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VEGETATION AND VERTEBRATES OF THE
PATUXENT WILDLIFE RESEARCH CENTER:
OUTLINE OF ECOLOGY AND ANNOTATED LISTS

A reprint, with new supplements, of
"Vegetation of the Patuxent Research Refuge, Maryland"

By Neil Hotchkiss and Robert E. Stewart

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Patuxent Wildlife Research Center
Fish and Wildlife Service
U.S. Department of the Interior
Laurel, Maryland 20811
1979

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FOREWORD

Copies of the "Vegetation of the Patuxent Research Refuge, Maryland," by Neil Hotchkiss and Robert E. Stewart have been unavailable for many years. We have had nothing to give new staff members and cooperators to help them become acquainted with the ecology of the Center and its plant life. It was highly desirable, therefore, to reprint the Hotchkiss and Stewart work, which contains the best existing account of the ecology of the Center. Much has changed in 30 years, however, both in the actual vegetation of the Center and in botanical nomenclature. As it was not possible to revise the entire work, a supplement has been added to incorporate the new species and to bring the nomenclature into line with that of current manuals.

It also seemed advisable to include annotated lists of the vertebrates, for these animals have received much attention and are of major interest at Patuxent. Mimeographed sheets listing the local vertebrates have been available since the 1940's, but these lists have been reworked and amplified for the present purpose.

The bird list was prepared by Chandler S. Robbins, Danny Bystrak, and Darrel D. Boone, all of the Migratory Bird and Habitat Research Laboratory, and Elwood M. Martin of the Office of Migratory Bird Management. The other supplements are primarily by William H. Stickel, who conceived of this reference and carried it through the countless details to completion.

We hope that this work will facilitate study of the biology of the Center by present and future employees and cooperating investigators. With 4500 acres, most of it natural, lying between Washington and Baltimore, the Patuxent Center offers exceptional opportunities for ecologically oriented research. Graduate students and faculty members of local universities have several studies underway, in addition to those of Patuxent personnel, and we welcome opportunities to discuss the possibility of more studies of this sort.

Lucille F. Stickel, Director
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Vegetation of the Patuxent Research Refuge, Maryland

Neil Hotchkiss and Robert E. Stewart

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Introduction

The information upon which this report is based was gathered during the years 1936-1946. A preliminary study of the flora and plant communities was made during the first four years and was summarized in mimeographed form in 1940¹. Since that time the authors, with the assistance of W. R. Greiner and J. W. Brainerd, made a detailed study of the plant communities. During the same period these workers, together with F. M. Uhler, W. H. Stickel, and A. C. Martin of the Refuge staff, and F. J. Hermann and S. F. Blake of the Department of Agriculture's Bureau of Plant Industry, Soils

¹ Hotchkiss, Neil. 1940—Flora of the Patuxent Research Refuge, Maryland. U. S. Dept. of the Interior, Bureau of Biological Survey Wildlife Leaflet BS-154.

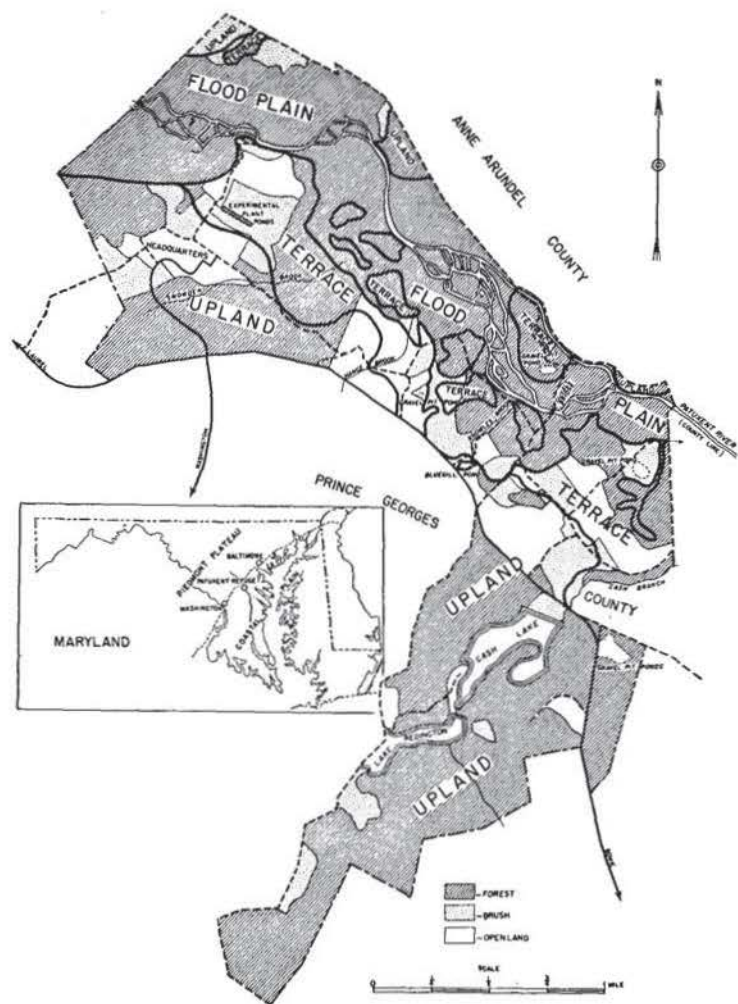


Fig. 1.—Physiography and Plant Cover of the Patuxent Research Refuge. (Drawn by Mrs. Katherine C. Tabb).

and Agricultural Engineering, have added one hundred and forty-eight species to the original list of plants and have amplified the knowledge of plant distribution and abundance.

Physical Characteristics of the Area

LOCATION

The Patuxent Research Refuge is an area of approximately 2,650 acres where research in wildlife management is being carried on under the administration of the Fish and Wildlife Service of the United States Department of the Interior. It is located in the Patuxent River watershed in Prince Georges and Anne Arundel Counties, Maryland, midway between Baltimore and Washington (see map, p. 2 and the War Department's Laurel Quadrangle). The United States Department of Agriculture's Agricultural Research Center at Beltsville, Md., adjoins the Refuge on the west; Fort George G. Meade adjoins it on the northeast.

CLIMATE

The Refuge lies in a region of cool winters, hot summers, and high relative humidity. Temperatures much above or much below the average may occur at any time during the year. Precipitation is rather evenly distributed throughout the year, being slightly higher in summer and lower in fall than in winter and spring. However, like temperatures, precipitation much above or much below the average may occur at any time of the year. Snowfall usually is light and rains occur frequently during the winter.

At the Bell weather station near Glenn Dale, Md., three miles south of the Refuge, records have been kept for 25 years. According to the 1945 summary of these records² the average annual temperature is 54° and monthly averages vary from 34° in January to 76° in July. The 1945 minimum was -4°, the maximum was 98°. The time between the last killing frost in spring and the first in the fall is usually about 175 days. The average annual precipitation is 42½ inches, and monthly averages vary from 2½ inches in December to 4½ inches in August. The prevailing winds are moderate and are from the northwest.

PHYSIOGRAPHY

The greater part of the Refuge is situated within the valley of the Patuxent River, which at this point, is about 3 miles wide and 150 feet deep. Altitudes vary from 80 feet above sea level along the river at the east end of the Refuge to 240 feet at the south end. The river falls about 25 feet in its crooked, 3½-mile course across the Refuge, traversing for the entire distance a flood plain that varies from one-quarter to one-half mile in width (see map, p. 2). On the south side of the river irregular areas of broad, nearly level terrace adjoin the flood plain in most places and lie less than 15 feet above it. Low bluffs separate flood plain and terrace. Back of the terrace the land in

² 1945—Climatological Data, Maryland and Delaware Section (U. S. Dept. of Commerce, Weather Bureau) 49:49-52.

most places slopes gently but irregularly to broad hilltops. In a few places on each side of the river the upland adjoins the flood plain and is separated from it by steep bluffs up to 50 feet in height. "Islands" of terrace with a relief of less than 5 feet are frequent on the flood plain.

In two-thirds of its course across the Refuge the Patuxent River has a braided channel, while further back on the flood plain are many shallow runs that go dry in summer. In most years the flood plain is flooded briefly one or more times, but usually the river flows between well-defined banks. Near the river the flood plain is well drained. Away from it much of the plain is permanently swampy because of its lower altitude and lack of drainage. Some of these swamps are partly fed by springs that occur along the foot of the bluffs.

Several brooks rise just outside the boundary of the Refuge and flow into the river. They are so small that the majority do not produce channels across the flood plain but disappear in alluvial fans or lose their identity in shallow runs. Along their valleys on terrace and upland are many seepage swamp areas. One and one-half miles is the greatest length of any brook except for Cash Branch (the southeasternmost) which has a length of over three miles and drains the entire south end of the Refuge. Its lower course is outside the Refuge. Further upstream it has been dammed to form two lakes, Cash Lake with an area of approximately 50 acres, Lake Redington of 25 acres. Bluegill Pond, formed by the damming of Knowles Brook, has an area of 2 acres. Shallow ponds occur in three gravel pits on the terrace and in one on the upland. Water is piped to a series of twenty-four 20x50 foot experimental plant ponds near Headquarters. All of the ponds except those in two of the gravel pits were constructed since 1937.

GEOLOGY AND SOILS

The Refuge is situated only a few miles from the inner boundary of the Atlantic Coastal Plain and lies within the Fall-line Clay Hills district³. The rocks are unconsolidated sediments, nearly all of Lower Cretaceous age. The principal formations are the Arundel and Patapsco⁴. Crystalline rocks form the nearby Piedmont Plateau.

Most of the soil materials have originated from the weathering of the underlying Coastal Plain sediments. A few soil materials have been transported short distances by streams; that for one soil, the Congaree Silt Loam, has been carried from the Piedmont by the Patuxent River⁵. This soil maintains high fertility through continued alluviation. The opposite extreme is the infertile, highly erodible Tuxedo soil which occurs on much of the steeper land of the southern part of the Refuge. Between the two extremes are a considerable number of soils of varying fertility. In texture the soils vary

³ Harper, Roland M. 1918—A phytogeographical sketch of southern Maryland. *Jour. Wash. Acad. Sci.* 8:581-589.

⁴ Miller, Benjamin L. 1911—The geology of Prince George's County. Maryland Geol. Survey, Prince George's County, pp. 83-136.

⁵ Perkins, S. O., and Bacon, S. R. 1925—Soil survey of Prince Georges County, Maryland. U. S. D. A. Bur. of Chemistry and Soils.

from silt loams to gravelly sands; in water-holding capacity they vary from those that are waterlogged to those that are excessively drained. In most of the soils the content of organic matter is low. The hydrogen-ion concentration ranges from neutral to strongly acid.

Plant Communities

The Patuxent Research Refuge is located within a major vegetational region which may be designated as the Central Pine-Oak Region. This is an ecotone between the Central Hardwoods Region (Upper Austral Zone) and the Southern Pine-Oak Region (Lower Austral Zone). The Central Pine-Oak Region extends from Cape Cod to central Georgia and north on the west side of the Appalachians to southern Ohio and thence to the Ozarks. The Refuge, itself, is situated much closer to the Central Hardwoods Region than to the Southern Pine-Oak Region and is characterized by a greater number of species typical of the Central Hardwoods.

The characteristic vegetation of the Central Pine-Oak Region in the vicinity of the Refuge apparently is due largely to changes in edaphic conditions within the last three centuries. During this period much of the fertile topsoil has been eroded and light and moisture conditions have been changed. This has resulted in a change from a mesophytic forest to one including many trees characteristic of sterile soils. A short distance south of the Refuge, on the rich Collington Fine Sandy Loam of the Greensand district⁶, small tracts of the original type of forest still persist. This forest is very similar to the Central Hardwoods forest (Oaks-Chestnut-Tulip-tree) found on the Piedmont Plateau of Maryland and undoubtedly represents the climatic climax for the region. The plant communities of both the Coastal Plain and Piedmont Plateau of Maryland have been outlined by Shreve and others⁶.

The report of the 1907 forest survey of Prince Georges County⁷ relates how agriculture, selective cutting, and fires have changed the forests from their original predominantly mixed hardwood composition. Among the hardwoods, many stands that were originally of nearly pure White Oak have, through constant culling, given greater prominence to other oaks. On poorly drained sites Red Maple and Blackgum have become much more prominent than formerly. Forest fires have reduced the abundance of Tulip-tree and Chestnut. Since the report was written the latter has been nearly eliminated by blight.

The greater part of the Refuge is now forested (less than 200 acres open, less than 400 acres brush—see map, p. 2) but, excepting the flood plain, nearly all appears to have been in cultivation at some time within the last one hundred years. Even the flood plain forest has been logged over, except on some of the islands between the river channels. The flood plain forest is composed entirely of hardwoods. The terrace and upland forest, in contrast,

⁶ Shreve, Forrest, and others. 1910—The plant life of Maryland. Maryland Weather Service Special Publication 3.

⁷ Besley, F. W. 1913—The forests of Prince George's County. Maryland State Board of Forestry.

comprises stands of pure pine, of mixed pine and hardwoods, and of pure hardwoods. Each stand of pine is even aged and each occupies a formerly cultivated field.

Most of the plant communities of well-drained terrace and upland represent stages of recovery from cultivation. In this recovery annual weeds are the pioneers. They invade the corn and soybean fields and the gardens, and even the wheat and hay fields, and without continued cultivation they soon become dominant. In the fallow fields perennial species become more abundant with each succeeding year of abandonment. Within three years Broomsedge (*Andropogon virginicus*) is dominant in many places. It is regularly replaced by pines, which often appear as seedlings almost simultaneously with the Broomsedge. Seedling pines grow in a few years to form even-aged, usually closed stands that ultimately are invaded by deciduous trees.

In the recovery of poorly-drained terrace and upland from cultivation, annuals, likewise, are the pioneers; but the percentage of native species is much higher than on well-drained land. Here, too, perennials quickly take over from the annuals; but they are wet-meadow species which, in turn, are quickly dominated by invading Sweetgum (*Liquidambar styraciflua*) or, locally, by Pitch Pine (*Pinus rigida*). These develop into dense stands that finally are invaded by a variety of deciduous trees.

On the flood plain the composition and relationships of plant communities are complicated by differences in water supply, whether from stream overflow or from seepage springs, by differences in drainage, and by differences in deposition of alluvium. On well-drained sites a mesophytic deciduous forest quickly develops. On poorly-drained sites marsh-meadows are replaced by shrub swamps, shrub swamps by either of two types of swamp forest.

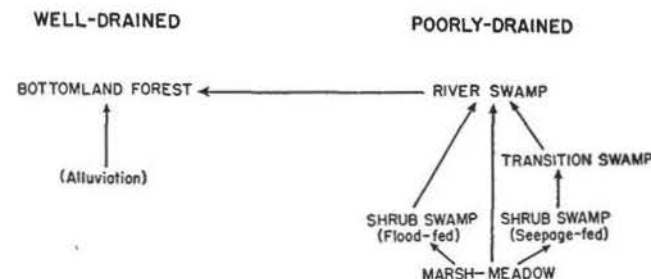
Two recent, detailed descriptions of the plant communities of widely separated areas show striking similarities to the communities of the Patuxent Refuge. The Illinoian till plain of southwestern Ohio⁸, with similar conditions of soil moisture and acidity, has vegetation similar to the Patuxent swamps of both lowland and upland. The North Carolina Piedmont⁹, with similar soil conditions, has vegetation similar to that of the succession of communities on the Patuxent terraces and upland.

A few areas on the Refuge represent an interspersing of types, due to intermediate environmental conditions. These areas are not readily classified into definite plant community types. The composition and relationships (see chart, p. 7) of the typical plant communities are described in the following pages.

⁸ Braun, E. Lucy. 1936—Forests of the Illinoian till plain of southwestern Ohio. Ecol. Monog. 6:89-149.

⁹ Oosting, Henry J. 1942—An ecological analysis of the plant communities of Piedmont, North Carolina. Am. Mid. Nat. 28:1-126.

FLOOD PLAIN SUCCESSIONS



TERRACE AND UPLAND SUCCESSIONS (secondary)

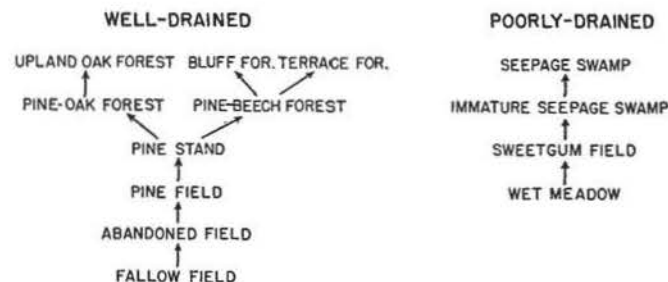


Fig. 2.—Succession of Plant Communities on the Patuxent Refuge. (Drawn by Mrs. Katherine C. Tabb).

AQUATIC AND MARSH PLANTS (open water—89 acres)

Aquatic and marsh plants are fairly common in the artificial lakes and ponds, although the abundance of submerged plants is limited by poor light penetration due to turbidity or stain. Elsewhere both aquatic and marsh plants are uncommon because of the heavy shading of most of the waters by trees, the swiftness of the river and the brooks, and the impermanence of water in the shallow flood plain runs. Most of the species are indicators of soft or acid water. The following list contains all of the species that have been found. Those preceded by an asterisk have been introduced and became established since the beginning of the study.

LAKES (including pond below Cash Lake dam)

Typha latifolia
Sparganium americanum
Potamogeton berchtoldi
Potamogeton diversifolius
Potamogeton ephedrus

Sagittaria pubescens
 **Vallisneria spiralis*
Panicum verrucosum
 **Zizania aquatica*
 **Zizania latifolia*

<i>Dulichium arundinaceum</i>	<i>Juncus effusus</i>
<i>Eleocharis acicularis</i>	<i>Polygonum punctatum</i>
<i>Eleocharis obtusa</i>	<i>Polygonum hydropiperoides</i>
* <i>Eleocharis palustris</i>	<i>Nuphar advena</i>
* <i>Eleocharis quadrangulata</i>	<i>Nymphaea odorata</i>
* <i>Scirpus acutus</i>	* <i>Brasenia schreberi</i>
* <i>Scirpus americanus</i>	<i>Ludvigia palustris</i>
<i>Scirpus cyperinus</i>	<i>Lindernia anagallidea</i>
<i>Scirpus purshianus</i>	<i>Utricularia geminiscapa</i>
* <i>Scirpus validus</i>	<i>Utricularia vulgaris</i>
<i>Carex crinita</i>	<i>Bidens frondosa</i>
<i>Pontederia cordata</i>	

GRAVEL PIT PONDS AND EXPERIMENTAL PLANT PONDS

<i>Typha latifolia</i>	* <i>Scirpus americanus</i>
<i>Sparganium americanum</i>	<i>Scirpus cyperinus</i>
<i>Potamogeton diversifolius</i>	<i>Scirpus purshianus</i>
<i>Sagittaria latifolia</i>	* <i>Scirpus validus</i>
<i>Alisma plantago-aquatica</i>	<i>Pontederia cordata</i>
* <i>Zizania aquatica</i>	<i>Heteranthera reniformis</i>
* <i>Zizania latifolia</i>	* <i>Iris pseudacorus</i>
<i>Eleocharis acicularis</i>	<i>Nuphar advena</i>
<i>Eleocharis obtusa</i>	<i>Nymphaea odorata</i>
* <i>Eleocharis palustris</i>	* <i>Brasenia schreberi</i>
* <i>Eleocharis quadrangulata</i>	<i>Callitriche heterophylla</i>
<i>Fimbristylis autumnalis</i>	<i>Utricularia geminiscapa</i>
* <i>Scirpus acutus</i>	<i>Utricularia gibba</i>

BOTTOMLAND POOLS AND RUNS, AND BROOKS

<i>Isoetes engelmanni</i>	<i>Nuphar advena</i>
<i>Sparganium americanum</i>	<i>Ranunculus ambigens</i>
<i>Potamogeton ephedrus</i>	<i>Callitriche heterophylla</i>
<i>Sagittaria latifolia</i>	<i>Ludvigia palustris</i>
<i>Alisma plantago-aquatica</i>	<i>Proserpinaca palustris</i>
<i>Glyceria pallida</i>	<i>Myosotis laxa</i>
<i>Glyceria septentrionalis</i>	<i>Gratiola virginiana</i>
<i>Orontium aquaticum</i>	<i>Utricularia geminiscapa</i>
<i>Polygonum hydropiperoides</i>	

PATUXENT RIVER

<i>Potamogeton ephedrus</i>	<i>Podostemum ceratophyllum</i>
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FLOOD PLAIN SUCCESSIONS

1. *Marsh-meadow* (8 acres).—Marsh-meadow represents the first stage in succession on the flood plain of the Patuxent River and on the flood plains of some of the smaller streams flowing into the river. It also occurs in a narrow, interrupted fringe along the shores of the lakes and along and in the shallower ponds. Several marsh-meadows have originated in the drowning out of other flood plain communities. The areas in marsh-meadow at the present time are small and widely scattered. The characteristic species are as follows:

Primary*

Leersia oryzoides

Polygonum sagittatum

* "Primary" and "secondary" as used in this and succeeding lists indicate relative abundance.

Secondary*

<i>Sagittaria pubescens</i>	<i>Glyceria obtusa</i>
<i>Echinochloa crusgalli</i>	<i>Cyperus erythrorhizos</i>
<i>Glyceria canadensis</i>	<i>Cyperus odoratus</i>
<i>Dulichium arundinaceum</i>	<i>Polygonum persicaria</i>
<i>Scirpus cyperinus</i>	<i>Hypericum virginicum</i>
<i>Scirpus polyphyllus</i>	<i>Viola lanceolata</i>
<i>Carex lurida</i>	<i>Ludvigia palustris</i>
<i>Juncus acuminatus</i>	<i>Proserpinaca palustris</i>
<i>Juncus canadensis</i>	<i>Eupatorium perfoliatum</i>
<i>Juncus effusus</i>	<i>Eupatorium purpureum</i>
<i>Polygonum pensylvanicum</i>	<i>Bidens frondosa</i>

2. *Shrub Swamp* (53 acres).—Two types of shrub swamp succeed marsh-meadow. Differences between these two types are correlated with differences in their sources of water.

One type is usually situated near running water and depends upon overflow from the stream-beds for its water supply. A nearly pure growth of Alder (*Alnus serrulata*) characterizes sites on ground usually covered with a very thin sheet of water (less than one or two inches). These Alder swamps are ordinarily rapidly invaded by River Birch (*Betula nigra*) and occasionally by Black Willow (*Salix nigra*) which form nearly pure, dense stands which eventually crowd the Alder out. In small, semi-shaded marsh-meadows within the flood plain forests, dense stands of River Birch sometimes become established by direct invasion without the intervention of the shrub swamp stage. A few shrub swamps in areas with deeper water are made up predominantly of Buttonbush (*Cephalanthus occidentalis*). Here the first tree invaders are usually either Pin Oak (*Quercus palustris*) or Overcup Oak (*Quercus lyrata*). Most of the birch and oak stands are followed directly by the river swamp stage. In a few of the birch stands, however, where the alluvium is more rapidly built up, a forest resembling bottomland forest follows. This is especially noticeable on alluvial fans formed by small streams where they enter the flood plain of the river.

The other major type of shrub swamp is generally located along the highland site of the flood plain on water-logged soil near springs. The seepage from the springs serves as their main source of water, although they are also fed from river overflow during high floods. This type of shrub swamp or "shrub bog" is characterized by a much greater variety of plants than the other. Tussocks of *Carex stricta* and a dense mat of sphagnum moss are characteristic features. Red Maple (*Acer rubrum*) is the only common tree invader. The characteristic species of this type of shrub swamp are as follows:

TREES (saplings)

Primary
Acer rubrum

Secondary
Salix nigra
Quercus lyrata
Quercus palustris

SHRUBS

Primary

Alnus serrulata
Magnolia virginiana
Rosa palustris
Toxicodendron vernix
Clethra alnifolia
Rhododendron viscosum
Cephalanthus occidentalis
Viburnum nudum (local)

Secondary

Lindera benzoin
Aronia arbutifolia
Amelanchier canadensis
Ilex verticillata
Leucothoe racemosa
Lyonia ligustrina
Vaccinium corymbosum
Viburnum dentatum

HERBS

Primary

Dryopteris thelypteris
Osmunda cinnamomea
Carex stricta
Symplocarpus foetidus
Rubus hispidus

Secondary

Woodwardia areolata
Woodwardia virginica
Panicum microcarpon
Panicum verrucosum
Glyceria striata

Secondary (continued)

Carex bullata
Carex folliculata
Carex incomperta
Carex laevivaginata
Arisaema triphyllum
Maianthemum canadense
Polygonum arifolium
Polygonum sagittatum
Hypericum virginicum
Viola cucullata
Cicuta maculata

3. *Transition Swamp* (78 acres).—The shrub swamps which are fed by springs ("shrub bogs") gradually change into transition swamps, with the development of a canopy of trees. In this canopy Red Maple (*Acer rubrum*) maintains its importance as the most abundant species for a considerable time. The shrub layer persists in transition swamps, although the number of species is usually reduced. The characteristic plants of transition swamps are as follows:

TREES

Primary

Quercus palustris
Liquidambar styraciflua
Acer rubrum

Secondary

Salix nigra
Quercus bicolor
Quercus lyrata
Nyssa sylvatica

SHRUBS AND VINES

Primary

Magnolia virginiana
Lindera benzoin (local)
Ilex verticillata
Viburnum dentatum

Secondary

Alnus serrulata
Toxicodendron radicans

Secondary (continued)

Toxicodendron vernix
Clethra alnifolia
Rhododendron viscosum
Leucothoe racemosa
Lyonia ligustrina
Cephalanthus occidentalis
Viburnum nudum

HERBS

Primary

Osmunda cinnamomea
Carex stricta

Symplocarpus foetidus
Rubus hispidus

SECONDARY

Woodwardia areolata
Dryopteris cristata
Carex crinita
Carex lupulina
Carex squarrosa
Carex typhina

Orontium aquaticum
Maianthemum canadense
Polygonum arifolium
Polygonum punctatum
Viola cucullata
Lobelia cardinalis

4. *River Swamp* (164 acres).—The final stage of succession on poorly drained portions of the flood plain is represented by river swamp. In the succession of seepage-fed sites, transition swamp gradually changes into river swamp through the reduction and eventual loss of the shrub layer and a change in the species of trees forming the canopy. In the succession on flooded sites the dense stands of small birch or oaks gradually thin out as the trees grow larger; and the composition of the forest becomes more varied as new species invade it. Pin Oak (*Quercus palustris*) is the most characteristic species in river swamp, since it is found commonly throughout. Certain areas of river swamp are located on land that is covered with a considerable amount of surface water through most of the year, and there Overcup Oak (*Quercus lyrata*) usually is dominant. Other areas have little or no surface water, except during floods, and in such locations Red Maple (*Acer rubrum*), Sweetgum (*Liquidambar styraciflua*), and Red Ash (*Fraxinus pennsylvanica*) are prevalent. Throughout much of the latter type occur small "islands" or hummocks of bottomland forest. The characteristic species of river swamps are as follows:

TREES

Primary

Betula nigra
Quercus lyrata (local)
Quercus palustris
Liquidambar styraciflua
Acer rubrum
Fraxinus pennsylvanica

Secondary

Salix nigra
Quercus bicolor
Quercus phellos
Nyssa sylvatica

SHRUBS AND VINES

Primary

Toxicodendron radicans

Secondary

Cephalanthus occidentalis

HERBS

Primary

Cinna arundinacea
Boehmeria cylindrica
Aster vimineus

Secondary (continued)

Habenaria flava
Pilea pumila
Polygonum arifolium
Tovara virginiana
Ranunculus hispidus
Chelone glabra
Lobelia cardinalis

Glyceria striata
Carex crinita
Carex lupulina

5. *Bottomland Forest* (472 acres).—Through the gradual deposition of alluvial materials a large part of the flood plain of the Patuxent River is well above the normal water table and, therefore, is quite well drained. This type of soil supports a very luxuriant vegetation. The composition of bottomland forest is extremely varied, slight differences in elevation accounting for striking differences in the vegetation of localities only a few feet apart. The herba-

ceous vegetation is particularly luxuriant and includes practically all of the "spring flowers" of the Refuge.

Bottomland forest is represented on the Refuge by all stages of development from areas that have been cut over recently to others that approximate the original, virgin bottomland forest. These mature stands, which are found only on some of the islands within the river drainage system, probably represent the physiographic flood plain climax for the region. Beech (*Fagus grandifolia*) predominates in all of the mature stands, where it comprises over 75% of the overstory. Other species associated with Beech in much smaller numbers include Tulip-tree (*Liriodendron tulipifera*), Northern Red Oak (*Quercus borealis*), and Sweetgum (*Liquidambar styraciflua*).

Outside these mature stands the overstory of the forest is generally composed of a considerable variety of species. Tulip-tree and Sweetgum are the only ones that sometimes occur in small, nearly pure stands. Sweetgum is the principal pioneer on well-drained flood plain land that has been retired from cultivation.

