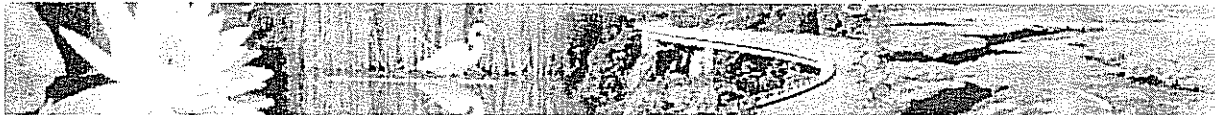

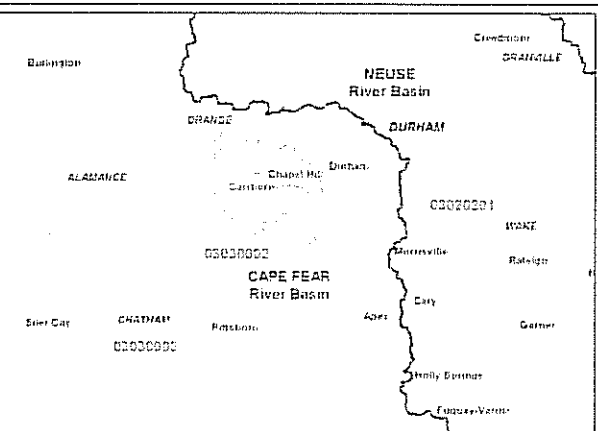


N.C. Ecosystem Enhancement Program



MORGAN CREEK LITTLE CREEK LOCAL WATERSHED PLAN Fact Sheet

Location: River Basin: Cataloging Unit: 14-digit Hydrologic Units: County:	Cape Fear 03030002 03030002060100, 03030002060070, 03030002060080 Orange
Watershed Area:	74.5 square miles
Planning Contact:	Daniel Ngandu, Phone: (919) 733-5312 E-Mail: Daniel.Ngandu@ncmail.net
Participants:	Local governments & resource professionals; Planning process was facilitated by Cape Fear River Assembly
Contractor Hired for Watershed Assessment	Tetra Tech, Inc.
	

Project Overview

This watershed was selected based on several 303(d) listed waterbodies, urban runoff, fecal coliform bacteria, sediment, low dissolved oxygen and habitat degradation issues. This watershed area drains to B. Everett Jordan Reservoir, a drinking water supply designated as Nutrient Sensitive Water. These watersheds also contain Natural Heritage Program Significant Areas that are stressed due to increasing urban development. A stakeholder team was established for this planning effort in October 2002 and met bi-monthly.

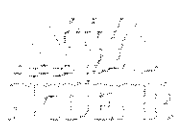
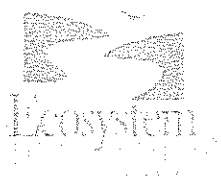
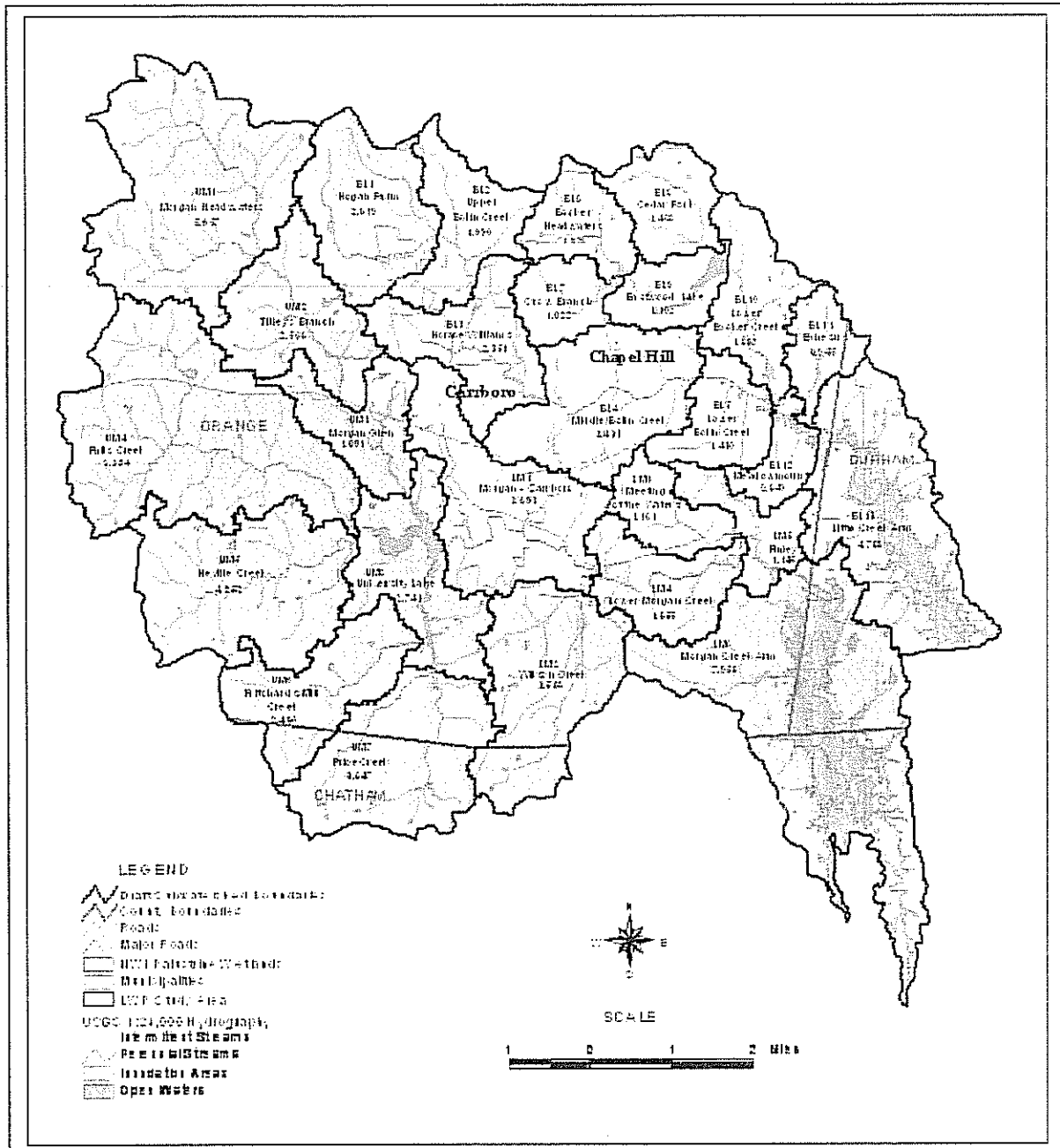
Project Schedule

The Morgan Creek / Little Creek Local Watershed Plan was completed in December 2004.

