Lower New England – Northern Piedmont Ecoregion Conservation Plan

First Iteration

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The overarching goal of conservation in the Lower New England – Northern Piedmont Ecoregion is to ensure the long term viability of all native species and natural communities and to sustain the landscape configurations and ecological processes critical to ensuring their long-term survival.

Conservation Goals

1. Ensure the continued existence of the eleven matrix forest communities and restore natural processes to promote development of mixed-aged stands.
2. Conserve multiple viable occurrences of all aquatic community types and restore hydrologic processes to promote healthy, functioning aquatic ecosystems.
3. Protect multiple viable occurrences of all terrestrial communities through the development of a portfolio of conservation sites. The multiple occurrences should represent the range of variability found within each of the community types in the ecoregion.
4. Include in the portfolio of sites viable occurrences of all G1-G3 and T1-T2 species, and declining G4-G5 species, with the goal of protecting multiple occurrences of such species in the variety of habitats in which they naturally occur.

Introduction to the Ecoregion

The Setting

The Lower New England – Northern Piedmont ecoregion (LNE-NP) includes portions of 12 states and the District of Columbia (Map 1. Ecoregion boundaries). The Lower New England ecoregion extends from southern Maine and New Hampshire with their formerly glaciated, low mountain and lake studded landscape through the diversity-rich, limestone valleys of western Massachusetts and Connecticut, Vermont and eastern New York. Rhode Island, eastern Massachusetts and Connecticut are distinctive in that the communities are more fire adapted including Pitch Pine and Oak dominated forests on glacially deposited sandy till that forms a broad plain with many ponds. The Northern Piedmont was never glaciated and provides broad gently-rolling hills and valleys with serpentine grasslands and chestnut oak forests in Maryland, northern Virginia and eastern Pennsylvania.

Large portions of the Appalachian Mountains lie within the ecoregion including the Palisades in New York and New Jersey, the Taconics and the Berkshires in Massachusetts, New York, Vermont, and Connecticut, and the widely strewn *Monadnocks* of southern New Hampshire. Large rivers originating in the Appalachians cut across the Atlantic slope lowlands generally from north or west to east emptying into the Atlantic Ocean. The Potomac, Susquehanna, Delaware, Hudson, Housatonic, Connecticut, Merrimack, and Saco Rivers provide a diversity of high- and low-energy aquatic habitats and most support conservation targets of this plan. The natural character of the ecoregion is perhaps best seen in the 8% of the region currently within existing protected lands, primarily state-held, including Mt. Greylock State Park in Massachusetts, Mt. Pisgah State Park in New Hampshire, Yale-Myers Forest in Connecticut, Palisades Park in New York and New Jersey, and the Potomac Gorge in Maryland and the District of Columbia.

The Atlantic slope of North America was shaped by many tectonic, volcanic, and glacial events that created a diverse geology, interesting landforms, and topographic elevations that range from sea-level to 3800 feet (Map 3. Bedrock Geology and Map 4. Topography). The region also contains many wetland types that receive 36 – 50 inches of precipitation annually. An Ecological Land Unit (ELU) analysis of the region identified 486 biophysical combinations of a potential 630 combinations based on lithology, topography, and elevation (See Appendix 5 for a complete description of Ecological Land Units.). Assuming that ELU's are a good surrogate for natural diversity where field data are lacking would suggest that this ecoregion is quite diverse. A number of endemic species occur in LNE-NP and the regions long north-south axis captures species and natural communities more representative of the Northern Appalachian\Boreal ecoregion in higher elevations and southern species in the Piedmont. The large rivers, particularly those that are tidal in their lower reach, provide habitat for estuarine and marine species more indicative of the North Atlantic Coast ecoregion.

The Lower New England – Northern Piedmont ecoregion was inhabited by Europeans soon after their arrival in the *New World* significantly influencing the distribution and composition of the region's landscapes and natural communities today. More than 90% of the original forest cover was removed and only a few patches of *old growth* forest remains in remote, inaccessible mountain coves and ravines. With the decline of farming at the turn of the last century, and the human-exodus towards more fertile lands in the west, much of the region returned to its pre-European forested state. Today, approximately 67% of the region is again forested; 70% is in natural cover of one form or another. Black bear, moose, white-tail deer, turkey, bobcat, fisher, pine marten, and beaver can all be found throughout much of the region and generally appear to be expanding their ranges.

Nonetheless, the region remains one of the most highly populated in the country. The cities of Hartford, CT, Baltimore, DE, Springfield and Worcester, MA, Nashua and Manchester, NH, York and Lancaster, PA, New York City and Albany, NY, and Washington, D.C. all lie within the ecoregion. As do the suburbs for the cities of New York, Philadelphia, Boston, Providence, and New Haven, CT. The great forest expanses are now being increasingly fragmented by first and second home development. While the mountainous areas of the ecoregion are lightly settled now, the valleys have long been developed for agriculture, and are rapidly giving way to homes (Map 6. Land Cover).

Eighteen subsections have been well characterized within the ecoregion and were used in the planning process to set geographic distribution goals for species targets. A more generalized sub-region map with 6 subregion divisions was created for evaluating the distribution and setting conservation goals for communities. Table 1 illustrates the divisions and lists the names of the subregions and subsections. Map 2 illustrates their geographic distribution.

Table 1. LNE-NP Subregions and Subsections

Lower New England/Northern Piedmont Ecoregion					
Lower New England				Northern Piedmont	
Hudson River Subregion	**Mountains & highlands Subregion**	**Northeast LNE Plains Subregion**	**Southern New Engl. Plains Subregion**	**Reading Prong Subregion**	**Northern Piedmont Subregion**
221Ba Hudson Limestone Valley **221Bb** Taconic Foothills **221Bc** Hudson Glacial Lake Plains	**M212Cb** Taconic Mtns **M212Cc** Berkshire-Vermont Upland **M212Bb** N. CT River Valley **M212Bc** Sunapee Uplands **M212Bd** Hillsboro Inland Hills & Plains	**221Ai** Gulf of Maine **221Al** Sebago-Ossipee Hills & Plain **221Ah** Worcester-Monandock Plateau	**221Ae** Hudson Highlands **221Af** Lower CT River Valley **221Ag** SE NE Coastal Hills & Plains	**221Am** Reading Prong	**221Db** Piedmont Upland **221Da** Gettysburg Piedmont Lowland **221Dc** Newark

Land Ownership

The Lower New England – Northern Piedmont ecoregion covers approximately 23,000,000 acres. Of this area, there are 117,952 acres in Federal ownership (0.5% of the total acreage), 1,134,522 acres in State ownership (4.9% of the total acreage), and the remainder is almost entirely private land. Therefore, only about 8% of the ecoregion is managed by public entities or others for conservation purposes (Map 8. Managed Area Ownership).

Introduction to the Planning Process

The ecoregional planning process for the LNE-NP ecoregion involved four basic steps:

1. Data development and analysis
2. Portfolio development and assessment
3. Strategy development and implementation
4. Data assembly and management

Data Development and Analysis

The development of data on potential conservation targets and viable occurrences of those targets occupied the planning teams for most of the process. After developing preliminary target lists, experts had to verify the targets and add other targets needed for the portfolio. Based on rangewide distributions of elements and based on assumptions made about the number of occurrences needed for long term element survival, we developed conservation goals for each target. These goals specified the number of occurrences that the LNE-NP ecoregion needed to contribute to ensure the long-term survival of the element. Using an element occurrence database, we could then select occurrences, identified as viable by the expert teams and Heritage Programs, to meet our conservation goals.

Portfolio Development and Assessment

Course and fine filter element occurrences selected for inclusion were then reviewed a second time at individual state meetings and regional meetings attended by TNC and Heritage staff, local partners, field biologists and ecologists and other experts. In addition to corroborating or changing the presumed viability of targets selected by the expert teams by applying more recent information not already captured in BCD, chapters were also asked to prioritize occurrences based on threat, irreplaceability, conservation status, and feasibility.

Strategy Development and Implementation

The Core Team made a conscious decision not to embark on a detailed threat assessment and strategy development for element occurrences. The core team had mixed opinions on the utility of threats analysis completed in adjacent ecoregions. The majority felt that threats (stresses and sources) are largely site specific and need to be addressed at a local or state level. There was also a feeling that a threats analysis went beyond the scope of this teams mandate to identify a portfolio of sites that conserve this region's biodiversity. Cross-site and cross-state threats should be discussed by individuals responsible for implementing the plan and there was considerable discussion about forming a regional "Implementation Team". A meeting is scheduled for November, 2000 for state directors to identify and discuss threats and strategies. Threat assessments are projected to be developed for all action sites by Chapter offices shortly after publication of the plan.

The Portfolio was divided into three classes of element occurrences (sites) for conservation action: 10 Year Action Sites, TNC Lead Sites, and Partner Lead Sites. Sites requiring a substantial increase in resources and immediate action were classified as 10 Year Action sites. TNC Lead Sites were those places that require continued activity by TNC at current levels. Partner Lead Sites were defined as sites where TNC will play a secondary role supporting local partner efforts. With appropriate monitoring, the portfolio status of element occurrences should be altered over time in response to changing threat status, target viability, or partner capacity. The Nature Conservancy should monitor all portfolio sites and take action if necessary.

