

Baseline Documentation Report
Sprucewood Forest
Owned and managed by
Sprucewood Retirement Trust and Chet Tecce, Jr. Revocable Living Trust



February 18, 2013

Easement Baseline Documentation Prepared by: Aaron J. Brondyke for The Trust for Public Land

Preparer

Date

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B. Owner Acknowledgement Statement

Property Name: Sprucewood Forest

Grantors:	Sprucewood Retirement Trust John H. Farrell, Trustee 8 Littlejohn Road Durham, NH 03824 603-534-9536 johnfarrell@hotmail.com	Chet Tecce, Jr. Revocable Living Trust 240 Mast Road Durham, NH 03824 603-868-2353
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Grantee: USDA Natural Resources Conservation Service
Jeremy Lougee, Soil Conservationist
Federal Building, 2 Madbury Road
Durham, NH 03824
603-868-9931 x. 142
jeremy.lougee@nh.usda.gov

Conservation Buyer:

Town of Durham, NH
Todd Selig, Town Administrator
15 Newmarket Road
Durham, NH 03824
603-868-5571; tselig@ci.durham.nh.us

Property Description

171.73 acres located in Durham, Strafford County, New Hampshire. Including 4,760 feet of frontage along the Oyster River and a mixture of primarily mature pine-oak forest, as well as wetlands, and a significant component of grassland and early successional shrublands. Owned by Sprucewood Retirement Trust and Chet Tecce, Jr. Revocable Living Trust; to be conveyed to the Town of Durham for wildlife habitat and water quality protection, scientific study, and public recreation, subject to a conservation easement to be held by the USDA Natural Resources Conservation Service. The New Hampshire Land & Community Heritage Investment Program and the NH Department of Environmental Services will both hold executory interests in the restricted fee interest in the property.

In compliance with Section 1.170-14(g)(5)(i)(D) of the Federal Tax Regulations This baseline inventory report is an accurate representation of the property at the time of the conservation easement donation fee simple acquisition.

Grantor _____ Date _____

Grantor _____ Date _____

Summary Information:

1. Landowners name, contact information

Sprucewood Retirement Trust
John H. Farrell, Trustee
8 Littlejohn Road
Durham, NH 03824
603-534-9536
johnfarrell@hotmail.com

Chet Tecce, Jr. Revocable Living Trust

240 Mast Road
Durham, NH 03824
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2. Easement holder name, contact information

USDA Natural Resources Conservation Service
Jeremy Lougee - Soil Conservationist
Federal Building, 2 Madbury Road
Durham, NH 03824
603-868-9931 x. 142
jeremy.lougee@nh.usda.gov

3. Executory Interest name, contact information

NH Land & Community Heritage Investment Program Authority
Dorothy Tripp Taylor, Executive Director
13 West Street, Suite 3
Concord, NH 03301
603-224-4113
dtaylor@lchip.org

NH Dept. of Environmental Services, Wetlands Bureau
Lori Sommer, Wetland Mitigation Coordinator
29 Hazen Drive
Concord NH 03301
603-271-4059
Lori.Sommer@des.nh.gov

4. Date or proposed date of project acquisition

March 31, 2013

5. Detailed directions to the property from the nearest town

From downtown Durham, drive southwest on Mill Road approximately 2.3 miles. Turn right onto Packers Falls Road. After 0.1 miles, look for a gated dirt road on your right (north) with a set of powerlines and a metal gate (see photo 6). Park on this dirt road near the gate. Alternatively, park in the roadside pull-off on Packers Falls Road, located just to the east of the gated dirt road (see photo 3).

6. General physical property description, including acreage

The Sprucewood Forest Property is located in southeastern New Hampshire's Strafford County, in the Seacoast Region. The Property consists of approximately 171.73 acres of flat to rolling terrain, including forestland, grassland, wetlands, and river frontage, which are the subject of this Baseline Report (hereafter known as "Property"). The majority of the Property is undeveloped forestland. Elevations range from approximately 60 feet above sea level at the Oyster River on the northern boundary of the property, to approximately 170 feet on a hillside on the western edge of the property near the Spruce Hole Conservation Area.

