

BIOLOGICAL ASSESSMENT OF THE VALLE CRUCIS CONFERENCE CENTER



**Valle Crucis, NC. Watauga County
Blue Ridge Province
Watauga River Basin**

August 2001

Appalachian Ecological Consultants

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BIOLOGICAL ASSESSMENT
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PROPERTY SUMMARY

A biological assessment of this property reveals:

- ? 11 natural & anthropogenic communities
- ? Old growth forests
- ? 3 rare plant species
- ? 252 total plant species
- ? 3 rare animal species
- ? 106 total wildlife species
- ? 15 potential rare animal species
- ? Mountain bog and wetland restoration opportunities
- ? North Carolina Natural Heritage Program “Significant Natural Area”

INTRODUCTION

The Valle Crucis Mission Center consists of approximately 400 acres of private land located in Watauga County, North Carolina approximately 1 mile southwest of Valle Crucis within the Valle Crucis USGS topographic quad. The western, and mostly forested, two-thirds of the property is occupied by Valle Mountain with elevations ranging between 2800ft – 3600ft and is drained by Craborchard Creek and Dutch Creek. The eastern third of the property is mostly valley bottom agricultural land drained by Dutch Creek.

METHODS

The North Carolina Natural Heritage Program (NCNHP) database was reviewed to determine if element occurrences exist on, or within 2 miles, of the property.

Botanical and Natural Community Inventory- The tract was surveyed in a “parallel meander” fashion, based on topography, during August 2001. Natural Communities and anthropogenic areas were inventoried and mapped during surveys. Specimens of unknown plant species were collected, pressed, and identified later if sufficient numbers were found on-site. Specimens were identified and described using the latest regional vegetation keys. Natural communities were described following the North Carolina Natural Heritage Program format (Schafale and Weakley, 1990).

Zoological Inventory- The zoological study targeted rare vertebrate and butterfly species, and their habitats, as indicated by the Natural Heritage Program List of the Rare Animal Species of North Carolina (LeGrand and Hall, 1999) and other available literature. The project area was surveyed on 2, 3, & 22 August 2001 for wildlife species and available habitats. Birds were surveyed by sight, song, and call. Searches for tracks, scat, and sign were used to determine presence of mammals. Herpetiles were searched by turning cover objects and raking through leaf-litter and debris. Butterflies were identified by sight with binoculars. The survey took place during a time of year that offers moderate to low

detectability of targeted species. Aquatic habitats were inspected to determine suitability for various species. Based on the availability of habitats within the property, the NCNHP records for Watauga County were reviewed to determine the potential for rare animal species occurrence on site.

BOTANICAL & NATURAL COMMUNITY INVENTORY

NATURAL COMMUNITY SUMMARY

AEC field surveys indicate this tract contains:

- ✍ 4 natural communities
- ✍ 2 embedded habitats
- ✍ Approximately 50 to 75 acres of old-growth forest within 4 natural community types
- ✍ Remnant and restoration quality wetlands within alluvial meadow areas
- ✍ 5 human created / maintained areas (anthropogenic areas)

Natural Communities (see Map 1.)

Category	Community Type	# Acres, estimate	# of Occurrences
Natural	Rich Cove & Slope Forest	200	4
Natural	Rich Cove Boulderfield Forest	30	3
Natural	Acidic Cove Forest	50	4
Natural	Chestnut Oak Forest	120	7
Natural, embedded	Forested Seeps	0.25 acre / each	8 observed
Natural, embedded	Wet and Dry Rock Outcrops	Unknown	100's
Anthropogenic	Alluvial Meadow	55	1
Anthropogenic	Upland / Forest Openings	6	5
Anthropogenic	White Pine Stand	3	2 observed
Anthropogenic	Pond Impoundments	0.5	1

Note: The NCNHP Natural Areas inventory mentions a small Canada Hemlock Community on a north-facing slope above Craborchard creek. Due to the limited field time available for the AEC inventory, this community was not relocated and is not delineated in the attached Community Map.

Biologically Critical Areas (see Map 2)

Biologically critical areas are those that contain old growth forest, unusual natural areas or features, rare species populations, areas of high biodiversity or combinations of these features. These are shown on Map 2 in orange for old growth areas, and yellow for areas of high species diversity, quality, and unusual features. Areas highlighted in orange should receive the highest level of protection from anthropogenic activities. Disturbances to areas highlighted in yellow should be avoided, however, we recognize these areas may be the most productive for certain activities such as single tree selection logging. We recommend uncolored regions be considered first in development or extraction events.

Anthropogenic Areas (see Map 3)

An extensive network of old roads runs through the site. Other human created and maintained areas include an old mining site, Alluvial meadows, Upland Forest Meadows, and a powerline corridor.

NATURAL COMMUNITY DESCRIPTIONS

Ten distinct natural areas are found on-site. Overall, the tract includes fairly equal representation of south and north facing coves and ridges. Southern slopes in the central portion of the tract are very steep. Slopes in the northern portions are tightly cleft ravines that are consistently moist and shaded. Forests cover approximately 75% of the surface area of the tract, and are dominated by moist, cove-forests with rich, neutral soils, and high to moderate species diversity. Oak-based communities with less rich, dry soils, and moderate to low species diversity are also common onsite. The natural composition and structure of the forests have been altered from their “original” form via timbering, grazing, and agriculture, and loss of the American Chestnut from fungal blight. Several smaller natural communities are embedded within the forests including seeps, wet and dry rock outcrops, and riparian areas. Common names for plant species are used below (see Table 1 for standard names). NCNHP records report the western third of the tract is considered a NCNHP “Significant Natural Area” and is referred to as Valle Mountain.

Notable features

- 1) Extensive old growth forests, also known as “primary” or “original” forests. These un-logged areas cover an estimated 15 to 25% of this site, having largely been protected by massive boulders, steepness, lack of marketable tree species, or a combination of these factors. Additionally, most natural communities found on-site are represented within the old growth forests.
- 2) Abundance of specialized natural areas and habitats. These include the Boulderfield Forest, Wet and Dry Rock Outcrops, Forested Seeps, a notable series of waterfalls, and former / remnant wetlands with high restoration potential.

RICH COVE & SLOPE FOREST

This is the most dominant native plant community onsite and is found nearly contiguously in the main body of the tract in both north and south facing coves, slopes, and portions of 3 peaks, which is unusual. Three smaller occurrences of this forest type are found in the southwestern portion of the tract and are not contiguous with the main forest area. All age classes including mature, and both mid- and early- successional stands are found onsite. This plant community is the most complex and diverse community on this property. Wet rock outcrops are embedded within this forest type (see descriptions below). Some of these forests appear to have been selectively timbered in the past 15 to 25 years.

Structure: The stands have a diverse mixture of canopy trees. Rich Cove forests are distinguished by their extremely diverse number of tree species, dense herbaceous groundcover, and rich moist soils. The understory and shrub layer are often “open” meaning not dense with shrubs or regenerating saplings except where canopy trees have recently fallen, and the herbs are very diverse and dense when undisturbed having 80 to 100% groundcover.

Newly succeeding areas (former orchards / grazing) in this forest type had less percentage of herb cover and greater soil exposure and erosion than non-cleared areas. Young areas contain more sun-preferring herbs and fewer long lived perennial herbs than mature and selectively logged area. The young areas are dominated by Tulip Poplar, Sugar Maple, and Buckeye regeneration, but lack the downed woody debris characteristic of, and returning within, the more mature and old growth areas onsite. Rich Cove areas north of Hwy 194, west of the conference center and church, contain notable slope talus and small, rocky cobble throughout the slopes.

Dominant Trees: Tulip Poplar, Sugar Maple, Northern Red Oak, Hemlock, Cucumber Magnolia, and Basswood. Buckeye is common on seeps and streams, and saplings are numerous below locust-poplar canopies in young cove areas. Less abundant are Bitternut Hickory, Black Birch, White Pine, Fraser Magnolia, and Beech. Chestnut Oak, Sourwood, and Black Gum can be found on some ridges between coves. Understory trees include Striped Maple, Flowering Dogwood, Fraser Magnolia, Ironwood, and American Chestnut sprouts. Average tree diameters are 6 to 10 inches in young forest, 12 to 20 in mid and later successional forest, and 18 to 28+ in mature areas with occasional 32 and 36 inch diameter trees.

Shrubs and Vines: Wild Hydrangea, Alternate-leaf Dogwood, Witch Hazel, Maple-leaf Viburnum, Spicebush, Rosebay Rhododendron, Elderberry, Roundleaf Greenbrier, Virginia Creeper, Dutchman's Pipe, Virgin's Bower, and Poison Ivy.

