
ECOLOGICAL SYSTEM: SOUTHERN AND CENTRAL APPALACHIAN COVE FOREST

Summary: This system consists of mesophytic hardwood forests of sheltered topographic positions in the Southern Blue Ridge and central Appalachian Mountains. Examples are generally found on concave slopes that promote moist conditions. The system includes a mosaic of acidic and "rich" coves that may be distinguished by individual plant communities based on perceived differences in soil fertility and species richness (rich examples have higher diversity and density in the herbaceous layer). Both acidic and rich coves may occur in the same site, with the acidic coves potentially creeping out of the draw-up to at least midslope on well-protected north-facing slopes. Characteristic species in the canopy include *Aesculus flava* (yellow buckeye), *Acer saccharum* (sugar maple), *Fraxinus americana* (white ash), *Tilia americana* (American basswood), *Liriodendron tulipifera* (tuliptree), *Halesia tetraptera* (mountain silverbell), *Tsuga canadensis* (eastern hemlock), *Fagus grandifolia* (American beech), and *Magnolia fraseri* (fraser magnolia).

High-ranked Species: *Aconitum reclinatum* (G3, white monkshood), *Actaea rubifolia* (G3, Appalachian bugbane), *Aneides aeneus* (G3G4, green salamander), *Arabis patens* (G3, spreading rockcress), *Brachythecium rotaeanum* (G3G4, rota's feather moss), *Bryoerythrophyllum ferruginascens* (G3G4), *Calystegia catesbeiana* ssp. *sericata* (G3T2T3Q, Blue Ridge bindweed), *Canis rufus* (G1Q, red wolf), *Cardamine clematitidis* (G3, small mountain bittercress), *Cardamine flagellifera* (G3, Blue Ridge bittercress), *Carex manhartii* (G3G4, manhart's sedge), *Carex radfordii* (G2, radford's sedge), *Carex roanensis* (G2, roan mountain sedge), *Catocala marmorata* (G3G4, marbled underwing), *Clematis addisonii* (G2, addison's leatherflower), *Collinsonia verticillata* (G3, stoneroot), *Delphinium alabamicum* (G2, alabama larkspur), *Desmognathus aeneus* (G3G4, seepage salamander), *Desmognathus imitator* pop. 1 (G3G4T1Q, waterrock knob salamander), *Desmognathus santeetlah* (G3G4Q, santeetlah dusky salamander), *Desmognathus wrighti* (G3G4, pygmy salamander), *Diervilla rivularis* (G3, mountain bush-honeysuckle), *Drepanolejeunea appalachiana* (G2?), *Entodon sullivantii* (G3G4, sullivant's entodon), *Euphorbia purpurea* (G3, glade spurge), *Hygrohypnum closteri* (G3, closter's brook-hypnum), *Juglans cinerea* (G3G4, butternut), *Lejeunea blomquistii* (G1G2, blomquist leafy liverwort), *Lophocolea appalachiana* (G1G2Q), *Marsupella emarginata* var. *latiloba* (G5T1T2), *Megaceros aenigmaticus* (G2G3), *Metzgeria fruticulosa* (G2Q), *Metzgeria uncigera* (G3), *Microtus chrotorrhinus carolinensis* (G4T3, southern rock vole), *Nesticus sheari* (G2?, a cave spider), *Neviusia alabamensis* (G2, alabama snow-wreath), *Panax quinquefolius* (G3G4, American ginseng), *Plagiochila austinii* (G3), *Plagiochila caduciloba* (G2, gorge leafy liverwort), *Plagiochila sharpii* (G2G4, sharps leafy liverwort), *Plagiochila virginica* var. *virginica* (G3T3), *Plagiomnium carolinianum* (G3, mountain wavy-leaf moss), *Platyhypnidium pringlei* (G2G3), *Plethodon aureolus* (G2G3, tellico salamander), *Plethodon hubrichti* (G2, peaks of otter salamander), *Plethodon punctatus* (G3, white-spotted salamander), *Plethodon teyahalee* (G3, southern Appalachian salamander), *Plethodon welleri* (G3, weller's salamander), *Polymnia laevigata* (G3, green leafcup), *Prosartes maculata* (G3G4, yellow mandarin), *Riccardia jugata* (G2), *Schisandra glabra* (G3, magnolia-vine), *Scutellaria alabamensis* (G2, alabama skullcap), *Scutellaria pseudoserrata* (G3, annie's skullcap), *Scutellaria saxatilis* (G3, rock skullcap), *Silene ovata* (G3, Blue Ridge catchfly), *Sorex palustris punctulatus* (G5T3, southern water shrew), *Speyeria diana* (G3G4, diana fritillary), *Thaspium pinnatifidum* (G2G3, cutleaf meadow-parsnip), *Trechus luculentus luculentus* (GHTH, a carabid beetle), *Trillium discolor* (G2, mottled wakerobin), *Trillium lancifolium* (G3, lanceleaf wakerobin), *Trillium rugelii* (G3, ill-scented wakerobin), *Trillium simile* (G3, jeweled wakerobin), *Triphora trianthophora* (G3G4, threebirds), *Viola appalachiensis* (G3, Appalachian blue violet), *Viola tripartita* var. *tripartita* (G5T3?, three-parted violet), *Virginia valeriae pulchra* (G5T3T4, mountain earth snake)