7. Summary of the conservation values protected

- The Property is an important resource for such recreational activities as fishing, wildlife observation, hunting, walking, running, and cross-country skiing on developed and informal trails.
- There are numerous surface water resources on or adjoining the Property, including the Oyster River, some small tributary streams, and associated wetlands.
- The property sits atop a high yield aquifer that will be tapped by a wellhead to serve as a secondary source of drinking water for the Town of Durham and UNH, serving a population of 16,000.
- The Property contains valuable wildlife habitat, including grasslands, marsh, shrub wetlands, forested uplands, floodplain forest, and other riparian zones.
- Several State of New Hampshire threatened and endangered species have been known to occur on or near the Property, including New England cottontail, upland sandpiper, American brook lamprey, the bog elfin butterfly, and the ringed boghaunter dragonfly.
- The Property's forested uplands, river frontage, and riparian areas help to protect water quality in the Oyster River, Great Bay, and Piscataqua River.

8. Extent of the investigation – Who did the work, when was the property visited, who else was consulted for information that is in the report, etc.

Aaron Brondyke, Senior Field Representative for The Trust for Public Land inspected the property on February 18, 2013, and prepared this report. TPL Project Manager Kate

Wanner performed the GIS analysis and prepared the GIS maps referred to in this report. See Literature Cited Section for additional sources of information.

C. History of the Project

In 2009, the Trust for Public Land was contacted by Duane Hyde, Chair of the Durham Conservation Commission, to meet with the landowner/developers who own the property. During initial conversations with the landowners, municipal officials and the University of New Hampshire Office of Campus Planning, TPL determined that the community had a strong desire to see the property conserved, but also was seeking opportunities to encourage economic development in Durham. As a result, TPL convened a stakeholder working group to identify properties located in Durham's downtown that were suitable for development with the goal of swapping the development potential on the Sprucewood property for town or UNH-owned property downtown.

The discussions took place over several months, involving representatives from the Town of Durham (Jamie Houle and Derek Sowers of the Durham Conservation Commission, Robin Mower and Diana Carroll of the Durham Town Council, and Durham Town Administrator Todd Selig) and the University of New Hampshire (Doug Bencks and Paul Chamberlin of the Office of Campus Planning, Tom Kelly of the Office of Sustainability, and Ecology Professor Tom Lee). Over the course of the discussions, several candidate properties were selected for consideration, but all were ruled out for different reasons. Based on these discussions, TPL sought and received consensus among the stakeholders that the project had sufficient merit solely as a conservation effort to proceed without a development component.

TPL optioned the Sprucewood Trust and Tecce Properties in November of 2009, and spearheaded a campaign to raise purchase funds from federal, state, municipal, and private sources. In March of 2013, the landowners will convey a conservation easement to NRCS. Then, TPL will acquire the underlying fee interest and convey the restricted fee interest in the property to the Town of Durham, with executory interests in the restricted fee to the NH Land & Community Heritage Investment Authority and the NH Department of Environmental Services.

D. Land Uses and Management

1. Historic

The property is made up of two separate ownerships, with different historical uses. Sprucewood Retirement Trust owns the western $\frac{3}{4}$ of the property—124.24 acres that are mostly forested, with the exception of approximately 30 acres of old field/early successional land cover. The present land cover indicates that the property was once used for agricultural purposes, but the fields now lay fallow. The surrounding forest has been harvested periodically for decades, mostly for personal use. The property shows signs of harvest within the past 10 years, including former log landings, a few skid roads, and

thinned areas, mostly along the western side of the property (see photos 9, 12, 43, 45, 47, and 48).

The Chet Tecce, Jr. Revocable Living Trust owns the eastern ¼ of the property—47.49 acres of forestland south of the Oyster River. This land was historically used as pasture for sheep. However, the Tecce family ceased pasturing animals on this property well over 50 years ago. Since then, the property has mainly been used to occasionally harvest timber for personal use. Forestland on this portion of the project area shows little sign of recent harvest. Young to medium-aged forest covers most of the acreage, with occasional wolf trees remaining from the pasture period.

2. **Current**

Timber Production

Both properties are occasionally used to harvest timber for firewood.

