RIPARIAN AND RIVERINE COMMUNITIES

Just as several of the preceding bluff communities are associtated with outstanding aquatic habitats, virtually all the natural areas in the present category have good to excellent slope communities. The main unifying feature of the sites grouped here, however, is their aquatic and riparian communities. Chatham County is particularly rich in rivers and streams and consequently contains a number of outstanding lotic habitats.

All three of the federally-listed species that occur in the county are found in these habitats, as are two of the four candidates for federal listing. Four additional state-listed species or candidates also occur only in this category of sites. These sites thus include the most significant of the county's natural treasures. They are also among the most scenic in the county and are highly popular for recreational purposes.

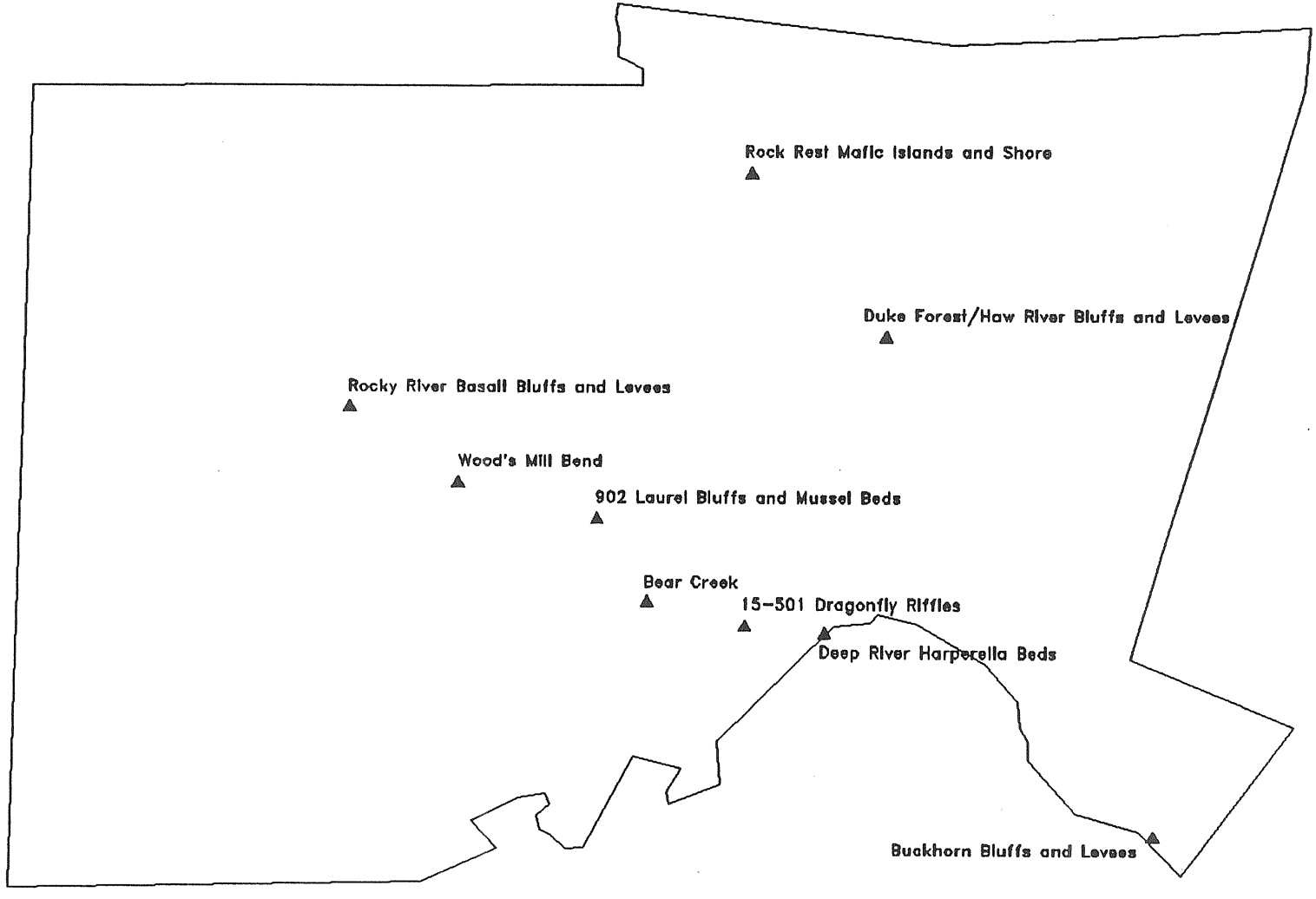
LARGER RIVERS

There is a strong division between the aquatic and streamside habitats associated with the three large rivers flowing through the county and those found along their smaller tributaries. Rivers have a year-round flow, deeper waters, and extensive floods that are typically missing on smaller streams. They also provide a greater diversity of micro-habitats. Among the most characteristic features of rivers are extensive levees, sand and gravel bars, and riffle habitats that are all scoured in spring and winter floods. Rivers are also wide enough to lack a closed canopy, permitting a greater growth of aquatic vegetation, most prominently beds of waterwillow.

These habitats are also among the most threatened in the county, or indeed the entire nation. Our larger rivers serve as the main drains for our industrial and municipal effluents; the longer the river, the greater the load. The Haw and Deep Rivers, for example, carry the wastes of several cities, including Greensboro, Burlington, and High Point. Currently, only the most hardy of aquatic species survive in the main channel habitats of these rivers. The Rocky River, on the other hand, is still one of the county's biological treasures. This is the principal world refuge for the federally-endangered Cape Fear Shiner and federal-candidate Septima's clubtail dragonfly. Along with its tributary, Bear Creek, it also contains the last remnants of the county's once rich mussel fauna.

However even this refuge, the best remaining in the upper Cape Fear Basin, may not survive the 20th Century. Although the Rocky lacks the large cities that occur along the banks of the Haw and Deep Rivers, episodic discharges of untreated sewage or excess chlorination from the Siler City Wastewater Plant have been implicated in the decline or outright demise of several of the river's inhabitants. On the other hand, because the river is almost completely contained within Chatham County, this is the one river that can be potentially saved by direct action by the county's residents.

Figure 19. River Habitats



SITE NAME: Rocky River Dragonfly Riffles

SIGNIFICANCE: State
INTEGRITY: High
THREATS: High -- siltation and pollution of the river
PROTECTION STATUS: None

JURISDICTION: Center, Oakland, and Hickory Mountain Townships
OWNERSHIP: Private

SUMMARY OF SIGNIFICANT FEATURES:

1. This reach of the Rocky River, down to the confluence with the Deep, contains the known largest population of the Cape Fear shiner (Notropis mekistocholas), a federally endangered species of fish endemic to this river system.
2. Two species of fresh-water mussels recently state-listed as threatened occur in this reach, the brook floater (Alasmidonta varicosa) and triangle floater (Alasmidonta undulata). The threatened Atlantic pigtoe (Fusconaia masoni) also once occurred in this reach.
3. This site also harbors the probably the largest remaining population of the rare Septima's clubtail dragonfly (Gomphus septima), a candidate species for federal listing.

GENERAL SITE DESCRIPTION:

The lower reach of the Rocky River thoroughly lives up to the river's name. The section upstream from the bridge on US 15-501 in particular looks more like a boulder field than a free-flowing river.

