



# Wildlife Habitat Zones: Horseshoe Farm Park

Raleigh, North Carolina

Parks and Recreation Department





### **Prepared For**

The City of Raleigh, North Carolina

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**Introduction:**

The City of Raleigh, North Carolina Parks and Recreation Department purchased Horseshoe Farm in 1994. During the Master Plan process in 2008, the Master Plan Committee developed **Horseshoe Farm Environmental Stewardship Recommendations** which suggested the creation of a Wildlife Habitat Zones Advisory Team (WHZAT) to assist the City of Raleigh with park planning. In this way, the City would benefit from the expertise and experience of professionals with wildlife habitat planning and management skills.

The Wildlife Habitat Zones Advisory Team convened for five planning sessions to assist the City of Raleigh Parks and Recreation Department with design, planning, and management recommendations for wildlife habitat areas of Horseshoe Farm. At the beginning of the process, several proposed WHZAT outcomes were defined in an attempt to set preliminary prescriptions:

- Delineate wildlife zones: field locate and map the zones with GPS
- Delineate and map Significant Natural Heritage Area portion of Horseshoe Farm Park
- Develop Visual Aid with Narrative that may include annual management recommendations for the wildlife zones

**WHZAT consists of the following members:**

1. John Connors, Wake Audubon Society
2. Harry LeGrand, NC Natural Heritage Program
3. Jacquelyn Wallace, NC Wildlife Resources Commission
4. Chris Moorman, NCSU Cooperative Extension Wildlife Biologist
5. Dowd Bruton, Wild Turkey Federation
6. Dr James Gregory, NC State University Professor of Forest Hydrology and Soils
7. Dr. Jon Stucky, NC State University Professor of Wetland Plant Biology
8. David Shouse, City of Raleigh Senior Park Planner
9. Ivan Dickey, City of Raleigh Assistant Parks Superintendent
10. Tiffany Frost, City of Raleigh Nature Program Director
11. Melissa Salter, City of Raleigh Land Stewardship Coordinator
12. WHZAT Facilitator: Stephen Bentley, City of Raleigh Senior Park Planner

The City of Raleigh is fortunate to have WHZAT members donate their time towards stewarding Horseshoe Farm. The input and expertise of WHZAT members has helped, and will continue to help, the City of Raleigh to develop an important wildlife management component to the Park. The City of Raleigh hopes that the Advisory Team will continue their involvement in the planning, development, and maintenance of Horseshoe Farm wildlife habitat zones.

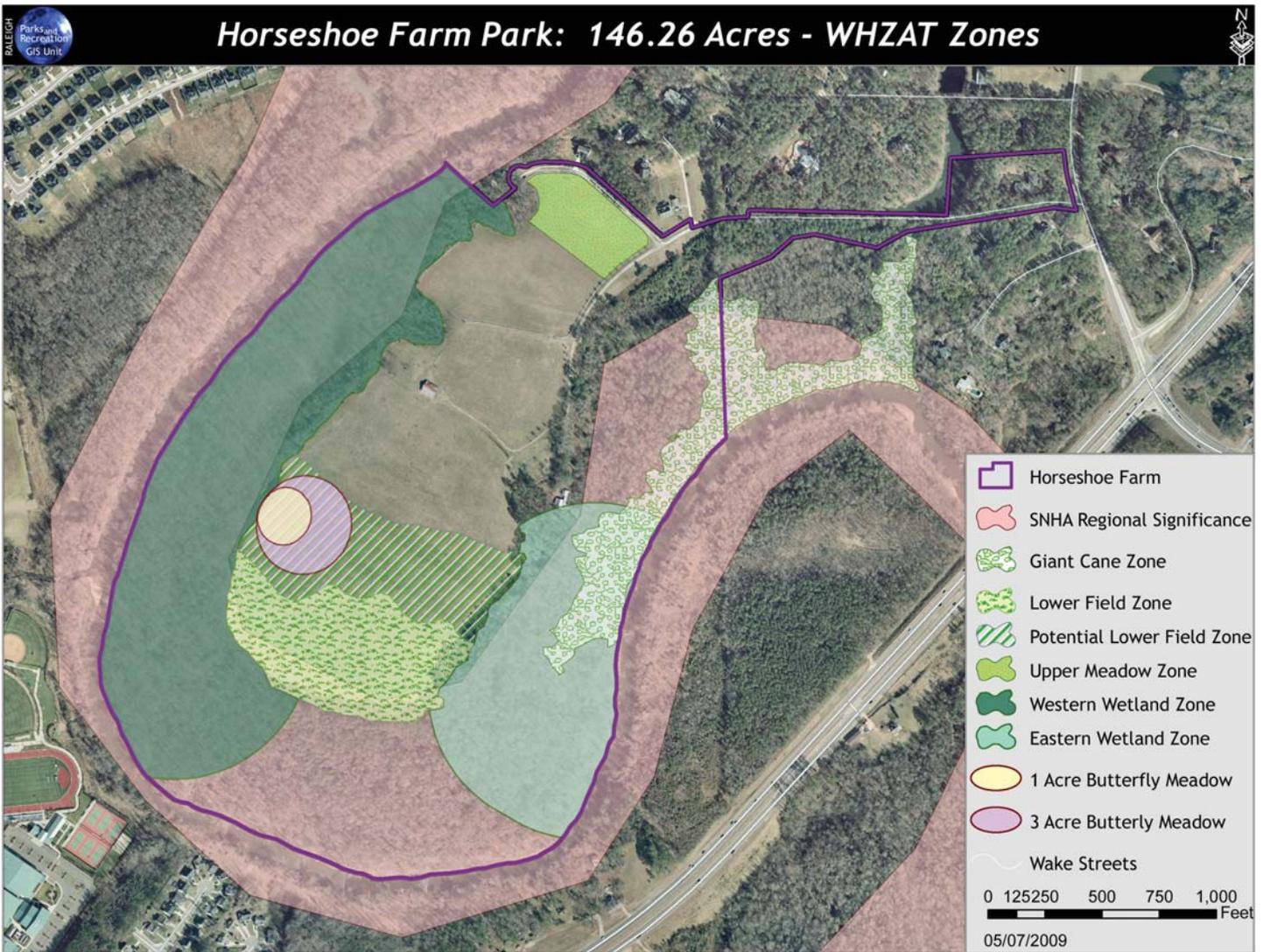
The City of Raleigh would also like to thank Joe Folta, Wildlife Biologist with the North Carolina Wildlife Resources Commission for his assistance with this project.

