SUSTAINABLE FOREST MANAGEMENT

House Committee on Environment

February 18, 2025

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PRESENTATION OUTLINE

- Sustainable Forest Management in the Vermont Context
- Sustainable Forest Management through Lens of Climate Resiliency
- Forest Monitoring Data
- Vermont's Forest Economy

DEFINITION OF SUSTAINABLE FOREST MANAGEMENT

- “A dynamic and evolving concept, which aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations. When sustainably managed, forests and trees make vital contributions to people and the planet by bolstering livelihoods, providing clean air and water, conserving biodiversity and helping combat climate change.”

  -UN General Assembly Resolution, 2007

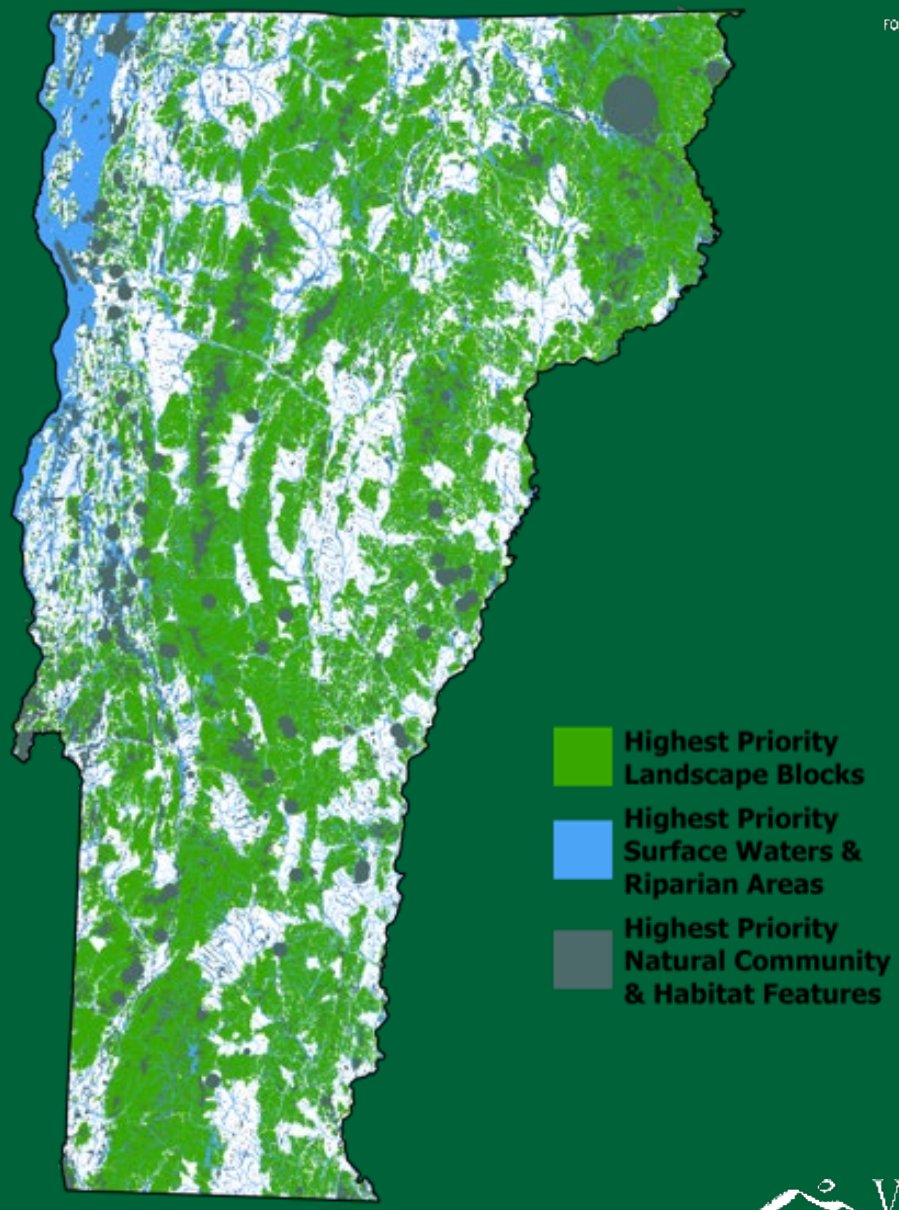
VT FPR VISION & MISSION

- VISION FOR VERMONT'S FORESTS: The forests of Vermont consist of healthy, sustainable ecosystems and provide significant environmental, social, and economic benefits. There is broad participation in the stewardship of trees and forests by landowners, businesses, government, and Vermont citizens.

- MISSION FOR THE VERMONT DIVISION OF FORESTS: We manage for and protect healthy forests; we work with Vermont citizens to promote forest health, supporting best management practices, sustainable use, and respect for the land.

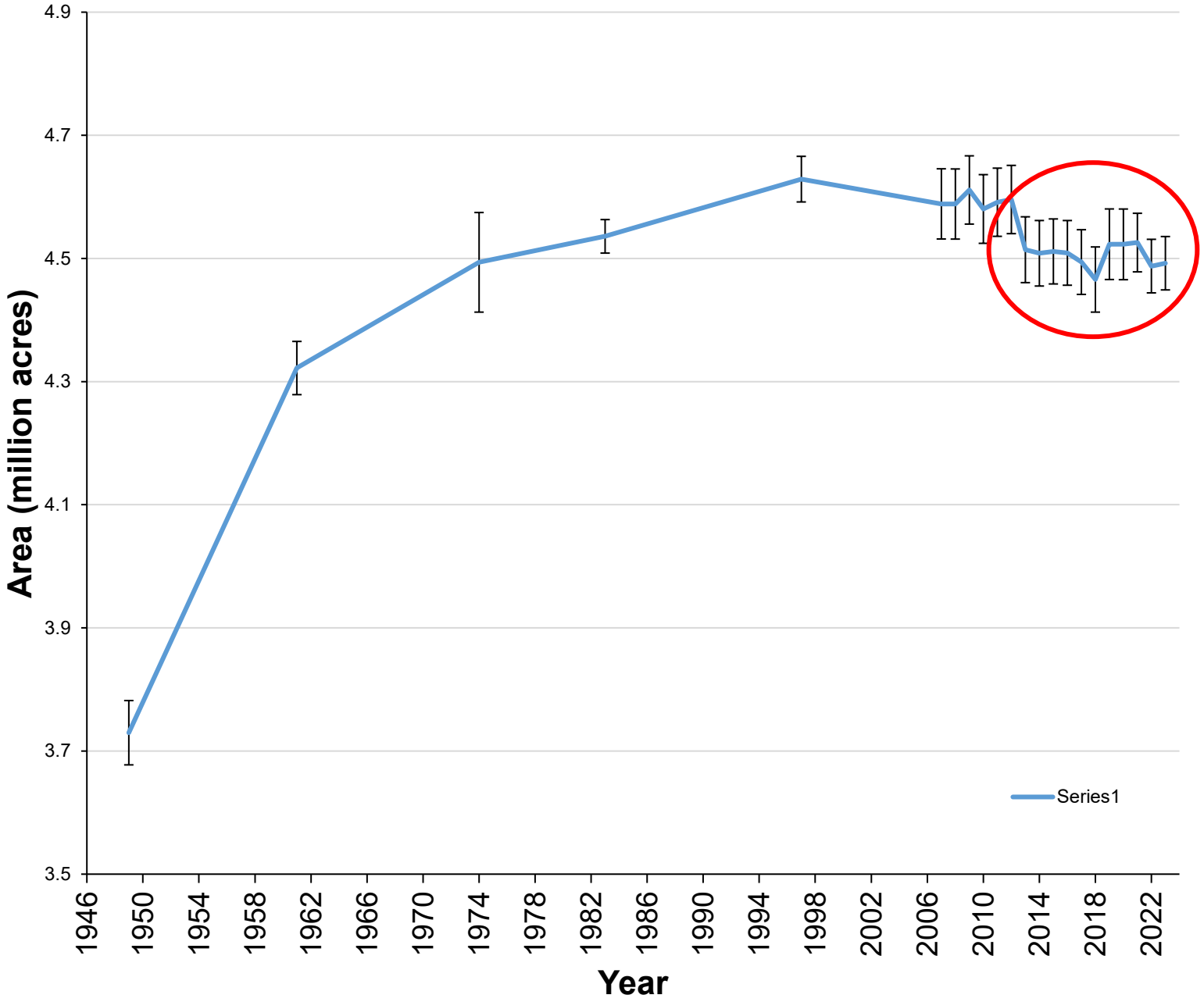
BASIC DATA ON VT'S FORESTS

- 76% of Vermont is Forested (4.49 million acres, 2022 FIA Data)
- Ownership is 80% Private, 10% Federal, 8% State, 2% Municipal
- Northern hardwood mix of beech, birch, and maple accounts for 71% of forest cover
  - Pines and Spruce/Fir Groups: 15%
- Most of Vermont's Forests "mature"