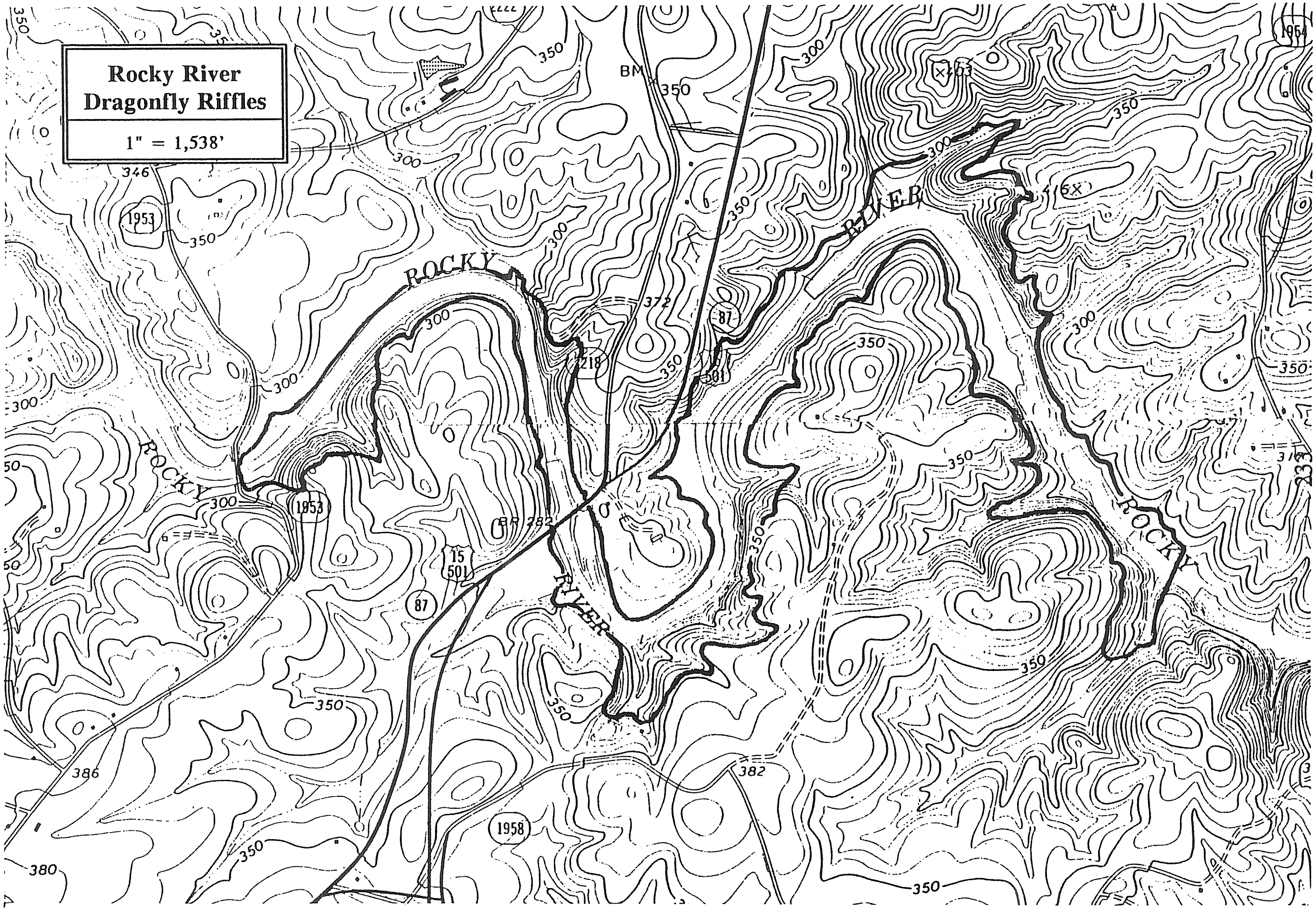
The riffle habitat present at this site is perhaps the most extensive anywhere in the eastern piedmont, and supports an unusual concentration of rare animals. Prime among these is the Cape Fear shiner, which is confined to the region of the Fall Line of the Cape Fear system. The population at this site is widely regarded to be the largest and most viable anywhere within its ever-shrinking range. Septima's clubtail dragonfly also appears to reach its world peak in numbers along this stretch of the Rocky. The highly aerated waters created by the riffles not only supply ideal conditions for the shiner and the clubtail, but also provide excellent habitat for several species of fresh-water mussels. Triangle and brook floaters, both of which are considered threatened in North Carolina are still present in this reach, as is the notched rainbow (Villosa constricta), a species considered to be of special concern.

A mesic mixed hardwood forest dominated by beech (Fagus grandifolia), red oak (Quercus rubra) and white oak (Q. alba) populates the slopes along this stretch, with a high diversity of shrubs and forest wildflowers. Mountain laurel occupies several steep bluffs, and two noteworthy plants found at the White Pines Promontory also appear here: white pine (Pinus strobus); one specimen with a few saplings) and large fothergilla (Fothergilla major). The levee forest along the river banks boasts several particularly large individual trees, including one loblolly pine (Pinus taeda) 80 cm in diameter.

Several species of alluvial forest birds round out the description of the site. Prothonotary warblers (Protonotaria citrea) and American redstarts (Setophaga ruticilla) are two prime indicators of rich bottomland forest, and yellow-throated warblers (Dendroica dominica), northern parula warblers (Parula americana), and Acadian flycatchers (Empidonax virescens) are other typical inhabitants of riparian woodlands.

CONSERVATION RECOMMENDATIONS:

Protection of the animal species present at this site depends on preserving water quality in the entire drainage basin of the Rocky River. More than any effort directed at this site itself, improvements to the habitat will come from modernizing the sewage treatment plant at Siler City and instituting erosion control practices in the agricultural and forestry lands along the entire course of the river.


Rocky River
Dragonfly Riffles
1" = 1,538'
ROCKY
RIVER
ROCKY
RIVER
ROCKY
1953
1953
1958
87
87
15
501
218

SITE SURVEY REPORT

Site name: Rocky River Dragonfly Riffles
County: Chatham

Date(s): 22/IV/89, 25/V/89

Surveyors:

Stephen P. Hall, Ph.D
NC Natural Heritage Program
P.O. Box 27687
Raleigh, NC 27611-7687
(919) 733-7701

Marjorie Boyer
NC Plant Conservation Program
P.O. Box 27647
Raleigh, NC 27611
(919) 733-3610

Size: 283 acres
Quad: Colon
Province: Piedmont
Watershed: Rocky River --> Deep River --> Cape Fear River
Location and directions: Area up and downstream from the 15-501 bridge over the Rocky River; 7 air miles south of Pittsboro

Landowners and addresses:
Owners contacted and attitude: Cathy Hundley and Ted Hart are interested in donating a conservation easement along the bluffs east of US 15-501; Fred and Joyce Sparling, who live west of 15-501, are also actively concerned with Rocky River protection

General landscape description: See Site Description

Physical description

Aspect: Various
Slope: Flat (10-35 on slopes above the river)
Topographic position: River and adjoining floodplain and slopes
Hydrology: Riverine to terrestrial
Moisture: Inundated to seasonally dry .
Elevation: 230'- 360'
Geology: Felsic crystalline tuffs
Soils: Congaree Silt Loam (bottomland); Alamance Gravelly Silt Loam, Goldston Gravelly Silt Loam, Georgeville Gravelly Silt Clay Loam, Georgeville Stony Silt Loam (uplands)

Comments on physical description: This is an extremely rocky stretch of the river; the adjacent steep slopes contain several of the community elements found at the White Pines Promontory.

