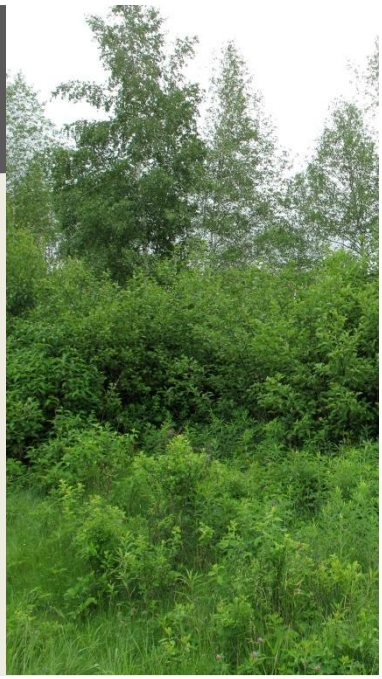
Early Successional Habitats
Climate Assessment

This habitat category includes those habitats that are primarily anthropogenic in nature, broadly divided into "shrublands" and "grasslands." Shrublands are dominated by low wood vegetation, and include old fields, coastal thickets (e.g., in dunes), regenerating forests, and maintained shrublands such as power line rights of way. New Hampshire grasslands are almost entirely agricultural in origin (e.g., hayfields), but also include airstrips and reclaimed landfills. When left unmanaged, grassland habitats tend to succeed into shrublands, and shrublands into forests, with exceptions to the latter in cases where soil conditions may preclude the establishment of trees (e.g., very wet or dry) or where natural disturbance regularly eliminates more mature woody plants.



Potential Changes to Habitat

- In general these habitats are currently believed resistant to climate change as long as management continues.
- Increased diversity and abundance of invasives (particularly plants).
- Potential for loss of wildlife value to these habitats from intensified management resulting from a longer growing season and an increased demand for biomass fuels.

What does this mean?

temperature effects, and are thus unlikely to suffer from the increased temperatures predicted by all climate change models. A longer growing season may allow for more rapid annual growth, thus speeding up natural succession rates, and this response may be facilitated by higher levels of CO_2 in the atmosphere. In addition, southern species – including invasives – may be better able to colonize NH with warmer temperatures and a longer growing season. It is important to note that there are limited data available on how productivity will vary with climate change (e.g., interactions between temperature and precipitation), and that any potential interactions are highly speculative (e.g., Parton et al. 1995, Thornley and Cannell 1997).

The effects of shifting precipitation patterns are even harder to predict. Many grasses are drought tolerant (especially the native bunch grasses [C3 plants]), and unlikely to be significantly affected by increased summer droughts. At the same time, if disturbance events (fire, flood, drought) become increasing erratic, generalist species (again including many invasives) would likely benefit, and come to dominate early successional communities (note that many already do so). Given that many agricultural grasslands are in floodplains, changes to flood regimes have the potential to both enhance these habitats (e.g., sediment deposition) or otherwise alter them (e.g., extensive standing

water), depending on when the flooding occurs. Changes to hydrology also have the potential to shift habitats back and forth between grasslands/shrublands and similar wetland types (marshes and shrub swamps, respectively).

Much of how these habitats respond to climate change will be tied to how people respond. For example, increased pressures for local agriculture or locally produced biomass energy may drive conversion of forest to grassland or shrubland, and existing grasslands may be converted to more intensive agricultural use (and thus be of lower value to wildlife). Increased productivity in grasslands may allow for more frequent hay harvests, to the detriment of grassland birds and other species. Intensified agriculture, in conjunction new populations of invasive plants and insects, may result in increased pesticide application, with uncertain effects on wildlife, water quality, and habitat composition.

HOW DOES THIS AFFECT WILDLIFE?

Because these habitats are unlikely to change significantly in response to climate change, most early successional wildlife are more likely to be affected by changes to management of grasslands and shrublands. For example, intensified agriculture may adversely affect grassland wildlife through crop conversion or more frequent mowing (which can cause mortality). Increased disturbance (e.g., fire, intense storms) may actually benefit shrubland wildlife species by facilitating understory or opening vegetation. The potential effects of invasive plant species on shrubland bird productivity and habitat occupancy are poorly known, and warrant additional study.

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
S5: Invasive Species Plan

Specific Strategies:

1. Establish permanent shrub plots to research how shrub species composition changes as climate changes.
2. Determine the value to rare wildlife of old and new invasive species.

This Climate Assessment is a section of the **Ecosystems and Wildlife Climate Change Adaptation Plan (2013)**, an *Amendment to the NH Wildlife Action Plan*, developed by New Hampshire Fish and Game with the help of many conservation partners. The full plan can be found at http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/climate.html. (Photo by Emma Carcagno)