



REVISTING: FOREST HEALTH & INTEGRITY

An Update for the Senate Natural Resources and Energy Committee

Michael Snyder, Commissioner

15 April 2021

How are we doing in our work to support the integrity of Vermont's forests?

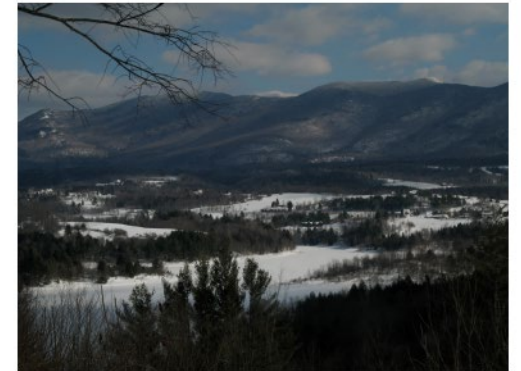
- What we've done
- Where do we go

Recommendations in support of Forest Health and Integrity In response to Act 61 of 2015

VERMONT
DEPARTMENT OF
FORESTS, PARKS
AND RECREATION

AGENCY OF
NATURAL
RESOURCES

MARCH 2016



SUBMITTED TO:

THE SENATE AND HOUSE COMMITTEES ON
NATURAL RESOURCES AND ENERGY

AND

THE HOUSE COMMITTEE ON FISH, WILDLIFE,
AND WATER RESOURCES

THE FORESTS OF VERMONT

State of Vermont's Forests:

- **4th** most forested state
- **4.5** million acres
- **74%** forest cover





VERMONT IS FOREST STRONG



Ecological



Cultural



Economic



THE FORESTS OF VERMONT

Current rate of forest land conversion:

- **.5%** average annual loss of forestland
- **11,189** acres of net forestland converted annually

Estimated 2050 forecast based on current trends:

- **324,481**+/- acres converted
- **67%** +/- forest cover





ACT 118 of 2014

AN ACT RELATING TO FOREST INTEGRITY

Accomplishments:

- Right to Conduct Forestry
- Logger Safety and Workers Compensation
- Forester licensing
- Timber Trespass as a crime
- Municipal Planning
- Sales and Use Tax exemptions

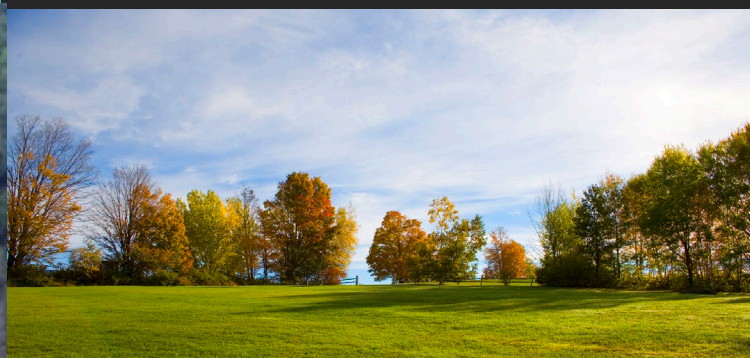
We've done a lot.





