Forest Stand Improvement

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What is Forest Stand Improvement?

A form of pre-commercial forest management used to improve vigor, composition, productivity and quality of forest stands at the sapling stage of regeneration

- Ensures **tree species diversity** in a forest stand by reducing competition
- Desired tree species: oaks, hickories, sugar maples, and other hardwoods.
- Without intervention and removal of competition, these species are more likely to become **suppressed and die**.
- Oak and hickories: valuable trees for many species of local wildlife
  - expected to become even more important as the changing climate causes them to expand their ranges northwards.

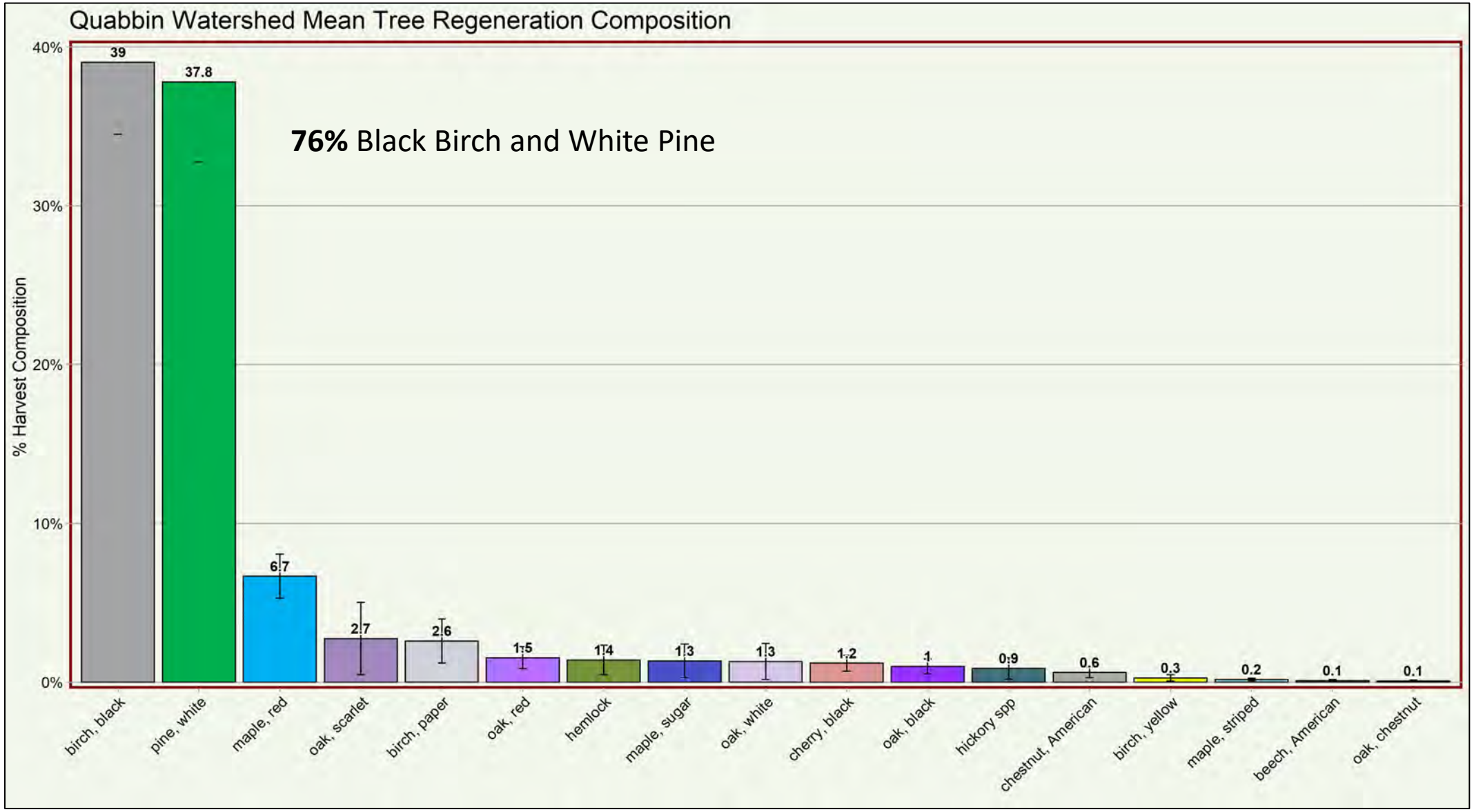
White pine saplings Quabbin Watershed: felled to release oak saplings.

