MESIC MIXED HARDWOOD FOREST (PIEDMONT SUBTYPE)

Concept: Mesic Mixed Hardwood Forests are forests of moist but not wet sites lacking indicators of unusually high pH or base-rich soils. They are characterized by vegetation dominated or codominated by *Fagus grandifolia,* but lacking the more diverse flora of Basic Mesic Forests or Montane Cove Forests. The Piedmont Subtype covers examples on Piedmont substrates, where *Quercus rubra* and other characteristic Piedmont species are present and characteristic Coastal Plain species are absent or scarce.

Distinguishing Features: Mesic Mixed Hardwood Forest is distinguished from Basic Mesic Forest by lower species richness and by lacking the species that in the Piedmont and Coastal Plain are indicators of higher pH soils (e.g, *Actaea racemosa, Asarum canadense, Adiantum pedatum, Sanguinaria canadensis, Cynoglossum virginianum, Cubelium (Hybanthus) concolor*, and *Actaea pachypoda*). *Ostrya virginiana, Carpinus caroliniana, Fraxinus americana, Lindera benzoin,* and *Aesculus sylvatica* tend to be common in Basic Mesic Forest and scarce in Mesic Mixed Hardwood Forest. Many of the same indicators are present in Rich Cove Forest, but a number of additional montane species are also present, including the additional trees *Aesculus flava, Tilia americana* var. *heterophylla, Halesia tetraptera*, and *Betula lenta*. A smaller set of species distinguishes Mesic Mixed Hardwood Forest from Acidic Cove Forest. These include *Betula lenta, Tsuga canadensis, Rhododendron maximum*, and *Leucothoe fontanesiana*.

Mesic Mixed Hardwood Forest is distinguished from Piedmont Levee Forest (Beech Subtype), Piedmont Headwater Stream Forest, Piedmont Alluvial Forest, and other floodplain communities, which may contain similar tree species, by the absence of evidence of flooding and by the lack of characteristic floodplain plant species such as *Platanus occidentalis, Fraxinus pennsylvanica, Betula nigra*, *Lindera benzoin, Xanthorhiza simplicissima, Elymus virgincus,* and *Elymus hystrix*.

The Piedmont Subtype is distinguished from the Coastal Plain Subtype by a number of species that occur primarily in the Coastal Plain, at least in mesic uplands. Coastal Plain species include *Quercus nigra, Stewartia malacodendron, Symplocos tinctoria, Gaylussacia frondosa, Ilex glabra*, and *Clethra alnifolia*. *Quercus rubra* is generally a good indicator of Piedmont flora. However, a number of species considered typical of the Piedmont occur as disjunct populations in the Coastal Plain in Mesic Mixed Hardwood Forests, including *Podophyllum peltatum*, *Epifagus virginiana*, and *Hamamelis virginiana*. Some of the indicators occur at low density, and standard plot samples may capture few of them, making classification based on data from individual plots difficult.

Synonyms: *Fagus grandifolia - Quercus rubra / Cornus florida / Polystichum acrostichoides - Hexastylis virginica* Forest (CEGL008465).
Ecological Systems: Southern Piedmont Mesic Forest (CES202.342).

Sites: Most examples occur on steep slopes, bluffs, or ravines in dissected uplands along streams, where slope aspect or topographic sheltering create a cool microclimate and limit spread of fire. They may also occur on relict river terraces in areas that no longer flood.

Soils: Examples occur on a wide range of soils, most of which are Typic Kanhapludults or Typic Hapludults. The most frequent series mapped in known occurrences are Pacolet, Cecil, Tatum,

and Georgeville, among the most extensive soils in the Piedmont. A few are mapped as Wilkes (Typic Hapludalf) or Goldston (Typic Dystrudept). More occurrences may be on inclusions within their map units.

Hydrology: Sites are moist but well drained.

