempervirens* - Boxwood; Late April  
 \*! *Pachysandra terminalis* - Pachysandra; Late March

#### Family EUPHORBIACEAE

- Acalypha virginica* var. *rhomboidea* - Three-seeded Mercury; Mid-August  
*Chamaesyce maculata* - Milk-purslane; Late June  
 ! *Chamaesyce polygonifolia* - Seaside Spurge; Late August; Rare  
 \* *Euphorbia cyparissias* - Cypress Spurge; Late April

### Family RHAMNACEAE

- Ceanothus americanus* - New Jersey Tea; Late June; Rare  
 \*!*Rhamnus cathartica* - Common Buckthorn; Early May  
 \*!*Rhamnus frangula* - Glossy Buckthorn; Early May

### Family VITACEAE

- \*!*Ampelopsis brevipedunculata* var. *brevipedunculata* - Porcelain-berry; Mid-July  
*Parthenocissus quinquefolia* - Virginia Creeper; Late June  
 \*!*Parthenocissus tricuspidata* - Boston Ivy; Late July; Rare  
 !*Vitis aestivalis* - Summer Grape; Early June  
*Vitis labrusca* - Fox Grape; Early June

### Family LINACEAE

- \*!*Linum usitatissimum* - Flax; Late June (Extirpated)

### Family POLYGALACEAE

- Polygala verticillata* var. *isocycla* - Whorled Milkwort; Early July

### Family SAPINDACEAE

- +!*Koelreuteria paniculata* - Yellow Golden-rain Tree; Early July

### Family HIPPOCASTANACEAE

- +!*Aesculus flava* - Sweet or Yellow Buckeye; Early May; Rare  
 +!*Aesculus hippocastanum* - Horsechestnut; Early May

### Family ACERACEAE

- \*!*Acer campestre* - Hedge-maple; Mid-April  
 \*!*Acer ginnala* - Amur Maple; Mid-April  
 \*!*Acer negundo* - Boxelder; Mid-April  
 \**Acer platanoides* - Norway Maple; Mid-April  
 \**Acer pseudoplatanus* - Sycamore-maple; Early May  
*Acer rubrum* var. *rubrum* - Red Maple; Late March  
*Acer saccharinum* - Silver Maple; Early April  
 +!*Acer saccharum* - Sugar Maple; Mid-April

### Family ANACARDIACEAE

- Rhus copallinum* - Shining Sumac; Late July  
*Rhus glabra* - Smooth Sumac; Late June

*Rhus hirta* - Staghorn Sumac; Mid-June; Rare  
*Toxicodendron radicans* ssp. *radicans* - Poison Ivy; Early May

Family **SIMAROUBACEAE**

\*!*Ailanthus altissima* - Tree-of-Heaven; Early June

Family **RUTACEAE**

*Ptelea trifoliata* - Hop-tree; Early June; Rare

Family **OXALIDACEAE**

*Oxalis stricta* - Yellow Wood-Sorrel; Early May

Family **GERANIACEAE**

\*!*Erodium cicutarium* - Storksbill; Late April  
*Geranium carolinianum* var. *carolinianum* - Cranesbill; Early June; Rare  
*Geranium maculatum* - Wild Geranium; Mid-April

Family **BALSAMINACEAE**

*Impatiens capensis* - Jewelweed; Early June

Family **ARALIACEAE**

*Aralia nudicaulis* - Wild Sarsaparilla; Early May  
 \*!*Aralia spinosa* - Hercules' Club; Mid-July  
 \*!*Hedera helix* - English Ivy; (No flowering time noted)

Family **APIACEAE**

\*!*Aegopodium podagraria* - Goutweed; Late May  
 \**Aethusa cynapium* - Fool's Parsely; Mid-June  
*Angelica venenosa* - Hairy Angelica; Early July; Rare  
*Cicuta maculata* - Water Hemlock; Early June  
 \*!*Conium maculatum* - Poison Hemlock; Late May; Rare  
*Cryptotaenia canadensis* - Honewort; Early June  
 \**Daucus carota* - Queene Anne's Lace; Mid-June  
*Heracleum maximum* - Cow-parsnip; Late May  
*Osmorhiza longistylis* - Sweet Anise-root; Mid-May  
 \**Pastinaca sativa* - Wild Parsnip; Late June  
*Sanicula odorata* - Clustered Snakeroot; Late May  
*Sanicula marilandica* - Black Snakeroot; Mid-May

### Family **APOCYNACEAE**

- Apocynum androsaemifolium* - Spreading Dogbane; Mid-June  
*Apocynum cannabinum* var. *cannabinum* - Indian Hemp; Early June  
 \**Vinca minor* - Periwinkle; Early March

### Family **ASCLEPIADACEAE**

- Asclepias incarnata* var. *incarnata* - Swamp Milkweed; Early July  
*Asclepias purpurascens* - Purple Milkweed; Mid-June; Rare  
*Asclepias syriaca* - Common Milkweed; Early June  
*Asclepias tuberosa* var. *interior* - Orange Milkweed; Late June; Rare  
 \**Cynanchum louiseae* - Black Swallow-wort; Late May

### Family **SOLANACEAE**

- !*Datura stramonium* - Jimsonweed; Early August  
 \**Lycium barbarum* - Matrimony-vine; Early September  
 \*!*Lycopersicon esculentum* - Tomato; Late May  
*Solanum carolinense* - Horse-nettle; Mid-June  
 \**Solanum dulcamara* - Bittersweet Nightshade; Mid-May  
*Solanum ptycanthum* - Black Nightshade; Early June

### Family **CONVOLVULACEAE**

- \**Calystegia sepium* ssp. *sepium* - Hedge Bindweed; Mid-May  
 \**Convolvulus arvensis* - Field Bindweed; Late May  
 \*!*Ipomoea nil* - Morning-glory; Early September; (Extirpated)  
 \*!*Ipomoea purpurea* - Common Morning-glory; Late July

### Family **CUSCUTACEAE**

- Cuscuta pentagona* - Field Dodder; Mid-August

### Family **POLEMONIACEAE**

- \**Phlox paniculata* - Summer Phlox; Late July

### Family **BORAGINACEAE**

- \*!*Echium vulgare* - Viper's Bugloss; Late June (Extirpated)  
 +!*Mertensia virginica* - Virginia Bluebells; Late March (Extirpated)  
 !*Myosotis laxa* - Smaller Forget-me-not; Late April  
 !*Myosotis verna* - Spring Forget-me-not; Early May; Rare  
 \*!*Pulmonaria saccharata* - Bethlehem Sage; Late March; Rare

\*!*Symphytum officinale* - Comfrey; Late August; Rare

#### Family VERBENACEAE

!*Phryma leptostachya* - Lopseed; Mid-July; Rare

*Verbena hastata* - Blue Vervain; Mid-July; Uncommon

*Verbena urticifolia* var. *urticifolia* - White Vervain; Early July

#### Family LAMIACEAE

*Agastache nepetoides* - Yellow Giant Hyssop; Early August; Rare;  
Threatened NYS G5 S2/S3

*Collinsonia canadensis* - Horse Balm; Early August

\**Glechoma hederacea* - Gill-over-the-ground; Early April

*Hedeoma pulegioides* - Mock-Pennyroyal; Late July; Rare

\*!*Lamium purpureum* var. *purpureum* - Purple Dead-nettle; Late March

\**Leonurus cardiaca* - Motherwort; Mid-June

*Lycopus americanus* - Bugleweed; Mid-July

*Lycopus uniflorus* - Northern Bugleweed; Mid-August

!*Lycopus virginicus* - Virginia Bugleweed; Early August

\**Prunella vulgaris* - Heal-all; Late May

*Pycnanthemum tenuifolium* - Narrow-leaved Mountain-mint; Late June

*Pycnanthemum virginianum* - Virginia Mountain-mint; Early July

*Scutellaria lateriflora* - Mad-dog Skullcap; Late July

*Teucrium canadense* var. *canadense* - Seaside Germander; Early July

*Trichostema dichotomum* - Blue-curls; Late July

#### Family PLANTAGINACEAE

\**Plantago lanceolata* - English Plantain; Early May

\**Plantago major* - Common Plantain; Late May

*Plantago rugelii* - Pale Plantain; Late May

#### Family OLEACEAE

+!*Chionanthus virginicus* - Fringe-tree; Late May (Extirpated)

+!*Forsythia viridissima* - Forsythia; Late March

*Fraxinus americana* - White Ash; Mid-May

+!*Fraxinus nigra* - Black Ash; Mid-May (estimated flowering time)

*Fraxinus pennsylvanica* - Green Ash; Mid-May

\**Ligustrum vulgare* - Privet; Late May

\*!*Syringa vulgaris* - Lilac; Late April

#### Family SCROPHULARIACEAE

*Aureolaria flava* var. *flava* - Smooth False-foxglove; Late August

- \*!*Chaenorrhinum minus* - Dwarf Snapdragon; Late July; Rare
- Chelone glabra* - White Turtlehead; Early September; Uncommon
- Gratiola neglecta* - Clammy Hedge-hyssop; Late June
- Linaria canadensis* - Old Field Toadflax; Mid-May
- \**Linaria vulgaris* - Butter-and-Eggs; Mid-June
- \*!*Mazus pumilus* - Asphalt-flower; Late April
- !*Mimulus alatus* - Winged Monkey-flower; Late July; Uncommon
- !*Mimulus ringens* - Common Monkey-flower; Mid-July
- Pedicularis canadensis* - Lousewort; Early May
- \*!*Penstemon digitalis* - Tall White Beardtongue; Early June; Uncommon
- Scrophularia lanceolata* - American Hare-figwort; Late May
- !*Scrophularia marilandica* - Hare-figwort; Mid-July
- \**Verbascum blatteria* - Moth-mullein; Late May
- \**Verbascum thapsus* - Mullein; Late June
- \**Veronica arvensis* - Corn Speedwell; Mid-April
- \*!*Veronica chamaedrys* - Bird's-eye Speedwell; Mid-May
- \*!*Veronica hederifolia* - Ivy-leaf Speedwell; Late March
- \**Veronica officinalis* - Speedwell; Late May
- Veronica peregrina* ssp. *peregrina* - Purslane Speedwell; Late April
- \**Veronica persica* - Persian Speedwell; Early April
- \**Veronica serpyllifolia* ssp. *serpyllifolia* - Thyme-leaf Speedwell; Mid-April
- Veronicastrum virginicum* - Culver's Root; Late July

#### Family **OROBANCHACEAE**

- Orobanche uniflora* - One-flowered Cancer-root; Early May

#### Family **BIGNONIACEAE**

- \**Campsis radicans* - Trumpet Vine; Mid-June; Rare
- \*!*Catalpa speciosa* - Catalpa; Mid-June; Rare
- \**Paulownia tomentosa* - Empress-tree; Mid-May

#### Family **CAMPANULACEAE**

- \*!*Campanula rapunculoides* - Creeping Bellflower; Late June (Extipated)
- Lobelia inflata* - Indian Tobacco; Mid-July
- !*Lobelia siphilitica* - Great Lobelia; Mid-August
- \**Triodanis perfoliata* var. *biflora* - Venus' Looking Glass; Mid-June; Rare
- Triodanis perfoliata* var. *perfoliata* - Venus' Looking Glass; Mid-June

#### Family **RUBIACEAE**

- Cephalanthus occidentalis* - Buttonbush; Early July; Rare
- Galium aparine* - Cleavers; Early May
- !*Galium circaezans* var. *circaezans* - Wild Licorice; Early June; Uncommon

- \**Galium mollugo* - Wild Madder; Mid-May
- !*Galium palustre* - Marsh Bedstraw; Mid-June; Rare
- !*Galium triflorum* - Sweet-scented Bedstraw; Early July
- !*Mitchella repens* - Partridge-berry (Twin-berry); Early June; Rare

#### Family CAPRIFOLIACEAE

- !*Diervilla lonicera* - Bush Honeysuckle; Mid-June; Rare
- +!*Lonicera fragrantissima* - Winter Honeysuckle; Early March
- \**Lonicera japonica* - Japanese Honeysuckle; Early June
- \*!*Lonicera morrowii* - Fly Honeysuckle; Early May
- \*!*Lonicera x bella* - Hybrid Fly Honeysuckle; Late April
- Lonicera sempervirens* - Coral Honeysuckle; Mid-May; Rare
- Sambucus canadensis* - Common Elderberry; Mid-May
- +!*Symphoricarpos albus* var. *laevigatus* - Snowberry; Early June (Extirpated)
- Triosteum perfoliatum* - Wild Coffee; Mid-May
- Viburnum acerifolium* - Maple-leaf Viburnum; Mid-May
- Viburnum dentatum* var. *lucidum* - Arrowwood; Late May
- " " var. *venosum* - Southern Arrowwood; Early June; Uncommon;  
Threatened NYS G5 T4?/S2
- \**Viburnum dilatatum* - Viburnum; Early June
- Viburnum lentago* - Sweet Viburnum; Early May
- \*!*Viburnum opulus* var. *opulus* - Guelder-rose; Mid-May; Uncommon
- Viburnum prunifolium* - Black-haw; Early May
- \*!*Viburnum sieboldii* - Siebold's Viburnum; Early May

#### Family ASTERACEAE

- \**Achillea millefolium* var. *occidentalis* - Yarrow; Mid-May
- Ambrosia artemisiifolia* - Ragweed; Early August
- Ambrosia trifida* - Giant Ragweed; Early August
- Antennaria plantaginifolia* - Plantain Pussy-toes; Late April
- \*!*Anthemis arvensis* - Corn-chamomile; Mid-May; Rare
- \*!*Anthemis cotula* - Mayweed; Late June
- \**Arctium minus* - Common Burdock; Mid-July
- \*!*Artemisia annua* - Sweet-scented Wormwood; Early September
- \**Artemisia vulgaris* - Mugwort; Mid-August
- Aster cordifolius* - Heart-leaf Aster; Mid-September
- Aster divaricatus* - White Wood Aster; Mid-July
- Aster ericoides* - Many-flowered Aster; Mid-September
- Aster laevis* var. *laevis* - Smooth Aster; Mid-September
- Aster lanceolatus* var. *simplex* - Eastern Lined Aster; Mid-September
- Aster lateriflorus* var. *lateriflorus* - Calico Aster; Early September
- !*Aster lowrieanus* - Lowrie's Aster; Mid-September
- Aster macrophyllus* var. *macrophyllus* - Bigleaf Aster; Late July
- Aster novae-angliae* - New England Aster; Mid-September

- Aster patens* - Late Purple Aster; Mid-September (Extirpated)  
*Aster paternus* - Toothed White-topped Aster; Early July  
 !*Aster pilosus* var. *pilosus* - Heath Aster; Late August  
 !*Aster schreberi* - Schreber's Aster; Early August  
*Aster subulatus* - Annual Salt Marsh Aster; Early September; Uncommon NYS G5S2  
*Aster tenuifolius* - Perennial Salt Marsh Aster; Late August  
*Aster umbellatus* var. *umbellatus* - Tall Flat White-top Aster; Late August; Rare  
*Baccharis halimifolia* - Groundsel-tree; Late August  
*Bidens bipinnata* - Spanish Needles; Mid-August; Rare  
*Bidens frondosa* - Beggar-ticks; Late August  
 \*!*Bidens polylepis* - Showy Beggar-ticks; Late August; Rare  
 !*Bidens vulgata* - Tall Beggar-ticks; Late August  
 \*!*Carduus nutans* - Nodding Thistle; Early June; Rare  
 \*!*Centaurea jacea* - Brown Knapweed; Mid-May  
 \*!*Centaurea maculosa* - Spotted Bachelor's Button; Early July  
 \**Centaurea nigrescens* - Short-fringed Knapweed; Mid-June  
 \**Cichorium intybus* - Chicory; Early June  
 \**Cirsium arvense* - Canada Thistle; Early June  
*Cirsium discolor* - Field Thistle; Late July  
 \**Cirsium horridulum* - Yellow Thistle; Early June; Uncommon  
 \**Cirsium vulgare* - Bull Thistle; Late June  
*Conyza canadensis* var. *canadensis* - Horseweed; Late July  
 \**Coreopsis lanceolata* - Lance-leaved Coreopsis; Late May; (Extirpated)  
 +*Echinacea purpurea* - Purple Coneflower; Mid-July; (Extirpated)  
*Erechtites hieracifolia* var. *hieracifolia* - Pilewort; Mid-August  
*Erigeron annuus* - Daisy Fleabane; Late May  
*Erigeron philadelphicus* - Fleabane; Mid-May  
*Erigeron strigosus* - Lesser Daisy Fleabane; Late May  
 !*Eupatorium dubium* - Eastern Joe-Pye Weed; Late July  
 !*Eupatorium fistulosum* - Hollow-stemmed Joe-Pye Weed; Mid-July  
 !*Eupatorium hyssopifolium* var. *laciniatum* - Fringed Boneset;  
 Late August; Uncommon; Threatened NYS G5 T?/S2  
*Eupatorium perfoliatum* - Boneset; Mid-August  
*Eupatorium purpureum* - Sweet-scented Joe-Pye Weed; Late July  
*Eupatorium rugosum* - White Snakeroot; Late July  
 \**Eupatorium serotinum* - Late-flowering Boneset; Mid-August  
*Eupatorium sessilifolium* var. *sessilifolium* - Upland Boneset; Late July; Rare  
*Euthamia graminifolia* - Grass-leaved Goldenrod; Late July  
 !*Euthamia tenuifolia* - Slender Fragrant Goldenrod; Early August  
 \*!*Gaillardia aristata* - Common Blanket-flower; Early June (Extirpated)  
 \**Galinsoga parviflora* - Lesser Quickweed; Early July  
 \**Galinsoga quadriradiata* - Quickweed; Late May  
*Gnaphalium obtusifolium* - Sweet Everlasting; Late August  
 \*!*Gnaphalium uliginosum* - Low Cudweed; Early July; Rare  
 \*!*Helianthus annuus* - Common Sunflower; Mid-August; Rare  
*Helianthus divaricatus* - Woodland Sunflower; Late July

- Helianthus giganteus* - Giant Sunflower; Late July  
 \**Helianthus tuberosus* - Jerusalem Artichoke; Late July  
 \*!*Heterotheca subaxillaris* - Camphor-weed; Late August; Uncommon  
 \**Hieracium aurantiacum* - Orange Hawkweed; Early June (Extirpated)  
 \**Hieracium caespitosum* - Field Hawkweed; Mid-May  
 \*!*Hieracium floribundum* - Pale Hawkweed; Early June; Rare  
 !*Hieracium kalmii* var. *kalmii* - Canada Hawkweed; Early August  
 \**Hieracium piloselloides* - Smooth Hawkweed; Mid-May  
*Hieracium venosum* - Rattlesnake-weed; Late May  
 \**Hypochaeris radicata* - Cat's Ear; Mid-May  
*Iva frutescens* ssp. *oraria* - Marsh Elder; Early August  
*Krigia virginica* - Dwarf Dandelion; Early May  
*Lactuca biennis* - Tall Blue Lettuce; Mid-August  
*Lactuca canadensis* var. *canadensis* - Wild Lettuce; Mid-July  
 !*Lactuca floridana* - False Lettuce; Late August; Rare; Endangered NYS G5 S1  
 \**Lactuca serriola* - Prickly Lettuce; Late July  
 \*!*Lapsana communis* - Nipplewort; Late June; Uncommon  
 \**Leucanthemum vulgare* - Ox-eye Daisy; Late May  
 \**Matricaria discoidea* - Pineapple Weed; Early May  
*Mikania scandens* - Climbing Boneset; Early August  
*Pluchea odorata* var. *succulenta* - Salt Marsh Fleabane; Early August  
*Prenanthes trifoliolata* - Tall Rattlesnake-root; Mid-August; Uncommon  
 \**Rudbeckia hirta* var. *pulcherrima* - Black-eyed Susan; Mid-June  
 \*!*Senecio vulgaris* - Common Groundsel; Late February  
*Solidago bicolor* - Silver-rod; Early September  
*Solidago caesia* - Blue-stemmed Goldenrod; Early September  
*Solidago canadensis* var. *scabra* - Tall Goldenrod; Early August  
*Solidago juncea* - Early Goldenrod; Early July  
*Solidago odora* - Sweet Goldenrod; Early August  
*Solidago rugosa* ssp. *rugosa* var. *rugosa* - Tall Hairy Goldenrod; Mid-September  
*Solidago sempervirens* var. *sempervirens* - Seaside Goldenrod; Early September  
*Solidago speciosa* - Showy Goldenrod; Mid-September  
 \**Sonchus oleraceus* - Common Sow Thistle; Early June  
 +!*Tagetes patula* - French Marigold; Mid-July  
 \**Tanacetum vulgare* - Tansy; Early July  
 \**Taraxacum officinale* - Dandelion; Late March  
 \**Tragopogon pratensis* - Yellow Goat's-beard; Late May  
 \**Tussilago farfara* - Coltsfoot; Mid to late March  
*Vernonia noveboracensis* - Ironweed; Late July  
*Xanthium strumarium* var. *canadense* - Clotbur; Late August

#### Family ALISMATACEAE

- Alisma subcordatum* - Water Plantain; Late June  
*Sagittaria latifolia* - Common Arrowhead; Early August; Rare

Family **ARACEAE**

- Acorus americanus* - Sweetflag; Mid-May; Rare  
*Arisaema triphyllum* ssp. *triphyllum* - Jack-in-the-Pulpit; Late April  
*Symplocarpus foetidus* - Skunk-Cabbage; Early February

Family **LEMNACEAE**

- Lemna minor* - Duckweed; no flowering time noted

Family **COMMELINACEAE**

- \**Commelina communis* var. *ludens* - Asiatic Dayflower; Mid-June  
 \*!*Tradescantia virginiana* - Virginia Spiderwort; Late May; Rare

Family **JUNCACEAE**

- Juncus acuminatus* - Sharp-fruited Rush; Late June  
*Juncus effusus* var. *pylaei* - Soft Rush; Early June  
*Juncus gerardii* - Black-grass; Late May  
*Juncus tenuis* - Path Rush; Early June  
*Luzula campestris* var. *multiflora* - Wood Rush; Mid-April

Family **CYPERACEAE**

- Bulbostylis capillaris* - Sand-rush; Mid-August  
*Carex annectens* var. *annectens* - Sedge; Early June  
*Carex blanda* - Sedge; Early May  
*Carex cephalophora* - Sedge; Late May  
*Carex crinita* - Sedge; Mid-May  
*Carex festucacea* - Sedge; Early June  
*Carex intumescens* - Sedge; Early June  
*Carex laxiflora* var. *laxiflora* - Sedge; Early May  
*Carex lurida* - Sallow Sedge; Early June  
*Carex pellita* - Sedge; Late May  
*Carex pensylvanica* - Wood Sedge; Mid-April  
*Carex squarrosa* - Squarrose Sedge; Early June  
*Carex stipata* - Sedge; Late May  
*Carex stricta* - Tussock Sedge; Early May  
*Carex swanii* - Sedge; Mid-June  
*Carex tribuloides* - Sedge; Mid-July  
*Carex vulpinoidea* - Sedge; Early June  
*Cyperus diandrus* - Sedge; Late August  
*Cyperus echinatus* - Globose Sedge; Rare; Early July; Endangered NYS G5 S1  
 \**Cyperus esculentus* var. *macrostachyus* - Yellow Nut Sedge; Late June

*Cyperus lupulinus* ssp. *macilentus* - Flat Sedge; Early June  
*Cyperus strigosus* - False Nut Sedge; Early September  
*Eleocharis elliptica* var. *pseudoptera* - Slender Spike Rush; Early July;  
 Endangered NYS G5T?S1  
*Eleocharis obtusa* var. *obtusa* - Blunt Spike Rush; Mid-May  
*Scirpus americanus* - Three-square; Late May  
*Scirpus atrovirens* - Black Bulrush; Late June  
*Scirpus cyperinus* - Wool-grass; Early July  
 !*Scirpus pendulus* - Bulrush; Early June  
*Scirpus robustus* - Salt Marsh Bulrush; Mid-July

#### Family POACEAE

\**Agrostis gigantea* - Redtop; Late June  
*Agrostis hyemalis* - Ticklegrass; Mid-June  
 !*Agrostis perennans* - Autumn or Upland Bent; Mid-August  
 \*!*Aira caryophyllea* - Silver Hairgrass; Mid-May  
 \*!*Aira praecox* - Hairgrass; Mid-May  
 \*!*Alopecurus pratensis* - Meadow Foxtail; Mid-May  
*Andropogon gerardii* - Big Bluestem; Early August  
*Andropogon virginicus* - Broom-sedge; Mid-August  
*Anthoxanthum nitens* - Sweet Vanilla Grass; Early April  
 \**Anthoxanthum odoratum* - Sweet Vernal Grass; Mid-April  
*Aristida dichotoma* - Churchmouse Three-awn; Mid-September; Rare  
 !*Aristida longespica* var. *longespica* - Slender Three-awn; Late September  
 \**Aristida oligantha* - Prairie Three-awn; Late September  
 \**Arrhenatherum elatius* - Tall Oatgrass; Mid-June  
 \*!*Avena fatua* ssp. *sativa* - Oats; Early June  
 \**Bromus commutatus* - Hairy Chess; Early June  
 \*!*Bromus hordeaceus* - Soft Chess; Early June  
 \**Bromus inermis* - Smooth Brome; Early June  
 \*!*Bromus sterilis* - Barren Brome; Early June  
 \**Bromus tectorum* - Downy Chess; Early June  
*Calamagrostis canadensis* var. *canadensis* - Bluejoint Grass; Mid-June  
 !*Cenchrus tribuloides* - Dune Sandbur; Mid-August; Rare; Threatened NYS G5 S2  
*Cinna arundinacea* - Common Woodreed; Late August  
 \**Dactylis glomerata* - Orchard Grass; Late May  
 !*Danthonia compressa* - Northern Oatgrass; Early June  
 !*Danthonia spicata* - Poverty Oatgrass; Early June  
 !*Deschampsia flexuosa* - Common Hairgrass; Mid-June  
 \**Digitaria ischaemum* - Smooth Crab-grass; Late August  
 \**Digitaria sanguinalis* - Northern Crab-grass; Early August  
*Distichlis spicata* - Salt-grass; Early August  
 \**Echinochloa crusgalli* ssp. *crusgalli* - Barnyard Grass; Mid-July  
*Echinochloa muricata* var. *microstachya* - Cockspur Grass; Mid-September  
 \**Eleusine indica* - Goose-grass; Early August

- Elymus virginicus* var. *virginicus* - Virginia Wild-Rye; Early August  
 \*! *Elytrigia repens* - Quack-grass; Early July  
 \* *Eragrostis cilianensis* - Stinkgrass; Early August  
 \*! *Eragrostis minor* - Lovegrass; Mid-August; Uncommon  
*Eragrostis pectinacea* - Lovegrass; Late July  
*Eragrostis spectabilis* - Purple Lovegrass; Mid-July  
 \* *Festuca rubra* ssp. *rubra* - Red Fescue; Mid-May  
*Glyceria striata* - Fowl Mannagrass; Early June  
 \* *Holcus lanatus* - Common Velvet Grass; Early June  
 \*! *Hordeum jubatum* - Foxtail Barley; Mid-May  
 \*! *Hordeum murinum* ssp. *leporinum* - Wild Barley; Early June  
 \*! *Hordeum pusillum* - Little Barley; Mid-June;  
*Leersia oryzoides* - Rice Cutgrass; Early September  
*Leersia virginica* - Whitegrass; Late July  
 \* *Lolium perenne* var. *aristatum* - Italian Ryegrass; Late May  
 \* *Lolium perenne* var. *perenne* - English Ryegrass; Late May  
 \* *Lolium pratense* - Meadow Fescue; Late May  
*Muhlenbergia schreberi* - Nimble-will; Early September  
*Panicum capillare* - Witchgrass; Early September  
*Panicum clandestinum* - Deer-tongue Grass; Early July  
*Panicum dichotomiflorum* var. *dichotomiflorum* - Smooth Panic Grass; Mid-August  
*Panicum dichotomum* - Panic Grass; Late June  
*Panicum rigidulum* var. *pubescens* - Panic Grass; Early August  
*Panicum sphaerocarpon* var. *sphaerocarpon* - Panic Grass; Late July  
*Panicum virgatum* var. *spissum* - Switch-grass; Late July  
*Paspalum setaceum* var. *muhlenbergii* - Slender Beadgrass; Mid-August  
 ! *Phalaris arundinacea* - Reed Canary-grass; Early June  
 \* *Phleum pratense* var. *nodosum* - Timothy; Early June  
*Phragmites australis* - Common Reed; Late August  
*Piptochaetium avenaceum* - Black Oatgrass; Early June; Rare  
 \* *Poa annua* - Speargrass or Annual Bluegrass; Late March  
 \*! *Poa bulbosa* - Bulbous Bluegrass; Early May  
 \* *Poa compressa* - Canada Bluegrass; Late May  
 \*! *Poa nemoralis* - Wood Bluegrass; Early June  
 \* *Poa pratensis* - Kentucky Bluegrass; Early May  
 \* *Poa trivialis* - Rough Bluegrass; Early June  
 \*! *Puccinellia distans* ssp. *distans* - Alkali-grass; Early June  
*Schizachyrium scoparium* ssp. *scoparium* - Little Bluestem; Late July  
 \*! *Secale cereale* - Rye; Late May  
 \*! *Setaria faberi* - Giant Foxtail; Late July  
 ! *Setaria parviflora* - Knotroot Foxtail; Mid-August; Rare  
 \* *Setaria pumila* - Yellow Foxtail; Early August  
 \* *Setaria viridis* - Green Foxtail; Late June  
*Sorghastrum nutans* - Indian Grass; Early August  
 ! *Spartina alterniflora* - Tall Salt Marsh Cordgrass; Mid-July  
*Spartina cynosuroides* - Salt Reedgrass; Mid-July; Rare

*Spartina patens* - Salt Meadow Cordgrass; Late June  
*Spartina pectinata* - Prairie Cordgrass; Mid-August; Rare  
*Sporobolus asper* - Dropseed; Mid-August; Rare  
*Tridens flavus* - Purpletop; Early August  
*Tripsacum dactyloides* - Northern Gamma Grass; Early July; Threatened NYS G5 S2  
 \**Triticum aestivum* - Wheat; Early June; Rare  
 \*!*Vulpia myuros* - Rat-tail Fescue; Mid-June  
 +!*Zea mays* - Corn; Late July

#### Family SPARGANIACEAE

*Sparganium eurycarpum* - Giant Bur-reed; Mid-June; Rare

#### Family TYPHACEAE

*Typha angustifolia* - Narrow-leaf Cat-tail; Early June  
*Typha latifolia* - Common Cat-tail; Late May

#### Family LILIACEAE

*Allium canadense* - Wild Garlic; Late May  
 \**Allium vineale* - Field Garlic; Late June  
 \**Asparagus officinalis* - Asparagus; Mid-May  
 \**Convallaria majalis* - Lily-of-the-Valley; Early May  
 \**Chionodoxa luciliae* - Glory-of-the-snow; Late March  
*Erythronium americanum* - Trout-lily; Late March  
 \*!*Galanthus nivalis* - Snowdrops; Mid to late February  
 \**Hemerocallis fulva* - Orange Day Lily; Mid-June  
 \**Hosta ventricosa* - Blue Hosta Lily; Mid-July  
 \*!*Hyacinthoides nonscripta* - English Bluebell; Early May  
*Hypoxis hirsuta* - Yellow Star-grass; Mid-May  
*Lilium canadense* ssp. *canadense* - Canada Lily; Early July; Rare  
*Lilium superbum* - Turk's Cap Lily; Mid-July; Rare  
*Maianthemum canadense* - Canada Mayflower; Early May  
*Maianthemum racemosum* - False Solomon's-seal; Mid-May  
 \**Muscari botryoides* - Grape Hyacinth; Late March  
 \*!*Narcissus pseudo-narcissus* - Daffodil; Late March  
 \*!*Ornithogalum umbellatum* - Star-of-Bethlehem; Early May  
 !*Polygonatum biflorum* - Small Solomon's Seal; Late May  
*Polygonatum commutatum* - Large Solomon's Seal; Late May; Uncommon  
 \*!*Scilla siberica* - Squill; Early March  
 +!*Trillium grandiflorum* - White Trillium; Late April (Extirpated)  
*Uvularia perfoliata* - Bellwort; Early May; Rare  
*Uvularia sessilifolia* - Sessile-leaved Bellwort; Mid-April  
*Veratrum viride* - False Hellebore; Mid-May

Family **IRIDACEAE**

\*!*Crocus* sp. - Crocus; Early March

*Iris prismatica* - Slender Blue Flag Iris; Mid-May; Uncommon;  
Threatened NYS G5/G4 S2

\*!*Iris pseudacorus* - Yellow Iris; Mid-May

*Iris versicolor* - Blue Flag Iris; Early May; Uncommon

*Sisyrinchium angustifolium* - Stout Blue-eyed Grass; Mid-May

!*Sisyrinchium montanum* var. *montanum* - Blue-eyed Grass; Late April

Family **AGAVACEAE**

\*!*Yucca filamentosa* - Yucca; Late June

Family **SMILACACEAE**

*Smilax glauca* - Sawbrier; Early June

*Smilax herbacea* - Carrion-flower; Mid-May

*Smilax rotundifolia* - Greenbrier; Mid-May

Family **DIOSCOREACEAE**

*Dioscorea villosa* - Wild Yamroot; Mid-June; Rare

Family **ORCHIDACEAE**

\*!*Epipactis helleborine* - Helleborine; Early July

*Spiranthes cernua* - Nodding Lady's Tresses; Late August (no specimen collected)  
(Extirpated)

Species	Common Name
<i>Acalypha gracilens</i>	Three-seeded Mercury
<i>Actaea pachypoda</i>	White Baneberry
<i>Agalinis maritima</i>	Seaside Gerardia
<i>Agalinis purpurea</i>	Gerardia
<i>Agalinis tenuifolia</i> var. <i>tenuifolia</i>	Slender Gerardia
<i>Amelanchier laevis</i>	Smooth Shadbush ( <i>Tree</i> )
<i>Anaphalis margaritacea</i>	Pearly-everlasting
<i>Aquilegia canadensis</i>	Columbine
<i>Arctostaphylos uva-ursi</i>	Bearberry ( <i>Shrub</i> )
<i>Aronia melanocarpa</i>	Black Chokeberry ( <i>Shrub</i> )
<i>Aster lanceolatus</i> var. <i>lanceolatus</i>	Eastern Lined Aster
<i>Aster puniceus</i> var. <i>puniceus</i>	Purple-stemmed Aster
<i>Aster undulatus</i>	Wavy-leaf Aster
<i>Athyrium filix-femina</i> var. <i>angustum</i>	Northern Lady Fern
<i>Aureolaria virginica</i>	Downy False-foxglove
<i>Baptista tinctoria</i>	Yellow Wild Indigo
<i>Bartonia virginica</i>	Bartonia
<i>Botrychium dissectum</i>	Dissected Grape Fern
<i>Calamagrostis cinnoides</i>	Reedgrass
<i>Callitriche palustris</i>	Water-starwort
<i>Cardamine x maxima</i>	Large Toothwort
<i>Carex alata</i>	Sedge
<i>Carex amphibola</i> var. <i>turgida</i>	Sedge
<i>Carex aquatilis</i>	Sedge
<i>Carex bebbii</i>	Sedge
<i>Carex bushii</i>	Sedge
<i>Carex buxbaumii</i>	Sedge
<i>Carex conoidea</i>	Sedge
<i>Carex cristatella</i>	Sedge
<i>Carex digitalis</i>	Sedge
<i>Carex granularis</i> var. <i>granularis</i>	Sedge
<i>Carex gynandra</i>	Sedge
<i>Carex hirtifolia</i>	Sedge
<i>Carex normalis</i>	Sedge
<i>Carex pallescens</i>	Sedge
<i>Carex polymorpha</i>	Sedge
<i>Carex projecta</i>	Sedge
<i>Carex rosea</i>	Sedge
<i>Carex scoparia</i> var. <i>scoparia</i>	Sedge
<i>Carex seorsa</i>	Sedge

Appendix D. Native Plant Species Extirpated from Pelham Bay Park, Bronx County, NY from 1948-1993

Species	Common Name
<i>Carex trisperma</i> var. <i>undetermined</i>	Sedge
<i>Carex vestita</i>	Sedge
<i>Chrysosplenium americanum</i>	Golden Saxifrage
<i>Cinna latifolia</i>	Drooping Woodreed
<i>Cirsium pumilum</i>	Small Bull Thistle
<i>Comandra umbellata</i>	Bastard Toadflax
<i>Comptonia peregrina</i>	Sweet-fern ( <i>Shrub</i> )
<i>Crotalaria sagittalis</i>	Rattlebox
<i>Cuscuta gronovii</i>	Dodder
<i>Cyperus filicinus</i>	Flat Sedge
<i>Cyperus flavescens</i>	Flat Sedge
<i>Cyperus lupulinus</i> ssp. <i>lupulinus</i>	Flat Sedge
<i>Dennstaedtia punctiloba</i>	Hay-scented Fern
<i>Desmodium humifusum</i>	Tall Tick-trefoil
<i>Dryopteris intermedia</i>	Wood Fern
<i>Echinochloa muricata</i> var. <i>muricata</i>	Cockspur Grass
<i>Eleocharis elliptica</i> var. <i>elliptica</i>	Slender Spikerush
<i>Eleocharis halophila</i>	Spikerush
<i>Elymus canadensis</i>	Canada Wild-rye
<i>Elymus villosus</i> var. <i>arkansanus</i>	Wild-rye
<i>Epifagus virginiana</i>	Beech-drops
<i>Eragrostis capillaris</i>	Lacegrass
<i>Erigeron pulchellus</i>	Robin's Plantain
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed
<i>Eupatorium pilosum</i>	Ragged Boneset
<i>Fimbristylis autumnalis</i>	Sedge-rush
<i>Galium tinctorium</i>	Bedstraw
<i>Helianthemum canadense</i>	Frostweed
<i>Helianthus strumosus</i>	Wood-sunflower
<i>Heliopsis helianthoides</i>	Ox-eye
<i>Hieracium paniculatum</i>	Hawkweed
<i>Hieracium scabrum</i>	Hawkweed
<i>Hydrophyllum virginianum</i>	Eastern Waterleaf
<i>Hypericum boreale</i>	No. Dwarf St. John's-wort
<i>Juncus articulatus</i>	Jointed Rush
<i>Juncus bufonius</i>	Toad-rush
<i>Juncus dudleyi</i>	Dudley's Rush
<i>Juncus scirpoides</i>	Sedge Rush
<i>Krigia biflora</i>	Two-flowered Cynthia
<i>Laportia canadensis</i>	Wood-nettle

Appendix D (cont.). Native Plant Species Extirpated from Pelham Bay Park, Bronx County, NY from 1948-1993

Species	Common Name
<i>Lathyrus japonicus</i> var. <i>maritimus</i>	Beach Pea
<i>Lechea pulchella</i> var. <i>pulchella</i>	Pinweed
<i>Lespedeza violacea</i>	Bush-clover
<i>Lindernia dubia</i> var. <i>dubia</i>	False-pimpernel
<i>Linum virginianum</i>	Yellow Wild Flax
<i>Lobelia spicata</i>	Pale-spiked Lobelia
<i>Medeola virginiana</i>	Indian Cucumber-root
<i>Moehringia lateriflora</i>	Grove Sandwort
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Muhlenbergia mexicana</i>	Satin-grass
<i>Oxalis violacea</i>	Violet Wood-sorrel
<i>Panax trifolius</i>	Dwarf Ginseng
<i>Panicum acuminatum</i>	Panic Grass
<i>Panicum boscii</i>	Panic Grass
<i>Panicum latifolium</i>	Panic Grass
<i>P. oligoanthes</i> var. <i>scribnerianum</i>	Panic Grass
<i>Panicum sabulorum</i> var. <i>thinum</i>	Panic Grass
<i>Panicum scabriusculum</i>	Panic Grass
<i>Panicum verrucosum</i>	Panic Grass
<i>Physalis heterophylla</i>	Clammy Ground-cherry
<i>Physostegia virginiana</i>	False Dragonhead
<i>Plantago maritima</i> ssp. <i>juncooides</i>	Seaside Plantain
<i>Plantago virginica</i>	Hoary Plantain
<i>Plantanthera lacera</i>	Ragged Fringed Orchis
<i>Polygala sanguinea</i>	Rose Milkwort
<i>Polygala verticillata</i> var. <i>ambigua</i>	Whorled Milkwort
<i>Polygonum erectum</i>	Erect Knotweed
<i>P. hydropiperoides</i> var. <i>hydropiperoides</i>	Mild Water-pepper
<i>P. ramosissimum</i> var. <i>prolificum</i>	Salt Marsh Knotweed
<i>Polystichum acrostichoides</i>	Christmas Fern
<i>Potentilla canadensis</i>	Dwarf Cinquefoil
<i>Prunus pumila</i> var. <i>undetermined</i>	Sand Cherry ( <i>Shrub</i> )
<i>Ptilimnium capillaceum</i>	Mock Bishop's Weed
<i>Rosa carolina</i> var. <i>undetermined</i>	Pasture Rose ( <i>Shrub</i> )
<i>Rubus setosus</i>	Bog Blackberry
<i>Rudbeckia laciniata</i>	Cut-leaf Coneflower
<i>Salicornia bigelovii</i>	Glasswort
<i>Saxifraga virginiana</i>	Early Saxifrage
<i>Selaginella apoda</i>	Creeping Spikemoss
<i>Selaginella rupestris</i>	Rock Spikemoss

Appendix D (cont.). Native Plant Species Extirpated from Pelham Bay Park, Bronx County, NY from 1948-1993

Species	Common Name
<i>Sisyrinchium atlanticum</i>	Blue-eyed Grass
<i>Solidago nemoralis</i>	Rough Goldenrod
<i>Solidago patula</i>	Spreading Goldenrod
<i>Solidago sempervirens var. mexicana</i>	Seaside Goldenrod
<i>Solidago ulmifolia</i>	Elm-leaf Goldenrod
<i>Sparganium americanum</i>	Bur-reed
<i>Spiraea tomentosa var. tomentosa</i>	Steeplebush ( <i>Shrub</i> )
<i>Spiranthes vernalis</i>	Spring Lady's Tresses
<i>Stellaria longifolia</i>	Needle-leaf Starwort
<i>Thalictrum thalictroides</i>	Rue anemone
<i>Toxicodendron vernix</i>	Poison Sumac ( <i>Small Tree</i> )
<i>Viola affinis</i>	LeConte Violet
<i>Viola conspersa</i>	American Dog Violet
<i>Viola cucullata</i>	Blue Marsh Violet
<i>Viola palmata</i>	Early Blue Violet
<i>Viola sagittata</i>	Arrow-leaf Violet
<i>Viola x porteriana</i>	Violet
<i>Vulpia octoflora</i>	Six-weeks Fescue
<i>Zizia aptera</i>	Golden Alexanders
<i>Zizia aurea</i>	Golden Alexanders

Appendix D (cont.). Native Plant Species Extirpated from Pelham Bay Park, Bronx County, NY from 1948-1993

## Appendix E. Historical and extant flora of New York City.

### Key to Symbols Used in Appendix E:

- \* - A non-native (alien), uncultivated species that is established in the local flora.
- ^ - Rare escape or introduced species that is not widespread and often does not persist in the local flora.
- (No symbol) - A native species that is historically and/or currently found in that borough.

Each species is classified using five different symbols that indicate occurrence in a particular borough:

- x** - A pre-1980 county record for the species is vouchered with a herbarium specimen. The species is considered to be extirpated in New York City.
- XX** - A county record for a species is either vouchered with a herbarium specimen, listed in a published paper or a report, or seen by a reliable field worker since 1980. The species is considered extant in New York City.
- BB** - A woody species that was seen and/or collected by trained volunteers and scientists of the Metropolitan Flora Project of the Brooklyn Botanic Garden since 1990.
- C** - A species that has been seen and/or collected by members of the Metropolitan Flora Project of the Brooklyn Botanic Garden prior to 1990. The year in which the species was identified or collected was not published. The species is believed to be extirpated in New York City.
- RE** - Recently Extirpated. A species that has been extirpated from a particular borough or county since 1990.

