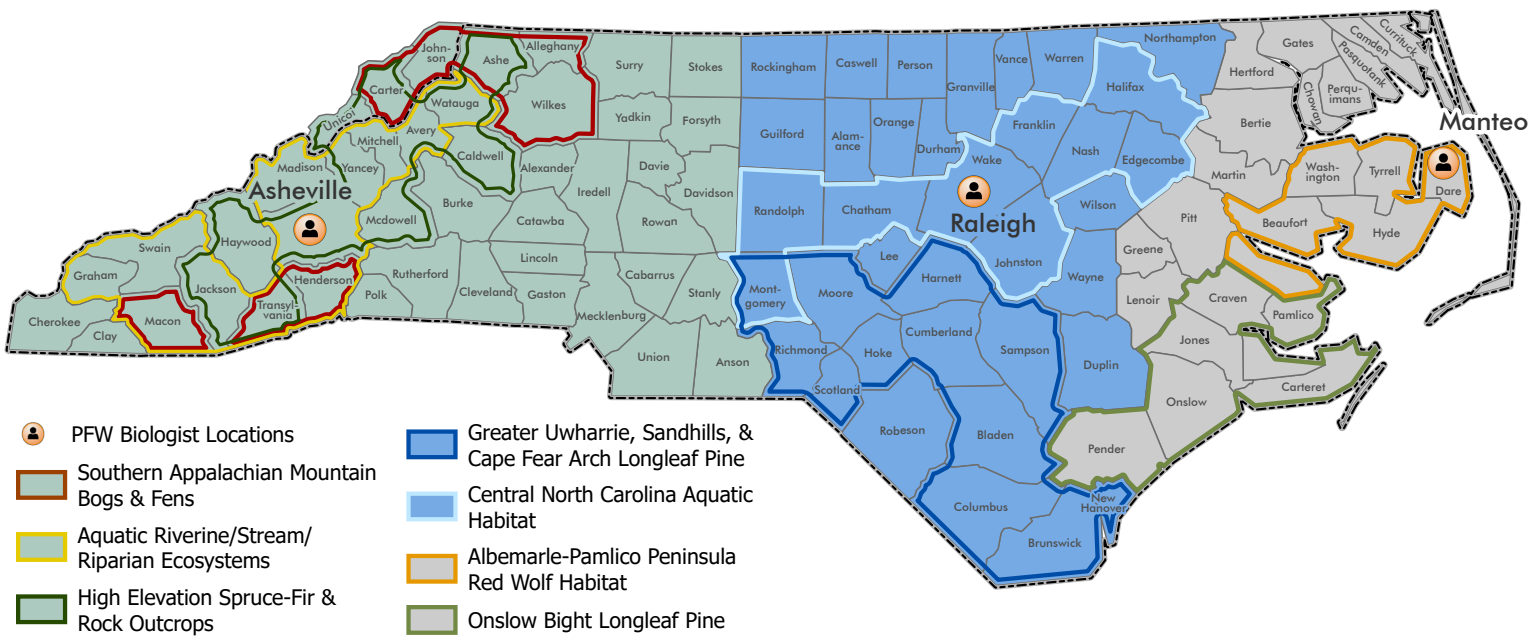




The Partners for Fish and Wildlife Program

Asheville Ecological Services Field Office, Asheville, NC
Raleigh Ecological Services Field Office, Raleigh, NC



The Asheville Ecological Services Field Office

The Asheville Ecological Services Field Office (AFO) is one of two Ecological Services field offices in North Carolina (NC), the other of which is located in Raleigh (RFO). There is one Partners for Fish and Wildlife Biologist (GS-11) located in Asheville, who covers the AFO work area from the Piedmont to the Blue Ridge Mountains in Western North Carolina, and three adjacent, priority counties in Tennessee. The AFO Partners for Fish and Wildlife (PFW) program works cooperatively with the RFO and Tennessee FO where joining priority focus areas exist. There are three focal areas representing high priority habitats within Western North Carolina – Southern Appalachian Mountain Bogs and Fens, Aquatic Riverine/Stream/Riparian Ecosystems, and High Elevation Spruce/Fir Forests- Spruce/Fir Matrix Rock Outcrop.

Established in the late 1970's, the AFO core work area encompasses the Blue Ridge and Piedmont physiographic provinces within 41 counties in North Carolina. It administers numerous environmental laws including the

PFW Coordination Act to assist in recovering 28 federally listed endangered and threatened species, and strives to prevent the need to list approximately 41 at-risk species.