Outdoor Recreation/Education

As the keystone property that links 2,200 acres of existing conservation land, the property offers excellent opportunities to improve and expand outdoor recreation. Low impact, non-motorized recreational uses of the property include hiking, biking, running, fishing, bird-watching, snow shoeing, and cross-country skiing (see photos 7, 8, 10, 21, 22, 26, 30, 37, 39, 41, 46, and 47). Although currently limited, Sprucewood's trail network could be improved and expanded to connect with an extensive network of trails in College Woods (see photo 22), Foss Farm, and other nearby conservation lands. In addition, the property provides opportunities for research and education for UNH faculty and students.

F. Inventory of Property Improvements

Disagreements often occur regarding the construction of new buildings or property improvements. For this reason it is critical that all existing improvements be detailed in the baseline inventory report. This information should include GPS locations of all improvements. The following need to be listed in this section.

1. Major agricultural structures such as barns, sheds, riding arenas and corrals

None.

2. Minor agricultural structures such as stock tanks and fences

None.

3. All man made ponds, stock tanks or reservoirs

None.

4. Any recreational improvements present on the property

None.

River Access

At this time, the Oyster River can be accessed by the general public only on foot, and no boat access is provided. A rough, unimproved foot trail extends westward from College Woods, generally parallel to the Oyster River, and ends at the property's old fields (see photos 22, 26, and 30).

5. Roads, public and private, paved and unpaved need to be located on a site map and preferably shown in photographs. This includes two-tracks present on the property.

Roads

A narrow, unpaved road extends northward from Packers Falls Road, and follows the water pipe easement shown on the Sprucewoods Retirement Trust portion of the survey plan. A fork of this road also provides emergency access to the Sprucewood senior living facility (see photos 6, 9-11, 41, and 46).

All roads on the property are shown on the survey plan, and represented in the Photo Log (see photos 1, 3-6, 9-11, 41, and 46). All roads on the interior of the property are unpaved.

6. Existing radio towers, cell towers, power lines, dumps, transfer stations, gravel pits and cemeteries, etc.

580 square feet of the property will be excluded from the easement area around the old Wiggin/Tuttle Cemetery near Packers Falls Road (see survey plan and photos 7 and 8).

G. Description of Property and Conservation Values

1. Physical Description

a) Topography – A general description and notable landmarks referenced in the report.

Elevation Range

Elevations range from approximately 60 feet above sea level at the Oyster River on the northern boundary of the property, to approximately 170 feet on a hillside on the western edge of the property near the Spruce Hole Conservation Area (see Appendix 2).

River

The shoreline of the Oyster River is covered with a mixture of forest types, including typical southeastern New Hampshire pine and oak forest, as well as hemlock forest and hemlock-hardwood-pine forest (see photos 22-23). Steep embankments form much of the Oyster River shoreline, but some red maple floodplain forest can be found in pockets of flat ground along the Oyster River. This habitat becomes more abundant on the north side

of the river, and in the adjacent College Woods.

Drainages

The northern portion of the property drains northward toward the Oyster River, but the southern quarter of the property slopes southeastward into Chelsey Brook, which in turn, drains into the Oyster River just upstream from the property.

- b) Geology – Note the underlying geology and any notable features located on the property.

The underlying bedrock of the property is primarily part of the Merrimack Trough. The vast majority of the property is underlain by the Merrimack Group, Eliot Formation (labeled “SOe” on Appendix 10), which is comprised of gray to green phyllite, calcareous quartzite, quartz-mica schist, and well-bedded calc-silicate. The extreme eastern tip of the property is underlain by the Exeter Diorite (labeled “De9” on Appendix 10), which is comprised of pyroxene and pyroxene-hornblende diorite and gabbro, along with minor granodiorite and granite.

- c) Soils – Note the major soil types and their locations on the property.

