Introduction: Climate change may bring higher temperatures, variable precipitation, and more frequent intense storms. This document provides a broad summary of potential impacts of climate change, and may provide a foundation for conservation planning in the face of an uncertain future.

Prescribed fire and wildfire
Prescribed burning of Wisconsin’s fire-dependent savannas may be impacted by climate change. Woodland burning, which is often already constrained by narrow prescriptions, could be hampered by wetter springs. However, burning at different times of year may be an option where site conditions allow. Periodic warmer and drier spells could lead to new opportunities, but could also create more volatile conditions which shut down operations. Conditions that promote wildfire may also increase, but widespread fire is unlikely in fragmented landscapes. Less burning overall would be particularly problematic for savannas, which quickly become invaded by woody shrubs in the absence of fire.

Invasive and aggressive species
Non-native invasives out-compete native plants by monopolizing light, water and nutrient resources. Non-native invasives may increase in productivity with increasing CO$_2$, warmer temperatures, earlier springs, and reduced snowpack, and may invade new areas during extreme flood events. Aggressive woody species may also benefit from higher CO$_2$ levels as well as nitrogen deposition. Invasive and other problematic species can also limit the ability of managers to apply fire by reducing the amount of fuel available to carry fire and by creating a moist ground level microclimate.

Vulnerable trees
Snowpack normally insulates trees from frost; with less snowpack, tree roots may incur frost damage. Insects and diseases that attack trees may get a boost from milder winters, as well as take advantage of trees that are stressed by drought and frost damage. Suitable habitat for bur oak, black oak and shagbark hickory may remain the same or increase with climate change,
while that for white oak may remain the same or decrease, a mostly favorable picture for Oak Opening dominants. Habitat projections for Oak Woodland dominants are similar, though habitat for red oak may incur large decreases under high-change scenarios.

**Natural community vulnerability assessments**

In 2014, the Wisconsin DNR conducted eight vulnerability assessment workshops across Wisconsin to evaluate the impacts and adaptive capacity of over 50 natural communities to climate change. At two workshops, a panel of experts reviewed the vulnerability of Wisconsin’s savanna communities, the results of which are summarized in the table below.

### Adaptive capacity

Although warmer temperature and periodic droughts may increase for Wisconsin, many savanna plants are adapted to such conditions, especially species that also grow in prairies. These adaptations may also give them a competitive edge over invaders. High floral diversity is also a plus for high-quality savannas, allowing species to fill different niches as conditions favor different suites of species.

### Managing for uncertainty

While most of the dominant species of Wisconsin’s savannas are adapted to projected future climate, there are uncertainties related to how climate will affect managers’ ability to control invasives and apply prescribed fire. These actions are essential for maintaining habitat for diverse savanna species. Actions such as the following are “win-win,” in that they represent sound practices regardless of uncertainty associated with future climate change. These and other voluntary actions can be found on the Wisconsin DNR Wildlife Action Plan website.

#### Win-Win actions:

- **Restore natural communities** to confer resistance to non-native invasives and tree pests and diseases by restoring disturbance regimes (e.g., fire), community structure (e.g., appropriate canopy closure), and increasing diversity of appropriate ground layer species.
- **Maximize** limited burn seasons by burning larger units and by preparing well in advance.
- **Promote** drought and frost-tolerant species and plant morphologies through prescribed burning.
- **Approach non-native invasives strategically**: Develop a plan by making maps and setting feasible objectives, prevent invasions by following BMPs, control new invasions as early as possible, slow their spread when control isn’t feasible, and conduct regular monitoring.

<table>
<thead>
<tr>
<th>Vulnerability to Climate Change</th>
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<tbody>
<tr>
<td>Oak Opening</td>
<td>Moderately Low</td>
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<tr>
<td>Oak Woodland</td>
<td>Moderate to Moderately High</td>
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<tr>
<td>Red Cedar Thicket</td>
<td>Moderately Low to Moderate</td>
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</tbody>
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For more information visit dnr.wi.gov and search keyword “natural communities”