The AFO and the National Wildlife Refuge System established the Mountain Bogs National Wildlife Refuge in 2015, which was subsequently expanded in 2020. This refuge, home to five federally listed species, is devoted to the conservation of southern Appalachian mountain bogs, one of the rarest and most imperiled habitats in the U.S.



The carnivorous Mountain sweet pitcher plant; protected at the Mountain Bog NWR Conservation Partnership Area, credit USFWS/Gary Peebles.

The geological alignment of the Appalachian mountain range, northeast to southwest, allowed for species migration as continental ice sheets advanced and retreated, approximately 10,000 years ago.

While much of the Northeast was blanketed with glacial ice during periods of advancement, the southern Appalachian Mountains remained free from glaciers and served as an important refugium for numerous plants and animals. Northern species migrated southward and established themselves in this region, where many persist today. In addition, oceanic waters never inundated the area during interglacial periods. This lack of disturbance set the stage for species to evolve and diversify over millions of years. Significant rainfall, coupled with a diverse topography and multitude of habitat types, has led to exceptional biological diversity and a high number of endemic species, some of which have no known close relatives anywhere else in the world.

Asheville Work Area

The Partners biologist, working out of Asheville, works with private landowners to accomplish on-the-ground restoration projects for southern Appalachian bogs, aquatic ecosystems (rivers, streams, and floodplains), and high-elevation Spruce-fir forests/Spruce-fir matrix rock outcrops. These imperiled habitats have led to a rich diversity of rare plant species, and provide refugia for their associated fauna. Each of these are associated with federally listed and at risk species that can benefit by habitat restoration on private lands.



Golden-winged warbler, at-risk species, eastern Appalachian Mountains Bird Conservation Region, credit: USFWS.

Southern Appalachian Mountain Bogs and Fens Focus Area

The purpose of projects in this PFW focus area is to contribute to the multi-partner effort to restore and manage mountain bogs and fens in Western North Carolina to benefit our federal trust species such as the imperiled southern population of bog turtle. This focus area provides habitat for up to thirteen rare species. Mountain bogs are globally-imperiled habitats that have been reduced in spatial extent by over 90% due to land conversion for agriculture and urban development. Remaining sites are small and fragmented, but are rich in biodiversity. The AFO PFW Program is closely working with private landowners, NC Wildlife Resources Commission, NC Chapter TNC, Tangled Bank Conservation, Project Bog Turtle, The Bog Learning Network, and local land trusts to restore and permanently protect Southern Appalachian Bogs.

Southern Appalachian Mountain Bogs and Fens Focus Area

Habitat Type: Southern Appalachian Mountain Bogs and Fens

Total Listed & At-Risk Species in Focus Area: Endangered (3), Threatened (1), Threatened (S/A)(1), At-Risk (3)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Bunched arrowhead (<i>Sagittaria fasciculata</i>) Mountain sweet pitcher plant (<i>Sarracenia rubra ssp. jonesii</i>) Green pitcher plant (<i>Sarracenia oreophila</i>)	Plant Plant Plant
Threatened: Swamp pink (<i>Helonias bullata</i>)	Plant
Threatened (S/A) Bog turtle (<i>Glyptemys muhlenbergii</i>)	Reptile
At-Risk: Mountain purple pitcher plant (<i>Sarracenia purpurea var. montana</i>) Golden-winged warbler (<i>Vermivor chrysoptera</i>) Monarch butterfly (<i>Danaus plexippus plexippus</i>)	Plant Bird Insect

Focal Area Counties: NC: Ashe, Alleghany, Henderson, Macon, Transylvania, Wilkes
TN: Johnson, Carter

Types of Habitat Improvement: Wetland hydrologic restoration (stream and floodplain) to prevent head-cutting, removal of hardwood encroachment, re-establishment of bog/meadow habitat; and invasive species eradication. Additionally, bog turtle nest and migration corridor protection.



The at-risk, Mountain Purple Pitcher Plant was found by Laura Fogo, PFW biologist, David Lee, Conserving Carolina, and Rebekah Reid, USFWS botanist, at a protected bog, credit: USFWS.

