

Town of Sudbury

<http://www.sudbury.ma.us>

November 20, 2009

The Town of Sudbury is pleased to release the *Comprehensive Four-Season Wildlife Habitat Evaluation* prepared by Call of the Wild Consulting (COTW), dated March 2009 with addendum dated May 27, 2009 and second addendum dated June 10, 2009.

Please note that the recommendations in Sections 1 and 3 of COTW's report state that there are no satisfactory mitigation alternatives for the impacts to wildlife described in these sections. Although COTW's observations and findings may indicate that there is sensitive wildlife habitat in these areas, we feel that the resulting recommendations exceed the scope of the project. COTW did not fully explore all plausible alternatives and therefore, cannot make specific recommendations on trail rerouting where the alternative routes have not been duly evaluated.

Debbie Dineen, Conservation Coordinator
Jody Kablack, Director of Planning and Community Development
I. William Place, Director of Public Works

Kablack, Jody

Subject: FW: Wildlife Study

From: Dineen, Deborah

Sent: Tuesday, May 26, 2009 1:34 PM

To: 'Diane Boretos'

Cc: Kablack, Jody; Place, Bill; Golden, Patricia; Sklenak, John

Subject:

Hi Diane,

I read with much interest your Wildlife Habitat Evaluation. It was very thorough and you evidently spent a great deal of time on the r.o.w. How exciting to have bobcats in Town in 3 of the 4 seasons!

I have a few additional questions:

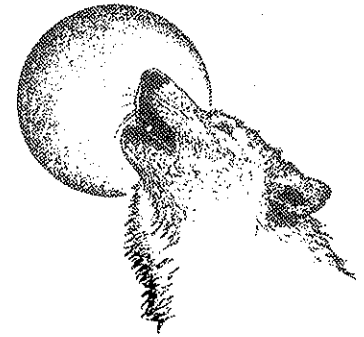
1. Are there any particular seasonal wildlife concerns?
2. Of the noted fauna, which species are dependent on the r.o.w. for life functions? Please cite scientific studies
3. Based on your knowledge, are there any areas you recommend for trail head or parking areas that would be least disruptive to wildlife?
4. I know this may be difficult to answer not knowing the type of contaminant, but do you feel the wildlife could be negatively impacted through the release of potential contaminants along the r.o.w. during construction? There is likely to be arsenic, coal ash, ????
5. Although you discuss NHESP areas, it would be useful to discuss the Priority & Estimated Habitat Areas and possible show them overlaid on the maps.

Feel free to call me if you have any questions.

Debbie

*Deborah Dineen
Sudbury Conservation Coordinator
275 Old Sudbury Road
Sudbury MA 01776
978-443-2209 x1370
978-443-6128 (fax)*

Call of the Wild Consulting and Environmental Services



May 27, 2009

Deborah Dineen, Conservation Agent
275 Old Lancaster Road
Sudbury, MA 01776

Re: Addendum to the Bruce Freeman Rail Trail Wildlife Habitat Evaluation

Dear Ms. Dineen:

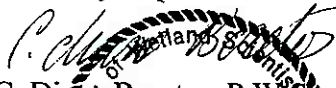
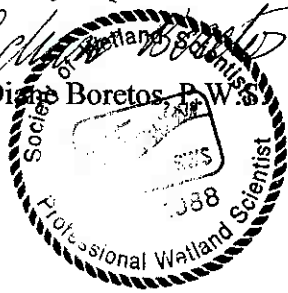
The following is in response to your questions.

1. The sensitive seasons for most wildlife is the breeding and rearing period, May through August for birds, and February to June for a lot of the mid to higher trophic mammals (Knight and Cole 1995). A lot of activity by breeding bird species occurs at almost all of the riverine crossing associated with the Bruce Freeman Rail Trail. My recommendation to minimize the human disturbance impacts in these breeding/rearing areas is to discourage stops at these locations with the placement of seating structures. Interpretive signage describing the human disturbance factor can be erected just outside these areas. This signage can identify the sensitive time period for certain species there, e.g. passerine birds, river otter, and the impact of human noise and stopping at these locations can have on the wildlife. Closing the R.O.W. during these periods is also an option. Dogs should be leashed at all times year round.
2. Call of the Wild documented the use of the R.O.W. by meadow vole *Microtus pennsylvanicus*, and eastern chipmunk *Tamias striatus*. Burrows of these species were observed in all sections. R.O.W. can create small edge effect habitat for species such as these. In addition, the R.O.W. is a conduit for wild canines and bobcat as a travel corridor. The use of R.O.W. and highways for travel and as habitat has been studied in the West and Canada (Foreman 1986, White 2007, Oetting and Cassel, 1971, Getz et al 1978).
3. The Davis Farm parking area could be expanded to handle additional parking for sections 4 and 5. There is adequate parking for section 2 at the soccer field off of Route 27, but signage to identify the field entrance is needed. The area south of Station Road could be made into parking for section 1 if the BFRT is not rerouted. These recommendations are not based on transportation engineering sight distance data.

4. Call of the Wild is not qualified to answer the question regarding the potential contaminants in the BFRT R.O.W. This is a complex issue. This issue should be addressed by the trail designers and/or contractors. I have enclosed a copy of the Department of Environmental Protection's *Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails* for your information.
5. NHESP areas overlays are being put on applicable section maps and will be mailed under separate cover.

Please feel free to call if you have any questions.

Sincerely,


C. Diego Boretos, P.W.S.


References

- Foreman, R.T., and Gordon, M., Landscape Ecology, 1986. Wiley and Sons, New York. 619.
- Getz, L.L., F.R. Cole, and D.L. Gates. 1978. Interstate roadsides as dispersal routes for *Microtus pennsylvanicus*. J. Mammal. 59:208-212.
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- Planning Trails with Wildlife in Mind. 1998. Trails and Wildlife Task Force. Colorado Department of Natural Resources.
- White, P.A., 2007. Getting up to Speed: A Conservation's Guide to Wildlife and Highways. Defenders of Wildlife, Washington, D.C. pp.136-196.



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Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails

This document summarizes **Best Management Practices (“BMPs”)** that should be considered before, during, and after former railroad lines are converted to recreation trails. These BMPs have been developed to eliminate or minimize potential exposures to residual oil or hazardous materials commonly found along railroad rights-of-way being converted to rail trails. This document also identifies locations and conditions for which the application of BMPs alone may not be sufficiently protective of public health and the environment.

These BMPs have been developed specifically for situations where a municipality has acquired a property interest in a rail corridor from the Massachusetts Bay Transportation Authority (MBTA) in order to convert the corridor to a rail trail¹. This fact sheet is relevant to municipalities: (1) with specific knowledge of a release of oil or hazardous materials through testing or other means and/or (2) without specific knowledge of a release, that seek to prevent the exposure of persons to oil or hazardous materials that may be present in such corridor until a responsible person conducts response action under MGL Chapter 21E.

Background Information

The waxing and waning of railroad activity in Massachusetts over the past century has left the Commonwealth a legacy of under-utilized rights-of-way that may be redeveloped for new rail service (such as the Amtrak Downeaster and the Greenbush line) or recreational trails (such as the Minuteman Trail or the Mass Central Rail-Trail).

When active, these railroad lines were important transportation corridors serving the citizens and industries of Massachusetts. Now many communities are actively seeking to convert former railroad lines to create new links – trails that link:

- commuter's homes to workplaces;
- children's schools to the playgrounds;
- tourists' curiosity to the region's history; and

¹ More specifically, only for those situations addressed under Chapter 46 of the Acts of 2003

- communities to their neighbors.

Kablack, Jody

From: Kablack, Jody
Sent: Wednesday, June 10, 2009 11:12 AM
To: Diane Boretos
Cc: Dineen, Deborah; Valente, Maureen
Subject: Final Report

Diane,

Thank you for providing answers to Debbie's comments. I also have a few issues that I believe need further discussion, and which were included as required elements of the RFP awarded to Call of the Wild. Please provide additional responses to the following:

1. Evaluate the long term effects of trail activities (use of the trail) versus short term (construction) on particularly sensitive species.
2. Evaluate trail distance effects
3. Evaluate edge effects
4. Evaluate habitat fragmentation - where it will occur, which species will be affected, how to avoid it
5. Identify the type and intensity of projected human activity anticipated from the proposed trail use, including time and year and time of day
6. Identify any species documented along the ROW that are endangered

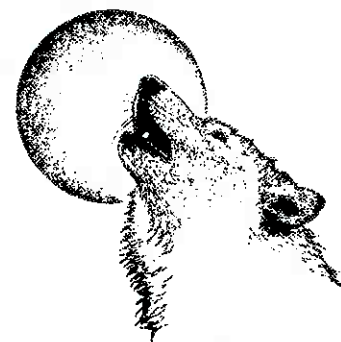
The final report does discuss some of these issues to some extent, but not being a biologist I found it difficult to extrapolate the answers to these questions in the context they were given. Please answer these questions specifically as it relates to the entire ROW, or specify which section(s) they are relevant to.

I have received your final invoice, and will process the payment once we work out these final details. Thanks.

Jody Kablack, Director of Planning and Community Development
278 Old Sudbury Road
Sudbury, MA 01776
(978)639-3387
(978)443-0756 fax

Call of the Wild

Consulting and Environmental Services



June 10, 2009

Jody Kablack, Director of Planning and Community Development
278 Old Sudbury Road
Sudbury, MA 01776

RE: Second Addendum to Bruce Freeman Rail Trail Wildlife Habitat Evaluation

Dear Ms. Kablack:

The following is in response to your e-mailed questions of June 10th.

1. There are numerous long and short term impacts associated with the proposed trail on the R.O.W. The long term impact is the actual loss of small mammal habitat in the R.O.W. itself. The Final Report points out that there are eastern chipmunk *Tamias striatus* and meadow voles *Microtus pennsylvanicus* living in the R.O.W. (p.8) in Section 1. At the Dudley/Hop Brook area the *Carex pennsylvanica* sedge adjacent to the R.O.W. would be lost. The seeds of this plant is a significant food source for the meadow voles and a number of sparrows. The trail would facilitate increased predation on ground nesting birds such as ruffed grouse and bobwhite and small mammals (voles, mice, chipmunks) by domestic cats and dogs all along the BFRT proposed route.

Sensitive Species: In Section 1, the trail would permanently displace the denning activities of muskrat *Ondatra zibethicus*, mink *Mustela vison*, river otter *Lontra canadensis*, nesting and feeding habitat of birds in the shrub wetlands on the west side of the R.O.W. at Dudley Brook. In Section 3, the trail would permanently displace owl nesting activities and denning by fisher *Martes pennanti* in the hemlock stand (p.12). In addition, the human disturbance factor associated with the use of the trail may alter the corridor function of the R.O.W. by sensitive species such as bobcat *Lynx rufus* and long-tailed weasel.

Short term impacts depend on the season when construction occurs. Almost all the wildlife species that are living near the R.O.W. will be more sensitive during the breeding/rearing season. For wild canines and mustelids that can be from February to June. For bird species except owls, this is from April to late July. Construction should be done in late summer or fall. All silt fencing should be removed as soon as disturbed soils are stabilized in order to minimize their effect as barriers on small mammals, amphibians and reptiles. Openings should be

created in the silt fencing near wetlands, at identified wildlife crossings, and at potential autumnal vernal pools.

