ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: University Lake Marsh
Site number: M05

Significance: 5 - County General **Integrity:** 5 - Fair
Threat Status: 5 - Negligible

Location: North of Damascus Church Road (CR 1939) at south end of University Lake.
Approx. acreage: 5 to 10

Jurisdiction: OWASA, Chapel Hill Township, Rural Buffer

Reasons for significance: This is a long-established marsh, with large willows (Salix spp.) and introduced bald cypress (Taxodium distichum) growing along the margins. This marsh offers good habitat for a number of waterbirds and other wildlife. A state-listed endangered mollusc, the Savannah shoremussel (Carunculina pulla = Toxolasma pullus), occurs in the lake itself (see M04).

General description: Since the construction of University Lake half a century ago, wetland conditions have developed at various sites along the perimeter of the impounded area. While this is not a "natural" marsh, many of the plants and animals that occur here are typical of habitats that are periodically flooded. Willows (Salix spp.), sweetgum (Liquidambar styraciflua), alder (Alnus serrulata), buttonbush (Cephalanthus occidentalis), swamp rose (Rosa palustris), and numerous grasses and sedges (Echinochloa crus-galli, Agrostis sp., Eleocharis obtusa, Cyperus spp., and others) dominate the mucky areas where water levels fluctuate according to periodic lake drawdown.

The shallow arms of the lake are home to a number of marsh and riparian animal species. Birds observed during the breeding season include great blue heron (Ardea herodias), green-backed heron (Butorides striatus), Louisiana waterthrush (Seiurus motacilla), yellow-throat (Geothlypis trichas), and yellow-throated warbler (Dendroica dominica). In addition to the large numbers of mussels and fish, the most conspicuous aquatic animals are turtles, seven species of which are known to occur here. Particularly interesting are the thriving populations of the red-eared turtle (Chrysemys scripta elegans), a species native to the Mississippi Valley and present here due to the release of pets, and its close relative, the yellow-bellied turtle (Chrysemys scripta scripta), a species common in our own Coastal Plain but confined to the borders of the Triassic Basin in the Piedmont. A number of hybrids between these two subspecies have also been reported from University Lake.

Protection Status: Carefully protected as part of the primary watershed of Chapel Hill and Carrboro.

Surrounding land use:
N: Residential
E: Residential, forest
S: Residential, forest
W: Residential, forest

Threats:
Immediate: None known
Potential: Same

Recommendations for management or protection: Continue the level of protection accorded a public drinking water supply.

Ownership: See Appendix A

Documentation References: None

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Berryhill Rhododendron Bluff
Site number: M06

Significance: 2 - Regional **Integrity:** 3 - Good
Threat Status: 3 - Moderate

Location: South of BPW Club Road (CR 1967) along Morgan Creek.
USGS Quad: Chapel Hill
Approx. acreage: 5

Jurisdiction: Town of Carrboro

Reasons for significance: This site contains a large stand of catawba rhododendron (Rhododendron catawbiense) and over two dozen individuals of ginseng (Panax quinquefolius), two species which are disjunct from the mountains; the ginseng is a state-listed species of special concern. This is the only site where either of these species occur in the Town of Carrboro.

General description: This community of catawba rhododendron (Rhododendron catawbiense) and mountain laurel (Kalmia latifolia) is growing on a steep north-facing slope which rises 100 feet above Morgan Creek. Among the six isolated rhododendron communities located along Morgan Creek, this is the only one where these two heath species are growing together. On the gentler upper slope and small ravines on the east and west side of this natural area, the mixed mesic hardwood forest provides habitat for a large population of ginseng (Panax quinquefolius), which is found nowhere else along Morgan Creek. Ginseng is a species that grows only in the richest sites; the surprising abundance of spring wildflowers further indicates the prime condition of this site. These species include bloodroot (Sanguinaria canadensis), spring beauty (Claytonia virginica), toothwort (Cardamine sp.), trout lily (Erythronium americanum), foam flower (Tiarella cordifolia), hepatica (Hepatica americana), and wind flower (Thalictrum thalictroides).