Aquatic Riverine/Stream/Riparian Ecosystems Focus Area

The “Aquatic Riverine/Stream/Riparian Ecosystems,” focal watersheds are located within the French Broad, Upper Nolichucky-Cane, and the Upper Little Tennessee rivers. They provide habitat for the endangered Appalachian elktoe and Littlewing pearlymussel freshwater mussels; the endangered Gray bat and threatened Northern long-eared bat; four endemic crayfish and freshwater fishes, and seven at-risk species.



Monarch tagging, credit: USFWS/Laura Fogo.

Aquatic ecosystem restoration goals are to utilize ecological, engineering principles focused on natural channel design, sediment reduction, barrier removal, and the re-establishment of the riparian buffers. The PFW program prides itself by conducting on-the-ground conservation delivery to provide immediate habitat. Habitat restoration is essential to recover rare species populations, and may help to preclude the need to list at-risk species.



The (E) Appalachian elktoe, occurs within three priority watersheds in Western North Carolina, credit: USFWS/Gary Peeples.



Rich in biological diversity, this Southern Appalachian bog contains rare plants, and the Southern bog turtle, credit: USFWS/Laura Fogo.

Southern bog turtle, credit: USFWS/Gary Peeples.

Aquatic Riverine/Stream/Riparian Ecosystems Focus Area	
Habitat Type: Aquatic Riverine/Stream/Riparian Ecosystems: French Broad River system (Upper French Broad, Mills River, Ivy River)	
Total Listed & At-Risk Species in Focus Area: Endangered (2), Threatened (2), At-Risk (5)	
Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Appalachian elktoe (<i>Alasmidonta raveneliana</i>) Gray bat (<i>Myotis grisescens</i>)	Mussel Mammal
Threatened: Northern long-eared bat (<i>Myotis septentrionalis</i>) Virginia spiraea (<i>Spiraea virginiana</i>)	Mammal Plant
At-Risk: Longsolid (<i>Fusconaia subrotunda</i>) Monarch butterfly (<i>Danaus plexippus plexippus</i>) Tricolored bat (<i>Perimyotis subfalvus</i>) Little brown bat (<i>Myotis lucifugus</i>) Golden-winged warbler (<i>Vermivor chrysoptera</i>)	Mussel Insect Mammal Mammal Bird
Focal Area Counties: Buncombe, Henderson, Madison, Transylvania,	
Types of Habitat Improvement: Aquatic passage barrier removal, streambank stabilization, in-stream habitat restoration, re-establishment and enhancement of riparian buffers and floodplains, and livestock exclusion.	

U.S. Fish & Wildlife Service



PFW Savanna Creek restoration-Little Tennessee River Watershed on private lands, credit: USFWS/Laura Fogo.

Western North Carolina benefits from over 43 conservation partners. Key critical partners are private landowners, Conserving Carolina, Blue Ridge RC&D, Mountain Valley RC&D, Mills River Partnership, NC Chapter TNC, NC Wildlife Resources Commission, Little Tennessee Native Fish Conservation Area Partnership, landtrusts, and local universities.



Floodplain wetland restoration, Mouth of Mud Creek, French Broad River, credit: USFWS/Laura Fogo.

Aquatic Riverine/Stream/Riparian Ecosystems Focus Area

Habitat Type: Aquatic Riverine/Stream/Riparian Ecosystems: Upper Nolichucky River system (Cane River)

Total Listed & At-Risk Species in Focus Area: Endangered (2), Threatened (2), At-Risk (4)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Appalachian elktoe (<i>Alasmidonta raveneliana</i>) (Critical habitat) Gray bat (<i>Myotis grisescens</i>)	Mussel Mammal
Threatened: Virginia spiraea (<i>Spiraea virginiana</i>) Northern long-eared Bat (<i>Myotis septentrionalis</i>)	Plant Mammal
At-Risk: Tricolored Bat (<i>Perimyotis subfalvus</i>) Little brown Bat (<i>Myotis lucifugus</i>) Golden-winged warbler (<i>Vermivor chrysoptera</i>) Monarch butterfly (<i>Danaus plexippus plexippus</i>)	Mammal Mammal Bird Insect

Focal Area Counties: Avery, Mitchell, Yancey

Types of Habitat Improvement: Aquatic passage barrier removal, streambank stabilization, in-stream habitat restoration, re-establishment and enhancement of riparian buffers and floodplains, and livestock exclusion.

