

APPENDIX A

LISTED SPECIES AND PRIORITY HABITATS



As we have explained throughout the toolbox, it is important to know about the species and habitats that are priorities for conservation in your community.

Federally Listed Species

- The U.S. Fish and Wildlife Service maintains a list of plant and animal species that are federally endangered, threatened and of special concern.
- Species listed as federally endangered or threatened are protected under the Federal Endangered Species Act (16 U.S.C. 1531 to 1543), meaning that the plant/animal or habitat cannot be harmed unless a permit is obtained through consultation with the U.S. Fish and Wildlife Service.
- At-risk species are species that are proposed to be listed or are in process of becoming listed. Further research is typically needed to determine the conservation status of an at-risk species.
- Following the recommendations in this guide will help to avoid and minimize negative impact to endangered species, but will not necessarily fulfill all regulatory requirements under the Endangered Species Act.
- For specific regulatory questions about a federally listed species, please contact the U.S. Fish and Wildlife Service at (919) 856-4520 in eastern NC, (828) 258-3939 in western NC, or visit www.fws.gov/raleigh/es.html
- To find out what federally listed species exist in your county and to view fact sheets about the species, visit www.fws.gov/species/search.

State-Listed Species

- State-listed species are protected under the State Endangered Species Act (G.S. 113-331 to 113-337), which is administered by the North Carolina Wildlife Commission.
- For a complete list of state listed species (divided by region) in North Carolina, download the document, "Protected Wildlife Species of North Carolina," from www.ncwildlife.org/Portals/0/Conserving/documents/Protected-Wildlife-Species-of-NC.pdf.

Other Priority Habitats and Species

- In addition to federal and state listed species, other species and habitats are considered priorities for conservation. Priority habitats, and the species that depend on them, are identified and described in North Carolina's Wildlife Action Plan.
- For more information on priority species and habitats listed for your region, see the North Carolina Wildlife Action Plan: www.ncwildlife.org/plan

APPENDIX B

AGENCIES AND ORGANIZATIONS WITH TECHNICAL EXPERTISE

Many organizations and agencies can provide technical expertise to your town or county on Green Growth or related topics. Each organization’s general contact information and primary expertise is outlined below.

State and Federal Agencies

The state and federal agencies listed below possess expertise related to planning for Green Growth. Note that agencies with regional expertise (particularly coastal agencies) are not listed below; these agencies are listed in regional appendices.

Agency	Primary Expertise	Contact
N.C. Wildlife Resources Commission	<ul style="list-style-type: none"> • Can assist local governments with Green Growth planning • Information about listed and priority species identified in the NC Wildlife Action Plan • The agency’s Habitat Conservation Division can provide information and assistance related to environmental permitting. 	<ul style="list-style-type: none"> • For general Green Growth Toolbox Project: (910) 638-4887 or (919) 630-3086 • For environmental permitting issues, Habitat Conservation staff at: (919) 707-0222
U.S. Fish & Wildlife Service	<ul style="list-style-type: none"> • Endangered Species Act • Information on planning related to federally listed species 	<ul style="list-style-type: none"> • Raleigh Field Office: (919) 856-4520 • Asheville Field Office: (828) 258-3939
N.C. Natural Heritage Program	<ul style="list-style-type: none"> • Inventories, catalogues, and supports conservation of the rarest and the most outstanding elements of the natural diversity of our state • Can conduct, update, or help interpret your county’s Natural Heritage Inventory 	<ul style="list-style-type: none"> • For data and data access questions: (919) 707-9392
N.C. Forest Service, Urban Forestry Program	<ul style="list-style-type: none"> • Provides technical guidance to communities on tree preservation and urban forestry issues • Provides funding, through the Urban and Community Forestry Grant Program, for developing local urban forestry programs 	<ul style="list-style-type: none"> • Urban Forestry Program Coordinator: (919) 857-4842