Biological description

Community # 1: Piedmont Levee Forest

Vegetation structure: Forest
Position in landscape and relation to other communities: levees and bottomland
Quality and condition: High
Size:

Dominants (*) and important species:

Canopy:

Betula nigra
Carya ovata
Fagus grandifolia
Liquidamabar styraciflua
Liriodendron tulipifera
Pinus echinata
Pinus taeda

Subcanopy:

Acer floridanum
Acer rubrum
Carpinus caroliniana
Ilex opaca
Juniperus virginiana

Shrubs and vines:

Alnus serrulata
Cornus amomum
Hamamelis virginiana
Hypericum sp.
Ilex decidua
Kalmia latifolia
Leucothoe racemosa
Rhododendron nudiflorum
Rhus radicans
Smilax sp.
Vaccinium arboreum
Viburnum rafinesquianum

Herbs:

rr Amsonia tabernaemontana
Claytonia virginica
Euphorbia corollata
Fragaria virginiana
Glecoma hederacea
Houstonia caerulea
Iris cristata
Luzula acuminata
Luzula echinata
Mitchella repens
Myosotis macrosperma
Nemophila microcalyx
Osmorhiza longistylis
Oxalis violacea
Pedicularis canadensis
Polygonatum biflorum
Prenanthes serpentaria
Ranunculus pusillus
Ranunculus recurvatus
Rudbeckia laciniata
Salvia lyrata
Saxifraga virginiensis
Sedum ternatum
Stellaria pubera
Taenidia integerrima
Thalictrum revolutum
Tiarella cordifolia
Trillium catesbaei
Viola palmata v. triloba
Viola papilionacea
Zizia aurea

Biological description

Community # 2: Mesic-mixed Hardwood Forest

Vegetation structure: Forest
Position in landscape and relation to other communities: slopes above river
Quality and condition: High
Size:

Dominants (*) and important species:

Canopy:

Carya glabra
Carya ovata
Carya tomentosa
Fagus grandifolia *
Pinus echinata
rr Pinus strobus
Quercus alba *
Quercus michauxii
Quercus rubra *
Ulmus rubra

Subcanopy:

Acer floridanum
Acer rubrum
Amelanchier arborea
Cercis canadensis
Cornus florida
Fraxinus americana
Ilex opaca
Juniperus virginiana
Nyssa sylvatica
Oxydendrum arboreum

Shrubs and vines:

Aesculus sylvatica
Anisostichus capreolata
Chionanthus virginicus
Euonymus americanus
rr Fothergilla major
Gelsemium sempervirens
Hamamelis virginiana
Kalmia latifolia
Lonicera sempervirens
Styrax grandifolia
Vaccinium stamineum
Viburnum acerifolium
Viburnum dentatum
var. lucidum
Viburnum prunifolium
Viburnum rafinesquianum
Vitis sp.

Herbs:

Cardamine angustata
Chimaphila maculata
Epifagus virginiana
Erythronium umbilicatum
Galium circaezans
Goodyera pubescens
Hepatica americana
Hexastylis arifolia
Hexastylis minor
Houstonia caerulea
Houstonia purpurea
Oxalis violacea
Polypodium polypodioides
Polypodium virginianum
Polystichum acrostichoides
Salvia lyrata
Thalictrum thalictroides
Tiarella cordifolia
Tipularia discolor
Uvularia perfoliata
Viola papilionacea

Special status species

State-listed species:

Animals:

fe	Notropis mekistocholas
fc	Gomphus septima
st	Alasmidonta undulata
st	Alasmidonta varicosa

Potential for other special status species: A survey is needed of the fresh-water mussels, several rare species of which are known to occur upstream. Ptilimnium nodosum, a Federally Endangered plant species, also occurs just downstream, and should also be carefully looked for.

Other noteworthy species or features:

Plants:

rr	Pinus strobus
rr	Fothergilla major
rr	Amsonia tabernaemontana

Site condition

Site integrity: High

Average DBH of canopy trees: 40 cm
Maximum DBH of canopy trees: 80 cm

Fire regime: No
Logged: No
Eveness of canopy: Natural
Ditched/drained: No
Stream channelized: No
Dredged/filled: No
Understory cleared: No
Grazed: No
ORV damaged: No
Other disturbances: No

Adjacent Land Uses: Forest, agriculture, and residential

Significance of site: State
Discussion: See Site Description

Protection considerations and management needs: The entire Rocky River should be included in the state's list of High Quality Waters; the steep slopes should also be preserved by conservation easements and other means (one pair of owners is already considering donating a conservation easement to the Triangle Land Conservancy)

Determination of survey boundaries: Encloses the rocky stretch of river from the White Pines Promontory Natural Area to the area of lower relief located at SR 1953
Priority for further study: Medium

Specimens collected:
Photographs: Gomphus septima

Others knowledgeable about the site: Jerrel Daigle (dragonfly)

References:

Bick, G.H. 1983. Odonata at risk in conterminious United States and Canada. Odonatologica 12:209-226.

Topo map: Attached
Sketch map: None

PLANT SPECIES LIST

List is: Medium-thorough

Polystichum acrostichoides (11)
Polypodium polypodioides (14)
Polypodium virginianum (14)
Pinus echinata (16)
rr Pinus strobus (16)
Pinus taeda (16)
Juniperus virginiana (18)
Luzula acuminata (40)
Luzula echinata (40)
Erythronium umbilicatum (41)
Polygonatum biflorum (41)
Smilax sp. (41)
Trillium catesbaei (41)
Uvularia perfoliata (41)
Iris cristata (46)
Goodyera pubescens (49)
Tipularia discolor (49)
Carya glabra (53)
Carya ovata (53)
Carya tomentosa (53)
Alnus serrulata (54)
Betula nigra (54)
Carpinus caroliniana (54)
Fagus grandifolia (55)
Quercus alba (55)
Quercus michauxii (55)
Quercus rubra (55)
Ulmus rubra (56)
Hexastylis arifolia (62)
Hexastylis minor (62)
Claytonia virginica (70)
Stellaria pubera (71)
Hepatica americana (76)
Ranunculus pusillus (76)
Ranunculus recurvatus (76)
Thalictrum revolutum (76)
Thalictrum thalictroides (76)
Liriodendron tulipifera (80)
Cardamine angustata (88)
Sedum ternatum (91)
Saxifraga virginiensis (94)
Tiarella cordifolia (94)
Fothergilla major (95)
Hamamelis virginiana (95)
Liquidamabar styraciflua (95)
Amelanchier arborea (97)
Fragaria virginiana (97)
Cercis canadensis (98)
Oxalis violacea (100)
Euphorbia corollata (107)
Rhus radicans (110)
Ilex decidua (112)
Ilex opaca (112)
Euonymus americanus (113)
Acer floridanum (115)
Acer rubrum (115)
Aesculus sylvatica (116)
Vitis sp. (120)
Hypericum sp. (126)
Viola palmata var. triloba (130)
Viola papilionacea (130)
Osmorhiza longistylis (140)
Taenidia integerrima (140)
Zizia aurea (140)
Nyssa sylvatica (141)
Cornus amomum (142)
Cornus florida (142)
Chimaphila maculata (145)
Kalmia latifolia (145)
Leucothoe racemosa (145)
Oxydendrum arboreum (145)
Rhododendron nudiflorum (145)
Vaccinium arboreum (145)
Vaccinium stamineum (145)
Styrax grandifolia (152)
Chionanthus virginicus (153)
Fraxinus americana (153)
Gelsemium sempervirens (154)
rr Amsonia tabernaemontana (156)
Nemophila microcalyx (160)
Myosotis macrosperma (161)
Glecoma hederacea (164)