The characteristic plants of bottomland forest are as follows:

TREES

Primary

Carpinus caroliniana
Betula nigra
Fagus grandifolia
Quercus palustris
Quercus prinus (local)
Ulmus americana
Liriodendron tulipifera
Liquidambar styraciflua
Acer rubrum

Primary (continued)

Nyssa sylvatica (local)
Fraxinus americana

Secondary

Quercus borealis
Asimina triloba
Platanus occidentalis
Cornus florida

SHRUBS AND VINES

Primary

Lindera benzoin
Toxicodendron radicans
Viburnum prunifolium

Secondary

Corylus americana
Parthenocissus quinquefolia
Vitis aestivalis

HERBS

Primary

Arisaema triphyllum
Erythronium americanum
Laportea canadensis
Claytonia virginica
Ranunculus abortivus
Popophyllum peltatum
Impatiens biflora
Viola affinis
Circaea quadrifida
Cryptotaenia canadensis
Galium aparine

Secondary

Botrychium virginianum
Poa sylvestris
Festuca obtusa
Carex convoluta

Secondary (continued)

Uvularia sessilifolia
Allium vineale
Stellaria longifolia
Stellaria pubera
Ranunculus recurvatus
Anemone thalictroides
Dentaria laciniata
Geum canadense
Amphicarpa bracteata
Geranium maculatum
Viola pennsylvanica
Panax trifolium
Mertensia virginica
Collinsia canadensis
Galium triflorum
Aster divaricatus
Rudbeckia laciniata

SUCCESSION ON POORLY DRAINED LAND ON TERRACE AND UPLAND

1. *Wet Meadow* (8 acres).—Certain areas of formerly cultivated fields scattered throughout the Refuge are nearly level and have a compact clay subsoil. This results in abundant moisture being confined in the surface soil. Characteristic pioneers are *Cyperus strigosus* and *Fimbristylis autumnalis*. These are succeeded by a great variety of wet meadow plants. The growth is much the same whether the fields are on terrace or upland. Many of the meadows, especially those located on the upland, are within the seepage area of springs. Characteristic wet meadow species are as follows:

Primary

Panicum dichotomiflorum
Panicum longifolium
Cyperus strigosus
Carex lurida
Carex scoparia

Juncus effusus
Viola sagittata
Rhexia mariana
Solidago graminifolia

Secondary

Onoclea sensibilis
Selaginella apoda
Panicum microcarpon
Cyperus scoparium
Echinochloa crusgalli
Setaria geniculata
Agrostis alba
Calamagrostis cinnoides
Cyperus flavescens
Cyperus rivularis
Eleocharis tenuis
Fimbristylis autumnalis
Scirpus atrovirens
Scirpus cyperinus
Scirpus polyphyllus
Rhynchospora capitellata
Carex albolutescens
Carex longii
Juncus acuminatus
Juncus canadensis
Juncus marginatus
Juncus scirpoides
Juncus secundus
Juncus tenuis
Sisyrinchium graminoides
Polygonum pensylvanicum
Polygonum punctatum

Thalictrum polygamum
Linum striatum
Polygala sanguinea
Hypericum canadense
Hypericum mutilum
Viola lanceolata
Viola primulifolia
Rhexia virginica
Ludwigia alternifolia
Oenothera fruticosa
Cicuta maculata
Lysimachia terrestris
Gentiana clausa
Asclepias pulchra
Scutellaria integrifolia
Pycnanthemum flexuosum
Pycnanthemum muticum
Gratiola neglecta
Gerardia purpurea
Houstonia caerulea
Lobelia puberula
Vernonia noveboracensis
Eupatorium perfoliatum
Eupatorium purpureum
Aster puniceus
Bidens connata
Bidens frondosa

2. *Sweetgum Field* (47 acres).—Typical wet meadows rapidly change into sweetgum fields with the establishment of scattered growth of saplings or small trees of Sweetgum (*Liquidambar styraciflua*). Where seepage occurs on sandy upland Pitch Pine (*Pinus rigida*) frequently takes the place of Sweetgum in being the most important pioneer. Characteristic species of typical sweetgum fields are as follows:

TREES (saplings and small trees)

Primary	Secondary (continued)
Liquidambar styraciflua	Pinus virginiana
	Juniperus virginiana
Secondary	Quercus palustris
Pinus rigida	Acer rubrum

SHRUBS AND VINES

Primary	Secondary (continued)
Dewberries (Rubus spp.)	Rhus copallina
	Lyonia ligustrina
Secondary	Vaccinium corymbosum
Smilax glauca	Campsis radicans
Spiraea tomentosa	

HERBS

Primary	Secondary (continued)
Sorghastrum nutans (local)	Apios americana
Juncus effusus (local)	Viola lanceolata
Potentilla simplex	Viola primulifolia
Solidago altissima	Viola sagittata
Solidago graminifolia	Oenothera fruticosa
Solidago rugosa	Gentiana clausa
	Apocynum cannabinum
Secondary	Asclepias pulchra
Onoclea sensibilis	Pycnanthemum flexuosum
Botrychium dissectum	Gerardia purpurea
Selaginella apoda	Lobelia puberula
Andropogon virginicus	Vernonia noveboracensis
Paspalum pubescens	Eupatorium album
Panicum lindheimeri	Eupatorium pubescens
Triodia flava	Eupatorium purpureum
Rhynchospora capitellata	Solidago juncea
Carex scoparia	Solidago nemoralis
Juncus tenuis	Aster lateriflorus
Rumex acetosella	Aster vimineus
Rubus hispidus	Gnaphalium obtusifolium

3. *Immature Seepage Swamp* (45 acres).—With the increase in numbers and size of Sweetgum (*Liquidambar styraciflua*) and the invasion of other species of trees and shrubs, sweetgum fields change into rather dense thickets. These changes take place so rapidly and on such a variety of sites that it is seldom that two different areas can be found in the same state of development. Characteristic plants of immature seepage swamps are as follows:

TREES

Primary	Secondary (continued)
Liquidambar styraciflua	Populus grandidentata
	Quercus palustris
Secondary	Quercus phellos
Pinus rigida	Acer rubrum
Salix nigra	

SHRUBS AND VINES

Primary	Secondary
Smilax glauca	Salix humilis
Vaccinium corymbosum	Alnus serrulata
	Rhus copallina
	Lyonia ligustrina

HERBS

Primary	Secondary
none	Selaginella apoda
	Rubus hispidus
	Gentiana clausa
	Eupatorium pubescens

4. *Seepage Swamp* (171 acres).—Immature seepage swamps become seepage swamps with approaching maturity of the overstory. Red Maple (*Acer rubrum*) and Blackgum (*Nyssa sylvatica*) are the most characteristic trees in the more mature seepage swamps. In some sandy areas Pitch Pine (*Pinus rigida*) predominates, sometimes forming nearly pure stands. Small drainage flats below springs occur along some of the upland streams and support a type of seepage swamp which somewhat resembles bottomland forest in general appearance. Here Tulip-tree (*Liriodendron tulipifera*) is a common species. The presence of a fairly dense understory of shrubs is a feature of most seepage swamps. Characteristic seepage swamp plants are as follows:

TREES

Primary	Secondary
Pinus rigida	Populus grandidentata
Quercus phellos	Betula nigra
Liriodendron tulipifera (local)	Quercus alba
Liquidambar styraciflua	Quercus palustris
Ilex opaca	
Acer rubrum	
Nyssa sylvatica	

SHRUBS AND VINES

Primary	Secondary (continued)
Smilax rotundifolia	Toxicodendron radicans
Magnolia virginiana	Ilex verticillata
Clethra alnifolia	Evonymus americanus
Rhododendron viscosum	Kalmia angustifolia
Leucothoe racemosa	Lyonia mariana
Lyonia ligustrina	Gaylussacia frondosa
	Vaccinium corymbosum
Secondary	Chionanthus virginica
Smilax glauca	Viburnum dentatum
Aronia arbutifolia	Viburnum nudum

HERBS

Primary	Secondary (continued)
Woodwardia areolata	Carex debilis
Athyrium asplenoides	Carex incompta
Osmunda cinnamomea	Carex intumescens
Lycopodium flabelliforme	Carex lupulina
Carex folliculata (local)	Carex rosea
Carex lurida (local)	Carex stricta
Rubus hispidus	Symplocarpus foetidus
	Maianthemum canadense
Secondary	Medeola virginiana
Polystichum acrostichoides	Goodyera pubescens
Dennstaedtia punctilobula	Tipularia discolor
Lycopodium obscurum	Mitchella repens

SUCCESSION ON WELL-DRAINED LAND ON TERRACE AND UPLAND

1. *Fallow Field* (Area of fallow field not determined separately from that of cultivated fields).—Recently cultivated land occurs on the upland as well as on the terraces along the Patuxent valley. The soils of the terrace fields are noticeably more sandy than elsewhere, and this is reflected in differences in vegetation. Characteristic of fallow fields (including fallow roadsides and yards) is the great variety of weedy species, of which the most common are as follows:

Primary

<i>Digitaria ischaemum</i>	<i>Draba verna</i>
<i>Panicum lindheimeri</i>	<i>Barbarea verna</i>
<i>Aristida dichotoma</i>	<i>Dewberries (Rubus spp.)</i>
<i>Aristida longispica</i>	<i>Oenothera biennis</i>
<i>Ornithogalum umbellatum</i> (local)	<i>Plantago lanceolata</i>
<i>Rumex acetosella</i>	<i>Diodia teres</i>
<i>Polygonum pensylvanicum</i>	<i>Erigeron canadensis</i>
<i>Chenopodium album</i>	<i>Gnaphalium obtusifolium</i>
<i>Amaranthus hybridus</i>	<i>Ambrosia elatior</i>

Secondary

<i>Andropogon virginicus</i>	<i>Trifolium agrarium</i>
<i>Digitaria sanguinalis</i>	<i>Trifolium arvense</i>
<i>Paspalum laeve</i>	<i>Trifolium dubium</i>
<i>Paspalum pubescens</i>	<i>Trifolium hybridum</i>
<i>Paspalum setaceum</i>	<i>Trifolium pratense</i>
<i>Panicum dichotomiflorum</i>	<i>Trifolium procumbens</i>
<i>Panicum philadelphicum</i>	<i>Trifolium repens</i>
<i>Setaria lutescens</i>	<i>Medicago lupulina</i>
<i>Muhlenbergia schreberi</i>	<i>Lespedeza stipulacea</i>
<i>Sporobolus vaginiflorus</i>	<i>Lespedeza striata</i>
<i>Agrostis alba</i>	<i>Oxalis stricta</i>
<i>Agrostis hyemalis</i>	<i>Euphorbia corollata</i>
<i>Agrostis perennans</i>	<i>Euphorbia maculata</i>
<i>Aira caryophylla</i>	<i>Hypericum gentianoides</i>
<i>Holcus lanatus</i>	<i>Hypericum mutilum</i>
<i>Triodia flava</i>	<i>Daucus carota</i>
<i>Eragrostis cilianensis</i>	<i>Trichostema dichotomum</i>
<i>Cyperus ovularis</i>	<i>Solanum carolinense</i>
<i>Cyperus strigosus</i>	<i>Linaria canadensis</i>
<i>Bulbostylis capillaris</i>	<i>Plantago aristata</i>
<i>Juncus tenuis</i>	<i>Plantago rugelii</i>
<i>Allium vineale</i>	<i>Plantago virginica</i>
<i>Rumex crispus</i>	<i>Solidago altissima</i>
<i>Rumex obtusifolius</i>	<i>Solidago graminifolia</i>
<i>Polygonum persicaria</i>	<i>Solidago juncea</i>
<i>Mollugo verticillata</i>	<i>Solidago nemoralis</i>
<i>Stellaria media</i>	<i>Aster pilosus</i>
<i>Cerastium viscosum</i>	<i>Aster vimineus</i>
<i>Dianthus armeria</i>	<i>Erigeron annuus</i>
<i>Sisymbrium thalianum</i>	<i>Erigeron strigosus</i>
<i>Barbarea vulgaris</i>	<i>Gnaphalium purpureum</i>
<i>Potentilla monspeliensis</i>	<i>Bidens frondosa</i>
<i>Potentilla simplex</i>	<i>Achillea millefolium</i>
<i>Cassia fasciculata</i>	<i>Anthemis arvensis</i>
<i>Cassia nictitans</i>	<i>Lactuca canadensis</i>
<i>Crotalaria sagittalis</i>	

2. *Abandoned Field* (57 acres).—Within two or three years after abandonment *Broomsedge (Andropogon virginicus)* begins to appear in most fallow fields. It soon becomes dominant and maintains dominance until it is crowded out by invading pines. In this study the term "Abandoned Field" is used only to designate this stage of succession. The co-dominance of certain goldenrods (*Solidago* spp.) and one aster (*Aster pilosus*) is another characteristic of abandoned fields. On sterile slopes *Little Bluestem (Andropogon scoparius)* sometimes takes the place of *Broomsedge* in becoming the chief dominant. Such areas appear to have been cleared for a much longer time and to be changing much more slowly than the typical fields. The characteristic species of abandoned fields are as follows:

Primary

<i>Andropogon scoparius</i> (local)	<i>Solidago juncea</i>
<i>Andropogon virginicus</i>	<i>Solidago nemoralis</i>
<i>Danthonia spicata</i> (local)	<i>Aster pilosus</i>
<i>Dewberries (Rubus spp.)</i>	<i>Achillea millefolium</i>
<i>Daucus carota</i>	<i>Chrysanthemum leucanthemum</i>
<i>Solidago altissima</i>	

Secondary

<i>Andropogon elliotii</i>	<i>Desmodium marilandicum</i>
<i>Paspalum laeve</i>	<i>Desmodium paniculatum</i>
<i>Paspalum pubescens</i>	<i>Desmodium viridiflorum</i>
<i>Paspalum setaceum</i>	<i>Lespedeza capitata</i>
<i>Panicum anceps</i>	<i>Lespedeza cuneata</i>
<i>Panicum clandestinum</i>	<i>Lespedeza repens</i>
<i>Panicum lindheimeri</i>	<i>Lespedeza virginica</i>
<i>Panicum polyanthes</i>	<i>Oxalis stricta</i>
<i>Setaria geniculata</i>	<i>Polygala curtisii</i>
<i>Anthoxanthum odoratum</i>	<i>Euphorbia corollata</i>
<i>Agrostis alba</i>	<i>Ascyrum hypericoides</i>
<i>Holcus lanatus</i>	<i>Lechea racemulosa</i>
<i>Triodia flava</i>	<i>Trichostema dichotomum</i>
<i>Eragrostis spectabilis</i>	<i>Prunella vulgaris</i>
<i>Poa compressa</i>	<i>Lobelia inflata</i>
<i>Poa pratensis</i>	<i>Eupatorium album</i>
<i>Bromus commutatus</i>	<i>Eupatorium hyssopifolium</i>
<i>Cyperus filiculmis</i>	<i>Eupatorium pubescens</i>
<i>Cyperus ovularis</i>	<i>Eupatorium verbenacifolium</i>
<i>Carex annectens</i>	<i>Liatris graminifolia</i>
<i>Carex complanata</i>	<i>Chrysopsis mariana</i>
<i>Carex vulpinoidea</i>	<i>Solidago erecta</i>
<i>Smilax glauca</i>	<i>Solidago graminifolia</i>
<i>Rumex acetosella</i>	<i>Solidago puberula</i>
<i>Dianthus armeria</i>	<i>Solidago rugosa</i>
<i>Fragaria virginiana</i>	<i>Aster vimineus</i>
<i>Potentilla pumila</i>	<i>Sericocarpus linifolius</i>
<i>Potentilla simplex</i>	<i>Antennaria neglecta</i>
<i>Desmodium ciliare</i>	<i>Antennaria parlinii</i>
<i>Desmodium dillenii</i>	<i>Gnaphalium obtusifolium</i>
<i>Desmodium laevigatum</i>	<i>Hieracium gronovii</i>

3. *Pine Field* (121 acres).—The establishment of a scattered growth of saplings or small trees of pine in an abandoned field initiates the pine field stage. Both *Virginia Pine (Pinus virginiana)* and *Pitch Pine (Pinus rigida)*

SHRUBS

Primary
Kalmia latifolia (local)
Gaylussacia baccata
Gaylussacia frondosa
Vaccinium vacillans

Secondary
Lyonia mariana
Vaccinium stamineum

HERBS

Primary
 none

Secondary
Lycopodium flabelliforme
Cypripedium acaule
Tephrosia virginiana

Secondary (continued)
Chimaphila maculata
Chimaphila umbellata
Pyrola rotundifolia
Monotropa uniflora
Epigaea repens

6a. *Beech-White Oak Forest* (TERRACE FOREST, 154 acres).—Terrace forest follows pine-beech forest on the river terraces, as the final stage of succession. Beech (*Fagus grandifolia*) and White Oak (*Quercus alba*) dominate the overstory, and they may be found as single dominants or mixed together in different parts of the forest. One small mature stand of terrace forest which apparently has never been cut over is still in existence on the Refuge. The overstory of this stand is composed entirely of Beech, which presumably represents the climax of development of the terrace forest. A few "islands" of terrace forest occur within extensive areas of river swamp. Tulip-tree (*Liriodendron tulipifera*) and Swamp Chestnut Oak (*Quercus prinus*) are common along the margins of these "islands." Characteristic species of terrace forest are as follows:

TREES

Primary
Fagus grandifolia
Quercus alba

Secondary
Pinus rigida
Pinus virginiana
Carya glabra
Carya tomentosa

Secondary (continued)
Quercus borealis
Quercus falcata
Quercus velutina
Liquidambar styraciflua
Amelanchier arborea
Ilex opaca
Acer rubrum
Cornus florida

SHRUBS AND VINES

Primary
 none

Secondary
Smilax glauca
Toxicodendron radicans

Secondary (continued)
Evonymus americanus
Parthenocissus quinquefolia
Rhododendron nudiflorum
Gaylussacia frondosa
Vaccinium vacillans
Viburnum acerifolium

HERBS

Primary
Dryopteris noveboracensis
Leersia virginica
Carex swanii
Medeola virginiana

Secondary
Agrostis perennans
Urtica laxa
Carex abscondita

Secondary (continued)
Luzula echinata
Dioscorea quaternata
Isotria verticillata
Goodyera pubescens
Tipularia discolor
Chimaphila maculata
Pyrola rotundifolia
Monotropa uniflora
Epifagus virginiana

6a. *Beech-White Oak Forest* (BLUFF FOREST, 64 acres).—A forest type occurs on some of the steep north slopes of the upland adjacent to the flood plain, as well as in some of the deeper ravines, which closely resembles terrace forest. As in the terrace forest, the two dominant species of trees are Beech (*Fagus grandifolia*) and White Oak (*Quercus alba*). Bluff forest is somewhat better drained than terrace forest and the herbaceous vegetation is noticeably sparser. Characteristic plants of bluff forest are as follows:

TREES

Primary
Fagus grandifolia
Quercus alba

Secondary
Quercus borealis
Quercus falcata
Amelanchier arborea
Acer rubrum
Cornus florida

SHRUBS AND VINES

Primary
 none

Secondary
Smilax glauca
Toxicodendron radicans

Secondary (continued)
Parthenocissus quinquefolia
Rhododendron nudiflorum
Gaylussacia frondosa
Vaccinium vacillans
Viburnum acerifolium

HERBS

Primary
 none

Secondary
Medeola virginiana
Dioscorea quaternata
Goodyera pubescens

Secondary (continued)
Tipularia discolor
Desmodium nudiflorum
Chimaphila maculata
Pyrola rotundifolia
Monotropa uniflora
Epifagus virginiana

6b. *Upland Oak Forest* (297 acres).—Upland oak forest represents the final stage of succession throughout most of the upland. Various species of oaks predominate, and, locally, hickories are common. Such xerophytic species as Post Oak (*Quercus stellata*) and Blackjack Oak (*Quercus marilandica*) are generally restricted to dry sandy areas. Chestnut Oak (*Quercus montana*) is commonly found only near the tops of some of the higher hills. Other species of oak are found more regularly throughout. A few areas of upland oak forest have been cut over recently, resulting in a dense second growth of oak sprouts. The characteristic species of upland oak forest are as follows:

TREES

Primary
Quercus alba
Quercus coccinea
Quercus velutina

Secondary
Pinus virginiana
Populus grandidentata
Carya glabra

Secondary (continued)
Carya tomentosa
Castanea dentata (sprouts)
Quercus falcata
Quercus marilandica
Quercus montana
Quercus stellata
Amelanchier arborea

SHRUBS

Primary	Secondary
<i>Rhododendron nudiflorum</i>	<i>Castanea pumila</i>
<i>Kalmia latifolia</i> (local)	<i>Lyonia mariana</i>
<i>Gaylussacia baccata</i>	<i>Vaccinium stamineum</i>
<i>Gaylussacia frondosa</i>	
<i>Vaccinium vacillans</i>	

HERBS

Primary	Secondary
none	<i>Tephrosia virginiana</i>
	<i>Chimaphila maculata</i>
	<i>Pyrola rotundifolia</i>
	<i>Monotropa uniflora</i>
	<i>Epigaea repens</i>

HEDGEROWS AND WOOD MARGINS (95 acres)

Hedgerows. Many of the fields on the Refuge are bordered or dissected by hedgerows which are dominated by a variety of trees having a dense undergrowth of shrubs and woody vines. The composition of the hedgerows varies considerably from place to place, depending on the relative age or development of the hedgerow and the amount of moisture in the ground. Characteristic plants are as follows:

TREES

Primary	Secondary
<i>Sassafras albidum</i>	<i>Salix nigra</i>
<i>Liquidambar styraciflua</i>	<i>Quercus palustris</i>
<i>Prunus serotina</i>	<i>Quercus phellos</i>
<i>Diospyros virginiana</i>	<i>Robinia pseudoacacia</i>
	<i>Acer rubrum</i>

SHRUBS AND VINES

Primary	Secondary (continued)
<i>Smilax glauca</i>	<i>Rosa carolina</i>
<i>Smilax rotundifolia</i>	<i>Rhus glabra</i>
<i>Highbush blackberries</i> (<i>Rubus</i> spp.)	<i>Toxicodendron radicans</i>
<i>Rhus copallina</i>	<i>Parthenocissus quinquefolia</i>
<i>Lonicera japonica</i>	<i>Vitis aestivalis</i>
	<i>Vitis labrusca</i>
	<i>Vitis vulpina</i>
	<i>Campsis radicans</i>
	<i>Viburnum dentatum</i>
	<i>Sambucus canadensis</i>
Secondary	
<i>Salix humilis</i>	
<i>Corylus americana</i>	
<i>Alnus serrulata</i>	
<i>Aronia arbutifolia</i>	

HERBS

Primary	Secondary (continued)
none	<i>Potentilla simplex</i>
	<i>Apocynum androsaemifolium</i>
	<i>Veronica officinalis</i>
	<i>Eupatorium purpureum</i>
	<i>Solidago graminifolia</i>
	<i>Solidago rugosa</i>
Secondary	
<i>Panicum clandestinum</i>	
<i>Panicum polyanthes</i>	
<i>Agrostis perennans</i>	

Wood Margins. A type of vegetation very similar in composition to that of hedgerows is found along the edges of woods and along wood roads and in other small openings within the forest. As a rule, wood margins located

on damp sites have a considerably more luxuriant vegetation than do those on drier sites. *Sassafras* (*Sassafras albidum*), Black Cherry (*Prunus serotina*), and Persimmon (*Diospyros virginiana*) are the commonest trees throughout. River Birch (*Betula nigra*) which is prominent in wood margins of flood plain and terrace is apparently lacking in wood margins of the upland. Characteristic species are as follows:

TREES

Primary	Secondary
<i>Betula nigra</i> (local)	<i>Carya cordiformis</i>
<i>Sassafras albidum</i>	<i>Carpinus caroliniana</i>
<i>Prunus serotina</i>	<i>Quercus palustris</i>
<i>Diospyros virginiana</i>	<i>Liquidambar styraciflua</i>
	<i>Cornus florida</i>

SHRUBS AND VINES

Primary	Secondary (continued)
<i>Smilax glauca</i>	<i>Alnus serrulata</i>
<i>Smilax rotundifolia</i>	<i>Rosa carolina</i>
<i>Highbush blackberries</i> (<i>Rubus</i> spp.)	<i>Rhus glabra</i>
<i>Rhus copallina</i>	<i>Toxicodendron radicans</i>
<i>Vitis aestivalis</i>	<i>Vitis labrusca</i>
<i>Lonicera japonica</i>	<i>Vitis vulpina</i>
	<i>Cornus amomum</i>
	<i>Campsis radicans</i>
	<i>Viburnum dentatum</i>
	<i>Sambucus canadensis</i>
Secondary	
<i>Salix humilis</i>	
<i>Corylus americana</i>	

HERBS

Primary	Secondary (continued)
<i>Phytolacca americana</i> (local)	<i>Hypericum gentianoides</i>
	<i>Lysimachia quadrifolia</i>
	<i>Prunella vulgaris</i>
	<i>Hedeoma pulegioides</i>
	<i>Veronica officinalis</i>
	<i>Solidago rugosa</i>
	<i>Krigia virginica</i>
	<i>Lactuca canadensis</i>
	<i>Hieracium gronovii</i>
Secondary	
<i>Pteridium aquilinum</i>	
<i>Potentilla pumila</i>	
<i>Desmodium illinoense</i>	
<i>Desmodium laevigatum</i>	
<i>Desmodium paniculatum</i>	
<i>Acalypha rhomboidea</i>	
<i>Ascyrum hypericoides</i>	

CULTIVATED FIELDS AND PASTURES

Cultivated Fields (177 acres).—The cultivated fields (principal crops are corn and soybeans) and gardens are invaded by many weed species. The more characteristic of these are as follows:

Primary	Secondary (continued)
<i>Eragrostis ciliaris</i> (local)	<i>Chenopodium album</i>
<i>Cyperus esculentus</i> (local)	<i>Amaranthus hybridus</i>
<i>Polygonum pensylvanicum</i>	<i>Stellaria media</i>
<i>Mollugo verticillata</i>	<i>Sisymbrium thalianum</i>
<i>Ambrosia elatior</i>	<i>Euphorbia corollata</i>
	<i>Euphorbia maculata</i>
	<i>Anagallis arvensis</i>
	<i>Ipomoea lacunosa</i>
	<i>Ipomoea purpurea</i>
	<i>Solanum carolinense</i>
	<i>Diodia teres</i>
	<i>Erigeron canadensis</i>
Secondary	
<i>Digitaria ischaemum</i>	
<i>Digitaria sanguinalis</i>	
<i>Panicum lindheimeri</i>	
<i>Cyperus strigosus</i>	
<i>Rumex acetosella</i>	
<i>Polygonum persicaria</i>	

Pastures (32 acres).—The pastures are all permanent and are quite weedy. Most of the lawns are similar. Characteristic pasture species are as follows:

Primary	Secondary (continued)
<i>Digitaria ischaemum</i>	<i>Juncus tenuis</i>
<i>Poa pratensis</i>	<i>Allium vineale</i>
<i>Cerastium viscosum</i>	<i>Rumex acetosella</i>
<i>Trifolium repens</i>	<i>Cerastium vulgatum</i>
<i>Plantago lanceolata</i>	<i>Potentilla canadensis</i>
	<i>Plantago rugelii</i>
	<i>Aster</i> spp.
Secondary	<i>Antennaria neglecta</i>
<i>Andropogon virginicus</i>	<i>Krigia virginica</i>
<i>Panicum</i> spp.	<i>Hieracium gronovii</i>
<i>Agrostis alba</i>	

The Flora

Eight hundred and fifty-four species of ferns and flowering plants have been found on the Patuxent Research Refuge. Trees account for 64 species, shrubs and woody vines for 70. Among herbaceous plants the largest families are the grasses, with 102 species (26 of *Panicum*); sedges, with 82 species (52 of *Carex*); and composites, with 105. Other large groups are the pteridophytes (31 species), Rosaceae (38), legumes (46), heaths (24), and mints (26). All of the species listed are included in Hermann's "A checklist of plants in the Washington-Baltimore area."¹⁰ Specimens of each species are preserved in the Refuge herbarium.

Most of the specimens of Gramineae were identified by J. R. Swallen, the few remaining by Mrs. Agnes Chase and Dr. F. J. Hermann. All *Carex* and Juncaceae were identified by Dr. F. J. Hermann. *Malus angustifolia* was identified by Dr. Rogers McVaugh; *Crataegus* by Ernest J. Palmer; specimens of six species of *Rubus* (all of the dewberries and highbush blackberries collected) by Dr. L. H. Bailey. All of the Compositae were identified by Dr. S. F. Blake. The remaining specimens were identified by the senior author.

The authors are responsible for the interpretation of the entire list in relation to Gray's Manual¹¹ descriptions and nomenclature. Where usage differs from that of Gray's Manual a suitable reference has been made.

A noteworthy element in the flora is the "spring flowers" of the Patuxent River bottomland forest, an area of Piedmont-derived soils in which both environmental conditions and flora resemble those of the Piedmont Plateau (see list on p. 12).

Another special group comprises species of marsh and aquatic plants that have been introduced since the beginning of this study and have established themselves. They are listed on pp. 7 & 8. A few other native plants of wet habitats have been increased through introductions.

¹⁰ Hermann, Frederick J. 1946—A checklist of plants in the Washington-Baltimore area, 2nd edition. Washington, D. C.

¹¹ Robinson, Benjamin Lincoln, and Fernald, Merritt Lyndon. 1908—Gray's new manual of botany (Seventh edition—illustrated). New York.

As everywhere else in long-settled, originally forested regions, open land supports many weedy species of both foreign and American origin; and the relative abundance of many other native species differs greatly from their abundance in the virgin forest.

Indicative of the interesting nature of the region is the following list of plants that have been found within one mile of the Refuge boundary but not on the Refuge: *Lycopodium adpressum* (*L. inundatum* var. *bigelovii* of Gray's Manual), *Andropogon furcatus*, *Panicum linearifolium*, *Trisetum pennsylvanicum* (*Sphenopholis palustris* of Gray's Manual), *Gymnopogon ambiguus*, *Carex atlantica* (*C. sterilis* of Gray's Manual), *Carex emoryi* (not treated in Gray's Manual), *Carex leptalea* var. *harperi* (*C. harperi* of Gray's Manual), *Quercus prinoides*, *Drosera rotundifolia*, *Lupinus perennis*, *Galactia regularis*, *Polygala cruciata*, *Polygala lutea*, *Viola kitaibeliana* (*V. rafinesquii* of Gray's Manual), *Gaylussacia dumosa*, *Pentstemon digitalis* (*P. laevigatus*, var. *digitalis* of Gray's Manual), and *Utricularia subulata*. Most of these species have been found in open gravel bogs or in dry sand. Considering the numerous small bogs, the large area of sand near Fort George G. Meade, the nearby Piedmont Plateau, and the fertile Eocene Greensand district just to the south, the Refuge region is one of unusual botanical interest.

In the following annotated list there is given for each species its relative abundance (rare, occasional, common, abundant, or very abundant) in each plant community where it has been observed. The arrangement of families and genera follows that of Gray's Manual; species are in alphabetical order within a genus.

LIST OF VASCULAR PLANTS

POLYPODIACEAE

Polypodium virginianum (Polypody). *P. vulgare* of Gray's Manual but not *P. vulgare* of Europe and western North America—see *Rhodora* 24:141. 1922. Rare on tree trunks in seepage swamps.

Pteridium aquilinum var. *latiusculum* (Bracken). *Pteris aquilina* of Gray's Manual—see *Rhodora* 43:41. 1941. Common in openings and along margins of upland forests; occasional in pine stands and hedgerows.

Woodwardia areolata (Net-vein Chain Fern). Common (locally abundant) in shrub swamps, transition swamps, and seepage swamps.

Woodwardia virginica (Virginia Chain Fern). Occasional in shrub swamps; rare in seepage swamps.

Asplenium platyneuron (Ebony Spleenwort). Occasional (locally common) in sweetgum fields, pine fields, and hedgerows; rare in immature seepage swamps and pine stands.

Athyrium asplenoides (Lady Fern). *Asplenium filix-femina*, in part, of Gray's Manual—see *Rhodora* 19:189. 1917. Common in seepage swamps; rare in immature seepage swamps and terrace forest.

Athyrium thelypteroides (Silvery Spleenwort). *Asplenium acrostichoides* of Gray's Manual. One station in seepage swamp at edge of flood plain.

Polystichum acrostichoides (Christmas Fern). Occasional (locally common) in seepage swamps, along brook banks in terrace forest, and along ditches in hedgerows on terrace; rare in bottomland forest and immature seepage swamps.

Dryopteris cristata (Crested Fern). *Aspidium cristatum* of Gray's Manual. Occasional in transition swamps; rare in seepage swamps.

Dryopteris hexagonoptera (Beech Fern). *Phegopteris hexagonoptera* of Gray's Manual. Rare in terrace forest and bluff forest; one station in bottomland forest.

Dryopteris marginalis (Marginal Wood Fern). *Aspidium marginale* of Gray's Manual. Rare in seepage swamps.

Dryopteris noveboracensis (New York Fern). *Aspidium noveboracense* of Gray's Manual. Abundant in terrace forest; occasional (locally common) in hedgerows; occasional in bottomland forest, seepage swamps, pine-beech forest, and bluff forest.

Dryopteris simulata (Massachusetts Fern). *Aspidium simulatum* of Gray's Manual. One station in shrub swamp.

Dryopteris spinulosa var. *intermedia* (Spinulose Wood Fern). *Aspidium spinulosum* var. *intermedium* of Gray's Manual. Rare in seepage swamps and bluff forest.

