ATTACHMENT A

A RESOLUTION ACCEPTING THE STAFF REPORT ON TREE COVER UPDATE AND LANDSCAPE WITH WILDLIFE SUBCOMMITTEE REPORT
Resolution No. 164/2003-04

WHEREAS, the Carrboro Board of Aldermen seeks to ensure that its existing and proposed policies and regulations promote sound management of wildlife habitat; and

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Aldermen accept this report and refer to staff for a recommendation on implementation of the proposed project components.

This is the 1st day of June in the year 2004.

ATTACHMENT B-1

STAFF REPORT

To: Patricia McGuire, Planning Administrator

From: Pam McIntosh, Environmental Planner

Date: July 18, 2001

Subject: Analysis of tree cover changes from 1985 to 1998 and wildlife value ratings for the 1998 tree cover

INTRODUCTION

Forested land has many functions and values including providing wildlife habitat, stabilizing the soil, absorbing stormwater, removing pollutants, and taking up CO_2, as well as having recreational, aesthetic, and economic value.

The Town's tree ordinance, open space regulations, buffer requirements, flood plain restrictions, and other policies are designed with the goals in mind of protecting larger trees and stands of hardwoods, protecting sensitive lands from degradation, preserving habitat, protecting water quality, and providing flood protection. The success of these measures toward protecting larger and contiguous tracts of forest has not been considered in this analysis.

The Triangle Land Conservancy (TLC) has completed two reports, one looking at forest coverage and another rating land in Orange County by its wildlife value. The TLC reports are based on 1985 aerial photography. More recent aerial photography from 1998 is now available. TLC will be completing a follow up report using the 1998 data, but has not yet done so. These reports look at forested areas of at least 40 acres in size or more. Many forested areas within Carrboro are smaller than 40 acres, and are, therefore, not included in those analyses.

The purpose of the current study and report is: 1) To examine changes in forest cover and maturity (i.e. hardwood, mixed, pine) between 1985 and 1998; and 2) To use TLC's methodology to evaluate, on a smaller scale appropriate to Carrboro, the value of forests for wildlife using the 1998 aerial photography. The result of these evaluations will then be considered in relation to tree protection and related Land Use Ordinance provisions.

Previously, Haven Wiley, who designed the TLC study, examined the 1985 aerial photographs of Carrboro and mapped forested areas within the Town's planning jurisdiction on a more detailed level than the TLC study had done. Last fall the Town applied for and obtained grant funding to hire an intern, who has mapped forest tracts using the more recent aerial photography from 1998. Using TLC's methodology, described below, each tract from the 1998 photography was then assigned an intrinsic rating value. The intrinsic values can be used to compare the relative value of forest tracts for wildlife.

METHODOLOGY

Forest Cover

Tracts of forest were mapped from the 1985 and 1998 aerial photography, and designated as being Hardwood (composed of >90% hardwoods), Mixed Hardwood (composed of 50-90% hardwoods), or Pine (composed of <50% hardwoods). These categories follow from those designated in the TLC reports on *A Landscape with Wildlife for Orange County*. The proportion of hardwoods in a forest indicates its

maturity. Mature forest is the primary habitat for most of the native wildlife in the county, as most species have adapted for life in hardwood forests since this is what had covered the area prior to human disturbance.

The size of a forest tract is an important determinant of the value of that forest for wildlife. Many species are sensitive to tract size and do not live in tracts of forest below a certain size. Tract size needs vary by species. For this reason the TLC study mapped only forests 40 acres or more in size or hardwood forests greater than 10 acres. It is assumed that scientific professional judgment was used in determining the 40-acre cutoff, though this is not specifically stated in the TLC report. The current study being done by Carrboro maps tracts smaller than this in size since much of the tree cover within the Town is in smaller tracts. Information comparing forest cover from 1985 to 1998, and on larger tracts (greater than 40 and 10 acres in size) is provided in the following section.

When the tracts were mapped from the 1985 aerial photography the smallest tract size mapped was 0.2 acres in size. When forest tracts were mapped from the 1998 aerial photography tracts of much smaller size were mapped, because the purpose of mapping was twofold: 1) for use in this current analysis, and 2) to allow examination of street trees in urban areas. Tracts smaller than 0.2 acres have been excluded from the current analysis so that the data is more comparable to that collected from the 1985 aerial photography.