Aquatic Riverine/Stream/Riparian Ecosystems Focus Area

Habitat Type: Aquatic Riverine/Stream/Riparian Ecosystems: Upper Little Tennessee River system

Total Listed & At-Risk Species in Focus Area: Endangered (3), Threatened (3), At-Risk (6)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Appalachian elktoe (<i>Alasmidonta raveneliana</i>) (Critical habitat) Littletwing pearlymussel (<i>Pegias fabula</i>) Gray bat (<i>Myotis grisescens</i>)	Mussel Mussel Mammal
Threatened: Spotfin Chub (<i>Cyprinella monachus</i>) (Critical Habitat) Virginia spiraea (<i>Spiraea virginiana</i>) Northern long-eared Bat (<i>Myotis septentrionalis</i>)	Fish Plant Mammal
At-Risk: Longsolid (<i>Fusconaia subrotunda</i>) Tennessee pigtoe (<i>Pleuronaia barnesiana</i>) Tricolored Bat (<i>Perimyotis subfalvus</i>) Little brown Bat (<i>Myotis lucifugus</i>) Tennessee Clubshell (<i>Pleurobema oviforme</i>) Monarch butterfly (<i>Danaus plexippus plexippus</i>)	Mussel Mussel Mammal Mammal Mussel Insect

Focal Area Counties: Graham, Jackson, Macon, Swain

Types of Habitat Improvement: Aquatic passage barrier removal, streambank stabilization, in-stream habitat restoration, re-establishment and enhancement of riparian buffers and floodplains, and livestock exclusion.

**High Elevation Spruce-Fir Forests/
Spruce-Fir Matrix Rock Outcrops
Focus Area**

High Elevation Spruce-Fir Forests/Spruce-Fir Matrix Rock Outcrops, relics from the last ice age, are a high priority focus area within the AFO to restore and protect habitat for six federally listed species, three threatened, and three at-risk species. These communities are naturally dominated or co-dominated by red spruce (*Picea rubens*) and Fraser fir (*Abies fraseri*). They occur within the highest and coldest parts of the Southern Blue Ridge Mountains over ~4000' feet in elevation in Western North Carolina and Eastern Tennessee. The ice age's cold temperatures pushed typically northern-latitude plants and animals, like spruce and fir trees, southward. As temperatures warmed, those species moved back north... and uphill, where they found refuge in the cold weather of the highest peaks east of the Mississippi. These species became isolated on these mountaintop islands, over time forming an ecosystem unique to the Southern Appalachians.

These forests are characterized by high moisture and often immersed in cloud cover. They're home to federally-listed species such as spruce-fir moss spider and Carolina northern flying squirrel; and species of concern, including northern saw-whet owl, brown creeper, black-capped chickadee, and several salamanders. From the 1880s to the 1930s these forests were logged extensively with some areas experiencing catastrophic wildfires in the logging slash. This era of unchecked logging is considered the primary reason that restoration efforts are needed since the spruce forests have not recovered from this era in more than 100 years.

The Partners for Fish and Wildlife Program supports the Southern Appalachian Spruce Restoration Initiative (SASRI) to restore this habitat by growing and planting spruce-fir seedlings. The SASRI is comprised of private, state, federal, and non-governmental organizations that recognize the importance of habitat restoration to benefit listed species within this fragile ecosystem.

High Elevation Spruce-Fir Forests/Spruce-Fir Matrix Rock Outcrops Focus Area	
Habitat Type: High Elevation Spruce/Fir Forests - Spruce/Fir Matrix-Rock Outcrops	
Total Listed & At-Risk Species in Focus Area: Endangered (6), Threatened (2), At-Risk (2)	
Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered:	
Carolina northern flying squirrel (<i>Glaucomys sabrinus coloratus</i>)	Mammal
Spruce-fir moss spider (<i>Microhexura montivaga</i>)	Arachnid
Rusty-patched bumble bee (<i>Bombus affinis</i>)(*)	Insect
Rock gnome lichen (<i>Gymnoderma lineare</i>) (*)	Plant
Spreading avens (<i>Geum radiatum</i>)(*)	Plant
Roan Mountain bluet (<i>Houstonia montana</i>)(*)	Plant
Threatened:	
Blue Ridge goldenrod (<i>Solidago spithameae</i>)(*)	Plant
Heller's blazing star (<i>Liatris helleri</i>)(*)	Plant
At-Risk:	
Golden-winged warbler (<i>Vermivor chrysoptera</i>)(*)	Insect
Monarch butterfly (<i>Danaus plexippus plexippus</i>)	Bird
Focal Area Counties: NC-Alleghany, Ashe, Avery, Buncombe, Caldwell, Graham, Haywood, Jackson, McDowell, Mitchell, Transylvania, Watauga, Yancey TN-Carter, Johnson, Unicoi	
Types of Habitat Improvement: Spruce/Fir: Restore by planting seedlings, conduct release work; assist with growing spruce and fir seedlings. (*) Spruce/Fir Matrix-Rock outcrops: Restore, protect, and maintain native rare plant community, and conduct release work.	