- 2.& 3. Evaluating trail distance effects is a difficult question to answer precisely. In Sections 1 and 3 where the R.O.W. crosses Dudley/Hop and Pantry Brooks, the human disturbance factor will be large because of the open water and sensitive species like the mustelids mentioned above, great blue heron *Ardea herodias*, spotted sandpiper *Acitis macularia*, and bobcat. The impact from humans (with dogs) on the trail in these areas may be up to 600 feet from the R.O.W. Vegetative changes to the areas adjacent to the R.O.W. will result from the removal of the existing canopy, particularly on the east side, changes in run-off patterns, increase in adjacent ground level temperatures from hard top. The east side may see plants, native and/or exotic, that need more sun come in over time. Keeping out exotic plant species in the disturbed soil associated with the R.O.W. may be a difficult task particularly near the open water areas. Some loss of biological plant diversity will result from trail project. This is an existing trail, albeit grown over in many sections. It may provide some "edge" habitat for generalist wildlife such as robins, crows, and cottontails but not significantly.
4. I do not see how the trail would, if properly designed along its shoulders, impede organisms such as turtles and salamanders from traversing across it. The human disturbance factor may fragment the availability of habitat on either side of the R.O.W. to the sensitive species (mustelids, bobcat, great blue heron, etc) who may abandon the area all together. Its more of a habitat loss issue. Call of the Wild recommendations made in the Final Report is to reroute the BFRT from Sections 1 and 3 to avoid the loss of the valuable habitat in those two sections.
5. Bike paths are used by humans year round in New England. Biking, jogging, walking, dog walking, roller-skating and cross country skiing are common recreational activities that occur on bike paths. Spring through fall would be peak usage seasons and 8am to 6 pm peak daily use. The BFRT is part of a regional bike trail system so there may additional numbers of users travelling by bike to and from other communities north and south of Sudbury.
6. Call of the Wild field investigated the area identified by MNHESP for the blue spotted salamander *Ambystoma laterale*, but none were located. We also investigated areas within 200 feet of the R.O.W. that appeared to be potential vernal pools. As reported in the Spring Report some vernal pool species were found. However, the pools did not qualify for certification. No new endangered species were found during the field visits.

Please call if you have any questions.

Sincerely,

C. Diane Boretos,



**Comprehensive Four-Season Wildlife Habitat Evaluation
Phase II Bruce Freeman Rail Trail Project
Sudbury, Massachusetts**



**Prepared for
Sudbury Conservation Commission**

**Prepared by
Call of the Wild Consulting
March 2009**

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Executive Summary

Call of the Wild Consulting and Environmental Services was contracted by the Town of Sudbury to conduct a four season wildlife habitat evaluation for the proposed Bruce Freeman Rail Trail project; located on 4.1 miles of the abandoned Old Colony Railroad Company Right-of-Way (ROW) in Sudbury, Massachusetts. Field surveys were conducted monthly from November 2007 to December 2008 along and adjacent to the rail roadbed. Field surveys included the documentation of wildlife species, significant wildlife habitat features, vernal pools, rare species in areas identified by Massachusetts Natural Heritage and Endangered Species Program (MNHESP) and the adjacent vegetative communities. Seasonal (Winter 2008 to Fall 2008) field survey reports were submitted at the end of each timeframe to the Sudbury Conservation Commission.

The proposed Bruce Freeman Rail Trail project would transect a number of very significant wildlife habitat areas in Sudbury. Most of the abandoned ROW is used as a north/south wildlife corridor for wild canines, mustelids, white-tailed deer and bobcat. The results of the field surveys and recommendations are described in this report. Attached are ortho-photographs, which have the significant wildlife habitat features sited on them.

Sections 1 and 3 are of regional ecological importance due to the quality, community diversity, juxtaposition in the landscape and connectivity to significant riverine systems. In order to protect the high value wildlife habitat in these two sections Call of the Wild Consulting recommends re-routing the proposed Bruce Freeman Rail Trail to an alternative route. Recommendations for mitigating impacts to wildlife habitat for Sections 2, 4, and 5 are also made.

1.0 INTRODUCTION

A four season wildlife habitat evaluation was conducted and completed by Call of the Wild Consulting from November 2007 to December 2008. The habitat evaluation focused on the 4.1 miles of abandoned Old Colony Railroad Company Right of Way (ROW) in Sudbury, Massachusetts where the Bruce Freeman Rail Trail project has been proposed. The purpose of this wildlife habitat evaluation was twofold: 1) to evaluate the level of impact on wildlife and wildlife habitat within the landscape context; and 2) to identify ways which to avoid impacts from trail construction and use without compromising or degrading the ecological integrity of the natural areas and the biological diversity of these areas.

2.0 METHODOLOGY

2.1 Discovery Phase

Prior to conducting field surveys, Call of the Wild obtained and examined existing biological and ecological data available from the Massachusetts Natural Heritage and Endangered Species Program (MNHESP), the Town of Sudbury, MassGIS maps, the SuAsCo Watershed map for Sudbury for landscape scale reference, and the SuAsCo Biodiversity and Stewardship Plan. In addition, Call of the Wild reviewed the *Bruce Freeman Rail Trail Environmental and Engineering Assessment* prepared by Fay, Spofford & Thorndike for the Town of Sudbury; and *Planning Trails with Wildlife In Mind, 1998 ed.*, by the Trails and Wildlife Task Force, Colorado State Parks.

The 4.1 mile ROW was delineated into five sections for reporting purposes. Call of the Wild submitted four seasonal reports for Winter 2008, Spring 2008, Summer 2008 and Fall 2008. Field surveys were based upon the *DEP Wildlife Habitat Guidance, Appendix B, March 2006* guidelines. The field surveys were conducted monthly to identify the fauna species; their activity (feeding, nesting, breeding); their use of the rail bed and the adjacent area; and finally, the potential impacts of the proposed bike trail. Significant wildlife habitat features have been identified on the aerial photos in the Appendix.

2.2 Field Surveys

Monthly field surveys were conducted on the 4.1 mile ROW from November 2007 to December 2008. Significant wildlife habitat features and track and sign were identified and located in the field on the MassGIS aerial photo field maps [(Sheets 1-12) *Environmental Engineering Assessment*, dated June 12, 2006, prepared by Fay, Spofford & Thorndike.] Terrain that had potential to develop into vernal pools was investigated from March to July. Wetland delineation flagging was accomplished during the Spring 2008 by Atlantic Engineering; some habitat features were identified in relation to wetland flag numbers. Wetland cover types and upland areas were characterized based upon

MNHESP draft Classification of Natural Communities of Massachusetts, July 2000. As stated previously, Call of the Wild submitted four seasonal reports.

Following are the wildlife habitat descriptions, and recommendations, for the five sections of the ROW, resultant of the seasonal field surveys.

3.0 Section 1, MBTA Rail to Route 27

The area adjacent to the ROW within this section is a residential-commercial mix, including a wholesale nursery business. The upland communities surveyed are dominated by various stages of white pine – oak woods. The dominant plant species within the upland woods include white pine (*Pinus strobus*), red oak (*Quercus rubra*), black oak (*Q. velutina*), white oak (*Q. alba*), pignut hickory (*Carya glabra*), and red maple (*Acer rubrum*). The understory density varies from open to fairly dense species of lowbush blueberry (*Vaccinium angustifolium*), huckleberry (*Gaylussacia baccata*), and sheep laurel (*Kalmia angustifolia*).

As described in the Winter 2008 Quarterly Report previously submitted to the Conservation Commission, there are three significant wetland system resources in this section which are providing keystone resources for a diverse range of wildlife. These wetlands are: a shallow emergent marsh north of the MBTA abandoned rail, Dudley/Hop Brook riverine system north of Codjer Lane, and the forested red maple swamp between Old Lancaster Road and Route 27.

Section 1 of the 4.1 ROW, as delineated by Call of the Wild, had year round use as a north/south corridor by wild canines, red fox and coyote.

Significant Wildlife Habitat Features

- Connectivity of the Dudley/Hop Brook to the Assabet and Sudbury Rivers riparian systems makes this a very significant east/west wildlife corridor.
- Diverse vegetative structure associated with Dudley/Hop Brook is comprised of forested swamp, shrub, and mudflats habitat.
- Low-energy riverbank habitat, above and below water, is used by mink (*Mustela vison*), river otter (*Lontra canadensis*), beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) as denning habitat. The dense, overhanging vegetated banks are providing perching and basking opportunities for insectivore birds and the northern water snake (*Nerodia sipedon*).



River Otter Bank Den on Dudley Brook

- Shrub wetlands in Dudley/Hop Brook are providing nesting and feeding habitat for many species of birds such as winter wren (*Troglodytes troglodytes*), cedar waxwings (*Bombycilla cedrorum*), yellow warbler (*Dendroica petechia*), common yellowthroat (*Geothlypis trichas*), and song sparrow (*Melospiza melodia*). It is also providing feeding habitat for the moles and cover for weasels.



Dudley/Hop Brook Shrub Habitat

- Mud flats associated with Dudley/Hop Brook are providing feeding habitat for spotted sandpiper (*Actitis macularia*), woodcock (*Scolopax minor*), and green heron (*Butorides virescens*); and mink adjacent to the ROW.



Mud Flats in Dudley/Hop Brook

- Floodplain forested red maple swamp is providing feeding, nesting, overwintering and corridor functions for many species such as the wood duck (*Aix sponsa*), green heron, red-tailed hawk (*Buteo jamaicensis*), raccoon (*Procyon lotor*), beaver, mink, river otter, coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), northern water snake, gray treefrog (*Hyla veriscolor*), northern spring peeper (*Pseudacris c. crucifer*), bullfrog (*Rana catesbeiana*), and snapping turtle (*Chelydra s. serpentina*). There is important landscape scale vertical and horizontal vegetative diversity within this area that provides canopy, shrub and sapling strata, and pit and mound microhabitat, habitat for four-toed salamanders (*Hemidactylium scutatum*)
- Dudley/Hop Brook has mussel beds, stream bed ripple zones and plunge pools adjacent to the ROW. The west side of the ROW is also providing turtle nesting habitat.

Impacts from the Proposed Rail Trail

There are a number of significant impacts to **Section 1** that would result from the proposed rail trail.

1. Man made access ways through natural areas change habitat attributes such as amount of sunlight, humidity, wind currents, and temperature. These alterations change plant species composition on and adjacent to the ROW, potentially creating opportunities for exotic plant species to invade.
2. The zone of influence from the human disturbance factor for sensitive wildlife species in **Section 1** would extend hundreds of feet beyond the ROW itself. Species such as river otter, mink, green heron, and woodcock would be adversely impacted by the project, long term. There would be a significant loss of feeding, nesting, rearing, and denning habitat for these and other sensitive species.
3. The proposed rail trail would provide easy access for domestic cats and dogs that predate ground nesting birds and small mammal populations. The population of the ground nesters such as woodcock, ruffed grouse (*Bonasa umbellus*), and northern bobwhite (*Colinus virginianus*) would be impacted. Meadow voles (*Microtus pennsylvanicus*), eastern chipmunk (*Tamias striatus*) and moles would also be susceptible to domestic pet predation.
4. The project would result in habitat loss on and adjacent to the ROW. An example of this is the high quality meadow vole habitat of *Carex pensylvanica* that is in the ROW at the Dudley/Hop Brook bridge crossing. Meadow voles are an important food source for many species of wildlife including red fox, coyote, bobcat, owls, hawks, long tailed weasel (*Mustela frenata*), and mink.



Meadow Vole Habitat in ROW by Dudley/Hop Brook

5. Erosion during pre- and post-construction of the rail trail near Dudley/Hop Brook is a serious concern because of the steep slopes in this area. Silt fencing or netting would be a wildlife corridor barrier here, at any season.

Recommendation

There are no meaningful mitigation alternatives for the above-described impacts. Therefore, Call of the Wild recommends rerouting the proposed rail trail outside of Section 1 from the MBTA Rail west of Station Avenue to Route 27.

4.0 Section 2, Route 27 to Morse Road

The adjacent uplands in **Section 2** consists of a mature stand of white pines, soccer field, pasture and mixed oak woods with scattered white-pines. The southern end of this section has a shrub thicket with nearby red cedars (*Juniperus virginiana*). Mineway Brook runs through the red maple swamp in the north part of this section. There is a certified vernal pool to the north of the soccer field.

The entire ROW in **Section 2** was used as a north/south corridor by white-tailed deer, red fox, and coyote.