Following indications of occurrence in New York City, the two counties on Long Island and Westchester County, rankings developed by The Nature Conservancy are provided for rare plant species status both globally (**G1**, imperiled through **G5**, secure) and statewide (**S1**, imperiled through **S5**, secure) as described in Mitchell and Tucker (1997).

Finally, the New York State legal status is given according to the following code developed by the Natural Heritage Program (1998):

- V** - Exploitable and vulnerable. The species is likely to become threatened in the near future throughout all or a significant portion of its range within the state if causal factors continue unchecked.
- U** - An unprotected species (Applies only to extirpated species).
- E** - An endangered species exists in 5 or fewer sites with fewer than 1,000 individuals known in total.
- T** - A threatened species exists in 6 to 10 sites in the state with fewer than 3,000 individuals known in total.
- R** - A rare species exists in 20-35 extant sites with 3,000 to 5,000 individuals known.

Appendix E. Historical and Extant Flora of New York City

Family	Species	Common Name	New York City					L.I.		WC	Status
			Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	
<b>LYCOPODIACEAE</b>	<i>Huperzia lucidula</i>	Shining firmoss, clubmoss				xC	xC	x	x		
LYCOPODIACEAE	<i>Lycopodiella alopecuroides</i>	Foxtail clubmoss			xC			x	XX		
LYCOPODIACEAE	<i>Lycopodiella appressum</i>	Swamp clubmoss	C		xC	x	xC	x	x		
LYCOPODIACEAE	<i>Lycopodiella inundata</i>	Bog clubmoss					RE		x		
LYCOPODIACEAE	<i>Lycopodium clavatum</i>	Running-cedar					RE		x	x	
LYCOPODIACEAE	<i>Lycopodium digitatum</i>	Running pine, Wolf's claw	C	C			XX	x	x		
LYCOPODIACEAE	<i>Lycopodium obscurum</i>	Ground pine, Eastern tree clubmoss	xC	C		XX	XX	x	x	x	
<b>SELAGINELLACEAE</b>	<i>Selaginella apoda</i>	Creeping spikemoss	xC				RE		x		
SELAGINELLACEAE	<i>Selaginella rupestris</i>	Rock spikemoss	xC	xC			RE	x	x		
<b>IOSETACEAE</b>	<i>Isoetes engelmannii</i>	Engelmann's quillwort	xC				RE			x	
IOSETACEAE	<i>Isoetes riparia</i>	Quillwort	xC							x	G4G5/S2/U
<b>EQUISETACEAE</b>	<i>Equisetum arvense</i>	Field horsetail, Common horsetail	XX	XX	XX	XX	XX		x	x	
EQUISETACEAE	<i>Equisetum fluviatile</i>	Water horsetail, Pipes	xC			xC			x		
EQUISETACEAE	<i>Equisetum hyemale</i> var. <i>affine</i>	Scouring rush				XX	XX			x	
EQUISETACEAE	<i>Equisetum litorale</i>	Shore horsetail	x						x		
<b>OPHIOGLOSSACEAE</b>	<i>Botrychium dissectum</i>	Cut-leaf grape fern	xC	xC	xC	xC	XX	x	x	x	
OPHIOGLOSSACEAE	<i>Botrychium multifidum</i>	Leathery grape fern					RE		x		
OPHIOGLOSSACEAE	<i>Botrychium oneidense</i>	Blunt-lobed fern, Oncida grape fern	xC					x	XX	x	G4/S1S3/V
OPHIOGLOSSACEAE	<i>Botrychium virginianum</i>	Rattlesnake fern	xC	xC	xC	XX	XX	x	x	x	
OPHIOGLOSSACEAE	<i>Ophioglossum pusillum</i>	Adder's tongue	x	C	x	xC		x	x	x	
<b>OSMUNDACEAE</b>	<i>Osmunda cinnamomea</i>	Cinnamon fern	XX	xC	xC	XX	XX	x	x	x	
OSMUNDACEAE	<i>Osmunda claytoniana</i>	Interrupted fern	XX	xC	xC	xC	XX	x	x	x	
OSMUNDACEAE	<i>Osmunda regalis</i> var. <i>spectabilis</i>	Royal fern, Flowering fern	XX	xC	xC	XX	XX	x	x	x	
<b>PTERIDACEAE</b>	<i>Adiantum pedatum</i>	Maidenhair fern	xC	xC	xC	xC	XX	x	x	x	
PTERIDACEAE	<i>Cheilanthes lanosa</i>	Woolly lip-fern, Hairy lip-fern	xC	xC					XX	x	G5/S1/U
PTERIDACEAE	<i>Pellaea atropurpurea</i>	Purple cliff brake	xC	xC						x	
<b>DENNSTADTIACEAE</b>	<i>Dennstaedtia punctilobula</i>	Hay-scented fern	XX	xC	xC	xC	XX	x	x	x	
DENNSTADTIACEAE	<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	Bracken, Brake-fern	XX	x	x	XX	XX	x	x	x	
<b>THELPТЕРIDACEAE</b>	<i>Phegopteris connectilis</i>	Northern beech fern	xC			xC	RE		x	x	
THELPТЕРIDACEAE	<i>Phegopteris hexagonoptera</i>	Broad beech fern	XX	xC	xC	xC	XX	x	x	x	
THELPТЕРIDACEAE	<i>Thelypteris noveboracensis</i>	New York fern	XX	xC	xC	xC	XX	x	x	x	
THELPТЕРIDACEAE	<i>Thelypteris palustris</i>	Marsh fern	XX	xC	xC	XX	XX	x	x	x	
THELPТЕРIDACEAE	<i>Thelypteris simulata</i>	Massachusetts fern	xC	x	xC	XX	RE	x	x	x	
<b>BLECHNACEAE</b>	<i>Woodwardia areolata</i>	Netted chain fern	xC		xC	XX	XX	x	x		
BLECHNACEAE	<i>Woodwardia virginica</i>	Virginia chain fern				xC	XX	x	x	x	

Appendix E. Historical and Extant Flora of New York City

Family	Species	Common Name	Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	Status
<b>ASPLENIACEAE</b>	<i>Asplenium platyneuron</i>	Ebony spleenwort	XX	XX	xC	xC	XX	x	x	x	
ASPLENIACEAE	<i>Asplenium platyneuron x rhizophyllum</i>	Walking spleenwort	C								
ASPLENIACEAE	<i>Asplenium rhizophyllum</i>	Walking fern	x							x	
ASPLENIACEAE	<i>Asplenium ruta-muraria</i>	Wall-rue spleenwort	xC								
ASPLENIACEAE	<i>Asplenium trichomanes</i>	Maidenhair spleenwort	xC	xC						x	
ASPLENIACEAE	<i>Athyrium filix-femina</i> var. <i>angustum</i>	Northern lady-fern	XX	XX	XX	C	XX				
	var. <i>asplenoides</i>	Lady fern	x	x	x	XX	x	x	x	x	
ASPLENIACEAE	<i>Cystopteris fragilis</i>	Common fragile fern	xC	xC			XX		x	x	
ASPLENIACEAE	<i>Cystopteris protrusa</i>	Lowland fragile fern					XX		x		G5/S1/E
ASPLENIACEAE	<i>Deparia acrostichoides</i>	Silvery spleenwort	xC	x	xC	xC	XX	x	x	x	
ASPLENIACEAE	<i>Dryopteris bootii</i>	Boott's wood fern			x	C	xC	x	x	x	
ASPLENIACEAE	<i>Dryopteris carthusiana</i>	Spinulose wood fern	XX		xC	xC	xC	x	x	x	
ASPLENIACEAE	<i>Dryopteris celsa x cristata</i>	Crested log fern					xC	x	x	x	G4/S1/V
ASPLENIACEAE	<i>Dryopteris celsa x goldiana</i>	Log fern	xC				xC			x	
ASPLENIACEAE	<i>Dryopteris clintoniana</i>	Clinton's shield fern	x				RE		x	x	
ASPLENIACEAE	<i>Dryopteris cristata</i>	Crested wood fern	x	x	x	x	XX	x	x	x	
ASPLENIACEAE	<i>Dryopteris goldiana</i>	Giant wood fern, Goldie's fern	xC				XX			x	
ASPLENIACEAE	<i>Dryopteris intermedia</i>	Fancy fern, Common wood fern	XX			xC	XX	x	x	x	
ASPLENIACEAE	<i>Dryopteris intermedia x marginalis</i>	Glandular marginal fern			x		C				
ASPLENIACEAE	<i>Dryopteris marginalis</i>	Marginal wood fern	xC	xC	xC	xC	RE	x	x	x	
ASPLENIACEAE	<i>Dryopteris neowherryi</i>	Wood fern					xC				
ASPLENIACEAE	<i>Dryopteris pittsfordensis</i>	Wood fern					xC				
ASPLENIACEAE	<i>Dryopteris slossonae</i>	Crested Marginal Fern	xC				xC	x			
ASPLENIACEAE	<i>Dryopteris triploidea</i>	Wood fern			xC		xC	x	x	x	
ASPLENIACEAE	<i>Dryopteris uliginosa</i>	Spinulose crested wood fern					xC				
ASPLENIACEAE	<i>Gymnocarpium dryopteris</i>	Oak fern	xC						x		
ASPLENIACEAE	<i>Matteuccia struthiopteris</i>	Ostrich Fern	XX				RE				
ASPLENIACEAE	<i>Onoclea sensibilis</i>	Sensitive fern	XX	xC	xC	XX	XX	x	x	x	
ASPLENIACEAE	<i>Polystichum acrostichoides</i>	Christmas fern, Shield fern	XX	xC	xC	xC	XX	x	x	x	
ASPLENIACEAE	<i>Woodsia ilvensis</i>	Rusty woodsia	xC							x	
ASPLENIACEAE	<i>Woodsia obtusa</i>	Blunt-lobed woodsia	XX			x	RE	x	x	x	
<b>POLYPODIACEAE</b>	<i>Polypodium virginianum</i>	Rock polypody, Common polypody	XX	xC	xC	xC	XX	x	x	x	
<b>SALVINIACEAE</b>	* <i>Salvinia minima</i>	Water fern					xC				
<b>AZOLLACEAE</b>	<i>Azolla caroliniana</i>	Water fern, Mosquito fern	xC	xC		xC	RE		x		
<b>GINKGOACEAE</b>	* <i>Ginkgo biloba</i>	Ginkgo, Maidenhair tree	XX	XX	XX	XX	XX	XX	XX	XX	

Appendix E. Historical and Extant Flora of New York City

Family	Species	Common Name	Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	Status
<b>TAXACEAE</b>	* <i>Taxus baccata</i>	English yew					BB	BB	x		
TAXACEAE	<i>Taxus canadensis</i>	American yew, Ground Hemlock	XX	x	C	RE	XX		xC	x	
TAXACEAE	* <i>Taxus cuspidata</i>	Japanese yew	XX	XX	BB	BB	BB	BB	BB	BB	
<b>PINACEAE</b>	<i>Abies balsamea</i>	Balsam fir				x				x	
PINACEAE	* <i>Larix laricina</i>	Tamarack, American larch	XX	XX	C			C	x	x	
PINACEAE	* <i>Picea abies</i>	Norway spruce	XX	XX	XX	C	BB	BB	BB	BB	
PINACEAE	<i>Pinus echinata</i>	Shortleaf pine, Yellow pine				C	RE		xC		G5/S1/E
PINACEAE	* <i>Pinus nigra</i>	Austrian pine	XX	XX		XX			XX	x	
PINACEAE	<i>Pinus resinosa</i>	Red pine, Canadian pine	XX	C			BB	C	BB	BB	
PINACEAE	<i>Pinus rigida</i>	Pitch pine	XX	xC	BB	BB	BB	BB	BB	BB	
PINACEAE	<i>Pinus strobus</i>	White pine	XX	XX	xC	xC	BB	BB	BB	BB	
PINACEAE	* <i>Pinus sylvestris</i>	Scotch pine	XX			XX	XX	C	BB		
PINACEAE	<i>Pinus virginiana</i>	Virginia pine, Scrub pine				RE	BB	xC		x	G5/S3/E
PINACEAE	<i>Tsuga canadensis</i>	Hemlock, Northern hemlock	XX	XX		BB	XX	BB	BB	BB	
<b>TAXODIACEAE</b>	* <i>Taxodium distichum</i>	Bald Cypress	XX								
<b>CUPRESSACEAE</b>	<i>Chamaecyparis thyoides</i>	Atlantic white cedar	x		x	x	BB	BB	BB	x	
CUPRESSACEAE	<i>Juniperus communis</i> var. <i>depressa</i>	Common juniper	XX		x		BB	C	BB		
CUPRESSACEAE	<i>Juniperus virginiana</i>	Red cedar, Savin	XX	xC	BB	BB	BB	BB	BB	BB	
CUPRESSACEAE	<i>Thuja occidentalis</i>	Northern white cedar, Arbor-Vitae	C		C	RE		BB	BB	BB	
<b>MAGNOLIACEAE</b>	<i>Liriodendron tulipifera</i>	Tulip tree, Tulip poplar	XX	XX	BB	BB	BB	BB	BB	BB	
MAGNOLIACEAE	<i>Magnolia acuminata</i>	Cucumber tree, Cucumber magnolia	xC	XX	xC	BB				x	
MAGNOLIACEAE	<i>Magnolia virginiana</i>	Sweet-bay magnolia	x		C	x	BB	BB	BB	x	G5/S1/U
<b>CALYCANTHACEAE</b>	* <i>Calycanthus floridus</i> var. <i>glaucus</i>	Sweet-shrub, Strawberry-bush	C	C			XX				
<b>LAURACEAE</b>	<i>Lindera benzoin</i>	Spicebush, Benzoin-bush	XX	BB	BB	BB	BB	BB	BB	BB	
LAURACEAE	<i>Sassafras albidum</i>	Sassafras	XX	BB	BB	BB	BB	BB	BB	BB	
<b>SAURURACEAE</b>	<i>Saururus cernuus</i>	Lizard's tail	XX	XX	C		XX		x	x	
<b>ARISTOLOCHIACEAE</b>	* <i>Aristolochia clematitis</i>	Birthwort	XX			C	C				
ARISTOLOCHIACEAE	<i>Aristolochia serpentaria</i>	Virginia snakeroot, Serpentry	xC	xC	C	xC	RE			x	G5/S1/U
ARISTOLOCHIACEAE	<i>Asarum canadense</i>	Wild ginger	XX			x	XX			x	
<b>NYMPHAEACEAE</b>	<i>Nuphar advena</i>	Yellow pond lily, cow lily	XX			xC	xC		x	x	
NYMPHAEACEAE	<i>Nuphar microphylla</i>	Yellow pond lily, cow lily	xC			C	XX				
NYMPHAEACEAE	<i>Nuphar rubrodisca</i>	Yellow pond lily, cow lily	x				RE				
NYMPHAEACEAE	<i>Nuphar variegata</i>	Yellow pond lily, cow lily	xC				XX	x	x	x	
NYMPHAEACEAE	<i>Nymphaea odorata</i>	Water-lily, Fragrant water-lily	C	C			C				
	ssp. <i>odorata</i>	Water-lily, Fragrant water-lily	XX			x	x	x	x	x	

Appendix E. Historical and Extant Flora of New York City

Family	Species	Common Name	Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	Status
<b>CABOMBACEAE</b>	<i>Brasenia schreiberi</i>	Water-shield, Purple wen-dock			xC	C	RE	x	x		
CABOMBACEAE	* <i>Caboma caroliniana</i>	Fanwort, Carolina water-shield				C	XX		x		
<b>CERATOPHYLLACEAE</b>	<i>Ceratophyllum demersum</i>	Coontail, Hornwort	C				x		x		
CERATOPHYLLACEAE	<i>Ceratophyllum echinatum</i>	Coontail, Prickly hornwort	C				XX		x	x	G4/S2S3/U
<b>RANUNCULACEAE</b>	<i>Actaea pachypoda</i>	White baneberry, White cohosh	XX	C		xC	XX	x	x	x	
RANUNCULACEAE	<i>Actaea spicata</i> ssp. <i>rubra</i>	Baneberry, Black cohosh				RE	XX				
RANUNCULACEAE	<i>Anemone canadensis</i>	Canada anemone, Windflower	xC	xC					x	x	
RANUNCULACEAE	<i>Anemone cylindria</i>	Thimbleweed, Thimble-head		xC					x	x	
RANUNCULACEAE	<i>Anemone quinquefolia</i>	Wood anemone, Snowdrops	XX	xC	C	xC	XX	x	x	x	
RANUNCULACEAE	<i>Anemone virginiana</i> var. <i>alba</i>	Thimbleweed, Tall anemone				xC				x	
	var. <i>virginiana</i>	Thimbleweed, Tall anemone	XX	xC	xC	xC	RE	x	x	x	
RANUNCULACEAE	<i>Aquilegia canadensis</i>	Wild columbine, Red columbine	XX	xC	xC	xC	XX	x	x	x	
RANUNCULACEAE	* <i>Aquilegia vulgaris</i>	Blue columbine, Purple columbine	XX				RE		x		
RANUNCULACEAE	<i>Callia palustris</i>	Marsh marigold, cowslip	XX	XX	XX	xC	XX	x	x	x	
RANUNCULACEAE	<i>Cimicifuga racemosa</i>	Black snakeroot, Black cohosh	XX	XX		xC	XX	x	x	x	
RANUNCULACEAE	<i>Clematis ochroleuca</i>	Curly-heads, Silky leather-flower			xC		RE				
RANUNCULACEAE	* <i>Clematis terniflora</i>	Yam-leaf clematis, Virgin's bower	XX			BB	BB	BB	BB	BB	
RANUNCULACEAE	<i>Clematis virginiana</i>	Virgin's bower, Traveler's joy	XX	xC	xC	xC	BB	xC	BB	BB	
RANUNCULACEAE	* <i>Consolida ajacis</i>	Rocket larkspur		xC		xC	xC		x	x	
RANUNCULACEAE	<i>Coptis trifolia</i>	Goldthreads, Canker-root					RE				
RANUNCULACEAE	* <i>Helleborus viridus</i>	Green hellebore			xC	C					
RANUNCULACEAE	<i>Hepatica nobilis</i> var. <i>obtusata</i>	Blunt-lobed hepatica	xC	C		xC	RE	x	x	x	
RANUNCULACEAE	<i>Hydrastis canadensis</i>	Golden-seal, Orange-root	XX								
RANUNCULACEAE	<i>Ranunculus abortivus</i>	Kidneyleaf crowfoot	C	C	C	C	C			x	
	var. <i>abortivus</i>	Kidneyleaf crowfoot	XX	x		XX	XX	x	x	x	
	var. <i>eucyclus</i>	Kidneyleaf crowfoot		x				x			
RANUNCULACEAE	* <i>Ranunculus acris</i>	Common buttercup, Tall buttercup	XX	XX	XX	XX	XX	x	x	x	
RANUNCULACEAE	<i>Ranunculus ambigens</i>	American Spearwort	x				RE		x	x	
RANUNCULACEAE	* <i>Ranunculus arvensis</i>	Corn crowfoot		xC							
RANUNCULACEAE	* <i>Ranunculus bulbosus</i>	Bulbosus crowfoot	XX	xC	xC	XX	XX	x	x	x	
RANUNCULACEAE	<i>Ranunculus cymbalaria</i>	Seaside crowfoot, Sea buttercup				xC			x		G5/S1/E
RANUNCULACEAE	<i>Ranunculus fascicularis</i>	Early buttercup	C			C	RE	x			
RANUNCULACEAE	* <i>Ranunculus ficaria</i> var. <i>bulbifera</i>	Lesser celandine	XX			XX	XX	x	x		
RANUNCULACEAE	<i>Ranunculus flabellaris</i>	Yellow water-crowfoot			xC	xC	RE		x		

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RANUNCULACEAE	<i>Ranunculus hispidus</i> var. <i>caricetorum</i>	Buttercup, Crowfoot	XX	xC		xC		x	x	x	
	var. <i>hispidus</i>	Buttercup, Crowfoot	XX	xC		xC	RE	x	x	x	
	var. <i>nitidus</i>	Swamp buttercup, Crowfoot	XX			xC					G5/S1/U
RANUNCULACEAE	<i>Ranunculus micranthus</i>	Small-flowered crowfoot	xC						x	x	G5/S2/U
RANUNCULACEAE	* <i>Ranunculus parviflorus</i>	Small-flowered crowfoot	x	C						x	
RANUNCULACEAE	<i>Ranunculus pensylvanicus</i>	Bristly buttercup, Bristly crowfoot	x	C			RE	x	x	x	
RANUNCULACEAE	<i>Ranunculus pusillus</i>	Spearwort		C			RE	x			G5/SX/U
RANUNCULACEAE	<i>Ranunculus recurvatus</i>	Hooked or Rough buttercup	XX	C	C	XX	XX		x	x	
RANUNCULACEAE	* <i>Ranunculus repens</i>	Creeping buttercup	xC		C	XX	XX	x	x	x	
RANUNCULACEAE	* <i>Ranunculus sardous</i>	Crowfoot		x							
RANUNCULACEAE	* <i>Ranunculus sceleratus</i>	Cursed crowfoot, Blistervort	XX	XX	XX	xC	XX	x	x	x	
RANUNCULACEAE	<i>Ranunculus trichophyllus</i>	White water-crowfoot				xC	RE	x	x	x	
RANUNCULACEAE	* <i>Thalictrum aquilegifolium</i>	Garden meadow-rue	x								
RANUNCULACEAE	<i>Thalictrum dioicum</i>	Early meadow-rue	XX	xC	xC	XX	XX	x	x	x	
RANUNCULACEAE	<i>Thalictrum pubescens</i>	Tail meadow-rue, Late meadow-rue	XX	xC	xC	xC	XX	x	x	x	
RANUNCULACEAE	<i>Thalictrum revolutum</i>	Waxy meadow-rue	XX	xC	xC	xC	RE	x	x	x	
RANUNCULACEAE	<i>Thalictrum thalictroides</i>	Rue anemone, Woods-potato	xC	C	C	xC	RE	x		x	
RANUNCULACEAE	<i>Trollius laxus</i>	Spreading globeflower	xC								G4/S3/T
BERBERIDACEAE	* <i>Berberis thunbergii</i>	Japanese barberry	XX	BB	BB	XX	XX	BB	BB	BB	
BERBERIDACEAE	* <i>Berberis vulgaris</i>	Common or European barberry				XX	RE	x	BB	x	
BERBERIDACEAE	<i>Caulophyllum thalictroides</i>	Blue cohosh, Papoose-root	XX	C			XX		x	x	
BERBERIDACEAE	<i>Podophyllum peltatum</i>	May-apple, Wild mandrake	XX			XX	XX			x	
LARDIZABALACEAE	* <i>Akebia quinata</i>	Five-leaf akebia	x					BB		BB	
MENISPERMACEAE	<i>Menispermum candense</i>	Moonseed, Yellow parilla	XX	C	C	RE	BB		BB	BB	
PAPAVERACEAE	* <i>Argemone mexicana</i>	Yellow poppy					C				
PAPAVERACEAE	* <i>Chelidonium majus</i>	Greater celandine, Swallow-wort	XX	C		xC	XX	x	x	x	
PAPAVERACEAE	* <i>Eschscholzia californica</i>	California poppy		C					x		
PAPAVERACEAE	* <i>Galucium flavum</i>	Horned poppy		C					x		
PAPAVERACEAE	* <i>Macleaya cordata</i>	Plume-poppy, Tree celandine	XX								
PAPAVERACEAE	* <i>Papaver dubium</i>	Cornfield poppy, Blind eyes				xC	RE				
PAPAVERACEAE	* <i>Papaver rhoeas</i>	Corn poppy, Shirley poppy		xC					x		
PAPAVERACEAE	* <i>Papaver somniferum</i>	Opium poppy	xC			xC	XX		x		
PAPAVERACEAE	<i>Sanguinaria canadensis</i>	Bloodroot, Puccoon	XX	C	xC	xC	XX	x	x	x	
FUMARIACEAE	<i>Corydalis aurea</i>	Golden corydalis		C				x			G5/S2/T
FUMARIACEAE	<i>Corydalis sempervirens</i>	Pink corydalis, Rock harlequin	xC	xC					x	x	

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FUMARIACEAE	<i>Dicentra canadensis</i>	Squirrel-corn, Turkey-corn	xC				RE				
FUMARIACEAE	<i>Dicentra cucullaria</i>	Dutchman's breeches	XX	XX			RE			x	
FUMARIACEAE	<i>Dicentra eximia</i>	Bleeding-heart	xC				XX				
FUMARIACEAE	* <i>Fumaria officinalis</i>	Fumitory, Earth smoke	xC	xC						x	
PLATANACEAE	<i>Platanus occidentalis</i>	Sycamore, Plane-tree	XX	XX	XX	XX	BB	BB	BB	BB	
PLATANACEAE	* <i>Platanus hybrida</i>	London plane-tree	XX	XX	XX	XX	XX	XX	XX	XX	
HAMAMELIDACEAE	<i>Hamamelis virginiana</i>	Witch hazel	XX	XX	BB	xC	BB	BB	BB	BB	
HAMAMELIDACEAE	<i>Liquidambar styraciflua</i>	Sweet-gum, Red gum	XX	XX	xC	BB	BB	BB	BB	BB	
ULMACEAE	<i>Celtis occidentalis</i>	Hackberry, Sugarberry	XX	BB	BB	BB	BB	BB	BB	BB	
ULMACEAE	<i>Ulmus americana</i>	American elm, White elm	XX	XX	xC	BB	BB	BB	BB	BB	
ULMACEAE	** <i>Ulmus glabra</i>	Wych elm, Scotch elm	xC	C	xC	BB	x	x	x	x	
ULMACEAE	** <i>Ulmus minor</i>	English elm, Cork elm	XX	XX	x		BB	x			
ULMACEAE	* <i>Ulmus pumila</i>	Dwarf elm, Siberian elm	XX	BB	C	BB	BB	BB		BB	
ULMACEAE	<i>Ulmus rubra</i>	Slippery elm, Red elm	XX	XX	BB	BB	BB	BB	BB	BB	
CANNABACEAE	* <i>Cannabis sativa</i>	Hemp, Marijuana	XX	xC	xC	xC	RE	XX	x	x	
CANNABACEAE	* <i>Humulus japonicus</i>	Japanese hop	XX	C	XX	xC	XX	XX	x	x	
CANNABACEAE	* <i>Humulus lupulus</i>	Common hop, Brewer's hop	XX	xC	xC	xC	RE	XX	XX	x	
MORACEAE	* <i>Broussonetia papyrifera</i>	Paper mulberry	XX	XX	BB	XX	XX	BB	BB		
MORACEAE	* <i>Maclura pomifera</i>	Osage orange	XX	XX					BB		
MORACEAE	* <i>Morus alba</i>	White mulberry	XX	BB	BB	BB	BB	BB	BB	BB	
MORACEAE	<i>Morus rubra</i>	Red mulberry	XX	RE	BB	BB	BB	BB	BB	BB	
URTICACEAE	<i>Boehmeria cylindrica</i>	False-nettle, Bog-hop	XX	xC	xC	XX	XX	XX	XX	x	
URTICACEAE	<i>Laportea canadensis</i>	Wood-nettle, Giant stinging nettle	xC	xC	xC	xC	XX	x		x	
URTICACEAE	<i>Parietaria pensylvanica</i>	Pellitory	xC		x			x	x		
URTICACEAE	<i>Pilea fontana</i>	Clearweed	xC			C	C		x		
URTICACEAE	<i>Pilea pumila</i>	Richweed, Clearweed	XX		x	XX	XX	x	x	x	
URTICACEAE	<i>Urtica dioica</i> ssp. * <i>dioica</i>	Stinging nettle, Great nettle	XX		x	x	XX			x	
	ssp. <i>gracilis</i>	Stinging nettle, Great nettle			x	x		XX	XX		
URTICACEAE	* <i>Urtica urens</i>	Burning nettle, Dog nettle				xC		x	x	x	
JUGLANDACEAE	<i>Carya cordiformis</i>	Bitternut, Swamp hickory	XX	XX	BB	BB	XX	BB	BB	BB	
JUGLANDACEAE	<i>Carya glabra</i>	Pignut	XX	XX	BB	BB	XX	BB	BB	BB	
JUGLANDACEAE	<i>Carya lacinosa</i>	Big shellbark hickory, Kingnut	C	C	C	C	C				
JUGLANDACEAE	<i>Carya ovalis</i>	Sweet pignut	XX	x		RE	RE	BB	BB	BB	
JUGLANDACEAE	<i>Carya ovata</i>	Shagbark, Shellbark hickory	XX	x	x	xC	XX	BB	BB	BB	
JUGLANDACEAE	<i>Carya tomentosa</i>	Mockernut, White-heart hickory	XX	XX	x	BB	BB	BB	BB	BB	

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JUGLANDACEAE	<i>Juglans cinerea</i>	Butternut, White walnut	XX	C		xC	RE	BB	BB	BB	
JUGLANDACEAE	<i>Juglans nigra</i>	Black walnut	XX	XX	xC	BB	BB	BB	BB	BB	
<b>MYRICACEAE</b>	<i>Comptonia peregrina</i>	Sweet-fern	xC	xC	xC	RE	BB	BB	BB	BB	
MYRICACEAE	<i>Myrica gale</i>	Sweet-gale, Meadow-fern	C			x		BB	BB		
MYRICACEAE	<i>Myrica pensylvanica</i>	Bayberry, Candleberry	XX	C	BB	BB	BB	BB	BB	BB	
<b>FAGACEAE</b>	<i>Castanea dentata</i>	American chestnut	XX	xC	xC	BB	BB	BB	BB	BB	
FAGACEAE	<i>Fagus grandifolia</i>	American beech, Beechnut	XX	XX	xC	BB	BB	BB	BB	BB	
FAGACEAE	* <i>Fagus sylvatica</i>	European beech, Beechnut	XX	XX	BB	C	XX	BB			
FAGACEAE	<i>Quercus alba</i>	White oak	XX	XX	BB	BB	BB	BB	BB	BB	
FAGACEAE	<i>Quercus bicolor</i>	Swamp white oak	XX	RE		RE	BB	XX	BB	BB	
FAGACEAE	<i>Quercus brittonii</i>	Oak			x		XX	XX	XX		
FAGACEAE	<i>Quercus coccinea</i>	Scarlet oak	XX	RE		C	BB	BB	BB	BB	
FAGACEAE	<i>Quercus x heterophylla</i>	Oak					XX				
FAGACEAE	<i>Quercus ilicifolia</i>	Scrub oak, Bear oak				RE	XX	BB	BB	BB	
FAGACEAE	<i>Quercus macrocarpa</i>	Mossy-cup oak, Bur oak	XX		C				C	xC	
FAGACEAE	<i>Quercus marilandica</i>	Blackjack oak	x				BB	BB	BB		G5/S3/R
FAGACEAE	<i>Quercus montana</i>	Chestnut oak, Rock oak	XX	XX		C	BB	BB	BB	BB	
FAGACEAE	<i>Quercus muhlenbergii</i>	Chinquapin oak		C					BB		
FAGACEAE	<i>Quercus palustris</i>	Pin oak, Spanish oak	XX	XX	BB	BB	BB	BB	BB	BB	
FAGACEAE	<i>Quercus phellos</i>	Willow oak	XX	XX	BB	BB	BB		xC	x	G5/S1/E
FAGACEAE	<i>Quercus prinoides</i>	Dwarf chestnut or Chinquapin oak			C		BB	BB	BB	XX	
FAGACEAE	* <i>Quercus robur</i>	English oak	XX					x	x		
FAGACEAE	<i>Quercus rubra</i>	Red oak	XX	XX	BB	BB	BB	BB	BB	BB	G5/SR/U
FAGACEAE	<i>Quercus x rudkinii</i>	Oak					xC				
FAGACEAE	<i>Quercus saulii</i>	Oak			C		XX	XX	x		
FAGACEAE	<i>Quercus stellata</i>	Post oak, Iron oak	XX	C	C	C	BB	BB	BB	BB	
FAGACEAE	<i>Quercus velutina</i>	Black oak, Dyer's oak	XX	XX	C	BB	BB	BB	BB	BB	
<b>BETULACEAE</b>	* <i>Alnus glutinosa</i>	Black alder, European alder	XX		xC	XX	XX		BB	x	
BETULACEAE	<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled alder, Hoary alder	XX	C	xC	x	BB	BB	BB	BB	
BETULACEAE	<i>Alnus serrulata</i>	Smooth alder	XX	C		x	BB	BB	BB	BB	
BETULACEAE	<i>Betula alleghaniensis</i>	Yellow birch	XX	x		BB		x	BB	BB	
BETULACEAE	<i>Betula lenta</i>	Sweet birch, Cherry birch	XX	XX	x	BB	XX	BB	BB	BB	
BETULACEAE	<i>Betula nigra</i>	River birch, Red birch	x	x		BB	XX	BB		x	G5/S3/U
BETULACEAE	<i>Betula papyrifera</i>	Paper birch, Canoe birch		x			XX		XX	XX	
BETULACEAE	<i>Betula populifolia</i>	Gray birch, Fire birch	XX	BB	BB	BB	BB	BB	BB	BB	

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BETULACEAE	* <i>Carpinus betulus</i>	European hornbeam	x	C					x		
BETULACEAE	<i>Carpinus caroliniana</i> ssp. <i>virginiana</i>	Hornbeam, Blue beech	XX	x	BB	BB	XX	BB	BB	BB	
BETULACEAE	<i>Corylus americana</i>	Hazelnut, American filbert	XX	x	C		BB	BB	BB	BB	
BETULACEAE	* <i>Corylus avellana</i>	European filbert, European hazel	XX								
BETULACEAE	<i>Corylus cornuta</i>	Beaked hazel					XX				
BETULACEAE	<i>Ostrya virginiana</i>	Hop hornbeam, Ironwood	XX	x	C	x	RE	BB	BB	BB	
PHYTOLACCACEAE	<i>Phytolacca americana</i>	Poke, Pokeweed	XX	x	C		XX	XX	x	x	x
NYCTAGINACEAE	* <i>Mirabilis hirsuta</i>	Hairy umbrella-wort					XX				
NYCTAGINACEAE	* <i>Mirabilis nyctaginea</i>	Heartleaf umbrella-wort	XX		C		XX	XX		x	x
CACTACEAE	<i>Opuntia humifusa</i>	Eastern prickly-pear cactus	XX	XX	XX	XX	XX				
CHENOPODIACEAE	<i>Atriplex arenaria</i>	Seabeach orach, Seabeach atriplex			x	C	XX	XX	x	x	
CHENOPODIACEAE	* <i>Atriplex hortensis</i>	Garden orach			C						
CHENOPODIACEAE	* <i>Atriplex lacinata</i>	Cut-leaf orach		C							
CHENOPODIACEAE	<i>Atriplex patula</i>	Seaside orach, Seaside atriplex	XX		x	C	XX	XX	x	x	x
CHENOPODIACEAE	* <i>Atriplex prostrata</i>	Orache, Spearscale	XX								
CHENOPODIACEAE	* <i>Atriplex rosea</i>	Red orach, Rosy orach	C	C			C	RE			
CHENOPODIACEAE	<i>Atriplex subspicata</i>	Orache	x							x	G5/S1/U
CHENOPODIACEAE	* <i>Atriplex tatarica</i>	Orach, Atriplex	x	C							
CHENOPODIACEAE	* <i>Bassia hirsuta</i>	Bassia					XX		x	x	
CHENOPODIACEAE	* <i>Bassia hyssopifolia</i>	Bassia					C				
CHENOPODIACEAE	* <i>Bassia scoparia</i>	Summer cypress, Belvedere	XX				XX				
CHENOPODIACEAE	* <i>Beta vulgaris</i> ssp. <i>maritimus</i>	Beet		C							
CHENOPODIACEAE	* <i>Chenopodium album</i>	Lamb's quarters, Goose-foot	C	C	C	C	C				x
	* var. <i>album</i>	Lamb's quarters, Goose-foot	XX	XX	XX	XX	XX			x	x
	* var. <i>missouriense</i>	Missouri goosefoot	x	C			x		x		G5/SH/U
CHENOPODIACEAE	* <i>Chenopodium ambrosioides</i>	Mexican tea, Worm-seed	XX	XX	XX	XX	XX			x	x
CHENOPODIACEAE	<i>Chenopodium berlandieri</i> var. <i>bushianum</i>	Pigweed	C				C	C			
	var. <i>macrocalyrium</i>	Large calyx, Goosefoot	x	C	x	x	x	C	x	XX	x
CHENOPODIACEAE	* <i>Chenopodium bonus-henricus</i>	Good-king-henry	C				C				
CHENOPODIACEAE	* <i>Chenopodium botrys</i>	Jerusalem oak, Feather-geranium		C	C			XX		x	x
CHENOPODIACEAE	<i>Chenopodium capitatum</i>	Strawberry-blight, Indian paint			C						
CHENOPODIACEAE	* <i>Chenopodium glaucum</i>	Oak-leaf goosefoot	XX	C	C		XX	XX		x	
CHENOPODIACEAE	* <i>Chenopodium multifidum</i>	Cut-leaf goosefoot		x	C						
CHENOPODIACEAE	* <i>Chenopodium murale</i>	Sovbane, Nettle-leaf goosefoot		x	C		C	RE			
CHENOPODIACEAE	* <i>Chenopodium pratericola</i>	Narrow-leaf goosefoot	x	C	C		XX	RE		x	x

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CHENOPODIACEAE	* <i>Chenopodium rubrum</i>	Red pigweed, Red goose-foot	x				C		x	x	G5/SX/U
CHENOPODIACEAE	<i>Chenopodium simplex</i>	Maple-leaf goosefoot	XX	C		XX	XX		x	x	
CHENOPODIACEAE	<i>Chenopodium standleyanum</i>	Goosefoot					RE				
CHENOPODIACEAE	* <i>Chenopodium urbicum</i>	City goosefoot	XX	XX	XX		XX				
CHENOPODIACEAE	* <i>Chenopodium vulvaria</i>	Stinking goosefoot					C	RE			
CHENOPODIACEAE	* <i>Corispermum hyssopifolium</i>	Bugsseed	xC								
CHENOPODIACEAE	* <i>Cycloloma atriplicifolium</i>	Winged pig-weed	XX	XX	XX	XX	XX		x		
CHENOPODIACEAE	<i>Salicornia bigelovii</i>	Annual glasswort, Dwarf glasswort	xC		xC	xC	RE	x	XX		G5/S2S3/U
CHENOPODIACEAE	<i>Salicornia europaea</i>	Glasswort, Samphire	XX		C	XX	XX				
CHENOPODIACEAE	<i>Salicornia perennis</i>	Perennial saltwort, Glasswort	XX		C	XX	RE				
CHENOPODIACEAE	* <i>Salsola kali</i>	Salsola, Barilla	XX	C	xC	XX	XX	x	x		
CHENOPODIACEAE	* <i>Salsola pestifer</i>	Russian thistle					C		x		
CHENOPODIACEAE	<i>Suaeda calceolariformis</i>	Sea-blite, Matted sea-blite	XX								
CHENOPODIACEAE	<i>Suaeda linearis</i>	Narrow-leaf sea-blite	XX		x	XX	XX	x	XX		G5/S1/U
CHENOPODIACEAE	<i>Suaeda maritima</i>	Lesser Sea-blite	xC	xC	C	XX	RE	x	XX		
CHENOPODIACEAE	<i>Suaeda rolandii</i>	Roland sea-blite			XX	XX		x	XX		G1G2/S1/U
AMARANTHACEAE	* <i>Amaranthus albus</i>	Tumbleweed, Pale amaranth	XX			XX	xC	x			
AMARANTHACEAE	* <i>Amaranthus blitoides</i>	Tumbleweed	XX	XX			XX	x	x		
AMARANTHACEAE	* <i>Amaranthus blitum</i>	Livid amaranth	C	C	XC	XX	XX				
AMARANTHACEAE	<i>Amaranthus cannabinus</i>	Water-hemp, Salt-marsh hemp	xC				XX		x		
AMARANTHACEAE	* <i>Amaranthus crispus</i>	Crisp amaranth		C	xC	XX					
AMARANTHACEAE	* <i>Amaranthus cruentus</i>	Blood amaranth, Purple amaranth	XX			xC	C				
AMARANTHACEAE	* <i>Amaranthus deflexus</i>	Low amaranth				C	RE				
AMARANTHACEAE	* <i>Amaranthus hybridus</i>	Green amaranth, Pigweed	XX	C		XX	RE	x	x		
AMARANTHACEAE	* <i>Amaranthus palmeri</i>	Amaranth				XX					
AMARANTHACEAE	<i>Amaranthus pumilus</i>	Seabeach amaranth			XX	XX		XX	XX		G2/S1/U
AMARANTHACEAE	* <i>Amaranthus retroflexus</i>	Pigweed, Green amaranth	XX		XX	XX	XX	x	x		
AMARANTHACEAE	<i>Amaranthus spinosus</i>	Thorny amaranth, Spiny amaranth	C				C				
AMARANTHACEAE	<i>Amaranthus tuberculatus</i>	Water-hemp					RE				
AMARANTHACEAE	* <i>Amaranthus viridis</i>	Slender amaranth, Green amaranth	xC								
AMARANTHACEAE	* <i>Froelicha gracilis</i>	Cotton-weed	XX			XX		x			
PORTULACACEAE	<i>Claytonia caroliniana</i>	Carolina spring beauty	xC				RE				
PORTULACACEAE	<i>Claytonia virginica</i>	Spring beauty, Mayflower	XX	XX		xC	XX	x	x	x	
PORTULACACEAE	* <i>Portulaca grandiflora</i>	Moss-rose, Red portulaca		C		XX	x		x		
PORTULACACEAE	* <i>Portulaca oleracea</i>	Purslane, Pussley	XX	C		XX	XX			XX	