The forest canopy on the mesic upper slopes is composed of numerous individuals up to two feet in diameter. Tree species include beech (Fagus grandifolia), red oak (Quercus rubra), white oak (Q. alba), and tulip poplar (Liriodendron tulipifera). Emergent above the rhododendron bluff are chestnut oak (Quercus prinus), scarlet oak (Q. coccinea), red maple (Acer rubrum), hop hornbeam (Ostrya virginiana), and witch hazel (Hamamelis virginiana).

Nowhere else in Carrboro is there as large a forested area of mesic hardwoods that is as undisturbed as here. It is surrounded by development but is extensive enough so that visitors can feel like they are walking in a large old-growth forest. This aspect, along with the rhododendron bluff and riparian species growing along the creek, make this the most significant site in Carrboro.

Protection Status: Portion adjacent to stream designated as open space

Surrounding land use:

N: Residential, tennis club
E: Residential
S: Residential
W: Residential

Threats:

Immediate: Construction of multifamily housing immediately upslope of bluff
Potential: Recreational overuse, runoff from development

Recommendations for management or protection: The rhododendron bluff itself and the ginseng population upslope deserve the highest degree of protection. Although the lower slopes and bluff have been ceded to the Triangle Land Conservancy, restrictions are still needed for the buffer area upslope, since this site is completely surrounded by development and hence quite fragile. Such restrictions would include control of entry along carefully constructed trails so that problems with erosion and trampling are minimized; careful consideration of landscaping for the adjacent development, particularly ground cover plants that could quickly invade and overwhelm the natural area; runoff from lawns, parking areas, and streets should be directed completely away from the natural area.

Ownership: See Appendix A

Documentation References: None

Overview of the Morgan Creek Valley

Along an approximately 1.5 mile stretch of Morgan Creek, from its confluence with Stillhouse Bottom to its entry into the Triassic Basin, occurs one of the richest areas for disjunct plant communities in the region. Including the Stillhouse Bottom Ravine (M07) and the lower slopes and ravines of Laurel Hill (M13), seven of the county's prime natural areas are located along this strip (M07 - M13).

Topographically, this is one of the steepest canyons in the county, quite comparable to the steep-walled gorge formed by New Hope Creek as it flows through the Korstian Division of Duke Forest. Located right at the edge of the Triassic Basin lowlands, the stream-cutting action has been as intense as along the Fall Line dividing the Piedmont from the Coastal Plain. The stream itself falls approximately 50 feet as it travels through the canyon and along the canyon walls the drop is 150 feet in some places, with slopes of up to 60 to 70 degrees. This steepness is further accentuated at several points where the strong cutting action of the stream has resulted in the exposure of numerous rock outcrops, including slates, diabase, and pyroclastic flows; some of these form sheer cliffs rising straight up from the creek.

Due to the general east-west orientation of streams within our region, the slopes of the canyons formed along these sharp drops in elevation often have exposures directly to the north and south. The nature of these extreme exposures, together with the frequency of rock outcrops, accounts in turn for the unusual biological communities found in these sites.

Along the north-facing slopes occur three of the county's largest stands of catawba rhododendrons and associated montane disjuncts, both plant and animal (see sites M09, M11, and M12 for details). Collectively these communities possess one plant that is state-listed as significantly rare, the sweet pinesap (Monotropsis odorata), along with the regionally-rare rhododendrons and at least two animal species that are similarly restricted to cool-mesic conditions.

At the opposite extreme, on two south- or southwest-facing rock outcrops (M09 and M11) occur two of the most xeric communities in the county and some of the most unusual plant species, including the extremely rare Anemone berlandieri, whose only known population in the county exists at this site. In addition to the state-listed anemone, three plants are found here that are regionally-rare and one butterfly that only has been found at the driest sites in the county. The dramatic contrast between these xeric communities and the cool-mesic slopes on the opposite walls of the canyon is one of this area's foremost features.

