

Relationship to Bolin Creek Greenway

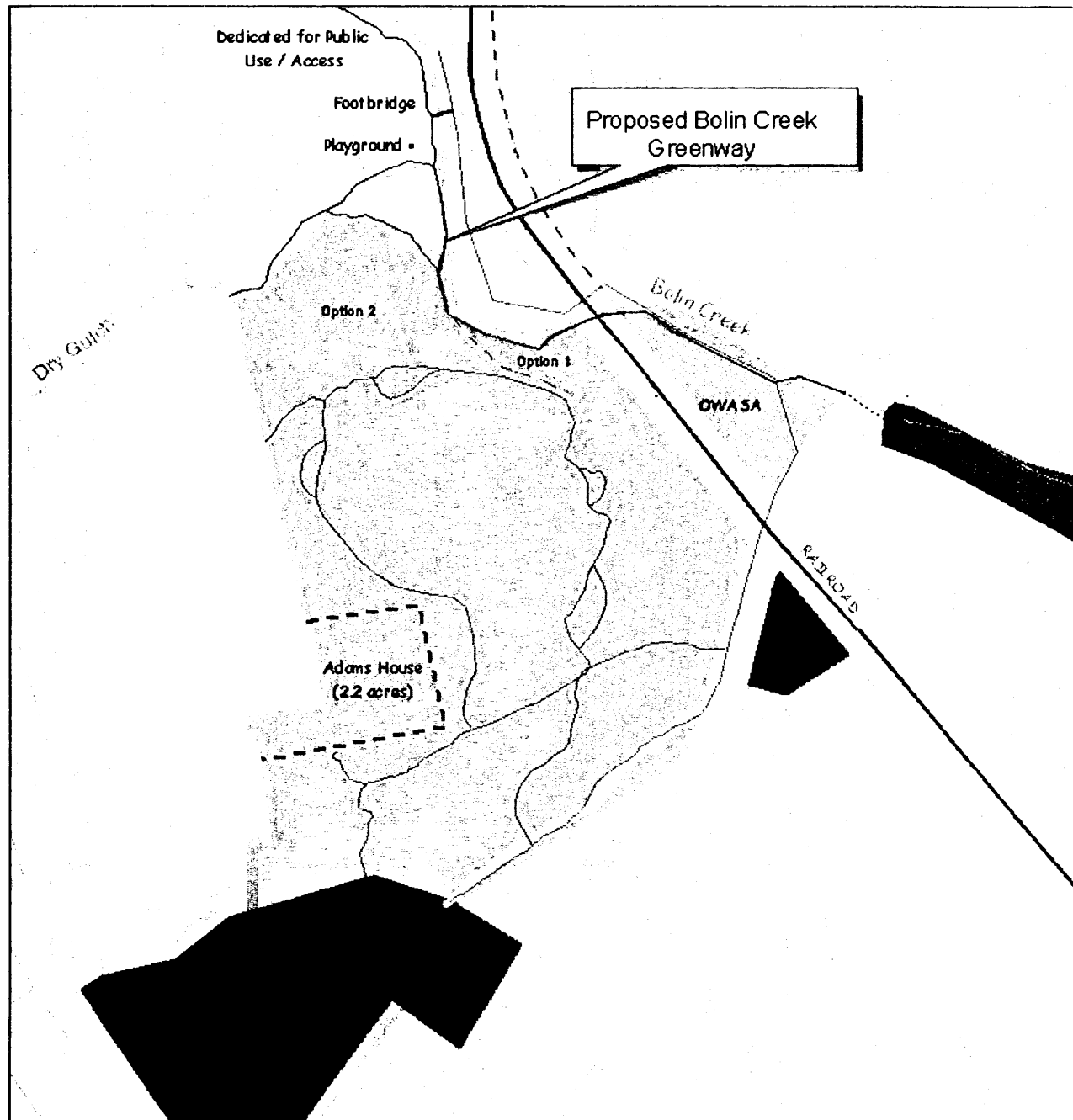
The Town of Chapel Hill's adopted Greenways Plan shows Bolin Creek Greenway approaching the Adams Tract on the south side of Bolin Creek. This plan would propose to continue that route, crossing over Estes Drive (in an as-yet-undetermined manner) onto property owned by OWASA. Another critical crossing for the greenway will be the Norfolk Southern rail line (which is also the Chapel Hill-Carrboro jurisdiction boundary at this point). Staff has looked at this crossing and feels that the greenway could cross under the railroad trestle over Bolin Creek, staying to the south side of the creek and entering the Adams Tract. At this point, this proposed stretch of the greenway would use the existing trail along the creek to continue northwest, intersecting with the loop trails from the Adams Tract and continuing north along the future sections of the greenway on other publicly-dedicated land (please see map).

In using the existing trail along Bolin Creek and the railroad trestle as the means of crossing the railway, a small part of this section of greenway may not be ADA-accessible. However, the proposed mountain bike route described previously (on the north side of Bolin Creek) would be, and this could serve as an alternative branch of the greenway for this short segment for ADA access.

