Field Management

Mowing Strategies to Maintain Ecologically Valuable Fields

Sudbury Valley Trustees

LITTLETON
Massachusetts

Metrowest
Conservation Alliance
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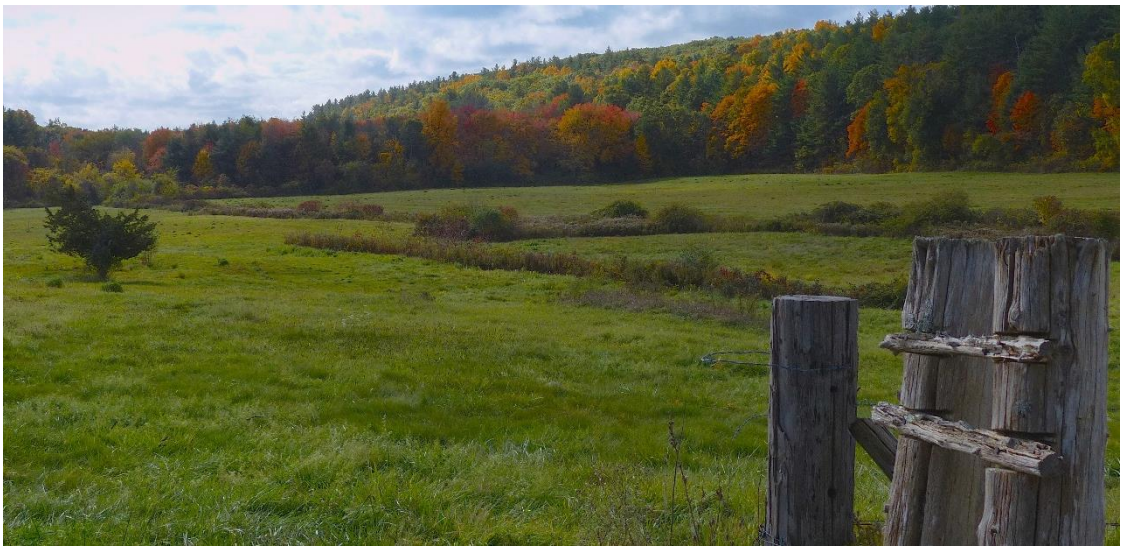


Bill Shelley

These guidelines were prepared by Sudbury Valley Trustees and reviewed by the Littleton Conservation Commission. Both organizations are members of the Metrowest Conservation Alliance (MCA).

The MCA is a partnership of organizations that work collaboratively on land management and land protection to achieve regional conservation success. The MCA works in the 36-community region that makes up the Sudbury, Assabet, and Concord River watershed, covering approximately 377 square miles. Partners include municipalities, state agencies, land trusts, and other non-profit organizations.

Last updated July 23, 2020. Cover photo taken by Amy Green.

Introduction

This guide is intended to inform landowners such as municipalities, land trusts, and individuals about field management techniques. Fields require regular maintenance, which is most easily accomplished with a mower. Other methods such as prescribed burning and grazing are costly and require additional planning and coordination. Maintaining an ecologically fulfilling field does not need a grand restoration project. Using a mower in strategic ways can make positive impacts for the wildlife and plants that inhabit the field.

The following pages contain management recommendations for various case study fields in Littleton, Massachusetts. The examples represent different types of fields managed by the Littleton Conservation Commission. Each case study's recommendations are intended to feasibly manage the field in an ecologically meaningful manner. These recommendations could also be applied to similar fields of other landowners. The case studies are followed with an appendix with information that was compiled while researching for this guide.

Jim O'Neil

For the purpose of this guide, fields are broadly defined as any natural or agricultural land that is primarily composed of herbaceous vegetation. There are several types of fields based on their land use and plant composition. Hayfields are agricultural lands where grass is harvested typically multiple times throughout the growing season. A wet meadow is a field where the soil is saturated during at least part of the growing season. It may periodically

Sandy Gotlib

have standing water, but it cannot support aquatic wildlife like fish. Wet meadows contain herbaceous plants that are characteristic of wetlands. Old fields develop from fields without major disturbances. The plant composition shifts from herbaceous to woody as the area succeeds into a shrubland.

Fields are an uncommon habitat in New England, because unmanaged fields either succeed into forests or become developed. They also provide important habitat for many types of wildlife. Fields of any size can provide habitat for wildlife such as nesting turtles, small mammals, snakes, foxes, raptors, pollinators, and other insects. Large fields (at least 10 ac.) can provide habitat for grassland nesting birds such as bobolinks and eastern meadowlarks.

Your field may have a large presence of invasive plants. For many invasive species, mowing is not enough to fully remove them or limit their spread. Other tactics such as pulling or targeted herbicide may be necessary. Visit the SuAsCo CISMA website (cisma-suasco.org/) for information to best remove specific invasive plant species, or consult a professional for guidance on treating invasive plants in your specific field.

One method that could be implemented to maintain fields is prescribed burning, which can have different effects on the field compared to mowing. Burning promotes native warm season grasses over nonnative cool season grasses. Fire also removes thick layers of thatch that accumulate with repeated mowing. However, conducting a controlled burn is complicated and expensive; consider it only if you have compelling reasons. Refer to your specific management goals and objectives.

Warm & Cool Season Grasses

Most grassy fields in New England are dominated with nonnative cool season grasses (CSG) like timothy, Kentucky, and orchard grasses. Native warm season grasses (WSG) provide higher quality habitat for more wildlife than cool season grasses. They have deeper roots that contribute to erosion control and soil fertility better than CSG. Types of WSG include big bluestem, little bluestem, Indiangrass, and switchgrass.