Significant Wildlife Habitat Features

- Eastern cottontail (*Sylvilagus floridanus*) cover and feeding habitat just north of Route 27.
- Potential eastern box turtle (*Terrapene carolina*) nesting habitat on the west side of the ROW adjacent to the soccer field. The large tract of nearby woods is good overwintering habitat.
- Mink and long-tailed weasel habitat in the red maple swamp.
- Ruffed grouse habitat in the upland woods south of the red maple swamp.
- Significant deer, coyote, and red fox corridor crossing the ROW just north of the soccer field. There is also a wild canine scent post at this crossing.
- Soccer field area is potential blue bird nesting habitat.

Impacts from the Proposed Rail Trail

1. Removal of the dense shrub thicket just north of Route 27 during construction will result in loss of eastern cottontail cover and feeding habitat.
2. Increase predation of ground nesting birds such as ruffed grouse and small mammals such as cottontails by domestic cats.
3. Human disturbance to sensitive species utilizing areas in and adjacent to the ROW.

Recommendations

- Reduce the width of clearing for the rail trail in the area of dense cottontail habitat described above.
- Signage requiring all dogs must be leashed.
- The rail trail should have no physical barriers on either side to allow for turtles and salamanders to freely cross the ROW. Gently sloping edges of the hard top, with native grass species substrate on the adjacent shoulders, should be incorporated into the design.
- Remove the shrub sucker growth on the west side of the ROW and stabilize the slope with *Carex pensylvanica* in order to enhance eastern box turtle nesting habitat.



Eastern Box Turtle Enhancement Area by Soccer Field

5.0 Section 3, Morse Road to Haynes Road

A significant portion of **Section 3** is red maple swamp and riverine habitat. The uplands are made up of pasture, fields, white pine and mixed white/red pine stands. The large red maple swamp starts just north of Morse Road and continues north to Ridge Hill Road. There is a hemlock (*Tsuga canadensis*) stand on the east of the ROW northwest of Bishop Lane. The ROW crosses the Pantry Brook riverine wetland system near the northerly end of **Section 3**.

As described previously in the submitted four season reports, **Section 3** provides very significant, diverse and unusual wildlife habitat in the Town of Sudbury--and within the broader landscape scale--because of the large size, structurally diverse forested red maple swamp, fields, hemlock wetland, and the significant Pantry Brook riverine system and its associated floodplain. There are several potential vernal pools near the ROW north of Pantry Brook.

The entire ROW in **Section 3** is used by wild canines, fisher, long-tailed weasel and bobcat as a north/south corridor.

Significant Wildlife Habitat Features

- The large, forested red maple swamp has both community structure and diversity of species which provide cover, feeding, denning, and nesting habitat for species such as mink, fisher, long-tailed weasel, raccoon, moles, masked shrew, owls, and white-tailed deer. There are also intermittent streams with mud flats in this area that are also providing important habitat for invertebrates.



Mud flats and Intermittent Stream in Red Maple Swamp

- The hemlock stand is a rare feature in the southern New England landscape. There is an active fisher den here in a downed log; hemlock woods are preferred denning habitat for this species. There are also several specimen hemlocks in this stand. Owls and pellets were observed in this area throughout the four seasons.



Specimen Hemlock



Entrance to Fisher Den with Scat (arrows) in Hemlock Stand

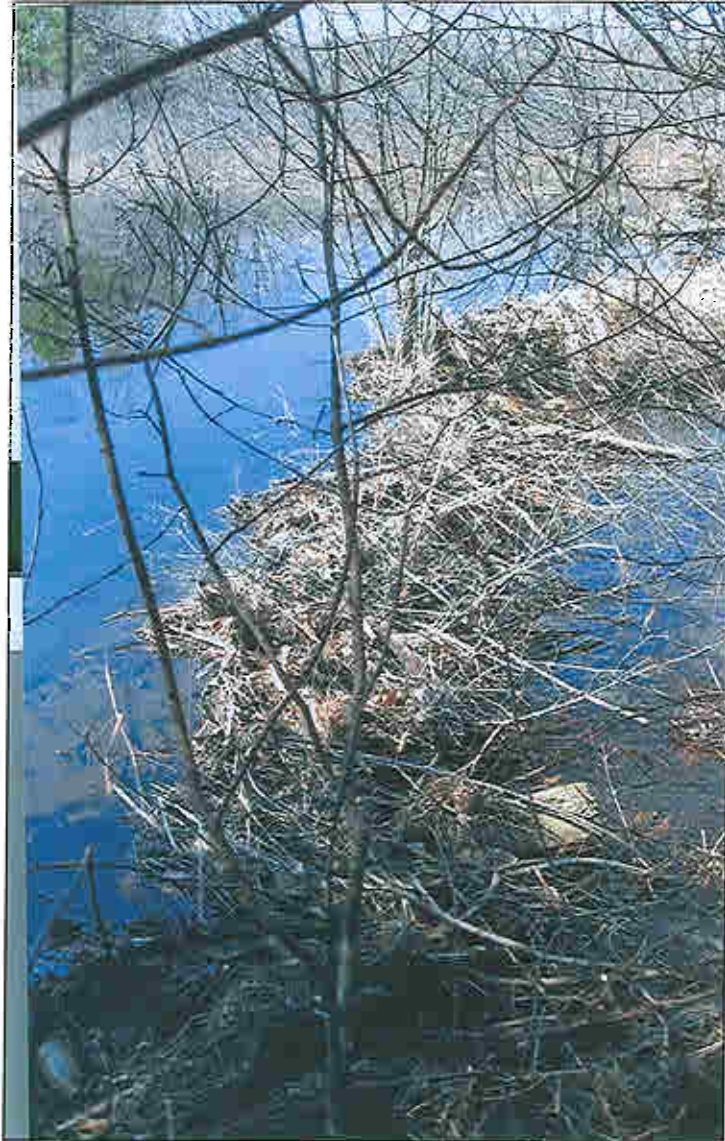
- Pantry Brook is a significant landscape scale northwest/east riparian corridor that connects wildlife to the major riverine Sudbury River system.

- Bobcat are using the wetlands associated with Pantry Brook for feeding habitat.



Bobcat Scat in Section 3 on ROW

- An important keystone species, beaver have built a dam on the west side of Pantry Brook. The dam has created a beaver pond that has enhanced the diverse wetland types associated with Pantry Brook. The pond is providing significant odonate breeding and feeding habitat, as well as waterfowl feeding habitat. Pantry Brook has low-energy riverbanks, shrub swamp, shallow emergent marsh, small river floodplain, and deep pool habitat. This community diversity is of regional significance. Sensitive species such green heron, mink, river otter, bobcat, great horned owl, acipiters, and various waterfowl are utilizing this area.
- There are two, small wetland areas on the west and east side of the ROW by Haynes Road that are potential vernal pools. The one to the west is a wet meadow and the one to the east is a shallow emergent marsh.



Beaver Dam



Accipiter near Pantry Brook

- The white/red pine stand southeast of Pantry Brook has an active red fox den. This area is also providing owl roosting habitat, and white-tailed deer winter yarding habitat.

Impact from the Proposed Rail Trail

As with **Section 1**, there are a number of adverse impacts that would result from the proposed project in **Section 3**.

1. The majority of the ROW in **Section 3** is densely overgrown with shrubs and saplings. The rail trail would significantly change the amount of sunlight, humidity, wind currents, and temperature.
2. There would be a significant impact from the human disturbance factor to the sensitive species that inhabit the entire length of this section. For example, the fisher denning habitat and owl nesting habitat in the hemlock stand would be lost.
3. Predation by domestic animals would increase in this section on ground nesters and small mammal populations.
4. The construction of the project would result in loss of habitat that is currently on and adjacent to the ROW.
5. Erosion and erosion control barriers along steep slopes of the ROW are another major concern in terms of siltation into wetlands, and bank failure along certain areas. The erosion control barriers would also alter corridors that cross this section at numerous points.

Recommendation

As with **Section 1** there are no satisfactory mitigation alternatives for the above-described impacts. Therefore, Call of the Wild recommends rerouting the proposed rail trail outside of **Section 3** from Morse Road to Haynes Road.

6.0 Section 4, Haynes Road to North Road

Section 4 is adjacent to the Davis Farm Conservation Area which has a large white pine woods and agricultural fields. There is a large, forested red maple swamp on both sides of Pantry Road that has several small water courses within it. Several ditches run adjacent to the ROW at the northerly end of **Section 4** that as described in the Spring 08 Quarterly Report had some facultative vernal pool species. The vegetative community on and adjacent to the ROW in the north section, are dense sapling/shrub (buckthorn) habitat. Fisher are using the northerly section of the ROW, as well as the Davis Farm woods. There is also a small, wet meadow area on the north side of Pantry Road that is used by waterfowl and had peepers chorusing in May 08', but dip netting did not result in additional vernal pool species.

Significant Wildlife Habitat Features

- Corridor for fishers from Davis Farm footpath north to North Road
- Invertebrate habitat in the ditch in the ROW
- Forested red maple swamp is large with creek habitat

Impacts from the Proposed Rail Trail

1. Alterations to the invertebrate habitat from construction of the ROW.
2. Human disturbance to waterfowl using the wet meadow north of Pantry Road.

Recommendations

- Minimize removal of vegetative growth by the ditches, which is the basis of the detritus food chain in these microhabitat areas.
- Condition appropriate erosion control along the ditch areas.
- Minimize shrub removal on the west side of the ROW by the wet meadow area to mitigate human disturbance to waterfowl feeding there.

7.0 Section 5, from North Road to Sudbury/Concord Town Line

A large part of **Section 5** is landscaped lawn and clearings. There are several small, man-made ponds on the west side in the middle of this section. These small ponds provide turtle basking habitat along the shoreline. There is also a forested red maple swamp on the west and east sides of the ROW that is providing wildlife habitat for numerous species of songbirds, red tailed hawk, mink, and coyote. The small private pond at the north end is mink, river otter feeding habitat, Canada goose (*Branta canadensis*) and killdeer (*Charadrius vociferus*) nesting habitat, and owl roosting habitat. Wild canines use the entire length of Section 5 for travel. This section is relatively clear of vegetation on the rail bed itself.

Significant Wildlife Habitat Features

- Forested red maple swamp on the west and east side of the ROW; has an unnamed stream that is a riparian connection to the Sudbury riverine system.
- The small private pond is nesting habitat (peninsula) for a number of bird species and feeding habitat for mustelids.
- Large white pine are adjacent to the small pond afford owl nesting habitat.

Impacts from the Proposed Rail Trail

1. Human disturbance to bird nesting habitat on the peninsula in the small pond and the owl nesting habitat.

Recommendations

- Because of the attractive view of the small pond, people will want to access the water here. This is where the river otter scent post is and the owl nest. Plant native low growing shrubs along the shoreline that will discourage access by people and dogs to the pond.

APPENDIX

Many former rail lines were abandoned years ago and appear to be nearly reclaimed by nature. Other lines run parallel to active lines, or reveal rusted rails threading through industrial areas. In some instances adjacent industrial activities, historic loading practices, leaks during material transfers or storage, and repair activities have contaminated soil with oil or hazardous materials. In addition, residual contamination is often found along the length of the line, incidental to the maintenance and use of the railway itself.

Redevelopment of former rail lines to recreational trails can be accomplished in a way that protects public health and the environment. It requires recognizing potential problems and implementing actions to safeguard nearby residents, workers, and trail users throughout the life of the project.

Residual Contamination from Railroad Operations

Some historic railroad operations involved the use of chemicals that may have resulted in presence today of contamination. The most commonly reported contamination along rail lines includes metals, pesticides² (such as lead arsenate), and constituents of oil or fuel (petroleum products). These chemicals have been associated with normal railroad operations and are likely to be found anywhere along the line. For example, it would not be uncommon to find arsenic (up to ten times natural background levels) present in the soil along a right-of-way from old railroad ties dipped in an arsenic solution, arsenic weed-control sprays, and arsenic-laced slag used as railroad bed fill³. Lubricating oil and diesel that dripped from the trains are likely sources of the petroleum product found along the lines. Other sources of contaminants associated with historic railroad operation may include coal ash from engines, creosote from ties, and polynuclear aromatic hydrocarbons ("PAHs") from the diesel exhaust.

