

Climate Change and Terrestrial Invasive Species



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Outline

- Concerns regarding terrestrial invasive species and climate change
- Example 1: Policy
 - Tree of heaven and porcelain berry
- Example 2: Management
 - Oriental bittersweet
- General actions for terrestrial invasive species

Climate Change Concerns

- Increased temperatures can allow species that previous couldn't do well in Minnesota to survive here
 - Plant hardiness zones have been changing
 - Insect populations not knocked back as much over the winter
- Vines are predicted to do well under high CO₂
- Longer growing seasons
 - Management actions may no longer be as effective

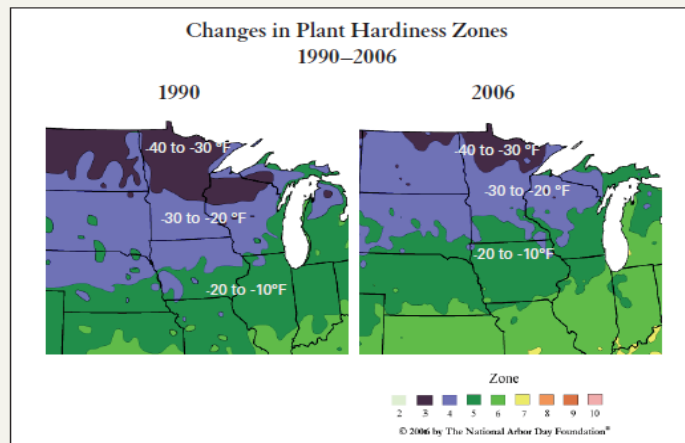


Fig. 3-2. Changes in plant hardiness zones in the Upper Midwest, 1990–2006. Zones defined by average minimum temperatures have shifted north. Note that a new hardiness zone (5) entered Minnesota by 2006 while Zone 3 retreated northward. Source: National Arbor Day Foundation.

Climate Change Concerns - Continued

- Assisted migration may introduce new species
- Loss of native species may open niches for invasive species
- Invasive species and their biocontrol may have different ranges or move at different rates
- MN DNR Operational Order 131 instructs DNR staff to consider climate change in our planning efforts

Approved by:
/s/ Tom Landwehr, Commissioner
Minnesota Department of Natural Resources

Date: 12 November 2014



Minnesota Department of Natural Resources

Climate Adaptation and Mitigation in Natural Resource Management

Operational Order..... 131

Example 1: Policy

- The Noxious Weeds Advisory Committee (NWAC) advises the MN Department of Agriculture on listing of noxious weeds
 - Prohibited Noxious Weed – Eradicate List
 - Highest concern, no widely spread in state, high impacts
 - Prohibited Noxious Weed – Control List
 - Land owners must prevent seed set
 - Restricted Noxious Weed
 - Sale and purposeful movement of plants not allowed
 - Control not required
 - Specially Regulated
 - Special cases, often involve economically important plants

Case study

- NWAC uses a risk assessment to evaluate species
 - Pressure to not let lists get “too” long
- Tree of heaven
 - Well known invasive species in the eastern US
 - 1 known tree in Minnesota
 - Currently legal to sell
 - Marginally hardy
- Porcelain berry
 - invasive species in the eastern US, Wisconsin seeing problems
 - Few known occurrences in Minnesota, all where planted
 - Currently legal to sell
 - Marginally hardy
- What would you recommend?



Tree of Heaven Risk Assessment Recommendation

- Unlikely that this species can *currently* grow well enough in MN for it to be very aggressive.
- Nationwide distribution is on the edge of plant hardiness zone 4, and it is likely to become able to thrive and spread in MN *as the climate warms*.
- Primary concern:
 - Species becomes widely planted for horticultural purposes
 - Leads to a much more widespread problem when it does become invasive in MN
- Recommendation: Restricting the sale and movement of the species now will help prevent future problems.

Porcelain berry Risk Assessment Recommendation

- Eradicate List:
 - species not yet documented as escaped from plantings in Minnesota
 - individual plants and populations can be controlled by hand pulling and systemic herbicides
- OR
- Restricted:
 - No documentation that porcelain berry has the ability to reproduce by seed in Minnesota
 - Since not yet naturalized in Minnesota, restrict sale to prevent to prevent new locations

NWAC Vote

- NWAC voted on whether or not to recommend listing tree of heaven and porcelain berry as restricted noxious weeds
 - Key reason for listing was threat of potential increased impacts due to climate change
 - Motion passed: will be recommended to MDA commissioner for listing starting in 2017
 - Several NWAC members voted against listing the species since the listing was due to future impacts as predicted by climate change not impacts seen in Minnesota today
 - The members wanted to wait to see what would happen and weren't convinced that climate change would happen and/or have the predicted effects on these species
 - Future: species reviewed every 3 years