Brett Whaley

With any habitat management, one of the most important factors is your goal. Prescribe your management practices to achieve your goals and objectives. Consider that a field cannot be habitat for all wildlife. Many wildlife species that use fields have conflicting habitat requirements. For example, one field will likely not support breeding bobolinks and bumblebees. Bobolinks need acres of tall grass. Bumblebees need a suite of flowering plants including many species of herbaceous plants and shrubs. One approach is to target a specific animal and manage for that. The habitat for one species can be habitat for many other species, but not all species.

Small Hayfield

Fields can have many different uses for wildlife and people. One of which is a hayfield where grass is mowed and collected for animal feed. Hay is typically harvested multiple times during the growing season. Hayfields can be any size, but the following recommendations are intended for small hayfields, which are less than 10 ac. Fields under this size will most likely not support any grassland nesting birds, so there is little concern for mowing during their breeding season. Hayfields can be managed to support both farmers and wildlife.

The following recommendations are for the hayfields of Newtown Hill Conservation Area and Yapp Conservation Land.

Newtown Hill

This property contains two small fields, sized about three and eight acres. They are adjacent to forest and a pond. The fields are maintained by an independent farmer.

Mark Levinson

Yapp

This property has three small fields, which are sized about one to two acres each. The fields are separated with stone walls and lines of trees. There are forests and a suburban neighborhood next to the fields. Like Newtown Hill, the fields are maintained by an independent farmer.

Terri Ackerman

Management Recommendations

Hayfields are typically mowed three times during the growing season. For the highest quality of hay, be sure to harvest during mid to late June. As mentioned, small hayfields do not need to be concerned about grassland nesting bird season, because these fields are too small to support them. Allow the farmer to mow whenever in the year is best for them. Avoid late season wildflowers like Canada goldenrod from establishing by mowing before September 15th when these plants set seed.

The whole field should not be mowed at once. This would create a complete disturbance to any wildlife using the field. Leave space for critters to refuge with either a designated section or field edges that are mowed less often. Ideally field edges would be 25-50 ft. wide. The images on the next page show the potential field edges (Fig. 1 and 2).

Avoid mowing all of the field edges or designated section at the same time, because this would create a complete disturbance. Implement a schedule where some portion of the

field will not be mowed in a year. For example, the interior of the hayfield is mowed three times in summer, the northern field edges are mowed at the end of summer, fall, or spring, and the southern field edges are untouched. The next year, the field interior and southern field edges are mowed. Then only the field interior is mowed in the following year. These less frequently mowed sections may not be suitable for hay sale because other plants that will likely grow alongside the grasses. When less-frequently managed areas are mowed, cut as close to any forest edge as possible to prevent invasive plants from encroaching into the field.

To disturb wildlife as little as possible, set the height on the mower to six inches. It retains habitat for critters like small mammals, snakes, and nesting turtles. This is also an optimal height for haying cool season grasses, because it better promotes regrowth than a shorter cut.

Do not mow outward-in. This pattern traps wildlife as the mower encircles the field toward the middle. Instead, mow either inward-out or in rows. Reduce the speed of the mower to 8 mph. Consider adding a flush bar to the mower to forewarn wildlife.