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<b>MOLLUGINACEAE</b>	<i>*Mollugo verticillata</i>	Carpetweed, Indian chickweed	XX	XX	XX	XX	XX	x	x	x	
<b>CARYOPHYLLACEAE</b>	<i>*Agrostemma githago</i>	Corn-cockle, Corn-rose	XX	xC			RE		x	x	
CARYOPHYLLACEAE	<i>*Arenaria serpyllifolia</i>	Thyme-leaf sandwort	XX	XX	XX	xC	XX	x	x	x	
CARYOPHYLLACEAE	<i>*Cerastium arvense</i>	Field chickweed	XX	XX	XX	XX	XX		x		
CARYOPHYLLACEAE	<i>*Cerastium fontanum</i>	Common mouse-ear	XX	XX	XX	XX	XX	x	x	x	
CARYOPHYLLACEAE	<i>*Cerastium glomeratum</i>	Mouse-ear chickweed	XX	C			XX		x	x	
CARYOPHYLLACEAE	<i>Cerastium nutans</i>	Nodding chickweed	xC				RE	x	x		
CARYOPHYLLACEAE	<i>*Cerastium semidecandrum</i>	Small mouse-ear chickweed	XX		C				x		
CARYOPHYLLACEAE	<i>*Dianthus armeria</i>	Deptford pink	XX	XX	XX	XX	XX		x	x	
CARYOPHYLLACEAE	<i>*Dianthus barbatus</i>	Sweet-William	xC						x		
CARYOPHYLLACEAE	<i>**Gypsophila muralis</i>	Baby's breath, Mist					C			x	
CARYOPHYLLACEAE	<i>**Herniaria cinerea</i>	Herniary	xC								
CARYOPHYLLACEAE	<i>**Herniaria glabra</i>	Herniary	xC								
CARYOPHYLLACEAE	<i>**Holoosteum umbellatum</i>	Jagged chickweed				xC			x		
CARYOPHYLLACEAE	<i>Hanckenya peploides</i> ssp. <i>robusta</i>	Seabach sandwort, Sea chickweed			xC	XX	RE	x	x		
CARYOPHYLLACEAE	<i>*Lychnis chalcidonica</i>	Scarlet lychnis, Maltese cross					RE				
CARYOPHYLLACEAE	<i>**Lychnis coronaria</i>	Rose champion, Mullein -pink	XX			XX	XX		x		
CARYOPHYLLACEAE	<i>*Lychnis flos-cuculi</i>	Ragged robin, Cuckoo-flower					xC				
CARYOPHYLLACEAE	<i>Minuartia carolinana</i>	Pine-barren sandwort, Longroot				XX	XX		XX		G5/S3/R
CARYOPHYLLACEAE	<i>Minuartia michauxii</i>	Rock Sandwort					C			x	
CARYOPHYLLACEAE	<i>Moehringia lateriflora</i>	Grove sandwort	xC			C	XX		x	x	
CARYOPHYLLACEAE	<i>*Myosoton aquaticum</i>	Giant chickweed, Water mouse-ear	xC							x	
CARYOPHYLLACEAE	<i>Paronychia canadensis</i>	Forked chickweed	XX			xC	XX	x	x	x	
CARYOPHYLLACEAE	<i>Paronychia fastigiata</i>	Forked chickweed			x	C	RE		x	x	
CARYOPHYLLACEAE	<i>**Petrorhagia prolifera</i>	Childing pink				XX	RE		x		
CARYOPHYLLACEAE	<i>**Petrorhagia saxifaga</i>	Forked chickweed				C					
CARYOPHYLLACEAE	<i>Sagina decumbens</i>	Small-flowered pearlwort					RE		XX	x	G5/S3/R
CARYOPHYLLACEAE	<i>*Sagina japonica</i>	Pearlwort, Japanese pearlwort	XX								
CARYOPHYLLACEAE	<i>*Sagina procumbens</i>	Pearlwort, Bird's eye	XX			C	RE		x		
CARYOPHYLLACEAE	<i>*Saponaria officinalis</i>	Bouncing-bet	XX	XX	XX	XX	XX		x	x	
CARYOPHYLLACEAE	<i>*Scleranthus annuus</i>	Knawel, German knot-grass	XX	XX	XX	XX	XX	x	x	x	
CARYOPHYLLACEAE	<i>Silene antirrhina</i>	Sleepy catch-fly	XX	xC		XX	XX		x	x	
CARYOPHYLLACEAE	<i>*Silene armeria</i>	Sweet-William, Catch-fly					RE		x		
CARYOPHYLLACEAE	<i>Silene caroliniana</i> var. <i>pennsylvanica</i>	Wild pink	XX	C		C	RE			x	
CARYOPHYLLACEAE	<i>**Silene csereii</i>	Campion			xC						

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CARYOPHYLLACEAE	* <i>Silene dichotoma</i>	Forked catch-fly				XX	XX				
CARYOPHYLLACEAE	** <i>Silene dioica</i>	Red campion				x			x		
CARYOPHYLLACEAE	* <i>Silene latifolia</i>	White campion, White cockle	XX	XX	XX	XX	XX		x		
CARYOPHYLLACEAE	* <i>Silene noctiflora</i>	Night-flowering catch-fly	C			XX	RE				
CARYOPHYLLACEAE	* <i>Silene nutans</i>	Nodding campion					C				
CARYOPHYLLACEAE	<i>Silene stellata</i>	Starry campion, Widow's frill	XX	C		xC	XX		x	x	
CARYOPHYLLACEAE	* <i>Silene vulgaris</i>	Bladder-campion, Maiden tears	XX	C	xC	XX	XX		x	x	
CARYOPHYLLACEAE	* <i>Spergula arvensis</i>	Corn-spurry, Poverty weed				xC	RE		x		
CARYOPHYLLACEAE	<i>Spergularia canadensis</i>	Northern sand-spurry					C		x		G5/SX/U
CARYOPHYLLACEAE	* <i>Spergularia media</i>	Sand-spurrey					RE	x	x		
CARYOPHYLLACEAE	* <i>Spergularia rubra</i>	Common sand-spurry	XX	XX	XX	XX	XX	x	x		
CARYOPHYLLACEAE	* <i>Spergularia salina</i>	Saltmarsh sand-spurry	XX	xC	xC	XX	XX	x	XX	x	
CARYOPHYLLACEAE	* <i>Stellaria alsine</i>	Bog starwort, Marsh chick-weed				xC	RE		x		
CARYOPHYLLACEAE	<i>Stellaria borealis</i>	Northern starwort, Stichwort					C				
CARYOPHYLLACEAE	* <i>Stellaria graminea</i>	Common stitch-wort	XX			XX	XX		x	x	
CARYOPHYLLACEAE	** <i>Stellaria holostea</i>	Easter-bell, Greater stitch wort				xC		x			
CARYOPHYLLACEAE	<i>Stellaria longifolia</i>	Needle-leaf starwort	xC			C	XX	x	x		
CARYOPHYLLACEAE	<i>Stellaria longipes</i>	Starwort, Stichwort	C			XX	C				
CARYOPHYLLACEAE	* <i>Stellaria media</i>	Common chick-weed	XX	C	xC	XX	XX		x	x	
CARYOPHYLLACEAE	* <i>Vaccaria hispanica</i>	Cow-herb, Cockle					RE		x		
<b>POLYGONACEAE</b>	* <i>Fagopyrum esculentum</i>	Buckwheat	xC	C	x	XX	RE		x	x	
POLYGONACEAE	<i>Polygonella articulata</i>	Jointweed			xC	XX	XX	x	x		
POLYGONACEAE	<i>Polygonum amphibium</i>	Water smartweed	C	C	C	C	XX				
	var. <i>emersum</i>	Water smartweed	xC			xC	XX	x	x		
	var. <i>emersum x stipulaceum</i>	Water smartweed	xC			C			x		
	var. <i>stipulaceum</i>	Floating smartweed	xC	C	C	C	C		x		
POLYGONACEAE	* <i>Polygonum arenastrum</i>	Doorweed, Knotweed, Knotgrass	XX	XX	XX	XX	XX	x	x	x	
POLYGONACEAE	<i>Polygonum arifolium</i>	Arrowleaf tearthumb	XX		xC	x	XX	x	x	x	
POLYGONACEAE	* <i>Polygonum aubertii</i>	Silver lace-vinc, China fleece				XX					
POLYGONACEAE	* <i>Polygonum aviculare</i>	Knotweed, Knotgrass	XX		xC	XX	XX	x	x	x	
POLYGONACEAE	* <i>Polygonum bellardii</i>	Needle-leaf knotweed	XX		xC	xC		x	x	x	
POLYGONACEAE	* <i>Polygonum cespitosum</i> var. <i>longisetum</i>	Low smartweed	XX	XX	XX	XX	XX	x	x	x	
POLYGONACEAE	<i>Polygonum careyi</i>	Carey's smartweed, Pinkweed	xC		xC	x			XX		G4/S2/U
POLYGONACEAE	<i>Polygonum cilinode</i>	Fringed bindweed			xC	xC					
POLYGONACEAE	* <i>Polygonum convolvulus</i>	Black bindweed, Corn-bind	xC		xC	XX	RE	x	x		

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POLYGONACEAE	* <i>Polygonum cuspidatum</i>	Japanese bamboo	XX	XX	XX	XX	XX		x	x	
POLYGONACEAE	<i>Polygonum erectum</i>	Upright knotweed, Erect knotweed	xC		xC	xC	RE	x	x	x	G5/SH/U
POLYGONACEAE	<i>Polygonum glaucum</i>	Seabeach knotweed			XX	XX	RE	XX	XX	x	G5/S2S3/U
POLYGONACEAE	* <i>Polygonum hydropiper</i>	Smartweed, Water-pepper	XX		xC	XX	XX	x	x	x	
POLYGONACEAE	<i>Polygonum hydropiperoides</i> var. <i>hydropiperoides</i>	Mild water-pepper, Smartweed	x		x	XX	XX	x	XX	x	
	var. <i>opelousanum</i>	Opelousa smartweed	XX		x	XX	xC	XX	XX		G5/S2S3/U
POLYGONACEAE	* <i>Polygonum lapathifolium</i>	Willow-weed, Dock-leaf smartweed	XX	XX	XX	XX	XX	x	x	x	
POLYGONACEAE	*^ <i>Polygonum orientale</i>	Prince's-feather	xC	xC	xC	xC	XX	x	x	x	
POLYGONACEAE	<i>Polygonum pensylvanicum</i>	Pinkweed, Smartweed	XX	XX	XX	XX	XX	x	x	x	
POLYGONACEAE	* <i>Polygonum persicaria</i>	Lady's-thumb, Heart's-case	XX		xC	XX	XX	x	x	x	
POLYGONACEAE	<i>Polygonum punctatum</i> var. <i>confertiflorum</i>	Water smartweed	xC		xC		XX	x	x	x	
	var. <i>punctatum</i>	Dotted or Water smartweed	XX			XX		x	x		
POLYGONACEAE	* <i>Polygonum ramosissimum</i> var. <i>prolificum</i>	Saltmarsh knotweed	xC			XX	RE	x	x		
	*var. <i>ramosissimum</i>	Knotweed, Slender knotgrass	XX	xC	xC	xC	RE	x	x	x	
POLYGONACEAE	<i>Polygonum robustius</i>	Large water smartweed	xC						x	x	
POLYGONACEAE	*^ <i>Polygonum sachalinense</i>	Sachaline, Giant knotweed	xC	C		xC	XX		x	x	
POLYGONACEAE	<i>Polygonum sagittatum</i>	Tearthumb, Arrow-vine	XX	C	xC	XX	XX		x	x	
POLYGONACEAE	<i>Polygonum scandens</i>	Climbing false-buckwheat	C	C	C	XX	XX			x	
	var. <i>cristatum</i>	Small climbing false-buckwheat	xC			xC		x	x	x	
	*var. <i>dumetorum</i>	European climbing buckwheat	XX		xC	xC	RE		x	x	
	var. <i>scandens</i>	Climbing false-buckwheat	xC	xC	xC	XX	XX	x	x	x	
POLYGONACEAE	<i>Polygonum tenue</i>	Slender knotweed	xC			xC	XX	x	XX	x	G5/S3/R
POLYGONACEAE	<i>Polygonum virginianum</i>	Jumpseed	XX	XX	XX	XX	XX	XX	XX	XX	
POLYGONACEAE	*^ <i>Rumex acetosa</i>	Garden sorrel, Green sorrel			x	C	xC		x	x	
POLYGONACEAE	* <i>Rumex acetosella</i>	Sheep sorrel	XX	XX	XX	XX	XX		x	x	
POLYGONACEAE	<i>Rumex altissimus</i>	Pale dock, Water dock	xC			xC			x	x	
POLYGONACEAE	* <i>Rumex crispus</i>	Curly dock, Yellow dock	XX	XX	XX	XX	XX	x	x	x	
POLYGONACEAE	* <i>Rumex x confusus</i>	Large curly dock				x					
POLYGONACEAE	<i>Rumex hastatulus</i>	Heart sorrel, Red sorrel			x	XX		x	XX		G5/S1/T
POLYGONACEAE	* <i>Rumex longifolius</i>	Yard dock	xC								
POLYGONACEAE	<i>Rumex maritimus</i> var. <i>sueginus</i>	Golden dock		x		x		XX	XX		G5/S1/T
POLYGONACEAE	* <i>Rumex obtusifolius</i>	Bitter-dock, Red-veined dock	XX		xC	xC	XX	x	x	x	
POLYGONACEAE	* <i>Rumex orbiculatus</i>	Great water dock			xC	xC	RE		x		
POLYGONACEAE	* <i>Rumex patientia</i>	Patience dock, Monk's rhubarb	xC		xC	xC	XX				
POLYGONACEAE	<i>Rumex salicifolius</i> var. <i>mexicanus</i>	Willow-leaf dock	xC	xC		xC	RE		x		

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POLYGONACEAE	<i>Rumex verticillatus</i>	Swamp dock, Water dock	C				RE		x		
PLUMBAGINACEAE	<i>Limonium carolinianum</i>	Sea-lavender, Marsh-rosemary	XX	xC	XX	XX	XX	x	x	x	
ELATINACEAE	<i>Elatine americana</i>	American waterwort					C		XX		G4/S1/E
ELATINACEAE	<i>Elatine minima</i>	Lesser waterwort, Mud-purslane					C	x	x		
ELATINACEAE	* <i>Elatine triandra</i>	Eurasian waterwort			C		RE				
CLUSIACEAE	<i>Hypericum boreale</i>	Northern dwarf St. John's-wort	x					x	x		
CLUSIACEAE	<i>Hypericum canadense</i>	Canadian St. John's-wort		C			XX	x	x		
CLUSIACEAE	<i>Hypericum dissimulatum</i>	St. John's-wort					C	C			
CLUSIACEAE	<i>Hypericum ellipticum</i>	Pale St. John's-wort	XX								
CLUSIACEAE	<i>Hypericum gentianoides</i>	Orange-grass, Pineweed	XX				xC	RE	x	x	
CLUSIACEAE	<i>Hypericum humifusum</i>	St. John's-wort					C	C			
CLUSIACEAE	<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>	St. Andrew's cross					RE	BB	BB		G5/S1/E
CLUSIACEAE	<i>Hypericum majus</i>	Canadian St. John's-wort	xC				C	RE	x	x	x
CLUSIACEAE	<i>Hypericum mutilum</i>	Dwarf St. John's-wort	XX				XX	XX			
CLUSIACEAE	* <i>Hypericum perforatum</i>	St. John's-wort	XX	C			XX	XX		x	x
CLUSIACEAE	<i>Hypericum prolificum</i>	Shrubby St. John's-wort	C				C		C	BB	XX
CLUSIACEAE	<i>Hypericum punctatum</i>	St. John's-wort	XX				XX	XX		x	x
CLUSIACEAE	<i>Triadenum virginicum</i>	Marsh St. John's-wort	C	C			XX	XX	x	x	
TILACEAE	<i>Tilia americana</i> var. <i>americana</i>	Basswood, Whitewood, Linden	XX	XX	BB	BB	BB	BB	BB	BB	BB
TILACEAE	* <i>Tilia cordata</i>	Small-leaved linden	XX	XX			xC		BB	BB	x
STERCULIACEAE	* <i>Melochia corchorifolia</i>	Chinese parasol tree					C				
MALVACEAE	* <i>Abutilon theophrasti</i>	Velvet-leaf, Butter-print	XX	C			XX	XX			
MALVACEAE	* <i>Alcea rosea</i>	Hollyhock	XX				C			x	
MALVACEAE	* <i>Althaea hirsuta</i>	Mallow			C						
MALVACEAE	* <i>Althaea officinallis</i>	Marsh-mallow, White mallow	XX	x			XX		x		
MALVACEAE	* <i>Anoda cristata</i>	Anoda					C				
MALVACEAE	<i>Hibiscus moscheutos</i>	Rose-mallow, Swamp-mallow	XX	C	xC	XX	XX	x	x	XX	
MALVACEAE	* <i>Hibiscus syriacus</i>	Rose-of-Sharon	XX		BB	BB	BB	BB	BB	BB	x
MALVACEAE	* <i>Hibiscus trionum</i>	Flower-of-an-hour					XX		x		
MALVACEAE	<i>Hibiscus laevis</i>	Smooth rose mallow	XX								
MALVACEAE	* <i>Malva moschata</i>	Musk-mallow	XX				xC	C	x	x	
MALVACEAE	* <i>Malva neglecta</i>	Chesses, Mallow	XX	C			XX	XX			x
MALVACEAE	* <i>Malva sylvestris</i>	High mallow, Chesses			C		C			x	
MALVACEAE	* <i>Sida spinosa</i>	Prickly mallow				xC					
SARRACENIACEAE	<i>Sarracenia purpurea</i>	Pitcher-plant, Side-saddle plant					XX		x		

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<b>DROSERACEAE</b>	<i>Drosera filiformis</i>	Dew-thread, Threadleaf sundew					XX		XX		G5/S2/V
DROSERACEAE	<i>Drosera intermedia</i>	Sundew, Narrow-leaf sundew					XX	x	XX		
DROSERACEAE	<i>Drosera rotundifolia</i>	Sundew, Round-leaf sundew	x	C		C	RE	x	x	x	
<b>CISTACEAE</b>	<i>Helianthemum bicknellii</i>	Frostweed, Rockrose					RE	x	x		
CISTACEAE	<i>Helianthemum canadense</i>	Frostweed, Rockrose	x	C			RE	x	XX		
CISTACEAE	<i>Helianthemum dumosum</i>	Bushy rockrose						XX	XX		G3/S2/T
CISTACEAE	<i>Hudsonia ericoides</i>	Golden heather, Hudsonia				XX	RE	C	BB		
CISTACEAE	<i>Hudsonia tomentosa</i>	Beach heather, Hudsonia			C	XX	BB	BB	BB		
CISTACEAE	<i>Lechea intermedia</i>	Pinweed	x	C					x		
CISTACEAE	<i>Lechea maritima</i>	Beach pinweed			x	XX	XX	x	x		
CISTACEAE	<i>Lechea minor</i>	Thyme-leaf pinweed					RE	x	x		
CISTACEAE	<i>Lechea mucronata</i>	Pinweed	XX	x	C	x	XX	x	x	x	
CISTACEAE	<i>Lechea pulchella</i> var. <i>moniliformis</i>	Bead pinweed					x	x	x		G5/S1/T
	var. <i>pulchella</i>	Bead pinweed	x				x	C	x	x	x
CISTACEAE	<i>Lechea racemulosa</i>	Pinweed	XX	x	C		XX	XX	XX		G5/S3/R
CISTACEAE	<i>Lechea tenuifolia</i>	Slender pinweed	x	C				XX	XX	XX	G5/S2/R
<b>VIOLACEAE</b>	<i>Viola affinis</i>	Leconte's violet	x	C		x	RE	x			
VIOLACEAE	* <i>Viola arvensis</i>	Wild pansy	x	C			x	C			
VIOLACEAE	<i>Viola x conjugens</i>	Violet					C				
VIOLACEAE	<i>Viola conspersa</i>	American dog-violet	x	C		x	RE	x		x	
VIOLACEAE	<i>Viola x cordifolia</i>	Violet					C				
VIOLACEAE	<i>Viola cucullata</i>	Blue Marsh Violet	XX			x	RE			x	
VIOLACEAE	<i>Viola x dissenia</i>	Violet					C				
VIOLACEAE	<i>Viola x felicetorum</i>	Violet					C				
VIOLACEAE	* <i>Viola hastata</i>	Halbard-leaf yellow violet					C				
VIOLACEAE	<i>Viola hirsutula</i>	Southern wood violet					XX		x	x	G4/SH/U
VIOLACEAE	<i>Viola lanceolata</i>	Lance-leaf violet, Water violet	x	C			XX	x	x		
VIOLACEAE	<i>Viola macloskeyi</i> ssp. <i>pallens</i>	Sweet white violet, Pale violet	x	C		x	XX	x	x	x	
VIOLACEAE	<i>Viola x mistura</i>	Violet					C	x			
VIOLACEAE	<i>Viola x modesta</i>	Violet					C	x			
VIOLACEAE	<i>Viola x mollicula</i>	Violet					C				
VIOLACEAE	* <i>Viola odorata</i>	English violet, Sweet violet	XX			XX	XX				
VIOLACEAE	<i>Viola palmata</i>	Early blue violet, Wood violet	x	C		x	XX	x		x	
VIOLACEAE	<i>Viola pedata</i>	Birdsfoot violet	XX	C		C	XX				
VIOLACEAE	<i>Viola x populifolia</i>	Violet	x				C				

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VIOLACEAE	<i>Viola x porteriana</i>	Violet	x				C			x	
VIOLACEAE	<i>Viola primultifolia</i>	Primrose violet	x			x	XX	x	x	x	G5/S2/U
VIOLACEAE	<i>Viola pubescens</i>	Yellow violet	XX	C		xC	XX			x	
VIOLACEAE	* <i>Viola rafinesquii</i>	Field pansy, Wild pansy					RE				
VIOLACEAE	<i>Viola x redacta</i>	Violet					C				
VIOLACEAE	<i>Viola rotundifolia</i>	Round-leaf violet	XX				RE			x	
VIOLACEAE	<i>Viola x ryoniae</i>	Violet					C				
VIOLACEAE	<i>Viola sagittata</i>	Arrow-leaf violet	xC	xC	C	xC	XX	x	x	x	
VIOLACEAE	<i>Viola septentrionalis</i>	Northern blue violet	C								
VIOLACEAE	<i>Viola x slavinii</i>	Violet	xC				C				
VIOLACEAE	<i>Viola sororia</i>	Common violet, Woolly violet	XX	XX	XX	XX	XX	x	x	x	
VIOLACEAE	* <i>Viola striata</i>	Cream violet, Pale violet	XX				RE				
<b>CUCURBITACEAE</b>	* <i>Citrullus colocynthis</i>	Watermelon		C		C	xC				
CUCURBITACEAE	* <i>Cucumis melo</i>	Melon, Cantaloupe					xC				
CUCURBITACEAE	* <i>Ecballium elaterium</i>	Squirting cucumber				xC					
CUCURBITACEAE	<i>Echinocystis lobata</i>	Prickly cucumber, Wild cucumber	XX			x	XX	x	x	x	
CUCURBITACEAE	<i>Sicyos angulatus</i>	Bur cucumber, Star cucumber	XX	xC	x	xC	XX	x	x	x	
<b>SALICACEAE</b>	* <i>Populus alba</i>	White poplar, Silver-leaf poplar	XX	C	xC	BB	BB	BB	BB	BB	
SALICACEAE	<i>Populus balsamifera</i>	Balsam poplar, Tacamahac		XX	xC		RE				
SALICACEAE	* <i>Populus canescens</i>	Gray poplar, Silverleaf poplar			C						
SALICACEAE	<i>Populus deltoides</i>	Cottonwood, Poplar	XX		C	x	XX		x	x	
SALICACEAE	<i>Populus grandidentata</i>	Big-tooth aspen	XX	C		C	XX	x	x		
SALICACEAE	<i>Populus heterophylla</i>	Swamp cottonwood		C			XX	x	XX		G5/S2/T
SALICACEAE	* <i>Populus jackii</i>	Balsam poplar					RE	x	x		
SALICACEAE	<i>Populus tremuloides</i>	Quaking aspen, Trembling aspen	XX	C	BB	xC	BB	BB	BB	BB	
SALICACEAE	* <i>Salix alba</i>	White willow	XX	C	C	C	BB	BB	xC	BB	
SALICACEAE	* <i>Salix babylonica</i>	Weeping willow	XX	XX	BB	BB	BB	BB	BB	BB	
SALICACEAE	<i>Salix bebbiana</i>	Baked willow, Livid willow			BB	x		x	BB	BB	
SALICACEAE	<i>Salix discolor</i>	Pussy-willow, Glaucous willow	XX	C	BB	C	BB	BB	BB	BB	
SALICACEAE	<i>Salix eriocephala</i>	Stiff willow, Heartleaf willow		xC		xC		BB	xC		
SALICACEAE	<i>Salix exigua</i>	Sandbar exigua			BB						
SALICACEAE	* <i>Salix fragilis</i>	Crack-willow, Brittle willow	XX	C	BB	BB	BB	BB	BB	x	
SALICACEAE	<i>Salix humilis</i> var. <i>humilis</i>	Prairie willow, Gray willow				xC	BB	BB	BB		
SALICACEAE	* <i>Salix lucida</i>	Shining willow, Glossy willow	XX	C			XX	xC			
SALICACEAE	<i>Salix nigra</i>	Black willow, Swamp willow	XX	C	C	xC	BB	BB	BB	BB	

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SALICACEAE	<i>Salix petiolaris</i>	Slender willow				x		BB			
SALICACEAE	* <i>Salix purpurea</i>	Purple willow, Basket willow				BB	XX		x		
SALICACEAE	<i>Salix sericea</i>	Silky willow	XX			xC	RE	C	BB		
<b>CAPPARIDACEAE</b>	* <i>Cleome hassleriana</i>	Spider-flower	XX	XX	XX		XX	x	x		
CAPPARIDACEAE	* <i>Polanisia dodecandra</i>	Clammyweed			xC		RE				
<b>BRASSICACEAE</b>	* <i>Alliaria petiolata</i>	Garlic mustard	XX	XX	XX	XX	XX	XX	XX	XX	
BRASSICACEAE	* <i>Alyssum alyssoides</i>	Alyssum	xC						x	x	
BRASSICACEAE	* <i>Arabidopsis thaliana</i>	Mouse-ear cress	XX	xC	xC	XX	RE		x	x	
BRASSICACEAE	<i>Arabis canadensis</i>	Sicklepod, Rock-cress		C			RE			x	
BRASSICACEAE	<i>Arabis hirsuta</i> var. <i>pycnocarpa</i>	Hairy rock-cress	C			XX	XX			x	
BRASSICACEAE	<i>Arabis laevigata</i>	Smooth rock-cress		C						x	
BRASSICACEAE	<i>Arabis lyrata</i>	Lyre-leaf rock-cress	xC				XX		x		
BRASSICACEAE	* <i>Armoracia rusticana</i>	Horseradish	XX				RE	x			
BRASSICACEAE	* <i>Barbarea verna</i>	Early wintercress, Winter belle-isle	C	C		XX	RE		x	x	
BRASSICACEAE	* <i>Barbarea vulgaris</i>	Cress, Yellow rocket	XX			XX	XX	x	x	x	
BRASSICACEAE	* <i>Berteroa incana</i>	Alyssum	xC	C		XX		x	x		
BRASSICACEAE	* <i>Brassica juncea</i>	Brown mustard, Indian mustard					RE				
BRASSICACEAE	* <i>Brassica napus</i>	Turnip rutabaga, Swedish turnip	C	xC		C	RE				
BRASSICACEAE	* <i>Brassica nigra</i>	Black mustard	xC			XX	XX		x	x	
BRASSICACEAE	* <i>Brassica rapa</i>	Field mustard	XX	XX	XX	XX	XX		x	x	
BRASSICACEAE	<i>Cakile edentula</i> var. <i>edentula</i>	Shore-rocket, Sea-rocket	XX		XX	XX	XX	x	x		
BRASSICACEAE	* <i>Cakille maritima</i>	Sea-rocket	xC								
BRASSICACEAE	* <i>Camelina sativa</i>	Dutch flax, Gold-of-pleasure				XX	RE		x		
BRASSICACEAE	* <i>Capsella bursa-pastoris</i>	Shepherd's-purse	XX	C		XX	XX		x	x	
BRASSICACEAE	<i>Cardamine bulbosa</i>	Spring cress	XX			XX	RE			x	
BRASSICACEAE	<i>Cardamine concatenata</i>	Cut-leaf Toothwort	XX	C	xC	xC	XX		x	x	
BRASSICACEAE	<i>Cardamine diphylla</i>	Peppervort	XX	C		C	RE			x	
BRASSICACEAE	<i>Cardamine douglassii</i>	Purple cress	xC								G5/S3/U
BRASSICACEAE	* <i>Cardamine hirsuta</i>	Hairy rock-cress	XX	C			XX		x	x	
BRASSICACEAE	* <i>Cardamine impatiens</i>	Bushy rock-cress	C			C					
BRASSICACEAE	<i>Cardamine x maxima</i>	Large toothwort	x			x					
BRASSICACEAE	<i>Cardamine parviflora</i> var. <i>arenicola</i>	Small-flowered bitter-cress	XX			C	RE				
BRASSICACEAE	<i>Cardamine pennsylvanica</i>	Pennsylvania bitter-cress	XX			xC	RE		x	x	
BRASSICACEAE	<i>Cardamine pratensis</i>	Cuckoo-flower, Lady's-smock	XX							x	
BRASSICACEAE	* <i>Cardaria draba</i>	Hoary cress	XX			C	XX				

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BRASSICACEAE	* <i>Conringia orientalis</i>	Hare's-car, Treacle-mustard					RE		x		
BRASSICACEAE	* <i>Coronopus didymus</i>	Wart-cress, Wart-grass				C					
BRASSICACEAE	* <i>Coronopus squamatus</i>	Swine-cress, Wart-cress		C							
BRASSICACEAE	* <i>Diplotaxis eruroides</i>	Hare's-car mustard					RE		x		
BRASSICACEAE	* <i>Diplotaxis muralis</i>	Wall-rocket, Sand-rocket	XX	C			XX				
BRASSICACEAE	* <i>Diplotaxis tenuifolia</i>	Wall-rocket	XX	C	xC	C	XX				
BRASSICACEAE	<i>Draba reptans</i>	Carolina whitlow-grass		xC		C	RE		x		G5/S2/R
BRASSICACEAE	* <i>Draba verna</i>	Whitlow-grass	XX	XX	XX	XX	XX	x	x	x	
BRASSICACEAE	* <i>Eruca vesicaria</i> ssp. <i>sativa</i>	Garden-rocket, Rocket-salad	xC								
BRASSICACEAE	* <i>Erysimum cheiranthoides</i>	Wormseed-mustard					RE				
BRASSICACEAE	* <i>Erysimum repandum</i>	Treacle-mustard	xC				XX				
BRASSICACEAE	* <i>Hesperis matronalis</i>	Dame's-rocket, Dame's-violet	XX	XX		xC	XX		x	x	
BRASSICACEAE	* <i>Lepidium campestre</i>	Cow-cress, Field-cress	XX		xC	XX	XX	x	x	x	
BRASSICACEAE	* <i>Lepidium densiflorum</i>	Bird's peppergrass		xC		xC	RE		x		
BRASSICACEAE	* <i>Lepidium latifolium</i>	Broadleaf peppergrass					C				
BRASSICACEAE	* <i>Lepidium perfoliatum</i>	Peppergrass	x								
BRASSICACEAE	* <i>Lepidium ruderae</i>	Stinking peppergrass	XX				RE		x	x	
BRASSICACEAE	<i>Lepidium virginicum</i>	Wild peppergrass	XX	xC		XX	XX		x	x	
BRASSICACEAE	* <i>Lobularia maritima</i>	Sweet alyssum, Seaside alyssum					RE		x		
BRASSICACEAE	* <i>Lunaria annua</i>	Money-plant, Honesty				XX			XX	x	
BRASSICACEAE	* <i>Raphanus raphanistrum</i>	Wild radish, Jointed charlock	XX		C	XX	RE		x	x	
BRASSICACEAE	* <i>Rapistrum rugosum</i>	Wild rape		xC	C		C				
BRASSICACEAE	* <i>Rorippa indica</i>	Indian yellow-cress	xC								
BRASSICACEAE	* <i>Rorippa nasturtium-aquaticum</i>	Watercress	XX	C		xC	XX		x	x	
BRASSICACEAE	<i>Rorippa palustris</i> ssp. <i>fernaldiana</i>	Marsh watercress		C			XX		x		
	ssp. <i>hispida</i>	Marsh watercress			C		RE	x			
	* ssp. <i>palustris</i>	Marsh watercress	XX		XX	XX			x		
BRASSICACEAE	* <i>Rorippa sylvestris</i>	Creeping yellowcress	XX	C	C	xC	XX		x	x	
BRASSICACEAE	* <i>Sinapis alba</i>	White mustard	XX				C				
BRASSICACEAE	* <i>Sinapis arvensis</i>	Charlock, Wild mustard	C				XX		x		
BRASSICACEAE	* <i>Sisymbrium altissimum</i>	Tumble-mustard	XX		xC	XX	XX		x	x	
BRASSICACEAE	* <i>Sisymbrium irio</i>	London-rocket		C			RE				
BRASSICACEAE	* <i>Sisymbrium officinale</i>	Hedge-mustard	XX			XX	XX	x	x	x	
BRASSICACEAE	* <i>Thlaspi arvense</i>	Field pennycress, Fawnweed	XX			XX	XX		x	x	
RESEDACEAE	* <i>Reseda alba</i>	White mignonette			C						
RESEDACEAE	* <i>Reseda lutea</i>	Yellow mignonette		xC		xC					

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RESEDACEAE	* <i>Reseda luteola</i>	Dyer's-rocket	xC	xC	xC				x		
RESEDACEAE	* <i>Reseda odorata</i>	Garden mignonette				xC	xC		x		
RESEDACEAE	* <i>Reseda phyteuma</i>	Mignonette		C							
CLETHRACEAE	<i>Clethra alnifolia</i>	Sweet pepperbush	XX	XX	xC	BB	BB	BB	BB	BB	
ERICACEAE	<i>Arctostaphylos uva-ursi</i>	Bearberry, Sandberry	x		x	x	RE	BB	BB	x	
ERICACEAE	<i>Chamaedaphne calculata</i>	Leatherleaf				x		BB	BB	BB	
ERICACEAE	<i>Chimaphila maculata</i>	Spotted wintergreen	XX	x	x	BB	BB	BB	BB	BB	
ERICACEAE	<i>Chimaphila umbellata</i>	Pipsissewa, Prince's-pine		xC	xC	xC	RE	BB	BB	xC	
ERICACEAE	<i>Epigaea repens</i>	Trailing arbutus, Mayflower	C				RE	BB	BB	BB	
ERICACEAE	<i>Gaultheria hispidula</i>	Creeping snow-berry, Moxie-plum					RE				
ERICACEAE	<i>Gaultheria procumbens</i>	Wintergreen, Checker-berry	C	C	C	xC	RE	BB	BB	BB	
ERICACEAE	<i>Gaylussacia baccata</i>	Black huckleberry	XX	C	C	RE	XX	BB	BB	BB	
ERICACEAE	<i>Gaylussacia frondosa</i>	Dangle-berry, Dwarf huckleberry	C	C		C	RE	BB	BB		
ERICACEAE	<i>Kalmia angustifolia</i>	Sheep laurel, Lambkill				xC	BB	BB	BB	xC	
ERICACEAE	<i>Kalmia latifolia</i>	Mountain laurel, Calico-bush	XX	C	C	RE	BB	BB	BB	BB	
ERICACEAE	<i>Leucothoe racemosa</i>	Sweetbells, Fetter-bush	RE	C	C	BB	BB	BB	BB	C	
ERICACEAE	<i>Lyonia ligustrina</i>	Male-berry, He-huckleberry	RE	C	C	C	BB	xC	BB	BB	
ERICACEAE	<i>Lyonia mariana</i>	Staggerbush	C		C	xC	BB	BB	BB		
ERICACEAE	<i>Monotropa hypopithys</i>	Pinesap, False beechdrops		xC		x	RE	x	x	x	
ERICACEAE	<i>Monotropa uniflora</i>	Indian-pipe, Convulsion-root	XX	XX	xC	XX	XX	x	x	x	
ERICACEAE	<i>Orthilia secunda</i>	One-sided wintergreen				C	C				
ERICACEAE	<i>Pyrola americana</i>	Wild lily-of-the-valley	XX	C			RE		x		
ERICACEAE	<i>Pyrola elliptica</i>	Shinleaf, Wild lily-of-the-valley				xC	RE		x		
ERICACEAE	<i>Rhododendron maximum</i>	Great laurel, White laurel	C			C		BB	BB	BB	
ERICACEAE	<i>Rhododendron periclymenoides</i>	Pinkster-flower, Pinkster-bloom	XX	C	C	C	BB	BB	BB	BB	
ERICACEAE	<i>Rhododendron prinophyllum</i>	Early azalea, Mountain azalea	C				C	C	C	C	
ERICACEAE	<i>Rhododendron viscosum</i>	Swamp azalea	XX	C	C	BB	BB	BB	BB	BB	
ERICACEAE	<i>Vaccinium angustifolium</i>	Lowbush blueberry	C			xC	BB	BB	BB	BB	
ERICACEAE	<i>Vaccinium corymbosum</i>	Highbush blueberry	XX	C	C	BB	BB	BB	BB	BB	
ERICACEAE	<i>Vaccinium macrocarpon</i>	Cranberry, Large cranberry	C			C	BB	xC	BB	BB	
ERICACEAE	<i>Vaccinium pallidum</i>	Sugar huckleberry, Low bilberry	XX	XX		xC	BB	BB	BB	BB	
ERICACEAE	<i>Vaccinium stamineum</i>	Deerberry, Squaw-huckleberry	C		C		BB		BB	BB	
EBENACEAE	<i>Diospyros virginiana</i>	Persimmon	XX	xC	C	C	BB	BB	BB		G5/S2/R
STYRACACEAE	* <i>Halesia tetraptera</i>	Silver-bells, Possumwood	RE			x			BB		
PRIMULACEAE	* <i>Anagallis arvensis</i>	Scarlet pimpernel	XX	C	C		XX		x	x	
PRIMULACEAE	<i>Hottonia inflata</i>	Featherfoil, Water-violet					XX		x	x	

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PRIMULACEAE	<i>Lysimachia ciliata</i>	Fringed loosestrife	XX	C		x	XX		x	x	
PRIMULACEAE	<i>Lysimachia hybrida</i>	Lance-leaved loosestrife			C	XX	RE	x	x		G5/S1/T
PRIMULACEAE	* <i>Lysimachia nummularia</i>	Moneywort, Creeping-jenny	XX		C		XX			x	
PRIMULACEAE	<i>Lysimachia producta</i>	Loosestrife	x	C			RE		x		
PRIMULACEAE	<i>Lysimachia quadrifolia</i>	Whorled loosestrife	XX			XX	XX	x	x	XX	
PRIMULACEAE	<i>Lysimachia terrestris</i>	Swamp-candles, Yellow loosestrife	XX	C			XX	x	x	x	
PRIMULACEAE	<i>Lysimachia thyrsiflora</i>	Tufted loosestrife		C	C	C	RE		x		
PRIMULACEAE	* <i>Lysimachia vulgaris</i>	Garden loosestrife			C	C	XX				
PRIMULACEAE	* <i>Primula veris</i>	Cowslip					RE		x		
PRIMULACEAE	<i>Samolus valerandii</i> ssp. <i>parviflorus</i>	Water pimpernel, Brookweed	XX		x	C	XX	x	x		
PRIMULACEAE	<i>Trientalis borealis</i>	Starflower, Chickweed-wintergreen	x	C	x	C	XX		x		
<b>HYDRANGEACEAE</b>	* <i>Deutzia scabra</i>	Deutzia		<b>BB</b>			<b>BB</b>	<b>BB</b>	<b>BB</b>		
HYDRANGEACEAE	* <i>Philadelphus coronarius</i>	Mock-orange, Syringa	XX	XX		RE	<b>BB</b>	<b>BB</b>	<b>BB</b>	<b>BB</b>	
HYDRANGEACEAE	* <i>Philadelphus tomentosus</i>	Himalayan mock-orange	XX	XX							
<b>GROSSULARIACEAE</b>	<i>Ribes americanum</i>	Wild black currant			C	C		C	C	C	
GROSSULARIACEAE	<i>Ribes cynosbati</i>	Dogberry, Prickly gooseberry	x			C			C		
GROSSULARIACEAE	<i>Ribes hirtellum</i>	Northern gooseberry, Currant	C						x	C	x
GROSSULARIACEAE	* <i>Ribes rubrum</i>	Northern red currant	XX				<b>BB</b>	<b>BB</b>	<b>BB</b>	<b>BB</b>	
<b>CRASSULACEAE</b>	<i>Penthorum sedoides</i>	Ditch-stonecup	XX				XX	x	x	x	
CRASSULACEAE	* <i>Sedum acre</i>	Yellow sedum, Wall-sedum	x	C			XX	x	x	x	
CRASSULACEAE	* <i>Sedum album</i>	White-flowered sedum, Stonecup	XX								
CRASSULACEAE	* <i>Sedum sarmentosum</i>	Sedum	XX		x	C	XX		x		
CRASSULACEAE	* <i>Sedum telephium</i>	Live-forever, Garden orpine	XX				XX		x	x	
CRASSULACEAE	* <i>Sedum ternatum</i>	Sedum, Stonewort			C	C	RE				
<b>SAXIFRAGACEAE</b>	<i>Chrysosplenium americanum</i>	Golden saxifrage, Water-mat	x	C		C	RE	x	x		
SAXIFRAGACEAE	<i>Heuchera americana</i>	Rock geranium	XX			C	XX			x	
SAXIFRAGACEAE	<i>Mitella diphylla</i>	Coolwort, Miterwort					RE			x	
SAXIFRAGACEAE	<i>Parnassia glauca</i>	Grass-of-Parnassus, Bog-stars		x	C		RE			x	
SAXIFRAGACEAE	<i>Saxifraga pensylvanica</i>	Swamp saxifrage, Wild beet		C			RE	x			
SAXIFRAGACEAE	<i>Saxifraga virginensis</i>	Early saxifrage	x	C		C	XX		x	x	
<b>ROSACEAE</b>	* <i>Agrimonia eupatoria</i>	Agrimony, Cocklebur	XX				RE				
ROSACEAE	<i>Agrimonia gryposepala</i>	Agrimony, Cocklebur	XX				XX		x	x	
ROSACEAE	<i>Agrimonia laevis</i>	Smooth shadbush					C				
ROSACEAE	<i>Agrimonia parviflora</i>	Swamp agrimony	x	C			XX			XX	G5/S3/R
ROSACEAE	<i>Agrimonia pubescens</i>	Agrimony, Cocklebur	XX				RE		x	x	

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ROSACEAE	<i>Agrimonia rostellata</i>	Agrimony, Cocklebur	x			XX	XX	x	x	x	G5/S2/R
ROSACEAE	<i>Agrimonia striata</i>	Agrimony, Cocklebur					C	x			
ROSACEAE	<i>Amelanchier arborea</i>	Shadbush, Serviceberry	XX	C		x	C	BB	BB	BB	
ROSACEAE	<i>Amelanchier canadensis</i>	Serviceberry, Shadbush	XX			x	XX	BB	BB	BB	
ROSACEAE	<i>Amelanchier laevis</i>	Smooth shadbush	x			XX					
ROSACEAE	<i>Amelanchier nantucketensis</i>	Nantucket juneberry					BB		BB		G3/S1/E
ROSACEAE	<i>Amelanchier stolonifera</i>	Bush juneberry, Shadbush	XX				RE		BB		
ROSACEAE	* <i>Aphanes microcarpa</i>	Parsley-piert, Lady's-mantle					C				
ROSACEAE	<i>Aronia arbutifolia</i>	Red chokeberry			x	C	BB	BB	BB	BB	
ROSACEAE	<i>Aronia melanocarpa</i>	Black chokeberry	x	C		x	XX	XX	BB	BB	BB
ROSACEAE	<i>Aronia x prunifolia</i>	Purple chokeberry	XX				XX	XX		x	
ROSACEAE	* <i>Aruncus dioicus</i> var. <i>acuminatus</i>	Goat's-beard	XX								
ROSACEAE	<i>Crataegus intricata</i>	Hawthorn		C							
ROSACEAE	* <i>Crataegus monogyna</i>	English hawthorn	XX	C			XX	BB	BB		
ROSACEAE	<i>Crataegus pedicellata</i>	Scarlet hawthorn, Red haw					XX				
ROSACEAE	<i>Crataegus pruinosa</i>	Hawthorn, Waxy-fruited thorn	x	C			RE		BB	BB	
ROSACEAE	<i>Crataegus succulenta</i>	Hawthorn					RE		x		
ROSACEAE	* <i>Duchesnea indica</i>	Mock-strawberry	XX				C	XX			x
ROSACEAE	<i>Fragaria vesca</i>	Woodland strawberry					XX				x
	*ssp. <i>vesca</i>	European strawberry					C		x		
ROSACEAE	<i>Fragaria virginiana</i>	Wild strawberry	XX						x	x	
ROSACEAE	<i>Geum aleppicum</i>	Yellow avens	C				C				
ROSACEAE	<i>Geum canadense</i>	White avens	XX				x	XX		x	
ROSACEAE	<i>Geum laciniatum</i>	Rough avens, Herb-bennet					C		x	x	
ROSACEAE	* <i>Geum vernum</i>	Avens	x	C							x
ROSACEAE	<i>Geum virginianum</i>	Rough avens, Herb-bennet					RE		x	x	G5/S1/E
ROSACEAE	* <i>Kerria japonica</i>	Japanese rose					XX		x	x	
ROSACEAE	* <i>Malus baccata</i>	Siberian crab	x	C	BB		BB	BB		C	
ROSACEAE	<i>Malus coronaria</i>	American crab, Sweet-crab					RE		C	C	x
ROSACEAE	* <i>Malus pumila</i>	Common apple	XX	BB	BB	XX	BB	BB	BB	BB	BB
ROSACEAE	* <i>Malus sieboldii</i>	Toringo crab-apple			BB				BB	BB	BB
ROSACEAE	<i>Physocarpus opulifolius</i>	Ninebark					RE				
ROSACEAE	<i>Potentilla anserina</i> ssp. <i>anserina</i>	Silverweed, Goose-grass					XX	RE		x	
ROSACEAE	* <i>Potentilla argentea</i>	Silvery cinquefoil	XX				XX	XX		x	x
ROSACEAE	<i>Potentilla canadensis</i>	Dwarf cinquefoil, Five-fingers	x	C			XX	XX	x	x	x