The BMPs outlined in this document are specifically designed to be protective of public health and provide a practical alternative to extensively testing for and possibly removing these "typical" residues expected from the historic operation of a rail line⁴.

In some instances, a rail corridor may have been open for a relatively short time, during a period of time or in a region where chemicals were not used by the rail operator. Application of the BMPs would not provide any significant benefit in those instances. In the absence of good historic information, the only sure way to know whether residuals pose a risk to trail users is to collect environmental samples along the corridor. Location-specific sampling results may then be used to modify these measures or obviate the need for their use.

Elevated Contamination from Railroad Operations or Other Sources

Several potential sources of contamination along a rail line may pose significant health and environmental risks worthy of closer examination. These sources include operations at switching and repair yards, railroad accidents involving hazardous cargoes, and releases of chemicals on rail spurs and properties that abut rail lines, but which are unrelated to the railroad operations. The latter two examples may

² The application of pesticides consistent with their labeling is excluded from the definition of a "release" under M.G.L. Chapter 21E.

³ Sampling along the abandoned Greenbush Line in the Fall of 2003, prior to its rehabilitation for commuter rail service, indicates the presence of arsenic concentrations up to 205 mg/kg, with 16% of the results greater than the MCP S-1 soil standard of 30 mg/kg, and 25% greater than the *proposed* standard of 20 mg/kg.

⁴ Consistent with Section 8C of Chapter 46 of the Acts of 2003 (<http://www.state.ma.us/legis/laws/seslaw03/sl030046.htm>), the BMPs described in this document suitably prevent access to the residual oil or hazardous materials expected to be present along a railroad right-of-way.

involve almost any chemical, such as the phosphorus trichloride released in an April 3, 1980, tank car incident in Somerville, or the asbestos released from the Zonolite processing plant in Easthampton. The contamination in rail yards is somewhat more predictable, including petroleum; metals; pesticides and organic compounds emanating from equipment cleaning areas; fueling areas; maintenance and repair activities; and the railroad beds themselves.

An MCP Phase 1⁵ level of investigation, tailored to the nature of the contaminant and source, would be appropriate to address these sources of elevated chemical contamination. A Phase 1 Preliminary Investigation would typically contain sufficient information in the following areas to determine the need for a Response Action or further detailed investigation:

- General Disposal Site Information (description of location and potential receptors in the area);
- Disposal Site Map (description of the property itself, with buildings, drains, and sampling locations noted);
- Disposal Site History (description of ownership, releases, chemical use, management of waste, compliance history);
- Site Hydrogeological Characteristics (description of groundwater flow, borings, wells, and the results of any investigations);
- Nature and Extent of Contamination (description of evidence of releases, laboratory results, thickness of NAPL, approximate location of contamination);
- Migration Pathways and Exposure Potential (description of contamination in air, water, soil, and discussion of potential human and environmental receptors);
- Evaluation for Immediate Response Actions; and
- Conclusions.

The results of such an investigation would be used to determine appropriate measures to implement to eliminate or reduce current and future exposure to the contaminated soils. Such measures could be similar to the BMPs proposed in this guidance, more extensive than these BMPs, or less stringent, depending on the outcome of the investigation.

Identifying Areas of Concern

As described above, locations along rail corridors could exhibit a wide range of chemical contamination, depending on the use of the line and adjacent properties. Trail developers can conduct historic research to categorize segments of a rail corridor by level of concern.

DEP has identified four categories of interest for the purpose of implementing the soil BMPs. Any given rail-trail may be comprised of one or more of these areas.

Residential, undeveloped or rural rights-of-way

These are stretches along a rail line that border historically residential, undeveloped or rural properties. These areas are likely to have been affected only by the normal operation of the rail line, with a residual level of contamination. The BMPs outlined in this document are considered appropriate for these locations, absent evidence of a specific release.

⁵ The general content of a Phase I "Initial Site Investigation Report" is described in the Massachusetts Contingency Plan, 310 CMR 40.0483.

Stations and crossings

These relatively small stretches along a right-of-way would be expected to be associated with contamination elevated over the residual levels, due to more frequent/intense use of pesticides to improve sight lines and greater frequency/intensity of human activities. The BMPs outlined in this document are considered appropriate for these locations, absent evidence of a specific release.

Industrial corridors

Many rail-trails include segments that pass through industrial areas, even the predominantly rural trails of western and central Massachusetts. These stretches have a higher *potential* for contamination within the right-of-way that is unrelated to the historic railroad use. The BMPs outlined in this document may not be sufficiently protective of public health and the environment at these locations. A preliminary review is recommended in order to establish whether site-specific concerns indicate a need for further investigation, including soil testing. Absent a site-specific concern, the BMPs outlined in this document are considered appropriate for these locations.

Switching and Repair Yards

As discussed earlier, switching and repair yards have a greater range of potential contaminants of concern and a higher likelihood that the contaminants are present at significant levels. The BMPs outlined in this document are not considered sufficient by themselves to protect public health and the environment at these locations, absent further investigation.

Figure 1 outlines the decision-making steps trail developers should follow in identifying locations of interest along the corridor they are developing and whether the BMPs apply without the need for further site investigation, including soil testing.

Goals of Best Management Practices

DEP's goals in publishing BMPs for use in developing rail-trails include:

- promoting rail-trail conversions that are both health-protective and cost-effective⁶;
- recognizing the potential presence of oil or hazardous material along the right-of-way;
- recognizing the potential health and environmental risks associated with developing the right-of-way;
- expediting trail development to prevent (or minimize) risk to current users of "beaten paths" along inactive rail corridors;
- preventing (or minimizing) exposures to oil or hazardous material before, during, and after construction of rail-trails; and
- preventing (or minimizing) off-site migration of contaminants before, during, and after the construction of rail-trails.

These BMPs are intended to be applied to those rail corridor segments where residual contamination from historic railroad operations is assumed to be present. Trail developers always have the option to conduct soil testing to rule-out the presence of contamination and tailor soil management practices to actual site conditions.

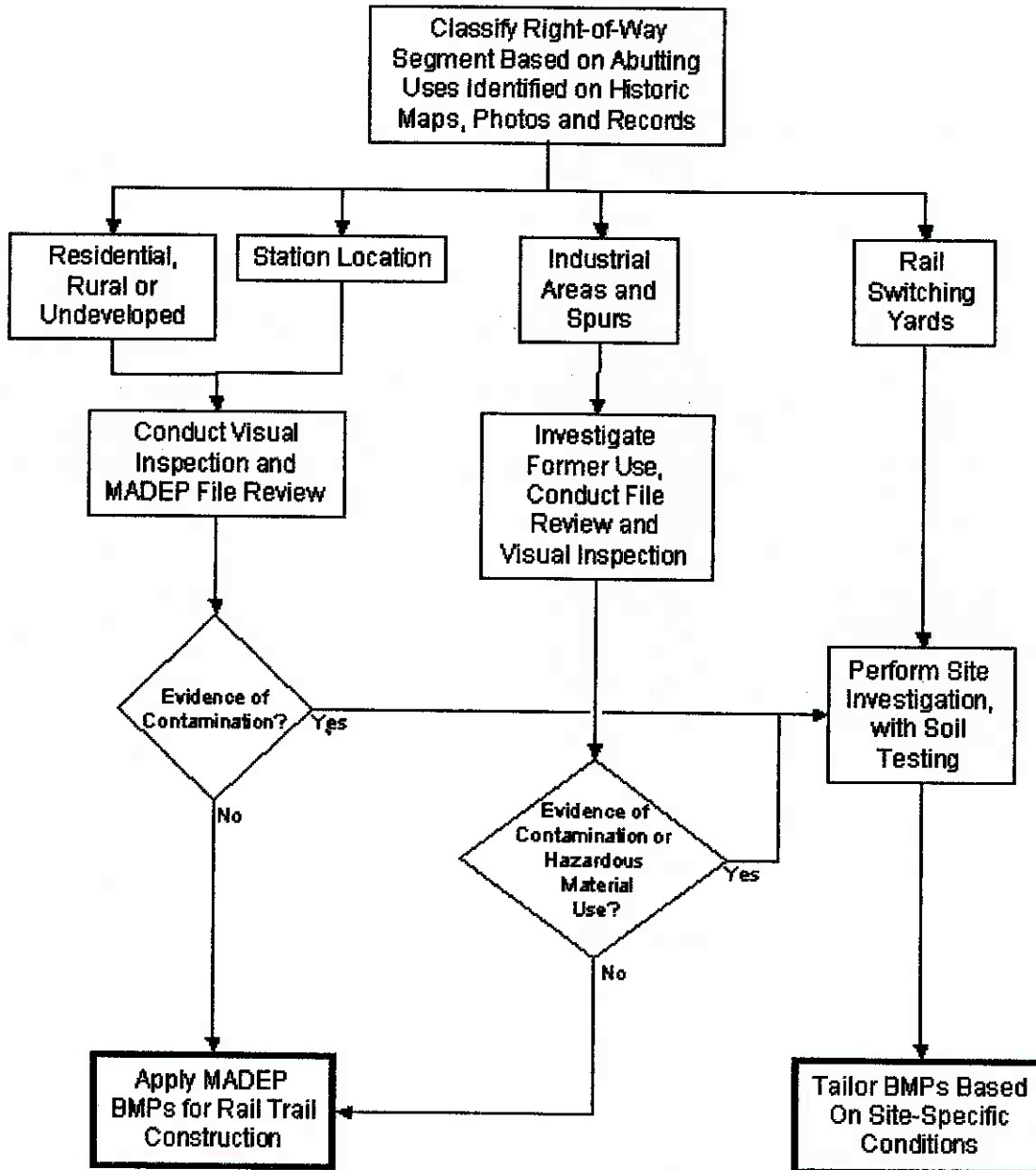
In addition to reducing risk of exposure to contaminants, the focus of this guidance, trails promote public health by encouraging active and healthy lifestyles.

The application of these BMPs to any portion of a rail corridor converted to residential use in conjunction with rail trail development is not appropriate. Only a site-specific investigation, including soil testing, can determine whether conversion to residential use is health protective.

Figure 1

Application of MADEP Best Management Practices at Rail Trail Conversions

(Pursuant to Section 8C of Chapter 48 of the Acts of 2003)



BMP Applicability

These BMPs were developed primarily for residential or rural rights-of-way, and stations and crossings. The BMPs will also be applicable in many industrial corridors, but those locations may need case-by-case review to determine the likelihood of contamination beyond the residual levels assumed here.

DEP does not believe that these BMPs are, by themselves, sufficient and appropriate for use without more extensive site investigation in industrial areas with known or likely non-railroad sources, or in rail yards.

Note that the focus of these BMPs is the potentially contaminated soil along the right-of-way and the human exposures and environmental exposures that may result from improperly managing that soil at or near the surface. This document is not intended to be a summary of all environmental requirements, such as wetlands permitting or Underground Storage Tank (UST) removal that may apply to a project. Municipalities developing rail trails are also obligated to contain the further release or threat of release of oil or hazardous materials from any structure or container within the corridor.

Phases of Project/Exposures of Concern

Rail-trail development occurs in three main phases, or time periods. Each phase has unique exposures that must be considered to identify appropriate BMPs. These phases are pre-construction, construction, and post-construction.

Pre-Construction Phase

The pre-construction phase covers the period up to the time construction actually begins. Depending on project finances and construction sequences, this phase may last several years as communities seek funds to develop a project. Trail design also occurs during the Pre-construction Phase.

While the right-of-way is not a designated rail-trail at this point, a potential may exist for people to be exposed to contaminated soil on or from the right-of-way. Dirt bikers, hikers, or children taking shortcuts, and adjacent residents may receive runoff or dust from the rail bed in its unimproved condition. Many future rail-trails also serve as utility corridors. Workers repairing or installing subsurface utilities (such as sewer lines) may have the highest potential for exposure, albeit short-term.

During trail design, developers should identify which soils will be handled during construction and plan the areas where people will congregate once the trail has been completed.

As the final grades are established, areas for playgrounds identified, and trailheads located, long-term exposures may be created to any contaminated soil remaining along the trail. By following the design guidelines provided below, designers can ensure that any long-term exposures are eliminated or minimized.