Dryopteris thelypteris (Marsh Fern). *Aspidium thelypteris* of Gray's Manual. Common in open shrub swamps; rare in marsh-meadows and wet meadows.

Dennstaedtia punctilobula (Hay-scented Fern). *Dicksonia punctilobula* of Gray's Manual. Occasional (locally common) in seepage swamps, terrace forest, and bluff forest.

Onoclea sensibilis (Sensitive Fern). Occasional (locally common) in wet meadows, sweetgum fields, immature seepage swamps, and damp hedgerows; rare in shrub swamps and seepage swamps.

OSMUNDACEAE

Osmunda cinnamomea (Cinnamon Fern). Common (locally abundant) in shrub swamps, transition swamps, and seepage swamps; occasional in damp hedgerows.

Osmunda claytoniana (Interrupted Fern). Rare in immature seepage swamps, seepage swamps, and damp hedgerows.

Osmunda regalis var. *spectabilis* (Royal Fern). *O. regalis* of Gray's Manual. Occasional in shrub swamps, transition swamps, and seepage swamps.

OPHIOGLOSSACEAE

Ophioglossum vulgatum (Adders-tongue Fern). One station in sweetgum field.

Botrychium dissectum (Grape Fern). *B. obliquum* and varieties of Gray's Manual. Occasional in bottomland forest and sweetgum fields; rare in wet meadows, immature seepage swamps, pine fields, and hedgerows.

Botrychium virginianum (Rattlesnake Fern). Common in bottomland forest; rare in seepage swamps.

EQUISETACEAE

Equisetum arvense (Horsetail). One station in damp soil along road embankment.

LYCOPODIACEAE

Lycopodium clavatum (Running-pine). Rare in seepage swamps; one station at open edge of upland oak forest.

Lycopodium flabelliforme (Common Ground-cedar). *L. complanatum* var. *flabelliforme* of Gray's Manual. Common (locally abundant) in seepage swamps, pine stands, pine-beech forest, and pine-oak forest; occasional in terrace forest; rare in sweetgum fields, immature seepage swamps, and pine fields.

Lycopodium lucidulum (Shining Clubmoss). Occasional in seepage swamps and along brook banks in terrace forest.

Lycopodium obscurum (Tree Clubmoss). Occasional (locally common) in seepage swamps; occasional in pine stands, pine-beech forest, terrace forest, and pine-oak forest; rare in bluff forest and upland oak forest.

Lycopodium tristachyum (Slender Ground-cedar). Rare in pine-oak forest.

SELAGINELLACEAE

Selaginella apoda (Creeping Selaginella). *S. apus* of Gray's Manual. Occasional (locally common) in wet meadows, sweetgum fields, immature seepage swamps, and damp pastures.

ISOETACEAE

Isoetes engelmanni (Quillwort). Occasional (locally common) in runs on flood plain.

PINACEAE

Pinus echinata (Shortleaf Pine). Occasional in pine-beech forest and pine-oak forest; rare in terrace forest and upland oak forest.

Pinus rigida (Pitch Pine). Common (locally abundant) in seepage swamps, pine fields, pine stands, pine-beech forest, and pine-oak forest; occasional in sweetgum fields, immature seepage swamps, and terrace forest; rare in shrub swamps and upland oak forest.

Pinus strobus (White Pine). Two trees: terrace forest and pine-oak forest; possibly seeded from nearby cultivated trees.

Pinus taeda (Loblolly Pine). Three trees at one station in pine stand.

Pinus virginiana (Virginia Pine). Very abundant in pine fields and pine stands; abundant in pine-oak forest; common in pine-beech forest; occasional in sweetgum fields, terrace forest, bluff forest, and upland oak forest; rare in immature seepage swamps and hedgerows.

Juniperus virginiana (Red-cedar). Occasional in sweetgum fields, pine fields, and hedgerows; rare in river swamps, bottomland forest, seepage swamps, terrace forest, bluff forest, pine stands, pine-oak forest, and upland oak forest.

TYPHACEAE

Typha latifolia (Common Cat-tail). Occasional along shore of Cash Lake and Lake Redington and in gravel pits and other wet depressions.

SPARGANIACEAE

Sparganium americanum (Bur-reed). Includes *S. lucidum* of Gray's Manual. Common (locally abundant) along shore of Cash Lake; occasional in pools in runs in river swamps and in slow brooks. Accidentally established in experimental plant pond through introduction of muck soil from Cash Branch swamp.

NAJADACEAE

Potamogeton berchtoldi, *F. pusillus*, in part, of Gray's Manual—see *Rhodora* 42:246. 1940. One station in pool below Cash Lake dam.

Potamogeton diversifolius, *P. hybridus*, in part, of Gray's Manual—see *Memoirs of the*

American Academy of Arts and Sciences 17:105. 1932. Common in south end of Cash Lake and in one gravel pit pond; rare in experimental plant ponds.

Potamogeton epihydrus (Ribbonleaf Pondweed). Common in shallows of Cash Lake (partly, at least, because of transplantation from Glenn Dale, Prince Georges County); occasional in shallows of Patuxent River and in brooks on flood plain.

ALISMACEAE

Sagittaria latifolia (Broadleaf Arrowhead). Occasional in pools in runs in transition swamps and river swamps. Established in experimental plant pond from transplantation from tidal Potomac River.

Sagittaria pubescens (Hairy Arrowhead). *S. latifolia* var. *pubescens* of Gray's Manual. Common along shore of Cash Lake and in marsh-meadows elsewhere; occasional in shrub swamps.

Alisma plantago-aquatica (Water-plantain). Occasional in pools in runs in river swamps, slow brooks, and one gravel pit pond.

HYDROCHARITACEAE

Vallisneria americana (Wild-celery). *V. spiralis* of Gray's Manual. Established in Cash Lake from transplantation from tidal Potomac River.

GRAMINEAE

Erianthus giganteus (Plume-grass). *E. saccharoides* of Gray's Manual. One station in sweetgum field.

Andropogon eliottii (Elliott Beardgrass). Occasional in abandoned fields and pine fields; rare in sweetgum fields.

Andropogon glomeratus (Bushy Beardgrass). Rare in wet meadows.

Andropogon scoparius (Little Bluestem). Occasional (locally abundant) in abandoned fields and pine fields on upland.

Andropogon virginicus (Broomsedge). Very abundant in abandoned fields and pine fields; occasional (locally common) in sweetgum fields and pastures; occasional in fallow fields; rare in lawns.

Sorghastrum nutans (Indian Grass). Occasional (locally abundant) in sweetgum fields.

Digitaria filiformis (Finger-grass). Occasional in fallow fields and wood margins.

Digitaria ischaemum (Smooth Crabgrass). *D. humifusa* of Gray's Manual. Common (locally abundant) in fallow fields, cultivated fields, pastures, and lawns.

Digitaria sanguinalis (Hairy Crabgrass). Occasional (locally abundant) in fallow fields and cultivated fields; occasional in lawns.

Paspalum laeve. Includes *P. plenipilum* of Gray's Manual. Occasional in fallow fields, abandoned fields, and lawns; rare in sweetgum fields, pine fields, and hedgerows.

Paspalum pubescens. Occasional in sweetgum fields, fallow fields, abandoned fields, and pine fields.

Paspalum setaceum. Occasional in fallow fields and abandoned fields; rare in pine fields.

Panicum agrostoides. Rare in wet meadows and sweetgum fields.

Panicum anceps. Occasional in abandoned fields.

Panicum boscii. Rare in terrace forest and upland oak forest.

Panicum capillare (Common Witch-grass). Rare in fallow fields; one station in cultivated field.

Panicum clandestinum (Deer-tongue Grass). Common in hedgerows; occasional in abandoned fields; rare in sweetgum fields, fallow fields, and open terrace forest.

Panicum columbianum. Rare in upland oak forest.

Panicum commutatum. Includes *P. ashei* of Gray's Manual. Occasional along margins of terrace forest and upland oak forest.

Panicum depauperatum. Occasional in abandoned fields and along margins of upland oak forest.

Panicum dichotomiflorum (Fall Panicum). Common in wet meadows; occasional in fallow fields; rare in cultivated fields.

Panicum dichotomum. Includes *P. barbulatum* of Gray's Manual. Occasional along margins of terrace forest and upland oak forest.

Panicum gattingeri (Gattinger Witch-grass). Abundant in one cornfield.

Panicum huachucae. Occasional in wood margins; rare in pine fields.

Panicum lindheimeri. Abundant in fallow fields; occasional in sweetgum fields, abandoned fields, pine fields, open terrace forest, and cultivated fields.

Panicum longifolium. Occasional (locally common) in wet meadows; rare in sweetgum fields.

Panicum lucidum. Rare in shrub swamps.

Panicum meridionale. One station in terrace forest.

Panicum microcarpon. Occasional (locally common) in shrub swamps and wet meadows; rare in sweetgum fields, seepage swamps, terrace forest, and damp hedgerows.

Panicum philadelphicum (Philadelphia Witch-grass). Occasional in fallow fields.

Panicum polyanthes. Occasional in abandoned fields, hedgerows, and wood margins; rare in sweetgum fields and open terrace forest.

Panicum scoparium (Velvet Panicum). Occasional in wet meadows; rare in sweetgum fields.

Panicum sphaerocarpon. Occasional in fallow fields; rare in abandoned fields, pine fields, and lawns.

Panicum stipitatum. Rare in wet meadows and sweetgum fields.

Panicum tennesseense. Rare in wood margins.

Panicum verrucosum (Warty Panicum). Common in south end of Lake Redington in 1946; occasional (locally common) in cleared shrub swamps; rare in fallow fields.

Panicum villosissimum. One station in wood margin on terrace.

Panicum virgatum (Switch Grass). One station in abandoned field.

Echinochloa crusgalli (Wild-millet). Abundant in 1946 along shore of Lake Redington, where it was seeded in 1945; occasional elsewhere in marsh-meadows and wet meadows; rare in fallow fields.

- Setaria faberi*. Not treated in Gray's *Manual*—see *Rhodora* 46:57. 1944. Two stations: fallow field and cornfield.
- Setaria geniculata*. *S. imberbis* of Gray's *Manual*. Occasional in wet meadows and abandoned fields; rare in sweetgum fields.
- Setaria lutescens* (Yellow Bristle-grass). *S. glauca* of Gray's *Manual*. Occasional (locally common) in fallow fields; rare in lawns.
- Setaria viridis* (Green Bristle-grass). Rare in fallow fields.
- Cenchrus longispinus* (Sandbur). *C. carolinianus* of Gray's *Manual*. Occasional in fallow fields on terrace.
- Zizania aquatica* (Wild-rice). *Z. palustris* of Gray's *Manual*. Established in south end of Cash Lake from seed and in experimental plant pond from transplantation from tidal South River, Anne Arundel County.
- Zizania latifolia* (Asiatic Wild-rice). Not treated in Gray's *Manual*—see Hitchcock, *Manual of the grasses of the United States*, p. 540. 1935. Established in Cash Lake and one gravel pit pond from transplantations from the U. S. Department of Agriculture.
- Leersia oryzoides* (Rice Cut-grass). Abundant in marsh-meadows.
- Leersia virginica* (White Grass). Common in terrace forest; occasional in hedgerows; rare in seepage swamps.
- Anthoxanthum odoratum* (Vernal-grass). Occasional in abandoned fields and lawns.
- Stipa avenacea* (Needle-grass). Rare in terrace forest.
- Aristida dichotoma*. Common in fallow fields; rare in abandoned fields and pine fields.
- Aristida longespica*. *A. gracilis* of Gray's *Manual*. Common in fallow fields; rare in sweetgum fields, abandoned fields, and pine fields.
- Aristida oligantha*. Rare in fallow fields.
- Aristida purpurascens*. One station in pine field on terrace.
- Muhlenbergia frondosa* (Wirestem Muhly). *M. mexicana* of Gray's *Manual*. Two stations: bottomland forest and fallow field.
- Muhlenbergia schreberi* (Nimble-Will). Occasional in fallow fields and pastures; rare in abandoned fields and lawns.
- Muhlenbergia sylvatica* (Forest Muhly). One station in bottomland forest.
- Brachyelytrum erectum*. One plant in bottomland forest.
- Phleum pratense* (Timothy). Occasional along roads; rare in abandoned fields.
- Sporobolus vaginiflorus* (Dropseed). Occasional (locally common) in fallow fields and lawns.
- Agrostis alba* (Redtop). Occasional (locally common) in wet meadows, abandoned fields, and pastures; occasional in fallow fields; rare in sweetgum fields.
- Agrostis hyemalis* (Tickle Grass). Occasional (locally common) in fallow fields; occasional in wet meadows.
- Agrostis perennans* (Autumn Bent). Common in one cut-over river swamp; occasional (locally abundant) in fallow fields; occasional in terrace forests and hedgerows and along roads in upland forest.

- Calamagrostis cinnoides* (Reed-grass). Occasional (locally common) in wet meadows; rare in sweetgum fields.
- Cinna arundinacea* (Wood-reed). Abundant in river swamps; occasional in bottomland forest; rare in immature seepage swamps, terrace forest, and damp hedgerows.
- Aira caryophyllea* (Silver Hair-grass). Occasional in fallow fields and along roads.
- Holcus lanatus* (Velvet Grass). Occasional in fallow fields and abandoned fields; rare in lawns.
- Sphenopholis intermedia*. *S. pallens* of Gray's *Manual*. Occasional in bottomland forest; one station in seepage swamp.
- Danthonia spicata* (Poverty Oat-grass). Common in abandoned fields; rare in sweetgum fields, pine fields, and open terrace forest.
- Cynodon dactylon* (Bermuda Grass). Rare in fallow fields and lawns.
- Eleusine indica* (Goose Grass). Rare in fallow fields, cultivated fields, and lawns.
- Triodia flava* (Purpletop). *Tridens flavus* of Gray's *Manual*. Common in abandoned fields; occasional in sweetgum fields, fallow fields, pine fields, hedgerows, and wood margins.
- Eragrostis capillaris* (Lace Grass). One station in clearing in upland oak forest.
- Eragrostis cilianensis* (Stink Grass). *E. megastachya* of Gray's *Manual*. Common (locally abundant) in cultivated fields; occasional in fallow fields.
- Eragrostis hypnoides* (Teal Grass). Rare in wet meadows.
- Eragrostis pectinacea* (Carolina Love-grass). *E. pilosa*, in part, of Gray's *Manual*—see Hitchcock, *Manual of the grasses of the United States*, p. 151. 1935. Rare in fallow fields.
- Eragrostis spectabilis* (Purple Love-grass). *E. pectinacea* of Gray's *Manual*. Occasional (locally common) in abandoned fields; rare in sweetgum fields, fallow fields, pine fields, and lawns.
- Uniola laxa*. Occasional in terrace forest; rare in seepage swamps.
- Dactylis glomerata* (Orchard Grass). Occasional in orchards and along roads.
- Poa annua* (Annual Bluegrass). Two stations: pasture and lawn.
- Poa autumnalis*. Occasional in bottomland forest.
- Poa compressa* (Canada Bluegrass). Occasional in abandoned fields; rare in sweetgum fields, pine fields, and hedgerows.
- Poa pratensis* (Kentucky Bluegrass). Common (locally abundant) in pastures and lawns (persisting from seeding); occasional in abandoned fields; rare in pine fields and hedgerows.
- Poa sylvestris* (Woodland Bluegrass). Common in bottomland forest.
- Poa trivialis* (Rough Bluegrass). Occasional in bottomland forest.
- Glyceria canadensis* (Rattlesnake Grass). Occasional (locally common) in marsh-meadows.
- Glyceria obtusa* (Atlantic Manna-grass). Occasional in marsh-meadows.
- Glyceria pallida* (Pale Manna-grass). Rare in pools in runs in river swamps.

- Glyceria septentrionalis* (Eastern Manna-grass). Occasional in pools in runs in transition swamps and river swamps.
- Glyceria striata* (Fowl Manna-grass). *G. nervata* of Gray's Manual. Common in shrub swamps and river swamps.
- Festuca elatior* (Meadow Fescue). One station in abandoned field.
- Festuca myuros* (Rat-tail Fescue). Occasional in abandoned fields.
- Festuca obtusa* (Nodding Fescue). *F. nutans* of Gray's Manual. Common in bottomland forest; one station in Ailanthus thicket.
- Festuca octoflora* (Six-weeks Fescue). Occasional in abandoned fields and wood margins.
- Bromus commutatus* (Hairy Chess). Occasional (locally common) in abandoned fields.
- Bromus mollis* (Soft Chess). *B. hordeaceus* of Gray's Manual. One station in lawn.
- Lolium multiflorum* (Italian Rye-grass). One station in fallow field.
- Lolium perenne* (Perennial Rye-grass). One station in fallow field.
- Agropyron repens* (Quack Grass). Occasional in fallow fields.
- Elymus villosus* (Slender Wild-rye). *E. striatus* of Gray's Manual. One station in bottomland forest.
- Elymus virginicus* (Virginia Wild-rye). Occasional in bottomland forest; rare in hedgerows.
- Hystrix patula* (Bottle-brush Grass). Rare in bottomland forest.

CYPERACEAE

- Cyperus erythrorhizos*. Locally abundant along west shore of Lake Redington in 1946; possibly introduced with Wild-millet seed.
- ✓ *Cyperus esculentus* (Chufa). Locally abundant in cultivated fields.
- Cyperus filiculmis*. Occasional in abandoned fields and wood margins; rare in sweetgum fields, fallow fields, and pine fields.
- Cyperus flavescens*. Occasional in wet meadows.
- Cyperus odoratus*. *C. ferax* of Gray's Manual. Locally abundant along west shore of Lake Redington in 1946; possibly introduced with Wild-millet seed.
- Cyperus ovularis*. Occasional in fallow fields and abandoned fields; rare in sweetgum fields.
- Cyperus polystachyos* var. *texensis*. *C. microdontus* of Gray's Manual. One station in wet meadow.
- Cyperus retrorsus*. *C. cylindricus* of Gray's Manual. Rare in wood margins.
- Cyperus rivularis*. Occasional in wet meadows.
- Cyperus strigosus*. Common in wet meadows and damp fallow fields; occasional (locally common) in damp cultivated fields; rare in sweetgum fields.
- Kyllinga pumila*. Occasional in wet meadows.
- Dulichium arundinaceum*. Occasional (locally common) along shore of Cash Lake and Lake Redington; occasional elsewhere in marsh-meadows.

- Eleocharis acicularis* (Needle Spike-rush). Abundant in Cash Lake; common in one gravel pit pond.
- Eleocharis obtusa* (Blunt Spike-rush). Locally abundant in south end of Lake Redington in 1946; common along shore of Cash Lake and in gravel pit ponds and experimental plant ponds.
- Eleocharis palustris* (Creeping Spike-rush). Established in experimental plant pond and along shore of Cash Lake from transplantations from tidal Potomac River.
- Eleocharis quadrangulata* (Square-stem Spike-rush). Established in Lake Redington from seed and in experimental plant pond from transplantations from tidal Patuxent River.
- Eleocharis tenuis* (Slender Spike-rush). Occasional (locally common) in wet meadows; rare in sweetgum fields and damp pastures.
- Bulbostylis capillaris*. *Stenophyllus capillaris* of Gray's Manual. Occasional in fallow fields and wood margins; rare in cultivated fields.
- Fimbristylis autumnalis*. Common along shores of gravel pit ponds and experimental plant ponds, and elsewhere in wet meadows and damp fallow fields.
- Scirpus acutus* (Hardstem Bulrush). *S. occidentalis* of Gray's Manual. Established in Cash Lake and experimental plant pond from transplantations from Minnesota.
- Scirpus americanus* (Three-square). Established in Lake Redington from seed and in experimental plant pond from transplantations from tidal Potomac River.
- Scirpus atrovirens* (Green Bulrush). Includes *S. georgianus* of Gray's Manual. Occasional in wet meadows.
- Scirpus cyperinus* (Wool-grass). Includes *S. eriophorum* of Gray's Manual. Abundant in south end of Lake Redington; occasional (locally common) along shore of Cash Lake and in gravel pit ponds; occasional in wet meadows; rare in sweetgum fields.
- Scirpus polyphyllus* (Leafy Bulrush). Occasional in marsh-meadows and wet meadows.
- Scirpus purshianus* (Weak Bulrush). *S. debilis* of Gray's Manual. Abundant in south end of Lake Redington in 1946; occasional (locally common) along shore of Cash Lake and in gravel pit ponds.
- Scirpus validus* (Softstem Bulrush). Established in south end of Cash Lake from seed and in experimental plant pond from transplantation from tidal South River, Anne Arundel County.
- Rhynchospora capitellata*. *R. glomerata* (typical) of Gray's Manual. Occasional (locally common) in wet meadows and sweetgum fields; rare in fallow fields.
- Rhynchospora corniculata*. Occasional in river swamps.
- Rhynchospora globularis*. *R. cymosa* of Gray's Manual. Rare in wet meadows.
- Scleria pauciflora* (Nut-rush). Two stations: immature seepage swamp and pine field.
- Carex abscondita*. *C. ptychocarpa* of Gray's Manual. Occasional in terrace forest; rare in hedgerows.
- Carex aggregata*. Not treated in Gray's Manual—see *North American Flora* 18:61. 1931. One plant in abandoned field.
- Carex albolutescens*. *C. albolutescens*, in part, of Gray's Manual, which figures *C. longii* as *C. albolutescens*—see *Rhodora* 40:330. 1938. Occasional in wet meadows.

- Carex annectens*. *C. selacea* var. *ambigua* of Gray's *Manual*. Includes *C. annectens* var. *xanthocarpa*—see *Rhodora* 24:74. 1922. Occasional in abandoned fields and wood margins.
- Carex blanda*. *C. laxiflora* var. *blanda* of Gray's *Manual*. Three stations: bottomland forest, abandoned field, and lawn.
- Carex bullata*. Occasional in open shrub swamps; rare in wet meadows.
- Carex canescens*. Rare in open shrub swamps.
- Carex caroliniana*. *C. triceps* var. *smithii* of Gray's *Manual*. Occasional in wood margins on flood plain and terrace.
- Carex cephalophora*. Rare in terrace forest.
- Carex complanata*. Not treated in Gray's *Manual*—see *North American Flora* 18:323. 1935. Occasional in abandoned fields.
- Carex convoluta*. *C. rosea*, in part, of Gray's *Manual*, which figures *C. convoluta* as *C. rosea*—see *North American Flora* 18:46. 1931. Occasional (locally common) in bottomland forest; rare in terrace forest.
- Carex crinita*. Common in south end of Lake Redington, transition swamps, and river swamps; occasional in shrub swamps and seepage swamps.
- Carex debilis*. Occasional in immature seepage swamps and seepage swamps.
- Carex digitalis*. One station in terrace forest.
- Carex emmonsii*. *C. varia*, in part, of Gray's *Manual*—see *North American Flora* 18:190. 1935. Occasional in terrace forest and damp wood margins.
- Carex festucacea*. Not treated in Gray's *Manual*, the *C. festucacea* described there being *C. merritt-fernaldii*—see *North American Flora* 18:150. 1931. One station in terrace forest.
- Carex folliculata*. Common in shrub swamps and seepage swamps.
- Carex frankii*. Occasional in river swamps.
- Carex glaucoidea*. Occasional in forest openings on terrace and upland.
- Carex grayii*. One station in bottomland forest.
- Carex grisea*. Rare in bottomland forest.
- Carex hirsutella*. *C. triceps* var. *hirsuta* of Gray's *Manual*. Two stations: abandoned field and hedgerow.
- Carex howei*. *C. scirpoides* var. *capillacea* of Gray's *Manual*. One station in seepage swamp.
- Carex incomperia*. *C. stellulata* var. *excelsior* of Gray's *Manual*. Common in shrub swamps and seepage swamps.
- Carex intumescens*. Occasional in seepage swamps.
- Carex laevivaginata*. Not treated in Gray's *Manual*—see *North American Flora* 18:80. 1931. Occasional in shrub swamps.
- Carex laxiculmis*. Rare in bottomland forest.
- Carex laxiflora*. *C. laxiflora* var. *patulifolia* of Gray's *Manual*. One station in terrace forest.

- Carex leavenworthii*. One station in lawn.
- Carex longii*. *C. albolutescens*, in part, of Gray's *Manual*, which figures *C. longii* as *C. albolutescens*—see *North American Flora* 18:161. 1931. Occasional in wet meadows.
- Carex louisianica*. *C. halei* of Gray's *Manual*. Rare in river swamps.
- Carex lupuliformis*. One station in run in river swamp.
- Carex lupulina*. Common in transition swamps and river swamps; occasional in seepage swamps.
- Carex lurida*. Common (locally abundant) in wet meadows; occasional (locally common) in marsh-meadows and seepage swamps; rare in fallow fields.
- Carex oblita*. *C. venusta* var. *minor* of Gray's *Manual*. One station in seepage swamp.
- Carex pensylvanica*. One station in sandy wood margin.
- Carex richii*. *C. hormathodes* var. *richii* of Gray's *Manual*. One station in open shrub swamp.
- Carex riparia* var. *lacustris*. *C. riparia* of Gray's *Manual*. One station along margin of shrub swamp.
- Carex rosea*. *C. rosea*, in part of Gray's *Manual*, which figures *C. convoluta* as *C. rosea*—see *North American Flora* 18:45. 1931. Occasional in seepage swamps.
- Carex scoparia*. Common in wet meadows; occasional in open shrub swamps and sweetgum fields.
- Carex scorsa*. Rare in seepage swamps.
- Carex squarrosa*. Occasional in transition swamps and river swamps; rare in seepage swamps.
- Carex stipata*. Includes var. *maxima*—see *North American Flora* 18:79. 1931. Occasional in transition swamps and river swamps; rare in seepage swamps.
- Carex stricta* (Tussock Sedge). *C. stricta*, in part, of Gray's *Manual*—see *North American Flora* 18:405. 1935. Abundant in shrub swamps and transition swamps; locally common in openings in seepage swamps, and persisting in flooded seepage swamps along lake shores.
- Carex swanii*. *C. virescens* var. *swanii* of Gray's *Manual*. Abundant in open terrace forest; occasional in open upland oak forest; rare in immature seepage swamps and hedgerows.
- Carex tonsa*. *C. umbellata* var. *tonsa* of Gray's *Manual*. Occasional in sandy wood margins on upland.
- Carex tribuloides*. Occasional in wood margins on flood plain; rare in hedgerows and wood margins on upland.
- Carex typhina*. *C. typhinoides* of Gray's *Manual*. Occasional in transition swamps and river swamps; rare in sweetgum fields and seepage swamps.
- Carex umbellata*. *C. umbellata* var. *brevirostris* of Gray's *Manual*. One station in open terrace forest.
- Carex virescens*. One station in margin of terrace forest.
- Carex vulpinoidea*. Occasional in abandoned fields and wood margins.
- Carex willdenowii*. Rare in terrace forest and wood margins.

ARACEAE

Arisaema triphyllum (Jack-in-the-pulpit). Common in bottomland forest; occasional in shrub swamps, transition swamps, and river swamps; rare in seepage swamps.

Symplocarpus foetidus (Skunk-cabbage). Common (locally abundant) in shrub swamps and transition swamps; occasional in seepage swamps.

Orontium aquaticum (Golden-club). Occasional in transition swamps and in pools in runs elsewhere on flood plain.

Acorus calamus (Sweet-flag). Established in marsh-meadow from transplantation from tidal Potomac River.

XYRIDACEAE

Xyris caroliniana. Rare along shores of Cash Lake and gravel pit ponds.

Xyris torta. *X. flexuosa* of Gray's Manual. Rare in wet meadows and immature seepage swamps.

COMMELINACEAE

Commelina communis (Common Dayflower). Rare in hedgerows, wood margins, and cultivated fields.

Commelina virginica (Hairy Dayflower). *C. hirtella* of Gray's Manual. Rare in river swamps.

PONTEDERIACEAE

Pontederia cordata (Pickerel-weed). Rare in transition swamps. Established in Cash Lake from seed and in experimental plant pond from transplantation from tidal Potomac River.

Heteranthera reniformis (Mud-plantain). Two stations: gravel pit pond and experimental plant pond.

JUNCACEAE

Juncus acuminatus. Common in experimental plant ponds; occasional elsewhere in marsh-meadows and wet meadows.

Juncus bufonius. Rare along roads.

Juncus canadensis. Occasional along shore of Cash Lake and elsewhere in marsh-meadows and wet meadows.

Juncus effusus (Soft Rush). Abundant in south end of Lake Redington; common (locally abundant) along shore of Cash Lake; common elsewhere in marsh-meadows, wet meadows, and sweetgum fields; rare in damp fallow fields.

Juncus marginalis. Occasional in wet meadows.

Juncus scirpoides. Occasional along shore of Cash Lake and elsewhere in wet meadows; rare in sweetgum fields.

Juncus secundus. Occasional in wet meadows.

Juncus tenuis. Includes *J. dichotomus* of Gray's Manual. Occasional (locally common) in fallow fields; occasional in wet meadows, sweetgum fields, and pastures.

Luzula bulbosa. *L. campestris* var. *bulbosa* of Gray's Manual. Rare in sandy wood margins.

Luzula echinata. Not treated in Gray's Manual—see *Rhodora* 40:84. 1938. Occasional (locally common) in terrace forest and bluff forest; rare in seepage swamps.

LILIACEAE

Stenanthium robustum. Rare in transition swamps.

Uvularia perfoliata (Bellwort). Two stations: bottomland forest and bluff forest.

Uvularia sessilifolia (Little Bellwort). *Oakesia sessilifolia* of Gray's Manual. Common in bottomland forest; rare in seepage swamps and terrace forest.

Allium canadense (Canada Onion). Rare in bottomland forest.

Allium vineale (Wild Onion). Occasional (locally common) in bottomland forest, fallow fields, and lawns; occasional in sweetgum fields, pastures, and hedgerows; rare in immature seepage swamps, abandoned fields, pine fields, and cultivated fields.

Heimerocallis fulva (Daylily). One station in wood margin on flood plain.

Lilium superbum (Turks-cap Lily). Rare in shrub swamps, transition swamps, river swamps, seepage swamps, sweetgum fields, and immature seepage swamps.

Erythronium americanum (Yellow Adders-tongue). Abundant in bottomland forest; rare in terrace and bluff forest.

Ornithogalum umbellatum (Star-of-Bethlehem). Common (locally abundant) in fallow fields on terrace; rare in lawns.

Asparagus officinalis (Asparagus). Rare in hedgerows.

Smilacina racemosa (False Solomons-seal). Occasional in bottomland forest, pine-beech forest, and terrace forest; rare in bluff forest.

Maianthemum canadense (False Lily-of-the-valley). Occasional (locally common) in shrub swamps, transition swamps, and seepage swamps.

Polygonatum biflorum (Smooth Solomons-seal). Not *P. biflorum* of Gray's Manual—see *Rhodora* 46:11. 1944. Rare in bluff forest; one station in seepage swamp.

Polygonatum canaliculatum (Big Solomons-seal). *P. commutatum* of Gray's Manual. Rare in bottomland forest.

Medeola virginiana (Indian Cucumber-root). Common in terrace forest; occasional in seepage swamps and bluff forest.

Aletris farinosa (Star-grass). Occasional (locally common) in pine fields; rare in immature seepage swamps and pine stands.

