Town of Rowe
Pelham Lake Park

Climate-Smart Forestry
Operational Plan for Patch Cut with Reserves

Stand 1 at Pelham Lake Park- maturing northern hardwoods with inadequate regeneration

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Updated December 1, 2025

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Executive Summary

This operational plan outlines the steps and operations requirements for implementing a Climate-Smart regeneration harvest at Pelham Lake Park. Having a healthy future forest with a diverse array of species at Pelham Lake is one of the most important climate-adaptation steps for the management of this land. Doing so requires securing and then nurturing a new cohort of young trees under changing and adverse regeneration conditions.

The central practice here is to install two, 2-acre patch cuts with reserves (strategically retained trees in an otherwise clear-cut area) on either side of the Davis Mine Trail, close to the parking lot on Davis Mine Road. Functionally, this will be a 4 acre patch cut but each 2 acre component will receive a different treatment. One of these patches will then be surrounded with a slash wall, a large wall of woody material, to exclude deer and protect young trees. Tree tubes will be placed on a portion of the second patch to protect individual, climate-adapted tree species from herbivory. While patch cuts are a routine and proven young tree establishment method, reserving trees within the patch and assisting regeneration with tree tubes, and a slash wall are relatively novel practices (in this region, at this scale) that we believe will make this project successful for the project's central Climate-Smart goal: securing tree regeneration that will become the future, climate-adaptable forest. Simultaneously, this practice will help create temporary, early successional habitat; helping to protect fledgling birds, such as the site's Black-throated green warbler that benefit from the Park's large swathes of otherwise maturing forest

Operationally, creating a slash wall at this relatively small scale is a challenging project that will deploy cutting-edge logging and site-work techniques to minimize soil disturbance, to maximize on-and off-site shorter- and medium-term carbon storage, and to develop accounting and financial mechanisms that allow us to shift traditional, extractive logging practices toward a service-based system that can better address climate concerns and maximize climate and carbon benefits for forest-based mitigation and adaptation practices.

Project History and Overview

Pelham Lake Park is a ~1,250-acre forest surrounding the iconic Pelham Lake that features a diverse array of forest types, wetlands, and streams. It is a treasured community resource boasting ~20 miles of multi-use recreational trails.

Beginning in 2020, the Town of Rowe started a forest management planning process for the Park. Out of this process, the community of stakeholders, managers, consultants, and elected officials identified and embraced a set of guiding management principles which included the central idea of protecting, maintaining, and enhancing the overall resilience of this forest to the threats posed by climate change. This public consultation process has involved surveys, woods walks, listening sessions, and public review of planning documents. We hope that continued stakeholder engagement will build a supportive coalition of people centered around the shared goal of making this forest as resilient as possible.

One recommendation in the property's Forest Stewardship Climate Plan is to begin purposefully securing a new cohort of young trees to build a more resilient forest. Resilience in this case refers to providing additional pathways for the forest to respond to and recover from more extreme disturbances that are associated with climate change.. Establishing a new generation of trees allows the forest to respond in different ways when a disturbance comes through. For example, younger trees may be less susceptible to wind disturbances or certain forest health threats. The addition of a slash wall and tree tubes helps to promote hard to naturally regenerate species, increasing the number of species present in the area. A

greater number of species means there is less risk to the ecosystem from a given threat. For example, warming temperatures will threaten some species and benefit others.

Creating a 2-4 acre area flush with a diverse array of thriving young trees will help to create an area of better adapted forest while supporting early successional habitat at the site, as identified in the stewardship plan. Given the site's vulnerability to herbivory pressure from deer, we need a way to keep them away from young trees until the trees attain heights of 4-6'. To do this efficiently, and in a climate-smart way, we will build a wall out of felled trees- trunks and branches- to protect the future forest while it establishes. This slash wall will degrade over time- slowly releasing carbon as the material decomposes, building soil, and providing wildlife habitat in the interim. We will also place tree tubes in a portion of the area that is not within the slash wall to protect naturally regenerating trees as they establish. These tubes will be removed once the regeneration is sufficiently established to avoid the worst impacts of deer browse.