N.C. Division of Water Resources (DEQ), Planning Section	<ul style="list-style-type: none"> • Coordinates nonpoint source reduction efforts 	<ul style="list-style-type: none"> • Contact Planning Section staff at: (919) 707-3630
N.C. Division of Parks and Recreation (DNCR)—State Trails Program	<ul style="list-style-type: none"> • Guidance to help local governments plan, develop, and manage trails and greenways • Provides grant funding to help organizations, including county and municipal governments, fund trail development and management 	<ul style="list-style-type: none"> • Contact State Trails Program at: (919) 707-9300
N.C. Division Energy, Mineral, and Land Resources: Erosion and Sediment Control & Stormwater Programs (DEQ)	<ul style="list-style-type: none"> • Technical assistance on local erosion, sedimentation control issues and stormwater management 	<ul style="list-style-type: none"> • For contact information for the Stormwater Program, see: https://deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program • For contact information for the Erosion and Sediment Control, see: https://deq.nc.gov/about/divisions/energy-mineral-and-land-resources/erosion-and-sediment-control
N.C. Division of Soil and Water Conservation (N.C. Department of Agriculture & Consumer Services)	<ul style="list-style-type: none"> • Provides technical assistance to soil and water conservation districts and local governments to protect soil resources and improve water quality • Guidance on a variety of watershed management issues 	<ul style="list-style-type: none"> • For contact information, see: www.ncagr.gov/SWC/find-yourdistrict.html
N.C. Division of Mitigation Services (DEQ)	<ul style="list-style-type: none"> • Develops local watershed plans that address sources of water quality degradation • Coordinates watershed improvement and restoration projects • Guidance on strategies and solutions to address watershed degradation 	<ul style="list-style-type: none"> • Contact or ask for your county's project manager: • Raleigh Office: (919) 707-8976 • Asheville Office: (828) 296-4500
N.C. Cooperative Extension—Ecology or Wildlife Programs	<ul style="list-style-type: none"> • Multiple programs that provide technical guidance related to local environmental planning 	<ul style="list-style-type: none"> • https://forestry.ces.ncsu.edu/forestry-wildlife/
N.C. Department of Commerce—Office of Community Planning	<ul style="list-style-type: none"> • Provides technical assistance to local governments on land use planning issues. 	<ul style="list-style-type: none"> • www.commerce.nc.gov/data-tools-reports/planning-services-tools

Land Trusts

Land trusts are primarily involved in protecting land through acquisition or conservation easements. Land trusts can be good partners in helping your community craft strategies to protect important lands for future generations.

Organization	Primary Expertise	Contact
NC Land Trusts	<ul style="list-style-type: none"> • Guidance related to conservation planning, land protection and land management/stewardship 	<ul style="list-style-type: none"> • To find your local land trust, see: https://landtrustalliance.org/land-trusts
Trust for Public Land	<ul style="list-style-type: none"> • Guidance or partnerships to protect land in certain areas of North Carolina • Guidance related to conservation finance (i.e., developing local means to pay for land conservation) 	<ul style="list-style-type: none"> • Contact the North Carolina Chapter Office at: (919) 836-0571
The Nature Conservancy	<ul style="list-style-type: none"> • Conservation planning, land protection and stewardship expertise 	<ul style="list-style-type: none"> • Contact the North Carolina office: (919) 403-8558 or northcarolina@tnc.org
The Conservation Fund	<ul style="list-style-type: none"> • The Community and Economic Development Program provides assistance to communities on integrating environmental protection and community development, including conservation plans for affordable housing. 	<ul style="list-style-type: none"> • Contact the North Carolina office at: (919) 967-2223

Regional Organizations

Communities in different regions will have access to different sources of technical guidance. Lists of regional organizations you can contact for assistance are provided in the Regional Appendices. However, most communities across the state will have a Council of Government or a conservation partnership nearby that may be able to provide assistance.

Agency	Primary Expertise	Contact
Councils of Government	<ul style="list-style-type: none"> • Land use planning-related technical assistance • If available, see addendum specific to your region for more information. 	<ul style="list-style-type: none"> • www.ncregions.org
Conservation Partnerships	<ul style="list-style-type: none"> • Regional conservation partnerships in North Carolina can provide technical guidance related to conservation planning. • If available, see appendix specific to your region for more information. 	<ul style="list-style-type: none"> • See your GGT Regional Appendix if available. • See: www.ncnhp.org/conservation/conservation-planning-tool/resources/other-efforts

APPENDIX C

HUMAN-WILDLIFE CONFLICT PREVENTION

As development in North Carolina spreads, urban-adapted wildlife and people are increasingly coming into contact with one another. Certain species—Canada geese, deer, raccoons, rabbits, opossums, bears, coyotes and foxes - can adapt to developed environments and will take advantage of available food and shelter. Conflicts can arise when animals dwell around stormwater ponds, dig up gardens, prey on outdoor pets, den in, near, or under housing structures, consume or destroy landscaping vegetation or root through trash cans.