Herbs: are most numerous and dense in this forest type. Dominant herbs include Sweet Cicely, Wood Nettle, Pale Jewelweed, Wild Ginger, and Wild Geranium. Typical herbs include Spiderwort, Plume Solomon's Seal, Yellow Mandarin, Black Cohosh, Blue Cohosh, Native Astilbe, Wild Yam, all Bedstraw species, Black Snakeroot, Goatsbeard, Jack-In-The Pulpit, Foam Flower, Marchflower, Great Indian Plantain, and Wild Ginger.

Less common are Showy Orchis, Rattlesnake Fern, Zigzag Goldenrod, Northern White Violet, Lovage, Wakerobin Trillium, Indian Cucumber Root, Canada Violet, Mossy Stonecrop, Roundleaf Violet, Honewort, Early Spring Rue, Spikenard, Jumpseed, Solomon's Seal, Clear-weed, Horse-balm, Large Toothwort, Fire-Pink, Flat-leaf Sedge, Wideleaf Violet, Canada Violet, Silvery Glade Fern, Silvery Spleenwort, Evergreen Woodfern, and Marginal Woodfern. American Cohosh and Hepatica was found only in coves west of the largest orchard in the northwestern portion of the tract.

Rare Plants: Appalachian Joe Pye, Ginseng

RICH COVE - BOULDERFIELD FOREST

This native plant community is embedded within Rich Cove Forest only on mid to upper southeast facing slopes immediately below Wet and Dry Rock Outcrops. Three separate occurrences in apparently original, uncut condition are found onsite. This is likely due to their treacherous position in combination with lack of marketable, sizable trees. Vegetation is generally the same composition as that within Rich Cove areas but with notably smaller diameter trees, less contiguous soil surface area, and less herb cover due to presence of large rocks and boulders. Very small glade-like areas are dominated by

herbs, and no to very few regenerating trees or shrubs. These areas are extremely dangerous to walk through as rocks are often slick and will slide or wobble easily.

Structure: These forests are defined by their presence in very steep, boulder-strewn coves which grade into very rocky talus slopes laterally on ridges. Extensive dry and wet Rock Outcrops define the upper portions of these natural communities. Diameters of canopy trees are often $\frac{1}{2}$ to $\frac{1}{3}$ rd of those found in adjacent Rich Cove forests, averaging 8 to 12 inches diameter. Disturbance from sliding or tumbling rocks, and presence of less soil substrate may prevent these trees from reaching large diameters within boulderfield areas.

Dominant Trees: Basswood, Sugar Maple, Black Cherry, White Ash, Striped Maple, and Hophornbeam. Poplar was not common in boulderfield areas.

Shrubs and Vines: No shrubs were observed, but vines are common. Dutchman's pipe vines are often 3 inch diameter and frequently twisted upon each other within this forest type, indicative of older forest dynamics. Poison Ivy, Virginia Creeper, and Allegheny Blackberry are common here.

Herbs: (see Rich Cove description). Herbs are more diverse over a larger area within this forest type than in Rich Cove forests due to presence of rocks. Dominant herbs include Pale Jewelweed, Wood Nettle, Wild Geranium and Wild Ginger.

Rare Plants: none observed.

ACIDIC COVE FOREST

This natural community is second-most common after Rich Cove forests onsite and dominates the more deeply cleft, north-facing slopes and coves. Four occurrences of this forest type are found onsite and all successional stages are represented

Dominant trees: Eastern Hemlock, Black Birch, Red Maple, Tulip Poplar, Northern Red Oak, Basswood, and Fraser Magnolia. Associated trees are White Oak, White Pine, Sugar Maple, Pignut Hickory, Cucumber Tree, Chestnut Oak, Striped Maple, and American beech. Small Yellow Birch trees were found along Craborchard creek, occurring at some of their lowest elevations in the southern Appalachians. A few Northern Red Oaks and Sugar Maples in the southeastern-most stand are notably large approaching 2.5 to 3 feet diameter.

Shrubs: are dominated by Rhododendron. Others are Sweet Pepperbush, Wild Hydrangea, Witch Hazel, and Mountain Holly. Of interest is the presence of Moosewood in the old growth area above Craborchard Creek, and in the western-most old-growth section. Moosewood is typically a very high elevation species, as is Yellow Birch.

Herbs: are typically sparse due to acidic soils and dense thickets of Rhododendron. Low to medium diversity was be found and includes species such as Roundleaf Violet, Wood Rush, Partridgeberry, Indian Cucumber Root, Bluets, Seep Rue, White Turtlehead, Rough Seep Sedge, Cinnamon Fern, and New York Fern. Less common, but not rare are Catesby's and Painted Trillium, Windflower, Northern White Violet, Southern Jack-in-the-Pulpit, Wild Yam, Christmas Fern, and Southern Lady Fern. Lungwort Lichens are common on old Red Maple trees in this natural area.

CHESTNUT OAK FOREST

Six occurrences of this drier forest community are found in the mid to upper elevations. Formerly, these forests were dominated by *American Chestnut*, and were called “*Oak - Chestnut Forests*” but are now in a state of transition following the loss of the Chestnut due to timbering and the introduced fungal blight (*Endothia parasitica*). A portion of this forest type remains in uncut condition in the southwestern portion of the site being protected by extensive Dry Rock Outcrops on the slopes. American chestnut is absent from this uncut portion yet debris of various sizes is dense throughout the area and no skid trails, stumps, or other signs of previous removals are seen.

Structure: Woody species dominate this forest type. The canopy and understory are well defined with a moderate shrub layer and either sparse or rich herb cover. In this forest type leaf-litter is often 50 to 80% of the groundcover on ridges and dry sites and 5% in moist sites.

Dominant trees: are Chestnut Oak. Other common trees include Tulip Poplar, Northern Red Oak, Scarlet Oak, and Red Maple. White Pine is occasionally found on ridges as saplings and understory trees. Understory trees include Black Gum, Dogwood, and Sourwood. More sporadic are White Pine and Beech. Serviceberry, Locust, Black Oak, and White Oak are found as small trees or saplings. Striped Maple is often dense in this forest type.

Shrubs and Vines: Hazelnut is found only within this forest type onsite. Mountain Laurel is the most common shrub, and others include Sweetleaf, Flame Azalea, Maple-leaf Viburnum. Highbush and Common Blueberries and Roundleaf Greenbrier are common in this forest type.

Herbs: In drier sites, herbs includes White Wood Aster, Sqauwroot, Striped Wintergreen, Large Houstonia, Sampson’s Snakeroot, Appalachian Oak Leech, Dwarf Iris, Cow-wheat, Golden Alexanders, Halberd-leaf Violet, Indian Cucumber Root, Wood Lily, Southern Bellflower, White Snakeroot, Hawkweed, Robin’s Plantain, Hairy Bellwort, New York Fern and Hayscent Fern.

Rare Plants: Appalachian Joe Pye

FORESTED SEEPS

A minimum of 8 of these very small, spring-head plant communities were observed throughout all elevations of the site. They are most commonly embedded within Rich Cove forests, and others likely exist in Acidic Cove areas that were less accessible. The seep complex found in the northwest facing cove west of the abandoned orchard is the largest seep complex area on the property.

Structure: Forested Seeps are distinguished by constant moisture, notable rock / cobble substrate, specific vegetation, and saturated soils lacking hydric (wetland) soil characteristics. They often contain dense colonies of herbs and sedges with trees occasionally rooted and often fallen within, and are shaded by trees and shrubs of surrounding forest area.

Dominant Species: are primarily herbs or shrubs that tend to prefer constant moisture and are largely not found on adjacent slopes. These include Spicebush, Umbrella leaf, Bee Balm, Large Toothwort, Branch Lettuce, Giant Coneflower, Bugleweed, Hepatica, Pink Turtlehead, Seep Rue, Love-Vine, Rough Seep Sedge and numerous Sedge species.

Rare Plants: Appalachian Joe Pye. Also, habitat exists for spring ephemeral rare plants that may not have been visible in July.

WET AND DRY ROCK OUTCROPS

Three very extensive series of these basic / neutral - igneous rock based communities are concentrated in the southwestern corner of the site and located on south to southeastern, upper slopes below the main ridgeline and peaks of the tract. They are embedded within Rich Cove, Rich Cove / Boulderfield, Acidic Cove and Chestnut Oak forests. Wet and dry outcrops have very different species compositions: wet outcrops tend to have greater numbers of species while dry outcrops tend to have much fewer and are often covered with poison ivy. Wet and dry outcrops can be found in close proximity as well, with higher outcrops being very dry and lower outcrops in the formation being very moist.