Potential Road Impacts

Finally, one factor that could impact the integrity of the Adams Tract for both conservation and recreation opportunities is the potential to extend a road through the property. Whether an extension from a future adjoining subdivision, or a new road associated with the plans for Carolina North, staff feels that a road through the Adams Tract would negate many of the opportunities shown here and cause fragmentation of both the natural habitat and the low-impact recreation opportunities shown on this draft plan

THE ADAMS TRACT AND BOLIN CREEK CORRIDOR - Draft



<p>Adams Tract</p> <p>Proposed Property Line</p> <p>Proposed Pedestrian Trails</p> <p>Mountain Bike Trail</p> <p>Proposed Mountain Bike Trail</p> <p>Dedicated for Public Use/Access</p> <p>Power Line Easement</p> <p>Planned Chapel Hill Rail Trail</p>	<p>OWASA Property</p> <p>Carboro Open Space</p> <p>Chapel Hill Open Space</p> <p>Railroad</p> <p>Proposed Bolin Creek Greenway</p> <p>Parcel Boundary</p> <p>Streams</p>	<p>Adams Tract</p> <p>Draft</p> <p>Proposed Plan</p> <p>PIN 9779-80-1016</p> <p>TMBL 7.30..11</p> <p>30.86 Acres</p>	<p>Scale: 0 100 200 feet</p> <p>North Arrow</p> <p>Seal of the Town of Chapel Hill</p> <p>Seal of the Town of Carboro</p> <p>Seal of the Town of Hillsborough</p> <p>Seal of the Town of Orange</p> <p>Seal of the Town of Wake</p>
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IV. Pulling It All Together...A Possible Bolin Creek Master Plan?

With all of the many planning efforts that have taken place in the Bolin Creek corridor over the past 10-15 years, one might ask ...“why hasn’t someone thought of the idea of a Bolin Creek master plan before?” Most likely, the answer is that the focus on individual projects along the corridor to date has taken precedence – and the fact that three different jurisdictions are involved in land use decisions along the creek may have served as an inadvertent disincentive to master planning.

At least in terms of greenways planning, there has been previous discussion between Town and County officials about connectivity along the corridor. But a debt is owed to the “Friends of Bolin Creek” for raising the concept to a higher level that includes not just a greenway concept, but conservation and other recreation potential as well.

Earlier this year, the “Friends of Bolin Creek” presented a report to the elected boards in Carrboro, Chapel Hill and Orange County (as well as some advisory boards). In summary, the “Friends” proposal is to create a “Bolin Creek Corridor Open Space Master Plan.” The group envisions using, as a model, the New Hope Creek Corridor Master Plan, which was created in the late-1980’s for that stream corridor than runs through the Joint Planning Area Rural Buffer north of the Towns, before entering Durham County. The proposal calls for the creation of a new committee to work with a consultant on developing a master plan for the Bolin Creek corridor. The “Friends” proposal asks the County and Towns to provide funds, in an as-yet-unknown amount, to pay for the hiring of the consultant.

County staff has been asked to evaluate this proposal. Staff agrees with the concept of creating a master plan, and thanks the “Friends” for bringing the idea to the forefront. However, in looking at how the County and Towns might proceed, we might suggest an a slightly different alternative approach for consideration (one which may not be inconsistent with the Friends’ vision):

1. The New Hope Creek Corridor Master Plan in the 1980’s was a ground-breaking effort in many ways, and has yielded plans that each jurisdiction has used to help protect the corridor, but the situation with Bolin Creek is, in several key ways, different:
 - a. The New Hope plan occurred when little other planning had been done in that corridor, but there are many existing plans already in place in the Bolin Creek Corridor
 - b. The New Hope corridor was largely undeveloped at the time this planning approach was undertaken, but much of the Bolin Creek corridor is already developed, with many longstanding residential areas abutting the stream corridor

THE ADAMS TRACT AND BOLIN CREEK CORRIDOR – Draft

- c. The New Hope Creek Corridor Committee was a new group created in 1987 to help guide planning in the corridor, and was largely the only group doing planning of this type at that time. As seen on page 8, in the case of Bolin Creek there are many different advisory boards with interests in the corridor.

With this previous activity in mind, the nucleus of a committee or work group to work on the Bolin Creek plan may already be present in the numerous advisory committees identified on page 6-7. Representatives from these groups, augmented by representatives of the Friends of Bolin Creek and Triangle Land Conservancy (TLC), may be also to accomplish the task.

Additionally, if the project was deemed a priority by each of the jurisdictions, existing staff from the County and Towns may be able to undertake the project administration – thereby saving the cost of hiring a consultant and providing staff support that is already familiar with the site and issues.

In summary, the alternative proposal for creation of a Bolin Creek Corridor Master Plan might be:

- Appointment of a Master Plan Committee primarily from the existing Town and County (and UNC) committees with an interest in the corridor
- Appointment of representatives from the Friends of Bolin Creek and TLC to this group
- An evaluation by the County and Towns as to whether existing staff could provide necessary support to the project
- Development of a project timeline and mission/charge

V. Conclusion

The Bolin Creek Corridor is the lifeline of the green infrastructure of Chapel Hill Township, from its beginnings in the transition areas north of Carrboro to its confluence with Booker Creek near the Durham County line. The community is indebted to the Friends of Bolin Creek for raising the collective consciousness about the need for a master plan for the corridor.