Climate and Ecosystem Rationale

Pelham Lake Park is largely a passively-managed forest with much of the Park legally designated as ecological reserves where natural forest development takes place and hunting is prohibited. Adding small amounts of active management to areas of the Park where it is permitted allows the Parks' Stewards to balance these passively managed areas with more actively managed areas where climate adaptation strategies can be demonstrated and refined in a public and educational setting.

Patch cuts, combined with tree protection strategies, play a crucial role in promoting forest adaptation to climate change by fostering diverse regeneration, enhancing resilience, and protecting young trees from excessive browsing. By creating small canopy openings, patch cuts allow sunlight to reach the forest floor, encouraging the growth of a variety of native tree species. This diversity ensures that as climate conditions shift—bringing temperature fluctuations, extreme weather, and new pests—more species will thrive, maintaining overall forest health. Slash walls and tree tubes further support adaptation by shielding regenerating saplings from deer and moose, allowing a more balanced mix of species to establish.

Alongside these active forest management strategies, passive management practices play animportant role in promoting climate resilience. Designated forest reserves allow natural processes to shape the landscape over time serving as reference points for understanding long-term ecological changes. The establishment of an old-growth interpretive trail at Pelham Lake Park helps connect visitors with the evolving forest ecosystem, fostering public appreciation and awareness of the benefits of natural succession. Additionally, eastern hemlock monitoring provides critical data on the health of this keystone species, which faces increasing threats from pests like the hemlock woolly adelgid.

Together, these passive and active management approaches create a complementary strategy for climate adaptation. While patch cuts and slash walls encourage regeneration and structural diversity, forest reserves and monitoring efforts help sustain intact ecosystems and guide future management decisions. This balance ensures that Pelham Lake Park's forest remains a dynamic, self-sustaining system, capable of adapting to environmental changes while providing habitat, recreational opportunities, and long-term ecological benefits.

Practice Description

To secure regeneration of northern hardwoods with a red oak component in Stand 1, we will install two side-by-side patch cuts of approximately 2 acres each with reserve trees interior to each patch. Reserve trees are pre-selected, individual trees retained as seed sources, legacy trees, and wildlife habitat or food provisioning sources. Together, this 4-acre area will allow sufficient light to reach the forest floor so that maples, birches, ash, red oak, basswood, red spruce, and an occasional pine will all be able to thrive. The 2-acre patch created to the northwest of the trail will contain two 1-acre sub-units. One sub-unit will be regenerated with saplings protected by tree tubes, and the other sub-unit will be left to regenerate naturally.

Furthermore, we will use the slash and low-grade material from all 4 acres to build a slash wall around the southern 2-acre patch to exclude deer. This will set up a paired demonstration where the Town can watch the two patches develop over time.

Slash walls are becoming an increasingly popular way to protect a regenerating forest from deer browse. Deer populations are high in our area and warmer winters with less snow are likely allowing their populations to thrive. Also, less snow leaves tree seedlings more vulnerable to browse in the winter. Work at Cornell University, and on State and Watershed lands in CT and MA, shows that slash walls can be economically constructed in the woods and are a better option than large scale metal or plastic fencing. More information on these walls can be found at: https://blogs.cornell.edu/slashwall/

Table 1: Slash Wall Overview

This project includes both industry standard and non-commercial forest operations processes that are less common in the region. Slash walls, particularly at this scale, are a relatively new tool in the forestry toolbox.

Advantages	**Disadvantages**
Made of natural material sourced on site	Large and very visible for longer period of time
Using slash and low-grade wood on site stores carbon for 5-20 years (as opposed to burning it for fuelwood or using it as shorter-lived products like paper)	Takes machinery time and diesel fuel to construct
Low maintenance over time when compared to fencing	Reduced revenue for landowner
No clean-up costs	Physical barrier to human or large wildlife passage
Significant wildlife habitat value for birds, small mammals, insects, and others	

The slash walls will have a 20-25'' wide base and be 10' tall. During marking, paint will be sprayed on perimeter trees at 10' to aid in wall construction. The bottom 4-6' will be nearly entirely wood stacked in

a close pick-up-sticks configuration. Finer material will be piled on top of this base. Agate will be installed to allow research and forest tour access.