Salvia lyrata (164)
Pedicularis canadensis (166)
Anisostichus capreolata (167)
Epifagus virginiana (169)
Galium circaezans (173)
Houstonia caerulea (173)
Houstonia purpurea (173)
Mitchella repens (173)
Lonicera sempervirens (174)
Viburnum acerifolium (174)
Viburnum dentatum
var. lucidum (174)
Viburnum prunifolium (174)
Viburnum rafinesquianum (174)
Prenanthes serpentaria (179)
Rudbeckia laciniata (179)

ANIMAL SPECIES LIST

List is: Cursory

Vertebrates:

	Buteo jamaicensis
	Zenaida macroura
	Empidonax virescens
	Hirundo rustica
	Cyanocitta cristata
	Parus bicolor
	Thryothurus ludovicianus
	Polioptila caerulea
	Vireo flavifrons
	Vireo olivaceus
	Parula americana
	Dendroica dominica
i	Setophaga ruticilla
i	Protonotaria citrea
	Piranga olivacea
	Cardinalis cardinalis
	Passerina cyanea
	Carduelis tristis
	Chrysemys scripta
	Eumeces fasciatus
	Nerodia sipedon
	Rana catesbeiana
fe	Notropis mekistocholas (NHP records)

Invertebrates:

	Papilio glaucus
	Pieris rapae
	Everes comyntas
	Libytheana bachmanii
	Polygonia interrogationis
	Vanessa virginiensis
	Achalarus lyciades
	Ancyloxpha numitor
fc	Gomphus septima
	Gomphus exilis
	Epicordulia princeps
st	Alasmidonta undulata
st	Alasmidonta varicosa
	Elliptio complanata
	Elliptio icterina
st	Fusconaia masoni (NHP records; probably extirpated)
sr	Villosa constricta
	Corbicula fluminea

SITE NAME: Deep River Harperella Bars

SIGNIFICANCE: National
INTEGRITY: Good
THREATS: High -- siltation and pollution of the river
PROTECTION STATUS: None

JURISDICTION: Oakland
OWNERSHIP: Private

SUMMARY OF SIGNIFICANT FEATURES:

1. This is one of only two known sites in North Carolina for the federally endangered Harperella (Ptilimnium nodosum).
2. The Cape Fear shiner (Notropis mekistocholas), also federally endangered, is almost certainly present in this reach of the Deep River.
3. A nationally rare dragonfly (Gomphus septima), currently a candidate for federal listing, has also been observed downstream from the confluence of the Rocky and Deep Rivers.

GENERAL SITE DESCRIPTION:

This reach of the Deep River flows through a projection of the slate-belt that juts between the two main divisions of the Deep River Triassic Basin. Unlike the slow-flowing, deep reaches located immediately up and downstream, this section is quite shallow and choked with rocks, resembling to a large degree the Rocky River, which joins the Deep just above this site. A large island divides the stream at this point, probably the result of continual deposition of gravel and other sediments. While most of the island is now wooded, a large, long, rocky gravel bar projects from the upstream end.

The vegetation of the gravel bar shows the effects of frequent high-volume spring floods. Water-willow (Justicia americana) is dominant at the head of the bar. Below this a dense scrub of river birch (Betula nigra), sycamore (Platanus occidentalis), black willow (Salix nigra), alder (Alnus serrulata), and buttonbush (Cephalanthus occidentalis) is interspersed with a variety of sedges, rushes and annual herbs, as well as much detritus from the floods. A small population of Harperella is found in well-scoured sections of the bar where competition is low and the surface is under water during much of the year.

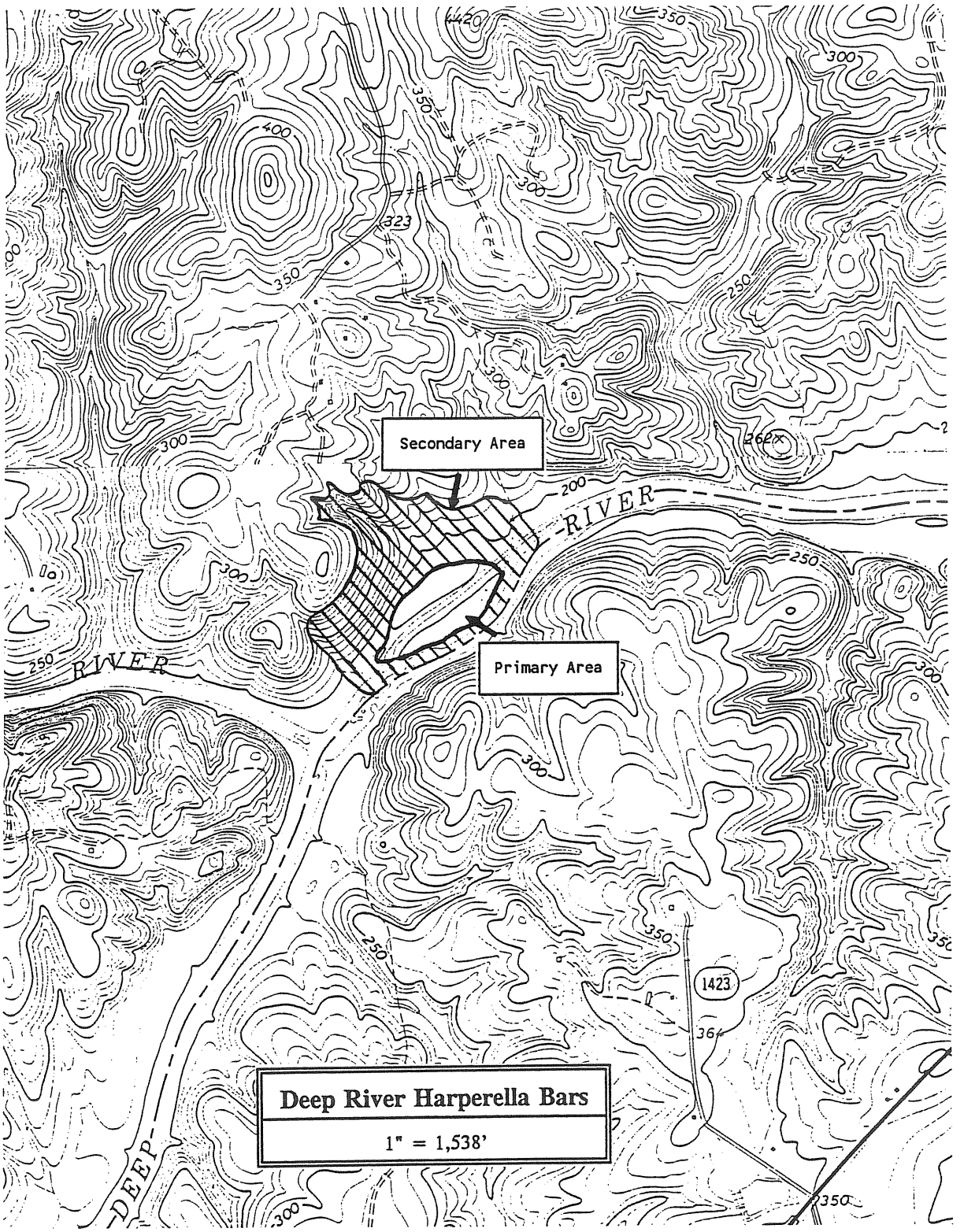
The rest of the island, with higher elevation and steep banks, supports an alluvial forest, as does the adjacent floodplain. This relatively undisturbed forest community, with its mixed canopy of ash (Fraxinus spp.), sycamore, river birch, tulip tree (Liriodendron tulipifera),

sweet gum (Liquidambar styraciflua), oaks (Quercus spp.), and bitternut hickory (Carya cordiformis) over a variety of vines and herbs, adds to the value of the site as a natural area.