Matt Helser

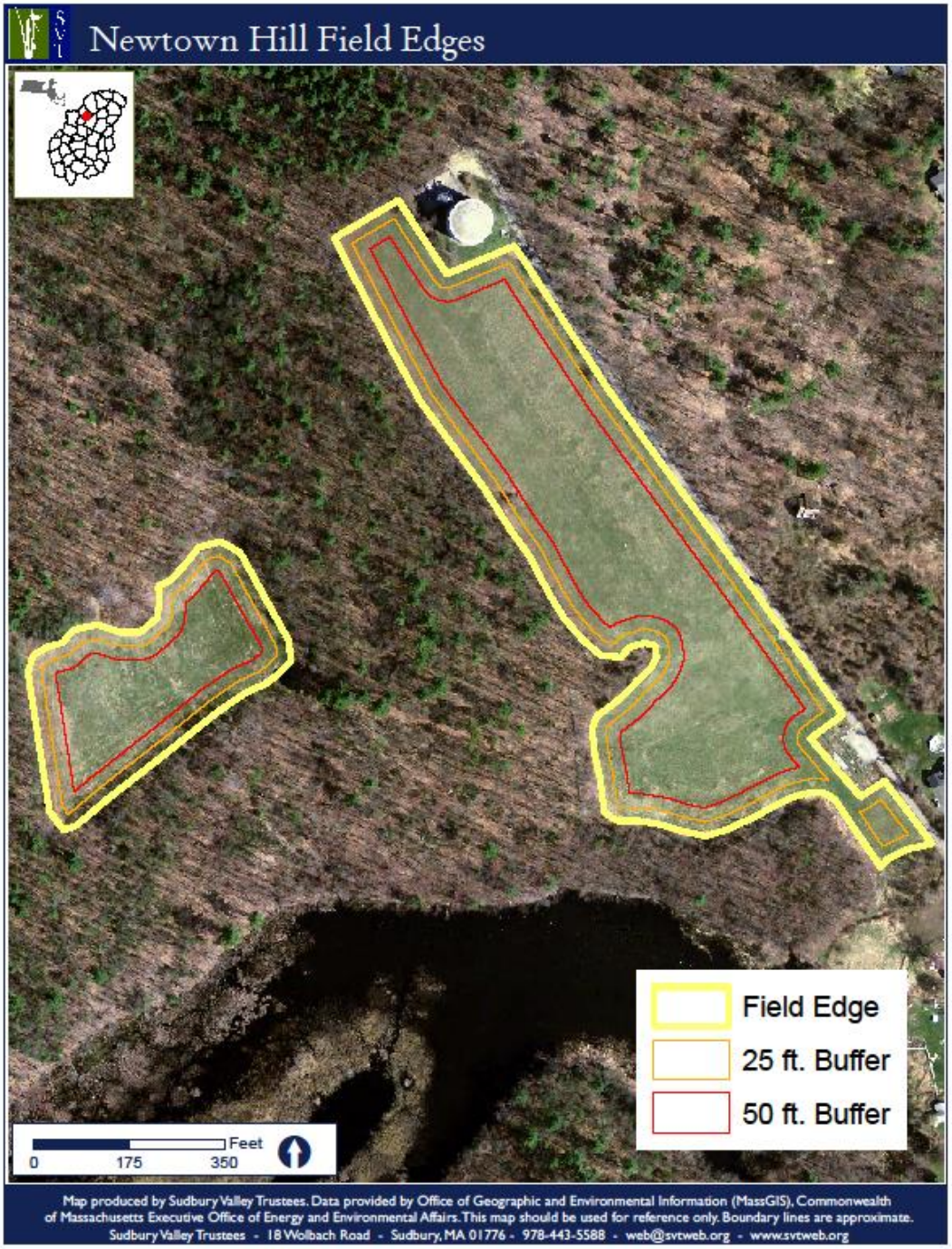


Figure 1. Field edges and potential edge buffer zones with less frequent mowing at Newtown Hill, Littleton. The haying boundary could be set between the orange and red lines. Field edges do not need to be around the whole field. For example, haying could extend to the forest edge where forest panhandles into the larger field on its left side.

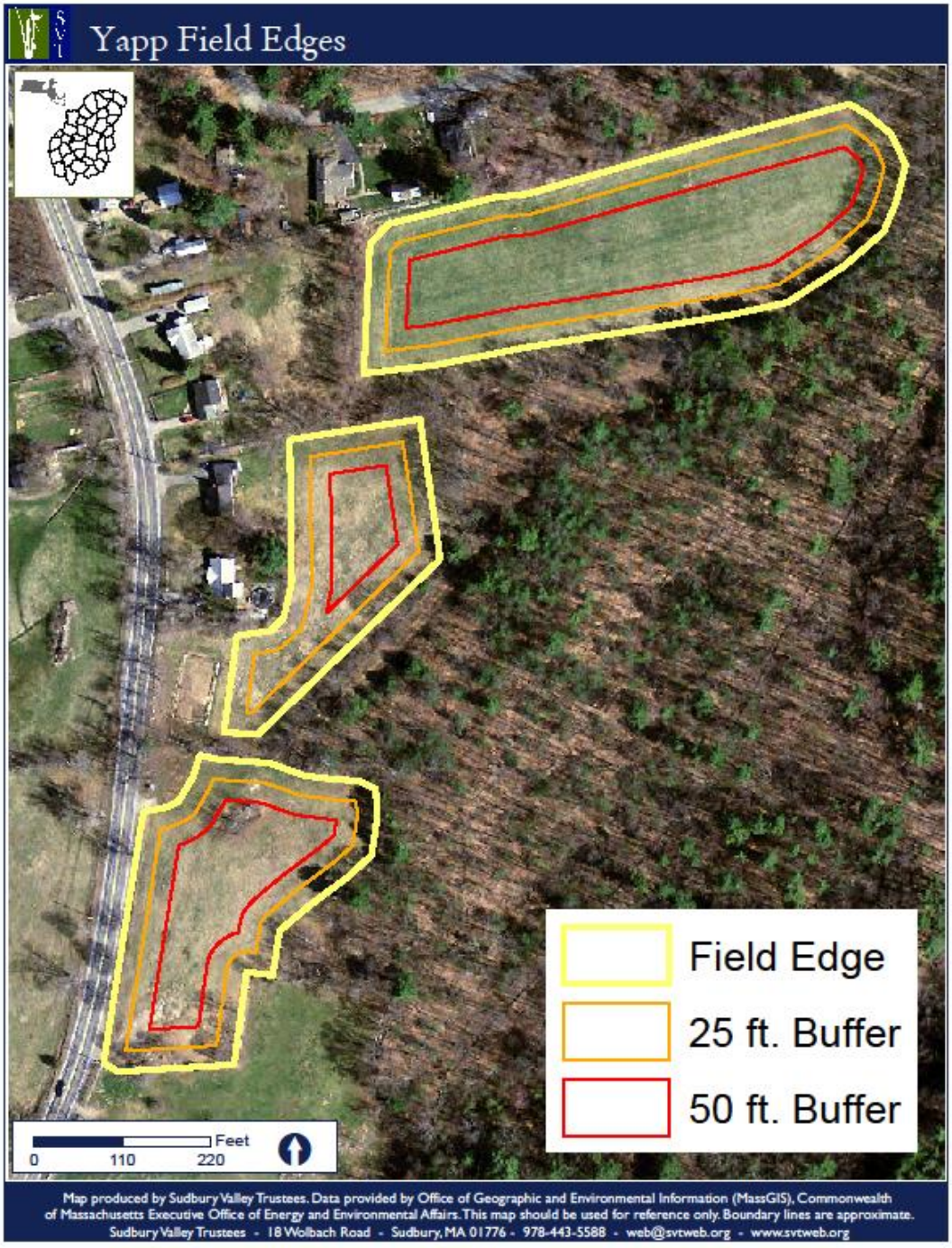


Figure 2. Field edges and potential edge buffer zones with less frequent mowing at Yapp, Littleton. The haying boundary could be set between the orange and red lines.

