Baseline Assessment

for the

Towle Land

October 2006
Revised: April 2007

Prepared by the
Land Stewardship Committee

A subcommittee of the
Carlisle Conservation Commission

Foreword

This Baseline Assessment has been prepared by the Land Stewardship Committee (LSC), a subcommittee of the Carlisle Conservation Commission (CCC). The LSC, which was formed in January 2006, has a number of core tasks. Two key core tasks are to:

1. Conduct Baseline Assessments of Town-owned conservation properties; and
2. Develop a Management Plan for each of these properties.

The Baseline Assessment involves the collection, evaluation, and presentation of information on several topics, including:

- The acquisition of the property, including reasons for purchase, costs, funding sources, and associated land use restrictions;
- A detailed description of the property (using maps and figures, where appropriate) covering such topics as: boundaries (and abutters), major features (e.g., fields, woods, ponds, wetlands), topography, agricultural use and soil quality, trails, parking, and signs and displays;
- Historic and current uses of the property;
- A description of previous planning documents or other studies of the property;
- Maintenance activities and current condition of the property; and
- A list of issues to be addressed in the formulation of a Management Plan.

The Baseline Assessment is considered a working document and not a final published report. It is primarily designed to organize important information on a Town-owned conservation parcel in preparation for the writing of a Management Plan. It is expected that most of the information in the Baseline Assessment will eventually be used in the Management Plan which – after appropriate review – will be published in both hard copy and electronically (e.g., on the Town's web site). The Baseline Assessment itself, after review and approval by the CCC, will be made available in electronic format to Town committees, boards, property user groups, and the public.

Because the Baseline Assessment is a working document, no attempt has been made to make it look like a formal publication. In addition, there may be a number of errors of fact, or omission, or emphasis which we hope the review process will correct prior to the writing of the more formal Management Plan.

If you have any comments on the content of this document, please send them to Warren Lyman (warrenlyman@mindspring.com) and Liz Carpenter (ejcarpenter@earthlink.net).

(Cover Bobolink drawing by Chris Goldade)

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1. General Description of the Property

1.1 Introduction

The Towle Land is a 112-acre conservation parcel, most of which was purchased by the Town in 1968 from private landowners. Smaller abutting parcels were acquired subsequently through 1971 (see Section 2). The property is located on the south side of Westford Road, approximately one-half mile west of the town center (see **Figure 1-1, Locus Map**). As shown on the Town's property map (**Figure 1-2**), the Towle Land is completely bordered to the north by Westford Road and has a small frontage on the south along Bingham Road. The rest of the property is surrounded by private land.[1]

The Towle land includes open rolling fields along Westford Road (Route 225), low forested rocky hills with granite/gneiss outcroppings, several small intermittent and ephemeral streams, wetlands, vernal pools, and areas of successional vegetation (meadow to forest). Man-made features include a trail system, wooden bridges, a small pond with an earthen dam, a small parking lot, signs, stone fences, bird houses in the field, sugar maple plantings, and possible rock quarry and Native American sites. The general features of the Towle property are shown in **Figure 1-3**.

An aerial view, **Figure 1-4**, shows the surface of the Towle Land. From the air photo it can be seen that the larger portion of the property is wooded with a mix of deciduous and evergreen trees. The mowed field is prominent in the northwest quadrant. **Figure 1-5** shows the topographic contours of the land, indicating a typical glaciated and poorly-drained New England landscape.

1.2 Abutters

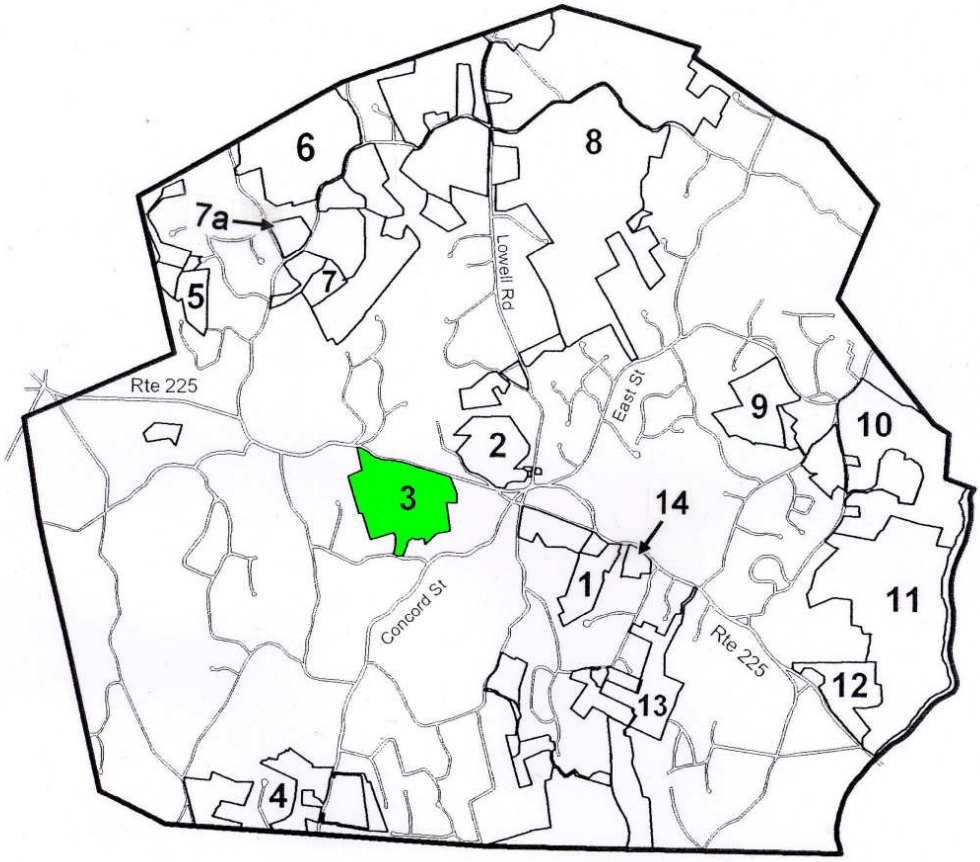
The Towle Land does not abut, nor is it reasonably close to, any other conservation or public land. There are approximately 26 privately-owned parcels of land in Carlisle that abut directly with the Towle Land (see **Figure 1-2**). An additional five or six would be considered close neighbors. At this time, all of the vacant land surrounding the Towle Land has been built upon, although the property to the east still has an active hay meadow. A list of direct and proximate abutters has been prepared by the Land Stewardship Committee (LSC).

1.3 Major Features

The major features of the Towle Land include the following:

- A large field
- A small pond with dam
- Successional meadows converting to forest
- Woods

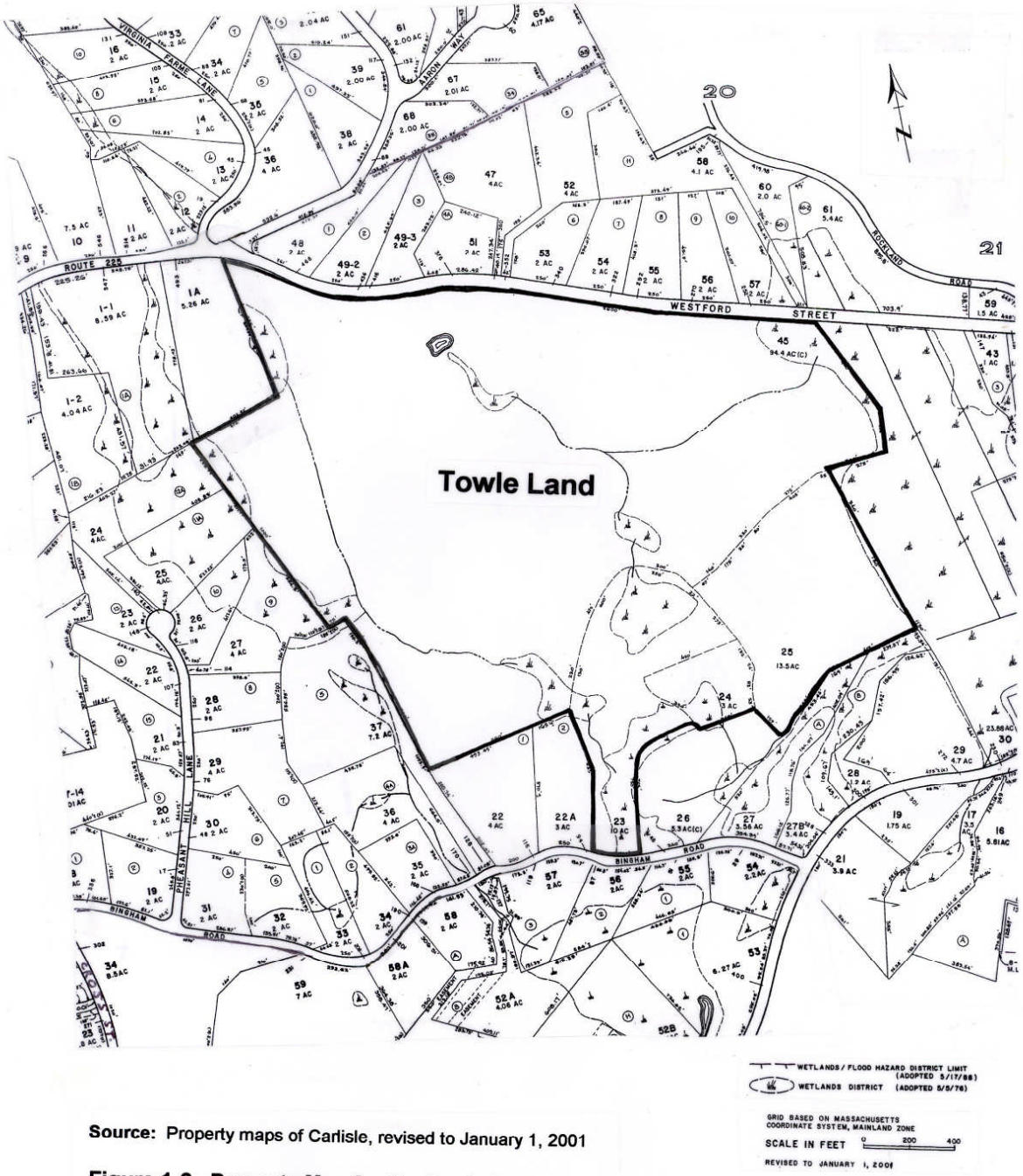
[1] The information in this section was compiled primarily from Section 1 References 1 and 2 (except as noted).



1 Banta Davis
2 Conant Land
3 Towle Land
4 Bisbee and Benfield Lands, & Spencer Brook Reservation
5 Carlisle Pines State Forest
6 Cranberry Bog
7 Curve St. Conservation Lands
7a Hutchins Field
8 Great Brook State Park
9 Town Forest
10 Greenough Land
11 Great Meadows NWR
12 Foss Farm
13 Davis Corridor & Malcolm Land
14 Fox Hill

Source: Modified from Carlisle's 2005 Open Space and Recreation Report

Figure 1-1. Locus Map for Selected Conservation and Recreation Properties in Carlisle



Source: Property maps of Carlisle, revised to January 1, 2001

Figure 1-2. Property Map for the Towle Land

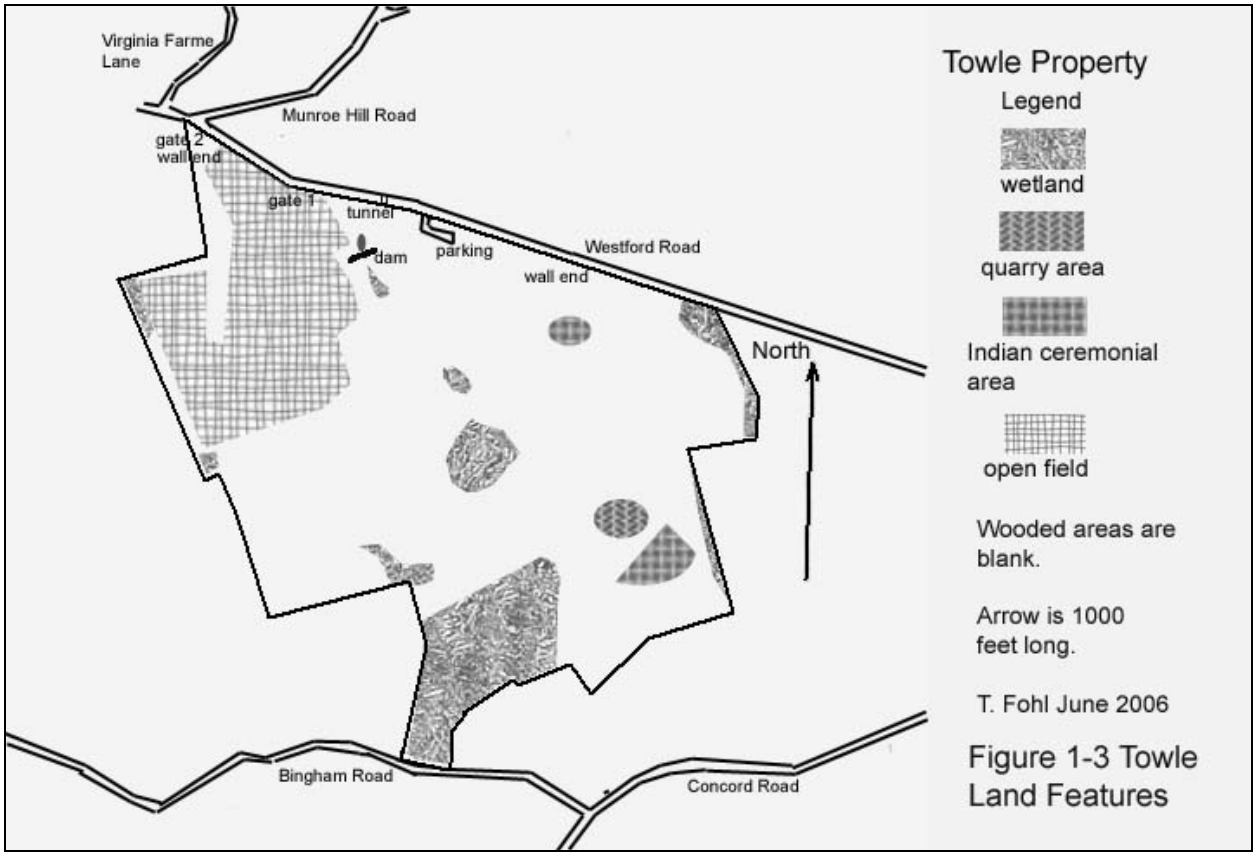


Figure 1-3. Towle Land Features

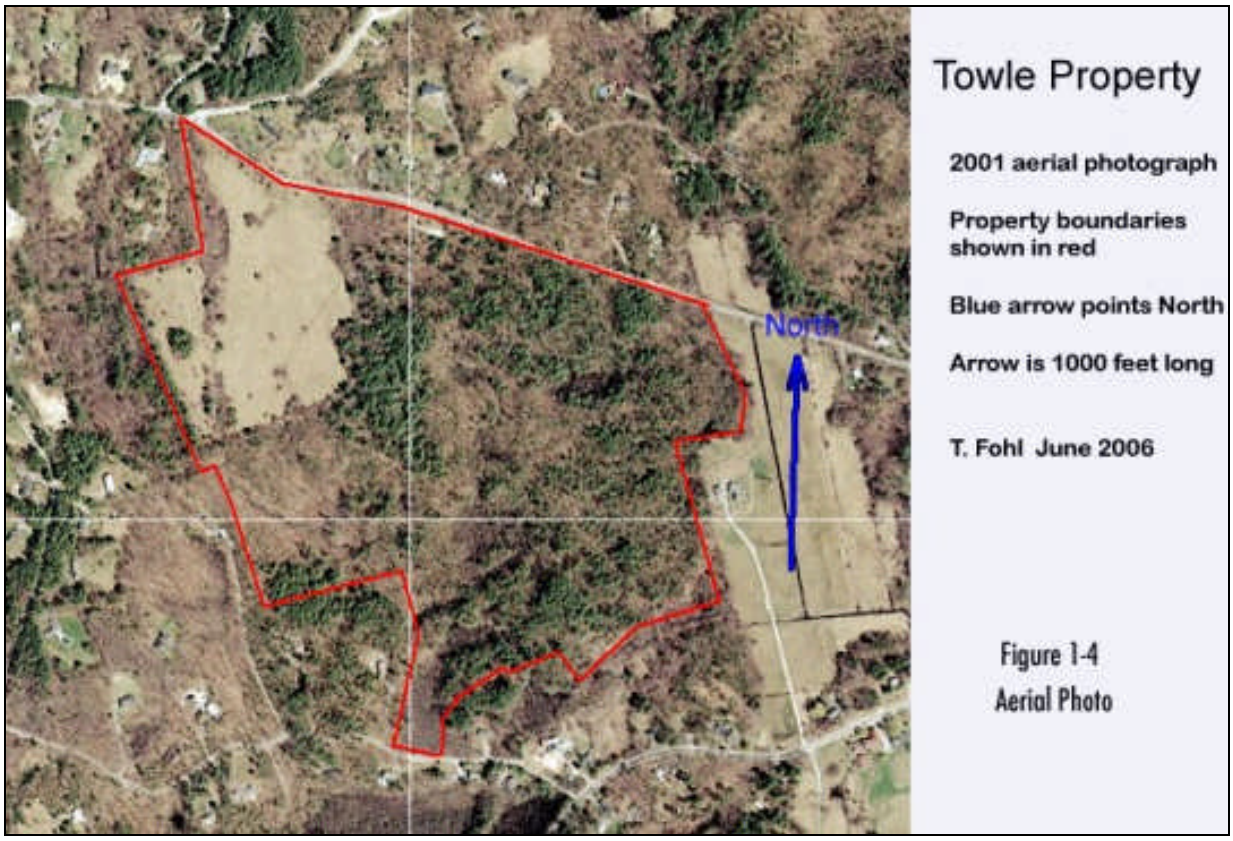


Figure 1-4. Aerial Photo of Towle Land

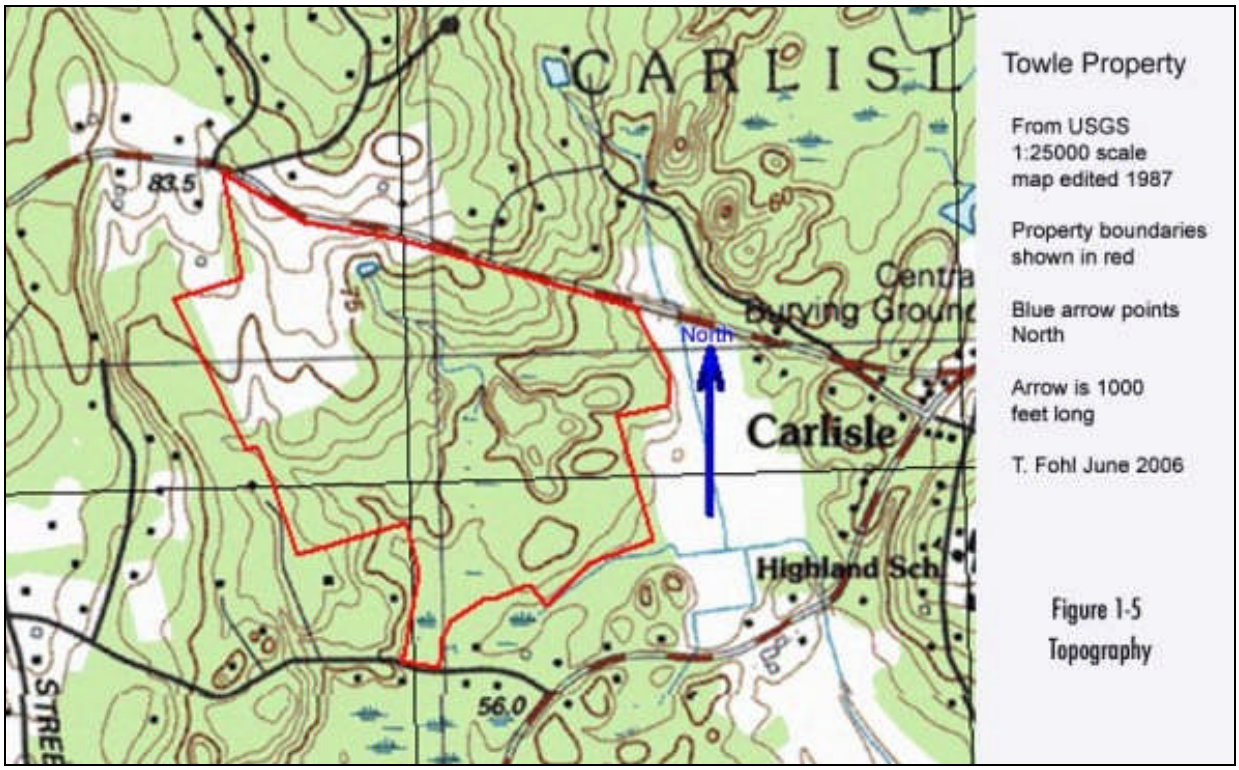


Figure 1-5. Towle Land Topography

- Wetlands (including vernal pools)
- Small streams
- A trail system
- Planted sugar maples
- A parking lot
- Stone walls and fences

Towle Field

Towle field (~20 – 25 acres) is the prominent grassy area in the northwest quadrant of the Towle Land (see **Figure 1-4**). Hardy herbaceous weeds and grasses dominate the field vegetation. Woody perennial shrubs and trees are encroaching on the margins. In 1979, the meadow extended about 1500 feet from Westford Road at its furthest point and was almost as wide. A 1971 aerial photograph (available in Town Office files) shows substantially less tree growth – including fewer and smaller tree "islands" – within the field and also north of the pond. It would be interesting to measure the extent of the meadow today to determine the extent of any forest encroachment in the past decades.