**Markets
and
Workforce
Challenges**

LET'S KEEP VERMONT **FOREST STRONG**



**Conversion to
Non-Forest Use**

**Poor Regeneration
and
Over Browsing**



**Invasive Plants,
Pests &
Pathogens**



STRATEGIES FOR THE FUTURE

All are still particularly important

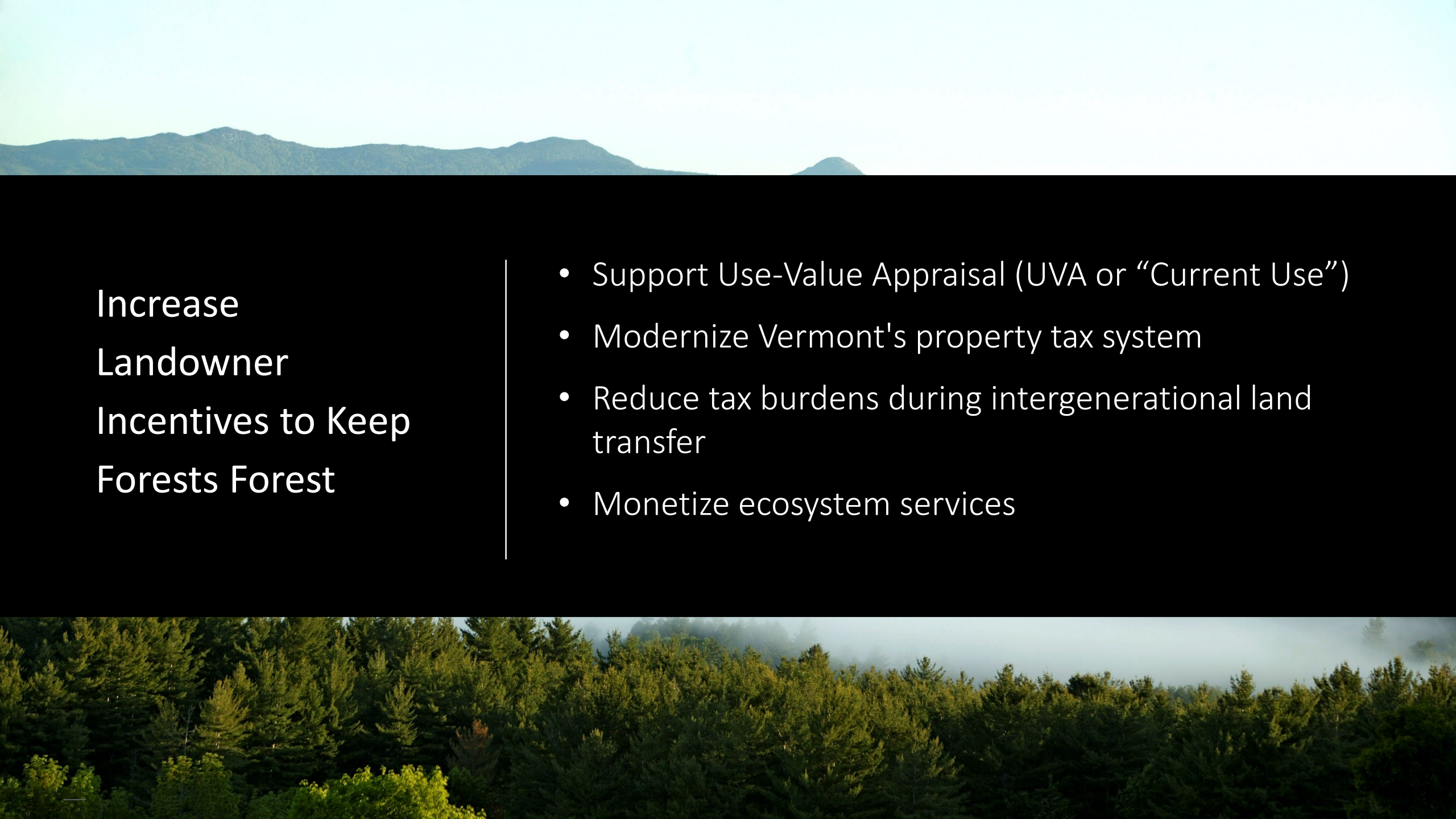
- Support Sustainable Forestry and the Vermont Forest Economy
- Increase Landowner Incentives to Keep Forests Forested
- Invest in Strategic Forestland Conservation
- Outreach and Education on Forest Values and Benefits



Sustainable Forestry and the Vermont Forest Economy

- Support & Improve Training for Loggers
- Protect and improve infrastructure that supports the local wood industry
- Expand modern wood heating in Vermont
- Expand markets for Vermont wood products
- Recognize and promote the value of forests in outdoor recreation and tourism



