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January 2022 Public Webinar: Forest Carbon Goals and Policies for the Clean Energy and Climate Plan for 2025 and 2030







January 14, 2022

- Resilient Lands Initiative
 - Objective, Goals, and Process
 - Proposed "Protect" actions
 - Proposed "Manage" actions
 - Proposed "Restore" actions
- Climate Smart Forestry
- Park & Forest Planning Effort by MA Department of Conservation & Recreation
- ► Feedback, Question & Answer



Overview

Resilient Lands Initiative



Kurt Gaertner Assistant Secretary of Environmental Policy

Quick Refresher

- Clean Energy & Climate Plan for 2025 & 2030 (2025/2030 CECP) will be completed by July 1, 2022
- MA is required to reduce GHG emissions 50% below 1990 levels by 2030 and achieve Net Zero by 2050
- The 2025/2030 CECP will include a Natural and Working Land (NWL) Plan that addresses our obligation to:
 - > Produce a statewide baseline measurement & measure the current carbon flux on NWL;
 - > Adopt statewide goals to reduce GHG emissions & increase sequestration on NWL;
 - Set numerical benchmarks & track the release of measurable GHG from and carbon sequestration by NWL and the products derived from these lands to the maximum extent practicable; and
 - Develop a NWL plan that outlines actions to meet these statewide goals, including, but not limited to, land protection, management and restoration and state and local legislation, laws and regulations, programs, grants, loans, incentives and public-private partnerships, and provide guidance and strategies for state agencies, authorities, municipalities, regional planning agencies, nonprofit organizations, landowners and operators; provided, however, that said plan shall be developed and informed by a stakeholder process and that the baseline, goal and plan shall be integrated into the inventory, baseline assessment, plan and reporting requirements pursuant to this chapter and shall be consistent with state climate change adaptation and resiliency policies.

Quick Refresher

- ► Main strategies in the NWL Plan, by priority level:
 - 1. <u>Protect NWL</u> to protect current carbon storage
 - 2. <u>Manage NWL</u> to enhance and improve resiliency of carbon storage
 - 3. <u>Restore NWL</u> to enhance carbon storage
 - 4. Incentivize carbon storage in durable wood products
 - 5. <u>Explore additional carbon sequestration</u> to achieve net zero emissions by 2050

"<u>Natural and working lands</u>", 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 - INTENT, GOALS, & PROCESS



- An inclusive vision for land conservation & stewardship in the climate change era;
- A compelling case and plan to use land conservation and stewardship to help reduce & prepare for climate change;
- An Initiative that guides land conservation and works on implementation over the next ten years; and
- An Initiative that links to other relevant efforts.
- Proposed goals include:
 - > Achieve No Net Loss of Forests & Farms by 2030
 - Reduce the footprint of development by 15,000 acres and create 29,000 acres of new forest, tree canopy, farms and community gardens
 - Conserve much of our last remaining intact landscapes, watersheds and habitats - 30X30
 - Help provide up to 20% of the 2050 Net Carbon Emissions reduction needs
- Process involved 12 meetings of 40+ member steering committee, 14 topic-specific focus group meetings, and two open public meetings (to date).
- Executive Summary available at <u>https://www.mass.gov/doc/rli-exec-sum-july-31-2020/download</u>

RESILIENT LANDS INITIATIVE - CONTENT



The RLI addresses nine land values:

- 1. Urban parks and public health
- 2. Reducing climate impacts to people
- 3. Supporting stable economies

<u>...via eight action groups</u> called "Strategies":

- 1. No Net Loss of Farm and Forest Land
- 2. Food Systems
- Urban Greenspaces 7. and Community Health & Safety
 - . Water Resources

- 4. Forests
- 5. Farms
- 6. Habitats
- 7. Watersheds and water supply
- 8. Outdoor recreation
- 9. Cultural Values
 - 5. Natural Carbon Storage and Climate Resilience
 - 6. The Green Economy
 - Landscape Conservation and Restoration
 - 8. Collaboration for Sustainable Solutions
- 9

RESILIENT LANDS INITIATIVE - STRATEGY #1: NO NET LOSS



Proposed Actions	Metric (by 2030)
Smart Growth: Assistance and greening incentives for 100 communities	15,000 acres of forest and farm saved from development
"PILOT for Climate"	500 acres restored - farm or forest
Tree planting along rivers	550 miles of river- banks planted -10,400 acres of new forest

- Pursue realization of "No Net Loss" of farm and forest land by 2030
- Explore a "Lands for People" bill to advance equity in the benefits provided by the open lands of MA. The bill could include setting no net loss as a goal and enable landowner and municipal incentives ("PILOT+", Forest Resilience Program, etc.).
- Create new farms, community gardens, forests, & tree canopy cover, focusing on environmental justice neighborhoods, and on creating forests buffers along rivers, to offset lost farm and forest land.