The field is probably the best-known and most accessible feature of the Towle land. The field and its margins are prime habitat for birds and other wildlife. Approximately 20 bluebird houses have been erected in the field. The Board of Health has installed a high water test well adjacent to the northern edge of the field. Current condition and maintenance of the field – and the birdhouses - are discussed in Section 5.

Pond and Dam

The small pond, located immediately east of the Towle field and west of the parking lot, was formed by damming the stream originating from at least two springs feeding it from the north. During extremely dry weather, the pond shrinks but remains mucky.

The dam is a 7 ½ ft vertical dry stone wall on the downstream side, with a 1-inch overflow pipe near the eastern end. The width of the dam is 11 ft at the ends and 9 ft in the middle. The upstream dam wall is dry stone wall and earth bank. (Ref. 3). The dam is in need of maintenance and the badly silted pond needs dredging (see Section 5 for discussion of current condition and maintenance of the pond and dam).

Successional Meadows

1n 1979, the pond was surrounded by successional meadows with a preponderance of field juniper, gray birch, and huckleberry. These meadows are developing toward mature vegetation with the progress of time. Successional meadows area also found at the southern boundary of Towle field and in a few other areas on the property. Successional meadows provide prime feeding ground for birds and other wildlife.

Woods

Upland pine and oak forests cover about two-thirds of the Towle land (see **Figure 1-4**). The property includes coniferous forest (composed primarily of white pine and other evergreens in successional forest), deciduous forest consisting primarily of oaks and red maples, and mixed stands of coniferous and deciduous trees.

Wetlands

The location of wetlands on the Towle land, although not surveyed, are generally shown in **Figure 1-6**, as well in previously called out figures (Figures 1-2, 1-3, 1-4 [dark areas in the woods], and 1-5). The wetlands are located primarily in the areas of upland forest, and are surrounded by wet wood transition zones which serve as buffers. The main wetlands are noted for large stands of skunk cabbage.

MassGIS has mapped several vernal pool candidates on the Towle property (Ref. 4).

Small Streams

A number of small, intermittent streams occur on the Towle land (see Figure 1-6 and also Figures 1-2 and 1-5**)**. Note that although Figure 1-6 (obtained from the United States Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS]) implies there are permanent streams on the site, all the streams are intermittent or seasonal. Portions of the stream flowing south through Towle field go underground, presumably flowing through rocks long ago placed in the stream bed. The streams provide an important habitat for riparian vegetation and add to the visual beauty of the property, especially in wooded areas where the steams flow among large granite outcroppings covered with ferns, mosses, and other moisture-loving plants.

Trail System

The Towle land has an extensive trail system, used for hiking and cross-country skiing. (See **Figure 1-7**). The trails are also used by birders and other students of nature. The trails are maintained and signs are provided by the Carlisle Trails Committee. The trails follow the perimeter of the field from the parking lot/pond area and provide inner and outer loops through the wooded area. Another trail spur leads south to the Bingham Road entrance. The current condition and maintenance of the trails is discussed in Section 5.

Planted Sugar Maples

According to the Conservation Commission report in the 1979 Carlisle Town Report, a Chelmsford Boy Scout troop (Kermit King's) planted about 25 sugar maples around the perimeter of Towle Field. A site visit by LSC members on June 6, 2006 noted the existence of 12 sugar maples along the eastern and northern perimeter of the field. One dead sugar maple is located approximately midway along the northern perimeter (bordering Route 225.) The other sugar maples were planted along the intermittent stream crossing the field (see the air photo, **Figure 1-4**). (Refs. 5, 6).

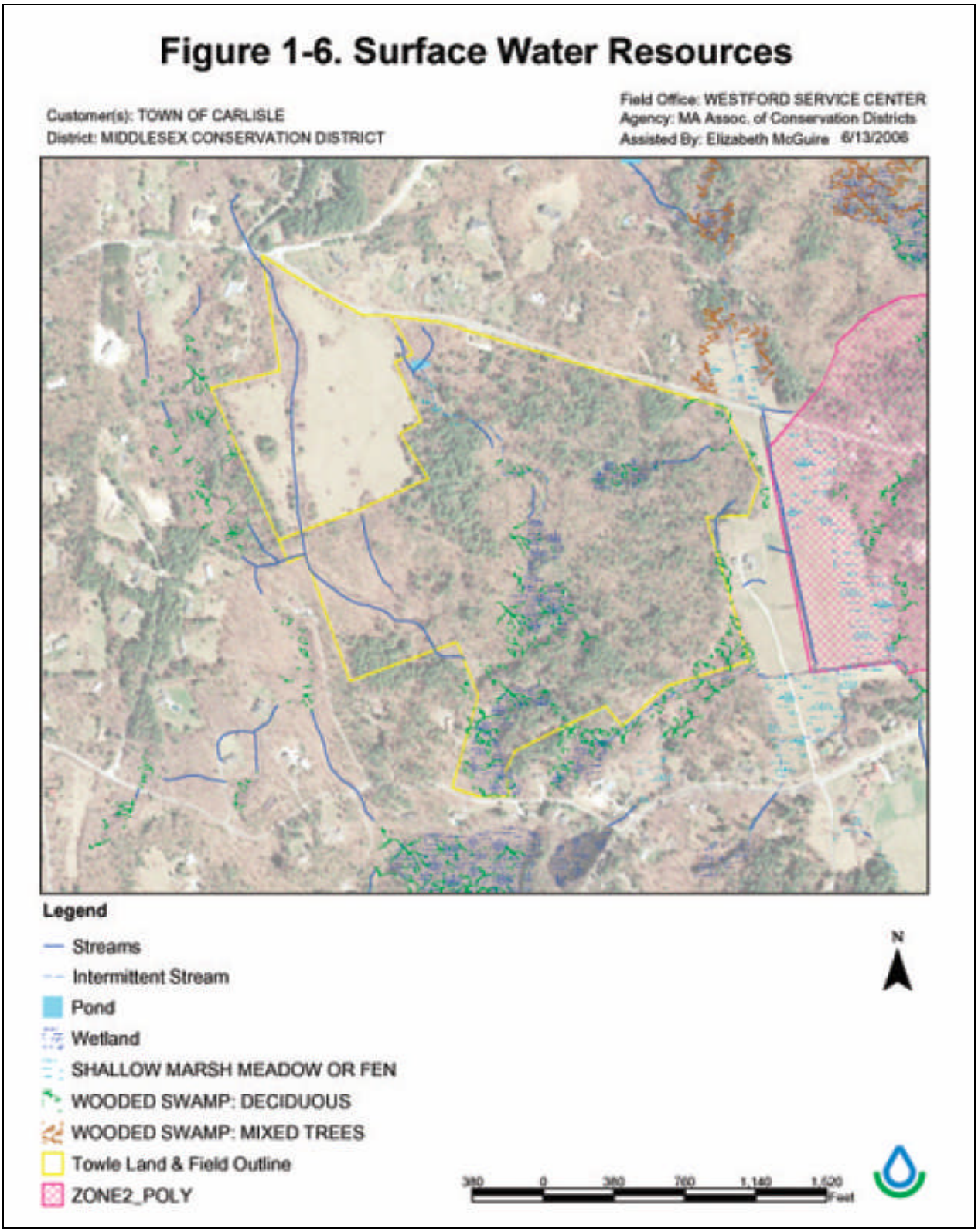
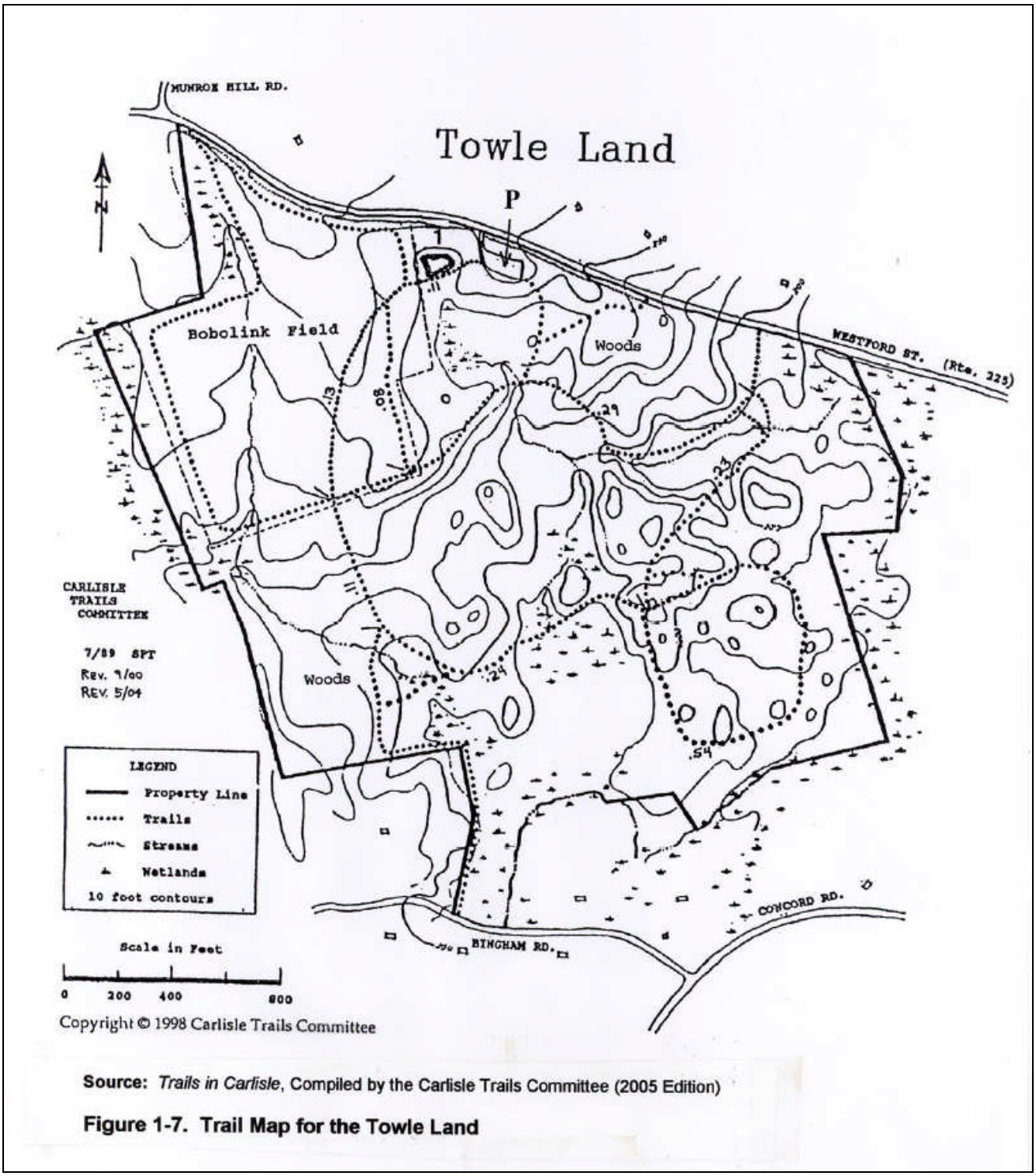


Figure 1-6. Towle Land Surface Water Resources



Source: *Trails in Carlisle*, Compiled by the Carlisle Trails Committee (2005 Edition)

Figure 1-7. Trail Map for the Towle Land

Figure 1-7. Trail Map for the Towle Land

Parking Lot

There is a small parking lot, with space for about 12 cars, along the north side bordering Westford Road. In the summer the lot is screened from the road by vegetation. The lot is reached by a short dirt access road from Westford Road. Large puddles and potholes often develop in this road in the spring and early summer.

Stone Walls and Fences

As in many rural New England landscapes, stone walls are a prominent feature of the landscape. Stone walls line a large portion of the northern boundary along Westford Road (except for three access openings), about half of the western boundary, a small portion of the eastern boundary, and about half of the southern boundary. In addition, remnants of stone fences of indeterminate age occur within the property, most likely the result of historic field clearances. The condition of the visible stone wall along Westford Road is of some concern, as it forms part of the vista of the Towle Land as seen from the road.

1.4 Importance of Major Features

The features described above demonstrate that the Towle Land is a significant conservation holding for Carlisle, providing:

- Preservation of significant land for passive recreation. The Towle property is well known and used for birding, nature education, hiking, and cross-country skiing;
- Preservation of significant vistas. The Towle property provides a beautiful vista for traffic along Westford Road in both directions and is a significant asset to the Town. Vistas within Towle property are also beautiful, especially across the field at sunrise and sunset or during times of interesting cloud formations;
- Preservation of agricultural land and associated cultural heritage. The Towle property is not currently farmed but the field has a history of truck farming and cattle raising.
- Preservation of land for general conservation; and
- Preservation of surface water bodies (streams and pond) and wetlands for wildlife habitat.

1.5 Signs and Displays

One property sign exists at the entrance to the parking lot, a second exists in the parking lot, and a third is located at the Bingham St. trail entrance. These three signs do not identify the site by name; they just state it is Carlisle conservation land. A fourth property sign ("Towle Field") exists along the northern perimeter facing Westford Road. The parking lot also has a sign requesting proper trash disposal in the trash can at that location. At three or four locations that provide entrance to Towle field, there are signs asking visitors to not disturb the bobolinks during their nesting period (May 15 to August 1). The Carlisle Trails Committee has posted directional signs on trees along the trails in the woods.

1.6 Regional Topography and Watershed

Figure 1-5 illustrates the regional topography and watershed features of the Towle land. The property drops about 80 feet from northwest to southeast. Few slopes are greater than 10% and most are less than 5%. The underlying rock is primarily gneiss, which tends to form sharp parallel-looking ridges and valleys as it weathers; in glaciated landscapes such as Towle, the ridge tops are often rounded as a result of glacial scouring. The site has high runoff as indicated by the several intermittent streams, caused by impervious bedrock or hardpan under the relatively pervious surface soils. Flow directions are east toward the large abutting meadow or south toward Bingham road. The dammed pond is fed by two small intermittent streams. Depth to the water table is less than five feet for much of the property, again indicative of impervious substrate.

1.7 Soils

Based on a NRCS study (Ref. 7), there are 14 classifications of soils on the Towle Land. These soils are listed in **Table 1-1** along with the approximate acreage covered and certain soil characteristics. The locations of the soils are shown in **Figure 1-8**. The approximate outline of Towle field is shown by the yellow line in the northwest corner of the property. A full definition of each soil is provided in **Appendix A**.

The Land Capability Classification of each soil (listed and explained in Table 1-1) shows, in a general way, the suitability of soils for most kinds of field crops. The three types of soils present in Towle field (codes 300B, 310B and 315B) are listed as capability class II-e or II-w. Capability class II-e would, for example, be defined (per the notes in Table 1-1) as:

> "Soils have moderate limitations that reduce the choice of plants that require moderate conservation practices. Soil is mainly limited by risk of erosion unless close-growing plant cover is maintained."

The NRCS study also gives a farmland rating to soils of generally high quality. The rating is either "Prime" or "Locally Important". As shown in Table 1-1, all the soils in Towle field are rated as Prime. Prime farmland is defined, in part, as follows:

> "Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, forest land, of other land, but not urban built-up or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to accepted farming methods." (Ref. 7)

Additional information on the soils in Towle field was contained in a 1983 study done by the USDA's Soil Conservation Service (SCS), predecessor of the NRCS, at the request of the Carlisle Conservation Commission. The SCS study is described in Section 4.3.

Table 1-1. Towle Land Soils and their Characteristics

Map #	Name & Definition	Acres[3]	Percent of Total	Land Capability Classification[1]	Farmland Rating[2]
Fields					
300B	Montauk fine sandy loam, 3 - 8% slopes	5.7	5%	II-e	Prime
310B	Woodbridge fine sandy loam, 3 - 8 % slopes	6	6%	II-e	Prime
315B	Scituate fine sandy loam, 3 - 8% slopes	13.3	12%	II-w	Prime
Woods					
51A	Swansea muck, 0 - 3% slopes	1.9	2%	VII-w	NR
52A	Freetown muck, 0 - 3% slopes	10.8	10%	VII-w	NR
71B	Ridgebury fine sandy loam, extremely stony, 3 - 8% slopes	0.3	0%	VII-s	NR
73B	Whitman fine sandy loam, extremely stony, 0 - 5% slopes	4.9	5%	VII-s	NR
103B	Charlton-Hollis-rock outcrop complex, 3 - 8% slopes	28.8	27%	VII-s	NR
103C	Charlton-Hollis-rock outcrop complex, 8 - 15% slopes	6.7	6%	VII-s	NR
103D	Charlton-Hollis-rock outcrop complex, 15 - 25% slopes	6.4	6%	VII-s	NR
104C	Hollis-rock-outcrop-Charlton complex, 3 - 15% slopes	3.3	3%	VII-s	NR
104D	Hollis-rock-outcrop-Charlton complex, 15 - 25% slopes	11.3	11%	VII-s	NR
253D	Hinckley loamy sand, 15-25%slopes	2	2%	VI-s	NR
422B	Canton fine sandy loam, extremely stony, 3 - 8% slopes	6.2	6%	VII-s	NR
	Total	107.6			

1. **Class Definitions**

- II. Soils have moderate limitations that reduce the choice of plants that require moderate conservation practices.
- VI. Soils have severe limitations that make them generally unsuitable for cultivation.
- VII. Soils have very severe limitations that make them unsuitable for cultivation.

Subclass Definitions

- e Soil is mainly limited by risk of erosion unless close-growing plant cover is mantained.
- s Soil is limited mainly because it is shallow, droughty, or stony.
- w Water in or on the soil interferes with plant growth or cultivation.

2. Farmland rated as either Prime or Locally Important. See text for definitions. NR = No rating.

3 Acerage is approximate as exact property boundaries were not used.

Source: Middlesex Conservation District, **Soil Survey Report** (1995), and Massachussetts Association of Conservation Districts GIS system (Westford, MA)

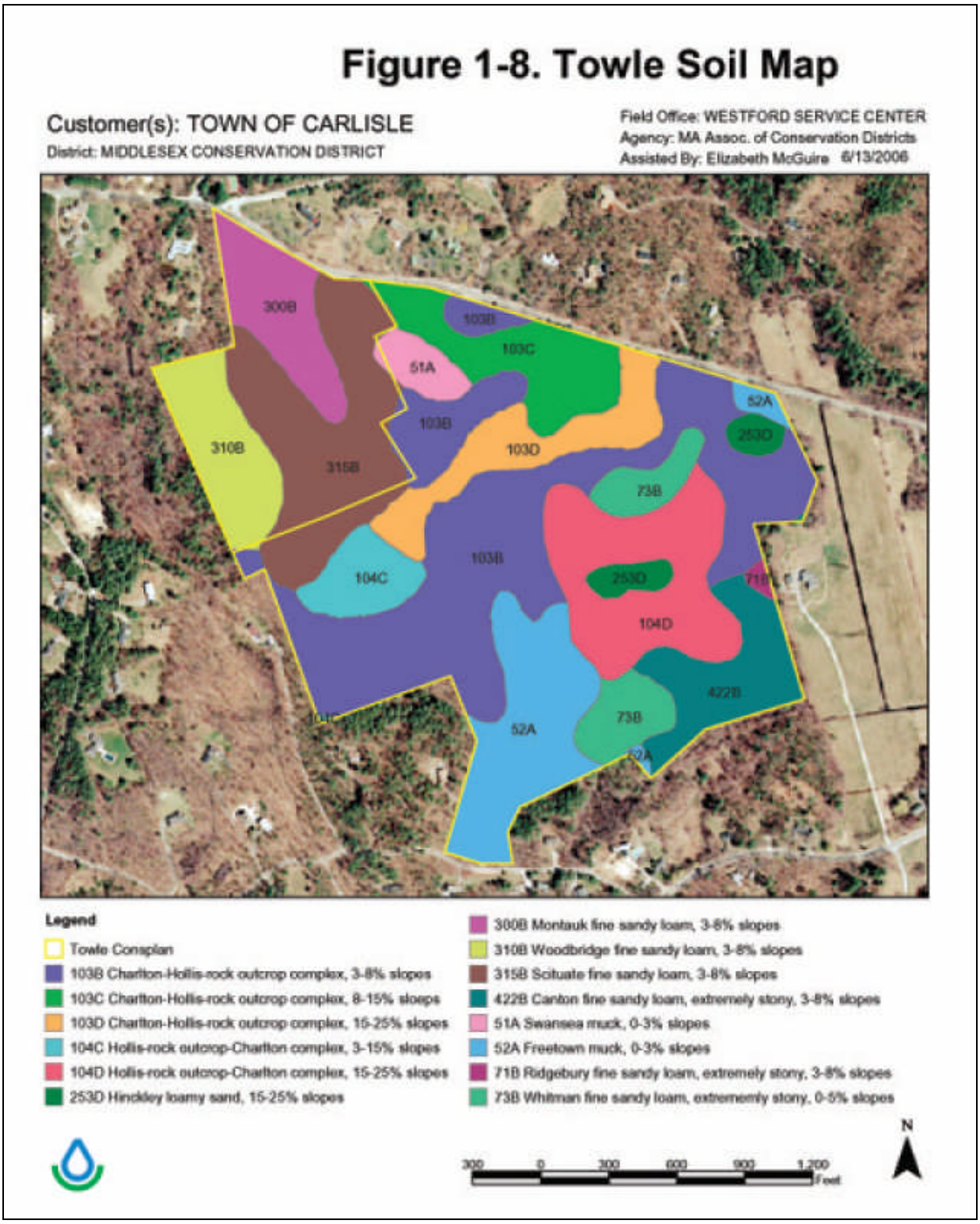


Figure 1-8. Towle Land Soil Map

Section 1 References

1. Niessen, Nancy E., Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, prepared for the Radcliffe Seminars Program, February 1979.
2. Carlisle Open Space and Recreation (OS&R) Plan, January 2000.
3. Loutrel, E.D., "Dam and Pond on Towle Conservation Land", February 1979.
4. Massachusetts GIS (http://www.mass.gov/mgis/massgis.htm).
5. Town of Carlisle, Annual Report for 1979.
6. Willard, Sylvia, personal communication, June 2006.
7. Middlesex County Massachusetts Interim Soil Survey Report, 4th Edition, July 1995. Prepared by the US Department of Agriculture, Natural Resources Conservation Service. Published by the Middlesex Conservation District.

