MASSACHUSETTS FOREST RESERVES
LONG TERM ECOLOGICAL MONITORING PROGRAM
CHALET FOREST RESERVE

A report on the baseline characteristics of the Forest Reserve located in the Chalet Wildlife Management Area

Prepared for the
Massachusetts Executive Office of Energy and Environmental Affairs

June 2009

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Cover: Scene from the Chalet Forest Reserve (photo by Lena Fletcher).

PREFACE

The Commonwealth of Massachusetts has established the Chalet Forest Reserve in the towns of Dalton, Cheshire, and Lanesborough. This property is one of eight large Forest Reserves in the Commonwealth (Fig. 1). The Forest Reserves were established by the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to create areas where forest development is the product primarily of natural succession and natural disturbance. The Forest Reserve management goal is to increase the area of late seral forest and to protect and conserve species that depend on this habitat, while allowing the effects of natural disturbances to create variation in successional trends in some areas. Only passive management is used in the Forest Reserves, mainly focusing on restoring native habitat by removing invasive species. Sustainable forest management, including timber harvesting, will be implemented on state lands outside the Forest Reserve system (EOEEA 2009). This report describes the physical features, disturbance history, land use history, and forest communities of the Chalet Forest Reserve.

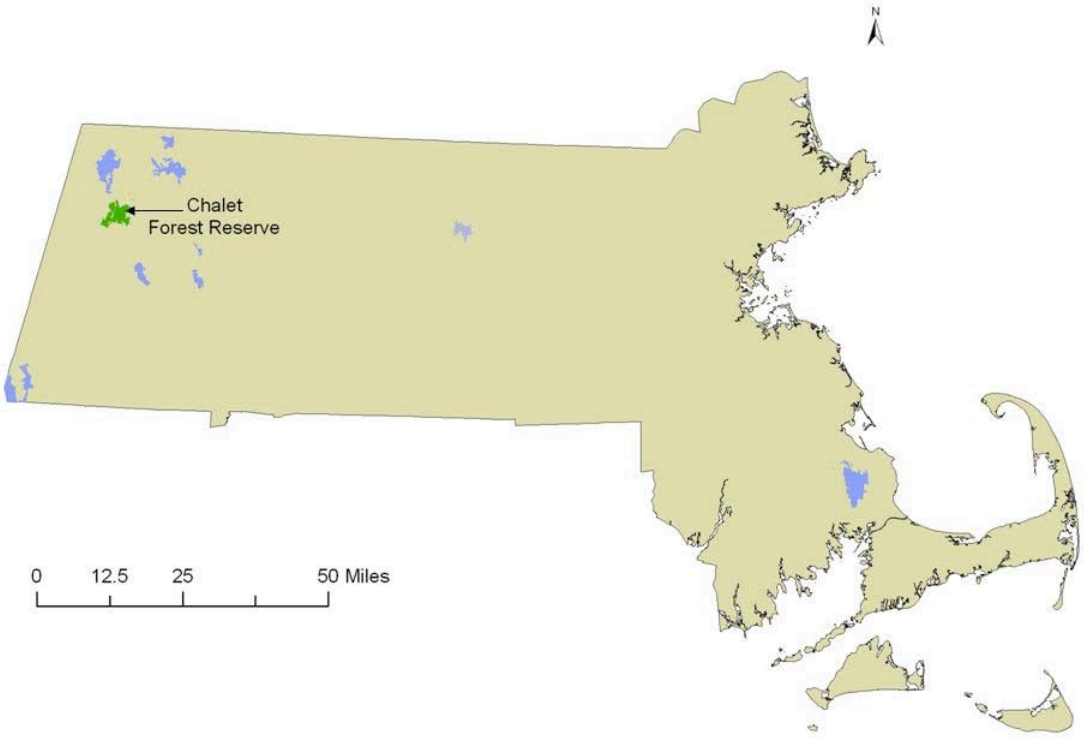

Fig. 1. The Chalet Forest Reserve (green). Other large Forest Reserves are shown in blue (DCR 2008). All GIS analyses were performed using ArcGIS 9.3 (ESRI 2008).

THE CHALET WMA FOREST RESERVE

INTRODUCTION

Description

The Chalet Forest Reserve consists of almost all of the Chalet Wildlife Management Area (WMA) and a part of the Stafford Hill WMA. It is located in the towns of Dalton, Cheshire, and Lanesboro, at the western edge of the Berkshire Plateau, and covers 6,370 acres (Fig. 2) (All area estimates are from GIS analysis). The Chalet and Stafford Hill WMAs are managed by the Massachusetts Department of Fish and Game, Division of Fisheries and Wildlife Management. The highest elevation in the Reserve is the peak of Weston Mountain, near the eastern Reserve border (2,280 ft). North Mountain near the western border reaches an elevation of 2,211 ft. The Forest Reserve is bordered on the west by the Hoosic River Valley and on the south by the valley formed by the east branch of the Housatonic River. The Hoosic River begins in the Cheshire Reservoir and flows north. The East Branch of the Housatonic River begins at Muddy Pond in Hinsdale and Washington and flows west and south. The watershed divide runs through the Reserve from east to west, almost on a line between Weston and North Mountains (MassGIS 2000). The Forest Reserve is divided by a series of stream valleys. In the southern portion (Dalton), Anthony, Holiday, and Egypt Brooks flow south to the Housatonic River. In the northern portion (Cheshire), South Brook flows north to the Hoosic River.

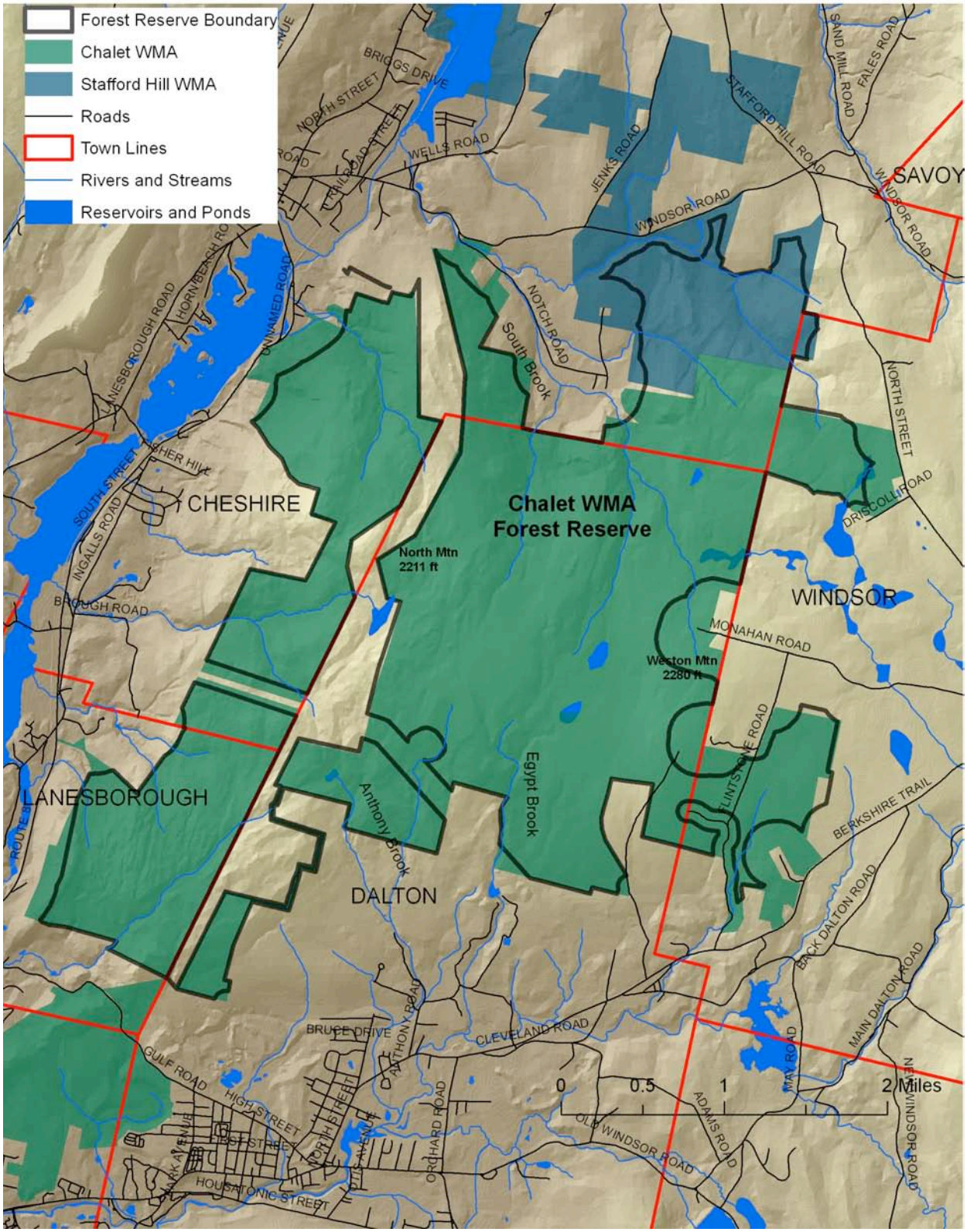

Fig. 2. The Chalet Forest Reserve consisting of most of the Chalet WMA and a section of the Stafford Hill WMA (DFW 2007).