Operations

To help to maximize potential climate benefit, this harvest will employ a set of Climate Informed Forest Access and Forestry Operations Practices. These are above-and-beyond standard practice forest management approaches that focus on accessing and working the forest with the recognition that while access and management havetradeoffs, some level of work in the forest is necessary and important to help promote forest climate adaptation while protecting carbon sequestration and storage over varying timescales to the extent possible. The forest industry is uniquely positioned with the tools and expertise necessary to do this work well and can evolve and tailor their approaches to fit with this developing reality. Some of these practices are standard on high-quality logging jobs; others are novel and will be tested here to assess and judge their climate benefits.

Protecting the recreational infrastructure on site is essential for this operation. During the project, the trail that bisects the two areas will be closed. Afterwards, the close out of the project will restore the trail to the same or better condition, which will in turn benefit park patrons.

Site features on Davis Mine:

- Simple, already-established access close to a well-sized landing on a Town maintained road
- A quality, existing forest road that bisects the treatment area
- No intermittent or perennial streams within 50’
- No wetlands, seeps, or vernal pools
- Relatively gentle slopes and stable ground
- Millsite-Westminster soils with severe rutting hazard and Medium Soil Compatibility Risk that will need to be monitored closely during operations
- Abundant woody material for equipment path armoring and slash wall construction
- A good location for stakeholders to see, observe, critique, and engage with this work
- Park and Town staff, Park Commissioners, and a Consulting Forester who can monitor the project over time

Table 2: Operational Requirements

Practice	**Considerations and Requirements**
Minimize Soil Disturbance	Operations only in dry or fully frozen conditions No ruts of >6” for a run >60” Use cut-to-length logging system to forward wood to landing site If dry, but not frozen ground is present, forwarder will drive “barefoot,” that is, without tire chains.

	Finer branch material will be processed and used as a temporary roadbed for machinery to keep them up and off the ground Spring/early summertime will be off-limits. This is because bark slippage that occurs this time of year makes running without chains challenging.
Practice	**Considerations and Requirements**
Convert high quality wood into long-lived durable wood products	Sawlogs and veneer logs will be extracted and sold to regional buyers. Storing this carbon in 100–300-year lifespan products is a smart carbon storage technique.
Avoid spreading invasive plant species	Machinery will be kept away from Japanese knotweed infestation at southern edge of landing Any additional invasive plant location to be brought to the attention of Long View Forestry Equipment to be free from soil, seeds, vegetative matter and other debris that could facilitate the introduction or spread of invasive plant species
No firewood or pulp production	This material will instead be retained in the slash wall or on the ground to provide a slow carbon release with interim wildlife/regeneration benefits
Retain all woody material outside of select sawlogs and minimally process this material.	Most will get utilized for slash walls and will slowly decompose while providing wildlife benefit and deer exclusion Any additional material will be retained on site to slowly rot and build up soil carbon Tops and other materials will be minimally processed to reduce ground contact and slow decomposition.
Employ high efficiency logging equipment	Use state-of-the-art diesel emissions systems where possible Minimize chainsaw and brush saw use

	Minimize hauling distance and time to landing via good site selection and smart landing design
Retain structural elements within the patches	A selection of larger, live trees of diverse species will be retained in each patch cut. Snags will be retained, and additional snags may be created for wildlife habitat value
Maintain a mid-sized excavator on site during the course of the operation	Water bars will be installed on haul roads ahead of any precipitation event during operations Excavator will aid in slash wall construction as needed Slash wall will not encroach on existing recreational trail

Table 3: Project Order of Operations and Tradeoffs

Order of Operations	**Activity**	**Benefits**	**Tradeoffs**
1	Project Layout and Marking	Careful planning yields better and more predictable results	Consultants add expense
2	Showing	Allows contractors to fully assess project	Vehicle mileage and added consultant time
3	Contracting	A sound contract will make project predictable and properly allocate risk while clearly spelling out climate-smart performance requirements	Time consuming and potentially off-putting for contractors unaccustomed to new, unorthodox contract requirements.
4	Site Preparation and Staging	Beech will be controlled in harvest area to facilitate diverse regeneration establishment Pre-harvest Haul Road and Landing set up will allow disturbed earth to settle before the operation and allow any operational trouble spots to be fixed early	Immediate cessation of beech carbon sequestration Minor soil disturbance along 1 haul road
5	Felling and Partial Extraction	Create growing space for new trees Store carbon in long-lived and stable wood products	Immediate, but temporary cessation of carbon sequestration by current forest
6	Trucking	Deliver high value logs to secondary manufacturing facilities	Diesel Fuel consumption