Data Assembly and Management

Most of the data used for assembling the portfolio for the LNE-NP ecoregion was derived from participating Natural Heritage programs. A BCD data download received from each Heritage Program was compiled at the Eastern Resource Office in Boston. The analysis were based on downloads received before August 1, 2000. Massachusetts element occurrence data was assembled manually from published reports and expert interviews and placed in an interim “dummy database” as BCD data was not made available by the Massachusetts Natural Heritage and Endangered Species Program.

The Eastern Resource Office of The Nature Conservancy compiled data on all G1-G3 species, other important species, and natural communities for all states and clipped data falling within the ecoregional boundaries. At the recommendations of experts certain elements were deleted or added, based on detailed knowledge of conservation status globally. A total of 3,317 Element Occurrences were considered by the planning team for inclusion in the portfolio (Map 9. Element Occurrence Viability). A large number of GIS data layers were also compiled by ERO staff. The entire ecoregional database will be maintained centrally at ERO.

Conservation Targets

As in other ecoregions, we adopted a “coarse filter/fine filter” approach to selecting conservation targets. We identified specific elements known to us on the ground (fine filter) and supplemented this by identifying large-scale targets (widespread or matrix-forming plant communities and other common plant communities) where we might expect more common species and unknown occurrences of species to be captured (coarse filter). The LNE-NP selection process included three fine filter analysis (plant, vertebrate, and invertebrate), and two course filter analysis (matrix-forming forests, and Ecological Drainage Units)

Species

All G1-G3 species were initially considered targets. Based on conservation significance as assessed by Expert Team members, some G3G4, and T1-3 species were considered as conservation targets, also. The portfolio was supplemented by G4-G5 species known to be declining in the ecoregion. Declining species were considered as primary targets when experts felt that a significant portion of the gene pool of the species was severely threatened within this ecoregion, such as timber rattlesnake.

In addition to this list of primary targets, we developed a "secondary target" list. A number of species were listed as secondary targets because experts were concerned for their long term viability. Portfolio sites were not created based on secondary target occurrences. Rather, the core team wanted to evaluate an assembled portfolio of sites effectiveness (based on primary targets) to capture these secondary targets. Secondary targets that were not adequately protected by the 1st Iteration Portfolio will have sites selected for them during the second iteration. A list of secondary targets can be found in Appendix 2.

A short list of migratory birds were also included as secondary targets. The birds chosen as secondary targets all had Partners in Flight risk scores of 19 or more. Additionally, the Expert Team considered whether the LNE-NP ecoregion provided habitat for a significant portion of their global population. The result was a list of 11 bird species that fit both criteria (Appendix 2).

Viability

Determining which occurrences should become the points around which to construct a reserve portfolio is a central question in ecoregional planning. To protect conservation investments in sites, we must set criteria for what constitutes a "viable" occurrence of the element. Viability is defined as the ability of an element occurrence (EO) to persist over time. This means that the occurrence is in good condition and has sufficient size and resilience to survive occasional natural and human stresses. The predicted viability of a species or community occurrence is currently addressed through the development and application of element occurrence ranks (*EO Ranks*). As recently defined, EO Ranks are meant to provide a succinct assessment of *estimated viability* based on the occurrence's size, condition, and landscape context (Element Occurrence Data Standards, Working Draft, February 5, 1997 The Nature Conservancy in cooperation with the Network of Natural Heritage Programs and Conservation Data Centers). These criteria apply to animal and plant species as well as communities, although they are assessed differently for each element type. Under the new EO standards, size, condition, and landscape context are integrated to create the EO Rank, which is defined as follows:

A = excellent estimated viability

B = good estimated viability

C = fair estimated viability

D = poor estimated viability

Application to Species in LNE-NP

All A, B, and C ranked EO occurrences were included in the portfolio provided their rank was supported by expert review – both by the expert teams and again by state teams comprised of Heritage Programs and Chapter Offices. In many cases, occurrences of species had either not been assigned an EO Rank or had been given a rank of "E", meaning that the occurrence is extant but has not been given a rank. In both cases these occurrences were reviewed by the expert teams and appropriate Heritage program and/or TNC staff. Target occurrences ranked D or E or without a rank were accepted where provisional data not currently in BCD suggested the occurrence to be viable. The remaining unranked and "E" ranked occurrences were not accepted into the portfolio. For occurrences that were provisionally accepted, it is the responsibility of each state to enter into BCD this documentation on population size, condition, and landscape context for the next iteration of the plan. EO's for which there was insufficient documentation and knowledge, but where there was reason to suspect that the EO was viable, were given a provisional viability rank of *maybe* (M) and placed on a list for further inventory and evaluation pending future inclusion in the portfolio.

Conservation Goals for Species

The LNE-NP planning team considered information from The Nature Conservancy's Population Viability Assessment Workshop (Morris et al. 1999) in trying to determine how many species occurrences to select to meet our overall conservation goals. Though it may be possible to ensure species survival with as few as 5 high quality occurrences, such a strategy would likely work only for species with low year-to-year variation in population size and with few exogenous disturbances. Based on the recognition that this condition is rarely ever obtained, that our EO evaluations typically do not include detailed population viability analysis, and understanding that not all occurrences chosen for the portfolio will be successfully conserved, the Expert Teams decided to establish minimum goals for species based on rarity and distribution (Table 2).

The number of viable element occurrences relevant for the portfolio depends on the rarity and the rangewide distribution of the species. On this basis, our minimum goals are variable. Given our minimum goal of 20 occurrences for restricted G1 and G2 species, it made sense to select all viable occurrences (all A, B, and C ranked) because the maximum number of occurrences for a G2 species is 20 and the ecoregion bears full responsibility for conserving the species. For species where the range is shared with only one or two other ecoregions (a limited distribution), we reasoned that we would select 10 – 20 occurrences for inclusion in the portfolio. Where the LNE-NP ecoregion bears less responsibility—for species with widespread distributions (3 or more ecoregions) and for peripheral species—we selected only 5 - 10 occurrences for the portfolio. We did not set a goal for G1 peripheral species as this combination of rarity and distribution probably does not exist. For G3, G4, and G5 species, depending upon our estimate of the proportional share of "responsibility" borne by the LNE-NP ecoregion, our goals range from a high of 30 EOs for restricted species (the minimum number of occurrences to be a G3 is 21) to a low of 5 for widespread species. It is important to note that such a methodology works only if other ecoregional plans make similar assumptions about conservation goals. We hope to be able to evaluate the contributions made by other relevant portfolios once plans for all of these ecoregions are complete.

In selecting occurrences for some species, we encountered a problem with the way occurrences are entered into the Biological Conservation Database. For a significant number of plant and animal species, occurrences may represent only one individual in a *local population, an entire isolated local population, a local population which is part of a metapopulation, or an entire metapopulation. Using expert advice, we tried to sort element occurrences and represent them in the portfolio in a manner reflecting which one of these situations was represented. We clustered element occurrences that we felt represented single individuals within a local population and counted them as one occurrence towards the species goal. For example, the numerous Karner Blue butterfly occurrences were grouped and tallied as one occurrence at the Albany Pine Bush.*

In order to stratify our selection of element occurrences, we used ecoregional subsections or subregions. However, a detailed analysis of our success at capturing a well-stratified portfolio for all targets is incomplete because of a lack of information on the with-in region distribution of targets. This analysis should be completed in the near future as part of the ongoing planning effort

Another concept used in selecting element occurrences of plants and animals was the idea of "Irreplaceable" occurrences. Irreplaceable occurrences were those identified by experts as the ones that were deemed absolutely necessary to ensure long term survival of the species. Typically, such occurrences were exceptional examples of A-ranked occurrences and occurrences that represented the only two or three remaining in the ecoregion. We selected Irreplaceable occurrences first before trying to ensure stratification of occurrence selection.

Table 2. Conservation Goals for Species based on Rarity and Distribution

Distribution	G1	G2	G3
Restricted (R)	20	20	30
Limited (L)	10-20	10-20	10-20
Widespread (W)	5-10	5-10	5-10
Peripheral (P)	-	5	5-10

Results and Progress towards Goals

Appendix 1 contains the following lists and tables:

- Table: List of all Primary and Secondary Targets
- Table: Distribution and Viability of EO's across Subsections
- Table: Success towards Conservation Goals

Vertebrates

Eight vertebrates were selected as primary target species. A total of 365 EOs were evaluated from which 76 were selected for the Portfolio. Goals were met and exceeded (doubled and quadrupled) for two of the eight vertebrate species; timber rattlesnake and bog turtle. These two species will receive an unnecessarily high level of conservation attention unless marginal occurrences are removed from the portfolio during the 2nd iteration. None of the other vertebrate species came close to meeting their goals.

Invertebrates

57 invertebrate species were chosen as primary target species. A total of 419 EOs were evaluated from which 213 were selected for the Portfolio. Goals were met for seven species, including dwarf wedgemussel, Karner blue butterfly, and ringed boghaunter. Many species did not meet their goals because of a lack of occurrences to choose from in the database. 15 invertebrate targets had no EOs documented in BCD. Extensive inventory is required for the majority of invertebrate targets as 50 species did not meet their goals.

Plants

42 plant species were chosen as primary target species. A total of 334 EOs were evaluated from which 154 were selected for the Portfolio. Goals were for 10 species, including northeastern bulrush, ram's-head lady's-slipper orchid, and Maryland bur-marygold. Only two species have distributions that are restricted to this region; Ogden's pondweed and basil mountain mint. Neither species met its conservation goal and both require additional inventory.