Vegetation: Forests generally are dominated by *Fagus grandifolia*. *Quercus alba* and *Liriodendron tulipifera* are often abundant and sometimes codominant. Less frequent canopy species include *Quercus rubra*, *Carya tomentosa*, and *Quercus velutina*. CVS data show the most abundant understory tree species to be *Cornus florida, Acer rubrum, Oxydendrum arboreum, Liquidambar styraciflua*, and *Nyssa sylvatica*, with *Acer floridanum, Ulmus alata*, *Ostrya virginiana*, and other species less frequent. Shrubs generally are sparse. *Euonymus americana* is the only frequent species, and *Viburnum prunifolium, Viburnum rafinesquianum*, *Viburnum acerifolium*, or *Vaccinium pallidum* occur in some examples. A few vine species are frequent, especially *Muscadinia rotundifolia* and small individuals of *Smilax glauca* and *Parthenocissus quinquefolia*. Herbs may be sparse to dense. Some examples have large beds of *Polystichum acrostichoides*, while other don't. Other herbs with high constancy in CVS data, though low cover, include *Galium circaezans*, *Maianthemum racemosum, Hexastylis arifolia, Chimaphila maculata, Goodyera pubescens, Uvularia perfoliate*, and *Hylodesmum nudiflorum*.

Range and Abundance: The equivalent association is ranked G3G4, but G4 likely is appropriate. These communities occur throughout the Piedmont and are one of the most frequently recorded communities in the state. Many examples were protected by steep topography from past agricultural clearing and more recent development, and some are steep enough to be unlikely to be logged. However, many examples are of limited size because of the dissected terrain and many are bordered by more altered sites.

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Associations and Patterns: Mesic Mixed Hardwood Forests may be regarded as matrix-forming communities; they make up a significant minority of the landscape mosaic in most Piedmont landscapes, though individual patches may be small. Mesic Mixed Hardwood Forests grade to Dry-Mesic Oak–Hickory Forest uphill and to floodplain communities downhill. Piedmont/Coastal Plain Heath Bluff, Basic Mesic Forest, or Piedmont Cliff communities may be associated with them along slopes.

Variation: Examples vary with the transition to adjacent communities and with biogeography. Examples farther west in the Piedmont may have more montane species, though a few disjunct montane species are known even in the eastern Piedmont. Examples also seem to vary significantly in species richness, with some moderately rich and some with only a few strongly dominant species. Harry LeGrand, in several Natural Heritage Program reports, proposed recognition of a distinct subtype on steeper bluffs. This initially does not appear consistently distinguishable but is recognized as a variant to allow use of the concept and to seek further evidence.

1. Typic Variant most closely fits the description of the subtype. Its canopy may be strongly dominated by *Fagus* or may be more mixed. Plants of deep soils generally are present, especially

Polystichum acrostichoides, but also *Podophyllum peltatum, Tiarella cordifolia, Cardamine angustata, Geranium maculatum*, and *Erythronium umbilicatum*.

2. Bluff Variant occurs on steeper slopes. *Fagus* typically is strongly dominant, and several species typical of shallow soil and greater drainage are present. These include *Hydrangea arborescens, Cunila origanoides, Epigaea repens, Solidago arguta, Hexastylis minor*, and *Silene virginica*.

Dynamics: Dynamics are similar to the theme in general.

Comments: Mesic Mixed Hardwood Forests have consistently been distinguished in local analyses of vegetation data in the Piedmont (Peet and Christensen 1980, Oosting 1942). Numerous CVS plots exist for this subtype.

A few Mesic Mixed Hardwood Forests in the Coastal Plain may fit this subtype better than the Coastal Plain Subtype. The NVC association synonymized to this subtype is recognized as extending into the Coastal Plain in northern Virginia.

Rare species: *Magnolia macrophylla.*

References:

Oosting, H.J. 1942. An ecological analysis of the plant communities of Piedmont, N.C. American Midland Nauralist 28: 1-126.

Peet, R.K., and N.L. Christensen. 1980. Hardwood forest vegetation of the North Carolina Piedmont. Veroeff. Geobot. Inst. ETH, Stiftung Rubel, Zurich. 69. Heft: 14-39.