

**Recommendations for Field Management  
at the  
McLean Open Space**

Submitted

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to the

**McLean Open Space  
Land Management Committee**

by

**Jeffrey Collins  
Mass Audubon  
Ecological Extension Service**

## **Introduction**

Early successional natural communities – grasslands, meadows, and shrublands – are an increasingly uncommon cover type in our region. In the natural process of succession, grasslands and meadows are pioneered by woody species, becoming shrublands; as tree species seed into the site and grow taller, shrublands succeed to forest. In order to maintain early successional habitat, some disturbance is required to continually set back the clock of succession.

Natural disturbances that create early successional habitat include browsing, fire, wind damage, forest disease, and beaver damming. Some of these processes occur on our landscape, but some, such as large scale browsing by wild animals, and fire, have essentially been removed from our landscape. In addition, throughout Southern New England agricultural landscapes are being abandoned and allowed to revert to forest or developed for housing or commercial use. As a result, the Massachusetts landscape, which was as little as 20% forest at the height of land clearing in the 1850s is now nearly 80% forested. While forest makes fine habitat, a wide range of plants and animals require grasslands or shrublands for parts of their life cycles. With fewer natural processes allowed to set back the successional clock, humans must take an active role in managing for early successional cover.

The McLean Open Space includes roughly 11 acres of grassland habitat and 5.4 acres of early successional shrubland habitat (Figure 1). The fields have been kept open by mowing in the past, but mowing was discontinued in the mid-1990s. The McLean Open Space Ecological Management Plan (BSC Group and Cecil Group, 2001) recognized that the open field sections of the property were beginning to revert to shrubland along the edges and recommended resumption of mowing. This report provides more specific recommendations for maintaining the open fields.

The objective of this report is to assist the McLean Land Management Committee in improving the ecological condition of a significant portion of the property and to make the property more accessible and desirable for passive recreation. For more than one hundred years, this property was held in private ownership, though casually allowing some passive public access. In 2005, ownership was transferred to the Town of Belmont, allowing and encouraging full public access. In addition to the ecological goals, the Committee wants to make the property more appealing to the average Belmont resident.

## **Methods**

Mass Audubon staff visited the site on 8 April 2006. The site inspection included walking inventory of The Great Field, the Heart-Shaped Field, and the Barn Meadow. Areas or stands with a common management need were delineated on an aerial photograph, and these units were then reproduced in ArcView GIS software. ArcView was used to calculate area for each management unit. The recommendations below were generated based on our experience managing early successional habitat, the characteristics of the vegetation encountered, and our experience planning for and implementing invasive species control.

## **Inventory Results and Management Recommendations**

Comments focus on maintenance of open habitat and control of invasives.

Recommendations include removal of native species, such as staghorn sumac where it is growing into the meadow, and white ash where poorly formed or unhealthy individuals have established in the meadow or on the edge.

The desire of the committee is to make the property more accessible. In that vein, the committee expressed concern over the amount of poison ivy on the property and asked that it be made a target for management. Our inventory did not locate an overabundance of poison ivy. The only significant locations were along the stone wall at the western edge of the Heart-Shaped Field and in one location in the Great Field. Regular mowing will limit the growth of poison ivy in the meadows themselves, and reduce the potential for contact by casual visitors. Poison ivy is present at higher density in the adjacent forested areas, and there is a fantastic example (from a botanical and natural history perspective) of a very large free-standing poison ivy shrub found alongside the trail just to the west of The Great Field.

### **The Great Field**

Comments are keyed to management units numbered in Figure 2.

Trees and shrubs – These copses and individual trees dot the field. Several of them provide a visual treat and should remain, with some cutting of invasives from underneath. Since too many trees dotting a field can detract from the grassland habitat, some of these trees and shrubs should be removed, particularly the poorly formed ones. Final determination of which trees to remove will be completed in the field and will involve the landscape contractor, Mass Audubon, and the Land Management Committee.