Structure: These areas are characterized by steep, rocky slopes of large rock outcroppings. This natural area tends to be relatively “stable” though areas may be disturbed occasionally by small slides of rocks and trees.

Dominant Species: Tree and shrub species of adjacent forest types surround, and occasionally occur upon, these outcrops. Dry rock outcrops are dominated by Poison Ivy, Virginia Creeper, Virgin’s Bower, and Allegheny Blackberry vines. Multiflora Rose is found on a few dry outcrops. Herbs include Rockcap Fern, Ebony Spleenwort, Evergreen Woodfern, Rock Alumroot, Smooth Rockcress, and Muhly Grass.

Wet rock outcrops: contain many herbs found in Rich Cove forests and others such as Mossy Stonecrop, Carey’s Saxafrage, Pale Jewelweed, Smooth Rockcress, and Clearweed. Mosses and lichens are very important components of both outcrop types and include Boulder Moss, Fern Moss, and Thread Moss.

Rare Plants: Carey’s Saxafrage, on moist outcrops; American Ginseng on a dry rock outcrop.

Anthropogenic Communities

These human created and maintained areas, or “anthropogenic communities” are found occasionally throughout the tract. Though not resembling natural dynamics, they often harbor planted species or species that respond to natural disturbances such as large-scale tree blowdown, fire, or soil exposure.

Alluvial Meadows: Approximately 50 to 55 acres of bottomland in the southeastern portion of the site have remained open with combinations of grazing, haying, and agriculture for over 100 years. Originally, this area was a complex of swamp forest and mountain bogs but has been drained and cleared for agriculture. It is now dominated by introduced, full sun species such as Clovers, Timothy Grass, Orchard Grass, Plantain,, Dandelion, Yarrow, and Fescue in hayed areas. Crops are grown on a portion of the site as well. A few large and regenerating small trees and shrubs remain along Dutch Creek and a few ditches, but are largely absent from the site. These include large sycamores and large saplings of Black Cherry, River Birch, Black Willow, and Tulip Poplar.

Of importance in this area is a network of former small wetlands (see Map 1) that area still visible and inferred due to the topography and hydrology of the site, presence of old ditch lines, and remnant wetland vegetation such as Juncus Grass, Bog Juncus, Ironweed, Boneset, Tearthumb, Forget-me-nots and numerous sedge species. These areas should be considered for restoration, as they are now very rare natural communities in the Blue Ridge. These wetlands are problematic for haying due to their moisture content and restoration of these areas would still leave 90 to 95% of the area currently used for haying, grazing, or agriculture.

Upland / Forest Openings: At least five small human created openings or meadows are found onsite, averaging an acre in size each. These areas do not add significantly to the natural heritage of the tract, but are likely used by wildlife and do contain concentrations of tall herb and regenerating tree species. Meadows in the former orchard area contain several remnant Apple trees, likely used by wildlife. Typical vegetation includes Tulip Poplar, Red Maple, and Blackberry vines as well as Woodland Sunflowers, Tall Bush Clover, Tall Goldenrods and Wingstems. Appalachian Joe Pye is found in the western-most meadow.

White Pine: At least two small areas of planted are found. One just west of the recreation area above and west of the conference center has been planted upon what was originally Rich Cove forest, as indicated by regenerating rich cove tree and herb species. Tree diameters in this stand range from 18 to 22 inches. The other is in the northwestern section of the property at the top of the northeast facing cove. Tree diameters in this stand range from 6 to 8 inches.

Pond Impoundments: One small pond is found onsite along a tributary to Dutch Creek at 2800' elevation. This man-made pond is a stocked with fish and bare of aquatic or emergent plant species.

Old Dam Site: A historic hydro-electric dam is located on Craborchard creek. The reservoir behind the dam has completely filled with sediment and created a reforested

island in the middle of the creek. The stream is split by this island, causing the two diverged streams to erode the banks of the creek. This process is producing large amounts of sediment in the creek, will continue for years to come, and may undermine the integrity of the dam. The dam itself is fractured and crumbling and may eventually fail, perhaps causing catastrophic flooding to downstream areas. Because its reservoir has mostly filled with sediment, this may reduce the amount of water discharged in a catastrophic failure, however there may be a large mudflow discharge instead. We advise that an engineer visit and assess this site.

PLANT SPECIES SUMMARY

NCNHP records report 2 rare plant species occurring within 2 miles of the tract. These species include: American Speedwell, *Veronica Americana* and Bleeding Heart, *Dicentra Exima*.

AEC field surveys indicate this tract contains:

- ✍ 3 NCNHP rare (watchlist) plant species
- ✍ 252 total plant species

Rare Plant Species (see Map 4)

<u>Form</u>	<u>Common name</u>	<u>Standard Name</u>	<u>Natural Area</u>
Wildflower	Appalachian Joe Pye	<i>Eupatorium steelei</i>	Rich Cove / Chestnut Oak
Wildflower	American Ginseng	<i>Panax quinquefolius</i>	Rich Cove / Dry Outcrop
Wildflower	Carey's Saxafrage	<i>Saxafraga careyana</i>	Wet Rock Outcrops

Plant Species Diversity (see Table 1)

A minimum of 252 species were identified. Of these, 64 species are trees, shrubs, and vines, and 188 species are herbs, 11 of which are non-vascular.

Canopy /Understory Trees:	34	Shrubs:	18
Vines:	12	Flowering Herbs:	142
Ferns& Allies	18	Sedges:	11
Grasses:	10	Rushes:	3
Mosses:	8	Lichens:	2
Liverworts:	1		

Exotic / Invasive Species

The most problematic species include Multiflora Rose, Japanese Grass, Garlic Mustard, and Japanese Knot weed. Japanese Barberry was observed near many outcrops and in Rich Cove forest areas. Numerous other introduced species are found onsite (Table 1, *** denotation) which have likely been naturalized for 150 or more years locally, and do not necessarily threaten native species diversity or natural areas.

New County Records

Populations of **Carey's Saxafrage** have not been reported to NCNHP in Watauga County in 20 years (Amoroso, 1999).

RARE PLANT DESCRIPTIONS

Note: see Amoroso (1999) for detailed explanations of NCNHP status codes

Carey's Saxafrage (*Saxafrage careyana*)

This species prefers mid elevation seeps and cliffs of neutral pH and is associated with numerous mosses.

Seen / Location: Approximately 1000+ specimens were seen on the Wet Rock Outcrops within Rich Cove Boulderfield forest in the central-most coves onsite.

Rank / Status: W7 / - / S3 / G3

“W7” species are described as “rare and poorly known” by NCNHP for which more field data is requested. It has between 21 and 100 state (S3) and regional populations (G3).

NC range: This species is known from 14 NC mountain counties, only 4 of which have reported the species in the last 20 years. This species has not been reported to NCNHP in Watauga County in 20 years.

Global range: Globally, this species occurs only in eastern North America in the southern Appalachians within NC, TN, VA and WV where it is an endemic species. It is not known from surrounding foothill areas.

American Ginseng (*Panax quinquefolius*)

This Ginseng Family member was once as common as Black Cohosh or Bloodroot and is of concern within each of its original states of occurrence because of severe declines; up to 99% of its original populations have been collected. This has occurred primarily through the use of ginseng in the medicinal herb trade.

Seen / Location: 2 specimens were seen, one the Rich Cove forest and another on a dry rock outcrop. As many as 50 to 100 or more specimens of this species might be found scattered throughout the tract.

Rank / Status: W5-SC/ -/ S4 / G4 / American Ginseng is of concern because of its serious decline, and is a “special concern” species because it is sought in the medicinal herb trade. S4 and G4 status describe the plant as being considered “relatively secure” in both NC and regionally.

NC range: Ginseng in known from 34 NC counties historically.

Global range: nearly all states of central and eastern US and Canada.

Appalachian Joe Pye (*Eupatorium steelei*)

This purple, late summer flowering, Aster family species was first described to science after 1968, being distinguished from the more common *E. purpureum*. It is endemic to 4 southern Appalachian states and occurs nowhere else continentally or globally.

Seen / Location:

Approximately 50 specimens of this species were observed throughout all forest types except Acidic Cove, in open areas where shrubs are not dense.

Rank / Status: W7 / - / S2S3 / G4

NC range: 5 NC counties historically reporting this species include Avery, Haywood, Macon, Avery, and Watauga, (Weakley, 1999)

ZOOLOGICAL INVENTORY

ZOOLOGICAL SUMMARY

NCNHP records report 4 rare animal species occurring within 2 miles of the tract. These species include the Hellbender, *Cryptobranchus alleganiensis*, Longtail Salamander, *Eurycea longicauda longicauda*, Warbling Vireo, *Vireo gilvus*, and a stonefly species, *Bolotoperla rossi*.