Related Links

- [Morgan and Little Creek Plan Summary 1-05](#)
- [Preliminary Findings Report](#)
- [Detailed Assessment](#)

- Targeting of Management Report
- Meeting Materials
- Participants
- Collaborators
- Morgan and Little Creeks Local Watershed Plan: Presentation to Assistant Secretary of the Army John Paul Woodley Jr., Nov. 3, 2004 (In MS PowerPoint--file size 22.3MB)



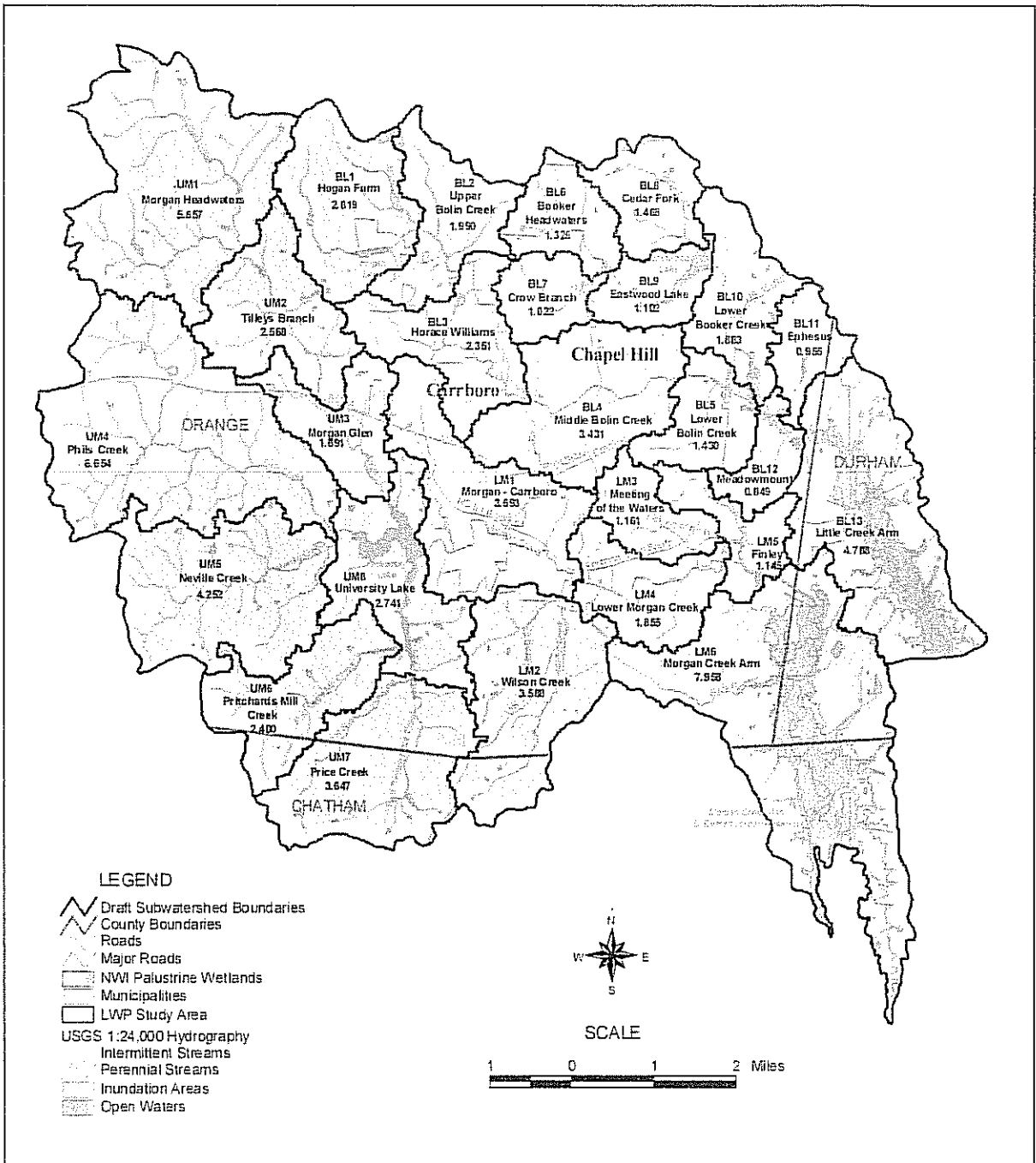
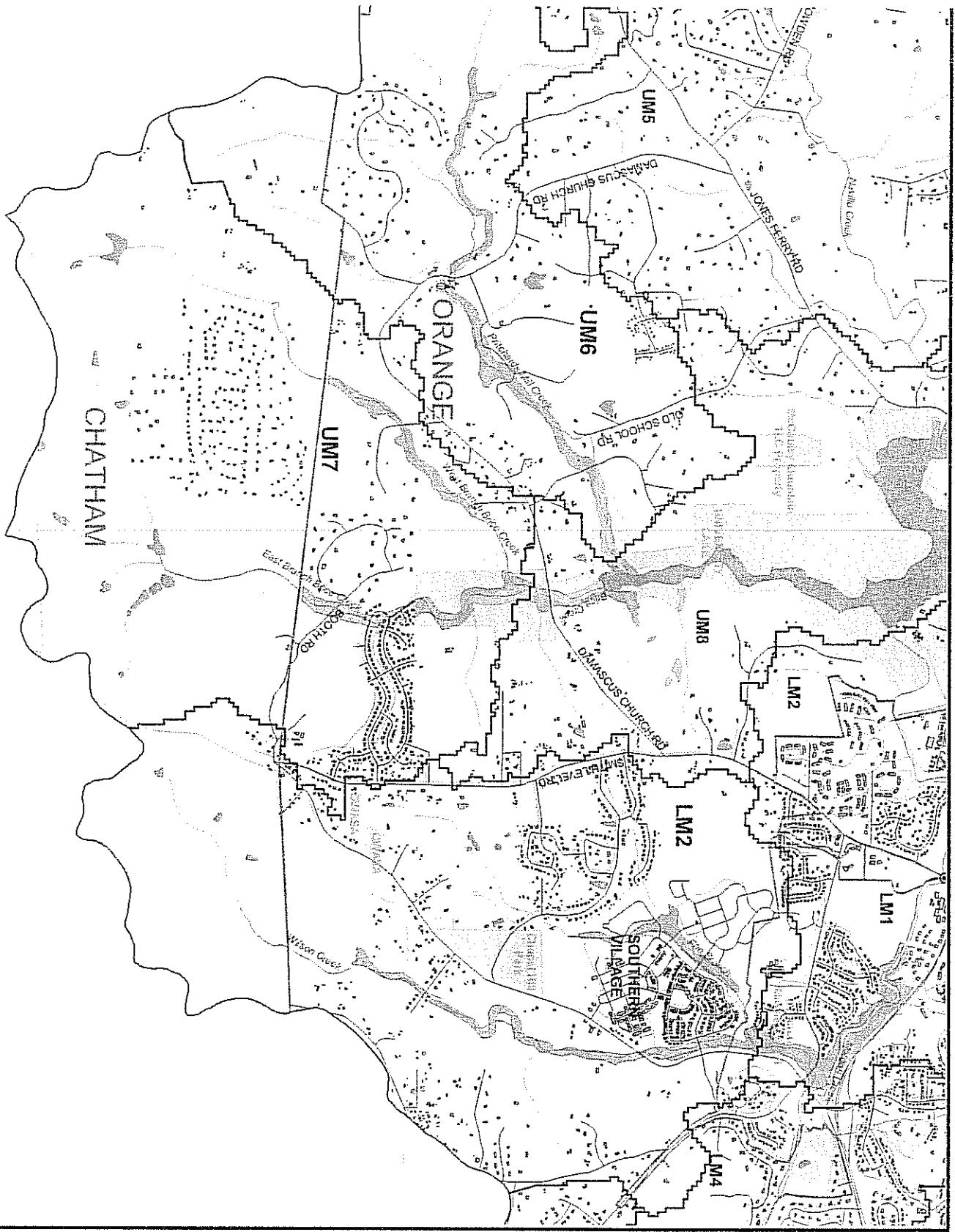