- 1) A sparse stand of black locust, generally less than 3 inches diameter at breast height (dbh) and under 20 feet tall, although a few reach 6” dbh and 25’ in height, and a single tree is up to 12” dbh. Oriental bittersweet grows along the ground underneath these trees and has begun growing up some of them. Staghorn sumac and common buckthorn also grow in this patch, with Celandine common on the ground.
  - This area should be cleared with a brush hog. A few of the larger black locust may require clearing by hand. After brush hogging, the site should be mown to reduce the cover of wild madder (*Galium mollugo*). Wild madder is an herbaceous perennial that can take over meadows if not controlled with mowing. It isn’t listed with the most obnoxious weeds, but its overabundance degrades the habitat quality of the meadow.
- 2) A small stand dominated by a large black oak roughly 18 inches dbh and 30’ tall with a pleasant, spreading canopy. Glossy buckthorn and a few black locust grow around the tree underneath the lowest branches and oriental bittersweet is underneath and starting to reach up into the tree.
  - Brush hog buckthorn, pull down and cut out bittersweet, trim lower dead branches from black oak (for access and aesthetics). Remove 8” dbh black locust nearby.

- 3) A sparse stand of glossy buckthorn on a small bedrock outcrop.
  - This section should be cleared out with a brush hog, paying attention to the presence of bedrock.
- 4) A single large silver maple with dense common and glossy buckthorn, oriental bittersweet, and poison ivy growing underneath.
  - Leave large silver maple, but brush hog vegetation underneath, pull bittersweet vines down from tree. Remove the few small white ashes too.
- 5) A section of 40 or so small trees including white ash, glossy buckthorn, ~20 apple or cherry trees and one larger white ash. This larger white ash is multi-stemmed, poorly formed, and not in good health. A single patch of Japanese knotweed has established in this section.
  - The apple trees are beautiful in flower and are worth keeping for now. In future they might be thinned. All other trees should be removed, including the large white ash, which will likely require a chainsaw.
- 6) This patch extending from the adjacent forest is dominated by staghorn sumac and glossy buckthorn.
  - This stand should be cleared to expand the meadow and control the spread of glossy buckthorn, which will likely require a chainsaw.
- 7) Edge between forest and field fairly dominated by invasives and creeping further into the field. One large mulberry (12" dbh, 25') stands at the north end of this section, surrounded by multiflora rose, buckthorns, staghorn sumac, and oriental bittersweet. A ragged edge of oriental bittersweet, buckthorns, honeysuckle, and multiflora rose continues south to a large bigtooth aspen with an Autumn olive near its base. Other bigtooth aspens along this border are heavily laden with oriental bittersweet vines into the canopy.
  - The mulberry and invasives at the north end should be completely removed. The edge should be pushed back into the forest to remove invasives and expand the meadow. There is a beautiful redbud roughly 50 feet into the forested section, obscured by poorly-formed trees and oriental bittersweet. Should be revealed. Immediate attention should be paid to removing the Autumn olive near large bigtooth aspen; this is the only occurrence of this rapidly spreading species found on the property. Removal of the mulberry and some of the larger trees may require a chainsaw. The bulk of clearing in this area will require a brush mower.
- 8) Further into the forest edge is a Tree-of-heaven and a Norway maple with multiflora rose growing underneath. Oriental bittersweet grows into the crown of a quaking aspen.
  - Although this is getting some distance from the meadow itself, these trees should be removed, especially the Tree-of-heaven, which can rapidly spread along the meadow edge. Area could possibly be addressed as part

of removal of construction debris, etc., from nearby. The trees will require a chainsaw for removal

- 9) A large stand of Japanese knotweed
  - This stand should be a high priority for control. Japanese knotweed is often managed with chemical herbicide carefully applied by hand.
  
- 10) A very large pignut hickory with two smaller ones surrounded by buckthorns, oriental bittersweet and staghorn sumac.
  - Largest pignut hickory, and possibly smaller ones, should stay, but invasives should be removed, with hand tools if a brush hog can't get underneath large tree.
  
- 11) A dense thicket on a short, steep, rocky slope. There are many invasives including black swallowwort, Japanese knotweed, and honeysuckles. A larger white ash growing at the eastern end is not in good form or good health. Two red cedars and the site's only willow grow in the mix. The area directly adjacent was brush hogged in 2005. The vegetation, when viewed from the stones under the Lone Tree, provides some screening of the new townhouses built to the south, but most of the vegetation is actually down the steep bank from this viewing point, and provides no screening.
  - Management of black swallowwort here should be a very high priority. Chemical treatment is the most effective approach. The white ash could be removed and most of the shrubs in this stand could be removed with a brush mower. The red cedars and willow should remain.
  
