



SECTION 6. GREENING DEVELOPMENT SITE LOCATION, REVIEW, & DESIGN

KENDRICK WEEKS

hooded warbler

ACHIEVE GREEN GROWTH IN DEVELOPMENTS

Greening development review and site design means selecting appropriate development sites and using conservation data and North Carolina Wildlife Commission habitat conservation recommendations to review and design developments. Sites that are next to Managed Areas or other high priority conservation areas will degrade wildlife habitat and natural resources regardless of how they are built. Wildlife that need especially large areas, are impacted by roads, or depend on fire disturbance will not be conserved on a single development tract. Developments that are appropriately located and maintain large areas of connected habitat among adjacent tracts can be designed to reduce impacts to wildlife.

- Planning staff and advisory boards can “green” the development review process by:
 - ▶ Requiring a sketch plan and a pre-design meeting with stakeholders¹
 - ▶ Using the [Conservation Data for Green Growth](#) and habitat conservation recommendations in Section 3 to evaluate development proposals
 - ▶ Advising applicants on how to design wildlife friendly development projects
- Developers, consultants and engineers can “green” site design by:
 - ▶ Using the [Conservation Data for Green Growth](#) and habitat conservation recommendations in Section 3 prior to site selection and design.
 - ▶ Selecting sites that are not next to Managed Areas or priority conservation areas.
 - ▶ Mapping and protecting unfragmented habitats and buffers.
 - ▶ Applying for Wildlife Friendly Development Certification ahead of site design. www.ncwildcertify.org.

Why “green” site design?



“Greening” site design can:

- Increase property values for desired lots.
- Produce more profitable developments.
- Connect children and residents with the outdoors.
- Preserve ecological resources for future generations.
- Help to prevent hazards such as flooding and drought.

STEPS TO MAINTAIN A CONNECTED NETWORK OF HABITATS ACROSS DEVELOPMENTS

Wildlife do not live solely within the wet areas of wetlands, streams or rivers. Wildlife need to range on land adjacent to water bodies. A wildlife friendly development conserves terrestrial habitats located in the uplands next to wetlands, floodplains and riparian areas.

Following these steps may also help ensure that developers comply with the Endangered Species Act and other environmental requirements ahead of permitting.

Step 1. Select an appropriate site for the type of development. Appropriate, green sites for major development are:

- a) Centered around towns and cities so that urban or suburban areas will not spread extensively into rural areas. Rural cluster developments are an exception to this.
- b) Not adjacent to Managed Areas (conserved lands) or within priority conservation areas.

Step 2. Create a map of important upland and wetland habitats on and adjacent to the site.

- a) Depict the Conservation Data for Green Growth (statewide and regional appendix data) on development maps. Include areas adjacent to the parcel.
- b) Map the boundaries of upland terrestrial and wetland habitats that will be conserved on site. The boundaries of these habitats can be partially mapped through analyzing aerial photos, but field surveys will be needed to fully delineate boundaries.
- c) As needed, have a qualified biologist survey for mapped and unmapped priority habitats on site. If staff or funds are not available for this, see Appendix B for a list of conservation partners who may be able to conduct surveys at no cost. Surveys can typically be done in a few hours to one day.

Step 3. Use the habitat map created in Step 2 to design an upland and wetland habitat network that will be protected and connected to other natural areas on and off site.

- a) This green infrastructure network should consist of large core areas of unfragmented, continuous habitats that are connected by wildlife travel corridors.²
- b) Design wildlife habitat core areas to be as large as possible and to maximize interior area while minimizing habitat edge.

