



DIVISION OF FISHERIES & WILDLIFE

Muddy Brook WMA Habitat Restoration Project Summary CE-MB-TS5

Location

Site: Muddy Brook Wildlife Management Area (WMA)

Town: Hardwick

District: Central

Project Acres

~20 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 create, 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, and 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

Muddy Brook WMA is a large natural community labeled as a riparian inland barren located in central Massachusetts. This unique natural community is a fire influenced landscape and hosts a significant array of rare and endangered species. The Music Camp section of [Muddy Brook WMA](#) is a recent acquisition located on Hardwick Pond that complements the larger WMA to the north. This site hosts a small sandplain grassland on glacial outwash. The uplands are a mix of oak trees species and white pine that slope down to marshlands to the west and south. Within these uplands are small pockets of heathland and pitch pine oak forest natural communities. Management efforts are being designed to enhance this fire influenced landscape.

Project Activities and Expected Outcomes

Selective tree removal will be conducted on the 20 acres that surrounds the sandplain grassland. Tree harvest will occur at varying intensities to stimulate oak woodlands responses. Individual trees or clusters of trees with high habitat value will be retained to provide food and/or winter cover to wildlife. Project planning and oversight will be implemented by a team of experienced Habitat Biologists.

This project will build on past successful habitat restoration work that has taken place on other portions of Muddy Brook WMA. Prescribed fire is planned to maintain the grasslands and woodlands.

Highlights:

- Targeted tree removal will create conditions that promote vigorous growth of blueberry heathlands, scrub oak thickets, as well as oak regeneration to provide cover for declining wildlife, including ruffed grouse, eastern whip-poor-will, and prairie warbler.
- This project will benefit state-listed insects, like the slender clearwing sphinx moth, which require pitch pine and oak woodland habitats with extensive low-bush blueberry patches to complete their lifecycle.
- Promoting open oak and pitch pine woodlands will reduce the area's vulnerability to harmful insects, like spongy moth and southern pine beetle.

Climate Considerations

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

- thinning to decrease tree density reducing vulnerability to wildfire and harmful insects, like the southern pine beetle and spongy moth;
- restoring native species that are best adapted to the site promoting resilience to future drought, wildfire, and harmful insects;
- thinning to prepare the site for the reintroduction of low-intensity prescribed fire to promote resilient native vegetation; and
- restoring fire-influenced ecosystems that provide reliable carbon sinks in the long term compared to vulnerable dense fire-excluded forests.

See page 4 for more details.