While not in the same class as the bluff communities, the riparian area itself is one of the better ones remaining in the

county and adds to the overall attractiveness of the valley. The absence of large agricultural areas or sewage treatment plants upstream has kept the water relatively clean compared to other small streams within the county and the fish community is fairly diverse, 12 species having been collected. Birds are also still numerous; 35 species were recorded during the 1988 breeding season, including one state-endangered bird, the cooper's hawk (Accipiter cooperi).

The mussel fauna, however, appears to be on the decline; we saw no beds along this entire stretch and several species observed in the past may now be gone (Johnson, 1970; Shelley, 1987; Hall, pers. obs.). This may be due to the heavy development upstream, since these organisms are particularly sensitive to both sedimentation and pollution from storm-water runoff. A contributing factor may be the abundant presence of the exotic asiatic clam, Corbicula, which has been implicated in the decline of our native mussels elsewhere. This species occurs in our other watersheds without the inroads seen along Morgan Creek, however, suggesting that the other factors are the most critical.

Administratively, the area is somewhat unified by a thread of land owned by the NC Botanical Garden, running primarily along the creek, sometimes on just one side or the other; extensions of Garden land also include the bluffs on which the catawba rhododendron grows, although there are some portions of these communities that are owned privately. One other tract administered by the garden is a small parcel of land owned by the Botanical Garden Foundation located at the upper extremity of Stillhouse Bottom.

Private lands constrict the Garden's holdings along this entire stretch of Morgan Creek and must also be considered in any effort to define the overall natural area within the valley. The two xeric bluffs are located on these private lands; one of them contains the entire population of the Anemone berlandieri. Although the rhododendron bluffs are mostly on Garden property (or on land which is in the process of being deeded over to the Garden), the slopes above all these stands are in private ownership; in some cases the property line is located right at the edge of the rhododendrons. Even along the creek, where the Garden owns a continuous strip, private property comes all the way down to the creekbank on one side or the other, from the Hunt Arboretum Rhododendron Bluff (M11) upstream. Along most of this strip, however, the steepness of the slopes has prevented development and the setting is still quite natural. Only at a few points does the proximity of dwellings and artificial landscaping intrude upon the scene.

With its steep-walled canyon, pleasant stream, abundant fauna and unusual biological communities, this is one of the most aesthetic stretches of natural area remaining in the vicinity of Chapel Hill. Although we cannot recommend that this area be used as a developed greenway, due to the narrowness of the valley and

the fragility of its features, some regulated visitation might be possible through an arrangement between the landowners and the Botanical Garden; an agreement of this sort is currently under negotiation.

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ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Stillhouse Bottom
Site number: M07

Significance: 3 - County High **Integrity:** 1 - Prime
Threat Status: Botanical Garden property 3 - Moderate; Duke Power property 2 - Strong

Location: Deep ravine south of Bayberry Drive (CR 2010).
USGS Quad: Chapel Hill
Approx. acreage: 45

Jurisdiction: Town of Chapel Hill Planning District

Reasons for significance: This is the only undisturbed, steep, north-facing ravine left in the county. For a hillside ravine, it displays a strikingly high plant diversity: over 100 species have been recorded.

General description: This ravine forms a deep cleft in a long east-west running ridge; facing due north, it is much cooler than the surrounding countryside. Along the narrow brook bottom and lowest slopes are found tree species of the mixed mesic hardwood assemblage; this community grades into dry-mesic oak--hickory forest farther upslope. Throughout the ravine, many of the trees are over 18 inches in diameter. Sycamore (Platanus occidentalis) is common along the gravelly stream bottom, and especially abundant along the lower slopes are beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), and red oak (Quercus rubra). Other oaks and hickories found here include white oak (Quercus alba), black oak (Q. velutina), northern shagbark hickory (Carya ovata), and pignut hickory (C. glabra).

