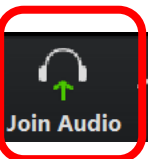


Webinar logistics

- ▶ Click on “Join Audio” to hear the webinar.
- ▶ This webinar is being recorded.
- ▶ Close captioning of this meeting is provided by auto transcription.
- ▶ The recording of the presentation will be posted on www.mass.gov/2030CECP afterwards.
- ▶ Remain on mute during the presentation.
- ▶ The line will be open for questions and oral comments after the presentation.
- ▶ Chat box is reserved for logistical issues and questions.
- ▶ Written comments should be sent to gwsa@mass.gov



Leave Meeting

February 2022 Public Webinar: *Additional Forest Carbon Policies for the Clean Energy and Climate Plan for 2025 and 2030*



February 11, 2022

Overview

- ▶ PROTECT: Avoiding forest conversion
 - ▶ Recommendations from GWSA Implementation Advisory Committee
 - ▶ Technical Solar Potential Study
- ▶ DURABLE WOOD PRODUCTS: Supporting forest protection and the local economy
 - ▶ Forest Carbon and the Harvested Wood Connection
 - ▶ Mass timber in Massachusetts
 - ▶ Research and development of local cross-laminated timber (CLT)
 - ▶ Local market and carbon storage
 - ▶ Tracking timber carbon flow
- ▶ Feedback, Question & Answer

Quick Refresher

- ▶ Main framing strategies in the NWL Plan of the CECP for 2025 and 2030:
 1. Protect NWL to protect current carbon storage
 2. Manage NWL to enhance and improve resiliency of carbon storage
 3. Restore NWL to enhance carbon storage
 4. Incentivize carbon storage in durable wood products
 5. Explore additional carbon sequestration to achieve net zero emissions by 2050

“Natural and working lands”(NWL) - lands within the commonwealth that: (i) are actively used by an agricultural owner or operator for an agricultural operation that includes, but is not limited to, active engagement in farming or ranching; (ii) produce forest products; (iii) consist of forests, grasslands, freshwater and riparian systems, wetlands, coastal and estuarine areas, watersheds, wildlands or wildlife habitats; or (iv) are used for recreational purposes, including parks, urban and community forests, trails or other similar open space land.

Quick Refresher: Resilient Lands Initiative

► Options for PROTECT:

- Natural Resources Protection Zoning (NRPZ) & related “cluster development”
- Tree Protection Bylaws
- Upland Drinking Water Protection Zones
- “PILOT for Climate” Payment
- Agricultural Preservation Restriction Program
- Landscape and watershed-scale conservation, stewardship and restoration projects
- Forest Viability Program

► Options for MANAGE:

- Forest Resilience Program
- Chapter 61C tax incentive program

► Options for RESTORE:

- Climate Risk Zones
- Urban and riparian tree planting programs
- Plot Restoration Opportunity Program
- Parking Lot Assessment and Restoration Program

Additional Options for PROTECT: Avoiding forest conversion

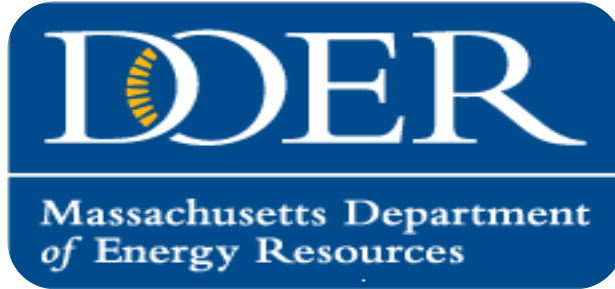
- Recommendations from the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC):

Land Use and Nature Based Solutions 1: Avoid Forest Conversion

Avoid the loss of forests in all geographies (rural, suburban and urban) by establishing new and increasing and streamlining existing grant and incentive programs for forest protection within the Executive Office of Energy and Environmental Affairs (EEA), and other state agencies, policies and programs. Programs should include priority set-asides for 1) conserving land near Environmental Justice (EJ) communities and water supply lands; 2) maintaining mature urban tree canopy; and 3) conserving large, interconnected forests (which contain the highest carbon). To further protect forests in all geographies, add tree removal as a mandatory threshold under Massachusetts Environmental Policy Act for an Environmental Impact Review, for trees of a size to be determined by geography. Measure the carbon loss from deforestation as well as urban tree loss in greenhouse gas inventories.

Additional Options for PROTECT: Avoiding forest conversion

- ▶ Interim 2030 Clean Energy and Climate Plan:
 - EEA and DOER will lead planning for ground-mounted solar development to ensure best land management practices that protect critical Massachusetts species and ecosystems, while MassCEC works to identify market mechanisms to incentivize



COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES
Patrick Woodcock, Commissioner

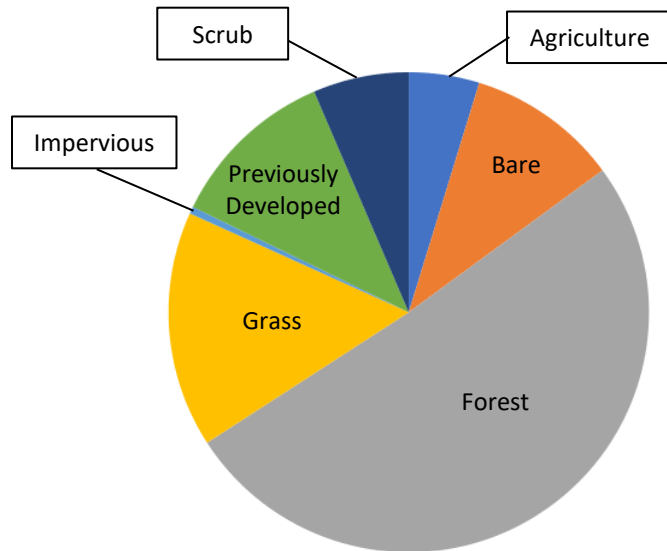
Technical Potential of Solar Study

Natural and Working Lands Public Meeting

February 11, 2022

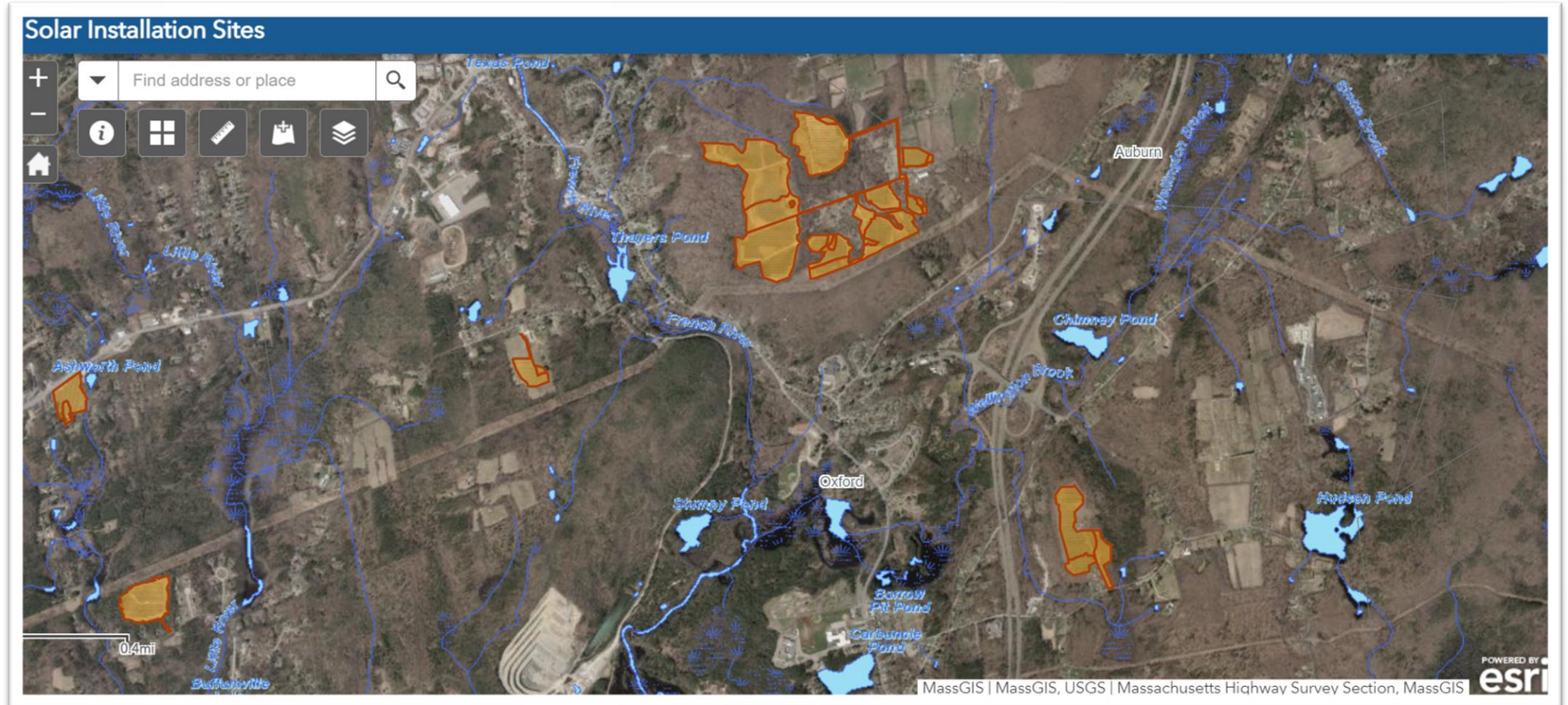
Massachusetts Solar Siting Analysis - 2021

- In early 2021, DOER release the findings of the Solar Siting Analysis
- The objectives of the analysis were to:
 - Establish a baseline of ground-mounted solar development in Massachusetts
 - Build methodology that is easily duplicated
 - Serve as building block for future work
- The analysis assess ground mounted solar development between 2010-2019 and characterized change in land classification



