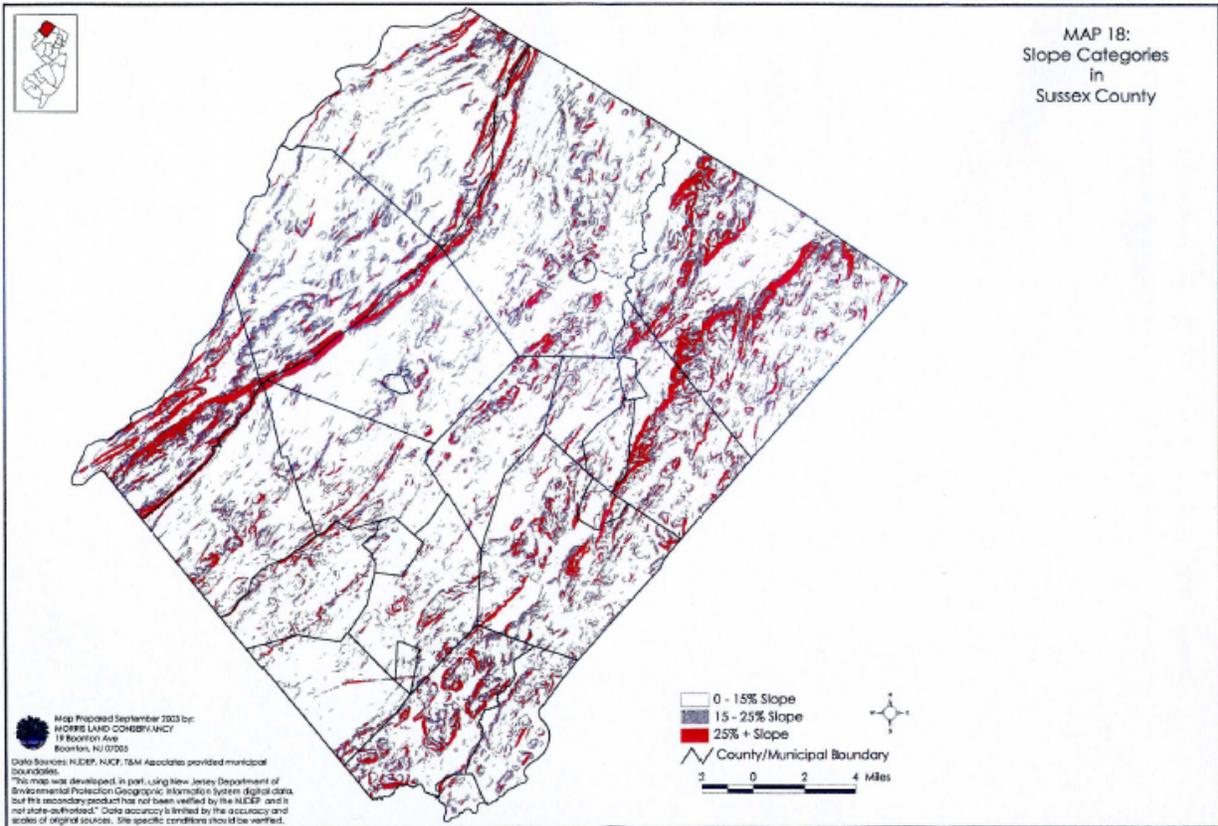


A third area of steep slopes occurs throughout the Pochuck Mountain area of northwest Vernon Township. In these areas slopes exceed 25%, indicating a rapid elevation change over a short distance.



Moderate slopes of 15% to 25% are less predictable throughout the county. The soils of these areas are less susceptible to erosion and have a lesser impact on stormwater flows. They occur more frequently in the county’s eastern, northern and western areas, but are found throughout Sussex County.

Threatened and Endangered Species

Sussex County’s diverse topography and land use patterns provide excellent habitat for many plant and animal species. Many of the species found in the county, such as deer, game birds and several species of fish, provide abundant hunting and fishing opportunities. Other habitat types contain non-game threatened and endangered species. Certain of these species are considered to be important indicators of the overall health of the ecosystems they inhabit. Therefore, taking steps to conserve functional threatened and endangered species habitat will provide benefits for many other species in the county.