Intrinsic Ratings

For the 1998 data, intrinsic ratings for each tract were assigned using TLC's formula to multiply the area by factors for forest maturity, absence of disturbance, minimization of edginess, whether it contains a natural area, and whether a stream is present. See the table below, which shows the multipliers for these factors. This methodology is taken exactly from the TLC report, with the exception that designated natural areas of County significance are given a rating factor of 1.5 (rather than 1 as in the TLC report) so that the value of these areas is distinguished. The TLC report only distinguishes sites that are of regional (given of rating factor of 2) or statewide (given a rating factor of 3) significance.

Areas with greater maturity, less disturbance, less edginess, a natural area, and a stream rank higher than those of an opposite nature. These additional factors of disturbance, edginess, and presence of a natural area or stream are also important indicators of the value for wildlife of a tract of forest.

It should be noted that tracts bordering the planning boundary of the Town may be part of larger tracts not wholly contained within Carrboro's planning area. The intrinsic values for these tracts are lower that they otherwise would be if the entire tract had been included in the analysis.

Table 1.

The Intrinsic Rating for Wildlife for a tract = A x M x D x E x S x I, where:

A = the Area of a tract

M = the Maturity, with a value of
- 3, if >90% hardwoods
- 2, if 50-90% hardwoods
- 1, if <50% hardwoods, and
- 0, if no closed canopy of full-grown trees exists

D = Disturbance, with a value of
- 3, if no breaks in the canopy for roads or buildings
- 2, if few breaks in canopy
- 1, if many breaks in canopy

E = Edginess (minimization of)
- Edginess is equal to the circumference of a circle of an area equal to the area of a tract, divided by the perimeter of the tract. The less edgy a tract is the, the closer this number will be to 1.

I = Inventoried natural area, with a value of
- 3, if tract overlaps or includes an inventoried natural area of state-wide significance
- 2, if tract overlaps or includes an inventoried area of regional significance
- 1.5, if tract overlaps or includes an inventoried area of local significance
- 1, if tract does not overlap or include an inventoried natural area

S = Stream, with a value of
- 2, if a mapped stream, river, vernal pool, or lake is within or adjoins the tract
- 1, if no known water body is present within or adjoining the tract

COMPARISON OF 1985 AND 1998 TREE COVER

Table 2 shows acreages for forest cover for All Forests, Hardwood, Mixed and Pine forests for 1985 and 1998. Maps 1 and 2 show the location of these forests.

Table 2.

Trees 1985	Acres	Number of Tracts	Mean Tract Size	Maximum Tract Size	Minimum Tract Size
All Forests	4016	380	10.6	141.1	0.2
Hardwood	1010	87	11.6	138.8	0.3
Mixed	897	119	7.5	73.7	0.2
Pine	2109	174	12.1	141.1	0.2
Trees 1998	**Acres**	**Number of Tracts**	**Mean Tract Size**	**Maximum Tract Size**	**Minimum Tract Size**
All Forests	3972	621	6.4	177.7	0.2
Harwood	1600	181	8.8	177.7	0.2
Mixed	913	139	6.6	82.2	0.2
Pine	1458	301	4.8	78.7	0.2

Between 1985 and 1998 the total number of acres forested decreased slightly (1%) from 4016 acres to 3972 acres. The amount of Hardwood forest has actually increased by 58% from 1985 to 1998 due to maturation of forests that were previously categorized as Mixed or Pine forests. The amount of Mixed forest has increased slightly (2%). The amount of Pine forest has decreased by nearly a third (31%).

Of the 1010 acres of Hardwood forest existing in 1985, 682 acres or approximately two thirds (67.5%) remained in 1998. Map 3 shows the location of the 1985 Hardwood forests that were remaining in 1998.

By 1998, however, the acres of Hardwood forest had increased to 1600 acres due to maturation of some Mixed and Pine forests into Hardwood forests. Between 1985 and 1998 918 acres of forest matured into Hardwood forest, increasing the value of these areas for wildlife. Such transition to Hardwood forest is particularly evident along University Lake and Morgan Creek.