2. Towle Land Purchase and Acquisition

2.1 Overview

The Towle land was acquired by the town of Carlisle in five separate parcels, as indicated in **Table 2-1** (Ref.1). The Towle and Ryan lots were the first parcels acquired. Three additional parcels were acquired in 1970 – 1971, bringing the total acreage up to approximately 112 acres. (Refs. 2, 3).

Table 2-1. Towle Land Conservation Acquisition

Year Acquired	Parcel	Acres (Approximate)	Purpose	Funding Sources
1968	Towle	82.8	Recreation/Conservation	Town, State, Federal
1969	Ryan	1.5	Conservation	Gift
1970	Metivier	14	Conservation	Town, State
1971	Clark/Foss	3.3	Conservation	Town, State
1971	Carr/Warren	10.3	Conservation	Town, State

The five parcels were acquired by a combination of the following means:

- Acquired by Town Meeting, voted to be managed by the Conservation Commission by Town Meeting, and permanently protected under Article 97 of the Massachusetts Constitution
- Acquired for conservation under MGL Ch 40 S8C, or created as open space through the Carlisle Conservation Cluster Bylaw, or by gift
- Acquired with Commonwealth of Massachusetts self-help funds, or with state APR funds
- Acquired with Commonwealth Self-help funds and the Federal Land and Water Conservation Fund.

The acquisition costs and funding sources for each parcel are listed in **Table 2-2**.

Table 2-2. Acquisition Costs and Funding Sources

Parcel	Purchase Price ($)	Federal Help ($)	State Help ($)	Cost to Town ($)
Towle	168,540	84,270	~ 42,135	~ 42,135
Ryan	Gift	0	0	0
Metivier	14,000	0	~7,000	7,503
Clark/Foss	2,608	0	1,304	1,304
Carr/Warren	11,300	0	5,650	5,650
Total	**196,448**	**84,270**	**56, 809**	**56,592**

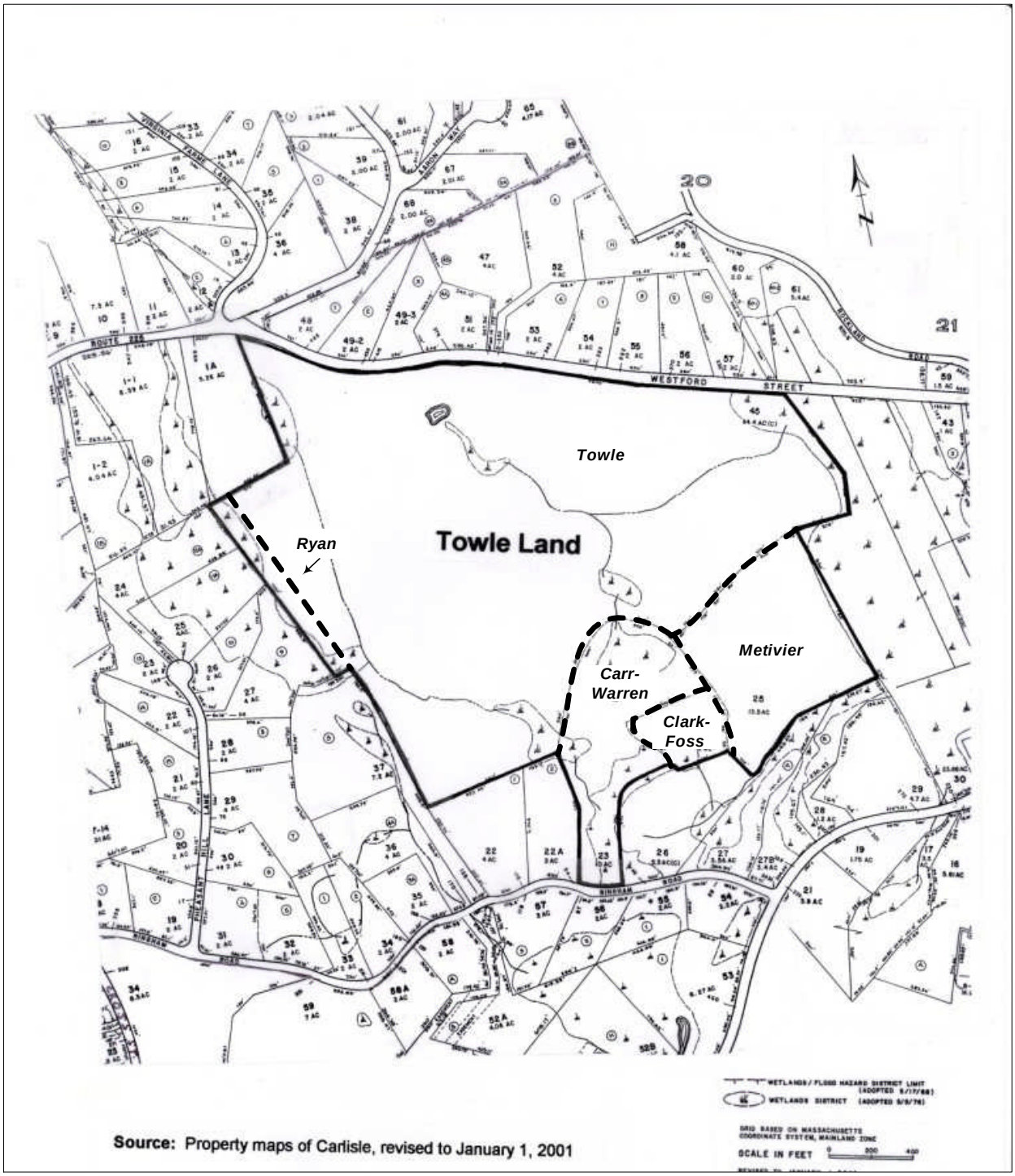


Figure 2-1. Towle Land Parcels

As indicated in Table 2-2, Carlisle received substantial Federal and State assistance in the purchase of the Towle parcels. The net result of this assistance was a total cost to the Town of approximately $56,592 and an average approximate cost of $506/acre.

2.2 Towle and Ryan Parcels

The first major acquisition of conservation land in Carlisle was the (approximately) 84 acres of the land of Phyllis N. Towle, widow of Dr. George P. Towle. The property is bordered on the north by Westford Road (see Figure 1-2) and provides scenic vistas for a significant stretch of this well-traveled road. [2]

The town voted to acquire the piece of land known as the Towle parcel at the Special Town Meeting held May 27, 1968. This was by a vote of 303 YES to 12 NO, on motion of Mr. William Badger, that the Conservation Commission was authorized to take in fee by eminent domain under Chapter 79 of the General Laws "for recreation and conservation purposes" parts of two parcels of land believed to be owned by Phyllis N. Towle located on the southerly side of Westford Road in Carlisle, together comprising about 84 acres of land. The boundaries are described in the minutes of the meeting (Ref. 4). Certification of the vote was recorded on May 28, 1968.

The deed for the Towle property (BK 1849, p. 47) was signed on June 26, 1968, and recorded on June 28, 1968. The Order of Taking (for eminent domain – recreation and conservation purposes) was recorded on June 28, 1968. This action was later rescinded due to procedural concerns and a new order (deed BK 1857 P. 247) was signed on August 27, 1968 and recorded on September 9, 1968. The Town Meeting subsequently re-voted on this issue (see following paragraph). On August 15, 1968, the Commonwealth of Massachusetts, Emergency Finance Board, approved the application of Carlisle for $84,270.00 of matching assistance funds from the Land and Water Conservation Fund of the U.S. Department of Interior to assist in the purchase of the Towle property. This is recorded in BK 1857, p. 246, and is for Town of Carlisle, Project 20-00020, "Land Conservation".

At the Special Town Meeting on November 12, 1968, on motion of Mr. Badger, it was unanimously voted that the Selectmen be authorized to take by eminent domain, purchase, or otherwise acquire in fee "for recreation and conservation purposes", the property as described in the Special Town Meeting of May 27, 1968 (see above). The vote was certified on November 13, 1968. After the Selectmen's meeting, the Order of Taking was signed on November 12, 1968 and recorded on November 13, 1968. The deed for the property was signed by Phyllis Towle on November 20, 1968 (BK 1868, p. 399) and recorded on November 27, 1968.

Subsequent to the purchase of the Towle property, William H. Ryan gave the town an abutting strip of approximately 1.5 acres (indicated as the "Ryan" parcel in Table 2-1 and Figure 2-1), which the town had mistakenly thought was the property of Mrs. Towle. This strip of land forms a small part of the western boundary of the property. The deed for the Ryan property (BK 1860, p. 82) was signed on September 12, 1968, and recorded on September 30, 1968. A surveyor's

[2] Complete references and background information for the transactions discussed in Sections 2.2, 2.3, and 2.4 can be found in Reference 4, Towle Purchase and Deed File, in the Carlisle Town Hall.

map of the parcel is appended to the deed. The Selectmen voted to approve receipt by the Conservation Commission of this gift on December 2, 1968. This vote was certified on June 16, 1969.

2.3 Metivier Parcel

The 14-acre Metivier lot forms the southeastern "corner" of the current Towle Land and abuts the hay meadow to the east. The land, formerly owned by Ralph G. and Gertrude Metivier, was acquired by the town of Carlisle in 1970. The Conservation Commission had an appraisal of the property to determine its fair market value, which was completed on June 2, 1969. The fair market value at that time was determined to be $14,000. According to the Carlisle Annual report for 1970, at the Town Meeting in March 1970 (Articles 21 and 22) it was voted to authorize the Conservation Commission to purchase the Metivier parcel, provided that the Commission obtain approval from the Massachusetts Department of Natural Resources (DNR) for financial assistance for the purchase. It was further moved that $14,000 be appropriated for the acquisition cost, and that to meet this appropriation that $7,000 would be transferred from the conservation Fund and that $7,000 would be borrowed. It was voted that the Conservation Commission be authorized to apply to the Massachusetts DNR for a grant of financial assistance as reimbursement for part of the cost of acquisition. The vote was certified on March 17th, 1970. (4).

Reference (6) states that, for the Metivier parcel, "There was 50% reimbursement from the Self-Help Program of the Mass. Department of Natural Resources so that the cost to the Town was $7, 503. The [Conservation] Commission stated that the money for the Town's share of the cost of the Metivier land was then in the Conservation Fund so that no appropriation was needed for that purpose, other than the authorization to use existing funds".

The deed (BK 1916, P. 204) conveying the property to the Town of Carlisle was recorded on March 20, 1970 (4).

2.4 Clark/Foss and Carr/Warren (Lapham) parcels

The Clark/Foss and Carr/Warren (also know as "Lapham") lots are in the southeastern section of the property, abutted by the original Towle purchase to the northwest and north and the Metivier lot to the east. Acquisition of the Carr/Warren lot provided a corridor to Bingham road, giving frontage on two town roads. (See Figure 1-2).

The Warrant of the Annual Town Meeting, March 1, 8, 1971, Articles 28 through 31, addresses the vote for acquisition of the Clark/Foss and Carr/Warren parcels, through a combination of direct purchase by the Town and grants for financial assistance from the Massachusetts Department of Natural Resources. These acquisitions are explicitly stated to be "for conservation purposes".

According to the Minutes of the Annual Election and Town Meeting, March 1, 8, 15 and 22, 1971, it was voted at the March 15 meeting to authorize the Conservation Commission to purchase in fee "for conservation purposes" the parcels known as the Carr-Warren lot and the Clark-Foss lot. In addition, it was approved for the Conservation Commission to apply for a grant of financial assistance to the State of Massachusetts DNR to acquire these lots "for conservation purposes". The votes were certified on May 4, 1971.

The deed for the Carr-Warren lot (BK 1957, p. 292) was signed on April 12, 1971, and recorded on May 4, 1971. The deed for the Clark-Foss lot (BK 1957, p. 296) was signed on April 16, 1971, and recorded on May 4, 1971.

Section 2 References

1. Carlisle Open Space and Recreation [OS&R] Report, Carlisle, Massachusetts, January 2000.
2. Benfield, A.E., "Open Space in Carlisle, III", Carlisle Mosquito, February 28, 1986
3. Niessen, Nancy E., Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, prepared for the Radcliffe Seminars Program, February 1979.
4. Towle Purchase and Deed File, Carlisle Town Hall, Carlisle, Massachusetts
5. Town of Carlisle, Annual Report for 1970.
6. Wilkins, Ruth Chamberlin, Carlisle: Its History and Heritage, The Carlisle Historical Society, Inc., Carlisle, MA 1976.

3. Historic and Current Uses

3.1 Cultural History of the Towle Land: c.a. 1900 – 1968

The Towle Land gets its name from Dr. and Mrs. George P. Towle, owners of the largest portion of the conservation land that was sold to the Town to form the present conservation parcel. Dr. Towle was very active in Town affairs (see below). It was his wife, Phyllis N. Towle, also active in Town affairs, who sold the approximately 84 acres of their property lying south of Westford Road to the Town in 1968. As described in Section 2 of this Baseline Assessment, approximately 28 acres were added to the Towle Land over the next four years from several other families.

By profession, Dr. Towle was a physician and surgeon with an office in Boston (Symmes Hospital, Arlington). He came to Carlisle in 1912 to live on what is now called Towle's hill. The land was purchased from Lars Olsen. According to Ruth Wilkin (Ref. 1), Dr. Towle served the Town of Carlisle in many capacities. He was: (a) on the committee that established the Town's first by-laws (1924); (b) on the committee that acquired Spaulding Park (1923 – 1925); (c) on the committee that led to the construction of the Town's first firehouse (1925); (d) on the committee that established the Town's Finance Committee (1932), and served on the first Finance Committee; and (e) a member of the Town's first Planning Board (1932). For some period of time he also served as the School Physician. Dr. Towle died in 1952. Phyllis Towle (1893 – 1989) served on the Town Celebration Committee, volunteered at the Town polls on election days, and was active in organizing many social activities. She directed many plays in Town. She was also one of the earliest recipients of the Carlisle Outstanding Citizen Award in 1973. So it seems fit, in recognition of such significant service to the Town, to have this important conservation parcel named after Dr. and Mrs. Towle.

According to Nancy Niessen (Ref. 2), the Towles used their fields to pasture beef cattle, and prior to that the open field had been used as a truck farm. Dr. Towle, who grew up on a farm in New Hampshire, "…continued to pursue his love for cattle, raising Herefords and western cow ponies on his 150-acre farm. Towle and his neighbor, Lawrence O. Sorli, built a 'cow tunnel' under Westford St. in 1914 to allow the cattle to reach pastures on the opposite side of the road." Later, the fields were used by local farmer Guy Clark as pasture for his cows. (Ref. 3).

It may be presumed that the Towle Land was used primarily for agriculture for many generations prior to Dr. Towle. There are remains of an old quarry in the lower woods, but the dates of any quarrying operations are not known.

3.2 Native American Uses

At some unknown time in the past, Native Americans used parts of the Towle Land for ceremonies. The remains of about 60 stone ceremonial structures are located in the lower woods near Guy Clarks's meadow (see Figure 1-3). A large turtle effigy is located in the woods not far from Westford Road. This topic is further discussed in **Appendix B**.

3.3 Current Uses of the Towle Land: 1968 – Present

Since its purchase by the Town, the Towle Land has been primarily used for passive recreation by individuals, small groups, and – less frequently of late – large groups. In the earlier years, Towle field was hayed by farmers who were allowed to keep the hay in return for their cutting work. This became more impractical as the quality of hay declined. More recently, the Towle field has been maintained by mechanical mowing and sheep (see Section 3.4 for details). The primary objectives of the mowing has been to preserve the fields not only for the vistas and special wildlife habitat it affords, but also to preserve the possibility of future agricultural use. At present, concerns over maintenance of the field as a nesting habitat for birds – especially the bobolink – appear to preclude any large-scale agricultural use of the whole field. Furthermore, the emergence of poison ivy by June of each year significantly restricts many field uses for the remainder of the growing season. A local farmer, Mark Duffy, kept cattle on a portion of Towle field a few years ago, but found that recreational users disturbed the cattle.

Specific passive recreation activities that take place (or have taken place) on the Towle Land include:

- Walking – There is an excellent trail system that affords walks through both the fields and the woods. Many walkers bring their dogs. The Carlisle Trails Committee occasionally sponsors a guided walk of the Towle Land. A large variety of birds, wildflowers and other wildlife may be found while walking the site (see **Appendices C, D** and **E**). Biodiversity Days studies on just two days (one each in 2001 and 2002) found a total of 50 wildflowers on the site (see Appendix E). Some of the special wild flowers – mentioned by local naturalist Kay Fairweather – include May apple, cardinal flower, ragged fringed orchid, fringed polygala, Virginal meadow beauty, and blue eyed grass.

- Cross country skiing – From the beginning, the Towle Land was a popular cross-country skiing site. For several years from 1972 through the early 1990s there was a Bill Koch Ski League – organized by Dusty Johnstone - that taught Carlisle youth to cross-country ski, and that sponsored races. The cross-country course (about three miles long) was highly praised by Bill Koch, one of America's most successful Nordic racers. The Bill Koch Ski League is still listed in the Conservation Commission's Rules and Regulations as an allowed "use" for the Towle Land. However, the lack of reliable snow cover has essentially precluded any formal programs in recent years.

- Bird Watching – The Towle field draws many bird watchers because of summer visitors such as the bobolinks, blue birds, swallows, and many other birds. One Carlisle resident, Ken Harte, has been watching over these birds for over three decades. A list of the birds he has recorded as being present on Towle field (totaling 132 species) is provided in Appendix C. Mr. Harte has been leading an annual bird walk on Towle Field for 35 years. Several bluebird boxes have been placed on the field; they are currently maintained by former Conservation Commissioner Tom Brownrigg.

Although there may have been some use by horseback riders and bicycle riders in the past, none appears to have occurred in recent years. The trails on the property are not – in any case – suited for such purposes. Kite flying, model rocket launching, and bird dog training have also taken place on the field.

Uses of the Towle Land by other groups have included the following:

- Bird walks (Ken Harte's annual guided walk in May)
- Trails Committee guided walks
- Biodiversity Days investigations (in 2001 and 2002. See Section 4.6)
- Demonstrations of sheep herding and grazing (2001 – 2004)
- Kite flying parties (Organized in the 1970s by Tim and Midge Eliasson)
- Alternative site for hot-air balloon landing on spring and fall weekends in the 1970s and 1980s (unplanned landings due to poor weather conditions)
- Filming of a Revolutionary War re-enactment (one event in April 2004)
- Forest fire fighting (one incident – not planned – in 2001)
- Bill Koch Ski League (~ 1972 - 1993)
- Camping (rare)

Section 3 References

1. Ruth Wilkins, Carlisle, Its History and Heritage, Carlisle Historical Society, 1976.
2. Niessen, Nancy E., Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, prepared for the Radcliffe Seminars Program, February 1979.
3. Carlisle Historical Society, Images of America: Carlisle, Arcadia Publishing, 2005.
4. Forsburg, Charles, personal communication, July 2006.

4. Previous Planning or Other Study Documents

4.1 Overview

The Towle land has had one prior overall management plan – the Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, prepared by Nancy E. Niessen for the Radcliffe Seminars Program (February, 1979). (Ref. 1). In addition, there have been a number of specialized studies for the fields, or for the property as a whole:

- Farmland plan by the Soil Conservation Service (1983) (for Towle field and three other Town-owned farmlands);
- Conservation Commission assessment for Towle land maintenance (1989);
- Conservation Commission assessment for Towle field management (1998);
- Inventory of species identified in Biodiversity Days studies (2001 and 2002);
- Carlisle's Open Space and Recreation Plan – 2005 (January 2006 draft); and
- Ken Harte's bird list.

These planning and study documents are briefly discussed in the following sub-sections.

In addition, there have been at least four studies focusing on the small dam and pond:

- Letter report by Jerome Long, P.E. (Terrain Investigation, Inc., Weston, MA) (1980);
- Letter-style report by the Soil Conservation Service (1989), covering both the Towle and Greenough dams;
- ConsCom assessment leading to an August 19, 1989 memorandum; and
- Report entitled *Towle Pond* prepared by Eunice Knight as a product of her Radcliffe Seminars Program (1993).

Details on these dam and pond studies are provided in Section 5.1 of this Baseline Assessment.

4.2 Site Analysis and Land Use Plan – Towle Conservation Land (1979)

In 1979, Nancy E. Niessen, Associate Commissioner of the Carlisle Conservation Commission, prepared a land use planning document for the Towle Conservation Land (Ref. 1). The purpose of this planning effort was to attempt to ensure the best possible utilization of the land to meet the recreational needs of the town, while simultaneously maintaining its natural beauty and character. The Towle property was chosen as a pilot site analysis and land use planning project because of its high degree of visibility and extensive use.