There are two state-maintained databases that highlight important habitat for threatened and endangered species: the Natural Heritage Database and the Landscape Project. Information from the Natural Heritage Database is used to map Natural Heritage Priority

Sites which identify some of the best and most viable occurrences of endangered and threatened plant, animal and natural communities in New Jersey. These sites do not encompass all known habitat for endangered or threatened species; rather, they identify sites where rare species or natural communities have been reported to exist. The Landscape Project takes a more sweeping approach. It attempts to map all critical habitat for rare animal species by habitat type. These habitats are identified according to the conservation status (federal/state, endangered/threatened/of concern/suitable habitat) of species present.

Natural Heritage Priority Sites

The Natural Heritage Database (maintained by NJDEP's Office of Land Management's NJ Natural Heritage Program) is a continuously maintained and updated inventory which is used to identify Natural Heritage Priority Sites. In New Jersey, 389 Natural Heritage Priority Sites have been mapped, representing "...some of the best remaining habitat for rare species and exemplary natural communities in the state". This information is intended for use by planners, developers, conservation organizations and government agencies to make informed land use decisions. Land within Natural Heritage Priority Sites is not necessarily permanently preserved, although several Priority Sites do occur within existing federal, state and local parkland.

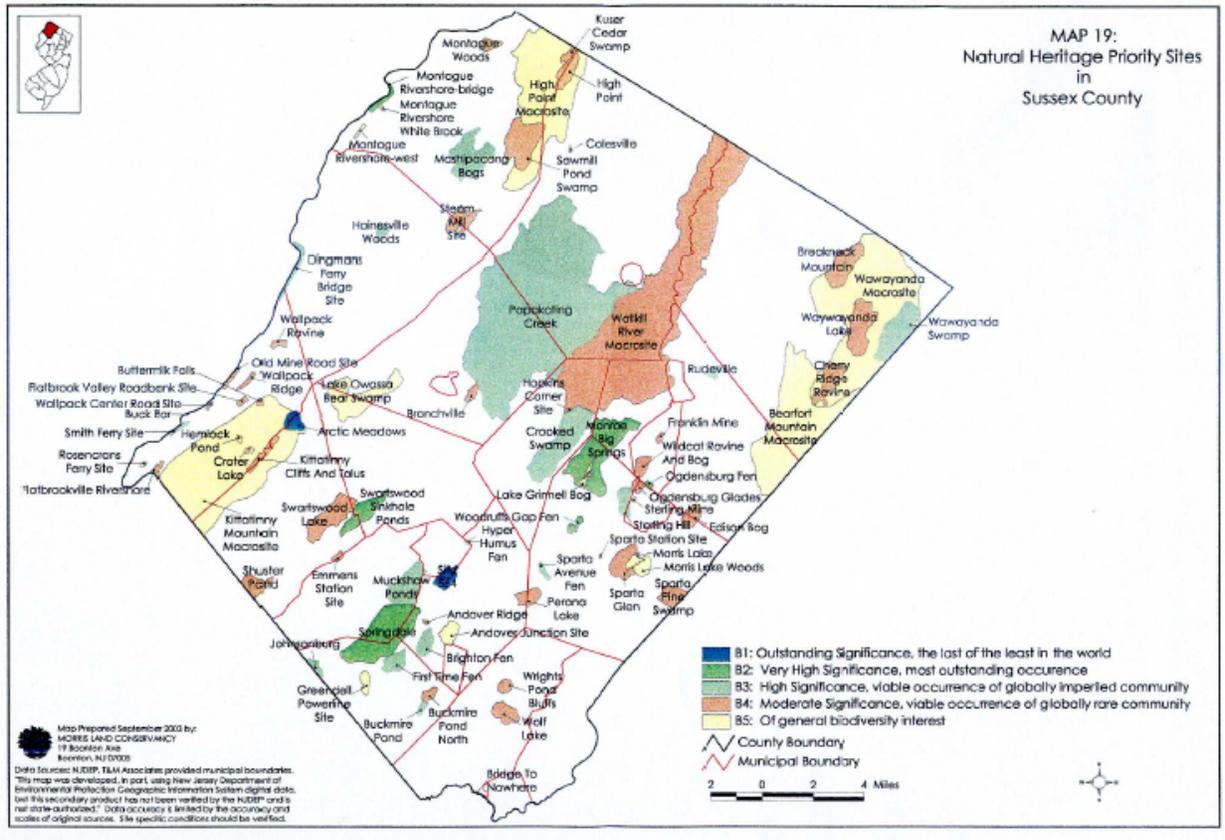
Sussex County has one of the largest concentrations of Natural Heritage Priority Sites in New Jersey. There are a total of 77 Priority Sites in Sussex County, or roughly 20% of total Sites. The Sites in Sussex County are also among the largest geographically, indicating the extent to which the county's natural communities are still intact. The State has given each priority site a biodiversity ranking from B1 to B5, indicating the relative importance of that particular area. The following table defines each biodiversity ranking, and indicates the number of Natural Heritage Priority Sites in Sussex County with each particular ranking.

