**Model Piedmont Conservation Ordinance and Incentives Guide**

A resource guide for local governments in North Carolina’s Piedmont region to
encourage land development activity that protects the state’s most valuable natural resources and wildlife habitat

Created by the

Cape Fear Council of Governments

Adapted for the Piedmont by the N.C. Wildlife Resources Commission

This guide accompanies the

NC Model Natural Resources Conservation Ordinance

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# INTRODUCTION

This *Model* *Piedmont Conservation Ordinance and Incentives Guide* was developed by the Cape Fear Council of Governments with funding from the NC Wildlife Resources Commission’s *Partners for Green Growth* cost-share program. This resource guide accompanies the NC Model Natural Resources Conservation Ordinance and is intended to assist local governments in North Carolina to amend their development regulations to encourage development that conserves the state’s most significant natural resources and wildlife habitat. The document is structured as follows:

1. Introduction
2. Natural Resources In The Piedmont Region
3. Determining What Should Be Protected
4. The Model Ordinance
5. Updating Your Ordinance & The Adoption Process

Appendix A: Definitions

Appendix B: Summary of Relevant Resources and Data

Appendix C: Using the Biodiveristy and Wildlife Habitat Assessment

Appendix D: Stormwater, Sedimentation and Erosion Control

Natural resources provide a wide range of benefits to the citizens of North Carolina and land development activities that are not coordinated to protect those valuable resources can have a significant negative impact. For a literature review of the economic and social benefits of natural resources, especially of wildlife, see Section 1 of the NC Wildlife Commission’s *Green Growth Toolbox* handbook. Clean water, clean air and many native wildlife and habitats are vulnerable. Unique wildlife habitats are being fragmented and eliminated and are disappearing in North Carolina and the southeastern United States. The North Carolina Wildlife Action Plan published by the NC Wildlife Resources Commission (NCWRC) estimates that over one-third of our 1,000 native wildlife species in NC are in decline due to habitat loss and fragmentation.

## The NC Model Natural Resources Conservation Ordinance

The NCWRC and the Nicholas Institute for Environmental Policy Solutions at Duke University developed the *NC* *Model Natural Resources Conservation Ordinance* to assist our state’s local governments in addressing the degradation of natural resources and wildlife habitats from the direct and cumulative impacts of land development. The model ordinance is intended to encourage conservation of the most sensitive wildlife habitats such as wetlands and rare, high quality wildlife habitats, especially in rural landscapes andpriority wildlife corridors protected lands. The NC model ordinance is written as a conservation overlay district. The NC Model Natural Resources Conservation Ordinance can be accessed at [www.ncwildlife.org/greengrowth](http://www.ncwildlife.org/greengrowth) under ‘Greening Incentives and Ordinances’.

## The Model Piedmont Conservation Ordinance and Incentives Guide

Thisguide builds on the *NC* *Model Natural Resources Conservation Ordinance* by acting as a guidance manual on how to implement the NC Model Natural Resources Conservation Ordinance and by providing model language to enhance conservation in a local government’s existing ordinances. The guide can assist local governments in the Piedmont of North Carolina to amend their land development regulations, by way of incentives instead of requirements. The goal of the model ordinance and this guide are to maintain the healthy functioning of significant natural resources within an individual local government’s jurisdiction while accommodating desired growth, development and property rights. The conservation measures provided are based on recommendations from a comprehensive review of the scientific literature (see NCWRC’s *Conservation Recommendations for Priority Terrestrial Wildlife Species and Habitats in North Carolina*) and the implementation measures are based on the expertise of local government professionals in North Carolina that were interviewed as part of this project.

It is hoped that enacting local conservation measures will benefit developers and landowners as well as natural resources protection efforts. Implementation of this model ordinance could lead to fewer delays in environmental permitting because standards will be met through the initial design of the development. Developers may benefit from taking advantage of the local conservation district proposed here because they (1) will be better informed of the sensitive environmental features of potential development sites, (2) will be guided through a predictable development process, (3) will be permitted to protect or increase existing development potential of real estate, (4) will conserve sensitive natural resources in such a way that many real estate markets will value as amenities, (5) will reduce opposition from neighbors and others in the community though a good faith effort to be sensitive to local concerns and context, and (6) may be eligible for a substantial tax benefit from donation of a conservation easement. It is also probable that developers will more easily obtain state and federal environmental permits and local development approval by designing projects that minimize adverse impacts.

**The model language in this guide is intended to be voluntary rather than mandatory**, although language for mandatory conservation measures is provided as an option. Interviews with several county and municipal planners in southeastern North Carolina suggest that even those jurisdictions most supportive of natural resource conservation and those with significant development pressure rely exclusively on voluntary, incentive-based conservation tools in order for them to be politically palatable. Discussions with planners from less affluent jurisdictions and those experiencing limited or stagnant development activity suggest that any attempt to introduce conservation efforts that have the potential to negatively impact real estate development would be opposed.

The recommended voluntary development incentives are generally provided in the form of development density bonuses, typically by permitting a site’s gross density to be clustered on portions of the site not containing the most valuable natural resources and the number of development units can be increased above that permitted for the site. In this case, gross density is calculated using the total site acreage rather than only the buildable acreage, thus providing developers with a significant incentive to voluntarily avoid critical but unregulated habitat in addition to regulated natural features. In fact, local governments with existing cluster subdivision or other flexible development approval procedures should seriously consider requiring development activity to avoid significant natural resources, where present, in order to be eligible for density bonuses. The *NC Conservation Subdivision Handbook* provides a comprehensive survey on the effectiveness of conservation subdivision ordinances in NC. Section 5 of the *Green Growth Toolbox* handbook offers case studies that provide further examples of effective density bonuses for conservation development in NC.

An important question when offering density bonuses is whether reduced minimum lot dimensions are specified. Interviews with planners from communities with successful density bonus programs frequently do not establish minimum lot dimensions, with local governments instead providing maximum flexibility to developers willing to conserve significant natural areas and relying instead on the market to limit excessively small lots. Developers will often prove to be wary of extremely small lots on their own accord, making regulatory control of lot dimensions unnecessary in many cases. Alternative incentives such as minimum setback reductions, increased height restrictions, reduced parking requirements, development fee waivers or reductions, or expedited project approval may be necessary to entice developers to conserve significant natural areas where density bonuses are not sufficiently attractive. See Section 5 of the *Green Growth Toolbox* handbook for an in-depth discussion of incentives for protecting significant natural resources and wildlife habitat.

A key concern for many communities will be that in order to require or encourage development activity to protect significant natural resources not otherwise protected, development densities will need to be transferred from the portion of the tract with high quality resources to a portion of the tract without. Inherently, this density transfer requires a permitted reduction in lot sizes to accommodate the additional units on the portion of the site to be developed. Minimum lot sizes are often already set at the size permitted by septic sewerage regulations by the county’s Health Department, making lot reductions difficult. This in effect gives maximum density to the developer automatically. In areas without sanitary sewer availability, it is recommended to encourage communal septic systems where multiple lots share a single absorption field, thereby enabling the individual homes to cluster on smaller lots. In rural areas it may be beneficial to landowners to have relatively low permitted development density, especially on large parcels, which would keep property taxes lower, while allowing for a density bonus incentive in the case that a landowner wishes to develop or sell for development. In this case a landowner would negotiate a satisfactory sale price when selling for development and would still have the option to sell to a future farmer or forester at a lower price per acre.