The WHZAT recommendations detailed in this report will be used to assist the City of Raleigh with development of a comprehensive Natural Resources Management Plan for Horseshoe Farm Park.



WHZAT defined a total of six wildlife habitat zones for Horseshoe Farm Park:

- Zone 1 Significant Natural Heritage Area (SNHA)
- Zone 2 Wetlands
- Zone 3 Butterfly Meadow
- Zone 4 Upper Meadow
- Zone 5 Giant Cane
- Zone 6 Lower Field



Following are detailed descriptions and maps of each individual wildlife habitat zone.

**Zone 1**

**Significant Natural Heritage Area (SNHA): Piedmont Levee and Bottomland Forest**

Size: 77.97 acres

Site description: The SNHA, delineated by the North Carolina Natural Heritage Program, encompasses the majority of the forested area of Horseshoe Farm Park, and continues north and south of the Park along the Neuse River. The area supports features rare in the Piedmont: a remnant oxbow with mature bottomland forest and several tiers of well developed natural levees and floodplain pools.

Goals: Preserve and enhance the natural integrity of the area, maintaining healthy plant and animal communities; preserve a corridor for wildlife traveling along the Neuse River.

Program opportunities: Wildlife viewing, education, passive recreation

Trail recommendations: Soft hiking trails with pervious surface following areas with low erosion potential within the SNHA; limit public trails in wildflower slope area to the extent possible

Management Considerations:

- Environmental impacts to this zone will be minimized overall to protect plant communities and wildlife habitat.
- All construction practices at Horseshoe Farm Park both major and minor must be sensitive to the natural resources on site including but not limited to various plant species, breeding/migratory birds, aquatic buffers and peak amphibian movement periods, etc. Staff and consultants should monitor and work closely with the consultant and contractor to address this.
- Invasive species should be controlled to protect and promote native vegetation and ecological function.
- Special attention to invasives should be used during Park development, as this is often when invasives establish, coming in on equipment, from outside soil brought in to the site, etc.
- Protect heritage trees: Avoid creating trails or other park development within their critical root zones (1.25 feet for every inch of dbh).
- Preserve snags and downed woody debris for wildlife habitat.
- Conduct a snag inventory at Horseshoe Farm and determine if additional large diameter snags would be beneficial for wildlife.
- Hazard trees may be removed where they present a safety issue near trails or other public areas.
- Wooded area may be enhanced by promoting desirable tree, shrub, and herbaceous species.
- City of Raleigh should decide whether to pursue participation with the USFWS Forest Land Legacy Program (FLLP) which can assist with forest management such as snag creation, gap creation, planting, and invasives control with a 75% cost share.
- Deer management may be needed to allow natural regeneration of trees and riparian shrubs. (Currently there is very limited natural regeneration due to high deer browse).
- Look for graduate student to install deer enclosure to do experiment on what natural regeneration would be taking place at Horseshoe Farm without the extreme deer pressure.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.

