

VEGETATION DESCRIPTION FOR ROCK CREEK PARK

***Fagus grandifolia* - *Quercus alba* / *Podophyllum peltatum* Forest (CEGL006075)**

COMMON NAME	Beech - White Oak / Mayapple Forest
SYNONYM	Coastal plain mixed oak - beech forest
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	I. Forest
PHYSIOGNOMIC SUBCLASS	IB. Deciduous forest
PHYSIOGNOMIC GROUP	IB2. Cold-deciduous forest
FORMATION	IB2Na. Lowland or submontane broad-leaved cold-deciduous forest
ALLIANCE	<i>Fagus grandifolia</i> - <i>Quercus alba</i> Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

RANGE

This association occurs in New York, New Jersey, Delaware, Maryland, and Pennsylvania and may also occur in Massachusetts and Virginia.

ENVIRONMENTAL DESCRIPTION

This forest association occurs on mesic to dry-mesic slopes or gentle gradients. Soils are typically well-drained, acidic sandy loams. The soils may be derived from parent material of relatively greater fertility. This association is found primarily on or in close proximity to the coastal plain. In Rock Creek Park this association occurs primarily in areas mapped as Manor and Glenelg loam, deep well-drained to excessively drained soils underlain by acid crystalline rocks (Smith 1976). Some locations of this vegetation type also occurred on Neshaminy soils in the Glover Archbold section of the park. These soils are underlain by semibasic or mixed basic and acidic rocks; this may play a role in the proliferation of non native species at this site.

USFWS WETLAND SYSTEM Not applicable.

MOST ABUNDANT SPECIES

*Globally*Strata

Canopy

Species*Fagus grandifolia*, *Quercus alba*, *Carya* spp., *Liriodendron tulipifera*

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Sub-canopy	<i>Ilex opaca</i> , <i>Cornus florida</i>
Shrub layer	<i>Viburnum acerifolium</i>
Herbaceous	<i>Podophyllum peltatum</i> , <i>Polystichum acrostichoides</i> , <i>Uvularia</i> spp., <i>Parthenocissus quinquefolia</i> <i>Polygonatum biflorum</i> .

Rock Creek Park

<u>Strata</u>	<u>Species</u>
Canopy	<i>Fagus grandifolia</i> , <i>Quercus alba</i> , <i>Liriodendron tulipifera</i>
Sub-canopy	<i>Ilex opaca</i> , <i>Cornus florida</i>
Shrub layer	<i>Viburnum acerifolium</i>
Herbaceous	<i>Uvularia</i> spp., <i>Parthenocissus quinquefolia</i> , <i>Polygonatum biflorum</i> , <i>Polystichum acrostichoides</i>

DIAGNOSTIC SPECIES

Fagus grandifolia, *Quercus alba*, *Ilex opaca*, *Viburnum acerifolium*

VEGETATION DESCRIPTION

Rangewide, this dry-mesic to mesic forest is co-dominated by oaks (*Quercus* spp.), beech (*Fagus grandifolia*), hickory (*Carya* spp.), tulip poplar (*Liriodendron tulipifera*) and sweetgum (*Liquidambar styraciflua*). A sparse sub-canopy of flowering dogwood (*Cornus florida*) and American holly (*Ilex opaca*) is usually present. The shrub layer is characterized by maple-leaved viburnum (*Viburnum acerifolium*). Typical herbs include mayapple (*Podophyllum peltatum*), bellwort (*Uvularia* spp.), Virginia creeper (*Parthenocissus quinquefolia*), pink lady's slipper (*Cypripedium acaule*), Solomon's seal (*Polygonatum biflorum*), partridgeberry (*Mitchella reprens*), jack-in-the-pulpit (*Arisaema triphyllum*) and Indian pipes (*Monotropa uniflora*). The herb layer may be lush to depauperate.

In Rock Creek Park this forest is dominated by white oak (*Quercus alba*), beech (*Fagus grandiflora*) and tulip poplar (*Liriodendron tulipifera*) in the canopy and sub-canopy. Associates include other oak species (*Quercus rubra*, *Q. velutina*, *Q. prinus*, *Q. falcata*), hickories (*Carya* spp.) and black gum (*Nyssa sylvatica*). Sweetgum (*Liquidambar styraciflua*) is rarely present in this community as it occurs in the park. Flowering dogwood (*Cornus florida*) is common and American holly (*Ilex opaca*) is characteristic but sparse. Maple-leaved viburnum (*Viburnum acerifolium*) is nearly always present, often forming a well-defined shrub layer. Herb composition may be fairly diverse and ranges from sparse to dense depending on soil type, disturbance history and moisture levels. Mayapple (*Podophyllum peltatum*), jack-in-the-pulpit (*Arisaema atrorubens*), and poison ivy (*Toxicodendron radicans*) are typical associates. Christmas fern (*Polystichum acrostichoides*) may be locally abundant, typically on hillsides. Other associates include cucumber root (*Medeola virginiana*), squawroot (*Conopholis americana*), sweet cicely (*Osmorhiza claytonii*), false solomons seal (*Smilacina racemosa*), wild yam (*Dioscorea villosa*), tick-trefoil (*Desmodium* sp.), partridgeberry (*Mitchella repens*) and others. Non-native species such as garlic mustard (*Alliaria officianalis*), Japanese honeysuckle (*Lonicera japonica*), and bittersweet (*Celastrus orbiculatus*) are common to abundant in some locations.

