PLANTING WITH PURPOSE

Lessons from Vermont's New Guidelines for ANR Lands

Presented by: Danielle Owczarski, VT FWD State Lands Ecologist

WHY PLANTING DECISIONS MATTER

NATURE AND BIODIVERSITY

Invasive species cost the world $423 billion every year

Sep 11, 2023

- Invasive species threaten food security and exacerbate environmental catastrophes across the world.
- They play a key role in 60% of recorded plant and animal extinctions.
- The climate crisis will only amplify the threat of invasive species, according to scientists.
- Prevention measures through border biosecurity and import controls are the most effective way to stop the spread.

Source: World Economic Forum

Water Hyacinth (*Eichhornia crassipes*)

This South American native is one of the worst aquatic weeds in the world. Its beautiful, large purple and violet flowers make it a popular ornamental plant for ponds. It is now found in more than 50 countries on five continents. Water hyacinth is a very fast growing plant, with populations known to double in as little as 12 days. Infestations of this weed block waterways, limiting boat traffic, swimming and fishing. Water hyacinth also prevents sunlight and oxygen from reaching the water column and submerged plants. Its shading and crowding of native aquatic plants dramatically reduces biological diversity in aquatic ecosystems.

Photo: Aquarius Systems, North Prairie, Wisconsin, USA

Water hyacinth on LakeVictoria

Source: https://www.iucngisd.org/gisd/100_worst.php

Pretty, But Invasive

Purple Loosestrife Takes Over Wetlands

AUGUST 27, 2015

BY MARYA MERRIAM

purple loosestrife. (Wiki- Media Commons / s)

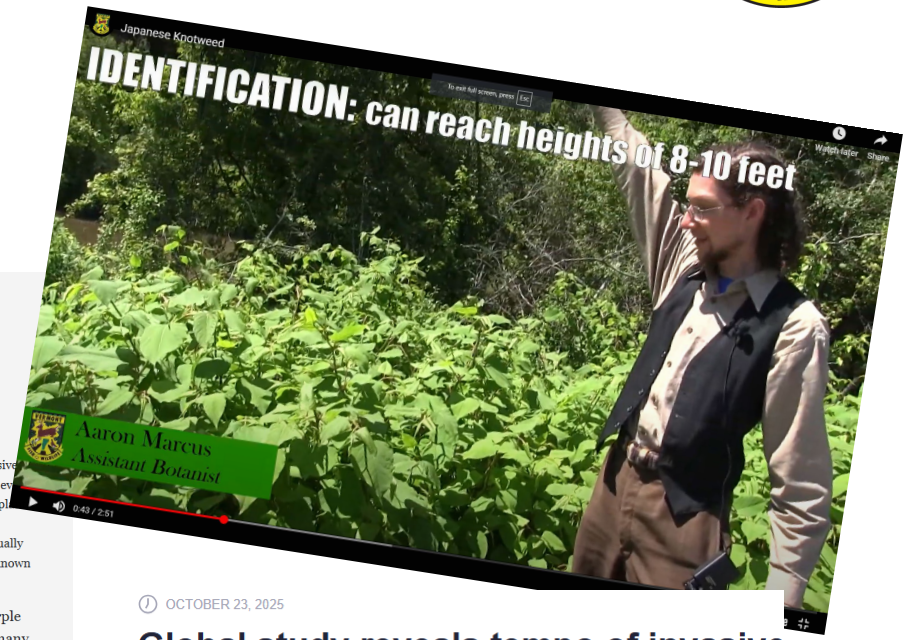
Many people have heard about invasive plants like chervil and wild parsnip, ev if they haven't mowed or pulled the pl themselves. Lesser known is purple loosestrife, although this plant is equally ecologically damaging as its better-known peers.

The tall, flowered stalks of purple loosestrife can be seen along many roadways in Vermont, but its real damage is found in wetlands.

The plant both grows and decomposes faster than native cattails and wetland grasses. Its rapid growth means it displaces these native species, replacing native animals' food sources.

Purple loosestrife can extend its growth into the shallow water where fish spawn, destroying the