AEC field surveys indicate the following are present on site:

- ? 106 total animal species
- ? Three rare animal species
- ? Potential for 15 rare animal species based on the occurrence of suitable habitat

Animal Species Diversity

106 total animal species were detected on site (Table 2). The survey took place during a time of year that offers low to moderate detectability of species. Future surveys during the spring will likely uncover additional species including many rare birds and butterflies.

Amphibian:	10
Reptile:	0
Fish:	1
Bird:	57
Mammal:	15
Butterfly:	23
Total:	106

RARE ANIMAL DESCRIPTIONS

Note: see LeGrand and Hall (1999) for detailed explanations of status codes.

Common Name (*Standard Name*) State Rank / US Rank / State Status / Global Status

Cooper's Hawk (*Accipiter cooperii*) SC / - / S3B,S3N / G5

Individuals seen flying throughout the tract. Nesting was not observed but likely occurs on or near the tract. This species preys mostly on birds and mammals within forests and near forest edges. Also referred to as "Chicken Hawk" due to its habitat of preying on poultry.

Vesper Sparrow (*Pooecetes gramineus*) SR / -- / S2B,S2N / G5

One individual observed within shrubs along Dutch Creek. Nesting was not observed but may occur nearby. This species nests in high elevation pastures and grassy fields. Harvesting of hay during the breeding season could destroy nests and broods.

Ravine Salamander (*Plethodon richmondi*) W2 /-- / S3 / G5

Several individuals uncovered throughout the tract. This long and slender salamander inhabits moist, high-elevation forests, usually on slopes in the northern mountains of the state.

Notes

Unknown trout species, likely stocked Rainbow Trout, were observed above and below the dam (a potential fish barrier) in Craborchard Creek. Dutch Creek appears suitable for trout.

POTENTIAL RARE ANIMALS

(based on the occurrence of suitable habitat)

Class	Common Name	Standard Name	NC Status	U.S. Status	NC Rank	Global Rank	Habitat
Amphibian	Longtail Salamander	<i>Eurycea longicauda longicauda</i>	SC	-	S1S2	G5T5	Moist woods and floodplains; small ponds for breeding. May occur in the area of Craborchard Creek between Monks Pool and Genie Stone's house. Would benefit from the creation of small, ephemeral and fish free pools.
Bird	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	SR	-	S2B,SZN	G5	Deciduous forests, mainly at higher elevations
Bird	Cerulean Warbler	<i>Dendroica cerulea</i>	SR	FSC	S2B,SZN	G4	Mature Rich Cove forests; steep slopes and coves in mountains. This species is currently being petitioned for federal listing under the ESA and likely breeds on site. Primarily detectable April-July
Bird	Cooper's Hawk	<i>Accipiter cooperii</i>	SC	-	S3B,S3N	G5	Forests and woodlands (for nesting)
Bird	Golden-winged Warbler	<i>Vermivora chrysoptera</i>	SR	-	S3B,SZN	G4	This rare and declining species breeds in old fields and successional hardwoods in the mountains. Primarily detectable April-July
Bird	Savannah Sparrow	<i>Passerculus sandwichensis</i>	SR	-	S1B,S5N	G5	Nests in grassy fields and pastures. Would benefit from protected meadow areas and wider shrub buffer along Dutch Creek.
Bird	Sharp-shinned Hawk	<i>Accipiter striatus</i>	SR	-	S3B,S4N	G5	Forests. Likely breeds on site or nearby.
Bird	Vesper Sparrow	<i>Poocetes gramineus</i>	SR	-	S2B,S2N	G5	Breeds in high elevation pastures and grassy fields. Primarily detectable April-July
Bird	Warbling Vireo	<i>Vireo gilvus</i>	SR	-	S2B,SZN	G5	Groves of hardwoods along rivers and streams [breeding season only] Primarily detectable April-July
Insect	Appalachian Azure	<i>Celastrina neglectamajor</i>	SR	-	S3?	G4	Rich Cove and Slope forests; host plant -- black cohosh (<i>Cimicifuga</i>) present on site. Probably observed but identification is difficult. Primarily detectable in spring
Insect	Baltimore Checkerspot	<i>Euphydryas phaeton</i>	SR	-	S2S3	G4	Bogs, marshes, wet meadows; rarely in upland woods; host plants -- turtlehead (<i>Chelone</i>) and false foxglove (<i>Aureolaria</i>) present on site. May benefit from wetland restoration.

Insect	Diana Fritillary	<i>Speyeria diana</i>	SR	FSC	S3	G3	Rich woods and adjacent edges and openings; host plant, violets, present on site. Likely occurs on site but only visible earlier in the season. Primarily detectable in early- through mid-summer.
Insect	Edwards' Hairstreak	<i>Satyrrium edwardsii</i>	SR	-	S2?	G4	Scrubby or xeric oak woods; host plants -- mainly oaks (<i>Quercus</i>) present on site. Primarily detectable May-June.
Insect	Hickory Hairstreak	<i>Satyrrium caryaevorum</i>	SR	-	S1?	G4	Deciduous forests; host plants -- primarily hickories (<i>Carya</i>), but other trees also. Primarily detectable in July.
Mammal	Allegheny Woodrat	<i>Neotoma magister</i>	SC	FSC	S1S2	G3G4	Rocky places in deciduous or mixed forests in the northern mountains. Likely occurs on site. Look for characteristic piles of sticks in rocky areas.
Mammal	New England Cottontail	<i>Sylvilagus transitionalis</i>	SR	FSC	S3	G4	Dense cover of montane woods and thickets, particularly Heath spp. (<i>Ericacea</i>) such as rhododendron, laurel, vaccinium.
Mammal	Southern Water Shrew	<i>Sorex palustris punctulatus</i>	SC	FSC	S2	G5T3	Stream banks in montane forests

MANAGEMENT RECOMMENDATIONS

- ? Restore wetlands. Wetlands are an increasingly rare habitat across the country. Many specialized species live exclusively within these areas and are now rare or endangered because of habitat loss. The historic wetland / bog areas delineated on Map 1 are problematic for hay production and draining it into the Dutch Creek tributary would require federal permits. We suggest the area be fenced off and restored. Restoration of this wetland should be straightforward and grants are likely available for such efforts through county and state agencies (contact Jon Calabria 828.712.1363 for additional information). In the mean time, avoid ditching, draining, and driving vehicles through these areas.
- ? Widen the shrub buffer on Dutch Creek at least 100ft and permanently exclude livestock. Leave the largest buffers possible along all other streams, seeps, ponds. Riparian buffers greatly reduce stream sedimentation and agricultural pollution, maintain cool stream temperatures and shading, supply woody debris for structure and nutrients, and are often used as corridors and nesting and foraging habitat by many species of wildlife.
- ? Designate grassland / meadow reserves in the alluvial valley bottom and pasture areas. The highest animal species diversity was observed within fenced areas free of grazing and hay harvest in adjacent properties. We suggest the creation of meadow reserves free of grazing and vehicle traffic throughout the growing season. These areas should be mowed or burned outside of the growing season to discourage woody species. Mowing within the growing season destroys nests, cover, and foraging for birds and destroys caterpillar larvae and chrysalis. The reserves will provide habitat for wildflowers, and rare and common bird and butterfly species. These features could be enjoyed by conference center clients and community members as wildlife and wildflower viewing areas. These reserves can also provide a control to demonstrate the effects of grazing or haying on species composition and structure for future ecology oriented classes.
- ? Add a border of shrubs to the south side of the fish pond extending to the tributary of Dutch Creek. This border will provide a corridor to the tributary and much needed shade to a portion of the pond, improving habitat conditions for stocked fish. Add dead debris, such as old Christmas trees, to a portion of the pond for structure. This will provide foraging and spawning substrates for aquatic animals.
- ? Connect reserves, forests, pond and stream buffers, and shrubby roadside areas with corridors throughout the alluvial valley bottom area. Protecting shrubby or grassy corridors between habitats such as forests, aquatic features, and meadows will provide increased dispersal and foraging opportunities for a variety of animals. Stream buffers and un-mowed roadsides often serve as convenient corridors.
- ? Confine future agricultural activities to areas that are already cleared of forests.