The Chalet Forest Reserve falls within the Berkshire-Vermont Uplands Subsection, an ecoregion classification of the U.S. Forest Service and the basis for Massachusetts state ecoregions (Fig. 3) (Keyes and Carpenter 1995). The Reserve covers parts of two U.S. Forest Service Land Type Associations (LTAs): the Berkshire Plateau Mid-Elevation and Berkshire Plateau Upper Elevation Land Type Association (LTAs) (de la Cretaz and Kelty 2008). LTAs are finer-scale ecological areas, defined within subsections. Both the Mid- and Upper Elevation LTAs are found on upland soils derived from parent material that developed on acidic bedrock. The Upper Elevation LTA begins at elevations ≥ 1,800 ft. Spruce and fir trees are found more commonly in the Upper Elevation LTA. The Mid-Elevation LTA forest is typically populated by northern hardwoods and hemlock. The Forest Reserve borders the Taconic Mountain subsection, the Hoosic River Valley and the Marble Valley Rolling Lowlands LTA. Soils in these LTAs are derived from calcareous parent material that developed on marble and limestone bedrock and favor the development of Rich Mesic Forest Communities (Appendix B).

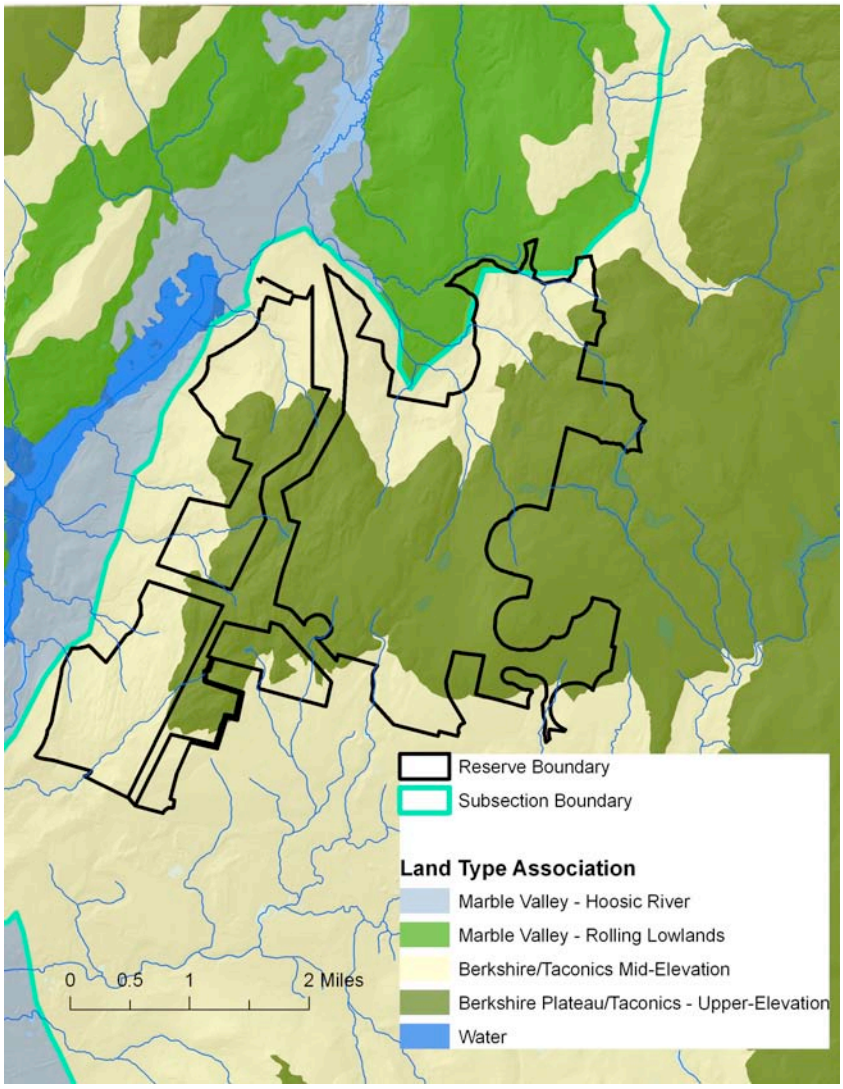

Fig. 3. Land Type Associations of the Chalet Forest Reserve (de la Cretaz and Kelty 2008).

Associated Open Space

Within a 2-mile buffer extending from the outer boundary of the Forest Reserve, 35% of the area (11,375 acres) is permanently protected open space (MassGIS 2009(a)) (Fig. 4). This includes 5,265 acres that are owned by the State. Of this area, 4,344 acres are managed by the Department of Fish and Game – Division of Fish and Wildlife and 921 acres are managed by the Department of Conservation and Recreation (DCR). The Appalachian Trail Corridor (550 acres), owned by the U.S. Federal Government and managed by the National Park Service, passes through the Chalet Forest Reserve. The remaining 5,560 acres are owned and managed by NGOs, including the New England Forestry Foundation and a number of private and municipal owners. The Crane Family of Dalton has protected almost 1,750 acres within this buffer area.

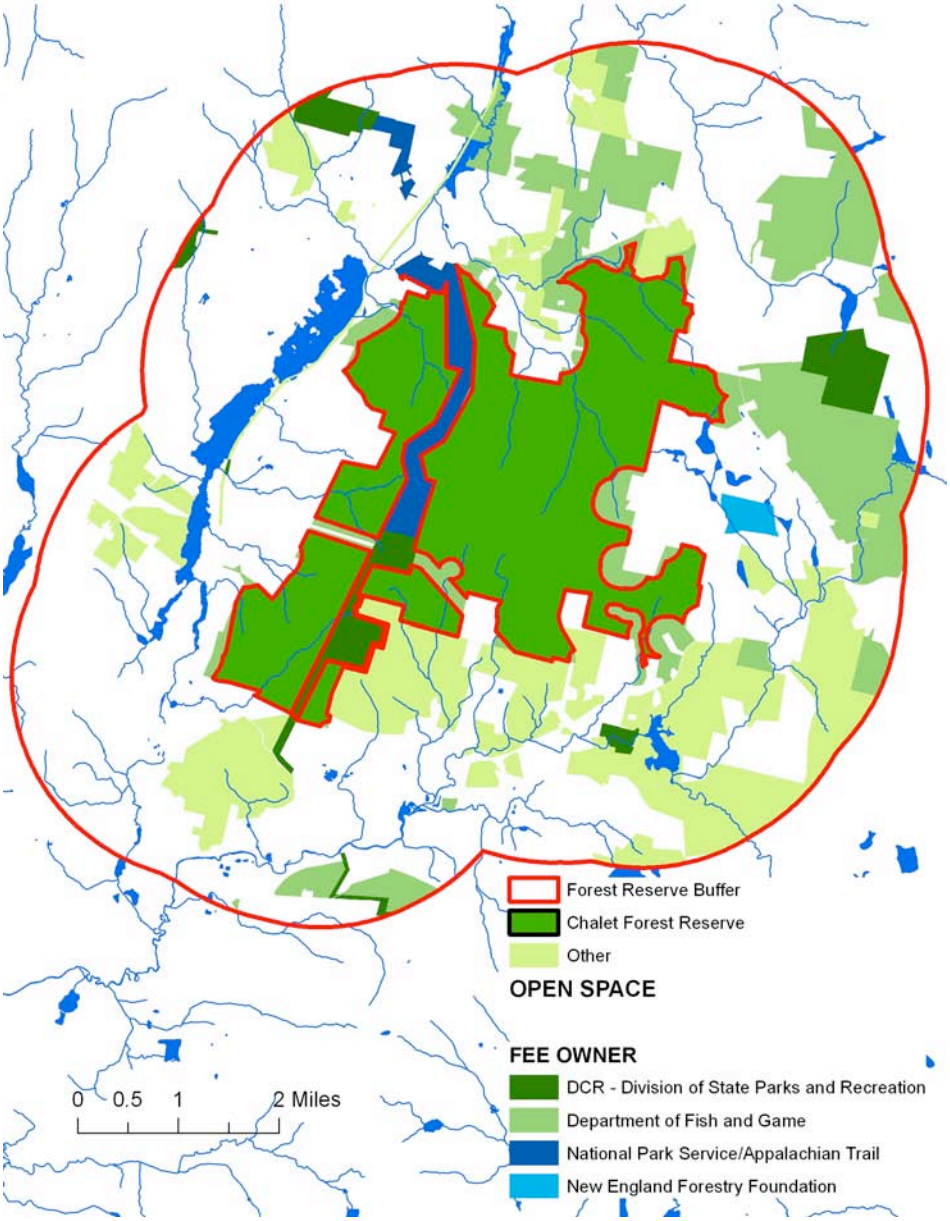

Fig. 4. Permanently protected open space within a buffer area extending 2 miles from Chalet Forest Reserve boundaries (MassGIS 2009 (a)).

PHYSICAL FEATURES

Topography

Elevations in the Chalet Forest Reserve range from 1,093 to 2,280 ft. The steepest slopes (≥45%) are found in the northern half of the Reserve. Slopes along the western border of the Forest Reserve, near the descent to the Hoosic River Valley, have a northwest aspect. In the remainder of the Reserve, slopes have either a northwest or southeast aspect along successive mountain ridges (Fig. 5).