Biodiversity Rank

Definition of Rank Number in Sussex

B1 Outstanding significance, the last of the least in the world 2
B2 Very high significance, most outstanding occurrence of something 6
B3 High significance, viable occurrence of globally imperiled community 17
B4 Moderate significance, viable occurrence of globally rare community 36
B5 Of general biodiversity interest 16
Total: 77

According to **Map 19: Natural Heritage Priority Sites in Sussex County**, there are six large Natural Heritage Priority Sites located in the county. The Kittatinny Mountain Macrosite and High Point Macrosite occur along the Kittatinny Ridge and are largely contained in already preserved lands. The Wallkill River Macrosite, much of which falls within preserved lands, and the adjacent Papakating Creek, an unpreserved region, fall in the central valley. Wawayanda Macrosite and the adjoining Bearfort Mountain Macrosite are located in northeastern Sussex County in the Highlands. These sites are partly contained in already preserved areas and watershed lands.



Landscape Project

The New Jersey Department of Environmental Protection’s Division of Fish and Wildlife maintains a database listing endangered and threatened species in New Jersey (this information is also used by the Office of Land Management for Natural Heritage Priority Site locations). These lists are used by the Division of Fish and Wildlife to determine protection and management actions necessary to ensure the survival of the State's endangered and threatened wildlife. Endangered species are defined as those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance, or contamination. Threatened species are those who may become endangered if conditions surrounding them begin to, or continue to, deteriorate.

To better manage the state’s endangered and threatened animal species, the Division of Fish and Wildlife’s Endangered and Nongame Species Program, has produced ‘The Landscape Project’. The Project is a Geographic Information System (GIS) mapping tool that delineates critical habitat where federal and state threatened and endangered animal species have been sighted, as well as habitat that is suitable for these species to survive but where known sightings have not occurred. Given that ‘The Landscape Project’ maps suitable habitat, the scope of this available data is broader than the boundaries of Natural

Heritage Priority sites which map known sites only. However, 'The Landscape Project' does not include rare botanical species as Natural Heritage Priority Sites do. Both databases contribute to our ability to understand the interrelationships between development and habitat.

The Landscape Project is publicly available and can be a useful tool for public and private organizations when decisions about setting priorities for land preservation and land use are made. The goal of the project is to protect biological diversity in New Jersey, "...by maintaining and enhancing rare wildlife populations within healthy, functioning ecosystems."

Data from the Landscape Project may be used in a number of different ways. For example, it is possible to determine if sightings of endangered species have been made in a particular region, or it can be used to rank different regions against each other according to the conservation category of endangered species (eg. federally endangered or state threatened) located there. The data are also potentially useful as part of a comprehensive open space plan. Lands of particular importance can receive high priority for purchase of development easements, alternative development design, or transfer of development rights.

To determine what kinds of endangered and threatened species exist in Sussex County, it is useful to break the county into three regions, the Kittatinny Ridge, the Kittatinny Valley and the Highlands, which, respectively, lie west to east in the county.

The largest of these areas is the Kittatinny Valley, which occupies approximately half of the county's land area. This is also the area of the county with the least amount of protected land. The landscape in this section is comprised of farm fields, wooded ridges and numerous stream corridors. The grasslands of abandoned and fallow farmland provide excellent habitat for threatened and endangered grassland bird species, such as bobolink, Savannah sparrow, vesper sparrow and grasshopper sparrow. The edge environments afforded by agricultural landscapes also foster larger mammals, such as coyote, bobcat and deer. Despite its human-sculpted appearance, the Kittatinny Valley is a region of tremendous biological diversity.

The western and eastern margins of the county, the Kittatinny Ridge and the Highlands, are forested and mountainous. These regions harbor concentrations of forest dwelling species, such as black bear, timber rattlesnake, barred owl and the elusive bobcat. These species thrive on large, contiguous patches of habitat. Nearly the entire extent of the Kittatinny Ridge is protected by federal and state agencies. In the Highlands, however, select state parks, wildlife management areas and water supply management lands protect discontinuous patches of habitat.

