

DRAFT – Sparsely Settled Mixed Habitats

Ecosystem Description

Wide -ranging animal species -- particularly carnivores near the top of the food web -- often utilize a wide variety of habitat types in their pursuit of food, mates and other resources. Their lack of habitat specificity prevents assigning them to any of the other ecosystem groups, all of which represent distinguishable habitat categories.

Many of these species are in decline, primarily due to loss, degradation, and fragmentation of all habitats, natural as well as semi-natural. The effects of climate change will exacerbate these already ongoing impacts and for at least a few of these species, especially the red wolf and least weasel, may ultimately outweigh all other factors in determining whether they persist within the state, or, in the case of the red wolf, whether any wild populations remain on earth.

Table 1 at the end of this report provides of summary of expected climate change impacts to these natural communities.

Predicted Effects to Wildlife Species

Tables 2 and 3 at the end of this report identify the species of conservation concern and priority species that use habitats in this ecosystem.

Predatory species utilizing this habitat play an important ecological role in all the ecosystems they occupy by regulating the abundance of species lower down in the food chain, particularly herbivorous mammals. Many of these high-level predators are generalists that have declined in both abundance and range due to conflicts with humans, with the majority now considered to be of conservation concern. Although all of the species included within this guild are highly adaptable and make use of a wide range of habitat types, the majority are considered rare or threatened in North Carolina. These include red wolf, least weasel, eastern diamondback rattlesnake, timber rattlesnake, and pigmy rattlesnake.

Others, like the black bear and white-tailed deer, are currently expanding their range across the state and are currently not considered to be of conservation concern. The status of longtailed weasel is unknown and based on harvest trends, may be declining. Bobcats are common and their populations appear to be stable. The black bear is currently

Sea level rise may lead to inundation of large parts of the Coastal Plain, including the Albemarle-Pamlico Peninsula where large reserves have been set aside for red wolves, black bear, and other wildlife. It is likely several large wildlife refuges clustered around the sounds

will be inundated, including Alligator River, Pocosin Lakes, Lake Mattumuskeet, Swanquarter, Cedar Island, and Mackay's Island National Wildlife Refuges, and the North River, Gull Rock, and Goose Creek Game Lands. Loss or even moderate reduction of these refuges is likely to strongly affect the survival of the pack of red wolves that has been restored on Albemarle-Pamlico Peninsula, as well as the largest population of black bears along the North Carolina coast.

While some movement inland can be expected, there are far fewer potential refuge areas in the Inner Coastal Plain and Piedmont to support viable populations of large predators or venomous snakes than there currently are in portions of the Outer Coastal Plain. Drought and wildfire may cause animals to range further away from more protected areas as they search for food, water, and cover. This can bring them into conflict with people and roads with high-volume traffic that are common conditions in the Piedmont. Residents in the central Piedmont have expressed safety concerns when black bears are sighted, and bears have been killed when attempting to cross busy roads and highways, or directly by local law enforcement officials that are not knowledgeable of normal bear behavior.

Black bears are tied to forested areas and in the southeastern United States; forest distribution matches the distribution of bears very closely. In many parts of the region, bears are dependent on oak trees with their energy-rich acorns and on a diversity of soft mast species. Where Oaks are not the dominant species, diversity in forest types and ages can provide mast producing hardwoods and shrubs. Bears are opportunistic omnivores, but low food supplies and an increase in fragmented habitat may also result in increased bear movements, making them more prone to human-caused mortalities (*e.g.*, vehicle, depredation).

Increased temperatures may cause some latitudinal shifts in the ranges occupied by members of this group, but the effects are likely to be mixed. Least weasels are probably the only species likely to shift its range as a consequence of increased warming. In the Mountains, they may retreat towards the north, becoming less common or even potentially extirpated from the state. In the Coastal Plain, eastern diamond backed rattlesnakes, currently at the very northern edge of their range and very rare in the state, have the potential to increase in abundance. However, that potential could very well be offset by increased development and fragmentation, as well as persecution.

Climate Change Compared to Other Threats

Climate change will contribute to the loss of the large blocks of habitat or fragmentation that creates barriers between blocks that are critical for the survival of species in this group. Development of habitat has become the limiting factor for priority species utilizing this habitat. Across the state more generally, increased exploitation of wild or semi-wild lands for energy production is likely to be the most important indirect effect of climate change on this group.

Table 4 compares climate change with other existing threats.

Table 4. Comparison Of Climate Change With Other Threats

| Threat | Rank Order | Comments |
|------------------|------------|--|
| Development | 1 | Development activities such as residential subdivisions, road construction, and retail development have and will continue to displace wildlife and place them in closer contact with humans. Reduction and fragmentation of large areas of open space will continue to accompany the expansion of the human population; climate change is likely to exacerbate these ongoing impacts. Construction of highways and access roads, increases in traffic, and other effects associated with infrastructural or industrial development needed to support new forms of energy extraction will create impacts. |
| Persecution | 1 | Direct persecution remains the largest limiting factor on abundance and range of species in this habitat. |
| Climate Change | 2 | The most important direct impact of climate change is likely to be the loss of a large number of coastal refuges due to sea level rise. |
| Land Use Changes | 2 | Plans to use grasses like switchgrass and miscanthus as biofuels may result in these marginal areas being put into short rotation production as the demand for alternative fuels increases. There is evidence that some species, such as black bears, are negatively impacted by wind turbine farms due to loss of mast-producing forests (Loder 2008). |

Summary and Recommendations

Conflicts with humans have resulted in the restriction of these species to large blocks of mixed habitat where human density and intrusion are minimal. Even black bears, which in some areas have adapted to human presence as garbage raiders, are highly unlikely to persist without these large sparsely settled blocks of habitat. These species require large blocks of habitat where density of human settlement or intensity of human intrusion is relatively low. More than any other, this group requires landscape-level conservation, particularly the protection of large areas of habitat -- natural or mixed -- from increased density of human settlement.