An opposing trend, in terms of effect on wildlife value of forests, is the fragmentation of forest tracts due to development. The number of tracts has increased from 380 in 1985 to 621 in 1998, and the mean tract size has decreased from 10.6 acres in 1985 to 6.4 acres in 1998, indicating fragmentation has occurred. Table 3 shows changes in the acreage and number of tracts that were 40 acres or more in size. While the number of Hardwood tracts 40 acres or greater has increased by 50% between 1985 and 1999, the total number of 40+ acre tracts has decreased by over 40%. Table 4 shows a 13% decrease in the number of acres in tracts greater than 10 acres. It should be noted that these figures are based on tracts of particular categories of forests (i.e. Hardwood, Mixed, and Pine) and not total contiguous forest regardless of forest category. Perusal of Maps 1 and 2 does clearly show some areas where development is fragmenting tracts of forest.

Table 3.

TRACTS >40 ACRES		
Trees 1985	**Acres**	**Number of Tracts**
All Forests	1604	22
Hardwood	429	6
Mixed	93	3
Pine	982	13
Trees 1998	**Acres**	**Number of Tracts**
All Forests	993	13
Hardwood	710	9
Mixed	163	2
Pine	121	2

Table 4.

TRACTS >10 ACRES		
	Acres	**Number of Tracts**
All Forests 1985	3076	97
All Forests 1998	2666	99

INTRINSIC WILDLIFE VALUE RATINGS FOR 1998 TREE COVER

Map 4 shows the intrinsic wildlife value ratings for the 1998 forest tracts. These ratings are based on area of the tract, forest maturity, how disturbed a tract is, how edgy it is, whether a natural area is present, and whether a stream is present, as described in the methodology section.

Areas with the highest intrinsic ratings are located mainly in the northern end of the planning jurisdiction, along Bolin Creek, and along University Lake and Morgan Creek. Table 5 shows the numbers of acres and tracts of forests in each of the four intrinsic rating categories. These categories were created by a natural breaks classification method used by ArcView to break the data into categories at points where relatively large jumps in values occur.

Seventeen tracts comprising 1094 acres (28% of the total number of forested acres) are in the top two intrinsic ratings classifications. The majority of these tracts (13 tracts) are Hardwood forests. Two of these tracts are Mixed forests, and one is a predominantly Pine forest that is located along Bolin Creek and overlaps a natural area of local significance.

Table 5.

INTRINSIC RATINGS		
	Acres	**Number of Tracts**
0-42	1620	534
42-209	1258	70
209-520	1010	16
520-1660	84	1