RESILIENT LANDS INITIATIVE STRATEGY # 5: NATURAL CARBON STORAGE AND CLIMATE RESILIENCE



Proposed Actions	Metrics (by 2030)
Launch the Forest Resilience Program and "Chapter 61C"	100,000 acres of forest managed to enhance carbon and resilience
Adopt Key Rec's of Healthy Soils Action Plan	10,000 acres of cultivated farmland managed for healthy soils with significant carbon storage
Increasing % of Long-Lived Forest Products	Increased storage of the existing MA forest harvest to realize the carbon benefits

- Achieve a significant increase in carbon storage and climate resilience in our forests
- Establish a Forest Resilience Program with a carbon storage and acreage goal to encourage private and municipal landowners, who own more than 2 million acres of forest, to adopt forestry practices that store carbon and improve forest climate resilience.
 - Forest management choices influence the amount of carbon captured and stored.
 - Based on a range of practices, expert verified, that will help create more resilient forests that can store more carbon.
 - Requires a 20-year commitment to implementing forest management.
 - > Qualified Landowners would be eligible for annual per-acre state reimbursements.

Resilient Lands Initiative: "PROTECT" Measures & Forest Land

Massachusetts is among the most forested, and the most densely populated states



Data: Reclassified 2016 Land Cover Layer, NOAA + MassGIS

2050 Decarbonization Roadmap Study - Land Sector Report

- In all scenarios, forest growth exceeds removals by both harvesting & forest conversion; forests will continue to be a net carbon sink, with between 36 to 39% more live carbon stored in forests by 2050.
- Forest loss affected 112,000 to 143,000 acres and reduced carbon stores 19.5 to 23.5 MMT of CO2eq, depending on the scenario, relative to a scenario with no land use/land cover change.
 - > 60% was from direct emissions due to tree clearing & 40% forgone carbon sequestration thru 2050.
 - > An analysis of the scenarios' land-cover change impacts on soil organic carbon suggests that an additional 40.0 to 51.0 MMT of CO2eq could be emitted due to development.

Emissions from Forest Conversions to Development (From USCA-Funded Study by Clark University)

1.3 MILLION

METRIC TONS OF CO2e PER YEAR

Forest loss averaged about 2,074 hectares (5,125 acres) per year in the early 2000s, committing 1.3 million metric tons of CO2e to the atmosphere as carbon emissions plus foregone sequestration each year.

80%

FROM CARBON EMISSIONS

20%

FROM FOREGONE SEQUESTRATION

Foregone sequestration contributes about 20% of the total carbon burden from deforestation, while 80% comes from carbon emissions.

CO₂**e**

IMPACT

THIS CO2eIMPACT OF FOREST CONVERSIONS IS EQUAL TO:

28% of statewide carbon sequestration occurring within remaining forestlands 150% of the harvested wood products emissions resulting from forest harvesting

2% of the state's fossil fuel emissions across all sectors (2018)

Avoided Forest Conversion - A Foundation to Build Upon

Existing Policies & Programs to Avoid Forest (and farmland) Conversion -

- Land Acquisition Fee & easement/restriction purchases
- State Investment Policies Especially in infrastructure, but also housing & economic development projects
- Municipal Land Use Regulations Tools, funding, & incentives
- Landowner Incentives Current use statute (61, 61A, 61B)
 - Forestry: 10+ acres, approved forest management plan under active forest management, assessed for forest use not highest & best use, withdrawal penalty & right of first refusal if converted before 10 years

Potential Enhancements to Current Efforts:

- Spend more on Land Conservation
 - > Direct purchases by agencies
 - > Grants to communities and land trusts
 - > Tax credits for land conservation
- Spend Land Conservation Funds Differently
 - > Change mix of the above
 - > Change the Land Acquisition Criteria
- Enhance Land Use & Other Regulations



