

**Maine Climate Council
 Natural and Working Lands Work Group
 Forest Carbon Subgroup Meeting #3 Agenda
 Wednesday, March 6, 2024, 9 am – 12 pm
 DACF’s Bolton Hill Facility, 2870 North Belfast Ave., Augusta**

For Zoom attendees, register in advance [HERE](#)

Desired Outcomes - By the end of this meeting, we will have:

- Learned of BPL’s work exploring options for increasing carbon sequestration potential on Public Reserved Lands
- Learned of progress on making updates to the Open Space Tax Program
- Considered and refined draft forest carbon recommendations
- Provided an opportunity for public input

Agenda

What	When
Welcome and Agenda Review	9:00 – 9:10
Carbon Sequestration Potential of Public Reserved Lands: update on BPL staff work on carbon sequestration and/or storage enhancements – Bill Patterson, Justin Schlawin	9:10 – 9:50
Open Space Current Use Taxation Program Revisions Update	9:50 – 10:05
Discussion of Initial Draft Recommendations - with intent to make them: more equitable, specific, actionable, measurable	10:05 – 11:30 (incl. break)
Public Input	11:30 – 11:40
Work Between Meetings – What Can Get Done Before March 19?	11:40 – 11:50
Final Subgroup Meeting <ul style="list-style-type: none"> • March 29 – 9:00-12:00, Bolton Hill Closing Thoughts	11:50 – 12:00

Note: Agenda item times are subject to change based on the progress of the subgroup

Maine Climate Council Natural and Working Lands Work Group

Working Agreements

- Meetings will start and end on time.
- When meetings are held in person, Committee members will make every effort to attend in person to maximize learning, communication, and collaboration.
- Cameras will remain on during virtual meetings to facilitate communication and understanding.
- Meeting materials will be shared in advance of meetings with sufficient time for review.
- Come prepared, having read meeting materials and completed assignments.
- Be present and engaged.
- Strive for equal airtime, enabling all to participate fully.
- Listen with curiosity and an openness to learning and understanding.
- Adopt a creative problem-solving orientation.
- Name the tension, kindly.
- Humor is welcome!

The Natural and Working Lands Work Group will strive for consensus in its recommendations through a facilitated, discussion-based process, and will not hold votes on specific decisions. The Work Group may choose to include a significant minority opinion as part of its final recommendations.

Maine Climate Council
Natural and Working Lands Work Group Meeting
Forest Carbon Subgroup Meeting Notes
Monday, January 21, 2024; 1:00 - 4:00 pm
Deering 101, Blossom Lane, Augusta

At this meeting, the Subgroup:

- Brainstormed strategies for key Forest Carbon Task Force recommendations
- Discussed concrete updates to the Open Space Tax Program
- Provided an opportunity for public input

The following numbers correspond to the recommendations in the Maine Forest Carbon Task Force (FCTF) final report.

#1. Review Current Harvest Levels. **Adam Daigneault**, presented the work that he, **Ivan Fernandez, and Jereme Frank** completed to update figures to reflect new FIA data, and provide more accurate ownership, stocking, and harvest level estimates within distinct acreage categories, including <10,000-acre ownerships (see 1/22/24 meeting materials). This analysis indicates that 7 million acres of forestland are owned by small landowners in the 10-10,000 acre category and that these lands account for 50% of the total private forest carbon stock in Maine. Harvest rates within this size class declined from 2017-21 as compared to 2015-19. Analysis of the stocking rates of various size classes can help identify how forest carbon could be enhanced through active forest management, such as thinning overstocked stands or planting poorly stocked forests. These data also highlight that significant portions of the small forestland owner forest area are classified as fully or overstocked forest that pose opportunities for improving forest health and carbon stocking through appropriate forest management practices. **Jereme will prepare an accompanying narrative to provide further context for the information on the tables.**

#2. Review Practice-Based Forest Carbon Programs. **Andy Whitman** presented a summary of existing forest carbon programs for the Subgroup's review (see 1/22/24 meeting materials). **Andy will draft a framework for landowners and other decision-makers of essential principles and components of forest carbon programs that helps ensure their effectiveness in advancing climate and forest carbon goals.**

#3. Identify Climate-Friendly Forest Management Practices. While the Subgroup viewed this work as largely complete, it acknowledged that a more refined list of climate-friendly forest management practices could be helpful to target actions with the greatest potential impact on and relevance to Maine's forests and forest landowners. **Andy Whitman will develop this list in concert with identifying key forest program carbon elements as noted in #2.**

#4a/b. Increase Technical Assistance and Offer Financial Incentives to Forest Landowners. Develop and/or Offer Financial Incentives to Landowners. The Subgroup continued to conclude that the state's role should not be to develop a forest carbon program in partnership with one or more entities, but rather to provide support to landowners interested in implementing climate-friendly forest management practices and/or enrolling in existing public or private forest carbon

programs. **Mort Moesswilde** will draft a concise list of existing landowner outreach and financial incentive programs.

#5. Identify Incentives for Loggers. The Subgroup reviewed a list of ideas Dana Doran developed for making further progress on actions that support high quality on-the-ground performance beyond the recent hiring of an MFS Forest Carbon Specialist and federal funding for portable bridges. **Dana Doran and Mort Moesswilde** will review incentive programs that could serve as potential models to provide support to logging contractors that helps achieve low-impact climate-friendly harvesting standards. One such model is the NY Watershed Agricultural Council's forest management implementation program.

#6. Update the Open Space Current Use Taxation Program. The Subgroup continued to express its support for a multi-party effort actively pursuing changes to the OS program that could be broadly supported and largely align with the Forest Carbon Task Force's original recommendations. This work is likely to conclude during this legislative session and therefore may not necessitate a recommendation to the Maine Climate Council.

#7. Explore Opportunities for Partnerships with Commercial Forestland Owners. **Alec Giffen** will provide brief summaries of the New England Forestry Foundation's (NEFF's) Climate-Smart Commodities Partnership and the Forest Carbon for Commercial Landowners (FCCL) projects.

#8. Participate in Multi-State Forest Carbon Initiatives. **Mort Moesswilde** will provide a brief summary of the Securing Northeast Forest Carbon Program, a 7-state effort to maximize private forest carbon in the Northeast through carbon sales in the voluntary and compliance markets, through special management practices, and through the use of conservation easements. **Stacy Knapp** will provide a summary of the Northeast State for Coordinated Air Use Management (NESCAUM) GHG Emissions Inventory Workgroup. When available, **Jo D. Saffier** will share the outcomes of the Northeast Net Zero Carbon Collaborative, which explored ways that ME, VT, and MA could potentially support achievement of one another's midcentury net zero greenhouse gas (GHG) emissions goals.

#9. Recommend a Numeric Goal for Increased Carbon Sequestration in Maine. The Subgroup agreed that even with updated FIA data, the estimate of current sequestration of 12 MtCo₂e/yr by Maine's forest sector should not be increased for a range of reasons highlighted in the FCTF report.

Subgroup members tasked with work products agreed to provide materials by **February 21** for inclusion in the March 6th meeting packet.

The final two meetings take place on:

Wednesday, March 6, 9am - 12pm, Bolton Hill

<https://us02web.zoom.us/join/joinMeeting/register/tZMsdeGuqzIsHNGnRO5hLz59B78uMCQ5mjv1>

Friday, March 29, 9am – 12pm, Bolton Hill

<https://us02web.zoom.us/join/joinMeeting/register/tZlPdO2hrTsoHtfSOGPFazxnm0CgTZWWyV31>

Essential Principles of Evaluating a Carbon Project on BPL Land

2.16.24 DRAFT

Considering the importance of forest carbon sequestration and storage on Public Reserved Lands in Maine, and the potential interest of staff and stakeholders in the topic, the Bureau of Parks of Lands has drafted the following criteria to evaluate any forest carbon-related proposals that may come forward.

1: Credibility of carbon sequestration and storage benefit

Additionality: Will this project lead to less carbon being in the atmosphere than if the project were not undertaken?

Permanence: What is the duration of commitment to long-term sequestration and storage of carbon?

Robust accounting: Is the accounting of forest carbon accurate, defensible, and transparent?

Co-Benefits: Are proceeds from this project used to fund carbon co-benefits, such as pre-commercial thinning, other silvicultural investments, or timberland acquisition?

Environmental Benefits: Will the project include the restoration of ecosystems or habitat?

2: Fiscal responsibility

Revenue: Are there net profits that will diversify revenue?

Replicability: Is the project structured financially so that it could provide an attractive return on investment and be replicated by other landowners?

Secondary disadvantages - internal: Will the project have minimal secondary disadvantages, such as demands on staff time, strained relationships with contractors and mills, or other costs?

Secondary disadvantages - external: Are any external costs diffuse and not disproportionately affecting one community?

Capitalizing on assets: Is there a viable and credible opportunity for reward based on stocking or growth of forest assets that BPL has historically managed for values other than timber, such as Ecological Reserves?

3. Carbon transaction evaluation

Moving to net-zero: If part of a carbon credit sale, is the project part of a robust, broader effort of the buyer's organization in making investments or other changes to reduce emissions?

Local credits: Can the carbon offsets credibly be counted in Maine's carbon sequestration and reduction goals through sale to a Maine-based buyer or through insets in state government?

4. Learning tool

Replicability: Is the project replicable in scope and scale?

Reporting: Is reporting clear and transparent for the public, and are there training opportunities and public support tools?

Timberland Management for Forest Carbon: Pilot Project Proposal on the Bureau of Public Lands – CONCEPT DRAFT

Developed by Maine Bureau of Public Lands for the New England Forestry Foundation - January 2024

Climate Smart Commodities Initiative and a Pilot Project on the Bureau of Parks and Lands

New England Forestry Foundation and its partners are administering a \$30-million initiative funded by a U.S. Department of Agriculture (USDA) Partnerships for Climate-Smart Commodities award to, in part, encourage forest landowners to implement climate-smart forest practices that store more carbon in working forests. Larger timberland owners such as BPL will play a key role in this initiative that seeks to implement practices across approximately 80,000 acres of working forests.

By overcoming financial challenges, in particular access to limited and often distant markets for low-value softwood and hardwood pulp, the Bureau of Parks and Lands (BPL) could immediately and effectively implement Improved Forest Management (IFM) on a land base with conditions and situations characteristic of many large commercial landowners. Additionally, BPL is able to publicly share financial details to help provide case study information related to this initiative with prospective participants.

Within three of its Management Units, BPL has identified a focus area of approximately 3,000 acres where IFM designed to store more carbon can be effectively implemented over each of the next five years. This focus area consists of targeted collections of stands within the Round Pond, Telos, and T15/14R11 units, all in the North Maine Woods region. The focus area consists almost exclusively of stands originating from 1980s-era spruce budworm (SBW) salvage/pre-salvage clearcuts, a stand condition characteristic of tens of thousands of acres across ownerships in the region. As a secondary benefit, the focus area is predominantly within the Allagash Wilderness Waterway (AWW) watershed, where IFM can maintain and complement the natural and cultural qualities of the AWW.