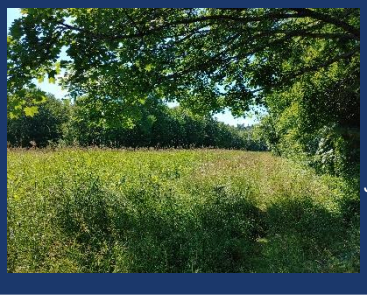
Small Field

There are hayfields, old fields, large fields, and wet meadows. Each have their own defining characteristics. For the purpose of this guide, a small field is an area that differs from the those just mentioned. It is an upland patch of herbaceous vegetation that is too small to support grassland nesting birds.

The following recommendations are for the small field on the Morgan Land.

Morgan

This property is part of a network of conserved land and trails. The property is fifty acres of forest and field, and the field is about six acres.



Amy Green

Management Recommendations

The primary goal of managing the field of Morgan Land is to maintain it as a field and prevent succession into a forest. To accomplish this, mow every two to three years to keep woody vegetation at bay. Do not mow the whole field at once. Instead, divide the field into two or three segments that are rotationally mowed. The mowing schedule could be to mow the northern section in the first year, mow the southern section in the second, mow nothing in the third year, and repeat.

Mow the sections in either late fall or early spring to allow perennial plants to complete their life cycles. Mowing later in fall or spring can promote wildflowers and other forbs, which would be beneficial to pollinators and other insects. Sometimes late season wildflowers, like Canada goldenrod, can become weedy and dominate the field. To suppress these weedy wildflowers, mow between August 1st and September 15th, which is before these plants set seed. Keep mowing during this period until the weedy forbs are at a preferred abundance.

Amy Green

Set the mower height to at least six inches; although higher is typically better. A minimum height of six inches protects wildlife like small mammals, snakes, and nesting turtles. Do not mow outward-in. This pattern traps wildlife as the mower encircles the field toward the middle. Instead, mow either inward-out or in rows. Reduce the speed of the mower to 8 mph. Consider adding a flush bar to the mower to forewarn wildlife. Collect cuttings at least every three years to prevent the buildup of thatch.

Old Field

An old, unmaintained field will start to succeed into a woody shrubland within five years. The field can eventually be managed as shrubland habitat. Shrublands are rare in New England because many have been unmanaged and allowed to mature into forests. This dense, woody habitat is required for many types of wildlife including shrubland songbirds.

The habitat conversion of field to shrubland is very management intensive, because it requires sufficient effort and funding. If abandoned, the shrubland could succeed into a forest or become a large patch of invasive plants. Consider managing an old field as a shrubland only if you will supply the effort and funds that maintaining it requires. Otherwise, switch the management practices to a small field.

The following recommendations are for the field of Mary Shepherd Open Space. However, these recommendations may not suit this field because of the prevalence of invasive plants like oriental bittersweet and multiflora rose in the field and its edges.

Mary Shepherd

This property is about twenty acres large and surrounds a residential development. The field is about three acres large is lies between the development and an equestrian center. Much of the field is wet from a lowland area and a nearby stream.

Jim O'Neil

Management Recommendations

Allow the field to grow native woody vegetation. Selectively remove trees that become taller than most of the shrubby vegetation with a chainsaw or handsaw every one to three years.

The initial growth of woody plants will likely be a mixture of native and invasive plants. Mow over the invasives and avoid the natives. Time this mowing during August, which is during the growing season of many invasive plants. For targeting specific invasive species, visit the SuAsCo CISMA website for more information.

Jill Kern

Once the shrubland is well established, it should be managed every five to twenty years with a large disturbance. Clear a portion of the shrubland with chainsaws or a Brontosaurus machine. Other methods for mechanical

vegetation removal include a skid steer or a hydro ax. Avoid creating a complete disturbance by only clearing a portion of the shrubland. Monitor the shrubland yearly to determine when it would be appropriate to clear a portion to restart succession. Avoid removing native vegetation during the brood rearing season, which occurs from April 15th to August 15th.

Jim O'Neil

Grassland Bird Habitat

For fields that are at least 10 ac. large, you have the option to manage for grassland nesting birds. These birds have one of the highest rates of decline of all birds in the country due to loss of large grasslands needed as breeding habitat. There are multiple species that each have their own requirements for field size and vegetation height. Fields should not be disturbed from May 15th to August 15th, the breeding season. Preferably, one would mow further from the start and end dates of the breeding season like in late fall or early spring.

The following recommendations for the field of Long Lake Park.

Long Lake Park

This property features a field that is about 12 acres large. The field contains about a dozen bird boxes. It has historically had breeding bobolinks. The field is part of a larger piece of conserved land, which is about 180 acres.

Amy Green

Habitat Requirements of Grassland Nesting Birds

Adapted from UNH Cooperative Extension

Grassland Bird Species	Required Minimum Field Size	Preferred Vegetation Height in Fields
Bobolink	10+ acres	Dense grass taller than 3 ft.
Eastern meadowlark	15+ acres	Dense grass and wildflowers taller than 3 ft.
Savannah sparrow	20+ acres	Both short and tall vegetation
Grasshopper sparrow	30+ acres	Short, sparse grass
Northern harrier	30+ acres	Forages in short grass fields, nests in wet meadows
Upland sandpiper	150+ acres	Short, sparse grass.

Management Recommendations

The field of Long Lake Park was purchased by the Town of Littleton for grassland nesting bird habitat. At 12 ac., it can potentially provide breeding habitat for bobolinks. It also has a long-running bird box monitoring program for eastern bluebirds and other cavity nesters.

Divide the field into two to three sections, and rotationally mow the sections in a three-year cycle to retain areas of grass after mowing and to exclude woody plants. If there are two sections, mow them in subsequent years and do not mow on the third year. If there are three sections, cycle through mowing one section yearly. Because this field is being

Dustin Neild

managed for grassland nesting birds, mow up to the woodland edge to maximize the size of the field.