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ROSACEAE	<i>Potentilla fruticosa</i> ssp. <i>floribunda</i>	Shrubby cinquefoil		C			xC		x		
ROSACEAE	* <i>Potentilla intermedia</i>	Cinquefoil, Five-fingers					C				
ROSACEAE	<i>Potentilla norvegica</i> ssp. <i>monspeliensis</i>	Rough cinquefoil	XX			XX	XX	x	x	x	
ROSACEAE	* <i>Potentilla recta</i>	Sulfur cinquefoil, Five-fingers	XX	XX	XX	XX	XX		x	x	
ROSACEAE	*^ <i>Potentilla reptans</i>	Cinquefoil		C					x		
ROSACEAE	<i>Potentilla simplex</i>	Old-field cinquefoil	XX	C	xC	XX	XX	x	x	x	
ROSACEAE	<i>Prunus americana</i>	Hedge-plum, Wild plum	XX				RE		xC	x	
ROSACEAE	* <i>Prunus avium</i>	Sweet cherry, Hazzard	XX	XX	BB	BB	BB	BB	BB	BB	
ROSACEAE	* <i>Prunus cerasus</i>	Sour-cherry, Pie-cherry		C		XX	XX				
ROSACEAE	<i>Prunus maritima</i>	Beach-plum, Shore-plum	XX	C	BB	BB	BB	BB	BB		
ROSACEAE	<i>Prunus pennsylvanica</i>	Pin-cherry, Fire-cherry		C	BB	RE	RE		x	x	
ROSACEAE	*^ <i>Prunus persica</i>	Peach	XX	XX		XX	BB	BB	BB		
ROSACEAE	<i>Prunus pumila</i> var. <i>depressa</i>	Dwarf sand-cherry	xC						xC		G5/S2/R
	var. <i>susquehanae</i>	Susquehanna sand-cherry	xC					x	xC		
ROSACEAE	<i>Prunus serotina</i>	Black cherry, Wild cherry	XX	BB	BB	BB	BB	BB	BB	BB	
ROSACEAE	<i>Prunus virginiana</i>	Choke-cherry	XX	C	BB	BB	BB		BB	BB	
ROSACEAE	* <i>Pyracantha coccinea</i>	Firethorn, Pyracantha				XX	XX				
ROSACEAE	*^ <i>Pyrus communis</i>	Pear	XX		xC	XX	BB	C	BB		
ROSACEAE	* <i>Rhodotypos scandens</i>	Jetbead, White kerria	XX	BB	BB	BB	BB	BB	BB	BB	
ROSACEAE	<i>Rosa carolina</i>	Pasture rose	xC			BB	BB	BB	BB	BB	
ROSACEAE	* <i>Rosa micrantha</i>	Sweetbrier	xC	C	C					C	
ROSACEAE	* <i>Rosa multiflora</i>	Multiflora rose	XX	BB	BB	BB	BB	BB	BB	BB	
ROSACEAE	<i>Rosa palustris</i>	Swamp rose	XX			XX	BB	BB	BB	BB	
ROSACEAE	* <i>Rosa rugosa</i>	Japanese rose, Turkistan rose	XX		BB	C	BB	BB	BB	BB	
ROSACEAE	<i>Rosa setigera</i> var. <i>setigera</i>	Prairie rose, Climbing rose	XX			xC	RE		C	C	
ROSACEAE	<i>Rosa virginiana</i>	Wild rose, Pasture rose	XX	C		XX	BB	xC	BB		
ROSACEAE	<i>Rubus allegheniensis</i>	Northern blackberry	XX	BB	BB	BB	BB	BB	BB	BB	
ROSACEAE	<i>Rubus cuneifolius</i>	Sand blackberry					RE		x		G5/SH/V
ROSACEAE	<i>Rubus enslenii</i>	Southern dewberry	x					x	BB		
ROSACEAE	<i>Rubus flagellaris</i>	American dewberry	XX		C	BB	BB	BB	BB	BB	
ROSACEAE	<i>Rubus hispidus</i>	Swamp dewberry				BB	BB	BB	BB	BB	
ROSACEAE	* <i>Rubus idaeus</i> ssp. <i>idaeus</i>	Red raspberry	xC	C			BB	BB	xC	BB	
ROSACEAE	* <i>Rubus laciniatus</i>	Cut-leaf blackberry	XX	C	xC	C	BB		BB	BB	
ROSACEAE	<i>Rubus occidentalis</i>	Black raspberry, Black-cap	XX	C	C	BB	BB	BB	BB	BB	
ROSACEAE	<i>Rubus odoratus</i>	Pink thimbleberry	XX			RE		RE		BB	

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ROSACEAE	<i>Rubus pensilvanicus</i>	High-bush blackberry	x			BB		BB	BB	x	
ROSACEAE	* <i>Rubus phoenicolasius</i>	Wineberry	XX	XX		BB	BB	BB	BB	BB	
ROSACEAE	<i>Rubus setosus</i>	Bog blackberry	x					x			
ROSACEAE	<i>Sanguisorba canadensis</i>	Canadian burnet			xC	xC	XX	XX	x		
ROSACEAE	* <i>Sanguisorba minor</i>	Garden burnet		C					x		
ROSACEAE	* <i>Sorbaria sorbifolia</i>	False spiraea	xC			C			x	x	
ROSACEAE	* <i>Sorbus aucuparia</i>	European mountain ash				BB	XX	BB	BB	BB	
ROSACEAE	<i>Spiraea alba</i> var. <i>latifolia</i>	Meadow-sweet, Canada tea	XX				BB	BB	BB	BB	
ROSACEAE	<i>Spiraea tomentosa</i> var. <i>tomentosa</i>	Hardwick, Steeple-bush	XX	C		BB	BB	BB	BB	BB	
FABACEAE	* <i>Albizia julibrissin</i>	Mimosa, Silk-tree	XX		XX	BB	BB	BB	BB	BB	
FABACEAE	* <i>Amorpha fruticosa</i>	False indigo, Indigo-bush	XX	BB		x	XX	BB	BB	BB	
FABACEAE	<i>Amphicarpea bracteata</i>	Hog-peanut	XX	C		xC	XX	x	x	x	
FABACEAE	* <i>Anthyllis vulneraria</i>	Lady's-fingers		C							
FABACEAE	<i>Apios americana</i>	Groundnut, Wild bean	XX	C	xC	XX	XX		x	x	
FABACEAE	<i>Baptisia tinctoria</i>	Wild indigo, Rattleweed	xC		C	XX	XX		XX	x	
FABACEAE	* <i>Cercis canadensis</i>	Redbud, Judas-tree	XX	XX						x	
FABACEAE	<i>Chamaecrista fasciculata</i>	Partridge-pea, Golden senna	XX	xC		XX	XX	x	x	x	
FABACEAE	<i>Chamaecrista nictitans</i>	Dwarf partridge-pea	XX	xC		XX	XX	x	x	x	
FABACEAE	* <i>Cladastris kentukea</i>	Yellow-wood, Virgilia	x								
FABACEAE	* <i>Clitoria mariana</i>	Butterfly-pea			xC						G5/SX/U
FABACEAE	* <i>Colutea arborescens</i>	Bladder-senna	XX								
FABACEAE	* <i>Coronilla varia</i>	Crown-vetch	XX			XX	XX		x	x	
FABACEAE	<i>Crotalaria sagittalis</i>	Rattlebox	xC	xC		x	XX	XX	x	XX	G5/S1/R
FABACEAE	* <i>Cytisus scoparius</i>	Scotch-broom	xC			RE		BB	BB		
FABACEAE	* <i>Cytisus villosus</i>	Broom					C				
FABACEAE	<i>Desmodium canadense</i>	Giant tick-clover, Giant trefoil	XX	C			XX		x	x	
FABACEAE	<i>Desmodium canescens</i>	Hoary tick-clover, Tick-trefoil	XX			C	XX		x		
FABACEAE	<i>Desmodium ciliare</i>	Tick-clover, Tick-trefoil	xC			x	RE	XX	XX	x	G5/S1/T
FABACEAE	<i>Desmodium cuspidatum</i>	Tick-clover, Tick-trefoil	XX			xC	RE		x	x	
FABACEAE	<i>Desmodium glutinosum</i>	Sticky tick-clover	XX				XX		x	x	
FABACEAE	<i>Desmodium humifusum</i>	Tall tick-clover	x	C		x	XX	x	x	x	G5/S1/T
FABACEAE	<i>Desmodium laevigatum</i>	Smooth tick-clover	x	C			RE		x	x	G5/SH/U
FABACEAE	<i>Desmodium marilandicum</i>	Maryland tick-clover	xC	C			RE	x	x	x	
FABACEAE	<i>Desmodium nudiflorum</i>	Naked-flowered tick-trefoil	XX	C		x	RE		x	x	
FABACEAE	<i>Desmodium nuttallii</i>	Nuttall's tick-clover		xC	xC		RE				G5/SH/U

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FABACEAE	<i>Desmodium obtusum</i>	Beggar-lice, Tick-trefoil	x	C			RE	x	XX	x	G4G5/S1/U
FABACEAE	<i>Desmodium paniculatum</i>	Tick-trefoil, Beggar-ticks	XX	C		C	RE		x	x	
FABACEAE	<i>Desmodium perplexum</i>	Tick-clover, Tick-trefoil	x	C		x	C	x	x	x	
FABACEAE	<i>Desmodium rotundifolium</i>	Tick-clover, Low tick-trefoil	C	C			x	C	x	x	
FABACEAE	<i>Galactia volubilis</i>	Milk-pea		x	C		RE		x	x	
FABACEAE	* <i>Galega officinalis</i>	Goat's-rue	x								
FABACEAE	* <i>Genista tinctoria</i>	Dyer's greenweed	XX								
FABACEAE	* <i>Gleditsia aquatica</i>	Water-locust	XX								
FABACEAE	* <i>Gleditsia triacanthos</i>	Honey-locust, Honeyshuck	XX	BB	BB	BB	BB	BB	BB	BB	
FABACEAE	* <i>Gymnocladus dioica</i>	Kentucky coffeetree	XX		BB	C	XX			BB	
FABACEAE	<i>Lathyrus japonicus</i> var. <i>maritimus</i>	Beach-pea	x	C	C	XX	XX	x	x		
	var. <i>pellitus</i>	Beach-pea					x	x	x		
FABACEAE	* <i>Lathyrus latifolius</i>	Everlasting-pea	XX			XX	XX		x		
FABACEAE	<i>Lathyrus palustris</i>	Vetchling, Marsh-vetch	x	C			RE		x	x	
FABACEAE	* <i>Lathyrus sylvestris</i>	Everlasting-pea				XX			x		
FABACEAE	<i>Lespedeza bicknelli</i>	Lespedeza	x					x			
FABACEAE	<i>Lespedeza brittonii</i>	Lespedeza	C							x	
FABACEAE	<i>Lespedeza capitata</i>	Lespedeza, Bush-clover	XX		x	XX	XX	x	x	x	
FABACEAE	* <i>Lespedeza cuneata</i>	Chinese bush-clover				XX			x		
FABACEAE	<i>Lespedeza hirta</i>	Lespedeza, Bush-clover	XX	x	C		RE		x	x	
FABACEAE	<i>Lespedeza intermedia</i>	Lespedeza, Bush-clover	XX				XX	x	x	x	
FABACEAE	<i>Lespedeza nuttallii</i>	Lespedeza			x	C			x		
FABACEAE	<i>Lespedeza procumbens</i>	Trailing lespedeza, Bush-clover	XX	C			RE	x	x	x	
FABACEAE	<i>Lespedeza repens</i>	Trailing lespedeza	x	C			XX	XX	XX	x	G5/S3/U
FABACEAE	<i>Lespedeza stuevii</i>	Velvety lespedeza, Bush-clover					XX	x	XX	x	G4/S2/R
FABACEAE	<i>Lespedeza violacea</i>	Violet lespedeza, Bush-clover	x			x	XX		XX	x	G5/S2/R
FABACEAE	<i>Lespedeza virginica</i>	Lespedeza, Bush-clover	XX			XX	XX	x	x	x	
FABACEAE	* <i>Lotus corniculata</i>	Bird's-foot trefoil	XX	XX	XX	XX	XX		x	x	
FABACEAE	<i>Lupinus perennis</i>	Wild lupine, Sundial lupine		x	x	x	RE	x	XX		
FABACEAE	* <i>Medicago lupulina</i>	Black medick, Nonsuch	XX	x	C	x	XX	XX		x	x
FABACEAE	* <i>Medicago minima</i>	Bur-clover		C							
FABACEAE	* <i>Medicago monspeliaca</i>	Bur-clover		C							
FABACEAE	* <i>Medicago polymorpha</i>	Yellow bur-clover				C					
FABACEAE	* <i>Medicago sativa</i> ssp. <i>sativa</i>	Alfalfa, Lucerne	XX	C	x	XX	C		x	x	
FABACEAE	* <i>Melilotus alba</i>	White sweet-clover	XX	XX	XX	XX	XX		x	x	

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FABACEAE	* <i>Melilotus indica</i>	Yellow sweet-clover	x	C							
FABACEAE	* <i>Melilotus officinalis</i>	Yellow sweet-clover	XX	XX	XX	XX	XX		x	x	
FABACEAE	* <i>Ornithopus sativus</i>	Serradela						x			
FABACEAE	<i>Phaseolus polystachios</i>	Wild bean, Kidney-bean	XX	C	C		RE		x		
FABACEAE	* <i>Phaseolus vulgaris</i>	Garden bean, Bush bean					C				
FABACEAE	* <i>Pueraria lobata</i>	Kudzu, Kudzu-vine	XX	BB		BB	BB	BB	BB	BB	
FABACEAE	* <i>Robinia hispida</i>	Rose-acacia, Bristly locust				RE		C	BB	C	
FABACEAE	* <i>Robinia pseudo-acacia</i>	Black locust, False acacia	XX	BB	BB	BB	BB	BB	BB	BB	
FABACEAE	* <i>Robinia viscosa</i>	Clammy locust	C				BB	C	BB	C	
FABACEAE	<i>Senna hebecarpa</i>	Wild senna, Partridge-pea	x	C			RE				
FABACEAE	<i>Strophostyles helvula</i>	Annual woolly-bean	XX		XX	XX	XX	XX	x	x	
FABACEAE	<i>Strophostyles umbellata</i>	Perennial woolly-bean			x	XX	XX	x	x		G5/S1/U
FABACEAE	<i>Stylosanthes biflora</i>	Pencil-flower		x	C		RE				G5/SX/U
FABACEAE	<i>Tephrosia virginiana</i>	Goat's-rue, Rabbit's-pea	C			C	RE	x	x	XX	
FABACEAE	* <i>Trifolium arvense</i>	Rabbit's-foot clover	XX	C	XX	XX	XX		x	x	
FABACEAE	* <i>Trifolium aureum</i>	Yellow clover, Hop-clover	x	C			XX	XX		x	
FABACEAE	* <i>Trifolium campestre</i>	Hop-clover, Low hop-clover	XX	XX	XX	XX	XX		x	x	
FABACEAE	* <i>Trifolium dubium</i>	Small hop-clover	x				XX			x	
FABACEAE	* <i>Trifolium hybridum</i>	Alsike clover	XX	XX	XX	XX	XX		x	x	
FABACEAE	* <i>Trifolium pratense</i>	Red clover	XX	XX	XX	XX	XX		x	x	
FABACEAE	* <i>Trifolium repens</i>	White clover, Lawn clover	XX	XX	XX	XX	XX			x	
FABACEAE	* <i>Trifolium squamosum</i>	Seaside clover	C				C				
FABACEAE	* <i>Trigonella caerulea</i>	Trigonella		C							
FABACEAE	* <i>Ulex europaeus</i>	Gorse, Furze					XX				
FABACEAE	<i>Vicia americana</i>	Purple Vetch, Tare					XX				
FABACEAE	* <i>Vicia caroliniana</i>	Wood-vetch		C							
FABACEAE	* <i>Vicia cracca</i>	Cow-vetch, Tufted-vetch	XX		XX	C	XX	x	x	x	
FABACEAE	* <i>Vicia grandiflora</i>	Large-flowered vetch		C						x	
FABACEAE	* <i>Vicia hirsuta</i>	Hairy vetch					RE				
FABACEAE	* <i>Vicia hybrida</i>	Vetch		C							
FABACEAE	* <i>Vicia sativa</i> ssp. <i>nigra</i>	Common vetch, Spring vetch	XX				XX		x		
	*ssp. <i>sativa</i>	Common vetch, Spring vetch	XX				XX	x			
FABACEAE	* <i>Vicia sepium</i>	Hedge-vetch	x	C							
FABACEAE	* <i>Vicia tetrasperma</i>	Lentil-vetch, Sparrow-vetch	XX			XX	RE				
FABACEAE	* <i>Vicia villosa</i> ssp. <i>varia</i>	Woolly-pod vetch	C				C				
	*ssp. <i>villosa</i>	Hairy vetch, Wolly-pod vetch	x		x	x			x	x	

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FABACEAE	* <i>Wisteria frutescens</i>	Wisteria				BB	BB	BB	BB		
FABACEAE	* <i>Wisteria sinensis</i>	Chinese wisteria	XX	BB	BB	x	BB	BB	BB	BB	
ELAEAGNACEAE	* <i>Elaeagnus angustifolia</i>	Russian olive, Oleaster	XX		C	BB	XX	x	BB	x	
ELAEAGNACEAE	* <i>Elaeagnus umbellata</i>	Oleaster, Autumn olive	XX	BB	BB	BB	BB	BB	BB	BB	
HALORAGACEAE	<i>Myriophyllum humile</i>	Water milfoil					XX	x	x		
HALORAGACEAE	<i>Myriophyllum pinnatum</i>	Green parrot's-feather				C		x	XX		G5/S1/U
HALORAGACEAE	<i>Myriophyllum tenellum</i>	Slender water milfoil					RE		x	x	
HALORAGACEAE	<i>Proserpinaca palustris</i>	Mermaid-weed					XX			x	
LYTHRACEAE	<i>Cuphea viscosissima</i>	Clammy cuphea, Blue waxweed		x	C	XX	RE	x			
LYTHRACEAE	<i>Decodon verticillatus</i>	Water-willow, Water-oleander	x			x	C	BB	C	BB	BB
LYTHRACEAE	<i>Lythrum alatum</i>	Winged loosestrife	XX				C			x	
LYTHRACEAE	* <i>Lythrum hyssopifolia</i>	Loosestrife					XX		XX		G5/S1/E
LYTHRACEAE	* <i>Lythrum salicaria</i>	Purple loosestrife	XX	XX	XX	XX	XX	XX	XX	XX	
LYTHRACEAE	<i>Rotala ramosoior</i>	Tooth-cup			C	x	C	XX	x	XX	G5/S2/R
THYMELIACEAE	<i>Dirca palustris</i>	Leatherwood, Moosewood	C	x	C		RE			BB	
ONAGRACEAE	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Enchanter's nightshade	XX	x		x	XX	x	x	x	
ONAGRACEAE	<i>Epilobium angustifolium</i>	Willow-herb, Fireweed					RE	x	x	x	
ONAGRACEAE	<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	Willow-herb				XX					
ONAGRACEAE	<i>Epilobium coloratum</i>	Purple-leaf Willow-herb	XX			XX	XX	x	x	x	
ONAGRACEAE	* <i>Epilobium hirsutum</i>	Fireweed, Willow-herb	XX		C	XX	XX			x	
ONAGRACEAE	<i>Epilobium leptophyllum</i>	Willow-herb, Fireweed	C	C			RE	x	x		
ONAGRACEAE	<i>Epilobium strictum</i>	Downy willow-wed	C						x		
ONAGRACEAE	<i>Lugwigia alterniflora</i>	Seedbox, False loosestrife	XX	C			XX	x	x	x	
ONAGRACEAE	<i>Lugwigia palustris</i>	Water purslane, Marsh purslane	XX	C		C	XX	x	x	x	
ONAGRACEAE	<i>Lugwigia sphaerocarpa</i>	Globe fruited ludwigia					XX		XX	x	G5/S2/R
ONAGRACEAE	* <i>Ludwigia uruguayensis</i>	Water-primrose					x	C			
ONAGRACEAE	<i>Oenothera biennis</i>	Common evening-primrose	XX	XX	XX	XX	XX	x	x	x	
ONAGRACEAE	<i>Oenothera fruticosa</i> ssp. <i>fruticosa</i>	Sundrops, Bush primrose	x	C		x	C	XX	x	x	
	ssp. <i>glauca</i>	Sundrops, Bush primrose	x	C		x	C	RE	x	x	x
ONAGRACEAE	<i>Oenothera laciniata</i>	Cut-leaved evening-primrose	XX				RE	x	XX		G5/S1/U
ONAGRACEAE	<i>Oenothera parviflora</i> var. <i>oakesiana</i>	Small-flowered evening primrose	XX			XX	RE	XX	XX		G4G5/S2/U
	var. <i>parviflora</i>	Small-flowered evening primrose		C		XX				x	
ONAGRACEAE	<i>Oenothera perennis</i>	Sundrops	XX			XX	RE	x	x		
ONAGRACEAE	* <i>Oenothera villosa</i>	Evening primrose	C								
MELASTOMATACEAE	<i>Rhexia virginica</i>	Meadow-beauty, Deergrass	x	C	x	C	XX	XX	XX	x	

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<b>NYSSACEAE</b>	<i>Nyssa sylvatica</i>	Black gum tupelo, Pepperidge	XX	BB	C	BB	BB	BB	BB	BB	
<b>CORNACEAE</b>	<i>Cornus alternifolia</i>	Green osier, Pagoda dogwood	XX	C		C	RE	BB	BB	BB	
CORNACEAE	<i>Cornus amomum</i> ssp. <i>amomum</i>	Silky dogwood, Kinninnik	XX	C	C	BB	BB	BB	BB	BB	
CORNACEAE	<i>Cornus canadensis</i>	Bunchberry, Dwarf cornel			C	C					
CORNACEAE	<i>Cornus florida</i>	Flowering dogwood	XX	RE	C	BB	BB	BB	BB	BB	
CORNACEAE	<i>Cornus foemina</i> ssp. <i>racemosa</i>	Gray dogwood, Stiff dogwood	XX	xC	C	RE	BB	BB	BB	BB	
CORNACEAE	* <i>Cornus kousa</i>	Japanese dogwood	XX			BB					
CORNACEAE	* <i>Cornus mas</i>	Cornelian cherry, Sorbet	XX	XX	XX	XX					
CORNACEAE	<i>Cornus rugosa</i>	Round-leaf dogwood	C						C	C	
CORNACEAE	<i>Cornus sericea</i>	Red osier, Red dogwood	XX		C	C	RE	C	BB	BB	
<b>SANTALACEAE</b>	<i>Comandra umbellata</i>	Bastard-toadflax	xC			xC	XX	x	XX		
SANTALACEAE	* <i>Pyralaria pubera</i>	Buffalo-nut, Oil-nut				xC					
<b>VISCACEAE</b>	<i>Phoradendron leucarpum</i>	Mistletoe					C				
<b>CELASTRACEAE</b>	* <i>Celastrus orbiculata</i>	Oriental bittersweet	XX	BB	BB	BB	BB	BB	BB	BB	
CELASTRACEAE	<i>Celastrus scandens</i>	American bittersweet	XX	XX		XX	XX		x		
CELASTRACEAE	* <i>Euonymus alata</i>	Winged spindle-tree	XX	x	x	BB	BB	BB	BB	BB	
CELASTRACEAE	<i>Euonymus americana</i>	American strawberry-bush	C	C		C	BB	BB	C	C	G5/S1/T
CELASTRACEAE	<i>Euonymus atropurpurea</i>	Burning-bush, Wahoo					RE			BB	
CELASTRACEAE	* <i>Euonymus europaea</i>	Spindle-tree	XX			C	BB	BB	BB	C	
CELASTRACEAE	* <i>Euonymus fortunei</i>	Spindle-tree	XX			C		BB	BB		
CELASTRACEAE	<i>Euonymus obovata</i>	Running strawberry-bush					RE				
<b>AQUILFOLACEAE</b>	* <i>Ilex crenata</i>	Japanese holly, Box-leaf holly					RE		BB	BB	BB
AQUILFOLACEAE	<i>Ilex glabra</i>	Gallberry, Inkberry					BB	BB	BB	BB	
AQUILFOLACEAE	<i>Ilex laevigata</i>	Smooth winterberry	C		C	C	RE	BB	BB	x	
AQUILFOLACEAE	<i>Ilex montana</i>	Mountain winterberry		C					BB		
AQUILFOLACEAE	<i>Ilex opaca</i>	American holly	XX	C	xC	BB	BB	BB	BB	BB	
AQUILFOLACEAE	<i>Ilex verticillata</i>	Black alder, Winterberry	XX	C	C	BB	BB	BB	BB	C	
AQUILFOLACEAE	<i>Nemopanthus mucronatus</i>	Mountain holly, Catberry				C	RE	C	BB	C	
<b>BUXACEAE</b>	* <i>Buxus sempervirens</i>	Common boxwood	XX						x		
BUXACEAE	* <i>Pachysandra terminalis</i>	Japanese spurge	XX				XX				
<b>EUPHORBIACEAE</b>	<i>Acalypha gracilens</i>	Three-seeded-mercury	x	C			RE	x	x	x	
EUPHORBIACEAE	<i>Acalypha virginica</i> var. <i>rhomboidea</i>	Three-seeded-mercury	XX			xC	XX		x	x	
EUPHORBIACEAE	<i>Chamaesyce maculata</i>	Eyebane, Wartweed	XX	C	x	XX	XX		x	x	
EUPHORBIACEAE	<i>Chamaesyce nutans</i>	Eyebane	xC				XX	x			
EUPHORBIACEAE	<i>Chamaesyce polygonifolia</i>	Seaside spurge	XX	C	xC	XX	XX	x	x		

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EUPHORBIACEAE	<i>Chamaesyce vermiculata</i>	Hairy spurge	xC	xC						x	
EUPHORBIACEAE	* <i>Croton capitatus</i>	Hogwort					RE				
EUPHORBIACEAE	<i>Euphorbia corollata</i>	Flowering spurge, Wild-hippo					RE				
EUPHORBIACEAE	* <i>Euphorbia cyparissias</i>	Cypress spurge	XX	XX	XX	XX	XX	x	x	x	
EUPHORBIACEAE	* <i>Euphorbia esula</i>	Wolf's-milk, Leafy spurge	C				RE	x			
EUPHORBIACEAE	* <i>Euphorbia exigua</i>	Spurge		C							
EUPHORBIACEAE	* <i>Euphorbia helioscopia</i>	Wartweed				C	x	XX	XX		G5/S1/U
EUPHORBIACEAE	<i>Euphorbia ipecacuanhae</i>	Ipecac spurge, Wild ipecac				C	RE		x		
EUPHORBIACEAE	* <i>Euphorbia lathyris</i>	Caper spurge, Mrtle spurge					C				
EUPHORBIACEAE	* <i>Euphorbia marginata</i>	Snow-on-the-mountain	xC								
EUPHORBIACEAE	<i>Euphorbia peplus</i>	Petty spurge		C							
RHAMNACEAE	<i>Ceanothus americanus</i>	New Jersey tea	XX		x	xC	RE	x	x	BB	
RHAMNACEAE	* <i>Rhamnus cathartica</i>	Common buckthorn	XX		C	BB	XX	C	BB	BB	
RHAMNACEAE	* <i>Rhamnus frangula</i>	Smooth buckthorn	XX	BB	BB	BB	BB	BB	BB	BB	
VITACEAE	* <i>Ampelopsis b. var. brevipedunculata</i>	Porcelain-berry	XX	XX	XX	XX	XX			XX	
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia creeper, Woodbine	XX	XX	BB	BB	BB	BB	BB	BB	
VITACEAE	* <i>Parthenocissus tricuspidata</i>	Boston ivy, Japanese ivy	XX	BB	BB	BB	BB	BB	BB	BB	
VITACEAE	<i>Vitis aestivalis</i>	Summer grape, Pigeon grape	XX	C	BB	BB	BB	BB	BB	BB	
VITACEAE	<i>Vitis labrusca</i>	Fox grape, Skunk grape	XX	C	BB	BB	BB	BB	BB	BB	
VITACEAE	<i>Vitis riparia</i>	Frost grape, Riverbank grape	BB	C		BB	BB	BB	BB	BB	
VITACEAE	<i>Vitis vulpina</i>	Winter grape	xC	xC		BB	BB	XX	BB	BB	G5/S1/U
LINACEAE	<i>Linum medium var. texanum</i>	Southern yellow flax, Wild flax	x				XX	x	XX		G5/S2/T
LINACEAE	<i>Linum striatum</i>	Stiff yellow flax	C				RE	XX	XX	XX	G5/S3/U
LINACEAE	<i>Linum sulcatum</i>	Yellow wild flax	xC								G5/S2/R
LINACEAE	* <i>Linum usitatissimum</i>	Flax, Linseed	XX	C			RE				
LINACEAE	<i>Linum virginianum</i>	Yellow wild flax, Slender flax	xC	xC			RE	x	x		
POLYGALACEAE	<i>Polygala cruciata</i>	Cross-leaf milkwort				C	XX	x	XX		
POLYGALACEAE	<i>Polygala incarnata</i>	Pink milkwort		C							
POLYGALACEAE	<i>Polygala lutea</i>	Yellow milkwort					XX	x	XX		G5/S1/E
POLYGALACEAE	<i>Polygala nuttallii</i>	Milkwort					RE	x	x		
POLYGALACEAE	<i>Polygala polygama</i>	Bitter milkwort					RE	x	XX	x	
POLYGALACEAE	<i>Polygala sanguinea</i>	Rose milkwort, Field milkwort	xC	x			XX	x	x		
POLYGALACEAE	<i>Polygala verticillata var. ambigua</i>	Whorled milkwort	x				RE	x			
	var. <i>isocycla</i>	Whorled milkwort	XX					x	x		
	var. <i>verticillata</i>	Whorled milkwort	x	x			XX	x	x	x	
STAPHYLEACEAE	<i>Staphylea trifolia</i>	Bladdernut	XX	C			XX		xC	BB	

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<b>SAPINDACEAE</b>	* <i>Koelreuteria paniculata</i>	Pride-of-India, China-tree	XX	XX	BB				C		
<b>HIPPOCASTANACEAE</b>	* <i>Aesculus flava</i>	Sweet buckeye, Yellow buckeye	XX								
HIPPOCASTANACEAE	* <i>Aesculus hippocastanum</i>	Horse-chestnut	XX	XX	BB	x	XX	BB	BB	BB	
<b>ACERACEAE</b>	* <i>Acer campestre</i>	Hedge-maple	XX		BB	x		BB		x	
ACERACEAE	* <i>Acer ginnala</i>	Amur maple	XX						BB	BB	
ACERACEAE	* <i>Acer negundo</i>	Box-elder, Ash-leaf maple	XX	XX	XX	XX	XX	XX	XX	XX	
ACERACEAE	<i>Acer nigrum</i>	Black maple	XX				XX			x	
ACERACEAE	* <i>Acer palmatum</i>	Japanese maple	x		BB			BB	BB	BB	
ACERACEAE	* <i>Acer platanoides</i>	Norway maple	XX	XX	XX	XX	XX	XX	XX	XX	
ACERACEAE	* <i>Acer pseudoplatanus</i>	Sycamore-maple	XX	XX	XX	XX	XX	XX	XX	XX	
ACERACEAE	<i>Acer rubrum</i> var. <i>rubrum</i>	Red maple, Soft maple	XX	XX		XX	XX	XX	x	x	
	var. <i>trilobum</i>	Red maple, Soft maple	x			XX			x		
ACERACEAE	<i>Acer saccharinum</i>	Silver maple, White maple	XX	XX	XX	XX	XX	BB	BB	BB	
ACERACEAE	<i>Acer saccharum</i>	Sugar maple, Rock maple	XX	XX	BB	x	XX	BB	BB	BB	
<b>ANACARDIACEAE</b>	<i>Rhus aromatica</i>	Fragrant sumac, Lemon sumac	XX				BB		BB		
ANACARDIACEAE	<i>Rhus copallinum</i>	Shining sumac, Winged sumac	XX	C	BB	BB	BB	BB	BB	BB	
ANACARDIACEAE	<i>Rhus glabra</i>	Smooth sumac, Smooth staghorn	XX	x	BB	BB	BB	BB	BB	BB	
ANACARDIACEAE	<i>Rhus hirta</i>	Staghorn sumac, Velvet sumac	XX	C	C	BB	BB	BB	BB	BB	
ANACARDIACEAE	<i>Toxicodendron radicans</i>	Poison ivy, Poison oak	XX	BB	BB	BB	BB	BB	BB	BB	
ANACARDIACEAE	<i>Toxicodendron vernix</i>	Poison sumac	x	C		C	XX	BB	BB	BB	
<b>SIMAROUBACEAE</b>	* <i>Ailanthus altissima</i>	Ailanthus, Stinkweed	XX	XX	XX	XX	XX	XX	XX	XX	
<b>MELIACEAE</b>	* <i>Melia azederach</i>	Chinaberry, Umbrella tree	C								
<b>RUTACEAE</b>	* <i>Phellodendron japonicum</i>	Japanese cork-tree	XX	XX		x	XX				
RUTACEAE	<i>Ptelea trifoliata</i>	Wafer-ash, Hop-tree	XX	x	C			BB	BB	BB	G5/S2/R
RUTACEAE	* <i>Ruta graveolens</i>	Rue, Herb-of-grace				x	C				
RUTACEAE	<i>Zanthoxylum americanum</i>	Prickly ash, Tooth-ache tree				x	RE			x	
<b>ZYGOPHYLLACEAE</b>	* <i>Tribulus terrestris</i>	Puncture-weed		x	C	x	C			x	
ZYGOPHYLLACEAE	* <i>Zygophyllum fabago</i>	Caltrop	C								
<b>OXALIDACEAE</b>	* <i>Oxalis corniculata</i>	Lady's-sorrel, Creeping sorrel	x			XX	RE			x	
OXALIDACEAE	<i>Oxalis dillenii</i>	Wood-sorrel, Wood-shamrock		x		XX		x	x		
OXALIDACEAE	<i>Oxalis montana</i>	Common wood-sorrel		C							
OXALIDACEAE	<i>Oxalis stricta</i>	Yellow wood-sorrel	XX	XX		XX	XX	x	x	XX	
OXALIDACEAE	<i>Oxalis violacea</i>	Violet wood-sorrel	x	C		x	C	RE	x	x	G5/S1S2/U
<b>GERANIACEAE</b>	* <i>Erodium cicutarium</i>	Storks-bill, Pin-clover, Alfileria	XX	C	x	C	XX	XX	x	x	x
GERANIACEAE	* <i>Erodium malacoides</i>	Storks-bill		x	C						

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GERANIACEAE	<i>Geranium bicknellii</i>	Geranium, Cranesbill	x	C					x		
GERANIACEAE	<i>Geranium carolinianum</i> var. <i>carolinianum</i>	Carolina cranesbill	XX	x	x	XX	XX	x	x	x	
	var. <i>sphaerospermum</i>	Cranesbill					x				G5/S1/E
GERANIACEAE	* <i>Geranium dissectum</i>	Cutleaf cranesbill		x	C			x			
GERANIACEAE	* <i>Geranium ibericum</i>	Geranium	x	C							
GERANIACEAE	<i>Geranium maculatum</i>	Wild geranium, Spotted geranium	XX	XX	XX	XX	XX	x	x	x	
GERANIACEAE	* <i>Geranium molle</i>	Dovesfoot cranesbill	x	x	C		XX	x	x		
GERANIACEAE	* <i>Geranium pusillum</i>	Slender cranes-bill		C	x	C	RE		x		
GERANIACEAE	* <i>Geranium robertianum</i>	Herb-Robert		XX	C	XX	RE			x	
GERANIACEAE	* <i>Geranium sibiricum</i>	Cranesbill	XX	x	C				x		
LIMNANTHACEAE	<i>Floerkea proserpinacoides</i>	False-mermaid	x	C			C			x	
BALSAMINACEAE	<i>Impatiens capensis</i>	Spotted jewelweed	XX	XX		x	XX	XX	XX	XX	
BALSAMINACEAE	<i>Impatiens pallida</i>	Pale jewelweed, Touch-me-not	XX				x			x	
ARALIACEAE	* <i>Aralia elata</i>	Japanese angelica	XX			XX					
ARALIACEAE	<i>Aralia hispida</i>	Bristly sarsaparilla, Dwarf-elder			C	C	XX		x		
ARALIACEAE	<i>Aralia nudicaulis</i>	Wild sarsaparilla	XX	C		XX	XX			x	
ARALIACEAE	<i>Aralia racemosa</i>	Spikenard, Petty-morrel	x	C		x	XX			x	
ARALIACEAE	* <i>Aralia spinosa</i>	Hercules'-club	XX	x		BB	BB	BB	BB	BB	
ARALIACEAE	* <i>Hedera helix</i>	English ivy	XX	BB	XX	BB	BB	BB	BB	BB	
ARALIACEAE	<i>Panax trifolius</i>	Dwarf ginseng, Ground-nut	x	C			XX	x			
APIACEAE	* <i>Aegopodium podagraria</i>	Goutweed, Goat's-foot	XX		C	x	RE				
APIACEAE	* <i>Aethusa cynapium</i>	Fool's-parsley	XX	C	C	C	XX	x			
APIACEAE	* <i>Anethum graveolens</i>	Dill	x	C							
APIACEAE	<i>Angelica atropurpurea</i>	Purple-stem angelica	C		C	C	RE		x		
APIACEAE	<i>Angelica venenosa</i>	Deadly angelica, Hairy angelica	XX				RE		x		
APIACEAE	* <i>Anthriscus caucalis</i>	Bur chervil					C				
APIACEAE	* <i>Anthriscus sylvestris</i>	Chervil					RE				
APIACEAE	* <i>Bupleurum rotundifolium</i>	Hare's-car, Thoroughwax					RE				
APIACEAE	* <i>Carum carvi</i>	Caraway, Anise	x				RE				
APIACEAE	<i>Cicuta bulbifera</i>	Water-hemlock					RE		x	x	
APIACEAE	<i>Cicuta maculata</i>	Water-hemlock	XX	C			XX	x	x		
APIACEAE	* <i>Conium maculata</i>	Poison hemlock	XX			C					
APIACEAE	* <i>Coriandrum sativum</i>	Coriander					RE				
APIACEAE	<i>Cryptotaenia canadensis</i>	Honewort, Wild chervil	XX			x	XX		x	x	
APIACEAE	* <i>Daucus carota</i>	Queen-Anne's-lace, Wild carrot	XX	XX	XX	XX	XX			x	

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APIACEAE	<i>Eryngium aquaticum</i>	Marsh cryngo					xC				G4/SX/U
APIACEAE	* <i>Foeniculum vulgare</i>	Fennel		C							
APIACEAE	* <i>Heracelum mantegazzianum</i>	Giant hogweed	XX								
APIACEAE	<i>Heracleum maximum</i>	Cow parsnip, Mastervort	XX				XX		x	x	
APIACEAE	* <i>Heracleum sphondylium</i>	Hogweed, Eltrot	xC	C							
APIACEAE	<i>Hydrocotyle americana</i>	Pennywort, Navelwort					RE			x	
APIACEAE	<i>Hydrocotyle umbellata</i>	Water pennywort, Sand pennywort					RE				
APIACEAE	<i>Lilaeopsis chinensis</i>	Lilaeopsis	C	C					XX	x	G5/S2/U
APIACEAE	<i>Osmorhiza claytonii</i>	Sweet jarvil, Sweet cicely	C			xC	XX			x	
APIACEAE	<i>Osmorhiza longistylis</i>	Anise-root	XX			xC	XX		x		
APIACEAE	<i>Oxypolis rigidior</i>	Stiff cowbane, Water-dropwort			xC	x	RE	x	x		G5/SH/U
APIACEAE	* <i>Pastinaca sativa</i>	Wild parsnip	XX	C		XX	XX		x	x	
APIACEAE	<i>Ptilimnium capillaceum</i>	Mock bishop's-weed	xC			XX	XX	x	x		
APIACEAE	<i>Sanicula canadensis</i>	Sanicle, Snakeroot	C			x	XX		x	x	
APIACEAE	<i>Sanicula odorata</i>	Sanicle, Snakeroot	XX			xC	XX	x	x	x	
APIACEAE	<i>Sanicula marilandica</i>	Black snakeroot, Sanicle	XX		x	xC	XX		x	x	
APIACEAE	<i>Sium suave</i>	Water-parsnip				C	XX		x		
APIACEAE	<i>Taenidia integerrima</i>	Yellow pimpernel	C			C		x			
APIACEAE	<i>Thaspium trifoliatum</i>	Purple meadow-parsnip					xC				
APIACEAE	* <i>Torilis japonica</i>	Hedge-parsley					C			x	
APIACEAE	<i>Zizia aptera</i>	Golden Alexanders	x		C	x	RE				
APIACEAE	<i>Zizia aurea</i>	Golden Alexanders	xC		C	xC	RE		x	x	
<b>GENTIANACEAE</b>	<i>Bartonia paniculata</i>	Screw-stem			xC	C			XX		G5/S1/U
GENTIANACEAE	<i>Bartonia virginica</i>	Bartonia	xC				XX	x	x		
GENTIANACEAE	* <i>Centaurium pulchellum</i>	Centaury				xC					
GENTIANACEAE	<i>Gentiana andrewsii</i>	Closed gentian, Bottle gentian					XX			x	
GENTIANACEAE	<i>Gentiana saponaria</i>	Soapwort gentian		C	x	x	XX	x			G5/S1/R
GENTIANACEAE	<i>Gentianopsis crinita</i>	Fringed gentian	C	C		xC	RE		x	x	
GENTIANACEAE	<i>Sabatia angularis</i>	Rose-pink, Bitterbloom		xC		xC	XX			x	G5/S1/E
GENTIANACEAE	<i>Sabatia campanulata</i>	Slender marsh-pink		C			XX	x	XX		G5/S1/E
GENTIANACEAE	<i>Sabatia dodecandra</i>	Sea-pink					RE				G5/S1/E
GENTIANACEAE	<i>Sabatia stellaris</i>	Sea-pink, Marsh-pink			xC	XX	RE	XX	XX		G5/S2/U
<b>APOCYNACEAE</b>	* <i>Amsonia tabernaemontana</i>	Blue-star	xC					x			
APOCYNACEAE	<i>Apocynum androsaemifolium</i>	Spreading dogbane	XX	C		x	XX	x	x	x	
APOCYNACEAE	<i>Apocynum cannabinum</i> var. <i>cannabinum</i>	Indian hemp, Dogbane	XX			XX	XX	x	x	x	
	var. <i>hypericifolium</i>	Indian hemp, Dogbane				XX	XX		x	x	

