MONTANE OAK–HICKORY FOREST (BASIC SUBTYPE)

Concept: Montane Oak–Hickory Forests are dominated by mixtures of oaks with *Quercus alba* as a significant component. The Basic Subtype encompasses forests of mafic rock or comparable substrates, whose flora contains species typical of high pH, base-rich sites.

Distinguishing Features: All Montane Oak–Hickory Forests are distinguished from other Mountain Oak Forest communities by having a canopy containing significant *Quercus alba* (10% of the canopy or more) mixed with other oaks, hickories, or pines. The Basic Subtype is distinguished from the Acidic Subtype and the Low Dry Subtype by the combination of limited heath shrub abundance and abundance of mesic herbs. Characteristic species such as *Pycnanthemum montanum*, *Tradescantia subaspera*, *Solidago curtisii*, *Podophyllum peltatum*, *Dichanthelium boscii*, and *Brachyelytrum erectum* are often abundant, but Rich Cove Forest and base-loving species such as *Collinsonia canadensis*, *Arisaema triphyllum*, *Actaea racemosa*, *Caulophyllum thalictroides*, *Sanguinaria canadensis*, *Adiantum pedatum*, *Euphorbia purpurea*, and *Philadelphus inodorus* are also usually present. Additional canopy species associated with more mesophytic or more base-rich communities are also often present, with *Fraxinus americana* and *Magnolia acuminata* especially characteristic. This subtype is potentially confused with Rich Cove Forest (Red Oak Subtype), but is distinguished by occurring in more topographically exposed settings and having a less mesophytic flora, as well as by having *Quercus alba* as a major component. While a number of herbaceous and woody species are shared with Rich Cove Forests, they represent a distinct subset of rich mesophytic species. Many of the associated species in this community are of drier sites.

Synonyms: *Quercus alba* - *Quercus rubra* - *Quercus prinus* / *Collinsonia canadensis* - *Podophyllum peltatum* - *Amphicarpaea bracteata* Forest (CEGL007692).


Sites: The Basic Subtype occurs on ridge tops and on upper to lower slopes, spur ridges, and some valley flats comparable to those of the Acidic Subtype, but with a substrate of amphibolite, calc-silicate, or other mafic or calcareous rock. It occurs over a tremendous range of elevation, from 1000 feet up to 5200 feet or higher.

Soils: Soils tend to have higher pH, higher base saturation, and higher concentrations of calcium, magnesium, and several other cations, compared to the prevailing soils of the region and those of the Acidic Subtype. This suite of characteristics is called basic, but rarely if ever is the pH above neutral. Soils mapped for this community include a broad range of upland soils that are not distinguished by their chemical characteristics and are usually shared with other subtypes. Most are Typic Hapludults such as Evard, Cowee, and Fannin, or Typic Dystrudepts such as Ashe, Chestnut, and Porters.

Hydrology: Sites are well-drained, and conditions generally are dry-mesic to dry. As with many communities of mafic rock, some of the flora suggests moister conditions than the topographic position or canopy composition suggest.