With the many existing groups and interests that lie along the route of Bolin Creek, a unique opportunity may exist to coalesce these distinct and discrete efforts toward the creation of a holistic corridor-wide plan. The window of opportunity may not be open long, with many pending activities that could shape the nature of the corridor.

The key hub in the corridor is the Adams Tract, strategically located at the midpoint of Bolin Creek. As a green node in the middle of an urban area, with trails and an adjacent park, the property offers opportunities for both conservation and recreation. However, the integrity of that property would need to be conserved for these values to remain intact.

Appendices

**Appendix 1 - Map Panels of Bolin Creek Corridor
(to be provided at a later date)**

Appendix 2 - Summary of Bolin Creek (B01) Natural Area

FRIENDS OF BOLIN CREEK
P.O Box 234
CARRBORO, NC 27510

November 25, 2003

Mayor Mike Nelson
Town of Carrboro
301 West Main Street
Carrboro, NC 27510

Dear Mayor Nelson and Aldermen:

The Board of Aldermen recently considered a request made by the Friends of Bolin Creek for support in creating a Bolin Creek Corridor Open Space Master Plan. Trish McGuire presented an excellent background report on the history, existing documents, plans and ordinances related to the Bolin Creek watershed and proposed greenways. She further proposed that a charrette be organized with the goal of creating a "comprehensive resource guide to the Bolin Creek corridor". We questioned whether the creation of a resource guide would provide an effective pathway to the development of a Bolin Creek Corridor Open Space Master Plan. We also noted that a "greenway" is not synonymous with "open space" and that the Bolin Creek Greenway is an important component of an open space master plan, but not the end goal. The lateness of the hour did not permit adequate discussion or resolution of these questions and a decision was made to hold a work session of the aldermen to clarify the issues. We would like briefly to address these questions and try to clarify our concerns.

Greenways and Open Space. Greenways have been an important component of Carrboro planning for many years and funding has recently been obtained to design an initial segment—albeit on Morgan Creek where easements are already in place. The functions usually attributed to greenways are (1) transportation corridors connecting important areas such as neighborhoods, commercial centers and parks and (2) recreation areas for hiking, biking and jogging. Greenways, if wide enough and left in a reasonably natural state, can also serve as wildlife corridors and a resource for nature study. The corridor of land along Bolin Creek currently serves all of these functions and we believe that preservation of open space along Bolin Creek, including a greenway, will ensure that future generations have access to the corridor for these activities.

Although Bolin Creek planning has previously focused on greenways, we feel strongly that the emphasis should be on "open space" rather than "greenway" because our concept is much more than a transportation corridor. Ecologically sensitive areas including stands of hardwood forest identified as "core natural areas" still survive in the rapidly disappearing undeveloped land along Bolin Creek. Vigorous action needs to be taken immediately in order to preserve these natural areas before they are destroyed by the relentless surge of development. Preservation of as much of these "core natural areas" as possible should be an important objective in a Bolin Creek Corridor Open

Space Master Plan. This objective is beyond the scope of, but not incompatible with, the development of greenways.

Two significant undeveloped tracts along Bolin Creek immediately come to mind. (1) The Adams Tract is one which the Town and County have been working hard to acquire. We view the Adams Tract as a critically important gateway to the Bolin Creek corridor. The Adams Tract connects Wilson Park and the creek. In addition to serving as a connecting corridor, the Adams Tract will provide a significant resource for nature study for local schools and citizens. (2) Another large undeveloped property, the PH Craig Tract, lies across the creek from the Adams Tract. This tract contains a network of widely used hiking and biking trails, is traversed by several lovely tributary streams and contains a valuable stand of hardwoods. Except for the Horace Williams and Adams Tracts, the PH Craig property is the only remaining undeveloped land near downtown Carrboro. We think that as much as possible of the PH Craig property should be acquired and included in a Bolin Creek "Park and Preserve", a more congenial term than "open space corridor".

County Report. In June of this year Orange County incorporated many of our ideas in a draft document entitled "Adams Tract and Bolin Creek Corridor: Towards a Possible Corridor Master Plan". This proposal provides a clear rationale and an effective framework for combining the Adams Tract acquisition effort and our concept of a Bolin Creek Park and Preserve. However, the County proposal diverges in two important ways from our original proposal: (1) use of existing staff and expertise from Towns and County instead of hiring a consultant and (2) use of members from existing committees instead of creating a *de novo* Bolin Creek Advisory Committee to create the "master plan". We are very enthusiastic about the County report and agree with these suggested changes. We urge the Towns of Carrboro and Chapel Hill to carefully consider the County report as a useful planning document. We think that the draft County report and the excellent background document prepared by Trish McGuire provide much of the "resource guide" needed to proceed in creating the "Bolin Creek Corridor Open Space Master Plan".