Land Cover Class	Area	
	acres	%
Forest	4036.3	51%
Grass	1260.2	16%
PrevDev	897.4	11%
Bare	807.8	10%
Scrub	510.8	6%
Agriculture	376.1	5%
Impervious	37.8	0%
Total	7926.5	

Solar Siting Analysis Mapping Tool and Data



Available at <https://www.mass.gov/service-details/annual-compliance-reports-and-other-publications>

Technical Potential of Solar Study

Study Objectives

- Build off the baseline solar siting analysis to assess how much solar could be sited in Massachusetts
- Identify preferred locations, barriers to development and potential solutions
- Environmental and cost factors should be assessed
- Develop stakeholder engagement process
- Final product should be accessible to all



Technical Potential of Solar Study

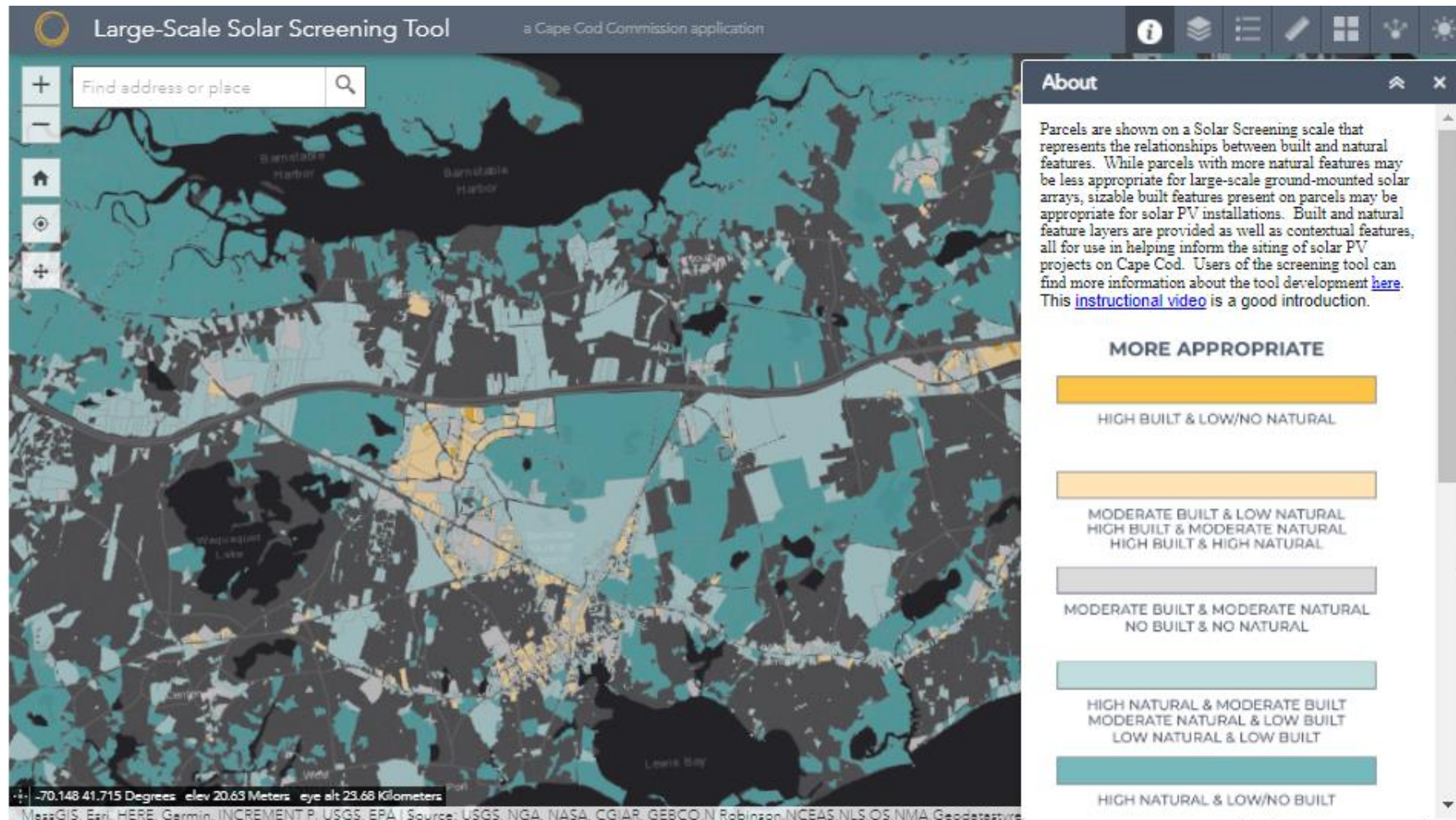
Other Studies and Analysis

- New Jersey (2012 and 2017)- Solar Siting Analysis
- Rhode Island (2019)- Solar Siting Opportunity Study
- California (2019)- Power of Place Technical Report- The Nature Conservancy
- Massachusetts (2020)- Solar Screening Tool- Cape Cod Commission
- New Jersey (2020)- Long Island Solar Roadmap
- Maine (2021-updated)- Renewable Energy Siting Tool- Maine Audubon



Technical Potential of Solar Study

- Cape Cod Commission- Solar Screening Tool at <https://www.capecodcommission.org/our-work/solar-screening-tool/>



Technical Potential of Solar Study

Anticipated Components

- Public Engagement
- Spatial Analysis
- GHG Analysis
- Policy Considerations
- Online Resource and Report



Technical Potential of Solar Study

Process (estimated timeline)

- Issue Request for Qualification (RFQ)- Winter 2022
- Evaluation, Selection and Contracting with Consultant- Spring 2022
- Engage Stakeholders- Summer 2022
- Refine Study
- Issue Results





United States Department of Agriculture

FOREST CARBON AND THE HARVESTED WOOD PRODUCTS CONNECTION

OFFICE OF SUSTAINABILITY AND CLIMATE, NATIONAL FOREST SYSTEM

DUNCAN MCKINLEY



Forest Service

Office of Sustainability and Climate

USDA is an equal opportunity provider, employer, and lender

SPEAKER



Duncan McKinley, PhD

Natural Resource Specialist

Office of Sustainability and Climate

OUTLINE

- What's the interest in forest carbon?
- Forest carbon mitigation pathways and how to reconcile them in the "Carbon System."



WHY IS THE PUBLIC INTERESTED?

1. Concerned about carbon emissions and effects on climate
2. Interest in using management to sequester carbon (i.e. Mitigation) and reduce carbon loss where appropriate (i.e. Adaptation)

■ *Further reading:*

- *Issues in Ecology* – Ryan et al. 2010 ESA synthesis for policy and managers
(available: www.esa.org/science_resources/issues.php)
- McKinley, Duncan C.; Ryan, Michael G.; Birdsey, Richard A.; Giardina, Christian P.; Harmon, Mark E.; Heath, Linda S.; Houghton, Richard A.; Jackson, Robert B.; Morrison, James F.; Murray, Brian C.; Pataki, Diane E.; Skog, Kenneth E. 2011. A synthesis of current knowledge on forests and carbon storage in the United States. *Ecological Applications*. 21(6): 1902-1924.

FOREST MANAGEMENT CAN PRODUCE CARBON BENEFITS

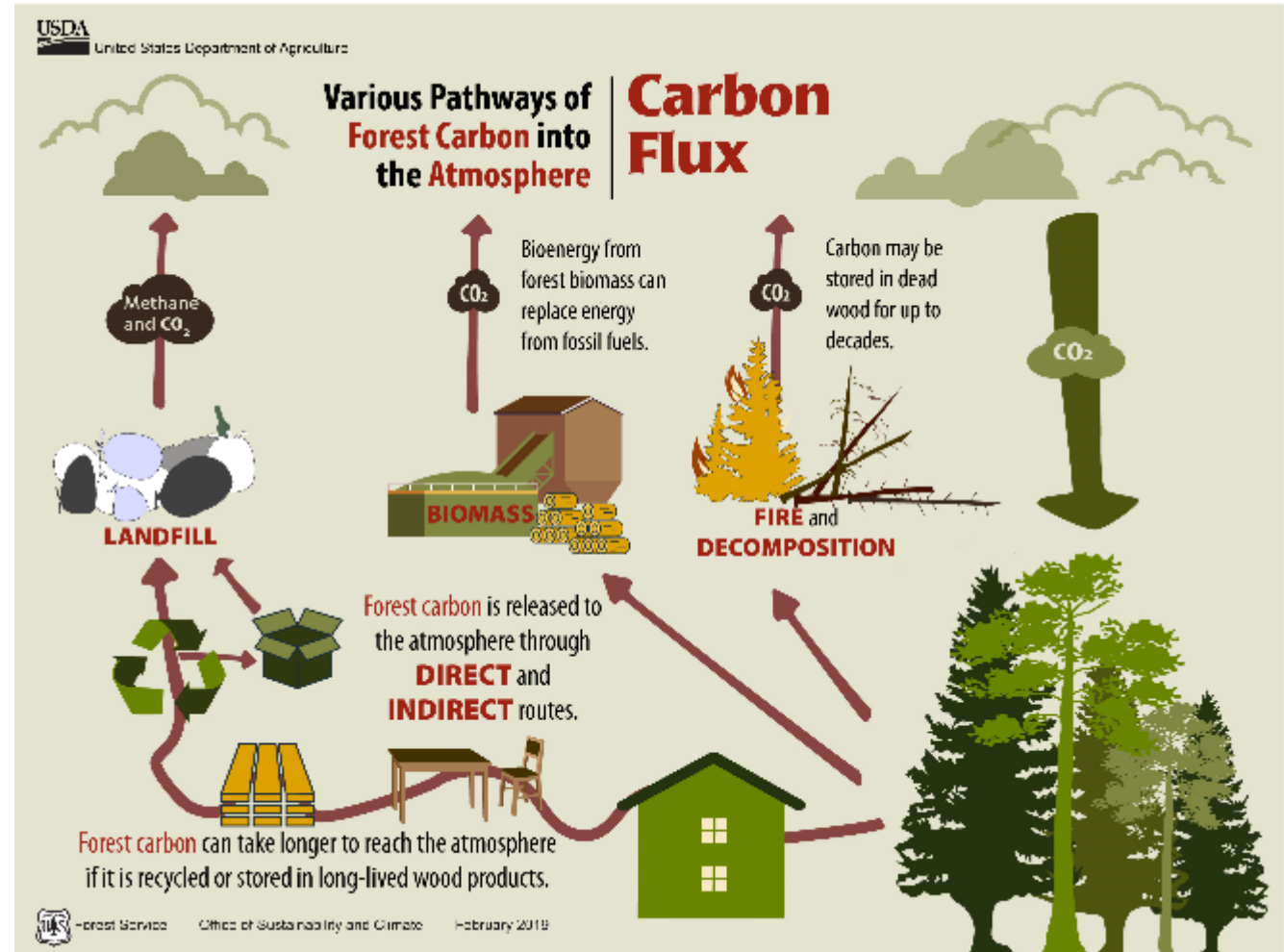
But how?