Vegetation: The forest generally is dominated by varying combinations of *Quercus alba*, *Quercus rubra*, *Carya glabra*, and less frequently, *Quercus montana*. A significant minority of species
characteristic of basic soils is present. Most constant of these species are *Fraxinus americana* and *Prunus serotina*. Other frequent canopy species include *Betula lenta*, *Quercus velutina*, *Carya cordiformis*, and less frequently but sometimes abundant, *Carya ovata*, *Acer saccharum*, *Tilia americana* var. *heterophylla*, or *Juglans nigra*. High constancy understory species in CVS plot data are *Castanea dentata* sprouts, *Acer rubrum*, *Nyssa sylvatica*, *Sassafras albidum*, *Cornus florida*, and *Oxydendrum arboreum*, and other frequent species include *Acer pensylvanicum*, *Magnolia acuminata*, and *Amelanchier arborea*. Shrubs generally are sparse. *Cornus alternifolia*, *Corylus americana*, *Calycanthus floridus*, *Hydrangea arborescens*, and various *Vaccinium* spp. sometimes occur. Vines are not generally abundant, but *Toxicodendron radicans* and *Parthenocissus quinquefolia* are highly constant. The herb layer is usually moderate in density and is diverse. In addition to widespread species such as *Maianthemum racemosum*, *Dioscorea villosa*, *Solidago curtisii*, *Polystichum acrostichoides*, *Lysimachia quadrifolia*, and *Medeola virginica*, herbs include several of a large suite of base-loving or mesophytic herbs shared with Rich Cove Forest and not generally present in other oak forests. High constancy species in CVS plots are *Amphicarpaea bracteata*, *Collinsonia canadensis*, *Uvularia perfoliata*, *Conopholis americana*, *Actaea racemosa*, *Dichanthelium bosci*, and *Galium latifolium*. Other frequent species include *Hylocladum nudiflorum*, *Tradescantia subaspera*, *Eurybia divaricata*, *Polygonatum biflorum*, *Goodyera pubescens*, *Prosartes maculata*, *Sanguinaria canadensis*, *Paraphleurytis noveboracensis*, *Eutrochium purpureum*, *Clintonia umbellula*, *Chimaphila maculata*, *Stellaria pubera*, *Nabalus sp.*, *Carex pensylvanica*, *Ageratina altissima*, and *Pycnanthemum montanum*. Less frequent species that are nevertheless characteristic of the Basic Subtype include *Thalictrum dioicum*, *Phyrrma leptostachya*, *Symphyotrichum cordifolium*, *Phegopteris hexagonoptera*, *Hylocladum nudiflorum*, *Adiantum pedatum*, *Ligusticum canadense*, *Brachyelytrum erectum*, *Bromus pubescens*, and *Laportea canadensis*. The Basic Subtype is among the most species rich of mountain communities. CVS plots average 77 species per 1/10 hectare plot.

**Range and Abundance:** Ranked G3. This community is scattered throughout the Mountain region and the foothills but is substantially less abundant than the Acidic Subtype. The association ranges southward to Georgia.

**Associations and Patterns:** The Basic Subtype may occur as small patches amid acidic communities or may occur in large patches. Where amphibolite is extensive, it may occur in a mosaic with High Elevation Red Oak Forest (Rich Subtype), Northern Hardwood Forest (Rich Subtype), Rich Cove Forest (Montane Rich Subtype), Montane Cliff (Mafic Subtype), and other basic soil communities. At the edges of mafic rock substrate, the Basic Subtype may give way abruptly to other subtypes of Montane Oak–Hickory Forest, but often is bordered instead by Chestnut Oak Forest. It often grades downslope to Rich Cove Forest, which may be the Montane Rich or Foothills Rich Subtype.

**Variation:** No variants are recognized, though further analysis may identify distinct groupings. Examples vary in how strongly basic they appear to be, based on their flora, with species such as *Brachyelytrum*, *Phegopteris*, and *Tradescantia* in less basic examples and *Phyrrma*, *Adiantum*, *Tilia americana* var. *heterophylla*, and *Juglans nigra* suggestive of more basic conditions.
**Dynamics:**  Dynamics are similar to those of Mountain Oak Forests in general. Although mesophytic tree species of rich soils are characteristic of this community, they presumably have increased with the lack of fire and the death of chestnuts.

**Comments:**  This community is one of several associated with basic soils and mafic rocks, with a distinctive flora sharing many species that normally are confined to more mesic sites. This distinction is not made in most of the early studies of vegetation, though it was recognized in many site-specific reports and is clear in McLeod (1988) and some other later studies. Ulrey (2002) noted that this may be because many study areas, such as the Great Smoky Mountains, have limited variation in geology. His analysis of CVS data from across the region clearly demonstrated the importance of the soil chemistry gradient as well as of topography. Ulrey (2002) also articulated the curious fact that the chemical differences that seem to drive community patterns are not the nutrients most limiting to plant production.

**Rare species:**  Vascular plants – *Adlumia fungosa, Carex amplisquama, Carex hitchcockiana, Carex purpurifera, Carex roanensis, Collinsonia tuberosa, Collinsonia verticillata, Cypripedium parviflorum, Euphorbia purpurea, Gillenia stipulate, Hackelia virginiana, Heuchera pubescens, Isotria medeoloides, Liatris microcephala, Liatris turgida, Melica nitens, Polygala senega, Pyrola elliptica, Silene ovata, Silphium perfoliatum, Sisyrinchium dichotomum, Spiraea corymbose, Thermopsis fraxinifolia, Thermopsis mollis, Tradescantia virginiana.* Animals – *Dendroica cerulea, Plethodon welleri.*

**References:**