If any soil will be excavated from the right-of-way and reused off-site, the potential for exposure should also be considered.

Construction Phase

The construction phase has the potential to create significant exposures to contaminated soil as the old rail line is cleared, the right-of-way is prepared, and the trail is constructed. While construction activities may be sporadic and short-term on any given stretch of the line, the project itself may continue for many months, or even longer than a year.

The receptors of concern during the construction phase include:
demolition workers (clearing the brush; and removing the rails, ties, ballast, and debris);
construction workers (grading and shaping the trail; and creating, moving, and dissipating soil stockpiles);
adjacent residents (inhaling dust generated from the project; exploring the partially-built trail; coming in contact with soil pushed onto their property, etc...); and
environmentally sensitive areas/species.

Post –Construction Phase

After construction, trail managers must monitor activities along the trail corridor to ensure that the steps taken to reduce exposure remain effective. Trail managers should be involved in decisions to excavate material from the trail corridor to ensure that users are protected both during and after such excavation. Workers repairing or installing subsurface utilities (such as sewer lines) may have the highest potential for exposure, albeit short-term. Maintenance activities will be necessary to ensure the integrity of the trail surface, structures and landscaping that help serve to eliminate exposures.

Recommended BMPs

Absent analytical evidence to the contrary, all soil along the right-of-way should be presumed to have at least residual levels of lead, arsenic, and PAHs from historic railroad operations, as described above. The following BMPs should be considered for the pre-construction, construction, and post-construction phases of rail-trail development, as appropriate.

Pre-Construction

1. Conduct a thorough, pre-construction paper review of the right-of-way and adjacent properties.
 - Investigate the rail line history; locate old stations, crossings, spurs, and rail yards. The Valuation Plans and historic aerial photos for the properties abutting the rail line can provide much of this information⁷.
 - Investigate site use and the history of adjacent properties; identify commercial and industrial stretches. The Valuation Plans and Sanborn Insurance maps can provide much of the information for the snapshot in time when they were developed. Local historical societies may have information on leading local industrialists and their local businesses.
 - Review the existing list of known or suspected disposal sites to see if any are located along the right-of-way⁸

⁶Rails-to-Trails Conservancy provides additional guidance in its publication "Acquiring Rail Corridors" p 95-97. (http://www.trailsandgreenways.org/resources/development/acquis/arc_book.asp)

- Inquire with neighbors, fire department personnel or the local historical society for further information on train crashes, accidents, and other incidents that may have released chemicals.⁹
2. Conduct a thorough, visual inspection of the right-of-way, looking for:
 - contaminated soil as evidenced by discoloration, odors, differences in soil properties, pipes, or buried debris;
 - signs of illegal dumping of waste from businesses or industry (not simply household trash);
 - stressed vegetation or "dead zones";
 - areas of soil run-off, both away from the right-of-way and toward the right-of-way;
 - signs of wind erosion sufficient to create a dust inhalation exposure;
 - signs of public use of the existing right-of-way (condoned or trespassing), such as dirt-bike trails, play forts, beverage cans, and fire pits.
 3. Control current (pre-construction) exposures to soil in areas of concern by implementing one or more of the following measures, as indicated by site conditions:
 - install signs to redirect people from areas of concern; or
 - strategically place barriers to control use in the areas of concern; or
 - implement other measures to eliminate contact with soils in areas of concern.

In the event these three measures do not prove successful, trail developers should consider covering areas of exposed soil or planting bushes (such as puckerbrush) to divert people away from areas of concern.

Design Guidelines to Reduce Exposure

While developing the design for the trail, the design engineer or architect should follow these guidelines in order to reduce potential exposures.

1. Within the tread way¹⁰ and in areas designated for recreational use along the trail (such as rest areas, picnic areas, and playgrounds), eliminate contact with potentially contaminated soil by implementing one or more measures, as appropriate:
 - Place potentially contaminated soil under pavement or an equivalent layer of compacted stone dust; or
 - Place potentially contaminated soil under at least 12 inches of clean fill and mark with a geosynthetic barrier immediately above the potentially contaminated soil; or
 - Remove and appropriately dispose of potentially contaminated soil off-site. Replace with clean material (soil, stone dust, wood chips, etc.) to establish the path and maintain grade.

⁷The Massachusetts DEP databases (<http://Mass.Gov/dep/bwsc/sites.htm>) have spills information from the early 1980's and list known and suspected locations of contamination by street address. If evidence exists that an off-site source may have contaminated the right-of-way, further investigation is needed. DEP files may contain sufficient information to determine whether the right-of-way has been affected.

⁸If evidence exists that an incident may have contaminated the right-of-way, further investigation is indicated. DEP files may contain sufficient information to determine the extent of the problem.

⁹The tread way includes any area intended for active use including jogging side paths and equestrian trails

2. Outside of the tread way, control contact with potentially contaminated soil by implementing one or more measures to minimize or eliminate contact with potential residual contamination, including:
 - Design landscaping, including the nature, location, and density of plantings, that channels recreational users of the trail to the tread way, disrupts the creation of informal tread ways (such as single track trails) and directs users away from potentially contaminated soil;
 - Create areas of congregation, such as benches, rest areas, and scenic areas, that draw recreational users of the trail and encourage congregation away from potentially contaminated soil;
 - Install signs informing users of upcoming congregation areas and/or advising users to remain on the path;
 - Stabilize the soil through plantings, grading, or other erosion control measures;
 - Install guardrails, curbing, or fences in areas to encourage users to stay the tread way; or
 - Implement other design features that would minimize or eliminate contact with residual contamination in the soil.
3. The design should identify areas where potentially contaminated soil will be removed and areas within the corridor where such soils can be safely stored temporarily so that the Construction Contractors can re-use as much material on-site as possible.

During Construction

The following BMPs presume the trail construction includes excavation, movement, placement and grading of soil. Trail construction activities that involve no movement of soil may be carried out with the application of standard dust control measures, such as spraying soil with water.

The following guidelines should be followed during construction involving soil grading and excavation and be incorporated into the construction bid documents in order to ensure the proper handling of soils during trail construction:

1. Hire an independent environmental monitor or task existing staff to oversee the Construction Contractor¹¹. The monitor will:
 - Verify that construction-related plans and training are in place before construction begins ;
 - Oversee all excavation,
 - Visually inspect material that will be moved, and
 - Ensure proper management of soil along the right-of-way and the implementation of BMPs.

During construction, the environmental monitor should be present whenever known contaminated soil will be excavated and should inspect construction-related BMPs several times each week.

¹⁰For example, a municipality may enter into an agreement with Mass Highway to manage a trail construction funded with federal transportation appropriations. The agreement should require that the construction contract include provisions requiring the contractor to follow the BMPs and the directions of the independent environmental monitor.

2. Minimize or eliminate exposure of construction workers to potentially contaminated soil.
 - Prepare site-specific soil management and health and safety plans.
 - Have employees and subcontractors complete a safety-training program covering the potential hazards associated with working with contaminated soil likely to be present along a rail line, before excavation work begins.
 - Educate employees and subcontractors in identifying contaminated soil and on handling and disposal procedures for contaminated soil.
 - Hold regular meetings to discuss and reinforce the health and safety procedures.
 - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations. Exercise caution to prevent soil spillage during transport.
3. Minimize or eliminate exposure of adjacent residents and curious trespassers to potentially contaminated soil.
 - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations. Exercise caution to prevent soil spillage during transport.
 - Install temporary signs and/or security fence to surround and secure areas where potentially contaminated soil may pose an Imminent Hazard to human health.
 - Avoid temporary stockpiling of potentially contaminated soils. Take the following precautions stockpiling, as necessary:
 - Identify long-term stockpile locations that are away from residences, schools or playgrounds;
 - Cover the stockpile with plastic sheeting or tarps to prevent dust generation and erosion;
 - Install a berm, hay bales, and/or silt fences around the stockpile to prevent runoff from leaving the area;
 - Do not stockpile in or near storm drains or watercourses; and
 - Clean-up materials should be staged near the storage area.
4. Minimize or eliminate the migration of potentially contaminated soil off-site.
 - Protect gutters, storm drains, catch basins, and other drainage system features on the site with hay bales and/or silt fences during construction. They should be cleaned following the completion of site work.
 - Prevent visible dust during excavation, transportation, and placement operations. Implement dust control measures, such as spraying soil with water, during excavation or grading operations.
 - Exercise caution to prevent soil spillage during transport.
 - Stabilize exposed areas of potentially contaminated soil and prevent run-off.
5. Prevent new leaks and spills and notify DEP, as appropriate, if they occur.
6. Transport and dispose potentially contaminated soil in accordance with the applicable rules and regulations of the United States Department of Transportation (USDOT), the United States Environmental Protection Agency (USEPA), and the Massachusetts Department of Environmental Protection (MADEP) (the specifications for the off-site management of contaminated soil supersede the procedures outlined in this BMP).

Post- Construction

1. Establish a protocol to ensure that future workers performing maintenance or construction within the right-of-way are made aware of the need for appropriate BMPs, including:
 - Posting of signage indicating that a permit from the trail manager is necessary before any excavation of the corridor begins.
 - Sending notice of the existence of such requirement to easement holders and the municipal engineer and/or public works department; and
 - Developing Standard Operating Procedures with local utilities, easement holders, DPWs, and other municipal offices for work in the right-of-way.
2. Establish a procedure for the trail manager to periodically travel the corridor and inspect the integrity of the trail surface, structures and landscaping and require appropriate action to correct any problems observed.

DEP Contact




For further information, please contact Paul Locke in the DEP Bureau of Waste Site Cleanup at (617) 556-1160 or Paul.Locke@state.ma.us.

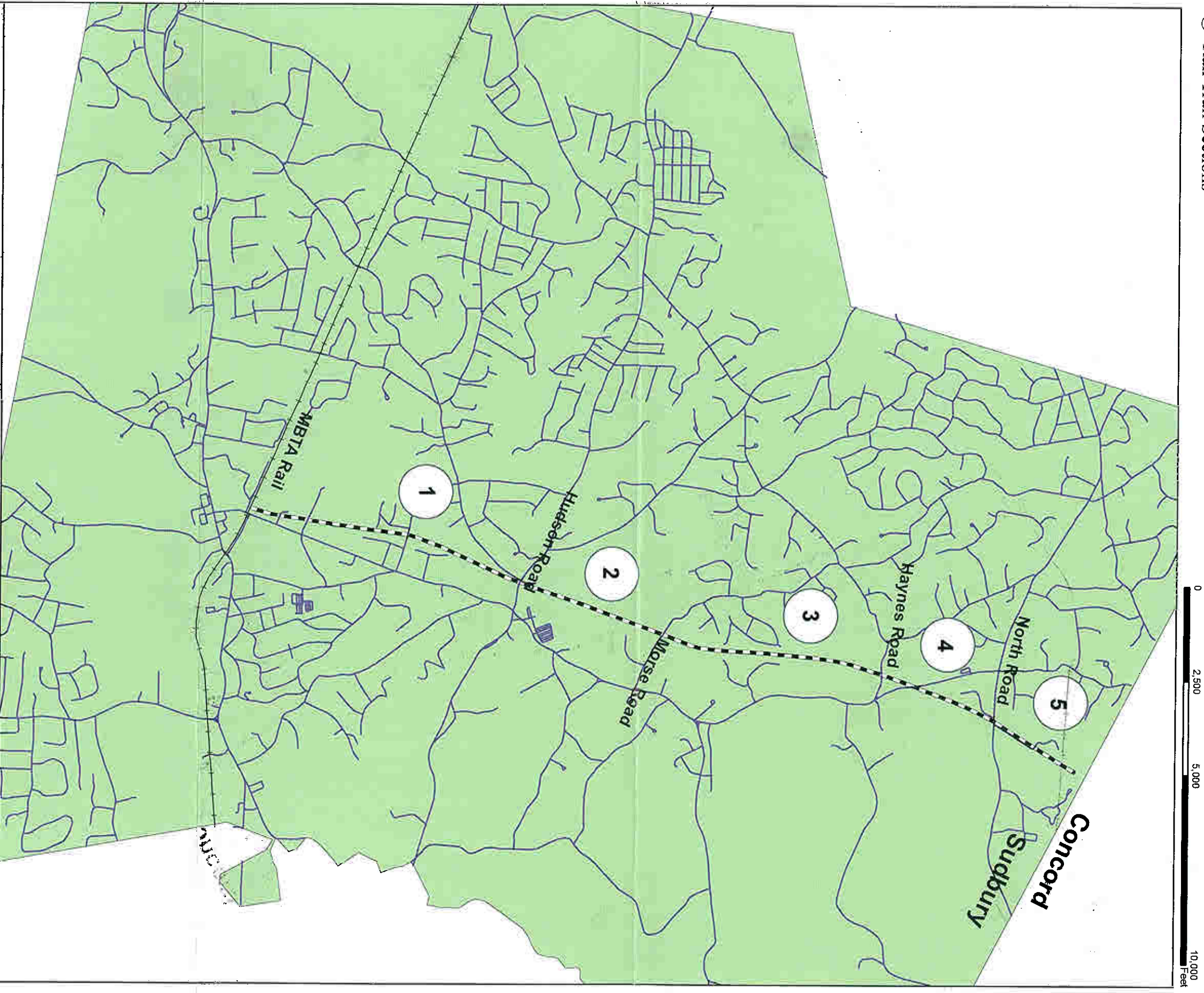
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Town of Sudbury
-  Bruce Freeman Rail Trail
-  Rail Trail Sections



Section
Boundaries

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information
(MassGIS) and the Natural Heritage & Endangered Species Program, Executive
Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.