The endangered Carolina Northern Flying Squirrel is only found in high elevations in North Carolina, Tennessee and Southwest Virginia, credit: Jonathan Mays.

The Raleigh Ecological Services Field Office

The Raleigh Ecological Services Field Office (RFO) is one of two field offices in North Carolina (NC), the other of which is located in Asheville (AFO). The Partners for Fish and Wildlife (PFW) program works cooperatively among offices with the RFO covering central and eastern NC and the AFO covering western North Carolina. The RFO supports two PFW staff, the State Coordinator and a biologist. The State Coordinator (GS-12) is located in Raleigh and covers central and southeastern North Carolina. The additional biologist (GS-11) is located in the Manteo sub-office and covers northeastern North Carolina. There are four focal areas covered by the RFO: The Uwharrie, Sandhills and Cape Fear Arch Longleaf Habitat, The Central NC Aquatic Habitat, The Albermarle-Pamlico Peninsula Red Wolf Habitat, and The Onslow Bight Longleaf Habitat.

North Carolina prides itself on its rich ecological and cultural diversity. From its pristine beaches, wide seafood-filled sounds and estuaries, across sprawling floodplains and longleaf savannas to its awesome mountain peaks, North Carolina houses over 10,500 plant and animal species. Presently, 1,609 of these are considered rare, threatened, or endangered according to federal and state agencies with 66 federally threatened or endangered and over 46 at-risk. Thirty-six of the nation's 66 carnivorous plants occur in North Carolina including the at-risk Venus flytrap. NC is home to more than 60 species of freshwater mussels. Unfortunately, 50% of these species are designated Endangered, Threatened, or Special Concern within the state. Red wolves live in the wild on the National Wildlife Refuges (NWR) and adjacent private property in northeastern North Carolina. The very resources that have made North Carolina so appealing and successful are threatened by urban sprawl, growing industry, and associated development. PFW responds by restoring habitat on private lands in cooperation with partners.



Through this Partners for Fish and Wildlife project a concrete bridge on Denson's Creek was replaced with a rock ford, allowing the passage of aquatic organisms, credit: USFWS.

The RFO encompasses the 57 eastern most counties in North Carolina. Of the over 300 unique natural communities occurring in NC, the RFO PFW Program focuses on Dry Longleaf and Wet Pine Savannas, Riverine Aquatic Communities, Coastal Plain Nonalluvial Wetland Forests, and Peatland and Streamhead Pocosins. Each of these are associated with federally listed and at-risk species that can benefit by habitat restoration on private lands.

Our key partners are private landowners, individuals, family trusts, conservation organizations, and municipalities. Other partners include non-profits such as The Longleaf Alliance, The Nature Conservancy, NC Wildlife Federation, and NC Coastal Federation. National Wild Turkey Federation, Audubon North Carolina, NC Coastal Land Trust, Three Rivers Land Conservancy, Tar River Land Conservancy, American Forest Foundation, American Rivers, Conservation Fisheries, Inc., and Piedmont Conservation Council.

We also work with state and federal agencies such as NC Wildlife Resources Commission, NC Forest Service, NC Natural Heritage Program, NC Plant Conservation Program, Natural Resources Conservation Service, and Department of Defense. The RFO work area has several geographically based conservation partnerships including The Greater Uwharrie Conservation Partnership, NC Sandhills Conservation Partnership, Cape Fear Arch Conservation Collaboration, The Onslow Bight Conservation Forum, The Chatham Conservation Partnership, and The Upper Tar River Collaboration, and other general partnerships such as NC Prescribed Fire Council and the NC Longleaf Coalition.

U.S. Fish & Wildlife Service

Raleigh Work Area

The State Coordinator, working out of Raleigh, works with private landowners to accomplish on-the-ground restoration projects for longleaf pine and its associated species in southcentral and southeastern North Carolina and for rare aquatic species central North Carolina.