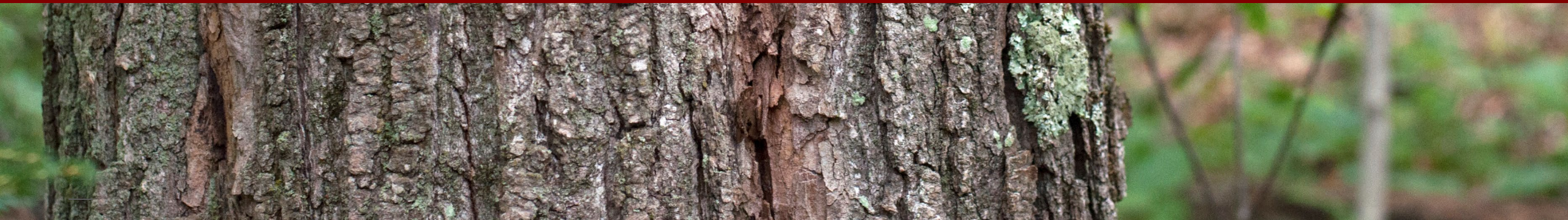


Increase
Landowner
Incentives to Keep
Forests Forest

- Support Use-Value Appraisal (UVA or “Current Use”)
- Modernize Vermont's property tax system
- Reduce tax burdens during intergenerational land transfer
- Monetize ecosystem services



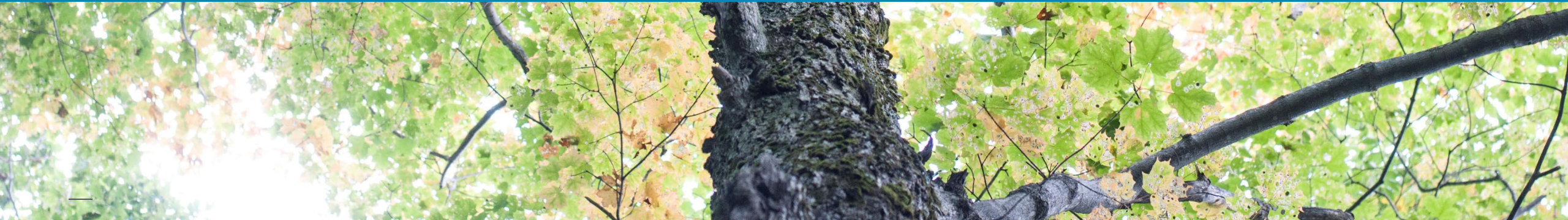
Invest in Strategic Forestland Conservation

- Create a robust funding source for forestland conservation
 - Establish a common goal and clear conservation priorities
 - Enhance Forestland Conservation Tools and Programs
- 



Support Outreach and Education on Forest Values and Benefits

- Support landowner assistance and education
- Provide technical assistance to towns, regional commissions and watershed groups
- Promote livable downtowns
- Engage schoolchildren



CLIMATE CHANGE AND FOREST HEALTH

The plan does not recognize strategies to adapt to a changing climate and health threats



- Forest can **mitigate** climate change
- Forests are **impacted** by climate change

NEW RESOURCES ON FOREST CARBON FOR A RANGE OF USES AND AUDIENCES

What is Forest Carbon?

The carbon cycle
The carbon cycle is the key to life on Earth. Through natural processes, carbon is exchanged among living organisms, soil, rocks, water, and the atmosphere. However, humans have disrupted the carbon cycle by burning fossil fuels and disturbing ecosystems, resulting in a significant increase in emissions of carbon dioxide (CO₂) and other greenhouse gases (GHG) into the atmosphere where they alter the Earth's energy balance and cause climate change. Because CO₂ is removed from the atmosphere through photosynthesizing plants, forests and other plant-based ecosystems are vital in maintaining the carbon cycle.

How do forests use carbon?
Through photosynthesis, trees and other plants take in CO₂ from the air to make carbon-based sugars (carbohydrates) using water and sunlight, releasing oxygen to the atmosphere in the process. Trees use these sugars to maintain day-to-day processes (and respire some CO₂ in doing so). But trees also use carbohydrates to grow their trunk, branches, roots, leaves, flowers, seeds, and fruits. The proportion that a tree uses for growth compared to respiration depends on the tree's species and age, along with the time of year and environmental conditions. When a tree produces seeds or makes defense chemicals to ward off insects, there is less energy (carbohydrates) to devote to growth.