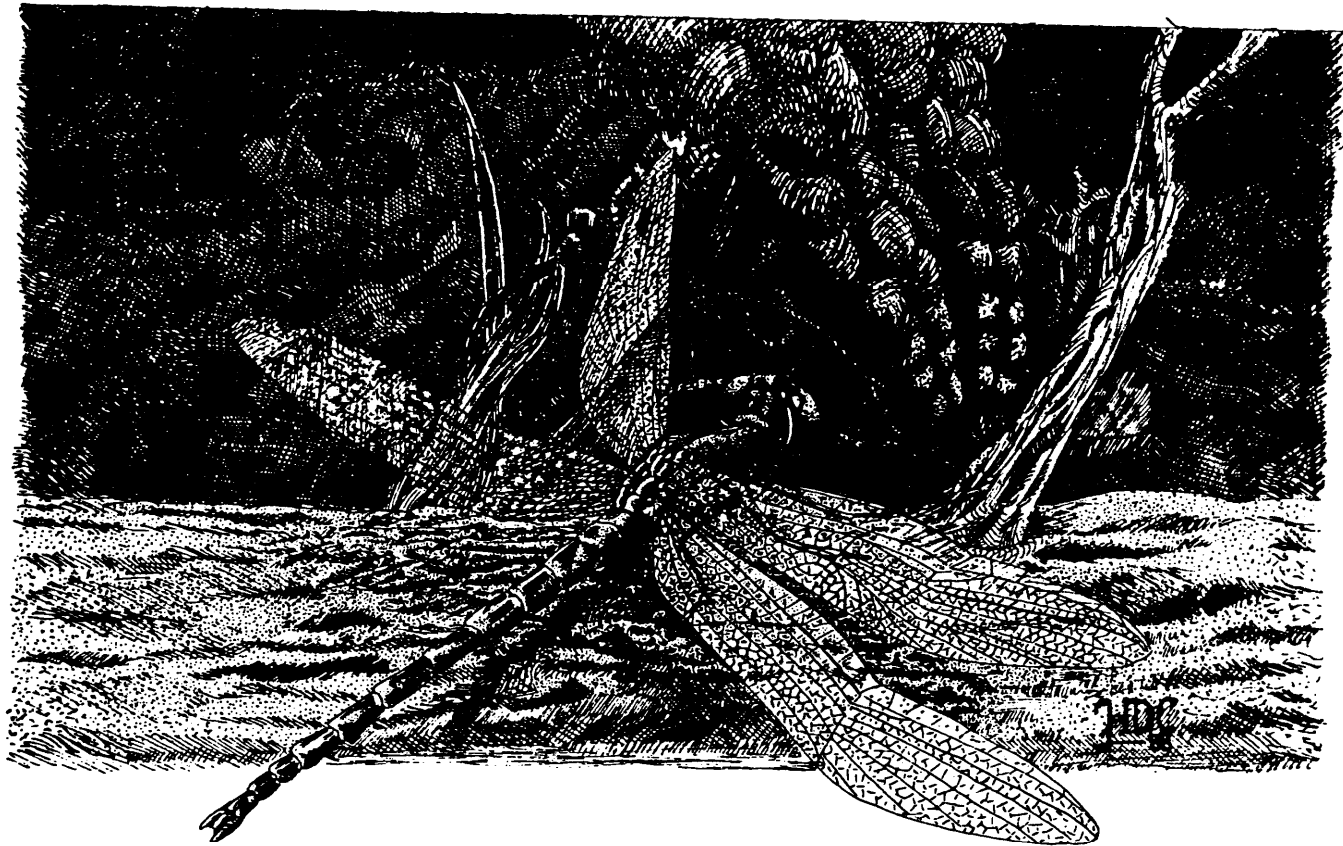
Recommendation. We recommend that a meeting of representatives of the key stakeholders—i.e., the Towns of Carrboro and Chapel Hill, Orange County, the University of North Carolina and the Friends of Bolin Creek--be scheduled (1) to appoint (from existing committees) members of a Bolin Creek Open Space Corridor Advisory Committee and (2) to draft a mission/charge statement and timeline.

We hope this letter will clarify some of the questions we raised at the recent Aldermen's meeting. We will try to set up meetings with individual aldermen over the next few weeks to discuss our plans in more detail. We look forward to working with you in planning how to preserve the Bolin Creek Open Space Corridor, a natural and endangered treasure of Carrboro, Chapel Hill and the County.

Respectfully,

David Otto, Co-chair
Friends of Bolin Creek

INVENTORY OF THE NATURAL AREAS AND WILDLIFE HABITATS OF ORANGE COUNTY, NORTH CAROLINA



GRAYBACK DRAGONFLY

**INVENTORY OF THE NATURAL AREAS
AND WILDLIFE HABITATS OF
ORANGE COUNTY, NORTH CAROLINA**

by

Dawson Sather and Stephen Hall

Conducted for and sponsored by the
Triangle Land Conservancy

in coordination with the
North Carolina Natural Heritage Program

December, 1988

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Cover illustration by Derek Collins

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Preface

The inventory of the principal natural areas and wildlife habitats of Orange County was conducted from June, 1987 to October, 1988. The County contracted the Triangle Land Conservancy to produce the systematic inventory of the county's remaining unique and exemplary natural ecosystems, rare species habitats, special wildlife habitats, and scenic areas. The Triangle Land Conservancy is a non-profit, citizen supported land trust which is actively identifying and protecting outstanding natural areas in the six-county Research Triangle region. Supplemental funding for the Orange County Natural Areas Inventory was provided additionally by a generous gift from an anonymous donor and appropriations by the towns of Chapel Hill and Carrboro.