Range: This system occurs in the southern and central Appalachian Mountains, ranging into the Cumberland Mountains of Kentucky and Tennessee. This range is more-or-less consistent with the "Oak-Chestnut" forest region of Braun (1950) and Greller (1988), versus the "Mixed Mesophytic" and

"Western Mesophytic" forest regions to the west. Distribution in Ecoregion 61 needs review. United States: GA, KY, MD, NC, PA, SC, TN, VA, WV

Delaware Estuary Associations:

- Calcareous Slope Forest
- Central Appalachian Rich Cove Forest

CLASSIFIERS FOR SOUTHERN AND CENTRAL APPALACHIAN COVE FOREST

Primary Division: 202

Land Cover Class: Forest and Woodland

Spatial Scale & Pattern: Large patch

Required Classifiers: Natural/Semi-natural; Vegetated (>10% vasc.); Upland

Diagnostic Classifiers: Forest and Woodland (Treed); Broad-Leaved Tree

CALCAREOUS SLOPE FOREST

Acer saccharum - *Fraxinus americana* - *Juglans cinerea* / *Staphylea trifolia* Forest

Range: This community is reported to occur in the northern and central Appalachian regions, from Vermont and New Hampshire south to Virginia and West Virginia. It occurs in the Pennsylvania portion of the Delaware Estuary.



Photo by Pennsylvania Natural Heritage Program

Environmental Description: Sites include talus slopes or shallow rocky soils weathered from calcareous or circumneutral bedrock. Habitats are situated on lower to middle slopes subtending streams in low-elevation montane valleys and gorges. Slopes are steep, usually with north to east aspects. Bedrock outcrops are frequent. Exposed rock (boulder and outcrop) cover can be up to 50%, which reduces both species richness and herbaceous cover. However, due to the relatively rapid weathering of carbonate materials and extremely fertile soils, these habitats are typically well vegetated with herbaceous plants. High cover of mosses provides a foothold for many species, while organic mats and soil pockets are also numerous.

Vegetation Description: In the northern part of this unit's range, canopy dominants are *Acer saccharum* (sugar maple) and *Fraxinus americana* (white ash), with typical associates of *Juglans cinerea* (butternut), *Quercus rubra* (northern red oak), *Tilia americana* (American basswood), *Carya cordiformis* (bitternut hickory), and *Quercus muehlenbergii* (chinquapin oak). *Betula alleghaniensis* (yellow birch), *Fagus grandifolia* (American beech), and *Ulmus* (elm) spp. may also occur locally. *Ostrya virginiana* (eastern hop-hornbeam) and *Carpinus caroliniana* (American hornbeam) are typical small trees. The shrub layer is open and characterized by *Staphylea trifolia* (American bladdernut), *Corylus* (hazelnut) spp., *Hamamelis virginiana* (American witch-hazel), *Rubus odoratus* (purple-flowering raspberry), *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis* (grape) spp. Typical species of the fairly diverse herb layer include *Actaea pachypoda* (white baneberry), *Allium tricoccum* (ramps), *Aralia nudicaulis* (wild sarsaparilla), *Aralia racemosa* (American spikenard), *Asplenium platyneuron* (ebony spleenwort), *Asarum canadense* (Canadian wild ginger), *Eurybia divaricata* (white wood-aster), *Circaea lutetiana* ssp. *canadensis* (broadleaf enchanter's-nightshade), *Cystopteris fragilis* (fragile fern), *Cystopteris bulbifera* (bulblet bladderfern), *Dryopteris* (woodfern) spp., *Polystichum acrostichoides* (Christmas fern), *Sanguinaria canadensis* (bloodroot), *Solidago flexicaulis* (zigzag goldenrod), *Trillium erectum* (stinking benjamin), *Woodsia obtusa* (common cliff fern), and others.