RLI - Select "PROTECT" Related Actions

- Enhance adoption & use of Natural Resources Protection Zoning (NRPZ) & related "cluster development"
- Achieve greater acceptance and use of Tree Protection Bylaws
- Update Upland Drinking Water Protection Zones: Plan, collaboratively, to expand protection of uplands and natural buffers. The upland areas of drinking water watersheds are increasingly important as climate change causes more frequent and intense storms.
- Create a "PILOT for Climate" Payment: Certain small/rural communities receive a Payment in Lieu of Taxes (PILOT) bonus for the state conservation lands they host to be used for green infrastructure, land conservation, forest or farm viability grants, and other NWL activities that help address climate change.
- Expand Agricultural Preservation Restriction Program capacity and funding to protect "whole farms"

- 6,000 acres of new greenspace and parks in urban areas;
- > 16,100 acres of new urban and riparian forest cover;
- > 200,000 additional acres of farm & forest land conserved; and
- > 410,000 additional acres of farm & forest land have adopted resilient conservation practices.

RLI - Select "PROTECT" Related Actions (Part II)

- Expand landscape and watershed-scale conservation, stewardship and restoration projects: Significantly expand the Landscape Partnership Program to include landscape & watershed scale projects of all types
 - Conserve the Most Intact Landscapes within our Cities' Drinking Water Watersheds
- Create the Forest Viability Program: Provide competitive infrastructure grants to forest businesses to improve their efficiency and market competitiveness. Participants would need to record a forest viability covenant on their land for 10 years to "keep forests as forests" & make them more valuable as forests.

- 6,000 acres of new greenspace and parks in urban areas;
- > 16,100 acres of new urban and riparian forest cover;
- > 200,000 additional acres of farm & forest land conserved; and
- > 410,000 additional acres of farm & forest land have adopted resilient conservation practices.



RLI - Select "MANAGE" Related Actions

- Launch a Forest Resilience Program: Pay an annual incentive to private and municipal landowners (10+ acres) to adopt climate smart forestry practices for at least 20 years in order to expand carbon storage and improve forest climate resilience on our 3 million acres of forests.
- Amend the MA Forest Tax Law: Create "Chapter 61C" (for climate and carbon): or a similar tax incentive for forest stewardship to support carbon storage and forest resilience and farmland "healthy soils" practices that enhance carbon storage (cover cropping, no till planting, crop rotation, etc.).

- 6,000 acres of new greenspace and parks in urban areas;
- > 16,100 acres of new urban and riparian forest cover;
- > 200,000 additional acres of farm & forest land conserved; and
- > 410,000 additional acres of farm & forest land have adopted resilient conservation practices.



RLI - Select "RESTORE" Related Actions

- Designate "Climate Risk Zones" where restoration efforts could be focused
- Plant Trees:
 - > Offer a state tax credit for tree planting, potentially focused on Climate Risk Zones
 - > Plant trees in riparian buffers along rivers, streams, lakes and ponds
- "Green" Developed Areas:
 - > Launch the "Plot Restoration Opportunity Program" to "green" vacant lots
 - > Create a network of small/shady neighborhood parks & natural areas in dense neighborhoods
 - > Offer grants for locally selected and led nature-based solutions to improve community health and resilience to climate impacts
 - > Expand urban river and stream restoration projects
 - > Create a Parking Lot Assessment and Restoration Program

- 6,000 acres of new greenspace and parks in urban areas;
- > 16,100 acres of new urban and riparian forest cover;
- > 200,000 additional acres of farm & forest land conserved; and
- > 410,000 additional acres of farm & forest land have adopted resilient conservation practices.





Climate-Smart Forestry: From Science to Action





Todd Ontl, PhD

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US forests:

- Absorb **15%** of total CO₂ emissions
- Contain 68% of terrestrial carbon stocks
- Are **90%** of the land sector sequestration capacity

"Climate-smart" forestry: Practices to improve the resilience to climate change impacts and increase the storage of carbon or enhance carbon sequestration in forests.



Carbon Sequestration:

The process of removing carbon from the atmosphere for use in photosynthesis, resulting in the maintenance and growth of plants and trees.

Managing Forest Carbon: FAQs Should we manage for carbon storage or sequestration?



Mature Forest

<image><text>

Young Forest

Source: Caring for Your Woods - Managing for Forest Carbon A Landowner Guide from the MA Department of Conservation and Recreation www.mass.gov/doc/caring-for-your-woods-managing-for-forest-carbon/download

Managing Forest Carbon: FAQs Answer: All of the above



Manage across <u>landscapes</u> for diversity of:

- Age-classes
- Forest types (e.g. young & old)



Managing Forest Carbon: FAQs Where is carbon located in a forest? What are the relative proportions?