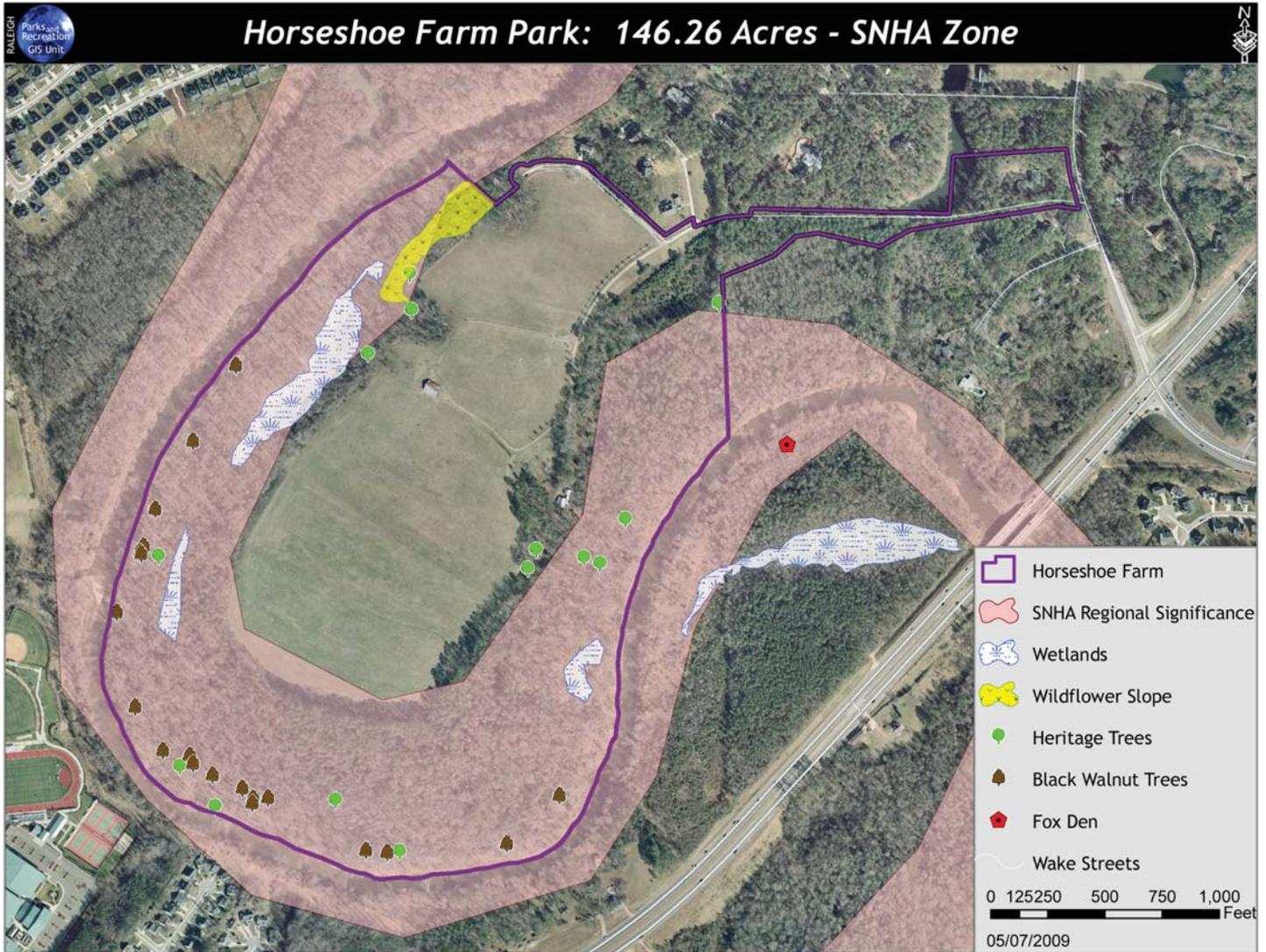
- Supplemental tree and shrub planting with native species (using tree protectors or fencing) should be done to mimic the natural regeneration that should be taking place.
- Recommended plant lists will be included with the Horseshoe Farm Natural Resources Management Plan.
- WHZAT members have formally and unanimously agreed that the SNHA portion of Horseshoe Farm is accurately delineated and represented on the City of Raleigh Wildlife Zone Map. This map was compiled from NC Natural Heritage Data.
- Areas of Loblolly Pine (*Pinus taeda*) at the south end of the Park would be a recommended area for proposed low impact camping.
- Preserve wildflower slope feature, a component within the Significant Natural Heritage Area, hosting high quality native woodland wildflowers including Bloodroot (*Sanguinaria canadensis*), and Yellow Corydalis (*Corydalis flavula*) which is the only known occurrence in Wake County. Public trails on the slope should be avoided if possible. If the Neuse River Greenway Trail passes through the wildflower slope, impacts should be minimized to every extent possible. This area could have limited access for resource professionals and educators.
- Document and develop a plan to preserve a healthy native violet (*Viola spp.*) population to offer a food source for the Falcate Orangetip butterfly (*Anthocharis midea*).
- Fox den is located on the City of Raleigh greenway parcel east of Horseshoe Farm Park. The den location has been delineated. The Horseshoe Farm Natural Resources Management plan should include a plan to protect the den area.
- High quality wooded wetland located on the City of Raleigh greenway parcel east of Horseshoe Farm Park needs to be delineated and protected with a buffer.
- Fire ants (*Solenopsis invicta*) within Horseshoe Farm Park are a recreational and ecological threat and should be controlled with caution to protect beneficial insects.
- Develop a list of steward groups for various projects within the park.
- Look for opportunities for graduate or professional studies on site.
- Birdhouses: Currently there is an Adopt-a-Park agreement with Wake Audubon to install and manage birdhouses at Horseshoe Farm. The City of Raleigh supports and appreciates this stewarding role from Wake Audubon and hopes to continue this partnership.
- Further study and confirm inventory of vegetation and wildlife at Horseshoe Farm.
- Public access should include marked hiking trails and river access for canoeing and fishing.