- ? Protect old-growth areas from disturbances such as road construction and logging. These areas should be allowed to further mature and undergo natural disturbance dynamics on their own; “restoration logging” is not necessary.
- ? Avoid disturbance to coves. These areas are typically the most sensitive and biologically diverse.
- ? Minimize the size of all canopy gaps. Large canopy gaps will change the floral and faunal species composition from an interior forest community to an edge community. In particular, bird populations are susceptible to brood parasites and predators associated with edges. Large canopy gaps also reduce substrate moisture destroying habitat for amphibians, small mammals, and certain herbs.
- ? Do not remove downed woody debris and standing dead trees, particularly those with large diameters or exfoliating bark. Standing and downed woody debris is a major limiting factor for many small mammals, amphibians, invertebrates, and plants. Because of historically extensive clear-cutting, the region’s forests are depleted of this important forest component.
- ? Take all precautions to reduce sedimentation in streams during development and logging activities. Install silt fencing and holding ponds and restrict grading to dryer seasons of the year. Minimize the area of exposed surfaces and sow native grass seed on areas that will be exposed for extended periods, including the roads. Pave all roads that will receive frequent use; paved roads produce less sediment than dirt or gravel. However, paved roads will increase run-off. This can be mitigated by installing holding ponds. Such ponds may also be useful to certain pond breeding amphibians and other wildlife.
- ? Maintain the currently open, orchard / meadow areas within forests for wildlife by mowing outside of the growing season. You may also consider planting and encouraging specific meadow plant species used by game and non-game wildlife (there are many books on this topic).
- ? Avoid unnecessary moving or compacting of soil. Soils take thousands of years to develop. Disturbing the soil alters floral and faunal communities for extended periods of time. Fossorial animals such as small mammals and salamanders are particularly affected.
- ? Create small fish free ponds. A limiting factor for many pond breeding amphibians is a lack of fish free ponds. Creating such ponds is relatively cheap and easy and will significantly increase the biodiversity on the property. A simple scoop by a bulldozer can create a breeding pond for a number of frogs and salamanders. It is important that such ponds remain free of predatory fish. Conference center clients may appreciate listening to the calls of breeding frogs throughout late winter and early spring. We suggest placing the ponds in a variety of habitats such as in valley bottoms, coves, and on ridge-tops in, near, or connected via corridors to, hardwood forests. Of critical importance is establishing metapopulation structure, i.e., having clusters of ponds in close proximity (ideally three or more at a given site). An array of pond depths that will

provide drying regimes spanning from highly ephemeral (holding water for 4-5 months) to semi-permanent (10-12 months) is important. Unless a lining is used, pond depth will be determined by the depth of clay soil. Maximum depths for constructed ponds should be 70-90 cm and pond sizes in the 1/4-1.0 acre size range. However, smaller “bath-tub” size ponds are useful . Mosquitoes will be controlled once predatory insects and larval salamanders have become established.

- ? Avoid disturbance to rock out crops and boulder fields. Leave 100ft buffers around outcrops. Exposed and shaded, wet and dry, outcrops and boulderfields provide habitat to a host of rare animals and plant species. These areas should be left undisturbed and buffered.

References / Literature Cited

- Amoroso, J. L.. 1999. Natural Heritage Program List of the Rare Plant Species of North Carolina. Division of Parks and Recreation. DENHR.
- Kartesz, J.T., and C.A. Meacham. 1999. Synthesis of the North American Flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill, NC. Copyright © 1999 J. T. Kartesz and C. A. Meacham
- LeGrand and Hall. 1999. Natural Heritage Program List of the Rare Animals of North Carolina. Division of Parks and Recreation. DENHR.
- Maptech, Inc. Terrain Navigator CD ROM. 1998. North Carolina: Western Great Smoky Mountains. Maptech, Inc. 1 Riverside Drive. Andover, MA 01810-1122.
<http://www.maptech.com>
- NC Geologic Survey. Brown, Philip M., editor. . Geologic Map of North Carolina. 1985. NC Department of Natural Resources and Community Development. Raleigh, NC.
- Radford, A.E. Ahles, H.E, and Bell, C.R. (RAB) 1964. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. Chapel Hill, NC.
- Schafale, M.P, and Weakley, A.S. Classification of the Natural Communities of North Carolina, Third Approximation. NCNHP. Division of Parks and Recreation. DEHNR, 1990.
- Weakley, A. 1999. Flora of Virginia and the Carolinas: A working draft. The Nature Conservancy. Raleigh, NC.

APPENDIX

Table 1: Observed Plant Species

Table 2: Observed Animal Species

Map 1: Natural Communities

Map 2: Critical Areas

Map 3: Anthropogenic Areas

Map 4: Rare Plants

Table 1
Observed Plant Species
Valle Crucis Conference Center
August 2001

***indicates exotic species

<u>Form</u>	<u>Common Name</u>	<u>Standard Name</u>
Tree	<i>Acer pensylvanicum</i>	Striped Maple
Tree	<i>Acer rubrum var rubrum</i>	Red Maple
Tree	<i>Acer saccharum var. saccharum</i>	Sugar Maple
Tree	<i>Aesculus flava (S)</i>	Yellow Buckeye
Tree	<i>Amelanchier arborea</i>	Serviceberry
Tree	<i>Betula allegheniensis</i>	Yellow Birch
Tree	<i>Betula lenta</i>	Black Birch
Tree	<i>Carya glabra</i>	Pignut Hickory
Tree	<i>Carya tomentosa</i>	Mockernut Hickory
Tree	<i>Castanea dentata</i>	American Chestnut
Tree	<i>Cornus florida</i>	Dogwood
Tree	<i>Fagus graffifolia</i>	American Beech
Tree	<i>Fraxinus americana</i>	White Ash
Tree	<i>Liriodendron tulipifera</i>	Tulip Poplar
Tree	<i>Magnolia acuminata var. acuminata</i>	Cucumber Magnolia
Tree	<i>Magnolia fraseri (S)</i>	Fraser Magnolia
Tree	<i>Nyssa sylvatica</i>	Black Gum
Tree	<i>Ostrya virginiana</i>	Hophornbeam
Tree	<i>Oxydendron arboreum</i>	Sourwood
Tree	<i>Pinus strobus</i>	White Pine
Tree	<i>Platanus occidentalis</i>	Sycamore
Tree	<i>Prunus pensylvanica</i>	Pin Cherry
Tree	<i>Prunus serrotina</i>	Black Cherry
Tree	<i>Quercus alba</i>	White Oak
Tree	<i>Quercus coccinea</i>	Scarlet Oak
Tree	<i>Quercus montana</i>	Chestnut Oak
Tree	<i>Quercus rubra var. rubra</i>	Northern Red Oak
Tree	<i>Quercus velutina</i>	Black Oak
Tree	<i>Robinia psuedoacacia</i>	Black Locust
Tree	<i>Salix nigra</i>	Black Willow
Tree	<i>Sassafras albidum</i>	Sassafras
Tree	<i>Tilia heterophylla</i>	White Basswood
Tree	<i>Tsuga canadensis</i>	Canada Hemlock
Tree	<i>Tsuga caroliniana (S)</i>	Carolina Hemlock
Shrub	<i>Alnus serrulata</i>	Tag Alder
Shrub***	<i>Berberis thunbergii***</i>	Japanese Barberry***
Shrub	<i>Ceanothus americanus</i>	New Jersey Tea
Shrub	<i>Clethra acuminata</i>	Sweet Pepperbush
Shrub	<i>Cornus alternifolia</i>	Alternate Leaf Dogwood
Shrub	<i>Corylus americana</i>	American Hazelnut
Shrub	<i>Hammamelis virginiana</i>	Witch Hazel
Shrub	<i>Hydrangea arborescens</i>	Wild Hydrangea
Shrub	<i>Ilex montana</i>	Mountain Holly
Shrub	<i>Kalmia latifolia</i>	Mountain Laurel
Shrub	<i>Lindera benzoin</i>	Spicebush
Shrub	<i>Sambucus canadensis</i>	Elderberry
Shrub	<i>Symplocos tinctoria</i>	Horse Sugar