The presence of some wildlife, such as foxes, coyotes, raccoons, opossums and even bears, in suburban areas is a result of these species being able to access garbage cans, outdoor pets, pet food, and bird feeders, especially at night. If food sources are made unavailable, these species will leave the area. The public often call wildlife control professionals and wildlife agency staff to remove wildlife from residential areas, which is not possible or is unsuccessful in many cases. The key to preventing human-wildlife conflicts is for: residents to remove trash and pet food sources around their homes, communities to have large natural habitat open space areas, and to allow for well-controlled hunting in suburban areas.

Overpopulation by urban-adapted wildlife not only can cause problems for people, but can also cause harm to wildlife. For example, when too many deer exist in an area they can overgraze their wild plant foods and many end up starving or surviving in very poor health.

The key to managing human-wildlife conflict is to educate the public on the points below and to look for the most effective way to reduce outdoor trash and pet food availability, increase natural open space, and amend local laws to allow trapping or hunting. Increasing natural open spaces in fields and forests will allow for food availability away from residential areas. Hunting and trapping will in turn reduce the high density of urban-adapted species.

Local governments and residents can take steps to proactively prevent human-wildlife conflicts.

- Provide animal and bear proof trash cans through your community's waste disposal program. Several companies can supply these. If you have black bears make sure the cans are proven to be truly bear proof.
- Educate, encourage or require the public not to actively feed wild animals by taking in their bird feeders in the evening and not placing food in their yards to feed pets, feral cats or wildlife.
- More recommendations can be found in our [Best Management Practices for Development](#).

Please note: It is beneficial to plant annual native wildflowers and warm season grasses in backyards to benefit wild birds and other native wildlife that are not considered a nuisance. Annual plants that are not as abundant in the winter will help to reduce deer conflicts.

- Prevent overpopulation of deer
 - Explore the feasibility of an urban archery season.
www.ncwildlife.org/Conserving/MunicipalitiesCounties.aspx
 - Consider enabling hunting with firearms in large open spaces associated with conservation subdivisions or parks on a few days when public access is restricted.
 - Encourage the use of deer fencing, especially around food gardens.
- Provide trapping opportunities during the trapping season to manage problematic animal populations—such as raccoons and foxes—in certain areas.
- Encourage homeowners to keep domestic cats and dogs indoors. Cats allowed outdoors negatively impact sensitive bird, reptile, and amphibian populations, while also attracting problematic wild animals that hunt cats and dogs.

For more information about preventing human-wildlife conflicts, visit the following website, www.ncwildlife.org/Trapping/HaveaProblem.aspx.

Bats in the attic and chimney swifts in the chimney.

In suburban areas large hollow trees are scarce and houses are usually the only remaining structures where certain bat species and chimney swifts can roost or raise their young.

It is important to the conservation of these species to provide alternative roosting structures for them if you need to close off your home or chimney to bats, chimney swifts, or other native wildlife that have taken up residence (owls, flying squirrels, etc.). There are a variety of nesting or roosting boxes that can be placed in the appropriate habitat nearby.

It is critical that you do not trap animals in the house when screening is put into place. Chimney swifts are protected under the Migratory Bird Treaty Act. Contact the U.S. Fish and Wildlife Service if you feel you need to do something. See Appendix B for contacts.

For chimney swifts:

- Consider tolerating the swifts which only use chimneys during the spring through early fall when fire places are not typically used. Make sure you clean out the chimney before you intend to use it in the fall after the nesting season is over.
- If possible consider constructing an alternative chimney like structure near your home for the swifts to use. See www.chimneyswifts.org for more information.
- Screening the top of the chimney should be done during winter to avoid trapping actively nesting birds inside the chimney.

For bats:

- Contact a professional who will do the following:
 - Screen house openings only outside of the breeding season during the winter.
 - Screen house openings during night hours while bats are outside.
- Consider constructing a bat house nearby where your 'house bats' can go. This is a very affordable and fun project. Bats are great to have in the yard to control insects and mosquitos. See the following website for bat house information www.bat-con.org/index.php/get-involved/install-a-bat-house.html.

APPENDIX D

GLOSSARY

Aquatic Species: Species of organisms that require water during their entire life cycle.