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APOCYNACEAE	<i>Apocynum x floribundum</i>	Hybrid Dogbane, Indian hemp	XX			XX	XX	x	x		
APOCYNACEAE	* <i>Vinca major</i>	Greater periwinkle	C	C		C	XX				
APOCYNACEAE	* <i>Vinca minor</i>	Common periwinkle	XX	XX	C	XX	C			XX	
ASCLEPIADACEAE	<i>Asclepias amplexicaulis</i>	Blunt-leaf milkweed				C	XX		x		
ASCLEPIADACEAE	<i>Asclepias exaltata</i>	Poke Milkweed				XX	XX		XX		
ASCLEPIADACEAE	<i>Asclepias incarnata</i> var. <i>incarnata</i>	Swamp milkweed	XX			XX					
	var. <i>pulchra</i>	Swamp milkweed	x			XX	XX	x	x	x	
ASCLEPIADACEAE	<i>Asclepias purpurascens</i>	Purple milkweed	XX	C		XX	XX	XX	XX	XX	G4G5/S3/T
ASCLEPIADACEAE	<i>Asclepias quadrifolia</i>	Four-leaf milkweed	C			C	XX		x		
ASCLEPIADACEAE	<i>Asclepias rubra</i>	Red milkweed				C	x	x			G4G5/SX/U
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common milkweed	XX	XX	C	XX	XX	XX	XX	XX	
ASCLEPIADACEAE	<i>Asclepias tuberosa</i> var. <i>interior</i>	Butterfly-weed, Pleurisy-root	XX		XX	XX	XX		XX	x	
ASCLEPIADACEAE	<i>Asclepias variegata</i>	White milkweed			x		RE	x	x		G5/S1/T
ASCLEPIADACEAE	<i>Asclepias verticillata</i>	Whorled milkweed	C			C	RE	x	x		
ASCLEPIADACEAE	<i>Asclepias viridiflora</i>	Green milkweed					XX	XX		x	G5/S2/T
ASCLEPIADACEAE	* <i>Cynanchum louiseae</i>	Black swallow-wort	XX		C	XX	XX	x		x	
SOLANACEAE	<i>Datura stramonium</i>	Jimsonweed, Stramonium	XX	C	x		XX		x	XX	
SOLANACEAE	* <i>Hyoscyamus niger</i>	Black henbane		C		C					
SOLANACEAE	* <i>Lycium barbarum</i>	Matrimony-vine	XX	XX	BB	BB	BB				
SOLANACEAE	* <i>Lycopersicon esculentum</i>	Tomato, Love-apple	XX			C	RE				
SOLANACEAE	* <i>Nicandra physalodes</i>	Apple-of-Peru		C		C	RE				
SOLANACEAE	* <i>Nicotiana rustica</i>	Wild tobacco					C				
SOLANACEAE	* <i>Petunia axillaris</i>	Garden petunia	C				C				
SOLANACEAE	* <i>Petunia parviflora</i>	Seaside petunia				C					
SOLANACEAE	* <i>Physalis alkekengi</i>	Japanese-lantern					C				
SOLANACEAE	<i>Physalis heterophylla</i>	Clammy ground-cherry	x	C			XX			x	
SOLANACEAE	<i>Physalis longifolia</i>	Ground-cherry		x	C		RE				
SOLANACEAE	<i>Physalis pubescens</i> var. <i>integrifolia</i>	Ground-cherry	x	C			RE		x		G5/S1/U
SOLANACEAE	<i>Physalis virginiana</i>	Virginia ground-cherry	C				x	x	x		G5/SH/U
SOLANACEAE	<i>Solanum carolinense</i>	Horse-nettle, Ball nightshade	XX	XX	XX	x	XX	x	x	x	
SOLANACEAE	* <i>Solanum dulcamara</i>	Climbing nightshade	XX	BB	BB	BB	BB	BB	BB	BB	
SOLANACEAE	* <i>Solanum nigrum</i>	Black nightshade, Poisonberry	XX	C	XX		XX			x	
SOLANACEAE	* <i>Solanum physalifolium</i>	Nightshade	x	C		x	C				
SOLANACEAE	* <i>Solanum rostratum</i>	Buffalo-bur, Kansas thistle		C	XX		RE		x		
SOLANACEAE	* <i>Solanum sisymbriifolium</i>	Sticky nightshade		x	C						

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<b>CONVOLVULACEAE</b>	<i>Calystegia sepium</i> ssp. <i>americana</i>	Hedge-bindweed	XX				C	x	x		
	*ssp. <i>sepium</i>	Hedge-bindweed	xC	C	x	XX	XX	x	x	x	
CONVOLVULACEAE	<i>Calystegia spithamea</i>	Low bindweed		C		C					
CONVOLVULACEAE	* <i>Convolvulus arvensis</i>	Field bindweed	XX		xC	XX	XX			x	
CONVOLVULACEAE	* <i>Ipomoea hederacea</i>	Morning-glory					RE				
CONVOLVULACEAE	* <i>Ipomoea nil</i>	Morning-glory	XX	C			C				
CONVOLVULACEAE	<i>Ipomoea pandurata</i>	Wild potato vine, Man-of-the-earth					XX				G5/S1/U
CONVOLVULACEAE	* <i>Ipomoea purpurea</i>	Common morning-glory	XX		x		XX		x	x	
<b>CUSCUTACEAE</b>	<i>Cuscuta cephalanthi</i>	Dodder					XX				G5/S1/E
CUSCUTACEAE	<i>Cuscuta compacta</i>	Dodder, Strangleweed				C	RE	x	x		
CUSCUTACEAE	<i>Cuscuta corylii</i>	Dodder, Strangleweed					RE	x	x		
CUSCUTACEAE	<i>Cuscuta gronovii</i>	Dodder, Love-vine	XX	C		XX	XX	x	x	x	
CUSCUTACEAE	<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i>	Southern dodder					XX				G5/S1/U
CUSCUTACEAE	<i>Cuscuta pentagona</i>	Field-dodder	XX	XX		C	XX	x			
CUSCUTACEAE	<i>Cuscuta polygonorum</i>	Dodder, Northern wild comfrey					XX	XX	x		G5/S1/R
<b>MENYANTHACEAE</b>	<i>Menyanthes trifoliata</i>	Buckbean, Bogbean			C	xC	RE				
MENYANTHACEAE	* <i>Nymphoides peltata</i>	Yellow floating-heart					XX				
<b>POLEMONIACEAE</b>	* <i>Gilia achilleifolia</i>	Gilia			C						
POLEMONIACEAE	<i>Phlox divaricata</i>	Blue phlox, Wild sweet-William	XX				XX			x	
POLEMONIACEAE	* <i>Phlox paniculata</i>	Fall phlox, Summer phlox	XX	XX		xC	XX	x	x	x	
POLEMONIACEAE	<i>Phlox subulata</i>	Moss phlox, Mountain phlox	xC			xC	RE	x			
<b>HYDROPHYLLACEAE</b>	<i>Ellisia nyctelea</i>	Ellisia		xC							
HYDROPHYLLACEAE	<i>Hydrophyllum canadense</i>	Canada waterleaf					RE				
HYDROPHYLLACEAE	<i>Hydrophyllum virginianum</i>	Virginia waterleaf, Shawnee-salad	x			C	XX			x	
<b>BORAGINACEAE</b>	* <i>Amsinkia intermedia</i>	Fiddleneck, Tarweed			xC						
BORAGINACEAE	* <i>Anchusa arvensis</i>	Small bugloss, Alkanet	xC		C	xC	RE				
BORAGINACEAE	* <i>Anchusa officinalis</i>	Alkanet	xC								
BORAGINACEAE	* <i>Asperugo procumbens</i>	Madwort					RE				
BORAGINACEAE	* <i>Borago officinalis</i>	Borage		xC			RE				
BORAGINACEAE	* <i>Buglossoides arvensis</i>	Corn gromwell, Bastard alkanet	xC	xC	xC	C	xC	x	x	x	
BORAGINACEAE	* <i>Cynoglossum officinale</i>	Hound's-tongue	xC			xC	RE		x		
BORAGINACEAE	<i>Cynoglossum virginianum</i> var. <i>virginianum</i>	Wild comfrey					RE	XX	XX		G5/SH/U
BORAGINACEAE	* <i>Echium vulgare</i>	Blue-weed, Blue-devil	XX	xC	xC	XX	XX	x	x	x	
BORAGINACEAE	<i>Hackelia virginiana</i>	Stickseed, Beggar-lice	XX			xC	XX	x	x	x	
BORAGINACEAE	* <i>Heliotropium arborescens</i>	Heliotrope, Cherry-pic	C	xC		x					

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BORAGINACEAE	* <i>Heliotropium europaeum</i>	Heliotrope	xC	xC	x	xC	RE			x	
BORAGINACEAE	* <i>Lappula squarrosa</i>	Stickseed	xC		xC	xC	RE				
BORAGINACEAE	* <i>Lithospermum officinale</i>	European gromwell		C	C		RE				
BORAGINACEAE	* <i>Myosotis arvensis</i>	Forget-me-not	xC			XX	RE	x			
BORAGINACEAE	* <i>Myosotis discolor</i>	Forget-me-not	xC			xC					
BORAGINACEAE	<i>Myosotis laxa</i>	Wild forget-me-not	XX		xC	XX	XX	x	x	x	
BORAGINACEAE	* <i>Myosotis scorpioides</i>	Forget-me-not	xC	C		C	XX	x	x	x	
BORAGINACEAE	<i>Myosotis verna</i>	Spring forget-me-not	XX	xC		xC	RE	x	x	x	
BORAGINACEAE	<i>Onosmodium virginianum</i>	Virginia false gromwell	C	xC	xC	xC			x	x	G4/S1/R
BORAGINACEAE	* <i>Pulmonaria saccharata</i>	Bethlehem sage	XX								
BORAGINACEAE	* <i>Symphytum officinale</i>	Comfrey	XX			x	XX	x		x	
VERBENACEAE	<i>Phryma leptostachya</i>	Lopseed	XX	xC		xC	RE	x	x	x	
VERBENACEAE	* <i>Verbena bracteata</i>	Prostrate vervain			xC	xC	xC		x		
VERBENACEAE	<i>Verbena hastata</i>	Blue vervain, Blue verbena	XX	C		XX	XX	x	x	x	
VERBENACEAE	<i>Verbena engelmannii</i>	Vervain, Verbena	xC					x			
VERBENACEAE	* <i>Verbena lasiostachys</i>	Vervain, Verbena			xC						
VERBENACEAE	* <i>Verbena officinalis</i>	European vervain	xC		xC	xC			x		
VERBENACEAE	<i>Verbena simplex</i>	Vervain, Verbena	xC	xC	C			x			
VERBENACEAE	* <i>Verbena stricta</i>	Hoary vervain				xC			x		
VERBENACEAE	<i>Verbena urticifolia</i> var. <i>leiocarpa</i>	White vervain	x			x			x	x	
	var. <i>urticifolia</i>	White vervain	XX			XX	XX		x		
LAMIACEAE	<i>Agastache nepetoides</i>	Yellow giant-hyssop	XX	xC	C	XX	XX	x			G5/S2S3/U
LAMIACEAE	<i>Agastache scrophulariifolia</i>	Purple giant hyssop	xC				RE		x		
LAMIACEAE	* <i>Ajuga genevensis</i>	Bugleweed		C							
LAMIACEAE	* <i>Ajuga reptans</i>	Carpet-bugleweed			C						
LAMIACEAE	* <i>Ballota nigra</i>	Black horehound, Fetid horehound	xC		C						
LAMIACEAE	<i>Blephilia hirsuta</i>	Hairy wood-mint				XX					
LAMIACEAE	* <i>Clinopodium vulgare</i>	Basil, Wild basil					C	x	x		
LAMIACEAE	<i>Collinsonia canadensis</i>	Richweed, Stoneroot	XX	C		xC	XX		x	x	
LAMIACEAE	<i>Cuncila origanoides</i>	Dittany					RE		x	XX	G5/S3/U
LAMIACEAE	* <i>Elsholtzia ciliata</i>	Elsholtzia		x							
LAMIACEAE	* <i>Galeopsis ladanum</i> var. <i>ladanum</i>	Red hemp-nettle		C			C				
LAMIACEAE	* <i>Galeopsis tetrahit</i> var. <i>tetrahit</i>	Hemp-nettle	C		C		RE		x	x	
LAMIACEAE	* <i>Glechoma hederacea</i>	Ground-ivy, Gill-over-the-ground	XX	C		XX	XX	x	x	x	
LAMIACEAE	<i>Hedeoma pulegioides</i>	Mock-pennyroyal	XX				RE		x	x	

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LAMIACEAE	<i>*Hyssopus officinalis</i>	Hyssop					RE				
LAMIACEAE	<i>*Lamium album</i>	Snowflake, White dead-nettle		C		C					
LAMIACEAE	<i>*Lamium amplexicaule</i>	Henbit, Dead-nettle		C		XX	XX		x	x	
LAMIACEAE	<i>*Lamium purpureum</i> var. <i>purpureum</i>	Purple dead-nettle	XX	XX	XX	XX	XX	x			
LAMIACEAE	<i>*Leonurus cardiaca</i>	Motherwort	XX			XX	XX		x	x	
LAMIACEAE	<i>Lycopus americanus</i>	Water-horehound, Bugleweed	XX			XX	XX		x	x	
LAMIACEAE	<i>Lycopus amplexens</i>	Water-horehound, Bugleweed				x	RE	x	x		
LAMIACEAE	<i>*^Lycopus europaeus</i>	European water-horehound		C	C		RE	x			
LAMIACEAE	<i>Lycopus rubellus</i>	Gypsy-wort, Water-horehound	xC			XX	RE	x	XX	x	G5/S1/U
LAMIACEAE	<i>Lycopus uniflorus</i>	Water-horehound, Bugleweed	XX	C			XX	x	x		
LAMIACEAE	<i>Lycopus virginicus</i>	Water-horehound, Bugleweed	XX			XX	XX	x	x		
LAMIACEAE	<i>*Marribium vulgare</i>	Horehound		C			RE		x		
LAMIACEAE	<i>*Melissa officinalis</i>	Balm, Lemon-balm		C			RE				
LAMIACEAE	<i>*Mentha aquatica</i>	Water-mint			C	C	RE				
LAMIACEAE	<i>Mentha arvensis</i>	Field mint	xC	C	C		XX			x	
LAMIACEAE	<i>Mentha canadensis</i>	Field mint		C			C		x	x	
LAMIACEAE	<i>*Mentha gentilis</i>	Red mint, Scotch mint	xC				RE	x	x		
LAMIACEAE	<i>*Mentha longifolia</i>	Horse-mint	x						x		
LAMIACEAE	<i>*Mentha piperita</i>	Peppermint, Bergamot mint	C	C		XX	RE	x	x	x	
LAMIACEAE	<i>*^Mentha rotundifolia</i>	Apple mint, Pineapple mint					xC	x			
LAMIACEAE	<i>*Mentha spicata</i>	Spearmint, Curly mint	C	C	C	XX	XX	x	x	x	
LAMIACEAE	<i>Monarda didyma</i>	Bee-balm, Oswego tea					RE				
LAMIACEAE	<i>Monarda fistulosa</i>	Wild bergamot, Horehound	xC			C	RE	x	x	x	
LAMIACEAE	<i>Monarda punctata</i>	Dotted horsemint					RE		x		
LAMIACEAE	<i>Monarda villicaulis</i>	Dotted horsemint					C				
LAMIACEAE	<i>*Nepeta cataria</i>	Catnip, Catmint	XX	C		XX	XX		x	x	
LAMIACEAE	<i>*Origanum vulgare</i>	Marjoram, Oregano	C	xC	C	C	RE				
LAMIACEAE	<i>*^Perilla frutescens</i>	Perilla			xC	C	RE				
LAMIACEAE	<i>Physostegia virginiana</i>	False dragonhead, Obedient plant	xC			C	XX				
LAMIACEAE	<i>*Prunella vulgaris</i>	Self-heal, Heal-all	XX	XX	XX	XX	XX	x	x	x	
LAMIACEAE	<i>Pycnanthemum clinopodioides</i>	Basil mountain-mint	C	xC			C				G2/SX/U
LAMIACEAE	<i>Pycnanthemum incanum</i>	Mountain-mint	xC	xC			RE	x	x		
LAMIACEAE	<i>Pycnanthemum muticum</i>	Blunt mountain-mint	C	C			RE		XX	x	G5/S3/U
LAMIACEAE	<i>Pycnanthemum tenuifolium</i>	Mountain-mint	XX	C	xC		XX	XX	x	x	
LAMIACEAE	<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	C	xC			XX				G2/S1/E

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LAMIACEAE	<i>Pycnanthemum verticillatum</i> var. <i>verticillatum</i>	Mountain-mint					XX		x		G5/S1/T
LAMIACEAE	<i>Pycnanthemum virginianum</i>	Mountain-mint	XX				XX	x	x	x	
LAMIACEAE	* <i>Satureja hortensis</i>	Summer-savory		C							
LAMIACEAE	* <i>Satureja montana</i>	Spanish-savory		C			XX				
LAMIACEAE	<i>Scutellaria elliptica</i>	Hairy skullcap	C		x		RE				G5/SX/U
LAMIACEAE	<i>Scutellaria galericulata</i>	Common skullcap					XX		x	x	
LAMIACEAE	<i>Scutellaria integrifolia</i>	Hyssop-skullcap	x	C			XX			x	
LAMIACEAE	<i>Scutellaria lateriflora</i>	Mad-dog skullcap	XX	C		x	XX		x	x	
LAMIACEAE	<i>Scutellaria serrata</i>	Skullcap	C								
LAMIACEAE	* <i>Stachys annua</i>	Hedge-nettle		C		C					
LAMIACEAE	* <i>Stachys arvensis</i>	Hedge-nettle		C		C					
LAMIACEAE	<i>Stachys hyssopifolia</i>	Rough hedge-nettle, Wound-wort				x	C	RE	x	XX	G5/S2S3/U
LAMIACEAE	* <i>Stachys nuttallii</i>	Hedge-nettle					C				
LAMIACEAE	* <i>Stachys palustris</i>	Woundwort					RE		x		
LAMIACEAE	<i>Stachys tenuifolia</i>	Creeping hedge-nettle		C		XX	RE	x			
LAMIACEAE	<i>Teucrium canadense</i> var. <i>canadense</i>	Seaside or Wild germander	XX	x	C	x	C	XX	x	x	
	var. <i>occidentale</i>	Seaside or Wild germander					XX				
LAMIACEAE	* <i>Thymus pulegioides</i>	Wild thyme, Mother-of-thyme	C				XX	RE	x		
LAMIACEAE	<i>Trichostema dichotomum</i>	Blue-curly	XX	C			XX	XX	x	x	x
LAMIACEAE	<i>Trichostema setaceum</i>	Tiny blue-curly					XX	x	C	x	G5/SH/U
CALLITRICHACEAE	<i>Callitriche hermaphroditica</i>	Autumnal water-starwort	x							x	G5/SH/U
CALLITRICHACEAE	<i>Callitriche heterophylla</i>	Water-starwort			C		XX	x	x		
CALLITRICHACEAE	<i>Callitriche palustris</i>	Water-starwort	x	C		x	C	XX	x	x	
CALLITRICHACEAE	* <i>Callitriche stagnalis</i>	Water-chickweed, Water-starwort					x	C	x	x	
CALLITRICHACEAE	<i>Callitriche terrestris</i>	Starwort					x	C		XX	G5/S1/U
PLANTAGINACEAE	* <i>Plantago aristata</i>	Rat-tail plantain, Bracted plantain	x	C			XX	XX	x		
PLANTAGINACEAE	<i>Plantago cordata</i>	Heartleaf plantain		C							G4/S3/T
PLANTAGINACEAE	* <i>Plantago coronopus</i>	Cutleaf plantain			C						
PLANTAGINACEAE	* <i>Plantago eriopoda</i>	Salt-plantain			C						
PLANTAGINACEAE	* <i>Plantago lanceolata</i>	English or Buck-horn plantain	XX	XX	XX	XX	XX	XX		x	x
PLANTAGINACEAE	* <i>Plantago major</i>	Common or Dooryard plantain	XX	XX	XX	XX	XX	XX	x	x	x
PLANTAGINACEAE	<i>Plantago maritima</i> ssp. <i>juncoides</i>	Seaside or Seashore plantain	x	x	C		XX	RE	x	XX	x
PLANTAGINACEAE	* <i>Plantago media</i>	Dwarf plantain, Hoary plantain	x			x	C				
PLANTAGINACEAE	* <i>Plantago psyllium</i>	Flaxseed plantain, Fleawort	C		C		XX	RE		x	
PLANTAGINACEAE	* <i>Plantago pusilla</i>	Dwarf plantain, Slender plantain		C					x	XX	
PLANTAGINACEAE	<i>Plantago rugelii</i>	Pale plantain, Grand plantain	XX				XX	XX	x		x

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PLANTAGINACEAE	<i>Plantago virginica</i>	Hoary or Pale-seeded plantain	x	C		x	RE		x		
OLEACEAE	* <i>Chionanthus virginicus</i>	Old-man's-beard, Fringe-tree	XX	XX							
OLEACEAE	* <i>Forsythia viridissima</i>	Forsythia, Golden-bells	XX	XX		XX				XX	
OLEACEAE	<i>Fraxinus americana</i>	White ash, American ash	XX	XX	BB	BB	BB	BB	BB	BB	
OLEACEAE	<i>Fraxinus nigra</i>	Black ash	XX	C			RE	x		x	
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red ash, Green ash	XX	XX	BB	BB	BB	BB	BB	BB	
OLEACEAE	* <i>Fraxinus profunda</i>	Pumpkin ash, Red ash	C								
OLEACEAE	* <i>Ligustrum vulgare</i>	Privet, Hedge-privet, Prim	XX	BB	BB	BB	BB	BB	BB	BB	
OLEACEAE	* <i>Syringa vulgaris</i>	Lilac, Purple lilac	XX			XX	RE			x	
SCROPHULARIACEAE	<i>Agalinis fasciculata</i>	Gerardia					XX				G3G4/S3/T
SCROPHULARIACEAE	<i>Agalinis maritima</i>	Seaside or Saltmarsh gerardia	x	C		x	RE	x	XX	x	G5/S3/U
SCROPHULARIACEAE	<i>Agalinis paupercula</i> var. <i>paupercula</i>	False-foxglove, Gerardia					C		x	x	
SCROPHULARIACEAE	<i>Agalinis purpurea</i>	Gerardia, False-foxglove	x	C	C	C	XX	x	x		
SCROPHULARIACEAE	<i>Agalinis setacea</i>	Needle-leaf gerardia				C	x	C	x	x	
SCROPHULARIACEAE	<i>Agalinis tenuifolia</i> var. <i>tenuifolia</i>	Gerardia, False-foxglove	x	C		C	RE		x	x	
SCROPHULARIACEAE	* <i>Antirrhinum majus</i>	Snapdragon			C		RE				
SCROPHULARIACEAE	* <i>Antirrhinum orontium</i>	Lesser snapdragon					x	C			
SCROPHULARIACEAE	<i>Aureolaria flava</i> var. <i>flava</i>	Yellow false-foxglove	XX	C		x	RE	x	x	x	
SCROPHULARIACEAE	<i>Aureolaria pedicularia</i>	Cutleaf false-foxglove				x	RE	x	x		
SCROPHULARIACEAE	<i>Aureolaria virginica</i>	Downy false-foxglove	x	C			RE	x	x	x	
SCROPHULARIACEAE	* <i>Castilleja coccinea</i>	Indian or Scarlet-paintbrush				x	RE			x	G5/S1/T
SCROPHULARIACEAE	* <i>Chaenorrhinum minus</i>	Dwarf snapdragon	XX								
SCROPHULARIACEAE	<i>Chelone glabra</i>	White turtle-head	XX	C	x	x	XX	x	x	x	
SCROPHULARIACEAE	* <i>Cymbalaria muralis</i>	Kenilworth-ivy, Coliseum-ivy	XX	XX					x	x	
SCROPHULARIACEAE	* <i>Digitalis lutea</i>	Yellow foxglove		C							
SCROPHULARIACEAE	<i>Gratiola aurea</i>	Golden-pert, Gratiola				x	x	XX	x	x	
SCROPHULARIACEAE	<i>Gratiola neglecta</i>	Mud-hyssop, Hedge-hyssop	XX	C		x	XX	x	x	x	
SCROPHULARIACEAE	* <i>Kickxia spuria</i>	Fluellin			C						
SCROPHULARIACEAE	<i>Limosella australis</i>	Mudwort				C					
SCROPHULARIACEAE	<i>Linaria candensis</i>	Old-field toadflax	XX	C		x	XX	x	x	x	
SCROPHULARIACEAE	* <i>Linaria dalmatia</i>	Dalmation toadflax			C						
SCROPHULARIACEAE	* <i>Linaria maroccana</i>	Moroccan toadflax	x	C							
SCROPHULARIACEAE	* <i>Linaria vulgaris</i>	Butter-and-eggs, Wild snapdragon	XX	XX	XX	XX	XX			x	
SCROPHULARIACEAE	<i>Lindernia dubia</i> var. <i>anagallidea</i>	False-pimpernel	x	C	x	x	RE		x	x	
	var. <i>dubia</i>	False-pimpernel	XX				XX	x	x	x	
SCROPHULARIACEAE	* <i>Mazus miquelii</i>	Mazus	x								

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SCROPHULARIACEAE	<i>*Mazus pumilis</i>	Mazus	XX							x	
SCROPHULARIACEAE	<i>Melampyrum lineare</i>	Cow-wheat	xC			xC	RE	x	XX	x	
SCROPHULARIACEAE	<i>Mimulus alatus</i>	Winged monkeyflower	XX	C			XX			XX	G5/S3/R
SCROPHULARIACEAE	<i>Mimulus ringens</i>	Common monkeyflower	XX	C	xC	xC	XX	x	x	x	
SCROPHULARIACEAE	<i>Pedicularis canadensis</i>	Lousewort, Wood-betony	XX	C	xC	xC	XX	x	x	x	
SCROPHULARIACEAE	<i>Pedicularis lanceolata</i>	Swamp lousewort, Wood-betony	xC	C	xC	xC	RE	x	x	x	G5/S2/R
SCROPHULARIACEAE	<i>*Penstemon calycosus</i>	Penstemon, Beard-tongue	xC								
SCROPHULARIACEAE	<i>*Penstemon digitalis</i>	False-foxglove, Beard-tongue	XX				XX	x	x	XX	
SCROPHULARIACEAE	<i>Penstemon hirsutus</i>	Penstemon, Beard-tongue	xC		C		RE		x	x	
SCROPHULARIACEAE	<i>Penstemon pallidus</i>	Pale penstemon, Beard-tongue				xC		x	x	x	
SCROPHULARIACEAE	<i>*^Scrophularia auriculata</i>	Shoreline figwort		xC							
SCROPHULARIACEAE	<i>Scrophularia lanceolata</i>	Hare-figwort	XX	C	xC	xC	XX	x	x	x	
SCROPHULARIACEAE	<i>Scrophularia marilandica</i>	Carpenter's-square, Figwort	XX		xC	xC	RE	x	x	x	
SCROPHULARIACEAE	<i>*Verbascum blatteria</i>	Moth-mullein	XX	XX	XX	XX	XX		x	x	
SCROPHULARIACEAE	<i>*^Verbascum lychnitis</i>	White mullein	xC				C				
SCROPHULARIACEAE	<i>*Verbascum thapsus</i>	Mullein, Mule's ear	XX	C			XX		x	x	
SCROPHULARIACEAE	<i>*Veronica agrestis</i>	Field speedwell			C	C				x	
SCROPHULARIACEAE	<i>Veronica americana</i>	American speedwell				xC	RE	x	x	x	
SCROPHULARIACEAE	<i>Veronica anagallis-aquatica</i>	Water speedwell, Brook pimpernel		xC	C	xC	RE	x	x		
SCROPHULARIACEAE	<i>*Veronica arvensis</i>	Corn speedwell	XX		XX		XX		x	x	
SCROPHULARIACEAE	<i>*Veronica beccabunga</i>	Brooklime			C						
SCROPHULARIACEAE	<i>*Veronica chamaedrys</i>	Bird's-eye speedwell	XX	XX	XX	x	XX				
SCROPHULARIACEAE	<i>*Veronica hederifolia</i>	Ivy-leaf speedwell	XX	C	C						
SCROPHULARIACEAE	<i>*Veronica officinalis</i>	Speedwell, Gypsy-weed	XX				XX		x	x	
SCROPHULARIACEAE	<i>Veronica peregrina</i> ssp. <i>peregrina</i>	Neckweed, Purslane-speedwell	XX		xC	XX	RE	x	x	x	
SCROPHULARIACEAE	<i>*Veronica persica</i>	Bird's-eye, Speedwell	XX	C		xC	RE				
SCROPHULARIACEAE	<i>Veronica scutellata</i>	Harsh speedwell	xC		xC	xC	RE		x		
SCROPHULARIACEAE	<i>*Veronica serpyllifolia</i> ssp. <i>serpyllifolia</i>	Thyme-leaf speedwell	XX				XX	x	x	x	
SCROPHULARIACEAE	<i>Veronicastrum virginicum</i>	Culver's-root	XX	C	xC	xC	XX	x		x	
OROBANCHACEAE	<i>Conopholis americana</i>	Squawroot, Cancer-root	xC	C		XX	XX	x			
OROBANCHACEAE	<i>Epifagus virginiana</i>	Beech-drops, Cancer-root	XX	C		xC	XX	x	x	x	
OROBANCHACEAE	<i>*^Orobanche minor</i>	Broome-rape		xC							
OROBANCHACEAE	<i>Orobanche uniflora</i>	One-flowered cancer-root	XX	xC		XX	XX	x	x	x	
ACANTHACEAE	<i>Justicia americana</i>	Water-willow, Willow-weed					XX				
PEDALIACEAE	<i>*^Proboscidea louisiana</i>	Unicorn-plant, Proboscis-flower				XX	XX	x	x		
PEDALIACEAE	<i>*Sesamum indicum</i>	Sesame				xC	xC				

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<b>BIGNONIACEAE</b>	* <i>Campsis radicans</i>	Trumpet-creeper, Trumpet-vine	XX	XX		XX	XX	BB	BB	x	
BIGNONIACEAE	* <i>Catalpa bignonioides</i>	Catawba, Indian-bean		xC		XX	XX			x	
BIGNONIACEAE	* <i>Catalpa speciosa</i>	Catalpa, Indian-bean	XX	BB	BB	BB	BB	BB	BB	BB	
BIGNONIACEAE	* <i>Paulownia tomentosa</i>	Princess tree, Empress tree	XX	BB	BB	BB	BB	BB	BB	BB	
<b>LENTIBULARIACEAE</b>	<i>Utricularia geminiscapa</i>	Bladdervort					XX		x		
LENTIBULARIACEAE	<i>Utricularia gibba</i>	Cone-spur bladderwort				C	XX		x		
LENTIBULARIACEAE	<i>Utricularia macrorhiza</i>	Common bladderwort				C	XX	x	x		
LENTIBULARIACEAE	<i>Utricularia minor</i>	Lesser bladderwort			C				x	XX	G5/S2S3/U
LENTIBULARIACEAE	<i>Utricularia purpurea</i>	Purple bladderwort				C			x		
LENTIBULARIACEAE	<i>Utricularia radiata</i>	Small floating bladderwort				xC		x	XX		G4/S2/R
<b>CAMPANULACEAE</b>	<i>Campanula americana</i>	Tail bellflower				C					
CAMPANULACEAE	<i>Campanula aparinoides</i>	Marsh flower				xC	RE				
CAMPANULACEAE	* <i>Campanula glomerata</i>	Clustered bellflowered					RE				
CAMPANULACEAE	* <i>Campanula rapunculoides</i>	Creeping bellflower	XX				XX			x	
CAMPANULACEAE	* <i>Jasione montana</i>	Sheep's-bit		C		C			x		
CAMPANULACEAE	<i>Lobelia cardinalis</i>	Cardinal-flower, Indian-pink	XX	XX		xC	XX		x	x	
CAMPANULACEAE	<i>Lobelia inflata</i>	Indian-tobacco	XX	C		XX	XX		x	x	
CAMPANULACEAE	<i>Lobelia nuttallii</i>	Nuttall's lobelia				xC		x	XX		G4G5/S3/R
CAMPANULACEAE	<i>Lobelia siphilitica</i>	Great lobelia, Blue cardinal-flower	XX	xC		xC	RE		x	x	
CAMPANULACEAE	<i>Lobelia spicata</i>	Pale-spike lobelia	xC	xC		xC	RE	x	x	x	
CAMPANULACEAE	<i>Triodanis perfoliata</i> var. <i>*biflora</i>	Venus' looking-glass	XX								
	var. <i>perfoliata</i>	Venus' looking-glass	XX	C		XX	XX		x	x	
<b>RUBIACEAE</b>	* <i>Asperula arvensis</i>	Woodruff					RE				
RUBIACEAE	<i>Cephalanthus occidentalis</i>	Buttonbush	XX	x	x	BB	BB	BB	BB	BB	
RUBIACEAE	<i>Diodia teres</i>	Buttonweed	XX		C		XX	x	x		
RUBIACEAE	* <i>Galium aparine</i>	Bedstraw, Cleavers	XX			C	XX		x	x	
RUBIACEAE	<i>Galium asperellum</i>	Rough bedstraw	XX				RE	x		x	
RUBIACEAE	<i>Galium circaezans</i> var. <i>circaezans</i>	Wild licorice	XX			C	RE		x	XX	
RUBIACEAE	<i>Galium concinnum</i>	Shining Bedstraw			XX						E G5 S1
RUBIACEAE	<i>Galium lanceolatum</i>	Wild licorice	xC	xC							
RUBIACEAE	* <i>Galium mollugo</i>	White bedstraw, False baby's-breath	XX	x	C	C	RE	x	x	XX	
RUBIACEAE	<i>Galium obtusum</i>	Marsh bedstraw, Cleavers	xC	xC			XX	x	x		
RUBIACEAE	<i>Galium palustre</i>	Ditch bedstraw, Marsh bedstraw	XX	C			XX	x		x	
RUBIACEAE	<i>Galium pilosum</i>	Bedstraw, Cleavers	xC			xC	RE		x		
RUBIACEAE	<i>Galium tinctorium</i>	Bedstraw, Cleavers	x			XX	XX	x	x		
RUBIACEAE	* <i>Galium tricornutum</i>	Small bedstraw		C		C					

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RUBIACEAE	<i>Galium trifidum</i> ssp. <i>trifidum</i>	Small bedstraw, Cleavers	XX				RE	x			
RUBIACEAE	<i>Galium triflorum</i>	Sweet-scented bedstraw	XX		C	x	XX	x	x	x	
RUBIACEAE	<i>Galium verum</i> ssp. <i>verum</i>	Yellow bedstraw, Golden bedstraw	xC			xC	RE		x		
RUBIACEAE	<i>Houstonia caerulea</i>	Clustered bluets	xC			x	XX		x		
RUBIACEAE	<i>Houstonia longifolia</i>	Pale bluets				xC		x	x		
RUBIACEAE	<i>Mitchella repens</i>	Partridge-berry, Twin-berry	XX	C		x	XX		x	x	
RUBIACEAE	<i>Oldenlandia uniflora</i>	Clustered bluets	xC	C	C	xC	XX		XX		G5/S1/T
<b>CAPRIFOLIACEAE</b>	<i>Diervilla lonicera</i>	Bush honeysuckle	XX	C			BB	RE		x	BB
CAPRIFOLIACEAE	<i>Lonicera dioica</i> var. <i>dioica</i>	Wild honeysuckle	xC	C							BB
CAPRIFOLIACEAE	* <i>Lonicera fragrantissima</i>	Winter honeysuckle	XX				RE		C		
CAPRIFOLIACEAE	* <i>Lonicera japonica</i>	Japanese honeysuckle	XX	BB	BB	BB	BB	BB	BB	BB	
CAPRIFOLIACEAE	* <i>Lonicera maackii</i>	Honeysuckle	XX				BB	BB	BB	BB	BB
CAPRIFOLIACEAE	* <i>Lonicera morrowii</i>	Fly honeysuckle	XX				BB		BB	BB	BB
CAPRIFOLIACEAE	* <i>Lonicera x bella</i>	Fly honeysuckle	XX								
CAPRIFOLIACEAE	<i>Lonicera sempervirens</i>	Trumpet honeysuckle	XX	XX	C	C	XX	BB	BB	BB	
CAPRIFOLIACEAE	* <i>Lonicera tatarica</i>	Tartarian honeysuckle	x				XX	XX	BB	x	BB
CAPRIFOLIACEAE	* <i>Lonicera xylosteum</i>	Fly honeysuckle						RE		x	x
CAPRIFOLIACEAE	<i>Sambucus canadensis</i>	Black elderberry, Common elder	XX	XX	BB	BB	BB	BB	BB	BB	
CAPRIFOLIACEAE	* <i>Sambucus racemosus</i> ssp. <i>pubens</i>	Red or Stinking Elderberry	C				RE	XX			BB
CAPRIFOLIACEAE	* <i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Snowberry	XX				XX			xC	SX
CAPRIFOLIACEAE	* <i>Symphoricarpos orbiculatus</i>	Coralberry, Indian-currant					XX	XX		BB	BB
CAPRIFOLIACEAE	<i>Triosteum aurantiacum</i>	Wild coffee, Horse-gentian	C	C				C			x
CAPRIFOLIACEAE	<i>Triosteum perfoliatum</i>	Tinker's-weed, Wild coffee	XX	C			xC	XX		x	
CAPRIFOLIACEAE	<i>Viburnum acerifolium</i>	Maple-leaf viburnum, Arrowwood	XX	XX			BB	BB	BB	BB	BB
CAPRIFOLIACEAE	<i>Viburnum dentatum</i> var. <i>lucidum</i>	Arrowwood	XX	XX	BB	BB	BB	BB	BB	BB	
	var. <i>venosum</i>	Southern arrowwood	XX							x	G5/S2/U
CAPRIFOLIACEAE	* <i>Viburnum dilatatum</i>	Viburnum	XX				BB		BB	BB	BB
CAPRIFOLIACEAE	* <i>Viburnum lantana</i>	Wayfaring tree, Twistwood	xC				x	BB		BB	
CAPRIFOLIACEAE	<i>Viburnum lentago</i>	Sheepberry, Sweetberry	XX				xC	XX	BB	BB	BB
CAPRIFOLIACEAE	* <i>Viburnum molle</i>	Black alder, Poison haw	xC					XX			
CAPRIFOLIACEAE	<i>Viburnum nudum</i> var. <i>nudum</i>	Poison-haw, Swamp-haw	C					BB	x	BB	x
	var. <i>cassinoides</i>	White-rod, Appalachian tea						xC	BB	BB	XX
CAPRIFOLIACEAE	* <i>Viburnum opulus</i> var. <i>opulus</i>	Gelder-rose	XX				XX				
CAPRIFOLIACEAE	* <i>Viburnum plicatum</i>	Japanese snowball	XX						BB	BB	BB
CAPRIFOLIACEAE	<i>Viburnum prunifolium</i>	Black-haw, Sweet-haw	XX	BB	xC	xC	BB	BB	BB	BB	
CAPRIFOLIACEAE	<i>Viburnum rafanisqueianum</i>	Downy arrowwood	C	C							BB

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CAPRIFOLIACEAE	* <i>Viburnum sieboldii</i>	Japanese viburnum	XX			BB		BB	BB	BB	
CAPRIFOLIACEAE	* <i>Weigela floribunda</i>	Weigela, Floribunda				XX					
VALERIANACEAE	* <i>Valeriana officinalis</i>	Common valerian					RE				
VALERIANACEAE	* <i>Valerianella locusta</i>	Corn-salad, Lamb's-lettuce		C		C	RE				
DIPSACACEAE	* <i>Dipsacus fullonum</i>	Common teasel, Fuller's teasel	C	C		XX	XX				
DIPSACACEAE	* <i>Knautia arvensis</i>	Bluc-buttons					RE				
ASTERACEAE	* <i>Acanthospermum humile</i>	Acanthospermum	x	C	C						
ASTERACEAE	* <i>Acanthospermum xanthoides</i>	Acanthospermum		C							
ASTERACEAE	* <i>Achillea millefolium</i> var. <i>millefolium</i>	Common yarrow, Milfoil	XX	XX	XX	XX	XX	x			
	*var. <i>occidentalis</i>	Yarrow, Woolly milfoil	XX					x	x	x	
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Ragweed, Hogweed	XX		C	XX	XX		x	x	
ASTERACEAE	<i>Ambrosia trifida</i>	Giant ragweed, Great ragweed	XX		C	XX	XX		x	x	
ASTERACEAE	<i>Anaphalis margaritacea</i>	Pearly-everlasting	x	C		XX	XX	x	x	x	
ASTERACEAE	<i>Antennaria neglecta</i>	Everlasting, Pussy's-toes	x	C	C	C	XX	x	x	x	
ASTERACEAE	<i>Antennaria plantaginifolia</i> var. <i>plantaginifolia</i>	Everlasting, Pussy's-toes	XX	C		x	RE	x		x	
ASTERACEAE	* <i>Anthemis arvensis</i>	Corn-chamomile	XX		C	XX	RE	x	x	x	
ASTERACEAE	* <i>Anthemis cotula</i>	Mayweed, Stinking chamomile	XX	C		XX	XX			x	
ASTERACEAE	* <i>Anthemis tinctoria</i>	Yellow or Dyer's chamomile				XX			x		
ASTERACEAE	* <i>Arctium lappa</i>	Burdock, Great burdock	C	C		XX	XX			x	
ASTERACEAE	* <i>Arctium minus</i>	Common burdock	XX	XX		x	XX			x	
ASTERACEAE	* <i>Artemisia annua</i>	Sweet wormwood	XX			XX	XX			x	
ASTERACEAE	* <i>Artemisia biennis</i>	Sage-weed	x	C			XX				
ASTERACEAE	<i>Artemisia campestris</i> ssp. <i>caudata</i>	Wild sage, Tall wormwood				XX	RE		x		
ASTERACEAE	* <i>Artemisia stelleriana</i>	Dusty-miller, Old-woman			C	XX		x	x		
ASTERACEAE	* <i>Artemisia vulgaris</i>	Mugwort, Felon-herb	XX	XX	XX	XX	XX	XX	XX	XX	
ASTERACEAE	<i>Aster acuminatus</i>	Mountain aster					RE	x		x	
ASTERACEAE	<i>Aster amethystinus</i>	Amethyst wreath aster	x	C							
ASTERACEAE	<i>Aster concolor</i>	Silvery aster			C	x	XX	x	XX		G4/S1/E
ASTERACEAE	<i>Aster cordifolius</i>	Blue wood aster	XX	C		x	XX	x	x	x	
ASTERACEAE	<i>Aster divaricatus</i>	White wood aster	XX	XX	XX	XX	XX	x	x	x	
ASTERACEAE	<i>Aster dumosus</i>	Rice-button aster, Bushy aster	x	C		XX	XX	x	x		
ASTERACEAE	<i>Aster ericoides</i>	White wreath aster, Heath aster	XX	x	C	XX	XX		XX	x	
ASTERACEAE	<i>Aster infirmus</i>	Cornel-leaved aster	C			C		x			
ASTERACEAE	<i>Aster laevis</i> var. <i>concinus</i>	Smooth blue aster					RE				
	var. <i>laevis</i>	Smooth blue aster	XX		x	x	XX		x	x	

