Walnut Creek 2000

Urban Wetland Educational Park

Partners for Environmental Justice

Walnut Creek 2000

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DESIGN PROGRAM

Schematic Master Plan

Partners for Environmental Justice

Prepared for:

Partners for Environmental Justice

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Project Summary

The *Urban Wetland Educational Park* is the cornerstone of Walnut Creek 2000, an action program developed by Partners for Environmental Justice (PEJ), focused on the conservation and restoration of the extensive Walnut Creek wetlands in Southeast Raleigh. The *Urban Wetlands Educational Park* includes 49 acres of a wetlands complex of more than 300 acres within the city limits, extending from Hammond Road, east to Highway 440.

This environmentally sensitive educational project has been initiated by a broad base of Wake County citizens. The goal is to restore to its former state an urban wetland that has suffered years of abuse and environmental neglect. The wetland will become a natural educational park that will improve the water quality of the Neuse River and its basin; demonstrate to the public the reason for the conservation of wetlands; create a healthy wildlife habitat; beautify an area of the city near downtown; and provide neglected Southeast Raleigh with a valuable educational /recreational resource that can also be incorporated into the City of Raleigh's Greenway system.

Furthermore, the project will support efforts to secure government assistance to improve the quality of life and to enhance property values in the economically depressed neighborhoods surrounding the park site.

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The Neuse River, North Carolina Lifeline

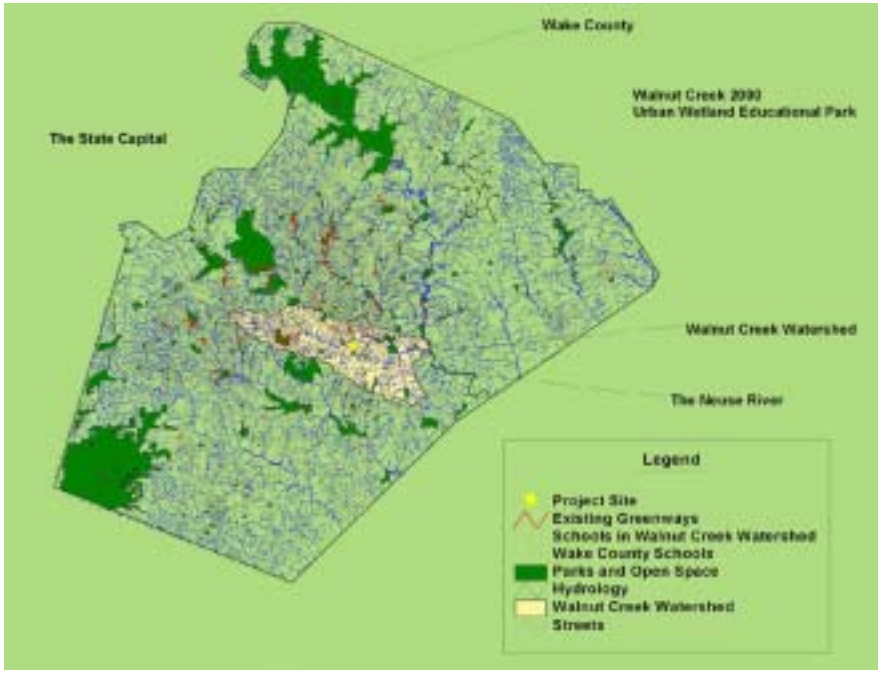
The Neuse River is one of three rivers in North Carolina whose boundaries lie wholly within the state. Estimated to be two million years old, the river is an ancient participant in the hydrologic cycle of the region. The Neuse is the third largest river in the state, is 200 miles long, contains over 3,000 stream miles, and drains more than 6000 square miles of land. Evidence of human settlement dates from as early as 14,000 years ago. Today, 1.5 million people live in the Neuse river watershed which is subdivided into upper (Piedmont) and lower (Coastal Plain) basins.

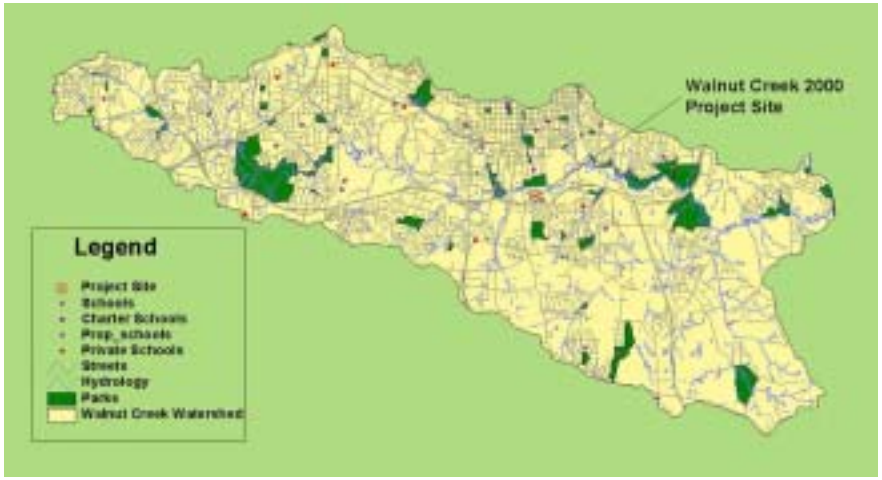
The Neuse River upper basin headwaters cover an area of 958,347 acres, contain 2,420 miles of streams and 52 “hydrologic units,” including Walnut Creek. The upper basin contains significant terrestrial and aquatic habitats but urban encroachment is reducing water quality. In the *Riparian Corridor Conservation Design for the Upper Neuse River Basin*, prepared in the year 2000 by the NC Center for Geographic Information and Analysis, NC Division of Community Assistance, and Triangle Greenways Council (TGC), three tributary streams were selected for protection. One of them is Walnut Creek, which contains endangered species of both plant and animal life.