The "montane" aspect of Stillhouse Bottom is striking, and numerous non-canopy species which are found on the richer, cooler, moister sites in the Piedmont are particularly abundant here. These include umbrella tree (Magnolia tripetala), sugar maple (Acer saccharum ssp. floridanum), yellow buckeye, (Aesculus sylvatica), wild hydrangea (Hydrangea arborescens), toothwort (Cardamine sp.), foam flower (Tiarella cordifolia var. collina), alumroot (Heuchera americana), hepatica (Hepatica americana), hog peanut (Amphicarpa bracteata), Catesby's trillium (Trillium catesbei), wind flower (Thalictrum thalictroides), and bloodroot (Sanguinaria canadensis).

Despite the fact that this area is completely surrounded by residential development, houses have not yet encroached upon the ravine to any significant extent. Due to this low level of disturbance, the animal community is still typical of mature hardwoods. Several bird species whose presence indicates the quality of this habitat are the red-tailed hawk (Buteo jamaicensis), yellow-billed cuckoo (Coccyzus erythropthalmus), white-breasted nuthatch (Sitta carolinensis), ovenbird (Seiurus aurocapillus), and scarlet tanager (Piranga olivacea). The purity of the brook's waters is likewise demonstrated by the healthy amphibian community, made up of such species as the dusky

salamander (Desmognathus fuscus), two-lined salamander (Eurycea bislineata), and green frog (Rana clamitans).

Protection Status: A very small portion of the property is owned by NC Botanical Garden and maintained as natural area; the majority of the area is unprotected.

Surrounding land use:
N: Residential
E: Forest, residential
S: Forest, residential
W: Forest, residential

Threats:
Immediate: None known
Potential: Powerline construction; development for housing

Recommendations for management or protection: Alert the landowners of the significance of the natural values of their property; negotiate for a conservation easement that would include the entire present extent of the ravine, since any further encroachment would quite probably eliminate the old-growth forest birds.

Ownership: See Appendix A

Documentation References: None

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Graybluff Rhododendron Slope
Site number: M08

Significance: 2 - Regional **Integrity:** 3 - Good
Threat Status: 3 - Moderate

Location: North of Bayberry Drive (CR 2009), just downstream from outlet of Stillhouse Bottom on south side of Morgan Creek.
Approx. acreage: 3

Jurisdiction: Town of Chapel Hill Planning District

Reasons for significance: This is one of only nine sites for catawba rhododendron (Rhododendron catawbiense) in Orange County.

General description: This is the driest of all the rhododendron slopes in the county, since the orientation and drainage of the rock substrate is such that there are few crevices for soil and root buildup. The canopy consequently is very open, and composed of beech (Fagus grandifolia), shortleaf pine (Pinus echinata), sweetgum (Liquidambar styraciflua), northern shagbark hickory (Carya ovata), loblolly pine (Pinus taeda), white oak (Quercus alba), and red maple (Acer rubrum). Individual specimens of the catawba rhododendron descend down to the edge of the sandy soil along Morgan Creek, mixing in with the alluvial species at the base of the bluff. Common along the alluvial bench are fetterbush (Leucothoe racemosa), ironwood (Carpinus caroliniana), yellow buckeye (Aesculus sylvatica), yellow-root (Xanthorhiza simplicissima), wild azalea (Rhododendron nudiflorum), and tag alder (Alnus serrulata). Herbaceous species characteristic of this dry bluff community are trailing arbutus (Epigaea repens), hawkweed (Hieraceum venosum), five-fingers (Potentilla canadensis), cross-vine (Anisostichus capreolata), and yellow jessamine (Gelsemium sepervirens).

Due to the presence of houses directly upslope on the lip of the bluff and the large amount of trail usage along this part of the creek, this is the most disturbed of all the rhododendron bluffs inventoried. Exotic plants intruding into the natural area are privet (Ligustrum sinense) and silverberry (Eleagnus umbellata), along with the ubiquitous Japanese honeysuckle (Lonicera japonica).