For this focus area, BPL has proposed management designed primarily around irregular multi-aged silviculture that is intended to:

- Increase composition of longer-lived species
- Capture imminent mortality in slowly declining fir, birch, poplar, and other pioneer species and turn forest carbon into long-lived wood products
- Maintain high levels of carbon storage in mature forests throughout the majority of the rotation
- Increase carbon sequestration rates in the residual stand, especially in longer-lived species
- Incorporate climate-smart infrastructure improvements

Challenges to implementing this management include

- Designing harvests that maintain residual wind firmness
- Overcoming poor market conditions, which requires selling some harvested products at a loss to achieve silvicultural objectives
- Incurring the cost of infrastructure, namely roads and bridges, that can withstand higher intensity/frequency precipitation events and allow for the flexibility of multi-season operations in the absence of reliable winter conditions
- Accounting for foregone income when comparing revenue from IFM to that of conventional silvicultural systems.

The remainder of the document provides general summaries of BPL's ownership and management objectives and descriptions of the conditions within the focus area that warrant IFM implementation.

The Bureau of Public Lands Ownership and Management Objectives

The Bureau of Public Lands (BPL) owns and manages approximately 630,000 acres in the State of Maine. Properties occur on a wide range of ecological and socio-economic regions throughout the state, extending from the Western Mountains to the Downeast coast and north to the Crown of Maine. Approximately 430,000 acres are “regulated,” meaning operable timberland. The remaining area includes about 100,000 acres of ecological reserve and another 100,000 acres of inoperable land/non-timberland. Contiguous properties (defined as “Units”) range in size from several hundred acres to entire townships.

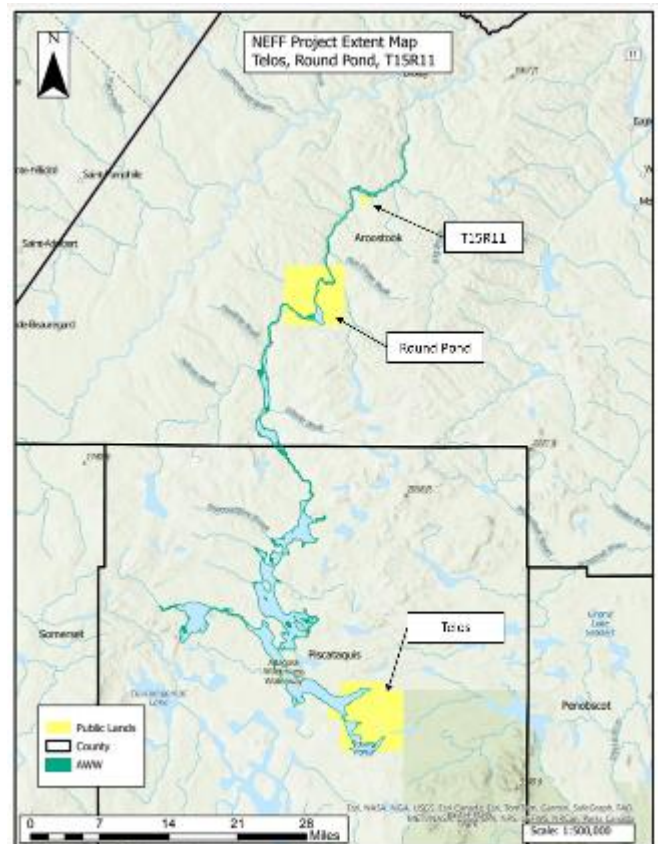
BPL manages under a multiple-use management framework, of which timber harvesting is one of five resource objectives managed together. Specific to BPL’s timber management program, the primary objective is to establish and maintain biodiversity, with management striving towards establishing and maintaining forest conditions necessary to achieve overall landscape goals. Additionally, BPL is required “to demonstrate exemplary land management practices, including silvicultural, wildlife and recreation management practices.” per Maine Statute (12 MRSA § 1847). BPL is sharpening its focus on management related to increasing forest carbon storage and sequestration and overall resiliency and adaptability of its forests and operations in the face of a changing climate.

Pilot Project Location Unit Descriptions

This 3,000 focus area consists of targeted collections of stands within the Round Pond, Telos, and T15/14R11 units. The three units together total approximately 44,500 acres, of which 42,900 are regulated (managed).

The Round Pond Unit (2,050 acres in the proposal focus area, 20,800 acres total; 20,450 acres regulated) comprises all T13 R12 outside the AWW Restricted Zone. 98% of the area is forested, and 98% of the forest is regulated (~20,000 acres). Unregulated acres are either small areas of steep land or noncommercial forests on infertile sites. Topography is generally rounded hills separated by gentle brook corridors, with relatively fertile soils on most acres, capable of excellent softwood growth. A minority of sites are sufficiently fertile enough to produce quality hardwoods. The Allagash River bisects the unit.

Most acres were acquired in a 1984 land trade with the Great Northern Company. Harvest History and Stocking Harvesting under State ownership began late in 1988 and has continued through all but two years (2003 and 2010) since then. Harvest volume between 1988 and 2021 totals 191,300 cords, averaging approximately 6,000 cords/year at a rate of about 12 cords/acre. About 75% of the harvest volume was softwood logs (mainly spruce-fir) and one-fourth of hardwood pulpwood, with much smaller amounts of hardwood logs/veneer and softwood pulpwood.



The Telos Unit (725 acres in the proposal focus area, 22,800 acres total; 21,400 acres regulated) is comprised of the entirety of T6 R11 and adjacent portions of T7 R11 and T6 R12 Townships in Piscataquis County, west of Baxter State Park's northern end. The Unit includes portions of the shores of Telos Lake and the south end of Chamberlain Lake; all of the shoreline lands associated with those waterbodies are part of the AWW. About one-third of 530-acre Webster Lake is also within the Unit. The only sizeable pond completely included is the 198-acre Coffeelos Pond.

Following State acquisition as part of a large 1970s land trade, the Great Northern was entitled to a considerable settlement to balance stumpage values and chose to fulfill this obligation at Telos, harvesting almost 100,000 cords, nearly all spruce, and fir, from 1978 through 1982. Harvests by the Bureau began soon after the settlement harvests and have continued to the present, except for very little activity between 2007-2011. The total harvest volume between 1985 and 2016 totaled 149,300 cords, averaging approximately 4,800 cords/year at a rate of about 12 cords/acre.

The T15R11 & T14R11 Unit (75 acres in the proposal focus area (in T15R11 only); 1,000 acres total; 950 acres regulated) is comprised of the two original public lots at approximately 500 acres each. 1,480 acres of the T15 R11 lot are within the AWW one-mile zone.

T14 R11 lot was heavily harvested in the early 1970s by the previous manager. The T15 R11 lot was also heavily harvested, taking place in the late 1970s at the height of the last spruce budworm outbreak. The Bureau harvested both lots in 2011-12, producing 6,400 cords. Heavy harvests in combination with SBW defoliation have resulted in lower than average merchantable volume on these lots and high densities of saplings and small poles/studwood of primarily desirable species.

Proposed Pilot Project Focus Area

The approximately 3,000-acre focus area is primarily made up of ~40-year-old, dense softwood and mixedwood stands just entering merchantability. This area includes groups of heavily harvested stands (generally stand replacing clear cuts) before BPL acquisition, generally, as salvage/pre-salvage clear cuts following the 1970-80s SBW outbreak. These stands have relatively high softwood (primarily fir-spruce) compositions due to site conditions and a series of 1982 Great Northern herbicide treatments. High ratios of fir to spruce have been observed. The focus area is also intermixed with higher hardwood composition (typing HS) stands, resulting from poor success rates of the herbicide attempts. Most hardwood in these stands are of poor quality (e.g. red maple stump sprouts) and short lifespan (e.g. white birch, quaking and balsam poplars). The area was identified by BPL staff with decades of on-the-ground experience with these units.

These groups of stands were cross-referenced with BPL's typing data to confirm density, height, and species composition standards. Stands are broken down in the table below based on broad type (HS = 30%-50% hardwood, SH = 50-70% softwood, SW = 70%+ softwood compositions). Canopy closure (used as a surrogate for density in the typing) was at least 70% closure, with an average height of 44 feet.

Forest Carbon Subgroup Recommendations **INITIAL DRAFT for 3.6.24 Meeting Discussion Purposes**

Context: The purpose of this effort is to develop incentives, primarily for Maine woodland owners of 10-10,000 acres, to increase carbon storage and sequestration while maintaining harvest levels (original Forest Carbon Task Force charge). The recommendations below are offered for discussion as the most immediate steps to further this effort. Some recommendations expand beyond this ownership size to address a larger ownership class, a specific segment of the forestry sector, or a need that pertains to the state as a whole.

- Forest conditions on small ownerships indicate opportunities to increase carbon sequestration by increasing the number of acres under active management utilizing carbon-friendly silvicultural practices.
 - Maine Forest Service (MFS) should conduct ongoing analyses of forestland ownership, stocking, and harvest levels to identify opportunities and refine methods to improve long-term carbon storage potential while maintaining forest harvest levels. Desired outcomes include:
 - Keeping forest as forest/reducing conversion to non-forest.
 - Improving stocking of poorly and moderately stocked acres.
 - Applying intermediate treatments such as thinning on currently fully or overstocked acres.

- Forest carbon programs continue to evolve, with many family forest owners still unaware or uncertain of their options.
 - MFS should develop a guidance document on forest carbon programs for landowners and other decision-makers, to include concise descriptions of key components of each forest carbon program, and key considerations and questions for landowners to consider when evaluating and enrolling in a program.

- Family forest owners require information, educational opportunities, technical assistance, and financial incentives. Outreach efforts to engage, inform, and assist landowners with regard to active forest management to address carbon sequestration and storage, should be increased by MFS in partnership with other entities.
 - MFS should continue to provide outreach, education and on-site technical assistance statewide at no cost, as capacity allows and with new sources of funding as available.
 - MFS should pursue methods to target specific owner groups, including:
 - New woodland owners
 - Owners of >40 acres
 - Farmers
 - MFS should work to identify and assist previously underserved and under-resourced woodland owners.
 - MFS should work with partner entities to address private technical service provider capacity, including an effort to support and increase opportunities for forestry students, recent graduates, and intern foresters, particularly in working with family woodland owners.

- MFS should continue to provide financial incentives for planning and practices as available (e.g. through the USDA Forest Service Forest Stewardship program) and work with partners to identify additional/new sources for such assistance.
 - MFS should develop a menu of climate-friendly management strategies for forest management plans and expand the WoodsWISE program to include these management strategies. This will require additional MFS staffing.
- Incentives and support for loggers to use low-impact harvesting equipment and climate/carbon-friendly practices are needed.
 - MFS should develop materials and training on extreme weather BMPs to supplement the Maine Forest Service's Best Management Practices for Forestry Manual.
 - MFS and other entities should identify additional technical and financial resources to support increased implementation of climate/carbon-friendly practices and equipment by loggers.
- Maine's current use property tax programs should be more flexible to accommodate woodland owners' needs and incentivize climate-friendly land management practices.
 - [If LD 1648 doesn't pass] Address identified concerns and reintroduce an amended open space property tax law bill to the 132nd legislature.
 - Develop printed information on Maine's current use taxation programs to briefly inform taxpayers about the importance of forests and how current use taxation can support stewardship for wood production, forest carbon, wildlife, and other values. Identify resources to support possible distribution of brief materials by municipalities (e.g. in property tax bills).
- Multiple efforts are underway to increase carbon sequestration on commercial forest land while maintaining harvest levels. State lands also present an opportunity for exploring management regimes that increase carbon sequestration.
 - The Department of Agriculture, Conservation and Forestry's Bureau of Parks and Lands (BPL) should investigate the potential benefits of engaging in a practice-based and/or carbon credit-based pilot project that could result in increased carbon sequestration on state-owned lands while also contributing to the knowledge base of BPL and other forest managers and the public.
 - DACF should continue to monitor other efforts that are identifying and implementing climate-smart forest practices on larger ownerships, aimed at increasing forest carbon sequestration while maintaining harvest levels.
- Maine is engaged in current and emerging multi-state efforts aimed at learning from the programs and policies of other states while increasing forest carbon sequestration and supporting a healthy Maine forest economy.
 - Maine should continue to engage in these efforts and learn from other states about their programs to enhance carbon sequestration on private forestlands.