# Natural Resources in the Piedmont Region

From the foothills of the southern Appalachian Mountains to the fall line demarking the beginning of the Coastal Plain, the Piedmont has an incredible diversity of habitats and is rich with plants and wildlife. While the coast and mountains have the highest biodiversity, the Piedmont, as an area in-between, also has many of these coastal and mountain species as well as species and habitats that are unique to the Piedmont. The Piedmont of North Carolina also includes some of the fastest growing communities in the nation and protection its natural resources is essential for ensuring a high quality of life for the majority of North Carolina’s residents.

The Green Growth Toolbox and NC Wildlife Action Plan identify the following as some of the highest priority habitats in the Piedmont region.

***Early Successional Habitat***

Common types of early successional habitat include hayfields, clear-cuts and regenerating forests, shrublands, grasslands, field borders, pastures, and large canopy gaps. Early successional habitats can be composed of mixed grasses, wildflowers, vines, shrubs, and saplings. Scattered mature trees may be present but not to the point that they shade out the beneficial understory vegetation. This habitat type is often associated with agricultural or forestry activities.  This habitat includes grasslands, shrublands, large canopy gaps, and field borders.  Early successional habitat requires periodic disturbance, such as fire or mowing, to keep it from growing up into forest. The quantity and quality of early successional habitat has diminished due to reduction of the use of fire, increasing development, encroachment of exotic vegetation, changing agricultural and forestry practices, and fragmentation of habitat patches into small isolated areas. Populations of many species that depend on these habitats are also in decline, including loggerhead shrike (Lanius ludovicianus) and northern bobwhite quail (Colinus virginianus).

***Forested Floodplains and Riverine Aquatic Communities***

These habitat types are found in and along streams and rivers. Riverine aquatic habitat is important for aquatic animals, as well as species that use aquatic habitat during part of their life cycle (like streamside salamanders). Wildlife such as otters and beavers rely on this habitat for their food base. Forested floodplains and riparian forest along intermittent and perennial streams is essential to maintaining good water quality and a food base for aquatic life including popular game fish.  Native tree cover cools streams and rivers and leaves that fall into waterways are the base of the aquatic food chain, without which aquatic species cannot persist. Piedmont floodplains are also important as movement corridors for most wildlife. Most wildlife use floodplain and riparian forests for habitat during critical stages of their life cycles provided the forest is sufficiently wide. These areas are especially important to neotropical migrants during the migration periods.  A number of waterfowl species and wading bird rookeries of heron and egret among other species are reliant on these floodplain systems.

* **“Canebrake” communities**, dominated by switch cane (*Arundinaria gigantean*), was once common in the Piedmont floodplains, but has diminished due to fire suppression. However, remnants of this natural community can still be found in the floodplains of the Piedmont. Migratory birds that use switch cane areas for breeding include hooded warbler, Kentucky warbler and Swainson’s warbler.

***Lakes and Reservoirs***

There are no natural lakes in the Piedmont.  However, reservoirs, mill ponds, farm ponds and other water bodies provide habitat for a variety of fully‐ and semi‐aquatic species.  These areas are also important areas for many bird species (nesting, roosting, and feeding sites) and provide habitat for fish, reptiles, amphibians, and aquatic mammals.  In addition, these water bodies are popular destinations for recreation.

***Longleaf Pine and Pocosin Ecosystem***

Longleaf pine, wet pine savanna, and pocosin habitats intermingle over much of the Sandhills region of the Piedmont.

* Longleaf pine forests have been reduced to less than five percent of the historic range throughout the southeast. It is one of the most endangered habitats in the United States, due to development and lack of fire. Species that depend on longleaf pine forest include many rare species that depend on natural fire regimes such as the Bachman’s sparrow (*Peucaea aestivalis*, federal special concern) and red-cockaded woodpecker (*Picoides borealis*, federally endangered) - federal and state endangered.
* Wet pine savannas are mineral wetlands characterized by an open canopy of pine and an understory of wiregrass, herbs or shrubs. The Carolina gopher frog (*Rana capito capito*) a state-threatened species and the pine barrens treefrog (*Hyla andersonii,* state rare) use this habitat.
* Pocosins are shrub dominated habitats occurring on peat-filled Carolina Bays and depressions. Many species of wildlife use this habitat, including a variety of neo-tropical migratory birds.

***Mesic and Dry Hardwood Forests***

This habitat includes all mature Piedmont forests found upslope, or on drier sites, and downslope, or on wetter (i.e., mesic) sites. Dry hardwood forests are dominated by a variety of oak and hickory tree species, whereas Mesic hardwood forests tend to be dominated by beech and tulip poplar. Pines are also an important component of both forest types. The quality of these forests depends on the age of the trees, management history and fragmentation. Large tracts of this habitat are essential habitat for a variety of birds, bats, small mammals, reptiles and amphibians.

***Mines***

Horizontal mine shafts are important for bats which do uncommonly roost and hibernate in these types of mines in the Piedmont. Abandoned mines are most frequently found in the Uwharries region. In the Piedmont, horizontal mine shafts provide important habitat for roosting bats, many of which are in decline, including tricolored bat (*Perimyotis subflavus*). There few small shallow caves in the Piedmont and some of these may offer some protection for bats.

***Rock Outcrops***

Rock outcrops in the Piedmont are an important habitat for many reptiles and bat species. In the Piedmont this habitat includes the typical large rock boulders and boulderfields, and there are some granitic flat rocks, domes and a few rocky summits and cliffs. Pilot Mountain State Park and Hanging Rock State Park are the only cliff habitats known to support peregrine falcons in the Piedmont. Crevices among large boulder rock outcrops emerging from the forest floor are important for reptiles and roosting bats.

***Small Wetland Communities***

Small wetlands include ephemeral (seasonally flooded) wetlands, seeps, small depression ponds, and beaver ponds. These communities provide key habitat for crayfish, amphibians, reptiles and wading birds. Some wetlands may hold water for a significant portion of the year; others may be saturated for only a few months.  All Piedmont wetland habitats are especially important as breeding sites for amphibian species.  Many species that use these areas also need large surrounding areas of upland habitat to complete their life cycle requirements. Undeveloped connections between small wetlands should be left undisturbed whenever possible.

* **Piedmont bog habitats** can be found in the foothills of the Appalachian Mountains. Bogs form in poorly drained soils in depressions or on gentle slopes, generally in relatively flat valley bottoms that are not subject to flooding.  Most often they are fed by seepage or springs, however some are associated with beaver activity. Bog Turtles (*Clemmys muhlenbergii*) are threatened due to the loss of these habitats.

