DIVISION OF
FISHERIES & WILDLIFE

Ram Hill WMA Oak Woodland Habitat Restoration Project Summary
WE-RH-TS1

Location

Site: Ram Hill WMA
Town: Chesterfield
District: Western

Project Area

293 Acres

MassWildlife's Approach to Habitat Management

MassWildlife uses habitat restoration and management to conserve both common wildlife and vulnerable species, including rare plants and animals protected by the Massachusetts Endangered Species Act (MESA) and other declining Species of Greatest Conservation Need (SGCN) identified in the Massachusetts State Wildlife Action Plan (SWAP). As part of this effort, biologists plan and implement projects to improve, restore, and maintain a variety of healthy habitats to increase biodiversity and climate resiliency across our forests, wetlands, streams, fields, and more.

Biologists plan habitat projects that may include tree cutting, mowing, and mulching to strategically increase open habitats, promote patches of vigorous young forest, restore natural processes, or remove invasive plants. This project has been designed to ensure consistency with recommendations for climate-oriented forest management provided by the Climate Forestry Committee (Climate Forestry Committee Report, 2024; see below).

Site Significance

Ram Hill Wildlife Management Area (WMA) is located off Route 143 and Old Chesterfield Road in Chesterfield, MA. Scout Pond Wildlife Conservation Easement (WCE) and Fisk Meadow WMA are located to the west of Ram Hill. Together, these three properties provide an important ecological network to the surrounding landscape with their unique hydrological and upland features. Restoration at Ram Hill WMA offers an opportunity to create high quality upland habitat for SGCN, as described in the SWAP.

Rocky outcrops are found throughout this site providing an array of micro habitat opportunities on site in and among the northern hardwood and oak tree forest community. Small pockets of tree oak are situated above cooler and wetter low-lying areas across the site. Past high grading and single tree selection forestry practices by the previous owner has resulted in a degraded oak woodland system. Proposed habitat management aims to improve the overall quality of this degraded system by removing generalist tree species while leaving healthy vigorous tree oaks to grow and continue to provide important hard mast for wildlife.

Project Activities and Expected Outcomes

Tree harvest will be conducted across approximately 293 acres in the western section of the WMA. Tree harvest will occur at varying intensities to stimulate hardwood regeneration. Generalist species, such as eastern hemlock, eastern white pine, and black birch, will be targeted for removal to provide ground conditions to regenerate tree oak species and understory shrubs, like high bush blueberry. Individual trees or clusters of trees with high habitat value (primarily oak tree species) will be retained to provide food and/or winter cover to wildlife.

A small red pine plantation will also be removed. The approximately 2-acre stand is infected with red pine scale, is in severe decline, and most trees are already dead or dying. The understory consists of large highbush blueberry, and the removal of these non-native trees will support regeneration of native hardwood species while simultaneously promoting the blueberry—an important source of food for wildlife.

The goal of planned habitat management is to open the currently closed canopy to allow more sunlight to reach the forest floor and shift the overall composition and structure of the forest. This will promote more tree oak regeneration and young forest. These actions will benefit wildlife species in this region, including neotropical songbirds, ruffed grouse, and American woodcock.

Project planning and oversight will be implemented by a team of experienced habitat biologists and restoration ecologists. It will take multiple years to complete project activities. This project will build on past successful habitat work that was conducted on the adjacent parcels in the region, including Ashfield Hawley, Fox Den, Eugene Moran, and Farmington River WMAs. Planned activities will develop open habitats and diversify the habitats currently available in the area. Moreover, prior to MassWildlife acquisition, the eastern portion of Ram Hill was managed as an oak woodland/young forest system, allowing this project to build off of that prior work and create a larger block of woodland habitat in this area.

Highlights:

- This habitat management project leads to the restoration of an oak woodland that will benefit many types of wildlife, especially ruffed grouse, American woodcock, and all neotropical songbirds that occupy this region.

