Caring for your trees & climate readiness

Peter Fritz

Washington County Master Gardener

Tree Squad Co-leader

Water your trees

First 2 weeks after planting, water every few days, or when the topsoil is dry.

After 3 weeks, thru the first season, water weekly, or when the topsoil is dry.

It is especially important in the fall, until the ground freezes.

For several years, water during dry spells.

Mulch your tree

- Keeps the roots cool and moist in the summer
- Protects tree roots from freezing in the winter
- Adds nutrients and organic matter to the soil
- Reduces competition with weeds
- Keeps weed whips and lawnmowers away from a tree's trunk.

Protect your trees

Use tree tubes, wrap or fencing to prevent animals from making a snack out of the bark on your trees through the winter

Planting a Newly Harvested Gravel Bed Tree

Blair Johnson, Washington County Master Gardener, 2024

Getting Started

Your tree has been harvested after 4 months in the Gravel Bed Tree Nursery (GBTN). The roots have been evaluated and detrimental roots have been trimmed. The roots were then dipped in a solution of Hydrogel and placed in a plastic bag to help maintain hydration during transportation to your planting site.

- It is best to plant your tree right after you pick it up from the GBTN. If that is not possible, store the tree in a cool shady place with the roots covered with wet burlap in a bag or large enough bucket to keep the roots moist.

Planting

The planting hole for a bare root tree is different than the hole for a container or a balled and burlapped tree.

- Bare root trees need more circumference but less depth than a potted or balled and burlapped tree, so the hole will be saucer shaped. Dig a hole to the proper depth (measure from the **Root Flare** to the bottom of the root system) and 2-3 times as wide as the root system. Remove any grass in the topsoil and break up any soil clumps larger than a small fist. Save the remaining soil for backfill.
- Place the tree in the hole and adjust the hole's diameter, shape and depth. Set a shovel handle across the hole to evaluate depth. The soil should come about 1" above the **Main Order Root**. Proper depth is critical for the root health and, in some cases, the survival of the tree.

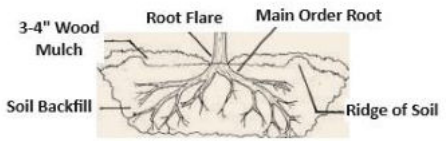


Fig. 1 Diagram of bare root tree planting hole.

Soil Backfill

Soil amendments should be minimal to encourage the roots to grow beyond the area of the backfilled soil.

- Adding fertilizer is generally **not** recommended and only organic slow-release fertilizer would be appropriate, if needed. Attention to correct planting depth and width will have the greatest impact on root growth and health.
- Avoid mixing compost or peat moss with the backfill soil. Do not include any grass or plant material from the removed soil. This material will deplete the availability of oxygen and nitrogen to the roots as those plants break down in the soil.
- Fill the hole and press the soil in place to have good root contact and eliminate any air pockets. Apply a couple of inches of soil each time, followed by pressing it into place around the roots. Make sure the trunk is straight and stable as you fill the hole. Apply water between layers to help settle the soil around the base. Gently raise and lower the tree during filling to help eliminate air pockets.
- Continue filling and pressing in the soil until it is 1" above the **Main Order Root**. A **Ridge of Soil** around the outer edge of the planting area can be used to help prevent water runoff over the root area.

Wood Mulch

- Use **wood mulch** on top of the soil in a donut pattern with no mulch within 3-4" of the trunk of the tree. Do not put plastic under the mulch for that will suffocate the roots.
- Apply 2-3" of mulch but no more than 4". Cover a 3-6' diameter area with the mulch (larger diameter with larger trees). An easy way to remember is 3x3x3 i.e. 3' diameter, 3" thick and 3" from trunk.

Water

- Apply 4-5 gallons of water after planting and continue watering 2-3 times a week depending on the type of soil and rain frequency.
- Trees should be watered as frequently as needed and monitored during the first 2-3 years except when the ground is frozen.
- Water bags can be used for the first 2-3 years to allow the water to slowly drip around the roots and prevent water loss due to rapid runoff. The bags are removed in the winter and replaced in the spring.

Staking

Most newly planted trees do not need staking and will do better without staking. Extended staking (more than the first year) will promote greater trunk growth without good root development, leading to less stability.

Young trees standing alone with their tops free to move will also develop stronger, more resilient trunks.

If the tree is unstable due to winds or is pushed over, then staking will be required and can be removed once the tree is established, usually after the first year.

A common problem with staking trees is the girdling effect the ties can have on the tree. Soft Nylon Webbing or Carpet Strips attached by grommets to a stake can reduce the damage. Wire is often too tight and will girdle the trunk which can kill the tree.

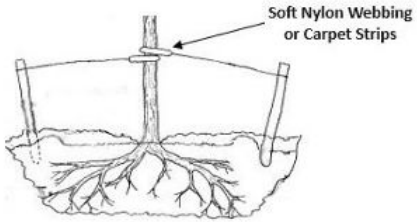


Fig 2. Image of proper tree staking, if needed.

Go to the

MN Department of Natural Resources

for more information on:

Tree Care

Pruning information

Tree diseases & pests

Trees and Shrubs for a Changing Climate

Power Point courtesy of

Gary Wyatt

Extension Educator, Agroforestry

wyatt@umn.edu

Additional Credits

- Tony Manzara – SMINC; for his vision and collaboration in the creation of the Washington County Premier of the Tree Trek with…
- Anna Barker and Kim Dupre – WCMG; working to develop new educational materials for the public with…
- Marge Sagstetter – MG Emeritus and creator of the Tree Squad…
- George Johnson – WCMG; who worked to obtain a grant from the MN DNR to remove buckthorn from the Sunfish Lake Preserve.

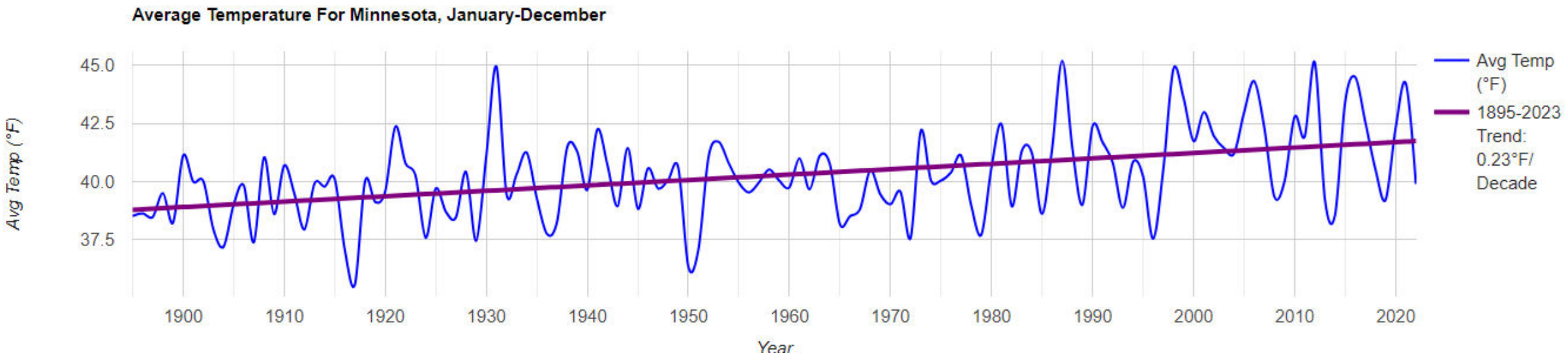
Outline

- **Climate change observations** in MN
- What to consider when **selecting trees and shrubs**?
- **Tree and shrubs that may do well** in a warming climate?
- DNR Native Yard Trees for Climate Change
- Slides of selected trees and shrubs