# DETERMINING WHAT SHOULD BE PROTECTED

## Mapping natural resources

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## *The North Carolina Biodiversity and Wildlife Habitat Assessment*

The NC Wildlife Resources Commission recommends using the NC Conservation Planning Tool’s Biodiversity and Wildlife Habitat Assessment (BWHA) to assist in identifying the highest value natural resources in your community. The BWHA is an assessment of the relative conservation value of aquatic and terrestrial habitat, landscape function, and connectivity to foster an interconnected network of natural green space and the associated benefits to human populations. The data used in the assessment are the best representations of spatial information for ecological functions statewide. For more information visit <http://portal.ncdenr.org/web/cpt/> and refer to Section 2 of the Green Growth Toolbox Handbook.

The BWHA dataset is downloadable from the NCWRC’s Green Growth Toolbox (clipped to regional planning areas) or the NC OneMap GeoSpatial Portal (for the entire state). Links and other useful reference material is provided in Appendix B. .

The BWHA ranks lands with conservation value on a scale from 1 (moderate value) to 10 (highest value). It also identifies developed areas (>20% impervious coverage) and areas with unknown value that have not been surveyed value 0). We recommend using the BWHA dataset planning and selecting a BWHA conservation value as the basis for the community’s overlay district. The BWHA conservation value is the “Final” field in the BWHA raster dataset.

## Mandatory versus Voluntary programs

Participation in the conservation program district can be either voluntary or mandatory. The type of program should be designed to fit the community, and either approach can be effective depending on several factors. The components of the program will vary based on the type of program established, and the type of program will affect the BWHA conservation value on which to base the overly zone.

## Selecting a conservation threshold

Selection of a BWHA conservation value on which to base the overlay zone is a critical part of the process. The overlay zone boundary is established to coincide to all areas with a BWHA conservation value greater than or equal to the selected conservation value. All development sites which intersect the overlay zone are either (1) subject to the conservation provisions of the district in a mandatory program or (2) eligible for the conservation incentives of the district in a voluntary program.

Selection of a higher value will target only habitat of the greatest conservation value and will result in a smaller overlay zone. In a mandatory program this will subject less land and fewer landowners to the required conservation measures of the district. In a voluntary program selection of a higher value will mean that the development incentives are applicable to less land and available to fewer landowners, but also that the level of protection required in order to receive the incentives is diminished. In both cases, the potential conservation gains of the program will be limited and wildlife corridors, many of which have values of high to moderate, will likely not be conserved

In order to effectively select a conservation threshold, it is important to understand how BWHA values are assigned and what potential impact selecting each conservation value may have on development activity in your community. The table in Appendix C identifies how values are assigned, and it is important to note that even lands with a value of 1 have moderate and not low conservation value.

Remember that to protect the most wildlife habitat and other land of high conservation value, you are looking to select the lowest target BWHA value as is reasonable for your community’ district threshold and to develop the overlay zone based on the areas with BWHA values greater than or equal to that target. This will ensure that the highest quality habitat areas are protected and connected across lands with a lower relative conservation value. It is important to understand the range of BWHA values, and that areas with BWHA values of 7 or 8 and higher represent the most exceptional natural resource areas in the state and that areas with values of 1 or 2 are still likely contain important resources worth protecting to maintain healthy ecosystems.

Of course, the highest value natural resources are not distributed evenly across the landscape and some communities have extensive high value areas and some have few. For example, Table 1 to the right identifies the distribution of BWHA conservation values for two municipalities in Brunswick County in southeastern NC. A conservation overlay district based on land classified with the same conservation value would have drastically different impacts on the two communities. If values of 7 and higher were selected to define the overlay district, nearly 80% of land in Boiling Spring Lakes would be subject to the regulatory provisions or eligible for the incentives of the district, in contrast to less than 2% of land in Northwest. It will be important for any community to weigh the degree of conservation desired with the concentration of high value resources and their overlap with existing and desired development patterns and with regulatory frameworks like zoning in order to properly calibrate the conservation overlay zone to local conditions. Other natural resource maps exist that can be used to set conservation district boundaries and towns with few areas mapped on the BWHA could use these to create a district (see ‘Other Resources for Mapping a Conservation District below).

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| Table 1. Distribution of BWHA values for two municipalities. |
| BWHA Value | City of Boiling Spring Lakes | Town of Northwest |
| 10 | 78.6% | 0% |
| 9 | 0% | 0% |
| 8 | 1.1% | 0% |
| 7 | 0.9% | 1.7% |
| 6 | 7.1% | 6.1% |
| 5 | 2.6% | 0% |
| 4 | 0% | 0% |
| 3 | 1.4% | 0% |
| 2 | 0.2% | 4.4% |
| 1 | 0% | 7.2% |
| 0 | 3.6% | 79.7% |
| -1 | 4.4% | 0.9% |

Another consideration in selecting a conservation value is a comparison to existing development, vacant tracts, water bodies, and other determinants of development suitability. The value of the overlay district is in protecting resources from future development, which can maintain rural character and lead to better planned and more aesthetically pleasing development. The degree to which there are developable tracts of land within the desired BWHA values will dictate how successful the conservation program will be and the extent of high value lands available for protection. This process should be completed alongside the process of determining applicability and exceptions, to ensure the desired balance of protection and development.

**Habitat Connectivity is Essential**

It is very important to consider habitat connectivity when selecting a target conservation value because wildlife and natural resource benefits cannot be maintained in isolated habitat fragments. It is up to each individual community to assess how a higher or lower conservation value might improve or reduce the habitat connectivity of protected areas to each other and to natural areas beyond the community’s boundaries. Connectivity of targeted conservation areas should also be coordinated protected lands managed by public agencies. Maps of existing conservation areas are represented in the Natural Heritage Program, Managed Areas map. Please see Section 2 of the NCWRC’s *Green Growth Toolbox* handbook for information on the Managed Areas map layer and for a link to download it.

**Site surveys are necessary when identifying onsite areas to conserve**

It is important to remember that the spatial accuracy of the BWHA and the datasets on which it is based are not site specific and are only a good guide to determine the likely presence of conservation resources and not an indication of their actual presence. Therefore, keep in mind throughout the process of identifying a target conservation value that, even in a mandatory program, the model ordinance does not require protection of all areas within the selected BWHA value range. Instead, properties that fall within the overlay district must complete a habitat survey before development planning in order to determine the actual presence, location, and significance of natural features. As a result, the selection of a BWHA value on which to base the conservation district is really a process to determine what properties need to complete a habitat survey to evaluate the presence of significant natural resources, not a process of determining what properties will necessarily be encouraged or required to implement protection measures.

Finally it is worth mentioning that the process of identifying an appropriate target conservation value is one that should be transparent and publicly-driven if it is to garner the support needed to survive the adoption process, which is discussed below.