Although we did not survey the animal community of this site, it undoubtedly contains both the Cape Fear shiner and an almost equally rare clubtail dragonfly (Gomphus septima), both of which are known to occur in similar habitat just upstream from this site. For the same reason, a diverse mussel and fish fauna can be expected, as well as a rich avian community similar to that of the alluvial forests of the White Pines Promontory.

CONSERVATION RECOMMENDATIONS:

Given the national level significance of the species present at this site, a conservation easement or outright purchase by a state or private conservation agency is recommended. True protection for these species will depend, however, on control of siltation, pollution, and artificial fluctuations in water level along the entire upstream reaches of both the Rocky and the Deep Rivers.


Secondary Area
Primary Area
RIVER
RIVER
DEEP
1423
Deep River Harperella Bars
1" = 1,538'

SITE SURVEY REPORT

Site name: Deep River Harperella Bars
County: Chatham

Date(s): 7/VIII/88, 16/X/89
Surveyors:

Stephen P. Hall, Ph.D
NC Natural Heritage Program
P.O. Box 27687
Raleigh, NC 27611-7687
(919) 733-7701

Marjorie Boyer
NC Plant Conservation Program
P.O. Box 27647
Raleigh, NC 27611
(919) 733-3610

Size: 16 primary acres + 34 secondary acres = 50 total acres
Quad: Colon
Province: Piedmont
Watershed: Deep River --> Cape Fear River
Location and directions: Gravel bars located just downstream from the confluence of the Deep and Rocky Rivers

Landowners and addresses:
Owners contacted and attitude:

General landscape description: See Site Description

Physical description

Aspect: Flat
Slope: Flat (5-10 on slopes above the river)
Topographic position: Alluvial Flat
Hydrology: Riverine
Moisture: Frequently Flooded
Elevation: 200'
Geology: Felsic crystalline tuffs
Soils: Congaree Silt Loam (bottomlands)

Comments on physical description: The gravel bars on which the Harperella grow are located at the upstream end of a wooded island. The rocky nature of this Piedmont stretch of the Deep River is somewhat unusual since most of the county's portion of the river lies within the Triassic Basin.

Biological description

Community # 1: Rocky Bar and Shore

Vegetation structure: Palustrine
Position in landscape and relation to other communities: River bar
Quality and condition: Good
Size:

Dominants (*) and important species:

Shrubs and vines:

Alnus serrulata
Betula nigra
Cephalanthus occidentalis
Platanus occidentalis
Salix nigra

Herbs:

Boehmeria cylindrica
Commelina virginica
Cuscuta compacta
Cyperus strigosus
Diodia virginiana
Eclipta alba
Eleocharis obtusa
Eryngium prostratum
Hypericum mutilum
Hypericum sp.
Juncus acuminatus
Justicia americana
Leersia oryzoides
rr Lemna perpusilla
Ludwigia alternifolia
Mecardonia acuminata
Mimulus alatus
Penthorum sedoides
Polygonum hydropiperoides
Polygonum punctatum
Pontederia cordata
fe Ptilimnium nodosum
Rorippa islandica
Samolus parviflorus

Herbs (cont):

Saururus cernuus
Zizaniopsis miliacea
Zizia trifoliata

Biological description

Community # 2: Piedmont Alluvial Forest

Vegetation structure: Forest
Position in landscape and relation to other communities: Alluvial flats
Quality and condition: Good
Size:

Dominants (*) and important species:

Canopy:

Betula nigra
Carya cordiformis
Celtis laevigata
Fraxinus sp.
Liquidamabar styraciflua
Liriodendron tulipifera
Pinus taeda
Platanus occidentalis
Quercus falcata
var. pagodaefolia
Quercus michauxii
Quercus nigra
Quercus phellos
Ulmus americana

Shrubs and vines:

Anisostichus capreolata
Campsis radicans
Ilex decidua
Ligustrum sinense
Lindera benzoin
Lonicera japonica
Parthenocissus quinquefolia
Rhus radicans
Smilax bona-nox
Smilax rotundifolia
Staphylea trifolia
Symphoricarpos orbiculatus
Vitis aestivalis

Subcanopy:

Acer negundo
Acer rubrum
Carpinus caroliniana
Cornus florida
Morus rubra
Ulmus alata

Herbs:

Boehmeria cylindrica
Botrychium biternatum
Carex sp.
Clematis virginiana
Cryptotaenia canadensis
Dicliptera brachiata
Elymus virginicus
Galium sp.
Geum canadense
Laportea canadensis
Lysimachia nummularia
Menispermum canadense
Microstegium vimineum
Osmorhiza longistylis
Oxalis violacea
Passiflora lutea
Pilea pumila
Polygonum punctatum
Polymnia uvedalia
Polystichum acrostichoides
Rudbeckia laciniata
Sanicula canadensis
rr Sicyos angulatus
Tovara virginiana
Ulmus rubra
Verbesina occidentalis
Viola sp.
Zizia trifoliata

Special status species

State-listed species:

Plants:

fe	Ptilimnium nodosum

Animals:

fe	Notropis mekistocholas
sc	Gomphus septima

Potential for other special status species: Medium; several rare mussels occur upstream in the Rocky River and should be looked for here.

Other noteworthy species or features:

Plants:

rr	Lemna perpusilla
rr	Sicyos angulatus

Communities:

Rocky Bar and Shore

Site condition

Site integrity: Good

Average DBH of canopy trees: 35 - 40 cm
Maximum DBH of canopy trees:

Fire regime: Natural
Logged: Within last 30-40 years
Eveness of canopy: Mixed-age
Ditched/drained: No
Stream channelized: No
Dredged/filled: No
Understory cleared: No
Grazed: No
ORV damaged: No
Other disturbances: No

Adjacent Land Uses: Pine plantation

Significance of site: National
Discussion: See Site Description

Protection considerations and management needs: The presence of two Federally Endangered species warrants the highest degree of protection for this site. This area, and the entire Rocky River system upstream, should be included in the state's High Quality Waters program.

Determination of survey boundaries: Encloses the known limits of the Ptilimnium population in Chatham County as well as the adjoining area of river, bottomlands, and steep slopes.

Priority for further study: Medium; a search was made in 1989 for Ptilimnium from this area downstream to US 1 without success, but this plant has been reported previously from the US 1 area.