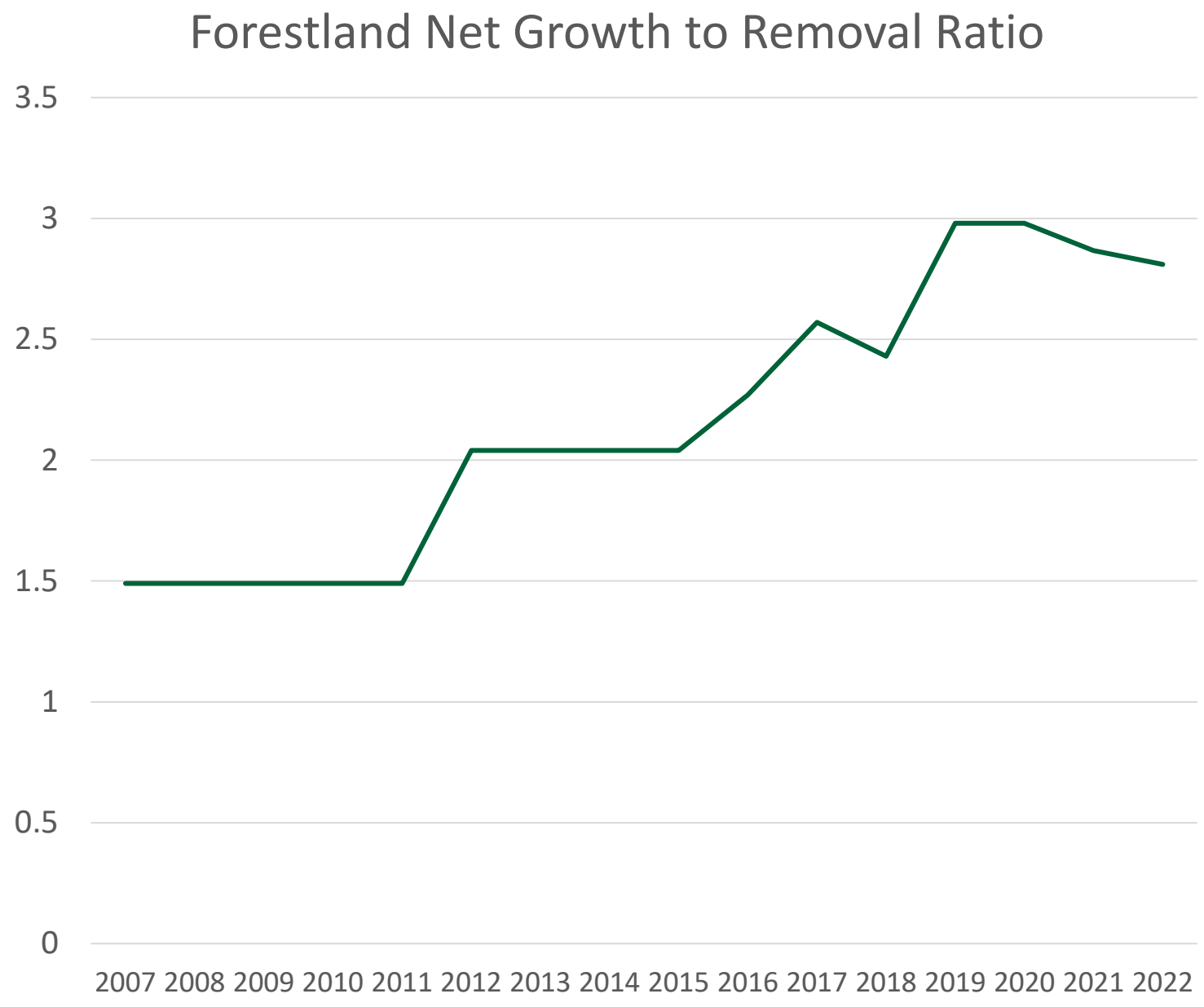
Forest Cover Change in VT 1948-2023 using USFS Forest Inventory & Analysis Data

- 75 years of Expansion
- Peaked in 1997
- 1997 – 2023: 5,250 acres lost/yr
- 2013 – 2023: 2,200 acres lost/yr



Net Growth to Removals Ratio

- Measure of Sustainability
- 1:1 Ratio = growth and removal are balanced
- VT is at 2.8
- USA is at 1.92



KEY PRINCIPLES FOR SFM IN VERMONT

- Multiple Use Forest Management
- Planning for Sustainability
  - >65% of Forests with Management Plans promoting sustainability, good silviculture, forest health, ecological functions, and water quality
  - Long Range Management Plans on Federal, State and Local Land (20%)
  - Use Value Appraisal Forest Management Plans (45%)
  - Management Plans developed & implemented by licensed foresters
- All Forests: Monitoring & Regulation
  - Heavy Cut & Acceptable Management Practices, Support Timber Trespass Laws

PLANNING FOR SUSTAINABILITY

- Ecosystem Based Approach integrating silviculture & ecological principals
  - Active and Passive Management
  - Silvicultural Techniques (*Research to Assess Impact*)
    - Even Aged, Uneven Aged, Restorative, Single Tree / Group Selection, etc
  - VCD principles, i.e. manage for both young and old forest types
  - Climate Resiliency & Adaptation (Carbon Sequestration & Storage)
  - Clean Water
  - Wildlife Habitat & Biodiversity Conservation
  - Recreation
  - Public Input (where applicable)

PLANNING FOR SUSTAINABILITY

	Young Forest	Old Forest Functions	Carbon Sequestration	Carbon Storage	Renewable Products
Even aged Management	x		x		x
Uneven Aged Management		x	x	x	x
Restorative Management		x	x	x	
Natural Areas Reserves / ESTAs		x		x	

STATE LANDS TIMBER HARVEST REVIEW STEPS

Detailed resource inventory and review

Pre-sale inventory

Ecological review

Bat review

Historic Resources Review

Other reviews

Prescription development and approval

- Existing conditions
- Long-term goals
- Short-term goals
- Marking standard
- Operations

Prospectus development and approval

- Species and volumes
- Operational requirements
- Deductions

Photos: FEMC, VTFWD, USFWS, FPR, DEC

FOREST & CLIMATE RESILIENCE

Al Freeman, Climate Forester
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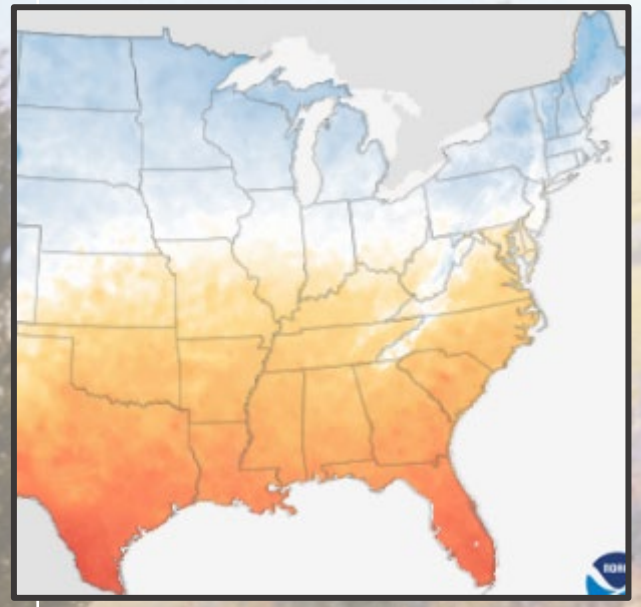
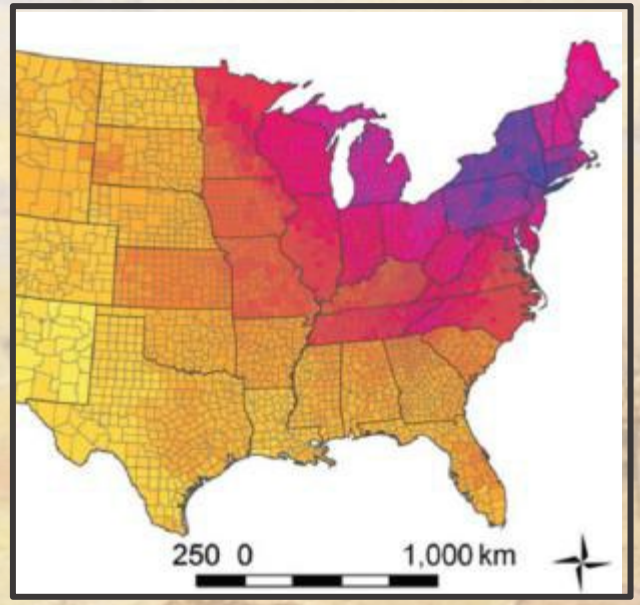
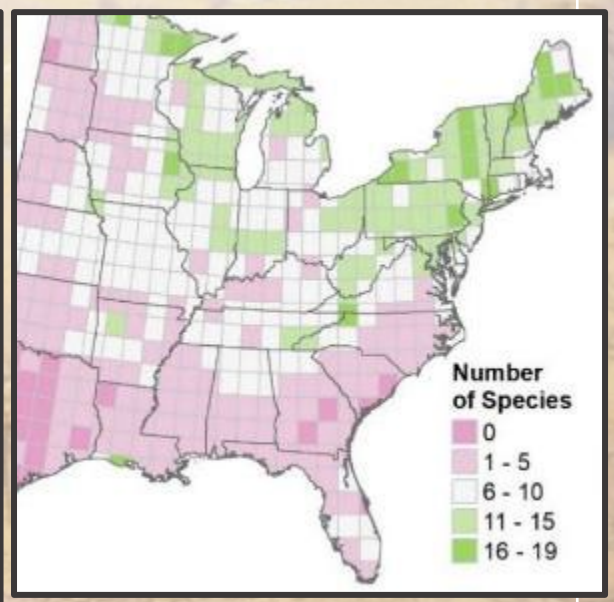
COMPLEX PROBLEMS FACING VT'S FORESTS