Biological Diversity: Also known as biodiversity, this term refers to the entire diversity of life in an area—including variation within and among species, natural communities and ecosystems. The more types of species and habitats in an area, the higher its biodiversity.

Climate Resiliency: The capacity of a community or a natural ecosystem to prevent, withstand, respond to, and recover from a climate-related event.

Conservation Concern: Sufficient evidence exists that species and or habitats may become threatened or endangered with extinction.

Conservation Data: Maps and information about habitats, animal and plant species of conservation concern. This data is mostly collected on the ground and is compiled by experts.

Conservation Planning: Process that occurs when a group of stakeholders consider the status of an area's natural environment and identify goals and strategies for conserving the area's natural heritage and biological diversity.

Conservation Priority: See [page 64](#).

Conservation Strategies: Steps that can be taken to conserve a community's most valuable environmental assets. See [page 67](#).

Conservation Value (and rank): The importance level of conserving a natural area due to the presence of rare species and habitats, high biodiversity or the presence of high-quality habitats or populations of wildlife.

Core Habitat: High-quality habitat that is not fragmented and has a large interior far from a habitat edge of incompatible land. Conditions where wildlife and plant populations can obtain most of the resources needed for maintenance of their population levels. See [page 48](#).

Data Layer: A map layer that is in a Geographical Information System and which contains data about the features represented in a mapped location.

Ecosystem and Ecosystem Services: See [page 8](#).

Ephemeral Wetland: A type of small wetland community. Temporary wetland pool that typically fills with water during winter and dries by summer. Because they dry out during part of the year, these wetlands do not support fish which prey heavily on amphibian eggs. These pools provide important breeding habitat for semi-aquatic amphibians.

Field (or Site) Survey: Biological surveys conducted by experienced natural resource professionals during suitable times of the year to document flora, fauna and habitats.

Fire-dependent Species: Species of animals and plants that require habitat where occasional fire occurs. Fire clears out old vegetation, leading to a more open habitat structure.

This allows plant seeds to open and or touch bare mineral soil, which is needed for fire-dependent plant growth.

Food Web: Also called a “food chain.” The feeding connections (who eats what) in a natural community of animals and plants. Food webs help to maintain natural levels of various species and nutrients in a habitat and ecosystem.

Game Land: Public land that is owned or managed by the North Carolina Wildlife Resources Commission. Game Lands are actively managed to provide wildlife habitat and wildlife-related recreation opportunities, including hunting, fishing, and wildlife watching.

Geographical Information Systems (GIS): A computer-based system for mapping and analyzing spatial data and information about mapped features (map layers).

Green Growth: A type of land use planning that conserves biological diversity, important fish and wildlife habitat, and associated natural resources as communities continue to grow.

Green Growth Toolbox: Instructional materials that explain how to do Green Growth, including a handbook, conservation data, and training workshops.

Habitat: See [page 4](#).

Habitat Edge: The edge of a habitat adjoining incompatible land. For example, forest habitat edge adjoins grassland, crops or development and grassland habitat edge adjoins development or forest. Habitat edge causes ‘edge effects’ whereby species are negatively impacted due to edge conditions including a higher number of predators, such as outdoor cats. The width of edge effects differs for different species. See [page 48](#).

Habitat Fragmentation: Habitat is reduced in size and separated from other habitat areas such that wildlife that require the habitat decline in abundance or become extinct locally. See [page 82](#).

Interior Habitat: The habitat far from a habitat edge and of sufficient size to support a species or group (guild) of species. See [page 48](#).

Invasive, Exotic Plants: Any plant species that does not occur naturally in North Carolina and poses serious threats to native ecosystems, due to the plant’s propensity to spread rapidly and out-compete native plant communities. See [page 101](#).

Natural Area or Community: An area containing mostly native plants and animals.

Natural Heritage Area (NHA): Terrestrial or aquatic sites that are of special biodiversity significance as defined by the North Carolina Natural Heritage Program. A site’s conservation priority rating or significance may be due to the presence of rare species, rare or high-quality natural communities or other important ecological features. Maps of NHAs are updated quarterly. See [page 22](#).

