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**ECOLOGICAL SYSTEM: NORTH-CENTRAL APPALACHIAN CIRCUMNEUTRAL CLIFF AND TALUS**

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**Summary:** This cliff system occurs at low to mid elevations from central New England south to Virginia and West Virginia. It consists of vertical or near-vertical cliffs and steep talus slopes where weathering and/or bedrock lithology produce circumneutral to calcareous pH and enriched nutrient availability. Substrates include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. *Fraxinus* (ash) spp., *Tilia americana* (American basswood), and *Staphylea trifolia* (American bladdernut) are woody indicators of the enriched setting. The herb layer is typically not extensive but includes at least some species that are indicators of enriched conditions, e.g., *Impatiens pallida* (yellow jewelweed), *Pellaea atropurpurea* (purple cliffbrake), *Asplenium platyneuron* (ebony spleenwort), or *Woodsia obtusa* (common cliff fern).

**High-ranked Species:** *Aneides aeneus* (G3G4, green salamander), *Arabis patens* (G3, spreading rockcress), *Clematis addisonii* (G2, addison's leatherflower), *Heuchera americana* var. *hispida* (G5T3?, American alumroot), *Homaliadelphus sharpii* (G3?, sharp's homaliadelphus), *Leptohymenium sharpii* (G1, mount leconte moss), *Neotoma magister* (G3G4, Allegheny woodrat), *Paxistima canbyi* (G2, Canby's mountain-lover), *Penstemon smallii* (G3, Small's beardtongue), *Platyhypnidium pringlei* (G2G3), *Radula voluta* (G3), *Sedum nevii* (G3, nevius' stonecrop), *Silene virginica* var. *robusta* (G5T1Q, fire-pink), *Taxiphyllum alternans* (G3?, Japanese yew-moss)

**Range:** This system ranges from central New England and New York south to Virginia and West Virginia. The extent of the Virginia range remains to be documented, but it appears to be absent from the Southern Blue Ridge and Southern Ridge and Valley portions of the state. United States: MA, MD, ME, NH, NJ, NY, OH, PA, VA, VT, WV

**Delaware Estuary Associations:**

- Calcareous Slope Forest
- Montane Cliff (Calcareous Type)

**CLASSIFIERS FOR NORTH-CENTRAL APPALACHIAN CIRCUMNEUTRAL CLIFF AND TALUS**

**Primary Division:** 202

**Land Cover Class:** Barren

**Spatial Scale & Pattern:** Small patch

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

**Diagnostic Classifiers:** Cliff (Substrate); Talus (Substrate); Temperate; Alkaline Soil

**Non-diagnostic Classifiers:** Lowland; Sideslope; Circumneutral Soil; Very Shallow Soil; Ustic; Landslide; Moderate

(100-500 yrs) Persistence

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## CALCAREOUS SLOPE FOREST

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

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**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.

**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.



Photo by Pennsylvania Natural Heritage Program

**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?. 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](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)

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## MONTANE CLIFF (CALCAREOUS TYPE)

*Asplenium ruta-muraria* - *Pellaea atropurpurea* Sparse Vegetation

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**Range:** This community occurs in areas of limestone or dolomite geology from Pennsylvania south to Alabama. It is found primarily in the Ridge and Valley and Cumberland Plateau, but ranges into scattered areas in the Blue Ridge.

**Environmental Description:** This community occurs on calcareous cliffs, outcrops, and rocky slopes and is often shaded by trees rooted in adjacent forested communities and/or the outcrops. It has little vegetative cover, often with 90% of the rock surface unvegetated. Mosses and lichens can have moderate coverage, and vascular plants occur on ledges and rooted in cracks.



Photo by Pennsylvania Natural Heritage Program

**Vegetation Description:** Stands of this association have little vegetative cover, often with 90% of the rock surface unvegetated. Mosses and lichens can have moderate coverage, and vascular plants occur on ledges and rooted in cracks. Calciphilic herbs, such as *Aquilegia canadensis* (eastern columbine), *Dodecatheon meadia* (pride-of-Ohio), *Symphotrichum ericoides* (white heath aster), *Cystopteris bulbifera* (bulblet bladderfern), *Bouteloua curtipendula* (sideoats grama), *Pellaea atropurpurea* (purple cliffbrake), *Dryopteris marginalis* (marginal woodfern), *Allium cernuum* (nodding onion), *Heuchera americana* (common alumroot), *Carex oligocarpa* (richwoods sedge), *Asplenium trichomanes* (maidenhair spleenwort), *Arabis hirsuta* (western hairy rockcress), *Arabis lyrata* (lyrate rockcress), and *Saxifraga virginiana* (early saxifrage) are characteristic. Woody species may occur scattered throughout or at the margins; these species include *Juniperus virginiana* (eastern red-cedar), *Rhus aromatica* (fragrant sumac), *Toxicodendron radicans* (eastern poison-ivy), *Hydrangea arborescens* (smooth

hydrangea), *Fraxinus americana* (white ash), *Parthenocissus quinquefolia* (Virginia creeper), *Cercis canadensis* (eastern redbud), *Tilia americana* (American basswood), *Carya* (hickory) spp., *Quercus muehlenbergii* (chinquapin oak), *Ostrya virginiana* (eastern hop-hornbeam), and *Cornus florida* (flowering dogwood).

**Characteristic Species:** *Aquilegia canadensis* (eastern columbine), *Asplenium trichomanes* (maidenhair spleenwort), *Dodecatheon meadia* (pride-of-Ohio), *Pellaea atropurpurea* (purple cliffbrake)

**Dynamics/Successional Trajectory:** Species composition varies with moisture, shade and exposure on the rocky surface.

**Management Concerns:** This community type 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, and other erosional disturbances may be relatively frequent in the habitats of this type.

**Reference Sites:** none identified

**Global and State Conservation Ranks and Reasons:** G3G4 (11-Aug-1997). PA: SNR.

**VegBank Link for Plot Data:** [http://vegbank.org/natureserve/element\\_global.2.688984](http://vegbank.org/natureserve/element_global.2.688984)

**References:** Allard 1990, CAP pers. comm. 1998, Fike 1999, Fleming et al. 2001, Harrison 2004, Schafale 1998b, Schafale and Weakley 1990, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Juniperus virginiana</i> (eastern red-cedar)
Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> (Virginia creeper)
Herb (field)	Forb	<i>Aquilegia canadensis</i> (eastern columbine)
Herb (field)	Forb	<i>Dodecatheon meadia</i> (pride-of-Ohio)