**Other Resources for Mapping a Conservation District**

It should be noted that the intent of this document is to assist local governments in identifying and conserving natural resources that are significant primarily due to their ecological benefits. There may be other natural resources in your community that, while providing less ecological benefit, provide other important benefits. In particular, significant agricultural or forestry lands may also be important assets to target for conservation. If this is the case, consider utilizing the NC Agricultural Lands Assessment and the NC Forestry Lands Assessment available from the NC OneMap Geospatial Portal at [http://data.nconemap.gov](http://data.nconemap.gov/geoportal/), from the NCDEQ Conservation Planning Tool at <http://portal.ncdenr.org/web/cpt/>, or via the interactive web maps at <http://www.ncmhtd.com/EnvironmentalPrograms/AgAssessment/> or http://www.ncmhtd.com/NCFS/ForestActionPlanPriorityLayers/. Contact your county’s NC Cooperative Extension agent or NC Forest Service ranger for more information about conserving agricultural or forestry resources in your community.

## Creating an overlay district boundary

Once the community has settled on a target BWHA conservation value, the BWHA raster dataset should be converted to an overlay district boundary. The recommended process is to convert the raster dataset to a polygon shapefile or feature class, ensuring that the FINAL field is retained in the output file. If the raster dataset has not already been clipped to a smaller extent than that of the original statewide or regional file, it is recommended to do so prior to conversion to a polygon. If using the ArcGIS *Raster to Polygon* tool, it is acceptable to select the Simplify Polygons option since, as mentioned above, the spatial accuracy of the BWHA data is not site specific. Once converted, the BWHA polygons with a BWHA conservation value of greater than or equal to the previously agreed-upon target conservation value can be selected and a new polygon can be created meeting those criteria. A fifty foot buffer should then be applied to the polygon to help ensure significant natural resources are actually located within the overlay district. Finally, the new polygon should then be clipped to the municipal or county planning jurisdiction boundary. The result should be a polygon feature class or shapefile representing the proposed overlay district boundary, which will need to be adopted as a zoning map amendment along with the overlay district regulations.

**Alternative approach**

Alternatively the district can be based on the existing parcel boundaries of parcels that contain areas equal to and above the BWHA threshold value chosen. In this case the district would be based on parcel boundaries and the entire parcel would be surveyed for areas to protect.

**Filtering Parcels**

You will likely select some parcels that are too small or that have only a small area of the BWHA within the parcel boundaries. There may be a need to use criteria to remove these parcels from the district.

## Determining applicability and exemptions

If a voluntary, incentive-based approach is taken, applicability and exemptions are of little value as no property owners or developers must participate. Some communities, however, may prefer a mandatory program with certain types of development exempted from the supplemental regulations of the overlay district. In this case, desirable land uses can be exempted from any mandatory provisions of the overlay district. Depending on the community, manufacturing, minor subdivisions, public uses or institutional uses, golf courses or marinas, etc. may be candidates for exemption, as may be permits for individual single-family residences or duplexes. It may also be appropriate to consider exempting sites that do not exceed a minimum acreage or do not create a minimum number of new development lots. Be sure to take care to incorporate applicability standards into both subdivision and zoning ordinances, as it is likely that the overlay district provisions should apply to both.

## Land use considerations

The underlying zoning of the overlay district will play an important role in the effectiveness of the conservation program. Many land uses are poorly suited to be located in close proximity to areas of high conservation value. Before beginning the rezoning process to establish a conservation overlay district, review the zoning districts in the proposed overlay district and the uses permitted in those district and try to limit incompatible activities in and around areas to be protected. This may involve downzoning certain areas to less intensive districts and perhaps upzoning other areas more well-suited to more intense uses, depending on the supply of those districts within the zoning jurisdiction. This evaluation should be closely coordinated with the applicability and exemptions considerations discussed above.

# THE MODEL ORDINANCE

The model ordinance below is divided into sections, each of which is discussed in various degrees of detail prior to the draft language itself, which is presented in gray text boxes. Due to the variation in structure of land development regulations, it is impractical to provide exact model ordinance language that can simply be copied and pasted into local ordinances. Instead, the following development standards will need to be modified as needed and inserted into the appropriate section of the ordinance.

## Establishing the overlay district

Land development ordinances vary widely in their structure, but zoning districts are often established in one of two ways. The first is to simply list the zoning districts together and for the purpose of each district to be designated separately in the subsequent sections which detail the requirements for the districts. The second is for each district’s purpose to be summarized within the list establishing the districts and for the subsequent sections to be limited to regulatory elements. The former is the method used here. Please modify the language as necessary to meet the needs of your development regulations.

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| **X. Natural Resources Conservation Overlay (NR) District**1. PurposeThe purpose of the Natural Resources Conservation Overlay district is to:1. Protect remaining large contiguous significant natural resource areas from activities that would alter their ecological integrity, balance, or character;
2. Connect significant natural resource areas with corridors of land in a natural state to maximize the migration of wildlife and plant species among habitat areas; and
3. [*voluntary*] Encourage development activity which minimizes impacts to significant natural resources and habitat connectivity.

OR[*mandatory*] Ensure that land uses and development activities are planned and designed to be harmonious with significant natural resources areas and to reduce conflicts with working lands, wildlife conservation, and habitat management activities.FOR VOLUNTARY PROGRAMS FOR MANDATORYPROGRAMS |

## Applicability and Exemptions

Generally, we recommend voluntary habitat conservation provisions. Model language is provided for both voluntary and mandatory programs and should be modified as appropriate.

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| 2. ApplicabilityThe provisions of this section shall apply to all development activity on a development site where any portion of one of more of the development tracts is within the NR district and for which the developer or property owner of such tract(s) seeks to be subject to the development standards herein.FOR VOLUNTARY PROGRAMS ORThe provisions of this section shall apply to any development activity where land disturbing activity is proposed within the NR district, except:FOR MANDATORYPROGRAMSa. Land development activity that cumulatively disturbs less than one-half acre and is not part of a larger common plan of development.b. A single-family or duplex residential unit on individual lot.c. Land development activity by a governmental agency for a public purpose.d. Agriculture, silviculture, forestry, and any activity beyond the regulatory authority of [insert local government name here].e. Minor subdivisions |

## The development approval process

For simplicity, both for the local government and for applicants, it is recommended to incorporate the overlay zone approval process into an existing approval process and not create a separate approval process. In all situations, the development of a site that falls within the overlay district will require other approvals and permits from the local jurisdiction, such as approval of a commercial site plan, preliminary and/or final subdivision plat, conditional or special use permit, planned development, conditional rezoning, etc. By adding the additional development standards and submittal requirements to those already in place, the approval of development activity in the overlay zone will be seamless and follow the typical approval process and timeline.

It is assumed that your local government’s existing submittal requirements for site-specific development plans such as site plans and subdivision plat include the following items. If they do not, it is recommended to include them as they will be important elements of the development review.

a. Survey of site boundaries and existing improvements, easements, and servitudes

b. Zoning district and municipal boundaries

c. Water features, flood hazard areas, and wetlands

d. Proposed improvements, including buildings, pavement, and utilities

Development review should be conducted by a technical review committee that includes, among other experts and agency representatives, a qualified wildlife biologist. Please consult with the NC Wildlife Resources Commission or another natural resource agency about assisting in evaluation of submitted habitat surveys and management plans. Ideally, the technical review committee should be established with flexible membership, such that certain members or agency representatives only participate where appropriate or applicable.