This survey was conducted for the Triangle Land Conservancy by Dawson Sather and Stephen Hall. Sather is a Ph.D. candidate in plant ecology at the University of North Carolina at Chapel Hill, and Hall completed his Ph.D. degree in zoology at the University of North Carolina at Chapel Hill. Both are experienced field biologists and ecologists.

The North Carolina Natural Heritage Program provided supervisory support for the study. The Natural Heritage Program is a unit of the State's Department of Natural Resources and Community Development and is responsible for statewide inventory and protection planning for North Carolina's exceptional natural areas and biological resources. The Orange County Natural Areas Inventory and its site reports and data records follow specifications made by the Natural Heritage Program.

Acknowledgements

This project would have been impossible without the assistance of various people who work in Orange County or know its natural features well. Among the many people to whom we owe our thanks are: Joe Bailey, Tom Barnett, Joe Bernardo, Marj Boyer, Alvin Braswell, Robert Butler, Gloria Caddell, Don Cox, Judd Edeburn, Jim Hill, Barry Jacobs, Charlotte Jones-Roe, Livy Ludington, Merrill Lynch, Hervey McIver, Helmut Mueller, Zack Murrell, Jeff Nekola, staff of the North Carolina Natural Heritage Program, staff of the North Carolina Forest Service, staff of the North Carolina Museum of Natural Sciences, Margaret Nygard, Mike Palmer, Quentin Patterson, Bob Peet, Jim Petranka, George Pyne, Albert Radford, Randle Sather, Jean Stewart, Pearson Stewart, Rob Sutter, Carol Tingley, Brad Torgan, Jamie White, and Haven Wiley.

Introduction

Orange County is a part of the Triangle area of North Carolina, which is one of the most rapidly developing parts of the nation. Early in 1987 the Triangle Land Conservancy recognized the need for an inventory of the remaining natural areas within the county, in order to protect the important sites that contain rare species, unique habitats, wildlife, and scenic areas. The County Board of Commissioners and the Town Boards of Carrboro and Chapel Hill responded to the recommendations by the Triangle Land Conservancy and others by providing funds to initiate the survey.

This report describes 64 sites which are the most significant of the many locations visited during the course of this survey. Collectively, the sites portray much of the natural diversity of the county, from dry upland ridges to river bluffs and bottomland forests. There are several state and regionally significant areas, sites for rare plants and animals, along with habitats and corridors for wildlife.

For some of these sites, this inventory may have come too late. We have documented several extirpations of species that once lived in this area, but have been wiped out by the various habitat modifications associated with urban growth and development and reservoir construction. For the remaining natural areas, the information and recommendations presented here can be used by various jurisdictions and agencies to guide future development so that these significant natural features and wildlife remain. Of the 64 natural areas identified in this inventory, roughly 80% lie in the southeast quarter of the county, which is the most heavily populated at present and shows the most probability of further accelerated suburban development. It is ironic that the most geologically and topographically diverse part of the county is also the one in which the pressure of habitat modification is the greatest. However, there are no areas identified in our report which are "unthreatened." Where possible, we have identified specific threats to the sites and the surrounding land, and have incorporated a discussion of threats and habitat integrity, along with biological significance, into our overall significance ranking. We hope this will be helpful in the logical next step after this inventory: the protection of these natural areas.

Methods and Data/Information Sources.

The information presented in this report was gathered from a variety of existing sources and from field investigations. Records from the data base, map files and literature collection at the North Carolina Natural Heritage Program were initially used to consolidate the information on the previously documented distribution of rare plants, rare animals, and natural areas in the county. Additional references and information were compiled from the following collections: North Carolina Museum of Natural Sciences, Duke University Herbarium, Duke University Vertebrate Collection, NC State University Insect Collection, UNC-CH Herbarium, and the UNC-CH Insect Collection. Site reports and scientific literature were assembled, and we consulted with several biologists who are familiar with the natural areas of the Triangle. These literature references and personal communications are cited in the literature references section.

This pre-existing data base was large, but most of it represented reports and specimen documentation from those areas of the county that were already recognized as natural areas, such as Duke Forest, Eno River State Park, and UNC Mason Farm Biological Reserve. Our search for natural areas in the rest of the county was aided by topographic maps, soil maps, geologic maps, and aerial photographs. Using these materials, we pinpointed many areas that would possibly contain unique habitats and visited them in the preliminary phases of the survey. Many of these sites are not included in our final report because they were heavily disturbed or lacked the elements we had predicted. However, these visits were valuable in building our knowledge of the natural landscape of the county and in evaluating sites for inclusion in this document. In total we spent 108 full or partial days in the field (roughly one third of those days we were working together) along with approximately 20 days of "unsuccessful" searching in the preliminary phase. Additionally, we spent approximately 60 days in preparing our evaluations and compiling this report.