Secondary Targets

The expert teams selected 14 vertebrate animals, 24 invertebrate animals, and 47 plant species as secondary targets. A total of 818 occurrences for 69 secondary targets were evaluated, of which 241 were captured in Portfolio Sites. Of these, 124 occurrences fell in Portfolio 10-Year Action Sites. There were no occurrences in the database for 18 secondary target species.

Secondary target occurrences captured by the Portfolio were not evenly distributed among species. 13 secondary target species had no occurrence captured by any type of Portfolio Site, and 26 species had no occurrences within a Portfolio 10-Year Action Site. Additionally, 45 secondary targets had 3 or less occurrences within any type of Portfolio Site, and 56 secondary targets had 3 or less occurrences captured within Portfolio 10 Year Action Sites. Some of the secondary targets require interior forest conditions and/or require large home-ranges, yet only 67 secondary target occurrences (for all species) were captured by Tier 1 Preferred Matrix Sites. Of these, only 36 were captured in Tier 1 Preferred 10-Year Matrix Sites. Table 3 provides a tabular accounting of secondary target element occurrence by portfolio status.

Secondary Targets Inside:	All Secondary eos	% Secondary eos
Tier 1 Matrix	67	8.19
Tier 1 Matrix 10yr Site	36	4.40
Tier 2 Alternate Matrix	23	2.81
Not in a Matrix Site	728	89.00
In Portfolio Patch Site	174	21.27
In Portfolio Patch 10yr Site	88	10.76
Total secondary eos	818	
Total Secondary eos in portfolio	**241**	**29.46**
Total Secondary eos in 10yr portfolio	**124**	**15.16**

Table 3. Secondary target element occurrences and portfolio status

Appendix 2 contains the following lists and tables:

- Table: List of Secondary Targets
- Table: Portfolio Sites that Capture Viable Secondary Target EOs
- Table: Secondary Targets with EOs in Portfolio Sites and 10 Year Action Sites

Secondary target species require additional evaluation and site selection for the LNE-NP Portfolio. Targets that are not represented or under-represented in Portfolio Sites need additional occurrences identified and selected. This will require inventory and the development of target and stratification goals.

Birds

Eleven species of migratory bird were selected as secondary target species. The Expert Team believes that Tier 1 Preferred Sites for matrix-forming forest communities will provide adequate protection for the following forest-dependent bird species:

- Black-throated Blue Warbler in northern conifer-dominated forests,
- Cerulean Warbler in swamps and bottomlands within matrix sites,
- Louisiana Waterthrush in deciduous forests mid-region,
- Prothonotary Warbler in larger swamps and bottomlands in the Piedmont,
- Wood Thrush in deciduous forests mid-region,
- Worm-eating Warbler in deciduous forests midregion.

Additional review of Portfolio sites will be required to ensure that an adequate number of suitable habitats have been selected regionwide for the remaining five species.

- Blue-winged Warbler in wet, old fields and moist, early successional woodlands,
- Golden-winged Warbler in old fields, forest openings, and thickets in the Piedmont and NY,
- Prairie Warbler in open sandy areas with shrubs, and dry brushy pasture,
- Bicknell’s Thrush in stunted conifer forests at high elevation in Lower New England.

Natural Communities

Natural community assessment within an ecoregion provides the fundamental coarse filter to capture most biodiversity at functional sites. Without a comprehensive set of natural community data for all of the LNE-NP Ecoregion, it was necessary to work in several areas to approximate the best set of sites to represent natural communities. Characteristic of all ecoregions, each of the twelve states in LNE-NP used a different set of natural community types in their classifications. As in other earlier analyzed ecoregions, a significant effort was made to improve the national vegetation classification (NVC) specific to LNE-NP to strengthen decision-making for communities across state lines. Meetings with ecologists for each of the states provided data to improve the coordination of perspective on natural community classification. Simultaneously, it was necessary to work with exiting data in the combined Heritage databases to identify high priority sites. Most of these data focused on rare natural communities and reflect traditional TNC conservation priorities. Analysis for this data set focused primarily on establishing viability for these occurrences. In a third approach to coarse-filter targets for LNE-NP, matrix forests were assessed using a GIS-driven, block analysis with detailed interviews of experts to identify biodiversity attributes for the blocks. All three of these natural community approaches to establishing priorities and selecting portfolio sites are an expansion of similar work undertaken in NAP, CAP, and, to some degree, NAC and serves as a strong basis for future natural community assessment of the ecoregion.

This text describes the process and progress in improving the national vegetation classification relative to LNE-NP, reviews a set of community principles that have guided natural community assessment, and describes how targets and goals were established for the ecoregion.

The NVC and LNE-NP and data collection from the Heritage Programs

To provide consistent descriptions of the natural community types for uplands and wetlands across the ecoregion, relevant types from the January 1999 working draft of the National Vegetation Classification (Sneddon, Anderson and Lundgren 1998) were compiled and used as the baseline for developing the Lower New England – Northern Piedmont Classification (Lundgren et al, 2000). These descriptions were reviewed and revised by 17 ecologists from state Heritage programs and The Nature Conservancy offices across the ecoregion. An initial list of approximately 200 vegetation associations was selected as potentially occurring in the ecoregion based on known or suspected range of the association. Ecologists compared association descriptions to community occurrences they were familiar with and/or for which vegetation data were available in the ecoregion. Vegetation associations are defined by the structure and composition of the overstory and understory species and environmental setting. Descriptions were modified to reflect the vegetation and environmental setting within the ecoregion for each type; closely related or associated types were also noted. Following review, a number of types were determined not to occur in the ecoregion or were not deemed as recognizable or distinct associations. One addition was described; several new types were proposed for further study. The result was a total of 153 NVC (National Vegetation Classification) associations currently described within this ecoregion and an expected total of up to160 types to be defined with additional classification and inventory in the future. A total of 107 NVC Alliances (broader than association level) were represented: 40% Forests (>60% cover of trees), 14% Woodlands (30-60% tree cover), 12% Shrublands, 34% Herbaceous types.

In addition, the ecology team provided information on the subregion distribution of the associations and the range of the occurrence of the association in respect to other ecoregions. Distribution was categorized as Restricted (only in the ecoregion), Limited (mostly within this ecoregion), Widespread (occurs over several ecoregions), or Peripheral (at the edge of range).

The scale of each association was also identified by the ecologist group. Scale was assigned based on the maximum size (acreage) at which examples of a given association occurs within the LNE-NP ecoregion. General guidelines were as follows: “Matrix communities” dominate the landscape, comprising over 1000 acres and are characterized by diffuse boundaries. “Large Patch” communities occur at a scale of 100 to 1000 acres or more and can usually be delineated on air photos. “Small Patch” communities are in the 10’s of acres to less than 1 acre and are often defined by specific environmental factors.

States currently completing new classifications have been connecting (crosswalking) state names to NVC names. Additional detail on subregion distribution will also be acquired through future field inventories and analyses of existing data sets. These components can be added to future versions of the classification and will further our understanding of how many types have been selected within conservation sites. The assumption is that conservation sites will encompass many of the associations within the ecoregion even where element occurrence data on them are lacking; other sites may be added in the future where significant gaps in representation occur.

Establishing Natural Community Targets

Grouping community occurrences into similar types for analysis

The revised National Vegetation Classification associations were not available for the analysis of documented community occurrences in LNE-NP for this stage of the assessment process. To coordinate community occurrences across state lines, conduct an assessment of occurrence viability, and set goals, all community occurrences in the database were assigned to one of seventeen ecological groups in table 4.

Table 4. Ecological or community groups in LNE-NP

Bogs and acidic fens
Calcareous fens
Cliff/outcrop
Deciduous or mixed woodland
Floodplain forest and woodland
Marsh and wet meadow
Palustrine forest and woodland
Pond and lake
Ridgetop/rocky summit
River and stream
Sandplains
Serpentine barrens
Terrestrial conifer forest
Terrestrial deciduous forest
Terrestrial mixed forest
Tidal
Other

The combined LNE-NP Heritage databases contain 1381 community element occurrences for LNE-NP. Of these, some were for aquatic communities which were analyzed with another method; some were for cave communities; and others did not reflect enough data for analysis. Where it was not possible to assign a community occurrence to one of these broad community groups or insufficient data were available for any type of viability analysis, the element occurrence was not used in selecting portfolio sites. In many cases, the recommendation to the state and Heritage program was simply to acquire more information on the element occurrence so that it could be better evaluated at a later date. The detail of documentation and the size of individual occurrences varied dramatically among the states. New York and New Hampshire contributed a large percentage of the total community database. A "dummy-database" containing community occurrences in Massachusetts gleaned from published documents and not from BCD was added to the ecoregional database. Many communities, both rare and common, are not represented in the database. A total of 1090 natural community element occurrences were used as the basis for viability analysis and site selection.

Viability Analysis

In general, because rangewide element occurrence rank specifications have not yet been developed for natural communities, few community occurrences have EO ranks that reflect a standard of conditions for the community throughout its range. Since occurrence viability is so important in developing a long-term portfolio, we found it necessary to develop interim specifications that could be applied to broad groups of communities. We determined that the most meaningful way to group communities for viability assessment should be based on the typical patch size in which they occur on the landscape and an assessment of occurrence size, condition, and landscape context.

Patch Type and Size Range

Communities vary greatly in terms of their size of occurrence and ecological specificity, with some types covering huge areas of varying topography, geology, and hydrology, while others exist only in small patches under unique environmental conditions. Categorizing communities to patch size is an effective way to evaluate the functional character of occurrences. All communities were classified into one of three types: matrix, large patch, or small patch.