- Maine's forest sector, with its many components, is a critical contributor to overall carbon storage and sequestration, supporting Maine's greenhouse gas emissions targets while also maintaining a robust forest economy. Recognizing the uncertainty inherent in projections of forest conditions, forest product markets, and climate impacts, sequestration by Maine's forests will continue to play an important role in state carbon budgets.
 - Conduct ongoing analyses of the most current data to monitor the current sequestration rate by Maine's forest sector of 12 MtCo₂e/yr, and inform policy makers and stakeholders about current forest carbon sequestration rates.

- There is an increasing need for public and landowner education on the role of forest management in meeting state and global climate goals.
 - Engage a marketing consultant to develop a green messaging campaign focused on the role that active forest management plays in forest health, wood fiber production, and carbon sequestration.

Update harvest levels and carbon stocking data on woodland owners of 10 to 10,000 acres with most current data available

Adam Daigneault (UMaine), Jereme Frank (MFS), Ivan Fernandez (UMaine)
Version: 1/30/24

The Forest Carbon subgroup updated the data provided in Tables 1 and 2 of the 2021 Forest Carbon Task Force (FCTF) report for 10-10,000-acre woodland ownerships with the most current data available. Key metrics for that specific landowner classification included: total forestland area, the aboveground carbon stocks, and harvest removals. All reported FIA data were based on a five year inventory, with the most recent reporting year being 2021. That is, carbon stock for the “2021” year reported in the tables below represent data from plots sampled between 2017-2021, while the “2019” carbon stock data reported in the 2021 FCTF report were from plots sampled from 2015-2019. For removals (harvests), 2021 estimates used FIA plots sampled between 2017-2021 and 2012-2016, while 2019 estimates used plots sampled between 2015-2019 and 2010-2014. In addition to the change in the data sample years, key changes in the reported data include:

- The FIA changed their recommended biomass and carbon estimation methodology for the entire U.S. to use the National Scale Volume and Biomass Estimators (NSVBE) instead of the Component Ratio Method (CRM). As a result, the average acre of Maine forest is estimated to have a higher amount of standing biomass and carbon. We have included both the NSVBE and CRM estimates for the 2017-2021 FIA inventory period for comparison.
- The low-end and best-guess forest areas have changed due to improved data and methods available to estimate acreage that falls into the small landowner category. The new estimates use landowner data sourced by the State of Maine, while the old estimates relied on data from the USDA Forest Service’s Spatial Data Services. While both sources are incomplete due to the complexity of collating parcel-level ownership information, we have greater confidence in state landowner data.

As a result, our best guess is that there are 7 million acres of small landowner forests that have an aboveground carbon stock of 601 million metric tons of carbon (Table 1). These estimates are equivalent to 43% of the total private forest area and 50% of the total private forest carbon stock. In terms of harvest, we estimate that 1-10,000 acre forestland owners removed an average of 2.6 million dry tons of wood per year from 2017-2021, a decline of 1.2 million dry tons over the previous measurement period of 2015-2019.

Additional data on the known area of small woodland owners provided by the U.S. Forest Service’s FIA program (5.6 million acres) and the most recent data inventory (2017-2021) and estimation method (NSVBE) can be used to better understand how the metrics presented above vary by stocking and stand size class (Table 2), noting that breaking the estimates out of

this level introduces a higher level of uncertainty due to a lower number of FIA plots in each stocking / size class combination. These estimates highlight how different combinations of stand classifications have varying levels of biomass and carbon stock and density as well as their relative contribution to the total annual removals across this specific landowner size. This information can be used to help identify how forest carbon could be enhanced by making changes to the landscape, such as thinning overstocked stands or planting poorly stocked forests. The estimates are relatively consistent with the more aggregated results listed in Table 1, but highlight that a lot of the small forestland owners forest area (and biomass/carbon) is classified as fully or overstocked forest with medium to large size diameter trees.

Table 1. Updated estimates of owned acres, stocking, removals, and potential harvested wood in long-term storage for Maine’s Small (10 – 10,000) acres forest ownership size class.

Estimate	Units	Year* / Method [^]	Small Landowner: Low End	Small Landowner: Best Guess	All Maine Private Forest	% Total Private < 10,000 acres (Best Guess)
NWOS Acres (family)	Million Acres	2021	4.8	4.8	16.1	30%
		2019	4.7	4.7	16.1	29%
Landowner Map Acres (family and small corporate) [§]	Million Acres	2021 - SOM	5.6	7.0	16.1	43%
		2019 - USFS	3.9	6.9	16.1	43%
FIA Above ground carbon (family and small corporate)	Million Metric Tonnes C	2021 – NSVBE	137.1	163.9	329.6	50%
		2021 – CRM	120.0	143.4	290.4	49%
		2019 – CRM	78.1	134.3	287.5	47%
FIA Above ground carbon assuming released as CO2 only (family and small corporate)	Million Metric Tonnes CO2e [#]	2021 – NSVBE	502.8	601.1	1,208.40	50%
		2021 – CRM	439.9	525.9	1,064.60	49%
		2019 – CRM	286.4	492.4	1,054.2	47%
FIA bole harvest removals	Million Dry Tons / year	2021 – NSVBE	2.1	2.6	7.1	37%
		2021 – CRM	2.1	2.6	7.3	36%
		2019 – CRM	2.2	3.8	9.1	42%

* 2021 = 2017-2021 FIA inventory; 2019: 2015-2019 FIA inventory

[^] NSVBE = National Scale Volume and Biomass Equations; CRM = Component Ratio Method

[§] SOM = State of Maine ownership map; USFS = USFS Spatial Data Services landowner map

[#] Carbon can be converted to carbon dioxide equivalent (CO2e) using a factor of 44/12 or 3.67 tCO2e/tC

Table 2. FIA Reported estimates for aboveground biomass, removals, and area organized by stocking class and stand size class for all known ownerships of 0-10,000 acres. Updated using latest FIA inventory data and new National Scale Volume and Biomass Equations (NSVBE) 2021 estimates.

FIA Stocking Class	FIA Size Class*	Area (Acres)	Aboveground Biomass (dry tons) [^]	Biomass Density (dry ton/ac) [^]	Annual Bole Wood Removals (dry tons/yr) [^]	% Total Removals	Opportunity to Increase Forest C
1. Overstocked	Lg	103,559	13,877,100	134	45,101	2%	
1. Overstocked	Med	78,892	6,984,940	89	5,095	0%	Thin
1. Overstocked	Sm	216,508	5,095,935	24	18,669	1%	Thin
1. Overstocked	Total	398,960	25,957,975	65	68,865	3%	
2. Fully Stocked	Lg	1,283,307	108,815,327	85	940,869	45%	
2. Fully Stocked	Med	1,161,125	68,326,975	59	433,245	21%	
2. Fully Stocked	Sm	420,248	10,804,992	26	49,508	2%	
2. Fully Stocked	Total	2,864,680	187,947,294	66	1,423,622	68%	
3. Moderately Stocked	Lg	746,676	40,582,562	54	330,422	16%	
3. Moderately Stocked	Med	876,135	34,458,657	39	133,626	6%	
3. Moderately Stocked	Sm	268,793	5,459,890	20	3,354	0%	Enrich Plant
3. Moderately Stocked	Total	1,891,605	80,501,110	43	467,402	22%	
4. Poorly Stocked	Lg	141,088	5,058,967	36	107,458	5%	Enrich Plant
4. Poorly Stocked	Med	223,258	4,775,257	21	11,930	1%	Enrich Plant
4. Poorly Stocked	Sm	29,123	356,705	12	231	0%	Enrich Plant
4. Poorly Stocked	Total	393,468	10,190,929	26	119,619	6%	Enrich Plant
5. Non-stocked (NS)	Total	22,670	110,782	5	0	0%	Plant
1-10,000 Acre Total	Lg	2,276,014	168,336,589	74	1,423,850	68%	
1-10,000 Acre Total	Med	2,342,274	114,571,315	49	583,896	28%	
1-10,000 Acre Total	NS	15,536	82,664	5	0	0%	
1-10,000 Acre Total	Sm	937,558	21,717,521	23	71,762	3%	
1-10,000 Acre Total	Total	5,571,382	304,708,089	55	2,079,508	100%	
Total Private	Total Private	16,072,009	732,357,050	46	7,063,165	100%	

* FIA classification of the predominant (based on stocking) diameter class of live trees, where at least 10% of the stand is forested. For large (Lg) and medium (Med) classification, at least 50% of the stand is in large and medium trees, and classification is based on the highest proportion of these two size classes.

Large: trees at least 11" diameter for hardwoods, 9" for softwoods. Medium: trees at least 5" in diameter but less than the large diameter trees; Small (Sm): less than 5" in diameter; Non-stocked (NS): less than 10% of stand is forested

[^] Dry biomass weight can be converted to carbon by multiplying the value by 0.5 and carbon dioxide equivalent by multiplying by 1.375.

DRAFT - A Forest Carbon Offset Program Assessment Worksheet for Woodland Owners Considering Offset Enrollment. *
(A. Whitman, Maine Forest Service February 21, 2024)

<i>Below is a selected list of questions to help determine if a forest carbon offset program is right for you</i>	Program requirements (enter the requirements of the forest carbon program of interest)	Does your woodland property meet program objectives?	Do the requirements meet your objectives for your woodland?
<i>Eligibility Basics</i>			
Are your goals, including wood harvesting goals compatible with the forest carbon program?			
What changes to current forest management in terms of goals and harvest levels will be required for enrollment?			
What forest type(s) are eligible?			
What is the minimum acre threshold?			
What is the minimum stand age requirement?			
What is the minimum tree basal area or standing tree volume requirement?			
What is the required enrollment timeframe for program participation (e.g., contract length)?			
<i>Financial Considerations</i>			
What are the program fees? (e.g., registration fee, verification fee, trading fee, etc.)			
What are the penalties if you would like to withdraw early? (e.g., repayment of credit value of removed tons)			
What are the costs/benefits of program participation? (i.e., is it economically feasible?)			
What is the schedule of payments?			
Does the program require the applicant to bid on the value of the credits?			