To supplement routine explorations for plants and animals at each site, searches for rare and indicator species were undertaken at critical times of the year. Rich bottomland herbs such as dutchman's breeches and atlantic isopyrum will fade soon after they flower in early spring, and many plants of the diabase rock areas bloom much later and are best looked for in early summer. Much of our bird distribution data was collected in the early morning (until 10:00) during the breeding season from mid-May to the end of July. Four-toed salamanders were searched for in March, Thorey's grayback dragonflies from May to July, and butterflies during their various flight seasons.

ORANGE COUNTY -- GENERAL FEATURES AND NATURAL AREAS.

Topography, Geology, Soils, and Vegetation.

Orange County lies on the eastern edge of the Piedmont physiographic province in North Carolina. Geologically, much of the 396 square miles of the county is in the Carolina Slate Belt, which is composed of diverse, generally metamorphosed volcanic rocks. The southeasternmost corner dips into the Triassic Basin, which is an area of sedimentary, easily eroded rock.

Most of the terrain of the Slate Belt portion of the county is broad, upland ridges, with low energy streams cutting narrow floodplains. No large streams originating in other counties cross through Orange; rather, the county serves as the upper watershed for three of the major river systems in North Carolina. New Hope, Morgan, Cane, and Back Creeks flow into the Cape Fear River system via the Haw (which skirts the county's southwest corner). In the north, the Eno and Little Rivers flow into the Neuse River. Hyco and Lynch Creeks, in Cedar Grove Township, flow north into the Roanoke River system which soon enters Virginia.

The highest elevation in Orange County is at the summit of Occonechee Mountain, over 860 feet high. Occonechee is one of the last of a series of monadnocks that run in a northeasterly direction in a line through the southwest portion of the county. These monadnocks are generally capped with a highly resistant layer of rock. Several of our more scenic peaks are monadnocks, including Occonechee, Bald, Blackwood, and Crawford Mountains.

Apart from these monadnocks, there are very few areas of high relief in the county. Along the three major streams of Morgan Creek, New Hope Creek, and the Eno river, steep slopes have been cut by water action, but these rarely exceed 150 feet in relief. Many of the most unique natural areas of the county, such as rhododendron communities, pine - oak bluffs, and all of our dry, rocky slopes are restricted to these steep, stream-cut slopes.

The most unique geologic formations in the county are the few areas where diabase rock is exposed on the surface. This rock, fairly common in the neighboring Triassic Basin of Durham and Granville Counties, is quite rare in Orange. Soils of the area are generally acid, although units of the more circumneutral Enon, Iredell, and Orange soil are found at scattered locations.

There are no natural lakes in Orange County. Small examples of marshy terrain are found in some of the larger semi-permanent beaver ponds, and around the margins of University Lake and several other long-established reservoirs. Seeps and springs have generally been altered by humans, except in situations directly within floodplains, where these important amphibian breeding habitats still exist. Narrow bottomland forests are

found along many of the streams, but in the southeast corner of the county, several units of swamp forest occupy the western margin of the Durham Triassic Basin. These areas, ranging down to 240 feet elevation, are the lowest in elevation in the entire county.

The natural communities of the county are strongly associated with the variety of topographic, geologic, soil, and hydrologic conditions found throughout the county. Table 1 on the following page lists the types of natural communities that we have identified in this survey, and the natural area site numbers where those communities are found. In the following description of natural communities, all names of the communities are taken from Schafale and Weakley (1985) and are capitalized.

The Mesic Mixed Hardwood Forest and the Dry-Mesic Oak--Hickory Forest are the two most common natural communities in the county. The Mesic Mixed Hardwood Forest is found on moderate to steep lower slopes, above the bottomland communities which adjoin streams. The soil is above the floodplain, but is generally moist and rich from colluvium and moisture input from the slopes above. Beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), and red oak (Quercus rubra) are common trees, and the understory and herb layers are very diverse. Many of these types of forest are in good condition, due perhaps to their occurrence on the relatively non-arable part of the slopes. Over one third of the natural areas in this report contain some portion of this forest type.

Upslope of the Mesic Mixed Hardwood Forest the community often grades into the Dry-Mesic Oak--Hickory Forest, which is common on these upper slopes and on uplands. White Oak (Quercus alba) is generally the most common oak species, though other oaks and several hickories are almost always present. The herb layer is less diverse than in the moister and richer Mesic Mixed Hardwood Forest. In the gentle upland terrain of Orange County, the Dry-Mesic Oak Hickory Forest is the most common natural community. On slightly drier sites, the Dry Oak--Hickory forest is found, usually indicated by an increase in the dominance of post oak (Quercus stellata). On sites where the soil is nutrient poor, especially over siliceous rock types, the Chestnut Oak--Scarlet Oak Forest occurs. Dominated by chestnut oak (Quercus prinus), species diversity is usually low, with several species of heath shrubs common in the understory. Many of the species are those that are also found on nutrient poor sites in the mountains. This natural community is found in several upland sites in Orange County, especially those that are extremely exposed or very nutrient poor, though it becomes much less common to the east. In very extreme situations at the dry edges of steep bluffs and again on nutrient poor sites, the Pine--Oak Heath community can develop. Also a community with many affinities to similar sites in the mountains, it is very rare in the Piedmont and is found at only two sites in Orange County.