The report features a site analysis section with information on:

- Visual analysis (a discussion of the various types of spaces, edges, circulation, accesses, and vistas)
- Topography

- Vegetational indicators
- Geology and soils
- Hydrology
- Microclimate
- Wildlife
- Use constraints

These sections are accompanied by maps of Towle land visual spaces, topography and slopes, vegetation, geology and soils, and hydrology. Bird and plant lists were compiled and are appended to the report. These sections of the report provide a comprehensive qualitative picture of the Towle land as it was in 1979 and allows for useful comparison with the condition of the Towle land today. Niessen's bird list – obtained from Ken Harte – is replaced by a more recent (2006) list from Ken Harte which is provided in **Appendix C** of this Baseline Assessment. Her plant list is provided in **Appendix D** of this Assessment.

The report includes a proposed land use plan section which documented existing uses and problems, proposed additional uses, and presented a proposed land use plan. Existing uses in 1979 included hiking on the extensive trail system, cross-country skiing, picnicking, jogging, horseback riding, dog training, ball- and frisbee-throwing, kite flying, and grape harvesting in the fall.

Problems that were noted in 1979 include increased noise (especially at night), wear and tear, and littering. These problems have been substantially alleviated by closing the upper parking lot, which limited access of crowds and illegal motorized vehicles to the field. The report indicates that parking remains a problem; there is adequate parking for everyday uses, but not enough for special occasion overflows. The report noted that limited access may prevent legitimate use as well as abuse. Improved access for emergency vehicles needs to be addressed (this remains a problem today). Other problems noted include siltation of the pond and the need to restrict picnicking to specific areas. The report continues on to recommend additional uses and a proposed land use plan, details of which can be found in Ref. 1.

4.3 Farmland Plan by the Soil Conservation Service (1983)

In 1983, the Carlisle Conservation Commission requested the assistance of the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) in Littleton, MA in developing a land use plan for four agricultural properties in Town, including the Towle field (Ref. 2). (The other three properties included the Foss Farm fields, the Fox Hill fields, and fields now part of Fisk Meadow and the adjacent Four Seasons Development conservation restriction.) A major consideration in the development of the SCS plan was the desire to increase the viability of agriculture in Carlisle.

The SCS report to the Carlisle Conservation Commission made reference to Carlisle's *Open Space and Recreation Target Plan – 1984* (March 1979) which included as Goal #5: "Encourage Preservation of Agriculture". Under this goal were listed three objectives:

a) Protect the most viable – and visible – farmland from development

b) Retain and restore active farming on both public and private land
c) Promote backyard farming

The SCS report provided the following general comments:

> "The primary land use objective of the Commission is that all fields remain in permanent vegetative cover. This practice is the best method of protecting the soil resource base while supporting agriculture. The agricultural resource (i.e., hay crop) should also be protected; usually by developing specific management criteria in a lease with the renting farmer. Other land uses, such as passive recreation and wildlife, are also important. This is especially true with the Towle field, where it is part of a larger parcel consisting of woods and swamp. With proper planning, all three land use objectives [*listed above*] can be accommodated in one overall plan."

Specific recommendations for the Towle field in the SCS report were as follows:

> "Towle field – 21 acres, 1983. This land is to be used as hay land. At the present time, existing vegetation consists of red clover, orchardgrass, timothy and numerous broadleaf weeds including: thistle, dandelion, milkweed, Queen Anne's lace, poison ivy. The Conservation Commission is interested in maintaining upland wildlife habitat in this field. Present management includes mowing only once a year so as not to disturb nesting sites in early summer. Reseeding and managing this field as an active hayfield will involve mowing three times per growing season. A compromise would be to continue to manage the southwest corner of the field (about six acres) for wildlife, while treating the rest as productive farmland.

Land Treatment

a) PASTURE AND HAYLAND MANAGEMENT – See Job Sheet MA-111, "Pasture and Hayland Management" for specifics. Management practices should include: regular mowing, weed control and regular applications of lime and fertilizer according to recent soil test recommendations. Field perimeters can be maintained for recreation by mowing existing vegetation, controlling brushy growth and removing rotted fence posts and other obstructions.

b) PASTURE AND HAYLAND SEEDING – This field should be reseeded to increase production on high quality legumes and grasses. See Job Sheet MA-101, "Seeding Forage Crops" for suggested seed mixtures and other specs. Using the No-Till method to reseed the field is an accepted, conservation-oriented approach to land management. Consult the brochure, "Guide for No-Till Forage Seeding."

The SCS report also provided the following comments for all parcels studied:

> "MANAGEMENT ALTERNATIVES - The soils found in the fields owned by the Conservation Commission are rated good to excellent in terms of agricultural capability. This can be better understood by reading the capability unit descriptions and definitions of prime

and important farmland. It would be possible then, to use some of these fields more intensively (i.e., row crops) and still maintain and protect the soil resource base…However, in a situation such as this where the land is not farmed by the owner, but leased to an active farmer, certain land use criteria should be developed. These standards would be made part of the lease and might include:

- Timing and rate of lime and fertilizer applications
- Use of cover and green manure crops
- Crop rotations
- Strip cropping and other erosion control measures
- Species to be seeded for winter cover and permanent vegetative cover."

The SCS report contains locus maps, aerial photographs and soil type maps for each property. The soil type map for Towle field is shown in **Figure 4-1**. The four types of soils identified in the field were described as follows:

222B – Montauk sandy loam (3 – 8% slopes). Well drained soil formed in a thin layer of friable loamy glacial till underlain by compact, sandy glacial till. Friable fine sandy loam subsoil underlain by compact gravelly loamy sand hard pan at a depth of about 30 inches.

27B – Scituate fine sandy loam (3 – 8% slopes). Moderately well drained soil formed in a thin layer of friable loamy glacial till underlain by compact sandy till. Friable, yellowish brown sandy loam subsoil. Hard pan at depths of 18 to 30 inches.

81B – Woodbridge fine sandy loam (3 – 8% slopes). Moderately well drained soil formed in loamy glacial till. Friable, olive brown fine sandy loam subsoil underlain by a hard pan at depths of 18 to 30 inches.

122B – Paxton fine sandy loam (0 – 3% slopes). Well drained soil developed in loamy glacial till. Friable, olive brown, fine sandy loam subsoil underlain by a hard pan at depths of 18 to 30 inches.

Each soil type was assigned an "agronomic capability unit" [code], and the report then supplied – for each capability unit – (1) a soil description; (2) use limitations (e.g., potential erosion); (3) suitable crop uses; (4) suitable forage uses; and (5) estimated yields that could be expected for various crops in units of tons (or hundredweight) per acre.

The SCS report also contained other useful information on pertinent farming practices.

4.4 Conservation Commission Assessment for Towle Land Maintenance (1989)

A subgroup of the Conservation Commission, in a memorandum dated August 19, 1989 (Ref. 3), gave the following recommendations regarding Towle Land maintenance (associated map and map key are not included here):

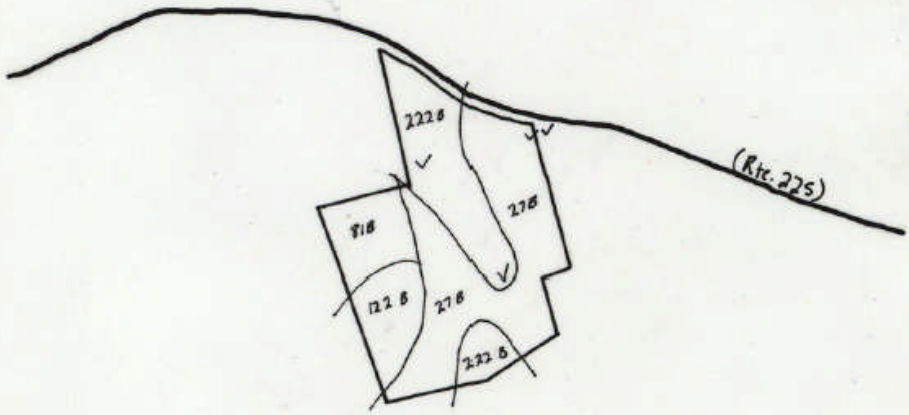
SCS-CONS-15
OCTOBER 1974

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

Owner Carlisle Conservation Commission Operator same
County Middlesex State Massachusetts
Soil survey sheet (s) or code nos. Atlas sheet #25 Approximate scale 1"=660'
Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with (the) Middlesex Conservation District

Location (Community, watershed, road & distance, etc.) Towle Field, Rte. 225



Note: See text for description of soil types.

Source: US Department of Agriculture, Soil Conservation Service report to Carlisle Conservation Commission: *Soil and Water Conservation Plan* (September 1983)

Figure 4-1. Towle Field Soil Map

Figure 4-1. Towle Field Soil Map

Field Maintenance

- The field should be mowed at least once, and preferably twice, a year.
- A perimeter trail should be mown once or twice during the summer between field mowings to make the field more accessible for passive recreation.
- The woods are creeping into the field. Brush and saplings should be removed now, and every 2-3 years. In some areas (e.g., the western edge near the road), trim back only to the taller saplings, because the area is favored by birds. In other sections, brush should be cut back to the stone wall that borders the field.
- One section of the field is rockier, harder to mow and contains more brush. If a tall grassy area is desired for wildlife, mow part of this area once every 2 years. Note, the tall grass should be away from the field edge, because the trail is along the edge, and the edge would grow into saplings most quickly.
- Exposing part of the stone wall may enhance the view, but don't spend extra money to remove tall trees or persistent growth (e.g., vines).
- There are many "islands" of trees and shrubs in the fields. Most center around rock outcrops that cannot be easily mown. While the clumps are scenic and good for wildlife, they must be controlled or they will grow over time. Leave most of the islands, and give them a "haircut" every 2-3 years, cutting back 6' – 10' of brush and saplings around the perimeter. Remove some of the smaller brush islands entirely.
- Brush cutting needed most:
    - by the path over the seasonal brook on the western side of the field.
    - in the corners of the field.
- Brush cutting is a large and ongoing job, and will probably require hiring help.

Pond

- Clear dike of saplings and brush.
- Apply bentonite at end of dike near visible leak.
- In October (when water level is low), clean litter from pond, and place a measuring stick in the pond to use in monitoring water level.
- Use volunteer labor and donated bentonite.

Woods near parking lot and pond

- Enlarge clearing by the large ledge outcrop along path to pond. Clear out young trees but leave juniper bushes.
- Build a path from ledge clearing downhill to locust grove. Path could wind through the grove and exit at the back of the pond and/or at the stone wall to the field. Keep the trail away from the road.
- Use volunteer labor.

Parking Lot

- Remove graffiti from 2 large rocks.
- Remove white plastic bag high in tree along driveway.
- Trim brush away from driveway.
- Ask Carlisle Department of Public Works for help.

Miscellaneous

- Remove fallen tree from perimeter trail in field.

4.5 Conservation Commission Assessment for Towle Field Management (1998)

In February 1998, in connection with a grant application, the Conservation Commission prepared a 7-page document – entitled *Towle Field Management* (4) – that reviewed Towle field maintenance options and made specific recommendations. It contains a Goal statement that says:

> "ConsCom has decided to manage the field as a habitat for bobolinks and other birds favoring fields and edges. How to accomplish this has turned out to be a maze of options, none of them perfect. Each involves tradeoffs for bird habitats, recreation uses, buckthorn control, and satisfaction of the townspeople."

The field maintenance options discussed in the document include the following: (1) do nothing; (2) mowing; (3) burning; (4) herbicides; and (5) animal grazing.

The recommended action plan (for the grant proposal) was as follows:

1. "Mowing the field completely (including small brush that has invaded the center of the field) in April 1997.
2. Beginning brush removal around the edges in spring 1997, disposing of the brush by chipping and scattering on site (the proximity of woodlands precludes burning).
3. Mowing the field again in late August 1997 and in the spring of 1998.
4. Continuing brush removal in the fall of 1997 to complete the restoration.
5. In future years, we plan to continue mowing and removing brush as needed to keep the field open. Future plans also include plowing and seeding the field piecewise. We plan to mow only before April 15 and after August 15 to protect bobolink nests and nestlings. These ongoing activities are not included in the current project and may be manageable under our annual operating budget."

4.6 Data from Biodiversity Days Surveys

Naturalists have surveyed the Towle Land to identify the diversity of living flora and fauna on three dates so far: June 8, 2001, June 4, 2002, and June 6, 2006 (Ref. 5). Data from the first two dates are currently available. These efforts have been part of the Biodiversity Days Program initiated by the State's Natural Heritage and Endangered Species Program (NHESP). Almost all cities and towns in Massachusetts participate in this volunteer effort to develop and keep an inventory of the flora and fauna in the State. All of the data on the species identified are available at the following web site: http://maps.massgis.state.ma.us/Biodiversity/BDResults.htm.

A complete list of the species found on the Towle Land is provided in **Appendix E**. The number of species found by class is as follows:

Amphibians – 4	Insects - 2
Birds - 34	Lichens - 1

Butterflies - 3
Dragonflies – 1
Ferns and fern allies - 12
Flies – 1
Freshwater fish – 1
Grasses, sedges, and rushes - 5
Mammals - 3
Mosses – 3
Mushrooms – 5
Trees and shrubs - 29
Wildflowers - 50

It should be noted however, that the web site does not list the location for any species considered as Rare, Endangered, Threatened, Special Concern or Watch List. Also, a few plants that were only identified at the genus level are not included in the listings here.

In addition to the above, Towle field was scheduled to be visited by a Biodiversity Days group on June 6, 2006. The focus was to be on fungi. The data will eventually be available at http://maps.massgis.state.ma.us/Biodiversity/BDResults.htm.

4.7 Open Space and Recreation Plan

The first Open Space plan was prepared by the Town of Carlisle in 1979 and revised in 1987, 1994, 2000, and 2005. The 2005 OS&R Plan (6) includes sections on

- Community setting
- Environmental inventory and analysis
- Inventory of land of conservation and recreation interest
- Community vision
- Analysis of needs
- Goals and objectives
- 5-year action plan
- Public comments
- Appendices with maps and other material

It is useful to provide the goals and objectives of the OS&R plan to provide continuity and a frame of reference for other planning documents. This set of goals and objectives, derived from research on community vision and analysis of needs, are as follows:

Goal 1 – Maintain the rural character of Carlisle

- Protect natural features such as open fields, woodlands, and scenic vistas
- Protect corridors for wildlife and linking trails and provide additional protected connections between existing open spaces
- Maintain a balance of protected open space throughout town
- Encourage agriculture in town

Goal 2 – Protect the town's environment

- Protect the town's water resources: land with surface water resources, wetlands, stream, ponds, or potential aquifer sites
- Protect natural spaces that provide ecological diversity
- Identify and protect sites with rare, endangered, or protected species

Goal 3 – Meet the town's recreation needs

- Improve the town's recreational facilities
- Enhance handicap accessibility
- Provide additional sites for active recreation facilities
- Upgrade existing recreation areas and facilities

Goal 4- Proactively manage land use in town

- Educate the town about the value of planning for long-term land use
- Guide where and how concentrated development occurs
- Improve the town's ability to finance preservation of open space and recreation

There are no specific recommendations for the Towle property in the 2006 OS&R plan. The Towle property is described in the plan's conservation inventory as follows:

> "This 112-acre parcel, the greater part of which was purchased in 1968 with state and federal assistance, features rolling fields along Westford Street, and the surrounding woods contain hills with rock outcrops, small streams, and wetlands. There is a small pond held in place by an earthen dam near the parking area.
>
> *Activities*: Wooded trails and open fields invite hiking and birding. The trails and fields are available for cross-country skiing in winter. Bluebird boxes are placed all around the field, and from 2001 to 2004 the field was intensively grazed by sheep as part of a study on the effectiveness of sheep for control of invasive vegetation.
>
> *Facilities*: Towle Field is mowed regularly on a schedule respecting the bobolink nesting season. A parking lot off Westford Street accommodates 12 cars.
>
> *Accessibility*: The terrain is hilly and not readily traversed by wheelchair.
>
> *Special Regulations*: There are no special regulations."

According to the 2006 OS&R plan, uses allowed on all Carlisle Conservation land include:

- Walking, hiking, jogging, and running
- Picnicking
- Kite-flying
- Horseback riding
- Snowshoeing

- Cross-county skiing
- Nature study (observation)
- Other uses of a passive recreational nature

Activities prohibited except by special permission from a majority of the Conservation Commission include camping, discharge of firearms, and fires. Activities prohibited on all Conservation land include hunting, trapping, swimming, and use of motorized vehicles (except by special permit and as regulated on Foss Farm). Use by large organized groups can be scheduled through the Conservation Commission office. An additional use that was specifically allowed for Towle was the cross-country skiing activity of the Bill Koch Ski League.

These uses and restrictions apply to all conservation land, not just the Towle property, but are provided for context.

4.8 Towle Land Bird Information Compiled by Ken Harte

Ken Harte, a long-time resident of Carlisle, has led mid-May bird walks since 1972. These walks are sponsored by the Carlisle Conservation Commission and are usually attended by 15 to 20 birders. Starting in January of 1977, in some years accompanied by Marilyn J. Harte, he has covered the Towle Land on the Concord Christmas Count, an annual bird census conducted in late December or early January. Other bird surveys have included a bird count conducted in 1968 before town acquisition of the land and several spring and summer visits. Since 1998, J. Thomas and D'Ann Brownrigg have made many visits at various times of the year and reported their significant observations.

Over the 38 years of town ownership and Conservation Commission management, there have been significant changes in bird life. Some of the change agents are the global warming trend, plant succession, increase in predators such as coyotes, and habitat destruction in Neotropical wintering grounds. On the whole the number of species and individuals has declined. The highest species count, 63, was recorded in 1984 and 1986. The highest count of individuals, 370, was made in 1984. Sixteen species of wood warblers (Parulidae) were found in 1974, but no more than 8 species were found in any year since 1996.

Not all trends were negative. Birds found only since 1996 are Turkey Vulture, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Wild Turkey, American Woodcock, Barred Owl, Red-bellied Woodpecker, and Carolina Wren. Other species that have increased over the years are Great Crested Flycatcher, Warbling Vireo, Tree Swallow, Eastern Bluebird, Chipping Sparrow, Northern Cardinal, and Baltimore Oriole.

Many species are in decline but still present, including Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Blue Jay, American Crow, Black-capped Chickadee, Northern Mockingbird, Blue-winged Warbler, Magnolia Warbler, Black-throated Green Warbler, Black-and-white Warbler, American Redstart, Common Yellowthroat, Eastern Towhee, and Dark-eyed Junco. Finally, birds formerly common which have not been found since 1996 and are presumed gone include Ring-necked Pheasant, Ruffed Grouse, Brown Thrasher, Nashville Warbler, Chestnut-

sided Warbler, American Tree Sparrow, Field Sparrow, Eastern Meadowlark, Purple Finch, and Evening Grosbeak. (Ref. 7).

Appendix C contains an annotated systematic list of the 132 species, plus two hybrids, that have been recorded on the Towle Land. High counts are the largest total number found in any one year, with multiple observations of the same presumed individuals (mainly nesting birds) excluded.

Section 4 References

1. Niessen, Nancy E., Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, Radcliffe Seminars Program, Carlisle Conservation Commission, February 1979.
2. Soil and Water Conservation Plan, prepared by the US Department of Agriculture, Soil Conservation Service (Littleton, Mass.), for the Carlisle Conservation Commission, September 1983.
3. Memorandum dated August 19, 1989. Subject: Towle Field Maintenance Walk. Attended: Sally Zielinski, Ken Harte, Nancy Hartle, Dick Shohet and Betsy Fell.
4. Document (as part of an unspecified grant proposal) entitled *Towle Field Management*, dated February 12, 1998. No authors listed, but – based on content – was prepared by the Carlisle Conservation Commission.
5. Biodiversity Days Data, June 8, 2001 and June 4, 2002.
6. Carlisle Open Space and Recreation (OS&R) Plan 2005 , Draft, January 2006.
7. Harte, Ken, "Birds of the Towle Conservation Land, Carlisle, MA, 1968-2006", July 29, 2006.

5. Maintenance and Current Condition of the Property

5.1 Towle Land Maintenance

Maintenance activities take place routinely for the fields, bird houses (in the fields), trails and parking lot areas of the Towle Land. Maintenance for the dam and pond near the current parking lot has been more limited, and – although studies have been done - no major dam repair efforts have been undertaken. Each of these is discussed below.

Fields

Sections 4.4 and 4.5 discussed some of the previous planning and study efforts of the Conservation Commission on the subject of Towle field maintenance. Carlisle has recently undertaken significant efforts to maintain the Towle fields, primarily by regular mowing, but also including special renovation projects (1997 – 1998[?]) and an experimental intensive sheep grazing program (2001 – 2004). The major problems are: (1) continual encroachment by trees not only along the edges of the fields, but also in small islands of trees within the field; (2) growth of invasive plants (trees, shrubs and herbs) throughout the field; and (3) growth of unwanted plants in the bordering stone walls (especially along Westford Road where maintenance of a vista is desired). Problematic invasive plants include glossy buckthorn and poison ivy. Other invasives have included sumac, brambles, goldenrod and dandelion. Maintenance techniques are limited by a desire to avoid the use of harmful chemicals and to protect the nesting habitat for bobolinks and other birds that nest in the fields. Burning, for example, has been rejected as it would remove the thatch which is important for the nesting birds.

Routine Mowing

The Towle fields have been mowed most years since purchase by the Town in 1968. For the last several years, the Towle fields have been mowed – generally once a year – by Jack O'Connor, a Carlisle resident, under the terms of an Agreement with the Conservation Commission. A new Agreement is used each year as changes in the work or restrictions are often stipulated. Most recently (in 2004 - 2006), Mr. O'Connor has been requested to conduct an early to mid-June perimeter mowing in conjunction with a grant from the U.S. Department of Agriculture's Wildlife Habitat Improvement Program (WHIP) (see description below). The WHIP grant will also allow an extra mowing in 2007. In other years, tree removal along the field edges has been requested. The mowing Agreement requires that the field be left undisturbed (except for perimeter mowing) between May 15 and August 15 to facilitate the nesting of bobolinks in the field. Exceptions to the Agreement are possible with Conservation Commission approval.