- 12) A stand of quaking aspens with glossy buckthorn underneath and bittersweet behind.
  - This section should be left as is and monitored for spread of oriental bittersweet into the meadow.
  
- 13) One of the few locations of black swallowwort found on the property.
  - Black swallowwort can rapidly expand and become a very troublesome invasive plant. This section should be regularly mown with a grass mower and monitoring for the spread of black swallowwort. Chemical control may be necessary.
  
- 14) The southern end of this section running along a stone wall includes large trees overhead with mostly glossy buckthorn growing underneath. The northern end has fewer large trees and is dominated by multiflora rose, Japanese barberry, honeysuckle, and oriental bittersweet.
  - The northern end of this section is the area proposed to be controlled as a Boy Scout project. The understory of the entire section could be cleaned out by hand if Scouts are available. The committee expressed concern about potential complications of the Boy Scout work if this area was heavy with poison ivy. There is actually very little if any poison ivy here, so this should not be a problem if basic precautions are taken.

- If the Boy Scouts or other volunteers are unavailable, the northern end should be brush-hogged as close to the wall as possible, and the area should be regularly mown to control resprouting of woody species. Brush-hog should get in underneath larger trees of southern section as much as possible, but large trees should remain.

### **The wetland buffer**

These sections are adjacent to the forested wetland. Any management in these areas should be done after communication with the Conservation Commission regarding activities within the wetland buffer area. Questions include: is this patch within the Conservation Commission jurisdiction? Does the wetland act as a vernal pool? Where are the boundaries of the wetland? What is the applicable 'no activities' buffer? All recommendations for vegetation management are secondary to buffering the wetland. Vegetation management in these areas will only marginally expand the meadow habitat, but will help to reduce the seed source for invasives to re-establish in the meadow. The understory of the adjacent forest stand is dominated by common buckthorn, so complete removal of the seed source is not feasible

- 15) Much of this section, now dominated by pin cherry and black cherry saplings, was already brush hogged in 2005 and the remaining edge needs no further treatment. This section may be best left to regenerate to strengthen the buffer area of the vernal pool. A few cherries were left standing 20-30 feet from the shrubby edge. These should be removed to open up the meadow and to ease access for a mower. The heavy woody debris remaining from the brush-hogging should be reduced with a mower and this section mown regularly as part of the meadow.
- 16) A few pignut hickory and quaking aspen with staghorn sumac and gray dogwood underneath.
  - This stand should be left alone to buffer the wetland.
- 17) This area was cut in November.
  - Some consideration should be given to allowing the edge vegetation to regenerate here, as a buffer to the vernal pool.
- 18) A small stand of cherries with a poorly-formed white ash and common and glossy buckthorn dominating the shrub layer.
  - The buckthorn could be pushed back from the field edge with a brush hog, but the trees should be left.
- 19) A large black locust (5" dbh) with glossy buckthorn, common buckthorn, and multiflora rose underneath.
  - This section should be cleared out with a brush hog.

### **The open meadow**

- 20) This section appears to have drier soil than others and to have been more recently disturbed. Herbaceous vegetation is dominated by ragweed with goldenrod and

grasses are subdominant. Japanese knotweed and oriental bittersweet have crept in from the adjacent forest. A single small quaking aspen stands in the middle of this section and seedlings of quaking and bigtooth aspen are pioneering the section.

- The quaking aspen should be removed (with loppers or hand saw or chain saw) and this section should be mown regularly to favor grasses over ragweed and invasives.

21) This eastern section of the meadow is an attractive meadow dominated by grasses. A few areas are currently covered with woody slash from the 11/05 brush hog operation. The vegetation management in November left approximately 20 trees standing within the meadow; most are pignut hickory, quaking aspen, or pin cherry.

- Too many trees within a meadow detract from its habitat quality. Several of these trees should be removed. The trees to remove should be decided on site by the contractor, Mass Audubon, and members or representatives of the Land Management Committee. The large privet shrub should be removed.

22) The lone tree of Lone Tree Hill. A very nice pignut hickory with a few stones underneath for sitting in the shade.

- Area requires no special management at present but should be monitored for new sprouts and poison ivy.

23) The central section of the meadow is dominated by grasses and only needs to be mown regularly.