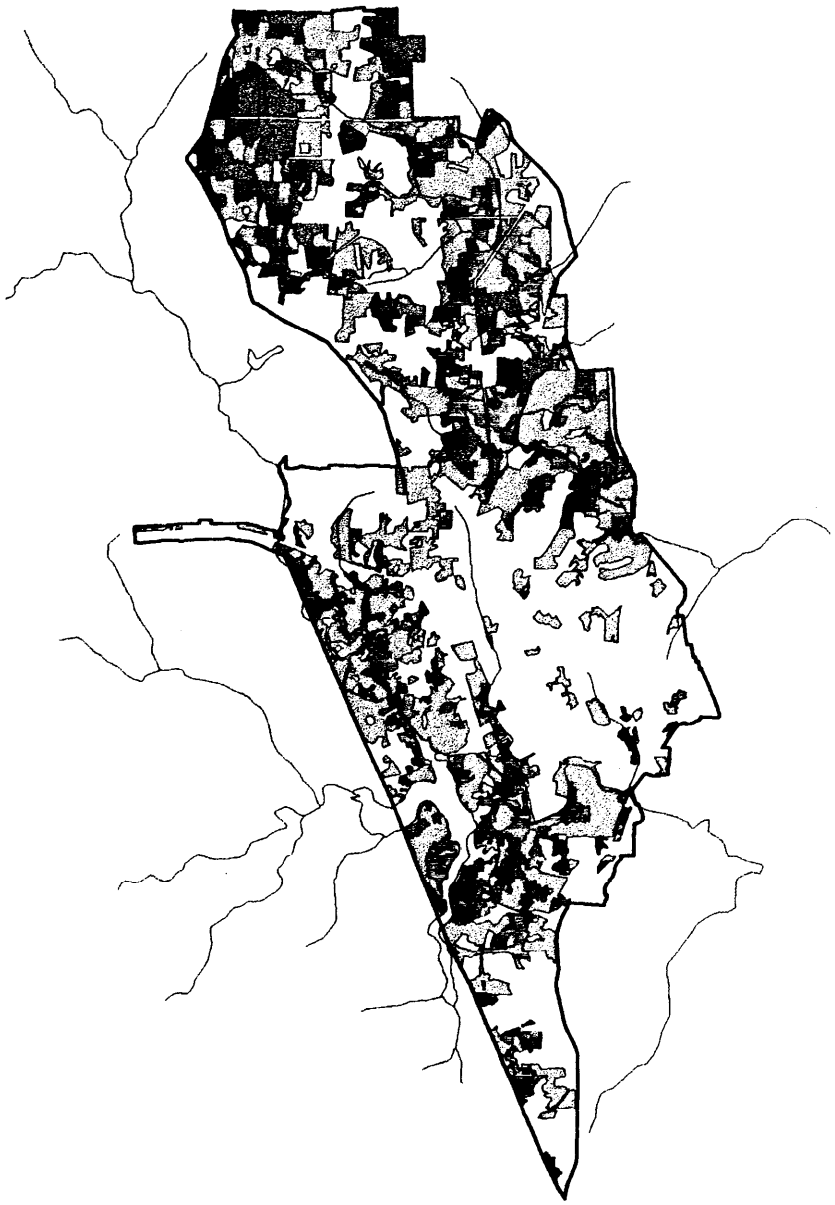
CONCLUSIONS

Overall forest cover has decreased by only 1% and Hardwood forest has increased significantly as forests have matured so that the overall value of Carrboro's forests for wildlife has increased. The transition to hardwood forest is particularly evident along areas of University Lake and Morgan Creek.

An opposing trend, however, in terms of the value of Carrboro's forests for wildlife, is the decline in value of some forests caused by fragmentation due to development. The total acreage of forest tracts greater than forty acres has decreased by 40% between 1985 and 1998. Loss of large tracts of forest negatively impacts the viability of Carrboro's forests to support certain species that require greater intact areas.

The intrinsic ratings analysis shows that the areas with the highest intrinsic ratings are located mainly in the northern end of the planning jurisdiction, along Bolin Creek, and along University Lake and Morgan Creek. These are indicated as being the most valuable lands in terms of value for wildlife. These areas represent also the larger clusters of contiguous forest coverage.

In order to directly relate tree cover changes to the Town's Tree Ordinance and other regulations, such as open space requirements, further analysis will need to be done looking at changes in development density before and after the regulations were put in place.



6300 0 6300 Feet

NC State Plane Coordinate System (NAD83)