TWO DIFFERENT WAYS...

- 1) Increase carbon stocks/sequestration in forest ecosystems
- 2) Increase carbon storage in harvested wood products and displace use of fossil fuels



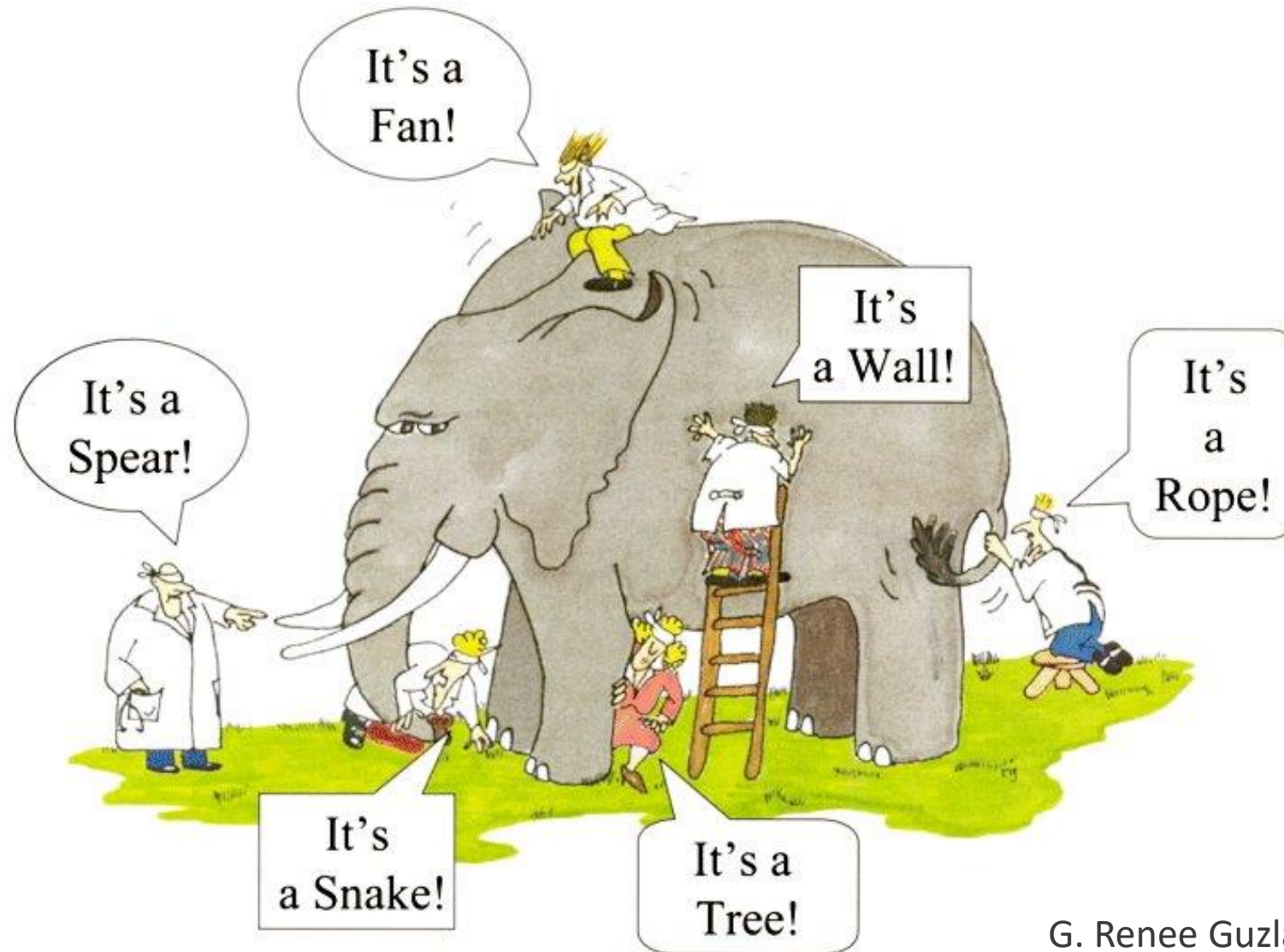
HARVESTED WOOD PRODUCTS AND BIOMASS ENERGY SHOULD ALSO BE CONSIDERED





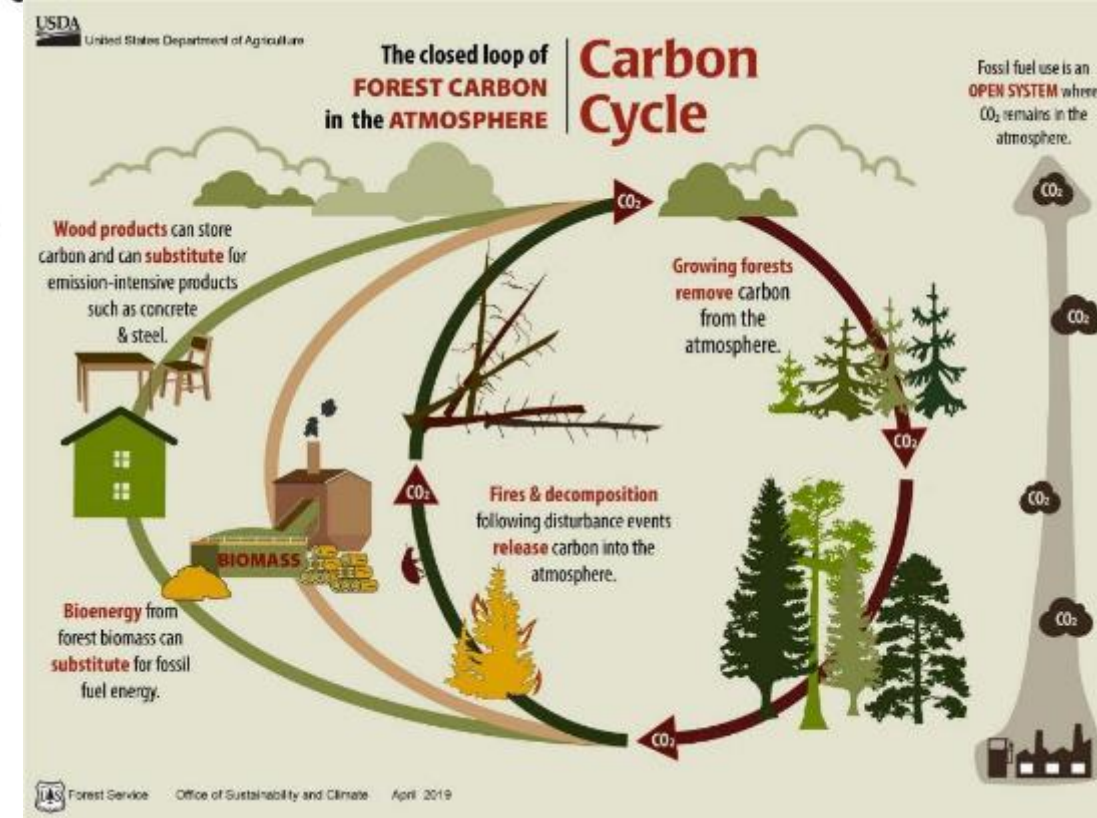
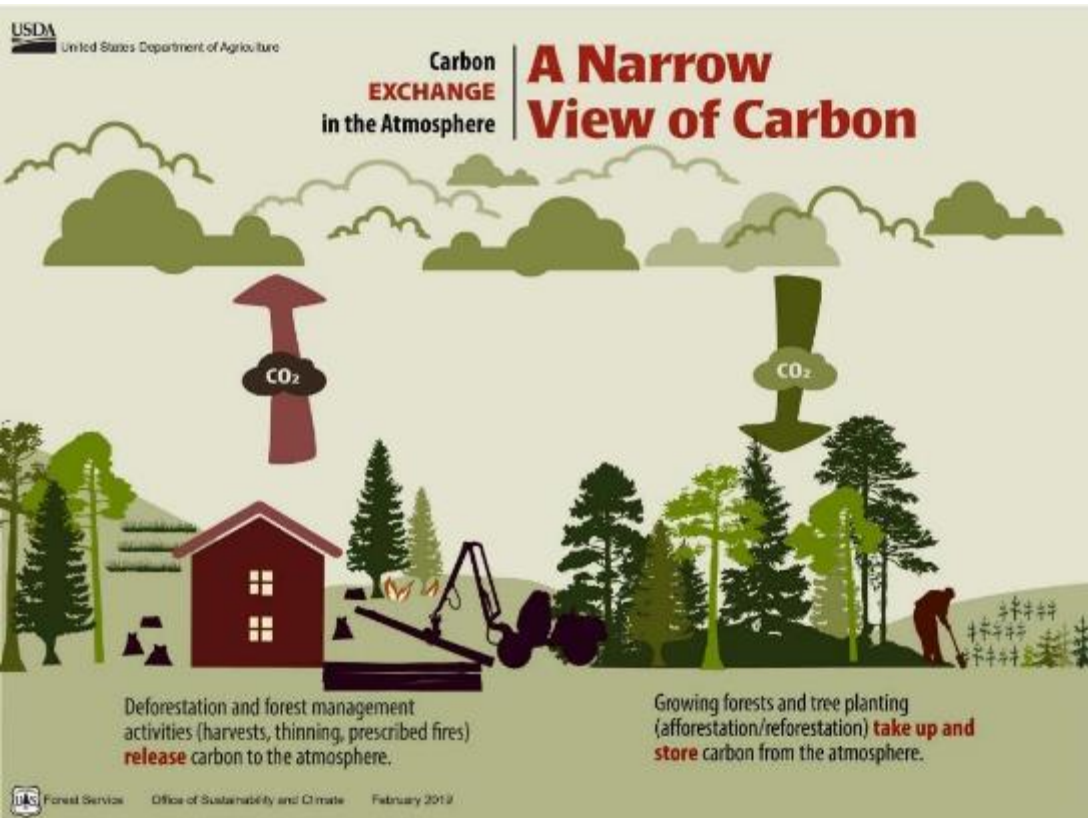
Differing perspectives on how to conceptualize the forest system is the greatest source of confusion.