Recommended Actions

- Surveys
- Conduct surveys for species for which current distribution information is already available or for species that are considered common.
- Monitoring
- Development of long-term monitoring strategies to document population trends, from which conservation strategies can be specifically designed to target those species.
 - Monitoring systems need to be expanded and/or targeted to be able to assess current population status and trend information for all wildlife species associated with this habitat.

- Research
- Research and identify important wildlife crossing areas; evaluate connectivity issues between intact and fragmented habitats used by priority species; work with partners to improve crossing and connectivity.
- Management Practices
- Maintaining and restoring connections between habitat blocks is also critical, not only for allowing adjustments in range in response to climate change, but to maintain genetic connectivity, population resilience and adaptability more generally.
 - Transportation facilities that utilize longer bridges at streams and wetlands not only minimize impacts (and thereby reduce mitigation requirements) but also provide crossing options for wildlife that often travel riparian corridors. Wildlife underpasses should be constructed for all new highway projects, as these reduce wildlife-vehicle collisions, conserve important travel corridors, and provide linkages for bear populations and many other wildlife species.
 - Limit the development of roads or other infrastructure within large unfragmented blocks as it would promote the development of denser human settlement or create connectivity barriers through fragmentation.
 - Work cooperatively with other agencies to define sustainable forestry criteria for biomass production.
- Land Protection
- Protecting existing large blocks of habitat and restoring connections between these blocks will therefore benefit not only the species in this group, but will enhance the viability of the state's native biodiversity overall.
 - Protect smaller tracts that are situated between blocks so they can function as a corridor between conservation sites.
 - In the Coastal Plain, a high priority should be given to protecting movement corridors that allow inland migration away from inundating areas along the sounds and seacoast.
 - Over the state as a whole, a high priority should be given to restoring connections that are lost due to construction of four-lane highways and other roads that create near-impassible barriers for all animals except those capable of flight.

References

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Table 1. Predicted Impacts of Climate Change

| Climate Change Factor | Comments |
|--------------------------------------|--|
| Increased Temperature/ Hot Spells | Increased temperatures are likely to have only a minimal effect on this group overall, although a northward shift in range can be expected for the least weasel, a primarily boreal species, perhaps leading to its extirpation from the mountains of North Carolina. |
| Sea Level Rise -- Inundation | Sea level rise is likely to affect large areas of the Outer Coastal Plain where many important wildlife refuges are located. |
| Inland Migration | Inundation of wildlife refuges will result in dispersal inland to Piedmont areas. Movement inland can be expected, but there are far fewer potential refuge areas in the Inner Coastal Plain and Piedmont to support viable populations of large predators or venomous snakes than there currently are in portions of the Outer Coastal Plain. Movement corridors that allow inland migration away from inundating areas along the sounds and seacoast are critical. |
| Acreage Change | Development and inundation can be expected to reduce availability of large blocks of undisturbed or unfragmented habitat. This trend will continue so long as the human population continues to grow and new ways are found to exploit even the most marginal of lands for human uses. |

Table 2. Mammal Species Utilizing

| Species | Common Name | Element Rank: | Endemic | Major Disjunct | Extinction/Extirpation Prone | US/NC/WAP* | Comments |
|------------------------|--------------------|---------------|---------|----------------|------------------------------|------------|--|
| MAMMALS | | | | | | | |
| <i>Canis rufus</i> | Red wolf | G1Q/S1 | YES | | YES | LE, XN/SR/ | The sole free-roaming population of this species may be imperiled by sea-level rise. |
| <i>Mustela frenata</i> | Long-tailed weasel | G5/S3S4 | YES | | | /W3/P | |
| <i>Mustela nivalis</i> | Least weasel | G5/S2 | YES | | | /SR/P | Endemic only to mountain region; did not historically occur statewide. |

Table 3. Reptile Species Utilizing

| Species | Common Name | Element Rank | Endemic | Major Disjunct | Extinction/Extirpation Prone | US/NC/WAP* | Comments |
|----------------------------|--------------------|--------------|---------|----------------|------------------------------|------------|----------|
| REPTILES | | | | | | | |
| <i>Crotalus horridu</i> | Timber rattlesnake | G4/S | | | | /SC/ | |
| <i>Sistrurus miliarius</i> | Pigmy rattlesnake | G5/S3 | | | | /SC/P | |

*** US/ NC/ WAP Abbreviations (species are subject to reclassification by USFWS, NHP, or WRC).**

| | | | | | |
|--------|---|----|--------------------|---|----------------------|
| E | Endangered | SC | Special Concern | P | WAP Priority Species |
| T | Threatened | SR | Significantly Rare | | |
| FSC | Federal Species of Concern | W | Watch Category | | |
| LE, XN | Endangered elsewhere, Non-Essential Experimental Population | | | | |

NatureServe Element Rank: <http://www.natureserve.org/explorer/ranking.htm>

USFWS Endangered Species Listing Status: http://www.fws.gov/raleigh/es_tes.html

NC Natural Heritage Program Status:
<http://www.ncnhp.org/Images/2010%20Rare%20Animal%20List.pdf>

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