24) The north-western section of the meadow is thick with wild madder and needs regular mowing to favor grasses over this moderately invasive non-native herbaceous plant.

### **Adjacent shrubland**

25) This large section northwest of the meadow is excellent shrubland habitat and should be left as is. Invasives management here, focusing on control of glossy buckthorn, would be beneficial, but would involve mowing back to meadow stage and allowing to revert again to shrubland. The invasive species would likely come to dominate again after mowing. The best approach here may be to allow this patch to grow undisturbed for now.

### **Heart-Shaped Field**

This meadow is generally in good shape after some clearing completed in November, 2005. The field could be left alone but for mowing to reduce coarse debris and limit resprouting. A more aggressive approach would include additional clearing on the

western bound, to maintain and enhance the view of stone wall, to remove poorly-formed and non-native trees (black locust and mulberry), and to clear out the unsightly oriental bittersweet vines which were cut near the ground in 2005. This meadow is adjacent to a wetland at the southwest, and the southwest corner of the meadow shows some wetland characteristics. Activities in this corner should be limited, or planned in consultation with the Conservation Commission. The following comments are keyed to the management units numbered in Figure 3.

- 1) A stone wall runs the length of this end of the field, southwest to northeast. Pignut hickories, white ashes, and black locust trees grow along the wall and a short distance from the wall out into the meadow. Poison ivy is rather common along the base of the wall, and oriental bittersweet grows on the ground and formerly grew into the trees. Vegetation management in November 2005 removed many lower shrubs and revealed the very attractive wall somewhat. The 11/05 operation cut most of the bittersweet stems, but left them dangling 8 feet above the ground. Many of the trees are heavily laden with bittersweet vines, now dead, but still unsightly.
  - The ground in front of the stone wall should be kept clear of woody plants by mowing. A few more of the trees growing alongside the wall might be removed, particularly the white ashes. Oriental bittersweet vines should be pulled down from the trees that remain.
- 2) A thick stand of glossy buckthorn and oriental bittersweet.
  - This clump of shrubs should be cleared out with a brush hog and then mown as part of the meadow.
- 3) This is another stand dominated by glossy buckthorn in the shrub layer.
  - Buckthorn should be removed underneath larger trees.
- 4) The southwest corner of the meadow is adjacent to a forested wetland and has some plants that indicate higher soil moisture including jack-in-the-pulpit, jewelweed, and sensitive fern. Conservation Commission staff should be consulted regarding the classification of this wetland, its boundary, and requirements for buffering the wetland.
- 5) A single mulberry tree stands alone in the meadow.
  - This tree should be removed using a chain saw
- 6) A single black locust tree stands alone in the meadow, heavy with bittersweet.
  - This tree should be removed. Poorly formed pignut hickories growing away from the wall could be removed as well (with chainsaw).

### **Barn Meadow**

A pleasant, small meadow dominated by little bluestem and other grasses, with mosses and a few wildflower species. Effort should focus on thinning areas of woody shrubs and

removing invasive species. Ongoing maintenance includes mowing open areas annually or every second year. Comments keyed to management units numbered in Figure 4.

- 1) A few staghorn sumac grow along the property bound adjacent to the road and the Rock Meadow driveway.
  - It would be nice to clear these out to maintain the view into the meadow from the road.
  
- 2) A very large, old common buckthorn, quite a specimen. Honeysuckles grow underneath and a red cedar grows in tight to the buckthorn. A few small cherry trees grow nearby.
  - The buckthorn isn't unattractive, but is a seed source and should be removed, together with the honeysuckle, by a brush hog. If possible, the red cedar could stay, but it is growing in close contact to the buckthorn and may need to come down. The cherries could stay if possible.
  
- 3) A large black cherry with Norway maple black cherry, staghorn sumac, and buckthorns underneath.
  - The large black cherry should stay. The Norway maples, buckthorns, and sumacs should be cleared out with a brush hog. The small cherries could be removed, or could stay if possible.
  
- 4) A large black oak with glossy buckthorn, oriental bittersweet, and staghorn sumac underneath.
  - The black oak should stay. The smaller woody vegetation should be removed with a brush hog.
  
- 5) A steep bank with glossy buckthorn thick in the shrub layer and various tree species overhead.
  - This area may be best left untouched due to the steep bank. If possible, the buckthorn could be thinned underneath using a brush hog.
  