Smilax glauca (White-leaf Greenbrier). Common (locally abundant) in sweetgum fields, immature seepage swamps, pine stands, hedgerows, and wood margins; common in seepage swamps, abandoned fields, pine fields, terrace forest, and bluff forest; occasional in pine-oak forest and upland oak forest; rare in cultivated fields.

Smilax herbacea (Carrión-flower). Rare in seepage swamps, terrace forest, hedgerows, and wood margins; one station in bottomland forest.

Smilax rotundifolia (Roundleaf Greenbrier). Abundant in hedgerows and wood margins; common in seepage swamps; occasional in shrub swamps, bottomland forest, immature seepage swamps, terrace forest, and bluff forest.

DIOSCOREACEAE

Dioscorea quaternata (Wild Yam-root). Not treated in Gray's Manual—see *Rhodora* 39:399. 1937. Occasional in terrace forest and bluff forest; rare in open river swamps, seepage swamps, and wood margins.

AMARYLLIDACEAE

Narcissus pseudo-narcissus (Daffodil). Two stations: fallow field and Ailanthus thicket.

Hypoxis hirsuta (Yellow Star-grass). Rare in wood margins.

IRIDACEAE

Iris pseudacorus (Yellow Iris). Established in experimental plant pond and marsh-meadow from transplantations from tidal Potomac River.

Iris versicolor (Blue Iris). *I. versicolor*, in part, of Gray's Manual—see *Annals of the Missouri Botanical Garden* 15:254. 1928. Rare in marsh-meadows.

Sisyrinchium atlanticum. Rare in wet meadows.

Sisyrinchium graminoides. *S. gramineum* of Gray's Manual. Occasional in wet meadows and lawns.

ORCHIDACEAE

Cypripedium acaule (Pink Lady-slipper). Occasional (locally common) in pine stands and pine-oak forest; occasional in seepage swamps; rare in terrace forest and upland oak forest.

Orchis spectabilis (Showy Orchid). One station in bottomland forest.

Habenaria ciliaris (Orange Fringe-orchid). Common at two stations: seepage swamp and immature seepage swamp.

Habenaria clavellata (Green Wood-orchid). One station in seepage swamp.

Habenaria flava (Tubercled Orchid). Occasional in river swamps.

Habenaria lacera (Green Fringe-orchid). Rare in river swamps.

Isotria verticillata (Whorled Pogonia). *Pogonia verticillata* of Gray's Manual. Occasional in terrace forest and bluff forest; rare in pine-oak forest and upland oak forest.

Spiranthes cernua (Nodding Ladies-tresses). Rare in wet meadows.

Spiranthes gracilis (Slender Ladies-tresses). Occasional (locally common) in pine fields.

Spiranthes vernalis (Upland Ladies-tresses). Rare in abandoned fields.

Goodyera pubescens (Rattlesnake-plantain). *Epipactis pubescens* of Gray's Manual. Occasional in seepage swamps, pine-beech forest, terrace forest, bluff forest, and pine-oak forest; rare in immature seepage swamps.

Corallorrhiza odontorhiza (Late Coralroot). Two stations: seepage swamp and terrace forest.

Tipularia discolor (Crane-fly Orchid). Occasional in seepage swamps, pine-beech forest, terrace forest, and bluff forest.

SALICACEAE

Salix humilis (Prairie Willow). Includes *S. tristis* of Gray's Manual. Occasional in immature seepage swamps and damp hedgerows and wood margins; rare in abandoned fields.

Salix nigra (Black Willow). Occasional (locally common) in river swamps; occasional in shrub swamps, transition swamps, immature seepage swamps, and damp hedgerows.

Populus alba (White Poplar). Rare in wood margins.

Populus grandidentata (Bigtooth Aspen). Occasional in immature seepage swamps, seepage swamps, and upland oak forest.

MYRICACEAE

Myrica pensylvanica (Bayberry). *M. carolinensis* of Gray's Manual. Rare in sweetgum fields and immature seepage swamps.

JUGLANDACEAE

Juglans cinerea (Butternut). Rare in bottomland forest.

Carya cordiformis (Bitternut). Occasional in bottomland forest and wood margins; rare in immature seepage swamps, terrace forest, bluff forest, and hedgerows; one station in upland oak forest.

Carya glabra (Pignut). Occasional (locally common) in terrace forest; occasional in bluff forest and upland oak forest; rare in bottomland forest and hedgerows.

Carya ovalis (Red Hickory). *C. microcarpa* of Gray's Manual. One tree in upland oak forest.

Carya tomentosa (Mockernut). *C. alba* of Gray's Manual. Occasional in terrace forest, bluff forest, and upland oak forest; rare in hedgerows.

BETULACEAE

Corylus americana (Hazelnut). Occasional (locally common) in partially cut over bottomland forest, hedgerows, and wood margins; rare in terrace forest.

Carpinus caroliniana (Hornbeam). Abundant in bottomland forest; occasional in river swamps, seepage swamps on terrace, cut-over terrace forest and bluff forest, and wood margins on flood plain and terrace; rare in hedgerows on terrace.

Betula nigra (River Birch). Common (locally abundant) in river swamps and bottomland forest; common in wood margins on flood plain and terrace; occasional in shrub swamps, transition swamps, and seepage swamps; rare in sweetgum fields, immature seepage swamps, and hedgerows.

Alnus serrulata (Alder). *A. rugosa* of Gray's Manual. Abundant in shrub swamps; occasional in transition swamps, immature seepage swamps, and damp hedgerows and wood margins.

FAGACEAE

Fagus grandifolia (Beech). Abundant in bottomland forest, pine-beech forest, terrace forest, and bluff forest; occasional in seepage swamps and upland oak forest; rare in immature seepage swamps and hedgerows.

Castanea dentata (Chestnut). Occasional as sprouts in upland oak forest.

Castanea pumila (Chinquapin). Occasional (locally common) in cut-over upland oak forest; rare in pine-oak forest.

Quercus alba (White Oak). Abundant in terrace forest, bluff forest, and upland oak forest; occasional in seepage swamps and pine-oak forest; rare in bottomland forest and hedgerows.

Quercus bicolor (Swamp White Oak). Occasional in transition swamps and river swamps; rare in seepage swamps.

Quercus borealis (Northern Red Oak). *Q. rubra* of Gray's Manual. Occasional in bottomland forest, terrace forest, and bluff forest; rare in upland oak forest and hedgerows.

- Quercus coccinea* (Scarlet Oak). Abundant in upland oak forest; occasional in pine-oak forest; rare in terrace forest and bluff forest.
- Quercus falcata* (Southern Red Oak). Abundant in pine-oak forest; occasional in pine stands, terrace forest, bluff forest, and upland oak forest; rare in immature seepage swamps and hedgerows.
- Quercus ilicifolia* (Bear Oak). Rare in partially cut-over upland oak forest.
- Quercus imbricaria* (Shingle Oak). Rare in pine-oak forest, upland oak forest, hedgerows, and wood margins.
- Quercus lyrata* (Overcup Oak). Occasional (locally common) in river swamps; rare in shrub swamps and transition swamps.
- Quercus marilandica* (Blackjack Oak). Occasional in upland oak forest and pine-oak forest.
- Quercus montana* (Chestnut Oak). *Q. prinus* of Gray's *Manual*. Occasional in upland oak forest and pine-oak forest.
- Quercus palustris* (Pin Oak). Abundant in river swamps; common in transition swamps, bottomland forest, and damp hedgerows; occasional in shrub swamps, sweetgum fields, immature seepage swamps, and seepage swamps; rare in pine fields.
- Quercus phellos* (Willow Oak). Common in seepage swamps and damp hedgerows; occasional in river swamps and immature seepage swamps; rare in bottomland forest, sweetgum fields, pine fields, pine stands, terrace forest, and pine-oak forest.
- Quercus prinus* (Swamp Chestnut Oak). *Q. michauxii* of Gray's *Manual*. Occasional (locally common) in bottomland forest; rare in river swamps.
- Quercus stellata* (Post Oak). Occasional in pine-oak forest; rare in terrace forest and upland oak forest.
- Quercus velutina* (Black Oak). Common in upland oak forest; occasional in terrace forest; rare in bluff forest and pine-oak forest.

URTICACEAE

- Ulmus americana* (American Elm). Common in bottomland forest; occasional in river swamps; rare in sweetgum fields and hedgerows on terrace.
- Humulus lupulus* (Hop). Two stations; bottomland forest and seepage swamp.
- Broussonetia papyrifera* (Paper-mulberry). One station in abandoned yard—spreading from cultivated plant.
- Morus alba* (White Mulberry). One station in hedgerow.
- Morus rubra* (Red Mulberry). Rare in bottomland forest and hedgerows; one station in seepage swamp.
- Urtica dioica* (Stinging Nettle). One station in Ailanthus thicket.
- Laportea canadensis* (Wood-nettle). Abundant in bottomland forest.
- Pilea pumila* (Richweed). Occasional (locally common) in river swamps and shallow runs in bottomland forest; rare in terrace forest.
- Boehmeria cylindrica* (False-nettle). Common in river swamps; rare in bottomland forest, terrace forest, and damp hedgerows.

SANTALACEAE

- Comandra umbellata* (Bastard Toadflax). Rare in wood margins on terrace.

LORANTHACEAE

- Phoradendron flavescens* (Mistletoe). Occasional on Blackgum in bottomland forest and seepage swamps.

ARISTOLOCHIACEAE

- Asarum canadense* (Wild-ginger). Occasional in bottomland forest.

POLYGONACEAE

- Rumex acetosella* (Sheep-sorrel). Abundant in fallow fields; common in sweetgum fields and lawns; occasional (locally common) in abandoned fields, pine fields, cultivated fields, and pastures.
- Rumex crispus* (Yellow Dock). Occasional in fallow fields and pastures.
- Rumex obtusifolius* (Bitter Dock). Occasional (locally common) in fallow fields and pastures.
- Polygonum arifolium* (Halberd-leaf Tear-thumb). Common in transition swamps and river swamps; occasional in shrub swamps.
- Polygonum aviculare* (Knotweed). One station in fallow field.
- Polygonum dumetorum*. One station in wood margin.
- Polygonum erectum* (Upright Knotweed). One station in fallow field.
- Polygonum hydropiper* (Common Smartweed). Rare in wet meadows.
- Polygonum hydropiperoides* (Swamp Smartweed). Occasional (locally common) in pools in runs on flood plain; occasional in south end of Lake Redington. Established in Cash Lake from transplantation from Swanson Creek, Charles County.
- Polygonum pensylvanicum* (Pennsylvania Smartweed). Abundant in fallow fields and damp cultivated fields; common in 1946 along shore of Lake Redington, where it was seeded and was abundant in 1945; occasional in wet meadows.
- Polygonum persicaria* (Ladys-thumb). Common in 1946 along shore of Lake Redington, where it was seeded and was abundant in 1945; occasional (locally abundant) in fallow fields and cultivated fields; rare in wet meadows.
- Polygonum punctatum* (Dotted Smartweed). *P. acre* of Gray's *Manual*. Common in south end of Lake Redington in 1946; occasional in transition swamps, river swamps, and wet meadows; rare in damp hedgerows.
- Polygonum sagittatum* (Arrow-leaf Tear-thumb). Common (locally abundant) in marsh-meadows and open shrub swamps; occasional in damp hedgerows; rare in seepage swamps.
- Polygonum scandens*. Rare in wood margins.
- Polygonum tenue*. One station in road.
- Tovara virginiana*. *Polygonum virginianum* of Gray's *Manual*. Occasional (locally common) in river swamps; rare in bottomland forest.

CHENOPODIACEAE

- Chenopodium album* (Lambs-quarters). Common in fallow fields and cultivated fields.
- Chenopodium ambrosioides* (Mexican-tea). Rare in fallow fields; one station each in hedgerow and cultivated field.

AMARANTHACEAE

- Amaranthus hybridus* (Slim Pigweed). Common in fallow fields and cultivated fields.

Amaranthus retroflexus (Redroot Pigweed). One station in fallow field.

Amaranthus spinosus (Spiny Pigweed). One station in cultivated field.

PHYTOLACCACEAE

Phytolacca americana (Pokeweed). *P. decandra* of Gray's *Manual*. Common in wood margins; rare in fallow fields, hedgerows, and cultivated fields.

ILLECEBRACEAE

Scleranthus annuus (Knapweed). Rare in fallow fields.

AIZOACEAE

Mollugo verticillata (Carpetweed). Common (locally abundant) in cultivated fields; occasional in fallow fields.

CARYOPHYLLACEAE

Arenaria serpyllifolia (Thyme-leaf Sandwort). Two stations: fallow field and lawn.

Stellaria longifolia (Longleaf Starwort). Common in bottomland forest.

Stellaria media (Chickweed). Common in fallow fields and cultivated fields; occasional (locally common) in bottomland forest and lawns.

Stellaria pubera (Starwort). Common in bottomland forest; rare in bluff forest.

Cerastium viscosum. Common in pastures and lawns; occasional in fallow fields.

Cerastium vulgatum. Occasional in pastures and lawns.

Agrostemma githago (Cockle). One station in grainfield.

Lychnis alba (White Campion). Rare in fallow fields.

Silene antirrhina (Sleepy Catchfly). One station along road.

Silene stellata (Starry Campion). Rare in bluff forest.

Dianthus armeria (Deptford Pink). Occasional in fallow fields, abandoned fields, pine fields, and lawns.

PORTULACACEAE

Claytonia virginica (Spring-beauty). Very abundant in bottomland forest; rare in seepage swamps, terrace forest, and bluff forest.

Portulaca oleracea (Purslane). Occasional in cultivated fields; rare in fallow fields.

NYMPHAEACEAE

Nuphar advena (Spatterdock). *Nymphaea advena* of Gray's *Manual*. Common in Cash Lake and pool below Cash Lake dam; occasional near head of Lake Redington and in brooks on flood plain. Accidentally established in experimental plant pond through introduction of muck soil from Cash Branch swamp.

Nymphaea odorata (White Waterlily). *Castalia odorata* of Gray's *Manual*. Occasional (locally abundant) in Cash Lake in 1945, having increased from a very small amount first noted in 1942. Established in experimental plant pond from transplantation from Lakeland, Prince Georges County.

Brasenia schreberi (Water-shield). Established in Cash Lake, gravel pit pond, and experimental plant pond from transplantations from Edmonston, Prince Georges County.

RANUNCULACEAE

Ranunculus abortivus (Small-flowered Buttercup). Common in bottomland forest; rare in seepage swamps.

Ranunculus acris (Tall Buttercup). One station in wet meadow.

Ranunculus ambigens (Tall Spearwort). *R. laxicaulis* of Gray's *Manual*. Occasional in pools in runs on flood plain and in marsh-meadows.

Ranunculus bulbosus (Bulbous Buttercup). Occasional in lawns.

Ranunculus hispidus (Hairy Buttercup). Occasionally (locally common) in river swamps; rare in bottomland forest.

Ranunculus pusillus (Low Spearwort). Rare in marsh-meadows.

Ranunculus recurvatus (Hooked Buttercup). Occasional (locally common) in bottomland forest.

Ranunculus repens (Creeping Buttercup). Rare in wet meadows.

Thalictrum polygamum (Tall Meadow-rue). Occasional in wet meadows and wood margins on flood plain.

Anemonella thalictroides (Rue-anemone). Occasional in bottomland forest; rare in terrace forest and bluff forest.

Anemone quinquefolia (Wood Anemone). Rare in bottomland forest and seepage swamps.

Clematis virginiana (Virgins-bower). Rare in wood margins on flood plain; one station in seepage swamp.

MAGNOLIACEAE

Magnolia virginiana (Sweetbay). Common in shrub swamps, transition swamps, and seepage swamps.

Liriodendron tulipifera (Tulip-tree). Common (locally abundant) in bottomland forest; occasional (locally common) in seepage swamps; occasional in immature seepage swamps; rare in sweetgum fields, pine fields, terrace forest, bluff forest, and hedgerows.

ANNONACEAE

Asimina triloba (Pawpaw). Occasional in bottomland forest; rare in seepage swamps.

BERBERIDACEAE

Podophyllum peltatum (May-apple). Common (locally abundant) in bottomland forest; rare in seepage swamps; one station in hedgerow.

Berberis thunbergii (Japanese Barberry). Not treated in Gray's *Manual*—see Bailey, *Manual of cultivated plants*, p. 288, 1924. Two stations: bottomland forest and sweetgum field.

LAURACEAE

Sassafras albidum (Sassafras). *S. variifolium* of Gray's *Manual*. Common in hedgerows and wood margins; rare in bottomland forest, pine fields, terrace forest, bluff forest, pine-oak forest, and upland oak forest.

Lindera benzoin (Spicebush). *Benzoin aestivale* of Gray's *Manual*. Common in transition swamps and bottomland forest; occasional in shrub swamps; rare in immature seepage swamps, seepage swamps, terrace forest, and damp hedgerows.

PAPAVERACEAE

Sanguinaria canadensis (Bloodroot). Rare in bottomland forest; one station in bluff forest.

Chelidonium majus (Celandine). One station in abandoned yard.

FUMARIACEAE

Dicentra cucullaria (Dutchmans-breeches). Occasional in bottomland forest.

Corydalis flavula (Yellow Corydalis). Occasional in bottomland forest.

CRUCIFERAE

Draba verna (Whitlow-grass). Common (locally abundant) in fallow fields and lawns.

Thlaspi arvense (Pennycress). One station in fallow field.

Lepidium campestre (English Peppergrass). Occasional in fallow fields.

Lepidium virginicum (Wild Peppergrass). Rare in fallow fields.

Capsella bursa-pastoris (Shepherds-purse). Occasional in fallow fields.

Raphanus sativus (Radish). Rare in fallow fields.

Sisymbrium altissimum (Tumble-mustard). One station in fallow field.

Sisymbrium officinale (Hedge-mustard). Rare in fallow fields.

Sisymbrium thalianum (Mouse-ear Cress). Occasional (locally common) in fallow fields and cultivated fields; rare in lawns.

Rorippa islandica (Marsh-cress). *Radicula palustris* of Gray's Manual. Rare in margins of swamps on flood plain.

Barbarea verna (Early Wintercress). Common (locally abundant) in fallow fields.

Barbarea vulgaris (Common Wintercress). Occasional in fallow fields.

Dentaria laciniata (Pepper-root). Common in bottomland forest.

Cardamine bulbosa (Bulbous Bitter-cress). Occasional in river swamps; rare in bottomland forest.

Cardamine pennsylvanica (Pennsylvania Bitter-cress). Occasional in river swamps; rare in bottomland forest.

PODOSTEMACEAE

Podostemum ceratophyllum (Riverweed). Locally common in river in swift, shallow water on coarse gravel bottom.

CRASSULACEAE

Penthorum sedoides (Ditch-stonecrop). Rare in margins of swamps on flood plain.

SAXIFRAGACEAE

Heuchera americana (Alumroot). Rare in bottomland forest and bluff forest.

Hydrangea arborescens (Wild Hydrangea). One station in bluff forest.

Itea virginica (Itea). Rare in transition swamps; one station in shrub swamp.

HAMAMELIDACEAE

Hamamelis virginiana (Witch-hazel). Rare in terrace forest; one station in bluff forest.

Liquidambar styraciflua (Sweetgum). Very abundant in sweetgum fields and immature seepage swamps; abundant in river swamps, bottomland forest, and damp hedgerows; common in transition swamps and seepage swamps on terrace; occasional in pine fields, pine-beech forest, terrace forest, and bluff forest.

PLATANACEAE

Platanus occidentalis (Sycamore). Occasional in bottomland forest; rare in sweetgum fields and damp hedgerows.

ROSACEAE

Spiraea latifolia (Meadow-sweet). Rare in margins of shrub swamps; common at one station in sweetgum field.

Spiraea tomentosa (Hardhack). Occasional in sweetgum fields.

Gillenia trofoliata (Bowmans-root). One station in upland oak forest.

Pyrus communis (Pear). Four stations; bottomland forest, sweetgum field, abandoned field, and terrace forest.

Malus angustifolia (Southern Crabapple). *Pyrus angustifolia* of Gray's Manual. One station in hedgerow.

Aronia arbutifolia (Red Chokeberry). *Pyrus arbutifolia* of Gray's Manual. Occasional (locally common) in shrub swamps; occasional in seepage swamps and damp hedgerows.

Aronia melanocarpa (Black Chokeberry). *Pyrus melanocarpa* of Gray's Manual. Rare in seepage swamps.

Aronia prunifolia (Purple Chokeberry). *Pyrus arbutifolia* var. *atropurpurea* of Gray's Manual. Rare in shrub swamps.

Amelanchier arborea (Downy Serviceberry). *A. canadensis* var. *botryapium* of Gray's Manual. Occasional (locally common) in pine-oak forest and upland oak forest; occasional in terrace forest and bluff forest; rare in seepage swamps.

Amelanchier canadensis (Swamp Serviceberry). *A. oblongifolia* of Gray's Manual. Occasional in shrub swamps; rare in sweetgum fields and damp hedgerows.

Crataegus boyntoni (Boynton Hawthorn). Rare in wood margins on upland.

Crataegus rubella (Reddish Hawthorn). Not treated in Gray's Manual—see Brittonia 5:484, 1946. Two stations: upland oak forest and wood margin.

Fragaria virginiana (Wild Strawberry). Occasional in abandoned fields and pine fields; rare in sweetgum fields, fallow fields, and hedgerows.

Duchesnea indica (Mock-strawberry). Rare in bottomland forest.

Potentilla canadensis (Dwarf Cinquefoil). *P. pumila* of Gray's Manual. Occasional in abandoned fields, pine fields, pastures, and wood margins; rare in sweetgum fields and hedgerows.

Potentilla monspeliensis (Rough Cinquefoil). Occasional in wet meadows and fallow fields; rare in lawns.

Potentilla recta (Sulfur Cinquefoil). Rare in abandoned fields.

Potentilla simplex (Common Cinquefoil). *P. canadensis* of Gray's Manual. Common (locally abundant) in sweetgum fields; occasional (locally common) in abandoned fields, pine fields, and hedgerows; occasional in fallow fields; rare in bottomland forest and wood margins.

Ceanothus canadense (White Avens). Common in bottomland forest; rare in hedgerows; one station in Ailanthus thicket.

Ceanothus vernum (Spring Avens). One station in bottomland forest.

Rubus cordialis (Dewberry). Not treated in Gray's Manual—see Centes Herbarum 5:271, 1943. Two stations: hedgerow and wood margin.

Rubus cuneifolius (Sand Blackberry). Rare in sandy abandoned fields.

Rubus flagellaris (Dewberry). Not treated in Gray's Manual—see Centes Herbarum

- 5:244. 1943. Two stations: hedgerow and wood margin.
- Rubus frondosus* (Highbush Blackberry). *R. frondosus*, in part, of Gray's *Manual*—see *Gentes Herbarum* 5:732. 1945. One station in hedgerow.
- Rubus fusus* (Dewberry). Not treated in Gray's *Manual*—see *Gentes Herbarum* 5:390. 1943. One station in hedgerow.
- Rubus hispidus* (Swamp Dewberry). Abundant in transition swamps and seepage swamps; common in shrub swamps; occasional in sweetgum fields, immature seepage swamps, and damp hedgerows.
- Rubus occidentalis* (Black Raspberry). Rare in hedgerows and wood margins.
- Rubus pensilvanicus* (Highbush Blackberry). Not treated in Gray's *Manual*—see *Gentes Herbarum* 5:699. 1945. Two stations in hedgerows.
- Rubus subtractus* (Highbush Blackberry). Not treated in Gray's *Manual*—see *Gentes Herbarum* 5:632. 1945. One station in hedgerow. Dewberries as a group are common (locally abundant) in sweetgum fields, abandoned fields, pine fields, and fallow fields. Highbush blackberries as a group are abundant in hedgerows and wood margins.
- Agrimonia parviflora*. Rare in wood margins on flood plain.
- Agrimonia pubescens*. *A. mollis* of Gray's *Manual*. One station in hedgerow.
- Sanguisorba canadensis* (Burnet). Rare in open shrub swamps.
- Rosa carolina* (Pasture Rose). *R. humilis* of Gray's *Manual*. Occasional in hedgerows and wood margins.
- Rosa palustris* (Swamp Rose). *R. carolina* of Gray's *Manual*. Common in shrub swamps.
- Prunus americana* (American Plum). Two stations: hedgerow and wood margin.
- Prunus avium* (Sweet Cherry). One tree in pine-oak forest.
- Prunus persica* (Peach). One station in hedgerow.
- Prunus serotina* (Black Cherry). Occasional (locally common) in hedgerows; occasional in wood margins; rare in bottomland forest, sweetgum fields, immature seepage swamps, pine fields, bluff forest, and pine-oak forest.

LEGUMINOSAE

- Cassia fasciculata* (Big Partridge-pea). *C. chamaecrista* of Gray's *Manual*. Common in fallow fields; occasional in lawns.
- Cassia hebecarpa* (Wild Senna). *C. marilandica* of Gray's *Manual*. Rare in hedgerows and wood margins.
- Cassia nitilans* (Little Partridge-pea). Common in fallow fields; occasional in abandoned fields, pine fields, and lawns; rare in sweetgum fields.
- Baptisia tinctoria* (Wild-indigo). Occasional in open terrace forest, open upland forest, and wood margins.
- Crotalaria sagittalis* (Rattlebox). Occasional in fallow fields; rare in abandoned fields and pine fields.
- Trifolium agrarium* (Hop Clover). Occasional (locally common) in fallow fields; rare in abandoned fields and pine fields.

- Trifolium arvense* (Rabbitfoot Clover). Common in fallow fields; rare in sweetgum fields, abandoned fields, and lawns.
- Trifolium dubium* (Little Hop Clover). Common in headquarters lawn; occasional in fallow fields.
- Trifolium hybridum* (Alsike). Occasional (locally common) in fallow fields; occasional in lawns.
- Trifolium pratense* (Red Clover). Occasional (locally common) in fallow fields; occasional in lawns.
- Trifolium procumbens* (Low Hop Clover). Common in headquarters lawn; occasional (locally common) in fallow fields.
- Trifolium repens* (White Clover). Abundant in lawns and common in pastures (presumably persisting from seeding in each); occasional in fallow fields.
- Melilotus alba* (White Sweetclover). Rare in fallow fields.
- Melilotus officinalis* (Yellow Sweetclover). Rare in fallow fields.
- Medicago lupulina* (Black Medic). Occasional in fallow fields and lawns.
- Medicago sativa* (Alfalfa). Two stations: lawn and roadside.
- Tephrosia virginiana*. Occasional in pine-oak forest and upland oak forest.
- Robinia pseudoacacia* (Black Locust). Occasional (locally abundant) in pine fields; occasional in hedgerows; rare in pine stands, terrace forest, and upland oak forest.
- Desmodium bracteosum*. One station in hedgerow.
- Desmodium ciliare*. *D. obtusum* of Gray's *Manual*. Occasional in abandoned fields; rare in pine fields.
- Desmodium dillenii*. Occasional (locally common) in abandoned fields and wood margins; rare in sweetgum fields, pine fields, and hedgerows.
- Desmodium laevigatum*. Occasional in abandoned fields and wood margins.
- Desmodium marilandicum*. Occasional in abandoned fields; rare in pine fields.
- Desmodium nudiflorum*. Occasional in terrace forest, bluff forest, and upland oak forest; rare in pine-oak forest.
- Desmodium paniculatum*. Occasional (locally common) in abandoned fields and wood margins; rare in sweetgum fields and pine fields.
- Desmodium rigidum*. Rare in abandoned fields on terrace.
- Desmodium rotundifolium*. One station in bluff forest.
- Desmodium viridiflorum*. Occasional in abandoned fields.
- Lespedeza capitata* (Roundhead Lespedeza). Occasional in abandoned fields.
- Lespedeza cuneata* (Sericea Lespedeza). Not treated in Gray's *Manual*—see Graham, *Legumes for erosion control and wildlife*, p. 64. 1941. Common (locally abundant) along roads; occasional (locally common) in abandoned fields. Seeded in several abandoned fields.
- Lespedeza hirta* (Hairy Lespedeza). Rare in abandoned fields on terrace.
- Lespedeza intermedia* (Wand Lespedeza). *L. frutescens* of Gray's *Manual*. Rare in abandoned fields on terrace.

- Lespedeza nuttallii* (Nuttall Lespedeza). One station in wood margin.
- Lespedeza procumbens* (Trailing Lespedeza). Rare in sweetgum fields, immature seepage swamps, and pine-oak forest.
- Lespedeza repens* (Creeping Lespedeza). Occasional in abandoned fields; rare in pine fields, pine-oak forest, and wood margins.
- Lespedeza stipulacea* (Korean Lespedeza). Not treated in Gray's *Manual*—see Graham, *Legumes for erosion control and wildlife*, p. 65, 1941. Abundant in headquarters lawn (presumably persisting from seeding); occasional along roads.
- Lespedeza striata* (Common Lespedeza). Occasional (locally common) in fallow fields and lawns.
- Lespedeza stuevei* (Stuve Lespedeza). Rare in abandoned fields.
- Lespedeza virginica* (Slender Lespedeza). Common in abandoned fields and pine fields.
- Stylosanthes biflora* (Pencil-flower). Rare in open terrace forest.
- Vicia angustifolia* (Narrowleaf Vetch). One station in abandoned field.
- Vicia tetrasperma* (Sparrow Vetch). One station in abandoned field.
- Vicia villosa* (Hairy Vetch). Rare in fallow fields.
- Apios americana* (Potato-bean). *A. tuberosa* of Gray's *Manual*. Occasional in sweetgum fields and damp hedgerows.
- Strophostyles umbellata* (Wild-bean). Rare in abandoned fields.
- Amphicarpa bracteata* (Hog-peanut). *A. monoica* of Gray's *Manual*. Occasional (locally common) in bottomland forest; rare in seepage swamps and terrace forest; one station in hedgerow.

LINACEAE

- Linum floridanum*. Rare in wet meadows, sweetgum fields, and pine fields.
- Linum striatum*. Occasional in wet meadows.
- Linum virginianum*. Rare in wood margins on upland.

OXALIDACEAE

- Oxalis europaea* (European Yellow Oxalis). *O. corniculata* of Gray's *Manual*. One station in wood margin on flood plain.
- Oxalis stricta* (Common Yellow Oxalis). Occasional in fallow fields, abandoned fields, pine fields, and lawns; rare in open terrace forest.
- Oxalis violacea* (Violet Oxalis). Rare in bottomland forest.

GERANIACEAE

- Geranium carolinianum* (Carolina Geranium). Occasional in fallow fields and wood margins; rare in lawns.
- Geranium maculatum* (Wild Geranium). Occasional in bottomland forest; one station in bluff forest.
- Geranium pusillum* (Small Geranium). One station in fallow field.
- Erodium cicutarium* (Filaree). Rare in fallow fields.

SIMARUBACEAE

- Ailanthus altissima* (Ailanthus). *A. glandulosa* of Gray's *Manual*. One thicket in abandoned yard.

POLYGALACEAE

- Polygala curtissii*. Occasional (locally common) in abandoned fields and pine fields; rare in sweetgum fields and fallow fields.
- Polygala mariana*. Rare in wet meadows; one station in damp pasture.
- Polygala sanguinea*. Occasional in wet meadows; rare in fallow fields.
- Polygala verticillata*. Occasional in fallow fields and abandoned fields.