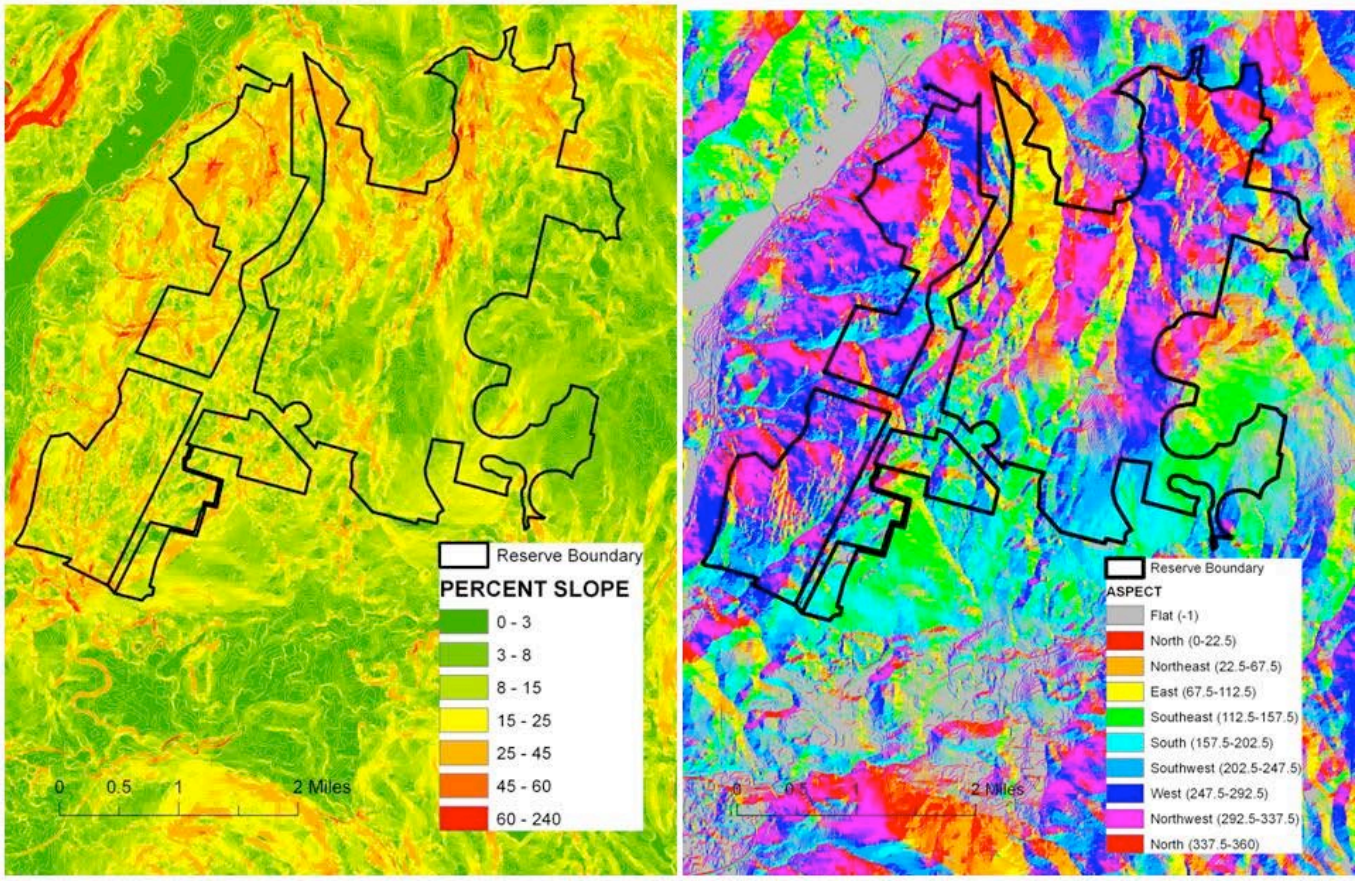

Fig. 5. Percent slopes (left) and aspect (right), Chalet Forest Reserve.

Bedrock Geology

The bedrock formations underlying the Chalet Forest Reserve vary in age (Fig. 6). The Washington and Tyringham Gneiss Formations are composed of Grenville gneiss, rocks that formed over one billion years ago during the Grenville mountain-building event. During this time, Laurentia, the core of the North American continent, collided with other continental plates to form the supercontinent of Rodinia. The immense pressure generated by this collision created massive mountain ranges at the continental margins and metamorphosed the volcanic and sedimentary material deep below the surface of the North American continent into gneiss. Magma intruded into pockets in the rock formations, producing new granite deposits. Five-hundred million years later, the mountains had eroded, exposing the erosion-resistant gneiss. Rodinia had broken up as Laurentia and the other continents drifted apart (Skehan).

The Dalton Formation dates from the late Proterozoic Period, 550 million years ago. The Dalton Formation is composed of poorly sorted sediments that were deposited in basins and rifts on the continental slope of Laurentia, in some places on the eroded, weathered surface of the older gneisses. The Cheshire Formation was created in the Cambrian Era between 545 and 495 million years ago. It consists of a glassy, fossiliferous quartzite that originated as beach sand (Fig.8). It overlies the Dalton formation at the ancient continental shoreline. Four hundred and fifty million years ago, during the Taconic mountain-building event, Laurentia collided with a series of off-shore volcanic islands chains. The collision squeezed the Grenville gneiss and overlying rock formations together like an accordion, thrusting material from the continental shelf, slope, and rise upwards. The Berkshire Plateau, including the bedrock of the Chalet Forest Reserve consists of the eroded remnants of much higher mountains formed during the Taconic mountain-building event (Skehan 2001). In addition to these larger formations, there are small deposits of mafic rock, a rocktype rich in iron and magnesium of volcanic origin (Fig. 7, Table 1, Map Code Zd).

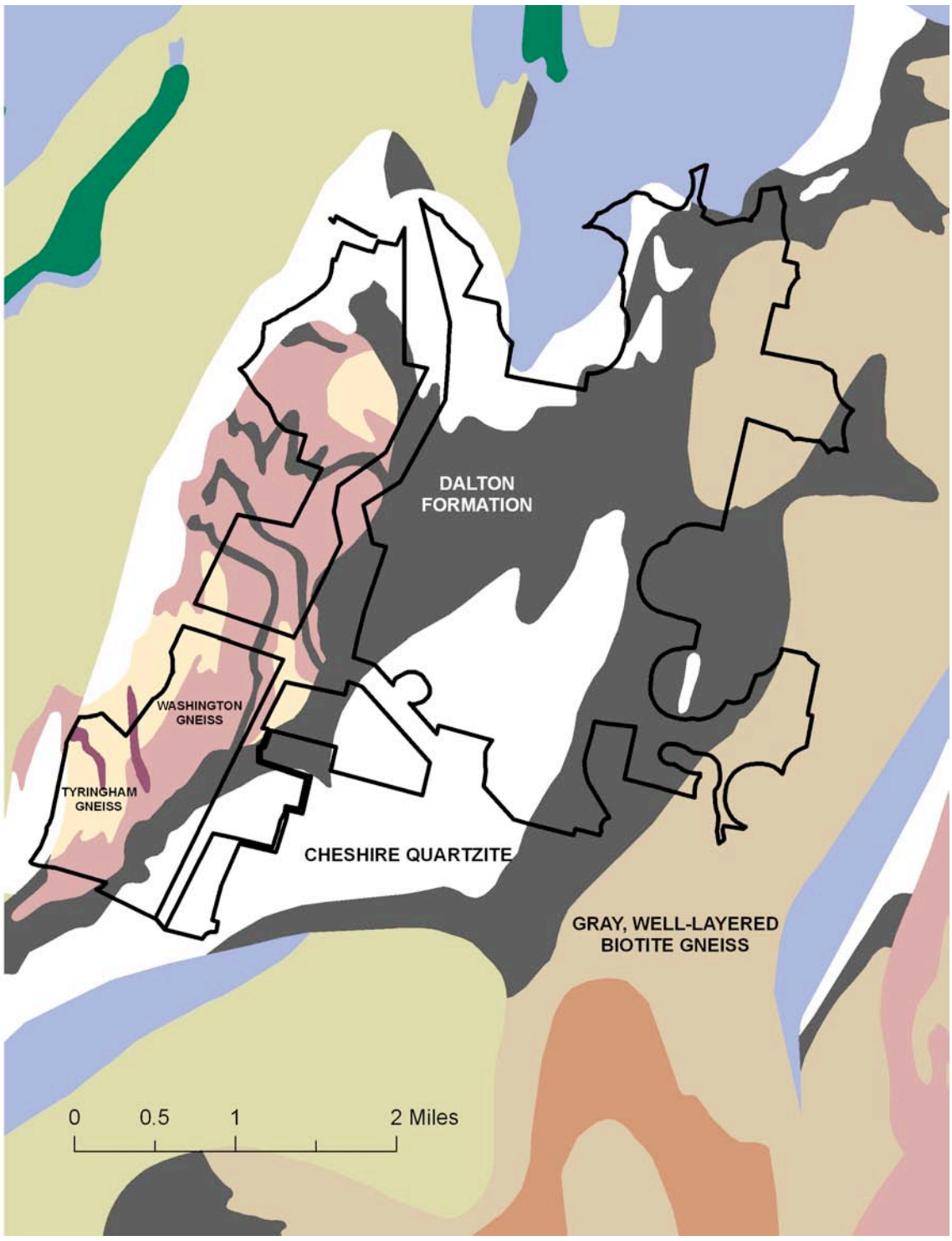

Fig. 6. Bedrock formations in the Chalet Forest Reserve Area (Zen et al. 1983).