Source: https://www.ourherald.com/articles/pretty-but-invasive/



OCTOBER 23, 2025

Global study reveals tempo of invasive species' impacts

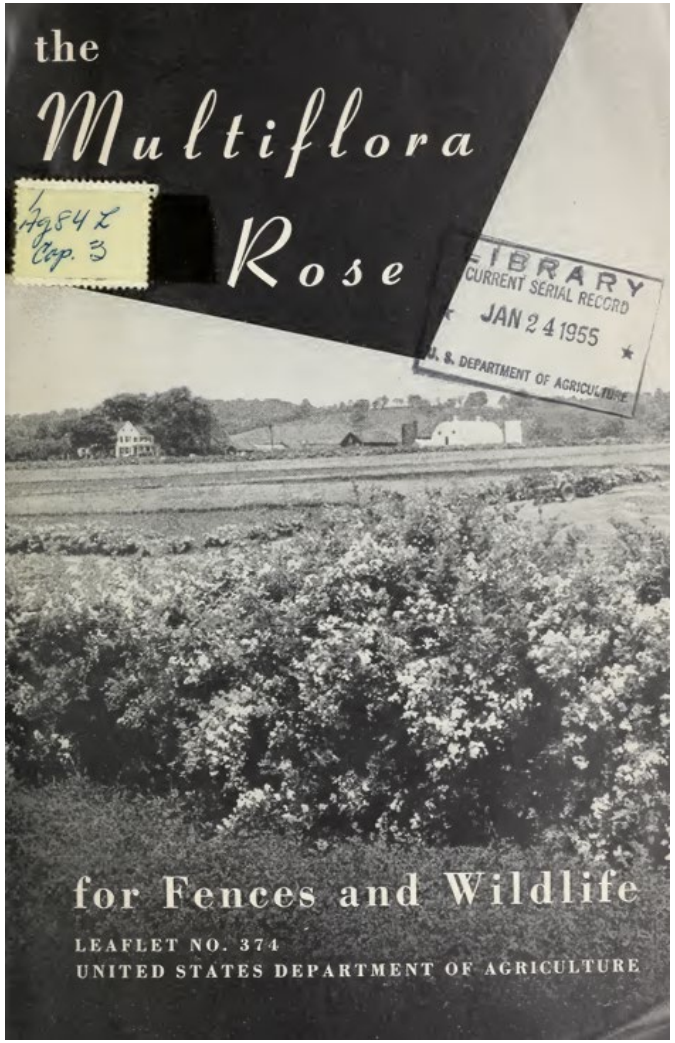
by University of Bern

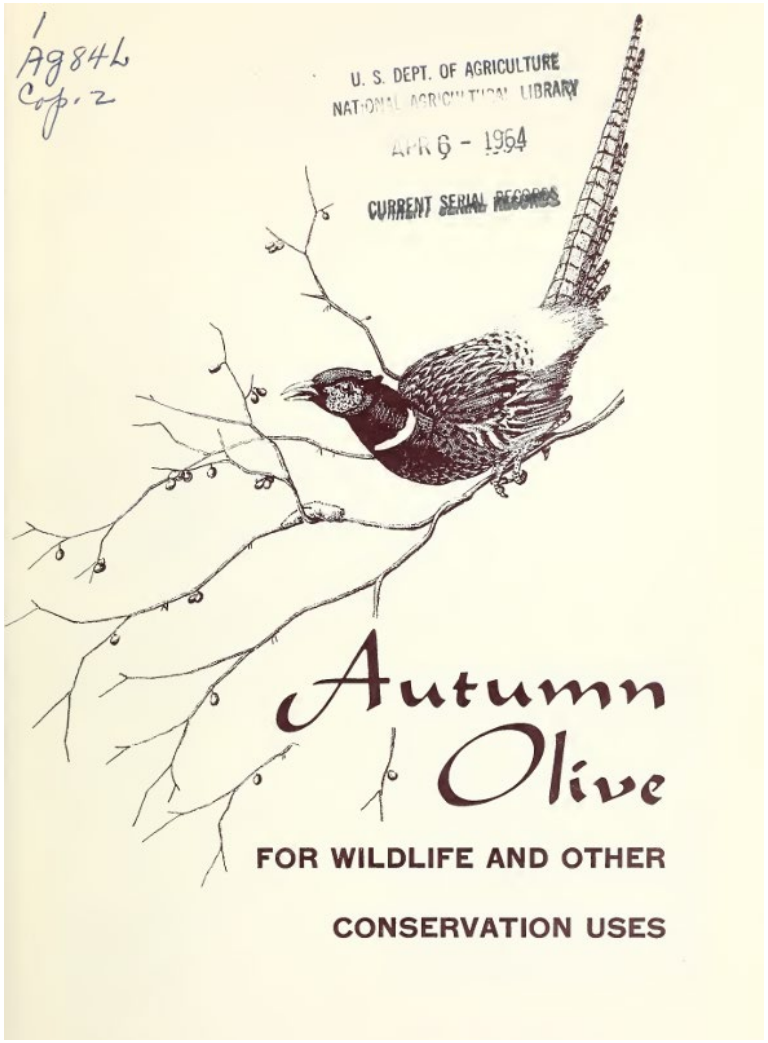
What this means for biodiversity and climate action

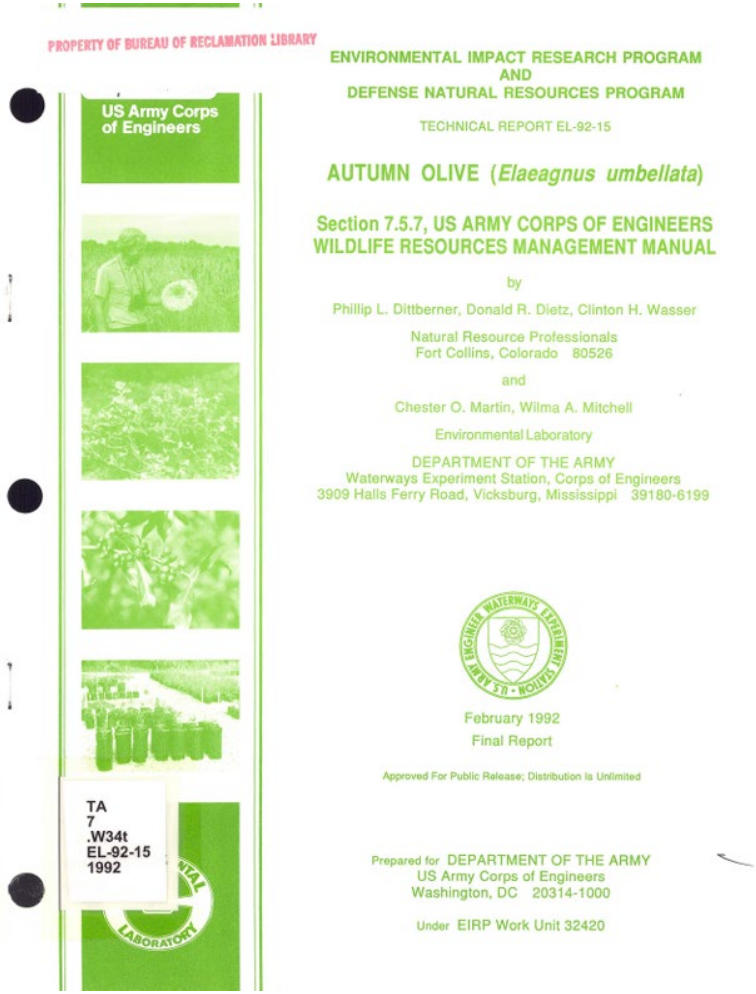
The study's message for conservation and policy is pragmatic: "Act early to prevent or remove invasive plants where native plant diversity is at stake; species losses accumulate with time," says Prof. Thakur.

