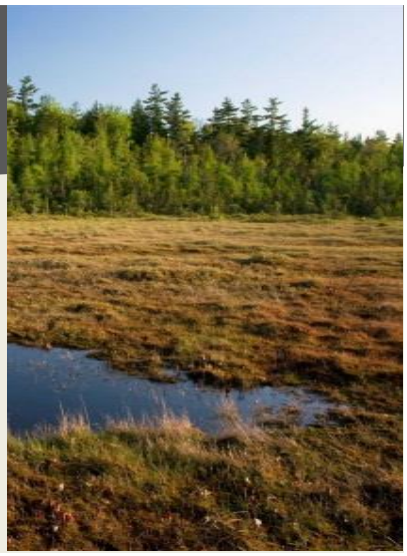
Peatland Habitat
Climate Assessment



Peatlands include all open wetlands dominated primarily by shrubs and sedges that occur on organic (peat) soils. These organic soils are composed of partially decomposed plant remains, and are typically made up primarily of sphagnum (peat moss). These wetlands are referred to as bogs or fens, with the latter comprising the majority of peatlands in New Hampshire. Not included in this category are a variety of forested wetlands on organic soils; these are discussed separately as "northern swamp" and "temperate swamp."

Potential Changes to Habitat

- Increased temperature may result in increased decomposition rates, causing peat mats to decay more rapidly, and resulting in a loss of peatland habitat, and possible conversion to marsh
- Extended periods of drought may further promote increased decomposition.

What does this mean?

The potential effects of climate change on peatlands are expected to be more severe than on any other wetland type. Peatlands are defined by their saturated organic soils, comprised primarily of the partially decomposed remains of plants, particularly sphagnum mosses. Such soils develop in cold and wet climates, where the rate of plant matter accumulation exceeds the rate of decomposition. These systems are near their southern limit in the northeastern US, where most occurrences are only a fraction of the size of the huge peatlands of the boreal zone.

In a typical climate change scenario, higher temperatures and a longer growing season will result in an increased decomposition rate for peatlands. As this rate increases, organic matter accumulation will not be able to keep pace with decomposition, and peat soils will begin to break down (Gorham 1991, Gignac and Vitt 1994). Without this organic matrix, many plants restricted to peatlands will disappear, and likely be replaced with those more typical of marsh or open water habitats.

Changes in peatland hydrology also have the potential to increase decomposition rates for peat. The combination of increased temperatures and reduced precipitation (at least seasonally) will result in increased evapotranspiration, which in turn could lower surface water levels (Gorham 1991) and expose peat to air and wind. In addition, lowered water levels may foster colonization by trees that are otherwise unable to survive on saturated peatlands (Gignac and Vitt 1994).

In both cases, increased decomposition of peatland soils is likely to release significant amounts of carbon (both CO_2 and CH_4) into the atmosphere, which has the potential to further increase global temperatures (Tarnocai 2006).

How does this affect wildlife?

If wetland habitats change composition as a result of climate change, specialist wildlife species are likely to be more affected than generalists. For example, invertebrates that occur primarily in peatlands would suffer a net loss of habitat if higher decomposition rates shifted these habitats toward marshes or open water. One of New Hampshire's rarest mammals, the northern bog lemming, is thought to occur in peatland habitats in the northern part of the state. In the south, the Ringed Boghaunter (a dragonfly) inhabits small peatlands with extensive Sphagnum. Most areas occupied by boghaunters contain significant amounts of open water, so degradation of peat mats is not likely to negatively affect the species in the short term.

General Strategies to Address these Vulnerabilities:

See the full Climate Change Adaptation Plan for strategy descriptions

S1: Conserve Areas for Habitat Expansion and/or Connectivity
S2: Habitat Restoration and Management
S4: Protect Riparian and Shoreland Buffers
S5: Invasive Species Plan
S6: Comprehensive Planning
S7: Stormwater Policy and Flood Response
S8: Revise Water Withdrawal Policies

Specific Strategies:

1. Conduct research on peatlands along a regional latitudinal gradient to assess the actual potential for peat decomposition under climate change.
2. Utilize research on peatland resilience to focus protection in areas where peatlands are likely to persist. Protect peatland/upland complexes to stabilize hydrology and minimize nutrient inputs.
3. Make rare peat and swamp community habitats priorities for permanent land protection. (if those communities are expected to persist in the face of CC).