Sometimes you make the wrong conclusions when you can't see the whole...



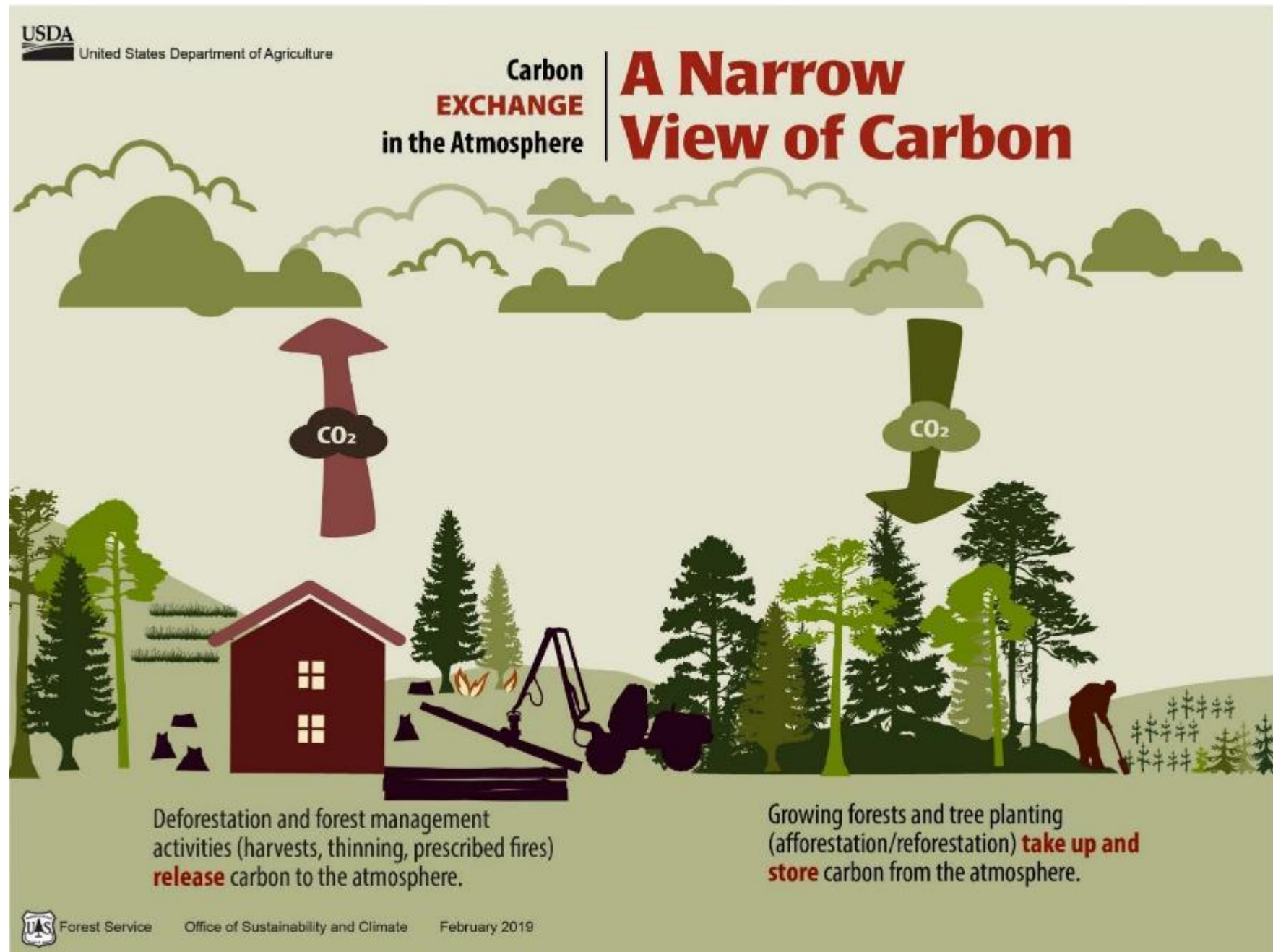
G. Renee Guzlas, artist

Challenges: Competing views



Differing perspectives on how to conceptualize the forest system is the greatest source of confusion!

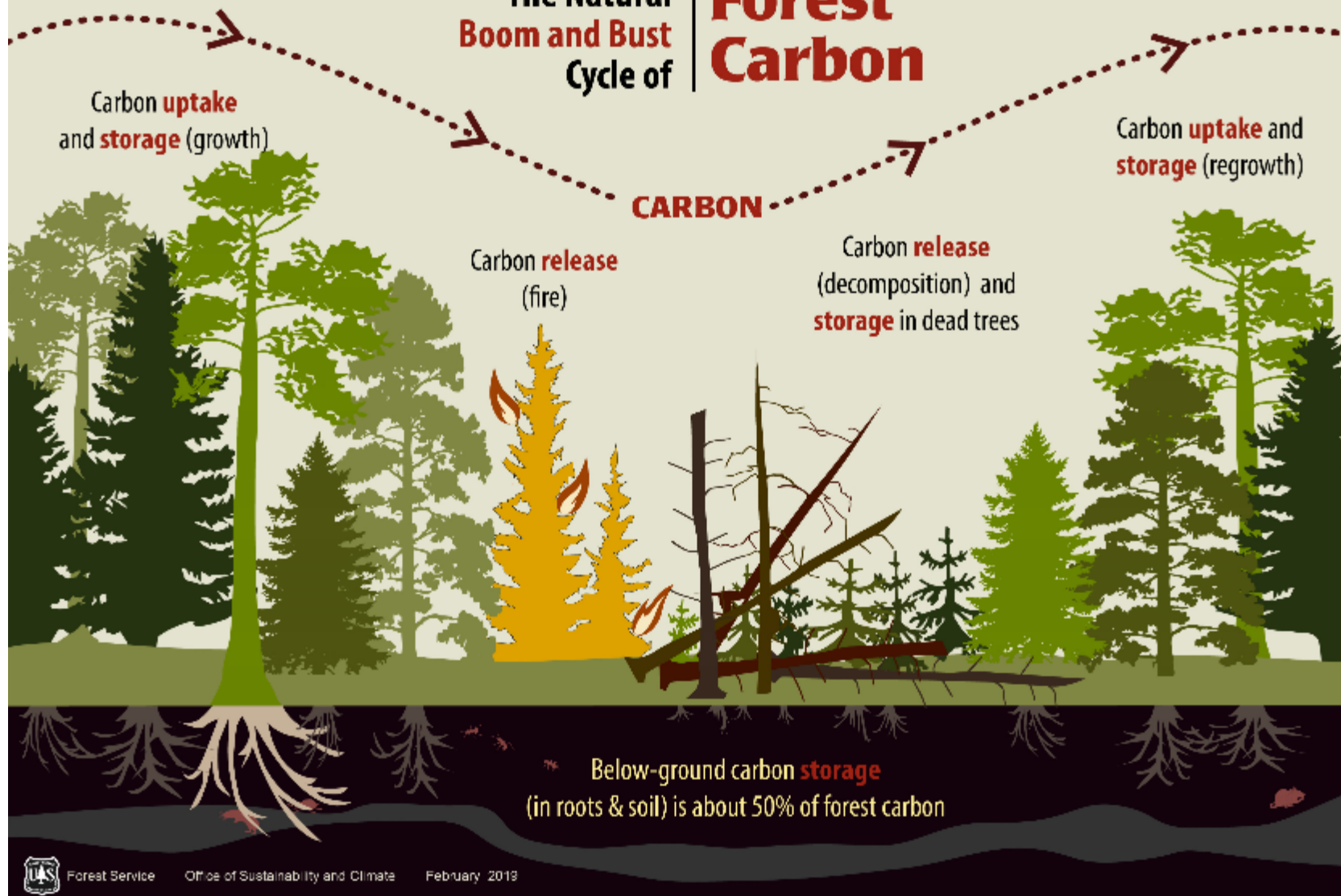
How
most
people
view the
forest
system...



But, we know there is A LOT more to the story...