Source: https://phys.org/news/2025-10-global-reveals-tempo-invasive-species.html

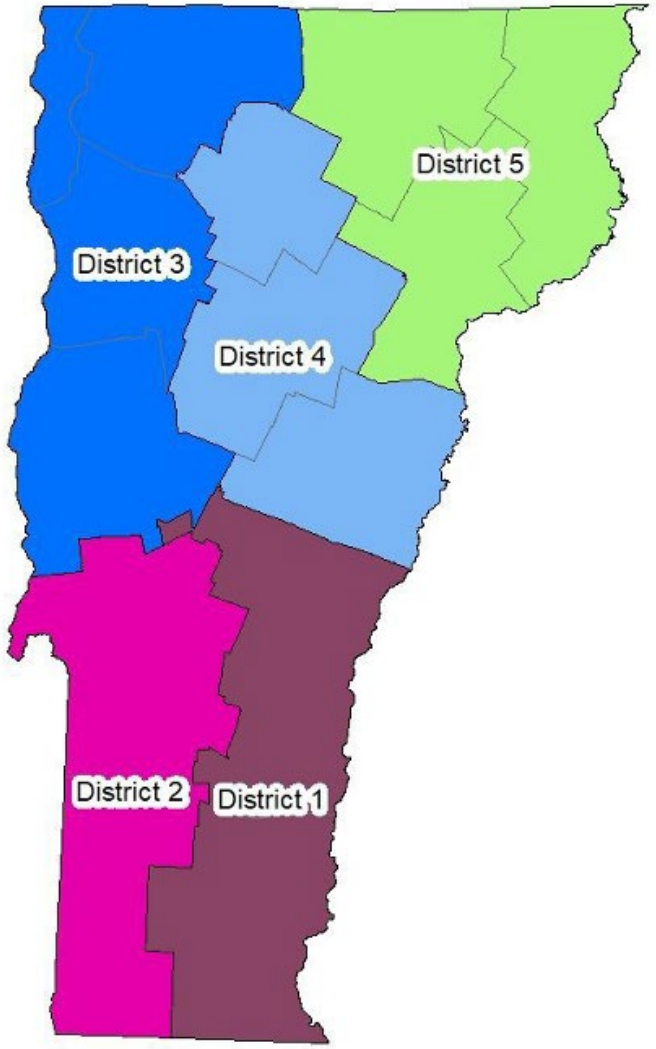
HISTORICAL INTRODUCTIONS







WHY ANR NEEDED UNIFIED GUIDELINES



Planting Guidance for the Revegetation of Riparian Areas in Vermont

The active revegetation of riparian areas through plantings can greatly accelerate the natural recovery process and restoration of important riparian functions. The following guidance is not meant to be a comprehensive resource on riparian restoration, but does provide basic information and resources regarding planting densities, techniques and species for riparian revegetation projects in Vermont.

General:

Species selection will vary based upon biophysical region, soils, topography, existing vegetation and other factors. Assessment of the project area and adjacent riparian lands, including an inventory of established trees and shrubs, will provide a good indication of which species are suited for the site.

When available, information on the known or potential natural community type of the site can further inform planting efforts. Vermont has five distinct floodplain forest natural communities, as well as many other shrub and wetland communities, that occur along shorelines. Each natural community is characterized by certain soils, flood regimes, and other conditions that will favor a certain suite of trees and shrubs. Selecting species appropriate to a site's natural community will enhance long-term restoration. Detailed information on Vermont's natural communities and their associated species can be found in *Wetland, Woodland, Wildland* (Thompson and Sorenson 2000).

Native species should be used. There are limited exceptions where naturalized, non-native species can be considered in areas where they are already well established and/or do not pose a threat to riparian ecosystems (e.g. boxelder). **When developing planting plans and ordering or purchasing plant material, it is important to provide complete scientific names (including subspecies if appropriate) of plant species to insure non-native and invasive species are not inadvertently introduced.** Plant a variety of suitable tree and shrub species to insure structural and ecological diversity and long term viability of the riparian area.

November 2, 2017 Final

Guidelines for Implementing

Assisted Migration of Plants on Agency Lands

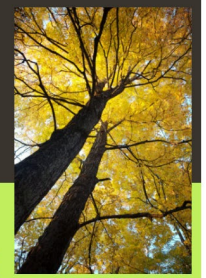
Accepted by Agency of Natural Resources Lands Team
November 2, 2017

Drafted by
Assisted Migration Work Group

Nancy Patch, Lisa Thornton and Sandy Wilmot
Department of Forests, Parks & Recreation

Robert Popp and Robert Zaino
Fish & Wildlife Department

Creating and Maintaining Resilient Forests in Vermont:
Adapting Forests to Climate Change



Vermont Department of Forests, Parks and Recreation

May 2015

VERMONT

GUIDELINE DEVELOPMENT STORY (2017-2025)

2017

Guidelines for Implementing Assisted Migration (AM) of Plants on Agency Lands approved by ANR Lands Team.

2022

FWD and FPR staff identified the need to revisit the AM guidelines for updates.

2023

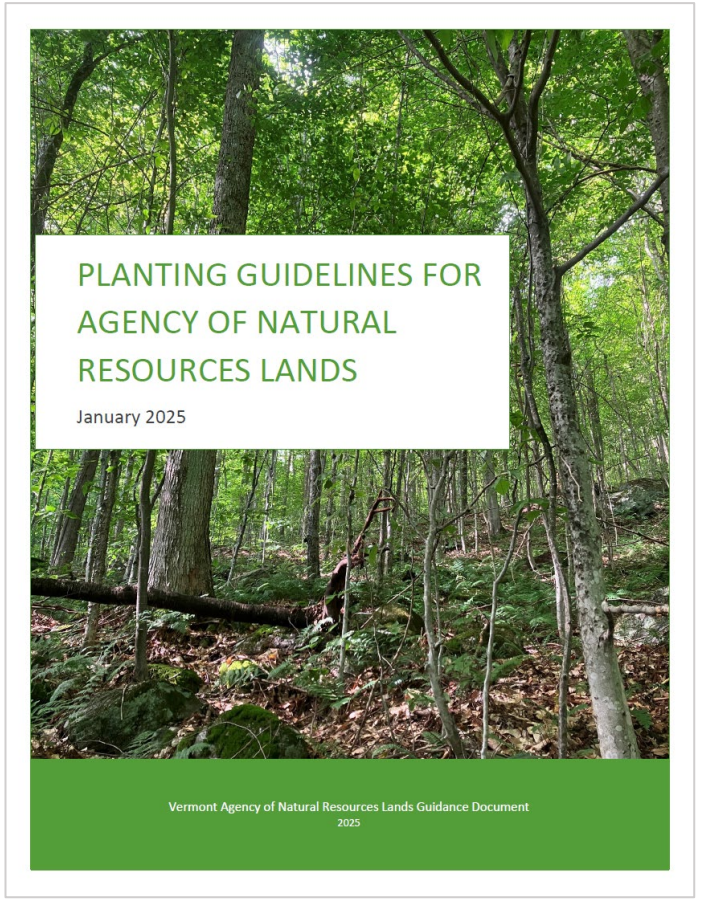
During the AM review process, staff identified need for comprehensive planting guidelines.