Matrix (or dominant) communities cover extensive areas, often blanketing 80% of the undeveloped land, and covering 100 to 1 million contiguous acres. Matrix communities, exclusively forests in the Northeast, have broad ecological amplitude and are driven by regional scale processes. They are important as coarse filters for wide-ranging fauna such as large herbivores, predators, and forest interior and migratory birds. Examples include White pine – oak forest (Pinus strobus – Quercus rubra, Quercus velutina – Fagus american Forest); Oak – hickory – hop-hornbeam forest (Quercus rubra – Carya (glabra, ovata) – Ostrya virginiana / Carex pennsylvanica Forest); Red oak – sugar maple – tuliptree forest (Quercus rubra – Acer saccharum – Liriodendron tulipifera Forest); Dry oak heath forest (Quercus (prinus, velutina) / Gaylusaccia baccata Forest).

Nested within the matrix forests are smaller scale "patch" communities with more specific ecological amplitudes and often more restricted species. Large patch communities may cover large areas, but are usually defined by a specific edaphic condition or disturbance regime; usually their boundaries are correlated with a single dominant local process such as a hydrologic or fire regime. These communities often have a set of characteristic fauna, and likely serve as resource patches for fauna associated with the matrix communities. Examples of large patch communities include: Atlantic white cedar swamp (Chamaecyparis thyoides / Ilex verticillata Forest), Northern hardwood forest (e.g., Acer saccharum – Fraxinus spp. – Tilia americana / Osmorhiza claytonii – Caulophyllum thalictroides Forest) and Red maple – ash floodplain forest (Acer rubrum – Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus Forest).

Even more restricted are small patch communities which have very narrow ecological amplitudes and occur where a number of local conditions come together in a precise way. Although their boundaries are often easy to delineate, these community types are usually inextricably linked to the landscapes in which they occur. Thus they may not be viable over the long term without preservation of the larger system in which they are embedded. Small patch communities often occur in extreme or unusual conditions that are stressful for most common species and serve as refuges for species which are poor competitors under more typical environmental conditions. Small patch communities often support rare plants and animals. There is also strong evidence that small patch communities also serve as a coarse filter for some specific invertebrate fauna. Examples in Lower New England – Northern Piedmont include Scrub oak rocky summit (Quercus ilicifolia Shrubland), Calcareous fens (e.g. Juniperus virginiana/ Pentaphylloides floribunda / Carex flava – Carex tetanica Shrub Herbaceous Vegetation) and Leatherleaf – water willow bog (Chamaedaphne calyculata – Decodon verticillatus / Woodwardia virginica Dwarf-shrubland).

Of the 153 community associations (representing 107 community alliances) in the Lower New England – Northern Piedmont ecoregion, about 7% are matrix types, 23% are large patch types, and 70% are small patch types. All patch communities support distinctive assemblages of species, making them targets for conservation. However, with regard to land cover, the eleven types of matrix forests cover most of the remaining natural landscape, while the large patch communities cover only a small area, and small patch communities cover only a tiny fraction of the landscape. Matrix types are the most important targets to maintain the biological integrity and fundamental structure of the region. Ideally, large and small patch communities should be embedded within matrix community types in large landscape blocks. Note that most matrix and some large patch communities are mainly threatened by fragmentation and broadscale environmental degradation, such as logging or acid rain deposition, while small patch communities are more susceptible to the often random hazards of rarity. The range of community types require different viability criteria and ultimately different conservation strategies.

Categorizing community types by patch size enabled us to set reasonable thresholds for the size, condition, and landscape context of viable occurrences. The relative weights of these criteria differed based on patch size. In addition to being stable, persistent, and resilient over time, our coarse/fine filter strategy makes it necessary for community occurrences to be functional as coarse filters for all associated common and uncommon species. By maximizing our viability thresholds we believed we could achieve both goals.

Size

The size of an occurrence is fundamental to predict both the stability and resilience of the community occurrence and the diversity of plant and animal species within the occurrence. The theoretical reasoning behind this is relatively straightforward, although the actual acreage needs are still somewhat elusive.

Although the size of a community occurrence is a standard field in the Heritage element occurrence database, size data are not always available. Landscape context was used as a general guideline to select viable examples of communities. Furthermore, since there were few documented occurrences of matrix communities in the database and viable matrix occurrences should ideally be located within contiguous areas of undeveloped land, block size was used as a surrogate for the size of matrix communities. Blocks are defined as contiguous, unfragmented natural areas bounded by roads, power lines, and shorelines.

Condition

A variety of observable features affect the condition of a community occurrence. Primary among these features are: fragmentation, invasion by exotics, anthropogenic manipulation, such as cutting, grazing, or mowing, altered soils, and altered natural processes, usually reflected in changes in vegetation structure and composition. All these factors are interrelated. For patch communities, we ranked the condition of each occurrence based on a combination of data available in the element occurrence record, usually summarized as an EO rank, and from expert and state chapter interviews.

Landscape Context

For patch communities and rare species, the surrounding landscape is important in the evaluation of viability. The presence of an occurrence in an intact landscape often indicates an important functional intersection of environmental features, such as local hydrologic regime, water chemistry, local disturbance regime, bedrock or soil type, and available propagule sources. Alteration of any of these features, most of which are maintained by processes beyond the boundaries of the actual occurrence, may result in the loss of the occurrence at the site. This concept is well understood by many applied ecologists who have observed the degradation and disappearance of many interesting community occurrences when fire regimes were altered (e.g. pine barrens); the surrounding hydrology was interrupted (e.g. fens and pond shores); water chemistry was altered from agricultural runoff (e.g. freshwater wetlands and ponds); or seasonal disturbance regimes were altered (e.g. rivershore grasslands and ice-scour communities). Wetland, floodplain and other lowland communities are particularly susceptible to alterations in ecological regimes, as lowland features tend to accumulate, concentrate and depend on materials from outside their own systems. Conversely, there are some patch communities which can persist at small sites. High elevation or locally-elevated features or systems on poor substrate types may be more biologically isolated and thus more tolerant of degradation or changes in the surrounding landscape.

To evaluate landscape context for each patch community, GIS cover type data were analyzed for a 1000 acre area surrounding each occurrence. This “landscape” was ranked on a scale of 1-4:

1 Surrounded by 99-100% natural land and the GIS signature averaged zero for development or agricultural lands.

2 Surrounded by 92-98% natural lands and the GIS signature averaged zero for development and two percent for agricultural lands.

3 Surrounded by 80-90% natural lands and the GIS signature averaged one percent for developed lands and 3-13% respectively for hay pasture and row.

4 Surrounding area less than 80% natural and more intensely developed than in class 3.

We used the assumption that if the occurrence were contained in a block less than 1000 acres, there was reason to be skeptical of its long-term persistence. Additionally, we assumed that if the occurrence fell within a selected matrix site, its landscape condition was probably good. Table 5 shows the viability ranking grid used to evaluate community viability in LNE-NP.

Table 5. LNE-NP viability ranking grid

Landscape context	Condition/Rank	Size: Large Patch	Size: Small patch	Viability estimate
1	A, AB, B, ?, E	>100	>0	Yes
1	BC,C			Maybe

2	A,AB,B,?,E	>100	>0	Yes
2	BC,C			Maybe
3	A,AB,B,?,E,	>100	>25	Yes
3	BC,C			No
4	A,AB,B,?,E	>100	>50	Maybe
4	BC,C			No
ANY	D			No

Goals for Natural Communities

After determining what the communities are and what qualify as viable occurrences, it was then necessary to decide how many occurrences are needed to preserve the community type throughout the ecoregion, and what spatial distribution these occurrences need to represent both the rangewide rarity and environmental variability of the community. The number of occurrences selected for the ecoregion is determined by both the patch size type of the community and its distribution across its entire range.

Stratification of the Ecoregion

To develop a geographic stratification of the ecoregion, US Forest Service subsections were grouped into subregions using ELUs. In general, the ecoregions and subregions, made up of clusters of subsections represent statistical groupings that are more related to each other in terms of community types than to other units. The 18 subsections in LNE-NP were grouped into six subregions as shown in table 1. These six groupings were reviewed by the ecologists within the LNE-NP states.

Setting Numerical Goals

To set benchmark levels for number and stratification of community occurrences we began by discussing the dynamics of a hypothetical restricted small patch community which occurred throughout the ecoregion. First, we decided that as a bare minimum we would need some occurrences in each of the 6 major subregions within which the community type naturally occurs to insure representation of the internal and landscape context variability of the type, buffer against degradation in one subregion or another, and to allow for possible geographic range shifts over time (Hunter 1996). Thus, we set the minimum stratification level for a restricted community at 6 (meaning we wanted some occurrences in each of the six subregions). Next we assumed that at least a handful of source occurrences in each subregion would be necessary to insure some connectivity between occurrences as well as buffer against the effects of chance events which might unexpectedly eliminate certain occurrences. Thus, we set a bare minimum of 5 occurrences per subregion, which totals 30 occurrences for the ecoregion stratified into 6 subregions which we adopted as a reasonable minimum benchmark for the type. From this number we worked backwards to the other types decreasing the numbers and stratification levels for the larger and less restricted community types (Table 6).