A resilient forest can withstand and recover from disturbances

Extreme Weather **Predation Dynamics** **Introduced Pests** **Habitat Shifts**







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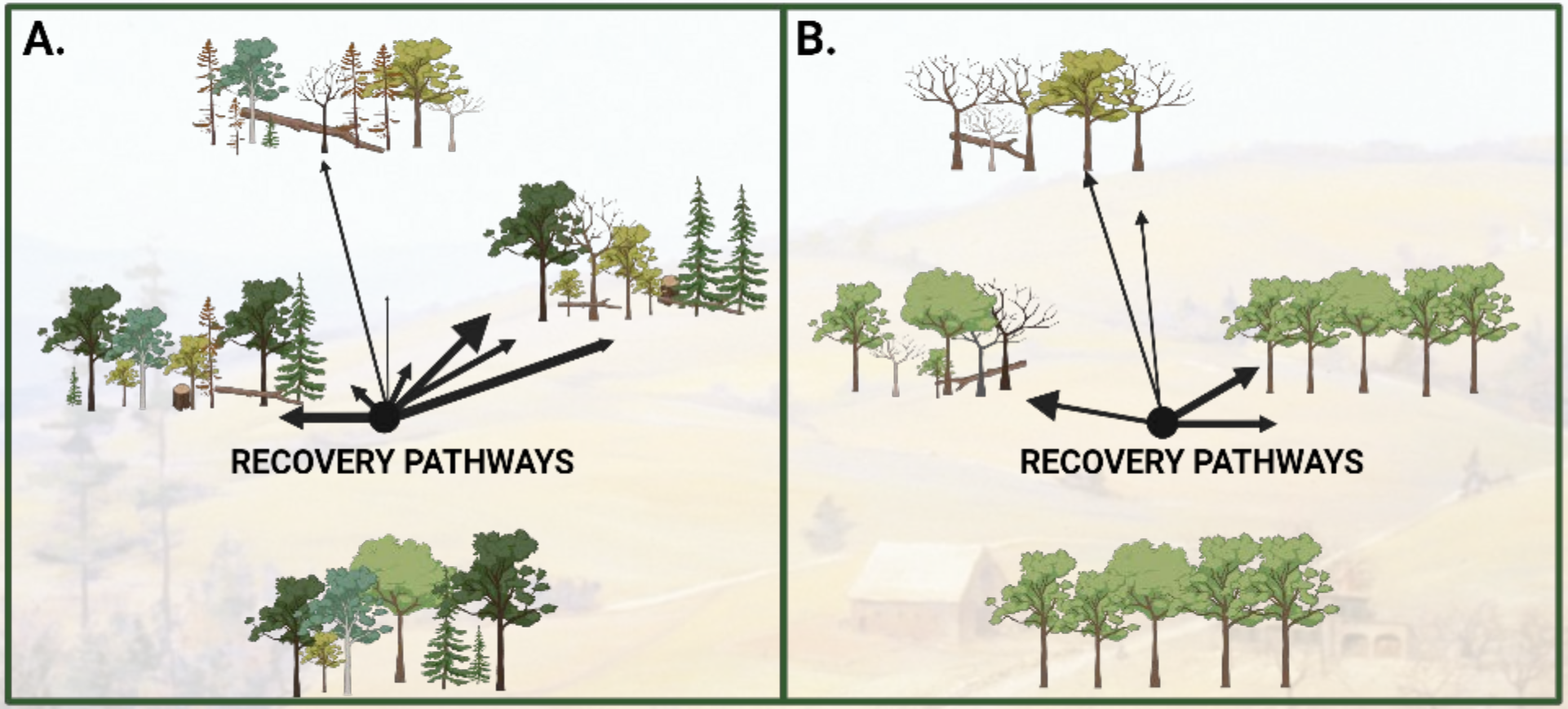

Complex Forest Structure

Simple Forest Structure

Adapted from Puettmann and Messier 2020

FOREST RESILIENCE

A resilient forest can withstand and recover from disturbances such as climate, pests, and pathogens.

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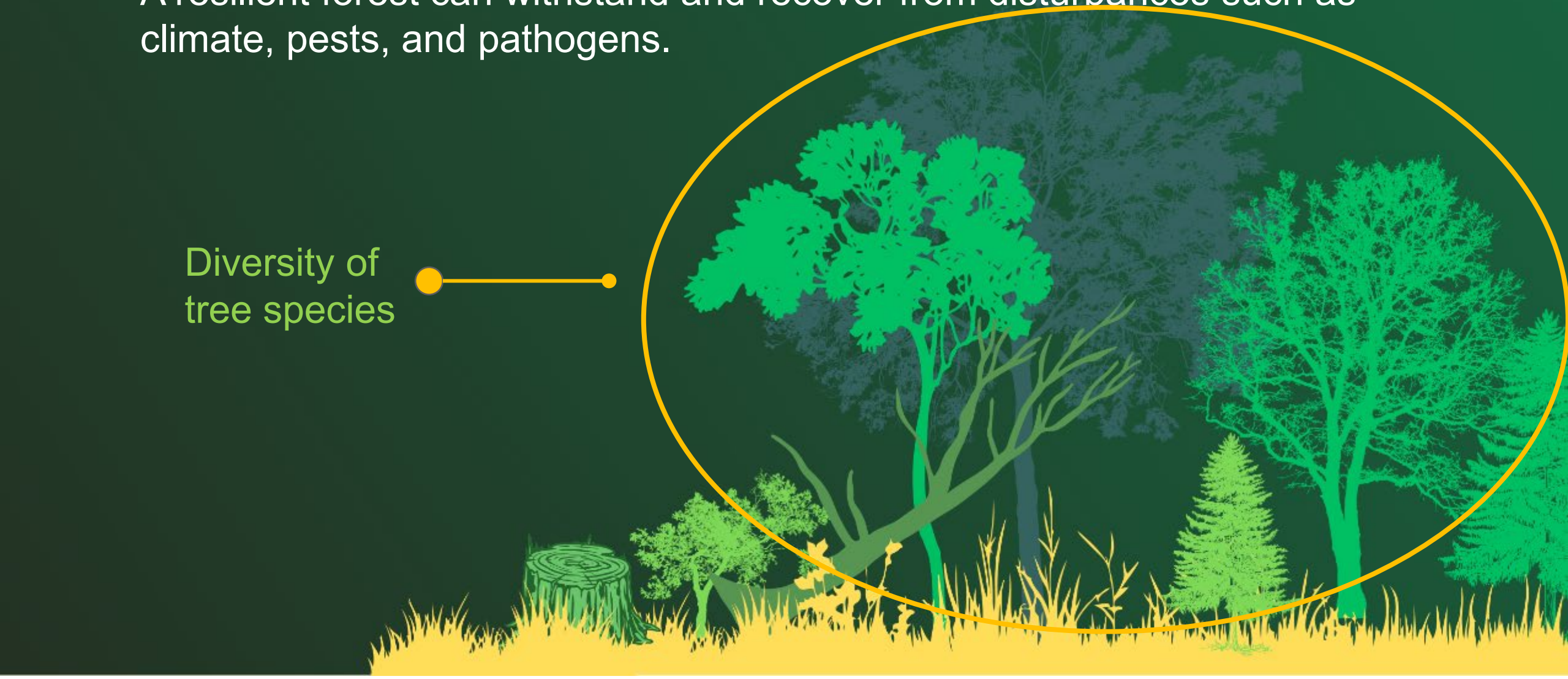

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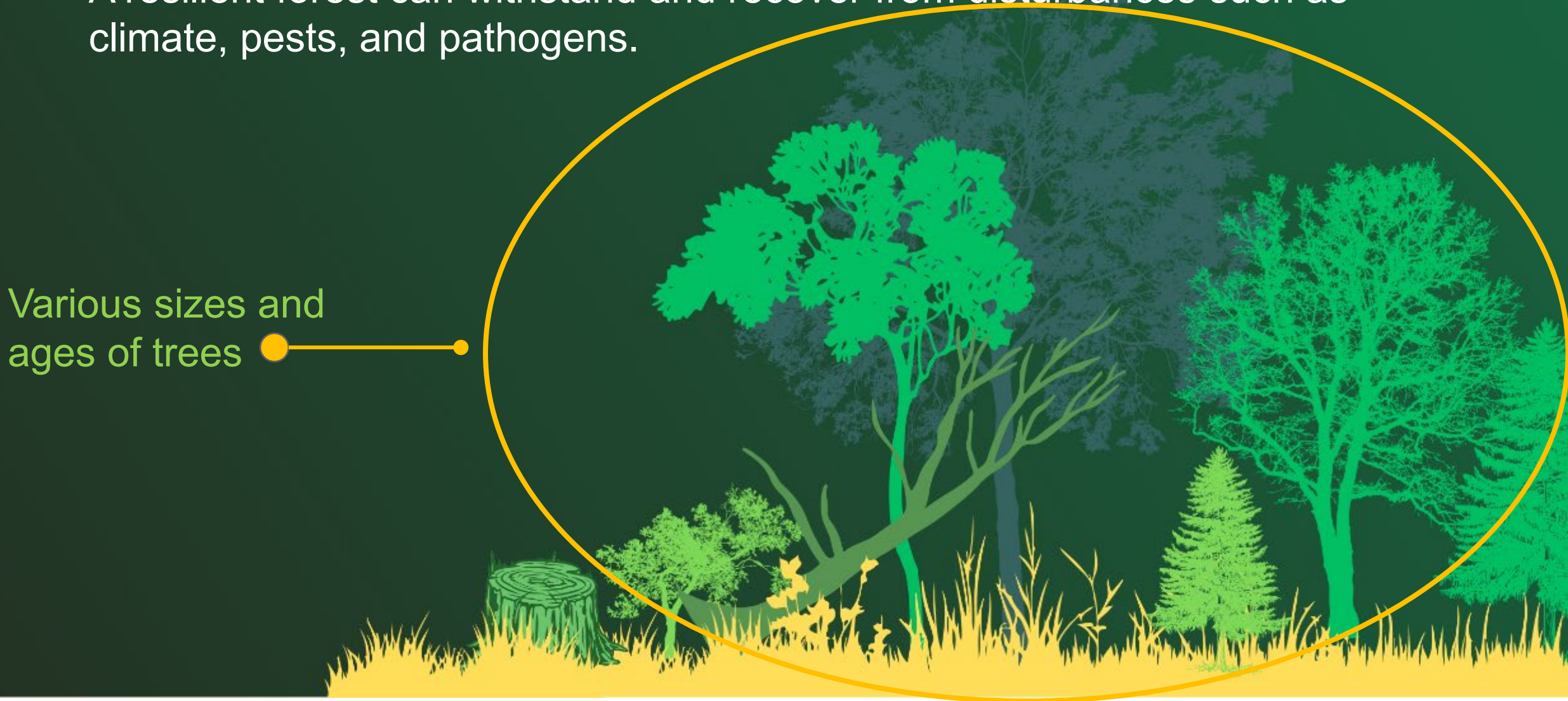