The Neuse River is the third largest in North Carolina and one of three river basins wholly within the state. The river drains more than 6,000 square miles of land. More than 1.5 million people live within the Neuse basin which extends approximately 200 miles from the headwaters in Orange and Person Counties the mouth of the river at Pamlico Sound.Red star shows location of Walnut Creek Urban Wetland Educational Park.

Walnut Creek—an urban stream needing protection

Walnut Creek flows through the most urbanized region of the Neuse River basin. The creek's headwaters originate in Cary, meander into Lakes Johnson and Raleigh, and continue eastward through the Southeast Raleigh floodplain before merging with Big Branch, which flows directly into the Neuse River. The TGC report notes that "Walnut Creek receives significant urban runoff from state owned property including NC State University and Centennial Campus." The report proposes to protect Walnut Creek from Lake Wheeler Road to Sunnybrook Road by enhancing the wetlands corridor through restoration and increased riparian buffers. Citeria include "significant resource values, proximity to other protected lands, and recreation potential due to location … a concept of greenways as conservation corridors at the landscape scale."





(Left) The Walnut Creek watershed occupies a central location in Wake County, south of downtown Raleigh.
(Top) Walnut Creek rises in Cary, flows through Lakes Raleigh and Johnson, continues south of downtown parallel to I-440, and joins the Neuse east of the city.
(Above) The Walnut Creek watershed, almost 15 miles long and draining an area of 50 square miles, is a key component of Cary-Raleigh green structure.

A Green Infrastructure Corridor

The Walnut Creek corridor is a key component of City of Raleigh's "green infrastructure." As defined by Edward McMahon (2000), this means the "network of open space, woodlands, wildlife habitat, parks and other natural areas, which sustain clean air, water, and natural resources and enrich their citizen's quality of life." Green infrastructure is a crucial open space planning strategy because the following environmental issues have become so pressing.

Landscape Fragmentation. Increased urban sprawl has caused the rapid fragmentation of land, particularly on the fringes of major metropolitan areas. Citizens have reacted to this trend by demanding that policymakers take steps to preserve open space and channel growth.

Walnut Creek floodplain: A lifeline of green infrastructure flowing through the heart of Southeast Raleigh.

Federal Water Quality Mandates. Clean water standards mean that natural drainage systems have become more important as urban waterways and wetlands are protected.

Endangered Species protection. Conservationists originally focused on preserving individual species and their habitat. Today, there is an emphasis on habitat conservation areas that protect multiple species and link isolated preserves.

Public Heath Concerns. More than 50 percent of U.S. adults are overweight and nearly 18 percent are obese. The Centers for Disease Control and Prevention have recommended more places to walk and bicycle as an antidote to inactive lifestyles.

Urban Revitalization. Strategies for revitalizing urban cores are increasingly emphasizing the value of natural areas within the city such as waterways, parks, and other green corridors.

Sustainable Development. Growing public interest in sustainable development is reflected in an emphasis on multi-modal transportation planning, support for bicycle and pedestrian facilities, and other policies aimed at reducing fossil fuel consumption.

The *Urban Wetland Educational Park* addresses each one of these issues for the benefit of surrounding residents, the children and teachers at local schools, and the citizens of the city at large. The park will help conserve the City's ecological systems and demonstrate how green infrastructure can become part of Raleigh's Comprehensive Plan—parks and greenway section.

Walnut Creek 2000

Walnut Creek 2000 is a project of *Partners for Environmental Justice* (PEJ)—an organization that grew out of the first cycle of actions to improve the Rochester Heights environment. PEJ is a grassroots, interracial group established to promote the growth and quality of life of Southeast Raleigh. A major goal of PEJ's Walnut Creek 2000 initiative is to create a model Urban Wetland Educational Park in the area bounded by Garner Road, Bailey Drive, State Street, and Peterson Street. Walnut Creek 2000, as the overall program of PEJ, addresses the four major objectives listed below.

Wake co copy.jpegThe section of flood plain containing the Urban Wetland Educational Park, stretching from Hammond Road to the city's eastern boundary, is the largest continuous wetland remaining along Walnut Creek. Except for clearing for roads, and sewer and power line rights-of-way, the riparian corridor remains substantially in woody and wetland vegetation. The Urban Wetland Educational Park will become the educational hub of this vast, 300-acre urban wetland and help ensure that wetland conservation values are embedded in the community for generations to come.

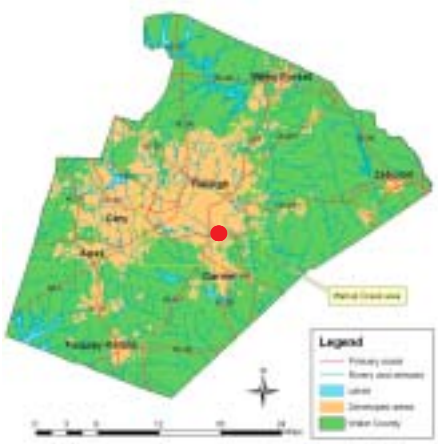
1. Reduce flooding and encourage land clean-up, thus raising residential property values and improving the economic level of local businesses.
2. Build an urban wetland educational park.
3. Beautify Hammond Pond, located west of Garner Road adjacent to the proposed industrial park and overlooked by Garner Road.
4. Provide clean water via Walnut Creek for those living downstream on the Neuse River and eventually reduce problem chemicals in North Carolina's estuaries.