The following table summarizes the soil units found on the Property, and their acreages:

Table 1: Soil Units

Forest Soils Classification	Map Symbol	Map Unit Name	Area (acres)
IA	EaB	Elmwood fine sandy loam, 3-8% slopes	1.1
IA	WfB	Windsor loamy fine sand, clay subsoil variant, 0-8% slopes	1.3
IB	BzB	Buxton Silt Loam, 3-8% slopes	27.8
IB	HcB	Hollis-Charlton fine sandy loams, 3-8% slopes	29.6
IB	HcC	Hollis-Charlton fine sandy loams, 8-15% slopes	4.5
IB	HdC	Hollis-Charlton very rocky fine sandy loams, 8-15% slopes	25.4
IC	HaA	Hinckley loamy sand, 0-3% slopes	0.4
IC	HaB	Hinckley loamy sand, 3-8% slopes	5.5
IC	WdA	Windsor loamy sand, 0-3% slopes	14.8
IC	WdB	Windsor loamy sand, 3-8% slopes	26.1
IC	WdC	Windsor loamy sand, 8-15% slopes	11.0

Forest Soils Classification	Map Symbol	Map Unit Name	Area (acres)
IIA	HbE	Hinckley gravelly loamy sand, 15-60% slopes	0.4
IIB	Sb	Saugatuck loamy sand	4.1
IIB	ScA	Scantic silt loam, 0-3% slopes	18.5
NC	MI	Mixed alluvial land, wet	0.3
NC	W	Water	1.5

The most abundant soil units on the property are as follows. Together, these 4 soil types underlie more than 63% of the Property's land area:

Hollis-Charlton fine sandy loams, 3-8% slopes (HcB): This soil covers much of the forested uplands on the north central part of the property.

Buxton Silt Loam, 3-8% slopes (BzB): This soil covers mid- to lower slopes on the north central part of the property.

Windsor loamy sand, 3-8% slopes (WdB): This soil overlays eastern sections of the Spruce Hole Aquifer on the property.

Hollis-Charlton very rocky fine sandy loams, 8-15% slopes (HdC): This soil covers the property's highest elevations.

Important Forest Soils

According to soils data from the Natural Resources Conservation Service's National Cooperative Soil Survey (downloaded from the New Hampshire GRANIT GIS Database), the Property contains soils that are well-suited to forestry (see below). Of those soils on the property that were ranked for suitability for forestry (170.5 acres), approximately 53% of those acres (89.7 acres), falls into important forest soils group IA or IB. Another 34% of those acres (57.8 acres), falls into important forest soils group IC, which is ideally suited for forest management, especially white pine.

IA: 2.4 acres 1.4 %

IB: 87.3 acres 51.2 %

IC: 57.8 acres 34.0 %

d) Hydrology – Note water features found on the property, watershed information and any

other information related to water on the property.

Watersheds

The Property lies entirely within the Oyster River watershed, which flows into the Piscataqua River at Great Bay, and ultimately drains into the Gulf of Maine at New Castle. As one of the major tributaries flowing into the Great Bay, land use patterns along the Oyster River profoundly affect the health of this important ecosystem. The Great Bay supports more than 150 rare species and 55 exemplary natural communities and provides feeding, breeding, and nursery grounds for a variety of finfish, oysters, shellfish, waterfowl, wading birds, and shorebirds.

Riparian and wetlands

There are approximately 7.8 acres of wetlands found on the Property, according to National Wetlands Inventory data. These consist of 6.5 acres of forested wetlands and 1.3 acres of scrub/shrub wetlands (see Appendix 8, and photos 13, 14, 16, 17, 19-21, 24, 27-29, and 44). These wetlands serve important functions in providing habitat and maintaining or improving water quality. The forested riparian zone along the Oyster River provides important water quality buffering to the river itself, and to coastal estuarine habitats downstream.

Aquifer and Drinking Water Resources

The entire 171.73-acre property lies completely within two Hydrologic Areas of Concern and two Source Water Protection Areas (Newmarket Water Works and the UNH/Durham Water System) which serve a population of over 16,000 citizens (see Appendix 8).

There is a total of 56 acres of stratified drift aquifer underlying the property in 2 separate mapped aquifer units (see Appendix 9). There are no known wellheads on the property. However, almost all of the Property lies within the buffer of the Emeritus at Spruce Wood Wellhead Protection Area. In addition, the buffer of the proposed Spruce Hole Wellhead Protection Area overlaps the southwestern edge of the property (see Appendix 9 and photo 48). Permitting is in progress for this water supply, which is intended to serve the UNH Campus and the Town of Durham.