Greater Uwharrie, Sandhills, and Cape Fear Arch Longleaf Pine Habitat Focus Area

The purpose of projects in this PFW focus area is to contribute to a larger multi-partner effort to restore the longleaf pine ecosystem at the northern end of the range on private lands in North Carolina for the benefit of federal trust resources including federally listed and at-risk species as well as migratory birds. Along with our partners, PFW supports the America's Longleaf Range-wide Conservation plan, the goal of which is to maintain and restore ecosystem functionality across the historic range of the longleaf pine forest. PFW works locally to step down this plan through the North Carolina Longleaf Coalition and geographically based local implementation teams/conservation partnerships including the Uwharrie, Sandhills and Cape Fear Arch Conservation Partnerships, each of which are geared towards long-term conservation of biological diversity with an emphasis on recovery of the longleaf pine ecosystem and the rare species dependent upon it.

The Greater Uwharries, located in the southern and central Piedmont, contains the ancient Uwharrie mountain range, a series of lakes along the Yadkin-Pee Dee watershed, and several state and federal protected areas such as Morrow Mountain State Park, Uwharrie National Forest, and Pee Dee National Wildlife Refuge. Efforts are underway to restore longleaf and build a corridor to the Sandhills where there is the second largest concentration of the endangered red-cockaded woodpeckers in existence.

Partners Coordinator John Ann Shearer presents a Partners for Fish and Wildlife sign to a proud North Carolina landowner after he teamed up with the Longleaf Alliance and the US Fish and Wildlife Service to successfully restore longleaf pine on his property, credit: USFWS.

Greater Uwharrie, Sandhills, and Cape Fear Arch Longleaf Pine Habitat Focus Area

Habitat Type: Longleaf Pine and Associated Wetlands

Total Listed & At-Risk Species in Focus Area: Endangered (13), Threatened (3), At-Risk (30)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Red-cockaded woodpecker (<i>Picoides borealis</i>), proposed downlisting Saint Francis' satyr butterfly (<i>Neonympha mitchellii francisci</i>) Cooley's meadowrue (<i>Thalictrum cooleyi</i>) Rough-leaved loosestrife (<i>Lysimachia asperulaefolia</i>) Golden sedge (<i>Carex lutea</i>) Smooth coneflower (<i>Echinacea laevigata</i>) Michaux's sumac (<i>Rhus michauxii</i>) Canby's dropwort (<i>Oxypolis canbyi</i>)	Bird Insect Plant Plant Plant Plant Plant Plant
Threatened: Wood Stork (<i>Mycteria americana</i>)	Bird
At-Risk: Venus flytrap (<i>Dionaea muscipula</i>)	Plant

Focal Area Counties: Bladen, Brunswick, Columbus, Cumberland, Harnett, Hoke, Montgomery, Moore, New Hanover, Richmond, Sampson, Scotland

Types of Habitat Improvement: Site preparation, longleaf planting, ground cover establishment, fire line establishment, prescribed burning, mid-story control, timber thinning, removal of undesirable species, practices that meet the unique needs of focal species such as wetland habitats for Carolina gopher frogs and artificial cavities for RCW





Thirty-six of the nation's 66 carnivorous plants occur in NC including the at-risk Venus flytrap, credit: USFWS.

The North Carolina Sandhills is approximately a million acres with Fort Bragg at its center. Through the North Carolina Sandhills Safe Harbor program and the PFW program, the USFWS is working with more than 120 landowners on over 57,000 acres of land providing longleaf pine habitat that supports 56 groups of red-cockaded woodpeckers. The Cape Fear Arch, in the southeast corner of North Carolina and the northeast corner of South Carolina encompasses one of the most biologically diverse areas along the Atlantic Coast and hosts the world's only populations of Venus flytraps.

Central North Carolina Aquatic Habitat Focus Area

This Focus Area includes important freshwater aquatic habitats in several drainages of the Tar-Pamlico, Neuse, Cape Fear, and Pee Dee River Basins. Many of the best remaining habitats for listed and at-risk species in this Focus Area intersect with threats from the growing urban sprawl of the North Carolina Piedmont. Among these river basins are five small watersheds (USGS 8-digit hydrologic units) identified as critical to conserving aquatic biodiversity in the United States, including the Fishing, Upper Tar, Upper Neuse, Deep, and Lower Yadkin watersheds. Two of these small watersheds – Upper Tar and Upper Neuse – are among 87 aquatic hotspots identified across the United States as having 10 or more listed and at-risk species.