2024

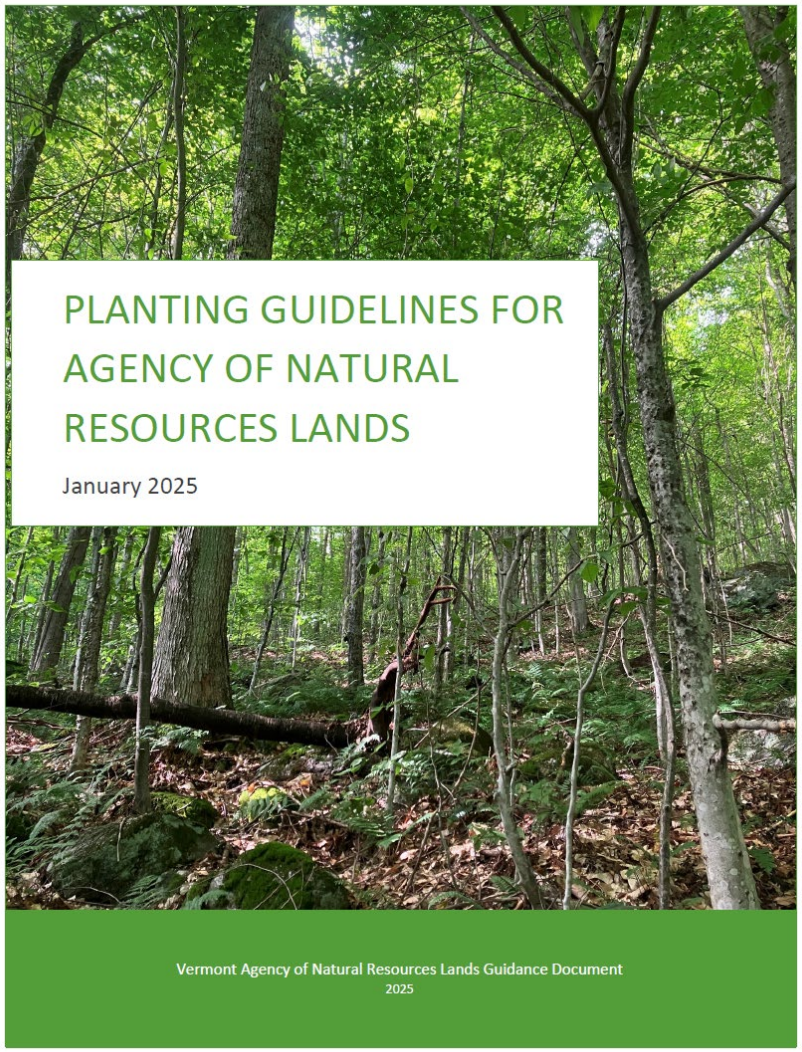
Guideline development.
ANR Staff review and feedback.
ANR Lands Team approval.

2025

Secretary Approval.
Presented outcomes to DSTs, State Lands Managers, and Parks Management Team.

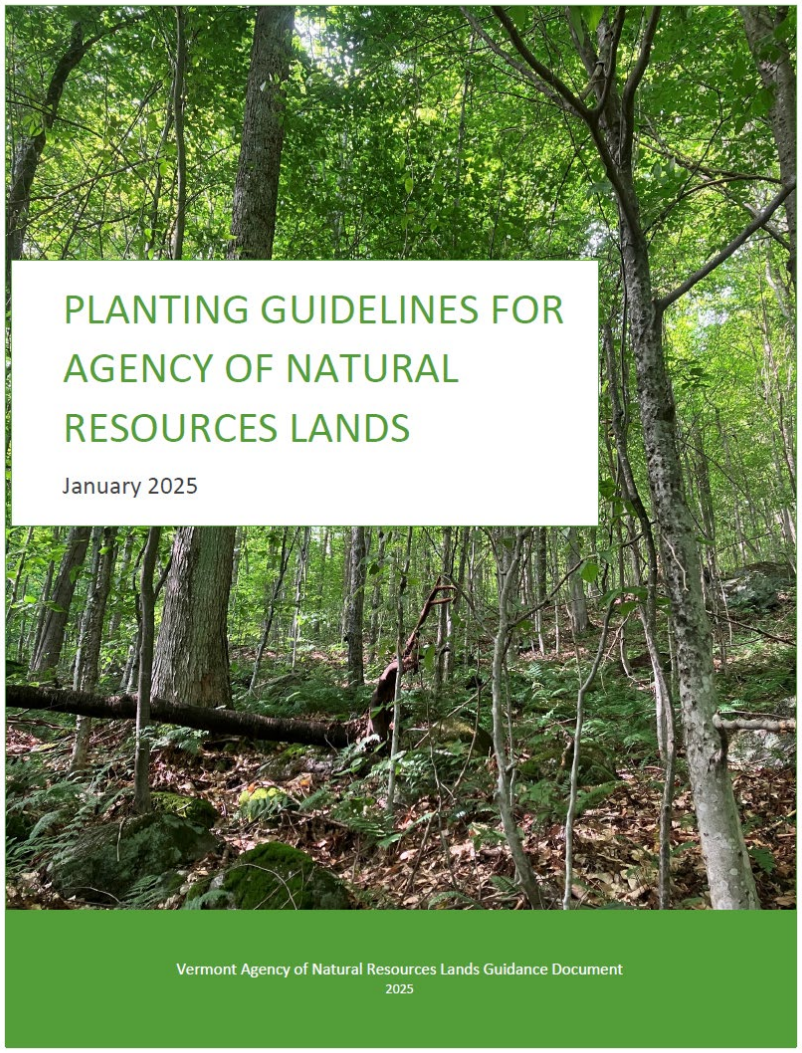


GOALS OF GUIDELINE DEVELOPMENT



- Clear objectives and application
- General and project specific guidance
- Resources for determining what plants are best suited for a certain area
- Plant lists based on project type
- Information on where to find plants
- Process for project review of planting projects

PRIMARY OBJECTIVES



Protect and enhance native biodiversity and ecosystem function.