Table 6. Minimum conservation benchmarks for communities as a function of patch size and restrictedness

	Patch Size	
Minimum stratification level	Large Patch 4	Small Patch 5
Restricted 6	24	30
Limited 3	12	15
Widespread 2	8	10
Peripheral 1	4	5

Our final set of numbers represents the Minimum Conservation Benchmark for each community type. Attempting to meet these goals should stimulate some excellent inventory, protection work, restoration, and partnerships. However, we do not know if they are truly adequate to preserve biodiversity in the ecoregion. The minimum conservation benchmarks do allow us to systematically assess, for any version of the portfolio, the degree to which it meets the goals.

Selecting Occurrences and Progress towards Goals

The selection and exact spatial arrangement of the target element occurrences was left to the understanding and judgment of the state Heritage Programs, TNC Field Offices, and other partners with guidance offered by the community working group. However, it is noteworthy that this has also allowed states to select for the portfolio occurrences that do not appear to meet established size, condition, or landscape context criteria. The consequence has been that the portfolio contains an excess number of occurrences for some community types some of which do not necessarily represent viable occurrences as determined in this document. Occurrences with questionable viability were also selected for community associations that did not meet their goals with the caveat that 1) the BCD records be edited to reflect the new and improved viability information and 2) that certain occurrences (portfolio sites) may need to be removed in the future if the portfolio goal can be met with better, more viable, occurrences. In short, there is a mixed degree of confidence that all the community sites selected should or will remain in the portfolio. An improved process is required to maintain suitably conservative viability standards and a scientifically rigorous portfolio while still allowing states the opportunity and freedom to judge select which occurrences should become a part of the portfolio.

Of the original 1381 EORs reviewed in the database, 585 were selected for the portfolio. The portfolio status of these sites include 229 occurrences that were selected as 10-year Action Sites, 82 that were selected as TNC Lead Sites, and the remaining 204 were designated as Partner Lead sites. One community group, cliff and outcrop communities, met and exceeded its goal by 220%. No other community group met its ecoregional goal (Table 7).

Table 7. Progress towards goals for LNE-NP community groups

Community Group	No. of Associations	Goal for Community Group	Total No. of Occurrences in the Portfolio	Percentage of Goal Achieved
Bogs and acidic fens	6	65	56	86
Calcareous fens	11	260	23	9
Cliff/outcrops	1	30	66	220
Dec. of mixed woodlands	3	34	21	62
Floodplain forest and woodland	10	146	16	11
Marsh and meadow	4	40	8	20
Palust. Forest and woodland	33	384	47	12
Pond and lake	6	75	18	24
Ridgetop/rocky summit	11	97	28	29
River and stream	7	110	20	18
Sandplain	7	162	4	3
Serpentine barrens	2	54	3	6
Terrest. Conifer forest	7	37	10	27
Terrest. Decid. Forest	18	132	71	54
Terrest. Mixed forest	8	81	2	3
Tidal	8	65	40	62

From this data review there are several clear trends that reflect the composition of the Heritage databases, the current state of the national classification, and their affect on achieving goals and conservation success in LNE-NP. Some general observations include:

- The inventory efforts of the Heritage Programs have been focused primarily on rare and small patch communities. There are abundance of occurrences for bogs, fens, and white cedar swamps, but few documented occurrences of palustrine and upland forests.
- Many occurrences were eliminated during analysis because they were not considered viable or their viability was in question. 60% of the 1090 occurrences were not selected for the portfolio. Of these, 324 are classed as “maybe viable” and might be accepted into the portfolio pending additional information. The majority of occurrences (226) are for community associations underrepresented in the portfolio.
- Goals were set based on patch size and distribution. The goal for a small patch, restricted community was 30 for the whole ecoregion. Some of these rarest communities are well below their goal because there are in fact few occurrences for these communities.
- The National Vegetation Classification is well developed in some areas and only roughly sketched out in other areas. For example, there are 11 types of calcareous fens in the classification, but only 7 types of rivers and streams. There are 33 palustrine forests and woodlands, but only 4 marsh and meadow types.

Matrix-Forming Forest Communities

Matrix forest sites were defined as large contiguous areas whose size and natural condition allow for the maintenance of ecological processes, viable occurrences of matrix forest communities, embedded large and small patch communities, and embedded species populations (Poiani et al. 2000, Anderson et al.1999). The goal of the matrix forest selection was to identify viable examples of the dominant forest types that, if protected and allowed to regain their natural condition, would serve as critical source areas for all species requiring interior forest conditions or associated with the dominant forest types. LNE-NP ecoregional planning used an ecoblock GIS analysis and expert interview process to select and to rank large areas of natural land as Potential Matrix Sites.

Matrix forest sites were required to meet a viability criteria based on the scale of expected disturbances and the size requirements of selected interior forest species within the ecoregion (See Anderson 1999 for full details on the methodology). To estimate the critical area needed to insure that a system can absorb, buffer, and recover from disturbance, (e.g. minimum dynamic area - Pickett and Thompson 1978) we listed the expected catastrophic disturbances typical of LNE-NP and then scaled the minimum size criteria for matrix forest areas to the extent of severe disturbance patches (total canopy removal) expected over one century (Table 8). Moreover we used the guideline that an occurrence should be about 4 times the size of the largest, most severely disturbed patch (the patch size of total canopy removal) to replicate the natural pattern of disturbed to undisturbed forests in the northeastern U.S. (Anderson 1999, based on Foster and Boose (1992) Canham and Loucks (1984) and Lorimer (1977).

Table 8. Comparison of characteristics among infrequent catastrophic disturbances in LNE-NP (sources Foster, Peterson and Thompson etc).

Disturbance characteristic	**Tornado**	**Hurricane**	**Down-bursts**	**Fires in N. Hard-wood**	**Fires in Oak or Oak-Pine**	**Insect outbreak**	**Ice Storm**	**Flood**
Duration	Minutes	Hours	Minutes	Weeks /months	Weeks /months	Months	Days	Week /months
Return interval in years	100-300	60-200	?	400-6000	10-100	10	2	50-100
Maximum size of severe patches (acres)	5000	803	3500	60	1250	?	?	?
Size of total event in acres	1240 K-24710 K	12400 K – 5 M	1M	12,400K-24 M.		247,000 K –200 M	12,400 K - 24 K.	12,400 K-124,000 K

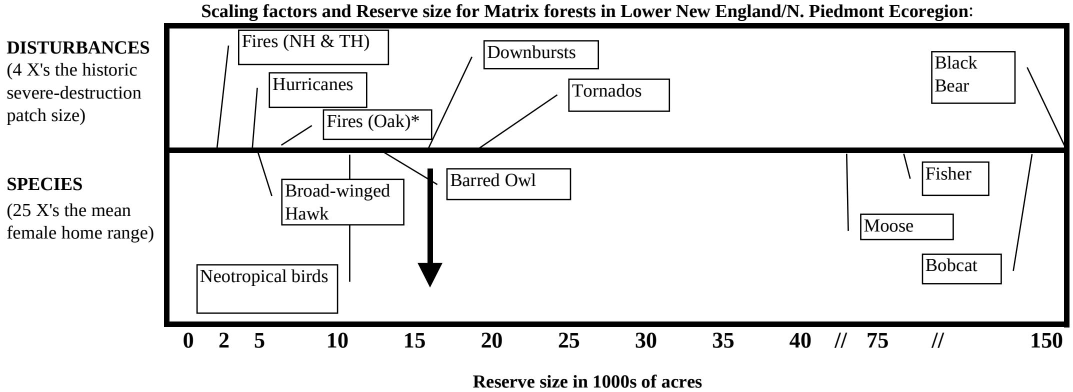
For species, we developed a list of forest–interior dependent species typical of LNE-NP that included cavity-nesting, non migratory bird species such as Barred Owls *(Strix varia)* that prefer deep woods with large cavity trees and neotropical migratory species such as: Black-billed Cuckoo *(Coccyzus erythropthalmus)*, Yellow-billed Cuckoo *(Coccyzus americanus)*, Hairy Woodpecker *(Picoides villosus)*, Broad-winged Hawk *(Buteo platypterus)*, Eastern Wood-Peewee *(Contopus virens)*, Least Flycatcher *(Empidonax* *minimus),* White-breasted Nuthatch *(Sitta carolinensis),* Veery *(Catharus fuscescens),* Wood Thrush *(Hylocichla mustelina),* Hermit Thrush *(Catharus guttatus),* Black-and-white Warbler *(Mniotilta varia)*, Canada Warbler *(Wilsonia canadensis)*, Northern Waterthrush *(Seiurus noveboracensis),*Black-throated Blue Warbler *(Dendroica caerulescens),* American Redstart *(Setophaga ruticilla),* Ovenbird *(Seiurus aurocapillus),* Scarlet Tanager *(Piranga olivacea),* , Blue-gray Gnatcatcher (*Polioptila caerulea*), Yellow-throated Vireo (*Vireo flavifrons*), Prairie Warbler (*Dendroica discolor*), Worm-eating Warbler (*Helmitheros vermivorus*), and Hooded Warbler (*Wilsonia citrina*). There were no mammals in this ecoregion that were completely dependent on interior forest although grey fox prefers dense forest with numerous logs for denning.

We adopted Robbins (1989) 10,000 acres guideline (assuming it takes 10,000 acres of road-bounded area to get a 7500 acre core area) for retaining all neotropical bird species based partially on a recommendation from Bob Askins who had found similar patterns and results in southern Connecticut (Askins et al. 1987) a region he considered roughly similar to Robbins' study area with regard to forest cover (Askins pers. comm.).