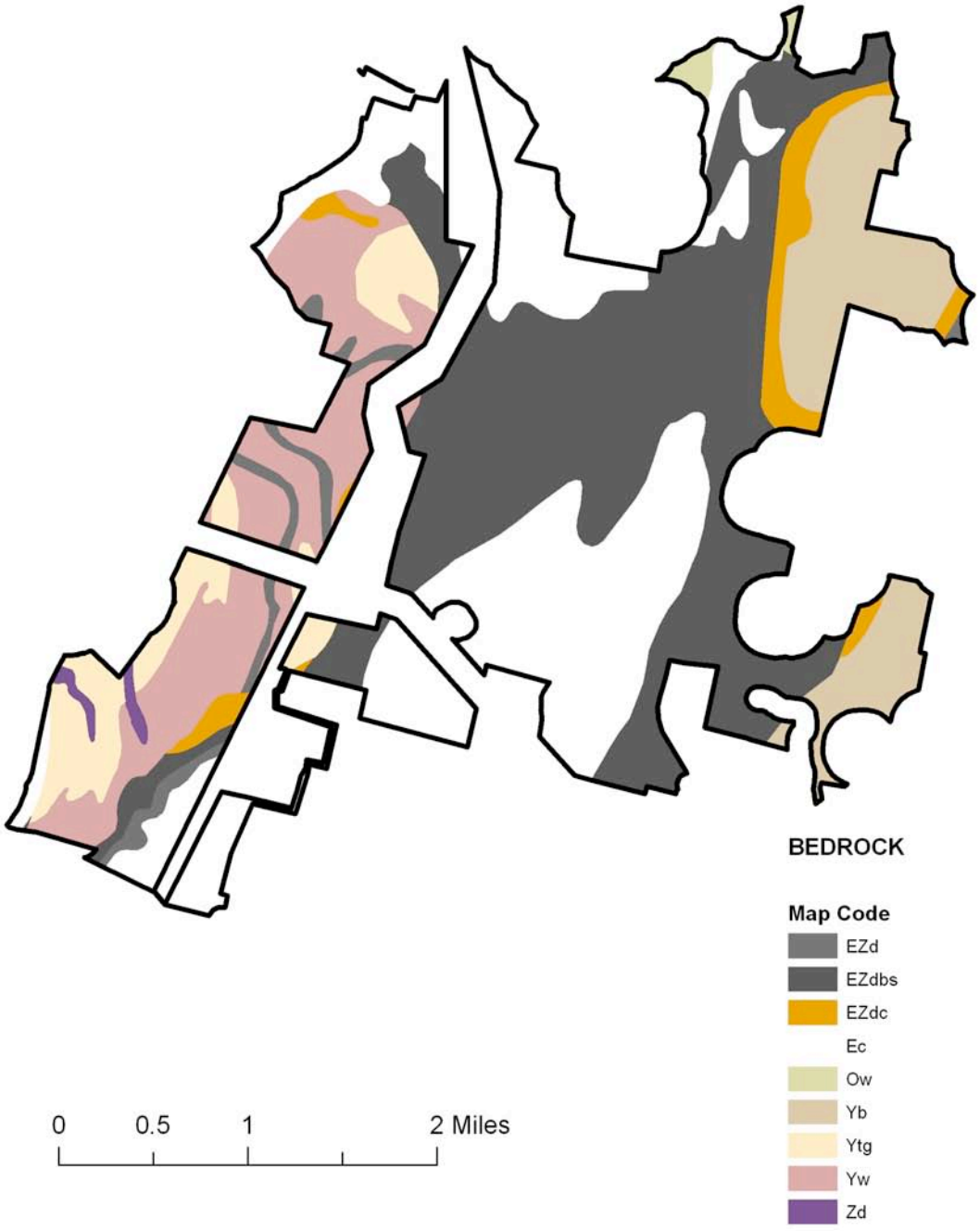

Fig. 7. Bedrock types within the Chalet Forest Reserve (Zen et al. 1983).

Table 1. Bedrock description, Chalet Forest Reserve (Zen et al. 1983).

Map Code	Description	Area (%)	Formation	Rock Type
EZd	Muscovite-microcline quartzite and feldspathic quartzite	2	Dalton Formation	Sedimentary
EZdbs	Carbonaceous quartz schist	35	Dalton Formation	Metamorphic
EZdc	Quartz and gneiss cobble and pebble conglomerate, rusty feldspathic schist, and muscovite quartz schist	4	Dalton Formation	Sedimentary
Ec	White, massive vitreous quartzite	28	Cheshire Quartzite	Sedimentary
Ow	Graphitic quartz phyllite and schist containing minor lenses of limestone	1	Walloomsac Formation	Sedimentary
Yb	Gray, well-layered biotite-plagioclase-quartz gneiss containing beds of amphibolite, aluminous schist, quartzite, and calc-silicate gneiss	11	Gray, well-layered biotite-plagioclase-quartz gneiss	Igneous
Ytg	Ferrohastingsite-biotite, quartz-rodded granodioritic to quartz monzonitic gneiss	6	Tyringham Gneiss	Igneous
Yw	muscovite-biotite-sillimanite and/or kyanite-garnet schist; blue-quartz ribbed conglomerate	13	Washington Gneiss	Metamorphic
Zd	Biotite-hornblende mafic dike	<1	Biotite-hornblende mafic dike	Igneous

Fig. 8. The “Prairie”, a large area of exposed bedrock in the Chalet WMA, near the Forest Reserve boundary, located on the Cheshire Quartzite Formation with glacial boulders (Photo by Avril de la Cretaz).

Surficial Geology and Soils

There have been repeated episodes of glaciation in New England during the past one million years. Mountains of ice have advanced from the north, scraping away existing material and retreated, leaving massive amounts of debris behind (glacial drift). During the last glaciation, the Hudson Valley lobe, an extension of the Wisconsinan ice sheet, moved south into Massachusetts, covering the Berkshire Hills to a depth of more than 1,000 feet. At its greatest extent, 23,000 to 22,000 years ago, the southern border of the ice sheet reached Northern New Jersey and Long Island, NY. The glacial lobe moved in a southeasterly direction and melted back in the opposite direction. Current river drainages in the Berkshires and the Berkshire foothills flow generally to the southeast following the path of glacial advance and recession (Skehan 2001).

The recession of the glaciers, which continued until about 12,000 years ago, exposed a landscape covered with thick deposits of rocks, sand, and gravel left behind by the melting ice. Glacial drift can be divided into different types, based on the size and range of sizes of the particles. Glacial till, created by the grinding movement of the glaciers over bedrock, consists of poorly-sorted material, particles of many different sizes, including clay, sand, gravel, rocks and boulders. Glacial outwash is deposited by fast-flowing meltwater and consists of well-sorted sand and gravel of fairly uniform size. The Chalet Forest Reserve is almost entirely covered by glacial till deposits (MassGIS 1999). While the Chalet Forest Reserve is located primarily on acidic bedrock, some of the surficial deposits developed on the marble and limestone bedrock of the Hoosic River Valley to the west. These deposits are rich in calcium and support the development of neutral to alkaline soils.

Soils in the Chalet Forest Reserve are primarily spodosols. Spodosols are acid, sandy, nutrient-poor, leached soils that form in acidic glacial till in cold, wet environments, typically under forests. Spodosols are characterized by an E or eluviated horizon, below the organic (O) horizon. Clay, iron, and aluminum oxides have leached out of the E horizon, leaving a soil layer that is light-colored and contains only resistant minerals such as quartz. (Brady and Weil 2002).

The Lyman, Tunbridge, Berkshire, and Peru soil series shown in Fig. 9 are spodosols. Lyman soils are shallow to bedrock (10 to 20 inches) and somewhat excessively drained. They are found on rocky hills, mountains, and high plateaus and develop in a thin layer of glacial till and frost fractured rock fragments derived from schist rocks with lesser amounts of phyllite, granite, and gneiss (NCSS 2007). Tunbridge soils are moderately deep (28 inches) well drained soils. They form in glacial till derived from micaceous schist, gneiss, and phyllite on uplands (NCSS 2008). Berkshire soils are very deep (65 inches), well drained and also formed in upland till. Bedrock underlying Berkshire soils is composed of mica schist with some phyllite, granite, and gneiss (NCSS 2006). The Peru series consist of very deep (65 inches), moderately well drained soils that formed in dense, loamy glacial till. Unlike the previous series, Peru soils are underlain by a dense substratum of compacted glacial material with limited permeability (NRCS 1998). There Hinckley formed in outwash deposits. Both are very deep and

excessively drained. Hinckley soils formed in sand and gravel, derived from granite, gneiss, and schist, and are classified as moderately to very strongly acid.

In additional to the soils described above, which cover 96% of the Forest Reserve area (Table 2), there are small areas of soils that formed on calcareous till, and calcareous glacial outwash. Farmington soils are shallow (10-20 inches to bedrock) and well drained and somewhat excessively drained. They formed in wind and water deposits mixed with till derived from limestone, dolomite, dolomitic limestone, shale and sandstone and are classified as acid to neutral (NCSS 2007). Amenia soils are very deep (72 inches) and moderately well drained. These soils formed in calcareous loamy till and are moderately acid to strongly alkaline (NCSS 2006). Pittsfield soils are very deep and well drained and formed in calcareous till derived primarily from schist and weathered limestone. They are classified as neutral to slightly alkaline (NCSS 2007). The Kendaia and Lyons soil series are both very deep (72 inches) wet soils that formed in calcareous till derived from limestone, calcareous shale, and sandstone. Both soil series range from slightly acid to moderately alkaline. Lyons soils are the more poorly drained of the two. Groton soils formed in outwash, gravelly sand and cobbles, derived from limestone, gneiss, and schist, and are classified as neutral to slightly alkaline.

Soils that formed on calcareous material are generally rich in nutrients compared to soils that develop in more acidic deposits. Nutrient-rich soils support rich, mesic, forest communities that are dominated by sugar maple, white ash, and basswood and are noted for a biologically diverse understory (NHESP 2004a,b,c, Appendix B).

Table 2. Soil Series, East Branch (NCSS 2007, 2008, 2006, 1998, 1997, 2007, 2006, 2007, 2007, 2007, 2007, 2004).