Signage Ideas: Post at several locations around wildflower slope and other sensitive areas: ‘*This is a sensitive area, please stay on the trail*’ and ‘*Please enjoy the plants in their natural setting and do not pick or dig them*’. Consider more details on this sign such as ‘*Plants dug from the wild seldom survive*’;

A sign highlighting the Yellow Corydalis (*Corydalis flavula*) as the first known location in Wake County would highlight this plant’s rarity for Park visitors;

A sign at park entrance stating ‘*NO ATV or other off-road vehicles allowed*’;

Signs should be posted at several locations in the Park stating the importance of keeping dogs on leash to protect ground-nesting birds and other wildlife.



## Zone 2

### Wetlands

There are three wetlands located in Horseshoe Farm Park, all within the SNHA Zone. WHZAT defined the wetlands as a distinct wildlife habitat zone, as they have different characteristics and management needs than the SNHA as a whole. Within the Wetlands Zone are two subzones:

1. Two wetlands on the western side of the Park are called the **Western Wetland Zone**.
2. The third wetland on the eastern side of the Park is called the **Eastern Wetland Zone**.

Western Wetland Zone size: 35.98 acres

Western Wetland Zone site description: This zone is an extremely high quality forested wetland complex with two wetlands totaling 3.41 acres. The largest of the two wetlands supports exceptional reptile and amphibian habitat. WHZAT created a wetland buffer around the desirable amphibian habitat, with the wetlands as the center of the buffer and extending out to a distance of 600 feet at the longest extent and 100 feet at the shortest extent (where amphibians would encounter habitat that was foreseen as probably undesirable). This delineation provided a wetland buffer of 35.98 acres around the two adjacent wetlands. Amphibians and waterfowl are abundant in this wetland complex, and WHZAT considers this zone to be a top priority.

Goals: Preserve the integrity of this high quality wetland area, maintain a breeding place for reptiles and amphibians; provide cover and food source for wildlife; provide educational opportunities in a limited area of the larger wetland with a concentrated “teaching station”.

Program opportunities: Wildlife viewing; Ecological study for school groups and other special programs

Trail recommendations: Neuse River Greenway Trail should be a boardwalk impacting the wetlands as little as possible; there should be no trail bisecting the two wetlands; A location with water access should be created at the largest wetland for educators and special programs.

### Management Considerations:

- Plug man-made ditch: research techniques and management and development implications.
- Preserve river oats (*Chasmanthium latifolium*).
- Preserve snags and downed woody debris.
- Control invasive species. Special attention to invasives should be used during Park development, as this is often when invasives establish, coming in on equipment, from outside soil brought in to the site, etc.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.
- Do not introduce fish or other predators of amphibian larvae into small wetland communities.
- Minimize use of chemical herbicides and insecticides in the Wetland Zone.
- Minimize site grading and construction and if they must occur keep them at least 150 feet away from wetlands.
- Use silt fencing or other appropriate means to exclude amphibians from construction areas, but avoid disturbing migration corridors between the two wetlands.
- Route any stormwater surface runoff from upland parking lot areas and construction areas away from wetlands.
- Site any stormwater detention ponds outside of wetland zones.
- Cluster any recreation infrastructure to a concentrated 25 percent developed area within each wetland

buffer, to allow at least 75% of the buffer area to remain undisturbed.

- Avoid placing any development between wetland pools.
- Public should be able to observe this wetland from boardwalk or upland viewing area.

Signage ideas: for example...*'NO Fish allowed. These wetlands are a very important breeding habitat for reptiles and amphibians, and fish in these pools would destroy the larvae'*



Eastern Wetland Zone size: 19.85 acres

Eastern Wetland Zone site description: A high quality .55 acre wetland of good reptile and amphibian habitat. This wetland is ephemeral in nature and does sometimes dry up, although it is artificially drained by previous landowners. WHZAT created a wetland buffer around the desirable amphibian habitat, with the wetlands as the center of the buffer and extending out to a distance of 600 feet at the longest extent and 100 feet at the shortest extent, (where amphibians would encounter habitat that was foreseen as probably undesirable). This delineation provides a wetland buffer of 19.85 acres.