TOWN OF CARRBORO
301 W. Main St.
Carrboro, NC 27510

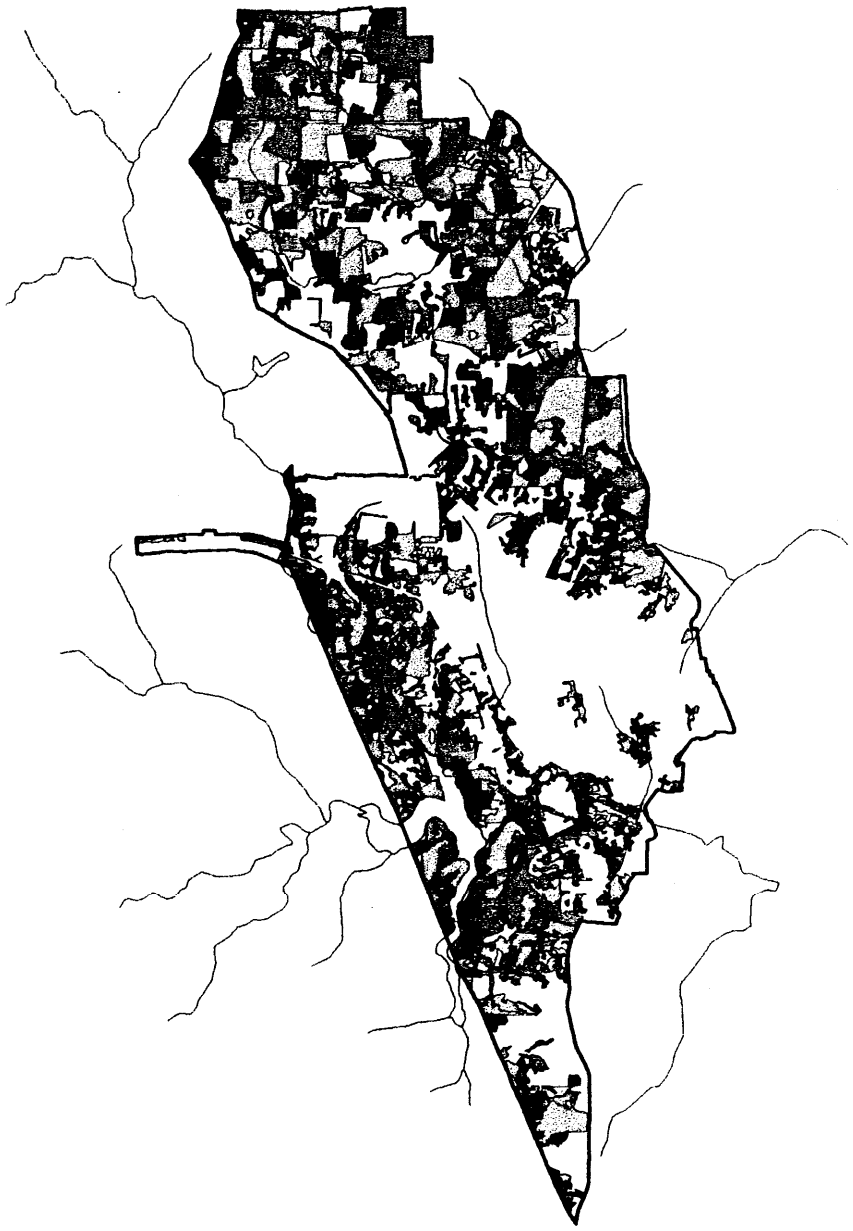
16 July 2004
Pam Mebane, Planning Department
968-7714

THIS MAP IS NOT A CERTIFIED SURVEY AND IS FOR REFERENCE ONLY

A requestor must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to the data.

Map 1. 1985 Tree Cover

Carrboro Streams
Planning Boundary
1985 Tree Cover
Hardwood
Mixed
Pine



Map 2. 1998 Tree Cover

6300 0 6300 Feet

NC State Plane Coordinate System (NAD83)