Does the program require the applicant to bid on the value of the credits?			
Program requirements			
What are the program requirements for a forest management plan? (If so, does it require a licensed forester, a program approved licensed forester, or a offset program forester to review and sign-off on your plan?)			
Are areas excluded from the carbon program if already restricted from harvesting by regulation or legal easement? (e.g. regulatory stream buffers, easements timber harvesting, enrollment in the Conservation Reserve Enhancement Program (CREP) or other USDA programs that restrict timber harvesting)?			
What happens in the event of catastrophic fire or insect/disease? (i.e., accidental release of carbon due to natural events or events beyond your control)			
What are program requirements concerning enrollment of your entire woodland ownership or of only enroll part of your woodland ownership?			
Is there a waiting period before landowners can enroll in another forest carbon program after the contract ends?			
Is there a renewal option?			
Monitoring and Verification Responsibilities			

Who is responsible for establishing initial baseline inventory?			
Who is responsible for ongoing monitoring?			
Will there be a requirement for third-party contractors to visit the property to verify carbon every few years?			
Legal and Land Tenure Considerations			
What obligations will your heirs have to continue the program? Do you wish to restrict the ability of your heirs to quickly sell woodland if you pass away?			
What happens if land is sold? Does the contract go with the land or are you responsible?			
What are the tax implications of enrolling in a carbon program? Will enrollment in a forest carbon offset program allow a landowner to continue to meet their management requirements for the Tree Growth Tax Program or the Open Space Program?			

* Based in part on: Putney, J., N. Kline, S. Fitzgerald, L. Grand, C. Schnepf, G. Latta, P. Shults and J. Rizza. 2023. Introduction to Forest Carbon, Offsets and Markets. PNW 775, Oregon State University Extension Service, Washington State University Extension, University of Idaho Extension.

DRAFT - A Forest Carbon Offset Program Assessment Worksheet of Forest Carbon Offset Programs and Projects (A. Whitman, Maine Forest Service with building on materials from Justin Schlawin MNAP February 21, 2024)

Key Topics

Key Sub-topics

Evaluation Questions

Carbon Benefits

1: Evaluation of the credibility of Carbon sequestration and storage benefit

Additionality: Will this project or project lead to less carbon being in the atmosphere than if the project were not undertaken?

Leakage: How likely is the program’s discount for leakage likely to accurately reflect regional market conditions and not lead to harvesting elsewhere?

Permanence: What is the duration of contract required by the program or project?

Verification: Does the program have an accurate, defensible, and transparent methodology for accounting for forest carbon that include review by a third party?

2. Evaluation of the Carbon buyer impact on the atmosphere

Moving to net-zero: Does the program or project focus on selling carbon to buyer’s organization that are substantively making investments or other changes to reduce GHG emissions?

Economic Impacts

3: Evaluation of Landowner Financial Benefits

Increased income: Will the program or project increase net revenue for participating landowner(s)?

Income diversification: Will the program or project diversify streams revenue of (a) participating landowner(s) by greater than 30%?

Capitalizing on assets: Does the program or a project generously reward existing carbon stocks on timber managed areas and areas historically managed for non-timber values, such as Ecological Reserves, important recreation areas, or wildlife dominant areas?

4: Evaluation of Local Economic Impacts

Secondary disadvantages - internal: Are program projects or a project of a size and scale that they likely NOT to have secondary impacts, such additional costs for project consultants, strained relationships with contractors and mills, and/or other costs?

Secondary disadvantages - external: Are program projects or a project of a size and scale that they likely NOT to have the unfavorable economic impacts on local communities, wood processing industries, and/or economies and not disproportionately affect one community?

Other Benefits

5. Co-benefits evaluation

Environmental Benefits: Does the program projects or project include the restoration of ecosystems or habitat?

Forest Reinvestment: How well does this program or a project potentially support additional carbon sequestration and storage opportunities through activities such as pre-commercial thinning, other silvicultural treatments, and/or timberland acquisition?

Environmental and Social Co-Benefits: How well does this program or a project support opportunities for wildlife habitat improvements, conservation of biodiversity (e.g., protecting unique communities, LSOG forest), water quality enhancement (e.g., otherwise upgrade stream crossing for stream conductivity), recreational access (e.g., new or upgraded trails), especially for disadvantaged communities (e.g., new trail access near residences), and/or contribute to land acquisition for conservation and/or local recreation?

6. Evaluation of Opportunity for Learning and Scaling

Replicability: Are the program’s projects or project replicable in scope and scale on other lands?

Reporting: Is reporting for a program or a project clear and transparent for the public, and are there training opportunities and public support tools?

DRAFT: Forest Carbon-Friendly Practices for Family Woodland Landowners (10-10,000 acres) in Maine

(for Forest Carbon Sub-working Group - A. Whitman, Maine Forest Service, February 21, 2024)

The silvicultural practices listed below can be applied to managed, reserved/restricted (e.g., stream buffers on large streams), and unmanaged areas to increase carbon storage. The decision to apply any of these practices should consider other objectives of the woodland owner. Not all practices can be applied on the same acre of forest and some practices may conflict with each other.

In all cases, the pre-treatment condition of the forest stand (species, size, structure, stocking site, etc.) needs to be considered to determine if there are positive carbon benefits to the practice.

Carbon Sequestration Practices

These are carbon-friendly practices that may increase rates of carbon sequestration of forests.

Supporting healthy regeneration: Allowing natural regeneration or planting tree seedlings and saplings in areas with low seedling/sapling density or no trees will increase carbon sequestration and storage.

- Control competing vegetation, especially invasive plant species around regeneration with mechanical or chemical treatments.
- Plant trees when natural regeneration is absent or insufficient to replace canopy trees.
- Re-forest non-forested areas by planting and protecting seedlings suited to the site.
- Protect regeneration from browsing using tree guards, fencing, slash, or sash walls.
- Match the size of the harvest gaps to the forest type, site characteristics, and desired tree species to ensure desirable regeneration.
- Favor regeneration of tree species that are likely do well on site 30 to 60 years from now by considering seed sources, mast years, season of harvest, soil scarification/protection, etc.

Thinning for healthy forests: Applying tree thinning practices will remove less vigorous trees and improve the growth, vigor, and resilience of remaining trees and enhance long-term carbon sequestration.

- Use stocking charts based on forest type, tree spacing, and average tree size to manage stand density.
- Maintain sufficient density and apply thinning carefully in dense young stands to limit windthrow.
- Apply crop tree release in developed stands to remove neighboring trees that are competing with desired (crop) trees.
- Used mechanical treatments and/or prescribed fire in fire-adapted ecosystems (e.g., pitch pine/scrub, oak/bear oak) to thin the forest and reduce risk of carbon loss due to catastrophic fire.

Harvest rotation extension: Extending the length of time between harvests of commercially viable stands allows trees to grow larger and store more carbon in the forest (and ultimately in durable wood products).

- Thin to accelerate the growth of larger trees and foster a range of tree sizes (without reducing stocking excessively).
- Avoid applying extended rotation to stands dominated with tree species vulnerable to emerging pest problems or extreme windstorms.

Enhancing tree species and age diversity: Enhancing the diversity of tree species and tree ages is likely to improve carbon sequestration and storage over time. Different tree species and tree ages occupy different

ecological niches allowing diversified forests to store more carbon and avoid losses than forests with only a few species.

- Manage for tree species that are suited for the site and can allow the forest to efficiently use resources.
 - Manage for an array of tree species to enhance forest resilience to disturbances such as insect outbreaks, frost events, and windstorms, and reduce subsequent carbon loss.
- Manage for an array of tree ages to enhance carbon storage and sequestration and resilience to disturbances and stressors.

Carbon Storage Practices

These are carbon-friendly practices that help keep carbon stored in the forest, forest soils, and potentially in long-lived forest products.

Harvesting Best Management Practices (BMPs): Minimizing damage to trees and soils caused by equipment and vehicles protects standing and soil carbon.

- Adhere to Best Management Practices for water quality to also minimize the impacts of timber harvesting on soils.
- Establish permanent forest access roads efficiently and where necessary, as terrain allows, to concentrate impacts to specific areas.
- Concentrate harvesting to limit impacts to select areas.
- Minimize disturbance of deadwood.
- Use bumper trees to protect residual trees and advance regeneration.
- Harvest when ground conditions are least vulnerable to disturbance (dry or frozen soils).

Deadwood Conservation: Conserving standing and downed deadwood allows the transfer of carbon from the live tree carbon pool to the deadwood pool.

- Leave wildlife trees, dying trees, and snags undisturbed when safe to do so.
- Girdle cull trees (away from roads, and active recreation areas).
- Avoid disturbing large logs with equipment.
- Leave slash and debris in the woods, and/or return tops and limbs to the forest.

Variable retention: Retention of large trees and deadwood will enhance carbon storage as they contain substantial amounts of carbon.

- Use variable retention (e.g., wildlife trees, dispersed retention, patch retention) to retain very large wildlife trees and nearby large logs).
- Use irregular/extended shelterwood harvesting to develop more complex structures and retain carbon on site.

Carbon reserves: Designating clumps and stands as reserves to conserve areas with high levels of carbon will retain carbon on site.

- Create long-term *reserves* on forest sites with high carbon density (e.g., old, many large trees, many logs) and/or limited accessibility or operability by logging equipment.
- Conserve and retain *forests including managed forest areas*, and limit forest conversion to non-forest land uses.

Growing for long-lived products: Growing and harvesting timber to be used in durable, long-lived products promotes to promote long-term carbon storage in wood products.

- Grow trees for composite-materials and solid-wood product markets.

A Brief Overview of Outreach, Assistance, and Incentives for Maine Family Woodland Owners (~10-10,000 acres) – 2024.02.20

Government agencies, nonprofit organizations, and private entities have long recognized that family woodland owners need information and assistance in making decisions about their woodland. The following provides a brief overview of programs that support such efforts, with an emphasis on Maine Forest Service (MFS) programs and activities.

Maine family woodland owners at a glance:

outreach/education	financial incentives	technical assistance
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- ~75,000 family woodland owners with 10-10,000 acres
- ~29% of Maine’s private land base
- ~25%+ of annual wood harvest
- ~25% of owners who harvest do so with the involvement of a licensed forester
- ~27% of owners have a forest management plan
- ~26% of owners are enrolled in a current use program (primarily Tree Growth)
- ~200,000 family woodland owners with >1 acre of woodland

Program	Description
MFS “Be Woods Wise” Program	MFS’s flagship outreach program to family woodland owners, established after the 1998 Ice Storm. Outreach consists of newsletters, informational displays (e.g. fairs & field days), and educational events, as well as flyers, stickers, booklets, and other handouts. MFS newsletters reach ~8,000 woodland owners, foresters, loggers, towns, community groups, etc. Maine’s Be Woods Wise implements the USDA Forest Service’s federally funded Forest Stewardship Program.
MFS Forest Information Center	Title 12 §8611 directs MFS to provide a "forest management information clearinghouse service" on a wide range of forest management topics. MFS’s signature publications include <i>Forest Trees of Maine</i> , <i>Woods in Your Backyard</i> , <i>Forestry Rules of Maine</i> , <i>Best Management Practices for Forestry</i> , and <i>What Will My Woods Look Like?</i> , as well as numerous information sheets and reports. MFS staff respond to thousands of calls and emails per year from all audiences, on any subject related to trees, forests, and forest products.
MFS Education	MFS statute identifies multiple specific audiences for MFS education, including "school-age children, forest landowners, forest products harvesters, and forest managers." MFS field foresters and staff offer 100+ adult education workshops and presentations per year for landowners, loggers, foresters, and others, and an additional 100+ presentations to students and teachers. MFS’s Urban & Community Forestry program also includes municipalities and community groups. MFS’s Forest Rangers and Forest Health staff also provide education.
MFS Field Foresters - Technical Assistance	Title 12 §8612 directs MFS to employ 16 field foresters to provide assistance "to small woodland owners and wood processors" about harvesting and forest management options and plans, including educational materials, incentives, and referrals. Currently 11 MFS District Foresters offer site visits or "walk and talks" to woodland owners, foresters, and harvesters, statewide and at no charge. MFS does roughly 400 such visits per year representing ~25,000-30,000 acres of family woodland ownership.
WoodsWISE Incentives	MFS offers a "cost-share" financial incentives program to woodland owners of 10-10,000 acres to reimburse a portion of the cost of hiring a private consulting forester to prepare a forest management plan. Support comes from the federal <i>Forest Stewardship Program</i> of the USDA Forest Service. MFS augments this funding when other sources are available. MFS maintains a list of over 100 "Stewardship Foresters," private consulting foresters who receive annual training and provide services, including planning to woodland owners.
Invasive Plant Control Program	MFS provides cost-share incentives to family and community woodland owners to identify, plan, and control invasive plant species in their forests. Funded by a USDA-Forest Service Landscape-Scale Restoration grant.