- 6) This very thick tangle is best left untouched.
  
- 7) A very large cottonwood with honeysuckle, oriental bittersweet, and glossy buckthorn underneath.
  - The smaller vegetation should be cleared with brush hog.
  
- 8) A line of black cherries, red cedar, and black oak with glossy buckthorn underneath. The ground is rocky underneath
  - Buckthorn should be cleared out with a brush hog.
  
- 9) The house site. A variety of invasives and poorly formed shrubs grows around the house.
  - After removal of the house, all vegetation within the fence should be removed. It would be nice to retain the one large white cedar (*arborvitae*) at the southeast if possible.

- 10) A classical line of old sugar maples with glossy buckthorn and a few other shrubs growing very sparsely underneath.
  - An arborist should be hired to remove the worst of the sugar maples, a few of which are dead or nearly dead. The shrubs should be removed to maintain a sightline into the meadow from the road. The healthy sugar maples should remain untouched.
- 11) Could keep red cedar in middle of field.

## **Specific Management Steps and Timeline**

### **Shrub clearing**

The following areas should be cleared with a brush mower capable of handling vegetation up to 4 inches in diameter:

Great Field – sections 1,2,3,4,5,6,7,10,11,14, 18, 19 (1.8 acres).

Heart-Shaped Field – sections 2,3 (0.2 acres).

Barn Meadow – 1, 3,4,7,8,9 (0.4 acres).

### **Tree clearing**

Larger trees should be removed from the following sections. Stem diameters (dbh) are approximate.

Great Field – sections 1 (3 6” black locust, a 12” black locust), 2 (8” black locust), 4 (3 6” white ash), 5 (6” white ash), 7 (12” mulberry), 11 (8” white ash), 21 (many).

Heart-Shaped Field – 1 (10” white ashes), 5 (8” mulberry), 6 (8” black locust).

Barn Meadow – 2 (8” common buckthorn), 10 (one or two large, dead sugar maples).

### **Invasives Management**

Invasives currently found in the meadow will be controlled by repeated mowing over the long term. Periodic review of the site should pay attention to the growth of woody vegetation around the edges, and mowing should be targeted to prevent shrubby species from re-colonizing the edges of the fields and re-establishing on the ground surrounding trees left in the fields. Glossy and common buckthorn, Japanese knotweed, oriental bittersweet, Autumn olive, and black locust will all be controlled by annual mowing.

Specific attention should be paid to the control of black swallowwort, which has established at two locations in the Great Field (units 11 and 13 on Figure 2), and to the reduction of wild madder in the west end of the Great Field. Black swallowwort is frequently best controlled with the targeted use of chemical herbicides. The vegetation management contractor hired for the work should ideally have experience managing black swallowwort. Wild madder, currently comprising up to 50% cover in patches of the Great Field, will be reduced with regular mowing. This section of the field calls for more frequent mowing, or mowing with a lower blade, over the first few years of management, to reduce the population of this mildly invasive species.

### **Grassland Restoration**

Sections of the fields with very little grass regeneration after shrub clearing should be seeded with a native grass restoration mix. New England Wetland Plants is a potential source of native grass seeds for this restoration. Their Native Warm Season Grass mix would be a good candidate for this site.

### **Mowing**

After land clearing, all of the open meadow sections of the three fields should be mown annually for five years to suppress woody stump sprouts, to reduce the cover of wild madder in the Great Field, to hasten the breakdown of slash from the clearing operation,

and to favor grasses over wind-dispersed weedy species such as ragweed. Mowing should be conducted after August 1<sup>st</sup>.

### **Equipment**

An operator with a brush mower could do the bulk of the clearing work recommended, although a chainsaw may be required for a few of the larger trees. Common equipment used for this type of work include rotary deck mowers and flail mowers. Deck mowers act like the familiar lawn mower, cutting with a rotating metal blade. Lighter equipment such as a Brush Hog brand mower can handle woody vegetation up to 4 inches in diameter. The brush hog-type attachment is dragged behind a tractor with a set height up to 12 inches. A heavy duty rotary mower, such as the Davco mower, is a sturdier spinning disk attached to a tracked vehicle or articulating arm, so that it can reach up into higher vegetation. The Davco can also handle vegetation up to 4 inches in diameter.