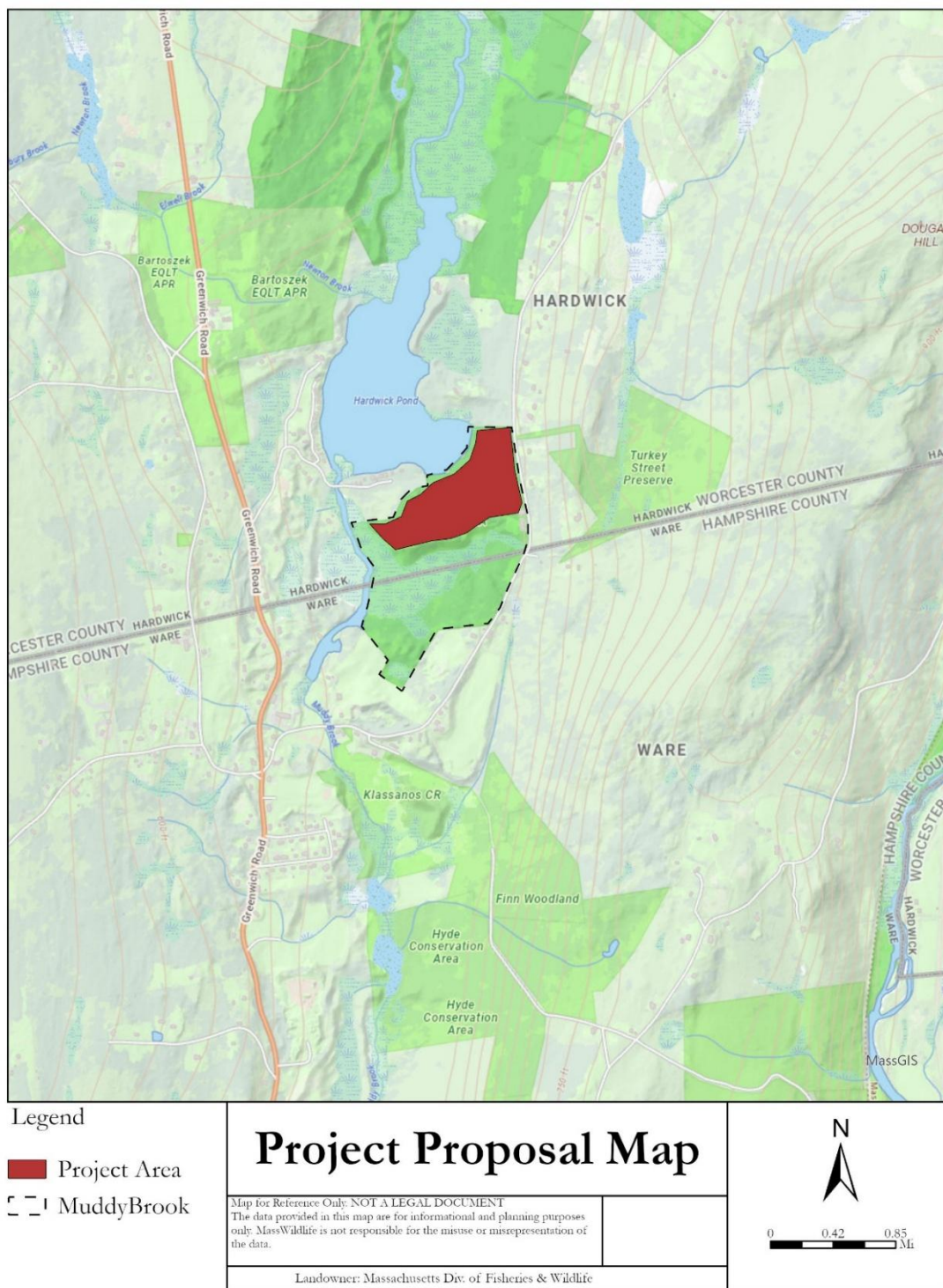


Figure 1. Map of Muddy Brook Wildlife Management Area with highlighted project area.

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.

Proposed 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).	<p>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.</p> <p>Vulnerabilities:</p> <ul style="list-style-type: none">• 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. <p>Opportunities:</p> <ul style="list-style-type: none">• 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.). <p>Given the predicted increase in storm frequency and intensity, improving and maintaining roads, road surfaces, and stormwater infrastructure is imperative.</p> <ul style="list-style-type: none">• 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. <p>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:</p> <ul style="list-style-type: none">• 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.

	<ul style="list-style-type: none"> Periodic mowing of permanent landings to allow herbaceous and shrubby vegetation to dominate the site between harvests, adding diverse habitat opportunities for local wildlife.
Invasive plant control, including pre- and/or post-harvest and follow up treatments.	<p>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:</p> <ul style="list-style-type: none"> 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. <p>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.</p>
Habitat restoration and maintenance prescribed fires—heath, shrubland, woodland, or grassland.	<p>Prescribed Fire is the planned use of fire in a particular place and time, under established conditions and safety requirements to accomplish resource management goals.</p> <ul style="list-style-type: none"> Prescribed fire improves habitat for a variety of wildlife and native plants and restores natural communities dependent on fire. In fire-influenced natural communities, fragmentation of the landscape and the suppression of fires (prescribed or natural) leads to accumulation of volatile hazardous fuels in the surface, mid-story, and canopy vegetation layers. Excessive vegetation density negatively impacts the habitat quality of the natural community and may eventually lead to fuel buildup and unplanned, catastrophic wildfire. Prescribed fires that reflect natural return intervals increase below-ground carbon storage and sequestration. <p>The consequences of catastrophic wildfires include:</p> <ul style="list-style-type: none"> The release of large amounts of carbon including soil carbon. Tree mortality. Severe soil, duff, and below ground vegetation impacts. Potential alteration of soil chemistry. Threats to firefighter safety, human communities, and property damage. Threats to human health from severe smoke impacts both locally and potentially at long distances.
Establishing and/or maintaining fuel/fire breaks.	<p>Climate models predict drought and wildfire potential increasing in the region due to climate change, and the agency is adopting strategies to both reduce the risk of catastrophic fire spread and maintain fire-adapted habitats. Fuel breaks and fire breaks are essential tools for both prescribed burning and wildfire control.</p> <p>Fuel breaks are:</p> <ul style="list-style-type: none"> vegetated areas,

	<ul style="list-style-type: none"> • maintained at lower structure and density, • designed to slow the spread of fire, • designed to control prescribed fire or wildfire, • opportunities to encourage open woodland, shrubland, or grassland natural communities. <p>Fire breaks may be natural or constructed barriers to the movement of fire, with some examples being:</p> <ul style="list-style-type: none"> • open water, • paved roads, • graveled woods roads, • trails, • and periodically mowed paths (“fire lines”). <p>The fuel and/or fire breaks proposed in this project were designed as part of agency planning efforts for fire control and management for this area within a framework of reducing climate vulnerability.</p>
<p>Diffuse overstory removal, partial cut, habitat modification/maintenance.</p>	<p>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:</p> <ul style="list-style-type: none"> • 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. <p>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.</p>

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