Order of Operations	Activity	Benefits	Tradeoffs
7	Slash Wall Construction	Protect regeneration from deer browse Short- and Medium-term carbon storage of woody material up off ground Ground scarification from extra excavator tracking, promoting regeneration	Diesel fuel consumption Impacts to forest aesthetics Ground scarification from extra excavator tracking resulting in potential additional soil carbon loss (Note the pros and cons of increased scarification)
8	Close Out	Proper close out protects soil integrity and soil carbon Repair (improvement?) of recreational trail Seeding/erosion control?	Enhanced BMPs are expensive, and installation requires more diesel fuel consumption
9	Tree tube placement	Protect regeneration from deer browse Directly support climate adapted species	Impacts to forest aesthetics Plastic use

Table 4: Project Timing and Constraints

Logging operations and slash wall building are both complex operations with variable and unpredictable timing. Weather adds another layer of complexity. However, to aid in project planning and assessment, I present the following idealized timeframe. Set up and planning this work can be done in 1 week. Felling, partial extraction and slash-wall building will take 1-2 weeks. Then, close out work will take 1-2 days.

Order of Operations	Activity	Timing	Constraints
1	Project Layout and Marking	6-12 hours Anytime pre-harvest	Consultant Availability Weather (can't paint in the rain)
2	Showing	2 hours Anytime pre-harvest	Contractor Availability
3	Contracting	2 hours Anytime pre-harvest	None

4	Site Preparation and Staging	12 hours precutting 4 hours excavator site prep and mat staging Pre-harvest	July and August for Beech Control Dry and not frozen conditions for staging and haul road work
5	Felling and Partial Extraction	24 harvester hours 8 forwarder hours Harvest	Dry or frozen conditions
6	Trucking	Variable and concurrent with harvest	Town Roads open for trucking
7	Slash Wall Construction	12 forwarder hours 12 excavator hours Concurrent with harvest	Dry or frozen conditions
8	Close Out	6 excavator hours	End of harvest Ideally dry or frozen conditions although this will be variable
9	Tree tube placement	Variable based on number of candidates for protection	Should be completed early in the first and second growing seasons following the harvest

Equipment

Three pieces of machinery will complete this project.

1. A feller buncher or excavator with a felling saw and grapple that will fell and process trees as needed.
2. A wheeled forwarder will extract some material destined for long-lived wood products and carbon storage. The forwarder will also aid in slash wall construction.
3. A grapple skidder to move felled wood from the harvest area to he slash wall construction
4. A tracked, mid-sized excavator will aid in slash wall construction and in interim and final Best Management Practices like water bars.
5. Portable bridge panels to be used in crossing wet areas of the haul road