To set a critical size threshold for matrix forest communities, we combined the minimum dynamic area for disturbances with acreage need of forest interior dependent fauna onto a single linear axis (Figure 1). This allows an estimate of the effect of any particular size minimum on a variety of selected disturbances and faunal associates. For instance, a matrix forest occurrence of 15,000 acres should be effective for 1) absorbing all types of expected severe wind and fire disturbances, 2) containing multiple breeding populations of all forest interior songbirds, and 3) containing 25 female territories of Barred Owl and Broad-winged Hawk.

Figure 1

Scaling factors and Reserve size for Matrix forests in Lower New England/N. Piedmont Ecoregion:



Factors to the left of the arrow should be encompassed by a 15,000 acre reserve NH = N. hardwoods (Maple-Beech-Birch)
TH = Transitional Hardwoods (Red oak-White Pine, Red Oak -Sugar Maple)
* Oak forests are dependent on relatively high-frequency, moderate fires, info on catastrophic fires is sketchy
Neotropical estimates based on Robbins et al. 1989, see text for full explanation.

Development and Selection of Matrix Forest Occurrences

Once the general matrix size criteria was set, the matrix site selection process followed 5 sequential steps: 1) Develop a GIS data layer of road-bounded forest blocks for the ecoregion. 2) Estimate a set of all potential matrix sites based on a GIS analysis of major road bounded blocks, 3) Determine which blocks qualify for inclusion by assessing the condition of each potential block through GIS, field, and expert analysis at individual state meetings, 4) Assess the biophysical composition within each block based on Ecological Land Units (ELUs) and cluster the blocks into ecologically similar groups based on similarities in ELU composition, 4) Prioritize blocks within each ELU group into Conservation Priority Tiers based on forest diversity and condition, and then proximity to other features, biodiversity value, complementarily, feasibility, and threat.

Step 1. Ecoblocks were defined as contiguous areas bounded by features such as roads, railroads, major utility lines, and major shorelines. The bounding features were chosen due to their ecological impact on biodiversity in terms of fragmentation, dispersion, edge-effects, and invasion of alien species. Blocks served as assessment and analysis units and a wide range of field and remotely sensed ecological attributes describing the blocks size, condition, diversity, and landscape context were collected and used in the LNE-NP ecoregional planning process.

Two sets of ecoblocks were developed for LNE-NP (Maps 10 and 11 - Major and minor road bounded blocks). The first “Major Road Bounded Blocks” consisted of primary highways, primary roads, and secondary roads from TIGER 1994 1:100k, with an update of major road classes from GDT 1998. The second “Minor Transportation Feature bounded blocks” were similar but also included local roads, utility lines, and major streams and shorelines from Macon USA TIGER 1994 1:100K. A description of the transportation features bounding blocks is shown in table 9. The size distribution of the blocks is shown in table 10. The larger blocks were found primarily in the northern subregions of LNE. The Northern Piedmont contained no minor road bounded block > 10,000 acres.

Table 9. Block bounding feature types

1. Primary highway with limited access: Interstate highways and some toll highways. Distinguished by the presence of interchanges, access ramps, and opposing traffic lanes separated by a median strip. 2. Primary road without limited access: Nationally and regionally important highways that do not have limited access. Mostly US highways but may include some state and county highways that connect larger cities May be divided or undivided and have multilane or single lane characteristics. 3. Secondary and connecting road: Mostly state highways that connect smaller towns. Must be concrete or asphalt and are usually undivided with single-lane characteristics. 4. Local, neighborhood, and rural road: Used for local traffic and usually have a single lane or traffic in each direction. Includes paved and unpaved roads. 5. Waterbodies: Lakes and wide rivers. 6. Railroads 7. Major Utility Lines: Pipelines or Powerlines 8. Airport runways, permanent fences, ski lifts

Table 10. Distribution of road bounded blocks by size.

	Number of Blocks per size class					
	2500-5K	5K-10K	10K-25K	25-50K	50-75K	>75K

Major Road bounded blocks (max = 150K)			397	110	34	75
Minor Road bounded blocks (max = 16K)	627	160	55	6	1	

Step 2. A GIS analysis of size, landcover, road density and managed areas of the major road bounded blocks resulted in 295 potential matrix sites. Potential sites were identified using the following criteria:

For states in Lower New England (ME, NH, VT, NY, MA, CT, RI):

Potential matrix sites are major road bounded blocks which meet one of the following criteria

1. Contain >= one 10,000 acre local road bounded block,
2. Area of block is >= 5,000 acres with >= 75% natural land cover **AND**

a. Contains >= 20,000 acres of natural land cover **OR**

b. Contains (>= 80% natural land cover) and (>= one 2,000 acre local road bounded block) and (managed area >= 20% or >= 4,000 acres)

For states in the Piedmont (NJ, PA, MD, VA, DE, DC):

Potential matrix sites are all major road bounded blocks > 5,000 acres with > 55% natural land cover.

Different criteria were used in Lower New England versus the Northern Piedmont due to the differing patterns of land use and lack of many large major road-bounded blocks in natural cover in the southern section of LNE-NP. The inclusion of potential matrix forest blocks of lesser size and condition was cause for numerous theoretical discussions on viability and a desire to maintain scientific rigor in the planning process. Generally, it was decided that it was better to include small matrix forest blocks with diminished condition in the portfolio where no alternative blocks existed. The potential for these blocks to provide habitat for some interior forest species (e.g. neotropical migrant birds) and serve as "seed points" for forest restoration and expansion seemed to be a more prudent decision than removing the blocks from the portfolio entirely.

Step 3. Expert interview supplemented with basic GIS statistics about each potential block was used to determine which of the 295 potential major road bounded blocks qualified for further consideration as matrix sites. Descriptive statistics that were generated for these blocks included landcover, size of the block, # and size of minor blocks within, miles of transportation features within, managed areas within, and locational context information. A sample potential block statistics analysis is shown in Appendix 4. Expert interview workshops were conducted over the summer of 1999 in each state to gather additional information about the 295 blocks. Experts reviewed the GIS information, revised site boundaries based on their knowledge of road conditions, and added additional information on the dominant forest types, forest condition and composition, land use, forestry practices, hydrologic features, rare species and patch communities, presence of old growth forest, and forest diversity. A questionnaire was completed for each block documenting the input by experts (Table 11).

Table 11. LNE-NP matrix block questionnaire

Block name
Size, boundaries, combination
Condition
Logging history: comments
Current ownership/management/logging practices: comment
Old growth?
Managed areas: comment
Cover class review, comments
Road density, comments
Block shape: comments
Comments/rank
Ecological features
Review EOs: comments
Review ELU set: comments
Expected communities: comments
Review aquatic features list: comments
Condition of Aquatic features: comments
Unique features?
General Comments/rank
Landscape Assessment
Visual assessment, of relation to other block/developments

The expert interviews were an invaluable "field check" of the GIS analysis -- especially the condition of local roads within blocks that may potentially act as fragmenting features. The experts classified interior local roads based on road width, canopy cover, road surface and curb construction, vehicle volume and speed, and roadside development making informed decisions on which should be treated as fragmenting features and which should not. Experts then ranked blocks as either Yes, Maybe-Yes, Maybe, and No regarding their potential for further analysis as matrix sites (Map 12).

Step 4. Expert interviews resulted in 128 of the 295 sites being ranked for further consideration as Yes, Maybe-Yes, or Maybe. Site boundaries for these 128 blocks were revised as determined at the expert workshops and grouped within three dominant-forest types; Central, Transitional, and Northern Hardwoods (Map 13). The composition of Ecological Land Units (ELUS) within each ecoblock was then analyzed to cluster the blocks into ecologically similar groups. Eleven different Ecological Land Unit groups were defined (See Map 14: Matrix Sites by ELU Group) and are listed below in table . A description of the ELU analysis along with the TWINSPAN cluster tables used to classify the blocks can be found in Appendix 5.

Table 12. A description of the eleven ELU groups in LNE-NP

ELU Group	Description
1	Very low to low elevation landforms, acidic sedimentary with shale and calcareous features, little granite
2a	Very low elevation landforms, granitic/sandy outwash plain
2b	Very low elevation landforms, granitic/sandy outwash plain
3a	Very low elevation landforms, acidic sedimentary/granitic, northern piedmont
3b	Very low elevation landforms, acidic sedimentary/granitic, northern piedmont
4a	Low to very low elevation landforms, sedimentary with some calcareous and granitic features
4b	Low to very low elevation landforms, sedimentary with some calcareous and granitic features
5	Low to very low elevation landforms, granitic slopes, scattered sedimentary/ultramafic features
6a	Low to very low elevation landforms, sedimentary/granitic with little calcareous features
6b	Low to very low elevation landforms, sedimentary/granitic with little calcareous features
7a	Mid to low elevation landforms, sedimentary and granitic sites with minor calcareous features
7b	Mid to low elevation landforms, sedimentary and granitic sites with minor calcareous features
8	High to low landforms elevation, primarily mid elevation, sedimentary/granitic with high elevation patches
9	Diverse, very low to high elevation, sedimentary and calcareous features, little granite
10	Mid elevation landforms, shale and sedimentary, little granite
11	Outliers

Step 5. A group meeting of core team members, state directors, and experts was held January 26-27, 2000 to review the ELU grouping of potential matrix sites and prioritize them by ELU group into Conservation Priority Tiers based on forest diversity and condition, and then proximity to other features, biodiversity value, complementarily, feasibility, and threat. Participants were provided with reports for each potential matrix site and gathered into teams for discussion. Each team was asked to select two Tier 1 Preferred Sites within their ELU grouping. Additional Tier 1 Preferred Sites were selected in some groups where two were insufficient to capture the range of variability or geographic distribution. Additionally, a goal of two Tier 1 Preferred Sites was set for each subregion.