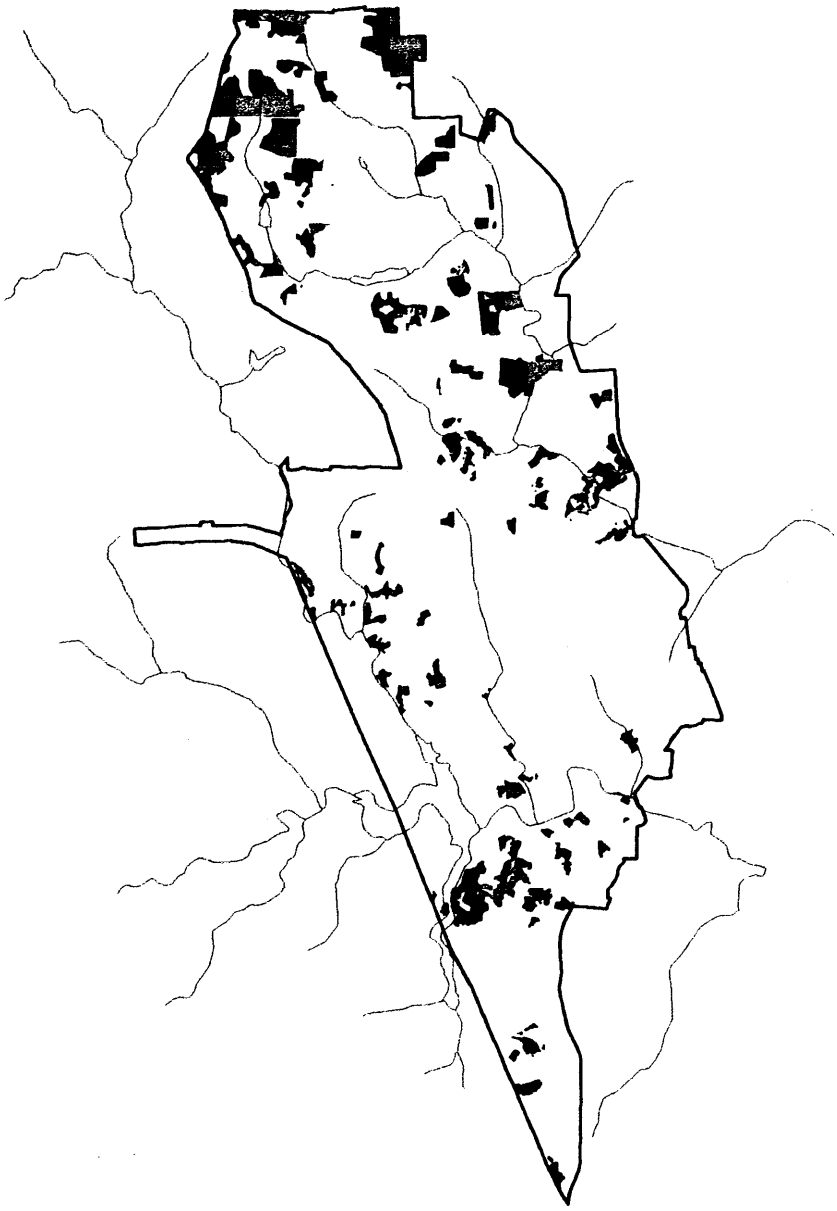
Carrboro Streams
Planning Boundary
1998 Tree Cover
Hardwood
Mixed
Pine

TOWN OF CARRBORO
301 W. Main St.
Carrboro, NC 27510

16 July 2001
Pam Mehaffey, Planning Department
968-7714

HIS MAP IS NOT A CERTIFIED SURVEY AND IS FOR REFERENCE ONLY

The requestor must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to the data.



Map 3. 1985 Hardwoods Remaining in 1998

6300 0 6300 Feet

NC State Plane Coordinate System (NAD83)

Carrboro Streams
Planning Boundary
1985 Hardwoods Remaining as Hardwoods in 1998

TOWN OF CARRBORO
301 W. Main St.
Carrboro, NC 27510

18 July 2001
Pam McIntosh, Planning Department
968-7714

THIS MAP IS NOT A CERTIFIED SURVEY AND IS FOR REFERENCE ONLY

The requestor must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to the data.

Map 4. 1998 Intrinsic Ratings

6300 0 6300 Feet

NC State Plane Coordinate System (NAD83)

Carrboro Streams
Planning Boundary
Trees98 Intrinsic Ratings.shp
0 - 42
42 - 209
209 - 520
520 - 1660

TOWN OF CARRBORO
301 W. Main St.
Carrboro, NC 27510

18 July 2001
Pam McIntosh, Planning Department
968-7714

THIS MAP IS NOT A CERTIFIED SURVEY AND IS FOR REFERENCE ONLY

he requestor must be aware of data conditions and ultimately bear responsibility for
e appropriate use of the information with respect to possible errors, original map scale,
collection methodology, currency of data, and other conditions specific to the data.

REPORT FROM LANDSCAPE WITH WILDLIFE SUBCOMMITTEE

MEMBERS FROM PLANNING BOARD: RANDEE HAVEN O'DONNELL & BRITT LUDWIG
MEMBERS FROM ENVIRONMENTAL ADVISORY BOARD:, RICKIE WHITE, AND FORMERLY GLYNIS GORE)

FIVE SPECIFIC FOCUS AREAS

A. Great Spaces of Carrboro

The committee agreed that awareness of the natural world around us in Carrboro is one of the most important ways we can effect change in local wildlife habitat. As citizens become more invested and involved in nature within the town limits, they will also become better advocates for wildlife habitat in their yards and subdivisions. As part of this, the committee proposes a process to pick the "great spaces of Carrboro". An initial survey at Carrboro Day resulted in the following suggestions for Carrboro's great spaces (n=31):