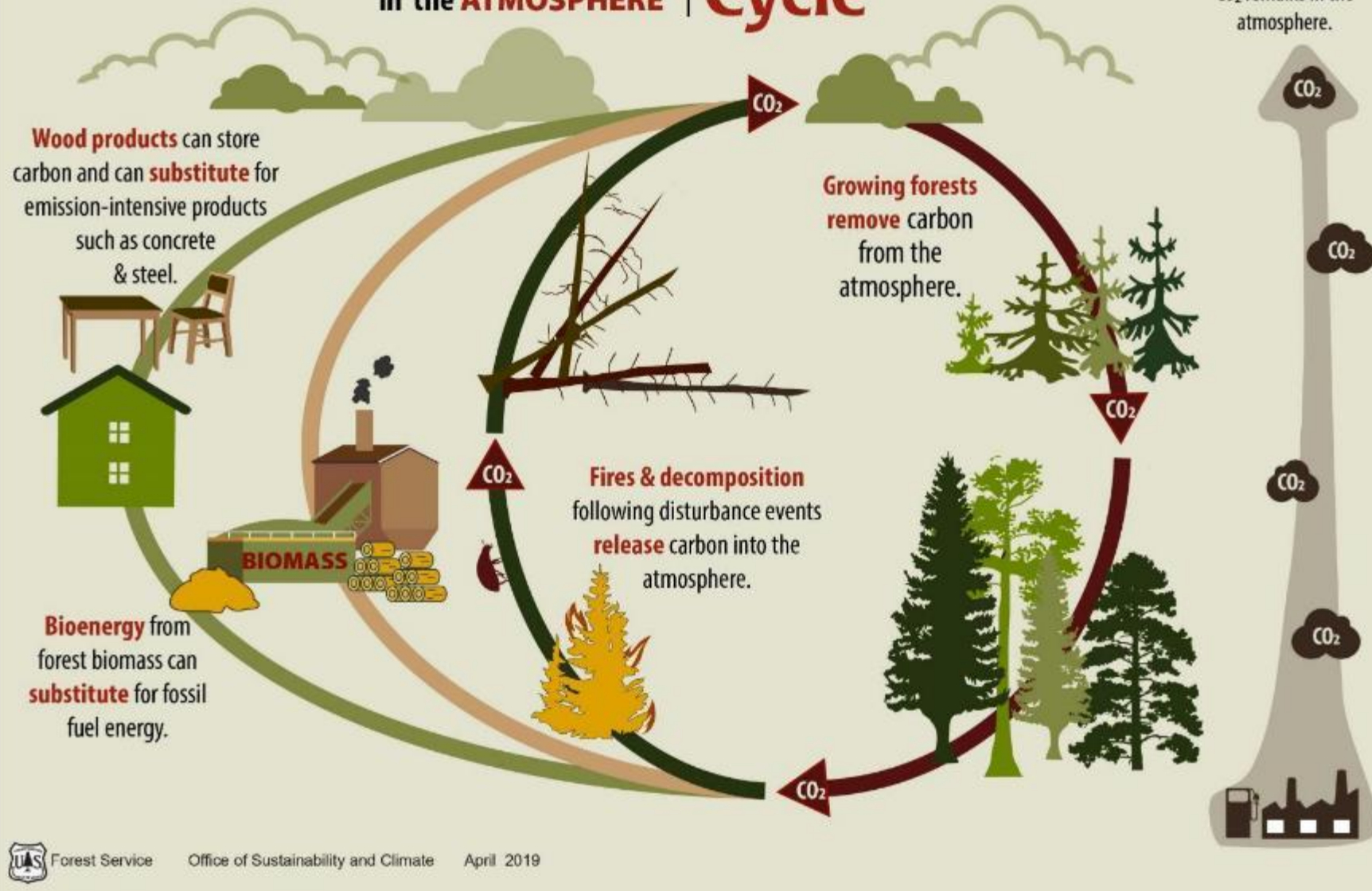
The Natural Boom and Bust Cycle of Forest Carbon



The closed loop of FOREST CARBON in the ATMOSPHERE

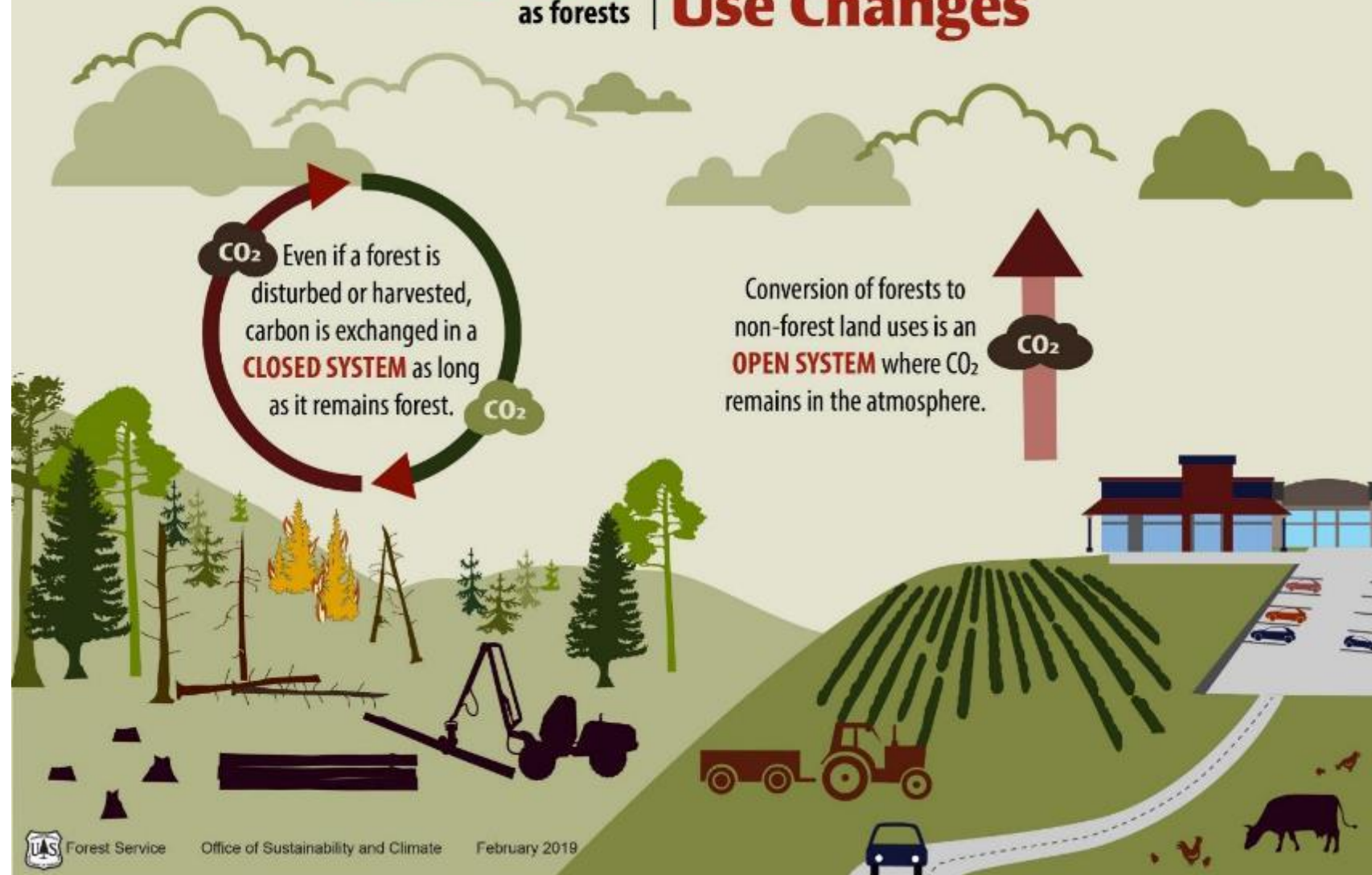
Carbon Cycle

Fossil fuel use is an
OPEN SYSTEM where
CO₂ remains in the
atmosphere.



The importance of
KEEPING FORESTS
as forests

Carbon & Land Use Changes



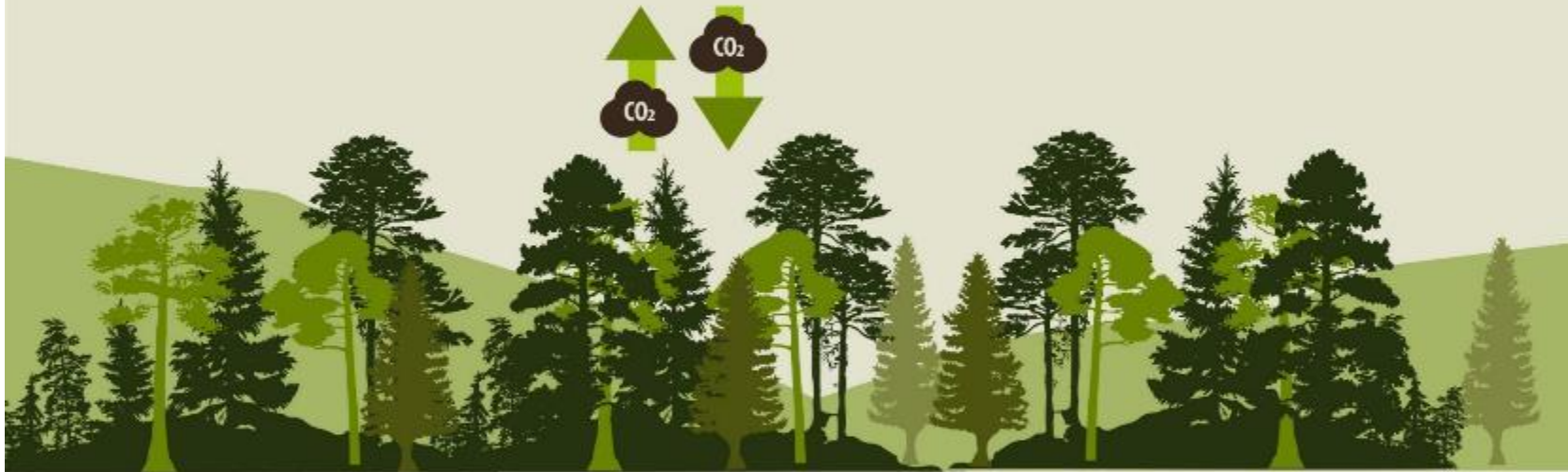


Differing perspectives on how to conceptualize the forest system is the greatest source of confusion.

What's happening in
the **Atmosphere?**

A Systems Perspective

If the goal is **minimize net emissions to the atmosphere**, a systems perspective is needed.