Another type of clearing equipment is a spinning drum, or flail-type, mower, such as the Fecon mower. These toothed cutters, usually attached to an articulating arm, act more like wood-chippers and can grind larger diameter stems from the top down. The Fecon-type will also reduce vegetation to smaller wood chips instead of stringy slash resulting from most rotary mowers. A third approach to clearing is the Brush Brute, a toothed rake mounted on the front of a tractor, which is used to pull small-diameter vegetation straight out of the ground, roots and all. The Brush Brute would reduce or eliminate small stumps left from the clearing and would reduce stump sprouting. Any of these types of equipment would be effective for the clearing recommended at the McLean Open Space as long as mowing is used to reduce stump sprouting and maintain the meadows as grasslands in the years following brush clearing. Each type of equipment would involve mild soil disturbance as the machinery moves about the site. If planned to avoid wet periods, soil disturbance should be minimal.

### **Timing**

The clearing recommended here involves conversion of shrubby areas to meadow, with the meadow conditions maintained over the long-term by frequent mowing. Management of shrubby areas, such as power lines, is usually done in the Spring, after leaf-out, when plants have translocated nutrients from their roots into new growth. At this point, energy reserves in the roots are low, so the woody plants will take longer to resprout. Since the McLean Open Space meadows will be managed as fields, with mowing to control re-sprouting woody plants, the seasonal timing of the brush clearing is not critical. If equipment is on-site as part of the cemetery or projects, the work could proceed in early Summer. In the interest of limiting disturbance to birds that will already be nesting in the vegetation to be cleared, activities might be postponed until late Summer or Fall.

Long-term maintenance of the meadows will require a tractor-mounted deck mower made for cutting high grass, not necessarily as robust as a brush hog deck mower. Long-term, mowing should take place after August 1<sup>st</sup>. Regular annual mowing will over time favor grasses and flowering herbaceous species over woody species. If mown annually, the meadow would be expected to equilibrate as a wildflower meadow within 3-5 years.

## Potential Contractors

The following landscape contractors offer a range of land clearing and invasives management services. Information on equipment and rates are attached.

Contractor	Information
Chris Polatin Polatin Ecological Services PO Box 913 Montague, Massachusetts 01351 413 262 9102 413-659-0292 (fax)	PES provides land clearing and invasives management with a special focus on the needs of conservation land managers. They use a Brown deck mower for land clearing Rates: Mower & operator = \$60/hr. Licensed herbicide applicator = \$40/hr.
Jeff Taylor Vegetation Control Service, Inc. 2342 Main Street Athol , MA 01331 (978) 249-5348	VCS has completed habitat restoration projects for the MassWildlife Upland Habitat program. They use a Davco rotary mower for land clearing. Rates Land clearing = \$160/hr.
Letourneau Products Manufacturing Corp. Mark Letourneau President/Director of Operations 200 Chace Road Freetown, MA 02717 508-763-9737	Mark Letourneau completed the initial field clearing work in 2005. Land clearing = \$1,500/day
R. J. Cobb Land Clearing, Inc. 174 Maple St Bellingham, MA 02019 508-966-516	Cobb uses a Fecon mower to reduce woody material to fine woodchips Rates Land clearing = \$1,500/day

None of these contractors was able to provide on-site estimates within the timeline of this report, however work would not be expected to require more than two days. The daily rates above include mobilization. Including the Barn Meadow site may incur additional mobilization fees as equipment will need to be loaded and transported from the other meadows. Chipping remnants can be left to decompose on-site. Large wood sections from tree removal should at least be moved to the meadow edge so they do not interfere with future mowing.

## Conclusion

The land clearing completed in November 2005 went a long way to restoring the Great Field to grassland habitat and reclaimed an important section of the Heart-Shaped Field. Additional clearing and a long-term management of these fields with mowing will create an attractive open area with views to the distance, pleasant walking paths, and fine habitat for the suite of species that make use of small grasslands.