The following table lists threatened and endangered species by county region.

Endangered and Threatened Wildlife of Sussex County

Region of Sussex County

Kittatinny Ridge Kittatinny Valley Highlands

Timber rattlesnake (SE) Wood turtle (SE) Timber rattlesnake (SE)
Wood turtle (SE) Bog turtle (SE) Wood turtle (SE)
Bog turtle (SE) Bobcat (SE) Bog turtle (SE)
Bobcat (SE) Great blue heron (ST) Bobcat (SE)
Red-shouldered hawk (SE, Br) Barred owl (ST) Red-shouldered hawk (SE, Br)
Great blue heron (ST) Northern harrier (SE, Br) Great blue heron (ST)
Barred owl (ST) Cooper's hawk (ST) Barred owl (ST)
Northern goshawk (SE, Br) Bobolink (ST) Northern goshawk (SE, Br)
Savannah sparrow (ST, Br) Northern harrier (SE, Br)
Vesper sparrow (ST, NB) Bobolink (ST)
Grasshopper Sparrow (ST, Br) Savannah sparrow (ST, Br)
Red-headed woodpecker (ST) Vesper sparrow (ST, NB)
Grasshopper sparrow (ST, Br)

SE = State Endangered Species

ST = State Threatened Species

Br = Breeding Population Only

NB=Non-breeding Population Only Pied-billed grebe (SE, Br)

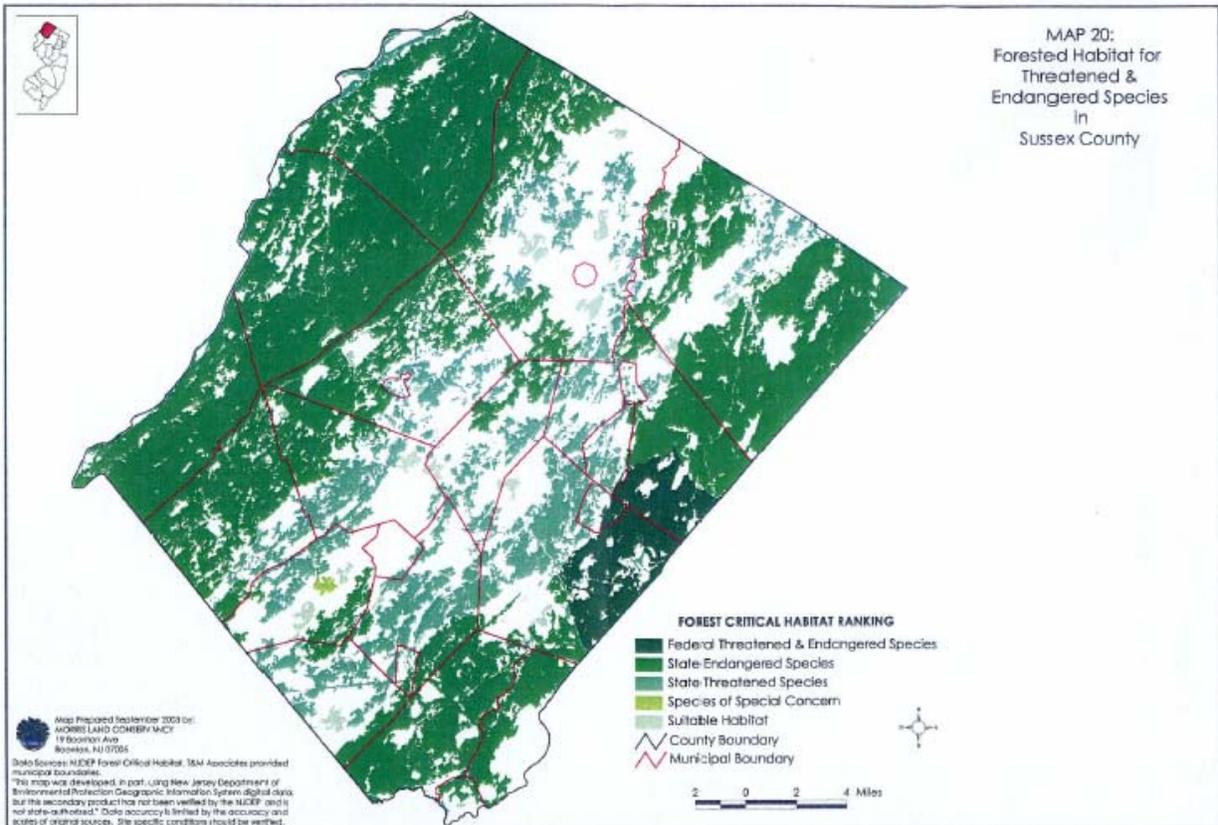
In order to evaluate the importance of different regions according to the conservation status of species present, The Landscape Project divides critical habitat into five habitat types: forest, grassland, forested wetland, emergent wetland and beach and dune. Each type is then ranked according to the conservation status of species present. The rank of conservation status for all habitat types from highest to lowest is as follows: federally threatened and endangered species, state endangered species, state threatened species, species of special concern and suitable habitat. Therefore, it is possible to identify and map which areas of forest habitat contain federally threatened or endangered species, which contain state endangered species and so on.