EUPHORBIACEAE

- Acalypha gracilens*. *A. gracilens*, in part, of Gray's *Manual*—see Rhodora 29:201. 1927. Rare in fallow fields, abandoned fields, pine fields, cultivated fields, and wood margins.
- Acalypha rhomboidea*. *A. virginica* of Gray's *Manual*. Occasional in fallow fields, cultivated fields, and wood margins; rare in hedgerows.
- Euphorbia corollata* (Flowering Spurge). Common in fallow fields and abandoned fields; occasional in cultivated fields; rare in sweetgum fields and pine fields.
- Euphorbia ipecacuanhae* (Ipecac Spurge). Rare in opening in forest on upland.
- Euphorbia maculata*. *E. preslii* of Gray's *Manual*. Occasional in fallow fields and cultivated fields.
- Euphorbia supina*. *E. maculata* of Gray's *Manual*. Rare in fallow fields and cultivated fields.

CALLITRICHACEAE

- Callitriche austini*. *C. deflexa* var. *austini* of Gray's *Manual*. Rare in damp wood margins.
- Callitriche heterophylla* (Water-starwort). Common (locally abundant) in gravel pit ponds and experimental plant ponds; occasional (locally common) in pools in runs and in brooks on flood plain.

ANACARDIACEAE

- Rhus copallina* (Shining Sumac). Common (locally abundant) in pine fields, hedgerows, and wood margins; occasional in sweetgum fields and immature seepage swamps.
- Rhus glabra* (Smooth Sumac). Occasional in hedgerows and wood margins; rare in pine fields.
- Rhus typhina* (Staghorn Sumac). Rare in hedgerows.
- Toxicodendron radicans* (Poison-ivy). *Rhus toxicodendron* of Gray's *Manual*. Abundant in river swamps and bottomland forest; common in hedgerows and wood margins; occasional in transition swamps, seepage swamps, sweetgum fields, pine fields, terrace forest, and bluff forest; rare in immature seepage swamps, pine stands, and pine-oak forest.
- Toxicodendron vernix* (Poison-sumac). *Rhus vernix* of Gray's *Manual*. Common in shrub swamps; occasional in transition swamps; rare in seepage swamps.

AQUIFOLIACEAE

- Ilex laevigata* (Smooth Winterberry). Rare in seepage swamps.
- Ilex opaca* (Holly). Common in seepage swamps; occasional (locally common) in pine-beech forest and terrace forest; occasional in pine stands; rare in bottomland forest, immature seepage swamps, pine-oak forest, and hedgerows.
- Ilex verticillata* (Winterberry). Common (locally abundant) in transition swamps; common in shrub swamps; occasional in seepage swamps; rare in damp hedgerows.

CELASTRACEAE

Evonymus americanus (Strawberry-bush). Occasional (locally common) in pine-beech forest and terrace forest; occasional in bottomland forest and seepage swamps; rare in immature seepage swamps, bluff forest, and hedgerows.

STAPHYLEACEAE

Staphylea trifolia (Bladdernut). Rare in bottomland forest.

ACERACEAE

Acer negundo (Box-elder). Rare in bottomland forest.

Acer rubrum (Red Maple). Abundant in transition swamps and river swamps; common in shrub swamps, bottomland forest, and seepage swamps; occasional in sweetgum fields, immature seepage swamps, pine fields, pine stands, pine-beech forest, terrace forest, bluff forest, and hedgerows.

Acer saccharinum (Silver Maple). Occasional near river in bottomland forest.

BALSAMINACEAE

Impatiens biflora (Touch-me-not). Abundant in bottomland forest; locally common in seepage swamps on upland; occasional in river swamps; rare in damp hedgerows; one station in *Ailanthus* thicket.

RHAMNACEAE

Ceanothus americanus (New Jersey Tea). Rare in dry wood margins on upland.

VITACEAE

Parthenocissus quinquefolia (Virginia Creeper). *Pseodera quinquefolia* of Gray's Manual. Common in bottomland forest; occasional in terrace forest, bluff forest, and hedgerows; rare in shrub swamps, seepage swamps, and pine-oak forest.

Vitis aestivalis (Summer Grape). Common in bottomland forest and wood margins; occasional in hedgerows; rare in pine fields.

Vitis labrusca (Fox Grape). Occasional in bottomland forest, hedgerows, and wood margins; rare in sweetgum fields.

Vitis vulpina (Frost Grape). *V. cordifolia* of Gray's Manual. Occasional in bottomland forest, hedgerows, and wood margins.

MALVACEAE

Abutilon theophrasti (Velvet-leaf). Occasional in fallow fields; rare in cultivated fields.

Sida spinosa (Prickly Sida). Two stations: fallow field and lawn.

Malva neglecta (Cheeses). *M. rotundifolia* of Gray's Manual. One station in fallow field.

Hibiscus moscheutos (Rose-mallow). *H. oculiroseus* of Gray's Manual. Established in marsh-meadow from transplantation from tidal Potomac River.

Hibiscus trionum (Flower-of-an-hour). Rare in fallow fields.

HYPERICACEAE

Ascyrum hypericoides (St. Andrew's Cross). Occasional in abandoned fields, pine fields, and wood margins; rare in open terrace forest and hedgerows.

Hypericum canadense. Occasional in wet meadows; rare in damp fallow fields.

Hypericum denticulatum. *H. virgatum* of Gray's Manual. Rare in sweetgum fields.

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entrance Romsberg on right on rd. toward sub-station
→ *Hypericum gentianoides* (Pineweed). Occasional (locally common) in fallow fields and pine fields; occasional in abandoned fields and wood margins.

Hypericum mutilum. Occasional (locally abundant) in wet meadows and fallow fields.

Hypericum perforatum (Common St. Johnswort). Rare in fallow fields and abandoned fields.

Hypericum punctatum. Occasional in river swamps and damp wood margins on flood plain and terrace; rare in sweetgum fields and damp hedgerows.

Hypericum tubulosum. *H. petiolatum* of Gray's Manual. Rare in river swamps.

Hypericum virginicum (Marsh St. Johnswort). Common along shore of Cash Lake; occasional elsewhere in marsh-meadows and open shrub swamps.

CISTACEAE

Helianthemum bicknellii. *H. majus* of Gray's Manual. Rare in abandoned fields.

Helianthemum canadense. Occasional in pine fields and dry wood margins.

Lechea leggettii. Two stations: pine field and wood margin.

Lechea racemulosa. Occasional (locally common) in abandoned fields and pine fields.

VIOLACEAE

Viola affinis (Woodland Blue Violet). Common in bottomland forest.

Viola brittoniana (Coast Violet). One station in immature seepage swamp.

Viola cucullata (Marsh Blue Violet). Occasional in shrub swamps and transition swamps; rare in seepage swamps.

Viola fimbriatula (Sand Violet). One station in open pine stand.

Viola lanceolata (Lance-leaf Violet). Occasionally (locally common) in marsh-meadows, wet meadows, and sweetgum fields; rare in damp fallow fields.

Viola papilionacea (Butterfly Violet). Occasional in bottomland forest.

Viola pedata (Birdfoot Violet). Rare in sandy margins of pine-oak forest.

Viola pensylvanica (Yellow Violet). *V. scabriuscula* of Gray's Manual. Occasional (locally common) in bottomland forest.

Viola primulifolia (Primrose-leaf Violet). Common in wet meadows; occasional in sweetgum fields; rare in damp fallow fields, hedgerows, and wood margins.

Viola sagittata (Arrow-leaf Violet). Common (locally abundant) in wet meadows; common in sweetgum fields; occasional in fallow fields, abandoned fields, and pine fields.

LYTHRACEAE

Rotala ramosior. Rare in marsh-meadows.

Cuphea petiolata. Occasional in fallow fields.

MELASTOMACEAE

Rhexia mariana (Maryland Meadow-beauty). Common in wet meadows.

Rhexia virginica (Virginia Meadow-beauty). Occasional in wet meadows.

ONAGRACEAE

Ludvigia alternifolia (Seedbox). Occasional (locally common) in wet meadows; rare in sweetgum fields and damp fallow fields.

Ludvigia palustris (Water-purslane). Common in south end of Lake Redington, pools in runs on flood plain, and marsh-meadows.

Epilobium coloratum (Willow-herb). Rare in wet meadows.

Oenothera biennis (Common Evening-primrose). Common in fallow fields; occasional in cultivated fields.

Oenothera fruticosa (Sundrops). *O. linearis* and *O. longipedicellata* of Gray's Manual. Occasional (locally common) in wet meadows and sweetgum fields; occasional in abandoned fields and pine fields.

Oenothera laciniata (Cutleaf Evening-primrose). Two stations: pine field and lawn.

Oenothera perennis (Little Sundrops). *O. pumila* of Gray's Manual. One station in abandoned field.

Circaea quadrisulcata var. *canadensis* (Enchanters-nightshade). *C. luteoliana* of Gray's Manual. Occasional (locally common) in bottomland forest; rare in seepage swamps.

HALORAGIDACEAE

Proserpinaca palustris (Mermaid-weed). Occasional in pools in runs on flood plain and marsh-meadows.

ARALIACEAE

Aralia nudicaulis (Wild-sarsaparilla). Rare in seepage swamps and bluff forest.

Aralia spinosa (Devils-walkingstick). Rare in terrace forest; one station in seepage swamp.

Panax trifolium (Dwarf Ginseng). Common in bottomland forest; rare in seepage swamps, terrace forest, and bluff forest.

UMBELLIFERAE

Sanicula canadensis (Snakeroot). Rare in bottomland forest and seepage swamps on upland.

Hydrocotyle americana (Pennywort). Rare in bottomland forest and terrace forest.

Cicuta maculata (Water-hemlock). Occasional in marsh-meadows and open shrub swamps and river swamps.

Cryptotaenia canadensis (Honestwort). Abundant in bottomland forest; rare in seepage swamps on upland.

Thaspium barbinode (Meadow-parsnip). One plant in bottomland forest.

Oxypolis rigidior (Cowbane). Rare in marsh-meadows; one station each in transition swamp and seepage swamp.

Angelica villosa (Hairy Angelica). One station in upland oak forest.

Daucus carota (Wild Carrot). Common (locally abundant) in fallow fields and abandoned fields; occasional in pine fields, cultivated fields, and pastures; rare in sweetgum fields.

CORNACEAE

Cornus amomum (Silky Dogwood). Occasional in margins of shrub swamps, open transition swamps, and damp hedgerows and wood margins.

Cornus florida (Flowering Dogwood). Occasional (locally common) in bottomland forest, terrace forest, bluff forest, and wood margins; rare in seepage swamps, pine fields, pine stands, and hedgerows.

Nyssa sylvatica (Blackgum). Common in seepage swamps; occasional (locally common) in bottomland forest; occasional in transition swamps, river swamps, immature seepage swamps, and hedgerows; rare in sweetgum fields, pine-beech forest, and bluff forest.

ERICACEAE

Clethra alnifolia (Sweet Pepperbush). Abundant in seepage swamps; common in shrub swamps, transition swamps, and damp hedgerows and wood margins; rare in bottomland forest and terrace forest.

Chimaphila maculata (Spotted Wintergreen). Common in pine stands, occasional in terrace forest, bluff forest, and pine-oak forest; rare in upland oak forest.

Chimaphila umbellata (Pipsissewa). Rare in pine stands and pine-oak forest.

Pyrola elliptica (Shin-leaf). One station in damp pine stand.

Pyrola rotundifolia var. *americana* (Roundleaf Wintergreen). *P. americana* of Gray's Manual. Occasional in pine-beech forest, pine-oak forest, terrace forest, bluff forest, and upland oak forest.

Pyrola secunda (Sidebells Wintergreen). One station in pine-oak forest.

Pyrola virens (Green-flowered Wintergreen). *P. chlorantha* of Gray's Manual. One station in pine-oak forest.

Monotropa hypopitys (Pinesap). Rare in terrace forest, bluff forest, pine-oak forest, and upland oak forest.

Monotropa uniflora (Indian-pipe). Occasional in terrace forest, bluff forest, pine-oak forest, and upland oak forest.

Rhododendron nudiflorum (Pink Azalea). Common in upland oak forest; occasional in terrace forest and bluff forest.

Rhododendron viscosum (Swamp Azalea). Common in shrub swamps and seepage swamps; occasional in transition swamps; rare in damp hedgerows.

Kalmia angustifolia (Lambkill). Occasional in seepage swamps; rare in shrub swamps.

Kalmia latifolia (Mountain-laurel). Locally abundant in pine-oak forest and upland oak forest; occasional in pine stands and terrace forest; rare in pine-beech forest.

Leucothoe racemosa (Sweetbells). Common in seepage swamps; occasional in shrub swamps and transition swamps; rare in immature seepage swamps.

Lyonia ligustrina (Male-berry). Common (locally abundant) in immature seepage swamps; common in seepage swamps; occasional in shrub swamps, transition swamps, sweetgum fields, and damp hedgerows; rare in terrace forest.

Lyonia mariana (Staggerbush). Occasional in seepage swamps, pine-oak forest, and upland oak forest.

Epigaea repens (Trailing-arbutus). Occasional (locally common) in pine-oak forest and upland oak forest; rare in pine stands and bluff forest.

Gaultheria procumbens (Wintergreen). Large patch in seepage swamp; rare elsewhere in seepage swamps, pine stands, terrace forest, and upland oak forest.

Gaylussacia baccata (Black Huckleberry). Abundant in pine-oak forest and upland oak forest; rare in terrace forest.

Caylussacia frondosa (Dangleberry). Common (locally abundant) in pine-oak forest and upland oak forest; occasional in seepage swamps, terrace forest, and bluff forest.

Vaccinium angustifolium (Lowbush Blueberry). *V. pennsylvanicum* of Gray's Manual. Two stations: pine stand and upland oak forest.

Vaccinium corymbosum (Highbush Blueberry). Includes *V. atrococcum* of Gray's Manual. Occasional (locally common) in sweetgum fields, immature seepage swamps, pine fields, and damp hedgerows; occasional in shrub swamps and seepage swamps; rare in transition swamps.

Vaccinium stamineum (Deerberry). Occasional (locally common) in pine-oak forest and upland oak forest; occasional in pine fields, pine stands, and dry wood margins; rare in terrace forest and bluff forest.

Vaccinium vacillans (Dryland Blueberry). Abundant in pine-oak forest and upland oak forest; occasional (locally common) in pine-beech forest, terrace forest, and bluff forest; occasional in pine stands; rare (locally common) in pine fields; rare in hedgerows.

PRIMULACEAE

Lysimachia ciliata (Fringed Loosestrife). *Steironema ciliatum* of Gray's Manual. Occasional (locally common) in bottomland forest.

Lysimachia lanceolata (Lance-leaf Loosestrife). *Steironema lanceolatum* of Gray's Manual. Rare in wet meadows; one station in sweetgum field.

Lysimachia nummularia (Moneywort). Locally common in bottomland forest.

Lysimachia quadrifolia (Whorled Loosestrife). Occasional in forest openings, hedgerows, and wood margins.

Lysimachia terrestris (Swamp-candle). Includes *L. producta* of Gray's Manual. Occasional (locally common) in wet meadows.

Anagallis arvensis (Pimpernel). Occasional in fallow fields and cultivated fields.

EBENACEAE

Diospyros virginiana (Persimmon). Occasional (locally common) in hedgerows and wood margins; rare in sweetgum fields, seepage swamps, and pine fields.

OLEACEAE

Fraxinus americana (White Ash). Occasional (locally common) in bottomland forest; rare in river swamps, sweetgum fields, and hedgerows.

Fraxinus biltmoreana (Biltmore Ash). Rare in bottomland forests.

Fraxinus pennsylvanica (Red Ash). Occasional (locally common) in river swamps; rare in bottomland forest.

Chionanthus virginica (Fringe-tree). Occasional in seepage swamps; rare in transition swamps, bottomland forest, terrace forest, and bluff forest.

GENTIANACEAE

Sabatia angularis (Rose-gentian). Rare in sweetgum fields, abandoned fields, and pine fields.

Gentiana clausa (Closed Gentian). *G. saponaria*, in part, of Gray's Manual—see *Rhodora* 19:149, 1917. Occasional in wet meadows, sweetgum fields, and immature seepage swamps; rare in seepage swamps and damp hedgerows.

Bartonia paniculata. Rare in seepage swamps.

APOCYNACEAE

Apocynum cannabinum var. *pubescens* (Indian-hemp). Common in sweetgum fields and pine fields; occasional in abandoned fields; rare in fallow fields and cultivated fields.

ASCLEPIADACEAE

Asclepias amplexicaulis (Bluntleaf Milkweed). Rare in abandoned fields and pine fields.

Asclepias pulchra (Hairy Milkweed). *A. incarnata* var. *pulchra* of Gray's Manual. Occasional in wet meadows and sweetgum fields.

Asclepias syriaca (Common Milkweed). Occasional in fallow fields and abandoned fields.

Asclepias tuberosa (Butterfly-weed). Rare in abandoned fields and pine fields.

Acerates viridiflora (Green Milkweed). Rare in abandoned fields.

CONVOLVULACEAE

Ipomoea hederacea (Ivy-leaf Morning-glory). Rare in fallow fields and cultivated fields.

Ipomoea lacunosa (Small-flowered Morning-glory). Occasional (locally common) in cultivated fields; rare in fallow fields.

Ipomoea pandurata (Wild Sweet-potato). Rare in abandoned fields and cultivated fields on terrace.

Ipomoea purpurea (Common Morning-glory). Occasional (locally common) in cultivated fields; rare in fallow fields.

Convolvulus sepium (Hedge Bindweed). Rare in abandoned fields and pine fields.

Cuscuta compacta. Two stations: on Winterberry and *Lycopus* in transition swamp and on Shining Sumac in wood margin.

Cuscuta gronovii. Common (locally abundant) on Wood-nettle and Touch-me-not in bottomland forest.

Cuscuta pentagona. *C. arvensis* of Gray's Manual. Common at one station on *Sericea Lespedeza* in abandoned field.

POLEMONIACEAE

Phlox maculata (Wild Sweet-William). Rare in damp hedgerows and wood margins.

HYDROPHYLLACEAE

Hydrophyllum virginianum (Virginia Waterleaf). Rare in bottomland forest.

BORAGINACEAE

Myosotis laxa (Forget-me-not). Rare in runs on flood plain; one station in wet meadow.

Mertensia virginica (Virginia Bluebells). Occasional in bottomland forest.

VERBENACEAE

Verbena hastata (Blue Vervain). Occasional in wet meadows and damp wood margins; rare in sweetgum fields.

Verbena simplex (Narrowleaf Vervain). *V. angustifolia* of Gray's Manual. Rare in abandoned fields.

Verbena urticaefolia (White Vervain). Rare in abandoned fields, hedgerows, and wood margins.

LABIATAE

- Teucrium canadense* (Wood-sage). Occasional in wood margins on flood plain.
- Trichostema dichotomum* (Blue-curls). Common in fallow fields and abandoned fields and along hedgerows and wood margins; occasional in pine fields; rare in sweetgum fields, cultivated fields, and lawns.
- Scutellaria integrifolia* (Hyssop Skullcap). Occasional in wet meadows; rare in sweetgum fields and damp hedgerows.
- Scutellaria lateriflora* (Mad-dog Skullcap). Occasional along shore of Cash Lake; rare in open shrub swamps and river swamps.
- Scutellaria ovalifolia* (Hairy Skullcap). *S. pilosa* of Gray's Manual. Rare in wood margins.
- Nepeta hederacea* (Ground-ivy). Rare in abandoned yards; one station in lawn.
- Prunella vulgaris* (Heal-all). Common in hedgerows and wood margins; occasional in abandoned fields; rare in fallow fields, pine fields, and lawns.
- Lamium amplexicaule* (Henbit). Rare in fallow fields and lawns.
- Leonurus cardiaca* (Motherwort). One station in fallow field.
- Stachys hispida*. *S. tenuifolia* var. *aspera* of Gray's Manual. One station along road.
- Stachys hyssopifolia*. One station in roadside ditch.
- Monarda punctata* (Horse-mint). Common at one station in pine field on terrace.
- Hedeoma pulegioides* (Pennyroyal). Occasional in wood margins; rare in cultivated fields, lawns, and hedgerows.
- Satureja vulgaris* (Wild-basil). Rare in hedgerows.
- Pycnanthemum flexuosum*. Occasional (locally common) in wet meadows and sweetgum fields; occasional in abandoned fields and pine fields.
- Pycnanthemum incanum*. Rare in bluff forest.
- Pycnanthemum muticum*. Occasional in wet meadows; rare in sweetgum fields, abandoned fields, and pine fields.
- Pycnanthemum verticillatum*. Rare in bluff forest.
- Cunila origanoides* (Dittany). Rare in pine-oak forest; one station in upland oak forest.
- Lycopus americanus*. Rare in wet meadows.
- Lycopus rubellus*. One station in bottomland forest.
- Lycopus uniflorus*. One station in wet meadow.
- Lycopus virginicus*. Occasional in damp hedgerows and wood margins; rare in sweetgum fields.
- Mentha arvensis* (Wild Mint). Occasional in wet meadows.
- Collinsonia canadensis* (Horse-balm). Occasional (locally common) in bottomland forest; one station in terrace forest.
- Perilla frutescens* (Perilla). Rare in bottomland forest.

SOLANACEAE

- Solanum carolinense* (Horse-nettle). Common in fallow fields and cultivated fields; rare in sweetgum fields, abandoned fields, pine fields, and pastures.
- Solanum nigrum* (Black Nightshade). Rare in fallow fields.
- Physalis subglabrata* (Ground-cherry). Rare in fallow fields.
- Datura stramonium* (Jimson-weed). Occasional in fallow fields; rare in cultivated fields.

SCROPHULARIACEAE

- Verbascum blattaria* (Moth Mullein). Rare in abandoned fields and pine fields.
- Verbascum thapsus* (Common Mullein). Rare in sweetgum fields, abandoned fields, and pine fields.
- Linaria canadensis* (Blue Toadflax). Occasional in fallow fields, abandoned fields, and pine fields.
- Chelone glabra* (White Turtlehead). Occasional in river swamps; one station each in shrub swamp and transition swamp.
- Mimulus alatus*. Occasional (locally common) in river swamps.
- Mimulus ringens*. Rare in wet meadows.
- Lindernia anagallidea*. *Ilysanthes anagallidea* of Gray's Manual. Locally common in south end of Lake Redington in 1946; rare in wet meadows.
- Lindernia dubia*. *Ilysanthes dubia* of Gray's Manual. Occasional in wet meadows.
- Gratiola neglecta*. *G. virginiana* of Gray's Manual. Occasional in wet meadows.
- Gratiola virginiana*. *G. sphaerocarpa* of Gray's Manual. Rare in pools in runs on flood plain.
- Veronica arvensis* (Corn Speedwell). Occasional in fallow fields, hayfields, pastures, and lawns.
- Veronica officinalis* (Common Speedwell). Occasional in hedgerows and wood margins; rare in abandoned fields, pine fields, pastures, and lawns.
- Veronica peregrina* (Purslane Speedwell). Rare in damp pastures; one station in garden.
- Veronica persica* (Birds-eye Speedwell). *V. tournefortii* of Gray's Manual. Common at one station in fallow field; another station in lawn.
- Veronica serpyllifolia* (Thyme-leaf Speedwell). Rare in damp pastures, lawns, hedgerows, and wood margins.
- Aureolaria virginica* (False-foxglove). *Gerardia flava* of Gray's Manual. Rare in terrace forest, bluff forest, and upland oak forest.
- Gerardia decemloba*. *G. parvifolia* of Gray's Manual. One station in abandoned field.
- Gerardia purpurea* (Purple Gerardia). Occasional (locally common) in wet meadows and sweetgum fields; rare in abandoned fields and pine fields.
- Melampyrum lineare* (Cow-wheat). Occasional in open terrace forest and bluff forest; rare in pine-oak forest and upland oak forest.
- Pedicularis lanceolata* (Swamp Lousewort). One plant in open shrub swamp.

LENTIBULARIACEAE

Utricularia geminiscapa. *U. clandestina* of Gray's *Manual*. Occasional (locally abundant) in Cash Lake, gravel pit ponds, and experimental plant ponds; rare in slow brooks.

Utricularia gibba. One station in gravel pit pond.

Utricularia vulgaris (Common Bladderwort). One station in south end of Cash Lake.

OROBANCHACEAE

Epifagus virginiana (Beech-drops). Common (locally abundant) under Beech in terrace forest and bluff forest; rare under Beech in pine-oak forest.

Orobanche uniflora (Cancer-root). Occasional in bottomland forest.

BIGNONIACEAE

Campsis radicans (Trumpet-creeper). *Tecoma radicans* of Gray's *Manual*. Occasional (locally common) in sweetgum fields and pine fields; occasional in abandoned fields, hedgerows, and wood margins; rare in bottomland forest, immature seepage swamps, and cultivated fields.

Catalpa speciosa (Northern Catalpa). One station in bottomland forest.

PHRYMACEAE

Phryma leptostachya (Lopseed). Rare in bottomland forest.

PLANTAGINACEAE

Plantago aristata (Bottle-brush Plantain). Occasional (locally common) in fallow fields; rare in abandoned fields.

Plantago lanceolata (Narrowleaf Plantain). Abundant in fallow fields, pastures, and lawns; occasional in abandoned fields, pine fields, and cultivated fields; rare in sweetgum fields.

Plantago major (Common Plantain). Rare in fallow fields.

Plantago rugelii (Rugel Plantain). Common in fallow fields, pastures, and lawns; rare in cultivated fields; one station in open seepage swamp.

Plantago virginica (Virginia Plantain). Occasional in fallow fields.

RUBIACEAE

Galium aparine (Cleavers). Common (locally abundant) in bottomland forest; rare in seepage swamps; one station in Ailanthus thicket.

Galium circaezans (Wild-licorice). Rare in terrace forest, bluff forest, and upland oak forest; one station in Ailanthus thicket.

Galium obtusum. *G. tinctorium* of Gray's *Manual*. Occasional in bottomland forest; rare in seepage swamps on upland.

Galium pilosum (Hairy Bedstraw). Rare in abandoned fields, pine fields, pine stands, and dry hedgerows and wood margins.

Galium tinctorium. *G. claytoni* of Gray's *Manual*. One station in wet meadow.

Galium triflorum (Sweet Bedstraw). Occasional (locally common) in bottomland forest; one station each in pine stand, upland oak forest, and Ailanthus thicket.

Diodia teres (Poor-Joe). Abundant in fallow fields; common in cultivated fields; occasional in abandoned fields and pine fields.

Mitchella repens (Partridgeberry). Common (locally abundant) in seepage swamps; occasional (locally common) in pine-beech forest, terrace forest, and bluff forest; occasional in pine stands and pine-oak forest.

Cephalanthus occidentalis (Buttonbush). Occasional (locally common) in shrub swamps; occasional in transition swamps and open river swamps; one station in seepage swamp on upland.

Houstonia caerulea (Bluets). Common in wet meadows; occasional in open bottomland forest, sweetgum fields, abandoned fields, and pine fields; rare in open terrace forest.

Houstonia purpurea (Purple Houstonia). Occasional in open bottomland forest, open terrace forest, and open bluff forest.

Oldenlandia uniflora. One station in wet meadow.

CAPRIFOLIACEAE

Lonicera japonica (Japanese Honeysuckle). Common (locally abundant) in hedgerows and wood margins; occasional in transitional swamps, river swamps, bottomland forest, seepage swamps, and abandoned fields; rare in sweetgum fields, pine fields, and pine stands.

Lonicera sempervirens (Trumpet Honeysuckle). One station in seepage swamp.

Viburnum acerifolium (Maple-leaf Viburnum). Occasional in terrace forest and bluff forest; rare in bottomland forest.

Viburnum cassinoides (Withe-rod). Rare in seepage swamps; one station in shrub swamp.

Viburnum dentatum (Arrow-wood). Includes *V. venosum* of Gray's *Manual*. Common in transition swamps and seepage swamps; occasional (locally common) in hedgerows and wood margins; occasional in shrub swamps; rare in river swamps, bottomland forest, sweetgum fields, immature seepage swamps, pine fields, pine stands, terrace forest, and bluff forest.

Viburnum nudum (Swamp Viburnum). Occasional (locally common) in shrub swamps; occasional in transition swamps and seepage swamps.

Viburnum prunifolium (Black-haw). Abundant in bottom forest; rare in river swamps, terrace forest, and damp hedgerows and wood margins.

Sambucus canadensis (Elderberry). Occasional in damp hedgerows and wood margins; rare in shrub swamps, transition swamps, river swamps, and bottomland forest.

VALERIANACEAE

Valerianella olitoria ? (Corn-salad). *V. locusta* of Gray's *Manual*. One station in cultivated field.

CUCURBITACEAE

Sicyos angulatus (Star-cucumber). Rare in bottomland forest.

CAMPANULACEAE

Specularia perfoliata (Venus Looking-glass). Occasional in fallow fields, abandoned fields, and pine fields.

LOBELIACEAE

- Lobelia cardinalis* (Cardinal-flower). Occasional (locally common) in river swamps; occasional in transition swamps and along runs in bottomland forest.
- Lobelia inflata* (Indian-tobacco). Occasional in abandoned fields, pine fields, and wood margins; rare in sweetgum fields and fallow fields.
- Lobelia puberula* (Downy Lobelia). Occasional (locally common) in wet meadows and sweetgum fields; occasional in abandoned fields and pine fields.
- Lobelia spicata* (Spiked Lobelia). Two stations: abandoned field and wood margin.

COMPOSITAE

- Vernonia glauca* (Broadleaf Ironweed). One station in abandoned field.
- Vernonia noveboracensis* (New York Ironweed). Occasional (locally common) in wet meadows; occasional in sweetgum fields and damp hedgerows and wood margins.
- Elephantopus carolinianus* (Elephants-foot). Rare in hedgerows and wood margins.
- Eupatorium album*. Occasional in sweetgum fields, abandoned fields, and pine fields; rare in terrace forest.
- Eupatorium aromaticum*. Three stations: sweetgum field, terrace forest, and upland oak forest.
- Eupatorium coelestinum* (Mist-flower). Rare in terrace forest; one station each in bottomland forest, fallow field, and abandoned field.
- Eupatorium hyssopifolium*. Occasional in sweetgum fields, abandoned fields, and pine fields.
- Eupatorium perfoliatum* (Boneset). Occasional in marsh-meadows and wet meadows; rare in sweetgum fields and damp fallow fields.
- Eupatorium pubescens*. Occasional in sweetgum fields, immature seepage swamps, abandoned fields, and pine fields.
- Eupatorium purpureum* (Joe-Pye Weed). Occasional (locally common) in marsh-meadows, wet meadows, sweetgum fields, and damp hedgerows.
- Eupatorium rotundifolium*. Rare in abandoned fields and pine fields.
- Eupatorium torreyanum*. Rare in sweetgum fields, abandoned fields, and pine fields.
- Eupatorium verbenaeifolium*. Occasional in abandoned fields and pine fields; one station in river swamp.
- Mikania scandens* (Climbing Hempweed). Rare in damp wood margins on flood plain; one station in seepage swamp.
- Liatris graminifolia* (Blazing-star). Occasional in abandoned fields and pine fields.
- Grindelia squarrosa* (Gum-plant). One station in lawn.
- Chrysopsis mariana* (Golden-aster). Occasional (locally common) in abandoned fields and pine fields; rare in fallow fields.
- Solidago altissima*. (Tall Goldenrod). Abundant in sweetgum fields, abandoned fields, and pine fields; occasional in fallow fields.
- Solidago bicolor* (White Goldenrod). Rare in terrace forest, bluff forest, and upland oak forest.