Natural Heritage Element Occurrence (NHEO): Occurrences of rare plants and animals, exemplary or unique natural communities and important animal groupings, as tracked and documented by the North Carolina Natural Heritage Program (NCNHP). Collectively, these plants, animals, natural communities and animal assemblages are referred to as “elements of natural diversity” or simply as “elements.” Maps of NHEOs are maintained and distribut-

ed by the NCNHP and are updated quarterly. See [page 24](#).

Natural Heritage Inventory Report: These reports are available for most North Carolina counties from the N.C. Natural Heritage Program website at www.ncnhp.org/web/nhp/searchable-publications. These reports are based on field surveys of public and private properties for which they have permission to survey. The reports are by county and document the details about Natural Heritage Natural Areas and other natural areas that are of critical importance to conserving the state's biodiversity.

Natural Resource-Based Land Use Patterns: See [page 92](#).

Natural Resource Inventory: See Field Survey.

North Carolina Conservation Planning Tool: See [page 20](#).

North Carolina Wildlife Action Plan: Every state wildlife agency develops a Wildlife Action Plan in compliance with a U.S. Congressional mandate. The plan identifies Species of Greatest Conservation Need, defines priority wildlife habitats, and offers a blueprint for fish and wildlife conservation in NC. It is updated every 10 years.

Prescribed Fire See [page 4](#).

Priority Wildlife Species and Habitats: Identified and described in the N.C. Wildlife Action Plan, these are wildlife species and habitats most of which are declining and may become threatened with extinction if conservation actions are not taken. See [page 19](#).

Riparian: Natural vegetation and forest along the banks of waterways.

Seep: A small spring or a wet place where water rises from the ground to the surface.

Small Wetland Community: See [page 54](#).

Species of Greatest Conservation Need: Identified and described in the N.C. Wildlife Action Plan, these are wildlife species that are declining and may become threatened with extinction if conservation actions are not taken..

Sprawl: Low density development patterns where buildings and roads are not clustered and where travel by a car is required for most needs (i.e., uses are not mixed). See [page 3](#).

Spring: Any natural flow of water from rock or soil onto land or into a body of surface water.

Subwatersheds: Smaller watersheds within larger watersheds. See [page 74](#).

Terrestrial Species: Species of wildlife that spend most of their life cycle on land. In North Carolina, groups of terrestrial species include birds, reptiles, amphibians, mammals, and insects.

Vernal Pool: See Ephemeral Wetland above.

Wildlife Travel Corridor (Wildlife or Habitat Corridor): An area of land in a relatively natural state that is unimpeded by significant development disturbance, including roads, such that a particular species can travel between core habitats along the corridor. See [page 92](#).

APPENDIX E

RECOMMENDED READING

In addition to the references listed in separate sections of this handbook, a number of other publications can provide more information on a Green Growth approach to planning. Selected references can be found below.

Integrating Conservation Science and Local Planning

- Beatley, T. 2000. Preserving biodiversity: Challenges for planners. *Journal of the American Planning Association* 66 (1): 5 - 20.
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- Esparza, A. X. and G.R. McPherson. 2009. *A Planner's Guide to Natural Resource Conservation: The Science of Land Development Beyond the Metropolitan Fringe*. New York: Springer.
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What is Happening in Other States?

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- Azerrad, J. M., and Nilon, C. H. 2006. An evaluation of agency conservation guidelines to better address planning efforts by local government. *Landscape and Urban Planning* 77: 255-262.
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- Maine's Department of Inland Fisheries and Wildlife. 2003. Beginning with Habitat. Available from: www.beginningwithhabitat.org
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- Minnesota Department of Natural Resources. 2007. Natural Resource Guide: A Guide to Using Natural Resource Information in Local Decision Making. Available from: www.dnr.state.mn.us/nrplanning/community/nrig.html
- Pima County, Arizona. 2012. Sonoran Desert Conservation Plan. Available from: www.pima.gov/cmo/sdcp/index.html
- Saving Special Places [Internet]. 1000 Friends of Florida. [cited 2013 Aug 8]. Available from: www.1000friendsofflorida.org
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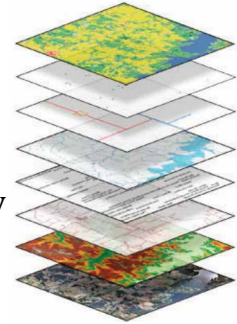
Legal Issues

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APPENDIX F

FURTHER GUIDANCE ON CONSERVATION PLANNING

There are a variety of conservation planning resources available with a large selection of map layers that are useful for planning. It would not be practical to include them all in Section 2 of this handbook so we summarize them in this appendix. The tools described here are most relevant for reference and supporting information at the planning stage and not at the level of development design. They contain a wide variety of map layers and analyses not found anywhere else. These resources communicate how important areas are to conserve and why, which can help to justify trying a conservation approach to land use and development in high priority areas.