UNH and the Town of Durham currently draw drinking water from the Lamprey River and the Oyster River. During certain conditions, water from the Lamprey is pumped into the Oyster River (see photo 42), for storage in the Oyster River Reservoir, located downstream from the property on the UNH campus. This Lamprey River water is delivered to the Oyster River via the buried water pipe that runs beneath the 20-foot wide easement that runs along the western edge of the subject property (see survey plan and Appendix 9).

The Spruce Hole well, located off of Packers Falls Road, has been proposed as a supplemental water source for UNH and the Town. The Town also plans to pump water from the Lamprey River, via a branch to be added onto the existing water delivery pipe,

into the Spruce Hole Aquifer, to recharge the Spruce Hole aquifer during times of water shortage and drought.

Rivers and Streams

This property protects 0.9 miles (4,760 feet) of frontage along the Oyster River (see photos 22-25, 27-29, 40, and 42). This section of the Oyster River was designated within the *Land Conservation Plan for New Hampshire's Coastal Watersheds* (2006) as a "Special Significant Stream Reach," defined as a "stream or river segment, and its associated floodplain and riparian zone known to have special significance for living resources, including fish species of conservation concern." This reach of the Oyster received this designation due to its importance as spawning and rearing habitat for the endangered American Brook Lamprey and seven fish species of conservation concern. Located just 4 miles upstream from where the Oyster River flows into Great Bay, Sprucewood Forest helps to maintain the estuary's rich aquatic ecosystem. Because of its ecological values, the river has also been nominated for special protection through the State's Rivers Management Protection Program.

2. Vegetative Communities

Provide a brief description of the main vegetative community types found on the property. The description should also include human altered vegetative communities such as hay field, corn fields or pastures. It is important to note the general locations of each community type and include a map showing the locations of the communities if appropriate.

Land Cover Types

No scientific field survey has ever been completed on the majority of the property. While not technically official natural communities, the best data available approximating natural communities comes from the University of New Hampshire's GRANIT database (see Appendix 7). This information on land cover, based on aerial imagery, dates to 2006, and identifies the following land cover types:

Table 2: Land Cover Types

Land Cover Type	Acreage
Appalachian Oak-Pine	156.7
Grasslands	28.9
Hemlock-Hardwood Pine	7.2

Land Cover Type	Acreage
Wet meadow/Shrub Wetland	5.3
Forest Floodplain	0.7

The precision of this land cover GIS data is coarse; being marked in 30-meter squares. Furthermore, some land cover types in the database overlap each other, and the surveyed property boundaries, so the acreages in Table 2 are approximate, and do not add up to the official surveyed acreage. Nevertheless, some generalizations can be made. Forest habitat on the Property is dominated by oaks, hickory, white pine, hemlock, gray birch, red maple, and yellow birch. Red maple floodplain forest, dominated by red maple, occurs only in small isolated pockets along the shoreline of the Oyster River on the northern boundary of the property (see photos 24, 28, and 29). Shrub wetlands can also be found along the Oyster River shoreline (see photos 29 and 40). Old field grasslands are found on former grazing land near the northwestern and central portions of the property (see photos 15, 30-34, 39 and 41).

2008 Kane Natural Inventory

Biologist Christopher Kane completed a scientific field survey of natural communities on a portion of the Property in May of 2008. This survey included only the 47.49-acre Tecce portion of the property, as well as a wooded portion of the Sprucewoods Retirement Trust property located just to the west of the Tecce parcel, and just east of the old fields. This survey was conducted in response to a request by the landowners to guide potential residential development and conservation on that portion of the project area. Some generalizations about the land cover types on the remainder of the project area can likely be made from Kane’s observations on the Tecce portion. A summary of natural community types documented through that study follows.