Goals: Focus on preservation as the primary goal.

Program Opportunities: As the eastern wetland is an ephemeral wetland, focus programming at largest wetland in the western portion of Horseshoe Farm.

Trail recommendations: Route public trails away from wetland to maintain the focus on preservation.

Management Considerations:

- Plug man-made ditch: research techniques and management and development implications.
- Re-evaluate extent of this wetland.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.



### Zone 3

#### Butterfly Meadow

Size: 1 to 3 acres

Site description: The Butterfly Meadow will consist of diverse North Carolina native plants that support butterflies and moths during all stages of their life cycle (nectar plants and caterpillar host plants). The optimal location will have full sun from mid-morning until mid-afternoon and soil types that will support the largest variety of plants in order to increase success attracting the widest range of species. The location and shape of the Butterfly Meadow is marked on the Horseshoe Farm Wildlife Zone Map as an example only. The location of the Butterfly Meadow would be appropriate in a variety of positions.

Goals: Design and develop a Butterfly Meadow with North Carolina native plants to provide nectar sources and larval food sources for moths and butterflies, to create butterfly and moth habitat and to provide public education opportunities.

Program opportunities: Wildlife viewing, youth and adult programming on butterfly identification and ecology, landscaping for wildlife, nature photography, benefits of native plants, native plant identification

#### Management Considerations:

- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.
- Diversity of plants is important to support the largest range of Lepidoptera species.
- Diversity of blooming time should range from early spring to late fall so that at any time during the growing season multiples species of plants are blooming.
- Diversity of flower color, size, shape, fragrance, plant height.
- Include night blooming flowers for moths.
- Include native fruiting trees or shrubs.
- Include landscaping features such as large flat rocks where butterflies can bask, brush piles for shelter, and wet areas for “puddling”, brush piles, etc.
- Leave dead flower heads in place during the growing season so eggs or pupating butterflies are not unintentionally disturbed or removed.
- Allow plants to seed and spread within the butterfly meadow.
- Local sources should be used when acquiring seeds and plants.
- Insecticides should not be used within the Butterfly Meadow, with the exception of non-native fire ant (*Solenopsis invicta*) control which must be done with great caution to avoid harming any beneficial insects.
- Soil testing will be needed once the location of the Butterfly Meadow is established.
- Recommended plant list will be included with the Horseshoe Farm Natural Resources Management Plan.

Signage Ideas: Butterfly and moth identification and ecology signs; landscaping for wildlife signs; plant identification signs



**Zone 4**  
**Upper Meadow**  
 Size: 3.16 acres

Site description: Currently a mowed field at the north end of the Park, above the “North Upper Field” referenced in the Horseshoe Farm Park Master Plan. In the Master Plan this area is located near the park entrance and future parking areas.

Goals: Provide cover and food source for wildlife; provide wildlife viewing area for the public; provide buffer for residential area north of the Park; provide a visually stimulating entrance area to the Park with an abundance of wildflowers; provide educational signage appropriate for high public visibility of this area; provide ADA access

Program opportunities: Wildlife viewing; walking trail; plant identification; native seed collection; nature photography