Characteristic graminoids include *Carex laxiflora* (loose-flower sedge), *Carex sprengelii* (longbeak sedge), *Carex virescens* (ribbed sedge), *Elymus hystrix* (bottlebrush grass), and *Piptatherum racemosum* (black-seed mountain ricegrass).

Characteristic Species: *Acer saccharum* (sugar maple), *Carex laxiflora* (loose-flower sedge), *Fraxinus americana* (white ash), *Juglans cinerea* (butternut), *Staphylea trifolia* (American bladdernut)

Dynamics/Successional Trajectory: Exposed rock (boulder and outcrop) cover can be up to 50%, which reduces both species richness and herbaceous cover. However, due to the relatively rapid weathering of carbonate materials and extremely fertile soils, these habitats are typically well vegetated with herbaceous plants. High cover of mosses provides a foothold for many species, while organic mats and soil pockets are also numerous.

Management Concerns: This community type has a wide geographic range and occupies rugged habitats that are not prone to many anthropogenic disturbances. Invasive exotic weeds do not appear to be particularly troublesome, but windthrow, slumping or landsliding of unstable colluvium, and other erosional disturbances appear to be relatively frequent in the habitats of this type.

Reference Sites: none identified

Global and State Conservation Ranks and Reasons: G4? (1-Oct-2001). NJ: S2, PA: S2?. This community occurs mostly in small, local patches. There are likely >50 occurrences in Virginia, and many in West Virginia (D. Walton pers. comm.).

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.688340

References: Breden 1989, Breden et al. 2001, CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Eyre 1980, Fike 1999, Fleming 1999, Fleming and Coulling 2001, Fleming et al. 2001, Harrison 2004, Lundgren 2000, Metzler and Barrett 1996, Metzler and Barrett 2001, Rawinski 1984, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, VDNH 2003, Walton pers. comm.

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> (sugar maple)
Tree canopy	Broad-leaved deciduous tree	<i>Fraxinus americana</i> (white ash)
Tree canopy	Broad-leaved deciduous tree	<i>Juglans cinerea</i> (butternut)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Ostrya virginiana</i> (eastern hop-hornbeam)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Staphylea trifolia</i> (American bladdernut)
Herb (field)	Fern or fern ally	<i>Polystichum acrostichoides</i> (Christmas fern)

CENTRAL APPALACHIAN RICH COVE FOREST

Acer saccharum - *Fraxinus americana* - *Tilia americana* - *Liriodendron tulipifera* / *Actaea racemosa*
Forest

Range: This forest is found in the High Alleghenies, Western Allegheny Plateau, Central Appalachians, and Cumberlands from New York and New Jersey south to West Virginia, Virginia, and eastern Kentucky. This community occurs in Pennsylvania in the Delaware Estuary.

Environmental Description: This community type occupies cool (northwest- to east-facing), mesic, lower to middle slopes, ravines, and coves at elevations from 425 to about 1050 m (1400-3450 feet). Sites may be underlain by a number of bedrock types, including limestone, dolomite,