Climate Considerations

This project was designed to ensure consistency with recommendations for climate-oriented forest management provided by the Climate Forestry Committee and includes:

- Diffuse overstory removal, partial cut, habitat modification/maintenance.
- Full overstory removal, partial stand, patch regeneration cut.
- Access improvements—improve parking and access

See page 4 for more details.

Project Proposal Map

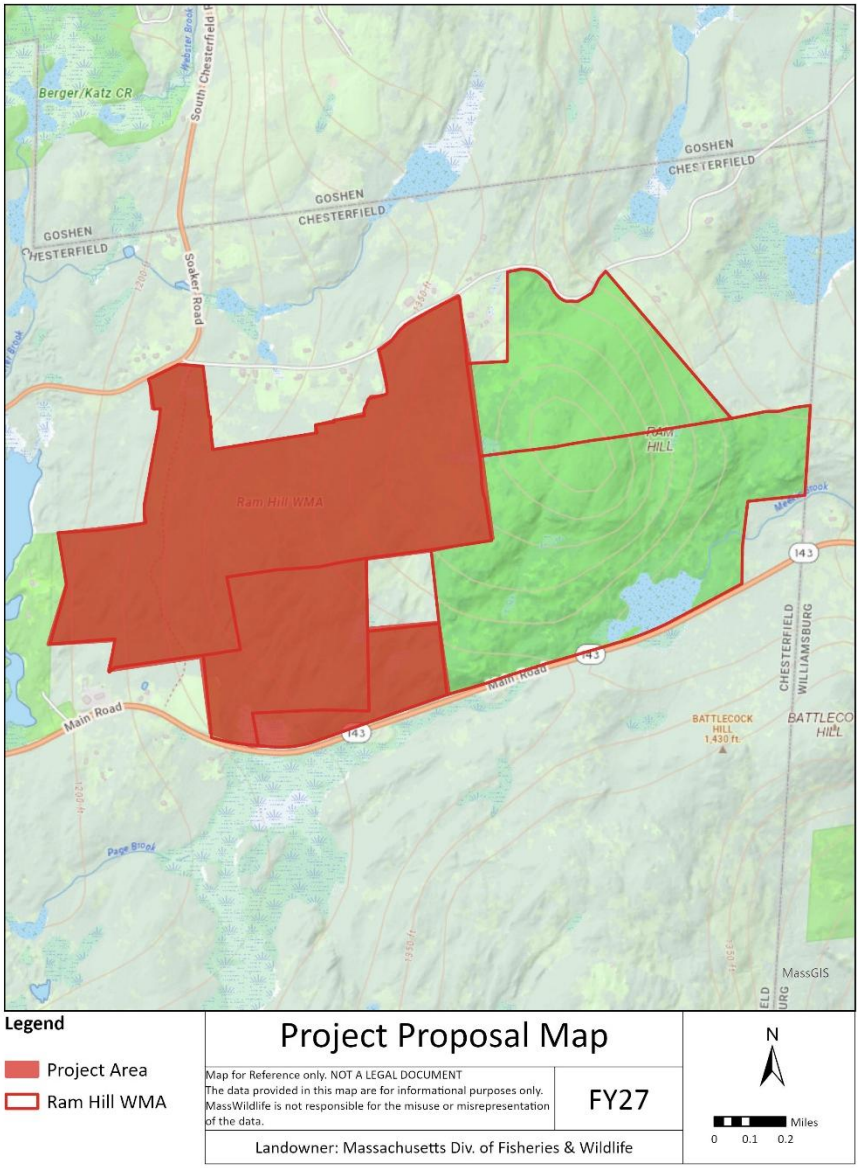

Figure 1. Map of Ram Hill WMA with highlighted project area.

Climate Considerations Details

MassWildlife has determined that the decision to implement this project is consistent with EEA climate goals and guidelines and agency land management objectives. Carbon and climate change considerations specific to the activities proposed for this project are discussed below.