From 1999 to 2004 the authorized cost for the routine mowing was about $1,000 per year. The authorized level was $1,300 for 2005. The authorized amounts are exclusive of payments related to the WHIP program.

Special Restoration and Maintenance: 1997-1998[?]

For a period of time prior to 1997, Carlisle's tenant farmer allowed the Towle fields to lie fallow. This resulted is an unwanted growth of buckthorn and other invasives within the fields, encroachment of trees and shrubs along the edges, the accumulation of deadfalls, and excessive plant growth around the stone wall along Westford Road. A few Town residents expressed their concern about this deterioration to the Conservation Commission. To correct these problems, the Conservation Commission undertook a field restoration program to involve two mowings in the 1997 growing season and ten other specific actions (see **Figure 5-1** for location of work corresponding to numbered items below):

1. Clear vines, brush and saplings along wall to improve vista from Westford Rd.

2. Clear brush and saplings to wall, avoiding damage to sugar maples. Prune sugar maples; remove suckers growing at base of trees; prune lower branches to a height of 3-4', taking care not to cut into branch collars.

3. Reduce shrub islands. Leave cedars, saplings greater than 4″ diameter at breast height (DBH), and brush growing within rocky areas.

4. Clear brush to toe of slope, maintaining the current established edge of woods.

5. Open path to 8' wide over seasonal stream.

6. Clear brush, fallen branches and saplings back to wall. Leave deciduous saplings greater than 4″ DBH and cedars and pines greater than 3″ DBH.

7. Remove brush piles.

8. Clear brush, but remove juniper, pine, and deciduous saplings and trees.

9. Clear 8' off trail towards woods.

10. Clear top of berm that forms the walkway from the parking lot to the field. Place a 4'-width of wood chips, 3″ deep along the path.

Bids for this work were solicited in March 1997. Three were received, with the winning bidder being Tom O'Rourke of O'Rourke Farms in Carlisle. The total cost of this project was $6,505. A part of the cost ($2,935) was covered by a grant from The William P. Wharton Trust. The restoration work was apparently completed by mid-May, 1997.

Intensive Sheep Grazing Experiment: 2001 – 2004

In the summers of 2001 to 2004, Carlisle participated in a significant experiment on the use of sheep to "mow" Towle field (20 - 25 acres). Carlisle's involvement was spearheaded – and

Figure 5-1. Towle Field Restoration Areas (1997)

See text for restoration or maintenance activities associated with each number.

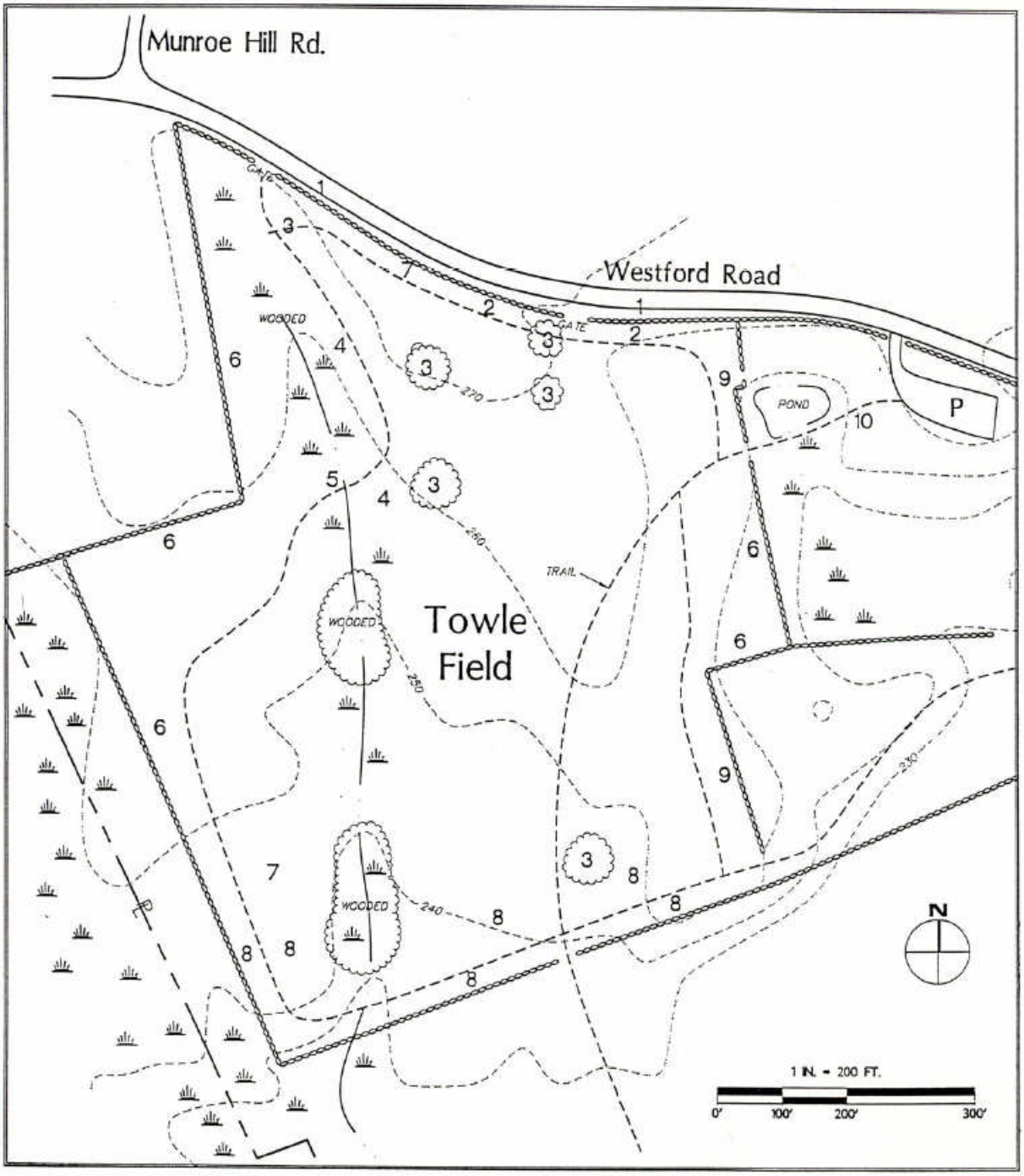


Figure 5-1. Towle Field Restoration Areas (1997)

mostly funded (~$66,000) - by the Carlisle Conservation Foundation (CCF). Additional program support was provided by the Carlisle Conservation Commission; some financial support ($7,600) was provided by the Wildlife Habitat Improvement Program (WHIP) (described below). Major goals of the program were to: (1) control – if not eradicate – the invasive buckthorn and poison ivy in the field; (2) remove excessive vegetation along the stone walls and other areas where mechanical mowing was unable to reach; and (3) to remove excessive thatch that had built up. CCF also included its own Spencer Brook Reservation (~ 4 field acres) in the experiment, so the total Carlisle field acreage involved was in the range of 24 to 29 acres. Other nearby entities involved in this regional experiment with their own lands were the Minute Man National Historic Park and the Concord Land Conservation Trust. For the grazing in Carlisle, CCF was the lead organization, and they were the entity that signed contracts with the two New Hampshire-based sheep suppliers that were used. For some periods during this experiment, controlled studies of grazed and ungrazed areas were conducted by the National Park Service (contact: Christopher Davis) and – as part of a senior thesis – a Middlebury College student, Molly Yazwinski. (See following subsection for details of these studies.)

Certain details on the mowing at Towle and Spencer Brook Reservation are provided in **Table 5-1**.

Table 5-1. Intensive Sheep Grazing Information

Year	Company Used	Approx. No. of Sheep	Number of Passes	CCF Cost
2001	Bellwether Solutions	~340	2	$6,322
2002	Sheepscapes LLC	~250	3	$20,000
2003	Sheepscapes LLC	~400	3	$20,000
2004	Sheepscapes LLC	~100	3	$20,000

As indicated in Table 5-1, the sheep were allowed to graze Towle field two to three times each summer (i.e., 2 – 3 passes), although the whole field was not mowed in each pass. Typically, the sheep would be contained in one portion of the field (by an electric fence, a shepherd, and sheep dogs) until they had removed the right amount of unwanted vegetation. They would then be moved to another portion of the field. For each summer, the Carlisle Conservation Commission issued a permit for the sheep mowing; the permit would stipulate certain exclusion locations (the center of the field) and times (nesting season) to protect the nesting bobolinks. The result, typically, was a grazing in late spring, late summer and mid-fall. As necessary, warning signs were posted at all entrances to the field (e.g., dog walkers to leash their dogs and keep a safe distance). At least for the first year of the experiment, all Towle Land abutters were provided with written notification of the planned experiment. On at least two occasions, the public was invited to a demonstration of sheep herding on Towle field by the resident shepherd. A significant amount of additional information on the sheep mowing experiment is available in articles published by the *Carlisle Mosquito* community newspaper.

The sheep mowing experiment took a significant amount of work by CCF, CCC, and others to bring about. While not exhaustive, important issues in the initiation and conduct of the experiment included the following:

- Costs (and fundraising to cover the costs)
- Preparing a contract and permit agreeable to all parties
- Insurance requirements for the operating company
- Protection of the bobolinks during their nesting season
- Local housing for the shepherd and his dogs
- Concern over dog walkers (possible bad interactions with sheep guard dog)
- Obtaining water for the sheep (Carlisle Fire Department helped here)
- Assessment of effectiveness (discussed below)

There was, unfortunately, no formal report at the end of the sheep mowing experiment. The files do contain a number of informal communications between the participating parties which contain valuable information.[3] Perhaps the best overall summary is given in a letter from Sally Swift (CCF president) and Arthur Milliken (key CCF mover for the sheep project) to Roy Watson (Conservation Commission chairman) dated February 17, 2005. Swift and Milliken stated the following in their letter:

> "CCF considers the grazing program to be a success both in terms of the benefits to the fields and in terms of what has been learned. Towle Field is looking substantially better and is much healthier. Buckthorn and other invasives have been subdued and portions of the property, particularly the second growth in the Southwest corner has been restored to pasture. As the sheep consumed and broke up the thatch, native grasses were allowed more space to grow. The growth along stone walls and boundaries which cannot be reached by mechanical means was trimmed to the ground.
>
> It was probably too optimistic to hope that the Buckthorn would be completely eradicated. Over time perhaps this invasive and others could be killed by continual grazing and mowing, but experts seem to agree that at this point multiple mowings and removal of plants by digging and/or careful herbicide application is both most economical and more effective."

Cost was certainly a factor in CCF's decision to discontinue the sheep mowing experiment after the 2004 season. Swift and Milliken (*op. cit*.) stated that the annual cost to CCF ($20,000) was a sizeable percentage of the CCF budget which relies on annual dues and contributions from members. They indicated that - if seed monies were needed for other property maintenance programs in the future - CCF might be able to assist in developing funding sources.

On the issue of cost, it should be noted that the annual CCF cost of $20,000 covered fields at both Towle Field and Spencer Brook Reservation. Perhaps 85% of the cost might be allocated to Towle Field because of the larger acreage, possibly $17,000 per year. This may be contrasted with the $1,000 per year mechanical mowing cost during the same time period. This comparison is not completely fair as: (1) Carlisle is getting a very favorable mowing rate from the local mower; (2) the cost of removing vegetation from along the stone walls is not included; and (3) the end result of sheep grazing may be more beneficial due to the removal of excessive thatch and the natural fertilization from sheep droppings.

[3] This material may be found in the Towle Field General Files located in the Carlisle Town Hall.

Scientific Experiments During Intensive Sheep Grazing

As mentioned above, two scientific studies were undertaken to evaluate the effectiveness of the sheep in reducing invasive species. Both studies had a significant focus on *Rhamnus frangula* (glossy buckthorn), an invasive, non-native woody plant. One study, conducted in 2001 at the Minute Man National Historic Park in Concord, was led by Christopher Davis of the National Park Service. (Ref. 1) The purpose of his study was to evaluate the feeding preferences exhibited by sheep in areas supporting a mix of native and non-native trees, shrubs and grasses. He used six ¼-acre enclosures, three of which were grazed and three used as controls (ungrazed). The grazing involved a flock of 328 sheep which was allowed to graze in each of the three 'grazed' enclosures for eight hours. Each enclosure was sampled for the mass (dry weight) of grass and leaves after 30 minutes, 90 minutes and 480 minutes (8 hours).

Davis found that "sheep preferentially consumed the leaves of woody vegetation until most leaves had been eaten after which grazing switched to grasses." (1) Within his test plots he specifically found the following:

> "Within 30 minutes of introducing sheep to enclosures, the mean biomass of leaves dropped by more than 50 percent, while the weight of grasses remained relatively constant. Within 90 minutes, sheep had consumed almost all available leaves, while the weight of grasses continued to remain relatively constant. After eight hours (480 minutes), sheep had eaten all palatable leaves (e.g., they ignored sweet fern) and had switched to consumption of grasses."(Ref. 1)

Davis also reported finding no buckthorn berries in grazed areas (versus an average of 201 berries in ungrazed plots) and a reduction from 67 inches to 20 inches of the average height of the tallest stem per plant. (Ref. 2)

The second study, conducted in 2003 by Middlebury College student Molly Yazwinski as part of her honors thesis, was done on Towle field. (Ref. 3) Her study sought to determine whether growth and development of glossy buckthorn is significantly hindered by repeated defoliation episodes. Yazwinski used three replicate enclosures (3 m × 8 m), each divided into grazing and no-grazing subsections. She also made use of a test plot (10 m × 24 m) with an exceptionally dense growth of buckthorn that had been laid out by Christopher Davis. This area had not been mechanically mowed since sheep grazing began in 2001. Half of this test area had been subject to the sheep grazing, the other half was a no-graze area. Yazwinski's studies involved the measurement of buckthorn stem length, number of branches, berry production and end-of-season biomass to compare regrowth in grazed and un-grazed areas over the course of a single growing season.

Yazwinski gave the following conclusion from her studies:

> "Grazing had a significant negative effect on end-of-season biomass and stem length in established *R. frangula* but no mortality of adult shrubs has yet been observed following three seasons of grazing. Grazing has also effectively prevented berry production in adult *R. frangula*, suggesting that grazing may be effective in controlling population growth.

However, the short-term nature of this study prevents full evaluation of the potential of sheep grazing as a method for controlling the growth and spread of *R. frangula*." (Ref. 3).

Both the Davis (Refs. 1, 2) and Yazwinski (Ref. 3) reports include references to several other sheep grazing studies that evaluated the ability of grazing to control invasive plant species. These references indicate control of some species may be achieved after 3 to 7 years of grazing.

Wildlife Habitat Improvement Program (WHIP): 2003 – 2007

From 2003 to 2007, the Wildlife Habitat Improvement Program (WHIP) is assisting in the maintenance of the Towle fields. WHIP, which is administered by the USDA's NRCS, was originally authorized under the Federal Agriculture Improvement and Reform Act of 1996, and reauthorized under the Farm Security and Rural Investment Act of 2002. WHIP provides cost share assistance to landowners to restore and improve wildlife habitat on upland, wetland, riparian, aquatic, and other areas. Carlisle applied for its WHIP assistance in March 2003. The total assistance package approved was for $13,475. The details of the work covered and allocated cost sharing are provided in **Table 5-2**. A portion of the maintenance mowing budget covers an early to mid-June perimeter mowing in areas delineated by the Conservation Commission.

Table 5-2. WHIP Activities and Cost Sharing Amounts Provided, by Year

Activity	2003	2004	2005	2006	2007
Sheep Mowing	$7,600				
Maintenance Mowing		$ 650	$650	$650	$650
Invasives Mechanical Control		$1,235	$140		
Lime & Fertilizer		$1,900			

Birdhouses

The birdhouses on Towle field (and Foss Farm) are currently maintained by Tom Brownrigg, former Carlisle Conservation Commissioner. The following information was supplied by Mr. Brownrigg.

There are about 20 boxes at Towle field, and perhaps 10 at Foss Farm. Former Carlisle residents and bird book authors Don and Lillian Stokes installed the first boxes in the late 1980's; many of these boxes are still in use. In the mid-1990's the Congregational Church probably built many more boxes for Towle, with cedar wood donated by George Senkler/Concord Lumber.

Most of the boxes at Towle are occupied by tree swallows, and a few by house wren, both native birds. Chickadees also use nest boxes. House wrens can be a problem because they build "dummy" nests of sticks thereby excluding use by other birds. They also will puncture the eggs of other birds. If Mr. Brownrigg finds a dummy nest he removes it. House wrens usually don't bother nest boxes that are far out in the field. He has never seen more than 2 pairs of Eastern Bluebirds at Towle field.

Here are the things Mr. Brownrigg does with regard to the nest boxes at Towle field and Foss Farm, starting in the spring:

1. Clean the boxes thoroughly in the early spring (March) and remove old nests. One might find White-footed mice and possibly other creatures such as wasps. Bluebirds will not use boxes that have such material in them.

2. The inside tops of the boxes should be rubbed with soap or wax. This will discourage paper wasps from building nests (they love nest boxes).

3. Check to see if house sparrows are nesting in the boxes. If so, remove the nest and eggs; this is legal as this is a non-native species. House sparrows are very persistent, so this will probably have to be done several times.

4. Check to see if the boxes are broken and repair as necessary. In general, the tops of the boxes seem most susceptible to damage (decay and splitting). If Mr. Brownrigg can't repair a top or side, he replaces it.

5. The original metal stakes used at Towle and Foss were a lighter gauge. The sheep liked to rub on the stakes, and a lot of stakes got bent and broken, since they're not too flexible. Mr. Brownrigg plans to replace these stakes with heavier-duty stakes (there are some in use now).

6. New nest boxes should be built of cedar instead of pine, as it's much more rot-resistant. There are good nest box plans available from several sources (e.g., the book by Don and Lilian Stokes and the North American Bluebird Society). Tricia Smith made some very nice cedar boxes using the Stokes' book plans. If Mr. Brownrigg uses pine, he treats it with linseed oil in order to make it more weather-resistant. See the *Carlisle Mosquito* March 10, 2006 Biodiversity Corner for references.

7. If new boxes are installed, put two together, about 10 feet apart. This will discourage the box from being occupied by a more aggressive species, such as house sparrow or tree swallow. Generally, two birds of the same species don't like nesting close together.

8. In the fall, after the nesting season, clean out the boxes again. Many birds will use nest boxes for shelter from the cold in winter.

<u>Trails</u>

The Carlisle Trails Committee currently maintains over forty miles of trails in Carlisle, including those on the Towle Land. There is no set maintenance schedule for each of the trails although the Committee maintains a list of those sections that have been recently checked or cleared as the seasons progress. Members walk much of the system on a regular basis to inspect as well as enjoy the trails. Special efforts are made to check major trails after large storms. When normal trail maintenance (brush cutting and branch removal) is required for a particular area, it is scheduled at the monthly meeting. E-mail messages are sent out to the list of volunteers and

notices are put in the *Carlisle Mosquito* if time allows. On maintenance days, crews are sent out in groups to the selected areas. For a small task, members often take care of the issue themselves as the need is noticed. For a number of years, the Committee had the benefit of having Bob Eaton, a licensed arborist and gifted ropes expert, on the team.

Each of the seasons has its share of work that fits into the Trails Committee's management schedule:

> Winter: Activities include cutting and removal of trees that fall along the path to keep trails open for skiing and tobogganing heavy materials into remote sites, as well as planning, manufacture and painting of signs for trails, mapping and charting using the Global Positioning System (GPS) when the foliage is out of the way, and planning for the rest of the year.
>
> Spring: The time before the foliage and bugs arrive in mid April is the best time to do major clearing jobs that require cutting and trimming of branches along the trails.
>
> Summer: Heavy spring rains may require trimming of new growth along trails. Mowing areas in the sun and in open fields needs to be done at this time. The Committee has purchased a DR trimmer to help with this.
>
> Fall: Boardwalks and other major projects are completed at this time when the ground is the most stable and the bugs are not biting.

Major projects such as the creation of new trails or boardwalks require months of planning. Ideally, the Trails Committee would take over a year to plan a new trail so that it can be marked and observed through the seasons to check for optimal location. The year allows the Committee to check for land drainage, and to identify particular features such as views or plants that would want to be highlighted along the trail. This time also allows the Committee to finish any permitting that may be required.

Parking Lot Areas

Initially, the Towle Land had two parking areas with access from Westford Road. One was near the existing location; the second was near the middle of the field where there is a break in the stone wall. Due to abuse of the latter (cars were sometimes driven onto the field), this upper lot was closed around 1980. The lower lot was then replaced with a new one at essentially the same location, but further removed from Westford Road.

Parking lot maintenance currently includes routine emptying of the trash can. This work is contracted out to Dick's Rubbish. The Carlisle Department of Public Works has been asked to periodically clear brush along the trails from the parking lot to the dam, and along the sides of the dam. They are occasionally asked to remove brush between the parking lot and Westford Road and to fill in the depressions in the entrance road leading to the parking lot.

Dam and Pond

The pond and slowly-deteriorating (and leaking) dam on the Towle Land have been a concern ever since its purchase. However, records of just what has been done (including inspections and studies) are not very complete or informative.