Unlike non-woody plants, trees can store an incredible amount of carbon in wood. Wood gets its strength and flexibility from these carbon compounds, like cellulose and lignin. About 50% of a tree's dry weight is made up of carbon.

If a tree dies and is decomposed by microbes or burned in a fire – whether in the forest or a woodstove – CO₂ is released back to the atmosphere but at different rates. The carbon can then be taken up by another tree and the cycle repeats.



What is Forest Carbon?

Forest Carbon Markets for Vermont Landowners

The Five Requirements of Carbon Offset Projects

- Real**: Reductions in emissions or increases in carbon sequestration must be tangible.
- Additional**: Reductions in emissions or increases in carbon sequestration must occur beyond a baseline scenario and not be the result of a prior legal commitment.
- Verifiable**: Reductions in emissions or increases in carbon sequestration must be quantifiable, monitorable, and verifiable by an accredited third-party through a standardized system.
- Permanent**: Reductions in emissions or increases in carbon sequestration must last in perpetuity (at least as long as the project contract).
- Enforceable**: Reductions in emissions or increases in carbon sequestration can be counted only once.

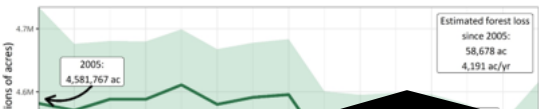
Carbon offsets are bought and sold in a **carbon market**. There are two types of carbon markets: **regulatory/compliance** and **voluntary**. The distinction between these two markets pertains only to the GHG emitter (offset purchaser), not the seller of carbon offsets. In the regulatory market, the government mandates a certain amount of carbon sequestration or emission reductions.

Carbon Markets for Vermont Landowners

Vermont Forest Carbon Inventory

Vermont Forest Carbon Inventory
Quantifying the amount of carbon contained in Vermont's forests, along with the fluxes between carbon pools over time and the impacts of human intervention (land-use conversion, harvested wood products), is essential for maintaining the natural greenhouse gas mitigation potential of forests. Continued monitoring is essential: the impacts of climate change, coupled with other stressors, could alter forest carbon dynamics through changes in tree health and forest cycling rates. Estimates of forest cover, carbon, and land-use change were derived from the USFS Forest Inventory and Analysis program¹² and follow guidelines by the Intergovernmental Panel on Climate Change (IPCC 2006)³. More information about forest carbon, a description of pools, and definitions of terms can be found in *What is Forest Carbon?*⁸

The amount of forestland is the most important factor in determining Vermont's forest carbon.
Based on data from multiple sources, Vermont has been losing forestland to other land uses since the early 1990s. Data from the USFS FIA Program¹ estimate the loss to be 4,191 acres per year (2005-2019) and NOAA's C-CAP² estimate the loss to be 2,051 acres per year (1996-2016). Despite uncertainty in the amount lost, as Vermont loses any amount of forestland, statewide carbon storage and sequestration decline.