ROCHESTER HEIGHTS (left) lies immediately south of the Urban Wetlands Educational Park. The neighborhood was built in the late 1950s and early 1960s, partly in the Walnut Creek flood plain, and was the first African American housing development in Raleigh. Until the 1960s, raw sewage flowed in Walnut Creek next to the neighborhood.

Severe flooding brought three Episcopalian parishes together at St. Ambrose Church in 1996 to help solve the flooding problem.

Additional aims included land clean-up to raise property values and improve the local economy, restoration of Hammond Pond (between Hammond and Garner Roads), restoration of the entire Walnut Creek wetland, and education.

(Above, right) Map shows Park location in relation to the urbanized area of Wake County.



● Park location in Wake County

Walnut Creek 2000

Urban Wetland Educational Park

Partners for Environmental Justice

MISSION

The mission of the *Walnut Creek Urban Wetland Educational Park* is to promote understanding and protection of an urban wetland, enhance community pride, and encourage economic development.

The park provides an accessible quiet zone for communing with nature. It preserves the natural beauty of the wetland, protects the habitat of numerous species, and lifts the spirits of those who visit through educational and recreational experiences.

The *Walnut Creek Urban Wetlands Educational Park* offers many community benefits, including the following:

Wetlands Restoration
Wetlands are essential for clean water as they serve as a filter system to cleanse runoff from suburban development, urban streets, and agriculture. The Urban Wetlands Educational Park site was previously the recipient of large amounts of trash. This inhibited the wetland functions of preventing flooding, cleaning water, and a supporting wildlife. The NC Wetlands Restoration Project, supported by the Clean Water Management Trust Fund, is partnering with Walnut Creek 2000 to restore the unique wetlands as a park.

Interracial Partnership
The wetland project site is located in a predominately African-American Southeast Raleigh Community. A major goal of this project is to provide a place where members of any racial heritage can work together to accomplish a common goal of better understanding and appreciation of racial diversity and the need to work together to conserve our environment. The Partners for Environmental Justice believes that when people work together for the common good they see the good in each other.

Economic Improvements
A tour of City of Raleigh parklands will reveal that historically areas outside Southeast Raleigh have received preferential treatment for funding recreational and educational development. The Walnut Creek 2000 project will help to rectify this imbalance.

People who live near the wetland purchased property without knowing that they were living in a floodplain. Nor were they aware

that after 1-40 was built, highway runoff would flow directly into the community and cause devastating flood damage. Engineering improvements made to the State Street Walnut Creek bridge in 1999 indicate that the most serious flooding problem has been solved—but it has yet to be tested in a severe hurricane.

The Urban Wetlands Educational park will bring a new population of visitors to Southeast Raleigh who will be looking for local services. Resulting business opportunities will boost the local econmy, add value to the Garner Road Redevelopment Plan, and support other economic initiatives in Southeast Raleigh.

Wetlands Education
The most important objective of the Walnut Creek 2000 project is education. The forty-nine acre site will become a major educational resource serving the residents of Raleigh and other communities across Wake County. As part of the Raleigh parks and greenways system, the park will support North Carolina's Environmental Education Program. The educational purpose is to demonstrate that wetlands are an essential aspect of an environmentally sound community. Several educational institutions are active members of the partnership, including North Carolina State University, St. Augustine's College, Shaw University, and several public schools near the site. These include Carnage, Centennial Campus, and Ligon middle schools, Fuller Elementary School, and SE Raleigh High School.

Recreational Benefits
The Urban Wetlands Educational Park will provide an inner-city quiet zone for exploring healthy wildlife habitats for urban workers, families, walkers, joggers, and cyclists.

Spiritual Support
The Urban Wetlands Educational Park promises to lift the spirits of a previously depressed area of the city. The park will provide residents a source of community pride, replacing the present 'trash dump' mentality. The consequences of the massive environmental upgrade will help the residents of Southeast Raleigh feel that their needs are appreciated and that action is being taken to address them.

Building Awareness
The Urban Wetlands Educational Park will raise community awareness about the special purpose of wetlands through media presentations, networking with community groups, newsletters, meetings with residents and neighbors, and special events such as PEJ community clean-ups. The first clean-up occured in November 1998, with eighty-five citizens participating. A second, held in March 1999, launched the Wake County National Keep America Beautiful program. More than 200 citizens participated. Now is the moment to move beyond "clean-up" towards the promise of the Wetlands Educational Park serving as a focal point for a broad program of year-round educational activities. No other community project in Southeast Raleigh has more benefits to offer the citizens of Raleigh, Wake County, and the State of North Carolina.

Capital Area Greenway entry to Walnut Creek Urban Wetland Educational Park from Peterson Street

Project Development Process

In 1998, PEJ engaged Professor Robin Moore and graduate students in the College of Design at NC State University, to produce a vision for the Urban Wetlands Educational Park.