U.S. Fish & Wildlife Service

Central North Carolina Aquatic Habitat Focus Area

Habitat Type: Stream Systems

Total Listed & At-Risk Species in Focus Area: Endangered (4), Threatened (2), At-Risk (9)

Focal Species: ESA Status, Common Name (*Scientific Name*)

Taxa Group

Endangered:

Cape Fear Shiner (*Notropis mekistocholas*)
 Dwarf wedgemussel (*Alasmidonta heterodon*)
 Tar River spinymussel (*Parvaspina steinstansana*)
 Harperella (*Ptilimnium nodosum*)

Fish
 Mussel
 Mussel
 Plant

Threatened:

Atlantic pigtoe (*Fusconaia masoni*)
 Yellow Lance (*Elliptio lanceolata*)

Mussel
 Mussel

At-Risk:

Neuse River waterdog (*Necturus lewisii*)
 Carolina madtom (*Necturus furiosus*)

Amphibian
 Fish

Focal Area Counties: Chatham, Edgecombe, Franklin, Johnston, Nash, Halifax, Montgomery, Randolph, Wake (coordination with Asheville PFW position on Montgomery and Randolph)

Types of Habitat Improvement: Fish passage enhancement/barrier removal, streambank stabilization, instream habitat restoration, riparian enhancement/establishment, livestock exclusion fencing, reforestation



Partners Biologist Laura Fogo and members of the Service's Aquatic Habitat Restoration Team on site during the removal of the Troy Dam in Montgomery County, NC, credit: USFWS.

This Focus Area supports several federally listed and at-risk aquatic species, including some endemic only to the Atlantic Slope river basins of eastern North Carolina, such as: Carolina Madtom, Tar River Spinymussel, Neuse River Waterdog, and Cape Fear Shiner. In Montgomery, Chatham, and Randolph Counties, aquatic resources span the Carolina Slate Belt and Triassic Basin Level IV EPA ecoregions, where the unique geology and comparable high relief of the ancient Uwharrie Mountains hosts a diversity of species.

The Carolina Slate Belt/Triassic Basin transitional area is home to the only known locations of the Cape Fear Shiner. The remaining counties in northeast-central North Carolina originate in the Northern Outer Piedmont and flow across the transitional Fall Zone to the Rolling Coastal Plain ecoregion, giving these systems diverse instream habitats, which support some of the highest freshwater biological diversity and endemism on the East Coast.

Manteo Work Area

The PFW Biologist working out of Manteo focuses on the grasslands/shrub lands/wetland of the Albemarle-Pamlico peninsula where private lands and NWRs provide habitat for red wolves. A second focus is the longleaf and wetlands associated with the Onslow Bight, centered on Camp Lejeune and providing habitat for red-cockaded woodpeckers and Venus flytraps. Both focal areas are part of the Sentinel Landscapes in which the military desires to retain a rural landscape to facilitate continued use of the airspace for training.

Albemarle-Pamlico Peninsula Red Wolf Habitat Focus Area

This focus area includes the Albemarle-Pamlico Peninsula, comprised of the five-county red wolf recovery area. Once an expansive wetland complex of pocosins, marshes, canebrakes, and non-riverine hardwood swamps, the natural hydrology of the area has now been highly altered through ditching and draining of the natural wetlands. Red wolves and red-cockaded woodpeckers, nesting bald eagles, as well as high densities of black bear are notable.

With an abundance of cropland, rivers, natural lakes, marshes, and the extensive sound waters, the peninsula also attracts thousands of migratory waterfowl each winter. These include numerous species of ducks as well as a significant percentage of the Atlantic populations of Canada geese, snow geese, and tundra swans. In addition, the non-riverine hardwood swamps and expansive pocosins support numerous migratory land bird species and a host of reptiles and amphibians. The PFW Biologist works with landowners to improve habitat for red wolves and their prey and reduce human-wolf conflict.

Onslow Bight Longleaf Pine Focus Area

The purpose of PFW projects in this focus area is to contribute to a larger multi-partner effort to restore the longleaf pine ecosystem at the northern end of the range on private lands in North Carolina for the benefit of federal trust resources including federally listed and at-risk species as well as migratory birds.