Project Canopy - Urban & Community Forestry	Although not directly related to individual landowners, MFS's <i>Project Canopy</i> provides grants to support forest management planning in municipal and community forests, as well as education, and outreach materials. Maine's <i>Big Tree Registry</i> similarly engages a wide audience including woodland owners. <i>Project Canopy</i> is supported by funding from USDA Forest Service's <i>Urban & Community Forestry program</i> .
Water Resources	MFS's <i>Best Management Practices for Forestry</i> manual, first printed in 2001, was among the first in the nation to take an explicitly outcome-based approach and has been emulated by multiple other states. MFS has provided hundreds of presentations and workshops over the years on BMPs and related topics, training thousands of foresters and loggers. Most recently MFS has taken a lead role in the establishment of the Adaptive BMP Cooperative (ABC) , which establishes an integrated framework of educational offerings for forest practitioners related to BMPs. Partners include Maine TREE, Maine Audubon, UMaine, Forest Stewards Guild, independent foresters & loggers, AMC, and SFI Maine. MFS's BMP monitoring program of 90+ sites/year provides data on the implementation and effectiveness of BMPs which informs future training.
Logger Training	Most logger training has focused on BMPs, forest regulations, and silviculture and has occurred in partnership with multiple organizations, primarily the Certified Logging Professional Program, the Master Logger Program, and the Qualified Logger Program.
Temporary Skidder Bridge Cost-share program	MFS recently established this 80% cost-share program for the purchase of temporary skidder bridges to help protect stream crossings on timber harvests. Uses federal grant funds.
Direct Link Loan program	MFS, in collaboration with DEP, the Maine Municipal Bond Bank, and participating banks, has made available reduced-interest loans for low-impact logging equipment via EPA's Clean Water Revolving Loan Fund. Since 2007 approximately \$55,000,000 in loans have been made through this fund, approximately \$7,000,000 in 2023.
Partnerships	MFS works with numerous organizations on outreach and education, especially Maine Woodland Owners, Maine TREE, Maine Tree Farm Program, Maine's Soil and Water Conservation Districts, Certified Logging Professional Program, Maine Master Logger Program, Maine Audubon, Forest Stewards Guild, Maine Organic Farmers and Gardeners Association, New England Forestry Foundation, Sustainable Forestry Initiative, Forest Resources Association, Department of Inland Fisheries and Wildlife, Department of Environmental Protection, and other organizations and agencies. Individual District Foresters work with dozens of regional and local organizations, including conservation groups, professional associations, businesses, land trusts, and community groups.
Maine Woodland Owners	Arguably the most active organizations in Maine with a statewide presence, with respect to woodland owners, and MFS's most frequent partners. These entities provide a wide range of outreach and education, including newsletters, publications, events, field tours (incl. the annual Forestry Field Day hosted by the year's Outstanding Tree Farmer), etc.
Maine TREE/Maine Tree Farm Program	
Maine Soil & Water Conservation Districts	
USDA - Natural Resource Conservation Service	Provides federal funding to woodland owners via EQIP (Environmental Quality Incentives Program) and related programs. Funding is available for the development of Conservation Activity Plans and implementation of conservation practices. The largest single source of funding for woodland owners.
USDA - Farm Service Agency	FSA administers the federal Emergency Forest Restoration Program which provides funding to woodland owners. Funding is intermittent. FSA has no forestry staff, and the program is little used in Maine.
USDA - Natural Resource Conservation Service	NRCS cost-share programs rely on private licensed foresters who participate as "Technical Service Providers."

A Brief Review of Incentive Programs that Support Loggers to Achieve Low-impact Climate-Friendly Harvesting Standards– 2024.02.20

This document provides a brief overview of financial incentive programs for loggers.

New York Watershed Agriculture Council (WAC) – Forestry Program

NYC Watershed is approximately 1.3 million acres (roughly equivalent to Waldo, Knox, Lincoln, and Kennebec Counties). The largest unfiltered drinking water source in the U.S. serves 9 million residents.

NYC WAC Forestry budget & staff:

- ~\$1.2 million annually (includes BMPs incentives, forest plans, tree planting, precommercial thinning.)
- 7 Forestry staff (manager, support, 3 foresters, researcher, outreach/education specialist) – separately funded.

Trained Logger Certification – provides voluntary training to loggers in forest ecology & silviculture, First Aid/CPR/AED, and Chainsaw Safety

Best Management Practices Program – provides financial and technical assistance to loggers, foresters and landowners in order to support the implementation of BMPs on privately owned forestland

- Focus is on Erosion Control, Stream Crossings (including portable bridge loan or cost-share). Costs of design, layout, materials can be included.
- Logger and Landowner must both sign the application/agreement
- WAC Forester must be involved in planning/pre-approval, layout, monitoring, inspection, approval (help identify high-priority)
 - o Private consulting forester or logger may be involved, can do layout
- 44 jobs last year, average was \$4,700 for e/s Average maximum payout is ~\$6,000-7,000 per job
- All loggers are eligible. Trained Logger Certification participants receive a higher incentive rate. 31 TLC loggers total (anticipating several re-enrollments), 25-35 total participating loggers/year.
- Stable budget is critical to assure awareness, trust. BMP implementation rates outside the watershed have been found to be lower than within the WAC. Provides a strong incentive to implement maximum BMPs.

Forest Management Plans – financial incentives for landowners to enroll in current use.

Vermont Forest Watershed Program

This program provides temporary bridges to loggers or foresters, from state resources, in two forms:

- Grants of temporary wooden bridges. Twenty-two bridges will be available in 2024, with recipients selected by lottery from applicants. Priority in the Champlain Basin.
- Temporary metal bridges at 75% cost-share. Five bridges will be available in 2024, with recipients selected by lottery.

Maine Forest Service Temporary Bridge Cost-share Program (2023-24)

Funded by USDA Forest Service’s Temporary Bridge Funding Opportunity. Designed based on feedback from a 2022 survey of potential program participants.

- Applicants are eligible for up to 80% reimbursement for 1-3 wooden bridges, not to exceed \$2,000 per bridge.

- With the first round of applications, the program is over-subscribed with approximately \$150,000 in funds obligated.

Note that multiple other states have similar programs funded through USDA Forest Service's Temporary Bridge Funding Opportunity. For example, Alabama has a comparable program that provides up to 75% of the total cost of purchasing a portable bridge up to \$20,000, and eligibility requirements include being certified as a Professional Logger Manager in AL and having no BMP complaints within the last three years. Maine expects to apply for additional funding through this USDA program.

Maine Forestry Direct Link Loan Program

Funded by USEPA's Clean Water State Revolving Fund loan program – funds important nonpoint source pollution remediation projects including publicly-owned sewage systems and wastewater treatment facilities, as well as nonpoint source pollution projects including oil tank remediation, sand-salt storage, forestry equipment. Managed by DEP, the Maine Municipal Bond Bank, and DACF Maine Forest Service by cooperative agreement.

Forestry equipment reduced rate loans:

- Original funding of \$3,000,000; subsequent funding of \$12,000,000; currently ~\$3,900,000 available
- Mechanism
 - o Private banks provide equipment loans with a 2% discount
 - o MMBB deposits equivalent funds into a CD with the bank and accepts a 2% reduction in earned interest
 - o Upon maturity, the original deposited funds and interest earned are returned to the fund.
- Eligibility
 - o Maine Master Loggers or Certified Logging Professionals
 - o Logger must retain a Harvest Operations Plan on file
 - o Max. loan amount of \$800,000; equipment must stay in state
 - o Eligible equipment includes harvesters, forwarders, tracked feller bunchers, tractors, graders, bridges, flotation tires, harvester heads, GPS systems, bottomless arches, sediment & erosion control products/materials
 - o MFS reviews applications/qualifications & monitors harvesting by participating loggers
- Total of \$59,000,000 for ~200 loans funded through the program 2008-2023
- Average loan amount ~\$300,000
 - In 2023, \$8,000,000 financed for 17 loans (9 processors)

February 8, 2024

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Joint Standing Committee on Taxation

***RE: LD 1648 - An Act to Make Changes to the Farm and Open Space Tax Law
Work Session Update - Amended Language***

Changes in the Amendment:

- Role of state agencies (MFS, DIFW) - agencies would maintain a list of approved practices that qualify for a property tax deduction for climate friendly or wildlife enhancement practices. To qualify for the practice deduction, the landowner would be responsible for selecting an approved practice from the agency list and having the practice certified at their own expense by a "technical service provider". DACF and DIFW would adopt rules to direct this aspect. **State agency staff are comfortable with this approach.**
- Valuation Method - current law allows municipalities to assess the value of land enrolled in Open Space two different ways. This process is confusing and has not been uniformly applied across the state.
 - o Current law - valuation methods
 - The municipal assessed value of a parcel of land enrolled in the Open Space program is the just value of that particular parcel if it were required to remain in the particular category or categories of open space land for which it qualifies, adjusted by the certified ratio for the municipality where the land is located.
 - Alternately, an assessor may determine the municipal assessed value of open space land by valuing the parcel as if it were not in the program (the 100% assessed value), then reducing the value according to the following categories: ordinary open space, permanently protected, forever wild, public access, managed forest.
 - o LD 1648 method
 - Base the open space valuation off the Tree Growth Tax Law Valuations.
 - Standard open space (no additional public benefits) would be calculated by taking the highest value forest type for each county and doubling it. This value would be published on the annual Chapter 202: Tree Growth Tax Law Valuations publication from the Maine Revenue Service.
 - Additional deductions available for practices or public benefits. A landowner may apply for up to 2 of the following reductions in valuation:
 - Public access - 25% reduction
 - Permanently protected - 25% reduction
 - Wildlife enhancement practice - 20% reduction
 - Climate-friendly forest practice - 20% reduction.

- This method maintains a differential between Tree Growth and Open Space that favors Tree Growth.
- Municipal reimbursement - included in this amendment. Today, municipalities are only reimbursed for lands enrolled in one of the state's current use tax programs: the Tree Growth Tax Law. LD 1648 would apply same reimbursement formula to lands enrolled in Open Space.
- Open Space acreage cap - The 15,000 acre cap still applies, but an exception was made for landowners classified as a 501(c)3 nonprofit organization as defined by the IRS. Allowing nonprofit landowners in the state to enroll in the Open Space programs provides a clear way for these entities to pay voluntary taxes on their tax-exempt properties.