The climate change basis

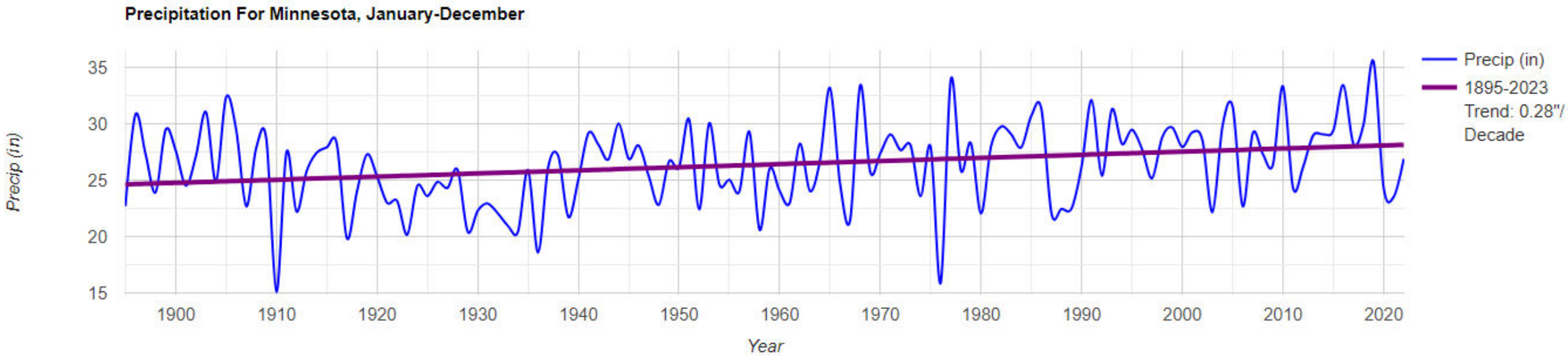
Minnesota climate history

Minnesota is getting **warmer**.



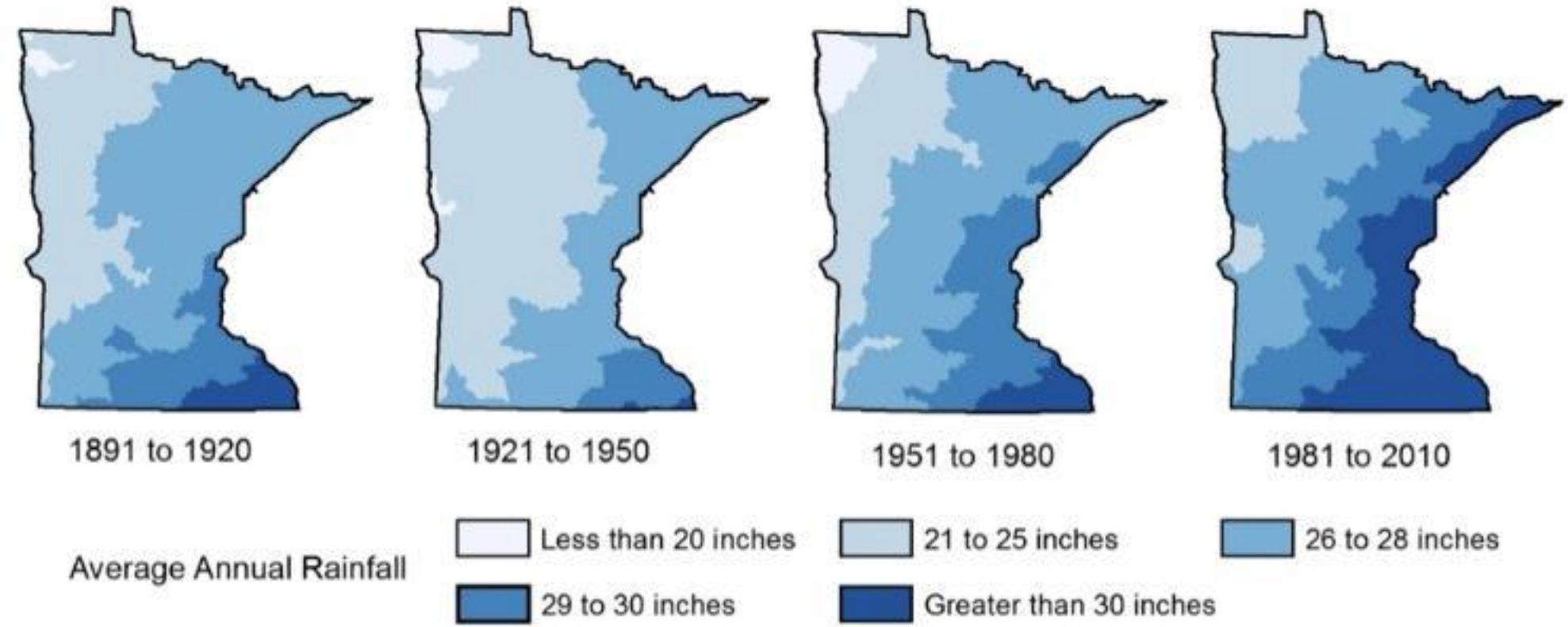
Credit: MN DNR 2023

Minnesota is getting **wetter**.