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Structural complexity

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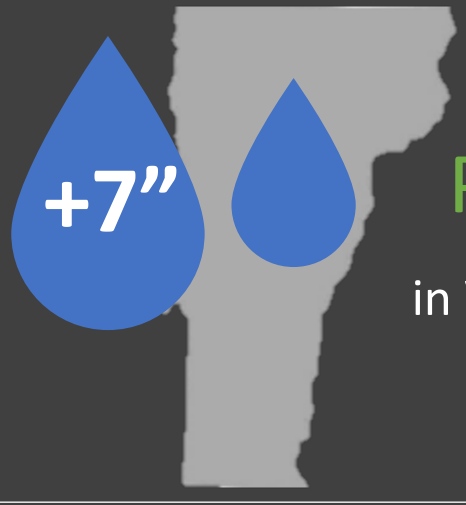
CLIMATE CHANGE IS LEADING TO GREATER VARIABILITY

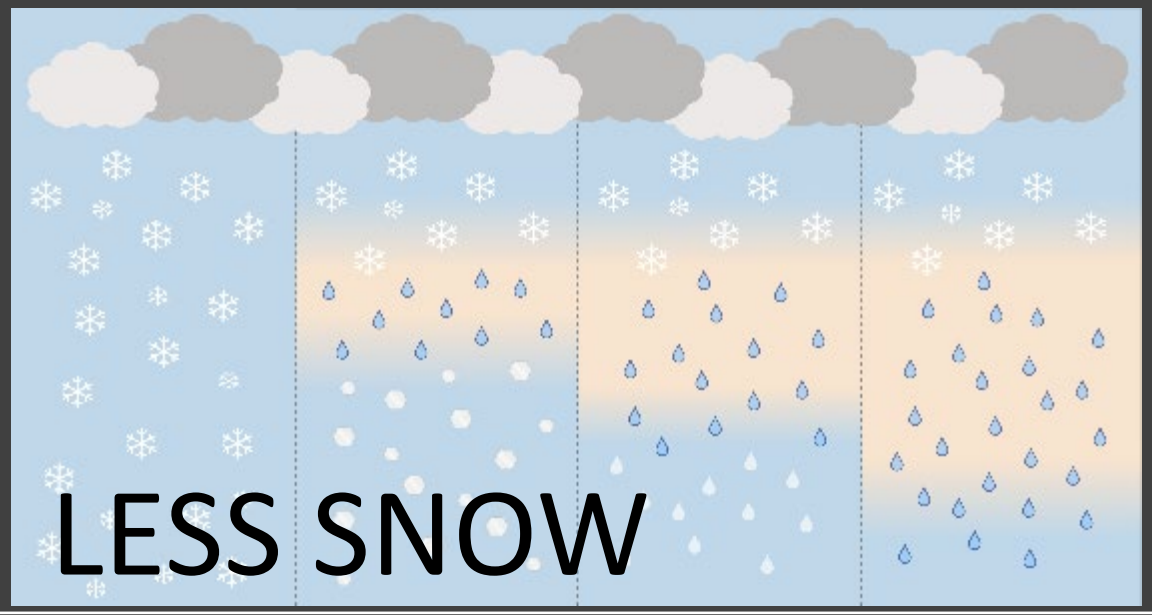


ANNUAL PRECIPITATION

in Vermont has increased by almost 7 inches

2°F
in summer

4°F
in winter



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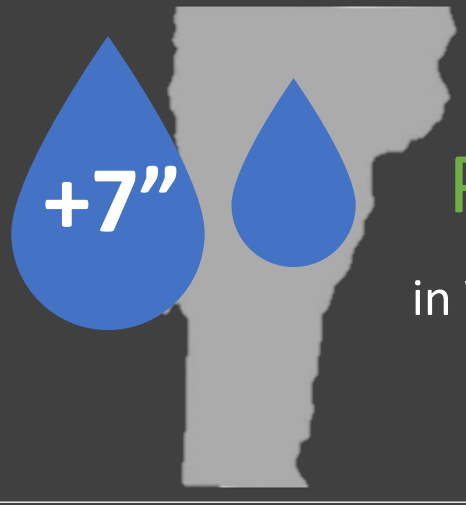

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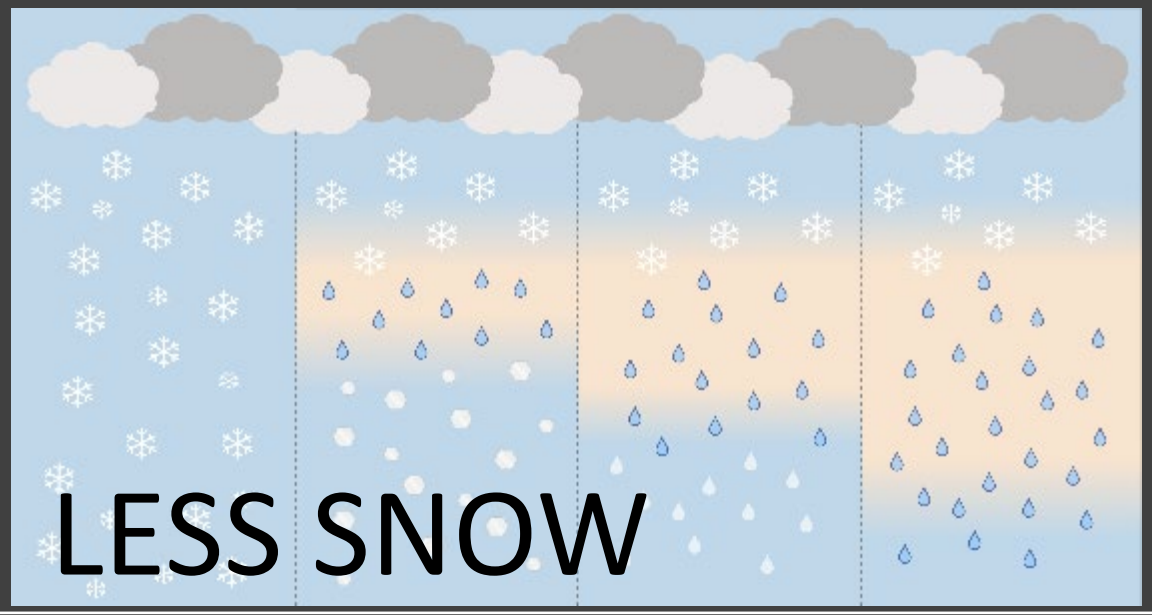
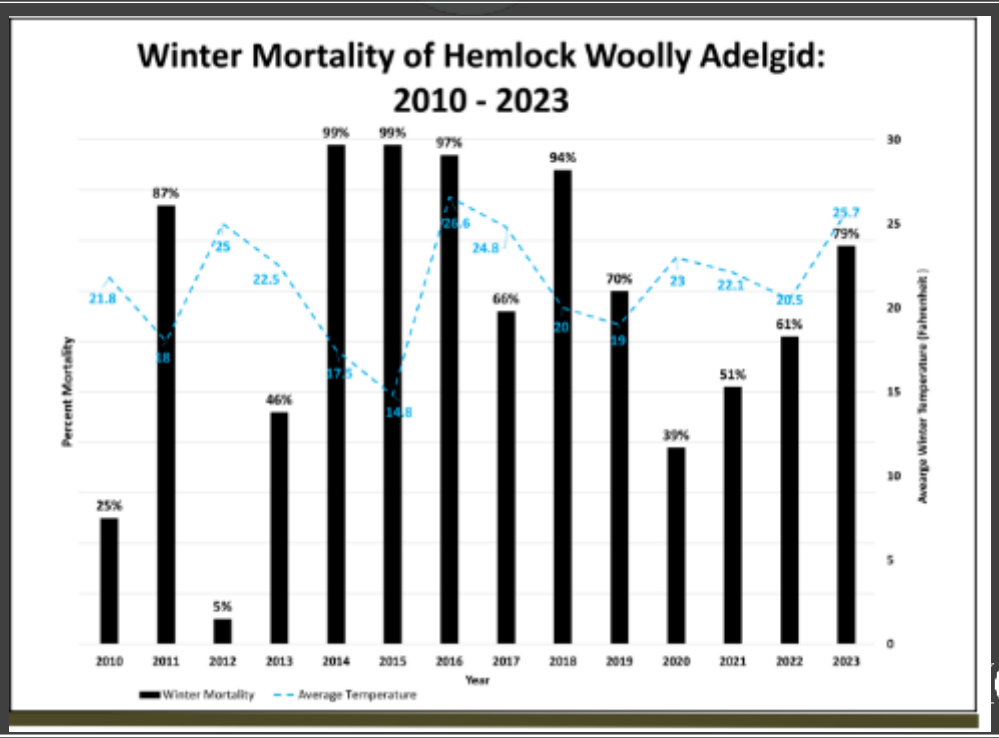