Why do our Watersheds need FSI?

- Regeneration goals include diversity of tree species
- Harvest regeneration sampling dominated by black birch, white pine, and red maple
- Began in collaboration with white oak sapling release study conducted in Ware River by Jeff Ward

Why do our Watersheds need FSI?

Sites with >15-year-old regeneration



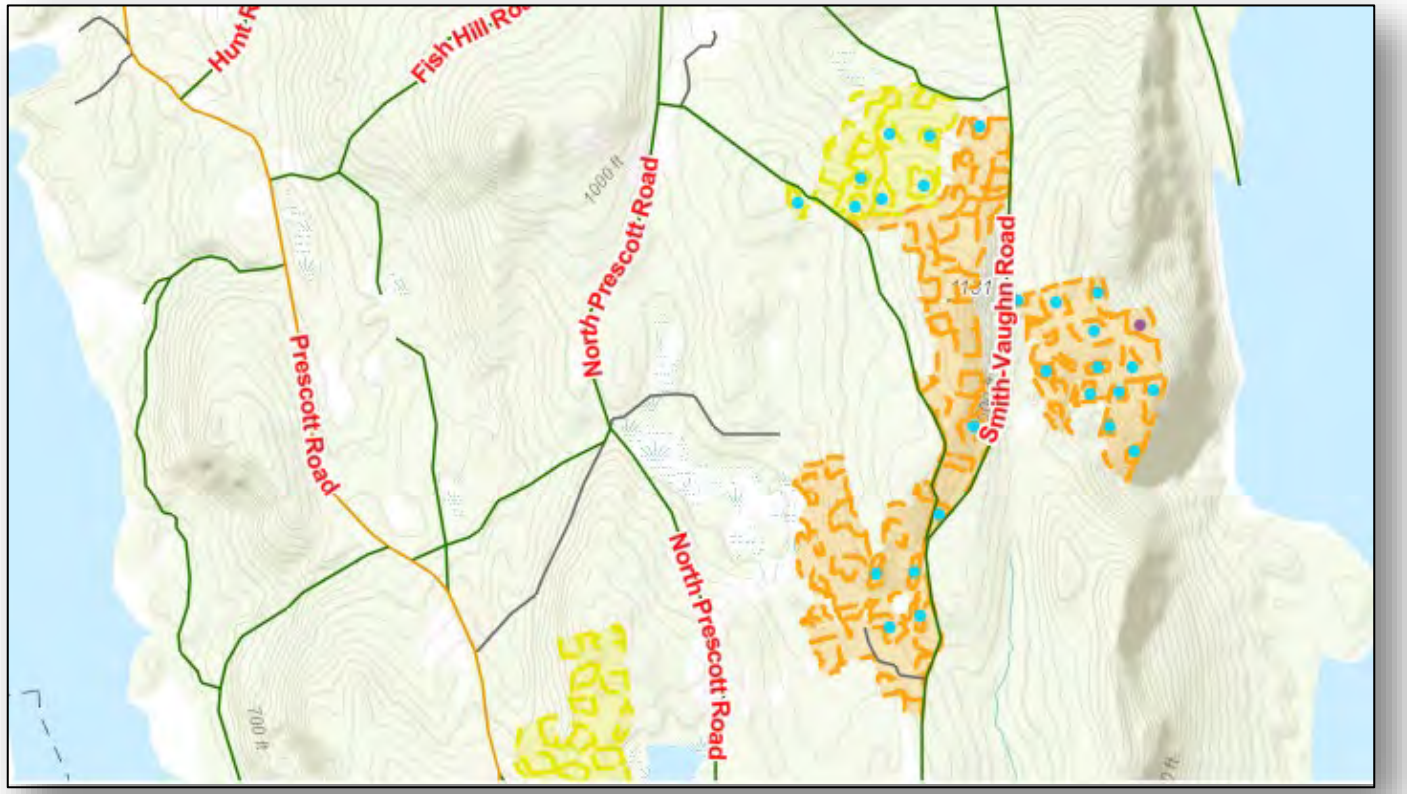
76% Black Birch and White Pine

FSI Site Assessments

- Harvested 8 – 20 years prior.
  - After 20 years of growth, overstory composition is mostly determined.
- Assessed by DCR Division of Water Supply foresters to determine if FSI is warranted.
- Patch cut openings between 0.5 and 2 acres

- *Diversity Improvement Recording* point.
  - FSI data:
    - stems released,
    - invasive plants present onsite,
    - date of fieldwork,
    - hours worked,
    - watershed, and any relevant site notes.