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ASTERACEAE	<i>Aster lanceolatus</i>	Tall white aster	C			XX	XX					
	var. <i>lanceolatus</i>	Tall white aster	x			XX		x	x	x		
	var. <i>simplex</i>	Tall white aster	XX			x	XX					
ASTERACEAE	<i>Aster lateriflorus</i>	Calico aster				C	XX					
	var. <i>lateriflorus</i>	Calico aster	XX			x		x	x	x		
ASTERACEAE	<i>Aster linariifolius</i>	Stiff-leaf aster		C		C	RE	x	x	x		
ASTERACEAE	<i>Aster lowricanus</i>	Lowrie's aster	XX	x	C	x	RE	x		x		
ASTERACEAE	<i>Aster macrophyllus</i> var. <i>macrophyllus</i>	Bigleaf aster	XX			x	XX	x	x			
ASTERACEAE	<i>Aster nemoralis</i>	Bog aster					XX		XX		G5/S3/R	
ASTERACEAE	<i>Aster novae-angliae</i>	New England aster	XX	C	C		XX		x	x		
ASTERACEAE	<i>Aster novi-belgii</i> var. <i>novi belgii</i>	New York aster	XX	C		XX	RE	x	x	x		
ASTERACEAE	<i>Aster patens</i>	Late purple aster	XX			x	XX		x			
ASTERACEAE	<i>Aster paternus</i>	White-topped aster	XX			x	RE	x	x	x		
ASTERACEAE	<i>Aster pilosus</i>	Heath aster	C	C	C	XX	XX					
	var. <i>pilosus</i>	Heath aster	XX					x	x	x	G5/S1/U	
	var. <i>pringlei</i>	Heath aster	x					x				
ASTERACEAE	<i>Aster praealtus</i>	Willow aster	x	C	x		RE	x	x			
ASTERACEAE	<i>Aster puniceus</i> var. <i>firmus</i>	Cornel-leaf aster	x	C			C	x	x	x	G5/S1/E	
	var. <i>puniceus</i>	Purple-stemmed aster	x	C			XX	x	x	x		
ASTERACEAE	<i>Aster racemosus</i>	Small white aster	x	C		XX	C		x			
ASTERACEAE	<i>Aster radula</i>	Swamp aster, Rough aster				x	RE	x	x	x	G5/SH/U	
ASTERACEAE	<i>Aster sagittifolius</i>	Arrow-leaf aster	XX			C	RE					
ASTERACEAE	<i>Aster schreberi</i>	Schreber's aster	XX			XX	RE	XX	XX	x	G4/S3/U	
ASTERACEAE	<i>Aster solidagineus</i>	Flax-leaf whitetop	x	C	x		XX	XX	x		G5/S2/U	
ASTERACEAE	<i>Aster spectabilis</i>	Showy aster			C	C	RE		XX		G5/S2/U	
ASTERACEAE	<i>Aster subulatus</i>	Saltmarsh aster	XX	x		C	XX	x	x		G5/S1S2/T	
ASTERACEAE	<i>Aster tenuifolius</i>	Slender saltmarsh aster	XX		x	C	XX	XX	x	XX	x	G5/S2/U
ASTERACEAE	* <i>Aster tripolium</i>	Tripoli aster		x	C							
ASTERACEAE	<i>Aster umbellatus</i> var. <i>umbellatus</i>	Flat-top white aster, Peewee daisy	XX				RE	x	x	x		
ASTERACEAE	<i>Aster undulatus</i>	Wavy-leaf aster	XX			C	RE		x			
ASTERACEAE	<i>Baccharis halimifolia</i>	Groundsel-tree, Sea-myrtle	XX	XX	BB	XX	BB	BB	BB	x		
ASTERACEAE	* <i>Bellis perennis</i>	English daisy, lawn-daisy		x	C	C						
ASTERACEAE	* <i>Bidens aristosa</i>	Showy beggar-ticks	XX				XX					
ASTERACEAE	<i>Bidens bipinnata</i>	Spanish-needles	XX	XX	XX	XX	XX		x	x		
ASTERACEAE	<i>Bidens cernua</i>	Stick-tights, Bur-marigold		C			XX			x		
ASTERACEAE	<i>Bidens coronata</i>	Tickseed-sunflower, Beggar-tick		C			XX	XX	x	x		

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ASTERACEAE	<i>Bidens discoidea</i>	Small beggar-ticks	C			C	RE		x		
ASTERACEAE	<i>Bidens frondosa</i>	Beggar-ticks, Stick-tights	XX			XX	XX		x		
ASTERACEAE	<i>Bidens laevis</i>	Bur-marigold, Beggar-ticks				XX	RE		x	x	G5/S2/R
ASTERACEAE	* <i>Bidens tripartita</i>	Beggar-ticks, Stick-tights				x	XX	x	x		
ASTERACEAE	<i>Bidens vulgata</i>	Beggar-ticks, Stick-tights	XX				XX		x		
ASTERACEAE	* <i>Boltonia asteroides</i> var. <i>recognita</i>	Boltonia, False-aster	x	C							
ASTERACEAE	* <i>Carduus acanthoides</i>	Thistle		C							
ASTERACEAE	* <i>Carduus crispus</i>	Wetted thistle		C							
ASTERACEAE	* <i>Carduus nutans</i>	Musk thistle, Nodding thistle	XX			C	XX		x		
ASTERACEAE	* <i>Carduus pycnocephalus</i>	Thistle		C							
ASTERACEAE	* <i>Centaurea aspera</i>	Star-thistle				C					
ASTERACEAE	* <i>Centaurea calcitrapa</i>	Caltrops, Star-thistle		C		C					
ASTERACEAE	* <i>Centaurea cyanus</i>	Bluebottle, Bachelor's-button				XX	RE				
ASTERACEAE	* <i>Centaurea jacea</i>	Brown knapweed	XX			XX	XX		x		
ASTERACEAE	* <i>Centaurea maculosa</i>	Bushy knapweed	XX			XX	XX		x		
ASTERACEAE	* <i>Centaurea nigra</i>	Black knapweed, Spanish-buttons	XX				XX		x	x	
ASTERACEAE	* <i>Centaurea nigrescens</i>	Knapweed	XX				XX		x	x	
ASTERACEAE	* <i>Centaurea solstitialis</i>	Yellow star-thistle					RE				
ASTERACEAE	* <i>Chrysanthemum segetum</i>	Corn chrysanthemum		C					x		
ASTERACEAE	<i>Chrysopsis mariana</i>	Golden aster		C			RE	x	x		
ASTERACEAE	* <i>Cichorium intybus</i>	Chicory, Blue-sailors	XX	XX	XX	XX	XX	x	x	x	
ASTERACEAE	<i>Cirsium altissimum</i>	Tall thistle					x		x		G5/SX/U
ASTERACEAE	* <i>Cirsium arvense</i>	Canada thistle	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>Cirsium discolor</i>	Field-thistle	XX				XX		x	x	
ASTERACEAE	* <i>Cirsium horridulum</i>	Yellow thistle	XX	C	XX		XX		x		
ASTERACEAE	<i>Cirsium muticum</i>	Swamp-thistle					XX		x		
ASTERACEAE	* <i>Cirsium palustre</i>	Marsh-thistle				C					
ASTERACEAE	<i>Cirsium pumilum</i>	Small bull-thistle, Pasture thistle	x	C		XX	RE		x	x	
ASTERACEAE	* <i>Cirsium vulgare</i>	Bull-thistle, Common thistle	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>Conyza canadensis</i> var. <i>canadensis</i>	Horseweed, Hogweed	XX	XX	XX	XX	XX		x		
	var. <i>pusilla</i>	Dwarf horseweed			C				x	x	
ASTERACEAE	* <i>Coreopsis lanceolata</i>	Lance-leaved Coreopsis	XX		XX	XX	XX	x	x		
ASTERACEAE	* <i>Coreopsis major</i>	Forest tickseed					XX				
ASTERACEAE	* <i>Cosmos bipinnatus</i>	Cosmos				C					
ASTERACEAE	* <i>Crepis capillaris</i>	Hawk's beard	x	C		C		x			
ASTERACEAE	* <i>Crepis tectorum</i>	Hawk's beard				C	RE		x		

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ASTERACEAE	* <i>Crepis vesicaria</i> ssp. <i>haenseleri</i>	Hawk's beard					RE				
ASTERACEAE	* <i>Dittrichia graveolens</i>	Stink-aster	x	C							
ASTERACEAE	* <i>Echinacea purpurea</i>	Purple coneflower	XX								
ASTERACEAE	<i>Eclipta prostrata</i>	Yerba-de-Tago			C		RE				
ASTERACEAE	<i>Erechtites hieracifolia</i> var. <i>hieracifolia</i>	Pilewort, Fireweed	XX	XX		XX	XX	x	x	XX	
ASTERACEAE	<i>Erigeron annuus</i>	Daisy-fleabane, Daisy	XX	XX	XX	XX	XX			x	
ASTERACEAE	<i>Erigeron philadelphicus</i>	Fleabane, Daisy	XX			XX	XX		x	x	
ASTERACEAE	<i>Erigeron pulchellus</i>	Robin's-plantain	x	C		XX	RE		x		
ASTERACEAE	<i>Erigeron strigosus</i>	Daisy fleabane, Whitetop	XX			XX	XX		x	x	
ASTERACEAE	<i>Eupatorium album</i> var. <i>subvenosum</i>	White boneset, Thoroughwort	XX			C	XX	x	XX	x	G4/S3/U
ASTERACEAE	* <i>Eupatorium altissimum</i>	Tall thoroughwort					XX				
ASTERACEAE	<i>Eupatorium aromaticum</i>	Small white snakeroot		x	C	C	XX	x	XX		G4G5/S1/U
ASTERACEAE	* <i>Eupatorium cannabinum</i>	Hemp-agrimony		C	C						
ASTERACEAE	<i>Eupatorium dubium</i>	Joe-pye-weed, Purple boneset	XX	C		XX	XX	x	x	x	
ASTERACEAE	<i>Eupatorium fistulosum</i>	Joe-pye-weed, Trumpet-weed	XX	C		XX	XX		x	x	
ASTERACEAE	<i>Eupatorium hyssopifolium</i>	Boneset, Thoroughwort			C	XX	C				
	var. <i>laciniatum</i>	Fringed boneset, Thoroughwort	XX			XX	XX	XX	XX		G5/S2/U
ASTERACEAE	<i>Eupatorium leucolepis</i>	White boneset, White thoroughwrt				XX	XX		XX		G5/S1/E
ASTERACEAE	<i>Eupatorium maculatum</i> var. <i>maculatum</i>	Spotted Joe-pye-weed	x			XX	XX			x	
ASTERACEAE	<i>Eupatorium perfoliatum</i>	Thoroughwort, Boneset	XX	C		XX	XX		x	x	
ASTERACEAE	<i>Eupatorium pilosum</i>	Thoroughwort, Boneset	x	C	x	XX	C	x	x		
ASTERACEAE	<i>Eupatorium purpureum</i>	Sweet Joe-pye-weed	XX			x	XX		x	x	
ASTERACEAE	<i>Eupatorium resinosum</i>	Boneset, Thoroughwort				x					G2/SX/U
ASTERACEAE	<i>Eupatorium rotundifolium</i>	Round-leaf boneset	C		C	C	XX				
	var. <i>ovatum</i>	Round-leaf boneset				x	C		XX		G5/S1/U
	var. <i>rotundifolium</i>	Round-leaf boneset				XX	x	C	x	x	G5/SH/U
ASTERACEAE	<i>Eupatorium rugosum</i>	White snakeroot, White sanicle	XX	XX		XX	XX			x	
ASTERACEAE	* <i>Eupatorium serotinum</i>	Late thoroughwort, Late boneset	XX			XX	XX	x		x	G5/S1/U
ASTERACEAE	<i>Eupatorium sessilifolium</i> var. <i>sessilifolium</i>	Upland boneset	XX	C		C	XX			x	
ASTERACEAE	<i>Euthamia graminifolia</i>	Bush or Flat-top goldenrod	XX			XX	XX	x	x	x	
ASTERACEAE	<i>Euthamia tenuifolia</i>	Buttonhead goldenrod	XX		XX	XX	XX	x	x	x	
ASTERACEAE	* <i>Filago vulgaris</i>	Herba impia, Cudweed					XX				
ASTERACEAE	* <i>Gaillardia aristata</i>	Blanket-flower	XX			XX			x		
ASTERACEAE	* <i>Galinsoga parviflora</i>	Quickweed	XX	XX	XX	XX	XX			x	
ASTERACEAE	* <i>Galinsoga quadriradiata</i>	Quickweed	XX	XX	XX	XX	XX			x	
ASTERACEAE	<i>Gnaphalium obtusifolium</i>	Catfoot, Cudweed	XX	x	C	XX	XX	x	x	x	

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ASTERACEAE	<i>Gnaphalium purpureum</i>	Purple everlasting					XX		XX	XX	G5/S1/R
ASTERACEAE	* <i>Gnaphalium uliginosum</i>	Low cudweed, Everlasting	XX	C		XX	RE		x		
ASTERACEAE	* <i>Guizotia abyssinica</i>	Niger, Ramtilla	xC			C					
ASTERACEAE	<i>Helenium autumnale</i> var. <i>autumnale</i>	Sneezeweed	C			C	XX	x			
ASTERACEAE	* <i>Helenium flexuosum</i>	Sneezeweed	xC				XX		x		
ASTERACEAE	<i>Helianthus ambiguus</i>	Sunflower			x						
ASTERACEAE	<i>Helianthus angustifolius</i>	Swamp sunflower	x		C	xC	XX	x	XX		G5/S2/T
ASTERACEAE	* <i>Helianthus annuus</i>	Common sunflower, Mirasol	XX	XX	XX	XX	XX			x	
ASTERACEAE	<i>Helianthus decapetalus</i>	Thin-leaf sunflower	XX	C		xC	XX			x	
ASTERACEAE	<i>Helianthus divaricatus</i>	Woodland sunflower	XX				RE		x	x	
ASTERACEAE	<i>Helianthus giganteus</i>	Giant sunflower, Garden sunflower	XX	C			XX	x	x	x	
ASTERACEAE	* <i>Helianthus grosseratus</i>	Sawtooth sunflower					RE				
ASTERACEAE	* <i>Helianthus hirsutus</i>	Sunflower					RE				
ASTERACEAE	* <i>Helianthus mollis</i>	Ashy sunflower					XX				
ASTERACEAE	* <i>Helianthus petiolaris</i>	Sunflower				XX	RE				
ASTERACEAE	* <i>Helianthus salicifolius</i>	Plains sunflower	xC								
ASTERACEAE	<i>Helianthus strumosus</i>	Wood-sunflower	xC				RE		x	x	
ASTERACEAE	* <i>Helianthus tuberosus</i>	Jerusalem artichoke, Hawkweed	XX	XX	XX	XX	XX		x		
ASTERACEAE	<i>Heliopsis helianthoides</i>	Ox-eye	XX				XX	RE		x	
ASTERACEAE	<i>Hemizonia pungens</i>	Tarweed					C				
ASTERACEAE	* <i>Heterotheca subaxillaris</i>	Camphorweed	XX		XX	XX	XX				
ASTERACEAE	* <i>Hieracium aurantiacum</i>	Orange hawkweed	XX		C	XX	XX		x	x	
ASTERACEAE	* <i>Hieracium caespitosum</i>	King-devil	XX	XX	XX	XX	XX	x	x		
ASTERACEAE	* <i>Hieracium floribundum</i>	Hawkweed	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>Hieracium gronovii</i>	Hawkweed	xC				RE		x		
ASTERACEAE	<i>Hieracium kalmii</i> var. <i>kalmii</i>	Canada hawkweed	XX	XX		XX	XX				
ASTERACEAE	* <i>Hieracium lachenalii</i>	Hawkweed					XX				
ASTERACEAE	<i>Hieracium marianum</i>	Hawkweed		C			C				
ASTERACEAE	* <i>Hieracium murorum</i>	Golden lungwort			xC						
ASTERACEAE	<i>Hieracium paniculatum</i>	Hawkweed	XX			x	RE		x	x	
ASTERACEAE	* <i>Hieracium pilosella</i>	Mouse-ear hawkweed	xC				XX	x	x		
ASTERACEAE	* <i>Hieracium piloselloides</i>	King-devil	XX			XX		x	x		
ASTERACEAE	* <i>Hieracium sabaudum</i>	Hawkweed					XX				
ASTERACEAE	<i>Hieracium scabrum</i>	Hawkweed	xC	C			RE		x		
ASTERACEAE	<i>Hieracium venosum</i>	Rattlesnake-weed	XX	C		XX	RE		x		
ASTERACEAE	* <i>Hypochaeris radicata</i>	Cat's-car	XX	XX	XX	XX	XX	x	x	x	

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ASTERACEAE	<i>*Inula helenium</i>	Elecampane		C			RE				
ASTERACEAE	<i>*Inula salicina</i>	Inula		C			C				
ASTERACEAE	<i>Iva frutescens ssp. oraria</i>	Saltmarsh-elder, Highwater-bush	XX	XX	BB	BB	BB	BB	BB	C	
ASTERACEAE	<i>*Ixeris stolonifera</i>	Ground-lettuce				C					
ASTERACEAE	<i>Krigia biflora</i>	Two-flowered Cynthia	XX		C	xC	RE	x	x	XX	
ASTERACEAE	<i>Krigia virginica</i>	Dwarf dandelion	XX			XX	RE	x	x	x	
ASTERACEAE	<i>Lactuca biennis</i>	Wild lettuce, Blue lettuce	XX				XX		x	x	
ASTERACEAE	<i>Lactuca canadensis var. longifolia</i>	Wild lettuce	XX	C	C	XX	XX	x	x	x	
ASTERACEAE	<i>Lactuca floridana</i>	False lettuce	XX				RE			x	G5/S1/U
ASTERACEAE	<i>Lactuca hirsuta</i>	Downy lettuce				x	RE				G4/S1/U
ASTERACEAE	<i>*Lactuca serriola</i>	Prickly lettuce	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>*Lactuca tatarica var. pulchella</i>	Blue lettuce				C					
ASTERACEAE	<i>*Lapsana communis</i>	Nipplewort	XX	xC		C		x		x	
ASTERACEAE	<i>*Leontodon autumnalis</i>	Fall-dandelion, Hawkbit		C	xC		RE	x			
ASTERACEAE	<i>*^Leontodon taraxacoides</i>	Hawkbit		C		xC			x		
ASTERACEAE	<i>*Leucanthemum vulgare</i>	Ox-eye daisy, White daisy	XX	XX	XX	XX	XX	x	x		
ASTERACEAE	<i>Liatris scariosa var. novae-angeliae</i>	New England blazing-star		xC	x	C	XX	x	XX	x	G5G4/S2/R
ASTERACEAE	<i>*^Liatris spicata</i>	Blazing-sun				xC	RE		x		
ASTERACEAE	<i>*Matricaria discoidea</i>	Pineapple-wced	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>*^Matricaria perforata</i>	Wild chamomile	x		XX				x		
ASTERACEAE	<i>*^Matricaria recutita</i>	Wild chamomile				XX	XX		x		
ASTERACEAE	<i>Mikania scandens</i>	Climbing boneset	XX	C		XX	XX	x	x		
ASTERACEAE	<i>*Onopordum acanthium</i>	Scotch thistle, Cotton-thistle		xC			RE		x		
ASTERACEAE	<i>*^Picris echioides</i>	Ox-tongue		xC		xC	C				
ASTERACEAE	<i>*Picris hieracioides</i>	Ox-tongue	x					x	x		
ASTERACEAE	<i>Pityopsis falcata</i>	Atlantic golden aster				XX	C		x		
ASTERACEAE	<i>Pluchea odorata var. succulenta</i>	Saltmarsh fleabane	XX	XX	XX	XX	XX	x	x		
ASTERACEAE	<i>Prenanthes alba</i>	White lettuce, Rattlesnake-root	xC			xC	XX	x		x	
ASTERACEAE	<i>Prenanthes altissima</i>	Rattlesnake-root, White lettuce	xC	C		xC	XX	x	x	x	
ASTERACEAE	<i>Prenanthes racemosa</i>	Glaucous rattlesnake-root			x			x			G5/SX/U
ASTERACEAE	<i>Prenanthes serpentaria</i>	Lion's-foot, Gall-of-the-earth	xC		x		RE	x	x	x	
ASTERACEAE	<i>Prenanthes trifoliolata</i>	Gall-of-the-earth	XX			xC	XX	x	x	x	
ASTERACEAE	<i>*Rudbeckia fulgida var. speciosa</i>	Coneflower, Black-eyed-Susan					RE				
ASTERACEAE	<i>*Rudbeckia hirta var. pulcherrima</i>	Black-eyed-Susan, Gloriosa dairy	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	<i>Rudbeckia laciniata</i>	Cut-leaf coneflower, Golden-glow	x				XX			x	
ASTERACEAE	<i>Rudbeckia triloba</i>	Black-eyed-Susan, Coneflower					XX		x		

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ASTERACEAE	* <i>Scolymus hispanicus</i>	Spanish oyster-plant, Gold thistle				xC					
ASTERACEAE	<i>Senecio aureus</i>	Golden ragwort, Golden groundsel	xC		C	XX	RE		x	x	
ASTERACEAE	* <i>Senecio jacobaea</i>	Tansy-ragwort, Stinking-Willie		C							
ASTERACEAE	<i>Senecio obovatus</i>	Ragwort, Groundsel	xC			C	RE				
ASTERACEAE	<i>Senecio pauperculus</i>	Balsam groundsel					RE				
ASTERACEAE	* <i>Senecio viscosus</i>	Sticky groundsel	xC								
ASTERACEAE	* <i>Senecio vulgaris</i>	Common groundsel	XX	XX	XX	XX	XX		x	x	
ASTERACEAE	* <i>Serratula tinctoria</i>	Serratula					C				
ASTERACEAE	* <i>Silphium perfoliatum</i>	Cup-plant	C	C			XX				
ASTERACEAE	* <i>Silybum marianum</i>	Blessed thistle, Milk thistle		C					x		
ASTERACEAE	<i>Solidago arguta</i>	Cutleaf Goldenrod				XX	RE				
ASTERACEAE	<i>Solidago bicolor</i>	White goldenrod, Silver-rod	XX			x	XX		x	x	
ASTERACEAE	<i>Solidago caesia</i>	Blue-stem goldenrod	XX			xC	XX	x	x	x	
ASTERACEAE	<i>Solidago canadensis</i> var. <i>canadensis</i>	Canada goldenrod	xC	XX	XX	XX	XX				x
	var. <i>scabra</i>	Tall goldenrod, Canada goldenrod	XX			x	XX	x	x	x	
ASTERACEAE	<i>Solidago elliotii</i>	Coastal goldenrod	C			XX	XX	x	XX		G5/S1/U
ASTERACEAE	<i>Solidago flexicaulis</i>	Zig-zag goldenrod	XX				XX				x
ASTERACEAE	<i>Solidago gigantea</i>	Late goldenrod	C		XX		RE		x	x	
ASTERACEAE	<i>Solidago hispida</i>	Goldenrod				C			x		
ASTERACEAE	<i>Solidago juncea</i>	Early goldenrod	XX			XX	XX	x	x	x	
ASTERACEAE	<i>Solidago nemoralis</i>	Rough goldenrod, Gray goldenrod	xC		xC	XX	XX	x	x	x	
ASTERACEAE	<i>Solidago odora</i>	Sweet goldenrod	XX	XX			XX	x	x	x	
ASTERACEAE	<i>Solidago patula</i>	Spreading goldenrod	xC	xC			C	XX			
ASTERACEAE	<i>Solidago puberula</i>	Downy goldenrod					C	XX		x	
ASTERACEAE	<i>Solidago rigida</i>	Stiff-leaf goldenrod		xC						XX	G5/S2/T
ASTERACEAE	<i>Solidago rugosa</i> ssp. <i>aspera</i>	Rough goldenrod			XX						G5/S1
ASTERACEAE	<i>Solidago rugosa</i> ssp. <i>rugosa</i> var. <i>rugosa</i>	Tall hairy goldenrod, Butterweed	XX			XX	XX	x	x	x	
ASTERACEAE	<i>Solidago sempervirens</i> var. <i>mexicana</i>	Seaside goldenrod	x				XX				G5/S1/E
	var. <i>sempervirens</i>	Seaside goldenrod	XX	XX	XX	XX	XX		x		
ASTERACEAE	<i>Solidago speciosa</i>	Showy or Noble goldenrod	XX	C			XX		x	x	
ASTERACEAE	<i>Solidago squarrosa</i>	Ragged or Stout goldenrod	C								
ASTERACEAE	<i>Solidago uliginosa</i>	Swamp or Bog goldenrod	xC			XX	XX		x		
ASTERACEAE	<i>Solidago ulmifolia</i>	Elm-leaf goldenrod	XX				C	XX		x	
ASTERACEAE	* <i>Sonchus arvensis</i> ssp. <i>arvensis</i>	Sow-thistle, Hog-thistle	x	x	x	XX	XX	x	x	x	
ASTERACEAE	* <i>Sonchus asper</i>	Spiny sow-thistle	C	C	C	C	XX	x	x		
ASTERACEAE	* <i>Sonchus oleraceus</i>	Sow-thistle, Milk-thistle	XX	XX	XX	XX	XX	x		x	

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ASTERACEAE	<i>*Sonchus tenerrimus</i>	Sow-thistle, Milk-thistle					xC				
ASTERACEAE	<i>*Tagetes patula</i>	French marigold	XX				XX				
ASTERACEAE	<i>*Tanacetum parthenium</i>	Fever-few			C	C	C		x	x	
ASTERACEAE	<i>*Tanacetum vulgare</i>	Tansy, Golden buttons	XX	C		C	XX		x	x	
ASTERACEAE	<i>*Taraxacum laevigatum</i>	Red-seeded dandelion					RE	x			
ASTERACEAE	<i>*Taraxacum officinale</i>	Common dandelion	XX	XX	XX	XX	XX	XX	XX	XX	
ASTERACEAE	<i>*Tragopogon dubius</i>	Goat's-beard				XX	XX		x	x	
ASTERACEAE	<i>*Tragopogon porrifolius</i>	Oyster-plant, Salsify				XX					
ASTERACEAE	<i>*Tragopogon pratensis</i>	Yellow goat's-beard	XX			XX	XX				
ASTERACEAE	<i>*Fussilago farfara</i>	Coltsfoot	XX				XX			x	
ASTERACEAE	<i>Verbesina alternifolia</i>	Wingstem	XX				XX		XX		G5/S2/T
ASTERACEAE	<i>*Verbesina encelioides ssp. exauriculata</i>	Crownbeard					RE				
ASTERACEAE	<i>Vernonia noveboracensis</i>	Ironweed	XX	xC			XX	XX	x	x	
ASTERACEAE	<i>*Xanthium spinosum</i>	Spiny cocklebur			C	C	RE				
ASTERACEAE	<i>Xanthium strumarium</i> var. <i>canadense</i>	Sea burdock, Beach cocklebur	XX	C		XX	XX	x			
	var. <i>glabratum</i>	Clotbur				XX					
	*var. <i>strumarium</i>	Beach cocklebur				XX					
ALISMATACEAE	<i>Alisma subcordatum</i>	Water-plantain	XX	C		x	C		x	x	
ALISMATACEAE	<i>Echinodorus parvulus</i>	Burhead				xC					
ALISMATACEAE	<i>Sagittaria calycina</i>	Burhead					C				
ALISMATACEAE	<i>Sagittaria engelmanniana</i>	Engelmann's arrowhead				C		x	x		
ALISMATACEAE	<i>Sagittaria graminea</i>	Grass-less sagittaria	C	C		C		x		x	
ALISMATACEAE	<i>Sagittaria latifolia</i>	Wapato, Duck-potato	XX	C		XC	XX	x	x	x	
ALISMATACEAE	<i>Sagittaria subulata</i>	Strap-leaf arrowhead			C	C			XX	x	G4/S3/U
HYDROCHARITACEAE	<i>Elodea canadensis</i>	Waterweed, Elodea	XX			C	C			x	
HYDROCHARITACEAE	<i>Elodea nuttallii</i>	Waterweed, Elodea				xC	RE		x	x	
HYDROCHARITACEAE	<i>Vallisneria americana</i>	Tapegrass, Wild cherry					RE	x	x	x	
JUNCAGINACEAE	<i>Triglochin maritimum</i>	Arrow-grass	xC	xC	xC		RE	x	x		
OTAMOGETONACEAE	<i>Coleogeton pectinatus</i>	Sago pondweed	xC				RE		x		
POTAMOGETONACEAE	<i>Potamogeton amplifolius</i>	Pondweed					RE			x	
POTAMOGETONACEAE	<i>Potamogeton bicupulatus</i>	Pondweed					x	x	x		
POTAMOGETONACEAE	<i>*Potamogeton crispus</i>	Pondweed, Curly huckweed	xC	C					x		
POTAMOGETONACEAE	<i>Potamogeton diversifolius</i>	Water-thread pondweed				xC	RE	x	x		G5/S1/U
POTAMOGETONACEAE	<i>Potamogeton foliosus</i>	Pondweed				C	RE		x	x	
POTAMOGETONACEAE	<i>Potamogeton gramineus</i>	Grass-leaf pondweed	xC			C					
POTAMOGETONACEAE	<i>Potamogeton natans</i>	Pondweed				C	RE			x	

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POTAMOGETONACEAE	<i>Potamogeton perfoliatus</i>	Pondweed	x	C			RE		x	x	
POTAMOGETONACEAE	<i>Potamogeton pulcher</i>	Spotted pondweed	x	C		x	RE	x	XX		G5/S1/U
POTAMOGETONACEAE	<i>Potamogeton pusillus</i> var. <i>pusillus</i>	Pondweed				x	XX		x	x	
	var. <i>tenuissimus</i>	Pondweed				x		x	x		
POTAMOGETONACEAE	<i>Potamogeton spirillus</i>	Pondweed					XX		x		
POTAMOGETONACEAE	<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	x	C		C					
<b>RUPPIACEAE</b>	<i>Ruppia maritima</i>	Ditch-grass, Widgeon-grass	x	C	x		RE	x	x	x	
<b>NAJADACEAE</b>	<i>Najas flexilis</i>	Naiad	C			C	RE		x	x	
<b>ZANNICHELLIACEAE</b>	<i>Zannichellia palustris</i>	Horned pondweed	x	C		C	RE	x	x	x	
<b>ZOSTERACEAE</b>	<i>Zostera marina</i> var. <i>stenophylla</i>	Eelgrass, Grasswreck	C			XX	RE	x	x		
<b>ARACEAE</b>	<i>Acorus americanus</i>	Sweetflag, Flagroot	XX	C		x	XX	x	x	x	
ARACEAE	<i>Arisaema triphyllum</i>	Jack-in-the-pulpit, Indian-turnip	C	C		C	C			x	
	ssp. <i>pusillum</i>	Jack-in-the-pulpit, Indian-turnip	x			x		x	x		
	ssp. <i>triphyllum</i>	Jack-in-the-pulpit, Indian-turnip	XX			x	XX		x	x	
ARACEAE	<i>Orontium aquatium</i>	Golden club			C	x		x	XX	x	G5/S2/U
ARACEAE	<i>Peltandra virginica</i>	Arrowleaf, Tuckahoe	XX				XX		x	x	
ARACEAE	* <i>Pinellia ternata</i>	Green dragon			x	C					
ARACEAE	<i>Symplocarpus foetidus</i>	Skunk-cabbage	XX	C		x	XX		x	x	
<b>LEMNACEAE</b>	<i>Lemna minor</i>	Duckweed	XX	XX		XX	XX		x	XX	
LEMNACEAE	<i>Lemna perpusilla</i>	Duckweed	x		x	x	RE		x	x	
LEMNACEAE	<i>Lemna trisulca</i>	Star duckweed				x	RE		x		
LEMNACEAE	<i>Lemna valdiviana</i>	Duckweed				x	RE		x		
LEMNACEAE	<i>Spirodela polyrhiza</i>	Giant duckweed, Water-flaxseed	XX			x	XX		x		
LEMNACEAE	<i>Wolffia braziliensis</i>	Watermeal				XX	XX		x		G5/S2/T
LEMNACEAE	<i>Wolffia columbiana</i>	Watermeal	XX				XX				
<b>XYRIDACEAE</b>	<i>Xyris difformis</i>	Yellow-eyed grass				C	RE	x	XX	x	
XYRIDACEAE	<i>Xyris torta</i>	Slender yellow-eyed grass				C	XX	x	x		
<b>COMMELINACEAE</b>	* <i>Commelina communis</i> var. <i>communis</i>	Dayflower	x	C	x	XX	XX		x		
	*var. <i>ludens</i>	Dayflower	XX	XX	XX	XX	XX	XX	XX	XX	
COMMELINACEAE	<i>Commelina erecta</i>	Dayflower		C		C	C				
COMMELINACEAE	<i>Tradescantia ohioensis</i>	Ohio spiderwort	x	C		XX	XX	x	x		G5/S1/R
COMMELINACEAE	* <i>Tradescantia virginiana</i>	Virginia spiderwort	XX			XX	XX			x	G5/S1/U
<b>ERICAULACEAE</b>	<i>Eriocaulon aquaticum</i>	White-buttons			C			x	x	x	
<b>JUNCACEAE</b>	<i>Juncus acuminatus</i>	Sharp-fruited rush	XX	C	C	XX	XX				
JUNCACEAE	<i>Juncus articulatus</i>	Jointed rush	x	C	C		XX		x	x	
JUNCACEAE	<i>Juncus balticus</i> ssp. <i>littoralis</i>	Baltic rush					RE	x	x		

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JUNCACEAE	<i>Juncus brachycarpus</i>	Short-fruit rush	XX					x	x		G4G5/S1/U
JUNCACEAE	<i>Juncus bufonius</i>	Toad-rush	xC	C	C	XX	XX	x	x		
JUNCACEAE	<i>Juncus canadensis</i>	Canada rush	xC		C	XX	XX	x	x	x	
JUNCACEAE	* <i>Juncus compressus</i>	Rush	C							x	
JUNCACEAE	<i>Juncus debilis</i>	Weak rush					RE		x		G5/S1/E
JUNCACEAE	<i>Juncus dichotomus</i> var. <i>dichotomus</i>	Forked rush	C		x	x	x	x	x		
JUNCACEAE	<i>Juncus dudleyi</i>	Dudley's rush	xC			xC	xC	x			
JUNCACEAE	<i>Juncus effusus</i> var. <i>pylaei</i>	Common rush	XX	C	C	XX	C	x	x	x	
	var. <i>solutus</i>	Common rush	xC	C	C	xC	C		x		
JUNCACEAE	<i>Juncus gerardii</i>	Black grass	XX	XX	XX	XX	xC	x	x	x	
JUNCACEAE	<i>Juncus greenei</i>	Greene's rush		xC	C	RE	XX	x	x		
JUNCACEAE	<i>Juncus marginatus</i> var. <i>biflorous</i>	Large grass-leaved rush			C	XX	RE				G5/S1/U
	var. <i>marginatus</i>	Grass-leaved rush	x			x	x	x	x	x	
JUNCACEAE	<i>Juncus maritimus</i>	Seaside rush			xC						
JUNCACEAE	<i>Juncus nodosus</i>	Knotted rush	C	C					x		
JUNCACEAE	<i>Juncus pelocarpus</i>	Brown-fruited rush				C			XX		
JUNCACEAE	<i>Juncus scripoides</i>	Sedge-rush	xC			XX	XX	x	XX		G5/S1/U
JUNCACEAE	<i>Juncus secundus</i>	Rush	C		C	RE	xC	x			
JUNCACEAE	<i>Juncus subcaudatus</i>	Rush	xC					XX	XX		G5/S1/R
JUNCACEAE	<i>Juncus tenuis</i>	Slender yard-rush	XX	XX	XX	XX	xC	x	x	x	
JUNCACEAE	<i>Juncus torreyi</i>	Torrey's rush		x		XX		x			
JUNCACEAE	<i>Luzula acuminata</i>	Hairy wood-rush	xC								
JUNCACEAE	<i>Luzula campestris</i>	Common wood-rush	C			XX	C			x	
	var. <i>echinata</i>	Common wood-rush	xC			C	C		XX		G5/S3/U
	var. <i>multiflora</i>	Common wood-rush	XX			xC	C	x	x	x	
JUNCACEAE	* <i>Luzula luzuloides</i>	Forest wood-rush	xC								
CYPERACEAE	<i>Bulbostylis capillaris</i>	Sand-rush	xC	XX	xC	XX	XX	x	x	x	
CYPERACEAE	<i>Carex abscondita</i>	Sedge	xC	xC		XX	XX	x	x	x	G4G5/S1/U
CYPERACEAE	<i>Carex alata</i>	Sedge	xC			xC		x	x		
CYPERACEAE	<i>Carex albicans</i> var. <i>albicans</i>	Sedge	xC				xC		x	x	
	var. <i>emmonsii</i>	Emmon's sedge	xC	xC		xC		x	XX	x	G5/S3/R
CYPERACEAE	<i>Carex albolutescens</i>	Sedge					RE				
CYPERACEAE	<i>Carex albursina</i>	Sedge				C					
CYPERACEAE	<i>Carex amphibola</i> var. <i>amphibola</i>	Narrow-leaf sedge	x			x		x			G5/S1/U
	var. <i>turgida</i>	Sedge	xC			xC	RE		x	x	
CYPERACEAE	<i>Carex annectens</i> var. <i>annectens</i>	Sedge	XX			XX	XX	x	x	x	

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CYPERACEAE	<i>Carex appalachia</i>	Sedge				xC	C			x	
CYPERACEAE	<i>Carex aquatilis</i>	Sedge	xC					x		x	
CYPERACEAE	<i>Carex argyrantha</i>	Hay sedge	XX			x	RE		XX	x	G5/S3/U
CYPERACEAE	<i>Carex atlantica</i>	Sedge				C		x	x	x	
CYPERACEAE	<i>Carex barratii</i>	Barratt's sedge	XX					x	x		G3G4/S1/E
CYPERACEAE	<i>Carex bebbii</i>	Sedge	xC			XX	XX				
CYPERACEAE	<i>Carex bicknellii</i>	Bicknell's sedge	XX					x		x	G5/S2S3/R
CYPERACEAE	<i>Carex blanda</i>	Sedge	XX			xC		x	x	x	
CYPERACEAE	<i>Carex brevior</i>	Sedge	xC					x		x	
CYPERACEAE	<i>Carex bromoides</i>	Sedge	xC				RE			x	
CYPERACEAE	<i>Carex bullata</i>	Button's sedge				xC	XX	XX	XX		G5/S1/T
CYPERACEAE	<i>Carex bushii</i>	Bush's sedge	x						XX	x	G4/S3/R
CYPERACEAE	<i>Carex buxbaumii</i>	Brown bog sedge	x		x	xC		x			G/S2/R
CYPERACEAE	<i>Carex canescens</i>	Sedge				C	RE	x	x	x	
CYPERACEAE	<i>Carex caroliniana</i>	Carolina's sedge				x					G5SH/U
CYPERACEAE	* <i>Carex caryophyllea</i>	Sedge	xC								
CYPERACEAE	<i>Carex cephaloidea</i>	Sedge	xC								
CYPERACEAE	<i>Carex cephalophora</i>	Sedge	XX	xC		C	RE		x	x	
CYPERACEAE	<i>Carex collinsii</i>	Collin's sedge					XX	x	XX		G4/S1S2/R
CYPERACEAE	<i>Carex communis</i>	Sedge					XX				
CYPERACEAE	<i>Carex comosa</i>	Sedge	xC			xC	RE	x	x	x	
CYPERACEAE	<i>Carex complanata</i>	Hirsute sedge	x				XX			XX	G5/S1/R
CYPERACEAE	<i>Carex conoidea</i>	Sedge	xC			x		x			
CYPERACEAE	<i>Carex crawfordii</i>	Sedge				xC		x			
CYPERACEAE	<i>Carex crinita</i>	Sedge	XX			xC	XX		XX	x	
CYPERACEAE	<i>Carex cristatella</i>	Sedge	xC			xC				x	
CYPERACEAE	<i>Carex debilis</i> var. <i>rudgei</i>	Sedge				xC	RE	x	x		
CYPERACEAE	<i>Carex deflexa</i>	Sedge	xC							x	
CYPERACEAE	<i>Carex diandra</i>	Sedge	xC								
CYPERACEAE	<i>Carex digitalis</i>	Sedge	x			xC	RE	x	x		
CYPERACEAE	<i>Carex disperma</i>	Sedge					RE				
CYPERACEAE	<i>Carex eburnea</i>	Sedge	xC	C					x		
CYPERACEAE	<i>Carex echinata</i>	Sedge	xC			xC	RE	x	x		
CYPERACEAE	* <i>Carex extensa</i>	Sedge			xC			x			
CYPERACEAE	<i>Carex festucacea</i>	Sedge	XX			xC	RE	x		x	
CYPERACEAE	<i>Carex flaccosperma</i> var. <i>glaucoidea</i>	Glaucous sedge	x				XX				G5/S1/R

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CYPERACEAE	<i>Carex flava</i>	Sedge	C								
CYPERACEAE	<i>Carex foenea</i>	Sedge	x	C		x	C		x	x	
CYPERACEAE	<i>Carex folliculata</i>	Sedge			x	C	XX	x	x		
CYPERACEAE	<i>Carex gracilescens</i>	Sedge	x	C		C			x		
CYPERACEAE	<i>Carex gracillima</i>	Sedge				x	C	x			
CYPERACEAE	<i>Carex granularis</i>	Sedge	C			C	RE				
	var. <i>granularis</i>	Sedge	x			x		x	x	x	
	var. <i>haleana</i>	Sedge	x			x		x	x		
CYPERACEAE	<i>Carex grayi</i>	Sedge	x	C			RE			x	
CYPERACEAE	<i>Carex gynandra</i>	Sedge	x	C				x			
CYPERACEAE	<i>Carex hirsutella</i>	Sedge	x	C			x	C	x		
CYPERACEAE	* <i>Carex hirta</i>	Sedge		C			XX				
CYPERACEAE	<i>Carex hirtifolia</i>	Sedge	x	C							
CYPERACEAE	<i>Carex hitchcockiana</i>	Hitchcock's sedge	x	C	x		x	x			G4/S2/S3/R
CYPERACEAE	<i>Carex hormaihodes</i>	Sedge	x	C		x	C	x	x		
CYPERACEAE	<i>Carex houghtoniana</i>	Sedge					XX				G5/S2/T
CYPERACEAE	<i>Carex hystericana</i>	Sedge	x	C	x	x	RE		x		
CYPERACEAE	<i>Carex interior</i>	Sedge	C							x	
CYPERACEAE	<i>Carex intumescens</i>	Sedge	XX			x	RE		x	x	
CYPERACEAE	<i>Carex lacustris</i>	Sedge				x	C		x		
CYPERACEAE	<i>Carex laxiculmis</i>	Sedge	x			x		x	x	x	
CYPERACEAE	<i>Carex laxiflora</i> var. <i>laxiflora</i>	Sedge	XX			x	C	x	x	x	
CYPERACEAE	<i>Carex leptalea</i>	Sedge					RE		x		
CYPERACEAE	<i>Carex longii</i>	Sedge				x	C	x	x		
CYPERACEAE	<i>Carex lupuliformis</i>	Sedge	C								
CYPERACEAE	<i>Carex lupulina</i>	Sedge	x	C			RE	x	x	x	
CYPERACEAE	<i>Carex lurida</i>	Sedge	XX			x	XX	x	x	x	
CYPERACEAE	<i>Carex meadii</i>	Mead's sedge				x					G4G5/SH/U
CYPERACEAE	<i>Carex mitchelliana</i>	Mitchell's sedge				x	C	x	XX	x	G3G4/S2/R
CYPERACEAE	<i>Carex molesta</i>	Troublesome sedge	x								G4/S2/R
CYPERACEAE	<i>Carex muhlenbergii</i> var. <i>enervis</i>	Sedge	x	C	x		C	x	x	x	
	var. <i>muhlenbergii</i>	Sedge	x	C			XX	RE	x	x	
CYPERACEAE	<i>Carex nigromarginata</i>	Sedge					RE	x	x	x	G4G5/SH/E
CYPERACEAE	<i>Carex normalis</i>	Sedge	x	C		x	RE	x	x		
CYPERACEAE	<i>Carex pallescens</i>	Sedge	x	C			C	x	x	x	
CYPERACEAE	<i>Carex pellita</i>	False-hop sedge	XX				C	RE		x	G3/S3/R