Background / Context:

- LD 1648 Policy Goals: implement recommendations from the Forest Carbon Task Force, create incentives for wildlife enhancement and forest carbon management within Open Space Tax Law, include state reimbursement to municipalities, make the program easier for landowners to understand and municipal officials to administer, allow for more flexibility or automatic transfer from Tree Growth to Open Space, lift the 15,000 acre cap in the Open Space Tax Program.
- Initial public hearing was held on May 17, 2023
 - o Sponsor: Representative Jim Boyle
 - o Support: The Nature Conservancy, Maine Coast Heritage Trust, Maine Woodland Owners, Maine Audubon, Maine Municipal Association, Professional Logging Contractors Northeast (with suggested amendments), Kerry Leichtman (Certified Maine Assessor serving Camden, Rockport, Rockland)
 - o NFNA: Patty Cormier, Director of MFS, Associate Commissioner for Tax Policy, DAFS
 - o Against: Maine Forest Products Council
- Committee chairs asked stakeholders to continue the discussion and draft an amended version that is amenable to all parties.
- Several stakeholder meetings were held from Sept 2023 - Jan 2024. These meetings have included the bill sponsor and representatives from:
 - o NGOs: TNC, MCHT, MWO, ME Audubon, NEFF
 - o Forest Products Industry: MFPC, Weyerhaeuser, PLCN
 - o State Agencies: MFS, DACF, DIFW

Multi-State Collaborations

Maine is an active member of the **Northeast States for Coordinated Air Use Management (NESCAUM) Greenhouse Gas (GHG) Emissions Inventory Workgroup**. The workgroup is comprised of greenhouse gas emissions inventory staff from Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Regular group meetings allow sharing of information and ideas about the tools states are building and analyses used to track GHG emissions and assess progress toward state GHG emissions reduction and carbon neutrality goals. State colleagues are able to ask questions, help with problem solving, share successes, and discuss best practices.

Maine has been a participating member of the **Northeast Net Zero Carbon Collaborative** with VT and MA, formed to facilitate interstate collaboration in achieving midcentury net zero GHG emissions goals. Its focus has been on understanding and comparing forest carbon inventory and GHG accounting methods across states, and on identifying potential mechanisms to support interstate carbon sequestration transfer. It also evaluated the multiple criteria that states would need to consider when assessing any transfer mechanism, including additionality, permanence, leakage, attribution, and equity.

Maine participates in the **Securing Northeast Forest Carbon Program (SNEFC)**. SNEFC is a cooperative project of the Northeast State Foresters Association, which includes the states of ME, CT, MA, NH, NY, RI, and VT. Funding is provided by the USDA Forest Service's Landscape Scale Restoration program. Key elements of this effort have been:

- Quarterly virtual meetings of state forestry agency's lead staff on matters of climate and forest carbon
- Facilitation and project management by a contracted consultant knowledgeable about forestry and forest policy issues
- An informational website with printable materials, and a regular newsletter for public distribution.
- Four training modules for state agency forestry staff: The Science of Forest Carbon; The Science of Forest Carbon Management; Forest Carbon Markets Overview & NRCS Forest Carbon Opportunities; and Forest Carbon Project Developers
- A "Forest Carbon and Climate Adaptation Webinar Specifically for Forest Landowners"
- A 2 1/2-day "Silviculture Institute" in October 2023, attended by state and private foresters from New England and New York. Recordings of all presentations including are available.
- Publicly available tools include: A Field Method for Estimating Tree Carbon; A Simple Basal Area to Tons of Carbon Estimator; A Durable Wood Products Calculator; and A compendium of other available estimation tools.

Overall, this effort has been very effective in developing a common understanding among state forestry personnel of forest carbon science, management, tools, and issues in the participating states and establishing a peer network of forest climate and carbon professionals in regional state governments. Its continuation is not assured but Maine will participate in this or similar networking opportunities as available.



PAYMENTS FOR FOREST CARBON

By Alexandra Kosiba. Illustrations by Erick Ingraham.

*This article is the last in a four-part series that focuses on forest carbon. A companion series, beginning this spring, will focus on climate change impacts and adaptation in forests. Alexandra Kosiba, a forest ecologist and tree physiologist, is an assistant professor of forestry at the University of Vermont Extension. She leads the Vermont Forest Carbon Inventory project and provides educational presentations for the **Securing Northeast Forest Carbon Program**, a federally funded collaboration among state foresters in New England and New York. To learn more about the program, go to northeastforestcarbon.org. To read the first three articles in this series, go to northernwoodlands.org/magazine/forest-carbon.*

Many forest landowners are interested in managing their forests for carbon benefits, yet few are able to do so without considering the financial consequences. To address this need, there are emerging opportunities for landowners to be compensated for the carbon sequestered and stored by their forests. Options include selling a forest's carbon benefits in a carbon offset market, as well as with more traditional programs that pay landowners to implement specific carbon beneficial practices that are not based on selling offsets. Because carbon offset markets are novel, complex, and often confusing, most of this article is devoted to explaining how they work.

Carbon offset markets are also subject to ongoing debate. Most of this discussion centers around whether carbon offset markets are achieving their intended goal of climate change mitigation by reducing and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere. Therefore, it's important to distinguish between the financial opportunity that can help landowners keep land forested and subsidize both conservation and forest stewardship efforts, and the less proven value of offsets as tools to directly reduce global emissions.

If none of the current options work for you right now or are not available where you live, keep in mind that new opportunities for being paid for the carbon your forest sequesters and stores are rapidly developing. Any landowner who commits to keeping their forest as forest, manages their forest sustainably, and harvests durable wood products that store carbon and help to reduce our dependency on more carbon-intensive materials is helping to mitigate climate change, regardless of whether they are getting paid directly to do so.

WHAT ARE CARBON OFFSETS?

Carbon offsets, or carbon credits, are designed as a market-based approach to climate change mitigation. They are based on the idea that greenhouse gas emissions at one location can be balanced out, or offset, by carbon sequestration and storage in another location. In this framework, a carbon offset buyer (typically a

company, although it could be an individual) who is responsible for greenhouse gas emissions pays someone else to keep that same amount of greenhouse gases out of the atmosphere. This includes actions that avoid emissions by keeping carbon stored, as well as actions that promote the sequestration of additional carbon from the atmosphere.

A single carbon offset is a certificate that represents the reduction or removal of one metric ton of CO₂, or the equivalent amount of other greenhouse gases, for a set amount of time. The buyer can use this certificate as a "license" to produce one metric ton of emissions. By purchasing offsets, the buyer seeks to counteract their own emissions. If the number of offsets purchased is equal to the amount of emissions, the buyer can claim to have "net zero" emissions.

HOW ARE CARBON OFFSETS BOUGHT AND SOLD?

Carbon offsets are transacted in *carbon offset markets*. There are two types of carbon markets: compliance (or regulatory) and voluntary. *Compliance carbon markets* are created by governments as part of a regulatory regime that requires certain greenhouse gas emitters, such as power plants and factories, to reduce their emissions over time. Emitters have the option of purchasing a percentage of required emissions reductions as offsets from certified projects. Over time, the percentage that is eligible to be offset decreases to force emitters to make enduring shifts away from fossil fuel usage. One example of a compliance carbon market is California's Cap-and-Trade program.

In contrast, the *voluntary carbon market* is unregulated. Anyone can purchase offsets in the voluntary market and because participation is not legally mandated, entities can choose what percentage of their emissions they offset, and there is no requirement for emitters to reduce emissions over time. In the Northeast, most forest landowners interested in selling forest carbon offsets will do so in the voluntary market. This is because California's compliance market restricts where offsets may be generated, and currently the Northeast does not have a compliance market that includes forest-based offsets.

HOW ARE CARBON OFFSETS GENERATED?

Carbon offsets can be generated by reducing emissions or increasing sequestration from a variety of sources. For example, carbon offsets may be generated by a landowner through the growth of trees, by delaying a planned timber harvest, or by planting trees in an un-used field. Offsets can also be generated in other ways, for example, by reducing methane emissions from manure pits on a dairy farm. Each of these is an example of an individual *carbon offset project*.

Calculating and verifying the number of offsets generated by a project is complex, labor intensive, and costly. As such, a landowner can't typically do it on their own. Instead, a landowner contracts with a *carbon offset developer*, which is a company that oversees the documentation, accounting, verification, marketing, and selling of carbon offsets generated from a carbon offset project. In doing so, the carbon offset developer bears the financial risk of the project.

Because of the complexity and cost of creating a carbon offset project, until recently, entry for forest landowners has been limited to large parcels (greater than 2,500 acres). But some carbon offset developers have created carbon offset programs that allow landowners with smaller parcels to enroll. Two examples available in the Northeast are the Family Forest Carbon Program (developed by American Forest Foundation and The Nature Conservancy) and the Conserve Program (developed by Forest Carbon Works). To reduce associated costs, these programs differ from traditional carbon offset projects in that enrolled parcels and their generated offsets are combined, or pooled.

Regardless of which developer you work with, landowners wishing to sell forest carbon offsets are required to manage their forests within specific guidelines for the length of the contract. Some developers disallow any tree harvesting, while others allow active management, but stipulate the amount of wood volume that's permissible to be harvested.

HOW ARE THE NUMBER OF CARBON OFFSETS QUANTIFIED?

Because carbon offsets are purchased by another entity to compensate for emissions made elsewhere, it is important that offsets represent a *real* carbon benefit that can be measured, that this carbon benefit be additional to what would have occurred otherwise, and that the benefit last for a set amount of time. How to reliably quantify the carbon benefit of a forest and management activities therein is one of the greatest challenges of carbon offset methodologies.

A crucial element of a carbon offset project is establishing the *baseline*, which is the forest's carbon storage potential in the absence of its enrollment in a carbon offset market. The baseline can be estimated several ways depending on the specific protocol used by the carbon offset developer, and may be referred to as the business-as-usual scenario or common practice. For example, some developers estimate the baseline as the carbon storage potential of the forest if the landowner harvested the maximum amount allowable by law. Other developers estimate the baseline from the average carbon storage in nearby forest-monitoring plots. Because these forest plots are presumed to be managed differently than forests enrolled to sell carbon offsets, measurements of their stored carbon can serve as the baseline.

To generate offsets, the enrolled parcel must store more carbon over a certain time interval compared to the baseline – this is called *additionality*. Thus, the baseline is critical in determining the number of carbon offsets generated by the forest, and consequently, the quantity of emissions that can be compensated by the offset buyer.

The baseline is not the only determinant of an offset project's carbon benefit. To ensure that the carbon project provides a sustained benefit, many carbon offset developers require landowners to sign a long-term contract. The length of this contract varies by the developer's methodology and the type of market. In the voluntary market, the length of the contract may be 10, 20, or 40 years, while in compliance markets, the length often exceeds 100 years. In addition, periodic monitoring of the forest's carbon storage may be required. In most cases, the developer oversees this monitoring.

However, there are a couple of factors that can reduce the intended carbon benefit. Natural disturbances, such as hurricanes, fires, and insects, can cause tree mortality and reductions in carbon storage. To account for these losses, developers may require that enrolled parcels allocate a portion of generated offsets to a *buffer pool*. This buffer pool acts as a reserve of carbon offsets that the developer retains as insurance to compensate for unforeseen carbon losses.