Protect genetics of locally adapted plant species and populations.

Avoid introduction of non-native invasive plants, pests, and pathogens.

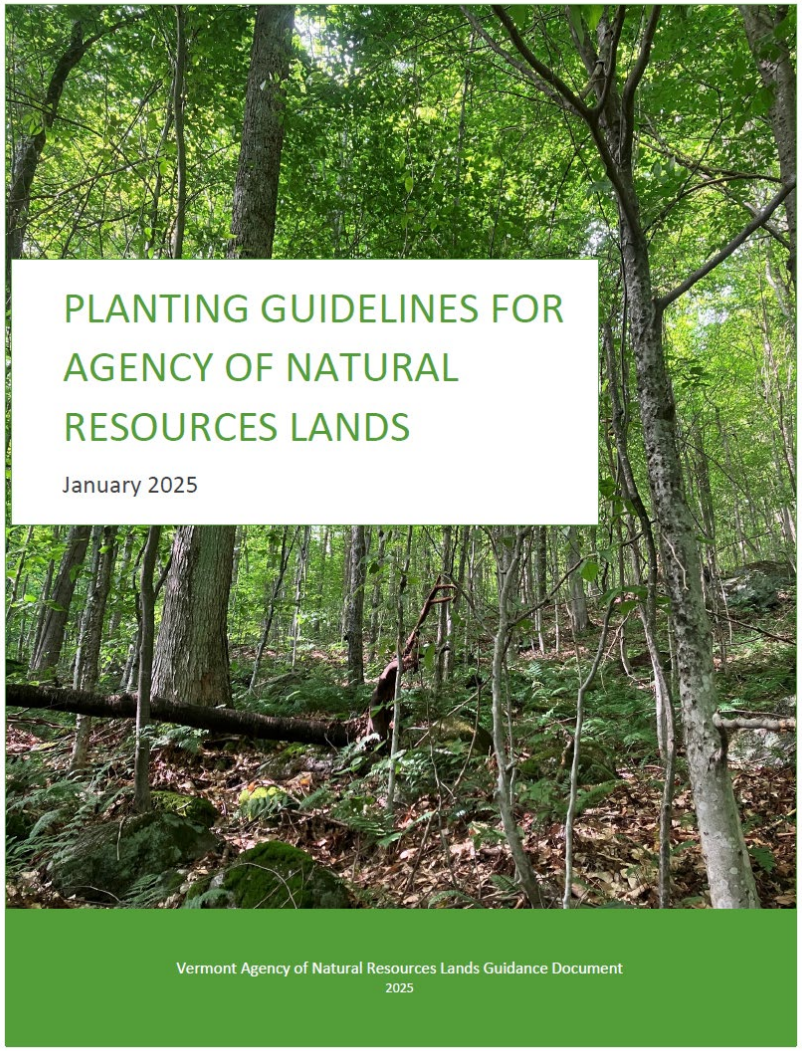
Provide guidance on adaptation plantings to address novel stressors such as climate change, pests, and pathogens.

Provide a framework/tool for project development and review.

Raise awareness and educate ANR staff on best practices for successful planting projects.

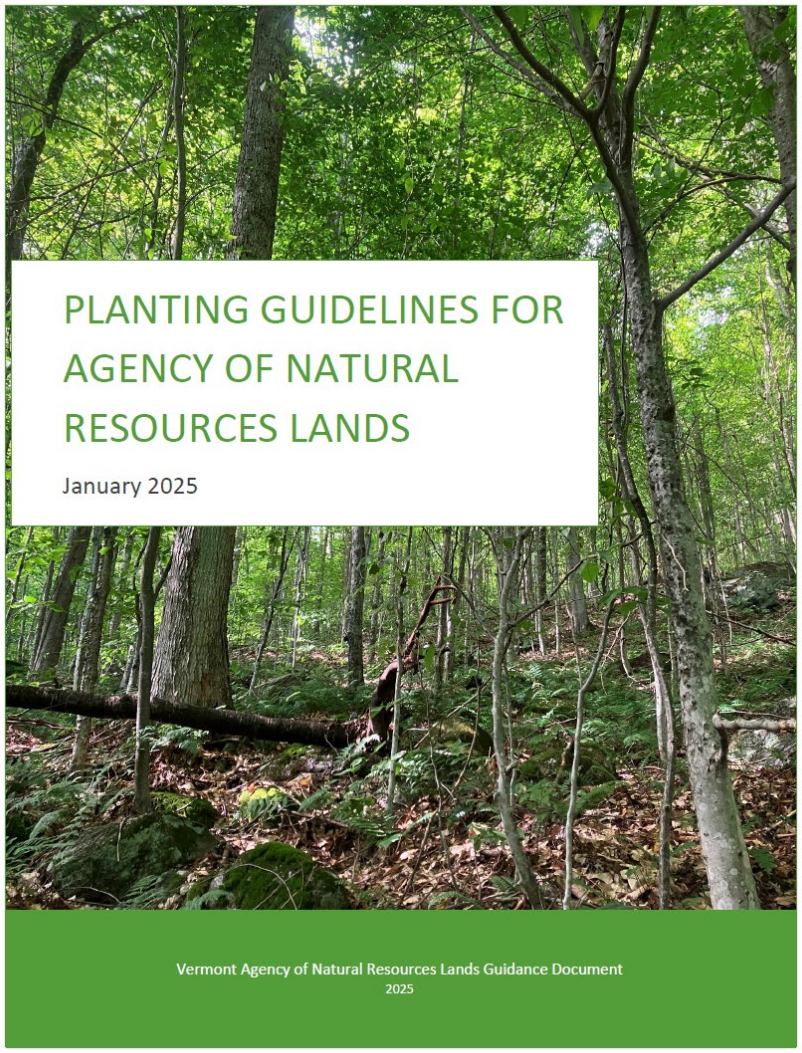
WHAT THE GUIDELINES *ARE NOT*

COLLABORATION AND REVIEW



- Multiple levels of review
  - Internal partners
  - External partners
- Multiple iterations of the document
  - Response to an emerging need
- Incorporating Feedback
  - VT District Stewardship Teams
  - VT ANR Lands Team
  - VT ANR Secretary
  - Additional VT state staff with pertinent experience
  - Subject matter experts

