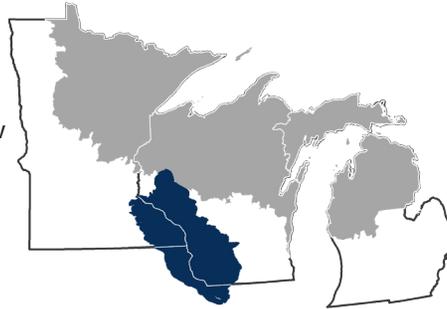# CLIMATE CHANGE PROJECTIONS FOR INDIVIDUAL TREE SPECIES
DRIFTLESS AREA (ECOLOGICAL SECTION 222L)

Midwestern forests will be affected by climate change during this century. Several reports describe the climate change risks to the region's forests and natural communities (WICCI 2017, Handler 2012). Foresters and researchers can use experience and information from past events to develop expectations about how future change might affect forests, but there are limits to what we can learn from the past. For example, future climate change may be beyond what has been experienced in recent centuries. Tools like computer models can help provide answers by testing scenarios that haven't been experienced before.

TREE SPECIES INFORMATION:
The "Tree Atlas" tool uses climate scenarios and current distribution information to project future habitat suitability for individual tree species (Landscape Change Research Group 2014). This page shows the most common tree species in this local area, organized into general categories of future expectations. Full results for all species for two climate scenarios can be compared side-by-side on page 2 to get a sense for the range of possible outcomes.

Remember that models are just tools, and they're not perfect. Models don't account for some factors that could be modified by climate change, like droughts, wildfire activity, and invasive species. If a species is rare or confined to a small area, Tree Atlas results may also be less reliable. These factors, and others, could cause a particular species to perform better or worse than a model projects. Human choices will also continue to influence forest distribution, especially for tree species that are projected to increase. Planting programs may assist the movement of future-adapted species, but this will depend on management decisions.

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 can be combined with information from published reports and local management expertise to draw conclusions about potential risk and change in the Driftless Area.

SPECIES	ADDITIONAL CONSIDERATIONS
LIKELY TO DECREASE	
Bigtooth aspen	Early-sucessional colonizer, but susceptible to drought
Eastern white pine	Good disperser, but susceptible to drought and insects
Northern pin oak	Tolerates drought and fire
Northern red oak	Susceptible to some insect pests and oak wilt
Paper birch	Early-sucessional colonizer, but susceptible to insects and drought
Quaking aspen	Early-sucessional colonizer, but susceptible to heat and drought
Red maple	Competitive colonizer tolerant of disturbance and diverse sites
Red pine	Susceptible to insect pests and diseases, and limited dispersal.
MAY DECREASE	
American basswood	Tolerates shade but susceptible to fire
Sugar maple	Grows across a variety of sites and tolerates shade
White oak	Fire-adapted and grows on a variety of sites
MIXED MODEL RESULTS	
Black cherry	Susceptible to insects and fire, tolerates some drought
Ironwood	Grows across a variety of sites and tolerates shade

SPECIES	ADDITIONAL CONSIDERATIONS
NO CHANGE	
Black oak	Tolerates drought, but susceptible to pests and diseases
Bur oak	Tolerates drought and fire
Slippery elm	Affected by Dutch elm disease, but tolerates shade
MAY INCREASE	
American elm	Affected by Dutch elm disease, grows across a variety of sites
Bitternut hickory	Tolerates some drought, but not shade
Black walnut	Doesn't tolerate drought or shade
Black willow	Susceptible to drought and fire
Boxelder	Tolerates drought, also disperses and establishes well
Eastern redcedar	Tolerates drought, but susceptible to fire and insect pests
Green ash	Emerald ash borer causes mortality
Hackberry	Tolerates drought, but susceptible to fire
Shagbark hickory	Susceptible to insects and fire
Silver maple	Good disperser and tolerates wet soils, but vulnerable to drought
White ash	Emerald ash borer causes mortality

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SPECIES	LOW CLIMATE CHANGE (PCM B1)	HIGH CLIMATE CHANGE (HAD A1FI)	ADAPT
American basswood	●	▼	·
American beech	▲	●	·
American elm	▲	●	·
American hornbeam	▼	●	·
Balsam poplar	★	★	·
Bigtooth aspen	▼	▼	·
Bitternut hickory	▲	●	+
Black ash	▼	▼	–
Black cherry	▲	▼	–
Black hickory		★	·
Black locust	▲	▲	·
Black maple	▼	▼	·
Black oak	●	●	·
Black walnut	▲	▲	·
Black willow	▲	▲	–
Blackjack oak		★	+
Boxelder	▲	▲	+
Bur oak	●	●	+
Butternut	▼	▼	–
Cedar elm		★	·
Chestnut oak	★	★	+
Chinkapin oak	★	★	·
Chokecherry	▲	●	·
Common persimmon	★	★	+
Eastern cottonwood	▲	▲	·
Eastern redbud	★	★	·
Eastern redcedar	▲	▲	·
Eastern white pine	▼	▼	·
Flowering dogwood	★	★	·
Green ash	●	▲	·
Hackberry	▲	▲	+
Honeylocust	▲	▲	+
Ironwood	▲	▼	+
Jack pine	▼	▼	·
Kentucky coffeetree		★	·

SPECIES	LOW CLIMATE CHANGE (PCM B1)	HIGH CLIMATE CHANGE (HAD A1FI)	ADAPT
Mockernut hickory	★	★	+
Northern catalpa		★	·
Northern pin oak	▼	▼	+
Northern red oak	▼	▼	+
Ohio buckeye	★	★	·
Osage-orange	▲	▲	+
Paper birch	▼	▼	·
Pawpaw	★	★	·
Peachleaf willow		★	·
Pecan		★	–
Pignut hickory	★	★	·
Pin oak	★	★	–
Post oak	★	★	+
Quaking aspen	▼	▼	·
Red maple	▼	▼	+
Red mulberry	▲	▲	·
Red pine	▼	▼	·
River birch	▲	▲	·
Sassafras	★	★	·
Shagbark hickory	▲	●	·
Shellbark hickory	★	★	·
Shingle oak	★	★	·
Silver maple	▲	▲	+
Slippery elm	●	●	·
Sugar maple	●	▼	+
Sugarberry		★	·
Swamp white oak	▲	▲	·
Sycamore	★	★	·
Tamarack	▼	▼	–
Water oak		★	·
Waterlocust		★	·
White ash	▲	▲	–
White oak	●	▼	+
Wild plum	▲	▲	·
Winged elm		★	·
Yellow-poplar	★	★	+

RESOURCES: Handler, S.D., et al., 2012. Climate change vulnerabilities within the forestry sector for the Midwestern United States. In: U.S. National Climate Assessment Midwest Technical Input Report. J. Winkler, J. Andresen, J. Hatfield, D. Bidwell, and D. Brown, coordinators. www.glisa.umich.edu/media/files/NCA/MTIT_Forestry.pdf

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