Leakage is another issue that can result in a reduced carbon benefit of enrolled parcels. Leakage occurs when reductions in timber harvesting in enrolled parcels results in increases in harvesting elsewhere to meet market demands. As described in the third article in this series, the intended carbon benefit of the forest can be negated if the same amount of wood is harvested from somewhere else. Developers have specific protocols they use to determine the leakage deduction depending on the amount of harvest reductions incurred.

Taken together, the total number of offsets generated from a forest is determined by the additionality relative to the baseline, minus deductions for the buffer pool and to compensate for

leakage. To provide a level of oversight for these quantifications, carbon offset developers often seek to have their protocols approved by organizations such as the American Carbon Registry or the Climate Action Reserve. While it is not obligatory to have this approval to sell offsets in the voluntary market, developers that have verified protocols usually have greater credibility and appeal to buyers.

HOW MUCH REVENUE CAN A LANDOWNER MAKE SELLING FOREST CARBON OFFSETS?

The amount of compensation a landowner can receive from selling forest carbon offsets varies. Landowner revenue has ranged from \$5 to \$25 per acre per year for forest projects that have occurred in New England (and perhaps more; sale prices in the voluntary market are often not publicly disclosed).

An important factor determining the revenue is the sale price of an offset. Compliance markets typically set the price of an offset, and periodically increase the price to incentivize transitions away from fossil fuels. In contrast, the sale price of an offset in the voluntary market varies considerably depending on demand, the reputation of the developer, and marketing. The developer allocates a portion of the revenue from selling these offsets to the landowner(s) and retains a portion, which typically ranges from 20 to 50 percent.

Because the total number of offsets generated from a forest depends on its size, larger parcels typically yield higher total revenue. Site and forest factors also affect the additionality, as certain forest types and locations may generate more revenue than

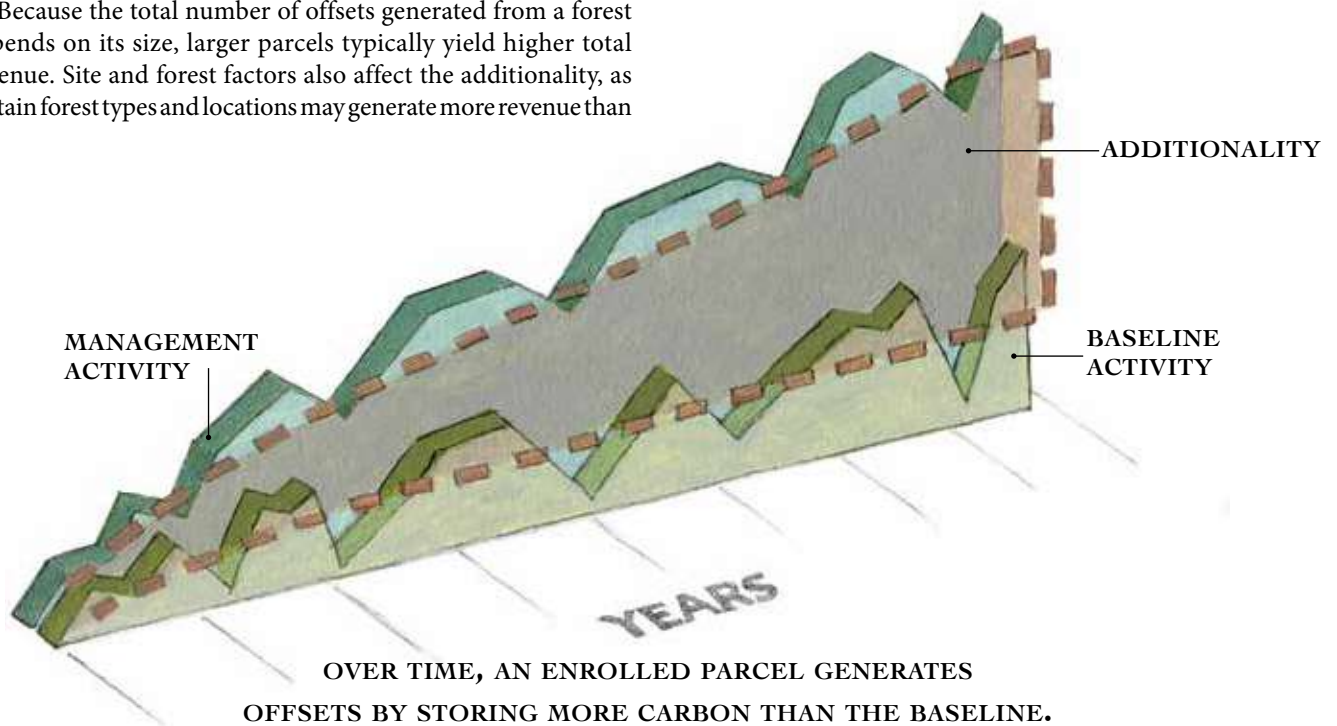
others. Some of the newer programs for smaller parcels combine multiple enrollees to ensure uniform per-acre payments.

Carbon offset developers also have different payment schedules. Payments may occur regularly over time, begin with an upfront payment and smaller payments at specified intervals, or only occur at the end of the contract. For some contracts, the landowner may incur financial penalties if the requirements are not fulfilled.

WHAT ARE THE BENEFITS OF SELLING FOREST CARBON OFFSETS? WHAT ARE THE CONCERNS?

Because selling carbon offsets typically requires long-term commitments from landowners, enrollment can prevent deforestation and conversion of the forest into other land use types, which not only maintains the forest's carbon benefit but also the other important ecosystem services that the forest provides, such as wildlife habitat and flood prevention. Further, the revenue generated from selling carbon offsets can help landowners pay taxes and fund stewardship-related activities, including land conservation and restoration.

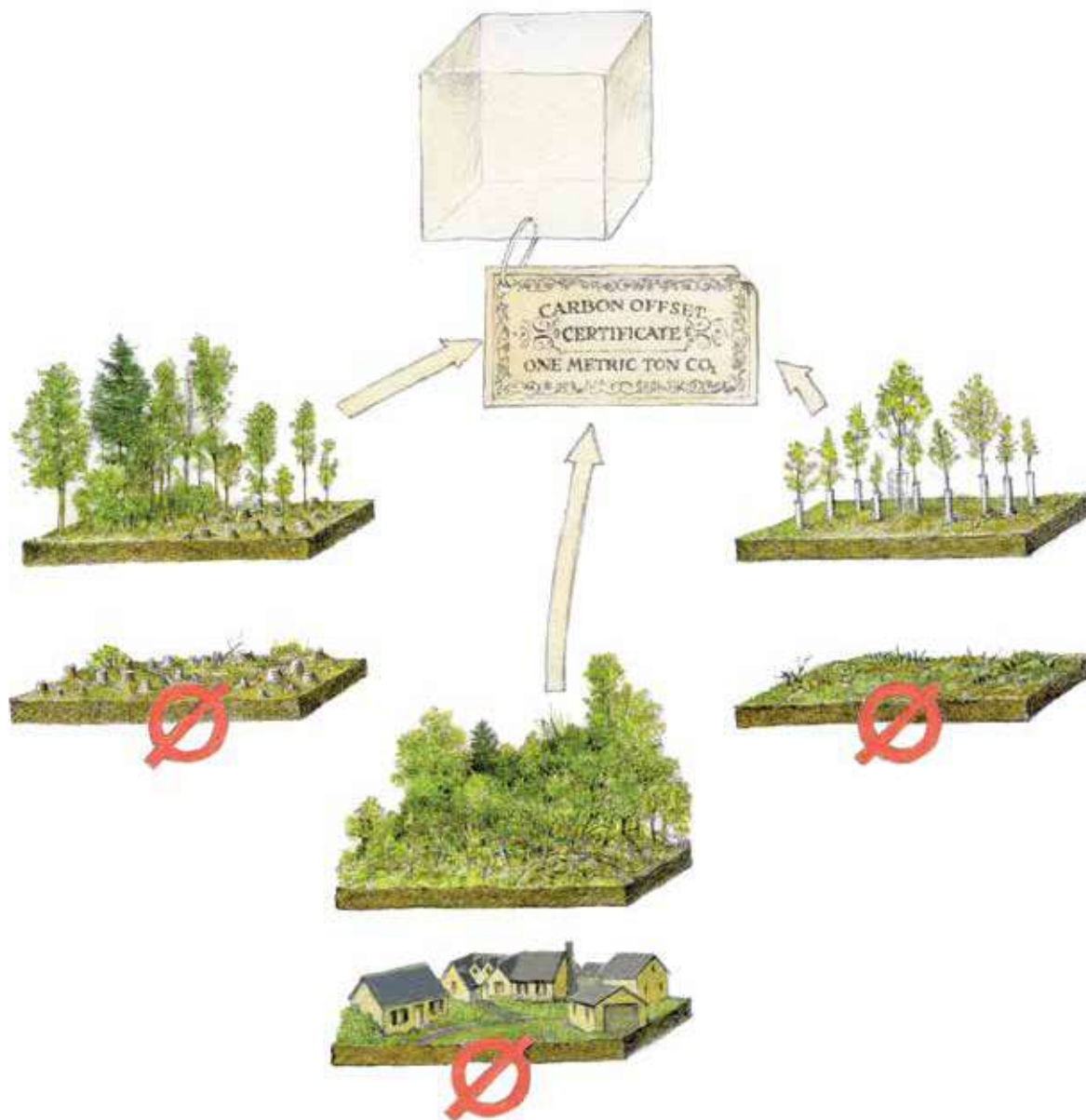
However, whether carbon offsets mitigate climate change by reducing net emissions is more difficult to determine and



depends on several factors. The first issue is that verification of a forest's actual carbon benefit poses a significant challenge. Part of this challenge is due to the "counterfactual" nature of offsets, in other words, the necessity of speculating about what would have happened without the parcel being enrolled in a carbon offset market. There's no way to truly know how much carbon would have been emitted or not sequestered in that other reality,

and thus, there's no perfect way to compute the additionality. Because offsets are used to cancel out emissions made elsewhere, an overestimation of carbon benefits can inadvertently increase emissions into the atmosphere.

There is also debate about whether the different ways offsets can be generated – by avoiding emissions (keeping carbon stored) and by increasing sequestration (absorbing more



**ADJUSTING FOREST MANAGEMENT TO SEQUESTER AND STORE MORE CARBON,
PREVENTING FOREST LOSS, AND PLANTING TREES IN OPEN FIELDS ARE
ALL POSSIBLE WAYS TO GENERATE CARBON OFFSETS.**

carbon) – provide the same climate change mitigation benefit. For instance, in an emissions avoidance project in which a landowner agrees to delay a timber harvest, the carbon benefit is assessed based on the counterfactual of an earlier harvest. That benefit is inherently more difficult to confirm as compared to a project that increases sequestration, such as tree planting. It may be impossible to prove that the landowner would in fact have conducted the early timber harvest, while the newly planted trees are clear evidence of a measurable change in management.