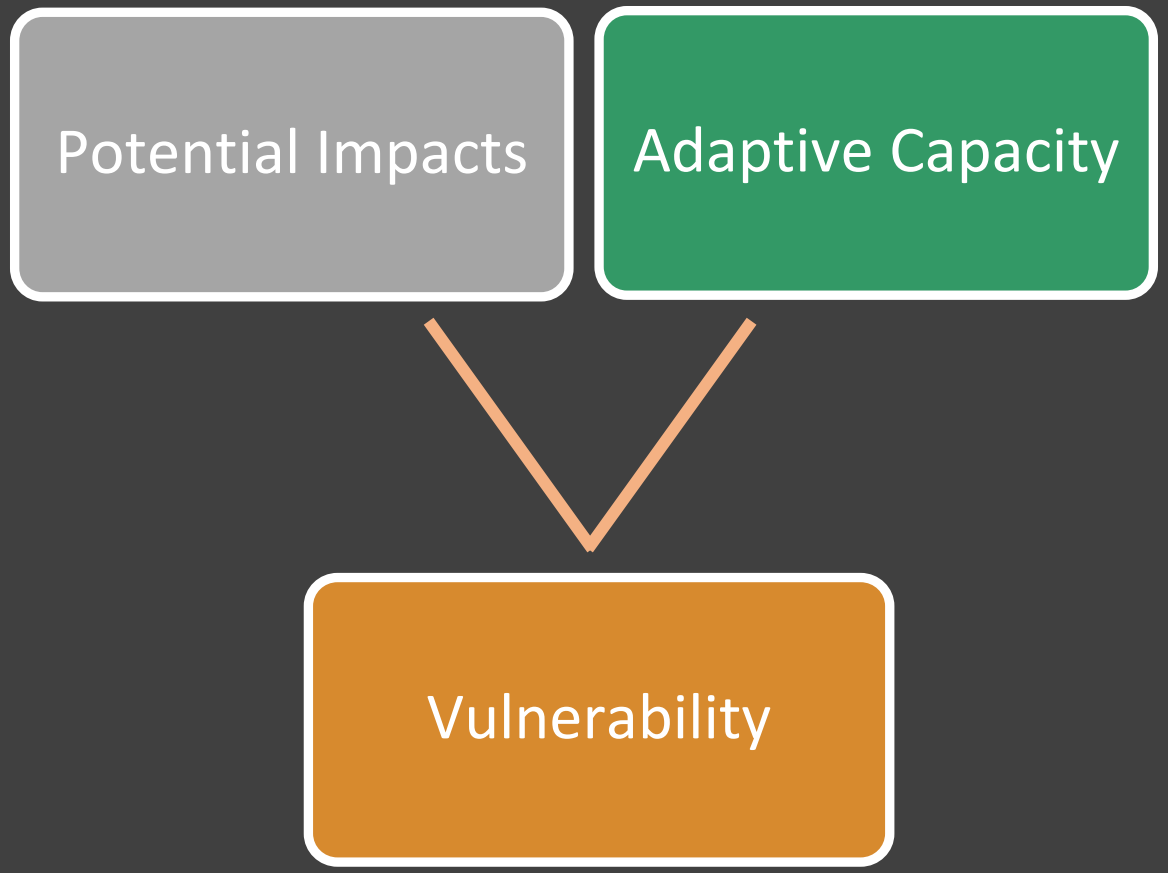
Data source: FPR

CLIMATE CHANGE IS LEADING TO GREATER VULNERABILITY

Two components:

What is the system is **exposed** to?
(*Changes in temperature, rainfall, storms, dominant species, stressors)*

How **sensitive** is the systems to those changes?



How **resilient** is the system to potential impacts?

Source: NIACS

ASSESSING SITE VULNERABILITY

FORESTS, PARKS & RECREATION
VERMONT
AGENCY OF NATURAL RESOURCES

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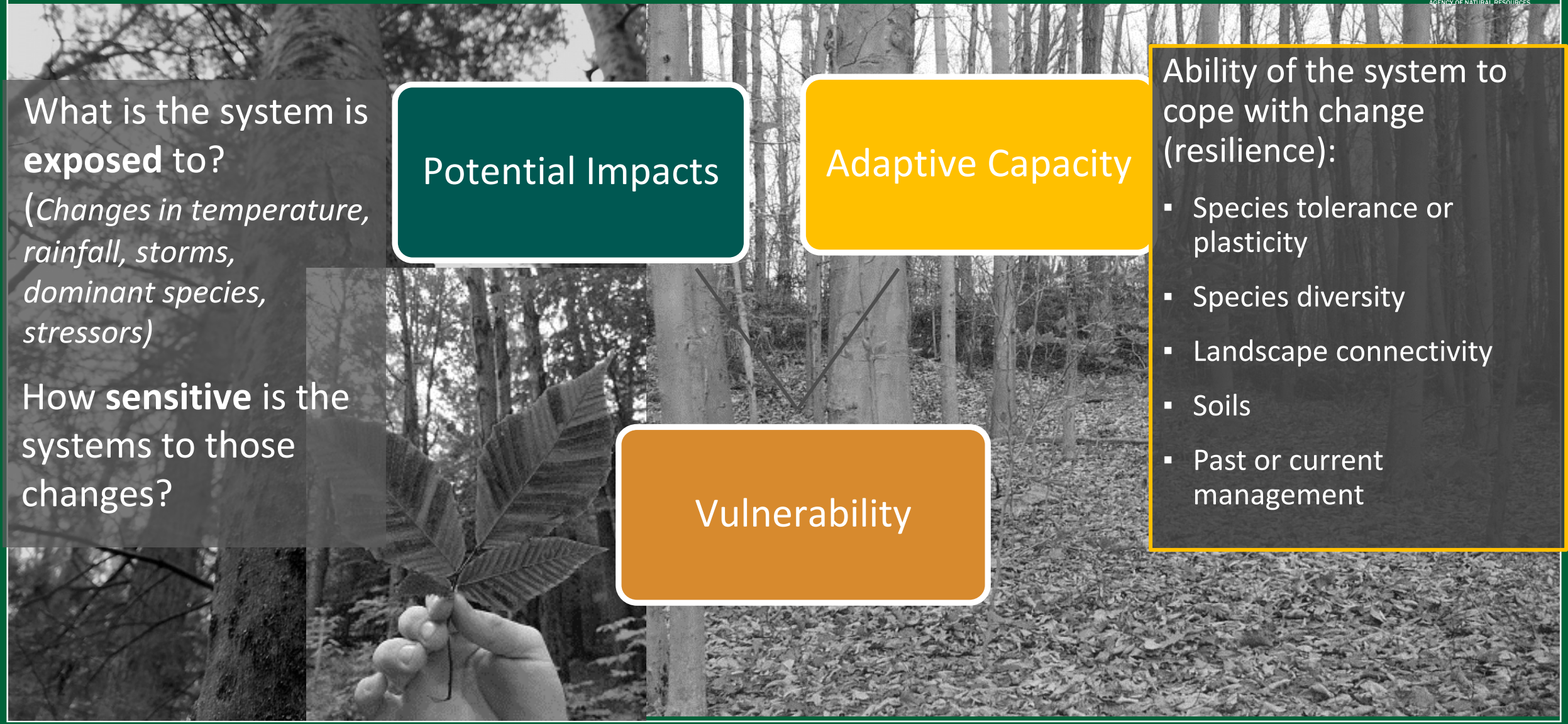

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(*Changes in temperature, rainfall, storms, dominant species, stressors)*

How **sensitive** is the systems to those changes?

Potential Impacts

Adaptive Capacity

Ability of the system to cope with change (resilience):

- Species tolerance or plasticity
- Species diversity
- Landscape connectivity
- Soils
- Past or current management

Vulnerability

LA PLAYA

Low-density shelterwood (Fall 2021)

- Soil scarification
- Mechanical removal of diseased beech

Regeneration of:

- Sugar maple
- Yellow birch
- Pin cherry

Photo: Groton State Forest

BILL SLADYCK WMA

HOW DO WE MAKE MANAGEMENT DECISIONS?