Forest Sector

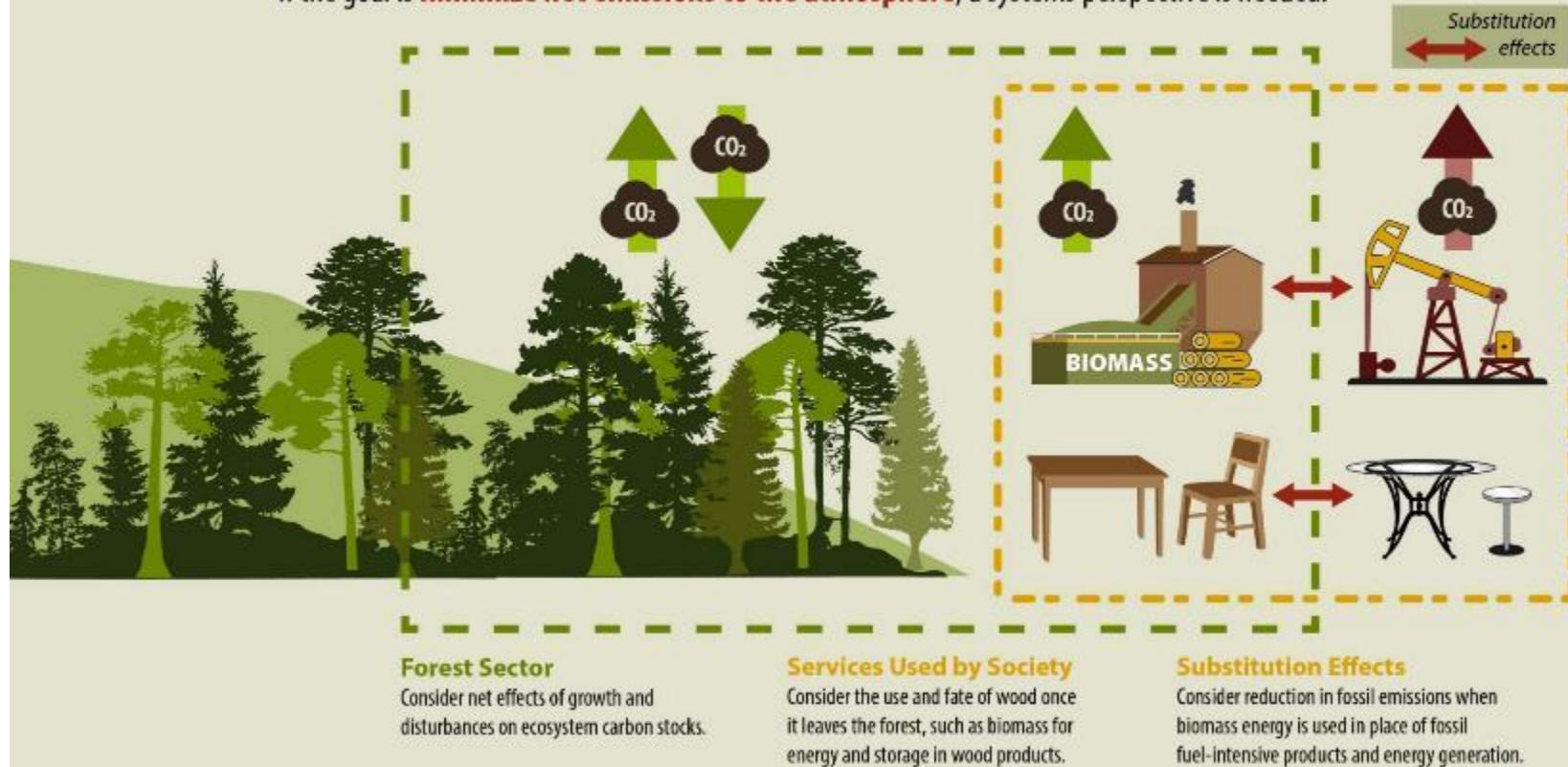
Consider net effects of growth and
disturbances on ecosystem carbon stocks.

Adapted from IPCC 2007, AR4 WGIII, Forestry

What's happening in
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A Systems Perspective

If the goal is **minimize net emissions to the atmosphere**, a systems perspective is needed.



Adapted from IPCC 2007, AR4 WGIII, Forestry

What's happening in
the **Atmosphere?**

A Systems Perspective

If the goal is **minimize net emissions to the atmosphere**, a systems perspective is needed.



Land Use Sector

Consider loss or gain of forested land.

Forest Sector

Consider net effects of growth and disturbances on ecosystem carbon stocks.

Services Used by Society

Consider the use and fate of wood once it leaves the forest, such as biomass for energy and storage in wood products.

Substitution Effects

Consider reduction in fossil emissions when biomass energy is used in place of fossil fuel-intensive products and energy generation.

Adapted from IPCC 2007, AR4 WGIII, Forestry

What's happening in
the **Atmosphere?**

A Systems Perspective

If the goal is **minimize net emissions to the atmosphere**, a systems perspective is needed.



Adapted from IPCC 2007, AR4 WGIII, Forestry



United States Department of Agriculture

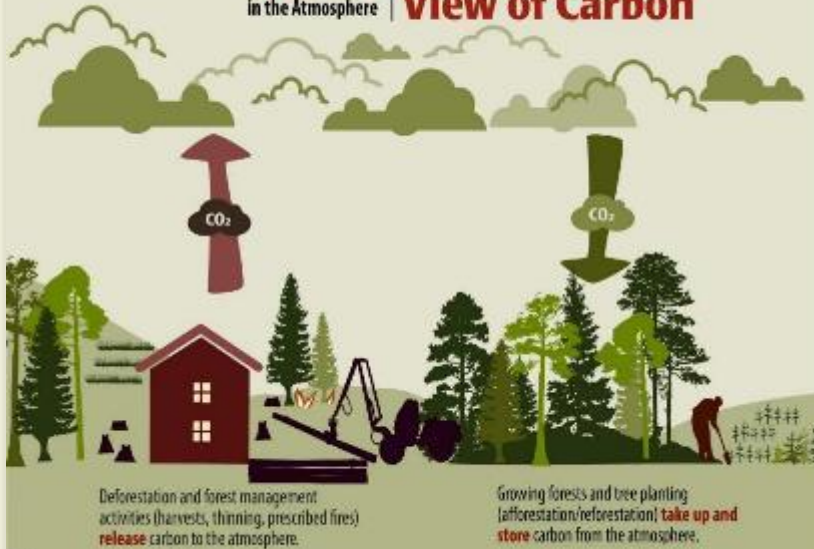
Carbon BENEFITS in the Broad View

How Carbon Stacks Up

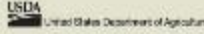


Carbon
EXCHANGE
in the Atmosphere

A Narrow View of Carbon



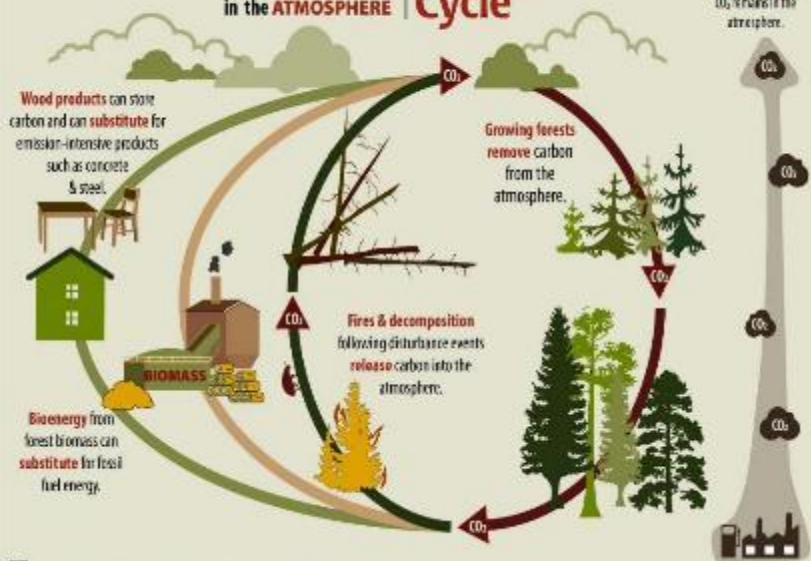
Forest Service Office of Sustainability and Climate February 2016



The closed loop of
FOREST CARBON
in the ATMOSPHERE

Carbon Cycle

Fossil fuel use is an
OPEN SYSTEM where
CO₂ remains in the
atmosphere.



Forest Service Office of Sustainability and Climate April 2016



CARBON COMMUNICATION TOOLS

Public facing website:
<https://www.fs.fed.us/managing-land/sc/carbon>



Forest Carbon FAQs

What is forest carbon?

Carbon in forests comes from carbon dioxide in the atmosphere. This carbon is sometimes called biogenic carbon, because it cycles through living organisms. Trees draw carbon dioxide from the atmosphere through a process called photosynthesis. Plants use photosynthesis to produce various carbon-based sugars necessary for tree functioning and to make wood for growth. Every part of a tree stores carbon, from the trunk, branches, leaves, and roots. By weight, dried tree material is about 50 percent carbon. Trees also release carbon dioxide to the atmosphere as a function of their physiology. When some or all parts of a tree decompose after death or burn during fire, the carbon is released back to the atmosphere. Thus, the amount of carbon in forests closely mirrors the natural cycle of tree growth and death.

Carbon can also be found in soils. Carbon in soils comes from the organic matter from trees and other vegetation in varying degrees of decomposition. In fact, soil carbon represents about 90 percent of the total carbon stored in forest systems in the United States. Live vegetation, soils release carbon dioxide when soil microbes break down organic matter. Some soil carbon can decompose in hours or days, but most resides in soils for decades or centuries. In some conditions, carbon resides in soils for thousands of years before fully decomposing. Soil carbon is generally considered very stable, meaning it does not change much or quickly in response to vegetation dynamics. Exceptions are when soils are disturbed significantly, such as tilled for agriculture, with soil erosion, extreme fire events, or with permanent changes in certain types of vegetation cover.