Craig Smith

Do not mow during the bobolink's breeding season. Instead mow in late fall or early spring. Bobolinks require grasses over other herbaceous plants. If the plant composition is shifting towards other forbs like asters and goldenrods, mow before those late-season wildflowers set seed (August 15th – September 15th).

Set the mower height to at least 6 in.; although higher is typically better. A minimum height of 6 in. protects wildlife like small mammals, snakes, and nesting turtles. Do not mow outward-in. This pattern traps wildlife as the mower encircles the field toward the middle. Instead, mow either inward-out or in rows. Reduce the speed of the mower to 8 mph. Consider adding a flush bar to the mower to forewarn wildlife.

Based on a few of its characteristics, this field likely cannot provide habitat for bobolinks. The Long Lake field is only 12 ac. large, which is on the lower end of the preferred size requirement. The field is an irregular shape that has a lot of edges (Fig. 3). Grassland nesting birds prefer fields that are shaped like circles or squares that have less edges. Bobolink nests have more fledglings when there is at least a buffer of 50 m from the forest edge. Finally, a trail runs through the interior of the field, so trail visitors would disturb any nesting bobolinks.

Consider the following actions to improve the suitability of this field for nesting bobolinks. Convert the two panhandles of forest into grassland (Fig. 4). This will reduce the amount of edges and increase the area of interior grassland. The adjacent forest northeast of the field could be converted to further add acreage and reduce the amount of edge. Redirect the trail to the forest or the field edges to limit disturbance to breeding birds in the field interior. Finally, move the bird boxes within twenty-five meters of the forest edge to limit disturbance from the bird box monitors.


Amy Green

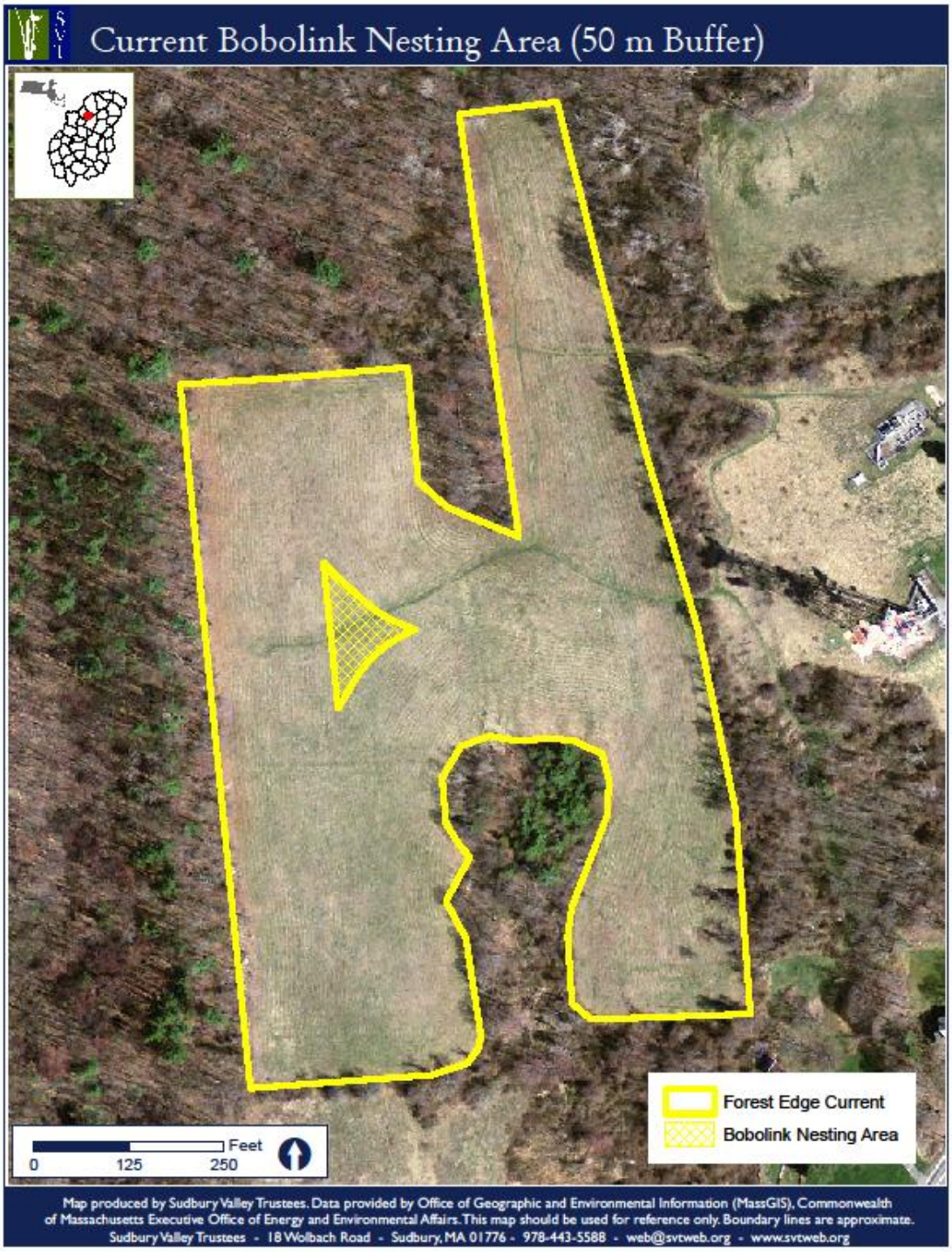


Figure 3. Current bobolink nesting area based on a 50 m buffer from forest edges at Long Lake Park, Littleton, MA.