A key component of this model ordinance is the requirement for developers to submit a habitat survey in conjunction with other required submittal documents such as site plans and subdivision plats. It is important for your local government to understand and to inform property owners subject (whether by choice or requirement) that any landowner can request a habitat survey from the NC Wildlife Resources Commission. It is also important for the local government to understand and to inform property owners that, whether a requirement or not, meeting with staff to discuss the project requirements and process in advance of initial submittal or detailed engineering is a great way to reduce the cost and time of approval and to give staff an opportunity to explain the conservation district and the habitat survey requirements.

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| 3. Submittal RequirementsDevelopment applications for applicable sites shall provide the following information on the face of, or in addition to, any required site-specific development plans, such as Site Plan, Special Use Permit, or Subdivision Plat:1. A habitat survey, prepared by a qualified biologist with demonstrated experience in wildlife habitat identification (preferably a NC Wildlife Resources Commission biologist or other agency wildlife expert), showing the location with reasonable specificity of all Significant Natural Resources, along with photographs of those resources.
2. The location of existing disturbed areas, existing buildings, structures, utility lines, sewers, water and storm drains, all constructed stormwater management systems, and existing impervious surfaces.
3. A habitat management plan, prepared by a qualified biologist (preferably a NC Wildlife Resources Commission staff biologist), identifying the habitat management activities employed to maintain significant natural resource areas, including specific habitat management implementation activities, schedules, and assignment of responsibility.
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## Development standards

The development standards presented below were created by the NC Wildlife Resources Commission and the Nicholas Institute for Environmental Policy Solutions at Duke University and are adapted from their *Model Natural Resources Conservation Ordinance.* Keep in mind that, while numerical values presented in the model ordinance were selected to provide maximum conservation of critical habitat, numerical values can be adjusted to meet the needs of the local government, in particular if elected or appointed boards are getting push back from landowners or the development community.

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| 4. Natural Resource Protection StandardsApplicable development activity shall conform to the following standards:1. Significant natural resources shall not be cleared of vegetation and shall not be developed in any manner that would negatively impact the habitat, except under the following conditions:

i. Improvements that protect or enhance the enjoyment of the habitat, including but not limited to uncovered walkways, self-guided trails, and protective fences.ii. If the significant natural resources cover greater than 50% of the development tract, then up to 50% of the development tract may be developed. Significant natural resources should be permanently protected in order of priority listed in the definition section such that any higher item on the list is a higher priority. The undeveloped habitat areas shall be contiguous within the tract and with habitat areas on adjacent tracts to the maximum extent possible. The undeveloped habitat should have the maximum habitat interior to edge ratio possible (circular shape) to prevent habitat fragmentation. To the maximum extent possible the development design shall protect and connect as many priority significant natural resources as possible and such that wetlands, as defined under definition 22.c, are not filled and the buffer is maintained around the wetland that is connected to other wetlands or streams or floodplain forest. Connectivity means that habitat areas are linked with areas of contiguous, natural vegetation that is at least 300 feet wide.iii. To provide for access to otherwise inaccessible parts of the parcel/development. If part of the parcel could be developed, but would be inaccessible due to the existence of significant natural resources, a road and/or utilities may be constructed through the significant natural resources. The road and/or utilities, however, shall cross at the narrowest practical point and shall be designed and constructed to the maximum extent possible to minimize impact to and fragmentation of the highest priority significant natural resources. Where significant natural resources must be negatively impacted, an equal area must be restored and protected on site, up to 50% of the tract.1. Significant natural resource areas shall be permanently protected by conservation easements, protective covenants, or similar restrictions or by any procedure authorized for the dedication of park, recreation, and open space areas. Conservation easements on significant natural resource areas may, at the discretion of the body with final approval authority, be required as a condition of approval of any site-specific or phased development plan.
2. Stormwater runoff from impervious surfaces shall not be discharged directly to the significant natural resourceswithout vegetated filtration and energy dissipation.
3. Sewer lines, water lines, and other utility infrastructure shall not be constructed within 100 feet of perennial and intermittent streams to the maximum extent possible. All utility crossings shall be minimized. The directional bore stream crossing method (installation of utilities beneath the riverbed avoiding impacts to the stream and buffer) shall be used for utility crossings wherever practical, and the open stream crossing method shall only be used when water level is low and stream flow is minimal.
4. Pesticides (including insecticides and herbicides) shall not be used for maintenance of rights-of-way within one hundred (100) feet of perennial and fifty (50) feet of intermittent streams, or within the 100 year floodplain, unless the pesticide is labeled for use in aquatic systems or is part of the approved Habitat Management Plan.
5. Curbing shall have a 1:4 slope to allow passage of small animals.
6. Bridges shall [OR should] be used for all permanent roadway crossings of streams and associated wetlands. If a culvert must be used, it shall be designed to allow passage of aquatic organisms by burying the culvert in the stream bottom or bank to a minimum depth of one (1) foot. Stream relocation or widening shall be avoided; however where required state-of-the-art natural channel design and construction techniques shall be used.
7. The land surrounding built structures should be maintained in natural vegetation to the maximum extent possible.
8. Non-native invasive species shall not be planted for any purpose.
9. The post-development condition should maintain connectivity of all significant natural resources, both within the tract and between adjacent tracts. Connectivity means that habitat areas are linked with areas of contiguous, natural vegetation that is at least 300 feet wide.
10. Site gas stations, car washes, and other potential “spill” land uses shall be located no less than two hundred (200) feet from perennial and intermittent streams.

5. Additional Development StandardsApplicable development activity in compliance with the Natural Resource Protection Standards above shall be entitled to the following development standards, which are intended to supersede the requirements of other sections or articles.1. Residential density. Any land containing significant natural resources permanently protected pursuant to the provisions of subsection 4 of this Section, and pursuant to all open space protection requirements elsewhere in this Ordinance, may be counted in calculating the permitted residential density of the subject site.
2. Minimum lot dimensions. The minimum lot dimensional standards for the underlying zoning district(s) shall not apply to major subdivisions applicable under this Section, provided that the residential density permitted in subsection a above is not exceeded. [*NOTE: Project boundary buffers are recommended where minimum lot sizes are reduced below those allowed by the underlying zoning district. If your jurisdiction does not require vegetated project boundary buffers, it is recommended to include one here.*]
 |

## Subdivision Ordinance Amendment

The above model language is designed as a zoning overlay district. It is designed and intended to apply to subdivisions within the NR overlay district; however, for communities with separate zoning and subdivision ordinances, it is recommended to also amend your subdivision ordinance to specifically reference the NR district section of the zoning ordinance. Most subdivision ordinances require that subdivisions are designed to comply with the zoning ordinance. If you feel your subdivision ordinance does not sufficiently reference the zoning ordinance and does not adequately specify that subdivisions must comply with all standards of their underlying zoning districts, this is the time to strengthen that language.