Results and Progress towards Conservation Goals

At the January, 2000 meeting 95 of the 128 sites were chosen as LNE-NP Matrix Sites. 25 sites were eliminated altogether based on new information regarding their size, condition, or landscape context. 43 of the 95 were chosen as Tier 1 Preferred Sites for the Portfolio and 52 were chosen as Tier 2 Alternative Matrix Sites that will be held in reserve (Map 15). Where a Tier 1 Preferred Site is no longer deemed to be viable or its conservation feasible, an Alternative Matrix Site within the same ELU grouping may be substituted for the Portfolio by the ecoregional planning team.

Two or more Tier 1 Preferred Sites were selected within each ELU grouping except in Group 10 where only one was chosen. At least two Tier 1 Preferred sites were selected in each subregion except the Reading Prong where no matrix sites (at any Conservation Priority Tier) were selected. An analysis of Preferred Tier 1 sites designated as 10-year Action Sites (n = 25) reveals that two subregions are without any matrix sites and the remainder are largely grouped into just two others (n = 21). Table 13 offers a breakdown of Tier 1 and 10-year Action Sites by Subregion.

All 11 matrix-forming forest community types are presumed to be captured in Tier 1 Preferred sites, though a lack of information on these associations actual distribution and a lack of inventory to support this analysis make it suspect and in need of additional work. The 11 matrix community types usually occur in mosaics with each other (usually 2 – 3 types in a given area), in various successional stages and are usually embedded with patch communities. These mosaics reflect stand variation due to environmental gradients, forest practices, historical events, and disturbances. See appendix 4, Matrix Forest Associations captured within Tier 1 Preferred Sites for a preliminary analysis.

Table 13. Tier 1 Preferred Matrix Site and Action Site distribution by subregion.

Lower New England/Northern Piedmont Ecoregion					
Lower New England				Northern Piedmont	
Hudson River Subregion	**Mountains & highlands Subregion**	**Northeast LNE Plains Subregion**	**Southern New Engl. Plains Subregion**	**Reading Prong Subregion**	**Northern Piedmont Subregion**
Tier 1 Preferred Sites **4**	**18**	**7**	**14**	**0**	**3**
Tier 1 Action Sites **0**	**13**	**2**	**8**	**0**	**2**

Ecological Land Units

A total of 371 Ecological Land Unit types were identified in LNE-NP. Tier 1 Preferred Matrix Sites capture 90% (n=335) of these while those identified as 10-year Action Sites protect 79% (n=294). The full Portfolio captures 93% (n=344)of the ELU diversity in the region and the full Portfolio of 10-year Action Sites conserves 84% (n=311) of the ELUs.

62% of LNE-NP consists of gently sloping to flat or dry flat ELU types (valley and coastal plain ELU types). Approximately eight percent of the total area covered by valley ELU types is within the portfolio and half of this area is within 10-year Action sites. More than half of the valley ELU acreage in LNE-NP is in natural cover (54%). Approximately 6% of the total area in natural cover is captured in Tier 1 Preferred Matrix Sites. Two-thirds of this acreage is in 10-Year Action Sites. A number of the valley ELU types are poorly represented in the LNE-NP portfolio, especially all of those on dry flats. A special effort should be made during the 2nd Iteration to capture more of these ELU types.

16% of the region is on sideslopes, cliffs, and summits (rolling hill and low mountain ELU types). The Portfolio captures 20% of the montane ELU type acreage present in the region; nine percent is captured in 10-year Action Sites. Natural cover is present across

92% of the acres in these ELU types and a high percentage of these acres are captured in Portfolio and 10-year Action Sites.

ELU types entirely missing from the portfolio number 27. Collectively they comprise less than 6,000 acres (0.0003% of the ecoregion). Ultramafic (serpentine) deposits are characteristic of 11 types. Serpentine outcrop ELUs and communities may need to be added during the next iteration.

TNC portfolio sites and those proposed for conservation action are not distributed across ELU types proportionate to their area in the ecoregion. For instance, 26% of the region and 24% of the portfolio is made up of ELUs on dry sloping flats. By comparison, only 13% of the ecoregion is on sideslopes but they comprise 26% of the acreage in the portfolio. ELUs on dry flats comprise 36% of the ecoregion but only 21% of the portfolio. Furthermore, only 12% of the acreage on dry flat ELU types captured by the portfolio are in natural cover. A summary table of the Ecological Land Unit Gap Analysis is in Appendix 5.

Aquatic Communities

Selecting Sites for Aquatic Conservation

Our approach to comprehensive or course filter aquatic conservation was separated into two steps: 1) comprehensive identification and mapping of ecological drainage units and stream macrohabitat types and 2) site selection (e.g. critical watersheds for protection). The first step is 90% complete and the results are presented below. Methodology for the site selection phase has been developed and is in the second round of critical review. Our approach emphasizes watershed condition, diversity, and the integration of aquatic, palustrine, and terrestrial features across multiple scales. The data for this phase has been compiled and it is nearly ready to implement across the ecoregion. Thus it is considered a part of the 2nd iteration. Steps and methodology are discussed briefly below with further details supplied in the appendices.

Identification and Mapping of Ecological Drainage Units and Stream Macrohabitat Types

Ecological Drainage Units (EDUs – Higgins et al. 1999) were determined according to large-scale environmental gradients and zoogeographic patterns that determine regional patterns of aquatic biodiversity (Maxwell et al. 1995, Hocutt and Wiley, 1986). Specifically EDUs were defined through the aggregation of USGS 8-digit watersheds according to regional patterns of aquatic zoogeography, geology, landform, climate, hydrologic patterns, and watershed drainage density and pattern. Results of the analysis partitioned the ecoregion into seven drainage units described in Appendix 6 and illustrated on Map 5.

Site Selection

We developed a comprehensive coverage of 8, 11, and 14 digit Hydrographic Classification Units (HUCs) for the ecoregion. Subsequently, we developed a set of attributes for each watershed that allow us to evaluate and rank watersheds within each EDU (Higgins et al. 1999). Information compiled for the ranking exercise include: 1) dams and diversions, 2) roads, 3) landcover, 4) water quality and 5) diversity (macrohabitat types, species and flood dependent community types). Results will be reviewed by experts through a series of EDU based meetings. A process of GIS analysis combined with expert interviews similar to that used for Matrix Forest Site selection will be used to target watersheds at one or more scales. The selection process will be conducted in 2001. Further details on the Final LNE-NP Aquatic Macrohabitat Classification can be found in Appendix.

Fine Filter Aquatic Species and Community Targets

Many fine filter aquatic targets are already included in the portfolio having been selected through the species and community selection process including dragonflies, mussels, fish, floodplain forests, and bogs and fens among others. Approximately 75% of all LNE-NP targets (n = 195) are aquatic. But less than one quarter of all aquatic target species and communities were selected in 10-year Action Sites, and those captured only represent seven percent of all EOs in these sites. By comparison, approximately 37% of all EOs selected for the portfolio are aquatic. More fine filter aquatic targets need to be identified and conserved within Matrix Sites where the landscape context and water quality is presumably better. Inventory should focus on watersheds selected through the EDU process.

The Portfolio

A total of 1,028 Element Occurrences or standard sites and 43 Matrix Forest Sites were selected for the portfolio. Site conservation planning will likely group many of these, particularly standard sites in close proximity to one another and those that fall within Matrix Forest Sites

Collectively, the Portfolio totals 2.7 million acres, accounting for about 11.5% of the 23.3 million acre ecoregion. Matrix Forest Sites encompass 2.2 million acres and standard sites another half million. The Matrix Forest Sites contain 176 viable occurrences of conservation targets (17% of the known viable occurrences in the ecoregion). Map 16 shows all Portfolio Element Occurrences (Sites) as points buffered by 1000 acre circles. Site Conservation Planning will provide more appropriate site boundaries.

Portfolio Ownership

A little less than one-fifth of the portfolio is in management. State governments have protected the largest amount including 15% of matrix sites and nine percent of standard sites. Federal Ownership comprises less than two percent of the total managed area, and private organizations manage approximately four percent of total area in patch sites. It should be noted that the analysis of managed areas may include lands that are not managed for conservation. The GIS datalayers do not necessarily distinguish land uses, only land ownership status. For instance, military reservations are included in the tally of federal acreage under management.

Linkages

The above portfolio of sites captures all of our currently known viable target occurrences which can be used to meet our conservation goals. Many of these sites will remain isolated islands in a sea of predominantly working forest and rural residential land when site boundaries are defined during site conservation. The ecoregional planning team assumes that this "portfolio of islands" will, in itself, not preserve the biodiversity of the ecoregion if land use between sites becomes a barrier to species movement. We feel that biodiversity will only be protected through a network of preserves or core sites that are adequately buffered by and connected through corridors of compatibly managed land. Fortunately, much of the existing land use does provide the necessary connections. However, a key activity in the near future will be to look at issues of site linkage and species movement and develop a plan for how to minimize the potential effects of site isolation.