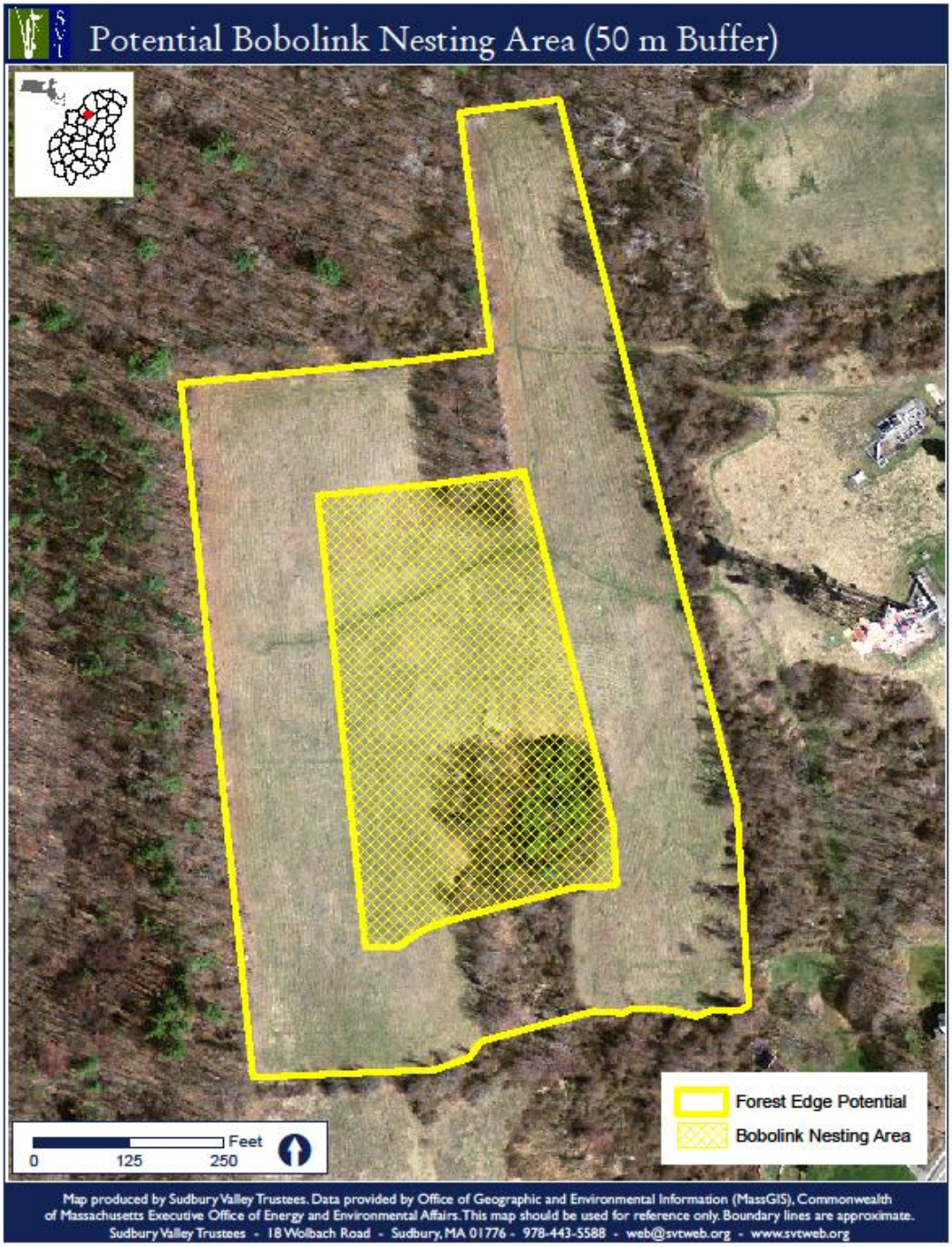


Figure 4. Potential bobolink nesting area if the two panhandles of forest are cleared. These two areas may be difficult to clear because stone walls surround most (but not all) of the forest edges of the panhandles.

Wet Meadow

This final case study varies from all of the previous examples because it is a wetland community. The soils of wet meadows are saturated and temporally flooded with standing water. Wet meadows are typically dominated by one species, usually a sedge.

The following recommendations are for Tahattawan Meadow.

Tahattawan

This meadow is about six acres large and is surrounded by forest and roads. The road edges hold the highest densities of invasive plants.

Amy Green

Management Recommendations

Although wet meadows are usually dominated by one species, Tahattawan has a rich plant community. The primary goal for this field is to maintain its diversity. It is facing threats of encroaching invasive plants like oriental bittersweet, purple loosestrife, and *Phragmites*. Reed canary grass is already well-established, and another management objective is to limit the spread of it.

Laura Mattei

To suppress woody plants, mow every two to three years. Do not mow the whole field at once. Instead, divide the field into two or three segments that are rotationally mowed. The mowing schedule could be to mow the northern section in the first year, mow the southern section in the second, mow nothing in the third year, and repeat. Mow the sections in either late fall or early spring to allow perennial plants to complete their life cycles. Mowing later in fall or spring can promote wildflowers and other forbs, which would be beneficial to pollinators and other insects.

Set the mower height to at least six inches; although higher is better. A minimum height of six inches protects wildlife like small mammals and snakes. Do not mow outward-in. This pattern traps wildlife as the mower encircles the field toward the middle. Instead, mow either inward-out or in rows. Reduce the speed of the mower to 8 mph. Consider adding a flush bar to the mower to forewarn wildlife.