- Solidago caesia* (Woodland Goldenrod). Occasional in bottomland forest; rare in terrace forest.
- Solidago elliotii* (Swamp Goldenrod). One station in open seepage swamp.
- Solidago erecta* (Slender Goldenrod). Occasional in abandoned fields and pine fields.
- Solidago gigantea* (Giant Goldenrod). *S. serotina* var. *gigantea* of Gray's *Manual*. One station in margin of river swamp.
- Solidago graminifolia* (Flat-top Goldenrod). Common in wet meadows, sweetgum fields, and damp hedgerows; occasional (locally common) in fallow fields, abandoned fields, and pine fields.
- Solidago juncea* (Early Goldenrod). Abundant in abandoned fields and pine fields; common in sweetgum fields; occasional in fallow fields.
- Solidago nemoralis* (Dwarf Goldenrod). Common (locally abundant) in abandoned fields and pine fields; occasional in sweetgum fields and fallow fields.
- Solidago odora* (Sweet Goldenrod). Rare in pine fields, open forest on terrace and upland, and wood margins.
- Solidago puberula* (Downy Goldenrod). Occasional (locally common) in abandoned fields and pine fields; rare in open forest on terrace and upland.
- Solidago rugosa* (Rough Goldenrod). Includes *S. aspera* of Gray's *Manual*. Abundant in sweetgum fields; common in abandoned fields, pine fields, hedgerows, and wood margins; occasional in immature seepage swamps; rare in fallow fields and open terrace forest.
- Aster divaricatus* (Wood Aster). Occasional (locally common) in bottomland forest; rare in terrace forest.
- Aster dumosus*. Rare in wet meadows, seepage swamps, fallow fields, and damp hedgerows.
- Aster infirmus*. One station in dry wood margin.
- Aster lateriflorus*. Occasional in sweetgum fields; rare in pine fields, hedgerows, and wood margins.
- Aster linariifolius* (Savory-leaf Aster). Rare in dry wood margins.
- Aster paniculatus*. Rare in wet meadows and damp hedgerows and wood margins.
- Aster patens* (Purple Aster). One station in hedgerow.
- Aster pilosus*. *A. ericoides* of Gray's *Manual*. Abundant in abandoned fields and pine fields; occasional (locally common) in fallow fields; occasional in wet meadows, sweetgum fields, and pastures.
- Aster puniceus* (Swamp Aster). Occasional in wet meadows.
- Aster umbellatus* (Flat-top Aster). One station in sweetgum field.
- Aster undulatus*. Rare in terrace forest and upland oak forest.
- Aster vimineus*. Common (locally abundant) in river swamps and openings in bottomland forest and low terrace forest; occasional (locally common) in sweetgum fields; occasional in fallow fields and abandoned fields; rare in wet meadows and pine fields.
- Erigeron annuus*. Common in fallow fields; occasional in abandoned fields.

Erigeron canadensis (Horseweed). Common (locally abundant) in fallow fields and cultivated fields.

Erigeron strigosus. *E. ramosus* of Gray's Manual. Common in fallow fields; occasional in abandoned fields and pastures.

Sericocarpus asteroides (Broadleaf Sericocarpus). Occasional in pine fields and pine stands.

Sericocarpus linifolius (Narrowleaf Sericocarpus). Occasional (locally common) in abandoned fields and pine fields.

Pluchea petiolata (Marsh Fleabane). One station in bottomland forest.

Antennaria neglecta. Occasional (locally common) in pastures; occasional in abandoned fields and pine fields.

Antennaria neodioica. Rare in abandoned fields and pine fields.

Antennaria parlinii. Occasional in abandoned fields and pine fields; rare in hedgerows.

Antennaria plantaginifolia. One station in upland oak forest.

Gnaphalium obtusifolium (Sweet Everlasting). *G. polycephalum* of Gray's Manual. Common (locally abundant) in fallow fields; occasional (locally common) in sweetgum fields, abandoned fields, pine fields, and pastures.

Gnaphalium purpureum (Early Cudweed). Occasional in fallow fields; rare in abandoned fields.

Ambrosia elatior (Ragweed). *A. artemisiifolia* of Gray's Manual. Abundant in fallow fields and cultivated fields; occasional in pastures; rare in sweetgum fields, abandoned fields, and pine fields.

Ambrosia trifida (Giant Ragweed). Rare in open bottomland forest and fallow fields.

Xanthium pungens (Cocklebur). *X. canadense* of Gray's Manual. Occasional in fallow fields and cultivated fields.

Eclipta alba. Rare in wet meadows.

Rudbeckia hirta (Black-eyed Susan). Occasional in fallow fields and abandoned fields; rare in pine fields.

Rudbeckia laciniata (Tall Coneflower). Occasional (locally common) in bottomland forest.

Helianthus angustifolius (Swamp Sunflower). One station in damp wood margin.

Helianthus decapetalus (Thin-leaf Sunflower). Rare in bottomland forest.

Helianthus giganteus (Giant Sunflower). Rare in sweetgum fields and damp wood margins.

Helianthus tuberosus (Jerusalem-artichoke). One station in fallow field.

Actinomeris alternifolia (Yellow Ironweed). Rare in open bottomland forest.

Coreopsis verticillata (Coreopsis). Two stations: pine field and upland oak forest.

Bidens aristosa (Sunflower Beggar-ticks). One station in wet meadow.

Bidens bipinnata (Spanish-needles). Rare in fallow fields.

Bidens connata (Swamp Beggar-ticks). Occasional in wet meadows; rare in damp wood margins on flood plain.

Bidens frondosa (Common Beggar-ticks). Abundant in south end and along west shore of Lake Redington in 1946; occasional (locally common) in wet meadows and fallow fields.

Bidens vulgata (Tall Beggar-ticks). Rare in damp hedgerows and wood margins; one station in abandoned field.

Galinsoga ciliata (Quickweed). *G. parviflora* var. *hispida* of Gray's Manual. Common at one station in fallow field.

Helenium autumnale. Rare in wet meadows.

Helenium nudiflorum. Rare in abandoned fields and damp wood margins; one station in lawn.

Achillea millefolium (Yarrow). Common in abandoned fields and pine fields; occasional in fallow fields; rare in sweetgum fields.

Anthemis arvensis (Corn Camomile). Occasional (locally common) in fallow fields.

Anthemis cotula (Mayweed). Rare in fallow fields.

Chrysanthemum leucanthemum (Daisy). Abundant in abandoned fields; common in pine fields; occasional in fallow fields; rare in sweetgum fields, cultivated fields, pastures, and lawns.

Erechtites hieracifolia. Occasional (locally common) in cleared shrub swamps; rare in fallow fields and wood margins.

Cacalia atriplicifolia (Indian-plantain). One station in terrace forest.

Senecio aureus (Golden Ragwort). Occasional in bottomland forest.

Senecio smallii. Rare in abandoned fields.

Arctium minus (Burdock). Rare in yards.

Cirsium arvense (Canada Thistle). One station in fallow field.

Cirsium discolor (Field Thistle). Rare in fallow fields, abandoned fields, and hedgerows.

Cirsium lanceolatum (Bull Thistle). Rare in fallow fields, abandoned fields, and pine fields.

Cichorium intybus (Chicory). Rare in fallow fields and abandoned fields.

Krigia virginica (Dwarf-dandelion). Occasional (locally common) in abandoned fields, wood margins, and pastures; rare in pine fields.

Hypochaeris radicata (Cats-ear). One station in abandoned field.

Leontodon nudicaulis (Hawkbit). One station in abandoned field.

Chondrilla juncea (Skeleton-weed). Rare in fallow fields.

Taraxacum laevigatum (Red-seeded Dandelion). *T. erythrospermum* of Gray's Manual. One station along road.

Taraxacum officinale (Dandelion). Occasional in pastures and lawns.

Sonchus asper (Sow-thistle). One station in fallow field.

Lactuca canadensis. Occasional (locally common) in abandoned fields and wood margins; rare in hedgerows.

Lactuca floridana. Rare in damp wood margins.

Lactuca serriola (Prickly Lettuce). *L. scariola* of Gray's Manual. Rare in fallow fields.

Lactuca spicata. Rare in damp wood margins.

Lactuca villosa. One station in damp wood margin.

Prenanthes serpentina (Rattlesnake-root). Rare in damp hedgerows and wood margins.

Hieracium aurantiacum (Devils-paintbrush). One station in abandoned field.

Hieracium gronovii (Hairy Hawkweed). Occasional (locally common) in abandoned fields, pine fields, pastures, and wood margins.

Hieracium paniculatum (Panicled Hawkweed). Rare in terrace forest.

Hieracium pratense (Field Hawkweed). One station in abandoned field.

Hieracium scabrum (Rough Hawkweed). Rare in terrace forest, hedgerows, and wood margins.

Hieracium venosum (Rattlesnake-weed). Rare in terrace forest and upland oak forest.

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Slender Lespedeza	48	Star-of-Bethlehem	37
Slender Spike-rush	33	Starry Campion	42
Slender Wild-rye	32	Starworts	42
Slim Pigweed	41	Steironema	54
Small Geranium	48	Stellaria	42
Small-flowered Buttercup	42	Stenanthium	37
Small-flowered Morning-glory	55	Stenophyllus	33
Smartweeds	41	Stinging Nettle	40
Smilacina	37	Stink Grass	31
Smilax	37	Stipa	30
Smooth Crabgrass	28	Strawberry, Wild	45
Smooth Solomons-seal	37	Strawberry-bush	50
Smooth Sumac	49	Strophostyles	48
Smooth Winterberry	49	Stuve Lespedeza	48
Snakeroot	52	Stylosanthes	48
Soft Chess	32	Sulfur Cinquefoil	45
Soft Rush	36	Sumacs	49
Softstem Bulrush	33	Summer Grape	50
Solanaceae	57	Sundrops	52
Solanum	57	Sunflower Beggar-ticks	62
Solidago	60, 61	Sunflowers	62
Solomons-seal, False	37	Swamp Aster	61

Swamp Azalea	53	Trailing Lespedeza	48
Swamp Beggar-ticks	63	Trailing-arbutus	53
Swamp Chestnut Oak	40	Tree Clubmoss	27
Swamp Dewberry	46	Trichostema	56
Swamp Goldenrod	61	Tridens	31
Swamp Lousewort	57	Trifolium	46, 47
Swamp Rose	46	Triodia	31
Swamp Serviceberry	45	Trumpet Honeysuckle	59
Swamp Smartweed	41	Trumpet-creeper	58
Swamp Sunflower	62	Tubercled Orchid	38
Swamp Viburnum	59	Tulip-tree	43
Swamp White Oak	39	Tumble-mustard	44
Swamp-candle	54	Turks-cap Lily	37
Sweet Bedstraw	58	Turtlehead, White	57
Sweet Cherry	46	Tussock Sedge	35
Sweet Everlasting	62	Typha	27
Sweet Goldenrod	61	Typhaceae	27
Sweet Pepperbush	53		
Sweetbay	43	Ulmus	40
Sweetbells	53	Umbelliferae	52
Sweetclovers	47	Uniola	31
Sweet-flag	36	Upland Ladies-tresses	38
Sweetgum	44	Upright Knotweed	41
Sweet-potato, Wild	55	Urtica	40
Sweet-William, Wild	55	Urticaceae	40
Switch Grass	29	Utricularia	58
Sycamore	44	Uvularia	37
Symplocarpus	36		
		Vaccinium	54
Tall Beggar-ticks	63	Valerianaceae	59
Tall Buttercup	43	Valerianella	59
Tall Coneflower	62	Vallisneria	28
Tall Goldenrod	60	Velvet Grass	31
Tall Meadow-rue	43	Velvet Panicum	29
Tall Spearwort	43	Velvet-leaf	50
Taraxacum	63	Venus Looking-glass	59
Tea, New Jersey	50	Verbascum	57
Teal Grass	31	Verbena	55
Tear-thumbs	41	Verbenaceae	55
Tecoma	58	Vernal-grass	30
Tephrosia	47	Vernonia	60
Teucrium	56	Veronica	57
Thalictrum	43	Vervains	55
Thaspium	52	Vetches	48
Thin-leaf Sunflower	62	Viburnum	59
Thistles	63	Vicia	48
Thlaspi	44	Viola	51
Three-square	33	Violaceae	51
Thyme-leaf Sandwort	42	Violet Oxalis	48
Thyme-leaf Speedwell	57	Violets	51
Tickle Grass	30	Virginia Bluebells	55
Timothy	30	Virginia Chain Fern	25
Tipularia	38	Virginia Creeper	50
Toadflax, Bastard	40	Virginia Meadow-beauty	51
Toadflax, Blue	57	Virginia Pine	27
Touch-me-not	50	Virginia Plantain	58
Tovara	41	Virginia Waterleaf	55
Toxicodendron	49	Virginia Wild-rye	32

Virgins-bower	43	Wild-indigo	46
Vitaceae	50	Wild-licorice	58
Vitis	50	Wild-millet	29
		Wild-rices	30
Wand Lespedeza	47	Wild-ryes	32
Warty Panicum	29	Wild-sarsaparilla	52
Water-hemlock	52	Willow Oak	40
Waterleaf, Virginia	55	Willow-herb	52
Waterlily, White	42	Willows	38
Water-plantain	28	Winterberries	49
Water-purslane	52	Wintercresses	44
Water-shield	42	Wintergreens	53
Water-starwort	49	Wirestem Muhly	30
Weak Bulrush	33	Witch-grasses	29
White Ash	54	Witch-hazel	44
White Avena	45	Witche-rod	59
White Campion	42	Wood Anemone	43
White Clover	47	Wood Aster	61
White Goldenrod	60	Wood Ferns	26
White Grass	30	Woodland Blue Violet	51
White Mulberry	40	Woodland Bluegrass	31
White Oak	39	Woodland Goldenrod	61
White Pine	27	Wood-nettle	40
White Poplar	39	Wood-orchid, Green	38
White Sweetclover	47	Wood-reed	31
White Turtlehead	57	Wood-sage	56
White Vervain	55	Woodwardia	25
White Waterlily	42	Wool-grass	33
White-leaf Greenbrier	37		
Whitlow-grass	44	Xanthium	62
Whorled Loosestrife	54	Xyridaceae	36
Whorled Pogonia	38	Xyris	36
Wild Carrot	52		
Wild Geranium	48	Yam-root, Wild	37
Wild Hydrangea	44	Yarrow	63
Wild Mint	56	Yellow Adders-tongue	37
Wild Onion	37	Yellow Bristle-grass	30
Wild Peppergrass	44	Yellow Corydalis	44
Wild Senna	46	Yellow Dock	41
Wild Strawberry	45	Yellow Iris	38
Wild Sweet-potato	55	Yellow Ironweed	62
Wild Sweet-William	55	Yellow Oxalises	48
Wild Yam-root	37	Yellow Star-grass	38
Wild-basil	56	Yellow Sweetclover	47
Wild-bean	48	Yellow Violet	51
Wild-celery	28		
Wild-ginger	41	Zizania	30

U. S. DEPARTMENT OF THE INTERIOR,
FISH AND WILDLIFE SERVICE,
PATUXENT RESEARCH REFUGE,
LAUREL, MARYLAND.

Much has changed at Patuxent since Hotchkiss and Stewart reported on the vegetation. The Farm Wildlife Project of the late 1940's and 1950's made great changes in the open areas and introduced many new plants, some of which have become aggressive dominants, at least locally. One, multi-flora rose, is now universally distributed and is a major problem. The impoundment project of the 1950's and 1960's created many acres of marsh, a habitat that was only marginally present before, and involved introducing many new plants. Some of these failed, others spread.

Today, in 1978, the Center consists almost entirely of dense forests, densely sodded meadows, and impounded areas. It is likely that some species that were seen earlier, at times of greater disturbance of soil and vegetation, are no longer present. In addition, the heavy deer pressure of recent years is thought to have reduced or eliminated a number of species. Other species have volunteered and have become abundant; two good examples are Arthraxon hispidus and Gidens polylophus.

The present list began with a list of additions and changes prepared by Hotchkiss. A search through the collection of Patuxent plants, and through all unmounted Patuxent plants, turned up more additions and provided at least some data for most species listed by Hotchkiss. Additional data on numerous plants, especially marsh and aquatic species, were supplied by Mr. F.M. Uhler. The unpublished manuscript of F.B. McGilvrey (1975) on impoundment studies was consulted for data on introduced aquatics. We have not listed all one-time waifs or all species that were introduced and failed.

This list applies to the same areas of the Center as did the list of 1947. It has not been feasible to include new areas east of the A-Farm or the former Forest Service tract. The latter offers special problems because several kinds of poplars and hybrid poplars were used there and still appear in puzzling forms; because experimental plantings of pines of unexpected types appear here and there; and because unidentified exotic oaks and other trees were planted around the headquarters area. Native plants of this tract are much like those of other upland forest areas of the Center, but between Patuxent land and the Agricultural Center airport, near the white sand area, there are a few plants of Quercus prinoides, a native shrub oak that is not known from Patuxent.

POLYPODIACEAE

Adiantum pedatum (Maidenhair fern). A patch in well-drained bottomland near plot 3720 in 1969.

Change: Athyrium asplenoides to filix-femina.

LYCOPODIACEAE

Lycopodium inundatum (Marsh clubmoss). First found at Bluegill Pond in 1954.

Change: Lycopodium flabelliforme to complanatum.

PINACEAE

Tsuga canadensis (Hemlock). One small plant in moist gully, plot 4240.

TYPHACEAE

Typha angustifolia (Narrow-leaved cattail). In gravel-pit pond that is north of Duvall Bridge; also in Lake Redington.

NAJADACEAE

Najas gracillima (Slender naiad). Planted in Island Marsh II and in Gravel Pit Pond on A-Farm. From Delaware.

Najas guadalupensis (Southern naiad). Planted in Snowden Pond and Island Marsh II. From Back Bay, Va.

Potamogeton natans (Floatingleaf pondweed). Planted in Snowden Pond. From Mass. Succeeded.

Potamogeton pulcher (Handsome pondweed). Planted in Duvall Pond I and Island Marsh II with limited success. From N. C.

Change: Potamogeton berchtoldi to pusillus.

ALISMACEAE

Sagittaria graminea var. weatherbiana (Slender arrowhead). Introduced from southwest of Dismal Swamp, Va. Throve for some years on shady side of Snowden Pond.

Sagittaria subulata (Water Arrowhead). Planted in Island Marsh II. From Back Bay, Va.

HYDROCHARITACEAE

Elodea canadensis, nuttallii form (Common elodea). In river, Island Marsh I, and Duvall Pond I.

GRAMINEAE

Arrhenatherum elatius (Tall oatgrass). Collected in 1953 from near Lake Redington gate, where planted in 1952. Seed from SCS nursery, Gretna, Va.

Arthraxon hispidus (Hairy jointgrass). Often abundant in scattered grassy areas. Forms dense beds in moist areas along Entrance Drive.

Bromus inermis (Smooth brome grass). Meadow border of road north of west end of Island Marsh II.

Bromus tectorum (Downy brome grass). Meadow northwest of Lake Redington.

Deschampsia flexuosa (Wavy hairgrass). Planted on south edge of outlet from Island Marsh II in 1968. From edge of brook in serpentine area called "Soldiers' Delight" in western Baltimore Co., Md.

Change: Eragrostis cilianensis to megastachya.

Festuca arundinacea (Alta fescue). Spreading aggressively through grasslands from Farm Wildlife plantings. Too coarse and dominant to be desirable.

Festuca rubra (Red fescue). Widely planted as prime forage for geese.

Panicum agrostoides var. condensum (No common name). Planted at west edge of Island Marsh II. Seed from Delaware.

Panicum ramosum (Browntop millet). Collected in 1962 from planting in field north of Island Marsh I.

Change: Panicum huachucae & tennesseense to lanuginosum.

Paspalum dilatatum (Dallis-grass). Abundant in lawns around laboratories.

Paspalum dissectum (Mudbank paspalum). Collected from bottom of drawn-down Knowles Unit I in 1973. Seed from Sussex Co., Del.

Paspalum distichum (Knotgrass). Growing in 6 inches of water in Snowden Pond in 1948. Introduced from pond near Port Conway, Va.

Change: Paspalum pubescens to ciliatifolium var. muhlenbergii.

Pennisetum glaucum (Pearl millet). Volunteered in field of Panicum ramosum planted north of Island Marsh I. Collected in 1962.

Phalaris arundinacea (Reed canarygrass). Introduced by Farm Wildlife Project. This is the exceptionally tall grass that forms striking clumps and stands in moist meadows of A and B-Farms. Also in some roadside ditches.

Change: Setaria faberi to faberii.

Change: Setaria lutescens to glaucula.

Sorghum halepense (Johnson grass). Scattered clumps in meadows. Collected in 1948 and 1958. Elimination by sprays attempted in 1976.

Sphenopholis obtusata (Prairie wedgescale). Collected June 1950 near plot 1629 in tall herbs at edge of pine field.

CYPERACEAE

Carex pseudocyperus (Cyperus-like sedge). Collected in 1963 from Gravel Pit Pond. Introduced from near Upper Marlboro, Md.

Carex vestita (Velvet sedge). Rare on somewhat sandy, shaded, seepage slope on south edge of Snowden Pond in 1948.

Change: Carex convoluta to rosea.

Change: Carex glaucodea to flaccosperma.

Change: Carex grisea to amphibola.

Change: Carex hirsutella to complanata.

Change: Carex howei & incomperta to atlantica.

Change: Carex longii to albolutescens.

Change: Carex oblita to venusta.

Change: Carex richii to straminea.

Change: Carex swanii to virescens.

Change: Carex tonsa to umbellata.

Cladium mariscoides (Twig rush). Collected from northwest edge of Snowden Pond in 1960. Introduced from Dorchester Co., Md. Believed to have failed.

Cyperus difformis (Asiatic cyperus). Fruited in mud bottom of drawn-down Island Marsh I in 1956. Believed to have failed since. Seed came from Sacramento Refuge, Calif.

Cyperus pseudovegetus (Marsh cyperus). Wet soil at edge of Gravel Pit Pond in 1955.

Eleocharis engelmanni [probably synonym of *E. obtusa*] (Blunt spike-rush). Gravel Pit Pond and Island Marsh II.

Eleocharis flavescens [includes *olivacea*] (Yellowish spike-rush). Collected in 1963 from Harding Spring Pond and south end of Cash Lake.

Eriophorum virginicum (Virginia cottonsedge). Rare in shrub swamp, plot 4503.

Change: Kyllinga pumila to Cyperus tenuifolius.

Scirpus fluviatilis (River bulrush). Collected in 1952 from edge of island in Snowden Pond. Believed to have failed since. Stock came from Hunting Creek at Alexandria, Va.

Scleria reticularis (Reticulated nut-rush). Occasional in moist area cleared for impoundment, near plot 2649, in 1958.

ARACEAE

Peltandra virginica (Arrow-arum). Planted in Snowden Pond, Gravel Pit Pond, and Island Marsh I. Persisting near Snowden outlet in 1978.

LEMNACEAE

Lemna minor (Lesser duckweed). River, Knowles units, Snowden Pond.

Lemna valdiviana (Valdivia duckweed). Knowles impoundments.

Wolffia papulifera (Pointed duckweed). Abundant on Duvall Ponds, 1961.

COMMELINACEAE

Anilema keisak (Asiatic dayflower). Collected in 1948 from Snowden Pond; later declined, but persists in 1978. Stock from Port Conway, King George Co., Va.

JUNCACEAE

Juncus subcaudatus (Slender rush). Locally common in sphagnum of shrub swamp in plot 4485 in 1947.

Change: Luzula bulbosa & echinata to campestris.

LILIACEAE

Change: Stenanthium robustum to gramineum.

DIOSCOREACEAE

Dioscorea batatas (Chinese yam or cinnamon vine). Vigorous vines persisting in shrubs at two points at Director's house, plot 2633. Apparently volunteered. Remarkable for small potato-like bulbils in leaf axils.

AMARYLLIDACEAE

Leucojum aestivum (Summer snowflake). Two small colonies found in 1956 in south side of plot 4418.

IRIDACEAE

Change: Sisyrinchium graminoides to angustifolium.

SAURURACEAE

Saururus cernuus (Lizard tail). Accidentally introduced into outlet of Island Marsh I from Fairfax Co., Va. Later found at Bluegill Pond.

SALICACEAE

Populus deltoides? (Cottonwood). One sample from Lake Redington Dam, 1948. Poplars are all suspect owing to varied species and hybrids used on former Forest Service tract.

Populus tremula (European aspen). Woods edge along road at north corner of Center (plot 2796?) in 1946. Roadside waif, plot 2642, in 1950, now gone. Large tree planted in yard, plot 2633.

Salix alba var. vitellina (White willow). Large tree planted near northwest end of Snowden Pond dam.

Salix purpurea (Basket willow). A many-stemmed shrub planted in wet soil on northwest side of Snowden Pond in about 1948. Persists.

JUGLANDACEAE

Carya ovata (Shagbark hickory). One planted tree (from West Virginia) grows in a small copse about 22 yards northeast of ne. corner of Chemistry Building. Put in by Uhler & Vance, probably in 1950's.

Juglans nigra (Black walnut). Was not originally listed, although large trees were present, probably because considered planted. Now reproducing and spreading, at least in Headquarters area. Efforts are made to protect seedlings.

FAGACEAE

Quercus hybrid of phellos x ? This is the only kind of hybrid oak known on the Center, but it is not rare. Can be seen at west end of Cash Lake dam and beside River Road at Hance Unit I.

Drop: Quercus imbricaria. The shingle oak probably does not occur here. Records for it are thought to represent Q. phellos hybrids.

Change: Quercus borealis to rubra.

Change: Quercus montana to prinus.

Change: Quercus prinus to michauxii.

URTICACEAE

Celtis occidentalis (Hackberry). A few trees found in plots 4419 and 5431. May have been planted on old Kluckhuhn Farm and may now be gone, for areas were altered by powerline cut and Farm Wildlife alterations.

Maclura pomifera (Osage orange). A few plants now just west of Chemistry Building in woods edge, plot 2636. Earlier reported from hedgerow in plots 3574 and 3585.

POLYGONACEAE

Polygonum cespitosum (Tufted smartweed). Abundant, often densely, especially in gardens, river channels, along woods roads, and similar sites.

Polygonum convolvulus (Black bindweed). A few in field border, plot 5445, in 1950.

Polygonum densiflorum (Southern smartweed). Introduced from Dare Co., N.C., with limited success, but made some growth in Knowles Unit I, Island Marsh I, and Snowden Pond.

Polygonum lapathifolium (Nodding smartweed). Found along roadside, plot 5431, in 1952. Introduced around Hance and Knowles units with limited success.

Polygonum orientale (Prince's plume). Introduced with seeds of other species. Seen on margin of Cash Lake, 1938, and in bottom of drawn-down Knowles Unit I in 1973. Probably gone.

Change: Polygonum dumetorum to scandens.

CARYOPHYLLACEAE

Paronychia fastigiata (Forked chickweed). On powerline clearing at Holly Run, plot 2578, in 1951.

Saponaria officinalis (Soapwort). Occurs sparingly as waif. One collected in yard, plot 4449.

Stellaria graminea (Grassy starwort). In disturbed soil in front of Merriam Laboratory in 1956 and 1962. In tall grass, plots 2634 and 2676, in 1978.

NYMPHAEACEAE

Change: Nuphar advena to luteum.

Nymphaea alba (European waterlily). Adventive, not planted, and now dominant in Knowles units. Both alba and odorata have both pink and white forms here.

PAPAVERACEAE

Papaver dubium (Longpod poppy). Waif in dry hillside meadow, plot 5431, in 1952.

CRUCIFERAE

Alliaria officinalis (Garlic mustard). Thriving patch just across road from Snowden Hall at southeast end of front row of arbor vitae in 1976.

Brassica rapa [=campestris] (Field mustard). Mostly an occasional waif, but a bad weed in meadow just west of south end of Cash Lake in 1972.

Cardamine hirsuta (Early bittercress). Abundant in lawns and elsewhere. Is earliest plant to bloom here.

Change: Sisymbrium thalianum to Arabidopsis thaliana.

ROSACEAE

Chaenomeles lagenaria (Flowering quince). Persisting rather poorly at a few spots, but not spreading freely from cultivation.

Change: Gillenia trifoliata to trifoliata.

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Merriam Room

Malus sieboldii (Toringo crab-apple). Some seedlings near planted ornamentals.

Change: Potentilla monspeliensis to norvegica.

Prunus pensylvanica (Fire cherry). Collected on powerline clearing near Entrance Drive in 1963. Probably gone owing to tree removal along line.

Rosa multiflora (Multiflora rose). Spreading aggressively from Farm Wildlife plantings into nearly all habitats. Locally dominant, especially in woods margins, thickets, and hedgerows, but present throughout woods and fields. Is the worst weed on the place and the worst error of the wildlife profession.

Rubus linkianus (Double-flowered bramble). An ornamental climber that has persisted for years amid roadside shrubs on Kluckhuhn Road, plot 5440 and on Entrance Drive, plot 2611. Also spreading in meadow 150 feet west of Snowden Hall.

Change: Rubus cordialis and fusus to enslenii.

LEGUMINOSAE

Albizia julibrissin (Mimosa). Seeding in freely from planted ornamentals, but dying wholesale from disease; larger trees now dead.

Cassia tora (Sicklepod). In corn row, plot 3558, Oct. 1959. One plant on bare gravel bank of small impoundment, plot 4515, Aug. 1978.

Cercis canadensis (Redbud). Seeding in freely from planted ornamentals.

Coronilla varia (Crown vetch). Planted in Black Duck Pond enclosure, about plot 4515, and in yard, plot 4449. Persisting in 1978.

Change: Desmodium bracteosum to cuspidatum.

Change: Desmodium dillenii to perplexum.

Lespedeza bicolor? (Shrub lespedeza). Spreading from Farm Wildlife plantings. Occasional in woods edges, common in certain meadows, as in plot 2698. There are at least two kinds, but neither is easily matched with descriptions and the species are variable. Collections should be made and identified authoritatively.

Change: Lespedeza stuevei to stuevei.

Lotus corniculatus (Birds-foot trefoil). An attractive yellow-flowered plant that persists in fields of A and B Farms from Farm Wildlife Plantings.

Vicia dasycarpa (Smooth vetch). Abundant, attractive, and conspicuous in most meadows. Probably introduced by Farm Wildlife Program in late 1940's or 1950's.

EUPHORBIACEAE

Euphorbia helioscopia (Wartweed). In wheatfield, plot 3554, in 1953. In front of Snowden Hall for years until about 1977.

CALLITRICHACEAE

Callitriche stagnalis (Water starwort). Snowden Pond. From Beltsville, Md.

Change: Callitriche austini to deflexa.

ANACARDIACEAE

Change: Toxicodendron radicans to Rhus radicans.

Change: Toxicodendron vernix to Rhus vernix.

CELASTRACEAE

Celastrus scandens (Climbing bittersweet). Common. Climbs fences and vegetation at various points, often along roadsides, as in plots 3566 and 3559.