We want to **optimize** multiple objectives, not maximize a single objective

- Climate resilience
- Carbon storage and sequestration
- Biodiversity
- Recreation
- Forest products

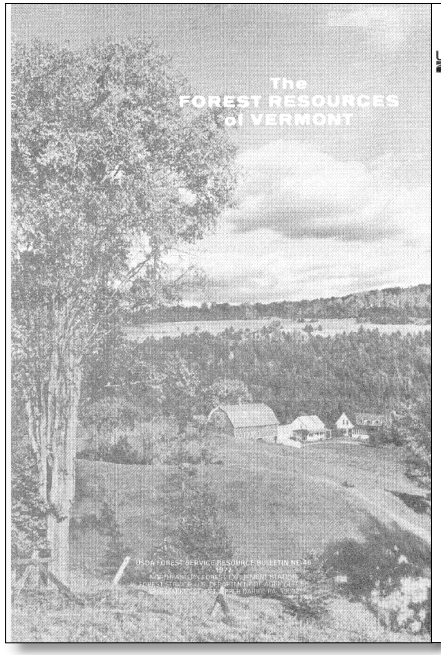
FOREST MONITORING DATA & VERMONT'S FOREST ECONOMY

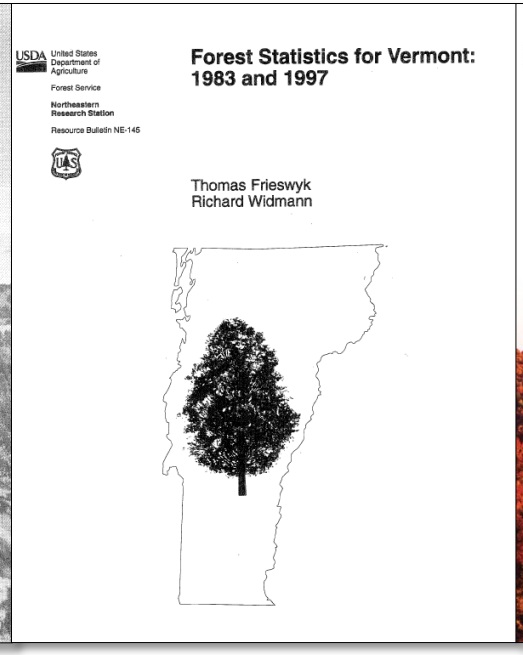
Katharine Servidio, Forest Economy Program Manager

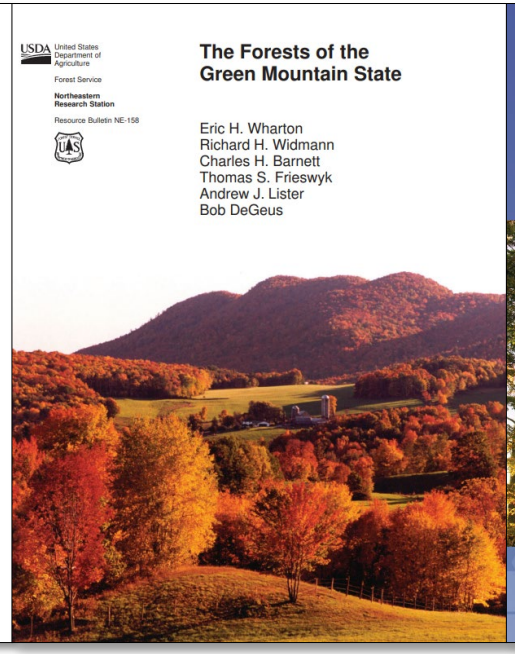
- katharine.servidio@vermont.gov

VERMONT FOREST DATA

- Vermont FPR Forest Resource Harvest Survey (published annually since 1945)
- Forest health monitoring partnerships
- US Forest Service, Forest Inventory & Analysis
  - Periodic inventory: 1948, 1965, 1973, 1983, 1997
  - Annualized inventory system: 2003 – present





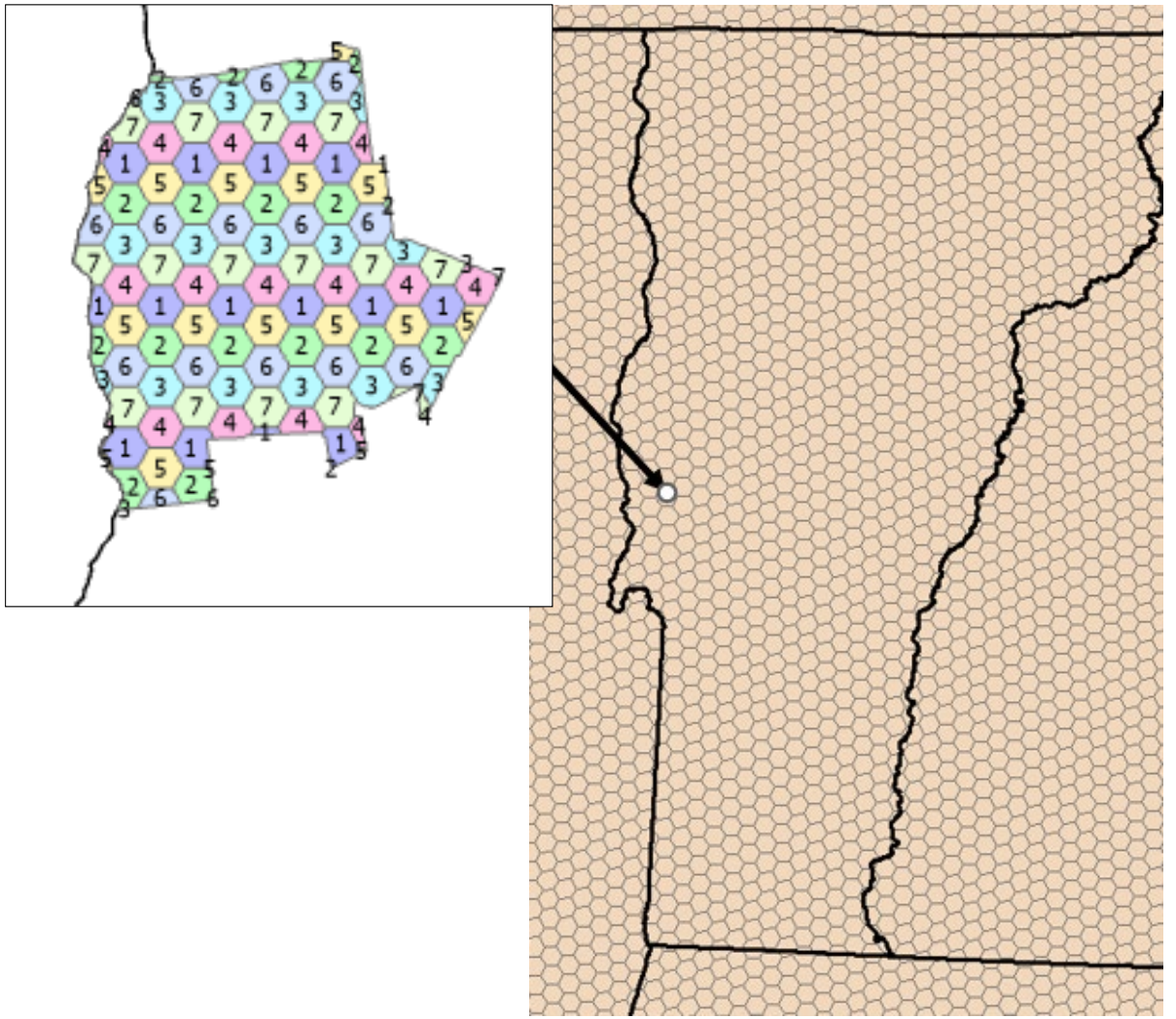


FOREST INVENTORY & ANALYSIS

- Forest Inventory and Analysis (FIA) is a cooperative program between the U.S. Forest Service and states
- Mandated by Congress in the 1930s
- The data can:
  - Indicate if forest resources are being managed sustainably
  - Provide estimates of forest trends such as gains/losses of forest acreage, species composition, age/quantity/quality of timber resources, and health
- Data collection occurs on plots across the state on public and private land
  - Landowners can deny access to their property

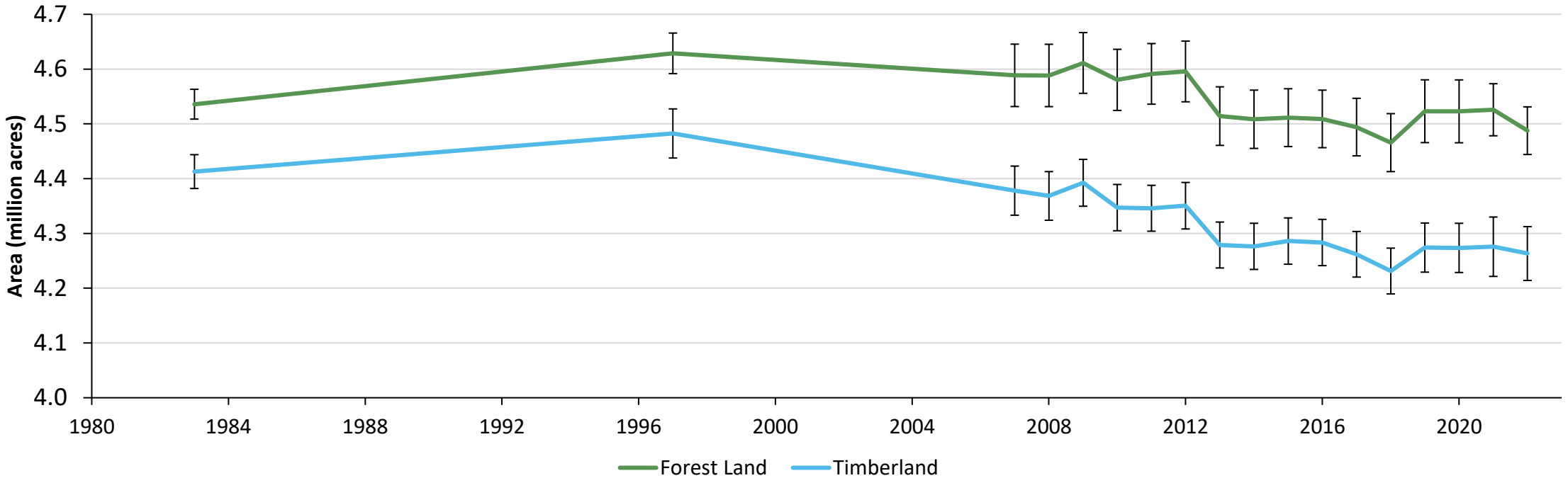
FOREST INVENTORY & ANALYSIS: VERMONT

- 1 plot for ~6,000 acres
- More than 1,000 plots in Vermont
- 10-20% of plots sampled annually
- Measurements include:
  - Species
  - Diameter
  - Height
  - Tree class
  - Log grade
  - Crown position
  - Introduced/exotic plant species, slope, aspect, forest type, stand age, disturbances/treatments