Each invasive plant has its own effective way to remove it and limit its spread. Cut and directly apply herbicide to oriental bittersweet growing on the forest and road edges. Using herbicide will likely require a licensed applicator. At low densities, purple loosestrife

can be pulled by hand or with a garden fork. *Phragmites* can be removed by hand pulling or cutting. The best time of year to cut the invasive grass is July. To manage the reed canary grass, mow and smother with a shade cloth. After several months, a smothered area could be ready for a native wet meadow seed mixture. Properly dispose any removed invasive plant material.

Actions to remove or limit the spread of invasive plants vary field by field. Effective strategies vary by species, quantity, and site. Visit the SuAsCo CISMA website to begin planning invasive plant management for your own fields.

Amy Green

Conclusion

Fields of any size can enhance the ecological value of a landscape by adding habitat diversity. They provide habitat for wildlife and plants that are not found in other natural communities. To retain a field and its benefits, fields need to be periodically disturbed. Otherwise, the field will likely succeed into a forest.

The most common and cost-effective way to maintain a field is with a mower. There are strategies to disturb the field without creating large disturbances for the wildlife that inhabit them. Generally, do not mow the whole field at once. Wildlife using the field will have no where to go after the complete disturbance. Instead, divide the field into two or three sections and rotationally mow. Set the height to at least 6 in. and do not mow outward-in. Opt for mowing either late fall or early spring rather than summer unless the field is harvested for hay.

You could consider the management recommendations of any case study for your own fields. See the appendix for more information on fields and managing them. Find a toolkit of useful resources for managing New England fields by typing **rebrand.ly/SmallField** into your web browser's address bar.

Amy Green

Appendix

The following pages contain notes and quotes that you may find useful when managing your fields. Complete information on where to find to the original source is in the references section.

Mowing Height

Since mowing fields close to the ground can eliminate small mammals from fields, mower height should be adjusted to leave a minimum of 8-10 inches of grass standing to provide habitat for small mammals (Childs 1990).

For haying, cold season grasses should be cut at 4-6 in. while warm season grasses should be cut at 8-10 in. (Gelley 2019; King 2019)

Mowing Pattern

If hay production is not an issue, grasslands can be left uncut until late in the year or even cut only once every two or three years. The latter would benefit small mammals but may allow woody plants to invade (Westover 1994). If woody plants are an issue, grasslands should be cut annually or portions of fields cut annually on a rotational schedule (Vernegaard et al. 2009). Rotational mowing is better for wildlife than mowing the whole field at once. Implement rotational mowing by sectioning the field and mowing only a half to a third of the field each year (Di Giulio et al. 2001).

Leaving fields unmowed or cutting only a portion of fields on a rotating schedule to keep woody invaders in check will benefit butterflies by providing flowers for adult butterflies throughout the growing season as well as allowing larvae and pupae time to develop. (Vernegaard et al. 2009)

Avoid mowing outside-in, which will coral wildlife towards the middle of the field that will struck by the mower. It is better to start from the middle of the field and mow inward-out (Vernegaard et al. 2009). Another option is to mow in lines starting from the field edge to the area that will not be mowed to allow wildlife to find refuge (Mattei, personal communication, 2020).

Mowing Timing

To promote wildflowers, mow in fall or winter when flowers have dies back or are dormant (Black et al. 2007). A late fall mow can promote forbs like Canada goldenrod, which can dominate a field and lower its plant diversity. If Canada goldenrod exceeds your preferred abundance, switch mowing to an earlier date before its seeds set (Gillespie, personal communication, 2019). Mow fields before September 15th each year to prevent to

proliferation of forbs. Mowing after that date allows goldenrods, asters, and other wildflowers to mature and set seed, which leads to a decline in grass cover (Atwood et al. 2017).

"Do not mow native grasses past September 1 to allow enough regrowth for winter cover and spring nesting habitat. This will also allow the grasses to build up energy reserves necessary for vigorous spring growth." (Kentucky Department of Fish and Wildlife 2013)

Old Fields

Old fields, which typically have shrubs and small trees scattered throughout rather than concentrated as borders or islands, should be maintained since they can support greater plant species richness and small mammal abundance than native grasslands or hayfields (Sietman et al. 1994).

"Abandoned fields on the way to becoming forest consist of overgrown shrubs and trees such as blueberry, juniper, eastern red cedar, aspen, apple, cherry, birches and white pine. Abandoned fields provide an excellent habitat for rabbits, deer, and many songbirds." (Yorke 2016)

"[S]mall isolated patches less than two acres are not large enough for species such as New England cottontails, yellow-breasted chats, and field sparrows to survive. However, they are large enough for species that have small home ranges including various butterflies, dragonflies, and some songbirds such as chestnut-sided warblers. Small patches will also provide foraging opportunities for more mobile and wide-ranging species such as white-tailed deer and turkeys." (Oehler et al. 2016)

"Maintaining old field habitat requires some control of invading woody vegetation. Woody plant species invade fields that are infrequently cut, compromising grassland habitat and management. While species that prefer early successional habitat (e.g. field sparrow) will benefit from woody plants invading fields, woody plants generally compromise grassland habitat. Fields that are not well suited for grassland wildlife (e.g. small fields surrounded by forest) may provide greater benefits to wildlife if they are managed for early successional habitat. Managing for early successional habitat will typically require leaving fields uncut for several years to allow woody plants to colonize and then mowing around woody plants annually or mowing and or burning the fields on a rotational schedule. Early successional habitat could also be incorporated into larger fields to provide grassland habitat diversity. Areas within larger fields could be managed on a rotational schedule that allowed early successional plants to develop for a few years and then converted back to grassland, leaving another area to develop as early successional habitat. Small fields may also be allowed to revert to woodland where forest fragmentation is a concern (Vernegaard et al. 2009)."