Protecting Habitat for Bald Eagles



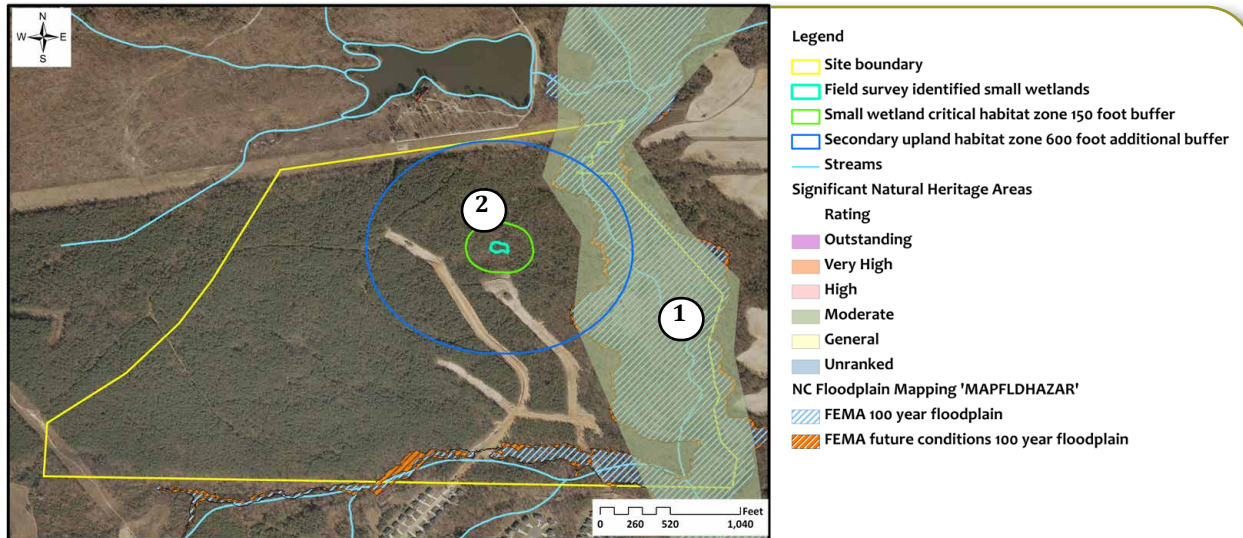
U.S. FISH & WILDLIFE SERVICE

Although bald eagles are no longer listed as endangered they are still protected under the Bald and Golden Eagle Protection Act.

The U.S. Fish and Wildlife Service has created a set of National Bald Eagle Management Guidelines (www.fws.gov/southeast/es/baldeagle/) for protecting bald eagle nesting sites alongside other land uses.

The N.C. Wildlife Commission can provide maps of bald eagle nests to local governments and landowners. Contact us for a copy of this data at greengrowth@ncwildlife.org.

Visual Example for Step 2



This is a development scenario near Knightdale, North Carolina, and the route of a future major highway. The scenario exemplifies the need to review a development using conservation data before any final plans are made. This example is hypothetical and in reality a field survey was not conducted on-site. The site is outlined in yellow. The tract is about 160 acres and the zoning is 1 – 4 units per acre. 1) The floodplain underlies most of the Natural Heritage Area. 2) A small wetland found during a site survey is in turquoise. There are two buffers mapped on the small wetland a critical habitat 150 foot buffer and a further 600 foot secondary upland habitat zone. See Section 3 pages 54 to 57 for more information on these buffers. Ideally, this second buffer zone would lie completely out of the floodplain to provide non-flooded areas for amphibians and reptiles to burrow underground.

- c) Design wildlife corridors to be as wide as possible, minimize trail widths, maintain forest canopy cover and the forest understory of shrubs and ground cover.³
- d) Design wildlife core habitat and travel corridors following the habitat conservation recommendations in Section 3 to conserve:
 - Habitat for federally protected species, such as bald eagles,
 - Natural Heritage Areas,
 - Priority wildlife habitats identified in the N.C. Wildlife Action Plan,
 - Wetland, stream, or river buffers,
 - Natural open spaces that connect or buffer existing protected natural areas.

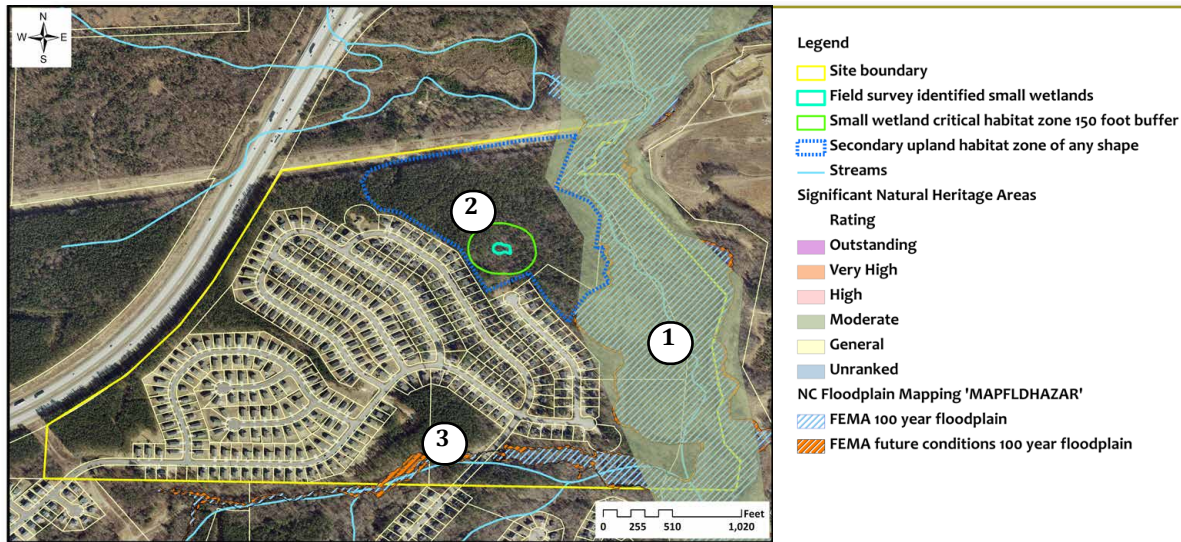
Step 4. Permanently protect as much of this upland habitat network as possible by:

- a) Clustering homes on smaller lots as much as possible.
- b) Using a conservation easement or equivalent legal tool. See Appendix B for potential land conservation partner contacts.