Change: Evonymus to Euonymus.

ACERACEAE

Acer platanoides (Norway maple). Spreading by seed from planted ornamentals. Occasional around buildings and roadsides, at least in Headquarters.

BALSAMINACEAE

Change: Impatiens biflora to capensis.

VITACEAE

Ampelopsis brevipedunculata (Grapeleaf ampelopsis). One vigorous vine in thicket behind apartment house, plot 2641. Not thought to have been planted.

VIOLACEAE

Viola arvensis (Field violet). Amid flowerbed weeds near front of Director's house, plot 2632, in 1977. A tall, stringy, weedy species.

Viola kitaibeliana (Iberian violet). Common on open roadsides, especially on Knowles dam. A small, pale violet.

PASSIFLORACEAE

Passiflora lutea (Yellow passion-flower). Scattered in thickets. Common behind house in west-central part of plot 2632.

ELAEAGNACEAE

Elaeagnus umbellata (Autumn olive). Spreading aggressively into meadows and edges from Farm Wildlife plantings. Now abundant and widely spread.

ONAGRACEAE

Gaura biennis (Biennial gaura). Was common in open area between Henshaw and Nelson laboratories and Entrance Drive, but nearly shaded out by 1977.

Change: Ludwigia to Ludwigia.

ARALIACEAE

Hedera helix (English ivy). Spreading from plantings in various areas.

Change: Panax trifolium to trifolius.

UMBELLIFERAE

Change: Angelica villosa to venenosa.

Hydrocotyle ranunculoides (Floating pennywort). Collected from upper end of Snowden Pond, 1960. From Cuckold Creek, Charles Co., Md.

ERICACEAE

Change: Monotropa hypopitys to hypopithys.

OLEACEAE

Change: Chionanthus virginica to virginicus.

Forsythia intermedia (Golden bells). Listed, but no available record, and not known to be spreading from cultivation.

Change: Fraxinus biltmoreana to americana var. biltmoreana.

Ligustrum obtusifolium (Border privet). Spreading aggressively from plantings, especially into woods edges and hedgerows. A nuisance.

Ligustrum ovalifolium (California privet). Spreading only sparingly from cultivation, but some outliers are seen.

APOCYNACEAE

Vinca minor (Periwinkle or myrtle). Spreading freely from plantings into woods and grassy areas.

ASCLEPIADACEAE

Change: Acerates viridiflora to Asclepias viridiflora.

Asclepias purpurascens (Purple milkweed). Uncommon and unhealthy. Has appeared on Snowden Pond dam and on powerline clearing near Service Road.

CONVOLVULACEAE

Ipomoea coccinea (Red morning-glory). Occasional as weed of disturbed sites. Known from plots 4449 and 2645.

BORAGINACEAE

Lithospermum arvense (Corn groomwell). On meadow slope on south side of east end of Island Marsh I in 1970.

VERBENACEAE

Change: Verbena urticaefolia to urticifolia.

LABIATAE

Lamium purpureum (Purple dead-nettle). In bottomland woods, plot 3705, and at various open sites in Headquarters area.

Change: Nepeta hederacea to Glechoma hederacea.

Change: Scutellaria ovalifolia to elliptica.

Drop: Stachys hispida. The sole sample is considered unidentifiable by experts.

Stachys nuttallii (Betony). Plants so identified by experts of National Herbarium in 1978 were found along Entrance Drive and around Knowles Marsh II.

Stachys palustris (Marsh betony). One sample so identified by National Herbarium in 1978 was found near bluegill Pond in 1954. S. palustris and nuttallii seem almost indistinguishable even by direct comparison.

SCROPHULARIACEAE

Change: Aureolaria virginica to Gerardia virginica.

Change: Gerardia decemloba to obtusifolia.

Gratiola pilosa (Hairy hedge-hyssop). Common among herbs in moist soil near foot of slope in plot 2612 in 1958.

Gratiola viscidula (Sticky hedge-hyssop). Formed wide marginal band in water along northwest shore of Snowden Pond. Also on south bank of Island Marsh I. Not planted.

Penstemon digitalis (Foxglove beard-tongue). Occasional, but attractive, in meadows of Headquarters area. May have escaped from cultivation.

Penstemon hirsutus (Hairy beard-tongue). One plant on dry road shoulder, plot 2606, in 1959.

LENTIBULARIACEAE

Utricularia resupinata (Lavender-flowered bladderwort). Introduced from Georgetown, Del., in 1965. Abundant in Island Marsh II for some years around 1968.

OROBANCHACEAE

Conopholis americana (Squawroot). Found in bluff forest, plot 2708, in 1954.

RUBIACEAE

Change: Oldenlandia uniflora to Hedyotis uniflora.

CAPRIFOLIACEAE

Diervilla lonicera (Northern bush-honeysuckle). Good stand at one point on powerline clearing near plot marker 5381 in 1977. May have come in on contractor's machines used on right-of-way.

Lonicera maackii (Amur bush-honeysuckle). Spreading strongly, but not aggressively, from Farm Wildlife plantings in most open areas of Center.

Lonicera tatarica (Tartarian honeysuckle). Spreading aggressively from Farm Wildlife plantings. Locally dominant on powerline clearing on A-Farm and nearby areas.

COMPOSITAE

Change: Ambrosia elatior to artemisiifolia.

Artemisia vulgaris (Mugwort wormwood). Introduced with nursery stock about 1969. Densely abundant weed around some Headquarters buildings and spreading strongly even into lawn. Nearly impossible to kill out.

Carduus nutans (Nodding thistle). One plant blooming on roadside about 150 feet southeast of Snowden Hall in July 1978.

Change: Aster paniculatus to simplex.

Baccharis halimifolia (Groundsel-tree). Uncommon, scattered. One collected in 1956 in plot 4588.

Bidens coronata? (Southern tickseed-sunflower). On marshy northwest side of Snowden Pond in 1951. Probably brought in with other plants from near Savanna Lake, Dorchester Co., Md., in 1949.

Bidens discoides (Small beggar-ticks). On wet soil of Knowles Marsh I in 1961, often on tree bases.

Bidens polylepis (Prairie tickseed-sunflower). Came in by itself and became one of the most abundant and showy plants of open areas. Now by far the commonest of flowering Bidens.

Centaurea solstitialis (Yellow star-thistle). Probably waif. Collected in 1964 from seeded pasture, plot 2645.

Change: Cirsium lanceolatum to vulgare.

Eupatorium rugosum (White snakeroot). Rare. Collected in bottomland forest, plot 1718, in 1954 and perhaps not seen since.

Eupatorium serotinum (Late boneset). Appeared in 1960's and became common in 1970's. Single plants and stands are scattered in open areas, especially on powerline clearing along Service Road, plot 3573.

Change: Eupatorium pubescens to rotundifolium.

Change: Eupatorium purpureum to maculatum.

Change: Eupatorium torreyanum to hyssopifolium.

Change: Eupatorium verbenaeifolium to pilosum.

Change: Hypochaeris to Hypochoeris.

Change: Lactuca spicata to biennis.

Change: Lactuca serriola to scariola.

Change: Lactuca villosa to floridana.

Change: Leontodon nudicaulis to leysseri.

Change: Pluchea petiolata to camphorata.

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Prenanthes alba or altissima (White lettuce). Basal leaves only collected from bottomland beech woods, plot 4634, in 1943. Flowering plants should be collected for identification.

Change: Taraxacum laevigatum to erythrospermum.

Tragopogon major (Meadow salsify). Scattered plants in meadows, especially in field that is north and east of Bird Yard.

Verbesina occidentalis (Yellow crownbeard). In shrub lespedeza border, plot 4458, in 1957.

Change: Xanthium pungens to chinense.

Fairly intensive collecting of fishes was done in 1941-42. The identifications were checked with, or made by Dr. Carl L. Hubbs. Data on these and various other collections at Patuxent are preserved in a loose-leaf notebook.

It is likely that many of the clear-water species collected in the river in the 1940's are now absent. Efforts to find certain of the darters failed in the 1950's. More recently, Chu-fa Tsai reported that the fish fauna at Duvall Bridge changed greatly in species composition between 1945 and 1966 (Chesapeake Science 9(2):83-93, 1968). The number of species was about the same, but most of the species found in the river in the 1940's were gone by 1966. The species that replaced them were generally ones we had found in such organic sites as bottomland pools, impoundments, or creeks. Tsai attributed this change primarily to toxic materials entering the river with chlorinated effluent from sewage treatment plants. He demonstrated that the effect was almost annihilative near sewage outfalls and diminished with distance. The responsible chemicals were not determined, but Tsai suspected compounds caused by chlorination.

A decade later, Ruggiero studied the benthic macroinvertebrates of the river and concluded that the main problem was sediment, for aquatic insects flourished when clean substrate was provided. His 1977 thesis is in the Patuxent library. Oral reports from State Water Resources workers in 1978 state that the river is in relatively good condition in respect to oxygen and chlorine, despite being enriched, and that they now have data of their own that favor Ruggiero's view. Sedimentation, therefore, may be one of the chief factors that now affects the fish fauna of the river.

The scientific and common names used here are based on those of "Common and Scientific Names of Fishes," 1970, Special Publication No. 6, American Fisheries Society.

PETROMYZONTIDAE (Lampreys)

Lampetra aepyptera (Least brook lamprey). Creeks. Was seen breeding in 1943 in brook where Bluegill Pond now meets Md. 197.

Petromyzon marinus (Sea lamprey). Young collected in river.

ANGUILLIDAE (Eels)

Anguilla rostrata (American eel). Probably all waters. Known from river, woods ponds, Snowden Pond, creeks.

CLUPEIDAE (Herrings)

Alosa pseudoharengus (Alewife). River and Cash Creek. Has runs upstream in spring.

UMBRIDAE (Mudminnows)

Umbra pygmaea (Eastern mudminnow). Bottomland pools, river, creeks, experimental pond, Harding Spring Pond.

ESOCIDAE (Pickerel)

Esox americanus (Redfin pickerel). Bottomlands pools and river.

✓ Esox niger (Chain pickerel). Bottomland pools, lakes, gravel pit, creeks, river.

CYPRINIDAE (Minnows)

Clinostomus funduloides (Rosyside dace). River and bottomlands pool.

Cyprinus carpio (Carp). Recorded from pond below Cash Lake, but no doubt in other waters.

— Exoglossum maxillingua (Cutlips minnow). River. Perhaps gone.

Hybognathus nuchalis (Silvery minnow). One taken from bottomland pool in 1954.

— Nocomis micropogon (River chub). River. Perhaps gone.

✓ Notemigonus crysoleucas (Golden shiner). Lakes, river, bottomland pools, impoundments.

— Notropis amoenus (Comely shiner). River. Perhaps gone.

— Notropis analostanus (Satinfin shiner). River and deep woods pool near river. Perhaps gone.

— Notropis cornutus (Common shiner). River and deep woods pool near river. Perhaps gone.

Notropis hudsonius (Spottail shiner). 11 reported from river in 1978, by G.H. Harman, letter of Oct. 27, 1978.

Notropis procne (Swallowtail shiner). River.

Rhinichthys atratulus (Blacknose dace). One reported from river by Tsai, 1968.

— Rhinichthys cataractae (Longnose dace). River. Perhaps gone.

Semotilus corporalis (Fallfish). River and bottomland pools. Common in 1940's, rare in 1966, common in 1978.

CATOSTOMIDAE (Suckers)

Catostomus commersoni (White sucker). River and deep bottomland pool near river.

Erimyzon oblongus (Creek chubsucker). Bottomland pools, river.

Hypentelium nigricans (Northern hog sucker). River and Cash Creek. Perhaps gone.

— Moxostoma macrolepidotum (Short-head redhorse). River. Perhaps gone.

ICTALURIDAE (Catfish)

— Ictalurus catus (White catfish). River. Perhaps gone.

✓ Ictalurus nebulosus (Brown bullhead). Lakes, impoundments, river, bottomland pools, creeks.

Ictalurus punctatus (Channel catfish). Collected in 1977 in an impoundment, probably Mallard Pond, fide Craig Phillips.

Noturus gyrinus (Tadpole madtom). Bottomlands pool, river.

— Noturus insignis (Margined madtom). River. Perhaps gone.

POECILIIDAE (Mosquito fishes)

Gambusia affinis holbrooki (Mosquito fish). Thriving in impoundments. Introduced by F.M. Uhler in about 1958 from Blue Pond, which is an old iron mine pond near Muirkirk, Prince Georges Co., Md. Source of stock in Blue Pond not known, but probably in-state. Three were recorded from river by Tsai, 1968; may have come from our impoundments.

APHREDODERIDAE (Pirate perches)

Aphredoderus sayanus (Pirate perch). Bottomland pools, river, and Cash Creek.

4/11/99
Buckley Bridge
Pond, N. Tract
(Bucky Woods)

CENTRARCHIDAE (Sunfishes & bass)

Emmeacanthus gloriosus (Bluespotted sunfish). Bottomland pools, impoundments, Cash Creek. Many reported from river by Tsai, but not found in that habitat in 1940's.

✓ Lepomis auritus (Redbreast sunfish). River and bottomland pool near river. Scarce, perhaps gone.

Lepomis cyanellus (Green sunfish). Three reported from river by Tsai, 1968.

✓ Lepomis gibbosus (Pumpkinseed). Lakes, ponds, impoundments, river, bottomland pools, gravel pit, creek.

✓ Lepomis gulosus (Warmouth). Impoundments, pool below Cash Lake dam.

✓ Lepomis macrochirus (Bluegill). River, lakes, ponds, bottomland pools, impoundments. Stocked in Farm Pond and probably elsewhere.

✓ Micropterus salmoides (Largemouth bass). Cash Lake, Snowden Pond, impoundments, river. Stocked in Cash Lake, Farm Pond, and probably elsewhere.

✓ Pomoxis nigromaculatus (Black crappie). Cash Lake, impoundments, bottomland pools, river. Stocked in Cash Lake and probably elsewhere.

PERCIDAE (Darters & perches)

- Etheostoma nigrum (Johnny darter). River. Perhaps gone.

- Etheostoma vitreum (Glassy darter). River, common on riffles. Perhaps gone.

Perca flavescens (Yellow perch). River.

- Percina notogramma (Stripeback darter). River. Part of the type series came from here. Perhaps gone.

- Percina peltata (Shield darter). River. Perhaps gone.

AMPHIBIANS AND REPTILES

OF THE PATUXENT WILDLIFE RESEARCH CENTER

Knowledge of the status of most of our reptiles and amphibians is based on subjective judgments, for studies have been made only of Terrapene and Elaphe. Rarity is easily confused with secretiveness and localism. Species may seem scarcer now than they did in the 1940's because there are now fewer people doing extensive survey work on the Center. We have tried to allow for these factors in annotating the list. We have also freely admitted ignorance. A strong feeling remains that some species are less common than they used to be on the Center; the annotations reflect this. Why they are scarcer is debatable, but among the factors to be considered are more severe and prolonged floods in the bottomlands, abandonment of agriculture, and polarization of the Center between increasingly dense forest and densely soddied meadows. On the other hand, the impoundments have helped some species; no doubt all water turtles, most frogs, Natrix sipedon, and perhaps Thamnophis sauritus are commoner than before.

The scientific and common names used here are standardized according to Roger Conant, 1975, A Field Guide to Reptiles and Amphibians of Eastern and Central North America, Houghton Mifflin, Boston, xviii + 429 p.

The two major references on Maryland herptiles are unfamiliar and deserve mention here. Good, recent spot maps for each species are presented by H.S. Harris, Jr., 1975, Distributional Survey (Amphibia/Reptilia): Maryland and the District of Columbia, in Bulletin of the Maryland Herpetological Society 11(3): 73-170. A complete monograph on the reptiles was written by R.H. McCauley, Jr., 1945, The Reptiles of Maryland and the District of Columbia, 194 pages + maps and photographs. This was privately printed and is out of print.

CAUDATA (Salamanders)

✓ Ambystoma maculatum (Spotted salamander). Was occasional. Now scarce; few egg masses found in bottomland pools where once fairly numerous.

✓ Ambystoma opacum (Marbled salamander). Was occasional, sometimes common, but now apparently scarcer.

✓ Desmognathus f. fuscus (Northern dusky salamander). Seldom sought. Once common in developed spring, plot 5440.

✓ Eurycea b. bislineata (Two-lined salamander). Occasional along spring runs.

Oct. 1, 1981
Found in window
well behind
Nelson
↓ +

11-1-94 Ad. ♀
basement of
Gabrielson Lab.

1/25/02 - rocks at
back, 5 sewage T. at, probably G. A. B.
by Jan D. Coe. Total length 160 mm
5 mm - vent 57 mm
96

Eurycea l. longicauda (Long-tailed salamander). Rare, two records, Here is just outside known range.

Hemidactylium scutatum (Four-toed salamander). Status unknown. Rarely seen or sought. In bottomland swamps.

Notophthalmus v. viridescens (Red-spotted newt). Occasional. Bottomland pools may be main habitat.

Plethodon c. cinereus (Red-backed salamander). Was common in bottomland woods and occasional elsewhere, as around houses. Current status in bottomlands is uncertain owing to severe floods of recent years.

Pseudotriton m. montanus (Eastern mud salamander). Status unknown. Rarely seen.

Pseudotriton r. ruber (Northern red salamander). Status unknown. Rarely seen.

SALIENTIA (Frogs and toads)

Acris c. crepitans (Northern cricket frog). Status not known; commonly heard at breeding pools.

Bufo a. americanus (American toad). Common.

Bufo woodhousei fowleri (Fowler's toad). Common. Occasionally hybridizes with B. americanus.

Hyla c. crucifer (Northern spring peeper). Common, sometimes abundant.

Hyla versicolor (Gray treefrog). Common. Some call from pools on roof of Gabrielson Laboratory. Several were calling from new sewage lagoon at Aviary almost as soon as it was full.

Pseudacris triseriata feriarum (Upland chorus frog). Now heard rarely if at all; was heard more often in 1940's.

Rana catesbeiana (Bullfrog). Occasional. Perhaps common in main habitat, the impoundments.

Rana clamitans melanota (Green frog). Common. Is the frog most often seen along creeks, but also uses impoundments.

Rana palustris (Pickerel frog). Common. Utilizes impoundments.

Rana s. sylvatica (Eastern wood frog). Once common in bottomland woods, where it bred in swamp pools near bluff. Now seems less common, but one chorus was heard in 1978 from near plot 1696.

Rana utricularia (Southern leopard frog). Occasional. Seen less often than pickerel frog. Has been known to breed here in fall.

Scaphiopus h. holbrooki (Eastern spadefoot). A burrower that is not seen for years, but may been seen in small numbers in very wet years. None reported for many years.

CHELONIA (Turtles)

Chelydra s. serpentina (Common snapping turtle). Common. Our largest reptile. Has been subject of control at times because of predation on waterfowl.

Chrysemys p. picta (Eastern painted turtle). Abundant. Its great abundance in marsh impoundments can be seen only on choice days for basking in early spring.

Chrysemys rubriventris (Red-bellied turtle). Uncommon. Sometimes seen in marsh impoundments or along river. Believed to be increasing slowly in impoundments.

Clemmys guttata (Spotted turtle). Occasional. Seems to favor pools in small streams, but is also seen along impoundments.

Kinosternon s. subrubrum (Eastern mud turtle). Seen occasionally. Probably not rare.

Sternotherus odoratus (Stinkpot). Seen occasionally. Probably not rare.

Terrapene c. carolina (Eastern box turtle). Common but declining in bottomland woods; occasional in other habitats. Decline over 30 years documented by L.F. Stickel in Copeia 1978 (2): 221-225. Same author reported on populations and travels in Ecological Monographs 20(4): 351-378, 1950.

SAURIA (Lizards)

Cnemidophorus s. sexlineatus (Six-lined racerunner). Apparently very rare and may no longer be present. Reported from bare areas such as gravel pits, which hardly exist at Patuxent these days.

Eumeces fasciatus (Five-lined skink). Occasional. Although this is the lizard most often seen here, owing to its conspicuousness on tree trunks, one may go years without seeing one and then see 2 or 3 in a season.

6/20/90 Barkley
Woods - Sandy
area E. Tipton
Airfield. 12 ind.

- Leiopeltis laterale (Ground skink). Perhaps occasional. Noticed only by those who hear it rustling in dry leaves of woods or woods edges.
- Sceloporus undulatus hyacinthinus (Northern fence lizard). Occasional. May not be noticed for years, then a few may be seen in some area of woods margin, as along powerline.

SERPENTES (Snakes)

- Carphophis a. amoenus (Eastern worm snake). Secretive burrower, seldom seen, but probably not rare.
- Coluber c. constrictor (Northern black racer). Fairly common, but usually too alert and speedy to be seen well. Is largely a snake of grasslands, but occurs in upland and lowland forests more than might be expected. See Copeia 1949 (4):264-268.
- Diadophis punctatus edwardsi (Northern ringneck snake). Secretive, but not rare. Seldom seen, except that young are often found caught by spider webs in basements of homes. This is the snake most often reported from inside homes in the Washington area, sometimes from second stories.
- Elaphe o. obsoleta (Black rat snake). Common. Our most evident snake. The slow blacksnake. Largely a tree snake. Sloughs in trees and outbuildings are almost always of this species. These are the snakes that have made famous the "Family Tree" (an old willow oak) behind Snowden Hall. Manuscript on them is in preparation.
- Heterodon platyrhinos (Eastern hognose snake). Fairly common, occasionally seen. Funnel traps in upland oak forest revealed more than expected. See Copeia 1949 (4):264-268.
- Lampropeltis calligaster rhombomaculata (Mole snake). Secretive, rarely seen now. Seems to be even less common than in 1940's, when it could have been rated occasional.
- Lampropeltis g. getulus (Eastern kingsnake). Secretive, rarely seen, probably occasional. Seems less common now than in 1940's.
- Lampropeltis triangulum temporalis (Coastal Plain milk snake). One record: a dead adult bearing fang or talon punctures was found on opening of small powerline just south of present border of Snowden Pond, plot 2595. [Conant now treats temporalis simply as a set of intergrades, but we prefer to keep it for practical purposes because of its distinctiveness and considerable range.]

- Natrix septemvittata (Queen snake). Rarely seen; few records from Center.

- Natrix s. sipedon (Northern water snake). Common. The most evident snake, and probably the commonest snake, in impoundments and river.

5/6/02
John C. G.
Kemper
Sawie Rd.
HS SNOW POND
+ REPPS R-O-W

• Opheodrys aestivus (Rough green snake). Status uncertain. Only a few have been seen here and years pass without one being reported.

• Storeria d. dekayi (Northern brown snake). Secretive, rarely seen, probably not rare.

• Storeria o. occipitomaculata (Northern red-bellied snake). Secretive, probably rare.

• Thamnophis s. sauritus (Eastern ribbon snake). Occasional, seldom seen; probably chiefly around marshy margins of impoundments.

• Thamnophis s. sirtalis (Eastern garter snake). Our second or third most evident snake; fairly common but far from abundant. Is occasional in open, upland sites such as Headquarters. Its major habitat here is not known.

• Virginia v. valeriae (Eastern earth snake). Secretive, rarely seen, but probably not rare.

Wks. date. Berky
Woods - Wildlife
Loop, east of Epton
Airfield.

New Record:

May 23, 1992 Southeastern shore of Lake Redington. Richard O. M. (see his research records)

Natrix erythrogaster erythrogaster
(Red-bellied water snake). 26" long.
Dorsal surface dark brown, ventral strong orange.

9/3/96

Observed 6-8 milk snake sheds under bark of dead tree by log cabin driveway.

OF THE PATUXENT WILDLIFE RESEARCH CENTER

The mammals of Patuxent are better known than any of the cold-blooded groups, thanks to many trapping studies and decades of observations. Knowledge of the status and habitats of the furbearers depends chiefly on the paper by F.M. Uhler and L.M. Llewellyn, 1952, "Fur productivity of submarginal farmland," Journal of Wildlife Management 16(1): 79-86. Foods of these animals were reported by L.M. Llewellyn and F.M. Uhler, 1952, "The foods of fur animals of the Patuxent Research Refuge, Maryland," American Midland Naturalist 48(1): 193-203. Current status of furbearers is unknown, but some species are thought to be scarcer, perhaps because of cessation of agriculture, successional changes, and disease.

Small mammals, especially *Peromyscus*, were the subject of many studies by L.F. Stickel; the publications are listed on pages 150-151 of F&WS Resource Publication 120.

Common and scientific names used here are nearly the same as those in "Mammals of Maryland," by J.L. Paradiso, 1969, North American Fauna No. 66. This volume cites some of the key Patuxent mammal papers and provides maps, keys, and accounts of habits. Common names of mammals in the present list are standardized according to E.K. Hall, "Names of species of North American mammals north of Mexico," 1965, University of Kansas Museum of Natural History, Miscellaneous Publication No. 43.

MARSUPIALIA (Pouched mammals)

Didelphis marsupialis virginiana (Opossum). Fairly common. Chiefly along brushy margins and in bottomland forest.

INSECTIVORA (Shrews and moles)

Blarina brevicauda kirtlandi (Short-tailed shrew). Common. Many habitats. Disease sometimes causes them to appear on roads whirling in circles or dead.

Cryptotis parva ssp. (Least shrew). Occasional. Old field habitats. Rarely seen without specialized trapping.

Sorex cinereus fontinalis (Masked shrew). Occasional. Fields and woods. Rarely seen without specialized trapping.

Condylura c. cristata (Star-nosed mole). Probably occasional. Bottomland woods. Effects of the severe floods of the 1970's are not known.

Scalopus a. aquaticus (Eastern mole). Common. Uplands.

CHIROPTERA (Bats)

Eptesicus f. fuscus (Big brown bat). Common. The bat that is most often found in buildings.

Lasiorycteris noctivagans (Silver-haired bat). Probably uncommon.

Lasiurus b. borealis (Red bat). Common or occasional.

Myotis lucifugus (Little brown bat). No Patuxent specimen, but believed seen at flood-light at entrance gate. Is second commonest bat of this area, after *Eptesicus*, but is far less often found in buildings.

Nycticeius h. humeralis (Evening bat). Probably uncommon.

Pipistrellus s. subflavus (Eastern pipistrelle). Uncommon or occasional.

CARNIVORA (Carnivores)

Lutra canadensis lataxina (River otter). Rare wanderer along streams. Known from tracks and one skull.

Mephitis mephitis nigra (Striped skunk). Once common, but scarce or rare ever since encephalitis epizootic in early 1950's. Trapping records indicate that it was most often taken along brushy margins.

Mustela frenata noveboracensis (Long-tailed weasel). Rare. Taken in woods, hedgerows and pen areas.

Mustela vison mink (Mink). Occasional. General, especially near water.

Procyon l. lotor (Raccoon). Common. General, especially bottomland forest. Often causes trouble at bird pens and bird nest boxes. Populations fluctuate, probably because of distemper.

Urocyon c. cinereoargenteus (Gray fox). This species is almost never seen at Patuxent, so it is amazing that Uhler and Llewellyn took more gray foxes than red foxes. Grays were taken chiefly along brushy margins and in bottomland woods.

Vulpes vulpes fulva (Red fox). Common. Chiefly in fields and edges. Some are very dark, probably indicating effect of a few silver foxes that are known to have escaped and bred about 1950. Fluctuations and lack of increase suggest control by disease, perhaps distemper.

RODENTIA (Rodents)

Castor canadensis ssp. (Beaver). Rare wanderer. Signs reported rarely. Large lodge in Lake Redington, plot 3308, and cuttings on shore, in 1978.

Glaucomys v. volans (Southern flying squirrel). Occasional or common. Woods.

Marmota m. monax (Woodchuck). Common. General, chiefly in and around fields, but has burrows even in bottomland woods and near buildings.

Sciurus carolinensis pennsylvanicus (Gray squirrel). Common. Deciduous woods and openings.

Tamias striatus fisheri (Eastern chipmunk). Rare in 1940's, now common, especially around buildings and wood margins.

Tamiasciurus hudsonicus loquax (Red squirrel). Rare. Chiefly pine stands.

Mus musculus ssp. (House mouse). Common in crop fields, animal pens, and buildings. General except woods. Manuscript on biology in fields is in preparation.

Rattus norvegicus (Norway rat). Occasional in many habitats. Common and troublesome at pens, where it is often a serious predator.

Microtus p. pennsylvanicus (Meadow vole). Common in restricted areas. Meadows and marshes. Tends to leave drier grasslands in warm season. High population levels have never been reported here.

Microtus pinetorum scalopsoides (Pine vole). Common, especially in deciduous forest and brushy areas. Lives in deep burrows. Sometimes forms depressed trails in lawns near bushes.

Ondatra zibethicus macrondon (Muskrat). Common. Water areas.

Peromyscus leucopus noveboracensis (White-footed mouse). Common. Woods and brush. Populations and travels at Patuxent have been treated in several papers by L.F. Stickel.

Peromyscus maniculatus bairdii (Prairie deer mouse). Was occasional in crop fields of A-Farm in 1949-50. Probably is in other thinly vegetated habitats such as road verges. Current status not known. Has spread East from grasslands of Middle West.

? Reithrodontomys humulis virginianus (Eastern harvest mouse). Not recorded. Possible only. One ball-nest, high in meadow stems, plot 1638, fit this species.

Zapus hudsonius americanus (Meadow jumping mouse). Occasional. Moist meadows and woods.

LAGOMORPHA (Rabbits, hares, pikas)

Sylvilagus floridanus mallurus (Eastern cottontail). Common. Favors open areas near cover in summer, but brushy areas in woods or woods margins in fall and winter.

ARTIODACTYLA (Deer and allies)

Odocoileus virginianus borealis (White-tailed deer). Very rare in early 1940's, now abundant and destructive. Hides in woods, feeds commonly in open areas, wet or dry.

OF THE PATUXENT WILDLIFE RESEARCH CENTER

This list of 256 species of birds recorded on the Center, 1941-1978, was prepared in July 1978 by Chandler S. Robbins and Danny Bystrak with the assistance of Elwood M. Martin and Darrel D. Boone. Scientific and common names, as well as indications of status, have been brought up-to-date.

Expressions of abundance are not standardized and remain somewhat subjective. The terms used are related to the size and habits of the species. What is common for a grebe or vulture is not what is common for a sparrow. Starlings, although numerous here, are termed common rather than abundant because they are far less numerous than in some other areas of the region. For the same reason, the House Sparrow is termed uncommon, although common enough to be a nuisance.

Species described as summer residents can be assumed to breed here. The term "casual" means that a bird is outside its normal range, but has appeared here and may well appear again.

Despite the length of the bird list, only about 50 species are considered common or fairly common breeders; about 58 species are rated as rare or uncommon breeders.

Birds are unquestionably the best-known group of animals on the Center. They have been the subject of major and minor studies, and constant observation, ever since the Center was established. The largest single publication on them is "Seasonal Distribution of Bird Populations at the Patuxent Research Refuge," 1952, by R.E. Stewart, J.B. Cope, C.S. Robbins, and J.W. Brainerd, American Midland Naturalist 47(2): 257-363. Another major work of value to birders of this area is "Birds of Maryland and the District of Columbia," 1958, by R.E. Stewart and C.S. Robbins, North American Fauna No. 62, vi + 401. Both are now out of print, but may be consulted in the Center's main library or bird library.