Two variants of the classic Beech - white oak / mayapple forest association could be discerned from the data. These relate to the soil moisture regime; the mixed oak/beech variant occurring on drier sites and the beech-Tulip poplar variant occurring on more mesic sites.

MIXED OAK / BEECH VARIANT:

This is a dry-mesic forest of slopes and hilltops. In comparison to the typical examples of the beech - white oak/mayapple forest association, this mixed oak - beech variant is characterized by greater percent cover of oaks and less dominance by tulip poplar. The canopy is co-dominated by a mix of red oak (*Quercus rubra*), black oak (*Q. velutina*), and white oak (*Q. alba*) and chestnut oak (*Q. prinus*). Beech usually occurs in the sub-canopy as a co-dominant with oaks, red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*) and hickory (*Carya* spp.). Maple-leaved viburnum (*Viburnum acerifolium*) is common but spicebush (*Lindera benzoin*), hornbeam (*Carpinus caroliniana*) and jack-in-the-pulpit (*Arisaema atrorubens*) are conspicuously lacking or sparse, a feature which distinguishes this variant from the typical beech - white oak/mayapple association. This variant occurs on well drained mid- to upper level slopes. Included in this association are the chestnut oak – oak type defined by Anderson et al. (1977, Rock Creek Park) and the mixed oak forest (Robichaud and Buell 1973, New Jersey). The oak - hickory forest of Maryland's western shore described by Shreve et al. (1910), in part, is included in this association; tulip poplar and beech were noted as frequent components. This type also appears to be similar to the Appalachian oak-hickory forest of New York (Reschke 1990). This variant is closely related to the *Quercus alba* (*Q. rubra*, *Carya* spp.) Forest Alliance (Grossman et al. 1998) but additional data and rangewide assessment would be necessary to determine if the two are synonymous.

BEECH - TULIP POPLAR VARIANT:

This variant of the beech - white oak / mayapple association is characterized by a dominance of tulip poplar (*Liriodendron tulipifera*) and beech (*Fagus grandiflora*) in the canopy and sub-canopy. Associates include red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), hickory (*Carya tomentosa*), flowering dogwood (*Cornus florida*) and hornbeam (*Carpinus caroliniana*) in the canopy or sub-canopy. Hornbeam is quite characteristic of this community; it is more prevalent in this variant than in the typical beech - white oak / mayapple association. Oaks (*Quercus* spp.), sycamore (*Platanus occidentalis*) and boxelder (*Acer negundo*) may be present as well but usually in low abundance. Spicebush (*Lindera benzoin*) and viburnums (*Viburnum prunifolium*, *V. acerifolium*, *V. dilatatum* and others) are common in the shrub layer. The herb layer may be diverse, with many of the components of the typical beech - white oak / mayapple association. Jack-in-the-pulpit (*Arisaema atrorubens*) is usually more prevalent in this variant. The beech - tulip poplar forest occurs on mesic mid- to lower slopes, often in proximity to streams but not on the floodplain itself. This may be related to or transitional to the *Fagus grandifolia* Temporarily Flooded Alliance (Grossman et al. 1998). Rangewide assessment of that alliance is incomplete.

NOTEWORTHY SPECIES

CONSERVATION RANK G?

RANK JUSTIFICATION

The *Fagus grandiflora* - *Quercus alba* Forest is described as widespread and relatively common Alliance (Sneddon et al. 1996). The association has not been assigned a conservation rank but is not likely to be uncommon or rare. Further analysis is needed to determine the rank of this forest type.