EXAMPLES OF GENERAL GUIDELINES



- Allow natural succession and regeneration to occur where practicable.
- Consider the current and future conditions and vulnerability of your planting site.
- Choose species native and common to Vermont.
- Prioritize local ecotype and genetics.
- Avoid introducing new pests or pathogens.
- Plan enough time for design, logistics, and review.
- Monitor and adapt over time.

PROJECT TYPE GUIDANCE & KEYS

Erosion Control & Stabilization

1. First consider if your site can revegetate naturally from the existing seedbank. If the site is mostly intact (ex. no existing invasive plant species, next to a minimally disturbed landscape) and is relatively flat and not adjacent to a water source, natural regeneration is preferred. In this case, only an inert mulching medium such as straw is recommended.
2. For disturbed sites where the goal is stabilization by establishing nonpermanent cover, mixtures of nonnative and native grasses plus legumes may be the most effective strategy. Both warm season and cool season mixes can be used on state lands.
    a. **Warm Season Cover Crop** (late May to mid-August) – grain oats (*Avena sativa*), red fescue (*Festuca rubra*), or annual ryegrass (*Lolium multiflorum*). All are non-native.
    b. **Cool Season Cover Crop** (late August to early May) – winter rye (*Secale cereale*) or autumn bentgrass *(Agrostis perennans*). The latter species is native.
    c. **Additional native species to add to create a mix** - Virginia wildrye (*Elymus virginicus*), little bluestem (*Schizachryrum scorparium*), deer tongue (*Dichanthelium clandestinum*), big bluestem (*Andropogon gerardii*), tufted lovegrass (*Eragrostis pectinacea*), showy tick-trefoil (*Desmodium canadense*) and tall lettuce (*Lactuca canadensis*). These native grasses and herbs provide valuable cover for wildlife and serve as host plants for many native insect species.
3. For disturbed sites where the objective is stabilization and the establishment of annual native vegetation cover for wildlife and pollinators, either a cool- or warm-season cover crop, supplemented with additional native species, may be utilized. Alternatively, any species included in the Erosion Control and Conservation Mixes[8] outlined in Appendix D is suitable.
4. When sourcing native seeds, inquire with the supplier about the geographical origin of the seeds. Preference should be given to seeds sourced from Vermont or adjacent regions to maintain ecological integrity and regional adaptation.
5. **The Project Review Process is NOT recommended when** using the seed mixes specified in Appendix D (2). Any additional non-native species not listed in Appendix D should be submitted for evaluation by the State Lands Ecologist.
6. Click here or go to Appendix A (1) for the Erosion Control & Stabilization Decision Key.

Appendix A. Project Type Decision Keys

Four out of the five project types have associated decision keys to help staff make decisions about how to apply the planting guidelines. Research is the only project type that does not have a decision key. For research, refer to the related project type decision key.

1a. Project Type: Erosion Control and Stabilization (EPS)

1. **Determine your site conditions.**
    a) **Is your planting site at least 25-ft from a water resource (ex. wetland, stream, river, lake or pond?**
        i) **Yes** → Proceed to 1b.
        ii) **No** → Go to 2.
    b) **Determine the erosion potential and regenerative capacity of your site. Is site relatively flat and unlikely to erode during a runoff event if not seeded and mulched, and is your site adjacent to natural conditions with no invasive species present?**
        i) **Yes** → Proceed to 1c.
        ii) **No** → Proceed to 2.
    c) **Consider mulching only and allow native regeneration through the existing seedbank.** This is most likely to be successful during the warm season (late May to mid-August).

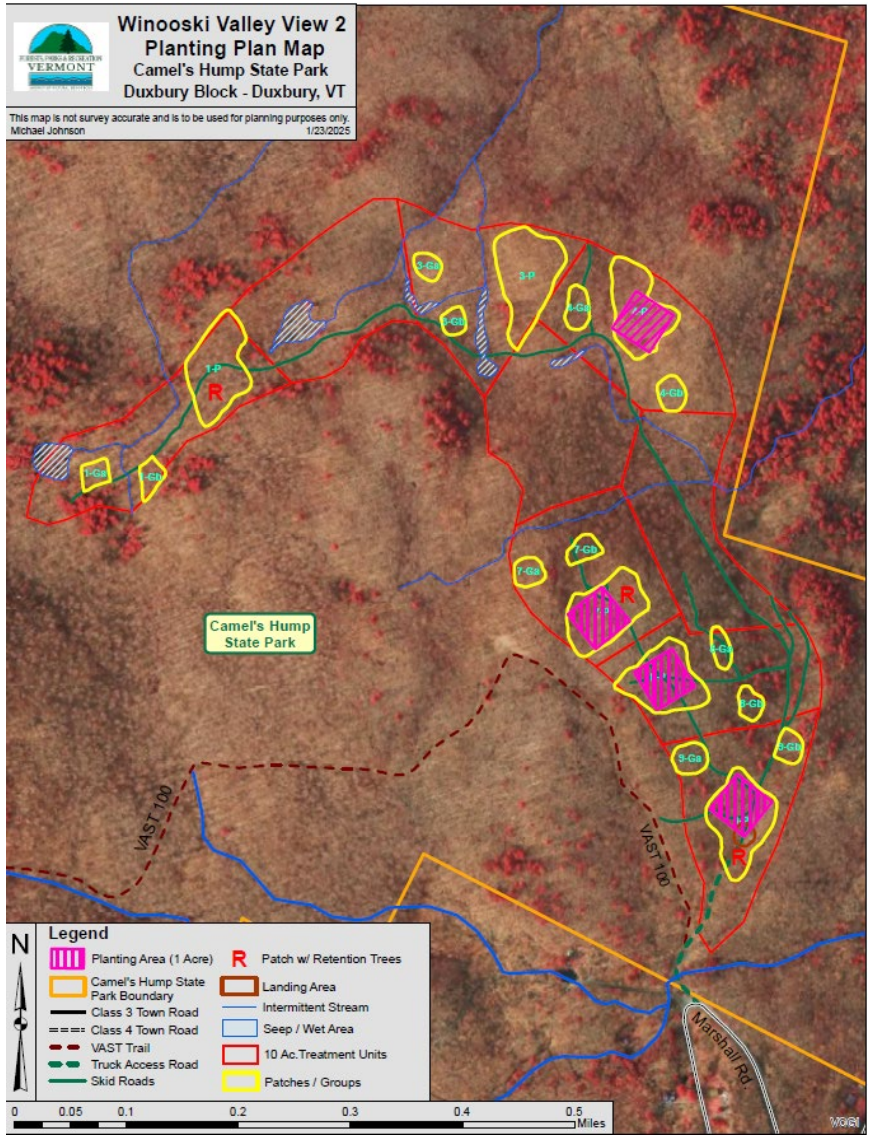
PROJECT SPECIFIC GUIDANCE – ADAPTATION PLANTING