An emerging concern of carbon offset markets revolves around accurately addressing leakage. Again, and as described in the third article in this series, the benefit to the atmosphere of reducing wood harvests in one area may be negated if the same amount of wood is harvested from somewhere else, or if people use more carbon-costly materials as a substitution for wood. Worse, that “somewhere else” may have less rigorous environmental protections and require longer transportation distances leading to greater overall emissions. Quantifying and verifying leakage is a challenging task, but as global demand for wood continues to rise, it’s probable that reductions in timber harvesting in certain areas will be countered by increased harvesting elsewhere.

There is also growing concern regarding the permanence of carbon stored within forests, given the threat of ongoing climate change. Natural disturbances – which are likely to become more frequent and severe as temperatures continue to rise – can cause forests to shift from carbon sinks to sources of carbon emissions. To date, some carbon offset projects in western states have not met their carbon targets because of catastrophic fire. While the buffer pool is intended to account for these natural disasters, an increase in disturbances may require the pool to be much larger.

A concern that is limited to the voluntary market is how to ensure that offset buyers make strides to reduce emissions over time and use offsets to cancel out only those emissions they cannot avoid right now. Otherwise, some worry that carbon offsets can give emitters a perpetual “license to pollute.” To address this concern, some carbon offset developers require offset buyers to show a decarbonization plan that outlines a path to emissions reductions.

WHAT ARE KEY CONSIDERATIONS TO MAKE BEFORE ENROLLING IN AN OFFSET PROGRAM?

Before signing a contract to sell carbon offsets, it is critical to understand the terms of the contract and implications for your

land. Important practical considerations are the length of the contract, stipulations about early termination, responsibilities for long-term monitoring costs, and contingencies if the parcel fails to meet the expected carbon benefits. Some contracts remain with the land if the parcel is sold, while for others the landowner may face penalties when they sell enrolled land. It is advisable to consult with a lawyer before agreeing to the contract terms, and landowners may also want to talk to an accountant because revenue from carbon sales is currently taxed as income¹.

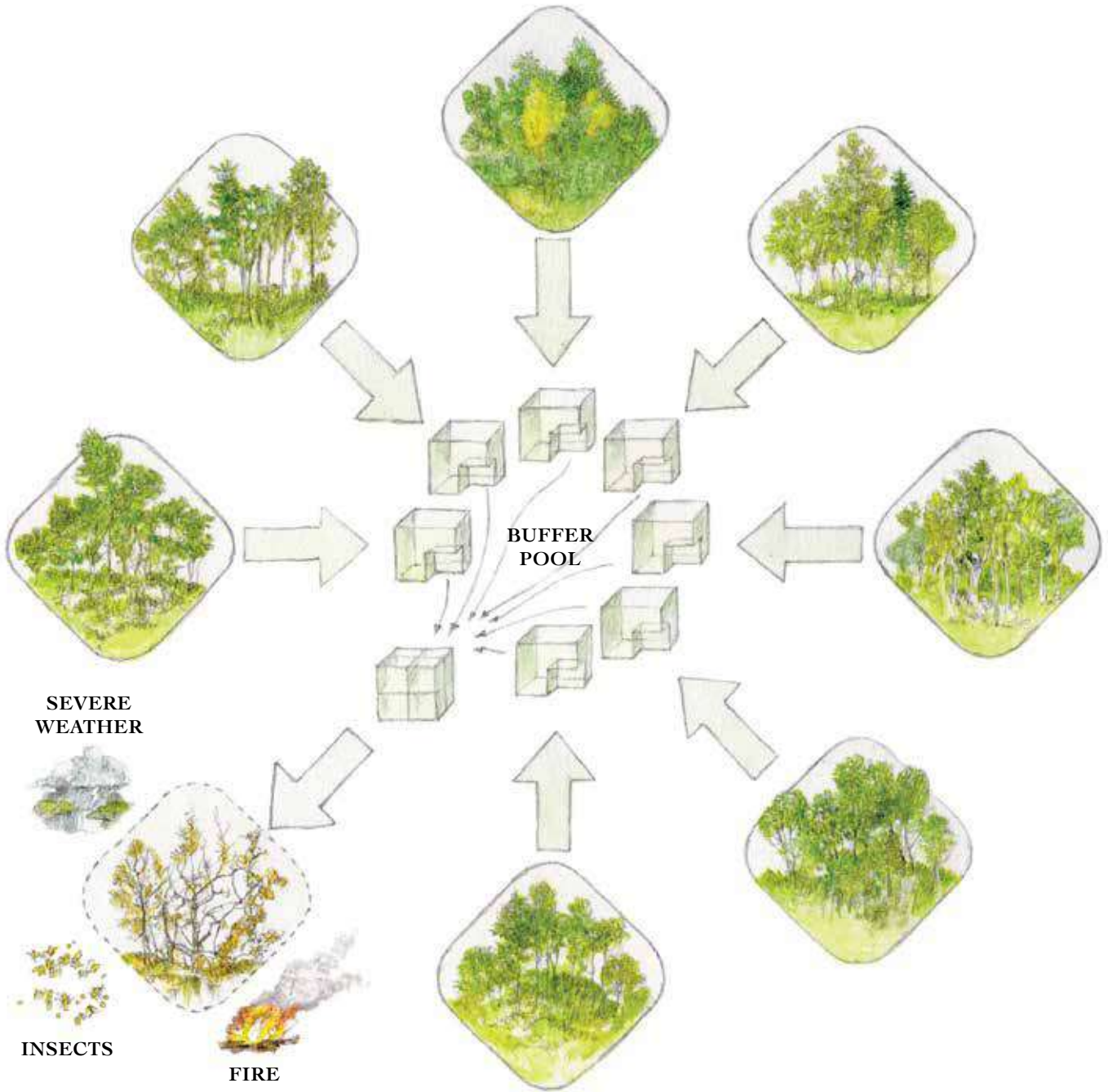
Another important consideration to be aware of before enrolling is whether the parcel has any legal encumbrances that mandate or restrict certain activities. Changes in forest management may invalidate eligibility in other forest programs, such as state tax equity programs (often referred to as current use). Each state has different requirements to maintain eligibility, and there can be significant financial penalties if you are determined to be out of compliance. Carbon offset developers may not be well versed in state-specific requirements, so if in doubt, reach out to a service or county forester in your state. Third-party forest certifications, such as Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), and American Tree Farm System, are usually compatible with selling carbon offsets. Parcels with a conservation easement may or may not be allowed to enroll. Because easement contracts vary considerably, landowners will need to show the easement to the offset developer.

In terms of evaluating the positive impact of selling carbon offsets, you may want to ask if the protocol used by the developer is verified by a credible third-party organization, as described above, as this demonstrates that their methods have been evaluated and approved by other experts. You may also be interested in asking the developer which types of entities are able to purchase the offsets they sell, and whether the developer requires those entities to commit to emissions reductions over time.

WHAT ARE GOOD SOURCES OF INFORMATION ABOUT CARBON PAYMENT PROGRAMS?

If you are interested in exploring whether selling carbon offsets is a good fit for you and your land, a recommended initial step is to take advantage of the growing number of resources and information geared for landowners by local forest landowner groups, state extension services, state and federal governments, and universities. For example, the Securing Northeast Forest Carbon project² is a regional collaboration that provides information on

¹ Cushing, T. *Tax Dimensions of Forest Carbon Contracts*. University of Florida Extension Forest Business & Economics.
² Visit northeastforestcarbon.org
³ For a list of current program developers, see northeastforestcarbon.org/forest-carbon-financial-markets



ALL ENROLLED FORESTS CONTRIBUTE TO THE BUFFER POOL,
WHICH COMPENSATES FOR UNEXPECTED CARBON LOSSES IN INDIVIDUAL FORESTS.

forest carbon science and payment opportunities. It may also be helpful to consult with a professional forester who can assist you in defining objectives for your land, identifying any legal restrictions, and evaluating the current state of your forest.

The next step is to reach out to different carbon offset developers,³ which will help you determine whether your land qualifies for enrollment and if proceeding is financially viable. Typically, this process is either free or involves a nominal fee, and it does not necessitate a commitment. It's important to note that developers may have eligibility criteria tied to factors such as parcel size, forest type, tree density, accessibility, and preexisting legal encumbrances that limit harvesting or land clearing. Consequently, not all forest parcels will be eligible for enrollment.

ARE THERE OTHER OPTIONS FOR LANDOWNERS TO FUND FOREST CARBON PRACTICES?

Practice-based programs offer a separate option from selling carbon offsets. In these programs, landowners can receive payments for implementing specific actions that are likely to provide enhanced carbon benefits. Because practice-based programs do not sell offsets to generate revenue, many of the concerns about carbon offset markets do not apply. Instead, these programs are designed to compensate the landowner for the cost associated with implementing a management action. One important consideration is that if the land is already enrolled in a practice-based program specifically for carbon, the land will likely not be eligible to also sell carbon in an offset market because it would be difficult to demonstrate additionality.

Practice-based programs have been available to landowners for many decades, usually offered through federal and state governments. The most notable are the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP) administered by the Natural Resources Conservation Service (NRCS). Under these programs, landowners can receive technical and financial assistance for a variety of forest stand improvement actions, from controlling invasive species to enhancing wildlife habitat.

Recently, the list of NRCS practices has been updated to include those intended to increase forest carbon storage.⁴ Under this practice, landowners follow specified active management techniques designed to maintain or increase carbon storage over the 10-year contract period⁵. Currently, the annual per-acre

payment for this practice is about the same amount a landowner might be paid to sell carbon in an offset market.

For landowners interested in practice-based programs, the next step is to reach out to a professional forester or to your state forestry office. You can inquire about the availability of state-funded initiatives or get in touch with your local Natural Resources Conservation Service (NRCS) office.

THE FUTURE OF FOREST CARBON

The options available for landowners to be paid for the carbon benefits their forest provides will no doubt change over time. Carbon offset markets are under immense scrutiny, and our understanding of the science of forest carbon continues to advance. With recent federal legislation to fund climate-focused forest stewardship, practice-based incentives for landowners will continue to grow.

Although carbon offset markets still have considerable distance to go before they can prove their value as a means to keeping greenhouse gases out of the atmosphere, the revenue generated from selling offsets can help landowners fund activities related to maintaining the health and integrity of their forests by subsidizing stewardship-related activities. There's also little doubt that large carbon offset markets have the potential for unintended consequences, for example, by transferring timber harvesting activity away from the Northeast. As noted in the first article in this series, the carbon cycle does not end at the forest's edge.

Forests by themselves cannot solve the climate crisis. This crisis requires us to be thoughtful about the impacts of our resource needs, to consider how we can sustainably harvest local wood to meet our growing housing demands, and to reduce our dependence on more carbon-intensive materials. We also have the opportunity, through thoughtful forest management, to promote the long-term resilience of our forest ecosystems to climate change and other stressors. Above all, it's critical that we pursue ways to reduce overall emissions, recognizing that there is no way to grow our way out of this problem.

Special thanks to the reviewers of this article: Adrienne Keller, Climate Adaptation Specialist, Northern Institute of Applied Climate Science; Caitlin Littlefield, Senior Scientist, Conservation Science Partners; and the State Leadership Committee of the Securing Northeast Forest Carbon Program.

⁴ For more information on NRCS "climate-smart" practices, see <https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/climate/climate-smart-mitigation-activities>. Refer to the subsection Forest Stand Improvement (code 666).

⁵ https://www.nrcs.usda.gov/sites/default/files/2022-11/E666H_July_2022.pdf