Numbers indicate pool size (%) for an average oak-hickory forest in MA



Managing Forest Carbon: FAQs

What influences the carbon mitigation benefits of a forest?

Stand Age



Data: Williams et al. 2021 Avoided Deforestation: A Climate Mitigation Opportunity in New England and New York

Management & Disturbance



A microburst windstorm at Hubbard Brook forest on June 2, 2013 significantly damaged trees, with longlasting impacts to future carbon sequestration. (Battles *et al.* 2017)

Structural diversity



Other factors include forest type/ species composition, soils (and other carbon pools such as dead wood),...

Managing Forest Carbon: FAQs What does climate-smart forestry look like?

Managing Forest Carbon: FAQs Answer: IT DEPENDS

Every forest is different

Each decision is unique and will vary based upon:

- People: Values, Culture, & Resources
- Place: Location & Site Conditions
- Purpose: Goals & Objectives
- **Practices:** Equipment, Procedures, & Methods

Address climate risks and vulnerability!!!

Look to site conditions to determine opportunities to enhance carbon, but only after addressing risks so we don't lose the carbon we already have!

Understanding carbon risks based on the conditions of our forests:

- Impacts of past land use on site conditions
- Current stressors impacting our forests
- Climate change vulnerability

These considerations are necessary to prepare our forests to be resilient and reliable carbon sinks

Past: legacies of land use can limit the future carbon sink of MA forests

Forest recovery after abandonment of agriculture has created ecosystems that are different from the forests that originally occupied the landscape

- Forests are often more homogeneous, with less species diversity
- Stand structure is typically simplified (lack of diversity in age-classes/ tree sizes)
- Forests can be lacking in important carbon pools (*e.g.* dead wood like snags, downed logs, and other coarse debris)

A significant portion of the state's forests are on lands previously deforested for agriculture

- Up to 1600: Forest cover was almost 90% of the land
- Late 1800's: Forests reduced to ~30% of land cover
- Late 1900's: forest regrowth to ~70% cover

Actions to enhance carbon in low diversity forests

Enhancing species composition diversity

Increasing structural complexity of forest stands

Enhancement of live and downed log carbon pools relative to conventional management

Total forest carbon not different from control

Figure: Ford & Keeton 2017

Present: Many stressors are impacting the health & productivity of our forests

Insect pests and forest diseases

41.1% of the total live forest biomass in the U.S. is at risk of future loss from the top 15 most damaging insect pests (Fei *et al. 2019* PNAS)

Invasive plant species

Healthy canopy trees (*left*); trees being strangled by invasive vines, like oriental bittersweet (*right*).

Herbivory

Forest fragmentation

Actions to maintain/ enhance carbon in areas with forest health concerns

Reduce risk of insect pest outbreaks

Thin dense stands vulnerable to invasive insect pests to increase tree resistance to damage:

- Hemlock woolly adelgid
- Southern pine beetle

Elevated light levels reduce hemlock woolly adelgid infestation and improve carbon balance of infested eastern hemlock seedlings

Steven T. Brantley ^{a,*}, Albert E. Mayfield III ^b, Robert M. Jetton ^c, Chelcy F. Miniat ^a, David R. Zietlow ^a, Cindi L. Brown ^a, James R. Rhea ^d

Remove invasive plants/ Preventing establishment

Protect forest regeneration from herbivory

Future: Changing climate conditions are adding new risks

Warmer temperatures

- Shorter winters
- Reduced snowpack
- Increased freeze-thaw
- Altered hydrology
- Northern expansion of insect pests

Climate change impacts summarized from: Janowiak et al. 2018 GTR NRS-173; www.nrs.fs.fed.us/pubs/55635

Actions to maintain/ enhance carbon in areas vulnerable to climate impacts

Favor or plant future-adapted species

Protect soil carbon on vulnerable sites

Managing Forest Carbon: FAQs What does climate-smart forestry look like?

Managing Forest Carbon: FAQs Shouldn't we PROTECT our forests for their climate mitigation benefits?

Managing Forest Carbon: FAQs Shouldn't we PROTECT our forests for their climate mitigation benefits?

*Where it makes sense. Places with forest health issues, high vulnerability to climate impacts, etc. are likely to become carbon sources rather than sinks!