Shrub	<i>Vaccinium corymbosum</i>	Smooth Highbush Blueberry
Shrub	<i>Vaccinium pallidum</i>	Hillside Blueberry
Shrub	<i>Vaccinium staminium</i> var. <i>sericeum</i>	Southern Deerberry
Shrub	<i>Viburnum acerfolium</i>	Mapleleaf Viburnum
Shrub	<i>Viburnum lantanoides</i>	Moosewood
Vine	<i>Aristolochia macrophylla</i> (S,C)	Dutchmans Pipe
Vine	<i>Clematis virginiana</i>	Virgin's Bower
Vine	<i>Cuscuta rostrata</i>	Love Vine
Vine	<i>Parthenocissus quinquefolia</i>	Virginia creeper
Vine	<i>Rosa multiflora</i> ***	Multiflora Rose***
Vine	<i>Rubus allegheniensis</i>	Allegheny Blackberry
Vine	<i>Rubus odoratus</i>	Purple Flowering Raspberry
Vine	<i>Smilax herbacea</i>	Carrionflower
Vine	<i>Smilax hispida</i>	Greenbrier
Vine	<i>Smilax rotundifolia</i>	Common Greenbrier
Vine	<i>Toxicodendron radicans</i>	Poison Ivy
Vine	<i>Vitis aestivalis</i>	Summer Grape
Herb	<i>Achellia millefolium</i> ***	Yarrow***
Herb	<i>Actaea pachypoda</i>	Dolls Eyes
Herb	<i>Actinomeris alteranifolia</i>	Wingstem
Herb	<i>Ageratina altissima</i>	White Snakeroot
Herb	<i>Agrimonia rostellata</i>	Woodland Agrimony
Herb	<i>Alliaria petiolata</i> ***	Garlic Mustard***
Herb	<i>Ambrosia artemisiifolia</i> ***	Common Ragweed***
Herb	<i>Ambrosia triloliata</i> ***	Giant Ragweed***
Herb	<i>Amphicarpaea bracteata</i>	Hog Peanut
Herb	<i>Angelica triquinata</i>	Filmy Angelica
Herb	<i>Aplectrum hymenale</i>	Puttyroot Orchid
Herb	<i>Arabis laevigata</i> var. <i>laevigata</i>	Common Smooth Rockcress
Herb	<i>Aralia nudicaulis</i>	Wild Sarsaparilla
Herb	<i>Aralia racemosa</i> ssp. <i>racemosa</i>	Spikenard
Herb	<i>Arctium lappa</i> ***	Great Burdock***
Herb	<i>Arisaema triphyllum</i> ssp. <i>quinatum</i>	Southern Jack in the Pulpit
Herb	<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>	Common Jack in the Pulpit
Herb	<i>Arnoglossum muhlenbergii</i>	Giant Indian Plantain
Herb	<i>Aruncus dioicus</i>	Goatsbeard
Herb	<i>Asarum canadense</i> var. <i>canadense</i>	Wild Ginger
Herb	<i>Asclepias incarnata</i>	Woodland Milkweed
Herb	<i>Aster acuminatus</i> (S)	Whorled Mountain Aster
Herb	<i>Aster cordifolius</i>	Heartleaf Aster
Herb	<i>Aster divaricatus</i>	White Wood Aster
Herb	<i>Aster elliotii</i>	Elliot's Aster
Herb	<i>Aster macrophyllus</i>	Largeleaf Aster
Herb	<i>Aster pilosus</i>	Heath Aster
Herb	<i>Astilbe biternatum</i> (S)	Native Astilbe
Herb	<i>Aureolaria laevigata</i>	Appalachian Oak-leach
Herb	<i>Campanula americanum</i>	Tall Bellflower
Herb	<i>Campanula divaricata</i>	Southern Harebell
Herb	<i>Caulophyllum thalictroides</i>	Blue Cohosh
Herb	<i>Chelone lyonii</i>	Pink Turtlehead
Herb	<i>Cicuta maculata</i> var. <i>maculata</i>	Poison Hemlock
Herb	<i>Cimicifuga americana</i>	American Cohosh
Herb	<i>Cimicifuga racemosa</i>	Black Cohosh
Herb	<i>Circaea alpina</i>	Dwarf Enchanters Nightshade

Herb	<i>Circaea quadrisulcata</i>	Enchanters Nightshade
Herb	<i>Clintonia umbellata (S)</i>	Bluebead Lily
Herb	<i>Collinsonia canadensis</i>	Northern Stoneroot
Herb	<i>Conophilis americana</i>	Cancer Root
Herb	<i>Convallaria majalis</i>	Lily of the Valley
Herb	<i>Cryptotaenia canadensis</i>	Honewort
Herb	<i>Daucus corota***</i>	Queen Anne's Lace***
Herb	<i>Desmodium nudiflorum</i>	Naked-flower Trefoil
Herb	<i>Dioscorea quaternata</i>	Whorled Wild Yam
Herb	<i>Diphylleia cymosa</i>	Elephant Leaf
Herb	<i>Erigeron pulchellus</i>	Robins Plantain
Herb	<i>Eupatorium maculatum</i>	Joe Pye
Herb	<i>Eupatorium perfoliatum</i>	Boneset
Herb	<i>Eupatorium purpureum</i>	Woodland Joe Pye
<u>Herb</u>	<u><i>Eupatorium steelei (S)</i></u>	<u>Steele's Joe Pye</u>
Herb	<i>Galax aphylla</i>	Galax
Herb	<i>Galearis spectabilis</i>	Showy Orchis
Herb	<i>Galium circazeans</i>	Wild Licorice
Herb	<i>Galium latifolium</i>	Wideleaf Bedstraw
Herb	<i>Galium orizabense ssp. laeviculale</i>	A Galium
Herb	<i>Gentiana villosa</i>	Sampson's Snakeroot
Herb	<i>Geranium maculatum</i>	Wild Geranium
Herb	<i>Geum canadense</i>	Common Avens
Herb	<i>Gillenia trifoliata</i>	Bowman's Root
Herb	<i>Goodyera pubescens</i>	Rattlesnake Orchid
Herb	<i>Helianthus strumosus</i>	Woodland Sunflower
Herb	<i>Hepatica acutiloba</i>	Sharp Lobe Hepatica
Herb	<i>Heuchara americana</i>	Alumroot
Herb	<i>Heuchara villosa (S)</i>	Rock Alumroot
Herb	<i>Hieracium caespitosum</i>	Hawkweed
Herb	<i>Impatiens pallida</i>	Pale Touch Me Not
Herb	<i>Iris cristata</i>	Wild Iris
Herb	<i>Lamium amplexicaule***</i>	Henbit***
Herb	<i>Laportea canadensis</i>	Wood Nettle
Herb	<i>Ligusticum canadense</i>	Lovage
Herb	<i>Lilium superbum</i>	Turks Cap Lily
Herb	<i>Lobelia puberula</i>	Hairy Lobelia
Herb	<i>Lobelia siphilicata</i>	Great Lobelia
Herb	<i>Lycopus uniflorus</i>	Bugleweed
Herb	<i>Lysimachia quadrifolia</i>	Whorled Loostripe
Herb	<i>Maianthemum racemosum</i>	Solomon's Plume
Herb	<i>Medeola virginiana</i>	Indian Cucumber Root
Herb	<i>Melampyrum lineare var. americanum</i>	Cow-wheat
Herb	<i>Monarda clinopoda</i>	Basil Balm
Herb	<i>Monarda didyma</i>	Bee Balm
Herb	<i>Monotropa uniflora</i>	Indian Pipes
Herb	<i>Myosotis laxa</i>	
Herb	<i>Oenothera biennis</i>	Evening Primrose
Herb	<i>Osmorhiza claytonii</i>	Sweet Cicely
Herb	<i>Oxalis montana</i>	Mountain Sorrel
Herb	<i>Oxipolis rigidior</i>	Cowbane
Herb	<i>Packera (Senecio) aureus</i>	Liferoot, Marchflower
<u>Herb</u>	<u><i>Panax quinquefolius</i></u>	<u>American Ginseng</u>
Herb	<i>Phryma leptostachya</i>	Lopseed