Despite these houses and others scattered along the creek, this stream valley, which begins at Stillhouse Bottom and terminates at Finley Golf course where Morgan Creek enters the Triassic Basin, still supports a large variety of wildlife. Particularly noteworthy are several birds of prey, including the cooper's hawk (Accipiter cooperi), a state-listed species considered endangered as a nesting bird, the red-shouldered hawk (Buteo lineatus), a declining species typical of mature bottomland forests, and the great horned owl (Bubo virginianus). Another animal more closely associated with the rhododendrons is the sumo mite (Allothrombium sp.), which appears in huge numbers every other year along all the north-facing slopes of the Morgan

Creek Valley.

Protection Status: Part of the rhododendron population is on Botanical Garden land; a small part is privately owned and unprotected.

Surrounding land use:
N: Residential
E: Residential
S: Residential
W: Residential

Threats:
Immediate: Impact from housing development upslope
Potential: Same

Recommendations for management or protection: A conservation easement is being negotiated between the landowners and the NC Botanical Garden. Any trail development should remain along the alluvial flat and away from the very sensitive rhododendron stand.

Ownership: See Appendix A

Documentation References: None

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Stillhouse Bend Glade
Site number: M09

Significance: 4 - County Medium **Integrity:** 3 - Good
Threat Status: 5 - Negligible

Location: North of Bayberry Drive (CR 2009), along south side of Morgan Creek just downstream from confluence with Stillhouse Bottom Ravine.
Approx. acreage: 3 to 5

Jurisdiction: Town of Chapel Hill Planning District

Reasons for significance: This south-facing rocky bluff is one of the driest cliff sites in the county and supports many xeric plant species, including the hairy lipfern (Cheilanthes lanosa), a regionally-rare species near the edge of its range.

General description: This site is located on a steep, west-facing slope, where the rock is exposed as numerous outcrops of volcanic tuff. Very little soil has developed on this dry cliff, so that vines and herbaceous species predominate under a sparse canopy. The woody species dominating the low canopy are shortleaf pine (Pinus echinata), black oak (Quercus velutina), white oak (Q. alba), and post oak (Q. stellata). In the subcanopy are mountain holly (Ilex ambigua), black haw (Viburnum prunifolium), fringe tree (Chionanthus virginicus), Georgia hackberry (Celtis occidentalis var. georgiana), and service berry (Amelanchier arborea). Vines clambering over the exposed rocks include crossvine (Anisostichus capreolata), poison ivy (Rhus radicans), and yellow jessamine (Gelsemium sempervirens). Noteworthy xerophytic herbs are hairy lipfern (Cheilanthes lanosa), resurrection fern (Polypodium polypodioides), ebony spleenwort (Asplenium platyneuron), two species of beggar's ticks (Coreopsis major var. stellata and C. verticillata), yellow star grass (Hypoxis hirsuta), wild oregano (Cunilla origanoides), pussytoes (Antennaria plantaginifolia), and trailing arbutus (Epigaea repens).

Although not as unique a site as the nearby Morgan Creek Anemone Glade (M10), this is a bluff that belongs to the same geologic formation, has similar steep slopes, and is less dry only because it is not facing due south. It is still one of the most xeric sites within the county.

Protection Status: None known

Surrounding land use:
N: Residential
E: Residential
S: Residential
W: Residential

Threats:
Immediate: None known
Potential: Impact from adjacent housing development

Recommendations for management or protection: Alert landowner of the natural values of his property; negotiate for conservation easement.

Ownership: See Appendix A

Documentation References: None

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Morgan Creek Anemone Glade
Site number: M10

Significance: 2 - Regional **Integrity:** 3 - Good
Threat Status: 3 - Moderate

Location: South of Hawthorne Lane (off of Otey's Road) on north side of Morgan Creek.
Approx. acreage: 8

Jurisdiction: Town of Chapel Hill Planning District

Reasons for significance: This is the driest site within Orange County. Two species are found here and nowhere else in the county: southern thimbleweed (Anemone berlandieri), which is state-listed as a primary-proposed species, and rock spikemoss (Selaginella rupestris), which is regionally rare. Two species of lipfern (Cheilanthes lanosa and C. tomentosa), both of which are regionally-rare species, are also found here.