Table 1. Natural Communities in Orange County and the Natural Areas in which they occur. Names of the communities from Schafale and Weakley (1985). Page 1 of 2.

Community, Abundance and General Location	Selected Sites
TERRESTRIAL COMMUNITIES	
Mesic Mixed Hardwood Forest Common; moist, moderate to steep slopes	B01,B02,C01,C03,E05, E09,E12,E11,E15,H01, M01,M02,M04,M06,M07, M13,N05,N06,N08,N11, N12,N13,N16
Basic Mesic Forest Rare; moist slopes on circumneutral soils	E03
Pine--Oak / Heath Rare in Piedmont; on exposed dry sites on siliceous rock	E06,E15
Chestnut Oak--Scarlet Oak Forest Rather rare; rocky ridges or steep bluffs, generally on siliceous rock	C01,E01,E02,E06,E08, M01,M06,N01,N05,N10
Dry Oak--Hickory Forest Fairly common; upland ridges, hilltops	E10,M10,N05,N06,N09, N18
Dry-Mesic Oak--Hickory Forest Very common; uplands	B01,B02,C01,C03,E02, E04,E05,E08,E10,E11, E12,H02,L03,M01,M03, M04,M07,M13,N05,N16, N17
Basic Oak--Hickory Forest Rare; on circumneutral soils on diabase and other mafic rocks	M16,N07
Montmorillonite Forest Rare, on circumneutral clay hardpan soils	L03,N04
Acidic Cliff Uncommon; on steep bluffs	E14,E15,M02,M06,M08 M09,M11,M12,M14,N14 N15

Table 1. Natural Communities in Orange County and the Natural Areas in which they occur. Names of the communities from Schafale and Weakley (1985). Page 2 of 2.

PALUSTRINE COMMUNITIES

Rocky Bar and Shore Uncommon in small streams; mainly in Eno River	E13
Piedmont Levee Forest Rare due to absence of large streams	C02
Piedmont Swamp Forest Rare; found here only in Triassic Basin areas	B03,M17,M18
Piedmont Bottomland Forest Common in broad stream valleys	E05,E08,M18,N16
Piedmont Alluvial Forest Common in stream valleys	C03,E07,E11,E13,E15, E16,M15,N16
Upland Depression Swamp Forest Uncommon; in flat, poorly drained upland areas	E10,N02,N03
Semipermanent Impoundment Uncommon; mostly beaver ponds	L01,L02,M05

Plant species characteristic of this unusual formation include Virginia pine (Pinus virginiana), mountain laurel (Kalmia latifolia), various heath species, and bracken fern (Pteridium aquilinum). In positions where steep, nutrient poor slopes are facing north and are thus relatively cool and moist, rhododendron slopes (part of the Acidic Cliff community) can occur. Rhododendron catawbiense, common in the mountains, is restricted in the Piedmont to these steep sites. There are nine such rhododendron slopes in Orange County, more than in any other of the Triangle counties surveyed to date.

Several other terrestrial forest communities are found on soils that are circumneutral in pH. Natural areas containing such forests are very rare in Orange County. The Basic Mesic Forest at Sevenmile Creek, with a large number of sugar maples and other woody species that thrive in circumneutral soils, is the only example of this forest type that we located in this survey. The Basic Oak--Hickory Forest is likewise rarely found in good condition in the county. The best examples are located on the few undisturbed large formations of diabase rock. A tree species found at these sites is the southern shagbark hickory (Carya carolinae-septentrionalis). Where circumneutral clay soils such as Enon or Iredell series develop an impermeable hardpan, the Montmorillonite Forest may develop. Quite rare and restricted to the Piedmont, these forests have a stunted canopy and are dominated by post oak (Quercus stellata) and blackjack oak (Quercus marilandica). The Montmorillonite Forest in the Blackwood Division of Duke Forest (N04) is one of the best examples of this natural community in the state.

There are several types of palustrine (wetland) communities in Orange County. The most common of these are the Piedmont Alluvial Forest and the Piedmont Bottomland Forest, which are common in stream valleys of various sizes. Standing water is absent most of the time, but regular seasonal inundation and deposition of sediments are characteristic. Many of the streamside natural areas we have identified in this report contain at least a small representative area of these natural communities.

Much more uncommon is the Piedmont Swamp Forest, which is restricted to the Triassic Basin areas found only on the easternmost edge of the county. A superlative example of this natural community, indeed one of the best remaining representatives in the eastern Piedmont, is the old growth swamp forest of the Big Oak Woods (M17).

Since Orange County is a headwater region, large streams are lacking. Only at the southwestern corner, where the Haw River forms several miles of the county border, is there a large enough river system to deposit the amount of sediments needed for the development of the Piedmont Levee Forest community. This community, dominated by river birch, box elder and ash, occurs only along a narrow portion of the Haw River that has been, until recently, protected as a part of the NC Wildlife Commission

Gamelands program.