Herb	<i>Phytolacca americana</i>	Pokeweed
Herb	<i>Pilea pumila</i>	Clearweed
Herb	<i>Plantago lanceolata</i> ***	Lanceleaf Plantain***
Herb	<i>Plantago major</i> ***	English Plantain***
Herb	<i>Podophyllum peltatum</i>	Mayapple
Herb	<i>Polygonatum biflorum</i>	Smooth Solomons Seal
Herb	<i>Polygonum sagittatum</i>	Tearthumb
Herb	<i>Potentilla simplex</i>	Large Five Fingers
Herb	<i>Prenanthes altissima</i>	Tall Rattlesnake Root
Herb	<i>Prosartes lanuginosum (A)</i>	Orange Mandarin
Herb	<i>Prunella vulgaris</i>	Self Heal
Herb	<i>Pycnanthemum montanum</i>	Hoary Mountain Mint
Herb	<i>Ranunculus abortivus</i>	Crowfoot
Herb	<i>Rudbeckia laciniata</i> var. <i>lacinata</i>	Giant Coneflower
Herb	<i>Rumex obtusifolius</i>	Bitter Dock
Herb	<i>Sanguinaria canadensis</i>	Bloodroot
Herb	<i>Sanicula canadensis</i>	Black Snakeroot
<u>Herb</u>	<u><i>Saxifraga careyana (S)</i></u>	<u>Carey's Saxifrage</u>
Herb	<i>Saxifraga micranthidifolia (S)</i>	Branch Lettuce
Herb	<i>Saxifraga virginiana (S)</i>	Virginia Saxifrage
Herb	<i>Scrophularia marilandica</i>	Eastern Figwort
Herb	<i>Sedum ternatum</i>	White Stonecrop
Herb	<i>Silene stellata</i>	Starry Campion
Herb	<i>Silene virginica</i>	Fire Pink
Herb	<i>Solanum carolinense</i>	Horse Nettle
Herb	<i>Solidago altissima</i>	Tall Goldenrod
Herb	<i>Solidago curtisii</i>	Curtis' Goldenrod
Herb	<i>Solidago flaccidifolia</i>	Appalachian Goldenrod
Herb	<i>Solidago flexicaulis</i>	Zigzag Goldenrod
Herb	<i>Solidago patula</i>	Bog Goldenrod
Herb	<i>Stachys latidens</i>	Bigtooth Hedge Nettle
Herb	<i>Stellaria pubera</i>	Chickweed
Herb	<i>Taenidia integerrima</i>	Yellow Pimpernel
Herb	<i>Thalictrum clavatum (S)</i>	Seep Rue
Herb	<i>Thalictrum dioicum</i>	Spring Woods Rue
Herb	<i>Tiarella cordifolia</i>	Foamflower
Herb	<i>Tovara virginiana</i>	Jumpseed
Herb	<i>Tradescantia subaspera</i> var. <i>montana</i>	Spiderwort
Herb	<i>Trillium erectum</i>	Wake Robin
Herb	<i>Triosteum perfoliatum</i>	Horse Coffee
Herb	<i>Uvularia perfoliata</i>	Perfoliate Bellwort
Herb	<i>Uvularia puberula</i>	Common Bellwort
Herb	<i>Veratrum latifolium (S,C)</i>	Lanceleaf Bunchflower
Herb	<i>Viola canadensis</i>	Canada Violet
Herb	<i>Viola hastata</i>	Halberd-leaf Violet
Herb	<i>Viola latiscula</i>	Wideleaf Wood Violet
Herb	<i>Viola pallens</i>	Northern White Violet
Herb	<i>Viola primulifolia</i>	Primrose-leaf Violet
Herb	<i>Viola rotundifolia</i>	Roundleaf Violet
Herb	<i>Viola sororia</i>	Common Violet
Herb	<i>Zizia aptera</i>	Heartleaf Alexanders
Fern	<i>Adiantum pedatum</i>	Maidenhair Fern
Fern	<i>Asplenium platyneuron</i>	Ebony Spleenwort
Fern	<i>Athyrium asplenoides</i>	Southern Lady Fern

Fern	<i>Botrychium biternatum</i>	Small Grape Fern
Fern	<i>Botrychium virginianum</i>	Rattlesnake Fern
Fern	<i>Cystopteris protrusa</i>	Spreading Bladderfern
Fern	<i>Dennstaedtia punctilobula</i>	Hayscented Fern
Fern	<i>Deparia acrostichoides</i>	Silvery Glade Fern
Fern Ally	<i>Diphasiastrum digitatum</i>	Running Cedar
Fern	<i>Dryopteris intermedia</i>	Fancy Fern
Fern	<i>Dryopteris marginalis</i>	Evergreen Woodfern
Fern Ally	<i>Huperzia lucidula</i>	Common Clubmoss
Fern	<i>Osmunda cinnamomea</i>	Cinnamon Fern
Fern	<i>Osmunda interrupted</i>	Interrupted Fern
Fern	<i>Polypodium virginianum</i>	Rock Cap Fern
Fern	<i>Polystichum acrostichoides</i>	Christmas Fern
Fern	<i>Pteridium aquilinum</i>	Bracken Fern
Fern	<i>Thelypteris nova-borecensis</i>	New York Fern
Grass	<i>Brachyelytrum erectum</i>	Shorthusk
Grass	<i>Dactylis glomerata</i> ***	Orchard Grass***
Grass	<i>Danthonia spicata</i>	Poverty Grass
Grass	<i>Dicanthelium clandestinum</i>	Deertongue Grass
Grass	<i>Dicanthelium dichotomum</i> var. <i>dichotomum</i>	Forked Witch Grass
Grass	<i>Festuca eliator</i> ***	Fescue***
Grass	<i>Glyceria melicaria</i>	Bog Mannagrass
Grass	<i>Hystrix patula</i>	Bottlebrush Grass
Grass	<i>Microstegium vimineum</i> ***	Japanese Grass***
Grass	<i>Muhlenbergia tenuiflora</i> var. <i>tenuiflora</i>	Muhly Grass
Sedge	<i>Carex digitalis</i>	Short Sedge
Sedge	<i>Carex laxiculmis</i> var. <i>laxiculmis</i>	Crown Sedge
Sedge	<i>Carex platyphylla</i>	Broadleaf Sedge
Sedge	<i>Carex scabrata</i>	A Seep Sedge
Sedge	<i>Carex virescens</i>	Hair-fruit Sedge
Rush	<i>Juncus effusus</i>	Juncus Grass
Rush	<i>Juncus subcaudatus</i>	Bog Rush
Rush	<i>Luzula acuminata</i> var. <i>acuminata</i>	Wood Rush
Moss	<i>Dicranum fulvum</i>	Boulder Moss
Moss	<i>Hypnum imponens</i>	Feather Moss
Moss	<i>Luecobryum albidum</i>	Pincushion Moss
Moss	<i>Mnium cuspidatum</i>	Giant Clear-Moss
Moss	<i>Mnium hornuum</i>	Common Clear-Moss
Moss	<i>Polytrichum</i> spp.	Haircap Moss
Moss	<i>Rhodobryum roseum</i>	Rose Moss
Moss	<i>Thuidium delicatum</i>	Thread Moss
Lichen	<i>Peltigera canina</i>	Dog Lichen
Lichen	<i>Umbilicaria mammulata</i>	Rock Tripe
Liverwort	<i>Conocephalum conicum</i>	Giant Liverwort

Table 2
Observed Wildlife Species
Valle Crucis Conference Center
2,3,22 August 2001

<u>Form</u>	<u>Common Name</u>	<u>Standard Name</u>
Amphibian	Black-bellied salamander	<i>Desmognathus quadramaculatus</i>
Amphibian	Blue Ridge two-lined salamander	<i>Eurycea wilderae</i>
Amphibian	Bullfrog	<i>Rana catesbeiana</i>
Amphibian	Green and bronze frogs	<i>Rana clamitans</i>
Amphibian	Mountain dusky	<i>Desmognathus orestes</i>
Amphibian	Northern woodlands salamander	<i>Plethodon montanus</i>
Amphibian	Pickerel frog	<i>Rana palustris</i>
Amphibian	Ravine salamander	<i>Plethodon richmondi</i>
Amphibian	Red-spotted newt	<i>Notophthalmus viridescens</i>
Amphibian	Yonahlossee salamander	<i>Plethodon yonahlossee</i>
Bird	American Crow	<i>Corvus brachyrhynchos</i>
Bird	American Goldfinch	<i>Carduelis tristis</i>
Bird	Barn Swallow	<i>Hirundo rustica</i>
Bird	Belted Kingfisher	<i>Ceryle alcyon</i>
Bird	Black Vulture	<i>Coragyps atratus</i>
Bird	Black-and-white Warbler	<i>Mniotilta varia</i>
Bird	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Bird	Black-throated Green Warbler	<i>Dendroica virens</i>
Bird	Blue Jay	<i>Cyanocitta cristata</i>
Bird	Blue-headed Vireo	<i>Vireo solitarius</i>
Bird	Broad-winged Hawk	<i>Buteo platypterus</i>
Bird	Brown Thrasher	<i>Toxostoma rufum</i>
Bird	Canada Warbler	<i>Wilsonia canadensis</i>
Bird	Carolina Chickadee	<i>Poecile carolinensis</i>
Bird	Carolina Wren	<i>Thryothorus ludovicianus</i>
Bird	Cedar Waxwing	<i>Bombycilla cedrorum</i>
Bird	Chimney Swift	<i>Chaetura pelagica</i>
Bird	Chipping Sparrow	<i>Spizella passerina</i>
Bird	Common Grackle	<i>Quiscalus quiscula</i>
Bird	Common Raven	<i>Corvus corax</i>
Bird	Common Yellowthroat	<i>Geothlypis trichas</i>
Bird	Cooper's Hawk	<i>Accipiter cooperii</i>
Bird	Downy Woodpecker	<i>Picoides pubescens</i>
Bird	Eastern Bluebird	<i>Sialia sialis</i>
Bird	Eastern Meadowlark	<i>Sturnella magna</i>
Bird	Eastern Phoebe	<i>Sayornis phoebe</i>
Bird	Eastern Towhee	<i>Pipilo erythrophthalmus</i>
Bird	Eastern Wood-Pewee	<i>Contopus virens</i>
Bird	European Starling	<i>Sturnus vulgaris</i>
Bird	Golden-crowned Kinglet	<i>Regulus satrapa</i>
Bird	Gray Catbird	<i>Dumetella carolinensis</i>
Bird	Great Blue Heron	<i>Ardea herodias</i>
Bird	Hairy Woodpecker	<i>Picoides villosus</i>
Bird	House Finch	<i>Carpodacus mexicanus</i>
Bird	House Wren	<i>Troglodytes aedon</i>
Bird	Indigo Bunting	<i>Passerina cyanea</i>
Bird	Mourning Dove	<i>Zenaida macroura</i>
Bird	Northern Cardinal	<i>Cardinalis cardinalis</i>