Maps 20, 21, 22, & 23 identify, delineate and rank habitat type as outlined above. This information allows users to identify the locations of critical habitat for federal and state endangered and threatened species, along with habitat for species of concern and areas that might be suitable as habitat.

Map 20: Forested Habitat for Threatened & Endangered Species in Sussex County

outlines and ranks the location of critical habitat for forest dependent species.

There is one large area of the highest ranking critical forest habitat for federal threatened and endangered species. This area is located in the eastern region of Sparta and the southern region of Hardyston. Much of this region is encompassed by Sparta Mountain Wildlife Management Area, the Wallkill River Preserve and Weldon Brook Wildlife Management Area.

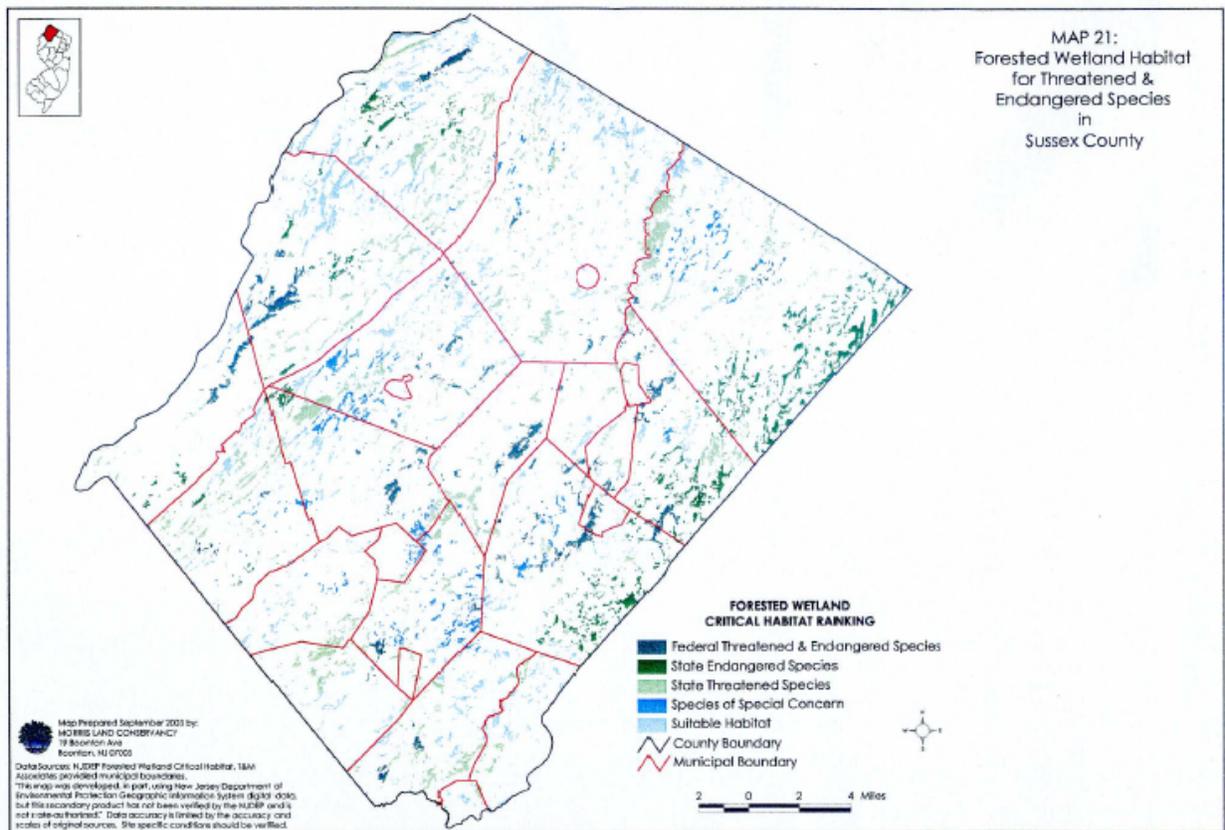


The second highest ranking critical forest habitat for state endangered species encompasses a large portion of the county. The largest area of this ranking runs in a large swathe along the Kittatinny Ridge and falls within the Delaware Gap National Recreation Area, High Point State Park, Stokes State Forest, Flatbrook Wildlife Management Area and Walpack Wildlife Management Area. Another area of this ranking is located in eastern Vernon and Hardyston, parts of which are included within Waywayanda State Park and Hamburg Mountain Wildlife Management Area. A third area of critical habitat for state endangered species is located at the southern tip of the county, centered around Byram. A fourth area is located in western Vernon Township near the Wallkill River National Wildlife Refuge. Other smaller areas of this ranking are scattered through the Kittatinny Valley in central Sussex County.