Specimens collected:
Photographs: Ptilimnium nodosum

Others knowledgeable about the site: Laura Mansberg, Margit Bucher, Nora Murdock

References:

Topo map: Attached
Sketch map: None

PLANT SPECIES LIST

List is: Nearly Complete

Carex sp.
Botrychium biternatum (6)
Polystichum acrostichoides (11)
Pinus taeda (16)
Elymus virginicus (29)
Leersia oryzoides (29)
Microstegium vimineum (29)
Zizaniopsis miliacea (29)
Cyperus strigosus (30)
Eleocharis obtusa (30)
rr Lemna perpusilla (33)
Commelina virginica (38)
Pontederia cordata (39)
Juncus acuminatus (40)
Smilax bona-nox (41)
Smilax rotundifolia (41)
Saururus cernuus (50)
Salix nigra (51)
Carya cordiformis (53)
Betula nigra (54)
Carpinus caroliniana (54)
Quercus falcata
var. pagodaefolia (55)
Quercus michauxii (55)
Quercus nigra (55)
Quercus phellos (55)
Celtis laevigata (56)
Ulmus alata (56)
Ulmus americana (56)
Ulmus rubra (56)
Morus rubra (57)
Boehmeria cylindrica (59)
Laportea canadensis (59)
Pilea pumila (59)
Polygonum hydropiperoides
(63)
Polygonum punctatum (63)
Tovara virginiana (63)
Clematis virginiana (76)
Menispermum canadense (79)
Liriodendron tulipifera (80)
Lindera benzoin (84)
Rorippa islandica (88)
Penthorum sedoides (91)
Liquidamabar styraciflua (95)
Platanus occidentalis (96)
Geum canadense (97)
Oxalis violacea (100)
Rhus radicans (110)
Ilex decidua (112)
Staphylea trifolia (114)
Acer negundo (115)
Acer rubrum (115)
Parthenocissus quinquefolia
(120)
Vitis aestivalis (120)
Hypericum mutilum (126)
Hypericum sp. (126)
Viola sp. (130)
Passiflora lutea (131)
Ludwigia alternifolia (137)
Cryptotaenia canadensis (140)
Eryngium prostratum (140)
Osmorhiza longistylis (140)
fe Ptilimnium nodosum (140)
Sanicula canadensis (140)
Zizia trifoliata (140)
Cornus florida (142)
Lysimachia nummularia (147)
Samolus parviflorus (147)
Fraxinus sp. (153)
Ligustrum sinense (153)
Cuscuta compacta (158)
Mecardonia acuminata (166)
Mimulus alatus (166)
Anisostichus capreolata (167)
Campsis radicans (167)
Dicliptera brachiata (171)
Justicia americana (171)
Cephalanthus occidentalis (173)
Diodia virginiana (173)
Galium sp. (173)

Lonicera japonica (174)
Symphoricarpos orbiculatus (174)

rr Sicyos angulatus (177)
Eclipta alba (179)
Polymnia uvedalia (179)
Rudbeckia laciniata (179)
Verbesina occidentalis (179)

SITE NAME: Bear Creek

SIGNIFICANCE: State
INTEGRITY: Good to poor
THREATS: High -- water quality degradation due to package treatment plants
PROTECTION STATUS: None

JURISDICTION: Gulf and Oakland
OWNERSHIP: Private

SUMMARY OF SIGNIFICANT FEATURES:

1. The Cape Fear shiner (Notropis mekistocholas), federally listed as endangered, has been found in the lower reach of Bear Creek.
2. Bear Creek also contains a remnant of the diverse mussel community that was once a major feature of this watershed. At least one rare species is still present, the brook floater (Alasmidonta varicosa), proposed for state-listing as threatened. Five other species were also observed and the rare Atlantic elktoe (Fusconaia masoni), which has also been proposed for state-listing as threatened, has been found here in the past.

GENERAL SITE DESCRIPTION:

Except for its size, Bear Creek strongly resembles the Rocky River into which it flows. It rises in the western part of Chatham County and flows entirely within the slate belt. Like the lower part of the Rocky River, its bed is consists of cobbles to medium-sized boulders, mixed with gravel. Unlike the Rocky, it does not receive any industrial or municipal discharge, and its water quality until recently, has been quite good. The proliferation of package treatment plants, however, threatens to change the situation.

The riffle and pool habitat that is the dominant feature of both Bear Creek and the Rocky River supports a high diversity of aquatic animals. The lower reach is known to have contained a population of the endangered Cape Fear shiner, and probably still does so; due to its protected status, we did not sample for this species during our survey. Due to the lateness of our one sample visit (October), we also did not encounter any Septima's clubtail dragonfly (Gomphus septima), a candidate for federal listing whose largest known population is in the Rocky River. Judging from the similarity in habitats between the two streams, this species is almost certain to occur at least in the lower reach of Bear Creek.

We did find six species of mussels, which indicates that the water quality is still fairly good -- mussels are among the first animals to be eliminated by water quality degradation. The most significant species was the brook floater, of which we found two relatively fresh shells. A lanceolate form of Elliptio -- possibly the rare Cape Fear spike (E. marsupiobesa), was

also fairly numerous. Also indicative of the general health of the mussel community was the presence of several size classes of both the lanceolate elliptio and the more common eastern elliptio (E. complanata); in many piedmont streams only old individuals are now found, indicating a complete failure of reproduction. On the other hand, we did not find any individuals of the squawfoot (Strophitus undulatus), the triangle floater (Alasmidonta undulata), or the notched rainbow (Villosa constricta), all of which have been reported from this reach in the past. By far the most numerous mollusk was the introduced asiatic clam (Corbicula fluminea), followed in abundance by the relatively pollution-tolerant eastern elliptio and eastern floater (Anodonta cataracta). The presence of a package plant and a clear-cut just upstream from the largest mussel bed we encountered does not bode well for the future survival of even this remnant of the original mollusk community.