The studio project team worked with the Walnut Creek 2000 Committee, Rochester Heights residents, wetlands and water quality technical advisors from NC State University, the Cooperative Extension service, and other representatives of state government and community organizations. The studio project focused on the Walnut Creek wetlands in South Raleigh and the adjacent Rochester Heights neighborhood and concentrated on flooding issues and the recreational/educational potential offered through the wetlands themselves and the nearby vicinity.

In 2001, PEJ's continued the NC State relationship, now with the Natural Learning Initiative (NLI) to fully develop the master plan.

The Process

NLI helped Partners for Environmental Justice with the development of the participation process and the creation of the master plan.

Community Participation
The objectives of the community involvement were:

1. To gather information from school age children, teachers, the disability community, neighbors, and Partners for Environmental Justice Board members to create the design program.
2. To raise awareness about the importance of Walnut Creek as an educational resource for the community.
3. To attract new partnerships especially with groups of neighbors that are relocating in the area.

Three community participation workshops were held between July and October 2001. Participants included Partners for Environmental Justice board members, residents of the local community, representatives of the broader community, educators from neighboring schools and the North Carolina Museum of Natural Sciences, members of the Raleigh Parks, Recreation and Greenways Advisory Board, representatives from environ-

PEJ workshop participants discuss plans for the Urban Wetland Educational Park.

Young volunteers help clean up Little Rock Creek, a tributary of Walnut Creek.

PEJ Chair, Dr. Norman Camp, discusses park plans at one of the community workshops.

Raleigh Mayor, Charles Meeker, visits the park site with members of Walnut Creek 2000.

mental organizations, city staff observers, and local politicians.

Workshop #1 (July 25, 2001) developed the mission statement, defined park user groups, profiled the types of activities and programs required to support the mission and needs of the user groups, and proposed facilities to support the activities, including an education center building.

Workshop # 2 (September 5, 2001) confirmed the mission statement for the Urban Wetlands Educational Park, discussed the social and natural history of the site, and further extended the range of facilities and educational settings to be included in the Design Program.

Workshop #3 (December 5, 2001) discussed further key site issues of project boundaries, park entrances, and siting of the Education Center.

Input from teachers
June 1, 2002, a meeting was held with schoolteachers from Carnage Middle, Ligon, and Fuller Middle School.
August 11, 2001, a well-attended workshop was hosted by teachers at Carnage Middle School which also included teachers from Ligon Middle School. The teachers contributed a vast range of ideas about how students could be involved educationally in the development of the park.

Clean-up Days
Clean-up days organized by PEJ continue to provide opportunities to inform participants about the mission and progress toward developing the Urban Wetland Educational Park.

Community Support
An increasing number of individuals and organizations have collaborated in the development of the Park. The Legacy Group made a major contribution with the development of the entry space from Peterson Street and related educational installations.

Centennial Campus Middle School developed a substantial website about the wetlands (http://www.ncpublicschools.org/ncbest/student/centennial/wc/index.htm).

Children's Ideas

Ideas and comments were solicited from young Clean-Up Day participants (September 29, 2001) on a flipchart pad. Following is a selection:

Wear boots to pick up trash
Let's spread the word to the best of our abilities
Organize tours
Have lots of wildlife on display
Nature building area with touch tank of local animals, bugs, plants
More pretty plants and signs
Signs with information about what the creatures and plants do for the environment and the community
Get all the stuff out to make it pretty
An observation deck above treeline—I agree!
Birdhouses for birdwatchers
Covered information kiosks
Boardwalks throughout the park

Carnage Middle School launched several education programs linked to the park including the new Eco-Greenhouse program.

Technical Data Collection
A graduate Soil Science class from NC State University has investigated the soils of the Wetlands Park and presented this information along with other useful natural history information on their website. A Zoology Master's degree bio-assessment by Amin Davis, NC State University provided a valuable set of data to inform management implications. This information has been incorporated into the site inventory and restoration proposals (pp.24-25) compiled by Ross Andrews, NC State University.

For each workshop and meeting, a report was produced containing the compilation and interpretation of information gathered, including photographs.

The vision

At the first community workshop, a list of key ideas was generated by workshop participants. The list inspired the mission statement for the project and at the same time presents an overall descriptive vision of the project. In alphabetical order, the key words are:

- Accessible for all abilities
- Achievement incentive
- All ages
- Beautification
- Child friendly
- Children's designs
- Comfortable walks
- Commune with nature in an urban setting
- Creative inspiration
- Demonstration/exhibit
- Develop
- Discovery
- Easy access
- Educational
- Environment
- Experience
- Greenway connections
- Holistic
- Improve ecology and natural habitats (beavers, great blue herons, muskrats, deer, turtles, fish, tadpole, crane)
- Interconnections
- Interracial tasks
- Involvement of neighbors and schools
- Learn about environment
- Life
- Lifts spirits of visitors
- Maintenance
- Model for NC State Capital
- Museum of Natural Sciences
- Natural landscape
- Nature through art
- Outdoor hands-on education
- Park
- Picnicking
- Place for discovery
- Points of life
- Preserve and Protect
- Facilitated programs
- Community of understanding of wetland value
- Protect habitat
- Provide closeness to nature
- Provide Quality
- Quiet Zone
- Raise economic/property values
- Recreational area for the surrounding community
- Relationship between nature and the urban setting
- Recreational opportunities
- Scenic experiences
- Socialization
- Source of education for young people
- Special events
- Spiritual experiences
- Sponsored by community
- State-of-the-art digital wireless technology
- Computerized teaching tools
- Stream restoration
- Teaching about mortality and equality
- Trams from museums
- Understanding of wetlands
- Urban
- Usable
- Value
- Walking
- Wetlands restoration
- Wildlife

The Educational Program

Valuable educational progamming input came from PEJ community workshops, meetings with Carnage, Ligon and Centennial Campus Middle School teachers, and educational professionals from the NC Museum of Natural Sciences, Keep America Beautiful, and many other institutions. From this rich source of information, the overall structure of education program for the Park was developed.