Field Maps View



- Patch cut openings are highlighted within the boundaries of the harvest
- Diversity Improvement Recording Points are color coded to relay whether work is need, completed, needs assessment, in progress, etc.

Methods

- Competing saplings encroaching the crown from the sides are felled

- Released trees:
  - Above deer / moose browse height,
  - Vigorous: free of deformities, disease, or insect infestation.

- Common tree species to be felled: white pine, red maple, and black birch.
  - Abundant, fast-growing species often outcompete other species.

- Interfering native vegetation:
  - witch hazel, grape vines, and mountain laurel.

Oak release Quabbin Reservoir
single white pine sapling removed next to it

Oak sapling Wachusett Reservoir.
Black birch, red maple, and white pine saplings cut and piled in the background.

Methods

- Chainsaw Safety Training sponsored by DCR
- Foresters use electric chainsaws to fell small trees,
  - typically 8” in diameter and under.
- Trees remain onsite to decompose and provide food, cover and/or habitat for various species of plants, animals and fungi.
- No heavy equipment is required to cut or remove brush or debris from site.

The FSI Team

Forest Resiliency Coordinator Christian Smith on Prescott Peninsula

Forestry Assistant Austin Gelinas cutting white pine at Barre Heath

Forestry Assistant Patrick Maher cutting red maple coppice at Ware River

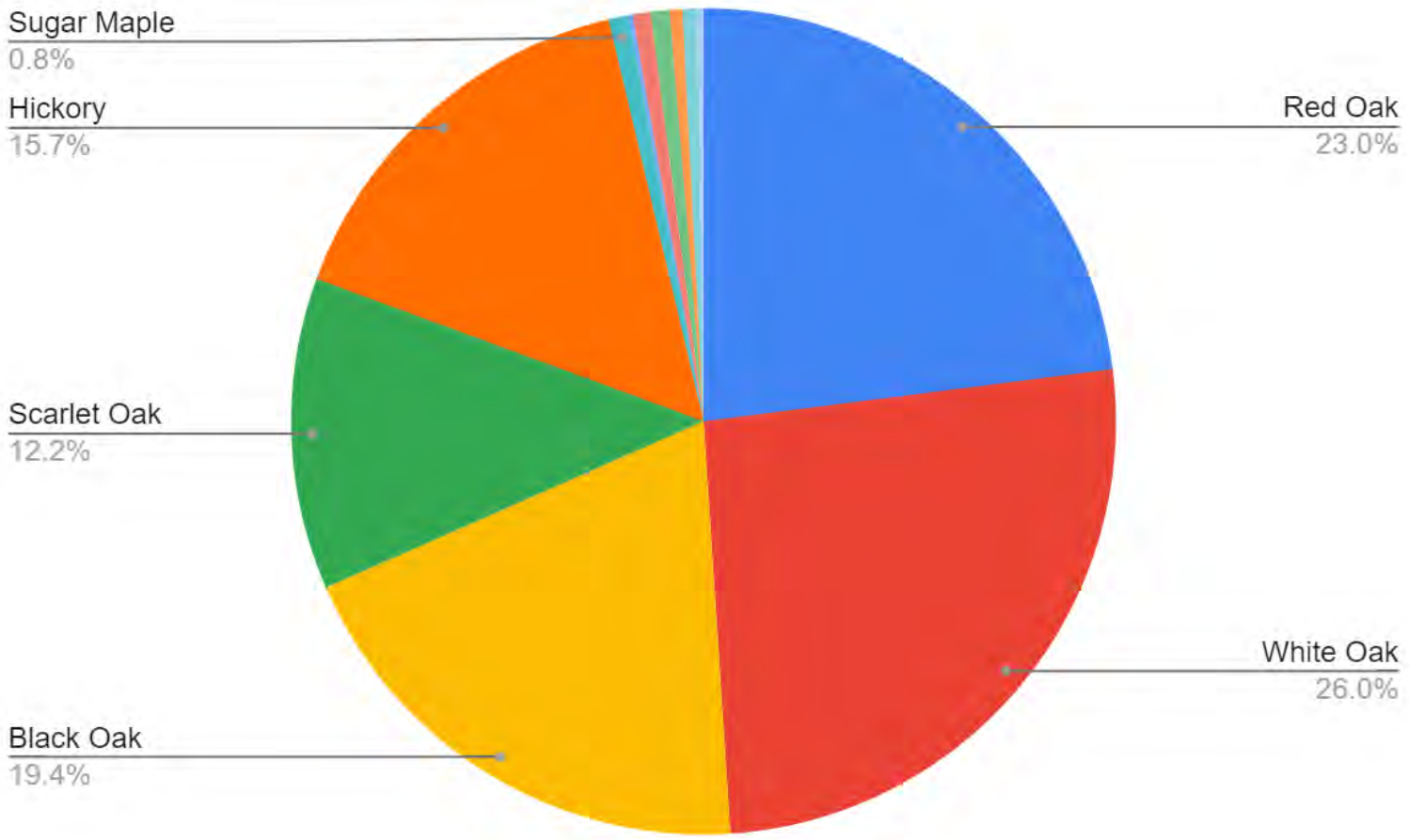
Brush piles for wildlife habitat

Patrick Maher piling brush.