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CYPERACEAE	<i>Carex pensylvanica</i>	Sedge	XX	XX	XX	XX	RE	x	x	x	
CYPERACEAE	<i>Carex platyphylla</i>	Broad-leaf sedge	C	C						x	
CYPERACEAE	<i>Carex polymorpha</i>	Variable sedge	x			xC		x	x		G2G3/SX/U
CYPERACEAE	<i>Carex prasina</i>	Sedge	xC				RE	x			
CYPERACEAE	<i>Carex projecta</i>	Sedge	xC			xC	x				
CYPERACEAE	<i>Carex radiata</i>	Sedge	x			x	x		x	x	
CYPERACEAE	<i>Carex retroflexa</i>	Reflexed sedge	xC			x	RE		x	x	G5/S1/U
CYPERACEAE	<i>Carex rosea</i>	Sedge	xC	C		xC	XX		x	x	
CYPERACEAE	<i>Carex rostrata</i>	Sedge					RE		x		
CYPERACEAE	<i>Carex rugosperma</i>	Sedge	xC	xC		xC			x	x	
CYPERACEAE	<i>Carex scabrata</i>	Sedge				xC		x			
CYPERACEAE	<i>Carex schweinitzii</i>	Schweinitz's sedge	xC	x							G3/S2/T
CYPERACEAE	<i>Carex scoparia</i> var. <i>scoparia</i>	Sedge	x			XX	XX	x	x	x	
CYPERACEAE	<i>Carex seorsa</i>	Weak stellate sedge	xC				RE	x	x	x	G4/S2/R
CYPERACEAE	<i>Carex silicea</i>	Sedge			xC	XX	RE	x	x		
CYPERACEAE	<i>Carex sparganioides</i>	Sedge	xC								
CYPERACEAE	* <i>Carex spicata</i>	Sedge	xC				C				
CYPERACEAE	<i>Carex squarrosa</i>	Sedge	XX	x		xC	RE		x	x	
CYPERACEAE	<i>Carex sterilis</i>	Sedge					C				
CYPERACEAE	<i>Carex stipata</i>	Sedge	XX			xC	XX		x		
CYPERACEAE	<i>Carex straminea</i>	Straw sedge	xC			XX	XX	x	x	x	G5/S1/U
CYPERACEAE	<i>Carex striatula</i>	Lined sedge					RE		x		G4G5S1/U
CYPERACEAE	<i>Carex stricta</i>	Tussock-sedge	XX			x	XX		XX	x	
CYPERACEAE	<i>Carex styloflexa</i>	Bent sedge	xC			xC	RE	x	XX	x	G4G5/S1/U
CYPERACEAE	<i>Carex swanii</i>	Sedge	XX				XX	x	x		
CYPERACEAE	<i>Carex tenera</i>	Sedge	xC			xC	xC		x	x	
CYPERACEAE	<i>Carex tetanica</i>	Sedge	xC			xC					
CYPERACEAE	<i>Carex tonsa</i>	Sedge				C		x	x		
CYPERACEAE	<i>Carex tribuloides</i>	Sedge	XX			XX	XX	x	x		
CYPERACEAE	<i>Carex trichocarpa</i>	Sedge	xC							x	
CYPERACEAE	<i>Carex trisperma</i> var. <i>trisperma</i>	Sedge	x				RE		x		
CYPERACEAE	<i>Carex typhina</i>	Cat-tail sedge	xC		x	xC	RE		XX	XX	G5/S2/R
CYPERACEAE	<i>Carex umbellata</i>	Sedge	C	xC		xC		x	x	x	
CYPERACEAE	<i>Carex vesicaria</i>	Sedge					RE				
CYPERACEAE	<i>Carex vestita</i>	Sedge	xC		C	C	RE		x	x	
CYPERACEAE	<i>Carex virescens</i>	Sedge	XX			xC	RE		x	x	

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CYPERACEAE	<i>Carex vulpinoidea</i>	Sedge	XX			x	XX	x	x		
CYPERACEAE	<i>Carex willdenowii</i>	Willdenow's sedge	xC								G5/S1/R
CYPERACEAE	<i>Carex woodii</i>	Sedge				xC				x	
CYPERACEAE	<i>Cladium mariscoides</i>	Bog-rush	xC		xC	x	RE	x	x	x	
CYPERACEAE	*^ <i>Cyperus amuricus</i>	Cyperus				xC		x			
CYPERACEAE	<i>Cyperus bipartitus</i>	Cyperus	C			XX	RE	x	x	x	
CYPERACEAE	*^ <i>Cyperus compressus</i>	Cyperus		C			RE			x	
CYPERACEAE	<i>Cyperus dentatus</i>	Cyperus					RE		x	x	
CYPERACEAE	<i>Cyperus diandrus</i>	Cyperus	XX			XX	XX	x	x	x	
CYPERACEAE	<i>Cyperus echinatus</i>	Globose flatsedge	XX	xC		xC	XX			x	G5/S1/E
CYPERACEAE	<i>Cyperus erythrorhizos</i>	Cyperus, Red-rooted flatsedge	x	XX		XX		XX	XX	x	G5/S3/R
CYPERACEAE	* <i>Cyperus esculentus</i> var. <i>macrostachyus</i>	Yellow nut-grass	XX		xC	XX	XX	x	x		
CYPERACEAE	<i>Cyperus filicinus</i>	Cyperus, Flatsedge	x		C	C	RE				
CYPERACEAE	<i>Cyperus flavescens</i>	Yellow flatsedge	x			x	XX	x	XX	x	G5/S1/U
CYPERACEAE	<i>Cyperus grayi</i>	Cyperus			xC	XX	XX	x	x		
CYPERACEAE	<i>Cyperus houghtonii</i>	Cyperus, Sedge				XX			x		G4/S3/T
CYPERACEAE	*^ <i>Cyperus involucratus</i>	Cyperus	xC								
CYPERACEAE	<i>Cyperus lupulinus</i> ssp. <i>lupulinus</i>	Cyperus	xC		xC	XX	XX	x	x		
	ssp. <i>macilentus</i>	Cyperus	XX	xC	xC	C	XX	x	x		
CYPERACEAE	<i>Cyperus odoratus</i>	Cyperus, Rusty flatsedge	xC	C		xC	XX	x	XX	x	G5/S3/U
CYPERACEAE	<i>Cyperus plukenetii</i>	Cyperus, Galingale		C			RE				G5/SX/U
CYPERACEAE	<i>Cyperus polystachyos</i> var. <i>texensis</i>	Cyperus, Coast flatsedge	xC		xC		xC	x	XX		G5/S1S2/R
CYPERACEAE	<i>Cyperus retrorsus</i>	Cyperus, Retorse flatsedge			xC		RE	x	XX	x	G5/S1/U
CYPERACEAE	*^ <i>Cyperus rotundus</i>	Nut-grass					RE				
CYPERACEAE	<i>Cyperus schweinitzii</i>	Cyperus, Schweinitz's flatsedge			XX	XX					G5/S3/R
CYPERACEAE	<i>Cyperus squarrosus</i>	Cyperus	C							x	
CYPERACEAE	<i>Cyperus strigosus</i>	Cyperus, Galingale	XX	XX	XX	XX	XX	x	x	x	
CYPERACEAE	<i>Dulichium arundinaceum</i>	Three-way sedge	xC	xC	xC	xC	XX	x	x	x	
CYPERACEAE	<i>Eleocharis acicularis</i>	Hairgrass				x	XX		x		
CYPERACEAE	<i>Eleocharis elliptica</i> var. <i>elliptica</i>	Slender spikerush	x	C		XX		x	x		
	var. <i>pseudoptera</i>	Slender spikerush	XX					x	XX		G5/S1/U
CYPERACEAE	<i>Eleocharis engelmannii</i>	Englemann's spikerush	xC			xC		x	XX		G4/S1/E
CYPERACEAE	<i>Eleocharis erythropoda</i>	Spikerush	xC	xC	x	xC	C	x	x	x	
CYPERACEAE	<i>Eleocharis fallax</i>	Creeping spikerush	x						XX		G4G5/S1/R
CYPERACEAE	<i>Eleocharis flavescens</i>	Spikerush				x	XX	x	x	x	
CYPERACEAE	<i>Eleocharis halophila</i>	Salt-marsh spikerush	xC	xC	xC			x	XX		G4/S2/R

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CYPERACEAE	<i>Eleocharis melanocarpa</i>	Black-fruited spikerush					C		XX		G4/S3/U
CYPERACEAE	<i>Eleocharis obtusa</i> var. <i>obtusa</i>	Spikerush	XX		xC	XX	C	x	x	x	
	var. <i>ovata</i>	Blunt spikerush			x		XX	XX	x		G5/S1S2/R
CYPERACEAE	<i>Eleocharis quadrangulata</i>	Angled spikerush					XX			x	G4/S1/E
CYPERACEAE	<i>Eleocharis palustris</i>	Creeping spikerush					RE		x	x	
CYPERACEAE	<i>Eleocharis parvula</i>	Dwarf spikerush	xC		xC		RE	x	x	x	
CYPERACEAE	<i>Eleocharis rostellata</i>	Spikerush	xC	C	C	xC	xC	x	x		
CYPERACEAE	<i>Eleocharis smallii</i>	Spikerush	xC			xC	xC	XX	x	x	
CYPERACEAE	<i>Eleocharis tuberculosa</i>	Spikerush				XX	XX	x	XX	x	G5/S2/T
CYPERACEAE	* <i>Eleocharis wolfii</i>	Spikerush				xC					
CYPERACEAE	<i>Eriophorum gracile</i>	Slender cottongrass	xC								
CYPERACEAE	<i>Eriophorum virginicum</i>	Tawny cottongrass	x				XX	x	x	x	
CYPERACEAE	<i>Eriophorum viridi-carinatum</i>	Cotton-grass	xC						x	x	
CYPERACEAE	<i>Fimbristylis autumnalis</i>	Sedge, Rush	xC			XX	RE	XX	XX	x	
CYPERACEAE	<i>Fimbristylis castanea</i>	Sedge, Rush				xC	RE		x		
CYPERACEAE	* <i>Kyllinga pumila</i>	Sedge, Cyperus				xC					
CYPERACEAE	<i>Rhynchospora alba</i>	White beakrush	xC	C		xC	RE	x	x		
CYPERACEAE	<i>Rhynchospora capitellata</i>	Beakrush	xC	C	xC	XX	XX	x	XX	x	
CYPERACEAE	<i>Rhynchospora fusca</i>	Sooty beakrush			xC	xC			x		
CYPERACEAE	<i>Scirpus americanus</i>	Three-square, Swordgrass	XX			XX	XX		x	x	
CYPERACEAE	<i>Scirpus atrovirens</i>	Bulrush	XX		xC	XX	XX	x	x	x	
CYPERACEAE	<i>Scirpus cyperinus</i>	Woolgrass, Bulrush	XX			XX	XX	x	x	x	
CYPERACEAE	<i>Scirpus expansus</i>	Wood bulrush					RE			x	
CYPERACEAE	<i>Scirpus fluviatilis</i>	River bulrush	xC	C							
CYPERACEAE	<i>Scirpus georgianus</i>	Georgia bulrush				xC		x	x	x	G5/S1/U
CYPERACEAE	* <i>Scirpus glaucus</i>	Saltmarsh bulrush				x					
CYPERACEAE	<i>Scirpus hattorianus</i>	Bulrush	x								
CYPERACEAE	<i>Scirpus longii</i>	Long's bulrush				xC					G2/SX/U
CYPERACEAE	<i>Scirpus maritimus</i>	Seaside bulrush, Prairie bulrush	xC			xC	RE	XX	XX		G5/S1/U
CYPERACEAE	<i>Scirpus microcarpus</i>	Bulrush	xC	C		C	RE				
CYPERACEAE	<i>Scirpus novea-angliae</i>	Saltmarsh bulrush	x	x					x	x	G4S1/E
CYPERACEAE	<i>Scirpus pedicellatus</i>	Bulrush					C				
CYPERACEAE	<i>Scirpus pendulus</i>	Bulrush	XX		C						
CYPERACEAE	<i>Scirpus polyphyllus</i>	Leafy bulrush	C				RE	x		x	
CYPERACEAE	<i>Scirpus pungens</i>	Chairmaker's rush	x		x		x	x	x		
CYPERACEAE	<i>Scirpus robustus</i>	Saltmarsh bulrush	XX			xC	XX	x	x		

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CYPERACEAE	<i>Scirpus tabernaemontanii</i>	Soft-stem bulrush, Tule				XX	XX	x	x		
CYPERACEAE	<i>Scirpus torreyi</i>	Torrey's bulrush				XX					
CYPERACEAE	<i>Scripus verecundus</i>	Clubrush	C			xC	RE	x	x	x	
CYPERACEAE	<i>Scleria pauciflora</i> var. <i>caroliniana</i>	Nutrush, Whipgrass				xC		XX	XX	x	G5/S1/T
CYPERACEAE	<i>Scleria reticularis</i> var. <i>pubescens</i>	Reticulate nutrush				C		x	XX		G5/S1/U
	var. <i>reticularis</i>	Reticulate nutrush				x		x	XX		G3G4/S3/R
CYPERACEAE	<i>Scleria triglomerata</i>	Whip nutrush	xC			xC	RE	XX	XX		G5/S2/R
CYPERACEAE	<i>Scleria verticillata</i>	Low nutrush				xC		x			G5/S1/E
POACEAE	* <i>Aegilops cylindrica</i>	Jointed goatgrass			xC		XX	XX		x	
POACEAE	* <i>Agropyron littorale</i>	Wheatgrass					C				
POACEAE	<i>Agrostis altissima</i>	Bentgrass	xC			xC		x	x		
POACEAE	* <i>Agrostis capillaris</i>	Colonial bent, Rhode Island bent	xC	C	C	xC		x	x	x	
POACEAE	* <i>Agrostis gigantea</i>	Redtop, Black bent	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Agrostis hyemalis</i>	Southern hairgrass, Ticklegrass	XX		x	XX	XX	x	x	x	
POACEAE	<i>Agrostis perennans</i>	Autumn bent	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Agrostis scabra</i>	Hairgrass, Fly-away grass	xC			xC	xC	x	x	x	
POACEAE	<i>Agrostis stolonifera</i> var. <i>palustris</i>	Creeping bent, Carpet bent	XX			XX	RE	x	x	x	
	var. <i>stolonifera</i>	Creeping bent, Carpet grass	x				x		x		
POACEAE	* <i>Aira caryophyllea</i>	Silver hairgrass	XX			xC		x	x		
POACEAE	* <i>Aira praecox</i>	Hairgrass	XX						x		
POACEAE	<i>Alopecurus aequalis</i>	Short-awn foxtail					xC		x		
POACEAE	* <i>Alopecurus carolinianus</i>	Carolina foxtail				xC		x			
POACEAE	* <i>Alopecurus geniculatus</i>	Marsh foxtail, Water foxtail	xC	xC							
POACEAE	* <i>Alopecurus myosuroides</i>	Slender foxtail		xC						x	
POACEAE	* <i>Alopecurus pratensis</i>	Meadow foxtail	XX	XX	XX	XX	XX	x			
POACEAE	<i>Ammophila breviligulata</i>	Beachgrass	xC	XX	x	XX	XX	x	x		
POACEAE	<i>Andropogon gerardii</i>	Big bluestem	XX		xC		XX	x	x	x	
POACEAE	<i>Andropogon glomeratus</i>	Bunch broom-sedge	xC			C	xC	x	x		
POACEAE	<i>Andropogon virginicus</i>	Broom-sedge	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Anthoxanthum nitens</i>	Indian sweetgrass, Vanilla-grass	XX								
POACEAE	* <i>Anthoxanthum odoratum</i>	Sweet vernalgrass	XX	xC	xC	XX	XX	x	x	x	
POACEAE	* <i>Apera spica-venti</i>	Silky bentgrass	xC	xC			RE				
POACEAE	<i>Aristida dichotoma</i>	Poverty grass	XX	x	xC	XX	XX	x	x	x	
POACEAE	<i>Aristida longespica</i> var. <i>geniculata</i>	Slender three-awn	x	x					x	x	
	var. <i>longespica</i>	Slender three-awn	XX			x	XX	x	x		

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POACEAE	* <i>Aristida oligantha</i>	Prairie three-lawn	XX		x	XX	XX	x	x		
POACEAE	<i>Aristida purpurascens</i>	Arrow-feather	C			xC	XX	x	x	x	
POACEAE	<i>Aristida tuberculosa</i>	Seaside three-awn, Needlegrass			xC	XX	XX	x	x	x	
POACEAE	* <i>Arrhenatherum elatius</i>	Tall oatgrass	XX			xC	XX	x	x	x	
POACEAE	* <i>Arthraxon hispidus</i>	Arthraxon	xC								
POACEAE	* <i>Avena fatua</i> ssp. <i>fatua</i>	Wild oats, Oats		xC	C	xC					
	*ssp. <i>sativa</i>	Oats	XX	xC	xC	xC	XX	x	x	x	
POACEAE	* <i>Beckmannia syzigachne</i> ssp. <i>baicalensis</i>	Slough-grass	xC								
POACEAE	<i>Brachyelytrum erectum</i>	Bearded-shorthusk				xC		x		x	
POACEAE	* <i>Briza maxima</i>	Bog quaking grass				xC			x		
POACEAE	* <i>Briza minor</i>	Little quaking grass		C							
POACEAE	<i>Bromus ciliatus</i>	Fringed brome	xC	C						x	
POACEAE	* <i>Bromus commutatus</i>	Hairy chess	XX	xC	xC	xC	XX	x	x	x	
POACEAE	* <i>Bromus erectus</i>	Hungarian brome, Upright brome	xC					x	x		
POACEAE	* <i>Bromus hordeaceus</i>	Soft chess	XX	XX	XX	XX	XX	x	x		
POACEAE	* <i>Bromus inermis</i>	Smooth brome, Hungarian brome	XX			XX	XX	x	x	x	
POACEAE	* <i>Bromus japonicus</i>	Japanese chess	xC	C	x	XX	XX	x	x	x	
POACEAE	<i>Bromus latiglumis</i>	Canada brome	xC							x	
POACEAE	* <i>Bromus pubescens</i>	Canada brome	xC	xC			RE		x	x	
POACEAE	* <i>Bromus racemosus</i>	Soft chess					XX				
POACEAE	* <i>Bromus secalinus</i>	Cheat	xC	xC	xC	xC	XX	x	x	x	
POACEAE	* <i>Bromus sterilis</i>	Barren brome	XX	XX	XX	XX	XX				
POACEAE	* <i>Bromus tectorum</i>	Downy chess	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Calamagrostis canadensis</i> var. <i>canadensis</i>	Bluejoint grass	XX			x	XX	x	x	x	
POACEAE	<i>Calamagrostis cinnoides</i>	Redgrass	x			XX	XX	x	x	x	
POACEAE	* <i>Calamagrostis epigeios</i>	Feathertop, Bushgrass			xC	XX			x		
POACEAE	<i>Cenchrus longispinus</i>	Field sandbur, Sandspur	xC	xC	xC	XX	XX	x	x	x	
POACEAE	<i>Cenchrus tribuloides</i>	Dune sandbur	XX		xC	XX	XX	x	x		G5/S2/U
POACEAE	<i>Chasmanthium laxum</i>	Slender spikegrass					RE	x	XX		G5/S1/U
POACEAE	* <i>Chloris verticillata</i>	Windmill grass, Prairie chloris				XX	XX				
POACEAE	<i>Cinna arundinacea</i>	Stout woodreed, Wood reedgrass	XX		xC	xC	XX	x	x	x	
POACEAE	<i>Cinna latifolia</i>	Drooping woodreed	x		x	C			x		
POACEAE	* <i>Coix lacryma-jobi</i>	Job's-tears	xC								
POACEAE	* <i>Corynephorus canescens</i>	Clubgrass, Silvergrass				XX		x	x		
POACEAE	* <i>Crypsis schoenoides</i>	Crypsis, Helcochloa	C	x	xC	xC				x	
POACEAE	* <i>Cynodon dactylon</i>	Bermuda grass	XX	C	xC	xC	xC	x	x	x	

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POACEAE	* <i>Cynosurus cristatus</i>	Crested dogtail		xC				x	x		
POACEAE	*^ <i>Cynosurus echinatus</i>	Spiny dogtail	xC								
POACEAE	* <i>Dactylis glomerata</i>	Orchard grass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	*^ <i>Dactyloctenium aegyptium</i>	Fingergrass, Crowfoot			C	x				x	
POACEAE	<i>Danthonia compressa</i>	Northern oatgrass	XX	xC			XX	x	x	x	
POACEAE	<i>Danthonia spicata</i>	Poverty-grass, Junegrass	XX	x	x	x	XX	x	x	x	
POACEAE	<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i>	Tufted hairgrass					RE	x	x		
POACEAE	<i>Deschampsia flexuosa</i>	Common hairgrass	XX	xC		xC	XX	x	x	x	
POACEAE	<i>Digitaria cognatum</i>	Fall witchgrass				XX	XX		x		
POACEAE	<i>Digitaria filiformis</i>	Slender crabgrass	xC	xC		xC	XX	x	XX		G5/S2/R
POACEAE	* <i>Digitaria ischaemum</i>	Smooth crabgrass	XX	XX	XX	XX	XX		x	x	
POACEAE	* <i>Digitaria sanguinalis</i>	Tall crabgrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Diplache maritima</i>	Salt-meadow grass, Sprangletop		xC		xC	C		XX		G5/S1/U
POACEAE	<i>Distichlis spicata</i>	Spikegrass, Alkali grass	XX	XX	XX	XX	XX	XX	XX	x	
POACEAE	* <i>Echinochloa crusgalli</i> ssp. <i>crusgalli</i>	Barnyard grass	XX	xC	xC	XX	XX	x	x	x	
	*ssp. <i>edulis</i>	Japanese millet					xC	x	x		
POACEAE	<i>Echinochloa muricata</i> var. <i>microstachya</i>	Cockspur grass, Barnyard grass	XX				XX	x	x		
	var. <i>muricata</i>	Cockspur grass, Barnyard grass	x	x		x	x	x	x	x	
POACEAE	<i>Echinochloa walteri</i>	Water-millet, Cockspur grass	xC		xC	xC	xC	x	x	x	
POACEAE	* <i>Eleusine indica</i>	Goosegrass, Yardgrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Elymus canadensis</i>	Canada wild-rye	xC	xC			XX	x	x	x	
POACEAE	<i>Elymus hystrix</i> var. <i>bigeloviana</i>	Bottlebrush, Hystrix	x							x	
	var. <i>hystrix</i>	Bottlebrush, Hystrix	x	x	x	x		x		x	
POACEAE	<i>Elymus riparis</i>	Marsh wild-rye	xC				xC			x	
POACEAE	<i>Elymus villosus</i>	Wild-rye	xC			xC	XX	x	x	x	
POACEAE	<i>Elymus virginicus</i> var. <i>halophilus</i>	Virginia wild-rye	xC	xC	xC	xC	xC	x	x		
	var. <i>virginicus</i>	Virginia wild-rye	XX	xC	xC	XX	XX	x	x	x	
POACEAE	* <i>Elytrigia repens</i>	Quackgrass	XX	XX	XX	XX	XX			x	
POACEAE	<i>Eragrostis capillaris</i>	Lacegrass	xC	C		XX	C			x	
POACEAE	* <i>Eragrostis cilianensis</i>	Stinkgrass, Skunk-grass	XX	XX	XX	XX	XX				
POACEAE	* <i>Eragrostis curvula</i>	Weeping lovegrass				XX	XX		x		
POACEAE	<i>Eragrostis hypnoides</i>	Lovegrass, Ponygrass	xC	xC							
POACEAE	* <i>Eragrostis minor</i>	Lovegrass	XX			XX	xC		x	x	
POACEAE	<i>Eragrostis pectinacea</i>	Lovegrass	XX	xC	xC	XX	XX	x	x	x	
POACEAE	* <i>Eragrostis pilosa</i>	India lovegrass	xC			XX	XX	x	x	x	
POACEAE	<i>Eragrostis spectabilis</i>	Purple lovegrass, Tumblegrass	XX		xC	XX	XX	x	x	x	

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POACEAE	<i>*Festuca filiformis</i>	Hair fescue	C			C	C				
POACEAE	<i>*Festuca rubra</i>	Red fescue	C		C	C	C				
	<i>*ssp. rubra</i>	Red fescue	XX			XX	XX	x	x		
POACEAE	<i>Festuca saximontana</i>	Sheep fescue				XX					G5/S1/E
POACEAE	<i>*Festuca subverticillata</i>	Nodding fescue	C			C	RE	x	x	x	
POACEAE	<i>*Festuca tenuifolia</i>	Hair fescue	xC			xC	xC	x	x	x	
POACEAE	<i>*Festuca trachyphylla</i>	Sheep fescue	x		x	x	XX	x	x	x	
POACEAE	<i>Glyceria acutiflora</i>	Mannagrass	xC	xC	C	xC	RE	x	x	x	
POACEAE	<i>Glyceria canadensis</i>	Rattlesnake grass	xC		xC	xC	RE	x	x	x	
POACEAE	<i>*Glyceria declinata</i>	Mannagrass				xC					
POACEAE	<i>*Glyceria fluitans</i>	Floating mannagrass	xC				RE			x	
POACEAE	<i>Glyceria grandis</i>	Reed meadowgrass	x			xC			x		
POACEAE	<i>Glyceria melicaria</i>	Slender mannagrass			xC	xC	RE				
POACEAE	<i>Glyceria obtusa</i>	Coastal mannagrass			C	xC	XX	x	x		
POACEAE	<i>Glyceria septentrionalis</i>	Floating mannagrass	xC			xC	RE		x	x	
POACEAE	<i>Glyceria striata</i>	Fowl mannagrass	XX		xC	xC	XX	x	x	x	
POACEAE	<i>*Holcus lanatus</i>	Velvet grass	XX	xC	C	XX	XX	x	x	x	
POACEAE	<i>*^Holcus mollis</i>	Velvet grass	x				xC				
POACEAE	<i>*Hordeum brachyantherum</i>	Meadow barley	x	x						x	
POACEAE	<i>*Hordeum jubatum</i>	Foxtail barley, Squirrel-tail grass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>*Hordeum murinum ssp. leporinum</i>	Wild barley	XX	xC						x	
POACEAE	<i>*Hordeum pusillum</i>	Little barley	XX			xC				x	
POACEAE	<i>*^Hordeum vulgare</i>	Barley	xC					x	x	x	
POACEAE	<i>*Koeleria macrantha</i>	Junegrass				xC			x		
POACEAE	<i>Leersia oryzoides</i>	Rice cutgrass	XX		xC	xC	XX	x	x	x	
POACEAE	<i>Leersia virginica</i>	Whitegrass, Cutgrass	XX		xC	xC	XX	x	x	x	
POACEAE	<i>*^Leymus arenarius</i>	Lyme-grass, Strand-grass				XX					
POACEAE	<i>*Lolium arundinaceum</i>	Tall fescue, Reed fescue	xC			C	xC	x	x		
POACEAE	<i>*^Lolium giganteum</i>	Giant fescue	xC							x	
POACEAE	<i>*Lolium perenne var. aristatum</i>	Italian ryegrass	XX	C	xC	xC	XX	x	x	x	
	<i>*var. perenne</i>	English or Perennial ryegrass	XX			XX	XX				
POACEAE	<i>*Lolium pratense</i>	Meadow fescue, English bluegrass	XX	xC	x	XX	XX	x	x	x	
POACEAE	<i>*Lolium temulentum</i>	Darnel, Poison-grass			xC		xC			x	
POACEAE	<i>*^Melica altissima</i>	Siberian melic	xC								
POACEAE	<i>*^Miscanthus sacchariflorus</i>	Japanese plumegrass	x					x	x		
POACEAE	<i>*Miscanthus sinensis</i>	Eulalia	XX				XX				

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POACEAE	<i>Muhlenbergia frondosa</i>	Wirestem muhly	xC	x	xC	xC	XX	x	x	x	
POACEAE	<i>Muhlenbergia mexicana</i>	Satin-grass, Muhly	xC			xC	xC	x		x	
POACEAE	<i>Muhlenbergia schreberi</i>	Nimble-will, Dropseed	XX	xC		xC	xC	x	x	x	
POACEAE	<i>Muhlenbergia sobolifera</i>	Creeping muhly	xC	xC		C				x	
POACEAE	<i>Muhlenbergia sylvatica</i>	Woodland dropseed, Muhly	C				RE				
	var. <i>sylvatica</i>	Woodland dropseed, Muhly	x							x	
POACEAE	<i>Muhlenbergia tenuiflora</i>	Woodland dropseed, Muhly	xC					x		x	
POACEAE	<i>Oryzopsis racemosa</i>	Ricegrass	C							x	
POACEAE	<i>Panicum acuminatum</i>	Panic grass	xC	xC	xC	XX	xC	x	x		
POACEAE	<i>Panicum acuminatum x dichotomum</i>	Panic grass	x					x	x		
POACEAE	<i>Panicum amarum</i>	Bitter panic grass			xC	XX	XX	x	XX		G5/S3/U
POACEAE	<i>Panicum bicknellii</i>	Panic grass	xC					x	x		
POACEAE	<i>Panicum boscii</i>	Panic grass	x			x	XX				
POACEAE	<i>Panicum capillare</i>	Witchgrass	XX		xC	XX	XX	x	x	x	
POACEAE	<i>Panicum clandestinum</i>	Deer-tongue grass	XX	xC	xC	XX	XX	x	x	x	
POACEAE	<i>Panicum commutatum</i>	Panic grass	xC	xC		xC	XX	x	x	x	
POACEAE	<i>Panicum depauperatum</i>	Poverty panic grass	xC	xC	xC	xC	XX	x	x	x	
POACEAE	<i>Panicum dichotomiflorum</i> var. <i>dichotomiflorum</i>	Smooth panic grass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Panicum dichotomum</i>	Panic grass	XX	xC		xC	XX	x	x	x	
POACEAE	<i>Panicum dichotomum x macrocarpon</i>	Panic grass	xC								
POACEAE	<i>Panicum gattingeri</i>	Panic grass	xC		xC	xC		x		x	
POACEAE	<i>Panicum latifolium</i>	Panic grass	xC			xC	RE	x	x	x	
POACEAE	<i>Panicum linearifolium</i>	Panic grass	xC	xC		xC	XX			x	
POACEAE	<i>Panicum macrocarpon</i>	Panic grass	xC		C	xC	xC	x	x	x	
POACEAE	* <i>Panicum miliaceum</i>	Proso, Broomcorn-millet	xC	xC		xC	xC		x	x	
POACEAE	<i>Panicum oligosanthes</i> var. <i>oligosanthes</i>	Few-flowered panic grass			xC		x		XX	x	G5/S1/U
	var. <i>scribnerianum</i>	Panic grass	xC		xC	xC	XX	x	x	x	
POACEAE	<i>Panicum ovale</i>	Panic grass				XX	XX	x	x	x	
POACEAE	<i>Panicum philadelphicum</i>	Panic grass	xC			xC	XX	x	x	x	
POACEAE	<i>Panicum rigidulum</i> var. <i>pubescens</i>	Panic grass	XX			XX	XX	x	x	x	
POACEAE	<i>Panicum sabulorum</i> var. <i>thinium</i>	Panic grass	xC		C	XX	RE	x	x		
POACEAE	<i>Panicum scabriusculum</i>	Panic grass	x			xC		x	XX		G4/S1/U
POACEAE	<i>Panicum scoparium</i>	Velvet panic grass	x	xC		XX	XX		x	x	G4/S1/U
POACEAE	<i>Panicum sphaerocarpon</i> var. <i>sphaerocarpon</i>	Panic grass	XX	xC	C	xC	RE	x	x	x	
POACEAE	<i>Panicum stipitatum</i>	Tall flat panic grass	xC						x	x	G4G5/SH/U
POACEAE	<i>Panicum tuckermanii</i>	Panic grass				C					

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POACEAE	<i>Panicum verrucosum</i>	Panic grass	xC		xC	xC	RE	x	x		
POACEAE	<i>Panicum virgatum</i> var. <i>spissum</i>	Switchgrass	XX	XX	XX	XX	XX	x	x	x	
	var. <i>virgatum</i>	Switchgrass	x			XX	XX	x	x	x	
POACEAE	<i>Paspalum laeve</i> var. <i>circulare</i>	Round field beadgrass	xC				RE		XX	x	G4/S1/U
	var. <i>pilosum</i>	Hairy field beadgrass	XX								G4/S1/U
POACEAE	<i>Paspalum setaceum</i> var. <i>muhlenbergii</i>	Slender beadgrass, Paspalum	XX	x		x	x	x	x	x	
	var. <i>psammophilum</i>	Slender beadgrass, Paspalum	xC			xC	xC	x	XX	x	G5/S1/U
	var. <i>setaceum</i>	Slender beadgrass, Paspalum	x			C	RE	XX	XX	x	G5/S2/U
POACEAE	<i>Phalaris arundinacea</i>	Reed canary-grass	XX			xC	XX	x	x		
POACEAE	* <i>Phalaris canariensis</i>	Canary-grass	xC	xC	xC	xC	xC		x	x	
POACEAE	** <i>Phleum arenarium</i>	Timothy		xC							
POACEAE	* <i>Phleum pratense</i>	Timothy, Herd-grass	C	C		C	C				
	*ssp. <i>nodosum</i>	Timothy, Herd-grass	XX		x	XX	XX	x	x	x	
POACEAE	<i>Phragmites australis</i>	Common reed, Reedgrass	XX	XX	XX	XX	XX	XX	XX	XX	
POACEAE	<i>Piptochaetium avenaceum</i>	Black oatgrass	XX				RE		x	x	
POACEAE	<i>Poa alsodes</i>	Speargrass, Woodland bluegrass			xC						
POACEAE	* <i>Poa annua</i>	Speargrass, Annual bluegrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	* <i>Poa bulbosa</i>	Bulbous bluegrass	XX						x	x	
POACEAE	* <i>Poa compressa</i>	Canada bluegrass, Wiregrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Poa cuspidata</i>	Bluegrass		xC			xC				G5/SH/U
POACEAE	* <i>Poa nemoralis</i>	Wood bluegrass	XX			xC	RE	x	x	x	
POACEAE	<i>Poa paludigena</i>	Slender marsh bluegrass	xC								G3/S1/E
POACEAE	<i>Poa palustris</i>	Fowl bluegrass, Meadowgrass	xC		xC	xC	XX	x	x	x	
POACEAE	* <i>Poa pratensis</i>	Kentucky bluegrass	XX	xC	xC	XX	XX	x	x	x	
POACEAE	<i>Poa sylvestris</i>	Woodland bluegrass			XX	XX					G5/S1/U
POACEAE	* <i>Poa trivialis</i>	Rough bluegrass	XX	C	xC	xC	XX	x	x	x	
POACEAE	* <i>Puccinellia distans</i> ssp. <i>distans</i>	Alkali-grass, Goosegrass	XX	C			XX				
POACEAE	<i>Puccinellia fasciculata</i>	Saltmarsh goosegrass			xC		RE	x	x		
POACEAE	* <i>Puccinellia maritima</i>	Seaside goosegrass					XX				
POACEAE	<i>Schizachne purpurascens</i>	False melic					xC				
POACEAE	<i>Schizachyrium scoparium</i> ssp. <i>littorale</i>	Little blue-stem, Beardgrass			xC	XX	XX	x	x		
	ssp. <i>scoparium</i>	Little blue-stem, Beardgrass	XX	C	xC	xC	XX	x	x	x	
POACEAE	* <i>Secale cereale</i>	Rye	XX		xC	XX	XX	x	x	x	
POACEAE	* <i>Setaria faberi</i>	Giant foxtail	XX	xC	xC	xC	XX	x	x	x	
POACEAE	* <i>Setaria italica</i>	Foxtail millet	xC			xC	XX	x	x	x	
POACEAE	<i>Setaria parviflora</i>	Knotroot bristlegrass	XX			XX	XX	x	x		

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Family	Species	Common Name	Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	Status
POACEAE	<i>*Setaria pumila</i>	Yellow foxtail, Pigeongrass	XX	xC	xC	XX	XX	x	x	x	
POACEAE	<i>*Setaria verticillata</i>	Bur bristlegrass		C	C	C	C				
POACEAE	<i>*Setaria verticilliformis</i>	Bur bristlegrass		xC	xC	xC	XX		x	x	
POACEAE	<i>*Setaria viridis</i>	Green foxtail, Bottlegrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Sorghastrum nutans</i>	Indian grass	XX			XX	XX	x	x	x	
POACEAE	<i>*Sorghum bicolor</i>	Sorghum, Broomcorn	xC				xC		x		
POACEAE	<i>*Sorghum halepense</i>	Johnson grass					RE				
POACEAE	<i>Spartina alterniflora</i>	Cordgrass, Saltgrass	XX	XX	XX	XX	XX	x	x	x	
POACEAE	<i>Spartina x caespitosa</i>	Salt meadowgrass, Cordgrass				x	x	x	x		
POACEAE	<i>Spartina cynosuroides</i>	Salt reedgrass, Tall cordgrass	XX	C	xC	xC	XX		x	x	
POACEAE	<i>Spartina patens</i>	Salt meadowgrass	XX		XX	XX	XX	x	x	x	
POACEAE	<i>Spartina pectinata</i>	Freshwater or Prairie cordgrass	XX	xC	C	xC	XX	x	XX	x	
POACEAE	<i>Sphenopholis nitida</i>	Wedgrass	xC	xC	C	xC	RE	x		x	
POACEAE	<i>Sphenopholis obtusata</i> var. <i>major</i>	Slender wedgrass	xC	xC	C	xC	xC	x		x	
	var. <i>obtusata</i>	Prairie wedgrass	xC	C			XX	x	x		G5/S1/U
POACEAE	<i>Sphenopholis pennsylvanica</i>	Swamp oats	xC	x		xC	RE		x		G4/S1/U
POACEAE	<i>Sporobolus asper</i>	Dropseed, Rushgrass	XX	xC		xC	XX	x	x	x	
POACEAE	<i>Sporobolus clandestinus</i>	Rough rush-grass				XX		x	XX		G5/S1/U
POACEAE	<i>*Sporobolus cryptandrus</i>	Sand dropseed	xC			xC		x	x	x	
POACEAE	<i>Sporobolus neglectus</i>	Poverty-grass, Small rushgrass	xC	C			RE	x	x	x	
POACEAE	<i>Sporobolus vaginiflorus</i>	Poverty-grass, Sheathed rushgrass	XX		xC		XX		x	x	
POACEAE	<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Pale mannagrass				xC			x		
	var. <i>pallida</i>	Pale mannagrass	C	C		xC	xC	x	x	x	
POACEAE	<i>*Tragus racemosus</i>	Texas bur		xC						x	
POACEAE	<i>Tridens flavus</i>	Purpletop	XX	xC		XX	XX	x	x	x	
POACEAE	<i>Triplasis purpurea</i>	Purple sandgrass		xC	xC	XX	XX	x	x		
POACEAE	<i>Tripsacum dactyloides</i>	Northern gamma grass	XX	xC	C	XX	XX	XX	XX	x	G5/S2/U
POACEAE	<i>*Triticum aestivum</i>	Wheat	XX	xC		xC	XX	x	x	x	
POACEAE	<i>*Vulpia myuros</i>	Foxtail fescue, Rat-tail grass	XX	xC			XX		x	x	
POACEAE	<i>Vulpia octoflora</i> var. <i>glauca</i>	Six-weeks-fescue, Six-weeks-grass	x		x	XX	RE	x	x	x	
POACEAE	<i>*Zea mays</i>	Corn, Sweetcorn	XX						x		
POACEAE	<i>Zizania aquatica</i>	Southern wild rice, Indian rice			xC	xC	RE	x	x	x	
POACEAE	<i>Zizania palustris</i>	Wild rice, Indian rice				xC			x		
SPARGANIACEAE	<i>Sparganium americanum</i>	Bur-reed	xC			xC	XX	x	x	x	
SPARGANIACEAE	<i>Sparganium androcladum</i>	Bur-reed		C		xC	RE	x	x	x	
SPARGANIACEAE	<i>Sparganium eurycarpum</i>	Bur-reed	XX	x		xC	XX	x	x	x	

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Appendix E. Historical and Extant Flora of New York City

Family	Species	Common Name	Bx.	N.Y.	Kings	Qns	S.I.	Na.	Su.	W	Status
<b>TYPHACEAE</b>	<i>Typha angustifolia</i>	Narrow-leaf cat-tail	XX	C		XX	XX		x	x	
TYPHACEAE	<i>Typha x glauca</i>	Cat-tail				XX					
TYPHACEAE	<i>Typha latifolia</i>	Common cat-tail, Broad-leaf cat-tail	XX	XX	XX	XX	XX	x	x	x	
<b>PONTEDERIACEAE</b>	* <i>Eichornia crassipes</i>	Water-hyacinth	XX						x		
PONTEDERIACEAE	<i>Heteranthera dubia</i>	Water stargrass	x	C						x	
PONTEDERIACEAE	<i>Pontederia cordata</i>	Pickereel-weed	XX		x	C	XX	x	XX	XX	
<b>LILIACEAE</b>	<i>Aletris farinosa</i>	Stargrass, Ague	C	C	x	C	RE	XX	x		G5/S2/U
LILIACEAE	<i>Allium canadense</i>	Wild garlic	XX	C	x	C	XX	XX	x	x	x
LILIACEAE	* <i>Allium porrum</i>	Leek				x	C		x		
LILIACEAE	* <i>Allium schoenoprasum</i>	Wild chives	x	C							
LILIACEAE	<i>Allium tricoccum</i>	Wild leek, Ramp	x	C		x	C	XX	x		x
LILIACEAE	* <i>Allium vineale</i>	Field garlic, Scallion	XX	XX	XX	XX	XX	x	x	x	
LILIACEAE	<i>Amianthium muscaetoxicum</i>	Fly-poison				x	C		x		G4G5/SX/U
LILIACEAE	* <i>Asparagus officinalis</i>	Asparagus	XX	XX	XX	XX	XX	x	x	x	
LILIACEAE	<i>Chamaelirium luteum</i>	Blazing-star, Fairy wand		C		x	C	RE			x
LILIACEAE	* <i>Convallaria majalis</i>	Lily-of-the-valley	XX		x	C	XX	XX		x	x
LILIACEAE	<i>Erythronium albidum</i>	White troutlily	XX								
LILIACEAE	<i>Erythronium americanum</i>	Troutlily	XX	XX	x	C	x	C	XX	x	x
LILIACEAE	* <i>Galanthus nivalis</i>	Snowdrop	XX				XX				
LILIACEAE	<i>Helonias bullata</i>	Swamp pink					RE				
LILIACEAE	* <i>Hemerocallis fulva</i>	Orange day-lily	XX	XX	XX	XX	XX	x	x	XX	
LILIACEAE	* <i>Hosta ventricosa</i>	Blue hosta, Plantain-lily	XX				XX				
LILIACEAE	* <i>Hyacinthoides nonscripta</i>	English bluebell, Harebell	XX								
LILIACEAE	<i>Hypoxis hirsuta</i>	Yellow Stargrass, Hypoxis	XX	C	x		XX	XX	x	x	x
LILIACEAE	<i>Lilium canadense</i> ssp. <i>canadense</i>	Canada lily, Wild yellow lily	XX		x		x	XX		x	x
LILIACEAE	<i>Lilium philadelphicum</i>	Woodlily, Orange-red lily	C	C	x	C	x	C	RE		x
LILIACEAE	<i>Lilium superbium</i>	Turk's-cap lily	XX	C	x	C	XX	XX	XX	x	
LILIACEAE	<i>Maianthemum canadense</i>	Canada mayflower	XX	C	x	C	x	C	XX		x
LILIACEAE	<i>Maianthemum racemosum</i>	False Solomon's-seal	XX	XX	x	C	XX	XX	x	x	x
LILIACEAE	<i>Maianthemum stellatum</i>	Starflower			x	C	XX	XX	x	XX	x
LILIACEAE	<i>Medeola virginiana</i>	Indian cucumber-root	x	C		x	C	RE	XX	x	x
LILIACEAE	<i>Melanthium virginicum</i>	Virginia bunchflower					RE	x			G5/SX/U
LILIACEAE	* <i>Muscari botryoides</i>	Common grape hyacinth	XX	XX	XX	x	C	XX		x	x
LILIACEAE	* <i>Muscari neglectum</i>	Grape hyacinth				x	C	C		x	
LILIACEAE	* <i>Narcissus pseudo-narcissus</i>	Daffodil, Trumpet narcissus	XX	XX			XX	XX			
LILIACEAE	* <i>Ornithogalum umbellatum</i>	Star-of-bethlehem	XX	XX	XX	XX	XX	XX	x	x	x