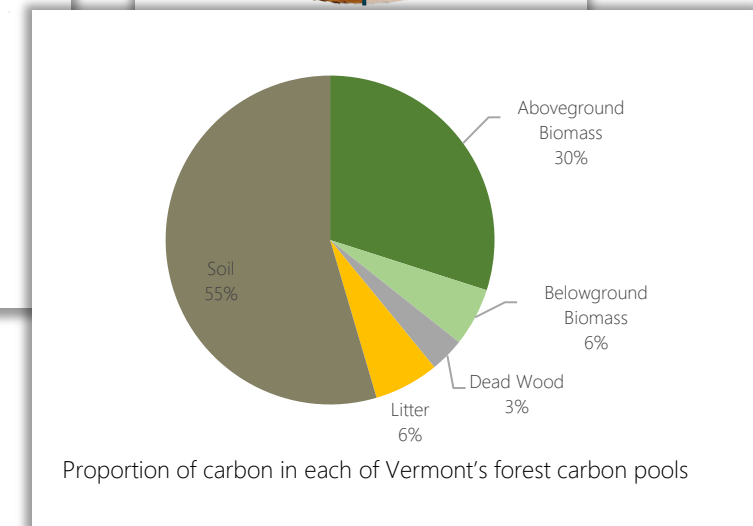
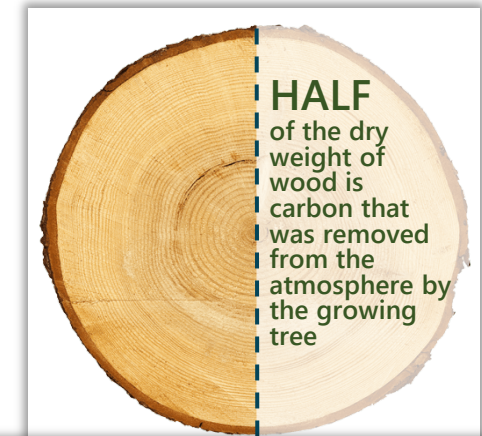
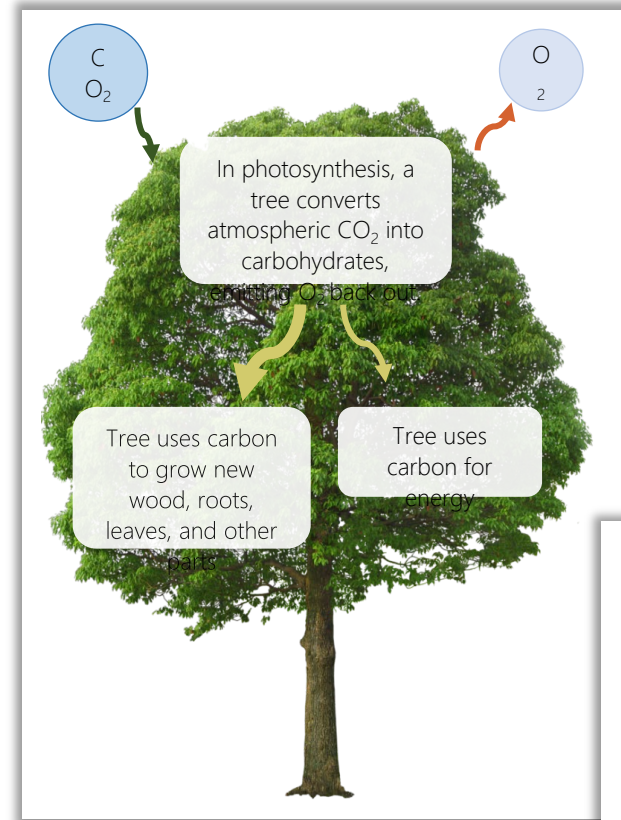
Vermont Forest Carbon Inventory

WHAT IS FOREST CARBON?

An informational guide to learn about the forest carbon cycle and key terminology. Contains graphical diagrams to help convey key messages.

Includes:

- Definitions for terms like carbon sequestration, storage, and flux.
- Description of the five forest carbon pools
- Methods scientists use to estimate and measure forest carbon.
- Forest carbon variation by forest type, age, and condition.