Mesic Appalachian Oak – Hickory Forest

This forest type is common throughout the property (see photos 1-6, 18, and 45-48). The dominant tree species of this community on the property are Red Oak (*Quercus rubra*), Black Oak (*Quercus velutina*), White Oak (*Quercus alba*), and Shagbark Hickory, (*Carya ovata*). White Pine (*Pinus strobus*), Red Maple (*Acer rubrum*), Sweet Birch (*Betula lenta*), Eastern Hemlock (*Tsuga canadensis*), and the occasional Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*) and Red Cedar (*Juniperus virginiana*) are sub-dominant or associate canopy species. Understory species include the dry-sited shrub and small tree species Witch-hazel (*Hamamelis virginiana*), Beaked Hazel (*Corylus cornuta*), Maple-leaved Viburnum (*Viburnum acerifolium*), Fly Honeysuckle (*Lonicera canadensis*), and

Ironwood (*Ostrya virginiana*).

Herbaceous species that are common in this community include Canada Mayflower (*Maianthemem canadense*), Partridgeberry (*Mitchella repens*), and Rough-leaved ricegrass (*Oryzopsis asperifolia*). Spring wildflowers include Wood Anemone (*Anemone quinquefolia*), Trout Lily (*Erythronium americanum*) and Dwarf Ginseng (*Panax trifolia*).

Red Maple – Black Ash – Swamp

A large wetland is located in the northeastern part of the property (see photos 19-21). Black ash is present, though in low numbers. Red maple and Swamp Saxifrage (*Saxifraga pensylvanica*) are both present also, as are lesser amounts of other tree species, including Basswood (*Tilia Americana*), American Elm (*Ulmus Americana*), and Red Oak (*Quercus rubra*). On drier locations, Shagbark Hickory (*Carya ovata*) and White Pine (*Pinus strobus*) occur. The canopy cover is 50%, while the shrub cover is about 80%. Predominant shrub species include Musclewood (*Carpinus caroliniana*), Gray Dogwood (*Cornus recemosa*), Silky Dogwood (*Cornus amomum*), Nannyberry (*Viburnum lentago*) and Winterberry Holly (*Ilex verticillata*). Common herbaceous species include Wild Geranium (*Geranium maculatum*), Water Aven (*Geum rivale*), Dwarf Raspberry (*Rubus pubescens*), Sedges (*Carex spp.*), Ragwort (*Senecio spp.*), and Spotted Touch-me-not (*Impatiens capensis*).

Red Maple Floodplain Forest

The New Hampshire Natural Heritage Bureau has documented a series of small sites of Red maple floodplain forest natural community in the northeastern portion of the project area along the Oyster River (see photos 24, 28, and 29). According to Chris Kane, the community is dominated in the canopy by red maple (*Acer rubrum*), with an abundance of other hardwood species, such as black cherry (*Prunus serotina*), American elm (*Ulmus Americana*), and basswood (*Tilia Americana*). The community has a ranking of S2 – “Imperiled due to rarity or vulnerability.”

3. Wildlife Values

Each property is used in different ways by wildlife and wildlife uses change over time. Please provide a description of the notable species found on the property.

Almost the entire property is located within the Coastal Conservation Focus Area from the 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds*, which was written by The Nature Conservancy, Society for the Protection of New Hampshire Forests and the Stafford and Rockingham regional planning commissions. The property ranks highly within this study due to its large, unfragmented forest blocks, intact floodplain and riparian zones, significant fish and wildlife habitat, critical habitat supporting rare species

and exemplary natural communities, and its importance for regional habitat connectivity. The NH Wildlife Action Plan classifies 171.1 acres of the property as Tier 1, and 3.5 acres as Tier 3.

Terrestrial Mammals

As illustrated on Appendices 3, 6, and 7, the Property is mostly forested, consisting primarily of oak-pine forests, with wet meadow/shrub wetlands along many riparian areas. The property's oak-pine and hemlock forests provide some winter cover for white tailed deer (*Odocoileus virginianus*), especially within the area located near the Oyster River (see photos 22 and 23). Abundant oaks provide nut mast for small mammals, white tailed deer, and turkeys (*Meleagris gallopavo silvestris*). Beavers (*Castor canadensis*) are active near the Oyster River (see photo 25). Abundant sign of white tailed deer and coyote (*Canis latrans*) was noted during field inspection (see photos 10 and 19).