Figure 2-2. Morgan Creek LWP Study Area and Subwatershed Delineation

MAP 10

Subwatersheds UM6, UM7, LM2



LEGEND

- ☆ NCDWMQ Biological Monitoring Sites
- ⊙ Chapel Hill Carbon Monitoring Sites
- ⊙ NCDWMQ Water Quality Monitoring Sites
- ⊙ Discharge Condition's Monitoring Sites
- ⊙ WARP Water Quality Monitoring Stations
- ⊙ Carbon Benthic Community Monitoring
- ⊙ WARP Benthic Community Monitoring Sites
- ⊙ NCDENR Benthic Community Monitoring Sites
- ⊙ NCDWMQ Fish Community Sites
- ⊙ NCDENR Fish Community Sites
- ⊙ Confined Animal Feeding Operations
- ⊙ NPDES Permitted Wastewater Discharge
- Saltwater Shaded Boundaries
- County Boundaries
- Oil/Federal Gas Transmission Lines
- Roads
- Rail Lines
- Water Lines
- Sewer Lines
- USGS 1:24,000 DLG Hydrography
- Potential Intermittent
- 303(d) Listed Streams
- Waterbodies
- Building Footprints
- Hydric Soils (Chevacha Soil Series)
- NMVI Wetlands
- Uncontrolled or Unregulated Hazardous Waste
- Land Managed for Conservation and Open Space
- Incorporated Municipalities
- Study Area Subwatersheds



SCALE

Preventing Groundwater Contamination at Gas Stations - What Municipalities and Water Suppliers Can Do

Generations of automobile drivers have become accustomed to finding gas stations conveniently located along busy roads and highways, at intersections, and in village centers, to support our automobile-dependent lifestyles. As the environmental risks associated with gas stations - particularly the risk of gasoline leaked from underground storage tank (UST) systems - have become increasingly clear, vast improvements have been made in the design, construction, and operation of UST systems. Unfortunately, federal and state regulators and UST system designers and installers have *not* succeeded in engineering *all* of the groundwater contamination risk out of these systems. A study by the U.S. Geological Survey, which randomly sampled 225 water supply wells in Rockingham County in 2003, detected the gasoline additive MtBE in 40 percent of public wells, and found a correlation between MtBE concentration and proximity to USTs¹.

The main sources of concern with respect to USTs and groundwater contamination are vapor releases from UST facilities and small spills of fuel that routinely occur when fuel is being dispensed to vehicles. With a view to minimizing the impacts of those releases, DES maintains technical standards for the siting, design, and installation of UST systems, and an active inspection program to oversee their operation and maintenance. Unfortunately, DES does not have the resources to ensure that all UST systems comply with daily operation and maintenance requirements once they are installed, let alone ensure that these systems are leak-free. There are also many older gas stations that are not required to comply with newer design standards for spill containment and stormwater management.

In addition to vapor releases and chronic small spills, larger spills sometimes take place during the process of fueling vehicles and portable containers. Well designed and operated gas stations incorporate a number of measures to minimize the groundwater contamination risk from routine and accidental spills. However, given the limits of DES's oversight and the state of the art, local officials need to ensure that the appropriate restrictions and oversight are in place on the local level, to the extent that communities want to ensure protection of their groundwater resources.

This fact sheet outlines a number of steps that municipal officials and water suppliers should consider taking to minimize the groundwater contamination risk of gas stations.

Siting Restrictions

Given the likelihood that UST systems will release gasoline constituents (most commonly in the form of vapor leaks from underground piping systems) and the possibility that spilled fuel will be carried off the fueling area by stormwater, municipal officials interested in providing the highest possible level of protection for groundwater used for drinking water should consider restricting the siting of gas stations as they would any other land use that is likely to contaminate groundwater. If the municipality's zoning ordinance prohibits the location of certain high-risk land uses in wellhead protection areas, aquifer protection areas, or other areas of high-value groundwater, gas stations should be considered for inclusion in the list of prohibited land uses.

Municipal officials should also consider including setbacks in zoning ordinances or site plan review regulations to separate UST systems and gas station stormwater discharges from water supply wells, both public and private. A 2002 study of petroleum contamination travel distances at discharge sites in Maine found the *average* distance traveled was 295 feet for gasoline constituents and 140 feet for diesel/fuel oil constituents. About one-third of MtBE contamination plumes, one-quarter of other gasoline plumes, and one-sixth of diesel/fuel oil plumes traveled more than 300 feet². DES's rules for the siting of UST systems *at new sites* (Env-Wm 1401.28 (ac)) include the following setbacks:

- 500' between gasoline USTs and public water supplies (PWSs)
- 400' between other USTs and PWSs
- 250' between gasoline USTs and private wells
- 75' between other USTs and private wells
- 75' between any UST and surface water

Municipalities that feel that these setbacks are not sufficiently protective of public or private water supplies or other water resources can establish more stringent setbacks, as well as applying setbacks to new USTs at existing sites, although DES does not recommend that local siting restrictions be applied to replacement USTs.

Whether or not municipalities establish their own UST setback requirements, they should help ensure that UST systems at new sites comply with DES's setbacks, since DES does not always have the resources to field-check information about existing wells provided to DES by UST applicants. This can be done through the local site plan review process (in municipalities that have site plan review regulations), and whenever applicants for new USTs notify the municipality, as required by DES.

Site Design

The design of UST systems (the tank and underground piping) is thoroughly regulated by DES³. DES does *not* recommend that municipalities establish additional *design* criteria for these tank systems. However, there are several aspects of gas station design that should receive attention during site plan review from a groundwater protection standpoint.

Spill Containment

In addition to requiring devices that are designed to contain spills that may occur when USTs are being filled, DES rules for new USTs⁴ require a concrete pad with positive limiting barriers (PLBs) to contain spills in the fuel dispensing area (Env-Wm 1401.28 (v)). PLBs are grooves in the concrete around the edge of the dispensing area; the rule requires that they be constructed *and maintained* to contain five gallons *for each dispenser* (each dispenser typically has two dispensing hoses). The rule also states that dispensing nozzles may not extend beyond the PLBs.

Stormwater Management

The guiding principle of stormwater management at gas stations is to keep clean water clean. Relatively clean stormwater, such as from roofs and areas other than the fueling area, may not be allowed to run onto the fuel dispensing area (Env-Wm 1401.28 (a)). The relatively clean stormwater can be managed the same as stormwater from any parking area; it should be directed as sheet flow over grassed areas and/or collected and treated according to accepted stormwater best management practices (BMPs)⁵. With this in mind, the site should be designed and maintained with a snow removal plan and designated snow storage areas that do not interfere with the intended stormwater flow.

If the municipality has an opportunity to review the site plan for an existing facility, such as in the case of site alteration or expansion, the design goal should be to keep stormwater off the dispensing pad. Whenever practical, stormwater management at an existing facility should be brought up to date with a canopy draining outside the dispensing area, a properly pitched, impervious concrete dispensing pad, and properly sized PLBs.