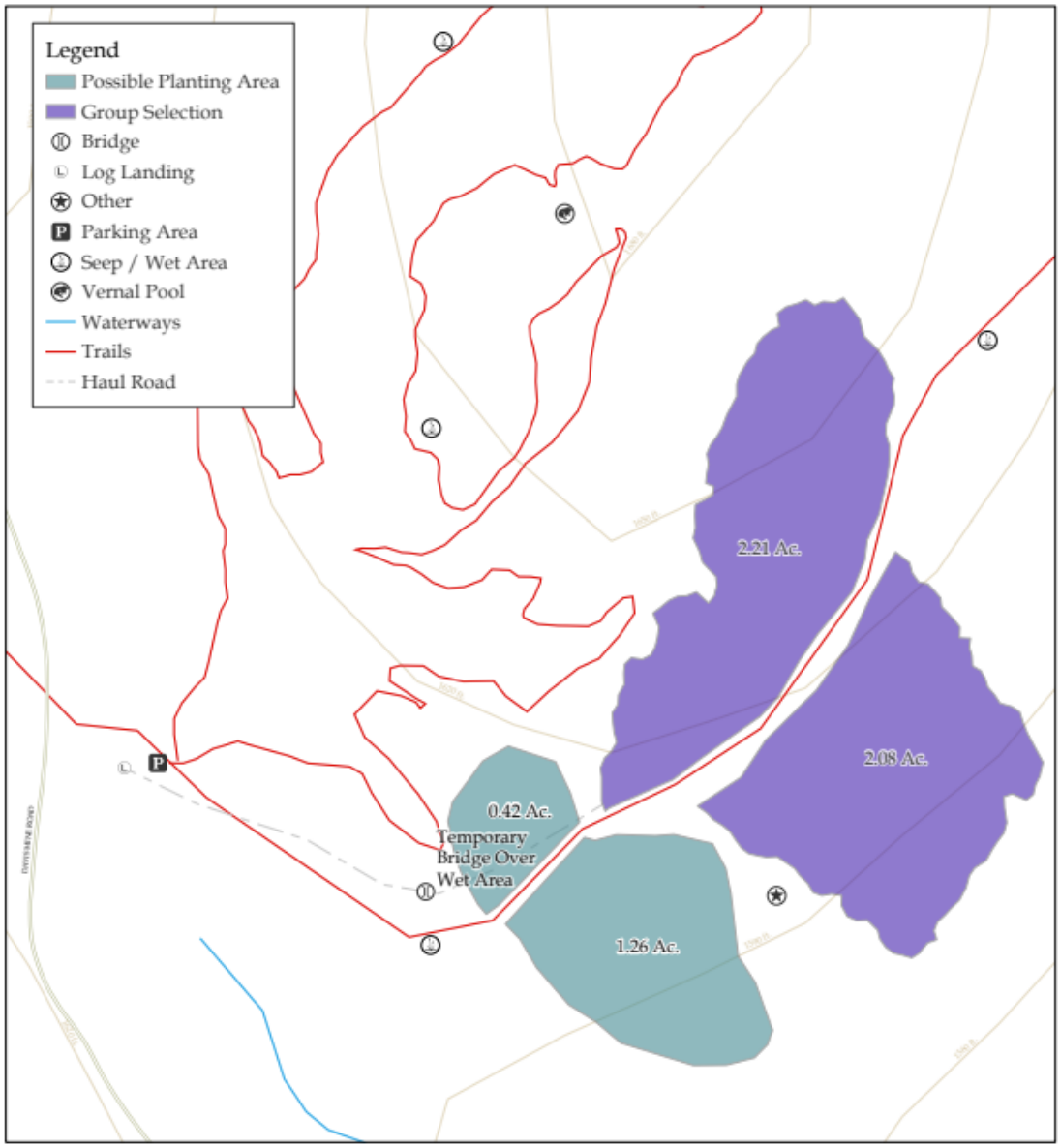
Other tools will include chainsaw, brush saw, seeder, mulcher spreader, and potentially a small, tracked forestry machine with attachments.

Project Monitoring

Pelham Lake Park is in a unique position where it has a Park Manager, summer seasonal staff, and a Consulting Forester to answer questions and monitor practices. Any budgeting for this work should include at least 5-8 years of monitoring budgeting.

Year	Task	Recurrence
1	Monitor slash wall and make repairs	1-3 hours monthly
2	Monitor slash wall and make repairs	1-3 hours monthly
3	Monitor slash wall and regeneration	1 hour bi-monthly
4	Monitor slash wall and regeneration	1 hour bi-monthly
5	Monitor slash wall and regeneration	1 hour bi-monthly
6	Monitor slash wall	1 hour quarterly
7	Monitor slash wall	1 hour quarterly
8	Monitor slash wall	1 hour quarterly
	Total Expected Hours	**80 hours over 8 years**

Project and Practices Map



Climate Smart Practices Map
for lands belonging to
The Town of Rowe - Pelham Lake Park
Rowe, MA

Long View Forest
MANAGEMENT