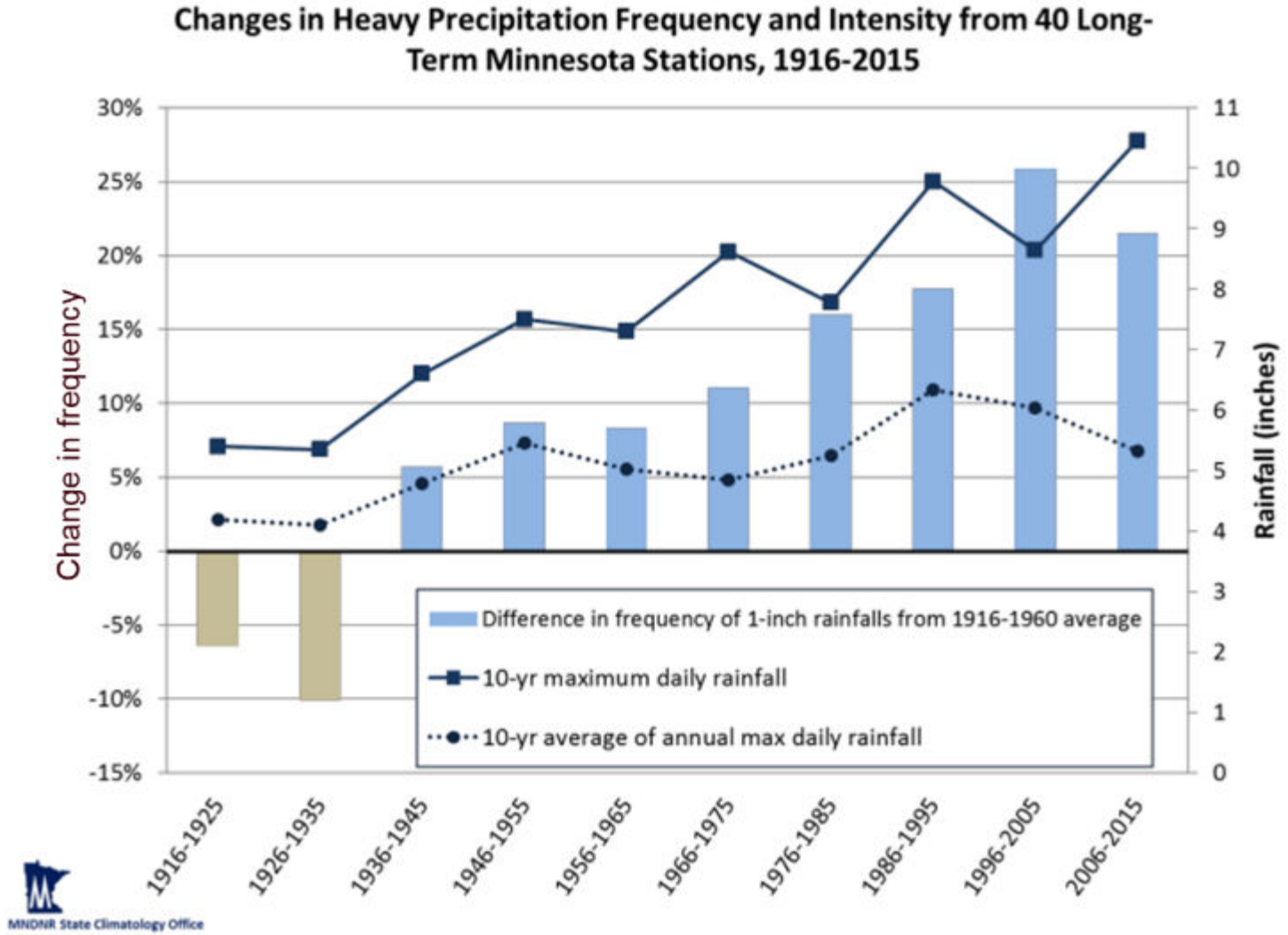
Credit: MN DNR 2023

Precipitation Change in Minnesota

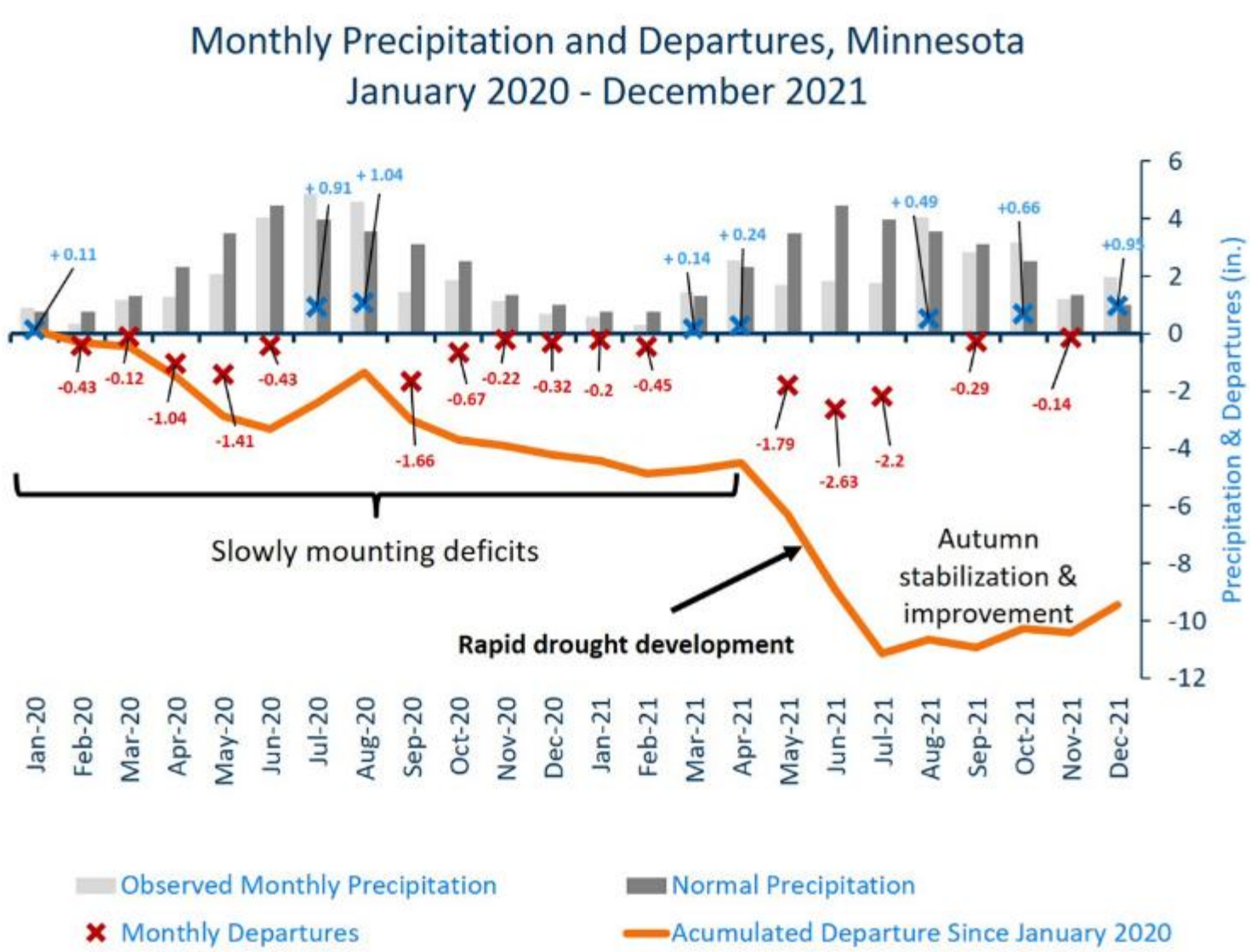


Adapted from Fields to Streams, University of Minnesota (2015) and Gupta, S.C., A.C. Kessler, and M.K. Brown (2014).
Based on data from MN DNR State Climatology Office

Large precipitation events are becoming more frequent.



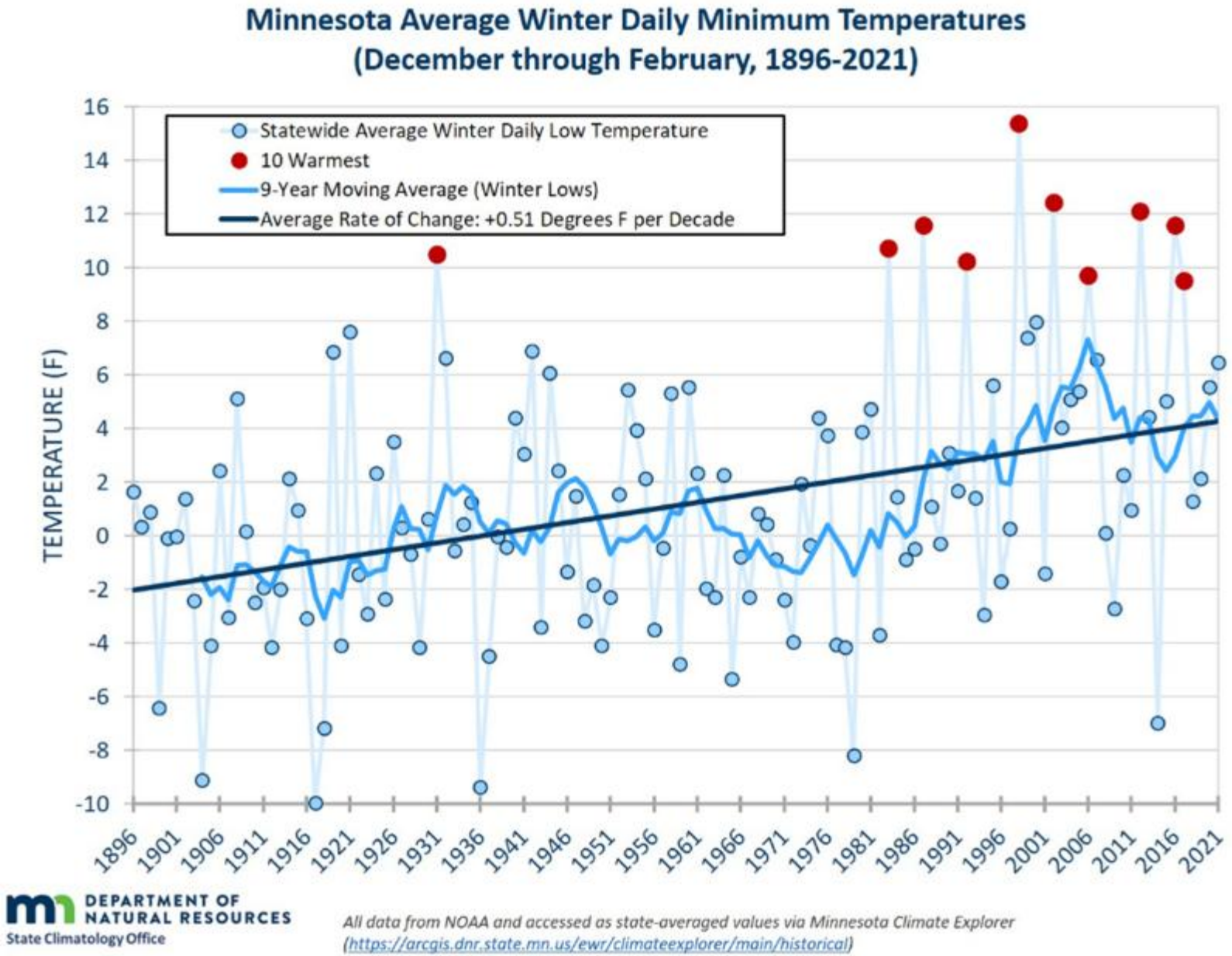
Minnesota is also experiencing **longer periods of drought**.