The Conservation Planning Atlas and Conservation Blueprint

This tool is produced in our region by the Southeast Conservation Adaptation Strategy (SECAS). SECAS is a regional conservation initiative that uses data and stakeholder input to develop a spatial conservation plan that seeks to achieve a connected network of lands and waters to benefit ecosystems, species, and people in the Southeastern United States and Caribbean

- This spatial plan (and data download) is available through the [Southeast Conservation Blueprint](#)

Map layers and information include:

The Conservation Blueprint: “The blueprint” depicts and describes areas of highest to medium conservation priority, the amount of various land cover types and what types of wildlife and habitats are most in need of conservation within watersheds. It also a good resource for identifying ecological corridors for plants and wildlife.

The Atlas: The Atlas provides information and maps on basically any natural resource-related topic from economics to water quality. Types of maps and information include urban growth projections, watersheds by length of 303d streams, forest products, areas where priority wildlife species are likely to be found, habitat connectivity, and habitat quality.

Conservation Opportunity Areas



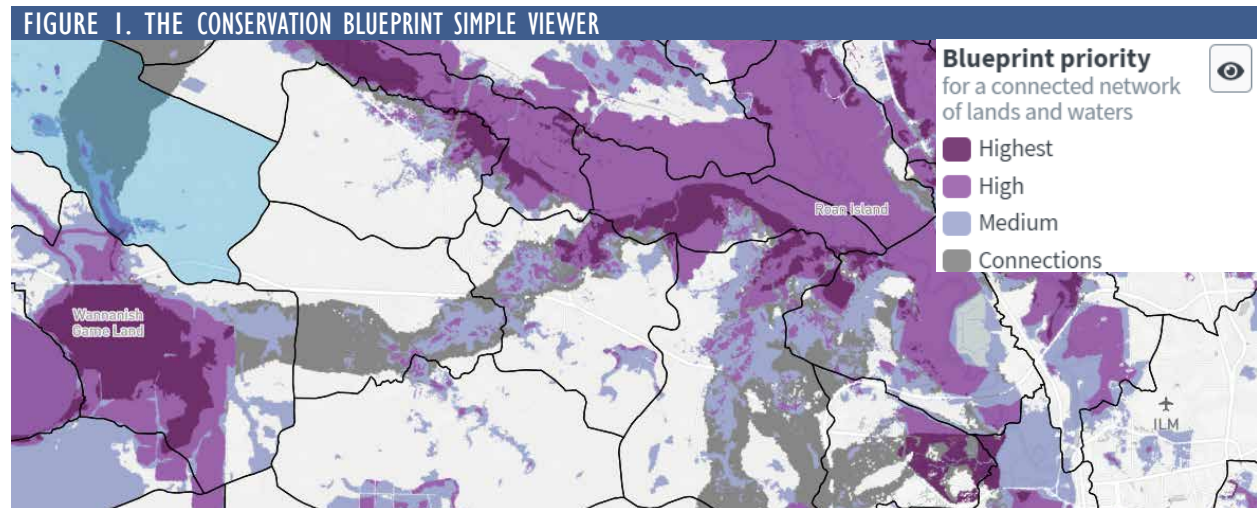
NATURE'S PICS

Northern flicker

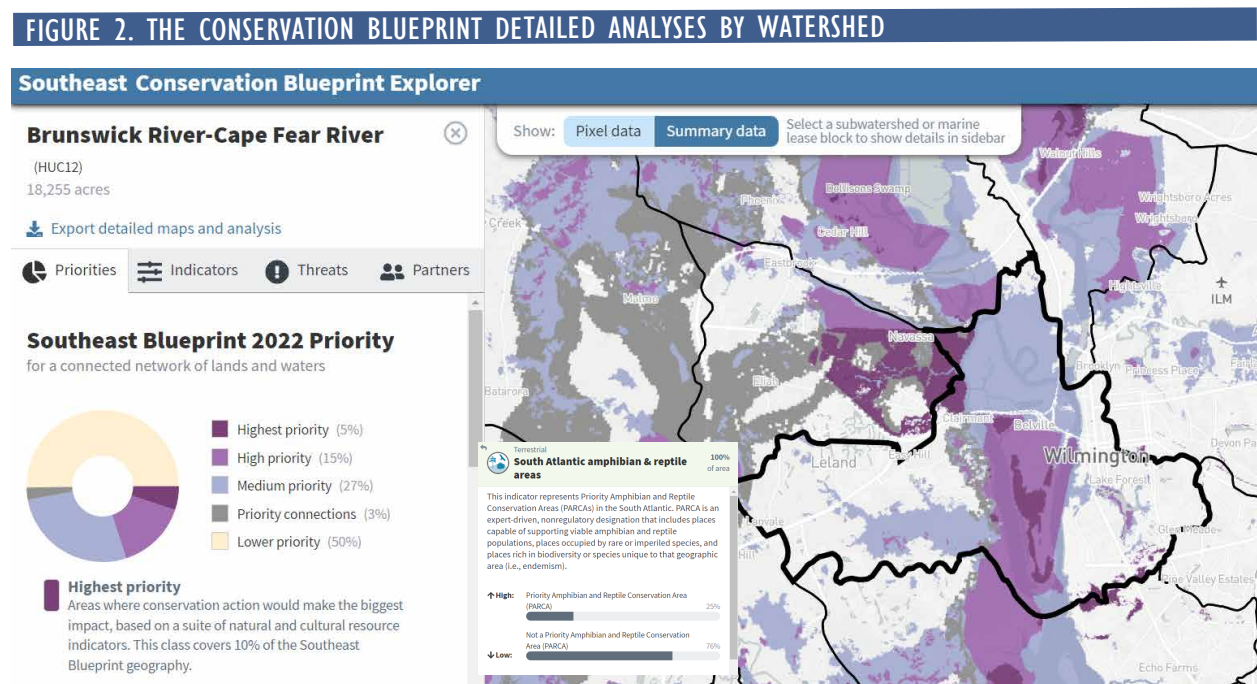
This resource was produced for the NC Wildlife Commission by NC State University. It depicts watersheds by the level of opportunity for conservation of wildlife Species of Greatest Conservation Need and priority habitats. Areas with more private unprotected land with declining habitat types rank higher in conservation opportunity. Information on the number and types of threats to wildlife and habitats is provided and can help guide decisions on what type of conservation measures to focus on. For example, communities could consider focusing land use or development policies and incentives on the highest priority habitat types in these high opportunity watersheds. A map of priority habitat types accompanies the opportunity areas map. This habitat map is not based on documented species occurrence and is a predictive model of what type of habitat is likely on the ground.