"The frequency of vegetation management activities necessary to maintain old-field and shrubland habitat conditions will depend on several factors. Old fields and shrublands that are relatively stable still require monitoring and occasional selective cutting, mowing, or herbiciding of small trees that invade the area (e.g., every five years).

Patches dominated by regenerating trees will require aggressive management for several years to aid in conversion to a more stable shrubland. This may include stumping and mowing every one to three years, perhaps coupled with an herbicide application to control trees attempting to resprout.

Reclamation of old fields and pastures that have begun to succeed to forest will initially require aggressive management using land clearing equipment such as a hydroaxe, Brown Brontosaurus, or even a tree shear … to remove larger unwanted trees followed by less frequent action (e.g., every three to five years) to maintain the habitats.

Once shrublands become well established they may require only periodic management (every five to ten years or longer). In areas with patches of shrubs interspersed with openings of grasses and forbs management may only be required every two to four years to prevent these openings from reverting to forest. Monitoring of your habitat patch will be required to determine when management is necessary to maintain the desired habitat condition." (Oehler et al. 2006).

Bobolinks

Do not leave soft edges between field and forest; mow right to the forest edge. This increases the size and suitability for nesting bobolinks. Bobolinks need at least a 50 m buffer from forest edges for successful nests. Up to 100 m is better (Bollinger and Gavin 2004). The breeding season of bobolinks is May 25th-July 15th (Jones 1997). Avoid disturbance during the breeding season, do any mowing in early spring or fall (Martin and Gavin 1995). The recommended field size for bobolinks is about 25-75 ac. (Bollinger and Gavin 1992).

"Try to restore warm season grasses like big/little bluestem, Indian grass, and switchgrass. Cool-season grasses (like timothy grass, Kentucky grass, and orchard grass) are non-native they are less suitable for nesting habitat because they form dense cover" (Jones 1997)

Prescribed Burning

Fire would help reintroduce native warm season grasses and remove the thick layer of thatch that comes repeated mowing. In small field, burn less than half of the field at a time (Herkert 1994).

"A single prescribed fire should burn an entire area of pollinator habitat. A program of rotational burning in which small section - 30 percent of a site or less – are burned every few years will ensure adequate colonization potential and refugia for insects. In addition, as

a fire moves through an area, skips – small, unburned patches – should be left intact as potential micro-refuges. Periods between managed burns over the same patch should be conservative. Based on a variety of studies cited above, it appears that three to ten years allows adequate recovery of pollinator populations, depending on the ecosystem and specific management goals. Unless the objective for a prescribed fire is for brush or tree removal, high intensity (hot) fires should be avoided. Low-intensity prescribed burns conducted early or late in the day, or from late fall to early spring, are not only preferable for pollinators but also reduce impacts on other wildlife species such as reptiles and ground nesting birds." (Black et al. 2007)

"When you burn determines how well invasive species are treated. In burning during spring or fall (dormant seasons where total non-structural carbohydrate is stored underground) is less effective than burning during the growing season." (Richburg and Patterson 2003)

Miscellaneous

"Management of grasslands should strive to maintain biological diversity. While rare species are important and should be considered at all times, management of grasslands should also strive to maintain the greatest number and variety of plants and animals. For example, leaving unmowed strips and edges throughout the year will provide cover for small mammals and wildflowers for butterflies. Common grassland plants native to New England such as goldenrods, asters, milkweeds, bush-clovers and violets should be encouraged since these species provide nectar for adult butterflies and may serve as important host plants for butterfly larvae." (Vernegaard et al. 2009)

"Mowing Hayfields benefits many species of wildlife. Following a harvest, foxes, hawks and owls find an abundance of vulnerable prey. However, whether hayfields are mowed for aesthetics or harvested for forage, many birds, small mammals, snakes, turtles, and even fawns are lost because of mowing. Placing the cutting blade to a height of six inches helps prevent the loss of wildlife. Mowing also should be avoided from April through mid-July, until ground nesters such as meadowlarks and bobolinks are finished nesting. If mowing must be done before mid-July, leaving unmowed patches or strips of grass or wet swales can limit the impact on ground nesting species." (Yorke 2016)

"Edges are the borders between two different habitats such as a forest and field. Edges provide habitats for cardinals, indigo buntings, catbirds, rabbits and towhees." (Yorke 2016)

To mow with pollinators in mind, follow these practices: use a flushing bar, set mowing height to 12-16 in., reduce mower speed to less than 8mph, and mow in the middle of the day (Black et al. 2007).

Remove clippings after mowing to prevent thatch build-up. Grassland nesting birds prefer a low amount of thatch (Atwood et al. 2017).

"Hedgerows [that are] 30 to 50 feet wide provide good escape cover, food, rest area and travel corridor. Existing hedgerows can be maintained by thinning to release mast producing trees and shrubs and increase vertical diversity. By not mowing and tilling areas next to fences, vegetation will naturally fill in. Once a dense hedgerow has been established, it can be maintained on a 10 to 20 year basis by cutting, mowing or burning." (Yorke 2016). This practice could also be done to soften forest-field edges.

"Grassy and shrubby borders can be established by leaving uncut strips 25 to 50 feet wide along hayfield edges, or uncut areas in wet swales. This nesting and brood rearing cover habitat can also serve as a deer and turkey food plot. The area can be maintained by mowing every three to five years." (Yorke 2016)

Maintain areas of bare ground. Killdeer and horned larks, for example, require patches of bare ground for nesting and feeding. This can simply be in areas where grass growth is poor due to soil conditions, or in small areas intensively grazed (Clyde 2015).

While managing to change a field's plant composition, remove undesired plants rather than planting desired plants (Harper 2017).

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