Three noteworthy animals observed at this site include the Cooper's Hawk (Accipiter striatus), which is state-listed as an endangered nesting bird, the red-shouldered hawk (Buteo lineatus), a regionally-rare species, and the sleepy duskywing (Erynnis brizo), an uncommon butterfly that appears to be restricted to dry habitats.

General description: This south-facing bluff along Morgan Creek is a steep outcrop of volcanic tuff that rises almost 100 feet above the creek. The crumbly, rocky soil produced by the combination of harsh exposure and this rock type supports the most xeric vegetation found anywhere within the county. The canopy is sparse and stunted, composed of only the driest species: red cedar (Juniperus virginiana) and hop hornbeam (Ostrya virginiana) are the most numerous; black oak (Quercus velutina), post oak (Q. stellata), white oak (Q. alba), virginia pine (Pinus virginiana), shortleaf pine (P. echinata), mockernut hickory (Carya tomentosa), and pignut hickory (C. glabra) are also present. Subcanopy and shrub species, also sparsely distributed, include persimmon (Diospyros virginiana), fringe tree (Chionanthus virginiana), sourwood (Oxydendrum arboreum), and Georgia hackberry (Celtis laevigata var. georgiana). Overall, this site has an open, glade-like aspect. The herb layer is likewise sparse and scattered, but those species present are ones found only on the driest sites. Among these interesting herbs are the state-listed southern thimbleweed (Anemone berlandieri), the regionally-rare rock spikemoss (Selaginella rupestris), and both the hairy and wooly lipferns (Cheilanthes lanosa and C. tomentosa), which grow here in a profusion unmatched in the county. Other xerophytic species include beggar's ticks (Desmodium spp.), verticelled milkweed (Asclepias verticellata), stipa grass (Stipa avenacea), reindeer lichen (Cladonia sp.), and agave (Agave virginica), which is known from only 3 other locations in the county. This is also the probable

site of a previous collection for Earle's gayfeather (Liatris squarrulosa), a species listed as significantly rare within North Carolina. Along the sandy alluvial soils at the base of this bluff, another historical record exists for nestronia (Nestronia umbellula), a species listed as threatened within the state. This population of nestronia was quite probably destroyed during the construction of sewer lines along Morgan Creek.

An animal that seems to be associated with the dry vegetation present on this bluff is the sleepy duskywing (Erynnis brizo), a butterfly that has been observed only on the summit of Occoneechee Mountain and one other dry oak forest within the county. Two other noteworthy species that were observed from this site but which make use of the entire riparian area along the creek are the endangered cooper's hawk (Accipiter cooperi) and regionally-rare red-shouldered hawk (Buteo lineatus). The cooper's hawk may be nesting nearby because it was seen mobbing the larger red-shouldered hawk during the middle of its normal breeding period (June 1988); the red-shouldered hawk is known as a common resident at the Mason Farm Biological Reserve located downstream.

Protection Status: One of the owners is aware of the property's natural values.

Surrounding land use:

N: Residential
E: Residential
S: Residential
W: Residential

Threats:

Immediate: None known
Potential: Same

Recommendations for management or protection: Negotiate with the landowner for a conservation easement.

Ownership: See Appendix A

Documentation References: None

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Hunt Arboretum Rhododendron Bluff
Site number: M11

Significance: 2 - Regional **Integrity:** 1 - Prime
Threat Status: 3 - Moderate

Location: North of the terminus of Rhododendron Drive, on south side of Morgan Creek.
Approx. acreage: 12

Jurisdiction: Town of Chapel Hill Planning District

Reasons for significance: This one of the five large slopes of catawba rhododendron (Rhododendron catawbiense) along Morgan Creek (one of only nine within Orange County), and one of only three in prime condition, with no development upslope yet.