Groundwater Protection Plan

Municipalities should require applicants to submit a plan to minimize the potential for groundwater contamination. Implementation of the plan should be a condition of site plan review approval. The plan should cover the following items:

- A complete description of spill prevention and control measures for the facility. Spill prevention begins with the customer. Signs should be posted at the pump instructing customers not to top off fuel tanks and to notify an employee in the event of a spill. Emergency shutoff switches should be plainly labeled.
- An estimate of the maximum quantity of fuel that could be spilled in the event of an equipment failure, along with an analysis of its fate and a plan for preventing it from reaching groundwater or surface water. The plan should include descriptions of containment and/or diversionary structures or equipment needed in the event of a spill, and a demonstration that the needed equipment, personnel, and other resources would be available to respond to a spill.
- A notification list, including the names and phone numbers of local management, remote management, fire and police, local and state agencies needing to be notified, and spill response contractors.
- Routine spot cleaning of small spills at fueling areas with dry methods. Dry methods include using rags or absorbents. Fueling areas should never be washed down unless the water is collected and disposed of properly. The plan should specify that an adequate supply of absorbent materials be kept readily available.
- Storage and disposal of used sorbents and/or rags.
- Maintenance of PLBs and the stormwater management system, including BMPs.
- Provisions to ensure that snow plowing and other maintenance will not interfere with the proper functioning of stormwater management, spill containment, and leak detection systems.
- Employee training: Employees should be trained (upon hiring and annually thereafter) in all aspects of routine operation and maintenance, including routine spill cleaning and containment of contaminated stormwater, as well as spill response and other emergency procedures.

Existing Gas Stations - Local Regulatory Options

Several options exist for local oversight of existing gas stations. Of the approaches listed above, siting restrictions clearly would not apply to existing UST systems at existing gas stations. However, some aspects of site design (stormwater management, PLBs) could be corrected at existing gas stations, and the implementation of a groundwater protection plan is certainly achievable at existing sites. While existing operations would be exempt from requirements enacted in zoning or site plan review regulations, municipalities can institute these requirements through a general bylaw under RSA 31:39, or a health regulation or health ordinance enacted under RSA 147:1, 1, if the purpose is to

protect public health.

Existing Gas Stations - Non-Regulatory Options

According to a 2001 report by the U.S. Government Accounting Office, 29 percent of regulated USTs nationally are not being operated and maintained properly. The most important non-regulatory role for water suppliers and municipal officials with respect to existing gas stations is to ensure compliance with state requirements with respect to stormwater management, spill containment, and periodic inspection of release prevention and detection systems. DES strongly urges municipalities and/or water suppliers to visit gas stations annually (subject to the voluntary cooperation of owners) to verify that the owners are complying with these requirements, as well as any local site plan review conditions.

For more information on local groundwater protection measures, please contact DES's Drinking Water Source Protection Program at 271-7061, or visit <http://www.des.state.nh.us/dwspp/>.

¹Ayotte, J.D., Argue, D.M., and McGarry, F.J., 2005, Methyl tert-Butyl Ether occurrence and related factors in public and private wells in southeast New Hampshire: Environmental Science and Technology, vol. 39, no. 1, p. 9-16. (<http://nh.water.usgs.gov/Publications/2005/es049549e.pdf>)

²Bureau of Remediation & Waste Management, Maine Department of Environmental Protection, "Historical Oil Contamination Travel Distances in Ground Water at Sensitive Geological Sites in Maine," April 30, 2002.

³This fact sheet deals only with USTs used to store motor fuel at gas stations. For state regulatory requirements for other UST types, please refer to DES Fact Sheet WMD-REM-20. For information on above-ground storage tanks, please refer to WMD-REM-5.

⁴The rules apply where the concrete pad is disrupted for tank or piping installation after February 2005.

⁵For more information, please see DES report R-WSPCD-95-3, Best Management Practice for Urban Stormwater Runoff.

Water Supply Engineering

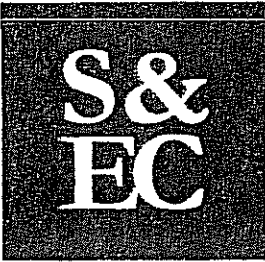
Environmental
Fact Sheet



Print Version

WD-WSEB-22-20

2006



Soil & Environmental Consultants, PA

11010 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
www.SandEC.com

August 18, 2006 ★

S&EC Project No.: 10419.W1

Chatham Development Corp.
Attn: Steven O'neal
6208 Fayetteville Road Suite 104
Durham, NC 27713

Re: Historical Records Review / Natural Heritage Program File Search
★ County Line Site
Chatham County, North Carolina

Dear Mr.O'neal:

In August 2006 S&EC conducted an updated review of records at the North Carolina State Historic Preservation Office (SHPO) for sites and structures of historical significance on the subject property. In addition, a file search for federally protected species was performed at the Natural Heritage Program office in Raleigh, North Carolina. The location of the project site is depicted on the attached Farrington and Chapel Hill USGS quadrangles.

Findings - NC State Historic Preservation Office

North Carolina SHPO maintains records and locations of buildings, structures, and objects that are listed by local governments as historic landmarks or that are listed or eligible for listing on the National Register of Historic Places. The records check at the State Historic Preservation Office (SHPO) revealed that there are no structures on the property that appear on the National Registry (NR), Determination of Eligibility (DOE), Study List (SL), or Locally Designated (LD) lists. Please refer to the attached Farrington and Chapel Hill USGS quadrangles for the exact locations of insignificant properties.

Findings – NC Natural Heritage Program Office

North Carolina Natural Heritage Program records occurrences of rare plant and animal species, exemplary natural communities, and special animal habitats known to occur in North Carolina. The record check was performed in August 2006. The subject property is located on the Farrington and Chapel Hill USGS quadrangles.

Charlotte Office:

236 LePhillip Court, Suite C
Concord, NC 28025
Phone: (704) 720-9405
Fax: (704) 720-9406

Greensboro Office:

3817-E Lawndale Drive
Greensboro, NC 27455
Phone: (336) 540-8234
Fax: (336) 540-8235

A list of the occurrences within a 3-mile radius of the property boundary within the Farrington and Chapel Hill USGS quadrangles are listed below:

Farrington USGS

IPAs:

Morgan Creek Bluffs
University Lake Bluffs
Cub Creek Bottomlands and Beaver Ponds
North Edwards Ridge

Animals:

→ *Cambarus davidii* (Carolina Ladle Crayfish)
→ *Hemidactylium scutatum* (Four-toed Salamander)

Chapel Hill USGS

Findings – NC Office of Archaeology

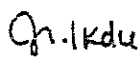
North Carolina Office of State Archaeology records archaeological sites and excavations. The record check was performed in August 2006. Archaeological sites in the surrounding area have been excavated. A Field Review of this site was documented at the Office of Archaeology (file # ER04-0411). Nothing of significance was found on this site and there are no historic artifacts documented within the project boundary.

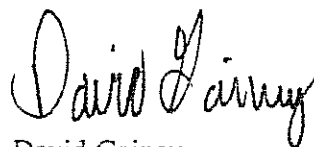
Summary

The records search at the Natural Heritage Program revealed that no rare plants or animals are documented within the project boundaries. Identified Priority Areas (IPA), Morgan Creek Bluffs University Lake Bluffs, Cub Creek Bottomlands and Beaver Ponds, and North Edwards Ridge, as designated by the Natural Heritage Program (NHP), are documented within a 3-mile radius of the property line. The file search at the State Historic Preservation Office produced no records of structures on property listed on the National Registry (NR), Determination of Eligibility (DOE), Study List (SL), or Locally Designated (LD) lists. The records search at the North Carolina Office of Archaeology revealed no records of significant archaeological sites or artifacts documented within the project boundaries.