The remaining rankings, which include state threatened species, species of special

concern and areas of suitable habitat for forest dependent species are also predominantly located in the Kittatinny Valley. A significant swathe of habitat for state threatened species runs southwest from the Borough of Franklin through to Green. A further area of state threatened species is located in Hampton reaching southwest through Stillwater and Fredon. There is one small patch of species of special concern located in Fredon and areas of suitable habitat scattered throughout the valley.

Map 21: Forested Wetland Habitat for Threatened & Endangered Species in Sussex County outlines and ranks the location of critical habitat for forested wetland dependent species. There may be areas of overlap between forested habitat and forested wetland; some species are exclusively dependent on each habitat type. To generate accurate information, these habitat types are mapped separately, as is emergent wetland habitat. There are a number of small patches of the highest ranking habitat for federally threatened and endangered species scattered throughout the county. The larger areas are located along Mill Brook in Montague and along the Flat Brook in Sandyston and Walpack. Other significant patches are located in eastern Hampton, north-central Lafayette, in Sparta and Ogdensburg and northern Hardyston.



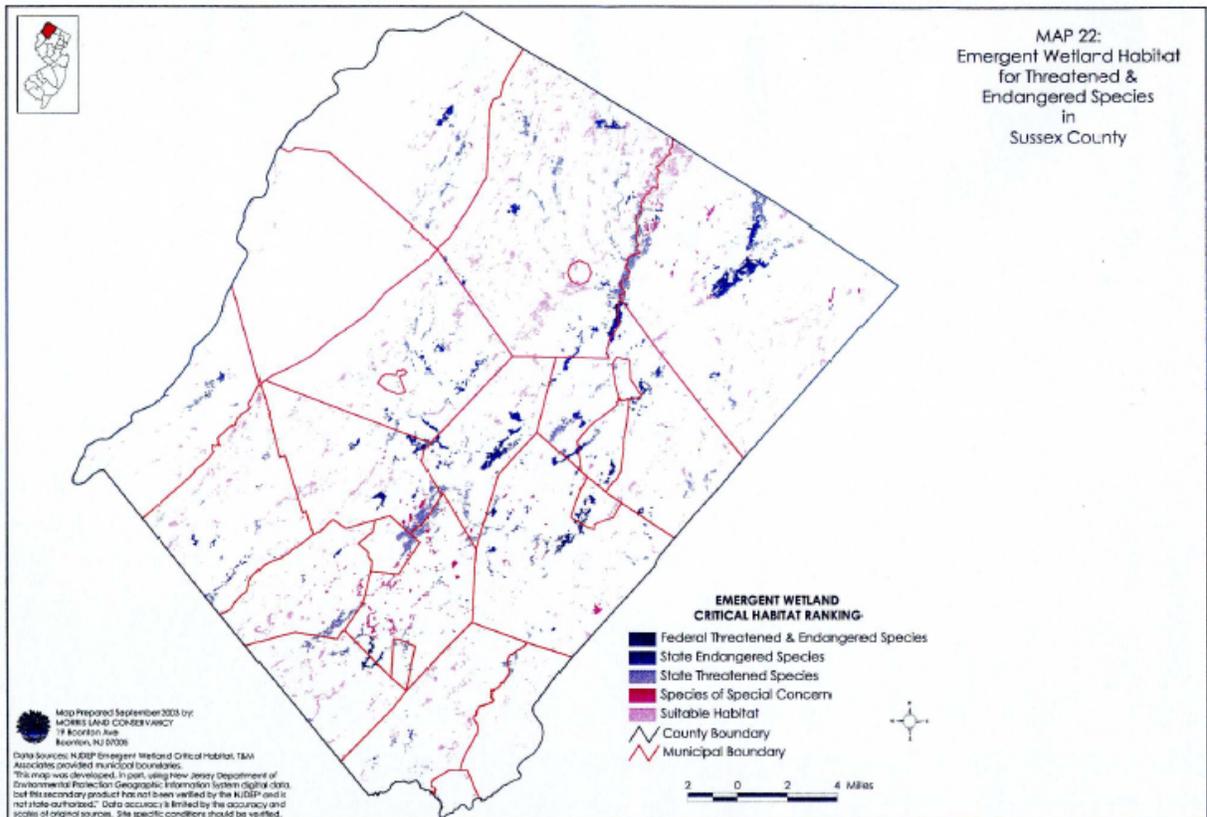
Habitat for state endangered species is predominantly located along the eastern border of Sussex County from Vernon through Sparta. These habitats are mainly located within already preserved areas such as Wawayanda State Park, Sparta Mountain and Weldon Brook WMA's. Smaller, more disconnected patches are scattered along the western