Trail recommendations: Trail access directly from parking area, ADA trails

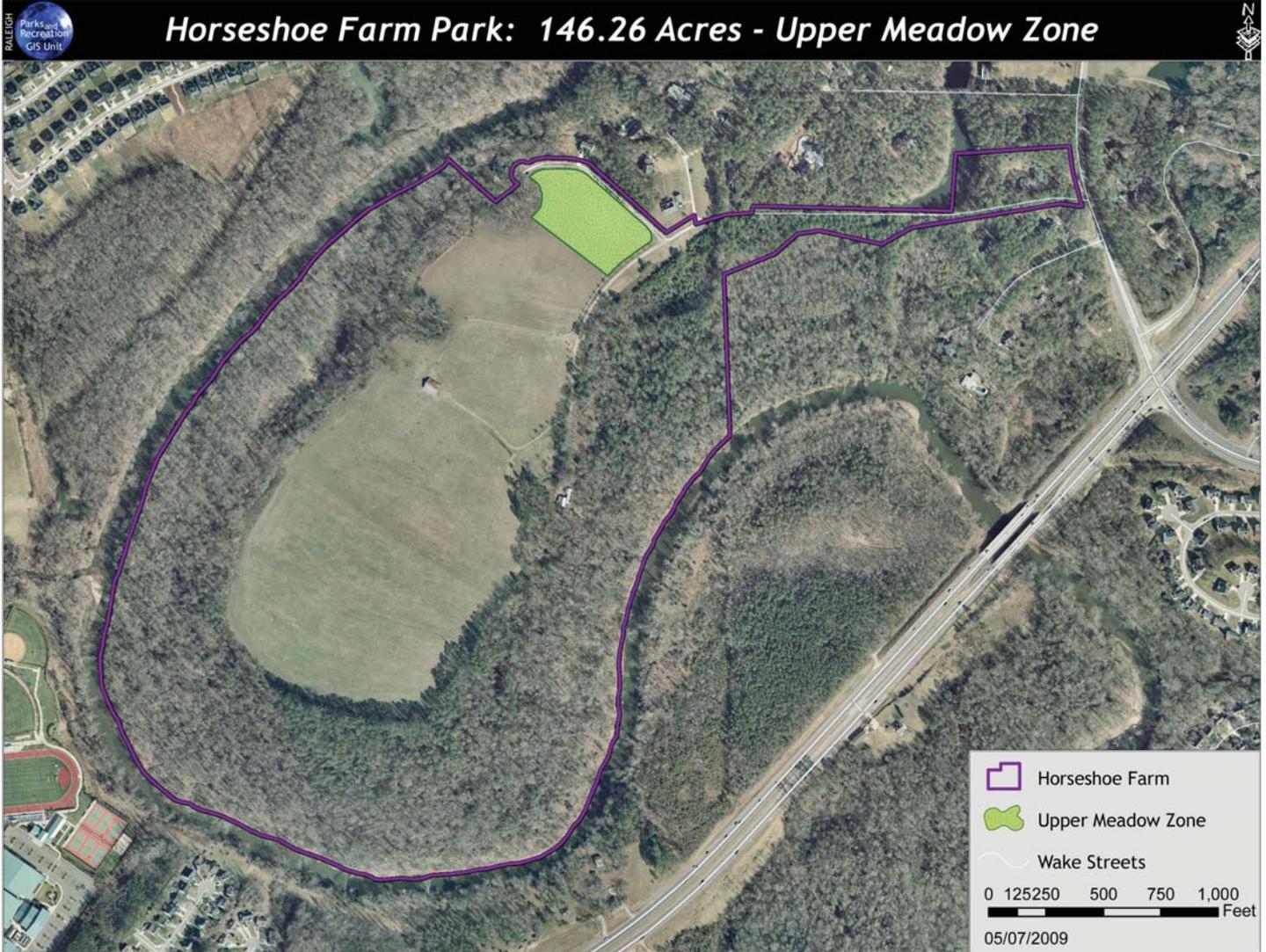
Management Considerations:

- Meadow will be established with native wildflowers and native warm season grasses.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.
- High percentage of wildflower species to promote wildlife diversity, and enhance public education.
- Plant a variety of hummingbird flowers.
- Establish a narrow shrub border adjacent to wood line to create a more natural appearance and improve wildlife value of this zone (width = 30 feet).
- Establish a few shrub and tree islands to improve wildlife habitat and offer a demonstration area for public education on “landscaping for wildlife” (tree protectors will be needed).
- Invite WHZAT to review the Upland Meadow zone design, including location of shrub and tree islands, woodland shrub border, trail and signage location.
- Crape-myrtles (*Lagerstroemia spp.*) are not native to North Carolina and are moderately invasive; crape-myrtle seedlings will need to be controlled and as the existing crape-myrtles lining the entrance drive to Horseshoe Farm deteriorate, the City of Raleigh could consider replacing the crape-myrtles with a native tree such as wax myrtle, serviceberry, persimmon, red cedar, etc. The City could install a second line of such trees behind the crape-myrtles, so that as the crape-myrtles phase out, mature trees will already be in place.
- Fire ant (*Solenopsis invicta*) control will be used in this zone as needed, with great caution taken to protect beneficial insects.
- Phasing: Stop mowing spring 2009; Do a soil test of the area; Inventory vegetation 2009 and 2010; Convene WHZAT to decide if vegetation “base” is suitable to meet zone goals in all 3 acres or possibly a portion of the site; City of Raleigh staff and/or WHZAT will need to evaluate the extent and control recommendations for non-native fescue and Bermuda grass; Leave area unmowed for winter cover and bird nesting during the spring and summer; Mow a portion of the zone once per year in November, mowing only one acre each year and alternating mow areas, so that each acre is mowed one time on a 3 year rotation and there is a constant source of winter cover and seed

heads to provide a winter food source for birds. This mowing schedule should continue until the zone development progresses into one of the two following scenarios (or a combination):