What is fossil fuel carbon?

Fossil fuels formed from organic materials under geologic processes which took place over hundreds of millions of years. Therefore, when we burn fossil fuels for energy, carbon dioxide is released into the atmosphere, and there is no natural mechanism within that geologic cycle to recapture or sequester the carbon from the atmosphere. This results in a net increase of carbon in the atmosphere or the ocean, which can also absorb some surplus carbon dioxide. Unlike forests and their products which present a closed loop cycle when allowed to regrow, fossil fuels represent an open system of carbon. Most fossil fuel carbon emissions remain in the atmosphere for thousands of years.

How much carbon is in trees?

The chemical composition of trees varies from species to species but is approximately 50 percent carbon by dry weight. Other elements in trees include oxygen, hydrogen, nitrogen, and smaller amounts of calcium, potassium, sodium, magnesium, iron, and manganese. Carbon is one of the most important elements that form the physical structure of the tree material in trunks, bark, branches, and woody leaves. While all vegetation stores carbon, trees are particularly important because they live a long time and because of their comparably dense mature and large size. Because forests are largely composed of trees with large amounts of carbon, forests are akin to a sea of carbon.

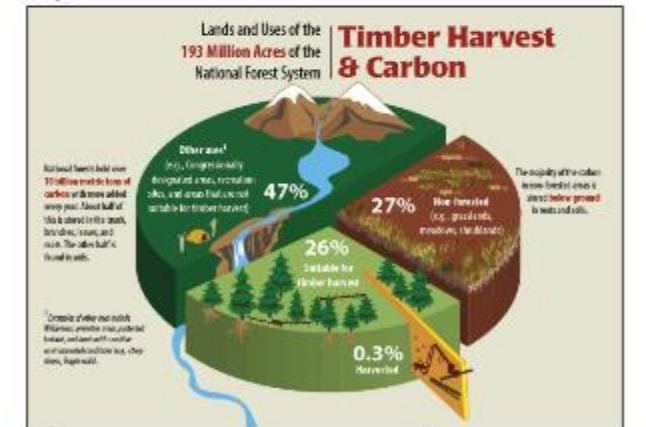
This is a screenshot of the USDA website's blog page. The header includes the USDA logo, "U.S. DEPARTMENT OF AGRICULTURE", and navigation links like "HOME", "TOPICS", "OUR AGENCY", and "MEDIA". The main content area features a blog post titled "The Wood Product and Carbon Connection" by Aaron Grier, Alex Dagen, and Duncan McKinley, dated Oct 17, 2019. The post includes a graphic titled "Carbon Emissions" that illustrates the carbon cycle. The graphic shows fossil fuel emissions (CO2) from an oil rig and a factory, and biogenic emissions (CO2) from a tree. It also shows carbon being stored in wood products like a house and furniture. A sidebar on the left lists "Blog Categories" such as Animals (42), Biotechnology (3), Broadband (6), Climate (14), Conservation (51), Disaster (7), Energy (5), Farming (42), Food and Nutrition (98), Forestry (129), Health and Safety (84), Initiatives (37), Recreation (5), Research and Science (186), Rural (21), Technology (26), and Trade (18). At the bottom, there are sections for "Show Blogs for" (with a "Select a Month" dropdown) and "Archive" (with a "Blog Archives" link).



Timber Harvest & Carbon

Active management of forests has been woven into the fabric of U.S. Forest Service conservation since Congress set aside the first national forest reserves in 1897. Through a variety of activities ranging from timber harvesting to tree planting to building trails, the Forest Service manages for multiple uses to meet the needs of a diverse public. We provide world-class recreation, livestock grazing, a clean and abundant water supply, wildlife habitat, and wood fiber while sustaining the health, productivity, and diversity of our national forests and grasslands.

Carbon uptake and storage are also benefits that the Forest Service considers important to the nation. In the face of a changing climate—with new records nearly every year for extreme temperature, drought, storms, and wildfire—the Forest Service continues to improve our understanding of how management actions affect complex ecological processes, such as the interface between timber harvest and carbon sequestration and storage.





CONTACT US



Duncan McKinley,
duncan.mckinley@usda.gov



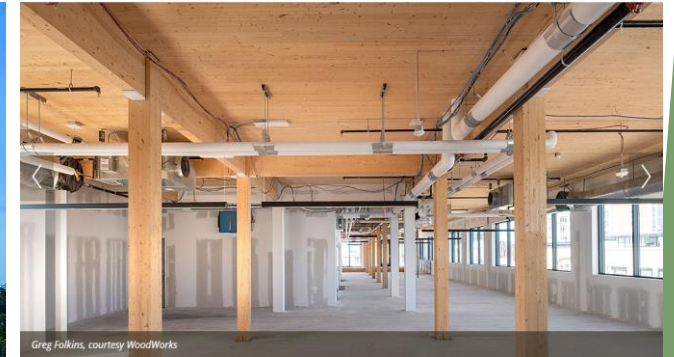
Aurora Cutler, (for comms)
aurora.cutler@usda.gov



Website,
<https://www.fs.usda.gov/managing-land/sc/carbon>



Mass Timber Market Development



Credit: Olifant



Research and Development on Local CLT



ASCE

Feasibility of Two Northeastern Species in Three-Layer ANSI-Approved Cross-Laminated Timber

Hamid Kaboli¹; Peggi L. Clouston, A.M.ASCE²; and Seth Lawrence³



Credit: Dr. Peggi Clouston



Credit: Smartlam

FY 2021 Wood Innovations Grant application narrative – North East State Foresters Association

Part 1: Narrative

A. Basic Project Information

Project Title: Eastern Hemlock Cross Laminated Timber Certification and Demonstration Project
Project Length: 2 years

MASS TIMBER

AN IMPORTANT CLIMATE SOLUTION AND
ECONOMIC OPPORTUNITY FOR CENTRAL NEW
ENGLAND & EASTERN NEW YORK

TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
MASS TIMBER IS BEAUTIFUL, AND CLIMATE-SMART WITH WOOD	3
WHY IS MASS TIMBER A GOOD FIT WITH THE REGION'S FORESTRY?	4
A POTENTIAL SOLUTION TO INCREASE AFFORDABLE HOUSING	5
MEETING CURRENT DEMAND FOR AFFORDABLE HOUSING WITH INNOVATIVE, SUSTAINABLE BUILDINGS	6
SUPPLYING MASS TIMBER TO MEET CENTRAL NEW ENGLAND AND EASTERN NEW YORK FORESTS AS FORESTS	7
RECOMMENDATIONS	8
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ABOUT THE AUTHORS	10
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PÖYRY

NEW ENGLAND
FORESTRY
FOUNDATION

ASSESSING THE WOOD SUPPLY AND INVESTMENT POTENTIAL FOR A NEW ENGLAND ENGINEERED WOOD PRODUCTS MILL

July, 2017

X325305

Local Markets and Carbon Storage

https://harvardforest.fas.harvard.edu/sites/default/files/Berlik_JBiogeography_2002.pdf

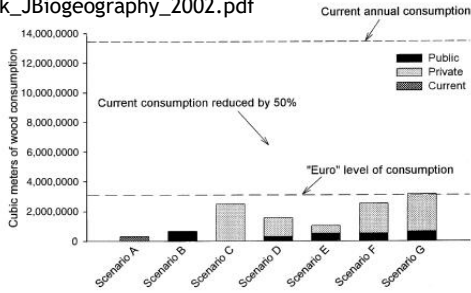
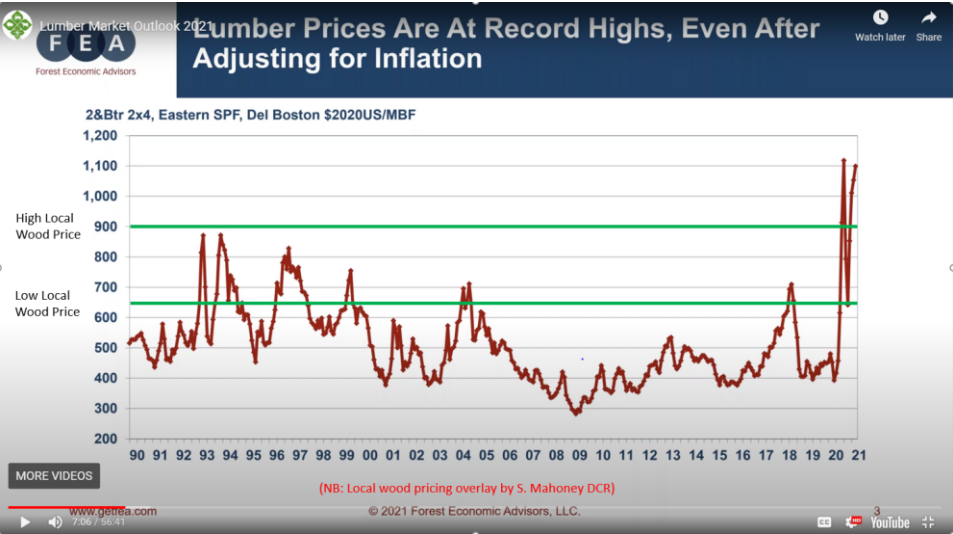


Figure 7 Massachusetts's hypothetical harvest scenarios compared with different levels of statewide consumption ($m^3 \text{ year}^{-1}$). The current annual harvest contributes little to meeting the estimated consumption of wood products in Massachusetts. Through potential decreases in consumption, coupled with various approaches to increased timber management on public and private lands, the gap between production and consumption can be made smaller. Scenario A: current annual MA harvest of 311,190 m^3 . Scenario B: 100% timber management of public land, 0% timber management of private land. Scenario C: 0% timber management of public land, 100% timber management of private land. Scenario D: 50% timber management of public land, 50% timber management of private land. Scenario E: 80% timber management of public land, 20% timber management of private land. Scenario F: 80% timber management of public land, 80% timber management of private land. Scenario G: 100% timber management of public land, 100% timber management of private land.