Management Activity	Alignment of Activity with Climate Oriented Strategies and Recommendations
Access improvements (landing improvements, gravel, road grading, ditch maintenance, road widening, straightening, and alteration of intersections).	Roads, landings, and associated infrastructure are critical for access by both the public and natural resource managers. These infrastructure elements are also associated with both **vulnerabilities** and **opportunities** in terms of climate change **resiliency**. **Vulnerabilities:** • Roads occupy areas that would otherwise be carbon rich forest. • Road edges can become avenues for the spread of invasive species. • Roads have the potential for sediment transport into surface water resources. **Opportunities** • A well-designed and well-maintained access system makes all other land management and monitoring activities possible while minimizing impacts. • Roads provide for public access including hiking, hunting fishing, etc. • Roads are critical for both Emergency Response (Injuries, Accidents, etc.) and Incident Stabilization (fire, flood, storm damage, etc.) Given the predicted **increase in storm frequency and intensity**, improving and maintaining roads, road surfaces, and stormwater infrastructure is imperative. • Proper surfacing, grading, and ditching **minimize erosion** from stormwater and snowmelt. • Periodic maintenance is required to **avoid water channelizing** within compacted tire paths. • **Adding gravel** or other material to the road surface helps support the **heavy vehicle traffic** associated with forestry work, fire operations, and post-storm recovery efforts. Alterations (**widening, straightening**) are often needed to upgrade old, narrow farm lanes to meet modern vehicle access needs. • Ditching, cross culverts, and relief cuts can be designed with **future storm intensities** in mind and should minimize, to the greatest degree possible, impacts to surface water resources. Most log landings are **temporary** in nature. Permanent landings that are properly located and well-built can serve as permanent access infrastructure, concentrating activities and minimizing the non-forested footprint required to conduct agency management. Whether temporary or permanent, the use, maintenance, and stabilization of landings will include considerations of **future climate change impacts**. Landing BMPs include:

	• **Post-harvest stabilization** measures such as grading and smoothing to prevent erosion and sedimentation. • **Seeding** to provide cover and further stabilize the soil. • **Invasive plant survey and control** to minimize further infestation risks. • Periodic mowing of permanent landings to allow herbaceous and shrubby vegetation to dominate the site between harvests, adding **diverse habitat opportunities** for local wildlife.
Restore areas of significant soil disturbance or damage.	Significant soil disturbances can impact numerous soil properties including reduced **carbon stabilization**, increased compaction, reduced fertility due to mixing layers, increased erodibility, etc. Restoration activities may include: • Smoothing and installing water bars on firebreaks, especially those that are installed on slopes. • **Reforesting** ORV or logging access roads that are no longer needed and/or are redundant. • Correcting **erosion issues** associated with poor maintenance, poor drainage or water diversion infrastructure, loss of vegetation or topsoil (can occur on newly acquired properties), etc. Considerations for soil restoration activities: • Seedlings or saplings used need to be **protected from herbivory**. • Seeding should be done with **non-invasive and preferably native vegetation** and monitored for **invasive vegetation** during establishment. • **Future climate scenarios** such as increased rain and flooding. • Access control, especially unauthorized OHV/ORV activities. • Felling trees on-site to create barriers increases the pool of large, **downed, woody debris** while reducing the needs for **larger carbon footprint** devices like gates. • If earthwork or natural features are included as design elements, plan for access to perform routine maintenance.
Erosion and sedimentation control installation, including water bar installation and seeding landings and other disturbed areas.	Water bars help stabilize skid trails and ensure that **excessive erosion** is avoided while maintaining the site for future forestry operations. Properly stabilized skid trails will **revegetate** naturally while being discernable enough to use in future operations. Beyond compliance with the BMP manual standards, the size and frequency of water bar installation, and degree of stabilization, should be determined by: • **Other uses** that may occur between operations, e.g. hiking trails, snowmobiles trails, use as firebreaks, or unauthorized uses (OHV/ATV) • The **impacts of future climate conditions**, especially more frequent storms. If the area is already known to be wet, and in