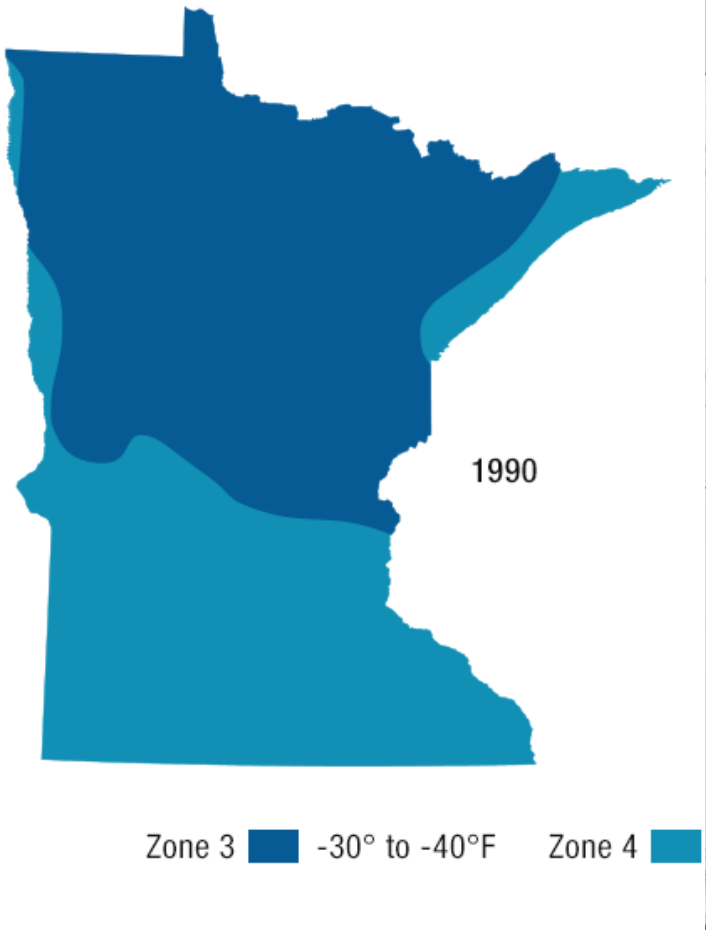
DEPARTMENT OF NATURAL RESOURCES
State Climatology Office

All data derived as state-averaged values by NOAA and served by Midwest Regional Climate Center via Cli-MATE retrieval tool (https://mrcc.purdue.edu/CLIMATE/welcome.jsp)

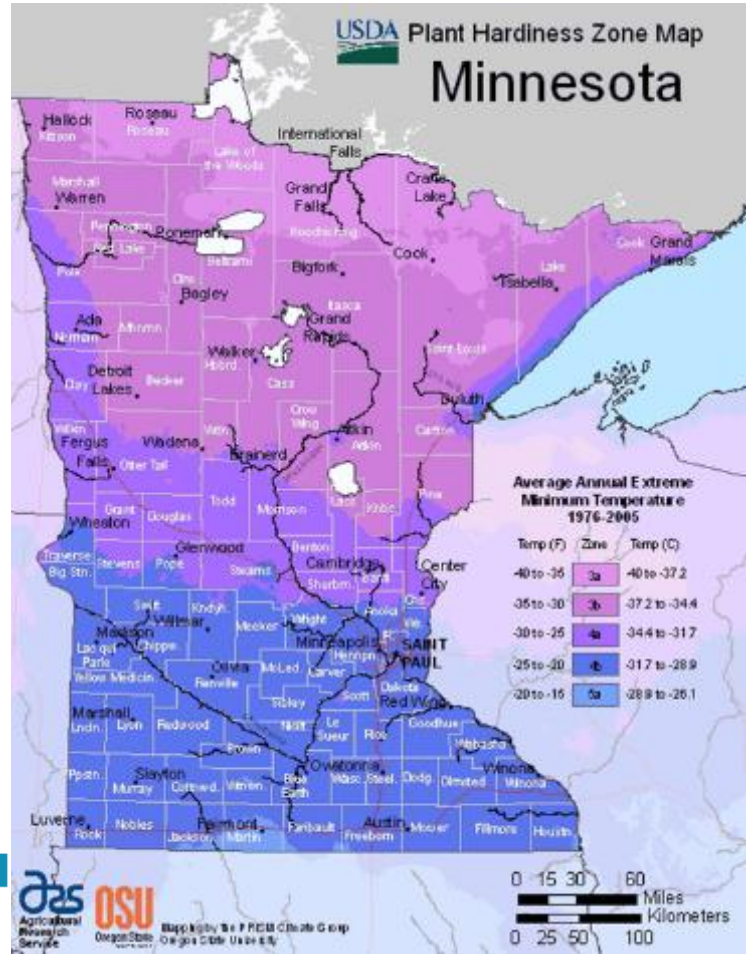
Our **winters** are getting **warmer**.