COMMENTS

The mixed hardwood upland forest described by Jorling (1969, Rock Creek Park) is synonymous with this association. Five forest types described by Anderson et al. (1977, Rock Creek Park) including the oak-beech, tulip tree-beech, tulip tree-oak, tulip tree-locust pine, and chestnut oak-hickory-beech associations fall within the *Fagus grandifolia* - *Quercus alba* / *Podophyllum peltatum* Forest Association. Portions of the dry-mesic inland mixed oak forest of New Jersey (Breden 1989) including sites described by Robichaud and Buell (1973) and Lord and Boerner (1981) are contained in this association. Also included are the mesophytic oak-hickory forest of the western shore of Maryland (Shreve 1910); the *Liriodendron tulipifera* - *Quercus* spp. - *Fagus grandifolia* forest (Clancy 1996, Delaware), in part; Pennsylvania's mesic-central forest (Smith 1983), in part; and Long Island's oak, mixed dicot-dogwood forest and the mixed mesophytic forest (Greller 1977) which is encompassed by Reschke's oak-tulip tree forest (1990, New York).

The term "mixed mesophytic" has been frequently used (e.g., Bromley 1935, Greller 1977, Rawinski 1989) to describe this and other associations in this alliance due to similarities in species composition with the Mixed Mesophytic Forest (see Braun 1950) of the central Appalachian mountains and vicinity. However, the classic Mixed Mesophytic Forest (or *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance in Grossman et al. 1998) is distinguished by an exceptionally high diversity of canopy and understory species and the presence of basswood (*Tilia americana* var. *heterophylla*) and buckeye (*Aesculus flava*) (Braun 1950). Although there are similarities in canopy and subcanopy associates (e.g., beech, white oak, red oak, tulip poplar, dogwood, maple-leaved viburnum and spicebush), the alliance represented at Rock Creek Park and other locations in the northeast (particularly on the coastal plain) lacks both the characteristic indicator tree species (*Tilia* spp. and *Aesculus flava*) and is considerably less diverse in species composition than the classic Mixed Mesophytic Forest.

REFERENCES

Anderson, R. R., D. M. McFaden, R. J. Kramer, J.C. Dee, and G. C. Jones. 1977. Rock Creek Park and Rock Creek and Potomac Parkway: vegetation community structure and automated classification of vegetation communities. Unpublished report. Department of Biology, The American University, Washington, D.C. National Park Service Contract number CX6000-3-1452.

Bromley, S. W. 1935. The original forest types of southern New England. Ecol. Monographs. 5: 63-89.

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Braun, E. L. 1950. Deciduous forests of eastern North America. Macmillan Publishing Co, New York, NY.

Clancy, K. 1996. Natural communities of Delaware (draft). Delaware Natural Heritage Inventory, Div. of Parks and Recreation, Dover, DE.

Greller, A. M. 1977. A classification of mature forests on Long Island, New York. Bull. Torr. Bot. Club 104: 376-382.

Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International classification of ecological communities: Terrestrial vegetation of the United States (draft). The Nature Conservancy, Arlington VA.

Jorling, T. C. 1969. An analysis of the vegetation of Rock Creek Park, Washington, D.C. M.S. Thesis, Washington State University, Spokane, WA.

Lord, T. R. and R. E. Boerner. 1981. Vegetation of Rancocas State Park, a New Jersey Inner Coastal Plain forest of the pine barrens-Piedmont tension zone. Bull. New Jersey Acad. Sci. 26: 6-12.

Rawinski, T. J. 1989. A classification of Delaware's vegetated and nonvegetated community elements (draft). Eastern Heritage Task Force, The Nature Conservancy, Boston, MA. 50 p.

Reschke, C. 1990. Ecological communities of New York State. New York Natural Heritage Program. New York State Dept. of Environmental Conservation. Latham, NY. 96 p.

Shreve, F., M. A. Chrysler, F. H. Blodgett, F. W. Besley. 1910. The Plant Life of Maryland. Maryland Weather Service. Special Publication, Vol. III. Johns Hopkins Press, Baltimore, MD.

Smith, H. 1976. Soil survey of District of Columbia. U.S. Dept of Agriculture, Soil Conservation Service in cooperation with the National Park Service. Washington D.C.

Smith, T. L. 1983. Natural ecological communities of Pennsylvania (draft). Pennsylvania Natural Diversity Inventory-East, Pennsylvania Science Office of The Nature Conservancy, Middletown, PA. Revised 1991.

PLOTS

(Groups refer to notation in TWINSPAN analysis)

GROUP 1 - MIXED OAK - BEECH VARIANT (less mesic, more oak) 9, 10, 11 (borderline with group 2), 13, 20, 22, 31, 33, 34, 56, 86

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GROUP 2 - Beech-white oak/mayapple forest association (classic type) 15, 16, 17, 18, 19
(around forest opening), 27, 29, 32, 35, 57, 81, 83

GROUP 3 - BEECH - TULIP POPLAR (more mesic variant) 4, 5, 21, 23*, 24, 25* (*
related to floodplain forest), 28, 30, 37, 51 (weedy), 52, 53, 61