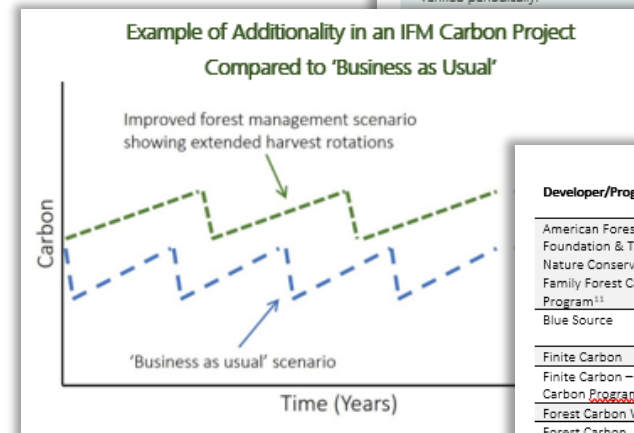
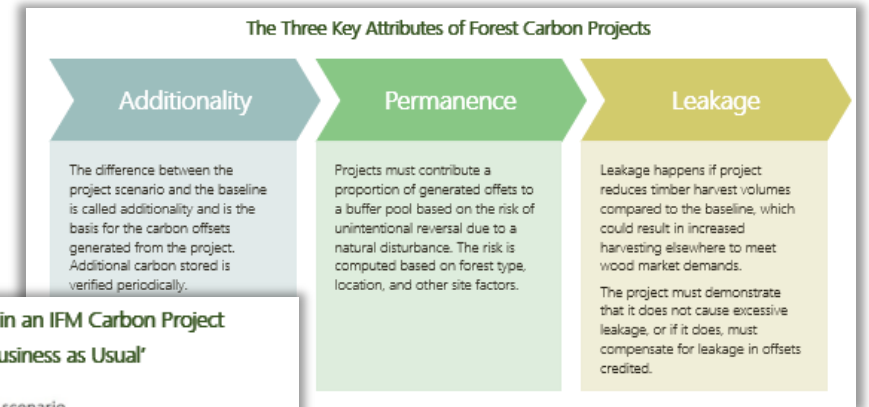


FOREST CARBON MARKETS FOR VERMONT LANDOWNERS

Guide to understanding forest carbon offsets and markets for Vermont forestland owners.

Includes:

- How carbon offsets are quantified and commoditized.
- The difference between carbon markets and registries.
- Compatibility of carbon markets with other forestland policies and programs, like VT's current use program.
- The development process for carbon offset projects
- A list of current programs available to VT landowners.



List of Forest Carbon Offset Project Developers and Programs²

Developer/Program	Website	Registry standard(s) ¹⁰	Commitment	Min. parcel size
American Forest Foundation & The Nature Conservancy – Family Forest Carbon Program ¹¹	https://www.familyforestcarbon.org/	VCS	20-year minimum	50-2400 acres
Blue Source	http://www.bluesource.com	ΔCB, VCS, CAR, CARB	40 or 100 years	>3000 acres
Finite Carbon	https://www.finitecarbon.com	ΔCB	40 years	>2000 acres
Finite Carbon – Core Carbon Program ¹²	https://corecarbon.com	ΔCB	40 years	>10 acres
Forest Carbon Works	https://forestcarbonworks.org	CARB	100 years	>40 acres
Forest Carbon Partners (New Forests)	https://newforests.com.au/forests-carbon-partners	CARB	100 years	Not provided
SilviaTerra – Natural Capital Exchange (NCAPE)	https://www.silviaterra.com/ncape	RISE ¹³	1 year	>20 acres
Spatial Informatics Group (SIG)	https://sig-sis.com/carbon-offsets	CARB, CAR, VCS	40 or 100 years	Varies
Terra Carbon	http://www.terracarbon.com	CARB	100 years	Not provided
The Nature Conservancy – Family Forest Co-op	https://www.nature.org/en-us/what-we-do/our-insights/perspectives/family-forests-powerhouse-in-climate-mitigation	VCS	40 years	200-2400 acres
The Nature Conservancy & Blue Source – Working Woodlands	https://www.nature.org/en-us/about-us/where-we-work/united-states/working-woodlands	VCS	40 years	>2400 acres

VERMONT FOREST CARBON INVENTORY

Uses the most recent data provided by the USDA Forest Service's Forest Inventory and Analysis program. Each graph is accompanied by interpretive information to help the reader understand and navigate the data.

Includes:

- Statewide annual estimates of forest loss.
- Carbon gains and losses from land-use change
- Rates of carbon storage accrual in the 5 forest carbon pools.
- Carbon flux across the forest sector, including harvested wood products.
- Per acre average carbon storage and flux by carbon pool.