Call of the Wild Consulting
& Environmental Services

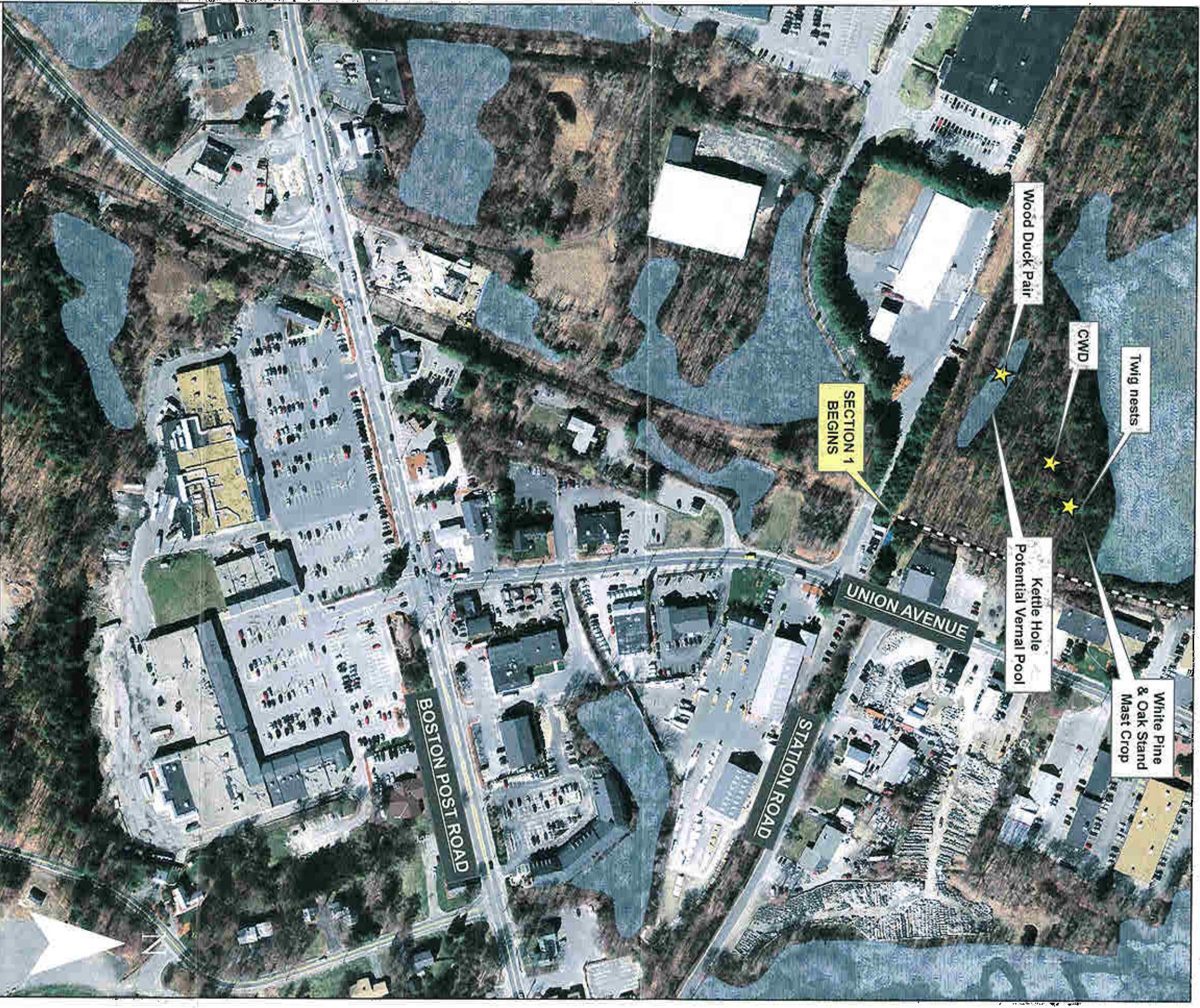


BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

Legend

-  Bruce Freeman Rail Trail
-  NHESP Certified Vernal Pool
-  Wildlife Sign
-  Mass DEP Identified Wetland



Section 1
Map 11 of 11

Wildlife Habitat Evaluation

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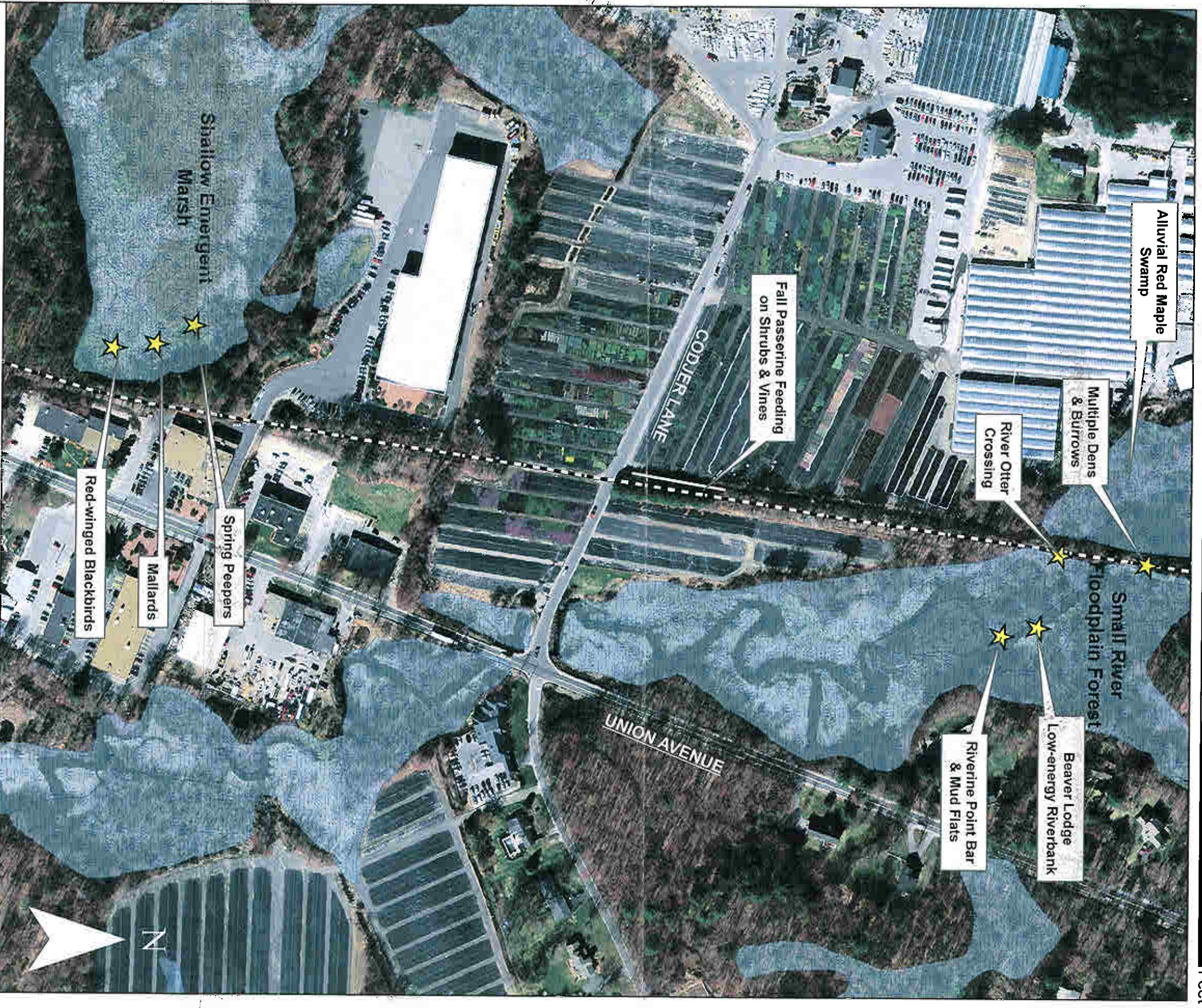
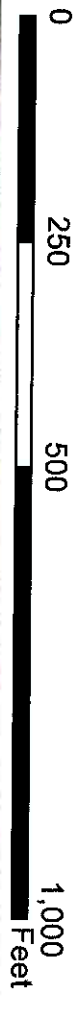
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

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Section 1
Map 10 of 11

Wildlife Habitat Evaluation

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BRUCE FREEMAN RAIL TRAIL

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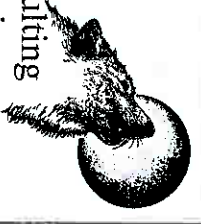


Section 1
Map 9 of 11

Wildlife Habitat Evaluation

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BRUCE FREEMAN RAIL TRAIL

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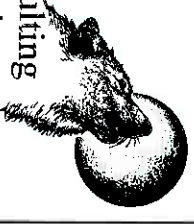