border of the county, many within the preserved area that stretches north to south from High Point State Park to the Delaware Water Gap.

Habitat for state threatened species is also scattered. However there are four large patches; the first located along the Walkkill River in Vernon, the second is associated with Crandon Lakes in Hampton, the third and fourth are along the Paulins Kill in the Andover, Hampton, Lafayette region and along the Pequest River at the Green and Fredon border respectively.

Rankings of habitat for species of special concern and suitable habitat are scattered throughout the county.

Map 22: Emergent Wetland Habitat for Threatened & Endangered Species in Sussex County outlines and ranks the location of critical habitat for herbaceous wetland dependent species. Critical emergent herbaceous wetland is predominantly associated with waterways and occurs in smaller, often contiguous patches in the eastern section of the county. Along the Pochuk Creek in central Vernon there are significant contiguous (or almost contiguous) areas of habitat for federally threatened and endangered species, state endangered, and state threatened species; some of which falls within preserved areas associated with the Appalachian Trail. Similarly, there are large areas of critical habitat for federally threatened and endangered species, state endangered, state threatened and species of special concern located along the Walkkill River within the Walkkill River WMA.

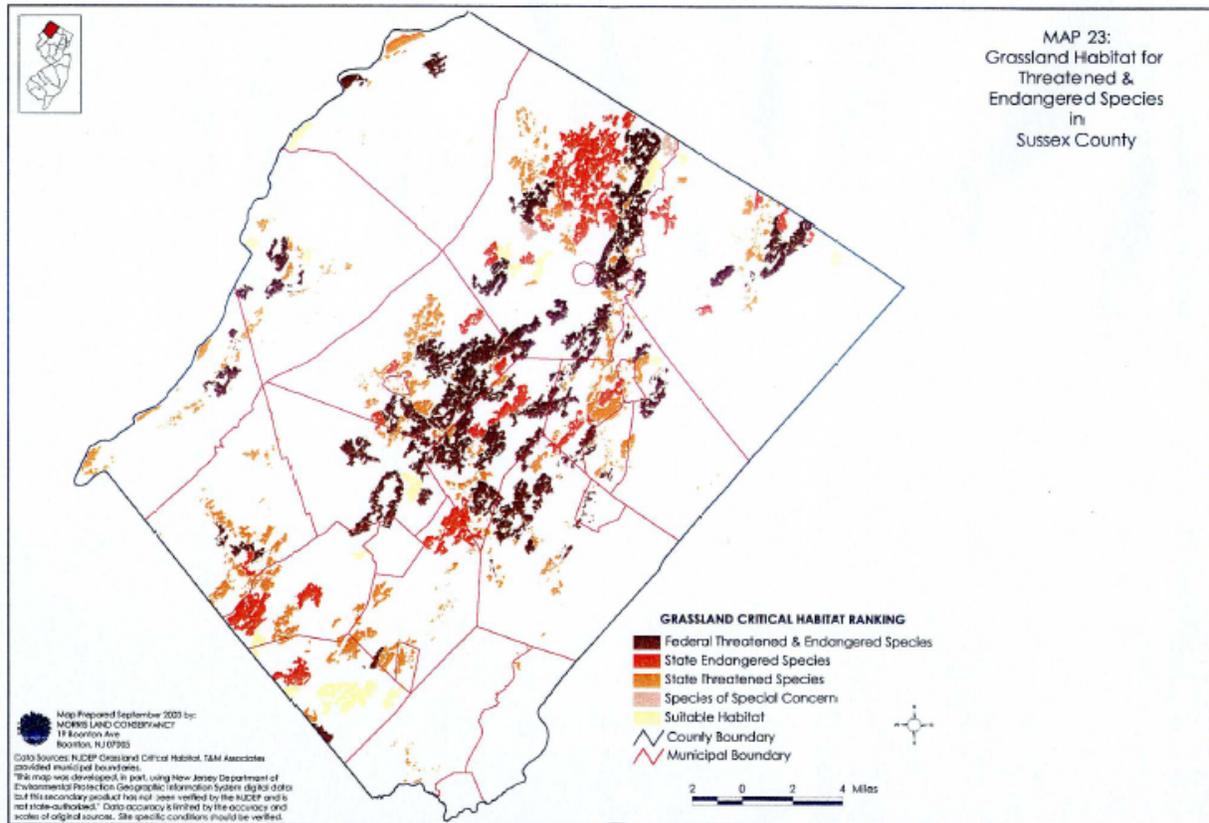


A significant habitat area for federally threatened and endangered species is located in Lafayette Township. Much of this area is located in municipally preserved open space or preserved farmland.

There are also two sizeable habitat areas for state threatened species. The first is located along the Hampton, Andover Township and Newton border; the second spans border between Fredon and Green and is encompassed within Whittingham WMA.

Habitat for species of special concern and areas of suitable habitat are scattered in smaller disconnected patches, mostly within the Kittatinny Valley and Highlands region of the county.