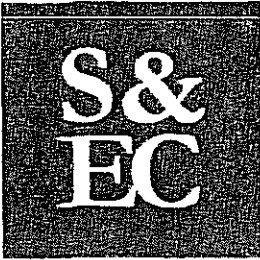
If you have any questions or need additional services, call us at 919-846-5900.

Sincerely,

James R. Graham Jr. 
James R. Graham Jr.
Biologist / Environmental Scientist


David Gainey
Environmental Specialist / Project Manager

Attachments: USGS Quad Map with Historical Site Locations and Occurrences of Rare Plant
and Animal Species



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www.SandEC.com

August 18, 2006 ★
S&EC Project No.: 10419.W1

Chatham Development Corp.
Attn: Steven O'neal
6208 Fayetteville Road Suite 104
Durham, NC 27713

★ Re: Threatened and Endangered Species Survey Report
★ County Line Site
Chatham County, North Carolina

Dear Mr. O'neal:

The purpose of this report is to advise you on the existing habitat types and the potential presence of protected plant and animal species at the County Line Site. The approximately 70 acre tract is situated on the east side of Highway 15 501 at the Orange/ Chatham County border. The location of the project site is depicted on the attached Farrington and Chapel Hill USGS quadrangles.

Executive Summary

There are four federally listed in Chatham County, NC, none of which were observed onsite during the field survey.

Introduction

Under the Endangered Species Act (ESA) (1973), species may be listed as either "endangered" or "threatened." Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. All species of plants and animals, except pest insects and non-native species are eligible for listing as endangered or threatened. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments.

Charlotte Office:
236 LePhillip Court, Suite C
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Section 4 of the ESA specifies that a species must be listed as endangered or threatened solely on the basis of its biological status and threats to its existence. When evaluating a species for listing, five factors are considered: 1) damage to, or destruction of, a species' habitat; 2) overuse of the species for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing protection; and 5) other natural or human related threats to the species' survival. When one or more of these factors imperils the survival of a species, the United States Fish and Wildlife Service (FWS) takes action to protect it. To ensure the accuracy of the data, the FWS decides all listings using sound science and peer review.

Section 7 of the ESA requires federal agencies to use their legal authorities to promote the conservation purposes of the law. This section also requires federal agencies to consult with the FWS to ensure that actions they authorize, fund, or carry out will not jeopardize listed species. The consulting agency then receives a "biological opinion" on the proposed action. In the relatively few cases where the FWS or National Marine Fisheries Service (NMFS) determines that the proposed action will January 1998 jeopardize the species, they must offer "reasonable and prudent alternatives" about how the proposed action could be modified to avoid potential impacts to the protected species. It is very rare to withdraw or terminate projects because of jeopardy to a listed species, however conditions to, and modifications of projects are common.

Section 10 of the ESA provides relief to private landowners who want to develop land inhabited by listed species. Landowners can receive a permit for the take of a listed species that may occur incidental to otherwise legal activities, provided they have developed an approved Habitat Conservation Plan (HCP). HCPs include an assessment of the likely impacts on the species from the proposed action, the steps that will be taken to minimize and mitigate those impacts, and the funding available to carry out those steps. When the FWS approves the HCP, the landowner can apply for an "incidental take" permit, which allows them to proceed with the proposed action.

RECORDS REVIEW

The North Carolina Natural Heritage Program (NHP) records occurrences of rare plant and animal species, exemplary natural communities, and special animal habitats known to occur in North Carolina. An updated record check was performed in August 2006. The subject property is located on the Farrington and Chapel Hill USGS quadrangles.

Chatham County Federally Threatened or Endangered species:

- 1) Bald Eagle (*Haliaeetus leucocephalus*)
- 2) Red-cockaded Woodpecker (*Picoides borealis*)
- 3) Cape Fear Shiner (*Notropis mekistocholes*)
- 4) Harperella (*Ptilimnium nodosum*).

Other state-listed species and/or Federal Species of Concern:

<i>Aimophila aestivalis</i>	Bachman's sparrow	NC-SC	US-FSC
<i>Lanius ludovicianus</i>	Loggerhead shrike	NC-SC	
<i>Phalacrocorax auritus</i>	Double-crested cormorant	NC-SR	
<i>Hemidactylium scutatum</i>	Four-toed salamander	NC-SC	
<i>Etheostoma collis</i> pop.2	Carolina darter	NC-SC	US-FSC
<i>Moxostoma</i> sp 2	Carolina redbhorse	NC-SR	US-FSC
<i>Alasmidonta undulata</i>	Triangle floater	NC-T	
<i>Alasmidonta varicosa</i>	Brook floater	NC-E	US-FSC
<i>Fusconaia masoni</i>	Atlantic pigtoe	NC-E	US-FSC
<i>Lampsilis cariosa</i>	Yellow lampmussel	NC-E	US-FSC
<i>Strophitus undulatus</i>	Creepers	NC-T	
<i>Villosa constricta</i>	Notched rainbow	NC-SC	
<i>Villosa delumbis</i>	Eastern creekshell	NC-SR	
<i>Villosa vaughaniana</i>	Carolina creekshell	NC-E	US-FSC
<i>Cambarus davidi</i>	Carolina ladle crayfish	NC-SR	
<i>Choroterpes basalis</i>	a mayfly	NC-SR	
<i>Gomphus abbreviatus</i>	Spine-crowned clubtail	NC-SR	
<i>Gomphus quadricolor</i>	Rapids clubtail	NC-SR	
<i>Gomphus septima</i>	Septima's clubtail	NC-SR	US-FSC
<i>Neurocordulia virginiana</i>	Cinnamon shadowdragon	NC-SR	
<i>Tricorythodes robacki</i>	a mayfly	NC-SR	
<i>Allium cuthbertii</i>	Striped garlic	NC-SR-T	
<i>Baptisia albescens</i>	Thin-pod White Wild Indigo	NC-SR-P	
<i>Collinsonia tuberosa</i>	Piedmont horsebalm	NC-SR-P	
<i>Dichanthelium annulum</i>	a witch grass	NC-SR-P	
<i>Fothergilla major</i>	Large witch-alder	NC-SR-T	
<i>Hexastylis lewisii</i>	Lewis's heartleaf	NC-SR-L	
<i>Isoetes virginica</i>	Virginia quillwort	NC-SR-L	US-FSC
<i>Monotropsis odorata</i>	Sweet pinesap	NC-SR-T	US-FSC
<i>Phacelia covillei</i>	Buttercup phacelia	NC-SR-T	US-FSC
<i>Porteranthus stipulatus</i>	Indian physic	NC-SR-P	
<i>Scutellaria nervosa</i>	Veined skullcap	NC-SR-P	
<i>Thermopsis mollis</i>	Appalachian golden-banner	NC-SR-P	

NC-SC: North Carolina Special concern

NC-SR: North Carolina Significantly Rare

NC-T: North Carolina Threatened

NC-E: North Carolina Endangered

US-FSC: US Special concern

"Endangered Species" (E) means any native species documented by biological research and inventory to be in danger of extirpation throughout all or a significant portion of its range within the state and to have no more than five occurrences in the state, and any species determined to be an "endangered species" pursuant to the federal Endangered Species Act.