Three other palustrine communities have a restricted distribution in Orange County. The Rocky Bar and Shore, dominated by perennial herbs such as justicia (Justicia americana), is present on shoals in the Eno River. Several beaver ponds, classified as Semipermanent Impoundments, occur on smaller streams throughout the county, most notably in places where the natural topography allows for the development of a wide impoundment, as at sites L01 and L02 on tributaries of the Little River. At both of these locations, marshes have developed in the wetland produced by the beaver ponds. A third uncommon palustrine community, the Upland Depression Swamp Forest, is found in flat or depressed upland areas that hold water for long periods of time. Such upland depressions vary in size: one depression in the Blackwood Division of Duke Forest (N03) covers dozens of acres, while several much smaller pools near the Eno River (E10) are less than an acre. These depressions are characterized by species that are more common to low-lying swamp forest, such as overcup oak (Quercus lyrata) and buttonbush (Cephalanthus occidentalis).

Table 2. Significant Plant Species of Orange County.

Endangered:

* *Rhus michauxii*

Michaux's Sumac

Threatened:

* *Echinacea laevigata*
Nestronia umbellula

Smooth Coneflower
Nestronia

Primary Proposed:

Anemone berlandieri
Hexastylis lewisii
Platanthera peramoena

Southern Thimbleweed
Lewis' Heartleaf
Purple Fringeless
Orchid

Significantly Rare:

Asplenium bradleyi
* *Baptisia australis*
Gillenia stipulata
* *Isopyrum bitermum*
* *Liatris squarrulosa*
Monotropsis odorata
Panax quinquefolius
* *Ranunculus ambigens*

* *Viola tripartita* v. *tripartita*

Bradley's Spleenwort
Blue Wild Indigo
Indian Physic
Atlantic Isopyrum
Earle's Blazing Star
Sweet Pinesap
Ginseng
Waterplantain
Spearwort
Threeleaf Violet

Regionally rare:

Aconitum uncinatum
Actaea pachypoda
Adiantum pedatum
Aralia nudicaulis
Asplenium montanum
Caulophyllum thalictroides
Cheilanthes lanosa
Cheilanthes tomentosa
Cypripedium calceolus v. *pubescens*
Fothergilla major
Galax aphylla
Rhododendron catawbiense
Selaginella rupestris
Taenidia integerrima

Monkshood
Doll's Eyes
Maidenhair Fern
Wild Sarsaparilla
Mountain Spleenwort
Blue Cohosh
Hairy Lipfern
Wooly Lipfern
Yellow Lady's Slipper
Witch-Alder
Galax
Catawba Rhododendron
Rock Selaginella
Golden Alexander

* = Historical record exists for Orange County, but habitats have been modified or destroyed since those collections; the species is presumed to now be extinct in Orange County.

Biogeography, History, and Land Use

An understanding of the present and past distributional relationships of our flora and fauna is necessary if we are to understand the significance of the occurrence of various species and communities within our region. It is equally important to comprehend the processes at work, both natural and artificial, that modify these distributional patterns; this is of vital importance in any effort to decide upon preservation or other management strategies.

Orange County lies completely within the Piedmont Biotic Province. The landscape consists typically of gently rolling hills, draining generally towards the southeast. For terrestrial species, no major geographic barriers occur either to the north or south. The major biome of our area is the Eastern Deciduous Forest. The typical vegetation of this biome is a forest dominated by oaks and hickories. The characteristic successional stages of this vegetation range from old fields to pine woods to hardwoods. More than one thousand plant species have been recorded from the county.

Typical woodland animals include mammals such as the White-tailed Deer, Raccoon, Gray Fox, Eastern Gray Squirrel, White-footed Mouse, Short-tailed Shrew, and Red Bat. Some of the common birds of the woodlands are the Downy and Red-bellied Woodpeckers, Barred Owls, Carolina Chickadees, Tufted Titmice, Carolina Wrens, Ovenbirds, Wood Thrushes, Red Eyed Vireos, and Cardinals. Reptiles and amphibians include the Eastern Fence Lizard, Five-lined Skink, Eastern Box Turtle, Brown Snake, Worm Snake, Black Rat Snake, Copperhead, American Toad, Gray Treefrog, and Slimy Salamander.

Due to the absence of any significant biogeographic partitions, few species are endemic (found here and nowhere else) to localized areas within the Piedmont or even to the Piedmont itself. Most animals, for instance, range widely over the Eastern Deciduous Forest Biome, from the Mississippi Valley to the Coastal Plain. Plant species show more regional differentiation than animals due to their generally more restricted powers of dispersal and narrower habitat requirements, but again few can be considered endemic to the Piedmont. Two exceptions here include the Piedmont endemics Lewis' heartleaf (Hexastylis lewisii) and Southern shagbark hickory (Carya carolinae-septentrionalis).

For aquatic species, the ladder-like arrangement of rivers up the Atlantic Slope has resulted in much more significant isolation than is true for terrestrial species. Apart from man-mediated introductions, the primary means of inter-basin transfer has been stream-capture or lowland flooding. Compared to the terrestrial biota there are significantly more endemic freshwater species in our area, and more species with restricted ranges.

Though a small area, Orange County has an unusually high