Hardiness zone changes in Minnesota



Source: U.S. Department of Agriculture



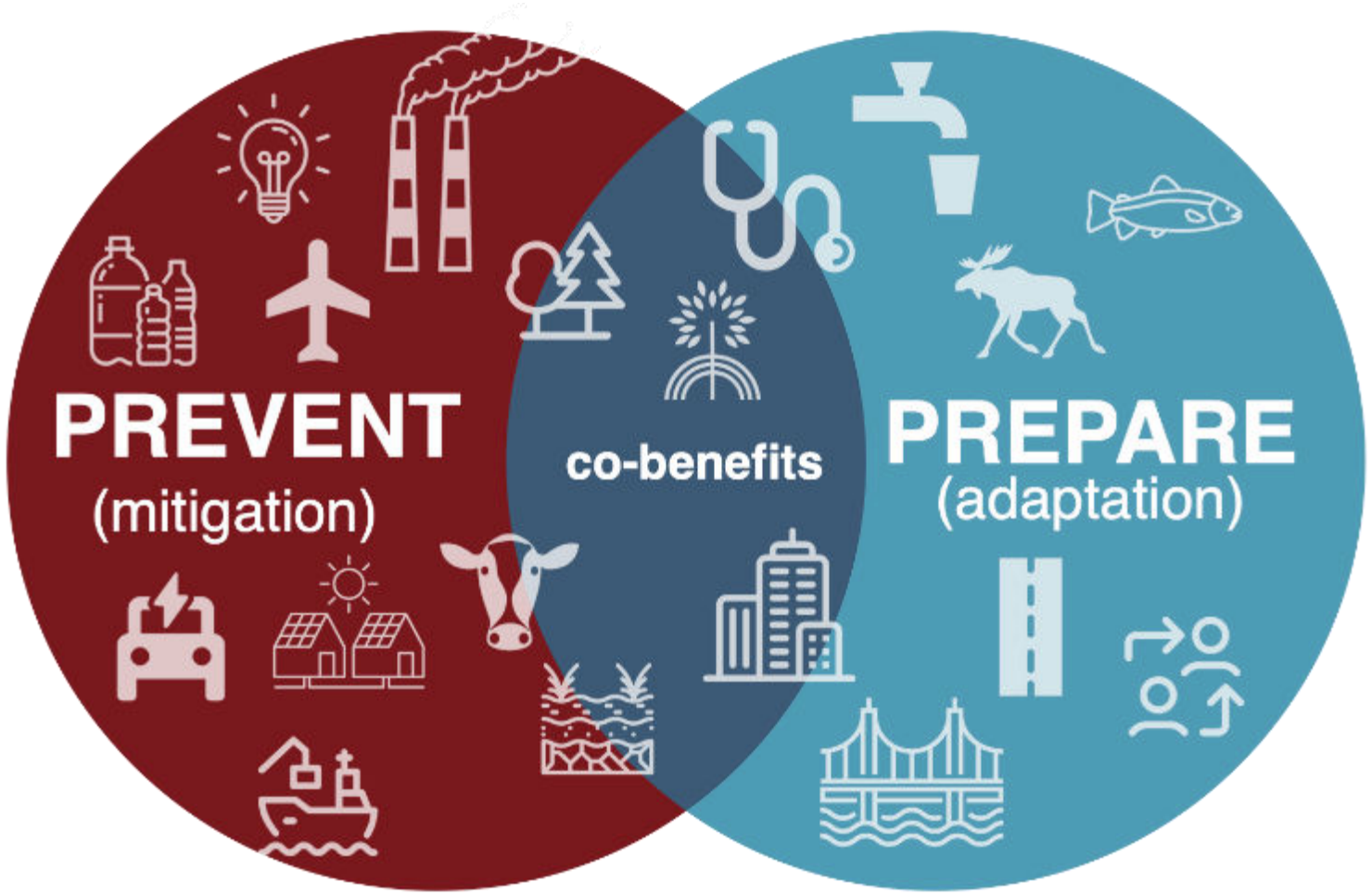
1990 2006 2023

Climate Change Risks to Minnesota's Forests

Example) Shifts in Minnesota's forested landscapes

Minnesota's north shore

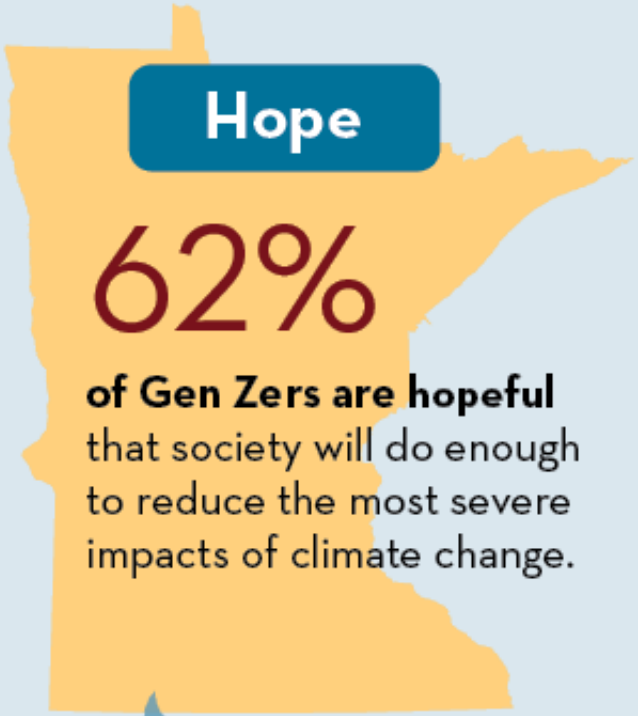
A Focus on Adaptation & Climate Risk Management



Adaptation comes in many forms and is needed across **human & natural systems**. We are responding to the **imperative to adapt** while we also seek to **mitigate** climate change.

Minnesotans concerned about climate change

Majority express hope for the future, desire for action



Concern

76%

of Minnesotans are **concerned about climate change**.

Hope

62%

of Gen Zers are hopeful that society will do enough to reduce the most severe impacts of climate change.

Action

64%

think we should prepare for climate change by **preserving and conserving** Minnesota's grasslands, forests, and wetlands.

insights
A CONSUMER PULSE SURVEY FROM CFANS

University of Minnesota | CFANS College of Food, Agricultural and Natural Resource Sciences

Source: CFANS, MCAP and Big Village Geo CARAVAN® omnibus survey, September 2022

We need to use our forests to mitigate climate change, but we also need to adapt our forests.

Climate adaptation spectrum

Adaptation strategies

RESISTANCE

- Maintain relatively unchanged conditions

RESILIENCE

- Accommodate some degree of change

TRANSITION

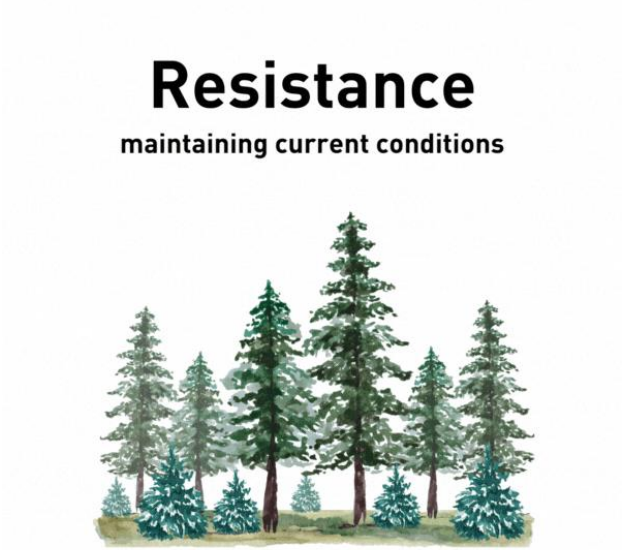
- Intentionally facilitate change

Reduce impacts/maintain current conditions → **Forward-looking/promote change**

Swanston et al. 2016; Nagel et al. 2017; Millar et al. 2007

Resistance

- **Goal**: improve defenses of an ecosystem against anticipated changes
- **Desired future condition**: relatively unchanged
- Risk over time:

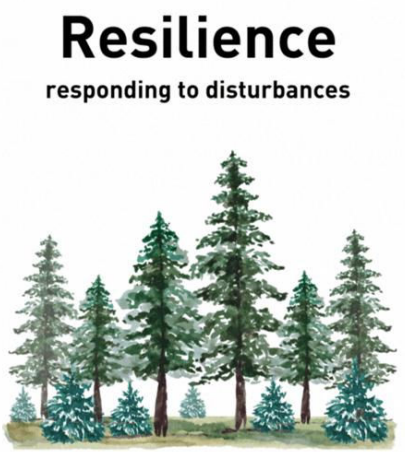


Graphic by: Emily Dombeck, UMN Extension

Source: Swanston, Christopher W.; Janowiak, Maria K.; Brandt, Leslie A.; Butler, Patricia R.; Handler, Stephen D.; Shannon, P. Danielle; Derby Lewis, Abigail; Hall, Kimberly; Fahey, Robert T.; Scott, Lydia; Kerber, Angela; Miesbauer, Jason W.; Darling, Lindsay; Parker, Linda; St. Pierre, Matt. 2016. Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd ed. Gen. Tech. Rep. NRS-GTR-87-2. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 161 p. https://doi.org/10.2737/NRS-GTR-87-2

Resilience

- **Goal**: promote better “bounce back” within an ecosystem after disturbances and tolerate changing conditions
- **Desired future condition**: accommodate some small degree of change
- Risk across time:



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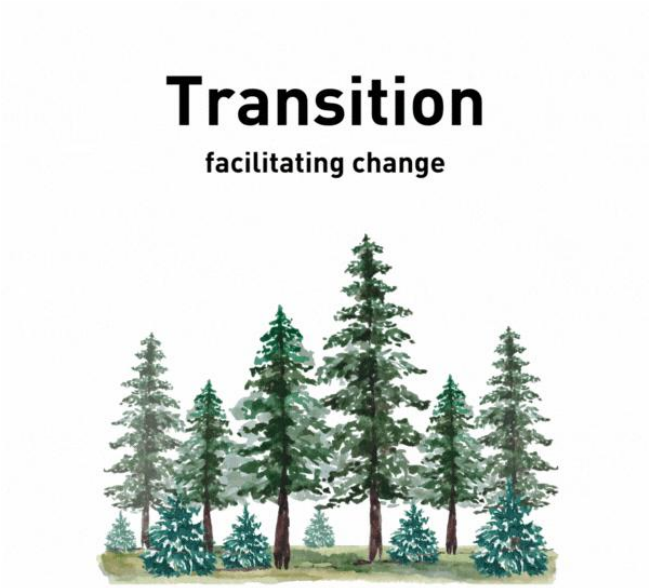
Transition

- **Goal**: intentionally anticipate and facilitate change
- **Desired future condition**: different than current conditions
- Risk across time:



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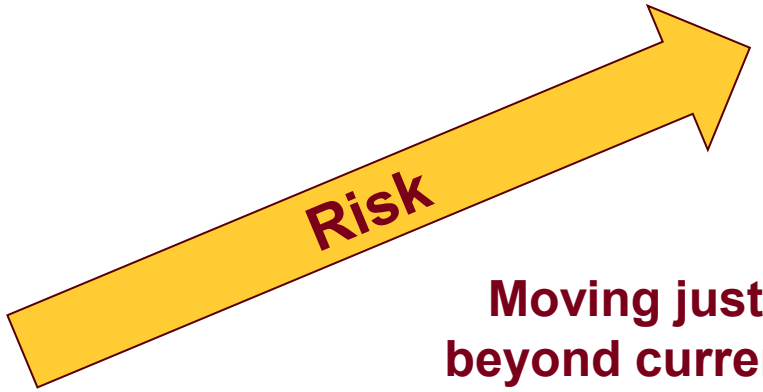
Assisted migration

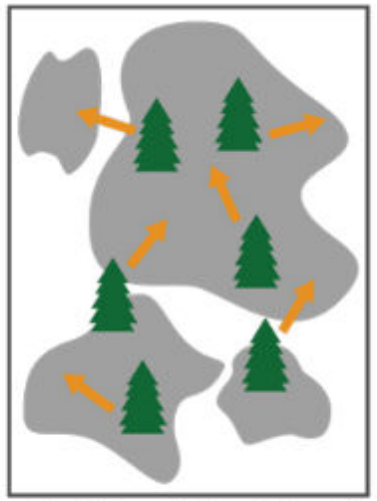
Definition: the human-assisted movement of species in response to climate change



Moving beyond locations accessible by natural dispersal

Moving just beyond current range

Moving between seed zones



Assisted Population Migration

Source: Handler, S.; Pike, C.; St. Clair, B.; 2018. Assisted Migration. USDA Forest Service Climate Change Resource Center. https://www.fs.usda.gov/ccrc/topics/assisted-migration

Risk and uncertainty

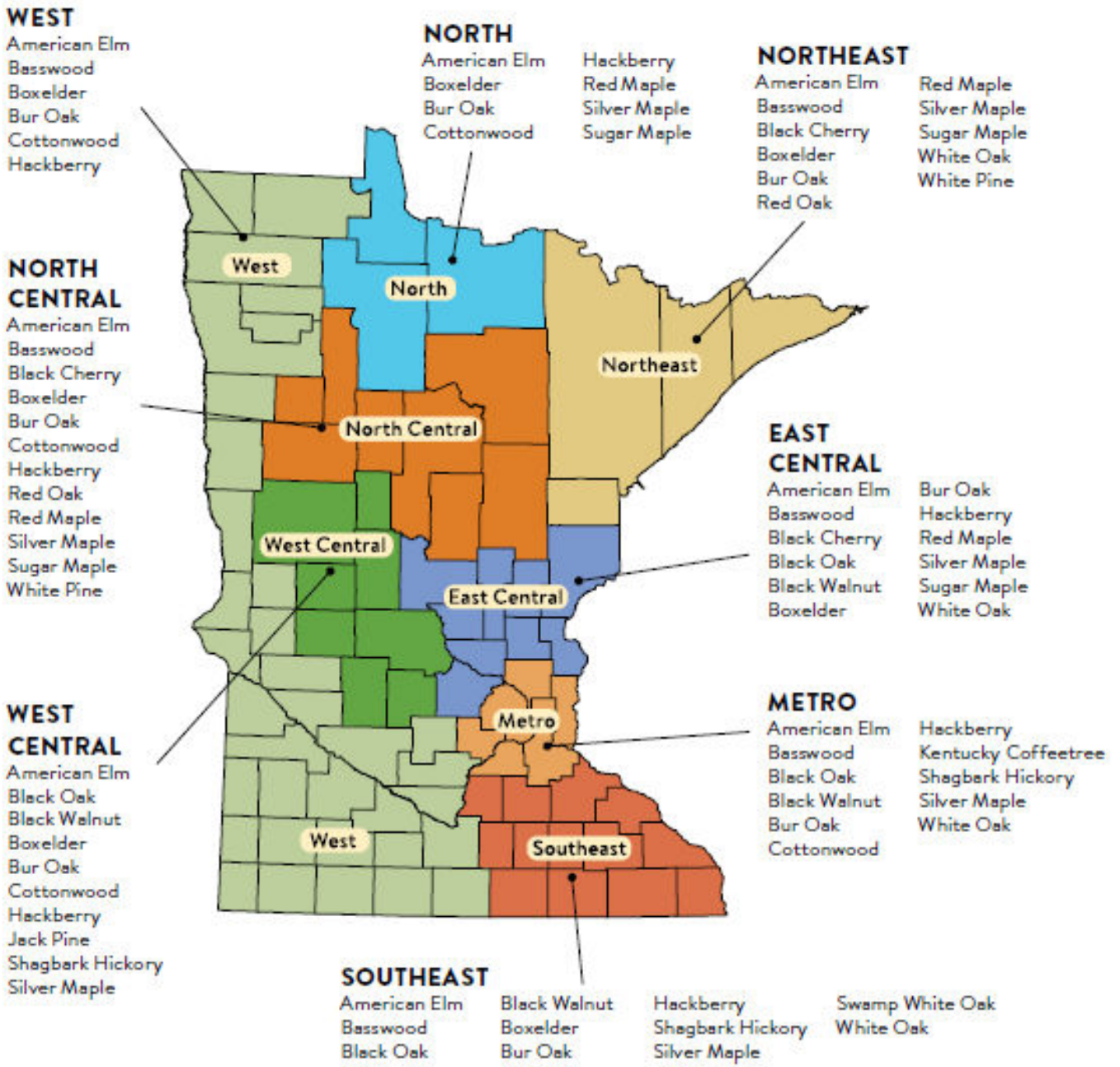
- Forests are **complex** and **dynamic** ecosystems
- Changes in **disturbance** regimes
- Species performance and survival is **site-specific**

“How do I know that the trees I plant will actually survive with climate change?”