According to a 1983 letter written by Bonnie Miskolczy (former Conservation Commissioner), the Conservation Commission's agenda for July 2, 1969 indicates the Soil Conservation Service was planning on sending an engineer to look at the dam, but records are unclear if such an inspection took place. She further states that the issue was discussed at the October 16, 1969 meeting. The Commission, at that time, felt that an estimate of $2,000 for dam repair was excessive. She also mentions that Ben Benfield (Conservation Commission Chairman) tried unsuccessfully to seal the dam leaks using bentonite, a clay that swells when wet. Other dam repair estimates (details unspecified) of up to $5,000 are mentioned.

In late 1979, the Conservation Commission hired Jerome Long, P.E. (Terrain Investigation, Inc., Weston, MA) to inspect the dam and make recommendations. Mr. Long's letter report (Jan. 8, 1980) described the existing conditions and mentioned – but did not recommend – three standardized methods for sealing ponds: (1) compacted clayey glacial till; (2) bentonite mixing; and (3) PVC liners. However, Mr. Long indicated there were problems and significant expenses associated with pond sealing, and there was no guarantee of success. His primary recommendations were to: (i) monitor the leakage rate; (ii) check the seepage to see if it was clear or carrying soil particles; and (iii) if downstream erosion was a problem, add appropriate amounts of crushed stone riprap.

In March 1989, the Conservation Commission requested the help of the Soil Conservation Service (SCS) in evaluating both the Towle and Greenough dams. The SCS undertook a study and submitted a letter-style report (dated May 23, 1989) to the Commission. The dam at Towle was described by the SCS as "…typical of the old style of dam construction, i.e. fill 'sandwiched' between vertical rock faces on the upstream and downstream side. The exact nature of the fill material is unknown. An outlet pipe is at the east end of the dam, but the water level is currently well below the inlet of this pipe." The SCS letter provides further descriptive information on the dam's deterioration and then presents five alternatives to address the deterioration:

1. Do nothing
2. Make minor repairs
3. Partial replacement of dam core
4. Sealing of dam face
5. Complete replacement

Each of these alternatives is briefly discussed in the SCS letter. No cost estimates are provided.

Other documents indicate that the Conservation Commission was contemplating significant restoration work on the Towle dam in 1989 and/or 1990, but it is unclear if any work was

actually undertaken. Specific actions mentioned in an August 19, 1989 memorandum include the following:

- Clear dike of saplings and brush
- Apply bentonite at end of dike near visible leak
- In October (when water level is low) clean litter from pond, and place a measuring stick in the pond to use in monitoring the water level
- Use volunteer labor and donated bentonite

In 1993, Eunice Knight, Carlisle citizen and former Conservation Commission secretary, prepared a report on the Towle pond as a product of her Radcliffe Seminars Program. Her report provided a detailed description of the pond and dam (with numerous photographs) and associated hydrology. Mrs. Knight proposed that the existing dam be taken apart and reconstructed at about half its current height, using the stones from the dam to line the sides and bottom of the brook below. The new dam would have one or two spillways. She also proposed relocating the trails to a brook crossing below the new dam, and dredging of the pond (3 – 4 feet). Other modifications are mentioned, and the many values of the restored pond clearly stated. She concluded: "Towle pond is a jewel to shine and reset."

At present, the only maintenance routinely undertaken is the removal of brush from the sides of the dam.

5.2 Current Condition of the Property

Parking Lot and Entrance Road

The unpaved parking lot is in fairly good condition. The entrance road has some serious, water-retaining depressions that periodically need to be filled.

Towle Field and Environs

The current assessment for Towle field proper is a mixed review. From one perspective, the field is clearly in the best shape it has been in many years. Compared to what is was in 1996 – with excessively deep thatch and buckthorn bushes growing 2 – 3 feet high – it is in very good shape. The special restoration of 1997, the annual mechanical mowing, and the 4-year sheep mowing experiment (2001 – 2004) have made significant improvements. Yet, the buckthorn and poison ivy are still there, and it is clear that the struggle against these and other invasive plants will be a continual one.

Small gains have been made over the years in reclaiming and maintaining the edges of the field; i.e., combating the encroachment of the forest. This has required aggressive mowing and some small tree cutting. In addition, there has been some success in reducing the size of some of the islands of trees and shrubs that are in the field.

Of the 12 sugar maples planted along the northern edge of the field, 10 are in good condition. One has died and remains as a standing dead tree. One other appears to be in serious condition. The condition of the sugar maples will continue to be monitored as the seasons progress.

The large stone wall along the north side of the field, bordering Westford Road, is slowly falling apart. There are two locations near the northwest corner of the field where it appears the stone wall may have been pushed in, perhaps by a snow plow. Much of the excessive vegetation that had grown up in and around the wall was significantly reduced during the sheep mowing experiment. However, the vegetation will grow back. There are three openings in this stone wall that – at least in the past – allowed vehicle access to the field. Only one now remains a true access (the one near the middle of the field at the site of the former parking lot). Only this latter opening has, of late, occasionally had a gate (metal bar) to restrict vehicle access. This one gate is not currently serviceable.

Dam and Pond

The slow deterioration of the dam and pond has continued over the years. One major improvement of late has been the renewed effort to eliminate the growth of brush and trees on the dam. Such growth is detrimental to the integrity of the dam. It appears, however, that each year another rock or two from the dam is dislodged, and that the water level in the pond is a little lower. Some might question if what remains now might be more properly called a wetland than a pond.

Property Signs

The wood-constructed Towle Land property signs are in fair condition, although the range is from poor to good. The property sign ("Towle Field") along Westford Rd. near the middle of the field is in good shape, while the one by the entrance to the parking lot, and the ones in the parking lot, are in poor to fair condition. Refurbishment and/or replacement will be required within the next few years. In addition to the wood-constructed signs, the property has a number of laminated paper signs that ask visitors not to disturb the bobolinks. These signs are in fair shape.

Trails and Trail Signs

The walking trails on the Towle Land are in generally good condition. Following periods of heavy rain, there a number of trail locations that become muddy, but they are not hard to traverse. There are approximately seven wooden bridges on the trail system that assist walkers in crossing the intermittent streams and wet areas. All except one are in good shape. One has deteriorated to the point it is no longer useable; however, it is not on a regularly used (or official) trail. Thus, replacement is not necessary.

In 2005 there was a significant blowdown of large trees across the trail leading to Bingham Road. The Trails Committee cleared the trails, but left the cut logs right next to the trail as – due to the proximity of wetlands – there was no room to discard the logs further off trail. Other trail-side logs and slash may be from an abutter.

There are at least seven trail signs to help walkers on the Towle Land, all in the woods, and all appear to be in good condition. Additional trail signs at the parking lot, and at the edges of the field, should be considered. A trail map should be posted at the parking lot.

Photographic Record

A series of approximately 80 photographs of the Towle Land was taken by Warren Lyman in May 2006. Photos were taken of the fields, trails in the woods, trail bridges, dam and pond, signs (property and trail), stone wall and sugar maples along Westford Rd., and a few other features. The photos are listed and keyed to a site map in **Appendix F**. Copies of these photos are available in Town Office files. The Town Office files also contain a few other photographs taken in earlier years, including: (1) prior to the field restoration work in 1997; and (2) of the dam and pond by Eunice Knight in connection with her study in 1993 (see Section 5.1). The *Carlisle Mosquito* contains a number of photos of the sheep during their visits in 2001 – 2004.

Inspection of Towle Land Boundary

In early 2007, an inspection of the Towle Land boundary was undertaken by the principal authors of this report. The primary purposes were to see how well the boundaries were defined (and could be found) and to check for possible encroachments by abutters. Notes and photographs from this boundary inspection are provided in **Appendix G**. Only the boundaries along public roads are well defined. Some others follow old stone walls, some of which also have remnants of barbed wire fences. Other boundaries follow ditches, or cross wetlands and woodlands without any identifying markers. At only one corner in the boundary was a marker found (see photo #6 in Appendix G). Evidence of significant encroachment was found at one location along the trail leading to Bingham Rd. Cut trees (logs and slash) from the abutting private lot had apparently been placed on conservation land. Other minor encroachments included two or three unofficial trails leading from the main (official) trail system to abutting private land.

References

1. Chris Davis (National Park Service), Preferential Sheep Feeding at Minute Man National Historic Park, unpublished draft report, January, 2003.

2. Chris Davis (National Park Service), unpublished Power Point presentation for Middlesex Community College – Botany Course, September 21, 2004.

3. Molly Yazwinski, The Effects of Intensive Sheep Grazing on the Growth and Reproduction of Invasive Glossy Buckthorn (*Rhamnus frangula*), thesis submitted in partial fulfillment of the requirements for honors, Department of Biology, Middlebury College, Middlebury, VT, January 2004.

6. Problems and Issues to be Addressed in the Management Planning Process

6.1 Introduction

The baseline assessment of the Towle Land condition resulted in identification of a number of problems and issues to be addressed the forthcoming management plan. Recommendations for management planning focus include the following:

- Towle Field
- Parking lot and entrance road
- Pond and dam
- Trails
- Signs
- Sugar maples
- Stone walls and gates
- Forest and understory management
- Vernal pools
- Encroachments by abutters

It should be noted that this is an initial list; it is possible that additional areas may be identified as the Land Stewardship Committee (LSC) gathers input on the baseline assessment and the management planning process from reviewers. It would also be useful to prioritize the list, based on inputs and LSC expertise, prior to developing the management plan.

6.2 Towle Field

Goal Statement

A clear goal needs to be agreed upon that specifies the most desired uses of the field, understanding that such uses might change with season, location in the field, and time. The major uses currently include: (1) habitat for bobolinks and other field-nesting birds (primarily June to August); (2) passive recreation (year round); and (3) maintenance of visually-pleasing vistas. Other uses should be considered before finalizing the goal statement.

Maintenance to Control Invasives and Forest Encroachment

Invasives such as buckthorn and poison ivy will require continuing action for adequate control. Agreement needs to be reached on acceptable control methods along with acceptable maintenance costs. Details on individual maintenance actions (e.g., the methods, locations and timing of mowing) need to be agreed upon. Consideration needs to be given to occasional reseeding and fertilizing which could be done in sections. The maintenance program will probably require a detailed inspection of the field each year, with the maintenance plan for the following year targeting areas of concern.

The field maintenance plan also needs to address control of encroachment of trees and shrubs both along the border of the field and around the several "islands" of trees that exist in the field. Certain "islands" may be slated for removal. The stone wall along Westford Rd. also needs to be occasionally cleared of excessive vegetation.

The Conservation Commission should continue to seek assistance from other groups to help maintain this valuable field. In the past, for example, the Conservation Commission has benefited from generous assistance from the Carlisle Conservation Foundation (the sheep grazing in 2001 – 2004) and technical advice from the USDA NRCS (formerly Soil Conservation Service). Many other private and governmental organizations may be able to offer help and advice.

6.3 Parking Lot and Entrance Road

Issues for the parking lot and entrance road include: (1) cutting back excessive brush; and (2) filling in the holes in the entrance road. It should be determined if there is a crucial need for more parking; it is probably desirable to limit additional parking space with the goals of keeping as much of the land as possible in natural cover and maintaining the rural character of the property.

6.4 Pond and Dam

It appears that all efforts to "save" the pond and dam have been put aside except for the cutting of brush and saplings along the sides of the dam. This informal decision needs to be more formally considered. Virtually everyone who parks in the lot and goes for even a short walk will pass over the trail on the dam, making the pond and dam an extremely visible part of the Towle property. Past assessments have indicated that dam repair and pond dredging are both difficult and expensive.

6.5 Trails

The "trails" which cross Towle field need to be better maintained both by more frequent mowing and by control of the poison ivy. Without such control, the trails become impassable during the growing season to all but the most daring.

No significant issues are apparent for the trails in the woods which are generally in good condition. One footbridge on an unused trail has rotted out. There are a few locations where the trail becomes muddy after heavy rains.

6.6 Signs

<u>Property Signs</u>

The two property signs at the entrance to, and in, the parking lot will need renovation or replacement in the near future. The trash removal sign in the parking lot will also need replacement soon.

Trail Signs

The existing trail signs are in good condition. However, recommendations should be made (to the Trails Committee) for additional signs, especially at the parking lot. It might be useful to have an overall trails map sign at the parking lot, as the trail system is somewhat confusing to the uninitiated.

6.7 Sugar Maples

A cursory inspection shows that most of the sugar maples (planted by a Chelmsford Boy Scout troop in 1979) are in good condition. The remaining sugar maples need to be identified and located. One dead tree remains standing and may need to be cut down; another appears to be dying. Regular inspections should be considered for these trees.

6.8 Stone Walls and Gates

The most important wall is the large one that lies along Westford Road. Because it is so visible, special efforts may be desirable to keep it in good condition. At present, it is slowly deteriorating, and in two locations (each 4 – 8 feet wide) near the northwestern part of the field it appears to have been pushed over, perhaps by a snow plow. There are many other stone walls on the property, but it is not clear if they warrant any maintenance efforts.

The stone wall along Westford Road has – excluding the parking lot entrance – two openings which have the potential to be used for vehicle entrance (See Figure 1-3). One of these is the opening in the middle of the field (site of a former parking lot) that was used during the sheep grazing experiment. There is a non-functional gate at this opening. Consideration needs to be given to securing these openings while insuring that emergency access vehicles are not hindered from entering the field.

6.9 Forest and Understory Management

Forests on the Towle property appear to be in reasonable condition after an initial inspection, although there are areas where the load of downed and dead wood needs to be reduced (as is true on much of Carlisle's open land). The succession meadows are apparently being taken over by forest; while this is a natural process, the succession meadows provide a valuable habitat for birds.

6.10 Vernal Pools

There are several vernal pools on the Towle property. While they are not directly threatened at present, it may be worthwhile to seek volunteers to certify them under NHESP.

6.11 Encroachments by Abutters

An assessment of the Towle Land property boundaries has not yet been undertaken. This will likely be done in late fall or winter (2006) to check for possible abutter encroachments or other

problems. This is an important area of concern as all of the parcels surrounding the Towle Land have been built upon and the property fronts upon a major town road.

Appendix A

Description of Soils on the Towle Land

Source: Middlesex County Massachusetts (Interim) Soil Survey Report, 4th edition, published by the Middlesex Conservation District, July 1995.

See Section 1.3 of the Baseline Assessment for a soils map, table of soils characteristics, and associated text.

Soils are listed in numeric order using the assigned soils code.

51A SWANSEA MUCK, 0-3% SLOPES. Swansea series consist of nearly level, deep (5+ ft.), very poorly drained organic soils in depressions and low flat areas of uplands and glacial outwash plains and terraces. They formed in 16 to 51 inches of black, highly decomposed organic material (muck) with moderate or moderately rapid permeability, over sandy mineral material with very rapid permeability. They have a water table that is at or near the surface most of the year. Major limitations are related to wetness and low strength.

52A FREETOWN MUCK, 0-3% SLOPES. Freetown series consists of nearly level, deep (5+ ft.), very poorly drained organic soils in depressions and on flat areas of uplands and glacial outwash plains. They formed in 51 inches to many feet of black, highly decomposed organic material (muck) over sandy or loamy mineral material. Permeability is moderate or moderately rapid. They have a water table which is at or near the surface most of the year. Major limitations are related to wetness and low strength.

71B RIDGEBURY FINE SANDY LOAM, EXTREMELY STONY, 3-8% SLOPES. Ridgebury series consists of nearly level and gently sloping, deep (5+ ft.), poorly drained soils in depressions and shallow drainageways of uplands. They formed in compact glacial till. Ridgebury soils have friable sandy loam and fine sandy loam surface soil and subsoil with moderate or moderately rapid permeability, over a firm sandy loam and fine sandy loam substratum (hardpan) at 14 to 30 inches which has slow or very slow permeability. They have a perched, seasonal high water table at 0 to 18 inches. Ridgebury soils have a very stony or extremely stony surface, except where stones have been removed, and have stones below the surface. Major limitations are related to wetness, slow permeability and stoniness.

73B WHITMAN FINE SANDY LOAM, EXTREMELY STONY, 0-5% SLOPES. Whitman series consist of nearly level, deep (5+ ft.), very poorly drained soils in depressions and drainageways of uplands. They formed in compact glacial till. Whitman soils have friable and loam or fine sandy loam surface soil and subsoil with moderate or moderately rapid permeability over a firm sandy loam, fine sandy loam or loam substratum (hardpan) at 10 to 30 inches which has slow or very slow permeability. They have a perched high water table at or near the surface most of the year. Whitman soils have a very stony or extremely stony surface, except where stones have been removed, and have stones below the surface. Major limitations are related to wetness, slow permeability and stoniness.

103B, C & D - CHARLTON-HOLLIS-ROCK OUTCROP COMPLEX consists of well drained Charlton soils, somewhat excessively drained Hollis soils and rock outcrops, that occur in such intricate patterns on the landscape, that it is not practical to separate them at the scale of mapping. Generally these

areas consist of about 50 percent Charlton soils, 15 percent Hollis soils, 10 percent rock outcrop and 25 percent other soils. Major limitations are related to rockiness and slope, and depth to bedrock in the Hollis soil. For information on Charlton and Hollis soils, see "Charlton" and "Hollis" series descriptions.

104C & D - HOLLIS-ROCK OUTCROP CHARLTON COMPLEX consists of undulating and rolling shallow soils, areas of exposed bedrock and very deep soils on hills and ridges where relief is highly affected by underlying bedrock. The components of this complex occur in such intricate patterns it is not practical to separate them. The complex is approximately 30 percent Hollis soils, 30 percent Rock outcrop and 25 percent Charton and 15 percent other soils. Major limitations are related to rockiness, slope and depth to bedrock in the Hollis soil. See "Charlton" and "Hollis" series descriptions for more information.

253D HINCKLEY LOAMY SAND, 15-25% SLOPES. Hinckley series consists of nearly level to very steep, deep (5+ ft.), excessively drained soils on glacial outwash plain, terraces, kames, and eskers. They formed in gravelly and cobbly coarse textured glacial outwash. Hinckley soils have friable or loose, gravelly and very gravelly sandy loam to loamy coarse sand surface soil and subsoil with rapid permeability, with loose stratified sands and gravels in the substratum at 12 to 30 inches which have very rapid permeability. Major limitations are related to slope and droughtiness.

300B MONTAUK FINE SANDY LOAM, 3-8% SLOPES. Montauk series consists of nearly level to steep, deep (5+ ft.), well drained soils on drumlins, or rounded and elongated hills. They formed in compact glacial till. Montauk soils have friable fine sandy loam surface soil and subsoil that have moderate or moderately rapid permeability over a firm loamy coarse sand to sandy loam substratum (hardpan) at 18 to 36 inches with moderately slow or slow permeability. Montauk soils have a very stony or extremely stony surface except where stones have been removed, and have stones below the surface. Major limitations are related to slow permeability in the substratum, stoniness and slope.

310B WOODBRIDGE FINE SANDY LOAM, 3-8% SLOPES. Woodbridge series consist of nearly level to steep, deep (5+ ft.), moderately well drained soils on drumlins. They formed in compact glacial till. Woodbridge soils have friable fine sandy loam or sandy loam surface soil and subsoil with moderate permeability over a firm, fine sandy loam or sandy loam substratum at 15 to 38 inches which has slow or very slow permeability. Woodbridge soils have a very stony or extremely stony surface except where stones have been removed, and have stones below the surface. They have a perched, seasonal high water table at 18 to 24 inches. Major limitations are related to wetness, slow permeability in the substratum, stoniness and slope.

315B SCITUATE FINE SANDY LOAM, 3-8% SLOPES. Scituate series consists of nearly level to sloping, deep (5+ ft.), moderately well drained soils in low areas and along drainage ways on uplands. They formed in compact sandy glacial till. Scituate soils have friable, fine sandy loam or sandy loam surface soil and subsoil with moderately rapid permeability, over a firm loamy sand or loamy fine sand substratum (hardpan) at 18 to 34 inches which has slow permeability. They have a perched seasonal high water table at 18 to 24 inches. Scituate soils have a very stony surface except where stones have been removed, and they have stones below the surface. Major limitations are related to wetness, slow permeability and stoniness.

422B CANTON FINE SANDY LOAM, EXTREMELY STONY, 3-8% SLOPES. Canton series consists of nearly level to very steep, deep (5+ ft.), well drained soils on uplands. They formed in glacial till, ground moraine and ice-contact stratified drift. Canton soils have friable fine sand loam surface soil and subsoil with moderately rapid permeability, over a loamy coarse sand to loamy fine sand substratum at 18 to 36 inches with rapid permeability. Canton soils have a very stony or extremely stony surface,

except where stones have been removed and have stones below the surface. Major limitations are related to slope and stoniness.

Appendix B

Indian Ceremonial Features on the Towle Land

The subject of Indian ceremonial areas and features in New England has been controversial in archaeological circles. However, there is an increasing acceptance of these features as remnants of the culture that preceded the European presence.

Ceremonial features include piles of stone clustered in special places, often associated with water; effigies; and features aligned with astronomical events such as the winter solstice sunrise. There are examples of each on the Towle Land. Those located so far are in the areas shown in Figure 1-3.

The feature in the northern area is a turtle effigy. It is shown in Figure B-1. It closely resembles the turtle effigy at Great Brook Farm State Park. In this effigy the head seems to have been formed by moving a slab whereas the State Park effigy is monolithic.

Figure B-1. The Head of the Turtle Effigy on the Towle Land

The head is pointing in the direction of the winter solstice sunrise. When the sunrise at the winter solstice is viewed from the area of the turtle the sun rises over Whipple Hill in Lexington, about thirteen miles to the southeast. Whipple Hill is the site of a number of

impressive ceremonial structures also. There are numerous feature sites extending northwest for at least 20 miles on this same line as well.