Examples of Using the Conservation Blueprint and the Atlas and in Planning

The map layers in the Conservation Blueprint and Atlas are updated annually, based on new data and input from stakeholders. This appendix was updated for the 2022 iteration of these resources.



The Conservation Blueprint has a number of map layers within it that can be useful for planning. The Simple Viewer, shown in Figure 1 for the area north of Wilmington, identifies priorities for where conservation impact would make the biggest impact on ecological health, based on a number of indicators, such as the indicator shown in Figure 3. The Simple Viewer also identifies where there are connections, in gray, between large, high priority habitat areas, or ‘hubs,’ that wildlife probably use to travel between habitat hubs. These areas could be considered appropriate as a rural land use district with low overall density and cluster development in order to maintain habitat and connectivity.



The Simple Viewer also includes a side panel, see Figure 2, which provides more detailed analysis of the underlying indicators that are used to identify conservation priorities, threats that that the area of interest face, and a list of conservation partners working in the region. These analyses provides an estimate of the percentage of land within a watershed that is a conservation priority and a list of indicators that show the percent of area of priority habitat types within a watershed. For example, in Figure 2, 25% of the area of the watershed outlined in black is estimated to support priority amphibian and reptile species. Five percent of this watershed is considered to be highest priority and 15% is high conservation priority. The Conservation Blueprint priorities are determined through stakeholder input and an analysis of many underlying data layers, termed ‘indicators,’ which can be viewed and downloaded through the Atlas. Figure 3 is an example of a map retrievable through the Atlas, where streams represented in darker shades of blue have a greater number of Species of Greatest Conservation Need observed.

