The region’s forests will be affected by a changing climate during this century. A team of forest managers and researchers created an assessment that describes the vulnerability of forests in New England and northern New York (Janowiak et al. in press). This report includes information on the current landscape, observed climate trends, and a range of projected future climates. It also describes many potential climate change impacts to forests and summarizes key vulnerabilities for major forest types. This handout is summarized from the full assessment.

### TREE SPECIES INFORMATION:

This assessment uses two climate scenarios to “bracket” a range of possible futures. These future climate projections were used with two forest impact models (Tree Atlas and LANDIS) to provide information about how individual tree species may respond to a changing climate. More information on the climate and forest impact models can be found in the assessment. Results for “low” and “high” climate scenarios can be compared on page 2 of this handout.

Despite these limits, models provide useful information about future expectations. It’s perhaps best to think of these projections as indicators of possibility and potential change. The model results presented here were combined with information from published reports and local management expertise to draw conclusions about potential risk and change in the region’s forests.

### SPECIES INFORMATION

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>ADDITIONAL CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIKELY TO DECREASE</strong></td>
<td></td>
</tr>
<tr>
<td>Black ash</td>
<td>Emerald ash borer causes mortality</td>
</tr>
<tr>
<td>Black spruce</td>
<td>Requires cold climate, susceptible to insect pests and drought</td>
</tr>
<tr>
<td>Eastern hemlock</td>
<td>Hemlock woolly adelgid causes mortality</td>
</tr>
<tr>
<td>Mountain maple</td>
<td>Able to grow across a variety of sites and tolerate shade</td>
</tr>
<tr>
<td>Northern white-cedar</td>
<td>Requires cold climate and susceptible to fire and herbivory</td>
</tr>
<tr>
<td>Paper birch</td>
<td>Early-successional colonizer, but susceptible to insects and drought</td>
</tr>
<tr>
<td>Red spruce</td>
<td>Needs a particular type of habitat, limited seedling establishment</td>
</tr>
<tr>
<td>Tamarack</td>
<td>Requires cold climate and susceptible to drought, fire, and insects</td>
</tr>
<tr>
<td>White spruce</td>
<td>Requires cold climate, susceptible to insect pests</td>
</tr>
</tbody>
</table>

| **MAY DECREASE** | |
| Bigtooth aspen | Early-successional colonizer, but susceptible to drought |
| Gray birch | Disperses easily, but susceptible to drought, fire, and insects |
| Pin cherry | Fast-establishing colonizer following fire and disturbance |
| Quaking aspen | Early-successional colonizer, but susceptible to heat and drought |
| Striped maple | Shade tolerant and easily established, but susceptible to drought |
| Yellow birch | Good disperser, but susceptible to fire, insects, and disease |

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>ADDITIONAL CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MIXED MODEL RESULTS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>LIKELY TO DECREASE</strong></td>
<td></td>
</tr>
<tr>
<td>American beech</td>
<td>Affected by beech bark disease, extremely shade tolerant</td>
</tr>
<tr>
<td>Balsam fir</td>
<td>Requires cold climate and susceptible to drought, fire, and insects</td>
</tr>
<tr>
<td>Eastern white pine</td>
<td>Good disperser, but susceptible to drought and insects</td>
</tr>
<tr>
<td>Red maple</td>
<td>Competitive colonizer tolerant of disturbance and diverse sites</td>
</tr>
<tr>
<td>Sugar maple</td>
<td>Grows across a variety of sites and tolerates shade</td>
</tr>
<tr>
<td>Yellow birch</td>
<td>Good disperser, but susceptible to fire, insects, and disease</td>
</tr>
</tbody>
</table>

| **MAY INCREASE** | |
| American basswood | Tolerates shade but susceptible to fire |
| American elm | Affected by Dutch elm disease, grows across a variety of sites |
| Black cherry | Susceptible to insects and fire, tolerates some drought |
| Black oak | Drought-tolerant, but susceptible to insects and disease |
| Eastern hop hornbeam | Grows across a variety of sites and tolerates shade |
| Northern red oak | Susceptible to some insect pests |
| Sweet birch | Susceptible to drought, fire topkill, and insects |
| White ash | Emerald ash borer causes mortality |
| White oak | Fire-adapted and grows on a variety of sites |

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## FUTURE PROJECTIONS

Data for the end of the century are summarized for two forest impact models under two climate change scenarios. The Climate Change Tree Atlas ([www.fs.fed.us/nrs/atlas](http://www.fs.fed.us/nrs/atlas)) models future suitable habitat, while LANDIS models changes in forest growth over time (future tree density presented in this table; additional data are available in the assessment).

### ADAPTABILITY

Factors not included in the models, such as the ability to respond favorably to disturbance, may make a species more or less able to adapt to future stressors.

- **+** high
  - Species may perform better than modeled
- **-** low
  - Species may perform worse than modeled

### INCREASE

Projected increase of >20% by 2100

### NO CHANGE

Little change (<20%) projected by 2100

### DECREASE

Projected decrease of >20% by 2100

### NEW HABITAT

Tree Atlas projects new habitat for species not currently present

### SPECIES

- **American basswood**
- **American beech**
- **American chestnut**
- **American elm**
- **American holly**
- **American hornbeam**
- **American mountain-ash**
- **Baldcypress**
- **Balsam fir**
- **Balsam poplar**
- **Bigtooth aspen**
- **Black ash**
- **Black cherry**
- **Black hickory**
- **Black oak**
- **Black spruce**
- **Black walnut**
- **Blackgum**
- **Blackjack oak**
- **Balsam fir**
- **Boxelder**
- **Bur oak**
- **Cherrybark oak**
- **Chesnut oak**
- **Chinkapin oak**
- **Common persimmon**
- **Eastern hemlock**
- **Eastern hophornbeam**
- **Eastern red cedar**
- **Eastern redbud**
- **Eastern white pine**
- **Flowering dogwood**
- **Gray birch**
- **Green ash**
- **Hackberry**
- **Jack pine**
- **Loblolly pine**
- **Longleaf pine**
- **Mockernut hickory**
- **Mountain maple**
- **Northern pin oak**
- **Northern red oak**
- **Northern white-cedar**
- **Osage-orange**
- **Paper birch**
- **Pignut hickory**
- **Pin cherry**
- **Pin oak**
- **Pitch pine**
- **Pond pine**
- **Post oak**
- **Quaking aspen**
- **Red maple**
- **Red pine**
- **Red spruce**
- **Sand pine**
- **Sassafras**
- **Scarlet oak**
- **Serviceberry**
- **Shagbark hickory**
- **Shingle oak**
- **Shortleaf pine**
- **Silver maple**
- **Slippery elm**
- **Southern red oak**
- **Striped maple**
- **Sugar maple**
- **Sugarberry**
- **Swamp chestnut oak**
- **Sweet birch**
- **Sweetgum**
- **Sycamore**
- **Tamarack**
- **Virginia pine**
- **White ash**
- **White oak**
- **White spruce**
- **Willow oak**
- **Winged elm**
- **Yellow birch**
- **Yellow-poplar

- **LOW CLIMATE CHANGE (PCM B1)**
- **HIGH CLIMATE CHANGE (GFDL A1FI)**

### TREE ATLAS

- **ADAPT**

### LANDIS

- **ADAPT**

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