Program domains

The following major environmental education program domains were identified as being most appropriate to the Urban Wetland Educational Park:

Wetland ecology
Air quality
Water cycle
Project Wet
Carbon and oxygen cycles
Urban forestry
Project Wild

Curricular areas

The following were identified as the major curricular areas and activities appropriate to the Urban Wetland Educational Park.

Water/Aquatic Habitats
Monitor water quality
Study of stream invertebrates
Wetland comparison studies

Soil and Plants
Soil testing
Plant genetics
Butterfly gardening
Carnivorous plants
Native plants

Habitats
Insect identification
Native plant/animal identification
Bird watching/bird counts
Building bird houses
Seasonal changes
Animal tracking, droppings and prints identification

Culture and Environment
Native American environments
Building teepees
Edible plants
Cooking with native plants
Herbal medicine
Archeology
History of Southeast Raleigh
Storytelling

Language Arts / Drama
Children's literature
Oral history
Creative writing
Hunting for stories
Dramatic performances

Arts and Crafts
Art projects
Nature photography
Building shelters from natural materials
Making clothing from natural materials
Leaf prints
Natural dyes

Special Activities / Events

Earth Day celebrations
Naturalist presentations
Book signings/readings by naturalist authors
Guided tours/audio tours
Tree planting
Day camps
Outdoor safety/survival training
Adventure education
Special education programs
Easter egg hunts
Community workshops
Team building activities
Walks for a cause
Clean-ups

Design Program

This document consists of a Design Program and a Schematic Master Plan. The Design Program defines the Park user groups and the activity settings that must be designed to support user needs and activities, as well as the requirements of the educational program.

The Design Program has been compiled from workshop reports and additional technical information gathered by NLI and from many other sources including the earlier College of Design student design project, the contributions of many professional volunteers, and the community participation process. The Schematic Master Plan (see p.23) consists of a scale drawing of the Park showing the locations and spatial relationships of the activity settings specified in the Design Program.

User Groups

At the first community workshop held July 25, 2001, an extensive list of potential user groups for the Park was established, including the following:

- Artists
- Church groups
- Elderly
- Exercisers: bikers, joggers, walkers, roller bladers, skaters, dog walkers, kayakers, boaters
- Students: college, K-12, summer camps
- Families
- Girl/Boy Scouts
- Home schoolers
- Neighbors
- Nonformal educational groups
- People with disabilities
- Scientists/researchers
- Tourists
- Youth
- Parents with strollers
- Visiting professionals

Activity settings

The schematic master plan accompanying the design program consists of a scale drawing of the park showing the locations and spatial relationships of the physical settings specified in the design program, information gathered from previous designs, community participation process, and universal design principles. Settings include:

- Entrances
- Environmental Education Center
- Gardens
- Weather Station
- Wetland Study Stations
- Wildlife Viewing Stations
- Outdoor Amphitheater
- Daycamp Area
- Project Area
- Trails

Entrances

Entry to the Park is provided at regular intervals along its boundaries from Rochester Heights, the Walnut Creek Greenway, and Carnage and Fuller Schools.

Access to the Urban Wetland Educational Park site is very easy. Major streets from central Raleigh run either side of the Park. Greenway connections include Walnut Creek, Rocky Branch, and Chavis Way Greenways. Schools located within an easy distance of the Park include Fuller Elementary, Washington Elementary, Carnage Middle, Ligon Middle, and Southeast Raleigh High. Shaw University is also close by.

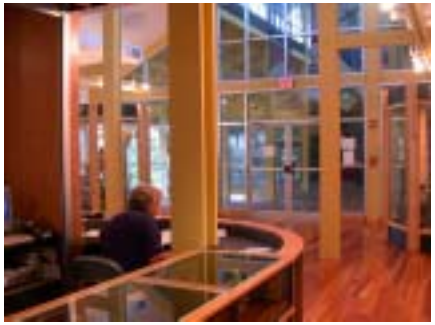
The Walnut Creek Greenway skirts the edges of the Park on two sides and links the park to locations outside the neighborhood—especially the schools. The Walnut Greenway trail and boardwalk are close enough to the Creek so that plants, birds, and other wildlife can be readily observed.

ENTRANCES (small yellow squares on the Phase 1 master plan above) are:
Rochester Heights Entry Garden
Greenway Entry
Peterson Street Main Entry
Peterson Street Carnage Entry
St. Ambrose Entry

Environmental Education Center

The activity hub of the Park is the *Environmental Education Center,* to be located in the Northeast corner of the site. Fanning out from the Center, informal trails and boardwalks provide easy ADA access to the major activity settings in the Park. The Center building will be designed to minimize disturbance to the site ecosystems. Indoor settings identified by participants in the design process are listed below. Further elaboration of indoor settings awaits the selection of an architectural team to design the Center building.