General description: This is one of the largest of the rhododendron bluffs within the county, extending approximately 75 yards along the creek; a satellite population also exists just across the ravine to the west. The rhododendron (Rhododendron catawbiense) forms a solid thicket along a large rock outcrop, with few other shrub species present. Emergent above the thick cover of rhododendrons is a canopy composed of chestnut oak (Quercus prinus), white oak (Q. alba), beech (Fagus grandifolia), virginia pine (Pinus virginiana), pignut hickory (Carya glabra), and red maple (Acer rubrum). Subcanopy trees include dogwood (Cornus florida), sourwood (Oxydendrum arboreum), witch hazel (Hamamelis virginiana), black gum (Nyssa sylvatica), hop hornbeam (Ostrya virginiana), and sassafras (Sassafras albidum). The few shrubs present in addition to the rhododendron include serviceberry (Amelanchier arborea), maple-leaved viburnum (Viburnum acerifolium), and two species of blueberry (Vaccinium tenellum and V. stamineum). The herbs here are typical of those found on rhododendron slopes in the North Carolina Piedmont: trailing arbutus (Epigaea repens), ebony spleenwort (Asplenium platyneuron), pipsissewa (Chimaphila maculata), beech drops (Epifagus virginiana), wild ginger (Hexastylis virginiana), devil's bit (Chamaelirium luteum), rattlesnake orchid (Goodyera pubescens), woodrush (Luzula acuminata), and hepatica (Hepatica americana).

Only one animal was observed that is strongly associated with this type of community, the sumo mite (Allothrombium sp.). Other animals observed were the riparian species found along the length of Morgan Creek Canyon.

Protection Status: The NC Botanical Garden property on the steepest face is maintained as natural area; private lands upslope are unprotected.

Surrounding land use:
N: Residential
E: Forest
S: Forest, residential
W: Residential

Threats:
Immediate: Construction of housing on private lands upslope
Potential: Same

Recommendations for management or protection: This site should be protected in its natural state; no trails should be constructed near this fragile community and a sufficient buffer area should be included upslope in order to preserve the cool and moist conditions of the slope.

Ownership: See Appendix A

Documentation References: Jones, 1980

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: King's Mill Rhododendron Slope
Site number: M12

Significance: 2 - Regional **Integrity:** 1 - Prime
Threat Status: 3 - Moderate

Location: Upstream from Mason Farm Wastewater Treatment Plant, on south side of Morgan Creek.
Approx. acreage: 15

Jurisdiction: NC Botanical Garden; Town of Chapel Hill Planning District.

Reasons for significance: This one of the five large slopes of catawba rhododendron (Rhododendron catawbiense) along Morgan Creek (one of only nine within Orange County), and one of only three in prime condition, with no development upslope. Additionally, this is one of only three sites within the county where the regionally-rare red-backed salamander (Plethodon cinereus) is known to occur.

General description: This is perhaps the largest rhododendron slope within the county. Close to the point where Morgan Creek enters the Triassic Basin, the stream turns abruptly from its eastward course and travels due north, carving a steep north-facing bluff that rises 150 feet above the creek. As is true for other steep north-facing slopes on the edge of the Basin (see Hollow Rock Rhododendron Bluff, N15, for another example), the entire bluff is covered with a thick stand of catawba rhododendron (Rhododendron catawbiense) and other species reminiscent of the mountains.

Emergent above the rhododendrons is a canopy of chestnut oak (Quercus prinus), red oak (Q. rubra), scarlet oak (Q. coccinea), white oak (Q. alba), beech (Fagus grandifolia), red maple (Acer rubrum), and pignut hickory (Carya glabra), and a subcanopy of sourwood (Oxydendrum arboreum), witch hazel (Hamamelis virginiana), hop hornbeam (Ostrya virginiana), ironwood (Carpinus caroliniana), and storax (Styrax grandifolia). In addition to the dominant catawba rhododendron, shrubs include maple-leaved viburnum (Viburnum acerifolium), fringe tree (Chionanthus virginicus), strawberry bush (Euonymus americanus), and serviceberry (Amelanchier arborea). Beneath the dense shrub layer only a few herbs are present, including bluets (Houstonia caerulea), ebony spleenwort (Asplenium platyneuron), Christmas fern (Polystichum acrostichoides), trailing arbutus (Epigaea repens), wild oregano (Cunila origonoides), pipsissewa (Chimaphila maculata), and resurrection fern (Polypodium polypodioides).