"Threatened Species" (T) means any native species documented by biological research and inventory to be likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range within the state and to have no more than nine occurrences in the state, and any species determined to be a "threatened species" pursuant to the federal Endangered Species Act, except for such species determined to be endangered by the Commissioner in accordance with section 4 of this act.

"Species of Special Concern" (SC) means any native plant species or any native nonharvested wildlife species documented by scientific research and inventory to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population or has been extirpated from the state.

"Significantly Rare" (SR) Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.

Identified Priority Areas

Identified Priority Areas within a 3-mile radius of the property boundary include:

- 1) Morgan Creek Bluffs
- 2) University Lake Bluffs
- 3) Cub Creek Bottomlands and Beaver Ponds
- 4) North Edwards Ridge

Local Elemental Occurrences

The closest protected elemental occurrence of a federally listed and / or endangered species is Sweet pinesap *Monotropsis odorata* (NC-SR-T; US-FSC). Sweet Pinesap is documented 2.06 miles northwest of the site near University Lake.

FIELD SURVEY

Natural communities are recurring assemblages of plants and animals found in particular physical environments. Each type of natural community has a unique set of environmental conditions that support certain species that have adapted to those conditions. By examining natural community types a majority of species can be accurately located by eliminating unsuitable habitat for survey. Species-specific action was focused on rare species that occur in only a fraction of the community type that are their habitat. Known populations of listed species were observed for visual references and intense surveys of suitable habitat were conducted. !

Why was suitable habitat for this species not considered?

RESULTS

Habitat Types

The habitat type that occurs throughout the property is Mixed hardwood / pine forests which have been timbered extensively. Understory and subcanopy have been severely altered by displaced boulders.

Protected Species

North Carolina Natural Heritage Program has documented 54 occurrences of State or Federally listed assemblages, communities, and species in Chatham County, NC. In Chatham County there are 14 Invertebrate Animals, 18 Natural Communities, 12 Vascular Plants, and 9 Vertebrate Animals, and 1 Animal Assemblage listed within the database. State and Federally listed species without obvious suitable habitat on property were omitted from the survey. The property boundaries were surveyed for suitable habitat of the following NHP documented species occurring within a 3-mile radius of the property:

Were just the boundary surveyed?

Cape Fear Shiner

The Cape Fear Shiner inhabits sandy and rocky pools and runs of small to medium rivers. Habitat for the Cape Fear Shiner does not occur on the property and no individuals of the species were observed.

Septima's Clubtail

Typical habitat for Septima's clubtail (*Gomphus septima*) (NC-SR; US-FSC) includes rivers with numerous rapids and exposed rocks. No suitable habitat occurs on the property and no individuals were observed.

Yellow Lampmussel

The yellow lampmussel (*Lampsilis cariosa*), (NC-E; US-FSC) can be found in gravel bars, margins of the flowing portions of waterbodies and cracks in bedrock in both large rivers and small streams. No suitable habitat occurs within the property boundaries and no individuals were observed.

Bald Eagle

The Bald Eagle (*Haliaeetus leucocephalus*) (NC-T; US-T) lives near large bodies of open water such as lakes, marshes, coasts, and rivers, where there are plenty of fish to eat and tall trees for nesting and roosting. Known populations occur in closer proximity to Lake Jordan. No trees of suitable nesting quality occur on property and no individuals were observed.

lot an adequate community habitat description

Red-cockaded Woodpecker

The Red-cockaded Woodpecker (RCW) (*Picoides borealis*) (NC-E; US-E), is a habitat specialist, requiring mature growth of pine forest with a grassland component underneath. For nesting/roosting habitat, open stands of pine containing trees 60 years old and older. Red-cockaded woodpeckers need live, large older pines in which to excavate their cavities. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwoods, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres. Suitable habitat for the RCW was not found, no nest sites were discovered on property. The Red-cockaded woodpecker has only a historical documentation in Chatham County.

Harperella

Harperella (*Ptilimnium nodosum*) (NC-E; US-E) typically occurs in two habitat types: (1) rocky or gravel shoals and margins of clear, swift-flowing stream sections; and (2) edges of intermittent pineland ponds in the coastal plain. This plant tolerates and may actually require a very specific and unusual water regime, which includes moderately intensive spring floods that may reduce or eliminate competing vegetation. Harperella is readily eliminated from its habitat by alterations of the water regime which result from impoundments, water withdrawal, and drainage or deepening of ponds. Other factors such as siltation, pollution, and shoreline development also threaten Harperella populations. Riverine populations flower beginning in late June or July and continue until frost. No suitable habitat and no populations of Harperella were found on property.

Buttercup Phacelia

Phacelia ranunculacea (NC-SR-T; US-FSC) (syn. *Phacelia covillei*) is documented as an element occurrence near the bridge over the Haw River on Chicken Bridge Road (SR 1545). Typical habitat for this species occurs within the fine textured soils of Piedmont alluvial forests and floodplains. *Phacelia ranunculacea* is documented only in Alamance, Chatham, Lee, and Harnett counties in North Carolina. *Phacelia ranunculacea* co-occurs with *Nemophylla aphylla*, these two species are very similar in overall appearance and phenology, flower and fruit characteristics are used to distinguish them from one another, which emphasizes the importance of conducting the field survey during the flowering and/or fruiting stages of its life cycle. This woodland herb species typically flowers in April to May. *Phacelia ranunculacea* can be differentiated from *P. dubia* in the field. Specifically, the leaves of *P. ranunculacea* are all petiolate and the stamens are included within the corolla tube. In contrast, *P. dubia* cauline leaves are sessile and the stamens are weakly exerted from the corolla tube. The survey of the property and examination of the plant and animal communities revealed no presence of the buttercup phacelia on property.

Carolina Ladle Crayfish

The Carolina Ladle Crayfish (*Cambarus davidi*) (NC-SR) is documented from a single individual captured about 2 miles east of the property boundary in a tributary on Roberson Creek at US 64, Pittsboro (NHP EO ID 3066). *Cambarus davidi* is apparently

The County
line Plaza
site is
not 2 mi.
west of this
element occurrence
near Pittsboro; this was
cut & pasted from the T&E
report for the Belmeade
development. *

limited to the upper Neuse and Cape Fear river basins in the eastern Piedmont Plateau of North Carolina (Cooper 2000). Suitable habitat for this species occurs in streams (under larger rocks) and burrows. Suitable habitat for *C. davidi* occurs on property and no individuals were observed during the survey.

Why is no suitable habitat found if site contains headwater wetlands

Four-toed Salamander

The four-toed salamander (*Hemidactylium scutatum*) (NC-SC) is a small, slender salamander is orange to grayish brown above, sometimes with small black and bluish speckles on the sides. The tail is constricted (narrows) at its base, and there are only four toes on each hind foot (most salamanders have five toes). Adults are 2 to 4 inches (5 to 10 cm) long. Suitable habitat is found throughout much of the state, but only where boggy ponds or spring fed creeks are available in or near damp wooded habitat. When not breeding, they take refuge under rotting logs and leaf litter. They eat insects and insect larvae, spiders, worms, and other small invertebrates. No suitable habitat for *H. scutatum* occurs on property, and no individuals were encountered in the field survey.