For communities that regulate land subdivision but not zoning, a detailed discussion is beyond the scope of this project. However, where zoning is not authorized, use of an overlay zoning district will not be permitted. In this case, we recommend making the submittal of a habitat survey purely voluntary and tailoring your community’s lot standards or other incentives to encourage developers to employ the development standards above.

## Definitions

There are a number of definitions that should be added to your ordinance(s) as appropriate. Here is a list of some of the most important. Appendix A includes a selected list of definitions from the original *NC* *Model Natural Resources Conservation Ordinance* referenced above and in Appendix B. The definitions are terms used in the model ordinance and should be added to your existing land development ordinances. However, as ordinances can vary greatly in structure and content, we recommend that you review Section V of the original model ordinance in the event any other definitions will be useful to you.

# UPDATING YOUR ORDINANCE & THE ADOPTION PROCESS

Local governments are encouraged to incorporate the model language into an existing land development regulation ordinance after any necessary modifications are made to ensure consistency, avoid redundancy, retain any provisions specifically related to project review, and to ensure the ordinance is not in conflict with other provisions. Below are some tips to help facilitate the ordinance adoption process.

## Establishing an Overlay District

An overlay is a zoning district and, therefore, must be displayed on the official zoning map of the jurisdiction. A zoning map amendment, or rezoning, consistent with NC General Statutes, in particular §160A-364, 383 and 384 for municipalities and §153A-323, 341, 343 for counties, is required in order to add the overlay district to the zoning map. In the model ordinance, the zoning district is called the Natural Resources Conservation Overlay District and is abbreviated as the NR district. It is a good idea to label the zoning map with both the name and abbreviation. It is also a good idea to identify the district as an overly district and to denote it on the map with a cross-hatch or other means to identify the underlying district below.

## Updating Land Development Ordinances

Unified development ordinances, zoning ordinances, and subdivision ordinances must be amended to include the proposed Natural Resources Conservation Overlay District and related language. Amendments must be consistent with the NC General Statutes identified above, including the required consistency statements and written Planning Board recommendation.

## Sample Resolution of Adoption

**AN ORDINANCE ESTABLISHING A NATURAL RESOURCES CONSERVATION OVERLAY DISTRICT IN THE [INSERT JURISDICTION NAME HERE]**

**WHEREAS,** natural resources such as natural water supply systems, forests, and plant and wildlife habitat provide valuable cultural, educational, recreational and tourism-related opportunities and support local industries and public health and welfare.

**WHEREAS,** plants and animals play an important role in maintaining healthy ecosystems through ecological interactions such as predation, pollination, seed dispersal and soil generation and health. Maintaining healthy natural resources mitigates air pollution, improves water quality, reduces drought and flooding, and sustains local tourism, timber, recreation and associated jobs and local revenue.

**WHEREAS,** the quantity and quality of drinking water is enhanced and the cost of water treatment is reduced by healthy ecosystems through mechanisms such as water absorption and filtration. These services can be degraded when impervious surfaces are placed in sensitive areas.

**WHEREAS,** maintaining healthy and diverse natural resources is important for a robust farming, forestry, and horticulture economy. These industries rely on native wild pollinators for two thirds of crop pollination, habitat for domestic crop pollination from honeybees, predators of pests, healthy soil, and other natural resources. These industries can be compromised when incompatible land uses surround them.

**WHEREAS**, healthy, contiguous floodplains and wetlands are supported by upland habitat conservation and protect the public and taxpayers from costly natural disasters.

**WHEREAS,** certain types of land development can negatively impact ecosystems, natural areas and wildlife. Properly planned development can maintain these natural resource assets by avoiding the fragmentation of key natural areas and the associated reduction of ecosystem function and services.

**WHEREAS,** the purpose of the Natural Resources Conservation Overlay district is to maintain the quality of life in [*insert local government name*] and to protect the health, safety, welfare and general well-being of the citizens of [*insert local government name*] by conserving and connecting the highest priority waterways, forests, and habitat for terrestrial and aquatic native plants and animals in [*insert local government name*]’s jurisdiction while accommodating development and other land uses.

**WHEREAS,** the Natural Resources Conservation Overlay district is intended to preserve and protect ecosystems, while balancing the need for planned growth, by minimizing fragmentation or separation of significant natural resourceareas, protecting upland habitats in addition to adjacent waterways and water sources, maintaining plant and animal habitat diversity and specifically protecting unique environmental features identified as integral parts of the designated landscape.

**NOW, THEREFORE**, the [*insert governing board name*] of the [*insert local government name*] hereby amends *the official zoning map of [insert local government name here]* andthe [*insert name of land development regulation(s)]* as follows:

**PART 1:** The Natural Resources Conservation Overlay district is added to the official zoning map in accordance with the attached map.

**PART 2:** The following language is added to the [*insert name of zoning/unified development ordinance*] as follows:

[*insert zoning ordinance text here*]

**PART 3**: The following language is added to the [*insert name of subdivision ordinance, if applicable*] as follows:

[*insert subdivision text here*]