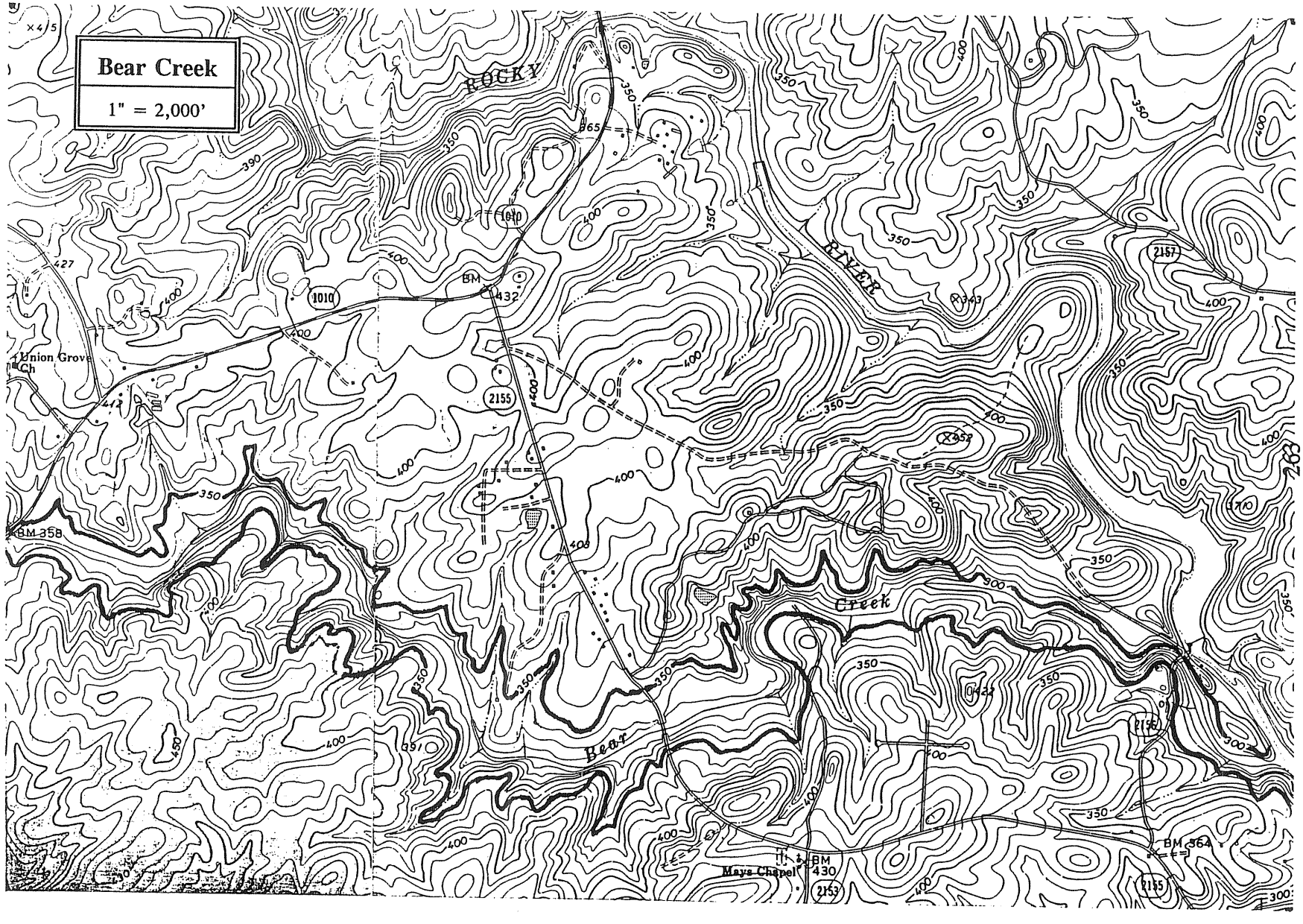
Bear Creek also resembles the Rocky River in several aspects of its vegetation. Willow-herb (Justicia americana), emphatically the dominant plant of the Rocky River, also grows abundantly in the sunnier riffle areas of Bear Creek, although due to its narrowness such areas are less extensive than in the Rocky. Wetland species such as arrowhead (Sagittaria longirostrata) and pickerelweed (Pontedaria cordata) appear in wet pockets and species adapted to scouring floods, such as black willow (Salix nigra) and sycamore (Platanus occidentalis), form a scrub community on the larger rock and gravel bars in the creek bed. Along the banks of the creek there are several steep bluffs and rock outcrops where, as along many stretches on the Rocky, mountain laurel (Kalmia latifolia) is the dominant plant.

The forest along gentler slopes and narrow floodplain of the creek reflects a history of moderate use for timbering and perhaps grazing. The trees are young to medium-aged hardwoods. Sycamore, river birch (Betula nigra) and other levee species grow close to the creek, while farther back are bottomland species such as sweet gum (Liquidambar styraciflua) and willow oak (Quercus phellos) mixed with mesic slope species including as red oak (Q. rubra), white oak (Q. alba), beech (Fagus grandifolia) and pignut hickory (Carya glabra). A considerable number of hackberries (Celtis laevigata), shagbark and southern shagbark hickories (Carya ovata and carolinae-septentrionalis) occur along this stretch, reflecting relatively rich soils and indicating that the woods along this reach would mature into a high-quality hardwood forest if left undisturbed.

CONSERVATION RECOMMENDATIONS:

The main threat to the aquatic community is the proliferation of package treatment plants along the entire course of the watershed. While these plants presumably reduce the amount of organic material entering the stream, they are far less efficient at doing so than full-scale plants, which themselves are largely responsible for the decimation of the aquatic fauna over most of the state. Particularly troublesome is the use of chlorine by both package and full-scale plants to disinfect the wastewater; this chemical is known to have a severe impact on mussel species. The amount of nutrients entering the stream can also destroy mussel populations by reducing the amount of available oxygen dissolved in the water.

Solution to the problem posed by these plants can only be accomplished by county or state ordinances restricting their use; in the most sensitive watersheds, such as Bear Creek or the Rocky River, they should be completely prohibited.


Bear Creek
1" = 2,000'
ROCKY
RIVER
Union Grove Ch
BM 358
BM 432
BM 430
Maye Chapel
BM 364
Bear
Creek
1010
2155
2157
2153
2158

SITE SURVEY REPORT

Site name: Bear Creek
County: Chatham

Date(s): 17/X/90
Surveyors:

Stephen P. Hall, Ph.D
NC Natural Heritage Program
P.O. Box 27687
Raleigh, NC 27611-7687
(919) 733-7701

Marjorie Boyer
NC Plant Conservation Program
P.O. Box 27647
Raleigh, NC 27611
(919) 733-3610

Size: 393 acres
Quad: Pittsboro
Province: Piedmont
Watershed: Bear Creek --> Rocky River --> Deep River --> Cape Fear River
Location and directions: From confluence with Rocky upstream to SR 1010.

Landowners and addresses:
Owners contacted and attitude:

General landscape description: See Site Description

Physical description

Aspect: North East South West
Slope: Mostly 0-5 but 5-10 on certain slopes
Topographic position: Crest Upper Mid Lower Slope Upland Alluvial Flat
Hydrology: Terrestrial and palustrine
Moisture: Inundated to Moist (Mesic)
Elevation:
Geology:
Soils:

Comments on physical description:

Biological description

Community # 1: Piedmont Bottomland Forest

Vegetation structure: Forest
Position in landscape and relation to other communities: Lower slopes and floodplain
Quality and condition: Fair to good
Size:

Dominants and important species:

Canopy:

Acer rubrum
Betula nigra
Carya carolinae-septentrionalis
Carya glabra
Carya ovata
Carya tomentosa
Celtis laevigata
Fagus grandifolia
Fraxinus pennsylvanica
var. subintegerrima
Juglans nigra
Liquidamabar styraciflua
Liriodendron tulipifera
Nyssa sylvatica
Pinus taeda
Platanus occidentalis
Quercus alba
Quercus nigra
Quercus phellos
Quercus rubra
Ulmus alata
Ulmus rubra

Subcanopy:

Acer floridanum
Acer negundo
Carpinus caroliniana
Cercis canadensis
Cornus florida
Diospyros virginiana

Subcanopy (cont.):

Ilex opaca
Juniperus virginiana
Morus rubra
Oxydendrum arboreum
Prunus serotina

Shrubs:

Aesculus sylvatica
Alnus serrulata
Anisostichus capreolata
Chionanthus virginicus
Cornus amomum
Elaeagnus umbellata
Gelsemium sempervirens
Hamamelis virginiana
Hypericum sp.
Ilex decidua
Ilex verticillata
Kalmia latifolia
Ligustrum sinense
Lonicera japonica
Parthenocissus quinquefolia
Rhododendron nudiflorum
Rhus radicans
Rubus sp.
Sambucus canadensis
Smilax bona-nox
Styrax grandifolia
Symphoricarpos orbiculatus
Tilia heterophylla

Shrubs (cont.):

Vaccinium stamineum
Viburnum acerifolium
Viburnum dentatum
var. lucidum
Viburnum prunifolium
Vitis rotundifolia