Image credit: Joseph OBrien, USDA Forest Service, Bugwood.org

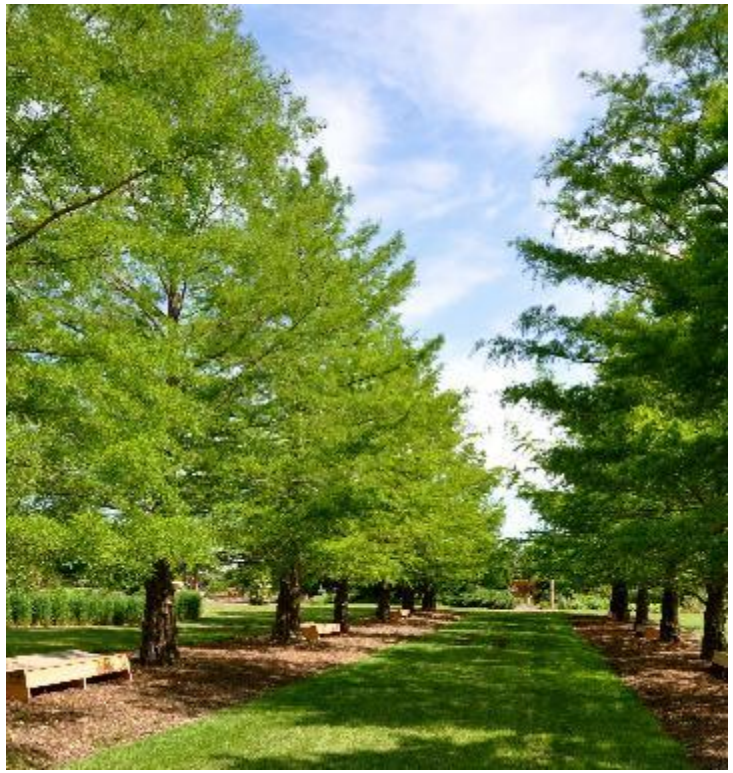
- Best Native Yard Trees for our Changing Climate (DNR)

- https://www.dnr.state.mn.us/treecare/best-native-yard-trees.html



Plant what you like or are interested in…

- As long as a tree or shrub is NOT on the Noxious Weed List or an Invasive Species, try it.



Bald Cypress

Sycamore

Statewide Trees

(Deciduous Trees – Leaf)

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EXTENSION
Driven to Discover℠

American Elm - DED Resistant Elms:

Princeton

- St. Croix
- Accolade
- Cathedral
- Discovery
- Princeton
- American Liberty
- Valley Forge

www.tree.umn.edu

Bur Oak (Quercus macropcarpa)

Height: 50+ feet

Spread:50+ feet

Growth: slow

USDA Zone: 2-8

Root Type: tap

Redmond Linden (Tilia americana)

Basswood

Height: 40+ feet

Spread: 20+ feet

Growth Rate: moderate

USDA Zone: 4-7

Root Type: fibrous deep

Silver Maple (Acer saccharinum)

Height: 60+ feet

Spread: 35+ feet

Growth: fast

USDA Zone: 3-9

Root Type: fibrous

Southern Trees

(Deciduous Trees – Leaf)

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EXTENSION
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Kentucky coffeetree: (Gymnocladus dioicus)

Height: 50+ feet

Spread: 40+ feet

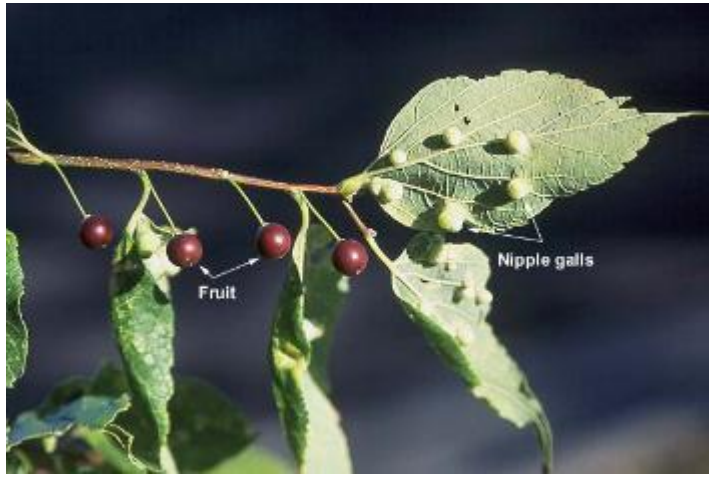
Growth: slow, moderate

USDA Zone: 3-8

Root Type: fibrous

(Stately Manor is poddless)

Common Hackberry (Celtis occidentalis)



Height: 40+ feet

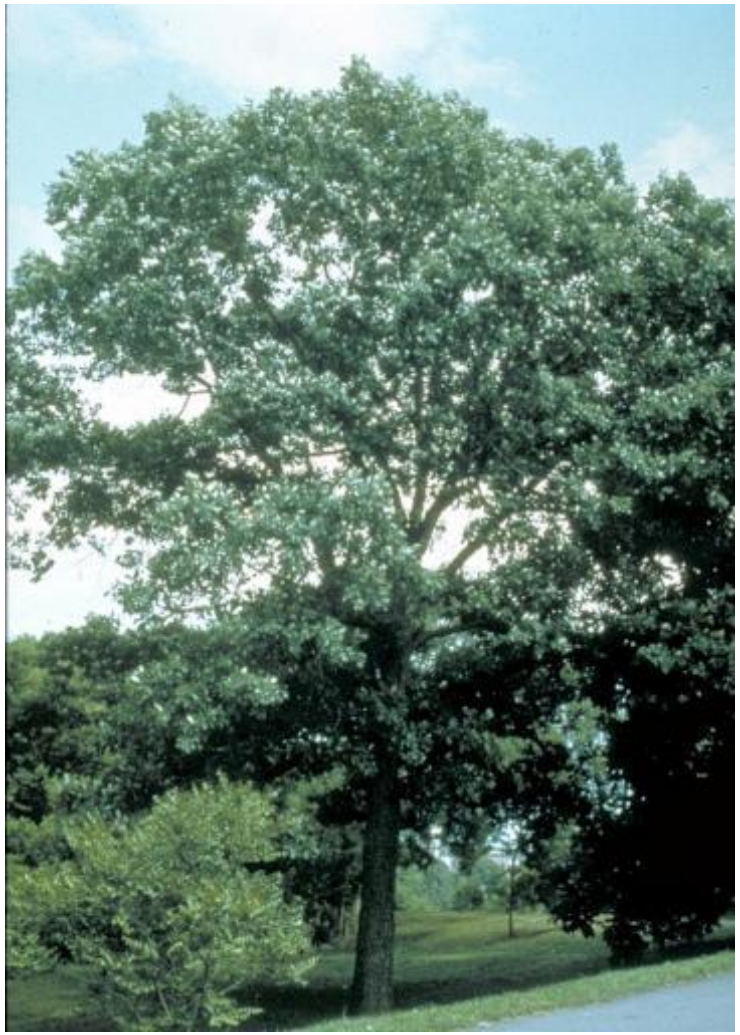
Spread: 30+ feet

Growth Rate: fast

USDA Zone: 3-9

Root Type: fibrous deep

Swamp White Oak (Quercus bicolor)



Height: 35 – 70 feet

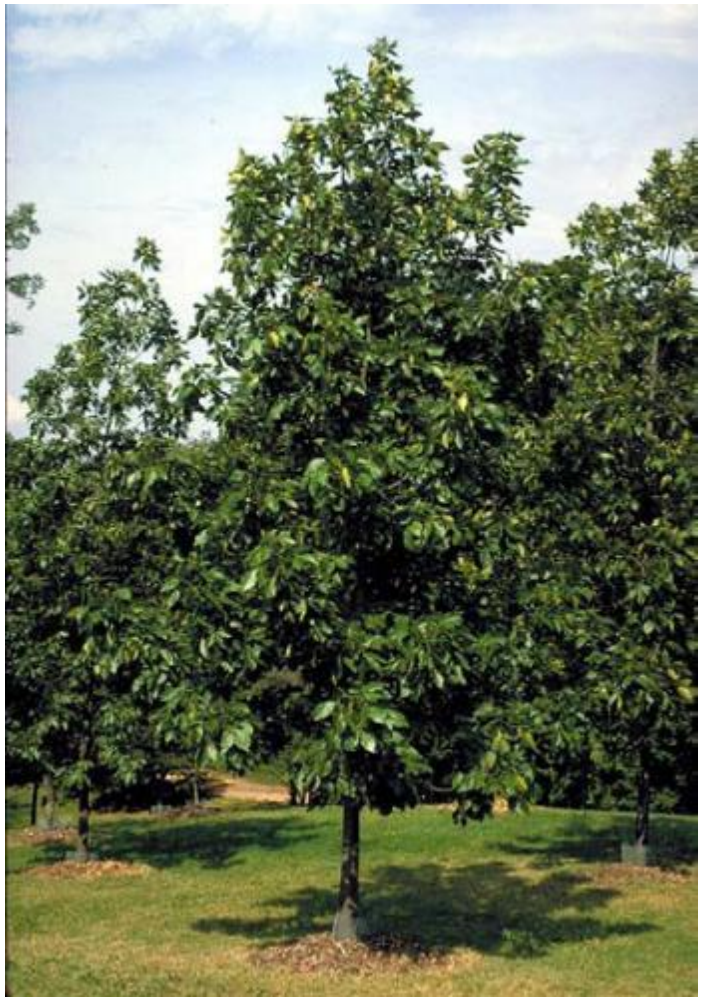
Spread: 25 – 50 feet

Growth: Medium

USDA Zone: 4 - 8

Root Type: Deep Lateral

Shagbark Hickory (Carya ovata)