Native Lumber Program

780 CMR 2302.2.3
780 CMR 110.R4

COVID-19 proved that price is the limiting factor for local lumber consumption.

- High Prices lumber prices last year brought 4 new mills online under the Native Lumber Program (18% growth in the program)

Native Lumber Producers capture 11% of the estimated MA saw timber harvest, (8.72 MMBF)

- If economically favorable mills could double capacity quickly

A complementary climate solution to CLT market development meeting suburban and rural needs utilizing the diversity of species in MA forests.

Credit: Sean Mahoney

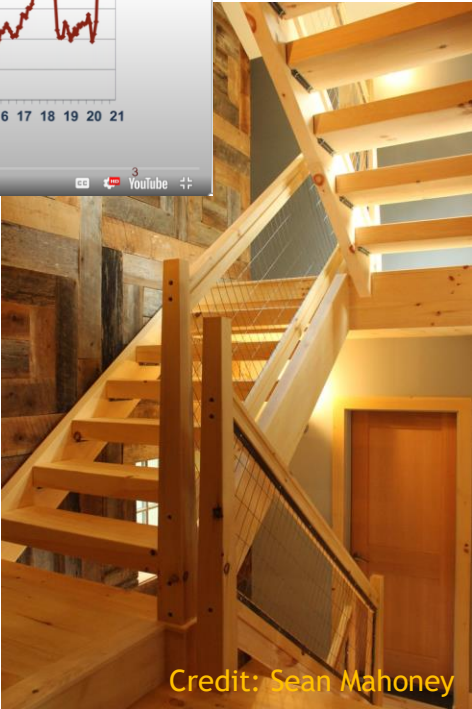


TABLE 2: Land-Use Scenario Allocations

<https://harvardforest.fas.harvard.edu/changes-to-the-land>

Land Use (annual acres)	Recent Trends	Opportunistic Growth	Regional Self-Reliance	Forests as Infrastructure
Forest Conservation	10,000	2,000-5,500	4,000-5,500	10,000-15,000
Development	7,500	10,000-15,000	4,000-5,500	6,000-7,000
Development type				
Dispersed residential	65%	50%	60%	30%
Clustered mixed-use	34%	40%	39%	65%
Very large commercial	1%	10%	1%	5%
Timber Harvest	25,000	20,000-35,000	36,000-61,000	34,000-45,000
Harvest type				
Improvement forestry	0	10%	10%	60%
Long-term forestry	66%	30%	20%	30%
Short-term revenue	34%	0	0	0
Short-term revenue with biomass	0	40%	50%	10%
Biomass clearcut	0	20%	20%	0
Agriculture	0	0	2,000-10,000	0

Climate Change Assumption: Increased fossil-fuel emissions based on the IPCC A1F1 scenario lead to an estimated increase in average annual temperature of 4 degrees Fahrenheit and increase in average annual precipitation of 5% to 7% in Massachusetts by 2060. These assumptions are applied to all land-use scenarios.

Tracking Timber Carbon Flow

- ▶ All commercial timber harvesting activities that remove more than 25,000 board feet (25 MBF) or 50 cords, or the combined equivalent of either of those values, are required to file a Forest Cutting Plan (FCP) for review and approval by the Department of Conservation and Recreation's Service Forestry Program, as required by the Forest Cutting Practices Act.
 - ▶ FCPs represent proposed work that may take place up to 4 years in the future or may not occur at all. Reported harvest volumes are not independently verified.
 - ▶ Exempted from FCP filing requirement: smaller harvests and other tree-cutting activities like agricultural clearing, utility corridor maintenance, and forest conversion.
- ▶ FCPs document patterns and trends in harvest volume and products (sawlogs, cordwood, chips, and pulp), acreage, landowner motivation and intent, involvement with a licensed forester, and enrollment in a current use program.
- ▶ Add requirement to specify where the timber will be processed?

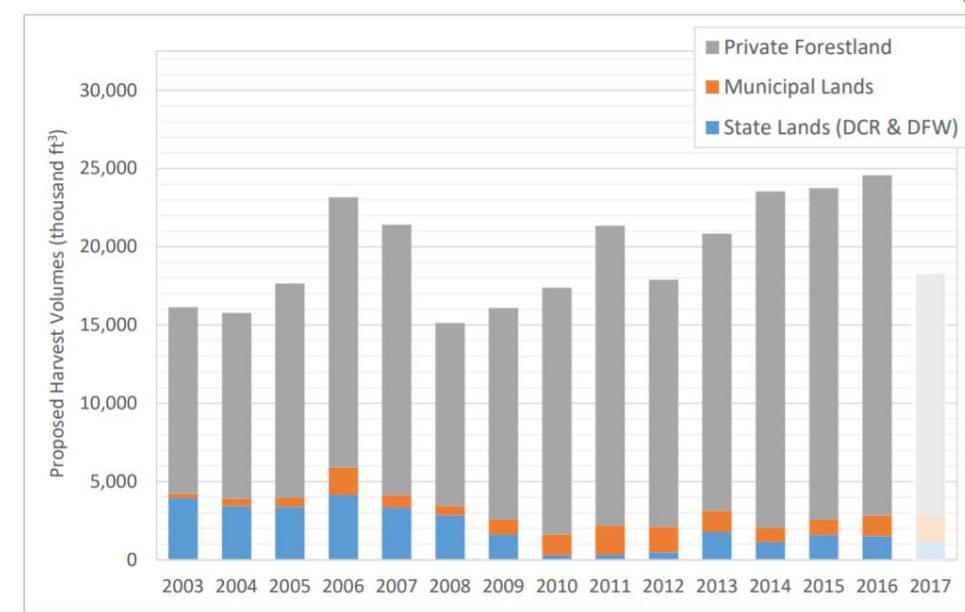


Figure 3.8. Volume of proposed timber harvests in thousand cubic feet by ownership type over time. 2017 values reflect only 10 months of data (data: DCR Bureau of Forest Fire Control and Forestry).

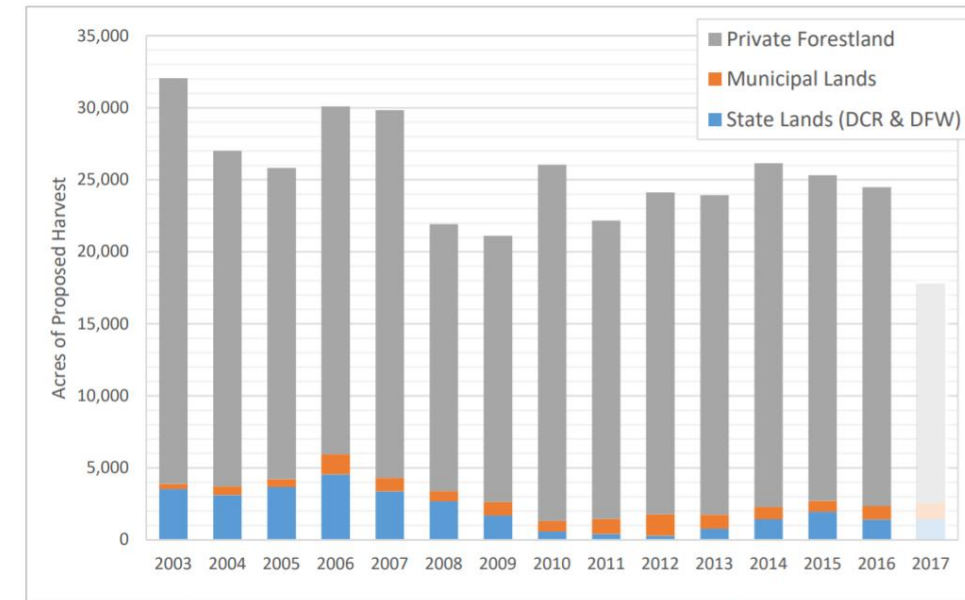
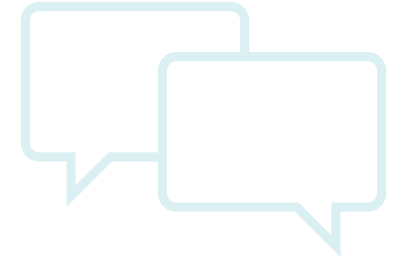
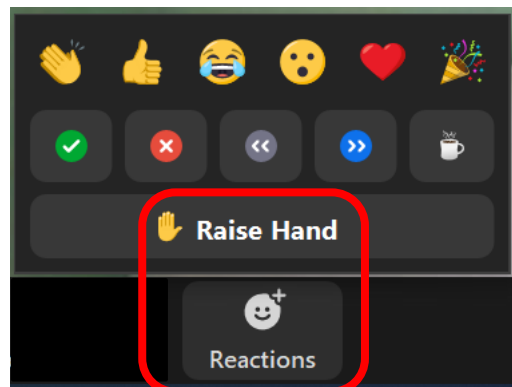


Figure 3.9. Area of proposed timber harvest in acres by ownership type over time. 2017 values reflect only 10 months of data (data: DCR Bureau of Forest Fire Control and Forestry).

Feedback



- ▶ In what ways can the Commonwealth support and scale up the local and sustainable production of durable wood products, especially for buildings construction?
 - ▶ Suggestions welcomed for and from landowners, sawmills, foresters, and other entities in the wood products industry.
- ▶ How can the Commonwealth help manufacturers access the technology they need to improve lumber yield and reduce energy consumption?
- ▶ What are ways the Commonwealth can track end use of harvested and cleared trees, especially from activities exempt from the Forest Cutting Practices Act?



Click on “Reactions” and then “Raise Hand”
and we will unmute you

If you are on the phone, press *9 to raise your hand.
When we call on you, press *6 to unmute yourself.

Thank You!

Website: www.mass.gov/2030CECP

Email: gwsa@mass.gov