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LILIACEAE	<i>Polygonatum biflorum</i>	Small Solomon's-seal	XX	XX		XX	XX	x	x	x	
LILIACEAE	<i>Polygonatum commutatum</i>	Large Solomon's-seal	XX	XX		XX	xC	x	x	x	
LILIACEAE	<i>Polygonatum pubescens</i>	Solomon's-seal	xC	xC		XX	XX	x	x	x	
LILIACEAE	<i>Scilla siberica</i>	Scilla, Squill	XX							x	
LILIACEAE	<i>Trillium cernuum</i> var. <i>cernuum</i>	Nodding trillium	XX			XX	RE	XX	x	x	
LILIACEAE	<i>Trillium erectum</i>	Purple trillium	XX			C	RE			x	
LILIACEAE	<i>Uvularia perfoliata</i>	Strawbell	XX	xC		xC	XX	x	x	x	
LILIACEAE	<i>Uvularia sessilifolia</i>	Wild-oats, Bellwort	XX	C		RE	XX	x	x	x	
LILIACEAE	<i>Veratrum viride</i>	False hellebore, White hellebore	XX	C	C		XX			XX	
IRIDACEAE	* <i>Belamcanda chiensis</i>	Blackberry lily, Leopard-flower				xC	RE		x		
IRIDACEAE	<i>Crocus</i> sp.	Crocus	XX	XX							
IRIDACEAE	<i>Iris prismatica</i>	Slender blueflag, Coastal iris	XX	XX	xC	xC	XX	x	x	x	
IRIDACEAE	* <i>Iris pseudacrocus</i>	Yellow iris, Yellow flag	XX	XX		x	XX			XX	
IRIDACEAE	<i>Iris versicolor</i>	Blue-flag, Wild iris	XX	C		XX	XX		x	XX	
IRIDACEAE	<i>Iris virginica</i> var. <i>schreveyi</i>	Southern blue flag			xC				x		
IRIDACEAE	<i>Sisyrinchium angustifolium</i>	Blue-eyed grass	XX			XX	XX	x	x	x	
IRIDACEAE	<i>Sisyrinchium arenicola</i>	Blue-eyed grass			C	xC	RE	x	x		
IRIDACEAE	<i>Sisyrinchium atlanticum</i>	Blue-eyed grass	xC		xC	XX	RE	x	x		
IRIDACEAE	<i>Sisyrinchium montanum</i>	Blue-eyed grass	C	C						x	
	var. <i>montanum</i>	Blue-eyed grass	XX					x	x	x	
IRIDACEAE	<i>Sisyrinchium mucronatum</i>	Michaux blue-eyed grass					xC		XX		G5/S1/U
AGAVACEAE	* <i>Yucca filamentosa</i>	Yucca, Adam's-needle	XX				BB	BB	BB	BB	BB
SMILACACEAE	<i>Smilax glauca</i>	Sawbrier	XX	C	C	xC	BB	BB	BB	BB	
SMILACACEAE	<i>Smilax herbacea</i>	Carrion-flower	XX	C		xC	XX		x	x	
SMILACACEAE	<i>Smilax pseudo-china</i>	False china-root			xC		xC	XX			G4G5/S1/E
SMILACACEAE	<i>Smilax pulverulenta</i>	Jacob's-ladder	xC	xC			XX			x	G4G5/S1/E
SMILACACEAE	<i>Smilax rotundifolia</i>	Greenbrier, Horse-brier	XX	XX	x	BB	BB	BB	BB	BB	
DIOSCOREACEAE	<i>Dioscorea villosa</i>	Wild yam	XX	C		xC	XX	x	x		
ORCHIDACEAE	<i>Aplectrum hyemale</i>	Puttyroot, Adam-and-Eve	xC								G5/S1/V
ORCHIDACEAE	<i>Arethusa bulbosa</i>	Swamp pink, Dragon's-mouth			C			x	x	x	G4/S2/R
ORCHIDACEAE	<i>Calopogon tuberosus</i>	Grass pink	C		xC	xC	RE		x		
ORCHIDACEAE	<i>Corallorhiza maculata</i>	Spotted coralroot	x	C			RE		x		
ORCHIDACEAE	<i>Corallorhiza odontorhiza</i>	Autumn coral-root	C	xC		xC	RE		x	x	
ORCHIDACEAE	<i>Cypripedium acaule</i>	Pink ladyslipper, Moccasin flower	C			XX	XX	x	XX	x	
ORCHIDACEAE	<i>Cypripedium parviflorum</i>	Yellow ladyslipper	C	C							
	var. <i>parviflorum</i>	Small yellow ladyslipper	C	C							

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ORCHIDACEAE	<i>Cypripedium reginae</i>	Showy lady'slipper					RE				
ORCHIDACEAE	* <i>Epipactis helleborine</i>	Helleborine, Weed-orchid	XX	XX	XX	XX	XX		x	x	
ORCHIDACEAE	<i>Galearis spectabilis</i>	Showy orchid	xC	xC			RE			x	
ORCHIDACEAE	<i>Goodyera pubescens</i>	Downy rattlesnake-plantain	xC	xC		xC	RE	x	x	x	
ORCHIDACEAE	<i>Isotria verticillata</i>	Large whorled pogonia, Five-leaves			xC		XX	x	XX		
ORCHIDACEAE	<i>Liparis lillifolia</i>	Large twayblade, Purple twayblade	C	xC	C	xC	RE		x	x	G5/S2/R
ORCHIDACEAE	<i>Liparis loeselii</i>	Bog twayblade, Yellow twayblade	xC	xC		xC	XX	x	x	x	
ORCHIDACEAE	<i>Listera cordata</i>	Heartleaf twayblade					RE		x		
ORCHIDACEAE	<i>Malaxis unifolia</i>	Green adder's-mouth				C	RE	x	x		
ORCHIDACEAE	<i>Platanthera blephariglottis</i>	White fringed orchid					RE	x	XX		
ORCHIDACEAE	<i>Platanthera ciliaris</i>	Orange fringed orchid		C	x	xC	RE	x	XX	XX	G5/S1/T
ORCHIDACEAE	<i>Platanthera clavellata</i>	Green woodland orchid					RE		x	x	
ORCHIDACEAE	<i>Platanthera flava</i> var. <i>herbiola</i>	Tubercled orchid	C	xC	xC		RE	XX	x	x	
ORCHIDACEAE	<i>Platanthera lacera</i>	Ragged fringed orchid	x	xC			XX	x	x	x	
ORCHIDACEAE	<i>Platanthera psycodes</i>	Small purple fringed orchid	xC			xC	RE		x	x	
ORCHIDACEAE	<i>Pogonia ophioglossoides</i>	Rose pogonia, Snake's-mouth	xC	x	xC	xC	RE	x	x	x	
ORCHIDACEAE	<i>Spiranthes cernua</i>	Nodding lady's-tresses	XX	C	C	XX	XX	x	x		
ORCHIDACEAE	<i>Spiranthes lacera</i> var. <i>gracilis</i>	Slender lady's-tresses	xC				xC		x	x	
	var. <i>lacera</i>	Slender lady's-tresses					RE		XX		
ORCHIDACEAE	<i>Spiranthes lucida</i>	Wide-leaved lady's-tresses	C	xC					x		
ORCHIDACEAE	<i>Spiranthes ochroleuca</i>	Creamy lady's-tresses					x		x		
ORCHIDACEAE	<i>Spiranthes tuberosa</i>	Little lady's-tresses	C			C	xC		x		
ORCHIDACEAE	<i>Spiranthes vernalis</i>	Spring lady's-tresses	xC			C	RE	x	XX		G5/S1/U
ORCHIDACEAE	<i>Tipularia discolor</i>	Crane-fly orchid		xC			xC		XX		G4G5/S1/T
ORCHIDACEAE	<i>Triphora trianthophora</i>	Nodding pogonia	C	xC			XX				G4/S1/V

## BIBLIOGRAPHY

Ahles, H.E. 1947. Letter to Dr. H.D. House at the New York State Museum. March 19, 1947. New York State Museum at Albany. Albany, NY. Np

Ahles, H.E. 1948. Letter to Dr. H.D. House at the New York State Museum. March 18, 1948. New York State Museum at Albany. Albany, NY. Np

Ahles, H.E. 1951. Interesting weeds in New York City. *Bulletin of the Torrey Botanical Club* 78: 266-274.

Alpine, L. 1986. Trends in special interest travel. *Specialty Travel Index* 13: 83-84.

Anderson, K. Plants of Conference House Park, Staten Island, New York. Unpublished.

Anderson, E. and L. Hubricht. 1940. A method for describing and comparing blooming seasons. *Bulletin of the Torrey Botanical Club* 78: 266-274.

Andropogon Associates. 1994. A landscape management plan for the natural areas of Prospect Park. The Prospect Park Landscape Management Office, Brooklyn, New York. 237pp.

Bambach, R.K. 1985. Classes and adaptive variety: the ecology of diversification in marine faunas through the Phanerozoic. Pages 191-253 *in* *Phanerozoic Diversity Patterns: Profiles in Macroevolution*, J.W. Valentine, ed. Princeton University Press.

Barel, C.D.N., Ligtvoet, W., Goldschmidt, T., Witte, F. and P.C. Goudswaard. 1991. The haplochromine cichlids in Lake Victoria and fisheries interests. Pages 258-279 *in* *Cichlid Fishes: Behavior, Ecology and Evolution*, M.H.A. Keenleyside, ed. Chapman and Hall, New York.

Barnosky, A.D. 1994. The late Pleistocene event as a paradigm for widespread mammal extinction. Pages 235-254 *in* *Mass Extinctions: Processes and Evidence*, S.K. Donovan, ed. Belhaven Press (Pinter Publishers), London, England.

Baskin, Y. 1994. Ecosystem function of biodiversity. *BioScience* 44: 657-660.

Beutenmuller, W. 1890. Catalogue of Lepidoptera found within fifty miles of New York City, with their food plants. *New York Academy of Science* 5: 199-230.

Beutenmuller, W. 1902. Descriptive catalogue of the Noctuidae found within fifty miles of New York City. *Bulletin of the American Museum of Natural History* 16: 413-458.

- Bibby, C. J. 1992. Putting Biodiversity on the Map: Priority Areas for Global Conservation. International Council for Bird Preservation, Cambridge.
- Bicknell, E.P. 1878. Evidences of the Carolinian fauna in the lower Hudson valley. Bulletin of the Nuttall Ornithology Club 3: 128-132.
- Bicknell, E.P. 1898. Two new grasses from Van Cortlandt Park, New York City (*Savastana nashii*, *Chaetochloa versicolor*). Bulletin of the Torrey Botanical Club 25: 104-107.
- Bicknell, E.P. 1928. Observations at Riverdale, New York City, as compiled by Ludlow Griscom. Proceedings of the Linnaean Society of New York. Numbers 39 and 40.
- Blumberg, A. 1998. Born to burn. Chicago Wilderness (Summer 1998): 4-9.
- Bolton, R.P. 1922. Indian paths in the great metropolis. Indian Notes and Monographs Miscellaneous 23. In Two Volumes. Museum of the American Indian, New York.
- Bolton, R.R. 1905. The History of Several Towns, Manors and Patents of the County of Westchester. Vol II. N.p., New York, NY.
- Boo, E. 1990. Ecotourism: The Potentials and Pitfalls. Volume 1. World Wildlife Fund, Washington, D.C.
- Bornstein, R.D. 1968. Observations of the urban heat island effect in New York City. Journal of Applied Meteorology 7: 575-582.
- Bridges, K.R. 1991. Blue Heron Park: A Master Plan. Office of Landscape Architecture, City of New York Parks & Recreation, Olmstead Center, Flushing, New York. 105pp.
- Britton, N.L. 1906. The Hemlock Grove on the banks of the Bronx River, and what it signifies: With a review of the history and literature of the hemlock tree. Transactions of the Bronx Historical Society 1: 5-15.
- Brooks, K.L. 1960. Field Trip Report: August 30, 1959. Marine Park, Brooklyn. Bulletin of the Torrey Botanical Club 87: 62-64.
- Brusca, R.C. and Brusca, G.J. 1990. Invertebrates. Sinaur, Sunderland, Massachusetts.
- Buckley, P.A. 1958. The birds of Baxter Creek, fall and winter of 1954. Proceedings of the Linnaean Society of New York. Numbers 66-70: 77-83.
- Bull, J. 1964. Birds of the New York Area. Dover Publications, New York.
- Burney, D.A. 1993. Recent animal extinctions: Recipes for disaster. American Scientist 81: 530-541.

- Cairncross, F. 1992. *Costing the Earth*. Harvard Business School Press, Boston, MA.
- Caro, R.A. 1974. *The Power Broker. Robert Moses and the Fall of New York*. Alfred A. Knopf, New York.
- Chapin, F.S., Zavaleta, E.S., Eviners, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E., Mack, M.C., and S. Diaz. 2000. Consequences of changing biodiversity. *Nature* 405: 234-242.
- Chapman, F.M. 1939. *Handbook of Birds of Eastern North America*. Dover Publications, New York.
- Clemants, S. E. 1990. *New York Metropolitan Flora. New York City Checklist. The Brooklyn Botanic Garden*. Brooklyn, New York. 44 pp.
- Clemants, S.E. (Ed.). 1999. *Woody Plant Workbook*. Brooklyn Botanic Garden. Brooklyn, New York. 307pp.
- Cox, P.A. and Balick, M.J. 1994. The ethnobotanical approach to drug discovery. *Scientific American* 270: 88-94.
- Cracraft, J. 1985. Biological diversification and its causes. *Annals of the Missouri Botanical Garden* 72: 794-822.
- Cramer, M., Heintz, J. and B. Kelly. 1984. *Vegetation in Central Park*. Central Park Conservancy. New York. Unpublished report.
- Cronquist, A. 1981. *An Integrated System of Classification of Flowering Plants*. Columbia University Press, New York.
- DeCandido, R.V. 1991a. Ecology of ospreys (*Pandion haliaetus*) foraging in migration. *Hawk Migration Studies* 16: 5-12.
- . 1991b. Pelham Bay Hawkwatch results, 1989-1990. *Kingbird* 41: 12-16.
- 2001a. The historical vascular flora of Pelham Bay Park, Bronx County, New York City as compiled by H.E. Ahles in 1946-47. (Submitted for Publication)
- 2001b. The vascular flora of Pelham Bay Park, Bronx County, New York City, 1994-98. (Submitted for Publication)
- 2001c. Recent changes in plant species diversity in Pelham Bay Park 1947-1998, Bronx County, New York. (Submitted for Publication)
- Denslow, H.M. 1924. Native orchids of Manhattan Island. *Journal of the New York Botanical Garden* 25: 290-293.

- Diamond, J.M. 1989. Overview of recent extinctions. Pages 37 to 41 in Conservation for the Twenty-first Century, D. Western and M. C. Pearl, eds. Oxford University Press, New York.
- Dobson, A.P. 1996. Conservation and Biodiversity. W.H. Freeman and Company, New York, NY.
- Drayton, B. and Primack, R.B. 1996. Plant species lost in an isolated conservation area in metropolitan Boston from 1894 to 1993. Conservation Biology 10: 30-39.
- Easterbrook, G. 1995. A Moment on the Earth. Penguin Books, New York, USA.
- Echelle, A.A. and Kornfield, I. 1984. Who's tending the flock. Pages 251 to 254 in Evolution of Fish Species Flocks, A.A. Echelle and I. Kornfield, eds. University of Maine Press, Orono, ME.
- Erwin, D.H. 1994. The Permo-Triassic extinction. Nature 367: 231-235.
- Erwin, T.L. 1982. Tropical forests: their richness in Coleoptera and other arthropod species. Coleopterists' Bulletin 36: 74-75.
- Erwin, T.L. 1988. The tropical forest canopy: the heart of biotic diversity. Pages 123 to 129 in Biodiversity, E.O. Wilson and F.M. Peter, eds. National Academy Press, Washington, D.C.
- Fox, R. 1987. Population images. United Nations Fund for Population Activities.
- Frankel, E. 1978. A floristic survey of the vascular plants of the Bronx River Park in Westchester County, New York. Bulletin of the Torrey Botanical Club 105: 147-155.
- 1978. A floristic survey of the vascular plants of the Bronx River Park in Westchester County, New York. Supplement, 1977-1978. Bulletin of the Torrey Botanical Club 106: 46-47.
- Gaston, K.J. 1992. Regional numbers of insect and plant species. Functional Ecology 6: 243-247.
- Gaston, K.J. 2000. Global patterns in biodiversity. Nature 405: 220-227.
- Gillis, M. 1991. Economics, ecology, and ethics: Mending the broken circle for tropical forests. Pages 155-175 in Ecology, Economics, Ethics: The Broken Circle, F.H. Bormann and S.R. Kellert, eds. Yale University Press, New Haven, CN.
- Gleason, H.A. and Cronquist, A. 1991. Manual of Vascular Plants of Northeastern United States and Canada. The New York Botanical Garden, New York. 2<sup>nd</sup> edition

Goodwin, B.J., McAllister, A.J. and L. Fahrig. 1999. Predicting invasiveness of plant species based on biological information. *Conservation Biology* 13: 422-426.

Gould, S.J. 1990. *Wonderful Life*. Harvard: Belknap Press, Cambridge, MA.

Grassle, J.F. and Maciolek, N.J. 1992. Deep-sea species richness: regional and local diversity estimates from quantitative bottom samples. *American Naturalist* 139: 313-341.

Graves, A.H. 1930. Inwood Park, Manhattan. *Torreyana* 30: 117-129.

Greller, A.M. 1972. Observations on the forests of northern Queens County, Long Island, from colonial times to the present. *Bulletin of the Torrey Botanical Club* 99: 202-206.

Greller, A.M. 1975. Persisting natural vegetation in northern Queens County, New York, with proposals for its conservation. *Environmental Conservation* 2: 61-69.

Greller, A.M. 1977. A vascular flora of the forested portion of Cunningham Park, Queens County, New York, with notes on the vegetation. *Bulletin of the Torrey Botanical Club* 104: 170-176.

Greller, A.M. 1985. A vascular flora of the forested portion of Cunningham Park, Queens County, New York: Corrections and additions - II. *Bulletin of the Torrey Botanical Club* 112: 312.

Greller, A.M., Panuccio, M.K. and C.M. Durando. 1991. A vascular flora of the forested portion of Cunningham Park, Queens County, New York: Corrections and Additions - III. *Bulletin of the Torrey Botanical Club* 118: 330-332.

Greller, A.M., Buegler, R., Johnson, E., Matarazzo, R., and K. Anderson. 1992. Two unusual plant communities in Tottenville, Staten Island, New York, with *Celtis occidentalis* and *Asimina triloba*. *Bulletin of the Torrey Botanical Club* 119: 446-457.

Grifo, F. and Rosenthal, J. (eds.). 1997. *Biodiversity and Human Health*. Island Press, Washington, D.C.

Griscom, L. 1926. The observations of the late Eugene P. Bicknell at Riverdale, New York City, fifty years ago. Abstract of the Proceedings of the Linnaean Society of New York 1925-26 for the two years ending March 23, 1926. Numbers 37-38.

Groom, M.J., Podolsky, R.D. and C.A. Munn. 1991. Tourism as a sustained use of wildlife: A case study of Madre de Dios, southern Peru. Pages 184-199 in *Neotropical Wildlife Use and Conservation*. University of Chicago Press, Chicago, USA.

Groombridge, B. (ed.) 1992. *Global Biodiversity. Status of the Earth's Living Resources*. Chapman and Hall, London.

- Hanks, J.P. 1985. Plant communities and ground-water levels in southern Nassau County, Long Island, New York. *Bulletin of the Torrey Botanical Club* 112: 79-86.
- Hardoy, J.E., Mitlin, D., and D. Satterthwaite. 1992. *Environmental Problems in Third World Cities*. Earthscan, London.
- Haub, C. and Kent, M.M. 1989. 1989 world population data sheet. Population Reference Bureau. Washington, D.C.
- Hawksworth, D.L. 1991. The fungal dimension of biodiversity: magnitude, significance and conservation. *Mycological Research* 95: 641-655.
- Herbert, R.A. Behavior of peregrine falcons in the New York City region. *The Auk* 82: 62-94.
- Heywood, V.H. 1994. The measurement of biodiversity and the politics of implementation. Pages 15-22 in *Systematics and Conservation Evaluation*, P.L. Forey, C.J. Humphries and R.I. Vane-Wright, eds. The Systematics Association Special Volume No. 50. Clarendon Press: Oxford, England
- Hickey, J.J. (ed.) 1969. *Peregrine Falcon Populations, Their Biology and Decline*. University of Wisconsin Press. Madison, Wisconsin.
- Hobbs, R.J. and L.F. Huenneke. 1992. Disturbance, diversity, and invasion: Implications for conservation. *Conservation Biology* 6: 324-334.
- Horenstein, S. 1989. Big Apple tusks. *Natural History* 3: 96-100.
- Jablonski, D. 1993. Extinctions: A paleontological perspective. *Science* 253: 754-757.
- Jackson, K.T. (ed.) 1995. *Encyclopedia of New York City*. Yale University Press. New Haven, Connecticut.
- Jenkins, S. 1912. *The Story of the Bronx from the Purchase made by the Dutch from the Indians in 1639 to the present day*. G.P. Putnam's Sons. New York and London.
- Kaesler, E.J. 1970. The Archery Range Site ossuary, Pelham Bay Park, Bronx, New York. *Pennsylvania Archaeologist* 40: 9-34.
- Kaltman, H. 1966a. Field trip report from Pelham Bay Park, July 10, 1966. *Bulletin of the Torrey Botanical Club* 93: 70-71.
- Kaltman, H. 1968. Field Trip Report: July 14. Pelham Bay Park. *Bulletin of the Torrey Botanical Club* 95: 660.
- Kastner, J. 1986. *A World of Watchers*. Alfred A. Knopf, New York.

Kazimiroff, T. 1977. Field trip report from Pelham Bay Park, November 13, 1977. *Bulletin of the Torrey Botanical Club* 104: 72-73.

Kellert, S.R. 1996. *The Value of Life: Biodiversity and Human Society*. Island Press, Washington, D.C.

Kellert, S.R. and Wilson, E.O., eds. 1993. *The Biophilia Hypothesis*. Island Press, Washington, D.C.

Kerlinger, P. and Brett, J.J. 1996. Hawk Mountain Sanctuary: A case study of birder visitation and birding economics, R.L. Knight and K.J. Gutzwiller, eds. Pages 271-280 in *Wildlife and Recreationists: Coexistence through Management and Research*. Island Press, Washington, D.C.

Kerlinger, P. and Wiedner, D. 1990. Economics of birding: A National survey of active birders. *American Birds* 44(2): 209-213.

Kieran, J. F. 1959. *A Natural History of New York City*. Houghton Mifflin Company, Boston, MA.

Klots, A.B. 1931. New records of microlepidoptera from New York. *Journal of the New York Entomological Society* 39: 291- 293.

Klots, A.B. 1932. New records of Lepidoptera from New York. *Journal of the New York Entomological Society* 40: 385-387.

Kruckeberg, A.R. and Rabinowitz. 1985. Biological aspects of endemism in higher plants. *Annual Review of Ecology and Systematics* 16: 447-479.

Kuerzi, J.F. 1927. A detailed report on the bird life of the greater Bronx region. Abstract of the Proceedings of the Linnaean Society of New York 1925-26 for the two years ending March 23, 1926. Numbers 37-38: 88-111.

Kunstler, D.S. 1993. Siebold's viburnum, *Viburnum sieboldii* Miquel, new non-native species record for New York. *Bulletin of the Torrey Botanical Club* 120: 188-190.

Lamont, E.E. 1994. Rediscovery of *Solidago sempervirens* var. *mexicana* (Asteraceae) in New York, with notes on its taxonomic history. *Bulletin of the Torrey Botanical Club* 121: 292-294.

Lamont, E.E. and Stalter, R. 1991. The vascular flora of Orient Beach State Park, Long Island, New York. *Bulletin of the Torrey Botanical Club* 118: 459-468.

Larson, J. 1986. Not without a plan: Geography and natural history in the late eighteenth century. *Journal of the History of Biology* 19: 447-488.

Lefkowitz, A. and Greller, A.M. 1973. The distribution of tree species on the uplands of Cunningham Park, Queens County, New York. *Bulletin of the Torrey Botanical Club* 100: 313-318.

Leveson, D.J. and Seyfort, C.K. 1969. The role of metasomatism in the formation of layering in amphibolites of Twin Island, Pelham Bay Park, the Bronx, New York. Pages 361-377 in Larsen, L.H., Prinz, M., and Manson, V., eds. *Igneous and Metamorphic Geology*. Geological Society of America, Memoir 115.

Loeb, R.E. 1983. Seton Falls Park: A land use history. *Bronx County Historical Journal* XVIII: 18-32.

Loeb, R.E. 1986. Plant communities of Inwood Hill Park, New York County, New York. *Bulletin of the Torrey Botanical Club* 113: 46-52.

Loeb, R.E. 1989. The ecological history of an urban park. *Journal of Forest History* 33: 134-143.

Loeb, R.E. 1993. Long term arboreal change in a landscaped urban park: Central Park, Manhattan. *Journal of Arboriculture* 19: 238-248

Loeb, R.E. 1998a. Urban ecosystem management and change during the past millennium: a case study from New York City. *Urban Ecosystems* 2: 17-26.

Loeb, R.E. 1998b. Evidence of prehistoric corn (*Zea mays*) and hickory (*Carya* spp.) planting in New York City: Vegetation history of Hunter Island, Bronx County, New York. *Journal of the Torrey Botanical Society* 125: 74-86.

Long Island Botanical Society Flora Committee. 1996. Preliminary atlas of the Magnoliidae on Long Island, N.Y., Part 1. *Long Island Botanical Society Newsletter* 6 (6): 41-44.

Lovelock, J.M. 1988. *The Age of Gaia*. Oxford University Press, Oxford, England.

MacArthur, R.H. and Wilson, E.O. 1967. *The Theory of Island Biogeography*. Princeton University Press, Princeton, New Jersey.

Margules, C.R. and Pressey, R.L. 2000. Systematic conservation planning. *Nature* 405: 243-253.

Margulis, L. and Fester, R. (Eds.) 1991. *Symbiosis as a Source of Evolutionary Innovation*. Massachusetts Institute of Technology Press, Cambridge, MA.

Martin, P.S. 1984. Prehistoric overkill: The global model. Pages 354 to 403 in Martin, P.S. and R.G. Klein, R.G., eds. *Quaternary Extinctions: A Prehistoric Revolution*. University of Arizona Press, Tucson, AZ.

Martin, P.S. and Klein, R.G. (eds.) 1984. *Quaternary Extinctions: A Prehistoric Revolution*. University of Arizona Press, Tucson, AZ.

May, R.M. 1990. How many species? *Philosophical Transactions of the Royal Society B* 330: 293-304.

Mayr, E. 1970. *Populations, Species and Evolution*. Cambridge: Harvard University Press.

Mayr, E. 1982. Processes of speciation in animals. Pages 1- 19 in *Mechanisms of Speciation*, F. Ehrendorfer, ed. Alan R. Liss, Inc., New York.

McCann, K.S. 2000. The diversity-stability debate. *Nature* 405: 228-233.

McDonnell, M.J. 1988. The challenge of preserving urban natural areas: A forest for New York. *Journal of the American Association of Botanical Gardens and Arboreta* 3: 28-31.

McDonnell, M.J. and Pickett, S.T.A. 1990. Ecosystem structure and function along urban-rural gradients: an unexploited opportunity for ecology. *Ecology* 71: 1232-1237.

McNeely, J.A. 1988. *Economists and Biological Diversity, Developing Incentives to Conserve Natural Resources*. International Union for the Conservation of Nature. Gland, Switzerland.

Merguerian, C. and Sanders, J.E. 1991. *Geology of Manhattan and the Bronx*. Notes for field trip 16. New York Academy of Sciences, Publication 3, New York.

Merguerian, C. and Sanders, J.E. 1993. *Cameron's line and the Bronx parks*. Notes for field trip 26. New York Academy of Sciences, Publication 16, New York.

Mitchell, R. S. 1990. *Preliminary Vouchered Atlas of the New York State Flora*. New York Flora Association of the New York State Museum Institute. Albany, New York. 494pp.

Mitchell, R.S. 2000. *Database and Revised Checklist of New York State Plants. Part 1): A Database of New York State Plants*. In *Microsoft Access*. 3779 entries. CD-ROM format. New York State Museum. Albany, New York.

Mitchell, R.S. and Tucker, G.C. 1997. *Revised Checklist of New York Plants*. Bulletin No. 490, New York State Museum, Albany, New York.

Mittelbach, M. and Crewdson, M. 1997. *Wild New York: A Guide to the Wildlife, Wild Places and Natural Phenomena of New York City*. Crown Publishers, New York.

- Moldenke, H.N. 1947. Noteworthy records from the local area. *Bulletin of the Torrey Botanical Club* 74: 262-263.
- Monachino, J. 1955. Field Trip Reports: October 10. Pelham Bay Park, N.Y. *Bulletin of the Torrey Botanical Club* 82: 64.
- Monachino, J. 1957. *Cynanchum* in the New York area. *Bulletin of the Torrey Botanical Club* 84: 47-48.
- Monachino, J. 1958. Field trip to Pelham Bay Park, October 20, 1958. *Bulletin of the Torrey Botanical Club* 85: 73-74.
- Morris, S.C. 1989. Burgess Shale formations and the Cambrian explosion. *Science* 246: 339-346.
- Moses, R. 1950. The reclamation of park areas by sanitation fill and synthetic top soil. Letter from Commissioner Robert Moses to the Mayor of the City of New York, Vincent Impellitteri. October 9, 1950. Archives of the City of New York Department of Parks and Recreation, The Arsenal, New York, NY.
- Murrill, W.A. 1906. A new chestnut disease (*Diaporthe parasitica*). *Torreya* 6: 186-89.
- Myers, N. 1990. The biodiversity challenge: expanded Hot-Spots analysis. *The Environmentalist* 10: 243-255.
- Myers, N. 1994. *Ultimate Security: The Environmental Basis of Political Stability*. W.W. Norton and Co. New York.
- Naeem, S., Thompson, L.J., Lawler, S.P., Lawton, J.H. and R.M. Woodfin. 1994. Declining biodiversity can alter the performance of ecosystems. *Nature* 368: 734-735.
- Natural Resources Group. 1988a. Natural areas management plan: Alley Pond Park, Queens. City of New York Parks & Recreation, New York. Np
- Natural Resources Group. 1988b. Natural areas management plan: Kissena Park. Queens. City of New York Parks & Recreation, New York. np
- Natural Resources Group. 1988c. Natural areas management plan: Marine Park, Brooklyn. City of New York Parks & Recreation, New York. np
- Natural Resources Group. 1990. Natural Areas Management Plan: Van Cortlandt Park, Bronx. Natural Resources Group, City of New York Parks & Recreation. Np
- Nelson, G. 1989. Species and taxa: Systematics and evolution. Pages 60-81 in *Speciation and its Consequences*, D. Otte and J.A. Endler, eds. Sinauer Associates, Inc., Sunderland, MA.

- Nelson, G. and Platnick, N. 1981. *Systematics and Biogeography, Cladistics and Vicariance*. Columbia University Press, New York.
- Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Company. Boston, MA.
- New York Natural Heritage Program. (1999). *Rare Plants of Staten Island*. Unpublished Survey Results. Albany, New York.
- New York State Ad Hoc Invasive Plant Group. 1998. Top twenty list of the most serious invasive plants in New York State. The Nature Conservancy, Troy, NY.
- Niklas, K.J., Tiffney, B.H. and A.H. Knoll. 1983. Patterns in vascular plant diversification. *Nature* 303: 614-616.
- Niklas, K.J., Tiffney, B.H. and A.H. Knoll. 1985. Patterns in vascular land plant diversification: An analysis at the species level. Pages 97-128 *in* *Phanerozoic Diversity Patterns: Profiles in Macroevolution*, J.W. Valentine, ed. Princeton University Press, New Jersey.
- Nixon, K.C. and Wheeler, Q.D. 1990. An amplification of the phylogenetic species concept. *Cladistics* 6: 211-223.
- Norton, B.G. 1994. On what we should save: the role of culture in determining conservation targets. Pages 138 to 174 *in* *Systematics and Conservation Evaluation*, P.L. Forey, C.J. Humphries and R.I. Vane-Wright, eds. The Systematics Association Special Volume No. 50. Clarendon Press: Oxford, England
- Paulay, G. 1994. Biodiversity on oceanic islands: Its origin and extinction. *American Zoologist* 34: 134-144.
- Payne, R.H. 1991. Potential economic and political impacts of ecotourism: a research note. *Texas Journal of Political Studies* 13: 65-77.
- Peters, C.M., Gentry, A.H. and R. Mendelsohn. 1989. Valuation of an Amazonian rain forest. *Nature* 339: 1419-1421.
- Plotkin, J.B., Potts, M.D., Wu, D.W. and P.S. Ashton. 2000. Predicting species diversity in tropical forests. *Proceedings of the National Academy of Sciences* 97: 10850-10854.
- Pons, L., ed. 1987. *Pelham Bay Park: Creating the sanctuaries*. City of New York Department of Parks and Recreation, Van Cortlandt and Pelham Bay Park Administrator's Office, Bronx, N.Y.

- Pouyat, R.V. and McDonnell, M.J. 1991. *The Ecology and Natural Resources of New York City: A Bibliography*. Number 5 (July 1991). Occasional Publication of the Institute of Ecosystem Studies, The New York Botanical Garden. Bronx, NY.
- Profous, G.V. and Loeb, R.E. 1984. Vegetation and plant communities of Van Cortlandt Park, Bronx, New York. *Bulletin of the Torrey Botanical Club* 111: 80-89.
- Purvis, A. and Hector, A. 2000. Getting the measure of biodiversity. *Nature* 405: 212-219.
- Radford, A.E., Ahles, H.E. and Bell, C.R. 1964. *Manual of the Vascular Flora of the Carolinas*. University of North Carolina Press.
- Randall, A. 1991. The value of biodiversity. *Ambio* 20: 64-68.
- Raup, D.M. and Sepkowski, J.J. 1982. Mass extinctions in the marine fossil record. *Science* 215: 1501-1503.
- Reid, W.V. and K.R. Miller. 1989. *Keeping Options Alive: The Scientific Basis for Conserving Biodiversity*. World Resources Institute, Washington, D.C.
- Reschke, C. 1990. *Ecological communities of New York State*. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.
- Rex, M.A., Stuart, C.T., Hessler, R.R., Allen, J.A., Sanders, H.L. and G.D.F. Wilson. 1993. Global-scale latitudinal patterns of species diversity in the deep-sea benthos. *Nature* 365: 636-639.
- Ridl, J.G. 1989. The Bronx age. *Birder's World*. October 1989: 26-29.
- Robinson, G.R. and Handel, S.N. 1993. Forest restoration on a closed landfill: Rapid addition of new species by bird dispersal. *Conservation Biology* 7: 271-278.
- Robinson, G.R., Yurlina, M.E. and S.N. Handel. 1994. A century of change in the Staten Island flora: Ecological correlates of species losses and invasions. *Bulletin of the Torrey Botanical Club* 12: 119-129.
- Robinson, G.R. 1999. *Database of the Staten Island Flora, 1979-1991*. Microsoft Excel format. Unpublished
- Rogers, G. and Rowntree, R. 1988. Intensive survey of structure and changes in urban natural areas. *Landscape and Urban Planning* 15: 59-78.
- Rosenzweig, M.L. 1995. *Species Diversity in Space and Time*. Cambridge University Press, New York.

- Roughgarden, J. 1983. The theory of coevolution. Pages 33 to 64 in *Coevolution*, D.J. Futuyma and M. Slatkin, eds. Sinauer Associates, Inc. Sunderland, MA.
- Rudnick, J.L. and McDonnell, M.J. 1989. Forty-eight years of canopy change in a hardwood-hemlock forest in New York City. *Bulletin of the Torrey Botanical Club* 116: 52-64.
- Rudwick, M.J.S. 1972. *The Meaning of Fossils. Episodes in the History of Paleontology*. 2nd edition. University of Chicago Press, Chicago, IL.
- Rusby, H.H. 1906. A historical sketch of the development of botany in New York City. *Torrea* 6: 101-111, 133-145.
- Schall, J.J. and Pianka, E.R. 1978. Geographical trends in the number of species. *Science* 201: 679-686.
- Schnitz, A. and Loeb, R.E. 1984. "More public parks!" The first New York environmental movement. *Bronx County Historical Journal* XIX: 51-66.
- Sefferien, M.L. 1932. Wild flowers of the Sputen-Duyvil and Riverdale sections of New York City. *Torrea* 32 (5): 119-127.
- Sepkowsky, J.J. and Hulver, M.L. 1985. An atlas of Phanerozoic clade diversity patterns. Pages 11-39 in *Phanerozoic Diversity Patterns: Profiles in Macroevolution*, J.W. Valentine, ed. Princeton University Press, New Jersey.
- Shanely, P. 1999. To Market, To Market. *Natural History* 108 (8): 44-51.
- Shapiro, A.M. 1973. Ecological characteristics of the New York state butterfly fauna (Lepidoptera). *Journal of the New York Entomological Society* 81: 201-209.
- Sharpe, W.P. 1978. Symposium on environmental effects of sulfur oxides and related oxides and related particulates, New York City, U.S.A., March 23-24. *Bulletin New York Academy of Medicine* 54: 983-127.
- Signor, P.W. 1990. The geologic history of diversity. *Annual Review of Ecology and Systematics* 21: 509-539.
- Simon, C.M. 1979. The debut of the 17-year old cicada. *Natural History* 88: 38-45.
- Simon, J.L. 1984. *The Ultimate Resource*. Princeton University Press, New Jersey.
- Simon, J.L. 1996. *The Ultimate Resource 2*. Princeton University Press, New Jersey.
- Simon, J.L. and Wildavsky, A. 1984. On Species losses, the absence of data, and risks to

- humanity. Pages 171-183 *in* J.L. Simon and H. Kahn, eds. *The Resourceful Earth*, Princeton University Press, New Jersey.
- Sisk, T.D., Launer, A.E., Switky, K.R., and P.R. Ehrlich. 1994. Identifying extinction threats. *BioScience* 44: 592- 604.
- Sisinni, S.M. and Anderson, M. O. 1993. Methods and results of natural resource assessments in New York City, New York. *Landscape and Urban Planning* 25: 95-114.
- Sloan, R.E., Rigby, K.J., Van Valen, L.M. and D. Gabriel. 1986. Gradual dinosaur extinction and simultaneous ungulate radiation in the Hell Creek formation. *Science* 232: 629-633.
- Stalter, R. 1981. A thirty-nine year history of the arborescent vegetation of Alley Pond Park, Queens County, New York. *Bulletin of the Torrey Botanical Club* 108: 485-487.
- Stalter, R., Lamont, E. E. and J. Northup. 1986. Vegetation of Fire Island, New York. *Bulletin of the Torrey Botanical Club* 113: 298-306.
- Stanely, S.M. 1984. Temperature and biotic crises in the marine realm. *Geology* 12: 205-208.
- Stanely, S.M. 1986. Anatomy of a regional mass extinction: Plio-Pleistocene decimation of the western Atlantic bivalve fauna. *Palaios* 1: 17-36.
- Stohlgren, T.J., Binkley, D., Chong, G.W., Kalkhan, M.A., Schell, L.D., Bull, K.A., Otsuki, Y., Newman, G., Bashkin, M., and Y. Son. 1999. Exotic plant species invade hot spots of native plant diversity. *Ecological Monographs* 69: 25-46.
- Stork, N.E. 1993. How many species are there? *Biodiversity and Conservation* 2: 215-232.
- Thompson, K. 1994. Predicting the fate of temperate species in response to human disturbance and global change. Pages 61-76 *in* T.J.B. Boyle and C.E.B. Boyle, editors. *Biodiversity, temperate ecosystems and global change*. Springer-Verlag, Berlin.
- Thompson, K. and Jones, A. 1999. Human population density and prediction of local plant extinction in Britain. *Conservation Biology* 13: 185-189.
- Tiffney, B.H. and K.J. Niklas. 1990. Continental area, dispersion, latitudinal distribution and topographic variety: A test of correlation with terrestrial plant diversity. Pages 146-153 *in* *Biotic and Abiotic Factors in Evolution*, ed. W. Allmon and R.D. Norris, Chicago: University of Chicago Press.
- Tilman, D. 2000. Causes, consequences and ethics of biodiversity. *Nature* 405: 208-211.

Tilman, D. and J.A. Downing. 1994. Biodiversity and stability in grasslands. *Nature* 367: 363-365.

Tippo, O. 1982. Harry E. Ahles, 1924-1981. *Bulletin of the Torrey Botanical Club* 109: 84-86.

Tobin, R.J. 1990. *The Expendable Future: U.S. Politics and the Protection of Biological Diversity*. Duke University Press, Durham, N.C.

United Nations Population Division. 1995. *World Urbanization Prospects: The 1994 Revision*. United Nations, New York.

United States Department of the Interior, Fish and Wildlife Service, and United States Department of Commerce, Bureau of the Census. 1993. *The 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*. United States Government Printing Office, Washington, D.C.

Valentine, J.W. 1989. Phanerozoic marine faunas and the stability of the earth system. *Palaeogeography, Palaeoclimatology, Palaeoecology (Global and Planetary Change Section)* 75:137-155.

Valentine, J.W. 1990. The fossil record: a sampler of life's diversity. *Philosophical Transactions of the Royal Society of London B*. 330: 261-268.

Valentine, J.W., Awramik, S.M., Signor, P.W. and P.M. Sadler. 1990. The biological explosion at the Precambrian-Cambrian boundary. *Evolutionary Biology* 16: 279-355.

Van Dover, C.L. 1990. Biogeography of Hydrothermal Vent Communities along seafloor spreading centers. *TREE* 5: 242- 246.

van Riper, C., van Riper, S.G., Goff, M.L. and M. Laird. 1986. The epizootiology and ecological significance of malaria in Hawaiian land birds. *Ecological Monographs* 56: 327-344.

Venezia, K. and Cook, R.P. 1991. *Flora of Gateway National Recreation Area*. United States Department of the Interior, National Park Service, Gateway National Recreation Area, Division of Natural Resources and Compliance. 40pp.

Vermeij, G.J. 1977. The Mesozoic marine revolution: Evidence from snails, predators and grazers. *Paleobiology* 3: 245-258.

Vermeij, G.J. 1987. *Evolution and Escalation*. Princeton University Press, Princeton, NJ.

Volchok, H.L. 1967. Sr-90 deposition in New York City. *Science* 156: 1487-1489.

Wells, J.V. 1998. *Important Bird Areas in New York State*. National Audubon Society, Albany, NY.

- White, H.G. 1894. Collecting in Prospect Park, Brooklyn, L.I. *Entomological News* 5: 174-175.
- White, C.S. and M.J. McDonnell. 1988. Nitrogen cycling processes and soil characteristics in an urban environment. *Journal of Biogeochemistry* 5: 243-262.
- Whittaker, R.H. 1972. Evolution and measurement of species diversity. *Taxon* 21: 213-251.
- Wilson, E.O. 1988. The current state of biological diversity. Pages 3-18 in
- Wilson, E.O. and F.M. Peter, eds. *Biodiversity*. National Academy Press, Washington, D.C.
- Wilson, E.O. 1992. *The Diversity of Life*. The Belknap Press of Harvard University Press, Cambridge, MA.
- World Resources Institute. 1993. *World Resources: A Guide to the Global Environment, 1993-1994*. Oxford University Press, Oxford, England.
- World Resources Institute. 1996. *World Resources: A Guide to the Global Environment, 1996-97. The Urban Environment*. Oxford University Press, Oxford, England.
- Yost, S.B., Antenen, S. D. and G.M. Hartvigsen. 1991. The vascular flora of the natural area of Wave Hill. *Bulletin of the Torrey Botanical Club* 118: 317-325.
- Young, C.F. The 1955 breeding season in the Pelham-Baychester area, Bronx County. *Proceedings of the Linnaean Society of New York*. Numbers 66-70: 84-85.
- Young, S.M. 1998. *New York Natural Heritage Program Rare Plant Status List, April 1998*. New York Natural Heritage Program. Latham, New York. 58 pp.