Section 1
Map 8 of 11

Wildlife Habitat Evaluation

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& Environmental Services







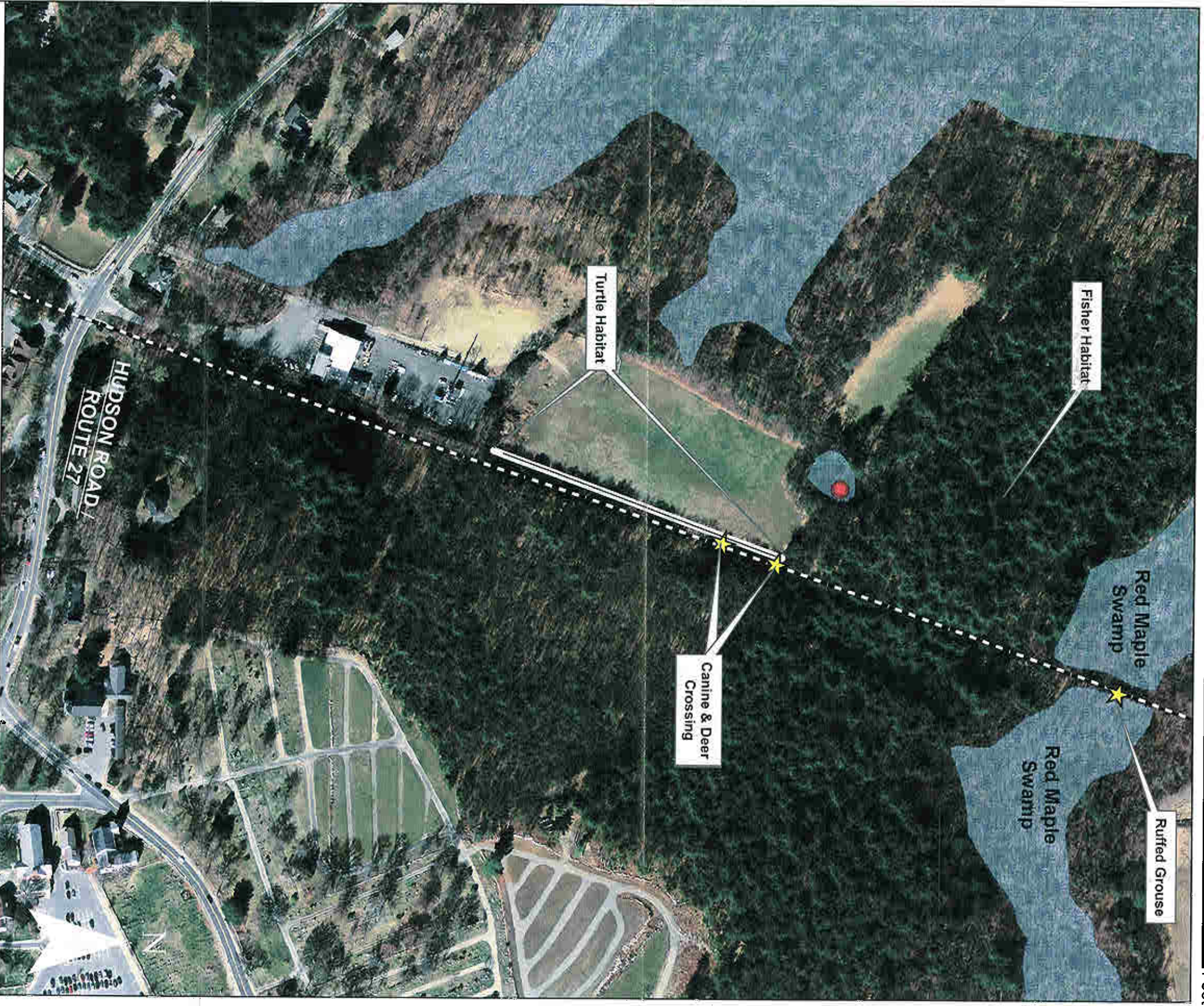
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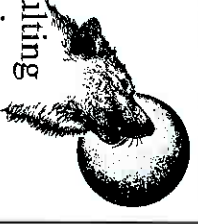


Section 2
Map 7 of 11

Wildlife Habitat Evaluation

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& Environmental Services







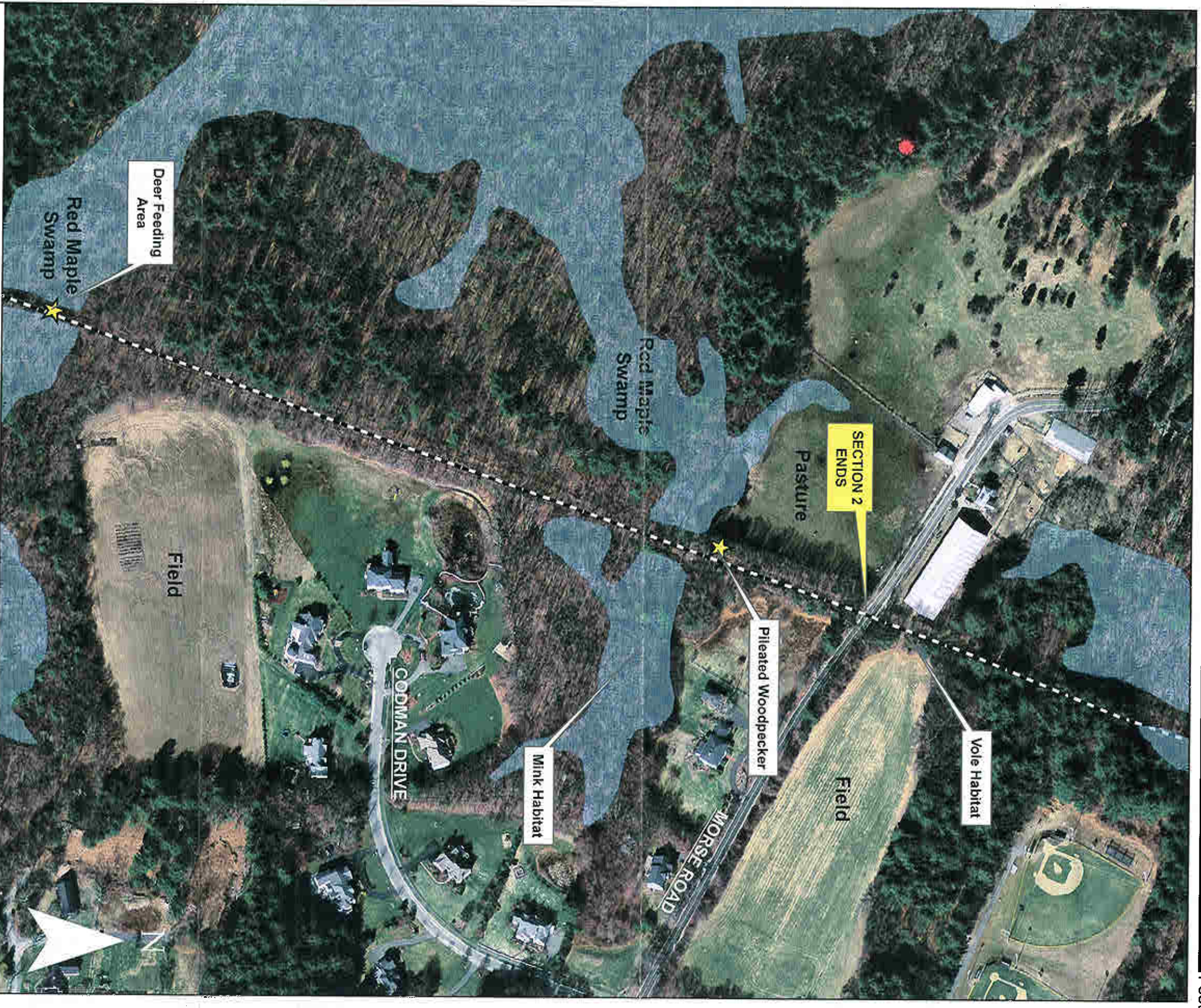
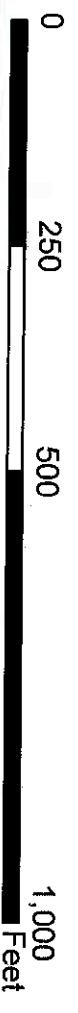
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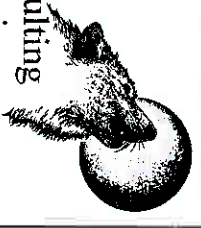


Sections 2 & 3
Map 6 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

Call of the Wild Consulting
& Environmental Services







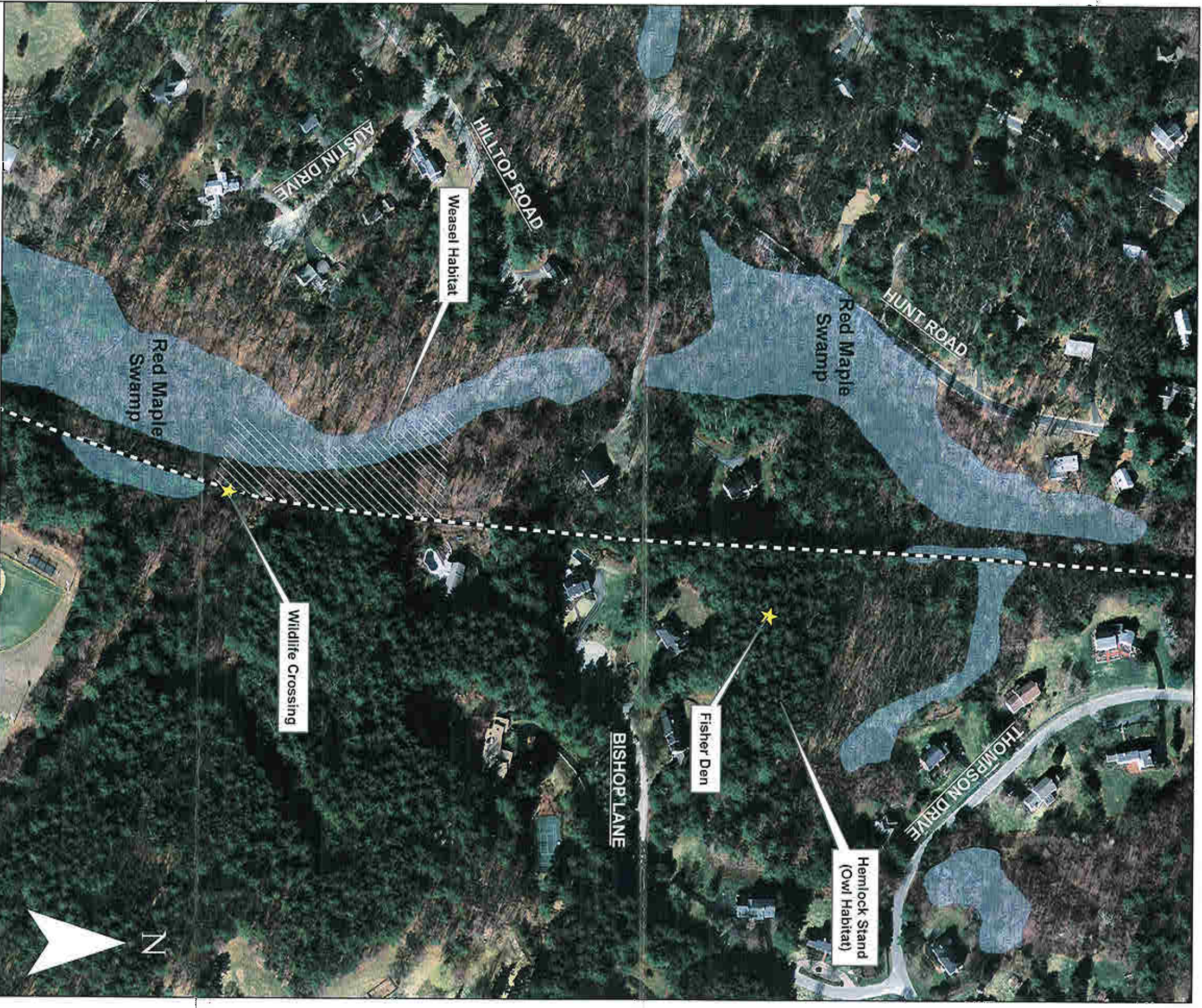
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Wildlife Sign
-  NHESP Certified Vernal Pool
-  Bruce Freeman Rail Trail
-  Mass DEP Identified Wetland