FOREST INVENTORY & ANALYSIS: VERMONT

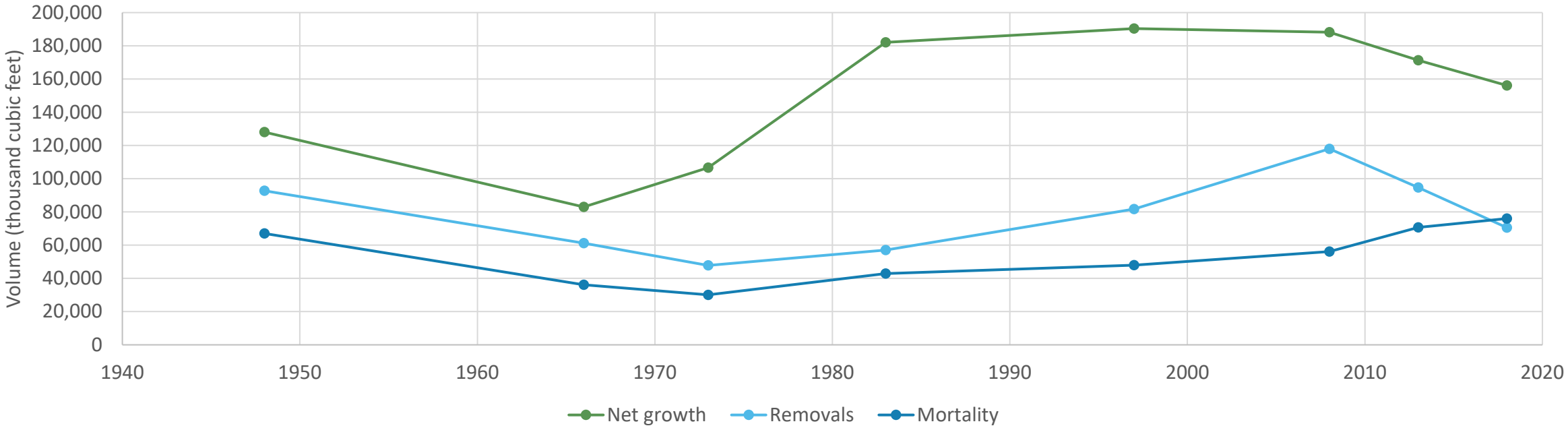
Forest land and timberland area by year.



	2022 Estimate	Sampling error (%)	2017 Estimate	Sampling error (%)	Change since 2017 (%)
Forest Land	4,487.6	1.0	4,494.1	1.0	-0.1
Timberland	4,263.3	1.2	4,266.3	1.2	-0.1

FOREST INVENTORY & ANALYSIS: VERMONT

Net growth, total removals, and mortality of growing stock on timberland by inventory year. Includes land-use change.



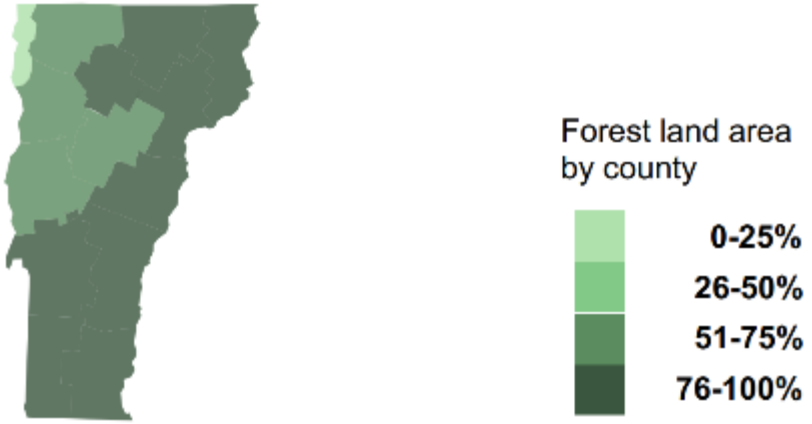
	2022 Estimate	Sampling error (%)	2017 Estimate	Sampling error (%)	Change since 2017 (%)
Annual net growth	159,053.9	4.1	168,121.2	4.5	-5.4
Annual mortality	74,598.3	6.6	73,049.1	6.6	2.1
Annual harvest removals	55,843.6	13.4	66,094.5	15.9	-15.5
Annual other removals	14,144.1	38.9	12,091.0	39.3	17.0

VERMONT'S FOREST RESOURCES

Forest Area: Vermont, 2022

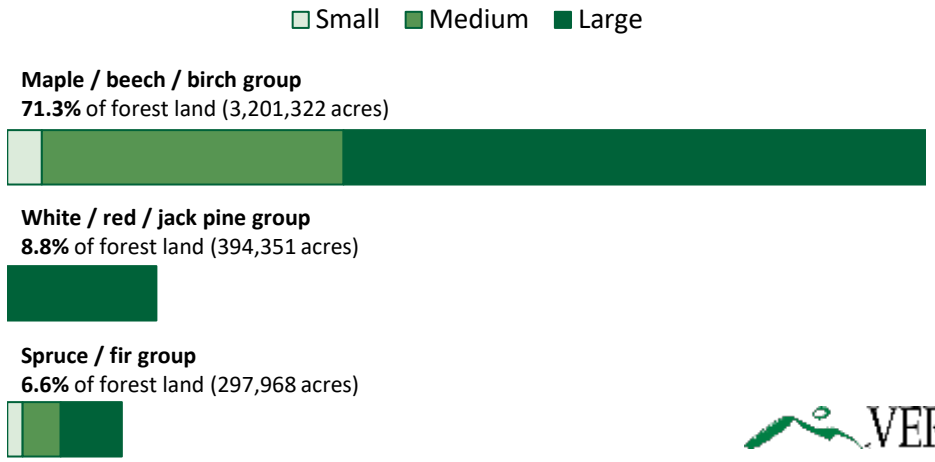
Forest land area: 4,487,566 acres (±0.97% SE)

Timberland area: 4,263,273 acres (±1.15% SE)



Forest Composition: Vermont, 2022

Most common forest-type groups by stand size class



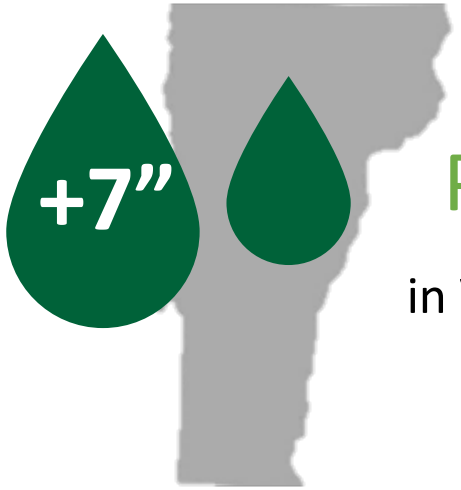
Data source: US Department of Agriculture, Forest Service. 2024. Forests of Vermont, 2022: FIA annual snapshot. Resource Update FS-697.

VERMONT'S FOREST ECONOMY

- 9,107 direct jobs
- $291.5 million in direct labor income
- $393.4 million in value-added
- **$1.4 billion in direct output**