The southern designated ceremonial area contains a collection of stone piles. Twenty six have been recorded. A picture of one pile is shown in Figure B-2. This pile is on a large boulder about three feet high.

Figure B-2. Rock Pile on a Large Rock on the Towle Land

This grouping of piles is adjacent to the wetlands forming the source of Spencer Brook which runs south from this area. There is a smaller collection of features on Concord Street directly across the open meadow from the Towle piles and adjacent to the exit of the water from the meadow into Spencer Brook.

The Conant wetlands were probably a part of the meadow wetlands before Route 225 split them. From comments made by knowledgeable members of the Indian community sources of water which give rise to flow in several directions are considered significant. This suggests that there may be a relationship between the Towle site and the neighboring sites based on the movement of surface water.

In this context the Towle Property is a significant element in a much larger ceremonial landscape. The extension of the flow relationship to the drainages makes the Towle area important to a broad area of Massachusetts. The astronomical alignment connects the property to sites many miles away, perhaps into New Hampshire. Thus the property may

have been very significant to the earlier cultures. Additionally it is believed that a major East-West trail ran past the property roughly along Route 225.

Selected References

The following are selected references relating to Indian ceremonial sites in New England. They are chosen to be accessible and are far from comprehensive.

1. *Survey Report of Indian Ceremonial Structures on Benfield "A" Property in Carlisle, Massachusetts* , D. Harris, C. Hoffman, P. Waksman and T. Fohl, 2005 (copies available in the Gleason Public Library)
2. *Manitou,* J. M. Mavor and B. E. Dix, Inner Traditions International, Rochester, VT, 1989
3. The webs site of the New England Antiquities Research Association (NEARA) www.neara.org
4. The blog http;//rockpile.blogspot.com/

The websites have numerous links to related sites.

Appendix C

Birds of the Towle Conservation Land, Carlisle, MA, 1968-2006

What follows is an annotated systematic list of the 132 species, plus two hybrids, that have been recorded on the Towle Land. High counts are the largest total number found in any one year, with multiple observations of the same presumed individuals (mainly nesting birds) excluded. This list was compiled by Ken Harte on July 29, 2006, but is should be noted that this list is a work in progress and will be revised based on subsequent bird counts.

Systematic List (DRAFT)

1. **Double-crested Cormorant.** *Phalacrocorax auritus.* Four records (flybys) including a flock of 22 in 1986. Last observed in 1994.
2. **Great Blue Heron.** *Ardea herodias.* Occasional visitor. Highest count was 3, in 1991.
3. **Green Heron.** *Butorides virescens.* Three records of single birds.
4. **Canada Goose.** *Branta canadensis.* Recorded in about half the years, typically 2 to 6 birds, with a high count of 18 in 1996.
5. **Wood Duck.** *Aix sponsa.*
6. **American Black Duck.** *Anas rubripes.*
7. **Mallard.** *Anas platyrhynchos.*
8. **Common Merganser.** *Mergus merganser.*
9. **Turkey Vulture.** *Cathartes aura.*
10. **Sharp-shinned Hawk.** *Accipiter striatus.*
11. **Cooper's Hawk.** *Accipiter cooperii.*
12. **Northern Goshawk.** *Accipiter gentilis.*
13. **Red-shouldered Hawk.** *Buteo lineatus.*
14. **Broad-winged Hawk.** *Buteo platypterus.*
15. **Red-tailed Hawk.** *Buteo jamaicensis.*
16. **American Kestrel.** *Falco sparverius.*
17. **Merlin.** *Falco columbarius.*
18. **Ring-necked Pheasant.** *Phasianus colchicus.*
19. **Ruffed Grouse.** *Bonasa umbellus.*
20. **Wild Turkey.** *Meleagris gallopavo.*
21. **Killdeer.** *Charadrius vociferus.*

22. **Greater Yellowlegs.** *Tringa melanoleuca.*
23. **Solitary Sandpiper.** *Tringa solitaria.*
24. **Spotted Sandpiper.** *Actitis macularia.*
25. **American Woodcock.** *Scolopax minor.*
26. **Herring Gull.** *Larus argentatus.*
27. **Iceland Gull.** *Larus glaucoides.*
28. **Great Black-backed Gull.** *Larus marinus.*
29. **Rock Dove.** *Columba livia.*
30. **Mourning Dove.** *Zenaida macroura.*
31. **Black-billed Cuckoo.** *Coccyzus erythropthalmus.*
32. **Yellow-billed Cuckoo.** *Coccyzus americanus.*
33. **Eastern Screech-Owl.** *Otus asio.*
34. **Barred Owl.** *Strix varia.*
35. **Common Nighthawk.** *Chordeiles minor.*
36. **Chimney Swift.** *Chaetura pelagica.*
37. **Belted Kingfisher.** *Ceryle alcyon.*
38. **Red-headed Woodpecker.** *Melanerpes erythrocephalus.* A male of this occasional visitor to eastern Massachusetts was found on 12 May 1973.
39. **Red-bellied Woodpecker.** *Melanerpes carolinus.*
40. **Downy Woodpecker.** *Picoides pubescens.*
41. **Hairy Woodpecker.** *Picoides villosus.*
42. **Northern Flicker.** *Colaptes auratus.*
43. **Pileated Woodpecker.** *Dryocopus pileatus.*
44. **Eastern Wood-Pewee.** *Contopus virens.*
45. **Least Flycatcher.** *Empidonax minimus.*
46. **Hammond's Flycatcher.** *Empidonax hammondii.* A probable individual of this accidental visitor from the west was found at the east edge of the Towle Land, adjacent to Hamilton's meadow, on 26 December 1998 by Tom and D'Ann Brownrigg. It disappeared on 28 December before it could be photographed or trapped to provide positive identification.
47. **Eastern Phoebe.** *Sayornis phoebe.*
48. **Great Crested Flycatcher.** *Myiarchus crinitus.*
49. **Eastern Kingbird.** *Tyrannus tyrannus.*
50. **Northern Shrike.** *Lanius excubitor.*
51. **Yellow-throated Vireo.** *Vireo flavifrons.*

52. **Blue-headed Vireo.** *Vireo solitarius.*
53. **Warbling Vireo.** *Vireo gilvus.*
54. **Red-eyed Vireo.** *Vireo olivaceus.*
55. **Blue Jay.** *Cyanocitta cristata.*
56. **American Crow.** *Corvus brachyrhynchos.*
57. **Tree Swallow.** *Tachycineta bicolor.*
58. **Barn Swallow.** *Hirundo rustica.*
59. **Black-capped Chickadee.** *Poecile atricapillus.*
60. **Tufted Titmouse.** *Baeolophus bicolor.*
61. **Red-breasted Nuthatch.** *Sitta canadensis.*
62. **White-breasted Nuthatch.** *Sitta carolinensis.*
63. **Brown Creeper.** *Certhia americana.*
64. **Carolina Wren.** *Thryothorus ludovicianus.*
65. **House Wren.** *Troglodytes aedon.*
66. **Winter Wren.** *Troglodytes troglodytes.*
67. **Golden-crowned Kinglet.** *Regulus satrapa.*
68. **Ruby-crowned Kinglet.** *Regulus calendula.*
69. **Eastern Bluebird.** *Sialia sialis.* Found first in 1990, bluebirds have made a comeback throughout the northeast and now nest in boxes installed in the field at about that time and maintained by the Carlisle Conservation Commission. High count was 10 birds, including 4 nesting pairs, in 2002. However, competition for nest boxes with Tree Swallows and House Sparrows is intense, and the breeding population is now no more than two pairs.
70. **Veery.** *Catharus fuscescens.*
71. **Swainson's Thrush.** *Catharus ustulatus.*
72. **Hermit Thrush.** *Catharus guttatus.*
73. **Wood Thrush.** *Hylocichla mustelina.*
74. **American Robin.** *Turdus migratorius.*
75. **Gray Catbird.** *Dumetella carolinensis.*
76. **Northern Mockingbird.** *Mimus polyglottos.*
77. **Brown Thrasher.** *Toxostoma rufum.*
78. **European Starling.** *Sturnus vulgaris.*
79. **Cedar Waxwing.** *Bombycilla cedrorum.*
80. **Blue-winged Warbler.** *Vermivora pinus.*

81. **Golden-winged Warbler.** *Vermivora chrysoptera.* A singing male of this uncommon and declining species was found in the white oak at the intersection of the Bingham Road trail with the main loop trail on 20 May 1973.

82. **"Lawrence's" Warbler.** *Vermivora "lawrencii".* An individual of this recessive Blue-winged Warbler x Golden-winged Warbler hybrid form was found on 18 May 1980 by Eric Darling and was seen also the next day.

83. **"Brewster's" Warbler.** *Vermivora "leucobronchialis".* This dominant Blue-winged x Golden-winged hybrid was seen on 21 May 1995.

84. **Tennessee Warbler.** *Vermivora peregrina.*

85. **Nashville Warbler.** *Vermivora ruficapilla.*

86. **Northern Parula.** *Parula americana.*

87. **Yellow Warbler.** *Dendroica petechia.*

88. **Chestnut-sided Warbler.** *Dendroica pensylvanica.*

89. **Magnolia Warbler.** *Dendroica magnolia.*

90. **Cape May Warbler.** *Dendroica tigrina.*

91. **Black-throated Blue Warbler.** *Dendroica caerulescens.*

92. **Yellow-rumped Warbler.** *Dendroica coronata.*

93. **Black-throated Green Warbler.** *Dendroica virens.*

94. **Blackburnian Warbler.** *Dendroica fusca.*

95. **Pine Warbler.** *Dendroica pinus.*

96. **Bay-breasted Warbler.** *Dendroica castanea.*

97. **Blackpoll Warbler.** *Dendroica striata.*

98. **Black-and-white Warbler.** *Mniotilta varia.*

99. **American Redstart.** *Setophaga ruticilla.*

100. **Worm-eating Warbler.** *Helmitheros vermivorus.* One record of this uncommon visitor from the south, a singing male on 21 May 1989.

101. **Ovenbird.** *Seiurus aurocapillus.*

102. **Northern Waterthrush.** *Seiurus noveboracensis.*

103. **Louisiana Waterthrush.** *Seiurus motacilla.*

104. **Kentucky Warbler.** *Oporornis formosus.* A singing male of this occasional visitor to our region from the south appeared on 16 May 1982 in the red maple woodland adjacent to the southwest corner of the main field. It attracted birders from eastern Massachusetts and beyond, and was last seen on 3 June.

105. **Mourning Warbler.** *Oporornis philadelphia.*

106. **Common Yellowthroat.** *Geothylpis trichas.*

107. Wilson's Warbler. *Wilsonia pusilla.*

108. Canada Warbler. *Wilsonia canadensis.*

109. Scarlet Tanager. *Piranga olivacea.*

110. Eastern Towhee. *Pipilo erythrophthalmus.*

111. American Tree Sparrow. *Spizella arborea.*

112. Chipping Sparrow. *Spizella passerina.*

113. Field Sparrow. *Spizella pusilla.*

114. Savannah Sparrow. *Passerculus sandwichensis.*

115. Song Sparrow. *Melospiza melodia.*

116. Swamp Sparrow. *Melospiza georgiana.*

117. White-throated Sparrow. *Zonotrichia albicollis.*

118. Dark-eyed Junco. *Junco hyemalis.*

119. Northern Cardinal. *Cardinalis cardinalis.*

120. Rose-breasted Grosbeak. *Pheucticus ludovicianus.*

121. Indigo Bunting. *Passerina cyanea.*

122. Bobolink. *Dolichonyx oryzivorus.* Summer resident and breeder since first appearance in 1976 as the Eastern Meadowlark population declined (see No. 124). High count was an amazing 61 (including 16 males in breeding plumage) in 1991. Since that year there has been a steady population decline, with only 3 (including 2 males in breeding plumage) in 2006. Although the cause of this decline is unknown, to give remaining Bobolinks the best chance of surviving, no mowing should take place anywhere in the field before mid-August. However, it is important that the field be thoroughly mowed (or grazed) every year to prevent succession to woodland, which would completely eliminate Bobolinks and their meadow habitat that is scarce in well-wooded Carlisle.

123. Red-winged Blackbird. *Agelaius phoeniceus.*

124. Eastern Meadowlark. *Sturnella magna.* Former summer resident and breeder on Towle Field, with high count of 12 in 1974. Last seen in 1981. Probable cause of disappearance was the succession in the late ‘70s from a relatively dry, grassy field to a wet meadow with mixed grasses and low bushes. See No. 122, Bobolink, which replaced Eastern Meadowlarks as the field changed.

125. Common Grackle. *Quiscalus quiscula.*

126. Brown-headed Cowbird. *Molothrus ater.*

127. Baltimore Oriole. *Icterus galbula.*

128. Purple Finch. *Carpodacus purpureus.*

129. House Finch. *Carpodacus mexicanus.*

130. Common Redpoll. *Carduelis flammea.*

131. **Pine Siskin.** *Carduelis pinus.*

132. **American Goldfinch.** *Carduelis tristis.*

133. **Evening Grosbeak.** *Coccothraustes vespertinus.*

134. **House Sparrow.** *Passer domesticus.*

Appendix D

Towle Land Plant List, by Habitat

Source: Niessen, Nancy E., Site Analysis and Land Use Plan – Towle Conservation Land, Carlisle, Massachusetts, prepared for the Radcliffe Seminars Program, February 1979.

COMMON NAME	SCIENTIFIC NAME
A. Succession Meadow	
Black birch	*Betula lenta*
Black locust	*Robinia pseudoacacia*
Blackberry	*Rubus* sp.
Common field juniper (red cedar)	*Juniperus virginiana*
Dwarf huckleberry	*Gaylussacia dumosa*
Gray birch	*Betula populifolia*
Gray dogwood	*Cornus racemosa*
Fox grape	*Vitis labrusca*
Hawthorn	*Crataegus* sp.
Multiflora rose	*Rosa multiflora*
Poison ivy	*Rhus toxicodendron (Toxicodendron radicans)*
Smooth sumac	*Rhus glabra*
Staghorn sumac[1]	*Rhus copallinum*
Sweetfern	*Comptonia peregrina*
Virginia creeper	*Parthenocissus quinquefolia*
B. Wet Woods	
Bitter nightshade (bittersweet)	*Solanum dulcamara*
Cinnamon fern	*Osmunda cinnamomea*
Common buckthorn	*Rhamnus cathartica*
False Solomon seal	*Smilacena racemosa (Maianthemum racemosum)*
Greenbrier	*Smilax rotundifolia*
Hayscented fern	*Dicksonia punctilobula(Dennstaedtia punctilobula)*
Jack-in-the-pulpit	*Arisaema atrorubens(A. triphyllum triphyllum)*
Marsh fern	*Dryopteris thelypteris (Thelypteris palustris)*
Poison ivy	*Rhus toxicodendron (Toxicodendron radicans)*
Pokeweed	*Phytolacca americana*
Red maple	*Acer rubrum*
Royal fern	*Osmunda regalis*
Silver maple	*Acer saccharinum*
Sphagnum moss	*Sphagnum magellanicum*
Swamp azalea	*Rhododendron viscosum*
Swamp (fly) honeysuckle	*Lonicera oblongifolia*
C. Upland Woods	
American chestnut	*Castanea dentata*
American elm	*Ulmus americana*

COMMON NAME	SCIENTIFIC NAME
Black oak	*Quercus velutina*
Blueberry	*Vaccinium* sp.
Bracken fern	*Pteris latiuscula (Pteridium aquilinum, P. latiusculum)*
Canadian hemlock	*Tsuga canadensis*
Dwarf rattlesnake plantain	*Goodyera repens*
Fragrant sumac	*Rhus aromatica*
Green ash	*Fraxinus pennsylvanica*
Partridgberry	*Mitchella repens*
Pink lady slipper	*Cypripediuim acaule*
Red maple	*Acer rubrum*
Red oak (northern red oak)	*Quercus borealis (Q. rubra)*
Round leaved pyrola	*Pyrola rotundifolia (P. americana)*
Sassafras	*Sassafras albidum*
Sheep laurel	*Kalmia angustifolia*
Spicebush	*Lindera benzoin*
Wintergreen	*Gaultheria procumbens*
White oak	*Quercus alba*
White pine	*Pinus strobus*
Witch hazel	*Hamamelis virginiana*
D. Open Meadow	
Black eyed Susan	*Rudbeckia hirta*
Blue eyed grass	*Sisyrinchium angustifolium*
Bluets	*Houstonia caerulea*
Butter and eggs	*Linaria vulgaris*
Common dandelion	*Taraxacum officinale*
Common groundsel	*Senecio vulgaris*
Common milkweed	*Asclepias syriaca*
Common plantain	*Plantago major*
Common ragweed	*Ambrosia artemisiifolia*
Cowvetch	*Vicia cracca*
Creeping buttercup	*Ranunculus repens*
Dewberry	*Rubus* sp.
False boneset[2]	*Kuhnia eupatorioides*
Field thistle	*Cirsium discolor*
Goldenrod	*Solidago canadensis*
Heath aster	*Aster ericoides*
Meadow grasses	*Gramminae* sp.
Oxeye daisy	*Chrysanthemum leucanthemum*
Pearly everlasting	*Anaphalis magaritacea*
Red clover	*Trifolium pratense*
Red campion	*Lychnis dioica (Silene dioica)*
Smooth sumac	*Rhus glabra*
Staghorn sumac	*Rhus copallinum*
Steeplebush	*Spiraea tomentosa*

COMMON NAME	SCIENTIFIC NAME
Tall buttercup	*Ranunculus acris*
Wild carrot (Queen Anne's lace)	*Daucus carota*
Yarrow	*Achillea millefolium*
E. Wetland	
Arrowwood	*Viburnum dentatum*
Cardinal flower	*Lobelia cardinalis*
Common cattail	*Typha latifolia*
Pickerelweed	*Pontederia cordata*
Skunk cabbage	*Symplocarpus foetidus*
Spotted jewelweed	*Impatiens capensis*

[1] The Flora of the Northeast (Magee and Ahles, University of Massachusetts, Amherst MA, 1999), hereinafter referred to as the Flora, lists staghorn sumac as *Rhus hirta* and shining sumac as *Rhus copallinum*.

[2] Neither common nor scientific name was found in the Flora. The USDA Natural Resources Conservation Service – Plant Database map (usda.gov) indicates that this plant does not occur in New England, although it is widely distributed in the eastern Midwest, South, and Mid-Atlantic states.

Appendix E

List of Species Identified on the Towle Land During Biodiversity Days Studies on June 8, 2001 and June 4, 2002

Source: http://maps.massgis.state.ma.us/Biodiversity/BDResults.htm
(See Section 4.6 of Baseline Assessment for description of these studies.)

Amphibians (4)	Birds (continued)
Common grey tree frog	European starling
Bull frog	Tree swallow
Green frog	House wren
Wood frog	American robin
	Mourning dove
Birds (34)	
Red winged blackbird	Butterflies (3)
Mallard	Common ringlet
Tufted Titmouse	Littlewood satyr
Cedar Waxwing	Hobomok skipper
Canada goose	
Red cardinal	Dragonflies (1)
American goldfinch	Common green darner
Hermit thrush	
Chimney swift	Ferns and Fern Allies (12)
Northern flicker	Lady fern
Eastern wood pewee	Hay-scented fern
American crow	Spinulose woodfern
Blue jay	Common horsetail
Black throated green warbler	Staghorn clubmoss
Bobolink	Princess pine
Grey catbird	Sensitive fern
Common yellowthroat	Cinnamon fern
Barn swallow	Interrupted fern
Baltimore oriole	Royal fern
Song sparrow	Bracken fern
Northern mockingbird	New York fern
Great crested flycatcher	
House sparrow	Flies (1)
Indigo bunting	Mosquito
Scarlet tanager	
Black-capped chickadee	Freshwater Fish (1)
Common grackle	Goldfish
Ovenbird	
Eastern bluebird	

Grasses, Sedges & Rushes (5)	Trees & Shrubs (continued)
Sweet vernal grass	Scarlet oak
Pennsylvania sedge	Black oak
Orchard grass	Glossy alder – buckthorn
Tall crab grass	Black locust
Red fescue	Multiflora rose
	Swamp rose
Insects (2)	Common blackberry
Northern field cricket	Sassafras
Meadow spittlebug	Carrion flower
	Meadowsweet
Lichens (1)	Poison ivy
A Phaeocalicium lichen	Eastern hemlock
	Large cranberry
Mammals (3)	Arrow-wood viburnum
Humans	
Eastern cottontail	Wildflowers (50)
Eastern chipmunk	Common ragweed
	Spreading dogbane
Mosses (3)	Wild sarsaparilla
Star mosses	Jack-in-the-pulpit
Haircap moss	Swamp milkweed
Sphagnum moss	Common milkweed
	Yarrow
Mushrooms (5)	Asparagus
Platterful mushroom	New England aster
Birch polypore	Common mouse-ear chickweed
Pheasant's-back polypore	Spotted wintergreen
Common split gill	Canada thistle
Violet-toothed polypore	Pink lady's slipper
	Queen Anne's lace
Trees & Shrubs (29)	Daisy fleabane
Red maple	Wild geranium
Hog peanut	Meadow hawkweed
Black choke cherry	Mouse-ear hawkweed
Black birch	Bluets
Grey birch	Orange jewelweed
Pignut hickory	Duckweed
Atlantic white cedar	Oxeye-daisy
Bunchberry	Canada mayflower
White ash	False Solomon's seal
Wintergreen	Indian cucumber root
Common juniper	Partridge berry
White pine	Virginia creeper
Quaking aspen	Common plantain
White oak	Ragged-fringed orchis

Wildflowers (continued) Fringed polygala Smooth Solomon's seal Dwarf cinquefoil Rough cinquefoil Rough-fruited cinquefoil Tall buttercup Red sorrel Live-forever, Orpine Eastern blue-eyed grass Red-sand spurrey Common stitch work Skunk cabbage Common dandelion Star flower Palmate hop-clover Red clover Common cattail Hoary vervain Common speedwell Bird vetch Identified only by genus: Hickory Crab grass Joe-Pye weed Blackberry	

Appendix F

List of Photographs Taken on the Towle Land as Part of the Baseline Assessment, May 2006

Photographs of the Towle Land were taken by Warren Lyman in May 2006. Prints of these photographs, and a CD with electronic copies, are available in the Conservation Commission files in Carlisle Town Office. The location each photograph was taken at is roughly shown in Figures F-1 (General Photos) and F-2 (Signs). In these Figures, the red numbers correspond to the numbers in the list below.