Series Name	Soil Characteristics	Area (%)
Soils formed in acidic till		
Lyman	Shallow, somewhat excessively drained	44
Tunbridge	Moderately deep, well drained	21
Berkshire	Very deep, well drained	7
Peru	Very deep, moderately well drained	15
Pillsbury	Very deep, poorly and somewhat poorly drained	9
Soils formed in calcareous till		
Farmington	Shallow, well drained and somewhat excessively drained	<1
Amenia	Very deep, moderately well drained	<1
Pittsfield	Very deep, well drained	1
Kendaia	Very deep, somewhat poorly drained	1
Lyons	Very deep, poorly and very poorly drained	<1
Soils formed in acidic outwash		
Hinckley	Very deep, excessively drained	<1
Soils formed in calcareous outwash		
Groton	Very deep, excessively drained	<1

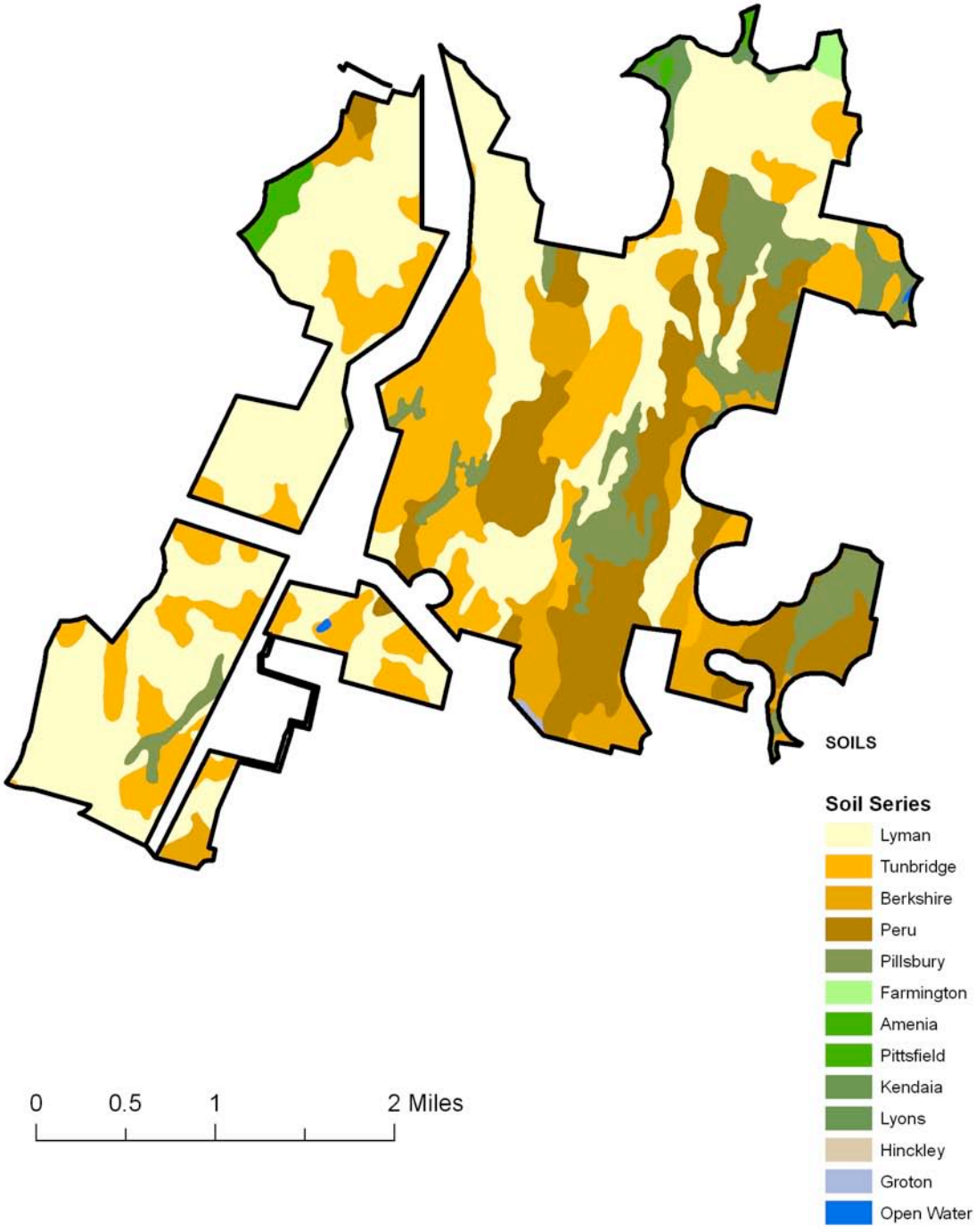

Fig. 9. Soil types in the Chalet Forest Reserve (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture 1999).

Climate

In the area surrounding the Chalet Forest Reserve, winters are cold and summers are moderately warm, with occasional hot spells. Annual precipitation is evenly distributed throughout the year (Scanu 1988). The nearest weather station is located at Cummington Hills (elevation 1,607 ft.), about 12 miles to the ease-southeast of the Reserve.

Table 3. Mean 24-hour temperature and mean total monthly precipitation, Cummington Hill, MA (World Climate 1996).

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
[1]Temp.˚F	19.9	22.1	31.5	42.4	54.0	62.6	67.3	65.7	58.3	48.2	37.0	24.6	44.4
[2]Precip. Inches	3.6	2.9	3.0	4.0	5.0	3.6	4.9	4.6	4.0	3.9	3.9	3.7	47.2

[1]Temperature derived from National Climatic Data Center, NCDC TD 9641 Clim 81 1961-1990 Normals. 30 years between 1961 and 1990.
[2]Precipitation from NCDC Cooperative Stations.16 complete years between 1963 and 1994.

Disturbance History

The most common natural disturbances in this area are windstorms (hurricanes and microbursts associated with severe thunderstorms), ice storms, and pathogens (insects, and disease) (O'Keefe and Foster 1998). Within the past 50 years, the forest of the Chalet Reserve has suffered from a variety of insect and fungal diseases including: beech bark disease, gypsy moth caterpillars, cankerworms, saddle prominent caterpillars, and pear thrips (MassGIS 1997). Widespread defoliation from unidentified causes, covering up to 6,000 acres, was identified from aerial photographs between 1969 and 1972. (This defoliation corresponded with a major outbreak of saddled prominent caterpillars elsewhere in the Northeast and it is possible that this species was responsible for the damage observed in Chalet). In 1980, gypsy moth caterpillars defoliated about 1,000 acres in the southwestern section of the forest, while cankerworms defoliated about 500 acres in a section to the north. In 1981, the forest was attacked by both gypsy moth and saddled prominent caterpillars with each insect defoliating about 1,000 acres. In the late 1980s, there were outbreaks of pear thrips resulting in the defoliation of about 2,500 acres. Beech bark disease has also been observed.

Pest and Pathogen Information

Beech bark disease results when bark, attacked and altered by the beech scale insect (*Cryptococcus fagisuga*), is invaded and killed by fungi, primarily *Nectria coccinea* and sometimes *Nectria galligena*. Beech bark disease causes significant mortality (Houston and O'Brien 1983).

Gypsy moth (*Lymantria dispar*) caterpillars have caused widespread forest defoliation throughout Massachusetts. The most severe recent outbreak occurred from 1980-1982. Gypsy moth caterpillars prefer hardwoods, especially oaks, basswood, gray and white birch, and poplar. Older larvae feed on several species of hardwoods plus hemlock, pines, and spruces. They tend to avoid ash, butternut, balsam fir, and mountain

laurel, but will feed on almost anything during a population outbreak. Outbreak populations return to low levels that do not visibly affect the forest canopy after 2 to 3 years. Wasps, flies, ground beetles, and ants; many species of spiders, birds, and many small woodland mammals (mice, shrews, chipmunks, squirrels, and raccoons) all prey on gypsy moth larvae when population density is low, but this predation does not prevent outbreaks (McManus et al. 1989, Elkinton et al. 2004). Population outbreaks are eventually controlled by density-dependent mortality. A virus (*Nucleopolyhedrovirus*) usually causes outbreak population collapse. Recently an entomopathogenic fungus species (*Entomophaga maimaiga*) has prevented population outbreaks. The fungus has spread rapidly since it was first observed in 1989, partially the result of intentional introduction into gypsy moth infested areas as a biological control (Hajek et al. 1996, Liebhold 2003).

Pear Thrips (*Taeniothrips inconsequens*) was first identified as an agricultural pest that attacked fruit trees. It has been considered a serious forest pest since 1979. Adult pear thrips emerge from the soil in the spring. They feed on the buds and emerging leaves of sugar maples, birch, ash, black cherry, and beech, and then lay their eggs in the veins and petioles of the leaf epidermis leaving brown scars (O'Brien and Snowden 1989).

Saddled Prominent (*Heterocampa guttivitta*) caterpillars (also referred to as Saddle Prominent) have caused defoliation of hardwoods in the Northeastern United States and Southeastern Canada. A major outbreak occurring from 1968 to 1971, affected nearly 1.5 million acres in Maine, Massachusetts, New Hampshire, New York, and Vermont (Rush and Allen 1987). Additional outbreaks affecting small patches (<300 acres) were reported in 1981 and 1995 (Mass GIS 1997). Saddled prominent larvae primarily feed on broad-leaved trees and shrubs, favoring American beech, sugar maple, yellow birch, and paper birch, species that are found in abundance in the Chalet forests. Saddled prominent populations collapse due to the combined actions of parasites, predators, and disease and from starvation as large populations defoliate many trees and outstrip the food supply (Canadian Forest Service 2007).