- Auditorium / lecture room (indoor performances and presentations, projection room, virtual field trip)
- Accommodations
- Classrooms (auditorium and meeting space)
- Demonstrations / exhibits space
- Multipurpose space (for meetings, community workshops, etc.)
- Media room
- Library / resource area
- Information desk area
- Gift Shop
- Snack bar / vending / outdoor eating
- Kitchen
- Mud room / washing room, or wet lab (sinks and non-carpeted floors)
- Observation deck (1st and 2nd story)
- Office for park police
- Raptor center
- Recycling facilities
- Porch / veranda
- Restrooms
- Storage (ADA accessible)



The Environmental Education Center building will be designed to meet the highest standards of "green" sustainable design, including minimal ecological impact on the site. The style of the building will be light, airy, and unpretentious—inviting to everyone.

Center activities

Permanent and seasonal displays
Rotating gallery
Projection room
Community workshops and meetings
Book signing
Introduction to educational activities and programs (brochures and field guides, newsletters, on-line access)
Check out point for trays, binoculars, charts, hand lenses, birds of prey handler, butterfly nets, cameras, ladders that allow binocular users to see into bird's nests
Guard station (full time staff monitoring, controlling trail lighting, infrared night goggles)
First aid station

Outdoor Settings

Learning Gardens

A series of learning gardens will be created to support the educational objectives of the park and will delight casual visitors. Native plantings enhance circulation pathways. Thematic gardens (such as a medicinal garden) will extend the interest of school groups during the year. The character of the gardens will be naturalistic, containing mostly native plants. Information panels will display information on how to create similar gardens elsewhere. Types of garden will include the following:

- Native plants garden
- Butterfly garden
- Bog garden
- Sound garden
- Carnivorous plants garden
- Sculpture garden
- Rock garden
- Medicinal garden

Activities
Examples of activities supported by the learning gardens include:

- Growing edible plants
- Creating a native plant garden
- Producing a native plant cookbook
- Studying the food web
- Building an ecological pyramid
- Studying plant genetics
- Developing herbal medicines

(Above) Example of a music garden feature—an artwork that complements the natural setting. (Right) Hi-tech weather station allows students to track weather in real time and compare local weather with climatic trends locally and globally.

Weather Station

Monitoring the weather, downloading the information in a database, and interpreting the findings interweave many student skills. It also provides stimulation of different learning styles. The proposed weather station offers the possibility of implementing computer and hands-on activities. Neighbor schools will have daily access to the station to conduct weather studies.

Activities
Documentation of seasonal changes
Monitoring daily max-min temperatures
Study of rainfall / drought impact on wetlands
Charting wind direction and speed
Downloading and interpreting data on computer

Adjacencies
Environmental Education Center

Wetlands Study Stations

The Wetlands Study Stations offer three settings for experiential learning on wetlands behavior, water quality, and the indivisible link between wetlands and habitat conservation. Teachers will use the stations as outdoor labs. The stream modeling station will support studies on erosion control.

- **Wetland study area close to the Environmental Education Center**
  Wetland research stations (water, soils, fauna, and flora)
- **Wetland study area at the main creek**
  Wetland research stations (water, soils, fauna, and flora)
- **Mini wetland / stream modeling station**
  Interactive watershed models
  Mud islands experimentation area

Activities
Flood control studies
Monitor and test water quality
Wetland comparison studies (urban vs. coastal)
Soil testing
Project WET / Project WILD
Stream invertebrate study
Erosion control study

Permanent elements
Sloped, safe water access for wetlands studies
Observation docks
Boat and kayak access
Eco-location device (ecological address)

Adjacencies
Restrooms

Wetlands study offers many fun, skill-building opportunities for children.
(Right) Taking water samples. (Far right) documenting flora and fauna in the riparian zone. (Upper right) Examining samples back in the lab in the Environmental Education Center building.

Wildlife Viewing Areas

The wildlife viewing areas are strategically located to provide close-up observation of birds and wildlife, plants and water flow. Adjacent areas will be enhanced with bird-attracting plants, bird, bat, and wildlife feeders. The viewing areas will be adjacent to primary and secondary paths to ensure easy access. Interpretive signs will be posted nearby with information to guide visitor's observations. Viewing areas may double as resting stops.

- Tree House
- Lookout platforms
- Bird blind

Activities
Wildlife viewing / counting wildlife (deer, muskrats, birds, beavers)
Wildlife and plant identification
Bird watching

Permanent elements
Interpretive signs
Benches

Movable elements
Bird houses
Bat houses
Telescopes, binoculars

Adjacencies
Bird attraction area
Bat attraction area
Butterfly garden

(Far left) Birdblind offers children an opportunity for observing birds at close quarters. (Left) Children enjoy identifying birds together.
(Below) The Park provides a base for delivery of environmental education programs.

Outdoor Amphitheater

The outdoor amphitheater is a naturalistic, shady gathering area that contains seating and a stage. Accessible from the main path, it also serves as an outdoor classroom. A semicircular row of trees encloses the area. Spillover space on adjacent grassy area is provided for larger audiences.

Activities
Oral history
Culture heritage story telling
Tom Sawyer stories
Presentations by naturalists
Art classes
Earth Day events
Performances and drama
Book signing and readings from naturalist authors
Seasonal celebrations
Community events
School events and celebrations
Language art activities
Outdoor classes

Permanent elements
Stage
Seating area
Paving area

Adjacencies
Main pathway
Environmental Education Center

(Right) Outdoor amphitheater accommodates all manner of outdoor presentations, meetings, and performances in a natural setting.