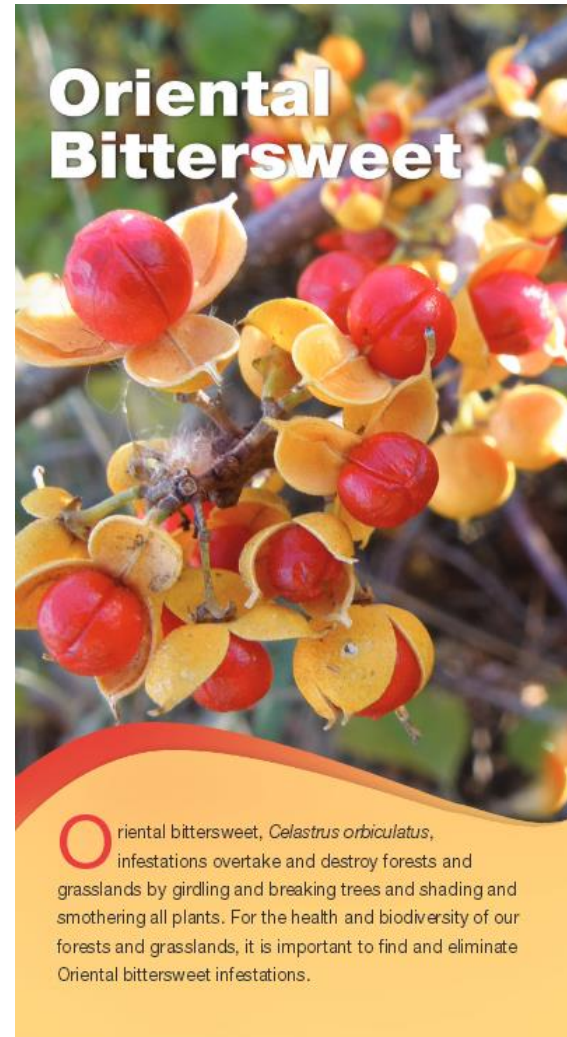
Example 2: Management

- Oriental bittersweet
 - Prohibited invasive species on the Eradicate List
 - Known problem in other states
 - Early stages of invasion in MN
 - Vines predicted to do well in future conditions



Oriental Bittersweet Actions

- Identified the species as high priority
- Encourage Oriental bittersweet outreach, mapping, and follow-up management
- Early detection and rapid response program funded by the Environmental and Natural Resources Trust Fund to the MN Department of Agriculture, U of MN Extension, and Conservation Corps



General Actions – Invasive Species and Climate Change

- Prevention
- Early Detection and Rapid Response
- Management
- Research
- Outreach

General Actions - Prevention

- Continue to emphasize the prevention of the introduction of new invasive species to Minnesota.
- Take climate change into account in risk assessments and regulations.
- Prevent introduction of invasive species planted for biofuels.
- When assisted migration is proposed to introduce new species to Minnesota, perform a risk assessment to determine response.
 - Decisions are likely to be species specific.

Prevention - continued

- Identify species that are poised to expand under climate change.
 - Widely planted ornamental species that are not currently in their primary climate zone that may expand under warmer temperatures.
 - New horticultural species not previously planted in Minnesota.
 - Southern US species planted in Minnesota may be able to expand.
 - If their natural enemies are not present in Minnesota, species may become invasive.
 - Terrestrial animals of potential concern:
 - feral hogs, nutria, pine bark beetles
 - Diseases that may become an outbreak when native species are stressed.
 - Prevent the introduction of Asian longhorn beetles as they have strong impacts on maples. Maples are likely to be more dominant with climate change and post-emerald ash borer.

General Actions - EDRR

- **Early Detection and Rapid Response**
 - Know what to look for
 - Continue to emphasize early detection and rapid response on a site level.

Keep a Lookout for New Invasive Plants in Minnesota

These species could be spreading in your area. Early detection and eradication can prevent an invasion.

• Positive Report



Russian Knapweed



Oriental Bittersweet



Brown Knapweed



Yellow Starthistle



Meadow Knapweed



Diffuse Knapweed



General Actions - Management

- Use adaptive management to promote native species and associated disturbance regimes.
 - Continue to monitor management results. If climate change affects management practices (such as causing some practices become less effective), then adjust practices.
 - Invasive species may have longer growing seasons. Management practices may need to be applied more frequently (for example, mowing more frequently).
- Determine if certain invasive species management projects are higher priority to fund due to climate change.

Management - continued

- If native species are lost due to climate change, use ecosystem function and service frameworks to determine if certain invasive species are filling important empty niches. If so, then adjust management goals accordingly.
- If biocontrol species change their range, adjust management accordingly.
- Develop forward looking goals – what is the goal community for a site recognizing that it may not be the same as it was in the past?

General Actions - Research

- Identify climate change and invasive species questions that need to be answered and propose those research projects.
 - The University of Minnesota Invasive Terrestrial Plants and Pest Center can be a key partner
- Look for ways to contribute data to national networks studying impacts of invasive species and/or climate change.

General Actions - Outreach

- Communicate with the public the steps that we and they can take to address terrestrial invasive species in the face of climate change.



**STOP INVASIVE SPECIES
IN YOUR TRACKS.**

PlayCleanGo.org

Summary

- Invasive species that previously couldn't survive in Minnesota may survive and thrive in the future.
- Invasive species here now may experience range expansion or have amplified impacts.
- Current management techniques may become less effective
- Loss of native species may provide more habitat for invasive species.
- **We have opportunities to adapt our policies and actions to minimize impacts of invasive species due to climate change**

Questions and Comments

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