Wet and wild spaces
- University Lake
- Bolin Creek
- Cane Creek Reservoir

Wild spaces
- Trails (e.g. Bike-Libba Cotton, Frances Shetley and Natural-Bolin and Morgan Creeks, Pickards Mountain-western Orange Co.)
- Open spaces
- Green spaces

Recreation and Park Spaces
- Anderson
- Hargraves
- Wilson

Community Spaces
- Town Commons
- Century Center
- Farmer's Market
- Weaver Street green

School Spaces
- Carrboro
- McDougles' Elementary & Middle

Next steps include:

- Solicit more input from citizens,
- Work with local conservation organizations to receive their input,
- Work with local authors and naturalists to write intriguing biographies about the "great spaces"

- Publish a "great spaces" brochure for town residents, or produced as an exhibit in a public place, or both. * * *Depending upon the initial response, this may also be used as a tool to develop walking nature day trips in Carrboro for those folks who come into town on the weekends to enjoy aspects of the community.

B. Homeowner's Association Guide to Open Space Management

Much of Carrboro's open space is locked up in homeowner's association land (**see map**). We recommend asking the Environmental Advisory Board to:

- Compile a homeowner's association guide to open space management that includes guidance on:
    - Exotic invasive plant management,
    - Native landscaping,
    - Lists of resources in the community,
    - Information and sources on providing habitat for suburban wildlife.

*In addition, we request that some very small amount of staff time be devoted to this project to assist in compiling and reporting information gathered by the EAB.

C. Invasive Exotics & Land Management

Due to the fragmented nature of all natural areas within the town limits, the number one threat to wildlife habitat appears to be invasion of exotic plant species.

- Privet, English ivy, Japanese stiltgrass, and Russian olive are but a few of the most serious invasive plants in town.
- Other species such as garlic mustard may become more common in our area as they become established in the area. To combat this issue takes a great deal of resources. Since our community has a dedicated core of conservationists,

As a first step, we suggest to establish:

1. A rapid assessment and
2. An invasive exotic removal work group- activated when a homeowner's association, public park, or other entity needs removal assistance. This group would consist of local folks interested in restoring native habitat for the benefit of both native plants and animals. We would coordinate this with local non-profits and other agencies to attempt to create a large corps of volunteers to conduct activities.
3. We also suggest that staff pursue grants such as the Forestry Grant to supply a source of funds for equipment and possibly to hire a part time coordinator for this project.

D. Mapping of Ecological Communities in Town of Carrboro planning Jurisdiction.

Although the county and region have both conducted surveys of sensitive habitat, very few areas within Carrboro qualified as a "high quality" natural area. However, this does not mean there are not areas worth saving and restoring within the town limits. In order to figure out what areas to target, however, it is important to know what areas are currently of the most ecological significance. One of the best tools to examine priorities would be to map ecological communities within the town limits. This could probably be performed with existing Spring 2003 color photography, although fall photography is ideal for this type of work. The committee suggests:

1. Staff pursue a Forestry Grant and
2. Contact NC State, UNC, and Duke to look into the possibility of graduate students interested in this project.

Regardless, it would be relatively easy to work towards mapping a portion of Carrboro every year (1/5 a year for 5 years, for instance). Since mapping relies on extrapolation, we would only need to visit selected privately owned areas and could extrapolate using information gathered on the publicly owned lands in Carrboro to privately owned lands. Once completed, we would suggest using this map to determine focus areas for future conservation effort (either acquisition or better land management).

E. Carrboro "Land" Day

The committee strongly encourages the town of Carrboro to sponsor a Carrboro "Land" Day during which tours would be given of all of the great places in Carrboro and residents and out of towners alike would be given a chance to:

- Hike
- Birdwatch
- Wildflower view
- Bike-trail and around a town course
- Creek wade
- Join an invasive response work group
- Other. Carrboro Land Day activities potentially may be linked to Carrboro Day or Earth Day, although the benefit of a separate Carrboro Land Day keeps the focus on enjoying our 'Great Spaces' here in Carrboro.