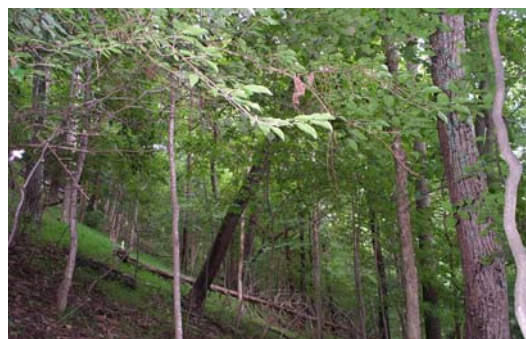


Photo by Pennsylvania Natural Heritage Program

metabasalt (greenstone), granitic rocks, and sandstone. Slopes are typically steep (mean in plots = 23 degrees) and concave in at least one direction. Soils are deep, dark, and fertile, although frequently stony or bouldery. Samples collected from plots range from very strongly acidic to circumneutral (pH range = 4.2-6.8, mean pH = 5.3) but consistently have high calcium levels (mean = 1978 ppm) and moderately high magnesium and manganese levels.

Vegetation Description: The canopy is dominated by *Acer saccharum* (sugar maple) with *Fraxinus americana* (white ash) and *Tilia americana* (American basswood) being very characteristic. Associated canopy trees include *Quercus rubra* (northern red oak), *Ostrya virginiana* (eastern hop-hornbeam), *Ulmus rubra* (slippery elm), *Acer rubrum* (red maple), *Betula alleghaniensis* (yellow birch), *Betula lenta* (sweet birch), *Fagus grandifolia* (American beech), *Juglans nigra* (black walnut), *Liriodendron tulipifera* (tuliptree), *Magnolia acuminata* (cucumber-tree), *Carya cordiformis* (bitternut hickory), and *Prunus serotina* (black cherry). The shrub layer is of variable composition, characterized by *Cornus alternifolia* (alternate-leaf dogwood), *Hamamelis virginiana* (American witch-hazel), *Lindera benzoin* (northern spicebush), *Asimina triloba* (common pawpaw), *Lonicera canadensis* (fly honeysuckle), *Rhododendron periclymenoides* (pink azalea), and *Viburnum acerifolium* (mapleleaf viburnum). The herb layer is diverse and made up of *Adiantum pedatum* (northern maidenhair), *Asarum canadense* (Canadian wild ginger), *Actaea racemosa* (black cohosh), *Cardamine* (bittercress, toothwort) spp., *Hepatica nobilis var. obtusa* (round-lobe liverleaf), *Hydrophyllum virginianum* (Shawnee salad), *Elymus hystrix* (bottlebrush grass), *Osmorhiza* (sweet-cicely) spp., *Trillium grandiflorum* (white trillium), *Viola* (violet) spp., *Dryopteris marginalis* (marginal woodfern), *Botrychium virginianum* (rattlesnake fern), *Anemone quinquefolia* (nightcaps), *Geranium maculatum* (spotted geranium), *Caulophyllum thalictroides* (blue cohosh), *Sanguinaria canadensis* (bloodroot), *Claytonia virginica* (Virginia springbeauty), *Allium tricoccum* (ramps), *Cardamine concatenata* (cutleaf toothwort), *Arisaema triphyllum* (Jack-in-the-pulpit), and *Laportea canadensis* (Canadian wood-nettle).

Noteworthy Associated Plant and/or Animal Species: *Aconitum reclinatum* (white monkshood)

Characteristic Species: *Actaea racemosa* (black cohosh), *Cornus alternifolia* (alternate-leaf dogwood), *Fraxinus americana* (white ash), *Tilia americana* (American basswood)

Management Concerns: Because of excellent site conditions for tree growth, stands are very vulnerable to logging and are further threatened by shade-tolerant exotic weeds.

Reference Sites: None referenced.

Global and State Conservation Ranks and Reasons: G4? (28-Sep-2001). NJ: SNR, PA: SNR. This unit has a fairly wide geographic range, within which it is regularly distributed as a small- to large-patch vegetation type in suitably fertile habitats.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.687966

References: Anderson et al. 1998, Breden et al. 2001, CAP pers. comm. 1998, Campbell 2001, Coulling and Rawinski 1999, Damman and Kershner 1977, Eastern Ecology Working Group n.d., Edinger et al. 2002, Eyre 1980, Fike 1999, Fleming 1999, Fleming and Coulling 2001, Fleming et al. 2001, Harrison 2004, Lundgren 2000, Martin 1975, Rawinski et al. 1996

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