LAND USE HISTORY

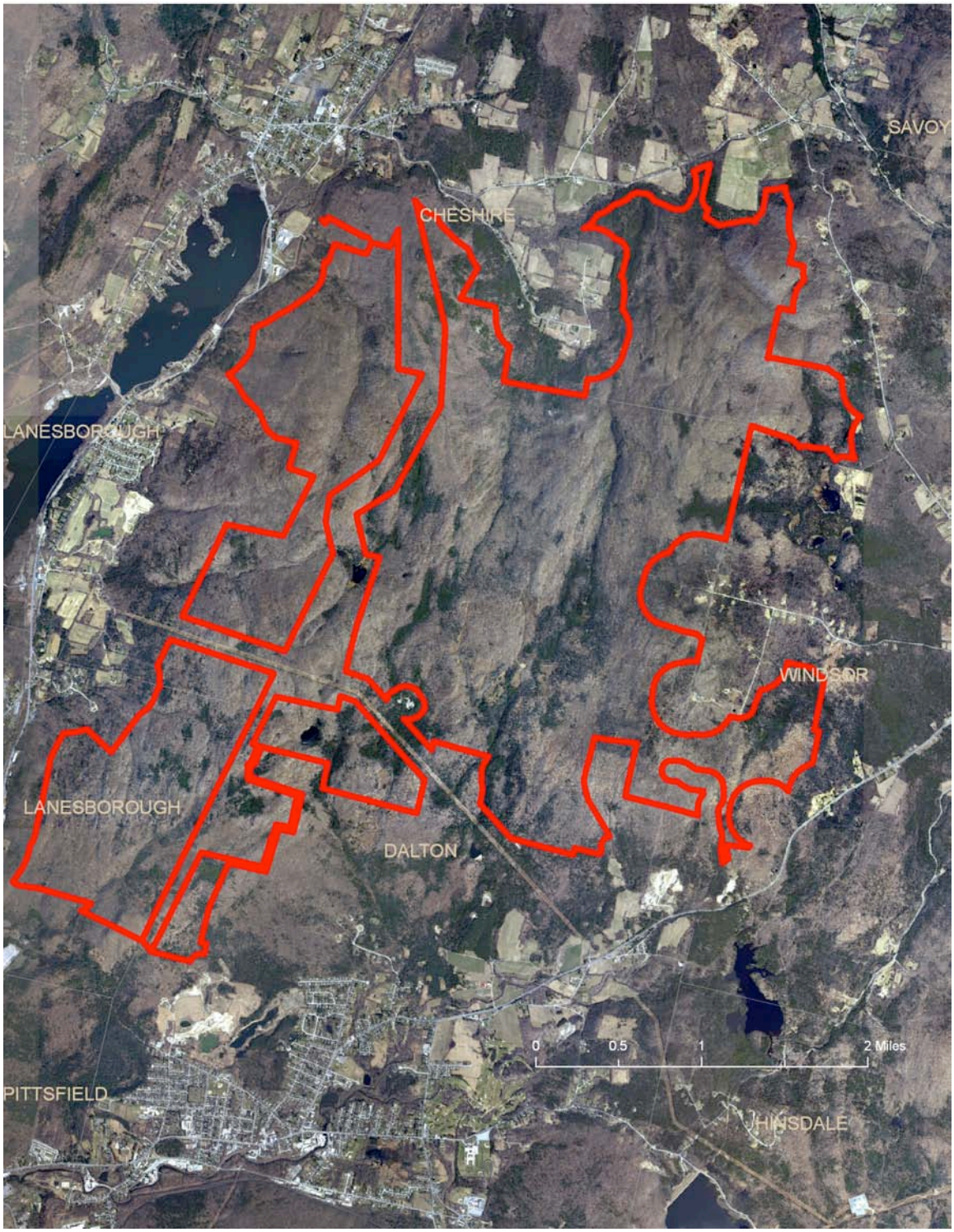

Fig. 10. Orthophotos of the Dalton, Lanesborough, and Cheshire (MassGIS 2005) with Forest Reserve boundaries shown in red.

The forestland of today's Chalet Reserve has been most accessible to and most influenced by human activity in the Hoosic and Housatonic River Valleys (referred to as the Marble Valley because the area is underlain by marble and limestone bedrock) (Fig. 10). This region of western Massachusetts was originally occupied by the Mahican people, an Algonquian tribe that occupied lands from the banks of upper Hudson River, in New York, extending north almost to Lake Champlain and eastward into Massachusetts. There were few English colonial settlements throughout Western Massachusetts in the early 18th century, due to the relative inaccessibility of the area and the continuing conflict brought about by the French and Indian Wars. The British defeated the French at Quebec in 1759 and the Treaty of Paris, signed in 1763, ceded all of North America, east of the Mississippi, save only New Orleans, to the British. The indigenous people in western Massachusetts lost French military support and were compelled to give up their lands and move to the west. At this point, English colonial development began in earnest (Resch and Katz 1976).

The town of Dalton was originally granted to Colonel Oliver Partridge, the Berkshire's first "real estate operator". Partridge and a group of associates had been granted a large tract of land on the lower Ashuelot River located in what is now southwestern New Hampshire. At that time, the boundary between Massachusetts and New Hampshire was in dispute and both colonies claimed the territory. In 1740, the British Privy Council granted the land to New Hampshire. Massachusetts was required to offer Colonel Partridge and his group "their choice of an equal allotment" from unappropriated lands in the western part of the Massachusetts colony. Partridge selected the upper valley of the east branch of the Housatonic and named it the Ashuelot Equivalent. The town was incorporated in 1784, following the Revolutionary War, and renamed Dalton, in honor of Tristram Dalton, speaker of the State House of Representatives (Federal Writers Project 1939, Horth 2007).

The town of Cheshire was originally purchased by Nicholas Cook and Joseph Bennett of Rhode Island in 1766. Their tract was later divided into parts of Savoy, Lanesborough, Adams, and Cheshire. Cook and Bennett hired Colonel Joab Stafford to survey the area. Stafford purchased 396 acres and settled the area of the Forest Reserve now known as Stafford Hill. The Low, Wells, Brown, Carpenter, Jenkes, Mason, Bliss, Tibbets, and Cowmans families joined Stafford in this early settlement. The town of Cheshire was incorporated in 1793 (The Berkshire Web(a), no date given).

In 1742, 76 inhabitants of Framingham and other towns in eastern Massachusetts petitioned the Colonial Government to found a wilderness township north of Shoonkeekmoonkeek (Pontoosuc Lake) in the Marble Valley. This area was called Richmond and then New Framingham, but, as with other areas in the region, there were few settlers prior to the cessation of the French and Indian Wars. New settlers began moving into the area in the early 1760s and the town was incorporated as Lanesborough in 1766 (The Berkshire Web (c), no date given, Lanesborough MA, no date given).

At the end of the 18th century, Dalton, Cheshire, and Lanesborough, were agricultural towns. Forests were cleared for croplands and pasture and woodlots were harvested for building materials and fuel but much of the economy was local. In 1799 Zenas Crane purchased 14 acres together with springs and waterpower rights for $194. He established the first paper mill (Crane & Company) in Dalton in 1801. The area provided all the necessary ingredients for paper manufacturing at that time: falling water for power, pure water for processing, transportation routes for bringing in supplies and shipping finished products to markets in a broader area, and sufficient population to supply the raw material for paper making: cotton and linen rags (McGaw 1987). A second paper factory was erected by David Carson, Joseph Chamberlain, and Henry Wiswall in 1822 and in 1824 a third mill was built by Thomas Carson, David's son. The Carson mill was later taken over by Byron Weston. Local industrial development proceeded rapidly. In Lanesborough, in 1822, there were two stores, five hotels, three tanneries, two hatters, five shoe shops, three tailors, a harnessmaker, five blacksmith shops, two cloth dressing and carding mills, two wagon makers, five saw mills, and a shop for spinning wheels. Dalton in 1829 was home to three paper mills, a gristmill, and five sawmills (The Berkshire Web(b), no date given).

Aside from paper manufacturing, the other major industries in the area were textile manufacturing and mining. Between 1820 and 1850, twelve small textile factories operated in Dalton. The Sawyer-Regan Company, a large woolen mill, survived until the 1950s. In the 1930s, it employed about 200 workers. Mining operations produced lime, marble, high-quality quartzite sand, and iron. White quartz sand, mined in Cheshire supplied the material for the manufacture of blown glass, plate glass, and window glass (Federal Writers Project 1939). The Cheshire Crown Glass Company was incorporated in 1812. Lime was mined and processed in many locations; there were 21 lime kilns in the southern part of the town of Cheshire alone. The original lime kiln in Cheshire was sold to the Farnam brothers in 1866 who established the Farnam Lime Works, one of the largest in Berkshire County. Farnams Lime Marble Quarry (US Gypsum Quarry; Lime-Marble Quarry #4), located on the west side of Cheshire Lake, is the principal and largest lime-marble quarry in Cheshire today. Lime was used in the making of mortar and plaster, in glassmaking, and also in the process of making paper, to break down fiber in rags and as a bleaching agent. Zenas Crane began using chloride of lime in 1839 as a bleaching agent for removing dye from the rags, in order to make pure white paper (Federal Writers Project 1939, McGaw 1987). Iron was discovered in Lanesborough in 1847 and the Briggs Iron Company (later the Lanesborough Iron Works) was founded at the same time (Lanesborough, no date given).

The industrial development in the valleys created increased demands on surrounding forests. Uplands were cleared for sheep pastures, while the remaining forest was harvested for timber and fuelwood. Much of the fuelwood was used to produce charcoal which was used with lime in the smelting of iron ore (Kirby 1995).

Current town populations are: Dalton, 6,892; Cheshire, 3,401; and Lanesborough, 2990 (MassGIS 2009 (b), U.S. Census 2000). The population remained relatively stable between 1980 and 2000.