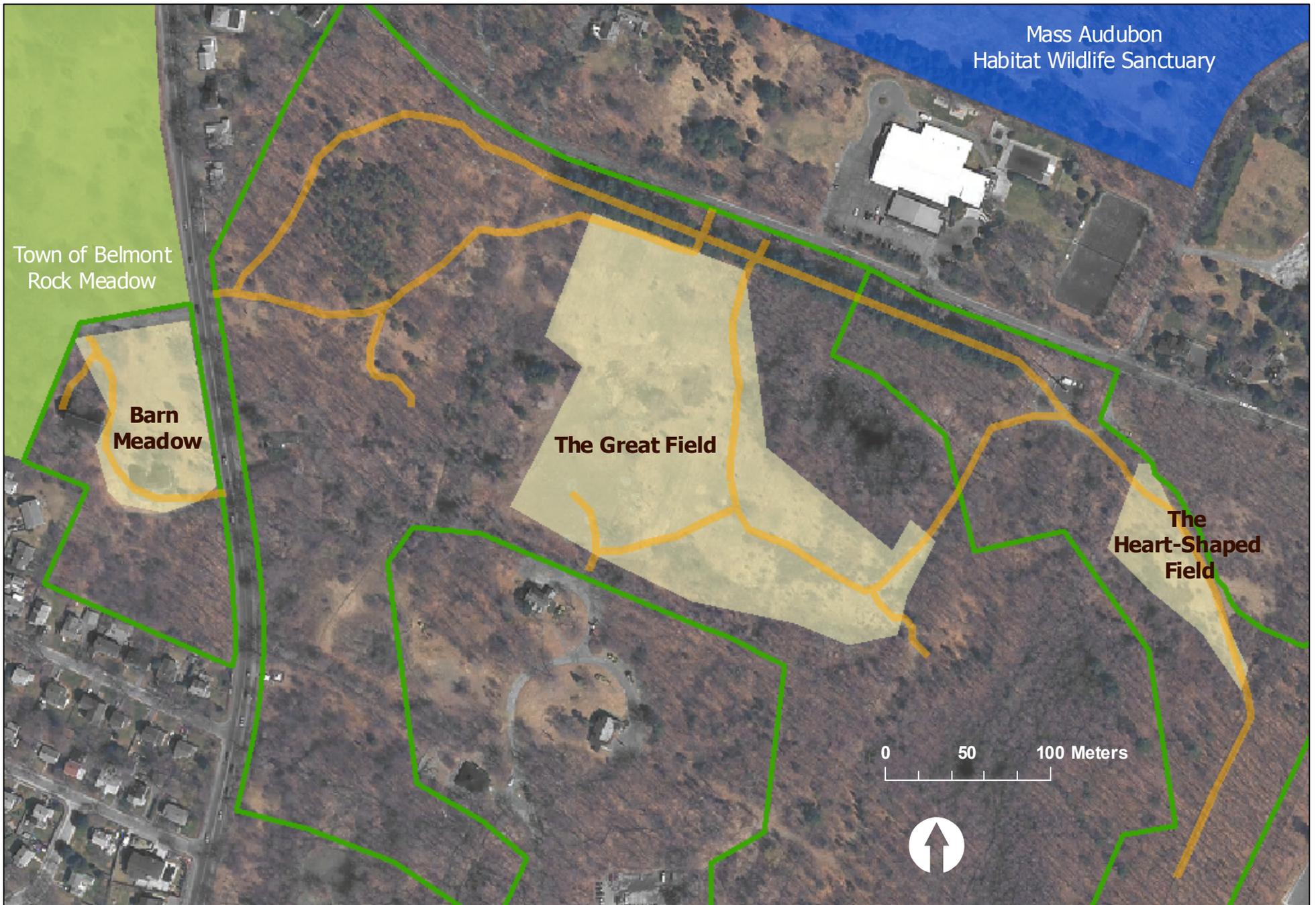


Figure 1. McLean Hospital Open Space -- Landscape Context

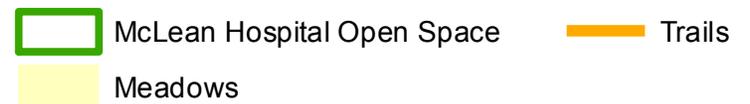




Figure 2. Great Field Management Units.



Vernal pool extent is estimated from 2005 MassGIS aerial photo.



Figure 3. Barn Meadow Management Units.

2005 MassGIS aerial photo.



0 50 Meters





Figure 4. Heart-Shaped Field Management Units.

2005 MassGIS aerial photo.