# Appendix A: Definitions

1. *Aquatic Significant Natural Heritage Area*: an Aquatic Significant Natural Heritage Area as defined and mapped by the NC Natural Heritage Program. These are “aquatic sites that are of special biodiversity significance. A site’s significance may be due to the presence of rare species, exemplary or unique natural communities, or other important ecological features. The areas identified represent the approximate boundaries of ecologically significant sites.”
2. *Disturbance area or disturbed area*: the area where vegetation clearing or land manipulation takes place for the purpose of development. This includes the area where fill material is removed or placed, the area affected by changes to natural hydrology, land converted from natural vegetation to lawns, golf courses and other *non-native vegetation*, and any area where development and related activities negatively impact wildlife habitat. This term includes the area lost to the construction of new lakes and other impoundments. It does not include alteration of existing disturbed areas (e.g. paving of an existing gravel road).
3. *Fragmentation*: Disruption in continuity and loss of habitat or *significant natural resources* by development of land or alteration of *natural vegetation*. Disruption or impediment of the natural movement and dispersal of wildlife within and between previously connected blocks of habitat caused by removing or altering the natural vegetation (forest, shrubland and grassland) within or between blocks of habitat or by building structures or other *infrastructure* within or between habitats and *significant natural resources*.
4. *Habitat Management Plan*: A document that details the specific required measures that the developer will take to minimize impacts and fragmentation of significant natural resources on the development site.
5. *Impervious Surface*: A surface composed of any material that impedes or prevents infiltration of water into the soil. Impervious surfaces shall include but are not limited to impervious roofs, driveways, patios, sidewalks, parking areas, tennis courts, concrete or asphalt streets, solid decks, or compacted gravel surfaces. Wooden slatted decks and the water area of swimming pools shall be considered pervious. Calculations of impervious surfaces for streets shall include the area compacted for impermeable pavement or gravel base for impermeable pavement.
6. *Natural vegetation:* Vegetation, excluding any non-native vegetation, as it exists on the tract prior to any of the proposed development or disturbance associated with the proposed development that is not part of a disturbance area or a disturbed area.
7. *Non-native invasive species:* 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.[[1]](#footnote-2) Non-native invasive plant species include any species identified as invasive on the NC Native Plant Society Invasive Exotic Plant list (<http://www.ncwildflower.org/plant_galleries/invasives_list>) or by a NC Cooperative Extension agent or a qualified biologist.
8. *Non-native vegetation:* non-native (or alien) to the ecosystem under consideration. [[2]](#footnote-3)
9. *Qualified biologist*: A qualified biologist is defined as one or more of the following: a Wildlife Society Certified Wildlife Biologist (CWB), a Professional Wetlands Scientist (PWS) certified by the Society of Wetlands Scientists, a Certified Ecologist or Certified Senior Ecologist certified by the Ecological Society of America, a biologist currently employed by the NC Wildlife Resources Commission, US Fish and Wildlife Service, NC Natural Heritage Program, US Army Corps of Engineers, or a biologist that is prequalified by the NC Department of Transportation or the NC Environmental Enhancement Program to conduct biological or ecological surveys.
10. *Sediment:* Solid particulate matter, both mineral and organic that has been or is being transported by water, air, gravity, or ice from its site of origin.
11. *Sedimentation:*  The process by which sediment resulting from accelerated erosion has been or is being transported off the site of the land-disturbing activity or into a lake or natural watercourse.
12. *Significant natural resource areas:* Those areas containing rare or declining habitats or habitats that support rare species or a high diversity of species, specifically including the following natural resources and habitats:
13. Jurisdictional and non-jurisdictional wetlands or endangered species habitat as delineated by state and federal agencies for environmental permitting.
14. The presence of a natural community or communities as defined by the NC Natural Heritage Program in the Classification of the Natural Communities of North Carolina[[3]](#footnote-4) within *Significant Natural Heritage Areas* identified and mapped by the NC Natural Heritage Program. *Significant Natural Heritage Areas* are not the same as significant natural resource areas and have their own definition.
15. An average 750 foot radius upland area of any shape adjacent to isolated non-alluvial wetlands (small wetlands) not connected to streams or not within conserved floodplains, starting from the edge of the water or watermark. This area includes a 150 foot radius buffer of symmetrical shape around the wetland water’s edge. Wetlands are jurisdictional and non-jurisdictional wetlands of the following types defined by the NC Natural Heritage Program in the Classification of the Natural Communities of North Carolina (Piedmont region): Floodplain Pool, Bogs, Upland Seepages and Upland Pools and Depressions.
16. Two hundred (200) feet on either side of permanent (“blue line”) streams or rivers within *subwatersheds* (14 digit Hydrologic Unit Code) which support federally endangered or threatened aquatic species. These buffers may be reduced to accommodate other priority habitat conservation on site, but shall not be less than 100 feet.
17. A 300 foot wide area on either side of the waterway adjacent to Aquatic Significant Natural Heritage Areas identified by the NC Natural Heritage Program. These buffers may be reduced to accommodate other priority habitat conservation on site, but shall not be less than 100 feet.
18. Habitat that is sufficient (as determined by the qualified biologist) to conserve species occurrences on the tract of documented Natural Heritage Element Occurrences tracked by the NC Natural Heritage Program.
19. Sufficient habitat as determined by the qualified biologist, of state listed wildlife species or federally listed plants observed opportunistically during site visits. The term “listed” includes designation as Endangered, Threatened, or Special Concern.
20. A three hundred and thirty (330) foot wide area on all sides of a colonial wading bird nesting colonies encountered or as mapped by the NC Wildlife Resources Commission. A wading bird nesting colony is defined as an area where 2 or more colonial wading birds are nesting or have nested within the past 2 years. Colonial wading birds are any species of heron, egret, anhinga. These data are mapped and can be downloaded on the Green Growth Toolbox website Conservation Data page.
21. A 650 foot buffer around rock outcrops, including any of the following natural communities described by the NC Natural Heritage Program in the Classification of the Natural Communities of North Carolina (Piedmont region): low elevation granitic dome, acidic, mafic and calcareous cliffs, granitic flatrocks, diabase glade, Ultramafic outcrop barren and Boulderfield forests.
22. Longleaf pine forest defined as forests where 20% of the tree canopy consists of longleaf pine trees, regardless of age, within a stand at least 10 contiguous acres in size. These 10 acres can occur solely on the development tract or only a portion of the 10 acres can occur within the development tract.
23. An undeveloped area at least 300 feet wide connecting isolated wetlands on the property.
24. Floodplain forests with a canopy that is dominated by hardwood trees within the 100 year floodplain. Floodplain forests occur within and outside of the 100 year floodplain. Floodplain forest is defined by the NC Natural Heritage Program in the Classification of the Natural Communities of North Carolina.
25. Wet Pine Savannas Peatland Pocosins, Streamhead Pocosins (Sandhills only) and Nonalluvial Wetland Forests as defined by the NC Natural Heritage Program in the Classification of the Natural Communities of North Carolina (Piedmont region).
26. A 100 foot wide area adjacent to each side of perennial streams, rivers, lakes and reservoirs and a 50 foot wide area adjacent to intermittent streams.
27. Mature hardwood forest consisting of greater than 25% hardwood trees native to the region over 50 years old or greater than 20 inches diameter to indicate “mature” trees (this will vary depending upon tree species and growing conditions).
28. Lands designated by [**insert local government name**] as important for hunting, wildlife viewing, and other traditional forms of wildlife-related recreation, including lands outside of NC Wildlife Resources Commission Game Lands, within 150 yards of Game Land boundaries.
29. Wildlife corridors and habitat connectors between significant natural resource areas where sufficient information exists to designate these areas or where these areas are part of the Biodiversity and Wildlife Habitat Assessment of the NC Department of Environment and Natural Resources Conservation Planning Tool**.**
30. S*ignificant natural resources:* significant natural resource areas that have been confirmed in site surveys by the *qualified biologist* and or state and federal permitting biologists.
31. *Significant Natural Heritage Area*: A Significant Natural Heritage Area as defined and mapped by the NC Natural Heritage Program. These are, “terrestrial sites that are of special biodiversity significance. A site’s significance may be due to the presence of rare species, exemplary or unique natural communities, or other important ecological features. The areas identified represent the approximate boundaries of ecologically significant sites.” These data are mapped (please see the user’s manual for details on obtaining these maps).
32. *Stormwater* The flow of water which results from precipitation and which occurs immediately following rainfall or snowmelt.
33. *Subwatersheds which support federally endangered or threatened aquatic species*: These watersheds (14 digit Hydrologic Unit Code) have been surveyed by state and federal biologists and are known to contain federally endangered and threatened species. These data are mapped (please see the user’s manual for details on obtaining these maps).
34. *Wetlands*: Jurisdictional and non-jurisdictional wetlands as defined or delineated by state and federal regulatory agencies or those wetlands following the definition under the definition of significant natural resource areas (c.). Wetlands are important for flood and drought control and water pollutant filtration and act as sponges across the landscape.
35. *Wildlife corridors*: Areas of undeveloped land at least 300 feet wide that connects significant natural resource areas allowing wildlife to move between habitats.