In a History of Berkshire County, published in 1829, the Reverend Ebenezer Jennings (Quoted in White, ca. 1990) described the condition of the forest in Dalton as follows:

> *"…there was formerly a very valuable pine forest in the town but the demand for pine stuff has been so great that this source of wealth is almost exhausted.*
>
> *A great quantity of wood is yet to be found on the hills; from which a considerable gain is derived from markets out of town. Great quantities of hemlock are sawed into boards and timber and sold abroad. Spruce is much used for shingles.*
>
> *One patent shingle mill furnishes a great many thousand shingles yearly for market. Hemlock bark, besides supplying two tanneries in town is carried away in considerable quantities.*
>
> *A turning lathe is now in operation, which works up chair stuff for the New York Market. Three wood mills have lately been erected which go by horse power, and are thought to be a great improvement. One of these mills will saw as much wood for stoves in a day as four men will chop.*

By 1876, most of the land now in the Forest Reserve in the town of Cheshire in what is now the northern part of the Reserve was open farmland. An 1,800 acre area on the border of Dalton and Cheshire was identified as timberland. Most timberland was cut repeatedly for forest products (Fig. 11) (Beers Atlas 1876).

Fig. 11. Chalet Forest Reserve: areas that were never plowed or pastured retain the pit and mound topography of the pre-settlement forest (photo by Matthew Kelty).

Paper mills were constructed from wood, and then wood was used to heat the milla once they were built. Tubs and beaters used to reduce rags to fiber were made of wood. In the 1870s, new technology made it possible to manufacture paper from wood fiber. While paper mills elsewhere (the Smith Paper Mill in Curtisville, a village in Stockbridge, was the first to do so) adopted this process, the Dalton mills (Crane & Co. and the Weston Mill, later acquired by Crane & Co.) did not. The Dalton mills produced high-end writing paper, paper for currency, bank notes, and paper for archived government records. Beginning in 1879, Crane & Co. has maintained an exclusive contract to furnish the United States Government with paper for currency and securities. These high-quality papers were made from rags – linen, cotton, and silk. Although the Cranes and Weston Companies did not use wood pulp for their products, other mills in the area did, leading to increased harvesting in the Berkshire Forests in general (McGaw 1987, Gordon 1998, Crane & Co., no date given).

Much of the northern part of the Forest Reserve was owned by the Farnam Mining Company and later sold to the W.J. Cowee Lumber Company of Berlin, N.Y. The Cowee Company sought to acquire clear cut land for the early-successional birch that would regenerate there, and used birch for a variety of manufactured products. Cowee milled birch into turnings (spools, bobbins, dowels etc.). Then, beginning in the early 20th Century, Cowee created a niche market of "wood wire picks" for supporting floral arrangements. They currently manufacture over a quarter of a billion floral picks per year. As the forest aged, cutting may have continued for fuelwood (W.J. Cowee Company, no date given; pers. comm., Dicken Crane August, 2009).

The southern portion of the Forest Reserve was primarily owned by the Crane family. Frederick G. Crane Sr. began buying farmland in Dalton in 1895. By about 1910, he had acquired approximately 3,600 acres. The site included several barns, farm houses, a blacksmith shop, granary, dairy, and a farm office. The farm was a working dairy farm employing 30 to 40 workers during the summer. In 1907, Crane bought Holiday Farm, a 22 ½ acre property to the west of Flintstone Farm from his sister Mary. Mary Crane had purchased the property in 1898, and used it as a summer vacation camp for under-privileged children from New York City (Hibbard, ca. 1990; Wislocki and Grahm, ca. 1990).

Frederick G. Crane Jr. inherited the property from his father and, in 1925, began an extensive tree-planting program, initially designed by his father. Red pine, white pine, and white spruce (approximately 10,000 trees per year) were planted on 100 acres of open farmland. Crane also began a program of selective harvesting on the 2,400 acres of second-growth forest within the rest of the farm property.

In 1972, Frederick Crane Jr. donated the development rights on 1,900 acres of land to the Berkshire County Land Trust and Conservation Fund, a tax-exempt trust set up by the Berkshire Natural Resources Council in 1969 for the purpose of accepting conservation easements. Under the terms of the conservation easement, the land was protected in perpetuity from development. The Crane family retained the right to cultivate and harvest forest products on the property. In 1976, Frederick Crane Jr. was

named “Outstanding Tree Farmer of the Year” in Massachusetts (Hibbard, ca. 1990; Wislocki and Grahm, ca 1990). The land was also protected under the Massachusetts Chapter 61 program, which provides tax benefits to owners who make a long-term commitment to improving the "quality and quantity" of timber on that land (DCR 2007).

In 1986, the Crane family donated 1,100 acres in Dalton, north of the Holiday and Flintstone Farm properties to the DFW. Shortly after that much of the Cowee land also was acquired by the DFW. At that point, much of the Cowee land had been high-graded The Cranes retained the timber rights on the property until the winter of 2006. Timber was harvested on about 1,400 acres of the entire Forest Reserve between 1984 and 2003 (Figs. 12 and 13). In the 1980s, nine parcels totaling 360 acres (median area = 10 acres) were harvested; between 1990 and 2000, an additional 900+ acres (10 parcels with a median size of 55 acres) were cut (McDonald et al. 2006). Additional harvesting occurred between 2003 and 2006, at which time the forest land was given Reserve status. Between 50 and 75% of the 1,100 acres donated by the Cranes was harvested. Some harvests were clear cuts, but no harvesting occurred in the stream valleys (pers. comm. Dicken Crane, August 2009).

Fig. 12. Chalet Forest Reserve, site of recent harvesting (photo by Avril de la Cretaz).

FOREST TYPES

The Division of Fisheries and Wildlife completed digital forest cover type data in 2002 using color orthophotos provided by MassGIS, scale 1" = 2,500'. Polygons were delineated by Landmark Systems (Warner Robins, Georgia), using a minimum mapping unit of 5 acres (DFW 2002).

The forest in the Chalet Reserve is primarily composed of northern hardwood species (76% of the forest area). These forests are dominated by beech, yellow birch, and sugar maple with lesser amounts of white ash and black cherry (Fig. 13, Table 6). Red spruce and balsam fir are intermixed with northern hardwoods at higher elevations. Spruce and fir are also found in high-elevation boreal wetlands. Hemlock and white pine mix with northern hardwoods at lower elevations. Central hardwoods (oak and hickory) are dominant in only 1% of the total land area. Although rich, mesic forest communities are too small to be observed at the scale of the digital forest type data, the presence of these communities within the Chalet WMA has been noted by Massachusetts Natural Heritage (Appendix B).

Table 6. Forest types, Chalet Forest Reserve WMA (DFW 2002).

Forest Type	Area (%)
Northern Hardwoods	76
Mixed Hardwoods	<1
Central Hardwoods	1
Conifers	2
Northern Hardwoods-Hemlock-White pine	7
Northern Hardwoods-Spruce-Fir	6
Northern Hardwoods-Conifer	4
Spruce-Fir Boreal Wetland	2
Mixed Wood Wetland	1
Open Wetland	<1
Non-Vegetated	<1
Open Water	<1

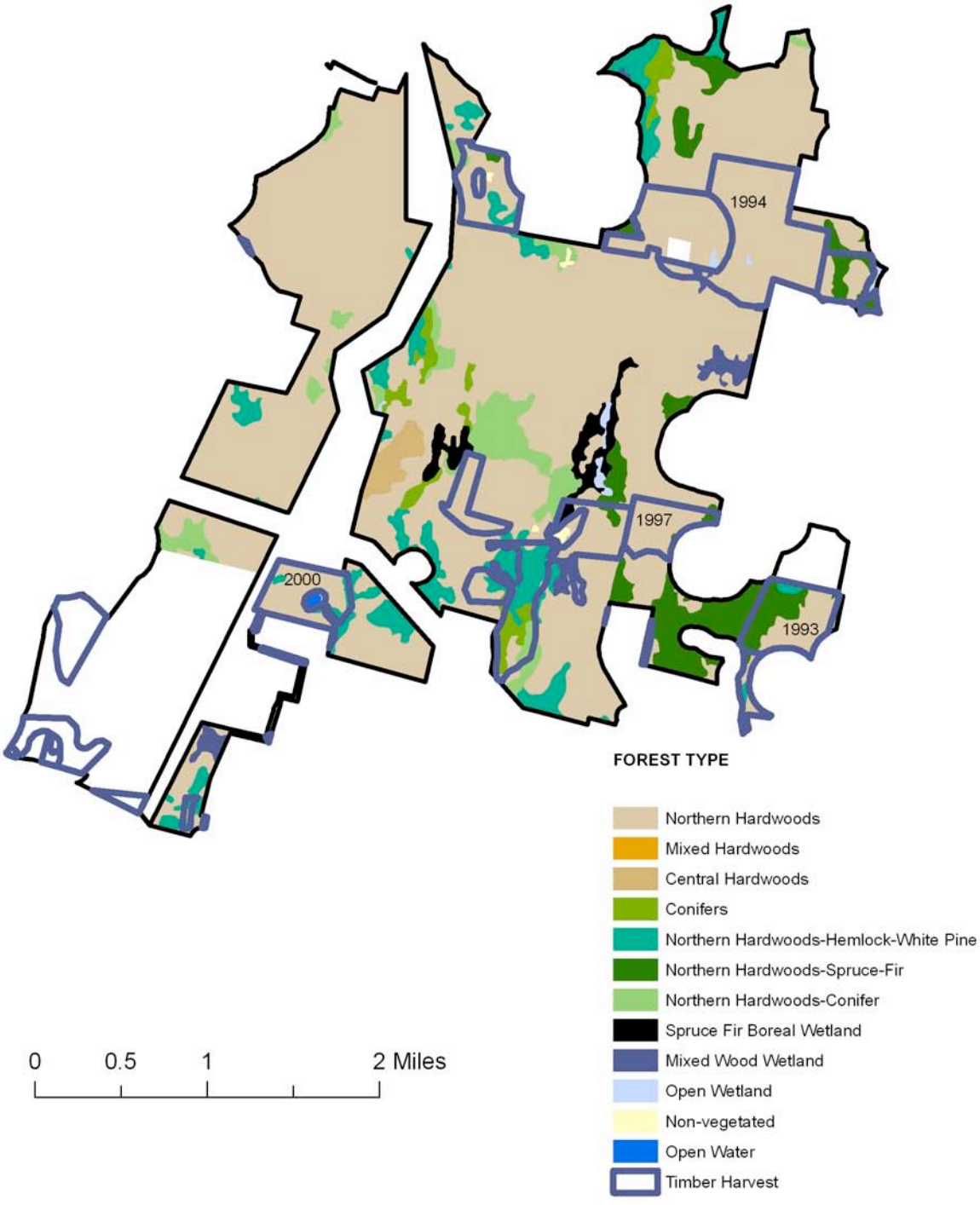

Fig. 13. Forest types, Chalet Forest Reserve, indicating predominant overstory species and timber harvests 1984-2003 (DFW 2002, McDonald et al. 2006).