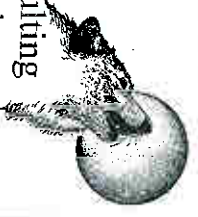


Section 3
Map 5 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

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& Environmental Services







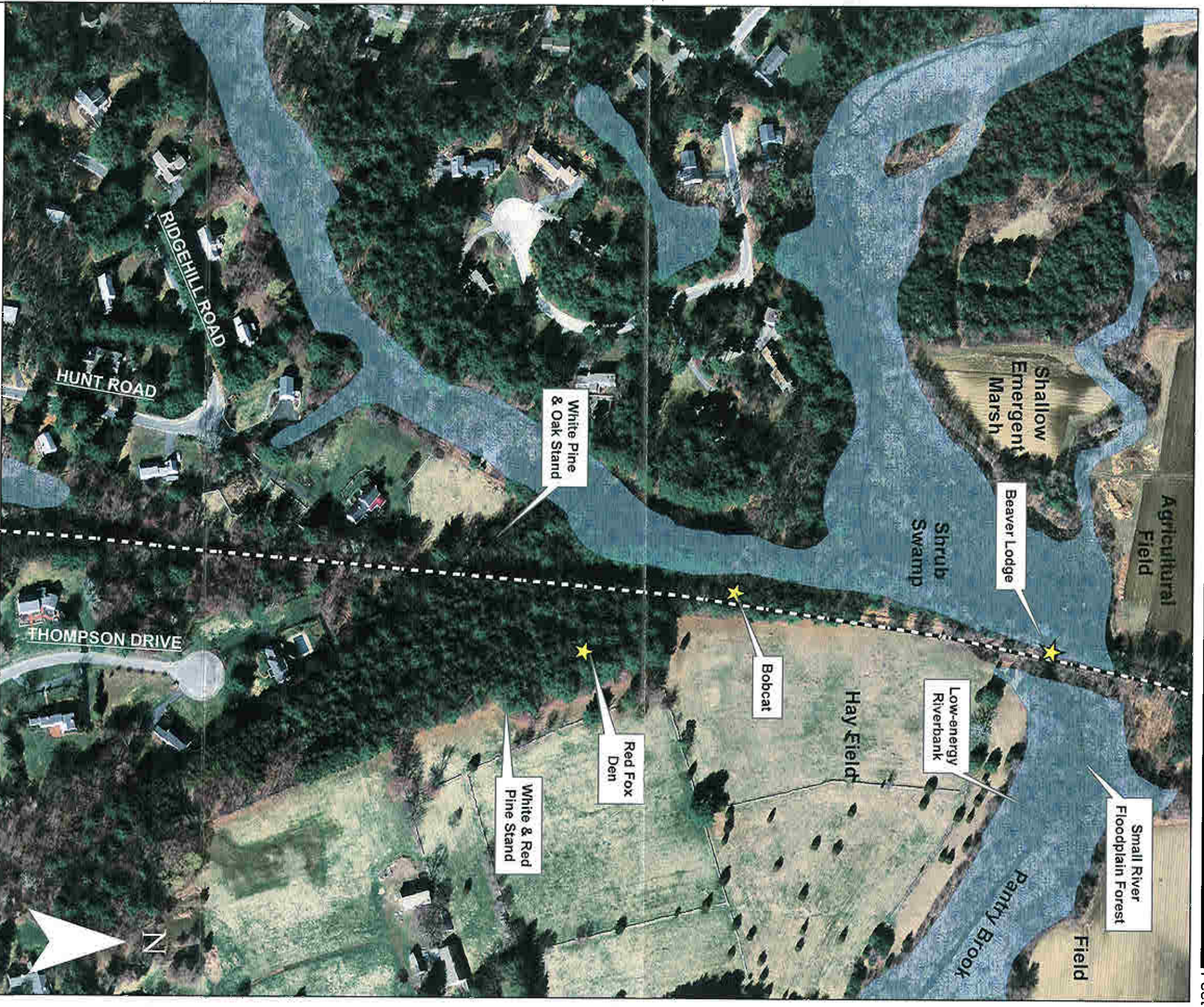
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Bruce Freeman Rail Trail
-  NHESP Certified Vernal Pool
-  Wildlife Sign
-  Mass DEP Identified Wetland

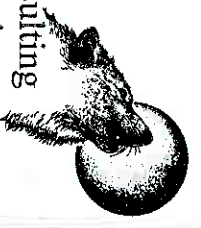


Section 3
Map 4 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

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& Environmental Services







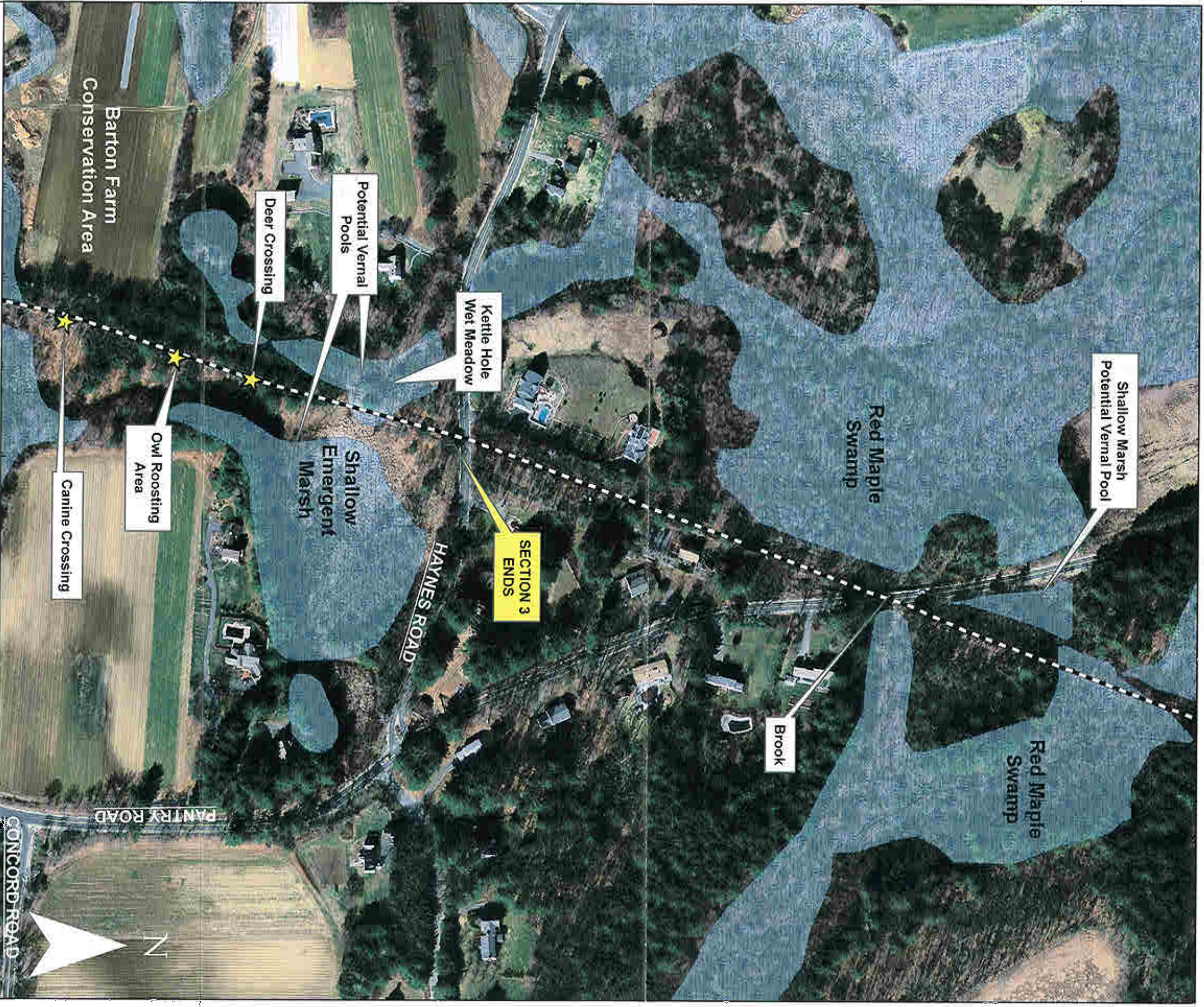
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Bruce Freeman Rail Trail
-  NHESP Certified Vernal Pool
-  Wildlife Sign
-  Mass DEP Identified Wetland

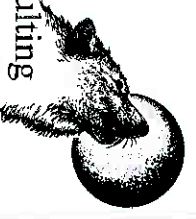


Sections 3 & 4
Map 3 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

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& Environmental Services







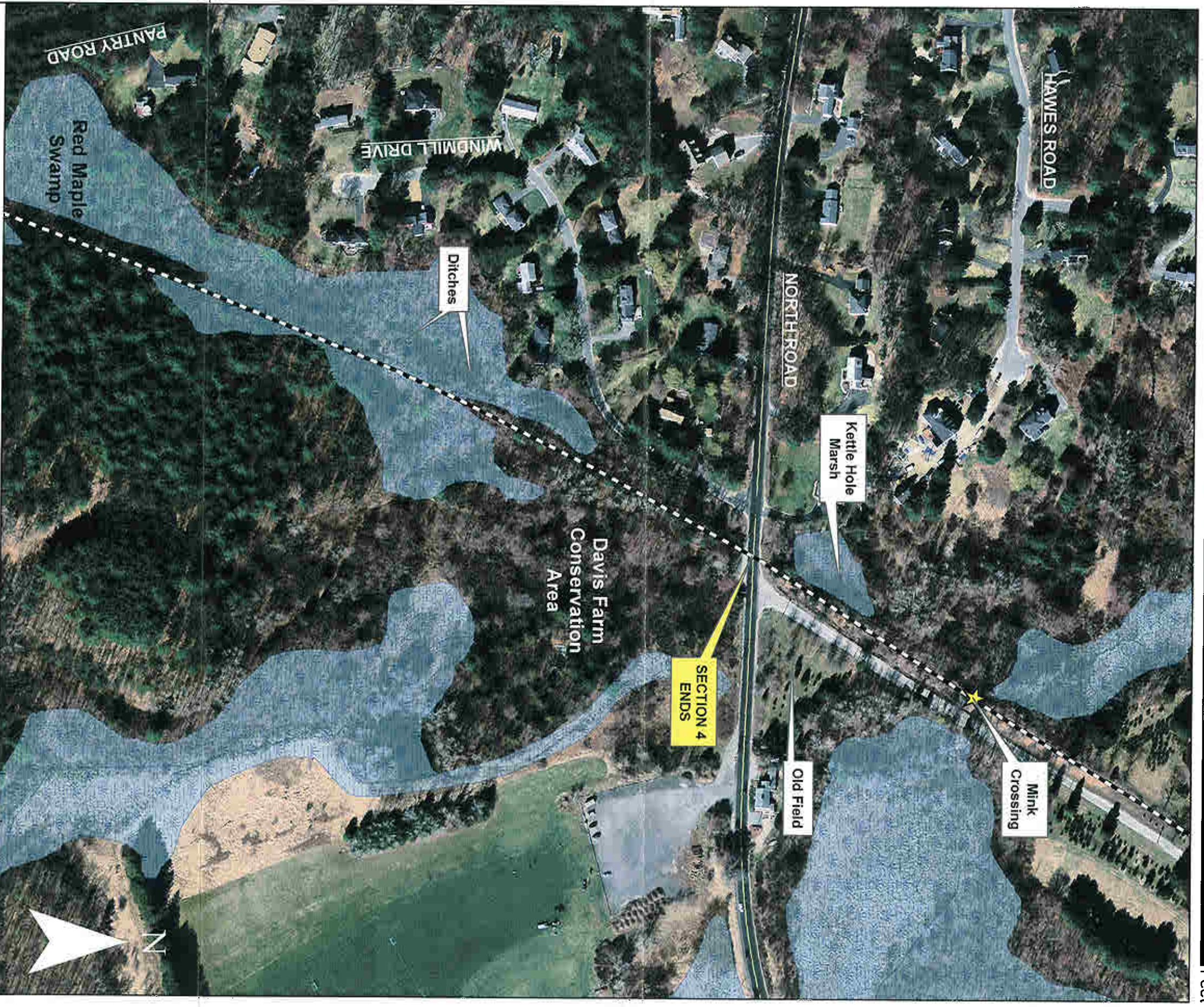
BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Bruce Freeman Rail Trail
-  NHESP Certified Vernal Pool
-  Wildlife Sign
-  Mass DEP Identified Wetland



Sections 4 & 5
Map 2 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

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& Environmental Services







BRUCE FREEMAN RAIL TRAIL

Town of Sudbury, Massachusetts

April 2009

Legend

-  Bruce Freeman Rail Trail
-  NHESP Certified Vernal Pool
-  Wildlife Sign
-  Mass DEP Identified Wetland

0 250 500 1,000
Feet



Section 5
Map 1 of 11

Wildlife Habitat Evaluation

All GIS data from the Office of Geographic and Environmental Information (MassGIS) and the Natural Heritage & Endangered Species Program, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts.

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