New Hampshire Fish & Game biologists report that, based on current modeling, habitat on the property is likely good for New England Cottontail (NEC) (*Sylvilagus transitionalis*), a State Endangered species. This species is critically imperiled throughout its range, and is a candidate for federal listing. Located within a NEC Focus Area, Fish & Game has documented NEC on either side of the subject property (some current, and some historic). Therefore, this property provides a critical potential link to connect NEC habitats. Recent studies indicate that NECs inhabit less than 25% of their historic range from New York to Maine. This dramatic population crash is largely attributed to habitat loss. If successful, this project will ensure that critical habitat will be permanently protected and managed to support NECs. Fish & Game has highly recommended surveying the property for this species, and managing the property for the benefit of NEC. NRCS has produced a map of areas of the property that have been proposed for specialized management to restore habitat for the benefit of NECs and other species (see Appendix 11 and photos 14-17, 19-20, 30-34, 39, 41, 43, and 45).

Birds

The property's grasslands are especially important for grassland birds. Vesper sparrow (*Pooecetes gramineus*), a state Species of Conservation Concern, and upland sandpiper (*Bartramia longicauda*) (a State Endangered species) have been documented in grasslands to the north, and habitat management on the grasslands of Sprucewood Forest would benefit these species, which could nest on the property. NH Fish & Game has also recommended working with the adjoining landowner to the north on grassland management for this purpose.

The property's grasslands are mapped in the NH Wildlife Action Plan as the "Priority Habitat Grassland" type. Bird species of concern in New Hampshire associated with this

community include northern harrier (*Circus cyaneus*), upland sandpiper, purple martin (*Progne subis*), eastern meadowlark (*Sturnella magna*), horned lark (*Eremophila alpestris*), grasshopper sparrow (*Ammodramus savannarum*), and vesper sparrow (*Pooecetes gramineus*). This field is also mapped in the WAP as being in the “Highest Rank by Condition” in New Hampshire. This is the highest value ranking for wildlife habitat on a State-wide basis. The remainder of the project area is mapped as a “Supporting Landscape” that protects, buffers and expands this highest-ranking habitat.

Fish

The Oyster River supports a recreational fishery, and fishing is popular on the Oyster River Reservoir as well, just downstream in College Woods on the UNH Campus. The property’s marsh and shrub wetlands, highest ranking in the State, help to support and enhance the property’s fish habitats.

American brook lamprey (*Lampetra appendix*) (a State Endangered species) is found in NH only within this watershed (Chesley Brook and Oyster River). According to NH Fish & Game, of the 47 miles of streams within the Oyster River Watershed, the American brook lamprey is now thought to live in three distinct areas, totaling about three stream miles. American brook lamprey are found in the channelized stream that flows northward from the small marsh that is located in the east-central portion of the property (see photos 13, 14, 16, 17, 35, 36, 40, and 44). For the benefit of this species, Fish & Game recommends keeping the marsh connected with the Oyster River floodplain forest. Fish & Game states that protecting this 1,756-foot section of brook is critical to protecting this species. Other species found in the Chesley Brook/Oyster River watershed include American eel (a state Species of Conservation Concern), and the swamp darter (a state Species of Conservation Concern).

Amphibians

The river floodplains and wet meadow/shrub wetlands on the property (see photos 14, 16, 17, 27, 29, 40, and 42) provide important habitat for amphibians as well. NH Fish & Game reports that blue-spotted salamanders (*Ambystoma laterale*) (a State Species of Conservation Concern) could potentially be found on the property, as the habitat is appropriate and they have been documented nearby. The property’s wetlands and grasslands also have the potential to support northern leopard frog (*Rana pipiens*), also a species of conservation concern.

Reptiles

Ribbon snakes (*Thamnophis sauritus*) and spotted turtles (*Clemmys guttata*) may also occur in the wetlands. Both species are identified as “species of greatest conservation concern” in the 2005 NH Wildlife Action Plan. Blanding’s turtles (*Emydoidea blandingii*)

(a State Endangered species) are unlikely to live on the property, but might pass through the property, according to preliminary habitat models. The property's wetlands and grasslands also have the potential to wood turtles (*Glyptemys insculpta*), also a species of greatest conservation concern.