- **Adaptation** is the process of adjusting natural or managed systems to better cope with new or changing stressors like climate change, pests, and pathogens.

- **Assisted migration** is one adaptation strategy that involves planting species or genotypes expected to thrive under future climate conditions.

Climate Adaptation Knowledge Exchange: cakex.org

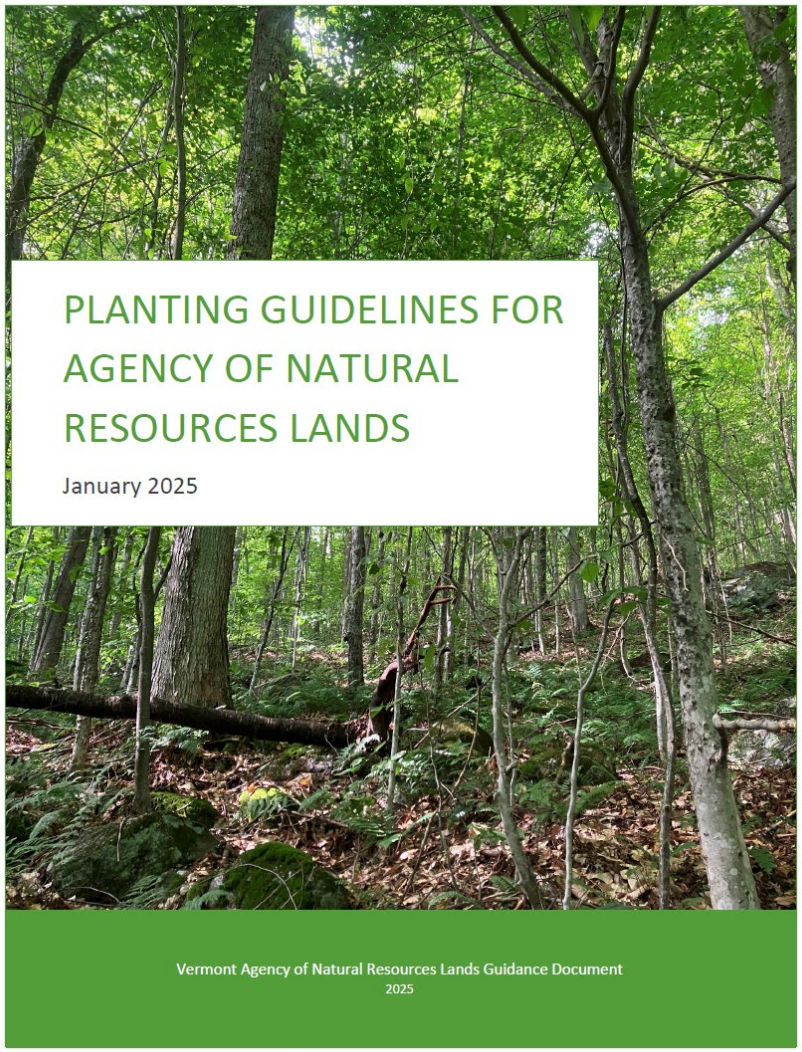
EX.: CAMEL'S HUMP ADAPTATION PLANTING



Northern Hardwoods (S5) with APM plantings

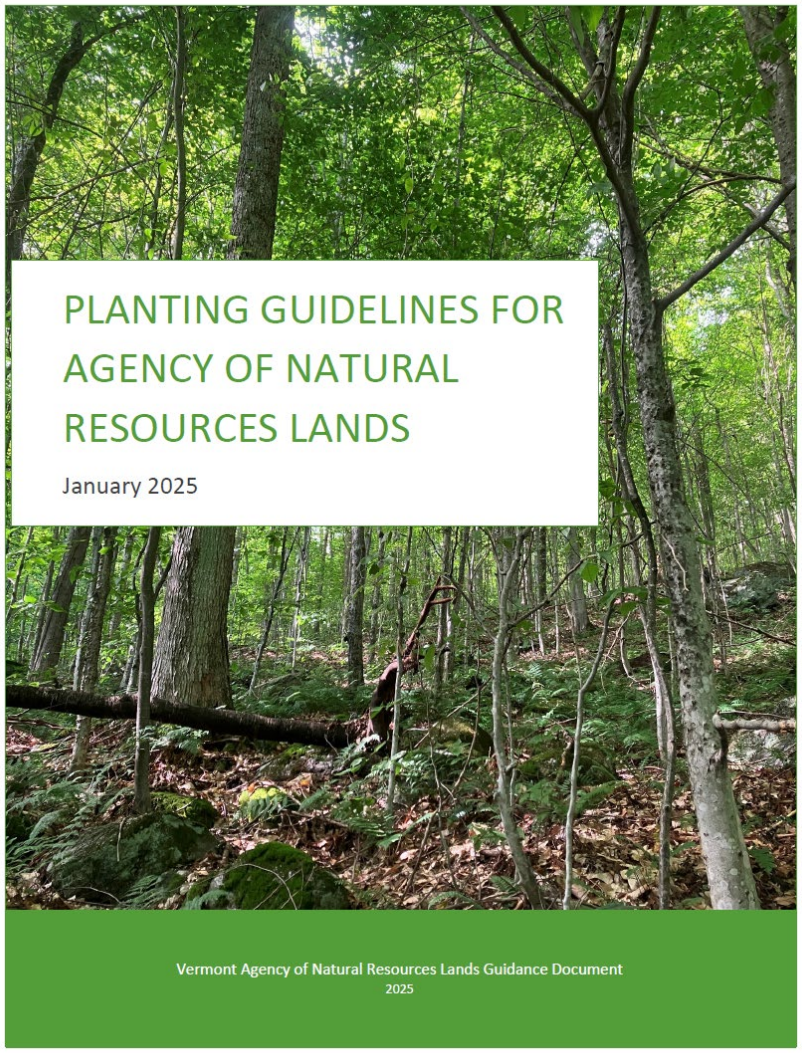
- Red oak (New Hampshire source)
- Black cherry (New Hampshire source)
- Red spruce (three sources—north-central MA, southern NH, and central New York)
- Bitternut hickory (Michigan source)
- American chestnut: B3F3 hybrid from American Chestnut Foundation (parent is from Virginia with cross to Chinese chestnut—94% American chestnut)*

PROJECT REVIEW PROCESS



1. Specified projects are entered into a state database and reviewed.
2. Minimum information is submitted for a sufficient review.
3. Additional review or information may be requested.
4. A final decision is made and documented.

EARLY LESSONS & ONGOING CHALLENGES



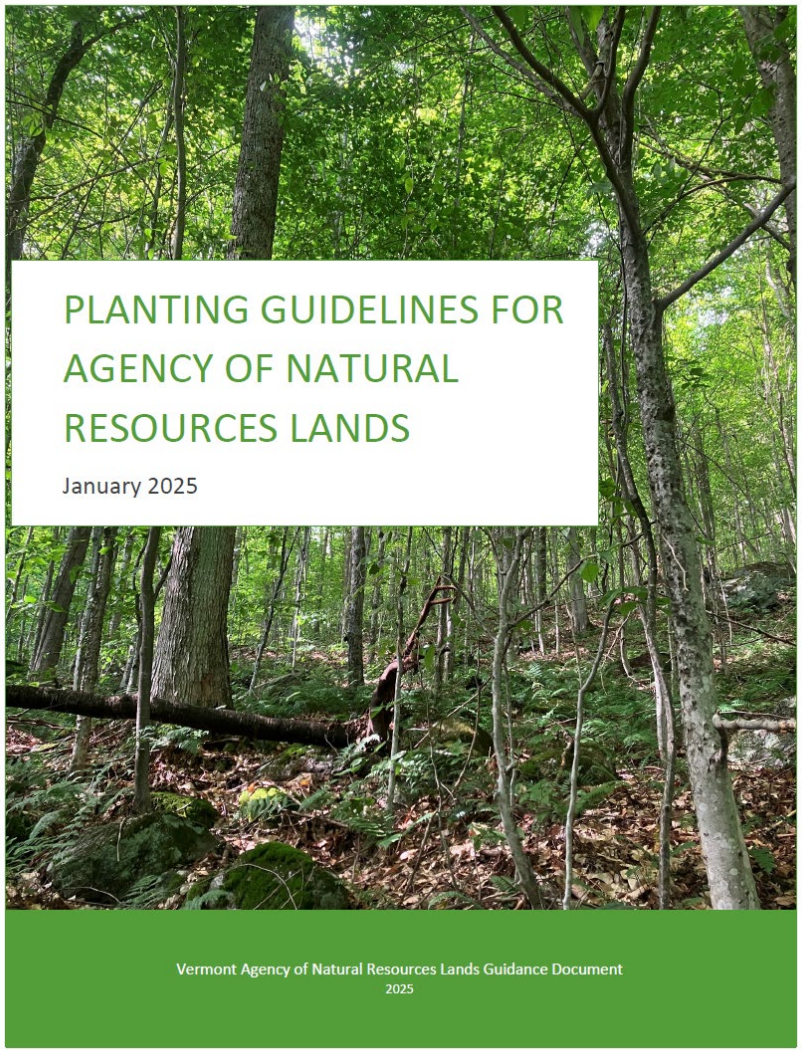