Herbs:

Asplenium platyneuron
Aster divaricatus
Aster pilosus
Aster sp.
Commelina communis
Dioscorea villosa
Elephantopus carolinianus
Elymus virginicus
Erechtites hieracifolia
Glecoma hederacea
Goodyera pubescens
Hexastylis arifolia
Hexastylis minor
Hystrix patula
Iris cristata
Matelea sp.
Microstegium vimineum
Mitchella repens
Osmorhiza longistylis
Oxalis stricta
Polygonum sp.
Polypodium polypodioides
Polystichum acrostichoides
Rudbeckia laciniata
Saxifraga virginiensis
Sedum ternatum
Solidago caesia
Solidago sp.
Tiarella cordifolia
Tipularia discolor
Uniola latifolia
Verbesina occidentalis
Zizia trifoliata

Biological description

Community # 2: Piedmont Gravel Bar and Creek

Vegetation structure: Palustrine
Position in landscape and relation to other communities: Creek
Quality and condition: Good to poor
Size:

Dominants and important species:

Subcanopy:

Salix nigra

Shrubs:

Betula nigra
Celtis laevigata
Cephalanthus occidentalis
Cornus amomum
Gleditsia tricanthos
Lyonia mariana
Platanus occidentalis
Rhus radicans

Herbs:

Aneilema keisak
Aster pilosus
Boehmeria cylindrica
Impatiens capensis
Justicia americana
Leersia oryzoides
rr Lemna perpusilla
Mecardonia acuminata
Pilea pumila
Polygonum sp.
Pontederia cordata
Sagittaria longirostra
Saururus cernuus

Special status species

State-listed species:

Animals:

st	Fusconaia masoni
st	Alasmidonta varicosa

Potential for other special status species:

Other noteworthy species or features:

Animals:

sr	Villosa constricta

Site condition

Site integrity: Good to poor

Average DBH of canopy trees: 20 - 25 cm
Maximum DBH of canopy trees: 50 cm (Betula nigra); 45 cm (Pinus taeda)

Fire regime: Natural
Logged: Within last 30-40 years
Eveness of canopy: Natural
Ditched/drained:
Stream channelized: No
Dredged/filled: No
Understory cleared: No
Grazed: No
ORV damaged: No
Other disturbances: Yes; package sewage treatment plants

Adjacent Land Uses: Residential, agriculture, and forest

Significance of site: State
Discussion: See Site Description

Protection considerations and management needs: Water quality protection is the most urgent need; package plants have been proliferating along Bear Creek and are endangering the aquatic fauna.

Determination of survey boundaries:

Priority for further study: High

Specimens collected: Villosa delumbis, Anodonta cataracta, Alasmidonta varicosa, Elliptio raveneli (?), Elliptio complanata
Photographs: Muskrat middens showing predominance of Corbicula

Others knowledgeable about the site: John Alderman

References:

Topo map: Attached
Sketch map: Attached

PLANT SPECIES LIST

List is: Cursory

Polystichum acrostichoides (11)
Asplenium platyneuron (13)
Polypodium polypodioides (14)
Pinus taeda (16)
Juniperus virginiana (18)
Sagittaria longirostra (27)
Elymus virginicus (29)
Hystrix patula (29)
Leersia oryzoides (29)
Microstegium vimineum (29)
Uniola latifolia (29)
Peltandra virginica (32)
rr Lemna perpusilla (33)
Aneilema keisak (38)
Commelina communis (38)
Pontederia cordata (39)
Smilax bona-nox (41)
Dioscorea villosa (43)
Iris cristata (46)
Goodyera pubescens (49)
Tipularia discolor (49)
Saururus cernuus (50)
Salix nigra (51)
Carya carolinae-septentrionalis (53)
Carya glabra (53)
Carya ovata (53)
Carya tomentosa (53)
Juglans nigra (53)
Alnus serrulata (54)
Betula nigra (54)
Carpinus caroliniana (54)
Fagus grandifolia (55)
Quercus alba (55)
Quercus nigra (55)
Quercus phellos (55)
Quercus rubra (55)
Celtis laevigata (56)
Ulmus alata (56)
Ulmus rubra (56)
Morus rubra (57)
Boehmeria cylindrica (59)
Pilea pumila (59)
Hexastylis arifolia (62)
Hexastylis minor (62)
Polygonum sp. (63)
Liriodendron tulipifera (80)
Sedum ternatum (91)
Saxifraga virginiensis (94)
Tiarella cordifolia (94)
Hamamelis virginiana (95)
Liquidamabar styraciflua (95)
Platanus occidentalis (96)
Prunus serotina (97)
Rubus sp. (97)
Cercis canadensis (98)
Gleditsia tricanthos (98)
Oxalis stricta (100)
Rhus radicans (110)
Ilex decidua (112)
Ilex opaca (112)
Ilex verticillata (112)
Acer floridanum (115)
Acer negundo (115)
Acer rubrum (115)
Aesculus sylvatica (116)
Impatiens capensis (118)
Parthenocissus quinquefolia (120)
Vitis rotundifolia (120)
Tilia heterophylla (121)
Hypericum sp. (126)
Elaeagnus umbellata (134)
Osmorhiza longistylis (140)
Zizia trifoliata (140)
Nyssa sylvatica (141)
Cornus amomum (142)
Cornus florida (142)
Kalmia latifolia (145)
Lyonia mariana (145)
Oxydendrum arboreum (145)
Rhododendron nudiflorum (145)

Vaccinium stamineum (145)
Diospyros virginiana (150)
Styrax grandifolia (152)
Chionanthus virginicus (153)
Fraxinus pennsylvanica
var. subintegerrima
(153)
Ligustrum sinense (153)
Gelsemium sempervirens (154)
Matelea sp. (157)
Glecoma hederacea (164)
Mecardonia acuminata (166)
Anisostichus capreolata (167)
Justicia americana (171)
Cephalanthus occidentalis (173)
Mitchella repens (173)
Lonicera japonica (174)
Sambucus canadensis (174)
Symphoricarpos orbiculatus
(174)
Viburnum acerifolium (174)
Viburnum dentatum
var. lucidum (174)
Viburnum prunifolium (174)
Aster divaricatus (179)
Aster paternus (179)
Aster pilosus (179)
Aster sp. (179)
Elephantopus carolinianus (179)
Erechtites hieracifolia (179)
Rudbeckia laciniata (179)
Solidago caesia (179)
Solidago sp. (179)
Verbesina occidentalis (179)

ANIMAL SPECIES LIST

List is: Cursory (visit made outside breeding season)

	Vertebrates:		Invertebrates:
i	Buteo lineatus	st	Fusconaia masoni *
	Colinus virginianus	sr	Villosa constricta *
	Megaceryle alcyon		Villosa delumbis
	Melanerpes carolinus		Anodonta cataracta
	Cyanocitta cristata	st	Alasmidonta varicosa
	Parus carolinensis		Elliptio producta
	Parus bicolor		Elliptio complanata
	Thryothurus ludovicianus		
	Cardinalis cardinalis		
	Pipilo erythropthalamus		
	Sciurus carolinensis		
	Castor canadensis		
	Ondatra zibethica		
	Procyon lotor		
	Odocoileus virginianus		
i	Terrapene carolina		
	Acris crepitans		
	Rana catesbeiana		
	Fundulus rathbuni		
	Gambusia affinus		