Insects

The Ringed boghaunter (*Williamsonia lintneri*) (a State Endangered species), one of the rarest dragonflies in North America, has been found in Spruce Hole Bog, as has the bog elfin butterfly (*Callophrys lanoraieensis*). Boghaunters require open woodlands for foraging as adults.

4. Scenic, Open Space and Historical Values

- a) This section should describe the public open space values that are protected by the project. These can include views from public roads or public lands and community buffers.

Sprucewood Forest provides an opportunity for visitors and residents of increasingly suburbanizing southeastern New Hampshire to connect with nature on many levels: from birdwatching to fishing, running, wildlife observation, or just enjoying the natural scenery while walking. Sprucewood Forest is a keystone property that links 2,200 acres of existing conservation land. It also protects approximately 2,000 feet of undeveloped frontage along Mill Road and Packers Falls Road, which helps to preserve bucolic views that are valued by local residents (see photos 1, 3, and 5).

In 1972, the National Park Service designated 7 acres around Spruce Hole Bog as a National Natural Landmark. Today, the Town of Durham owns 35.6 acres surrounding Spruce Hole Bog, directly adjacent to Sprucewood Forest. Although this unique natural feature is not located directly on the subject property, Sprucewood Forest helps to buffer the unique vegetation and geology of the Landmark and its underlying watershed from disturbance and pollution (see photos 47 and 48). Spruce Hole Bog is the last true kettle hole bog known to exist in southern New Hampshire, and it is the only National Natural Landmark located in the southeastern quadrant of the state.

- b) If the property has any historical or archaeological values please briefly describe.

Numerous old stone walls cross and bound portions of the property, indicating that this property was once used for grazing livestock. In addition, 580 square feet of the property will be excluded from the easement around the old Wiggin/Tuttle Cemetery near Packers Falls Road (see survey plan and photos 7 & 8). This cemetery contains approximately eight graves, the oldest legible stone bearing the date of August 13, 1804.

H. Appendices on the following pages.

1. Photographic Documentation

- a) Color photographs
- b) Photopoints map

2. USGS Topographic Map

3. Aerial Photograph

4. Annotated Survey Plan or Detailed Property Map

5. Excerpt of Soils Map

6. Critical Wildlife Habitat Map

7. Land Cover Map

8. Aquatic Features Map

9. Drinking Water Map

10. Geology Map

11. Restoration Map

12. References cited in the Report

This report was based upon the following sources:

- Field visit by Aaron J. Brondyke on February 18, 2013.
- Data on soils, conservation lands, geology, wetlands, DEM, and streams from New Hampshire GRANIT. <http://www.granit.sr.unh.edu/>
- Geologic descriptions derived from U.S. Department of the Interior U.S. Geological Survey. URL: <http://mrddata.usgs.gov/sgmc/nh.html>.
- “Natural Resources Assessment for Property of JLB Partners, Worthen Road, Durham, NH,” by Christopher Kane, May 13, 2008.
- Review by NH Natural Heritage Bureau of request dated 2009-02-26.
- NH Nongame and Endangered Wildlife Program URL: <http://www.wildlife.state.nh.us/Wildlife/Nongame/mammals.html>. Also, <http://www.wildlife.state.nh.us/Wildlife/Nongame/birds.html>. And, http://www.wildlife.state.nh.us/Wildlife/Nongame/reptiles_amphibians.htm.
- New Hampshire Wildlife Action Plan, New Hampshire Fish and Game Department. 2005, with GIS updates in 2010.
- NH Natural Heritage Bureau URL: http://www.nhdf.org/library/pdf/Natural%20Heritage/WebVersion_Tech%20Manual.pdf
- National Park Service URL: <http://www.nature.nps.gov/nnl/site.cfm?Site=SPHO-NH>
- Town of Durham URL: http://www.ci.durham.nh.us/boc_conservation/spruce-hole-bog-and-conservation-area-0

13. Recorded Copy of the Conservation Easement (submitted after closing)