Bird	Northern Mockingbird	<i>Mimus polyglottos</i>
Bird	Pileated Woodpecker	<i>Dryocopus pileatus</i>
Bird	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Bird	Red-eyed Vireo	<i>Vireo olivaceus</i>
Bird	Red-shouldered Hawk	<i>Buteo lineatus</i>
Bird	Red-tailed Hawk	<i>Buteo jamaicensis</i>
Bird	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Bird	Ruby-thr. Hummingbird	<i>Archilochus colubris</i>
Bird	Ruffed Grouse	<i>Bonasa umbellus</i>
Bird	Slate-colored Junco	<i>Junco hyemalis</i>
Bird	Song Sparrow	<i>Melospiza melodia</i>
Bird	Tree Swallow	<i>Tachycineta bicolor</i>
Bird	Tufted Titmouse	<i>Baeolophus bicolor</i>
Bird	Turkey Vulture	<i>Cathartes aura</i>
Bird	Vesper Sparrow	<i>Pooecetes gramineus</i>
Bird	White-breasted Nuthatch	<i>Sitta carolinensis</i>
Bird	Wild Turkey	<i>Meleagris gallopavo</i>
Bird	Yellow-bell. Sapsucker	<i>Sphyrapicus varius</i>
Bird	Yellow-shafted Flicker	<i>Colaptes auratus</i>
Butterfly	American Lady	
Butterfly	Aphrodite Fritillary	
Butterfly	Appalachian Azure	
Butterfly	Azure spp.	
Butterfly	Cabbage White	
Butterfly	Cloudless Sulphur	
Butterfly	Eastern Tailed-Blue	
Butterfly	Eastern Tiger Swallowtail	
Butterfly	Great Spangled Fritillary	
Butterfly	Harvester	
Butterfly	Little Glassywing	
Butterfly	Meadow Fritillary	
Butterfly	Monarch	
Butterfly	Orange Sulphur	
Butterfly	Painted Lady	
Butterfly	Pearl Crescent	
Butterfly	Pipevine Swallowtail	
Butterfly	Silver-spotted Skipper	
Butterfly	Silvery Checkerspot	
Butterfly	Skipper spp.	
Butterfly	Spicebush Swallowtail	
Butterfly	Variigated Fritillary	
Butterfly	Wild Indigo Duskywing	
Fish	Trout spp.	
Mammal	Black Bear	<i>Ursus americanus</i>
Mammal	Bobcat	<i>Lynx rufus</i>
Mammal	Coyote	<i>Canis latrans</i>
Mammal	Deer Mouse	<i>Peromyscus maniculatus</i>
Mammal	Eastern Chipmunk	<i>Tamias striatus</i>
Mammal	Eastern Cottontail	<i>Sylvilagus floridanus</i>
Mammal	Eastern Grey Squirrel	<i>Sciurus carolinensis</i>
Mammal	Grey Fox	<i>Urocyon cinereoargenteus</i>
Mammal	Raccoon	<i>Procyon lotor</i>
Mammal	Red fox	<i>Vulpes vulpes</i>
Mammal	Southern Flying Squirrel	<i>Glaucomys volans</i>

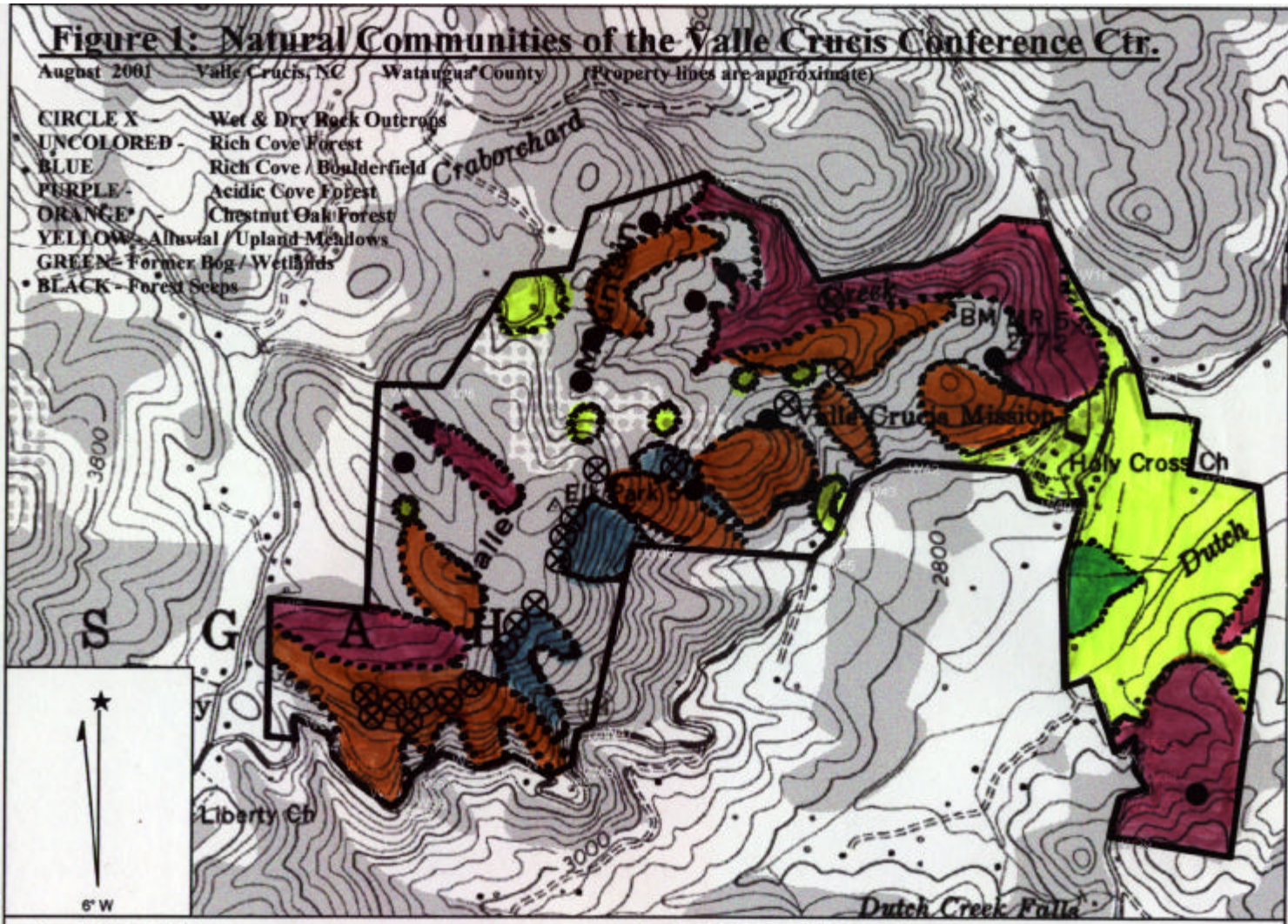
Mammal Striped Skunk
Mammal Virginia opossum
Mammal White-tailed Deer
Mammal Woodchuck

Mephitis mephitis
Didelphis virginiana
Odocoileus virginianus
Marmota monax

Figure 1: Natural Communities of the Valle Crucis Conference Ctr.

August 2001 Valle Crucis, NC Watauga County (Property lines are approximate)

- CIRCLE X - Wet & Dry Rock Outcrops
- UNCOLORED - Rich Cove Forest
- BLUE - Rich Cove / Boulderfield
- PURPLE - Acidic Cove Forest
- ORANGE - Chestnut Oak Forest
- YELLOW - Alluvial / Upland Meadows
- GREEN - Former Bog / Wetlands
- BLACK - Forest Seeps



Name: VALLE CRUCIS
 Date: 8/24/01
 Scale: 1 inch equals 952 feet

Location: 036° 11' 50.1" N 081° 47' 58.0" W

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