Map 23: Grassland Habitat for Threatened & Endangered Species in Sussex County outlines and ranks the location of critical habitat for grassland dependent species. Much of the critical grassland habitat in Sussex County is located in the Kittatinny Valley. Smaller areas are located in the Pochuk Mountain region in Vernon, with still smaller areas located along the western side of the Kittatinny Ridge.



A significant area of habitat for federally threatened and endangered species, and state endangered and state threatened species is located in Wantage. There is also a large patch of these rankings located in the center of the county, encompassing parts of Frankford, Lafayette, Hardyston, Hampton, Andover and Sparta Townships. A smaller patch of these rankings is located in the Pochuk Creek area of central Vernon Township.

In northern Montague significant areas of habitat exists for federal threatened and endangered species and state threatened species. Similar areas can also be found in western Sandyston and Walpack Townships.

Vernal Pools

New Jersey has recently adopted legislation to protect vernal pools. These pools are “confined wetland depressions, either natural or man-made, that hold water for at least two consecutive months out of the year, and are devoid of breeding fish population....These unique ecosystems provide habitat to many species of amphibians, insects, reptiles, plants and other wildlife.”⁵⁹ As of August 2003, initial research by Rutgers University to identify the location of these special resources has found 840 sites in the Ridge and Valley geophysical region and 728 in the Highlands. Many of these sites are located in Sussex County.

Biodiversity

A report compiled in 2003 by The Morris Land Conservancy for the Sussex County Open Space and Recreation Plan further identifies the biodiversity enjoyed in the County. Sussex County has 29 species and communities that can be classified as globally rare. The county leads the nation in dragonfly and damselfly diversity with 142 documented species. The county also supports a high concentration of breeding birds. The Kittatinny Ridge and Delaware River serve as important routes for neotropical migrants and migrating raptors. Sussex County is home to over 160 species of birds, 72 fish species, 49 species of amphibians/reptiles, 83 butterfly species, 292 species of trees and shrubs, and 33 mammals including black bear, red fox, gray fox, bobcat and coyote.