Height: 60+ feet

Spread: 20+ feet

Growth Rate: slow

USDA Zone: 4-8

Root Type: tap

Black Walnut (Juglans nigra)

Height: 70-100 Feet

Spread: 75-100 Feet

Growth: Fast

USDA Zone: 4-8

Root Type: tap

Common Honeylocust (Gleditsia triancanthos)

Height: 40+ feet

Spread: 40+ feet

Growth Rate: fast

USDA Zone: 4-7

Root Type: fibrous deep

Shrubs

UNIVERSITY OF MINNESOTA
EXTENSION
Driven to Discover℠

American Hazelnut (Corylus americana)

Height: 6 – 12 feet

Spread: 6 – 12 feet

Growth: Medium

USDA Zone: 3 - 9

Root Type: Deep Fibrous

Black Chokeberry (Aronia melanocarpa)

Height: 12 feet

Spread: 7 feet

Growth: moderate

USDA Zone: 2 - 5

Root Type: fibrous shallow

Serviceberry/Juneberry/Saskatoon

(amelanchier… *many*) (shrub & tree types)

Height: 15+ feet

Spread: 10+ feet

Growth: moderate

USDA Zone: 2-4a

Root Type: fibrous shallow

Honeyberry (Lonicera caerulea)

Height: 3 - 8 feet

Spread: 3 - 4 feet

Growth: moderate

USDA Zone: 3 - 8

Root Type: fibrous shallow

Other Trees to Consider?

Ginkgo – Ginkgo biloba

Height: 50-60 feet
Spread: 30-40 feet
Growth: Slow
USDA Zone: 4-8
Root Type: fibrous deep

Northern Catalpa (Catalpa speciosa)

Height:	40+ feet
Spread:	20+ feet
Growth:	Fast
USDA Zone:	4-8
Root Type:	tap

Kentucky Coffee Tree: Stately Manor

- 50’ x 40’
- Male, no seed pods
- Tolerates many soils
- Bark adds winter interest

Buckeye: Autumn Spender

- 35’ in height
- Cluster of yellow flowers, shiny, nut fruit
- Resists leaf scorch diseases
- Brilliant maroon fall color

InnovaTree™ Hybrid Poplar

- Developed at the Natural Resources Research Institute, UMD
- Cottonless male variety
- 50 feet tall in 10 years!
- Available for sale this summer:

InnovaTree leaves

6-year-old InnovaTree plantation

Natural Resources Research Institute
University of Minnesota Duluth
Driven to Discover

University of Minnesota | Extension

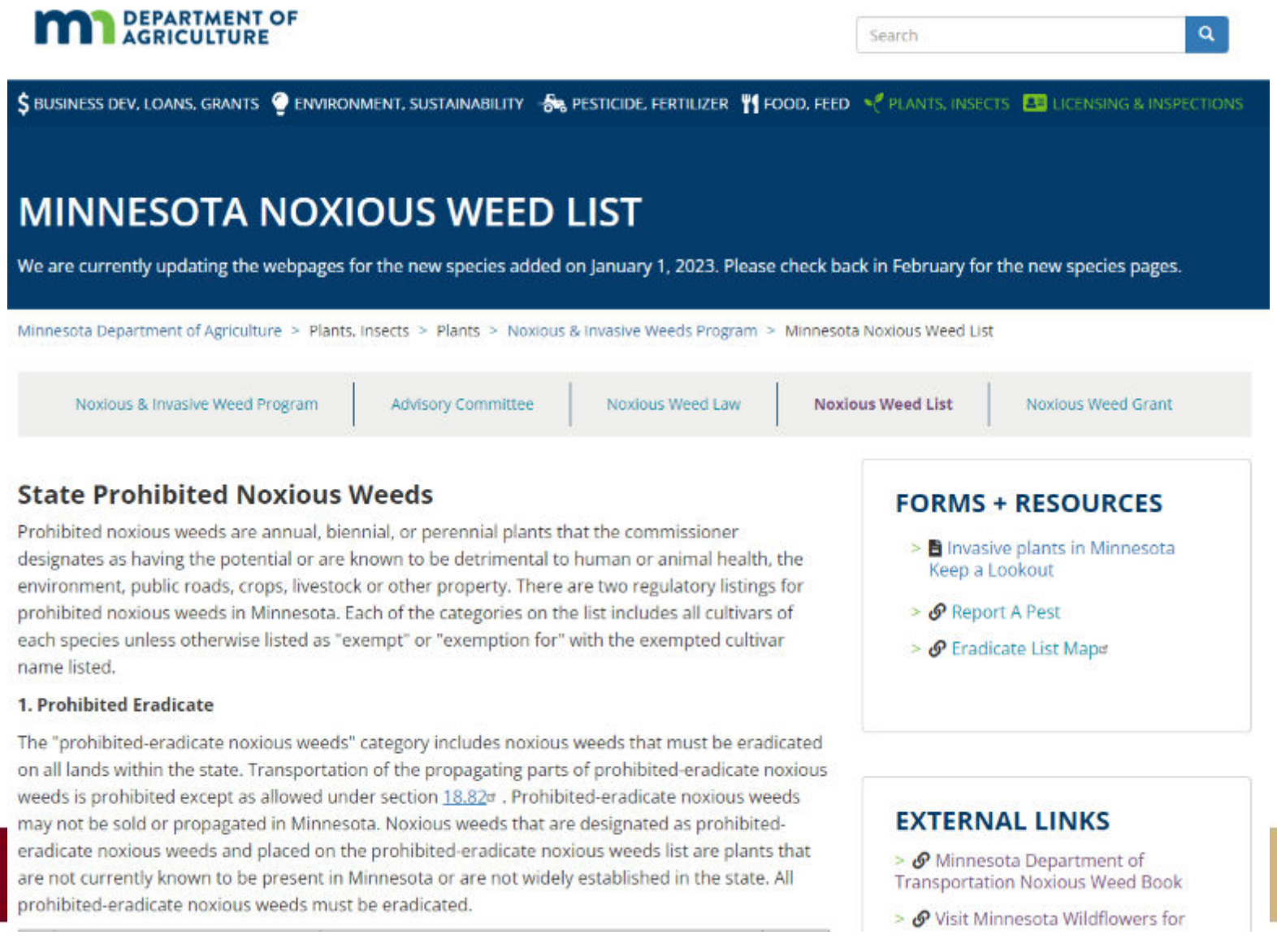
Pests Affecting Trees...

- Plant trees that have minimal pests:

Prune trees up to 15 years old...

- Plant the right tree in the right site...

www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list



Key takeaways

- Minnesota's climate is getting **warmer, wetter, and experiencing changes in extremes**.
- A **diverse** ecosystem is a **resilient** ecosystem.
  - (Plant different species of trees and shrub)

Get involved with participatory science!

https://z.umn.edu/ParSciTIPS

Image credit: eastern redbud: Paul Wray, Iowa State University, Bugwood.org, flowering dogwood Chris Evans, University of Illinois, Bugwood.org

County Resources for Tree Plantings

- Soil and Water Conservation District
- Natural Resources Conservation Service
- County Extension Office

University of Minnesota Extension

USDA NRCS

United States Department of Agriculture

Natural Resources Conservation Service

Thank You!

Questions?