Released oaks in the background.

Brush pile Quabbin Reservoir.
Released oaks in the background.

Brush piles Quabbin Watershed

Results for Quabbin Reservoir



Species Released – Stem Count

- White Oak – 1,101
- Red Oak – 974
- Black Oak – 824
- Hickory spp. – 665
- Scarlet Oak – 517
- Sugar Maple – 33
- Cherry spp. – 31

Other species released include yellow birch, paper birch, ash, beech, poplar, spruce, hemlock, pitch pine, red pine, sassafras, and sumac

- 4,258 stems released in total across Quabbin Reservoir
- 96% of stems released are oaks, hickory, and sugar maple
- 4% stems released include other species to improve site diversity

Crew Statistics for the Winter 2023 Season

Wachusett and Quabbin Reservoirs

Overall Stats as of 3/15/2024 (Last Day of Winter Season)

- Total fieldwork days: 51
- Total acres covered: 125.5
- Total person hours: 628.25
- Total working/cutting hours (crew): 221.75
- Work rate for crew: ~.56 acres per hour and ~47 stems released per acre
- Total stems released: 5,961

What's Next?

- FSI: **continuous component** of DWSP Forest Management
  - Over time, fewer harvests enter the 8–20-year window.

- **Experiment with FSI** in openings younger than 8 years for white oak resilience.
  - Often suppressed with poor form by the time of FSI at 8-20 years.

Incorporate Non-commercial forest management / improvement.

- invasive plant control, tree planting, removal of interfering native vegetation, coppice thinning, and sanitation cuts into FSI activities.