Suitable habitat also likely exists for wet pinesap and four-toed salamander

CONCLUSION / RECOMMENDATIONS

Of the species surveyed for none were found on property. Suitable habitat for the Carolina Ladle Crayfish exists on property, but none of these species were observed. No other state or federally listed species were found on property.

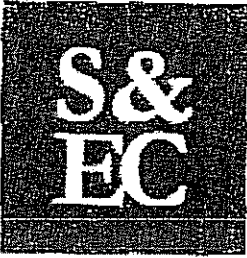
If you have any questions or need additional services please call us 919-846-5900.

Respectively,

James R. Graham Jr. /kdu
James R. Graham Jr.
Biologist / Environmental scientist

David Gainey
David Gainey
Environmental Specialist

The Historical Records Review/ Natural Heritage Program File Search conducted/ documented the same date the T & E Report was written (Aug. 18, 2006) found a record for the Four-toed salamander within a 3-mile radius.



Soil & Environmental Consultants, PA

11010 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
www.SandEC.com

August 11, 2006 ★
S&EC Project No.: 9894.W2

Chatham Development Corp.
Attn: Steven O'neal
6208 Fayetteville Road Suite 104
Durham, NC 27713

★ Re: Threatened and Endangered Species Survey Report
Pittsboro Site
Chatham County, North Carolina

Dear Mr. O'neal:

The purpose of this report is to advise you on the existing habitat types and the potential presence of protected plant and animal species at the Pittsboro Site. The approximately 555 acre tract is situated south of and adjacent to Highway 64 at the junction of Highway 64 Business and Highway 64 Bypass, west of Pittsboro, NC. The location of the project site is depicted on the attached Pittsboro and Siler City NE USGS quadrangles.

Executive Summary

There are four federally listed in Chatham County, NC, none of which were observed onsite during the field survey.

Introduction

Under the Endangered Species Act (ESA) (1973), species may be listed as either "endangered" or "threatened." Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. All species of plants and animals, except pest insects and non-native species are eligible for listing as endangered or threatened. For the purposes of the ESA, Congress defined

Charlotte Office:
234 Leffellip Court, Suite C
Concord, NC 28025
Phone: (704) 720-9405
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Greensboro, NC 27455
Phone: (336) 540-8234
Fax: (336) 540-8235

species to include subspecies, varieties, and, for vertebrates, distinct population segments.

Section 4 of the ESA specifies that a species must be listed as endangered or threatened solely on the basis of its biological status and threats to its existence. When evaluating a species for listing, five factors are considered: 1) damage to, or destruction of, a species' habitat; 2) overuse of the species for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing protection; and 5) other natural or human related threats to the species' survival. When one or more of these factors imperils the survival of a species, the United States Fish and Wildlife Service (FWS) takes action to protect it. To ensure the accuracy of the data, the FWS decides all listings using sound science and peer review.

Section 7 of the ESA requires federal agencies to use their legal authorities to promote the conservation purposes of the law. This section also requires federal agencies to consult with the FWS to ensure that actions they authorize, fund, or carry out will not jeopardize listed species. The consulting agency then receives a "biological opinion" on the proposed action. In the relatively few cases where the FWS or National Marine Fisheries Service (NMFS) determines that the proposed action will January 1998 jeopardize the species, they must offer "reasonable and prudent alternatives" about how the proposed action could be modified to avoid potential impacts to the protected species. It is very rare to withdraw or terminate projects because of jeopardy to a listed species, however conditions to, and modifications of projects are common.

Section 10 of the ESA provides relief to private landowners who want to develop land inhabited by listed species. Landowners can receive a permit for the take of a listed species that may occur incidental to otherwise legal activities, provided they have developed an approved Habitat Conservation Plan (HCP). HCPs include an assessment of the likely impacts on the species from the proposed action, the steps that will be taken to minimize and mitigate those impacts, and the funding available to carry out those steps. When the FWS approves the HCP, the landowner can apply for an "incidental take" permit, which allows them to proceed with the proposed action.

RECORDS REVIEW

The North Carolina Natural Heritage Program (NHP) records occurrences of rare plant and animal species, exemplary natural communities, and special animal habitats known to occur in North Carolina. An updated record check was performed in August 2006. The subject property is located on the Pittsboro and Silk Hope USGS quadrangles.

Chatham County Federally Listed species:

- 1) Bald Eagle (*Haliaeetus leucocephalus*)
- 2) Red-cockaded Woodpecker (*Picoides borealis*)
- 3) Cape Fear Shiner (*Notropis mekistocholus*)
- 4) Harperella (*Ptilimnium nodosum*).

Other state-listed species and/or Federal Species of Concern:

<i>Aimophila aestivalis</i>	Bachman's sparrow	NC-SC	US-FSC
<i>Lenius ludovicianus</i>	Loggerhead shrike	NC-SC	
<i>Phalacrocorax auritus</i>	Double-crested cormorant	NC-SR	
<i>Hemidactylium scutatum</i>	Four-toed salamander	NC-SC	
<i>Etheostoma collis</i> pop.2	Carolina darter	NC-SC	US-FSC
<i>Moxostoma</i> sp 2	Carolina redbhorse	NC-SR	US-FSC
<i>Aleamidonta undulata</i>	Triangle floater	NC-T	
<i>Aleamidonta varicosa</i>	Brook floater	NC-E	US-FSC
<i>Fusconia masoni</i>	Atlantic pigtoe	NC-E	US-FSC
<i>Lampsilis cariosa</i>	Yellow lampmussel	NC-E	US-FSC
<i>Strophitus undulatus</i>	Creeper	NC-T	
<i>Villosa constricta</i>	Notched rainbow	NC-SC	
<i>Villosa delumbis</i>	Eastern creekshell	NC-SR	
<i>Villosa vaughaniana</i>	Carolina creekshell	NC-E	US-FSC
<i>Cambarus davidi</i>	Carolina ladle crayfish	NC-SR	
<i>Choroterpes basalis</i>	a mayfly	NC-SR	
<i>Gomphus abbreviatus</i>	Spine-crowned clubtail	NC-SR	
<i>Gomphus quadricolor</i>	Rapids clubtail	NC-SR	
<i>Gomphus septima</i>	Septima's clubtail	NC-SR	US-FSC
<i>Neurocordulia virginiensis</i>	Cinnamon shadowdragon	NC-SR	
<i>Tricorythodes robecki</i>	a mayfly	NC-SR	
<i>Allium cuthbertii</i>	Striped garlic	NC-SR-T	
<i>Baptisia albenscens</i>	Thin-pod White Wild Indigo	NC-SR-P	
<i>Collinsonia tuberosa</i>	Piedmont horsebalm	NC-SR-P	
<i>Dichanthelium annulatum</i>	a witch grass	NC-SR-P	
<i>Fothergilla major</i>	Large witch-alder	NC-SR-T	
<i>Hexastylis lewisii</i>	Lewis's heartleaf	NC-SR-L	
<i>Ischaetes virginica</i>	Virginia quillwort	NC-SR-L	US-FSC
<i>Monotropsis odorata</i>	Sweet pinesap	NC-SR-T	US-FSC
<i>Phacelia covillei</i>	Buttercup phacelia	NC-SR-T	US-FSC
<i>Porteranthus stipulatus</i>	Indian physic	NC-SR-P	
<i>Scutellaria nervosa</i>	Vained skullcap	NC-SR-P	
<i>Thermopsis mollis</i>	Appalachian golden-banner	NC-SR-P	

NC-SC: North Carolina Special concern

NC-SR: North Carolina Significantly Rare

NC-T: North Carolina Threatened

NC-E: North Carolina Endangered

US-FSC: US Special concern

"Endangered Species" (E) means any native species documented by biological research and inventory to be in danger of extirpation throughout all or a significant portion of its range within the state and to have no more than five occurrences in the state, and any species determined to be an "endangered species" pursuant to the federal Endangered Species Act.