I. General

1. Entrance to parking lot.
2. Parking lot, looking towards exit.
3. Parking lot.
4. Trail exiting parking lot to west.
5. Trail across dam. Pond to right.
6. Trail across dam. Pond to right.
7. Deterioration of south side of dam.
8. South side of dam.
9. Pond with plant growth.
10. Pond.
11. Pond.
12. Field (and "trail"), view to south.
13. View to south along stone wall. Some forest encroachment.
14. Bird house.
15. Field, view to west.
16. Field, view to south from high point in center.
17. Boardwalk through island of trees & wetlands in field.
18. Field, view to east from south of boardwalk.
19. Field, view to north (towards boardwalk) from south side. Bluets.
20. Entrance to woodland trail on south side of field.
21. Trail in woods.
22. Intermittent stream.
23. Bridge on trail to Bingham Rd.
24. Decayed bridge ~ 50 yds downstream of bridge in photo #23.
25. Trail in woods. Muddy section after rain.
26. Trail in woods.
27. Trail in woods.
28. Footbridge on trail.
29. Footbridge on trail. Muddy section after rain.
30. Trail in woods. Start of outer loop.
31. Trail in woods.
32. Trail in woods.

33. Trail in woods. Start of area burned by forest fire in 2001.
34. Trail in woods. Area affected by forest fire in 2001.
35. Area affected by forest fire in 2001.
36. Granite slabs from old quarry. Area affected by forest fire in 2001.
37. Area affected by forest fire in 2001.
38. Trail in woods.
39. Intermittent stream.
40. Trail in woods. Muddy area after rains.
41. Trail in woods.
42. Trail in woods. Muddy area after rains.
43. Trail in woods. Reconnecting with inner loop.
44. Trail in woods.
45. Footbridge on trail.
46. Footbridge on trail.
47. Vernal pool.
48. Trail in woods.
49. Trail in woods.
50. Footbridge on trail (near cutback to parking lot).
51. Trail in woods. Parking lot in distance.
52. Trail in woods. Muddy area after rains.
53. Stone wall along Westford Rd., looking east from gate.
54. Opening to Towle Field on Westford Rd. Gate post visible.
55. Stone wall along Westford Rd., looking west from gate.
56. Sugar maples on north edge of field (by Westford Rd.).
57. Towle Field looking south from Westford Rd. (west of gate).
58. Stone wall and dead Sugar maple near Westford Rd. (west of gate).
59. Stone wall along Westford Rd., view to west (west of gate).
60. Entrance to Towle Field near northwest corner of property.
61. Bird house near northwest entrance.
62. Stone wall along Westford Rd. near northwest corner. Stones pushed over?
63. Stone wall along Westford Rd. near northwest corner. Stones pushed over?
64. Towle Field. View from northwest corner.

II. Signs

1. Property sign at entrance to parking lot.
2. Property sign in parking lot.
3. Sign in parking lot. (“Please do not litter. Put trash in cans.”)
4. “Towle Field” sign visible from Westford Rd.
5. “Towle Field” sign visible from Westford Rd.
6. Bobolink sign by entrance to Towle Field (near pond).
7. Bobolink sign by northwest entrance to field from Westford Rd.
8. Bobolink sign by entrance to Towle Field at gate in center of field.
9. Property sign at Bingham Rd. trail head.
10. Trail sign and map at Bingham Rd. trail head.
11 - 16. Trail signs.

Figure F-1

Location of 'General' Baseline Assessment Photos (May 2006)

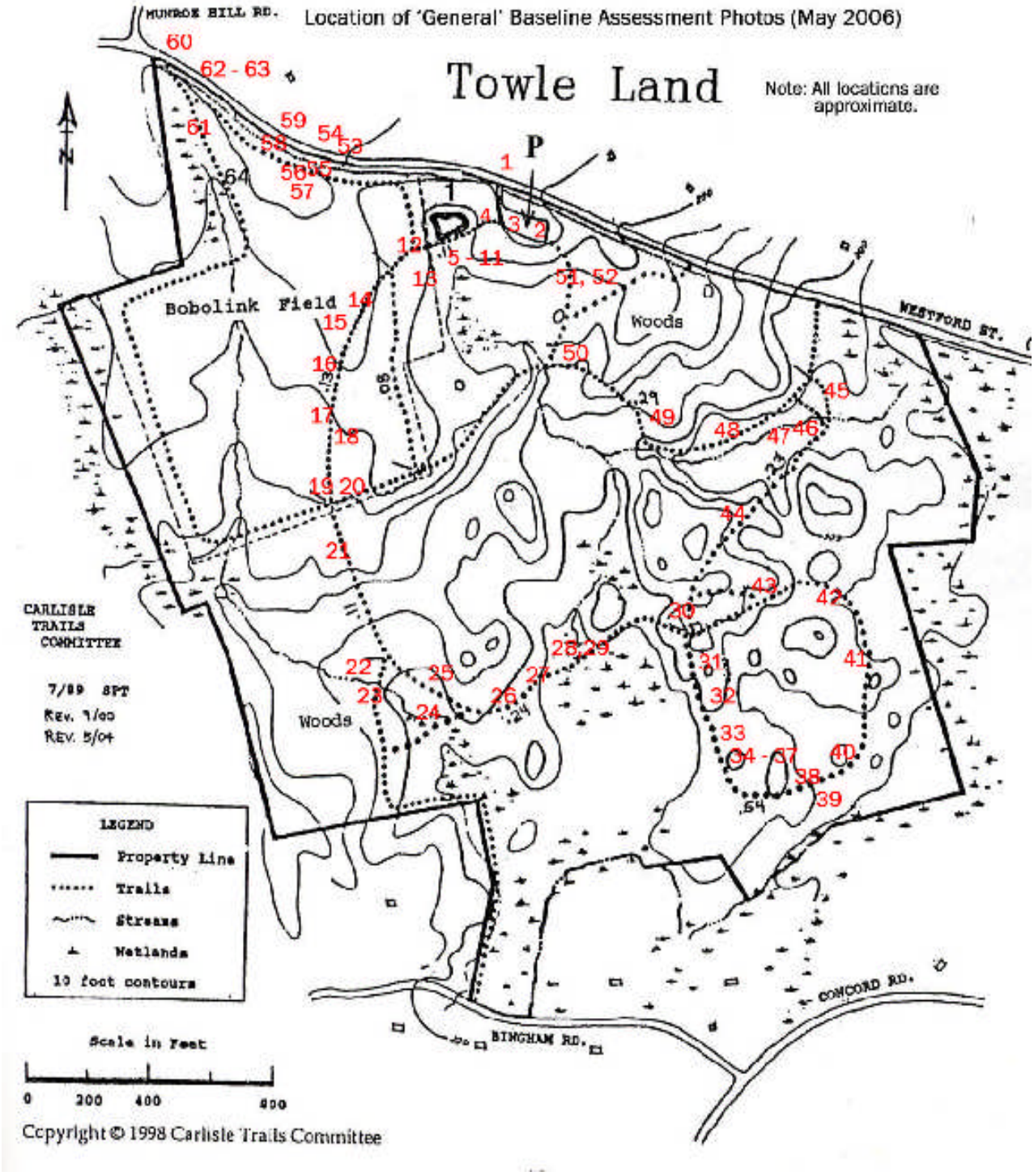
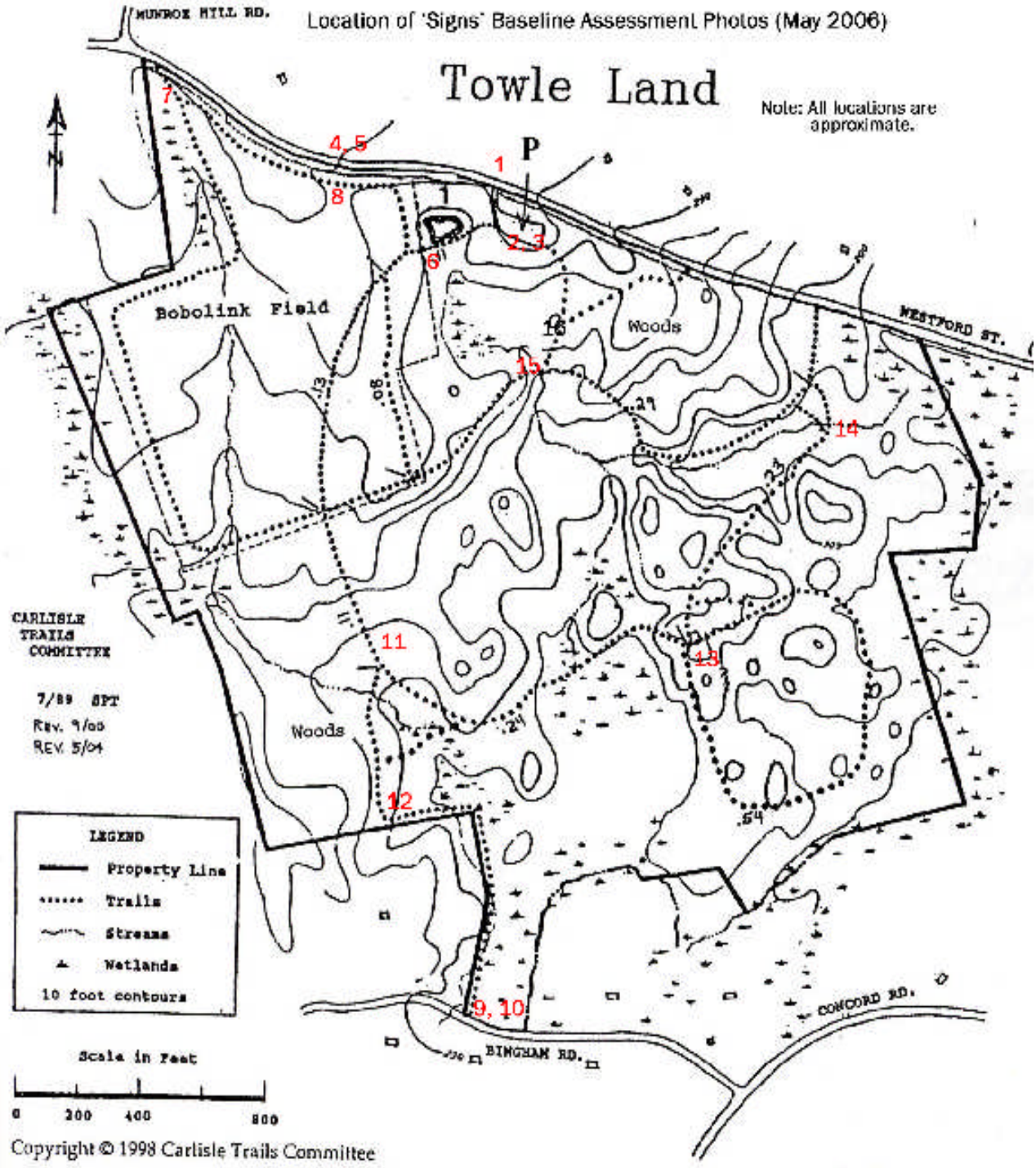


Figure F-2

Location of 'Signs' Baseline Assessment Photos (May 2006)



Appendix G

Towle Land Boundary Inspection

January 11, 2007 – Eastern Side (WL & LC, stewards)

Started from parking lot entrance on Westford Rd and headed east. Number of each note corresponds to a location marked on a map of the property (**Figure 1**).

1. Stone wall crumbling; could use some repair. Also, brush growing on street side of the stone wall should be cut back to maintain view of stone wall.

2. Location where stone wall along Westford Rd. takes a right-angle turn to the south and heads into the property. (Photo 1)

3. An old barb wire fence runs along this part of the property. Vague trail entrance possible? No trail sign indicating trail that does come out around here. Much trash in the woods.

4. No evidence of any trailhead here as marked on Trails Committee's map.

5. Northeast corner of property. (Photo 2) Exact corner not located as there appears to be no markers. There are the remnants of an old fence corner, but this may not be the official boundary corner.

6. In this general area, exact location of boundary was not determined. A private fence encloses a horse ring to the east. Outside the fence at one location are two piles of what looks like dirt. Also in the vicinity, outside the fence, is a white standpipe (~ 2 ft high?) which may be associated with a septic area.

7. This boundary, according to an old map, is supposed to follow along a ditch. However, there was no obvious ditch; just a natural boundary between the (private) field and the woods.

8. This boundary, as indicated on an old map, does follow an old ditch. This one was 5 – 8 feet wide and had a good flow of water in it. (Photos 3 – 5)

9. This corner, where the boundary turns away from the stream by a stone wall is easy to locate. We did not see any boundary marker at this location.

10. At this turn in the boundary line, a large stone (part of the stone wall) is visible from the trail. On the other side of the stone wall (not visible from the trail) is a stone marker (~ 3 feet high) that is likely marking the corner. (Photo 6) Standing at this location and looking back towards the trail, you see the other quarry-cut stones that are beside the trail.

11. In this area, there were numerous blue tape markers on branches. (Photo 7) It was not possible, due to high water (not frozen hard) to follow – to Bingham Rd. – the eastern boundary of the 'handle' of land that fronts on Bingham.

12. Bingham Rd. frontage. The remnants of an old stone wall along most of this (~ 200 ft) stretch are evident. Would be nice to have the wall reconstructed.

13. Slash and logs (from abutter?) still lie along the trail that goes to Bingham Rd. Small piles of slash on west side of trail. One large pile (or more) of slash and cut logs on east side of trail.

March 14, 2007 – Western Side (WL & LC, stewards)

14. Woods in this former pasture area looks trashy. Perhaps might look better if did some tree and brush removal. Also, railing along road is seriously deteriorated. Old opening in stone wall (former gate) exists just to the west of the parking lot entrance. Possible future use for opening?

15. Cow tunnel location. (Photos 8 – 10) Stone wall on right side of cow tunnel is falling down. Area thick with rose canes (Multiflora?). Possible future trail from pond (or field) to cow tunnel would be a feature to add. Stone wall to west of cow tunnel along Rt. 225 is slowly falling down. (Photo 11).

16. This boundary follows an old stone wall with remnants of a barb wire fence. (Photo 12) There is significant water flow in this area (north to south), with much of the water flow being just under the forest litter and rocks. Some surface water areas (ice) present. Large group of trees in wall about midway down the stone wall boundary segment. (Photo 13; view to north.)

17. Right angle turn in boundary follows stone wall turn. (Photo 14; view to west.) Some remnants of barb wire fence still evident. This corner of field has some brush and small trees that could be cleared to enlarge the field a bit. (Photo 15; view to north.)

18. At 'T' in stone wall (Photo 16; view to NE.), there is some brush in field which should be mowed down. Boundary continues several feet across the wall shown. If you walk in a westerly direction from this point past the Towle property line, there is an old boardwalk across some of the wetlands heading towards a private residence to the west.

19. View south along boundary. (Photo 17) Towle field is to left (across stone wall), boundary is to the right.

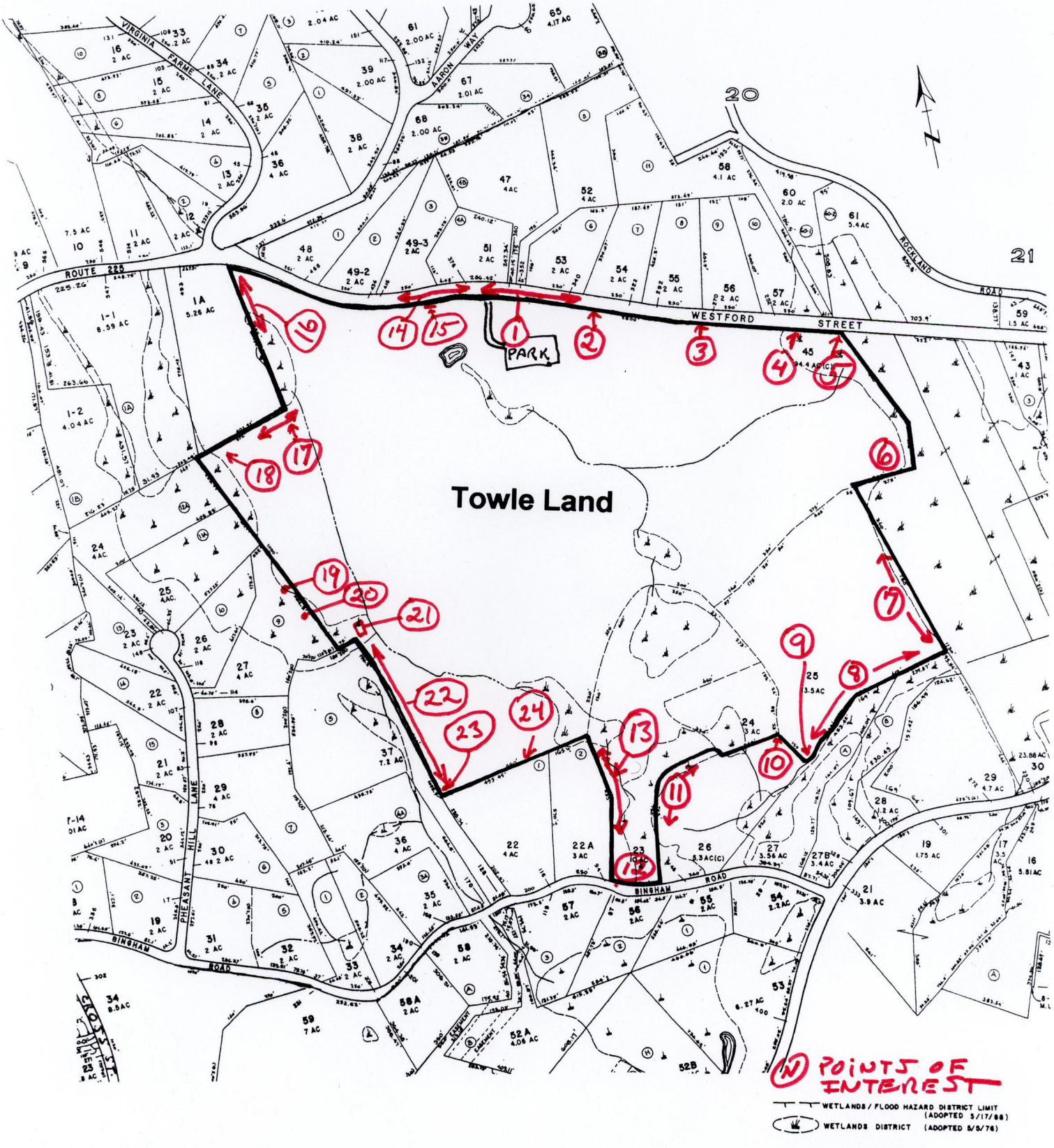
20. Opening in stone wall near SW corner of Towle field. (Photo 18; view to east.) Old path enters field (from woods to west) at this point.

21. Small wooden bridge across flowing stream. (Photo 20; view to south.) Trail here leads to private residence to the south. Northern end of trail goes to Towle field via break in stone wall on south side of field. (Photo 19)

22. There are some remnants of an old stone wall along the initial and later parts of the portion of the boundary. The boundary goes along a ridge with house visible on right. At one point close to house, there is evidence that the residents have placed leaf rakings on the Towle land. (Photo 21)

23. There is no marker or stone wall to show where this right-angle boundary corner is. It is easiest to guess where it is by viewing aerial photo (with superimposed lot line) and Town property map.

24. View east along general area of property line. (Photo 22) There is no stone wall or any other markers to show where this boundary line is. In middle of photo can be seen a trail that heads to a private residence to the south of the Towle land.



Source: Property maps of Carlisle, revised to January 1, 2001

Figure 1. Property Map for the Towle Land – BOUNDARY WALK (2007)

Towle Land – Boundary Walk Photographs (2007)

#1

#2

#3

#4

#5

#6

#7

#8

#9

#10

#11

#12

#13

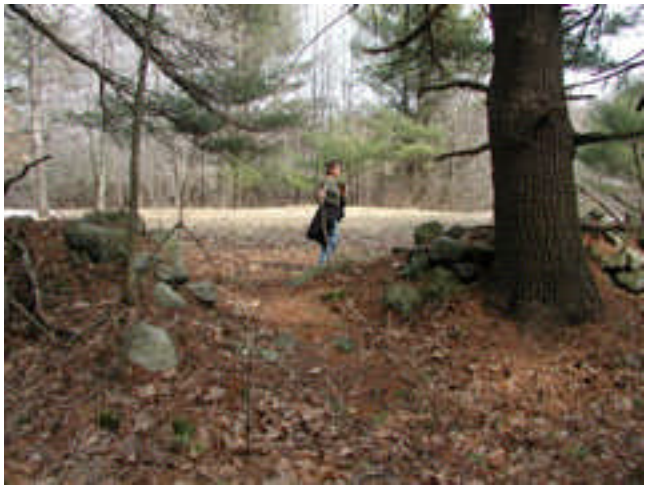
#14

#15

#16

#17

#18



#19

#20

#21

#22