

North Carolina Ecosystem Response to Climate Change: DENR Assessment of Effects and Adaptation Measures

Purpose

DENR has made it a priority to comprehensively address climate change in our state, addressing mitigation and adaptation efforts to increase the resilience of our natural resources to these complex changes. The mitigation sector will primarily work on reducing carbon emissions and developing emission regulations. The adaptation sector will proactively prepare for changes that cannot be prevented and will address potential impacts to natural resources. As part of the adaptation side of this Plan, the Natural Heritage Program staff is initiating an evaluation of the likely effects of climate change on North Carolina's ecosystems and species. The goals of this assessment are to:

- Predict climate change effects and possible ecosystem responses to these effects
- Recommend conservation measures and adaptation strategies that can help offset the impacts we predict are likely to occur to native species and ecosystems

Methods

For this assessment, we use the Climate Wizard mid century (2050s) ensemble average climate model. Based on the available information, we

1. Estimate regional changes caused by climate change (e.g. change in temperature and frequency of droughts, floods, wind damage, wildfires, etc.)
2. Estimate possible ecosystem, habitat, and species responses (good or bad)
3. Rank climate change threats in comparison to other threats
4. Recommend adaptation strategies
5. Identify conservation priorities, including migration corridors

We conduct this hierarchical analysis at three levels of biological organization:

- 42 Broad Ecosystem Groups (listed below)
- Natural Communities and Landscape/Habitat Indicator Guilds
- Plant and Animal species (including rare species and Priority Species in the State's Wildlife Action Plan)

Information generated from our analysis is stored in an Access database. The entire process is iterative and we expect to continue making improvements to our assessments and recommendations as new predictions about the effects of climate change become available or as empirical evidence of the effects begins to accumulate. Current Ecosystem Group reports can be downloaded at www.climatechange.nc.gov under the link for the NHP Climate Change Ecosystem Assessment.

List of Ecosystem Groups

1. Blackwater Coastal Plain Floodplains
2. Brownwater Coastal Plain Floodplains
3. Coastal Plain Depression Communities
4. Coastal Plain Large River Communities
5. Coastal Plain Marl Outcrop
6. Coastal Plain Nonalluvial Mineral Wetlands

7. Coastal Plain Stream/Swamp Communities
8. Dry Longleaf Pine Communities
9. Estuarine Communities
10. Freshwater Tidal Wetlands
11. General Hardwood and Mixed Forests
12. Granitic Flatrocks
13. Grass and Heath Balds
14. High Elevation Rock Outcrops
15. Low Elevation Cliffs and Rock Outcrops
16. Mafic Glades and Barrens
17. Maritime Grasslands
18. Maritime Upland Forests
19. Maritime Wetland Forests
20. Montane Cold Water Stream Communities
21. Montane Cool Water Stream Communities
22. Montane Oak Forests
23. Mountain Bogs and Fens
24. Mountain Cove Forests
25. Natural Lake Communities
26. Northern Hardwood Forests
27. Peatland Pocosins
28. Piedmont and Coastal Plain Mesic Forests
29. Piedmont and Coastal Plain Oak Forests
30. Piedmont and Mountain Dry Coniferous Woodlands
31. Piedmont and Mountain Floodplains
32. Piedmont Headwater Stream Communities
33. Piedmont Large River Communities
34. Piedmont Small River Communities
35. Piedmont Upland Pools and Depressions
36. Sparsely Settled Mixed Habitats
37. Spruce Fir Forests
38. Streamhead Pocosins
39. Successional and Ruderal Uplands
40. Successional Wetlands
41. Upland Seepages and Spray Cliffs
42. Wet Pine Savannas