Step 5. Create an upland habitat management plan for the habitat network.

- a) Without active management, habitat structure and plant species composition may deteriorate and the habitat may become unusable to priority species. This is because habitat management mimics natural disturbances, such as fire, that no longer occurs in developed areas.

Visual Example for Steps 3 and 4



Development is centralized and habitat edge is minimized. 1) The floodplain and Natural Heritage Area are conserved by being outside of lots. 2) The small wetland critical habitat zone is not disturbed and the secondary zone is connected to the floodplain. This secondary zone can be of any shape but should be outside flooded areas and should be of equal size to a further 600 foot buffer on the critical zone, which was not completely achieved here. 3) The streams to the south are buffered by at least 100 feet and lots are outside of the stream buffer and floodplain. The homeowner association owns the natural contiguous open space.

- b) Plans can be developed to actively manage protected natural areas using techniques, such as: periodic mowing outside of the nesting season, thinning of trees, reforestation, protection of dead trees and canopy gap creations (small clearings in the forest).
- c) Create a long-term funding mechanism to implement goals and objectives of the natural resource management plan, such as collecting fees from the homeowner association. The HOA can profit from tree cutting and mowing by selling timber or native grass hay.
- d) Partner with a land trust, parks department or natural resource agency to create and implement the management plan. Habitat management may qualify the land for tax credit and financial incentive programs.
- e) Seek outside assistance from natural resource professionals in crafting and reviewing such plans. See [Appendix B](#) for an abbreviated directory of professionals who may be able to provide such assistance.

Step 6. Landscape using native plants.

Native plants are more adapted to the local climate and do not need as much water or maintenance. See Section 3, [page 60](#), for more information.

A note about emergency response and street design

Public health and safety is one of the paramount concerns for making certain streets are interconnected among neighborhoods. Grid street designs are more space efficient and lead to more walking and sense of community. To avoid impacts to streams, avoid or minimize road crossings over streams.

EXAMPLE DEVELOPMENTS

Listed below are a few examples of development projects that have incorporated many wildlife friendly development practices.

The Woodlands, Davidson, North Carolina

- An award-winning, 56-home neighborhood that is a Certified Wildlife Friendly Development.
- The developer conserved a wide riparian buffer and 23 acres of contiguous riparian forest in an urbanizing area.

Harmony, Florida

- Voted one of the top 50 places to retire in the U.S.
- Over half of the development has been set aside as a nature preserve, which is actively managed for preservation and enhancement of wildlife habitat.
- Harmony has a well-qualified Conservation Director on staff who guides conservation and management activities in this planned community.
- The development uses “Dark Sky” streetlights to minimize the negative effects of artificial night lighting on wildlife.
- The developer also partnered with the University of Florida’s Wildlife Extension department to develop an environmental education website and outreach programs for residents.

Creston, North Carolina

- The [Creston Development](http://www.creston-nc.com/)^a has placed 40 percent of the project area under a conservation easement with Foothills Land Conservancy, the local land trust.
- The conservation property is actively stewarded by land trust staff.

Bundoran Farm, Virginia

- [Bundoran Farm](http://www.bundoranfarm.com)^b planned community has a large contiguous wildlife habitat conservation area that is connected to adjacent protected habitat, off-site.
- Large, conserved grasslands are also used for ranching.
- Building envelopes were designed for habitat conservation and connectivity.

a <http://www.creston-nc.com/>

b www.bundoranfarm.com

- 1 Arendt, R. 1999. Growing Greener: Putting Conservation into Local Plans and Ordinances. Island Press, Washington DC.
- 2 Environmental Law Institute. 2003. Conservation Thresholds for Land Use Planners. Environmental Law Institute, Washington D.C.
- 3 Mason, J., C.E. Moorman, G. Hess and K. Sinclair 2006. Designing suburban greenways to provide habitat for forest-breeding birds. Landscape and Urban Planning, 1-13 and Sinclair, K.E., G.R. Hess, C.E. Moorman and J.H. Mason. 2005. Mammalian nest predators respond to greenway width, landscape context, and habitat structure. Landscape and Urban Planning, 71, 277-293.