# Appendix B: Summary of Relevant Resources and Data

## NC Wildlife Resources Commission

The North Carolina Wildlife Resources Commission (NCWRC) is a state agency established to conserve and sustain the state’s fish and wildlife resources through research, scientific management, wise use, and public input.

**Green Growth Toolbox**

Spread-out development patterns are a top threat to wildlife and habitats in North Carolina. The Green Growth Toolbox is a technical assistance tool for communities, local governments, planners, planning-related boards, GIS specialists and developers. The toolbox provides mapping data, planning techniques, recommendations and case studies for conservation of priority wildlife habitats that can be used in local land use planning, policy-making and development design. The program also provides free workshops and technical assistance. [www.ncwildlife.org/greengrowth](http://www.ncwildlife.org/greengrowth/)

**Partners for Green Growth**

Partners for Green Growth is a program of the Green Growth Toolbox that provides funding to assist local government efforts in conservation planning.

**Greening Incentives and Ordinances**

Greening Incentives and Ordinances means structuring incentives, zoning and development ordinances to conserve priority habitats and remove regulatory barriers to better conservation. See the resources below in addition to Section 5 of the Toolbox handbook.

[NC Model Natural Resources Conservation Ordinance](http://www.ncwildlife.org/Portals/0/Conserving/documents/GGT/A%20Model%20Natural%20Resources%20Conservation%20Ordinance%20for%20North%20Carolina%20Communities_7.2015.pdf) (PDF)

[NC Model Natural Resources Conservation Ordinance Fact Sheet](http://www.ncwildlife.org/Portals/0/Conserving/documents/GGT/Model%20ordinance%20fact%20sheet%207%202015.pdf) (PDF)

**Wildlife Habitat Conservation Guide**

This document represents a compilation of the best available science on habitat thresholds and conservation needs for at-risk species. The recommendations are the result of an extensive review of scientific literature with review and compilation by a multi-agency team of natural resources professionals.

[Conservation Recommendations for Priority Terrestrial Wildlife Species and Habitats in North Carolina](http://www.ncwildlife.org/Portals/0/Conserving/documents/ConservingTerrestrialHabitatsandSpecies.pdf) (PDF)

## NC Office of Land and Water Stewardship

The NC Office of Land and Water Stewardship is a non-regulatory division that provides information and assistance to support effective conservation and resilient communities.

<https://www.ncdcr.gov/about/nature/land-water-stewardship>

**NC Natural Heritage Program**

The program serves as an information clearinghouse in support of conservation of the rarest and most outstanding elements of natural diversity in the state. Of particular note is their downloadable conservation data and Interactive Data Explorer Map.

<https://ncnhde.natureserve.org/content/data-download>

<https://ncnhde.natureserve.org/content/map>

**NC Conservation Planning Tool**

North Carolina Conservation Planning Tool by the Office of Land and Water Stewardship provides a framework for decisions about future growth, while also ensuring that significant benefits provided by our state’s natural resources will be preserved for future generations. The report and data are great resources and are available for download, including the Biodiversity/Wildlife Habitat Assessment, Open Space and Conservation Lands Assessment, Agricultural Lands Assessment, and Forestry Lands Assessment.

http://portal.ncdenr.org/web/cpt/

## NC Cooperative Extension Service Urban & Community Forestry Program

The Urban & Community Forestry Program offers a number of publications of interest to local governments in NC, including the NC Conservation Subdivision Handbook, a guide for North Carolina communities in the use of conservation design for land use planning.

[NC Conservation Subdivision Handbook](http://content.ces.ncsu.edu/conservation-subdivision-handbook.pdf) (PDF)

## NC Forest Service Urban & Community Forestry Program: Green Infrastructure

Green infrastructure is an interconnected system of natural areas and other open spaces that are protected and managed for the ecological benefits they provide to people and the environment. It represents the idea that trees and natural areas provide ecosystem function and value to sustain clean air and water, reduce soil erosion, provide wildlife habitat, and various other benefits to people.

<http://ncforestservice.gov/Urban/urban_green_infrastructure.htm>

[Evaluating Green Infrastructure](http://ncforestservice.gov/Urban/pdf/EvaluatingGreenIfrastructureNC.pdf) (PDF)

## NC Geospatial Portal

NC OneMap is the geospatial data backbone supporting North Carolina data users. The Geoportal Server is a massive data repository that enables discovery, download, and web-mapping of geospatial data resources, including the Biodiversity/Wildlife Habitat Assessment. Refer to Section 2 of the Green Growth Toolbox Handbook for detailed information on useful conservation data available from the NC Geospatial Portal.

[http://data.nconemap.gov](http://data.nconemap.gov/geoportal/)

# Appendix C: BWHA Relevant Criteria Ranking



# Appendix D: Stormwater, Sedimentation and Erosion Control

North Carolina General Statute §113A-60 allows local governments to develop sedimentation and erosion control ordinances specific to their jurisdiction. Local sedimentation and erosion control programs must be approved by the North Carolina Sedimentation Control Commission and may include provisions that exceed the minimum standards established in the Sedimentation Pollution Control Act, N.C. Gen. Stat. §113A-50 et seq. If the local government adopting a natural resources conservation ordinance also has a local sedimentation and erosion control program, the local government is encouraged to add the following standards to protect significant natural resource areas:

1. The clearing and grading of native vegetation shall be minimized and development activities shall be targeted to areas with non-native invasive species vegetation. A list of non-native invasive plants in North Carolina can be found at <http://ncwildflower.org/invasives/list.htm>

2. Protect waterways by preventing clearing adjacent to waterways, and stabilize drainage ways.

3. Construction sites larger than 25 acres shall be developed in phases to reduce time and area that disturbed soils are exposed.

4. Soils shall be stabilized within 14 calendar days of disturbance with a grass or mulch cover.

5. Steep slopes shall be protected and clearing or grading existing steep slopes shall be minimized.

6. Advanced settling devices shall be employed to the extent possible. Recommended practices include increased wet or dry storage volume, perforated risers, better internal geometry, use of baffles, skimmers and other outlet devices, and multiple cell construction.

7. The use of Low Impact Development standards from the NC State University Low Impact Development Guidebook ([www.ces.ncsu.edu/depts/agecon/WECO/lid-curriculum/index.php) shall](http://www.ces.ncsu.edu/depts/agecon/WECO/lid-curriculum/index.php%29%20shall) be encouraged.

1. U.S. Department of Agriculture. Native Invasive and other Plant Related Definitions. Retrieved 8/3/12. http://www.ct.nrcs.usda.gov/plant\_definitions.html [↑](#footnote-ref-2)
2. U.S. Department of Agriculture. Native Invasive and other Plant Related Definitions. Retrieved 8/3/12. http://www.ct.nrcs.usda.gov/plant\_definitions.html [↑](#footnote-ref-3)
3. Shafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Raleigh. [↑](#footnote-ref-4)