Albemarle-Pamlico Peninsula Red Wolf Habitat Focus Area

Habitat Type: Peatland and Streamhead Pocosin, Early Successional

Total Listed & At-Risk Species in Focus Area: Endangered (2), Threatened (3), At-Risk (3)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Red wolf (<i>Canis rufus</i>) Red-cockaded woodpecker (<i>Picoides borealis</i>)	Mammal Bird
Threatened: Black rail (<i>Laterallus jamaicensis</i>) Northern long-eared bat (<i>Myotis septentrionalis</i>) Sensitive Jointvetch (<i>Aeschynomene virginica</i>)	Bird Mammal Plant
At-Risk: Spotted turtle (<i>Clemmys guttata</i>) Northern red-bellied cooter (<i>Pseudemys rubriventris</i>) Monarch Butterfly (<i>Danaus plexippus plexippus</i>)	Reptile Reptile Insect

Focal Area Counties: Beaufort, Dare, Hyde, Tyrrell, Washington

Types of Habitat Improvement: Mechanical clearing and/or herbicide treatment of undesirable vegetation, fireline installation, prescribed burning, disking, and site preparation and planting of desirable vegetation, wetland enhancement.



The only place that red wolves can be found in the wild is in the Albemarle Pamlico Peninsula in eastern North Carolina. Private landowners restore habitats that benefits red wolf prey through the Partners for Fish and Wildlife's Prey for the Pack program. A key partner for this effort is the NC Wildlife Federation, credit: PDZA/Seth Bynum (CC BY 2.0).

U.S. Fish & Wildlife Service

Along with our partners, PFW supports the America's Longleaf Range-wide Conservation plan, the goal of which is to maintain and restore ecosystem functionality across the historic range of the longleaf pine forest. PFW works locally to step down this plan through the North Carolina Longleaf Coalition and geographically based local implementation teams/conservation partnerships including the Onslow Bight Conservation Forum.



Prescribed fire is recommended to stimulate young longleaf pine and the native ground cover to create a healthy longleaf ecosystem, credit: USFWS.

The Onslow Bight Landscape area of eastern North Carolina, bounded on the north by Cape Lookout and to the south by Cape Fear, contains a unique landform of saltwater marshes, riverine wetlands, pocosins, longleaf pine savannahs, and other coastal ecosystems. The Onslow Bight includes several large protected areas including Camp Lejeune, Hoffman State Forest, Croatan National Forest, Cedar Island NWR, and Holly Shelter Gameland currently managed to support the natural communities of those areas. The area supports nationally significant occurrences of animal and plant communities. The threat of rapid population growth was the impetus for eleven conservation organizations to develop a memorandum of understanding and establish the Onslow Bight Conservation Forum to enhance cooperation and communication regarding regional conservation issues.

Onslow Bight Longleaf Pine Habitat Focus Area

Habitat Type: Longleaf Pine and Associated Wetlands

Total Listed & At-Risk Species in Focus Area: Endangered (6), Threatened (2), At-Risk (12)

Focal Species: ESA Status, Common Name (<i>Scientific Name</i>)	Taxa Group
Endangered: Red-cockaded woodpecker (<i>Picoides borealis</i>), proposed downlisting Cooley's meadowrue (<i>Thalictrum cooleyi</i>) Rough-leaved loosestrife (<i>Lysimachia asperulaefolia</i>) Golden sedge (<i>Carex lutea</i>)	Bird Plant Plant Plant
Threatened: Black rail (<i>Laterallus jamaicensis</i>)	Bird
At-Risk: Carolina gopher frog (<i>Lithobates capito</i>) Eastern diamondback rattlesnake (<i>Crotalus adamanteus</i>) Venus flytrap (<i>Dionaea muscipula</i>)	Amphibian Reptile Plant

Focal Area Counties: Carteret, Craven, Jones, Onslow, Pamlico, Pender

Types of Habitat Improvement: Site preparation, longleaf planting, ground cover establishment, fire line establishment, prescribed burning, mid-story control, timber thinning, removal of undesirable species, practices that meet the unique needs of focal species such as providing wetland habitats for Carolina gopher frogs and artificial cavities for RCW



This fire-maintained longleaf pine habitat in the Onslow Bight Focus Area serves as foraging habitat for red-cockaded woodpeckers and is home to a healthy population of Venus flytraps, credit: USFWS.