Additional resources on climate-smart forestry

Northern Institute of Applied Climate Science Climate Change Response Framework forestadaptation.org/focus/forest-carbon-management

Massachusetts DCR Caring For Your Woods - Managing For Forest Carbon: www.mass.gov/doc/caring-for-your-woods-managing-for-forest-carbon/download

MassWoods/ Umass-Amherst College of Natural Sciences Forest Carbon: <u>masswoods.org/caring-your-land/forest-carbon</u> Forest Resiliency: <u>masswoods.org/caring-your-land/forest-resiliency</u>

FOREST CARBON An essential natural solution for climate change

UMassAmherst PAUL CATANZARO ANTHONY D'AMATO Increasing Forest Resiliency for an Uncertain Future

Paul Catanzaro | Anthony D'Amato | Emily Silver Huff

New England and Northern New York Forest Ecosystem Vulnerability Assessment and Synthesis: A Report from the New England Climate Change Response Framework Project

Northern Institute of Applied Climate Science Climate Change Response Framework forestadaptation.org/assess/ecosystem-vulnerabilit

Visit the online Story Map:

usfs.maps.arcgis.com/apps/MapSeries/index.html ?appid=a4babe8e2fe849739171e6824930459e

State Park & Forest Planning Efforts

Peter Church Director of Forest Stewardship

Jessica Rowcroft Planner, Division of Conservation & Resource Stewardship

dct
MASSACHUSETTS DEPARTMENT OF
CONSERVATION AND RECREATION

DCR State Park & Forest Planning Efforts

2009 - 2010: Forest Futures Visioning Process

- Advisory Group of Stakeholders, Technical Steering Committee
- ▶ 5 public forums; approx. 450 written comments
- Key Recommendations: ecosystems services approach; clarifying activities on DCR lands; 3 Landscape Designations with acreage allocations; Director of Forest Stewardship

2010 - 2012: Landscape Designations

- Selection Criteria, Management Guidelines for each designation, Landscape Designations
- ▶ 14 workshops, over 550 participants; approx. 750 written comments
- "DCR will review both the Landscape Designations and the management guidelines every ten years to assess their effectiveness in reaching the agency's goals of providing for the broad range of ecosystem services and make any necessary adjustments as a result in order to increase effectiveness."

Ecosystem Benefits - Why we Manage our Forestlands

- Demonstration forestry Be leaders in exemplary forest management
- Restoration of native ecosystems and wildlife habitat enhancement
- Managing for carbon
- Diversify species and stand age structure
- Home fuel wood
- Hazard tree removal and recreational access improvements
- Restore fuel breaks in fire prone areas
- Increase forest resilience from forest pest threats (EAB)
- Produce forest products and provide forest products payments to municipalities

Landscape Designations 2022 Update

- Internal DCR Working group representing all divisions being assembled
- Review 2012 Management Guidelines and Designations, assess how the management guidelines have worked in practice, review new data and recent complimentary planning efforts, and identify areas for adjustment
- Review acquisitions the agency has made in the past ten years to formalize designations
- Provide opportunities to receive public feedback
- Make adjustments and updates identified internally and highlighted through public feedback

Feedback

- Should land conservation funds be invested differently? How so?
- What is the best incentive to offer a private owner of forestland to manage their property with climate in mind?
- What would it take for your community to adopt and use Natural Resource Protection Zoning or a tree retention bylaw/ordinance?
- What do you think is the best way to restore tree cover in riparian areas or vacant urban lots?
- Are there ways to Protect, Manage, or Restore that you would particularly endorse?

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.

Public Meetings on Natural and Working Lands

▶ Dec. 21, 2021, 12PM-1:30PM

Summarize statutory requirements for and development process of the 2025/2030 CECP

- Outline approach to developing goals for reducing GHG emissions and enhancing carbon sequestration on natural and working lands
- ► Gather feedback on the five broad strategies for achieving these goals

▶ Jan. 14, 2022, 12PM-2PM

Summarize and gather feedback on key elements of the Resilient Lands Initiative

▶ Feb. 11, 2022, 12PM-2PM

 Gather feedback on additional options for reducing GHG emissions and enhancing carbon sequestration on forestlands

Visit <u>www.mass.gov/2030CECP</u> to sign up for public meeting notices!

Thank You!

Website: www.mass.gov/2030CECP Email: gwsa@mass.gov