	the future **more frequent storms are expected**, more water bars than what may be normally installed are encouraged. • **Soil type**. Land managers may consider seeding and mulching water bars on highly erodible soils, steep slopes, or excessively wet areas to ensure longevity and prevent water bar degradation.
Temporary stream or wetland crossing.	Temporary stream crossings are occasionally necessary to facilitate forest management activities, though careful project layout can help **minimize the number of stream crossings required**. • Crossing design, installation, maintenance, and removal should be done in accordance with the highest standard BMPs to minimize impacts to sensitive stream and wetland resources. • Plan for worst case **climate scenarios** that generally indicate a greater frequency of higher intensity precipitation events. • Changing **climatic conditions** change will require the continuous evaluation on the types of structures used.

TSI or similar young stand intervention/improvement.	Early intervention treatment within a young stand involves selecting healthy, vigorous, well-formed trees of desirable species and releasing them from competition by removing neighboring trees. Such work can have long-term positive impacts that **improve both tree and stand resiliency** in the face of climate change.
	• Deliberately shifting growing resources to the best trees early in stand development can result in more **carbon being stored on-site** at stand maturity.
	• Carefully planned and executed TSI activities can also **enhance the health and vigor of trees** that are important to the functioning of natural systems but may be **vulnerable to climate change** (e.g. pin cherry)**.**
	• This **very low impact** activity is unlikely to damage soils or spread invasive plants.
	• Allows for **full site occupancy**
	  ○ by superior growing stock,
	  ○ with little competition stress,
	  ○ quicker than would naturally occur,
	  ○ for much a longer period of time.
	• Early stand interventions can also assist in the **migration or transition of a climate adapted species**.

Invasive plant control, including pre- and/or post-harvest and follow up treatments.	Strong consensus exists among land managers and climate science experts regarding the **threat to future forest health** posed by the introduction and spread of invasive plants. **Invasive plants** can: • aggressively **outcompete native plant species,** • dominate understory communities, and even climb, kill, and topple mature trees, • threaten overall **biodiversity**. • threaten **soil health** and long-term **carbon storage**. **Monitoring and controlling** invasive and interfering plant populations prior to and following forestry operations is a critical practice for

	minimizing the risk of further impacts inadvertently (though not unexpectedly) spread by harvesting-related activities.
Full overstory removal, partial stand, variable retention harvesting	Variable retention (VR) is a regeneration technique based on natural disturbance ecology that retains important biodiversity components of the stand during the harvest to meet habitat objectives. The retained components include a diverse species mix of live and dead trees in a range of diameters with an emphasis on the larger sizes, cavity trees, and large snags and logs of different decay stages. These are in a patchwork pattern across the stand from single trees to large groups measured in acres. • This practice more closely **aligns with natural disturbance patterns**. • Promotion of a diversity of age classes, species composition and structural diversity **enhances overall forest resiliency**. • **More carbon is left on the landscape** for longer periods, in live trees, snags, and coarse woody material while regeneration develops. • **Improving conditions for a wide variety of local wildlife** through the creation of temporary young forest habitat. • Maintenance of continuous forest corridors provides for wildlife habitat connectivity. • As part of a regeneration system this method can be used to **help guide species diversity towards more future-adapted mixes.**
Full overstory removal, partial stand, patch regeneration cut.	Patch cutting is a regeneration technique that straddles the boundary between classic even-aged and uneven-aged forest management systems. Foresters select appropriate areas ('patches' or 'groups') covering a portion of the stand to harvest rather than removing the entire stand and then return periodically to repeat the process in other portions of the stand. In using patch cutting there is no final regeneration cut. Patch size and shape are determined by many different factors including overstory condition, desired species composition in the regeneration layer, other desirable herbaceous and woody vegetation, location, stand re-entry period, etc. Harvesting in patches aligns with many **climate-smart forestry practices**: • Increasing **structural diversity** improves resiliency by reducing the impact of age/size related disturbances. • Extending regeneration periods minimizes short term impacts to groundwater and nutrient cycling. • Partial stand overstory removals more closely align with **natural disturbance patterns**. • More **carbon is left on the landscape** for longer periods, and within-patch live tree, snag, and coarse debris retention allow for development of old forest characteristics. • Can also be used as opportunities to increase the stocking of **future climate adapted species, current climate imperiled species**, or other types of desirable vegetation.