Expanding species lists for all planting types

Refining guidance on assisted migration monitoring

Integrating emerging research into the guidelines

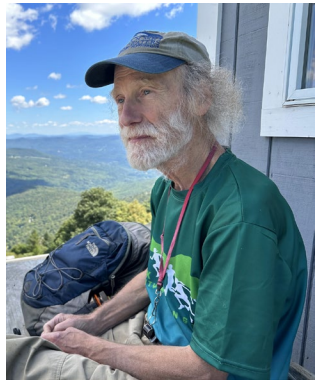
Updating project-type keys to improve usability

QUESTIONS FOR THE FEMC COMMUNITY



- How can we balance simplicity and usability with ecological nuance?
- How can these guidelines better connect to long-term monitoring data?
- And most importantly, how do we act as responsible stewards today so future Vermonters inherit resilient forests — not additional problems?

ACKNOWLEDGEMENTS



Bob Popp, VT State Botanist, Retired

Lisa Thornton, VT Stewardship Forester, Retired

Nancy Patch, VT County Forester, Retired

Grace Glynn, VT State Botanist

Al Freeman, VT Climate Forester

Danielle Owczarski, VT State Lands Ecologist

Ali Kosiba, Extension Assistant Professor of Forestry at UVM

Dr. Tony D'Amato, Associate Professor of Forestry UVM Adaptation and Silviculture

Dr. Peter Clark, Research Associate UVM, NIACS Adaptation and planting

Questions?

The guidelines are available online and can also serve as a resource for those implementing planting projects on private lands.

Scan me!

VERMONT