- If using existing vegetation as a base, proceed in 2010 with spot treatment of invasives in this zone as needed, and proceed with supplemental plantings to increase diversity and visual appeal when plants and/or funding are available for this step. Stewardship volunteers could be used for portions of site establishment if hand broadcasting native wildflower or grass seed, and for supplemental plantings of plugs or container plants. Larger container plants will be better suited to compete with existing vegetation than plugs or seeds. This zone would also be an area to relocate or transplant quality native plants from areas of Horseshoe Farm that will be developed. It may also be possible to occasionally relocate plants from an established healthy and abundant population from which experienced staff could take very limited divisions to propagate a particular plant species into a new area.
- If the decision has been made that zone goals will be better met with a “blank slate” for the establishment phase, proceed with the following tasks as funding and/or project readiness is in place. Treat only a portion of the total area at any one time to maintain some wildlife food and cover while converting the plant community. Treat area with a glyphosate-based herbicide product 1-2 weeks prior to tilling or drilling native seed mix. Prepare seedbed by disking and firming with a cultipacker and be ready for planting in September-October. The seed mix selected will determine how much of each seed is planted, but in general plant 7-15 lbs. of seed per acre. This zone will contain a large percentage of native wildflowers in the seed mix to enhance the visual appeal of the area. Seeds can be broadcast and followed with a cultipacker or drilled to a maximum depth of ¼ inch. Stewardship volunteers could be used for portions of site establishment if hand broadcasting the seed mix, and if supplemental plantings of plugs are used to increase the speed with which this site is visually appealing.
- **Zone Maintenance:** Recommended maintenance techniques will be provided in the Horseshoe Farm Natural Resources Management Plan. Mowing, disking, and controlled burning will all be evaluated as potential management tools. Some ongoing control of invasive plants may be needed. Sweet Gum (*Liquidambar styraciflua*) may need to be controlled on edge of field to reduce competition to native grasses and wildflowers.
- **Plant list:** City of Raleigh staff will continue to research and gather input from WHZAT and other professionals. All plants will be native to the Piedmont and Inner Coastal Plain of North Carolina. The plant list will be developed to include a variety of color, height and form, with year round visual appeal to both wildlife and the public. A recommended plant list will be included with the Horseshoe Farm Natural Resources Management Plan.

Signage Ideas: Plant identification signs, “meadow” ecology signs, landscaping for wildlife signs



## Zone 5

### Giant Cane

Size: 12.70

Site description: A component within the Significant Natural Heritage Area with extensive native Giant Cane (*Arundinaria gigantea*).

Goals: Preserve the area; Provide cover and food source for wildlife; Educational opportunities

Program opportunities: Education, stewardship

Trail recommendations: Attempt to develop trails with a more direct route, rather than meandering, to minimize the area disturbed.

#### Management Considerations:

- Giant Cane is the host plant to three butterflies:
  - Creole Pearly Eye (*Enodia creola*)
  - Southern Pearly Eye (*Enodia portlandia*)
  - Lace-winged Roadside-Skipper (*Amblyscirtes aesculapius*)
- Protect heritage trees within the vicinity of the Giant Cane.
- Control invasive species in this zone as needed.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.
- Provision of river access for canoeing and fishing will likely impact the Giant Cane, but impact should be minimized to the extent possible.

Signage Ideas: Provide a sign about Giant Cane (*Arundinaria gigantea*) and the three host butterflies, and post several signs that state: *'This is a sensitive area, please stay on the trail'*



## Zone 6

### Lower Field

Size: 10 acres minimum (up to 21.32 acres)

Site description: The adopted **Horseshoe Farm Park Master Plan** drawing depicts a “transitional wildlife habitat zone” in the lower field along the forest edge. WHZAT recommends this area be expanded to a minimum of 10 acres but could be expanded with consideration to phased development of the park facilities to maximize wildlife benefits and increase opportunities for public education, stewardship activities, and programming. This zone would consist of approximately 1/3 shrub thicket and 2/3 grassland. The Lower Field Zone should have high diversity, feathering shrub thickets, tree and shrub islands, and a possible wetland plant community in the natural drainage area. Interpretive and bird trails are recommended along the periphery of the zone with a limited number of trails that bisect it, to reduce fragmentation of the habitat. Wildlife amenities such as birdhouses and watering stations could be included when appropriate. The location of the Lower Field offers the opportunity for the City of Raleigh’s first ‘controlled burns’, a highly effective and educational ecological management tool.

Goals: Provide habitat, cover and food source for wildlife within three distinct habitat zones – grassland, shrubs, and forest. Wildlife food sources will include browse, soft mast, and seeds. Establish a range of vegetation to include cover habitat for escaping predators and adverse weather conditions, and for nesting and brooding; Seek to sustain a variety of wildlife in this zone to provide public education opportunities; Support educational institutions to research and observe a variety of land management prescriptions; Offer interpretive signage and guided hikes for public and school education.