Diffuse overstory removal, partial cut, habitat modification/maintenance.	Open **woodlands, savannas, barrens, and heathlands** are low tree-density, **fire-dependent** forests with diverse understory vegetation critical for conserving many state-listed rare species. They are **imperiled** across Massachusetts due to development and negative ecological alterations resulting from a lack of management primarily decades of fire exclusion. Climate experts recommend **prioritizing and maintaining sensitive or at-risk species and habitat**, with the expectation that pressure on these will only increase with changing climate. Ecological restoration of these sites ensures continued habitat function and reduces climatic vulnerability: • Reducing tree **density reduces vulnerability** to pests like southern pine beetle and to drought stress. • Restoring **native species** that are best adapted to the site **promotes resilience** to future drought, wildfire, and harmful insects. • Reintroducing low-intensity fire **promotes resilient native vegetation**. • Removing heavy fuel loads **reduces vulnerability to wildfire**. • Restoration better positions these sites **to adapt to climate change**. • Restored sites are **more reliable carbon sinks in the long term** than highly vulnerable dense fire-excluded forests. The agency recognizes that this site may store less carbon than denser forests in the short term. But climate models predict an increase in disturbance on these sites including drought, wildfire and range expansion of harmful insects that puts a dense fire suppressed forest at greater risk of becoming a carbon source in the long term. Projects like this are undertaken on Federal, state agency, and other conservation lands across the Commonwealth, under the guidance of collaborative teams consisting of biologists, restoration ecologists, foresters, and fire management professionals.
Diffuse overstory removal, partial cut, mid-rotation thinning.	Classic thinnings are partial cuts implemented during the 'middle years' of stand development ('intermediate treatments') to **adjust species composition**, shift growth towards desirable and more vigorous trees, and maintain desired density and stocking levels. Stands may be thinned multiple times prior to initiating the regeneration phase near the end of a planned rotation. Time intervals between thinnings are generally considerations between rotation lengths and the response of the trees on the site. Climate-smart practices that agency foresters keep in mind when conducting thinnings include: • **Retaining higher residual densities** that maintain higher levels of carbon stocks on the landscape. • Retaining better-formed and more vigorous individuals which will improve **carbon sequestration capacity**. • Taking the opportunity to favor **desired species**, especially those species that are better adapted to **future climate scenarios**.

Diffuse overstory removal, partial cut, late rotation regeneration related.	Partial cutting via single trees or small groups in a mature stand can advance a variety of management objectives as well as **climate-smart practices**. Single tree or very small group removals, if used exclusively and repeatedly, will perpetuate an **uneven-aged stand condition** with a species mix shifted towards higher shade tolerance. However, this type of harvest can also serve within an even-aged system to establish regeneration of species of lower shade tolerance under a partial canopy for subsequent release using larger group or patch cuts (irregular shelterwood) or complete-stand overstory removals. Advantages of partial overstory removals include, but not limited to: • Partial cutting **retains carbon on the landscape** for extended periods while regeneration develops. • Reducing competition for resources improves growth and **carbon sequestration** rates on residual trees. • Promotion of a diversity of age classes enhances overall forest **resiliency**. • Maintenance of continuous forest corridors provides for wildlife habitat. • As part of a regeneration system this method can be used to help guide species diversity towards more **future-adapted mixes**.