GAVIIFORMES (Loons)

Gavia immer (Common Loon). Uncommon spring transient; very rare fall transient.

PODICIPEDIFORMES (Grebes)

Podiceps grisegena (Red-necked Grebe). Very rare spring transient.

Podiceps auritus (Horned Grebe). Rare spring and fall transient.

Podilymbus podiceps (Pied-billed Grebe). Common spring and fall transient; occasionally breeds.

PELECANIFORMES (Pelicans and allies)

Phalacrocorax auritus (Double-crested Cormorant). Very rare transient.

CICONIIFORMES (Herons and allies)

Ardea herodias (Great Blue Heron). Uncommon summer and winter resident; common spring and fall transient.

Butorides striatus (Green Heron). Uncommon summer resident; common spring and fall transient.

Florida caerulea (Little Blue Heron). Very rare spring visitor; common or uncommon late summer and fall visitor.

Bubulcus ibis (Cattle Egret). Rare spring and fall visitor.

Casmerodius albus (Great Egret). Uncommon late summer visitor; very rare spring and fall visitor.

Egretta thula (Snowy Egret). Uncommon late summer visitor; very rare spring and fall visitor.

Nycticorax nycticorax (Black-crowned Night Heron). Rare spring and fall transient and summer visitor.

Nyctanassa violacea (Yellow-crowned Night Heron). Rare spring visitor.

Ixobrychus exilis (Least Bittern). Rare spring transient and summer resident.

Botaurus lentiginosus (American Bittern). Uncommon spring transient; very rare fall transient and formerly summer resident.

Mycteria americana (Wood Stork). Casual late summer visitor.

Plegadis falcinellus (Glossy Ibis). Rare spring visitor.

Eudocimus albus (White Ibis). Rare and irregular late summer visitor.

ANSERIFORMES (Swans, Geese, and Ducks)

Olor columbianus (Whistling Swan). Fairly common spring and fall transient.

Branta canadensis (Canada Goose). Wild geese are common spring and fall transients and winter residents. The half-tame breeding flock was artificially established, but now travels widely, mostly within the Washington area, and leaves Patuxent when ponds freeze over.

- Chen caerulescens (Snow Goose). Very rare spring and fall transient and winter resident.
- Anser albifrons (Greater White-fronted Goose). Casual spring transient.
- Anas platyrhynchos (Mallard). Common permanent resident.
- Anas rubripes (American Black Duck). Uncommon permanent resident.
- Anas strepera (Gadwall). Uncommon spring and fall transient and winter visitor.
- Anas acuta (Common Pintail). Fairly common spring and fall transient and rare winter visitor.
- Anas crecca (Green-winged Teal). Fairly common spring and fall transient and winter resident.
- Anas discors (Blue-winged Teal). Common spring and fall transient; rare summer resident.
- Anas americana (American Wigeon). Fairly common spring and fall transient; rare winter visitor.
- Anas clypeata (Northern Shoveler). Rare spring and fall transient and winter resident.
- Aix sponsa (Wood Duck). Common spring and fall transient and summer resident; rare winter resident.
- Aythya americana (Redhead). Rare spring and fall transient and winter visitor.
- Aythya collaris (Ring-necked Duck). Common spring and fall transient and winter resident as long as ponds stay open.
- Aythya valisineria (Canvasback). Uncommon spring and fall transient.
- Aythya marila (Greater Scaup). Rare spring and fall transient.
- Aythya affinis (Lesser Scaup). Fairly common spring and fall transient.
- Bucephala clangula (Common Goldeneye). Uncommon spring and fall transient.
- Bucephala albeola (Bufflehead). Uncommon spring and fall transient; rare winter visitor.
- Clangula hyemalis (Oldsquaw). Rare spring and fall transient.

- Melanitta deglandi (White-winged Scoter). Casual fall transient.
- Melanitta nigra (Black Scoter). Casual fall transient.
- Oxyura jamaicensis (Ruddy Duck). Fairly common spring and fall transient; rare winter visitor.
- Lophodytes cucullatus (Hooded Merganser). Fairly common spring and fall transient; rare breeder and uncommon winter visitor.
- Mergus merganser (Common Merganser). Rare spring and fall transient; irregular winter visitor.
- Mergus serrator (Red-breasted Merganser). Rare spring and fall transient and winter visitor.
- FALCONIFORMES (Hawks and allies)
- Cathartes aura (Turkey Vulture). Common permanent resident.
- Coragyps atratus (Black Vulture). Uncommon permanent resident.
- Accipiter gentilis (Northern Goshawk). Casual transient and winter visitor.
- Accipiter striatus (Sharp-shinned Hawk). Common spring and fall transient; uncommon winter resident.
- Accipiter cooperii (Cooper's Hawk). Uncommon winter resident and spring and fall transient; rare summer resident.
- Buteo jamaicensis (Red-tailed Hawk). Common spring and fall transient; uncommon winter resident; rare summer resident.
- Buteo lineatus (Red-shouldered Hawk). Common permanent resident.
- Buteo platypterus (Broad-winged Hawk). Common (occasionally abundant) fall transient; common spring transient; uncommon summer resident.
- Buteo lagopus (Rough-legged Hawk). Very rare fall, winter and spring visitor.
- Aquila chrysaetos (Golden Eagle). Very rare fall visitor.
- Haliaeetus leucocephalus (Bald Eagle). Uncommon spring and fall visitor; rare winter and summer visitor.
- Circus cyaneus (Northern Harrier). Uncommon spring and fall transient and winter resident.

Pandion haliaetus (Osprey). Common spring transient; uncommon fall transient; rare summer visitor.

Falco peregrinus (Peregrine Falcon). Very rare spring and fall transient.

Falco columbarius (Merlin). Rare spring and fall transient; casual winter visitor.

Falco sparverius (American Kestrel). Common spring and fall transient; uncommon winter and summer resident.

GALLIFORMES (Quail and allies)

Colinus virginianus (Common Bobwhite). Common permanent resident.

GRUIFORMES (Rails, Gallinules, and Coots)

Rallus elegans (King Rail). Rare spring and fall transient; very rare summer resident.

Rallus limicola (Virginia Rail). Uncommon spring and rare fall transient.

Porzana carolina (Sora). Uncommon spring and fall transient.

Porphyryla martinica (Purple Gallinule). Casual spring and summer visitor.

Gallinula chloropus (Common Gallinule). Rare spring and fall transient.

Fulica americana (American Coot). Fairly common spring and fall transient and winter visitor.

CHARADRIIFORMES (Shorebirds, Gulls, and Terns)

Charadrius semipalmatus (Semipalmated Plover). Very rare spring and fall transient.

Charadrius vociferus (Killdeer). Common spring and fall transient; uncommon summer resident.

Pluvialis squatarola (Black-bellied Plover). Very rare fall transient.

Bartramia longicauda (Upland Sandpiper). Very rare spring and fall transient.

Tringa melanoleuca (Greater Yellowlegs). Rare spring transient; uncommon fall transient.

Tringa flavipes (Lesser Yellowlegs). Rare spring and fall transient.

Tringa solitaria (Solitary Sandpiper). Uncommon spring and fall transient.

Actitis macularia (Spotted Sandpiper). Common spring and fall transient.

Lobipes lobatus (Northern Phalarope). Very rare spring transient.

Philohela minor (American Woodcock). Common transient and resident in spring; uncommon summer resident and fall transient.

Capella gallinago (Common Snipe). Uncommon spring and fall transient; very rare winter visitor.

Limnodromus griseus (Short-billed Dowitcher). Very rare spring and fall transient.

Calidris alba (Sanderling). Very rare fall transient.

Calidris pusilla (Semipalmated Sandpiper). Rare fall transient.

Calidris mauri (Western Sandpiper). Very rare fall transient.

Calidris minutilla (Least Sandpiper). Rare or uncommon spring and fall transient.

Calidris fuscicollis (White-rumped Sandpiper). Very rare fall transient.

Calidris melanotos (Pectoral Sandpiper). Rare fall transient.

Calidris alpina (Dunlin). Very rare spring and fall transient.

Larus argentatus (Herring Gull). Uncommon winter and spring visitor; very rare fall visitor.

Larus delawarensis (Ring-billed Gull). Uncommon winter and spring visitor; very rare fall visitor.

Larus atricilla (Laughing Gull). Casual.

Larus philadelphia (Bonaparte's Gull). Rare spring and very rare fall transient.

Sterna hirundo (Common Tern). Very rare spring transient.

Sterna albifrons (Little Tern). Casual fall visitor.

Sterna caspia (Caspian Tern). Casual fall transient.

Chelidonias niger (Black Tern). Very rare spring and fall transient.

Sterna antillarum Least Tern - 6/2/98 - Merganser Pond.
 ~ 3:00 p.m. During feeding. Looking on
 water level marker.

5/30/07
 K. NOZ
 saw 2X in
 Juncus
 effusus

COLUMBIFORMES (Doves and Pigeons)

Columba livia (Rock Dove). Uncommon permanent resident (feral birds); birds owned by pigeon fanciers often fly over, especially on weekends.

Zenaida macroura (Mourning Dove). Common permanent resident.

CUCULIFORMES (Cuckoos)

Coccyzus americanus (Yellow-billed Cuckoo). Common spring and fall transient and summer resident.

Coccyzus erythrophthalmus (Black-billed Cuckoo). Uncommon spring transient, rare fall transient; very rare summer resident.

STRIGIFORMES (Owls)

Tyto alba (Barn Owl). Rare spring visitor; very rare summer visitor.

Otus asio (Common Screech Owl). Rare permanent resident.

Bubo virginianus (Great Horned Owl). Rare permanent resident.

Strix varia (Barred Owl). Common permanent resident.

Asio otus (Long-eared Owl). Very rare spring visitor.

Asio flammeus (Short-eared Owl). Very rare transient.

Aegolius acadicus (Saw-whet Owl). Rare spring, fall and winter visitor.

CAPRIMULGIFORMES (Goatsuckers)

Caprimulgus carolinensis (Chuck-will's-widow). Very rare spring transient.

Caprimulgus vociferus (Whip-poor-will). Common spring transient; uncommon summer resident and fall transient.

Chordeiles minor (Common Nighthawk). Common fall transient; rare spring transient; formerly very rare summer resident.

APODIFORMES (Swifts and Hummingbirds)

Chaetura pelagica (Chimney Swift). Common spring and fall transient; fairly common summer resident.

Archilochus colubris (Ruby-throated Hummingbird). Common summer resident and fall transient; uncommon spring transient.

CORACIIFORMES (Kingfishers)

Megaceryle alcyon (Belted Kingfisher). Rare summer and winter resident; fairly common spring and fall transient.

PICIFORMES (Woodpeckers)

Colaptes auratus (Common Flicker). Common spring and fall transient; uncommon winter and summer resident.

Dryocopus pileatus (Pileated Woodpecker). Fairly common permanent resident.

Melanerpes carolinus (Red-bellied Woodpecker). Common permanent resident.

Melanerpes erythrocephalus (Red-headed Woodpecker). Rare fall transient; very rare winter resident and spring transient.

Sphyrapicus varius (Yellow-bellied Sapsucker). Uncommon spring and fall transient and winter resident.

Picoides villosus (Hairy Woodpecker). Fairly common permanent resident.

Picoides pubescens (Downy Woodpecker). Common permanent resident.

Picoides borealis (Red-cockaded Woodpecker). Accidental summer visitor.

PASSERIFORMES (Perching birds)

Tyrannidae (Tyrant Flycatchers)

Tyrannus tyrannus (Eastern Kingbird). Common spring transient; uncommon summer resident and fall transient.

Myiarchus crinitus (Great Crested Flycatcher). Uncommon spring transient and summer resident; rare fall transient.

Sayornis phoebe (Eastern Phoebe). Uncommon summer resident and fairly common spring and fall transient; very rare winter resident.

Empidonax flaviventris (Yellow-bellied Flycatcher). Rare spring and fall transient.

Empidonax virescens (Acadian Flycatcher). Common summer resident (no evidence of transients).

Empidonax traillii (Willow Flycatcher). Rare spring transient.

Empidonax alnorum (Alder Flycatcher). Very rare spring and fall transient.

12/18/06
OUTLET OF
DUVALL
SNAGS IN
DRAINAGE

Empidonax minimus (Least Flycatcher). Rare spring and fall transient; casual summer resident.

Contopus virens (Eastern Pewee). Common fall transient; fairly common spring transient and summer resident.

Nuttallornis borealis (Olive-sided Flycatcher). Very rare spring and fall transient.

Alaudidae (Larks)

Eremophila alpestris (Horned Lark). Rare spring and fall transient; very rare winter and summer resident.

Hirundinidae (Swallows)

Iridoprocne bicolor (Tree Swallow). Common spring transient; rare summer resident and uncommon fall transient.

Riparia riparia (Bank Swallow). Uncommon spring transient; rare summer visitor and fall transient.

Stelgidopteryx ruficollis (Rough-winged Swallow). Uncommon spring transient; rare fall transient.

Hirundo rustica (Barn Swallow). Common spring and fall transient; fairly common summer resident.

Petrochelidon pyrrhonota (Cliff Swallow). Rare spring and fall transient.

Progne subis (Purple Martin). Common fall transient; uncommon spring transient; fairly common summer resident.

Corvidae (Jays and Crows)

Cyanocitta cristata (Blue Jay). Common spring and fall transient and winter resident; uncommon summer resident.

Corvus brachyrhynchos (American Crow). Common spring and fall transient and winter resident; fairly common summer resident.

Corvus ossifragus (Fish Crow). Uncommon permanent resident.

Paridae (Chickadees and Titmice)

Parus atricapillus (Black-capped Chickadee). Rare and irregular winter visitor.

Parus carolinensis (Carolina Chickadee). Common permanent resident.

Parus bicolor (Tufted Titmouse). Common permanent resident.

Sittidae (Nuthatches)

Sitta carolinensis (White-breasted Nuthatch). Uncommon permanent resident; fairly common some winters.

Sitta canadensis (Red-breasted Nuthatch). Irregular, rare, or uncommon (sometimes absent) winter resident and spring and fall transient.

Certhiidae (Creepers)

Certhia familiaris (Brown Creeper). Fairly common winter resident and spring and fall transient; rare summer resident.

Troglodytidae (Wrens)

Troglodytes aedon (House Wren). Uncommon summer resident and spring and fall transient.

Troglodytes troglodytes (Winter Wren). Fairly common fall transient; uncommon winter resident and spring transient.

Thryomanes bewickii (Bewick's Wren). Casual spring visitor.

Thryothorus ludovicianus (Carolina Wren). Uncommon to common permanent resident.

Cistothorus palustris (Marsh Wren). Rare spring and fall transient.

Cistothorus platensis (Sedge Wren). Rare spring transient; very rare fall transient and formerly summer resident.

Mimidae (Mockingbirds and Thrashers)

Mimus polyglottos (Northern Mockingbird). Fairly common permanent resident.

Dumetella carolinensis (Gray Catbird). Common summer resident and spring and fall transient; rare winter resident.

Toxostoma rufum (Brown Thrasher). Uncommon summer resident and spring and fall transient; rare winter resident.

Turdidae (Thrushes)

Turdus migratorius (American Robin). Abundant fall transient; common spring transient and summer resident; rare (occasionally uncommon) winter resident.

Hylocichia mustelina (Wood Thrush). Common summer resident and spring and fall transient.

Catharus guttatus (Hermit Thrush). Common fall transient; uncommon spring transient; rare or uncommon winter resident.

Catharus ustulatus (Swainson's Thrush). Common fall transient; uncommon spring transient.

Catharus minimus (Gray-cheeked Thrush). Uncommon spring and fall transient.

Catharus fuscescens (Veery). Uncommon spring and fall transient; rare summer resident.

Sialia sialis (Eastern Bluebird). Common spring and fall transient; uncommon summer resident; uncommon (occasionally rare) winter resident.

Sylviidae (Gnatcatchers and Kinglets)

Polioptila caerulea (Blue-gray Gnatcatcher). Common spring transient, fairly common summer resident.

Regulus satrapa (Golden-crowned Kinglet). Abundant or common fall transient; common or uncommon (sometimes rare) winter resident and spring transient.

Regulus calendula (Ruby-crowned Kinglet). Abundant or common fall transient; common (sometimes uncommon) spring transient; rare (occasionally uncommon) winter resident.

Motacillidae (Pipits and Wagtails)

Anthus spinoletta (Water Pipit). Uncommon spring and fall transient.

Bombycillidae (Waxwings)

Bombycilla cedrorum (Cedar Waxwing). Common spring and fall transient; rare or uncommon (sometimes absent) winter resident; rare summer resident.

Laniidae (Shrikes)

Lanius ludovicianus (Loggerhead Shrike). Rare spring and fall transient; casual winter visitor.

Sturnidae (Starlings)

Sturnus vulgaris (European Starling). Common permanent resident.

Vireonidae (Vireos)

Vireo griseus (White-eyed Vireo). Common summer resident and spring and fall transient.

Vireo flavifrons (Yellow-throated Vireo). Uncommon spring transient and summer resident; rare or uncommon fall transient.

Vireo solitarius (Solitary Vireo). Uncommon or rare spring and fall transient.

Vireo olivaceus (Red-eyed Vireo). Abundant spring transient and summer resident; common fall transient.

Vireo philadelphicus (Philadelphia Vireo). Very rare spring and fall transient.

Vireo gilvus (Warbling Vireo). Very rare spring migrant and summer visitor.

Parulidae (Wood Warblers)

Mniotilta varia (Black-and-white Warbler). Common spring and fall transient; uncommon summer resident.

Protonotaria citrea (Prothonotary Warbler). Uncommon summer resident (no evidence of transients noted).

Helmitheros vermivorus (Worm-eating Warbler). Rare spring and fall transient and summer resident.

Vermivora chrysoptera (Golden-winged Warbler). Fairly common spring transient; uncommon or rare fall transient.

Vermivora pinus (Blue-winged Warbler). Fairly common or uncommon spring transient; rare fall transient.

Vermivora peregrina (Tennessee Warbler). Fairly common spring and fall transient.

Vermivora celata (Orange-crowned Warbler). Very rare fall transient.

Vermivora ruficapilla (Nashville Warbler). Rare spring and fall transient.

Parula americana (Northern Parula Warbler). Common summer resident and spring transient; uncommon fall transient.

Dendroica petechia (Yellow Warbler). Fairly common spring transient and summer resident; rare fall transient.

Dendroica magnolia (Magnolia Warbler). Common fall transient; fairly common spring transient.

Dendroica tigrina (Cape May Warbler). Common fall transient; fairly common spring transient.

Dendroica caerulescens (Black-throated Blue Warbler). Common or fairly common spring and fall transient.

Dendroica coronata (Yellow-rumped Warbler). Abundant spring and fall transient; uncommon winter resident.

Dendroica virens (Black-throated Green Warbler). Common fall transient; common or uncommon spring transient.

Dendroica cerulea (Cerulean Warbler). Rare spring transient; very rare summer resident and fall transient.

Dendroica fusca (Blackburnian Warbler). Fairly common spring and fall transient.

Dendroica dominica (Yellow-throated Warbler). Very rare spring visitor.

Dendroica pensylvanica (Chestnut-sided Warbler). Common fall transient; uncommon or common spring transient.

Dendroica castanea (Bay-breasted Warbler). Fairly common spring and fall transient.

Dendroica striata (Blackpoll Warbler). Common (occasionally abundant) spring transient; common or uncommon fall transient.

Dendroica pinus (Pine Warbler). Uncommon summer resident and spring and fall transient.

Dendroica discolor (Prairie Warbler). Common spring transient and summer resident; uncommon fall transient.

Dendroica palmarum (Palm Warbler). Uncommon or rare fall transient; rare spring transient.

Seiurus aurocapillus (Ovenbird). Common summer resident and spring and fall transient.

Seiurus noveboracensis (Northern Waterthrush). Uncommon spring and fall transient.

Seiurus motacilla (Louisiana Waterthrush). Uncommon summer resident and spring and fall transient.

Oporornis formosus (Kentucky Warbler). Common summer resident; uncommon spring transient; rare fall transient.

Oporornis agilis (Connecticut Warbler). Rare fall transient.

Oporornis philadelphia (Mourning Warbler). Rare spring and fall transient.

Geothlypis trichas (Common Yellowthroat). Abundant spring and fall transient and common summer resident.

Icteria virens (Yellow-breasted Chat). Common spring transient and fairly common summer resident; uncommon fall transient.

Wilsonia citrina (Hooded Warbler). Common summer resident; uncommon spring and fall transient.

Wilsonia pusilla (Wilson's Warbler). Uncommon spring transient; rare fall transient.

Wilsonia canadensis (Canada Warbler). Common or uncommon spring and fall transient.

Setophaga ruticilla (American Redstart). Common summer resident and spring and fall transient.

Ploceidae (Weaver Finches)

Passer domesticus (House Sparrow). Uncommon permanent resident.

Icteridae (Blackbirds and Orioles)

Dolichonyx oryzivorus (Bobolink). Common fall transient; common or uncommon spring transient.

Sturnella magna (Eastern Meadowlark). Uncommon spring and fall transient; uncommon summer resident; uncommon or rare winter resident.

Xanthocephalus xanthocephalus (Yellow-headed Blackbird). Very rare spring and fall transient.

Agelaius phoeniceus (Red-winged Blackbird). Abundant spring and fall transient; common summer resident; irregular winter resident.

Icterus spurius (Orchard Oriole). Uncommon summer resident and spring and fall transient.

Icterus galbula (Northern Oriole). Uncommon spring and fall transient. Nested in 1963.

Euphagus carolinus (Rusty Blackbird). Uncommon spring and fall transient; rare winter resident.

Quiscalus quiscula (Common Grackle). Abundant spring and fall transient; common summer resident; irregular winter resident.

Molothrus ater (Brown-headed Cowbird). Common spring and fall transient and summer resident; uncommon and irregular winter resident.

Thraupidae (Tanagers)

Piranga olivacea (Scarlet Tanager). Common summer resident and spring and fall transient.

Piranga rubra (Summer Tanager). Rare spring transient and summer resident.

Fringillidae (Finches, Sparrows, and allies)

Cardinalis cardinalis (Northern Cardinal). Common permanent resident.

Pheucticus ludovicianus (Rose-breasted Grosbeak). Fairly common spring and fall transient; casual winter visitor.

Guiraca caerulea (Blue Grosbeak). Uncommon summer resident and spring and fall transient.

Passerina cyanea (Indigo Bunting). Common summer resident and spring and fall transient.

Spiza americana (Dickcissel). Very rare spring and fall transient.

Hesperiphona vespertina (Evening Grosbeak). Irregular but often common winter visitor.

Carpodacus purpureus (Purple Finch). Common spring and fall transient; uncommon or rare winter resident.

Carpodacus mexicanus (House Finch). Uncommon spring and fall transient; rare winter visitor; very rare summer visitor.

Pinicola enucleator (Pine Grosbeak). Casual winter visitor.

Carduelis flammea (Common Redpoll). Very rare winter visitor.

Carduelis pinus (Pine Siskin). Irregular, but often common spring and fall transient and winter visitor.

Carduelis tristis (American Goldfinch). Common spring and fall transient and winter resident; uncommon summer resident.

Loxia curvirostra (Red Crossbill). Rare and irregular fall, winter and spring visitor.

Loxia leucoptera (White-winged Crossbill). Very rare and irregular mid-winter visitor.

Pipilo erythrophthalmus (Rufous-sided Towhee). Common summer resident and spring and fall transient; rare (occasionally uncommon) winter resident.

Passerculus sandwichensis (Savannah Sparrow). Uncommon spring and fall transient; rare winter resident.

Ammodramus savannarum (Grasshopper Sparrow). Uncommon summer resident and spring and fall transient.

Ammodramus henslowii (Henslow's Sparrow). Formerly uncommon or rare summer resident; no record since about 1955.

Poocetes gramineus (Vesper Sparrow). Rare spring and fall transient; formerly a rare summer resident; very rare winter visitor.

Chondestes grammacus (Lark Sparrow). Casual late summer visitor.

Aimophila aestivalis (Bachman's Sparrow). Formerly a very rare summer resident; not recorded since 1947.

Junco hyemalis (Northern Junco). Abundant winter resident and spring and fall transient.

Spizella arborea (American Tree Sparrow). Uncommon winter resident (no evidence of transients).

Spizella passerina (Chipping Sparrow). Common summer resident and spring and fall transient; very rare winter visitor.

Spizella pusilla (Field Sparrow). Common summer resident and spring and fall transient; uncommon or rare winter resident.

Zonotrichia querula (Harris' Sparrow). Casual fall transient and winter resident.

Zonotrichia albicollis (White-throated Sparrow). Abundant spring and fall transient; common or uncommon winter resident; very rare summer vagrant.

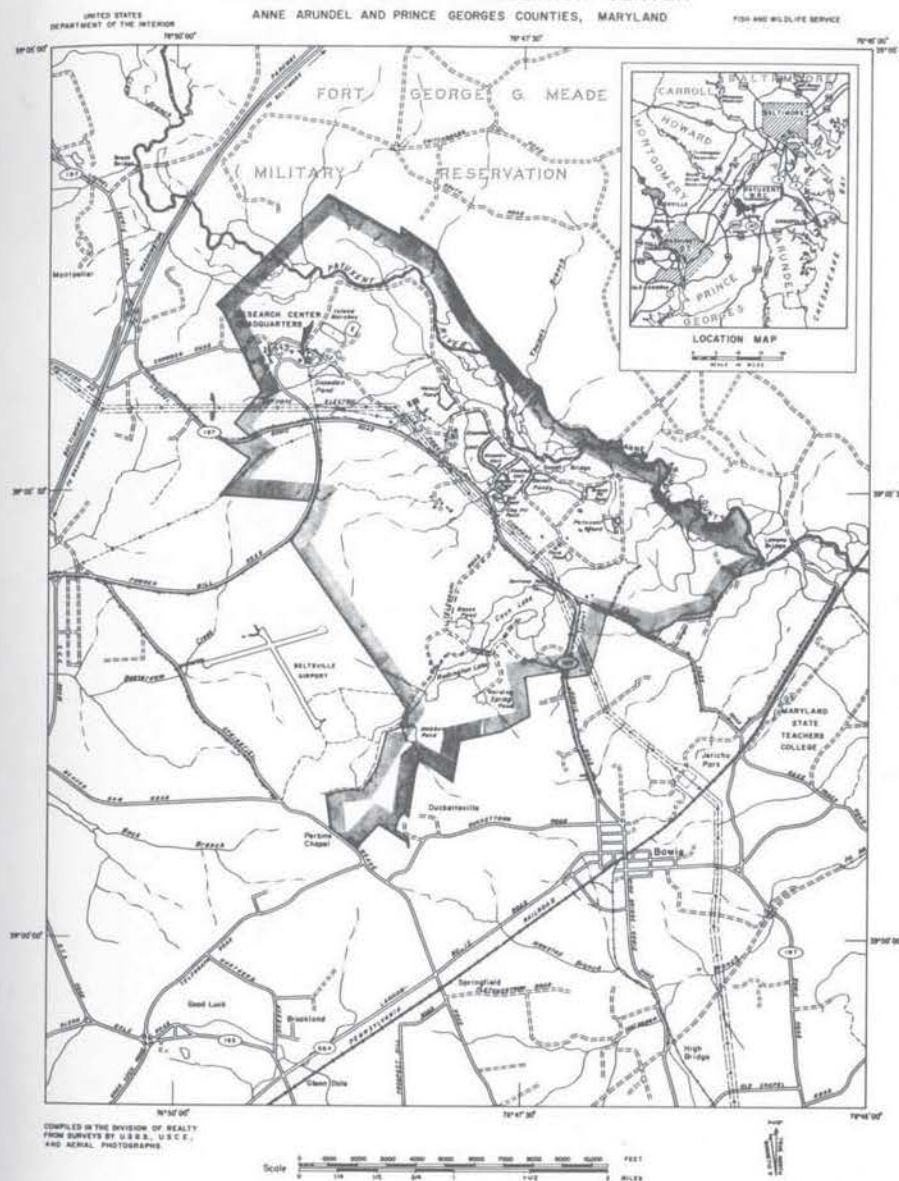
Passerella iliaca (Fox Sparrow). Common spring transient; uncommon fall transient; very rare winter resident.

Melospiza lincolni (Lincoln's Sparrow). Rare fall transient; very rare
spring transient.

Melospiza georgiana (Swamp Sparrow). Common spring and fall transient;
rare or uncommon winter resident.

Melospiza melodia (Song Sparrow). Abundant spring and fall transient; common or uncommon winter resident; uncommon summer resident.

Calcarius lapponicus (Lapland Longspur). Very rare winter visitor.



NEW PLANTS OF PATUXENT RESEARCH REFUGE
(Not listed by Hotchkiss and Stewart 1947 or Stickel 1979)

SCIENTIFIC NAME	COMMON NAME	LOCATION
GRAMINEAE		
<i>Paspalum floridanum</i>		Uhler Marsh meadows (Aug)
<i>Phragmites australis</i>	common reed	Goose Pond; Gabe Lab (July)
<i>Zoysia japonica</i>	Japanese lawn grass	Merriam Lab lawn (May)
<i>Phyllostachys bambusoides</i>	bamboo	Stickel Lab
POLYGONACEAE		
<i>Polygonum perfoliatum</i>	Chinese tearthumb	Gabe Lab. (Sept)
CARYOPHYLLACEAE		
<i>Spergula arvensis</i>	corn spurrey	Hance Pond 2 dike (April)
BERBERIDACEAE		
<i>Mahonia aquifolium</i>	Oregon grape holly	Stickel Lab forest area
LEGUMINOSAE		
<i>Lespedeza violaceae</i>	bush clover	Hance Exp. Pools (Sept)
EUPHORBIACEAE		
<i>Euphorbia cyparissias</i>	cypress spurge	N. Tract BGE ROW (Aug)
LYTHRACEAE		
<i>Decodon verticillata</i>	water willow	Central Tract impoundments
ONAGRACEAE		
<i>Jussiaea repens</i>	primrose willow	N. Tract - Lake Allen (July)
<i>Ludwigia sphaerocarpa</i>	globe-fruited ludwigia	Uhler Marsh 2 (Sept)
HALORAGACEAE		
<i>Myriophyllum brasiliense</i>	parrot's feather	N. Tract - n. Lake Allen
GENTIANACEAE		
<i>Bartonia virginica</i>	yellow bartonia	Hance Pond 2 dike (August)
LABIATAE		
<i>Monarda fistulosa</i>	wild bergamot	Hance Field (Oct)
SOLANACEAE		
<i>Solanum dulcamara</i>	deadly nightshade	End. Spec. Incinerator (July)
SCROPHULARIACEAE		
<i>Gratiola aurea</i>	golden-pert	Snowden Creek Delta (Sept)
<i>Veronica agrestis</i>	garden speedwell	Henshaw Lab lawn (May)

CAPRIFOLIACEAE		
<i>Symphoricarpos orbiculatus</i>	coralberry	PEPCO ROW (Oct)
DIPSACACEAE		
<i>Dipsacus sylvestris</i>	teasel	Hance Farm gardens (Aug)
COMPOSITAE		
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	Henshaw Lab lawn (April)
<i>Tussilago farfara</i>	Coltsfoot	Snowden Hall; N. Tract roads
<i>Hieracium floribundum</i>	smooth hawkweed	Hance Exp. Pools (May)