"Threatened Species" (T) means any native species documented by biological research and inventory to be likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range within the state and to have no more than nine occurrences in the state, and any species determined to be a "threatened species" pursuant to the federal Endangered Species Act, except for such species determined to be endangered by the Commissioner in accordance with section 4 of this act.

"Species of Special Concern" (SC) means any native plant species or any native nonharvested wildlife species documented by scientific research and inventory to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population or has been extirpated from the state.

"Significantly Rare" (SR) Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.

Identified Priority Areas

The Lesser Montmorillonite Forest is a NHP Identified Priority Area (IPA), occurring adjacent to the site.

Local Elemental Occurrences

The closest protected elemental occurrence of a federally listed and / or endangered species is the Four-toed Salamander (*Hemidactylium scutatum*) (NC-SC). The Four-toed Salamander is documented adjacent to the site in the Lesser Montmorillonite Forest.

FIELD SURVEY

Natural communities are recurring assemblages of plants and animals found in particular physical environments. Each type of natural community has a unique set of environmental conditions that support certain species that have adapted to those conditions. By examining natural community types a majority of species can be accurately located by eliminating unsuitable habitat for survey. Species-specific action was focused on rare species that occur in only a fraction of the community type that are their habitat. Known populations of listed species were observed for visual references and intense surveys of suitable habitat were conducted.

RESULTS

Habitat Types

The habitat type that occurs throughout the property is Mixed hardwood/ pine forests which have been timbered extensively.

Protected Species

North Carolina Natural Heritage Program has documented 54 occurrences of State or Federally listed assemblages, communities, and species in Chatham County, NC. In Chatham County there are 14 Invertebrate Animals, 18 Natural Communities, 12 Vascular Plants, and 9 Vertebrate Animals, and 1 Animal Assemblage listed within the database. State and Federally listed species without obvious suitable habitat on property were omitted from the survey. The property boundaries were surveyed for suitable habitat of the following NHP documented species occurring within a 10 mile radius of the property:

Cape Fear Shiner

The Cape Fear Shiner inhabits sandy and rocky pools and runs of small to medium rivers. This type of habitat is found along the northeastern border of the property. Habitat for the Cape Fear Shiner does not occur on the property and no individuals of the species were observed.

Septima's Clubtail

Typical habitat for Septima's clubtail (*Gomphus septima*) (NC-SR; US-FSC) includes rivers with numerous rapids and exposed rocks. No suitable habitat occurs on the property and no individuals were observed.

Yellow Lampmussel

The yellow lampmussel (*Lampsilis cariosa*), (NC-E; US-FSC) can be found in gravel bars, margins of the flowing portions of waterbodies and cracks in bedrock in both large rivers and small streams. No suitable habitat occurs within the property boundaries and no individuals were observed.

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Red-cockaded Woodpecker

The Red-cockaded Woodpecker (RCW) (*Picoides borealis*) (NC-E; US-E), is a habitat specialist, requiring mature growth of pine forest with a grassland component underneath. For nesting/roosting habitat, open stands of pine containing trees 60 years old and older. Red-cockaded woodpeckers need live, large older pines in which to excavate their cavities. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwoods, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres. Suitable

habitat for the RCW was not found, no nest sites were discovered on property. The Red-cockaded woodpecker has only a historical documentation in Chatham County.

Harperella

Harperella (*Ptilimnium nodosum*) (NC-E; US-E) typically occurs in two habitat types: (1) rocky or gravel shoals and margins of clear, swift-flowing stream sections; and (2) edges of intermittent pineland ponds in the coastal plain. This plant tolerates and may actually require a very specific and unusual water regime, which includes moderately intensive spring floods that may reduce or eliminate competing vegetation. Harperella is readily eliminated from its habitat by alterations of the water regime which result from impoundments, water withdrawal, and drainage or deepening of ponds. Other factors such as siltation, pollution, and shoreline development also threaten Harperella populations. Riverine populations flower beginning in late June or July and continue until frost. No suitable habitat and no populations of Harperella were found on property.

Buttercup Phacelia

Phacelia ranunculacea (NC-SR-T; US-FSC) (syn. *Phacelia covillei*) is documented as an element occurrence near the bridge over the Haw River on Chicken Bridge Road (SR 1545). Typical habitat for this species occurs within the fine textured soils of Piedmont alluvial forests and floodplains. *Phacelia ranunculacea* is documented only in Alamance, Chatham, Lee, and Harnett counties in North Carolina. *Phacelia ranunculacea* co-occurs with *Nemophylla aphylla*, these two species are very similar in overall appearance and phenology, flower and fruit characteristics are used to distinguish them from one another, which emphasizes the importance of conducting the field survey during the flowering and/or fruiting stages of its life cycle. This woodland herb species typically flowers in April to May and was apparent during the time of the survey. *Phacelia ranunculacea* can be differentiated from *P. dubia* in the field. Specifically, the leaves of *P. ranunculacea* are all petiolate and the stamens are included within the corolla tube. In contrast, *P. dubia* cauline leaves are sessile and the stamens are weakly exerted from the corolla tube. The survey of the property and examination of the plant and animal communities revealed no presence of the buttercup phacelia on property.

Carolina Ladle Crayfish

* The Carolina Ladle Crayfish (*Cambarus davidi*) (NC-SR) is documented from a single individual captured about 2 miles east of the property boundary in a tributary on Roberson Creek at US 64, Pittsboro (NHP EO ID 3066). *Cambarus davidi* is apparently limited to the upper Neuse and Cape Fear river basins in the eastern Piedmont Plateau of North Carolina (Cooper 2000). Suitable habitat for this species occurs in streams (under larger rocks) and burrows. Suitable habitat for *C. davidi* occurs on property, but no individuals were observed during the survey.

Four-toed Salamander

The four-toed salamander (*Hemidactylium scutatum*) (NC-SC) is documented from an egg mass observed under sphagnum in the Lessler Montmorillonite Forest adjacent to the property boundary (NHP EO ID 9662). *Hemidactylium scutatum* is a small, slender salamander is orange to grayish brown above, sometimes with small black and bluish

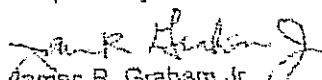
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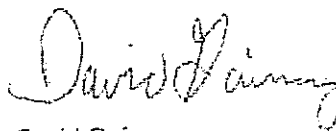
CONCLUSION / RECOMMENDATIONS

Of the species surveyed for none were found on property. Suitable habitat for the Carolina Ladle Crayfish and the Four-toed salamander exists on property, but none of these species were observed. No other state or federally listed species were found on property.

If you have any questions or need additional services please call us 919-846-5900.

Respectively,


James R. Graham Jr.
Biologist / Environmental scientist



David Gainey
Environmental Specialist