One noteworthy animal that occurs in this community is the red-backed salamander (Plethodon cinereus). This is a primarily northern and montane species that reaches the southern limit of its distribution in the Piedmont at approximately this point. Like the rhododendron, its populations here are widely isolated

disjuncts; it is known to occur in Orange County only on this slope, on the nearby bluff located at Mason Farm (M14), and on a similar bluff along the Eno (E14). Another animal occurring with the rhododendron is the sumo mite (Allothrombium sp.), which also appears to be disjunct in its distribution, although it is more widespread in our area than is the salamander.

Protection Status: The bluff is designated as a natural area by the Botanical Garden; the slope above the bluff is unprotected.

Surrounding land use:
N: NC Botanical Garden
E: Forest
S: Forest
W: Forest

Threats:
Immediate: Development of adjoining slope above bluff.
Potential: Same

Recommendations for management or protection: Maintain its current protection as a natural area; avoid trail construction near this fragile community; provide sufficient buffer area upslope to preserve the cool, moist conditions of the slope.

Ownership: See Appendix A

Documentation References: Michener and Morgan, 1976; Jones, 1980.

ORANGE COUNTY NATURAL AREAS SURVEY. SITE DESCRIPTION.

Site name: Laurel Hill Ridge and Vernal Pool
Site number: M13

Significance: 4 - County Medium **Integrity:** 1 - Prime
Threat Status: 2 - Strong

Location: North of the terminus of Parker Road (CR 1916), along ridge south of Morgan Creek.
Approx. acreage: 530

Jurisdiction: University of North Carolina; Town of Chapel Hill Planning District.

Reasons for significance: This is one of the last large unbroken tracts of mature upland forest habitat remaining in the vicinity of Chapel Hill, and indeed in the entire county. It serves as a buffer for two of the rhododendron slopes along Morgan Creek (M11 and M12) and more importantly for the Mason Farm Biological Reserve; included within this tract are the heads of the brooks feeding into the Big Oak Woods and the Botany Pond research area. Additionally, this ridge possesses one of the county's three large vernal pools occurring in an upland situation. One significant plant species is also present, the sweet pinesap (Monotropsis odorata), which is state-listed as significantly rare.

General description: This long, north-south running ridge was once settled and cultivated, but due to its abandonment for over 60 years has now reverted to woodlands. Although several patches of pine forest are still present, most of the ridge is now covered in dry-mesic oak--hickory forest, some of it fairly mature. The common canopy species in the hardwood forest are white oak (Quercus alba), red maple (Acer rubrum), mockernut (Carya tomentosa), post oak (Q. stellata), and pignut hickory (Carya glabra). Important members of the subcanopy include sourwood (Oxydendrum arboreum), dogwood (Cornus florida), red maple (Acer rubrum), black gum (Nyssa sylvatica), and red mulberry (Morus rubra). The shrub layer in some areas is densely covered with thickets of downy arrow-wood (Viburnum rafinesquianum) and maple-leafed viburnum (Viburnum acerifolium); in other places the shrubs are more scattered and consist of several species of blueberries (Vaccinium spp.), serviceberry (Amelanchier arborea), black cherry (Prunus serotina), black haw (Viburnum prunifolium), and blue haw (V. rufidulum). The herbaceous cover, for the most part, is quite sparse, at least along the ridge and upper slopes covered by the dry-mesic oak-hickory forest.

Within the ravines, such as along Yancey Brook, and on the north-facing slopes above Morgan Creek, the conditions are much more mesic. The forest in these situations grades into mesic mixed hardwoods, with the canopy including such species as beech (Fagus grandifolia) and red oak (Quercus rubra). Both the shrub and herbaceous layers in these sites are more diverse, and