Data source: Forest Products Industries' Economic Contributions: Vermont

STATE OF THE FOREST ECONOMY



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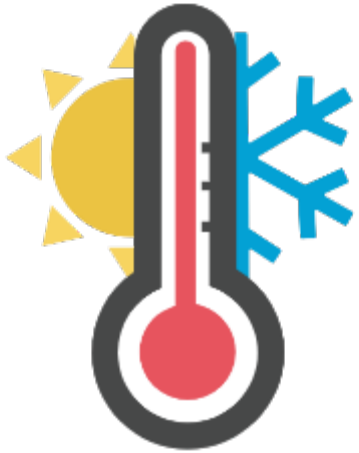
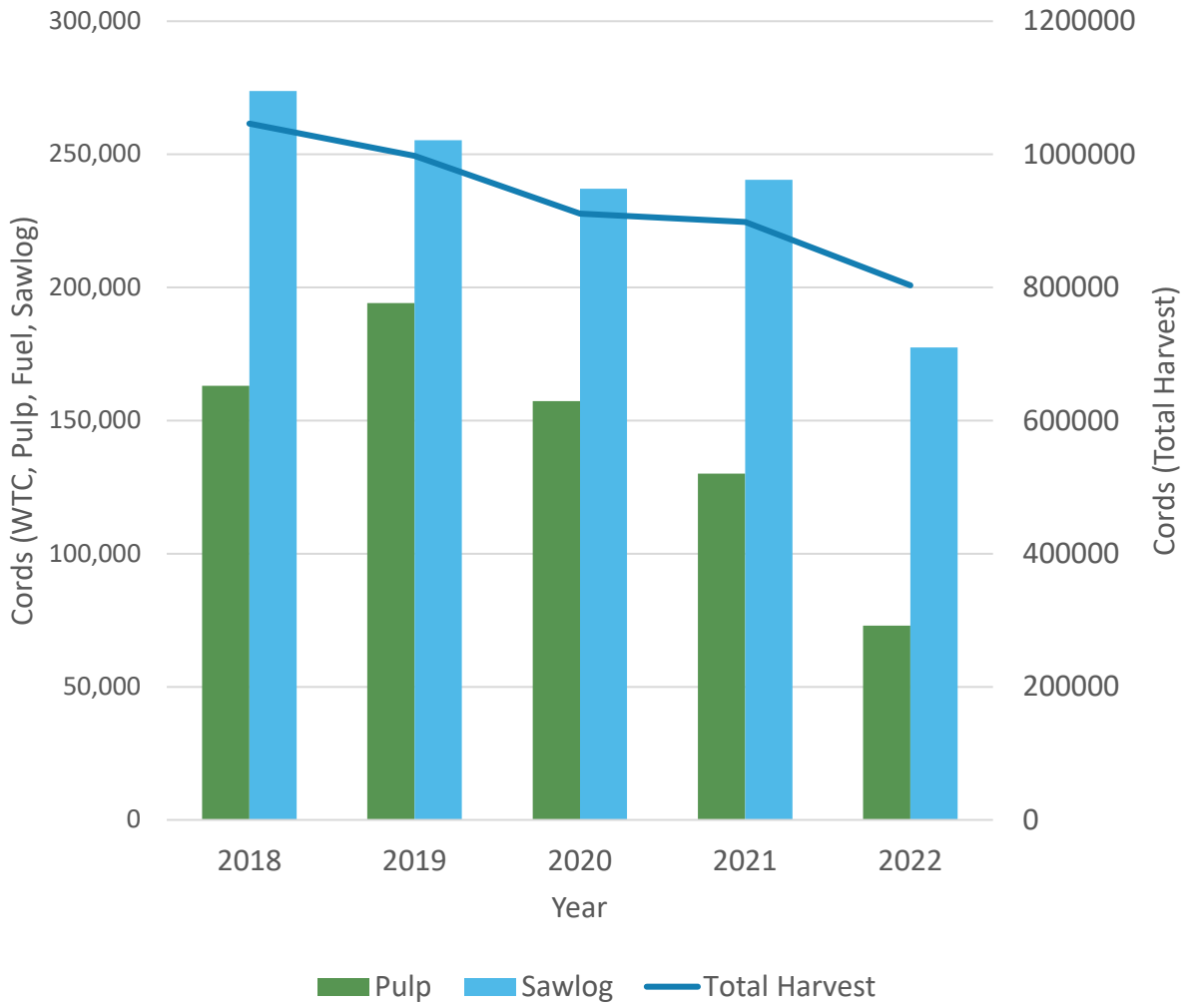


4°F

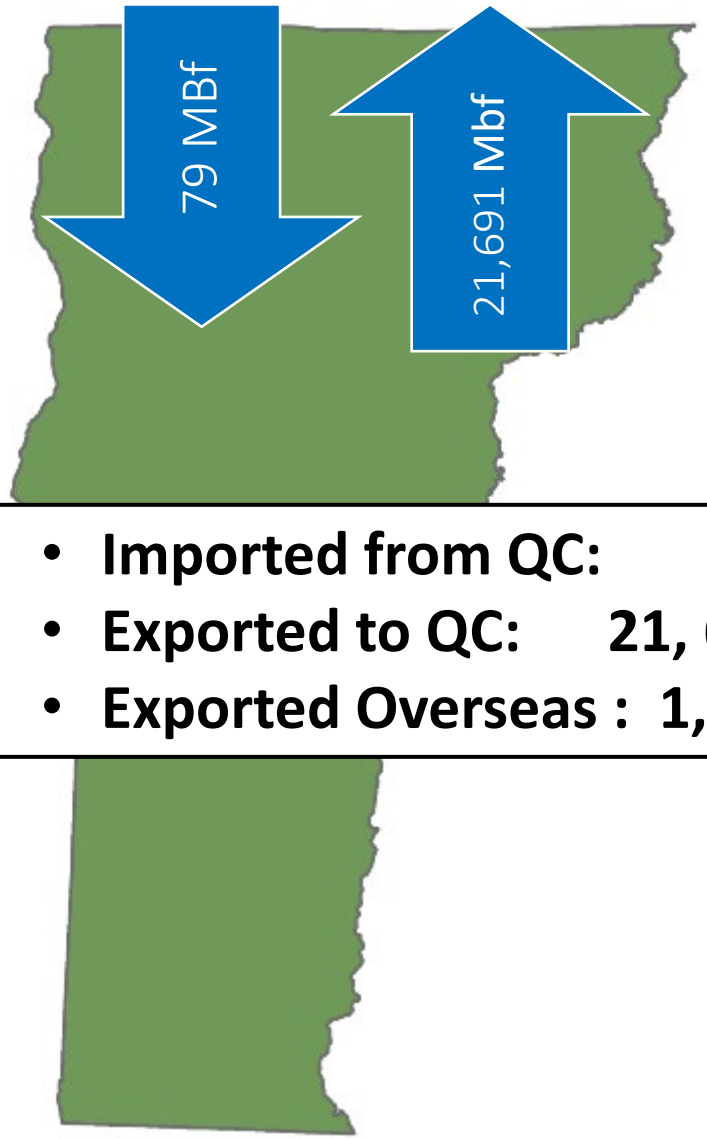
AIR TEMPERATURES

have increased



Data source: VT FPR, 2023. 2022 Annual Harvest Report

WOOD FLOWS 2022: SAWLOGS



- **Imported from QC:** **79** Mbf
- **Exported to QC:** **21, 691** Mbf
- **Exported Overseas :** **1,810** Mbf

VERMONT 2022

- Sawlog Harvest: 88,723 Mbf
- Processed in VT: 79,988 Mbf
- Exported: 41,726 Mbf
- Imported: 32,991 Mbf

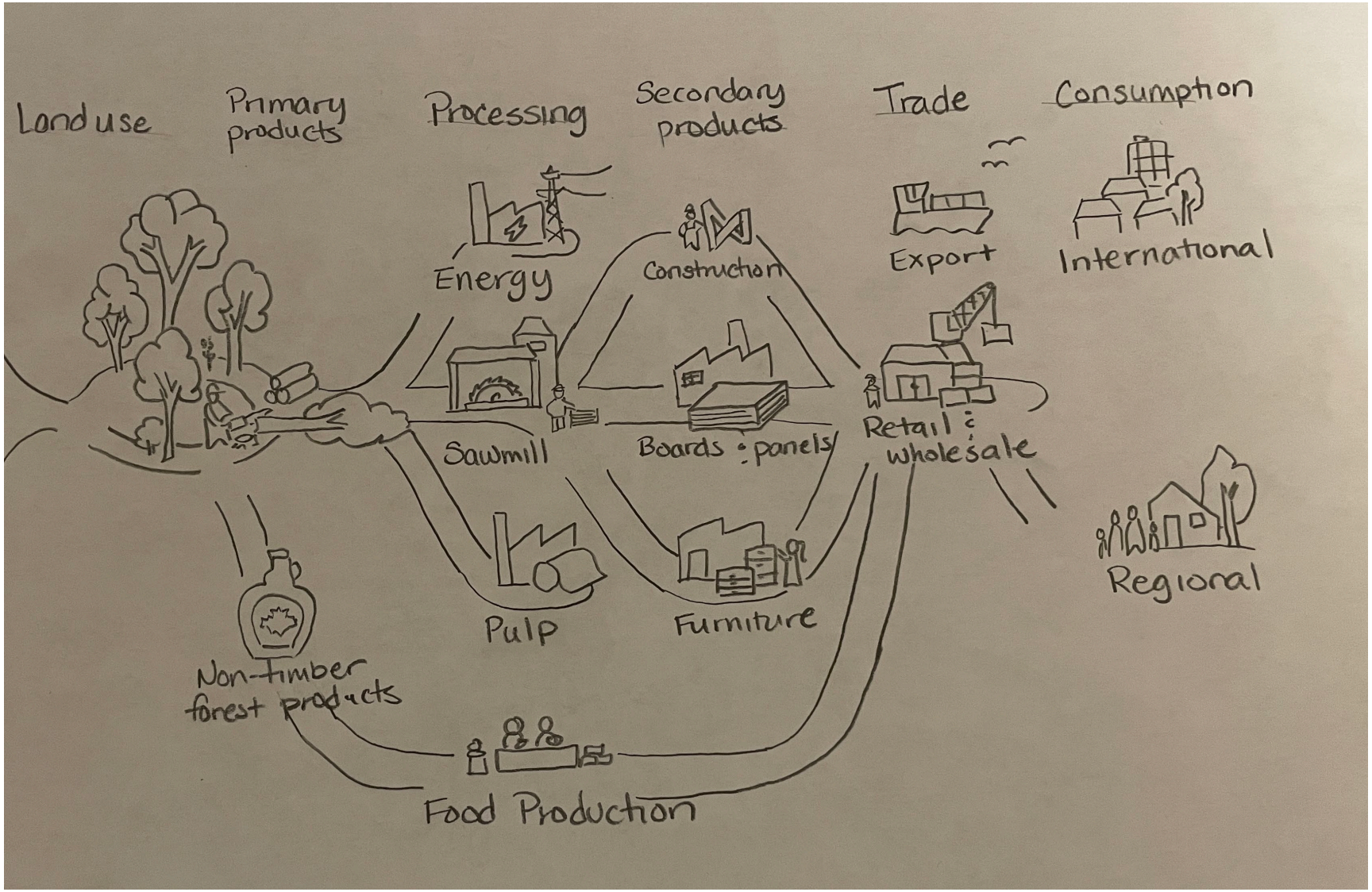
32,991

Imported from other states: 22,969 Mbf
Exported to other states: 34,757 Mbf

41,726

Data source: VT FPR, 2023. 2022 Annual Harvest Report

A (SIMPLIFIED) FOREST PRODUCTS VALUE CHAIN



OUR WORK & LOOKING AHEAD