Daycamp Area

The daycamp area accommodates up to two school classes (50 children) and their teachers. It is a multipurpose area used for summer camp activities or school projects. The picnic shelter provides an anchor space for playing, working, resting, or having a snack. The area is surrounded by trees that provide shade and create the feeling of being in a contained space. An adjacent open area provides space for collective games. The campfire circle provides a space for cooking as well as story telling, break time and informal conversations.

Sub-settings
Picnic shelter
Cooking space (grill, water gauge, fire extinguisher)
Open area for games

Activities
Day care center and school day camp
City of Raleigh Adventure Camps
Outdoor safety
Survival training
Church groups day camp
Girls and boy scouts day camp
Adventure play activities
Storytelling

Permanent elements
Shelter
Campfire circle

Movable elements
Picnic tables and benches
Low ropes course

Adjacencies
Restrooms
Emergency and maintenance access

(Below) Children gather in the outdoor meeting area, at the start of a day of adventure! (Bottom, left) Discovering the properties of clay—and a traditional Piedmont craft. (Left) Craft activity with natural materials—and excellent stimulation of dexterity.

Project Area

This area is an open space where children can carry out supervised creative projects both during and after school hours. The setting is especially appropriate for summer and weekend programming. Children's creations are exhibited in the display area. A storage shed provides a base for distribution of materials. This program could be managed by a community organization.

Sub-settings
Display area
Working area

Activities
Designing walking sticks
Building teepees
Creating natural dyes from leaves / plants
African American batik dying
Creating sculptures from found items
Weaving baskets
Ephemeral art projects
Team building activities
Building birdhouses for park

Permanent elements
Storage

Movable elements
Activity tables and benches

Adjacencies
Environmental Education Center

(Top, left) Children explore native American culture using natural materials harvested from the the Park site.
(Left) Children construct "animal habitats" from natural materials.

Trails

The system of trails encourages visitors to explore the site. The trails offer an unusual variety of spaces that encourage visitors to exercise in the fresh air and, at the same time, to learn about the inequitable environmental qualities of the site. The sensory path adds interest to the system of trails. Plants and flowers (with different textures, fragrances, and colors), rocks, and ground surfaces border the path. It is especially stimulating for people with disabilities. The rope walk is designed as wayfinding for people with visual impairments. The animal track prints pathway supports track identification and quiz games.

- Boardwalk along the creek
- Meadow trail
- Animal Track Prints Pathway
- Sensory Path
- Rope walk

Activities

Children's walking club
Walk hunt for stories
Walk / race for a cause
School groups walking club
Discovering animal tracks
Animal droppings interpretation
Discovering wild flowers along the trails
Sight impaired visitor guided tours (rope walk)
Guided audio tours prepared by students
Orientation and interpretive signs

(Far left) Existing Greenway and interpretive sign.
(Left) Secondary trail invites intimate explorations of the wetlands.
(Above) Main boardwalk trail through the wetland vegetation.

WALNUT CREEK URBAN WETLANDS EDUCATIONAL PARK SCHEMATIC MASTER PLAN

Composite image shows the proposed Environmental Education Center located in the northeast corner of the site (immediate left), with access from Peterson Street.

At weekends, ample parking is available at Carnage Middle School, just up the street. The park is readily accessible to the Carnage students.

An extensive trail system connects the Environmental Education Center to the Amphitheater, Day Camp, and other public facilities via a bridge over Little Rock Creek.

Each trailhead is marked with a small, covered entry plaza.

The proposed Phase One development includes the Environmental Education Center (building 1). The major trails traverse the park so visitors can enjoy the beauty of the place.

Site Inventory and Restoration Proposals

Consisting of approximately 300 acres of Piedmont Alluvial Forest, Bottomland Hardwood, and open water plant communities, the Walnut Creek Wetlands play a vital role in the Neuse River Watershed. These natural communities perform numerous important environmental and hydrologic functions. Sediment and nutrients are received from storm runoff and flood waters are lessened throughout the Walnut Creek Watershed from Crossroads in Cary to the southwestern edge of Knightdale. Combined with the aesthetic value of majestic cypress and Great Blue Herons, the educational and ecological value of this area is undisputable.

In order to maintain this unique and vital corridor a vision of ecological restoration, enhancement and stewardship must be considered. Three restoration goals are defined:
1) Remove invasive exotic shrubs and vines in certain areas and replace with native Piedmont Alluvial Forest species absent in the floodplain (example: spring ephemeral wildflowers); 2) Plant appropriate wetland species in artificially inundated areas with standing water due to road embankments on Highway 440 (example: south of Walnut Creek and east of State Street); 3) Restore sections of Walnut Creek where channel is incised and degraded.

Overall Site Inventory
Total area: more than 300 acres.
Elevation. 200 ft. to 250 ft; West of Sunnybrook Road, elevation drops to 190-200 ft.
Geology. Injected gneiss and schist. Close to Sunnybrook Road the geology is layered Mica Gneiss and Schist with numerous dikes and sills of Granite, Pegmatite and Aplite.
Soils: Mostly Chewacla soils (Cm) and Wehadkee and Bibb soils (Wo); upland area= Wilkes soil (WmC). Depression 0.5-1 ac., upland=300 acres; Closer to Sunnybrook road the soil type is Cecil-Appling, Cecil Association; Appling sandy loam (ApB), Altavista fine sandy loam (Afa) Louisburg loamy sand (LoB, LoC, LoD) and Mantachie soils.