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Appendix A. East Branch Forest Reserve Species List

Trees and Shrubs

Ash	*Fraxinus* spp.
Balsam fir	*Abies balsamea*
Basswood	*Tilia americana*
Beech (American beech)	*Fagus grandifolia*
Bitternut hickory	*Carya cordiformis*
Black cherry	*Prunus serotina*
Hemlock	*Tsuga canadensis*
Hickory	*Carya* spp.
Oaks	*Quercus* spp.
Spruce	*Picea* spp.
Sugar maple	*Acer saccharum*
White ash	*Fraxinus americana*
White birch	*Betula papyrifera*
White pine	*Pinus strobus*
Yellow birch	*Betula alleghaniensis*

Herbaceous Species

Bloodroot	*Sanguinaria canadensis*
Blue cohosh	*Caulophyllum thalictroides*
Maidenhair fern	*Adiantum pedatum*

Appendix B: Massachusetts Natural Heritage and Endangered Species Program, BioMap and Living Waters 2004

Massachusetts Natural Heritage has identified three core habitats that fall within the Chalet WMA Forest Reserve: BM502, BM521, and BM551.

Core Habitat BM502 (Cheshire, Dalton)

On the slopes of North and Weston Mountains, this Core Habitat encompasses many miles of coldwater streams that support Spring Salamanders. It also includes a large area of Northern Hardwoods forest that is home to the Eastern Veined White butterfly, and a small but diverse area of Rich, Mesic Woods.

Natural Communities

This large Core Habitat contains 35 acres of Rich, Mesic, Forest in Dalton. Rich, Mesic Forests are a variant of northern hardwood forests dominated by Sugar Maple with a diverse herbaceous layer and many spring ephemerals, unusual plants that appear only in spring, in a moist nutrient-rich environment. These woods have high species diversity, including Sugar Maple, Basswood, Leatherwood, Elderberry, Maidenhair Fern, Blue Cohosh, and Wild Leek among others. Unfortunately the rich, nutrient conditions also make the sites attractive to many exotic invasive plant species.

Plants

A small population of the showy Great Laurel (*Threatened*) *is growing within this Core Habitat.*

Invertebrates

The southwestern portion of this Core Habitat (*in western Dalton, southeastern Lanesborough, and northeastern Pittsfield*) *includes a tract of undeveloped and unfragmented Northern Hardwoods forest with sunny openings that is inhabited by the rare Eastern veined White butterfly. This Core Habitat is located less than 10 km* (6.2 miles) *from Core Habitats in Windsor and Pittsfield, which probably allows for the dispersal of Eastern Veined Whites between these areas. While some of this Core Habitat is on protected land, including the Appalachian Trail corridor and the Chalet Wildlife Management Area, much of it appears to be unprotected.*

Vertebrates

This is an elongate, multi-lobed Core Habitat along the slopes of North Mountain. It contains over 16 miles of coldwater, high-gradient brooks and headwater seeps that support populations of Spring Salamanders. The majority of this Core Habitat is protected within the boundaries of the Chalet Wildlife Management Area.

Natural Communities

Common Name	Scientific Name	Status
Rich, Mesic Forest Community		Vulnerable

Plants

Common Name	Scientific Name	Status
Great Laurel	*Rhododendron Maximum*	Threatened

Invertebrates

Common Name	Scientific Name	Status
Eastern Veined White	*Pieris oleracea*	Threatened

Vertebrates

Common Name	Scientific Name	Status
Spring Salamander	*Gyrinophilus porphyriticus*	Special Concern

Core Habitat BM521

Vertebrates

This Core Habitat protects high-gradient brook habitat and adjacent upland forests along the upper reaches of Collins Brook on the slopes of North Mountain. This area contains significant habitat for Spring Salamanders and is almost entirely protected as conservation land within the Chalet Wildlife Management Area.

Vertebrates

Common Name	Scientific Name	Status
Spring Salamander	*Gyrinophilus porphyriticus*	Special Concern

Core Habitat BM551

Here the cold, high-gradient brooks on the western slopes of North Mountain provide habitat for Spring Salamanders. This Core Habitat also contains serpentine rock outcrops needed to support the Endangered Large-Leaved Sandwort. The eastern portion of this Core Habitat is protected as conservation land, but the western portion at lower elevations is currently unprotected.

Plants

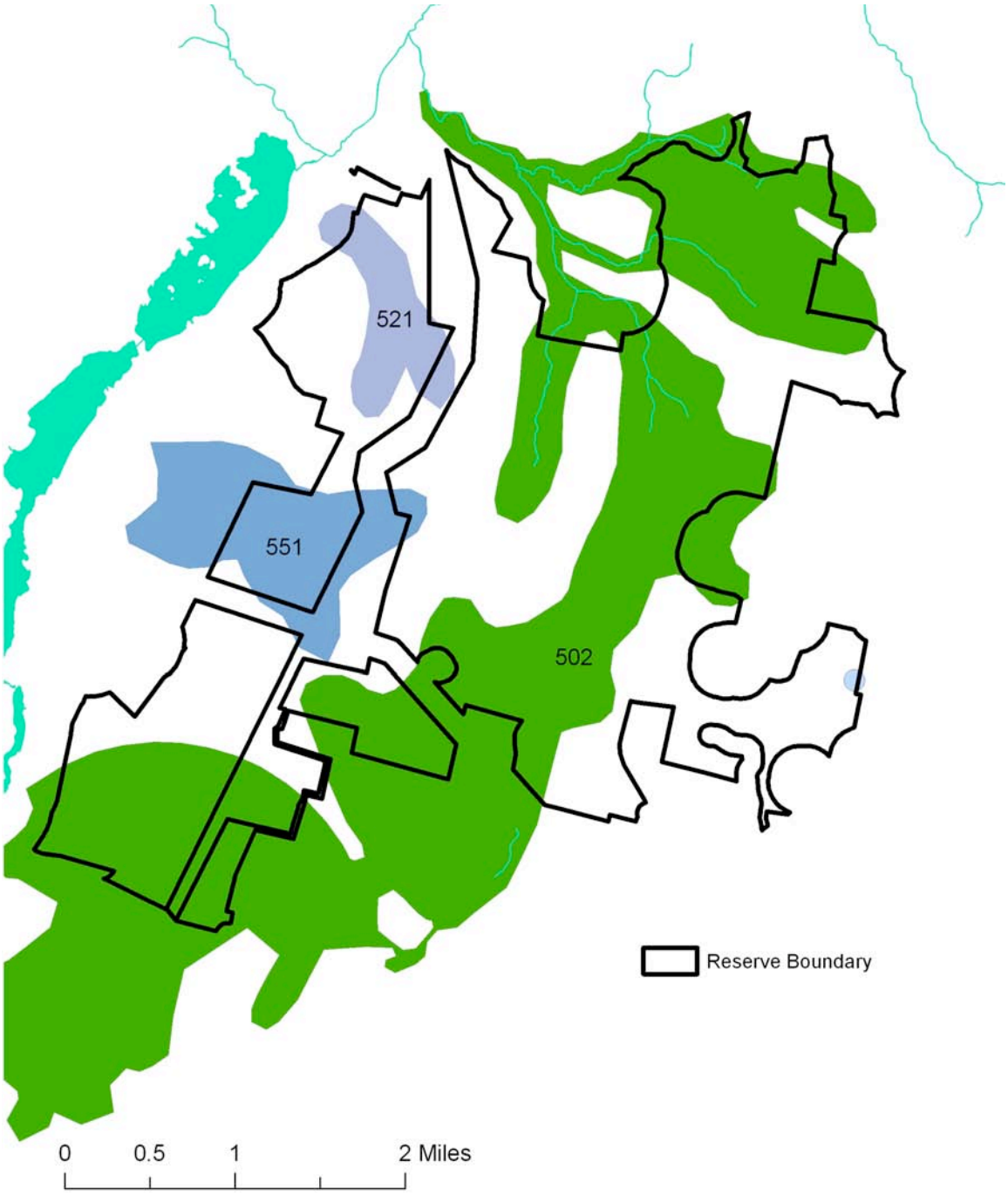
Large-Leaved Sandwort is an Endangered plant limited in its distribution by its preference for serpentine rock, an uncommon type of rock outcropping, which is found within this Core Habitat.

Vertebrates

This Core Habitat encompasses cold, high-gradient brook habitat for Spring Salamanders, as well as adjacent mixed forest habitat, along over 2 miles of the upper reaches of Gore Brook flowing off the western slope of North Mountain.

Living Waters

The goal of the Living Waters project, completed in 2003, was to identify and delineate the rivers, streams, lakes, and ponds that are important for freshwater biodiversity in the Commonwealth.



Appendix B. Fig. 1. Core Habitats and Living Waters designations within the Chalet Forest Reserve. Core Habitats are identified by number. Living Waters streams are shown in bright blue-green (MassGIS 2004, NHESP 2004 a,b,c).