Program opportunities: Stewardship and service learning for both adults and children; passive recreation; wildlife viewing; education; bird census; study of vegetation and wildlife management techniques; provide research areas for graduate students or other institutions of learning

Trail recommendations: WHZAT recommends a moderate amount of maintained trails to balance the needs of wildlife with opportunities for passive recreation and education. Trails should be designed along a periphery to reduce human impacts to wildlife species using this zone. Trails bisecting the area should be minimized, as trails cutting through the interior of this zone will open up the area to edge predators, invasives, and other human impacts, and may ultimately reduce the diversity of birds and other wildlife using this zone.

#### Management Considerations:

- Zone should be established with approximately 1/3 shrub thicket, 2/3 grassland.
- All plantings within this zone should use plants native to the Piedmont and Inner Coastal Plain of North Carolina.
- Zone should include a diversity of shrubs and small trees.
- Meandering shrub line, or “feathering” is most beneficial to wildlife.
- Shrub and tree islands should be scattered within the grassland portion of the zone.
- The shrub portion of this zone should also include native warm season grasses and forbs.
- Invite WHZAT to review the Lower Field Zone design, including location of shrub and tree islands, trails and signage location, and wildlife enhancements.
- Immediate recommendation to City of Raleigh Parks maintenance staff to stop mowing a lower 10 acre zone which was delineated by City of Raleigh staff in April 2009.
- Ten acre no mow area includes drainage swale on the east side of the Lower Field. This will

potentially allow wetland vegetation to re-establish this area and may provide added diversity to the Lower Field for increased wildlife diversity.

- Maintain an approximately four foot wide trail along the edge of the current unmowed area (shift the current trail away from the edge of the woods).
- Inventory existing vegetation in the Lower Field to assist with development of a site establishment process and site specific management recommendations.
- Fire ant (*Solenopsis invicta*) control will be used in this zone as needed, with great caution to protect beneficial insects.
- Phasing: Stop mowing spring 2009; Do a soil test of the area; Inventory vegetation 2009 and 2010; Convene WHZAT to decide if vegetation “base” is suitable to meet zone goals, and what vegetation enhancements should be made; City of Raleigh staff and/or WHZAT will need to evaluate the extent and control recommendations for non-native fescue and Bermuda grass; Leave area unmowed for winter cover and bird nesting during the spring and summer; Mow a portion of the zone once per year in November, and alternate mow areas on a rotation to ensure a constant source of winter cover and seed heads as a winter food source for birds. This mowing schedule should continue until the zone development progresses into one of the two following scenarios (or a combination):
  - If using existing vegetation as a base, proceed with supplemental plantings into the zone to increase diversity when plants and/or funding are available for this step. Stewardship volunteers could be used for portions of site establishment if hand broadcasting native wildflower or grass seed, and for supplemental plantings of plugs or container plants. Larger container plants will be better suited to compete with existing vegetation than plugs or seeds. This zone would also be an area to relocate or transplant quality native plants from areas of Horseshoe Farm that will be developed. It may also be possible to *occasionally* relocate plants from an established healthy and abundant population from which experienced staff could take very limited divisions to propagate a particular plant species into a new area.
  - If the decision has been made that zone goals will be better met with a “blank slate” in certain portions of this 10-20 acres for the zone establishment phase, proceed with the following tasks as funding and/or project readiness is in place. Treat only a portion of the total area at any one time to maintain some wildlife food and cover while converting the plant community. Treat area with a glyphosate-based herbicide product 1-2 weeks prior to tilling or drilling native seed mix. Prepare seedbed by disking and firming with a cultipacker and be ready for planting in September-October. The seed mix selected will determine how much of each seed is planted, but in general plant 7-15 lbs. of seed per acre. The seed mix chosen will be based on highest wildlife value. Seeds can be broadcast and followed with a cultipacker or drilled to a maximum depth of ¼ inch. Stewardship volunteers could be used for portions of site establishment if hand broadcasting the seed mix, and if supplemental plantings of plugs are used to increase the speed with which this zone is established.
- Both of the site establishment techniques discussed above would allow opportunity to study methods of land management and restoration; University students and others could benefit from applied practice.
- Zone Maintenance: Recommended maintenance techniques will be provided in the Horseshoe Farm Natural Resources Management Plan. Mowing, disking, and controlled burning will all be

evaluated as potential management tools. Some ongoing control of invasive plants may be needed. Maintenance techniques will be used on different portions of this zone each year to provide a constant cover and food source for wildlife.

- Plant list: City of Raleigh staff will continue to research and gather input from WHZAT and other professionals. All plants will be native to the Piedmont and Inner Coastal Plain of North Carolina; selection will focus on the wildlife value of the plant species, and a variety of forms will be included: forbs, shrubs and sub-shrubs, vines, and small trees. Plantings may need to be protected with tree shelters or fencing. The plants will offer food and cover in all four seasons.

Signage Ideas: Early successional plant community signs, wildlife signs, 'Please keep your dog on a leash in this area to protect ground nesting birds'