The site consists of five main areas:
1. Hammond Pond—the area between Hammond Road and Garner Road.
2. The Urban Wetland Educational Park—the area between Garner Road and State Street.
3. The East Wetlands Conservancy 1—the area between State Street and Rock Quarry Road.
4. The East Wetlands Conservancy 2—the area between Rock Quarry Road and Rose Lane.
5. The East Wetlands Conservancy 3—the area between Rose Lane and Sunnybrook Road

1. Hammond Pond
This area consists of an open water marsh dominated by herbaceous species Smartweed, (*Polygonum densifolium)* and Arrowleaf Tearthumb (polygonum sagittatum), (Andrews 2001). In the center of the marsh is a stand of bald cypress, *Taxodium distichum*. It is unusual to find this coastal plain community as far west as Raleigh. Around the edges of the marsh is black willow (*Salix nigra)* and Marsh Mallow (Hibiscus moscheutos) are abundant (Pullman 1999). Buttonbush (*Cephalanthus occidentalis),* Woolgrass, (*Scirpus cyperinus)* and Cattails (*Typha latifolia*) are also present. Plants used as wildlife forage include the floating aquatic Arrow arum, (*Peltandra virginica)* and soft rush, *Juncus effusus.*

2. The Urban Wetland Educational Park
This area runs along the northern floodplain of Walnut Creek and is classified as Piedmont Alluvial forest. Green Ash (*Fraxinus pensylvanica*) is the main canopy species while Box Elder, (*Acer negundo*) dominates the sub-canopy. Creeping vines (Smilax, Ampelopsis, Calystegia, Humulus, Lonicera, Clematis and Rhus) form a large part of the ground cover (Pullman, 1999). Small stands of Chinese Privet (*Ligustrum sinense*) and individual Sycamores (*Plantanus occidentalis*) are found interspersed in the floodplain (Andrews, 2001).

3. The East Wetlands Conservancy 1
This area has Piedmont Alluvial Forest bordering pine-oak uplands and a large area of open water. Of note, several mature Black Walnuts (*Juglans nigra*) can be found just east of State Street, suggesting the origin of the creek,s name (Andrews, personal communication). Sycamore and Swamp Cottonwood (*Populus heterophylla*) are found in sandy soils along the creek bank. The large impoundment, Boneyard Lake, just west of Rock Quarry Road harbors numerous wetland species including Arrow-arum, Buttonbush, Tag Alder, and Black Willow. Marsh Hawks, Great Blue Herons and other water foul are often seen from the boardwalk.

4. The East Wetlands Conservancy 2
Most of the natural communities along this section of Walnut Creek can be classified as Piedmont/Mountain Alluvial forest. The canopy is predominantly a mixture of medium aged to mature Ash, Red Maple, Sweetgum, River Birch, Willow Oak, and Tulip Poplar (Barry Dalton, 1985). Much of this area is young, especially the section closest to Rock Quarry Road. There are some upland areas adjacent to the floodplain on the south side of the creek but most appear to have been cut (Barry Dalton, 1985). Nowhere in the floodplain area are there places devoid of exotic species. Further downstream, there are medium aged alluvial forests w/ impenetrable thickets of privet, honeysuckle, greenbriar, blackberry/ raspberry, Russian Olive (*Elaeagnus spp.*), and Cinnamon Vine (*Dioscorea batatas*). Much of the native herbaceous layer has been out competed (Barry Dalton, 1985). There are a couple of significant swampy areas east of rock Quarry Road dominated by young to medium aged As! h (Fraxinus spp.) with essentially no herbaceous layer. Clay lines on trunks of these trees suggests that at times these areas may be as much as five feet under water. There is also a medium aged to mature upland area (Dry-Mesic Oak-Hickory Forest) just east of the large swampy area that appears to be in good condition. There are many large rocks scattered over the ridge.

5. The East Wetlands Conservancy 3
This is the largest area of the fives sites consisting of over 100 acres. Downstream from Rose Lane on the south side of the creek is a fairly extensive swampy area (Alluvial/Bottomland) dominated by medium aged Ash, Red Maple, River Birch, Willow, etc. Some of these trees are greater than 30 inches dbh. Close to Sunnybrook road is a fairly extensive Alluvial/Bottomland Forest with small areas that resemble 'swamp forest'. Vegetation includes sweetgum (*Liquidambar styraciflua*), American Elm, (*Ulmus americana*), Swamp Chestnut Oak, *(Quercus michauxii*), and Green Ash (*Fraxinus pensylvanica*). However, there is extensive beaver damage to small and large trees, impenetrable thickets of Chineese Privet (*Ligustrum sinense*) and Japanese Honeysuckle (*Lonicera japonica*), and "substantial" amounts of refuse accumulated in debris dams along the creek (Barry Dalton, 1985 citing Wentworth, 1984). There is an abandoned beaver dam east of Rose Lan! e which still backs up enough water to form a swamp of considerable size (Barry Dalton, 1985). One extremely rare plant, Michaux,s Sumac (*Rhus michauxii*), was found in this area (Barry Dalton, 1985).

*Areas 1 and 2 are the main focus areas in this design proposal. Studies of the other adjacent areas are included to further explain the likely conditions of the larger project.

The site inventory was compiled by Ross Andrews, NC State University.

Partners For Environmental Justice (PEJ) Board of Directors

Partners for Environmental Justice has applied for a 501 (c)3 status. The Board of Directors is made up of 11 distinguished citizens and representatives of the Wake County community listed below.

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