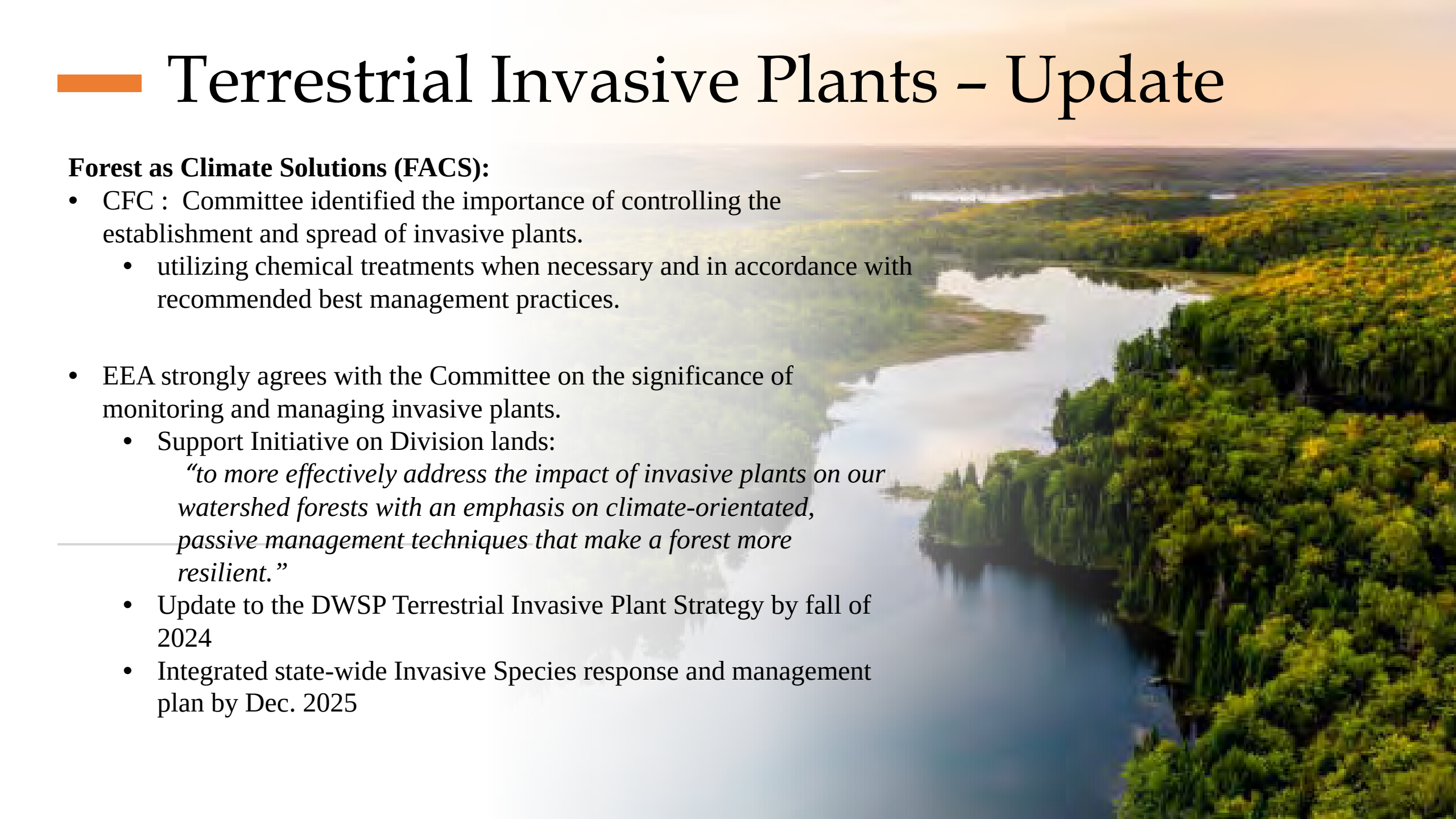
Terrestrial Invasive Plants – Update

Forest as Climate Solutions (FACS):

- CFC : Committee identified the importance of controlling the establishment and spread of invasive plants.
  - utilizing chemical treatments when necessary and in accordance with recommended best management practices.

- EEA strongly agrees with the Committee on the significance of monitoring and managing invasive plants.
  - Support Initiative on Division lands:

    "to more effectively address the impact of invasive plants on our watershed forests with an emphasis on climate-orientated, passive management techniques that make a forest more resilient."
  - Update to the DWSP Terrestrial Invasive Plant Strategy by fall of 2024
  - Integrated state-wide Invasive Species response and management plan by Dec. 2025



Terrestrial Invasive Plants – Upcoming Actions

- **Effective Integrated Vegetation Management approach**
  - Manage invasive and interfering plants
  - Integrate with cutting/mowing
    - Minimize amount of herbicide needed
    - Spot treatments
  - Follow all laws/regs and labels

- **Summer/seasonal projects:**
  - Continue habitat follow-up treatments with EEA Stewardship funding
  - Focus: forestry landings, pre/post-harvest openings
  - Continue Early Detection- Rapid Response (EDRR)
    - Stiltgrass, Corktree, Tree-of-heaven, Japanese aralia
  - Japanese knotweed /Hayscented fern control trials