Implementation of the Plan

Action Sites

During the portfolio selection process, state teams selected element occurrences for inclusion in the portfolio based on goals set by the Core and Expert Teams. In addition to selecting element occurrences, state teams (composed of state conservation scientists, State Directors, and Natural Heritage Program staff) identified which sites should be prioritized for action within the next 10 years. "10-year Action Sites" are sites where it is feasible to take action to achieve measurable improvement in the conservation targets, abate threats to those targets, or increase the conservation capacity at the site. Improvements would result, at a minimum, in retaining the current quality of the conservation targets. These sites not only have a high probability of successful conservation action, but they are often the sites where reduction in threat status is most needed.

The remaining Element Occurrences not selected as "10-year Action Sites" were categorized into two groups; "TNC Lead Sites" and "Partner Sites". TNC Lead Sites are sites that require less investment in new TNC resources or are under less threat. TNC preserves where a sustained commitment at current capacity is forecast are a good example. Partner Sites are those at which we presume our conservation partners will take the lead in implementing conservation. At a minimum, we must measure success towards maintaining the conservation target and be willing to provide our partners assistance if required. Ownership patterns at 10-year Action Sites are very similar to those described for all portfolio sites collectively.

Based on these criteria, the state teams selected 25 Tier 1 Preferred Matrix Sites, and 450 Element Occurrences (standard sites) as 10-year Action Sites. Approximately 13% of the Element Occurrence 10-Year Action Sites (n= 131) are contained within a Tier 1 Preferred Matrix Site. The Portfolio also contains 144 Element Occurrences that were selected as TNC Lead Sites and another 332 Partner Lead Sites. Map 17 shows all 10-year Action Sites in LNE-NP.

State Chapters will now proceed to develop threats assessments and strategies for action at these sites over the next few years, with the expectation of achieving positive conservation results within 10 years. There is interest in organizing a regional implementation team that would consider cross-state landscape-scale projects, create a network of conservation sites, and evaluate threats and design strategies regionwide. In the interim, a meeting has been scheduled for November for State Directors to begin considering plan implementation.

Preparation for the Second Iteration

Ongoing Work

This document represents the first iteration of what is expected to be an ongoing planning process for the Lower New England – Northern Piedmont Ecoregion with additional iterations forthcoming in future years. In the near term, there is a need for the core team to work with state Chapter Offices and Heritage Programs to prepare for future iterations by completing the following tasks:

- Conduct a region-wide follow-up meeting to identify cross-border action sites and cross-site threats and abatement strategies (Autumn, 2000).
- Refine the aquatic community classification, and identifying and incorporating aquatic targets and sites (Winter, 2000 - 2001).
- Identify a new team leader (Winter, 2000 – 2001),
- Obtain a data-sharing agreement with the Massachusetts Natural Heritage Program that includes all target species element occurrences.
- Conduct additional inventory for all species and community occurrences to help meet target goals. Focus special attention on the Reading Prong (221Am) and Worcester – Monadnock Plateau (221Ah) within which no viable community EOs were identified using current datasets.
- Draft EO specifications for all target species and communities.
- Incorporate all new data and ranks in Heritage Program BCD systems.
- Work with ECS on a multi-region target analysis to determine if target goals have been met across regions.
- Complete the LNE – NVC community classification and determine community distribution within subregions to better evaluate success towards stratification goals. Natural community occurrences currently contained in BCD need to be tagged at the association level once the classification is complete to determine whether all association types are adequately represented in the portfolio. A number of community were recognized as needing more classification work including floodplain

communities, river and stream communities, and rich forest and woodland communities.

- Identify forest community types that formerly occurred in the more developed valleys and lowlands and that were not adequately captured during the first iteration. Identify potential restoration sites.
- Determine the within-region distribution of all species targets by sub-section to evaluate success towards stratification goals. Create stratification goals for all species.
- Incorporate data from the Massachusetts Natural Heritage and Endangered Species Program and reevaluate all of the occurrences in the portfolio in relation to this new information.
- Establish a methodology for updating and maintaining the database and the portfolio.
- Additional review of Portfolio sites is required to ensure that an adequate number of suitable habitats have been selected throughout the region for Blue-winged Warbler, Golden-winged Warbler, Prairie Warbler, and Bicknell's Thrush.
- Secondary target species require additional evaluation and site selection for the LNE-NP Portfolio. Targets that are not represented or under-represented in Portfolio Sites need additional sites selected. This will require inventory and the development of provisional target and stratification goals.
- Extensive inventory is required for the majority of invertebrate targets as 50 species did not meet their goals.
- Species and communities for which an excessive number of occurrences were selected for the Portfolio during the first iteration should be re-evaluated with a goals of reducing the number of Portfolio occurrences.
- More fine filter aquatic targets need to be identified and conserved within Matrix Sites where the landscape context and water quality is presumably better. Inventory should focus on watersheds selected through the EDU process.
- A number of the valley ELU types are poorly represented in the LNE-NP portfolio, especially all of those on dry flats. A special effort should be made during the 2nd Iteration to capture more of these ELU types.
- Serpentine or ultramafic ELUs are not well represented in the portfolio. Serpentine ELUs and communities may need to be added during the next iteration.
- Look at issues of site linkage and species movement and develop a plan for how to minimize the potential effects of site isolation.

There is also an immediate need to design and implement an interim process for adding and subtracting portfolio sites as new information is made available. State's should begin working on "potential" portfolio sites that host target occurrences that meet viability criteria and are needed to fulfill target goals. The core team can then accept the occurrence into the portfolio once a process has been established.

Lessons Learned

All ecoregional planning processes present logistical, technical, and methodological challenges. Perhaps the most challenging aspect of this planning exercise has been coordinating the process with 13 participating TNC Chapter Offices and Heritage Programs. The coordination required, among other things:

- joining and matching GIS data sets across all states;
- creating a new community classification that "cross-walks" state classifications to the National Vegetation Classification (NVC) and to one-another as the NVC is not the standard in most eastern states,
- coordinating productive meetings and a workable process with more than 100 participants.

Specifically, we offer the following suggestions for improving future iterations.

- Part-time clerical assistance in the team leader's office is required to maintain frequent communication with all states, to assist with meeting logistics, and manage paper-flow. Information is often better conveyed by phone as many team members do not find the time to read materials.
- Notify Chapter Offices and Heritage Programs, in particular, six to nine months in advance of initiating the next iteration so that they can incorporate their participation into their work plans.
- Maintain monthly expert team leader meetings or conference calls to evaluate progress and share best practices and lessons learned.
- Provide bi-monthly memos to all core team members on progress to date, imminent deadlines, next steps, and action items.
- Maintain frequent communications to keep team members engaged. Be sure that their supervisors have made their participation an annual goal and have allocated sufficient time to be a team member.
- Expert team meetings that require field staff should not be conducted during the field season.
- Pick expert team members well: choose more than the number you believe you will need and extract a commitment to participate for the duration of the planning period. Provide a job description and an approximate time requirement.
- Expert team leaders should set aside a month just for communicating with experts or visiting with less available team members to choose and review targets, to review their regional distribution, and to research the latest taxonomic contortions for possible inclusion in the portfolio.
- A dedicated budget before work proceeds.
- Practice good project management skills and keep everyone to agreed upon deadlines to minimize rescheduling conflicts.

Lower New England/Northern Piedmont Ecoregion

Target Species List

Vertebrates (22 Species: 8 Primary Targets, 14 Secondary Targets)

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
AFCAA01010	Primary	ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON	G3
AFCAA01040	Primary	ACIPENSER OXYRINCHUS	ATLANTIC STURGEON	G3
AFCQC01060	Primary	AMMOCRYPTA PELLUCIDA	EASTERN SAND DARTER	G3
ARAAD02040	Primary	CLEMMYS MUHLENBERGII	BOG TURTLE	G4
ARADE02040	Primary	CROTALUS HORRIDUS	TIMBER RATTLESNAKE	G4
AMACC01130	Primary	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	G4
AMACC01100	Primary	MYOTIS SODALIS	INDIANA OR SOCIAL MYOTIS	G2
AMAFF08100	Primary	NEOTOMA MAGISTER	ALLEGHENY WOODRAT	G3G4

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
ABPBJ18120	Secondary	CATHARUS BICKNELLI	BICKNELL'S THRUSH	G4
ARAAD02020	Secondary	CLEMMYS INSCULPTA	WOOD TURTLE	G4
ABPBX03050	Secondary	DENDROICA CAERULESCENS	BLACK-THROATED BLUE WARBLER	G5
ABPBX03240	Secondary	DENDROICA CERULEA	CERULEAN WARBLER	G4
ABPBX03190	Secondary	DENDROICA DISCOLOR	PRAIRIE WARBLER	G5
ARAAD04010	Secondary	EMYDOIDEA BLANDINGII	BLANDING'S TURTLE	G4
ABPBX08010	Secondary	HELMITHEROS VERMIVORUS	WORM-EATING WARBLER	G5
ABPJ19010	Secondary	HYLCOCICHLA MUSTLENIA	WOOD THRUSH	G5
ABPBX11010	Secondary	OPORORNIS FORMOSUS	KENTUCKY WARBLER	G5
ABPBX07010	Secondary	PROTONOTARIA CITREA	PROTHONOTARY WARBLER	G5
ABPBX10030	Secondary	SEIURUS MOTACILLA	LOUISIANA WATERTHRUSH	G5
AMAEB01050	Secondary	SYLVILAGUS TRANSITIONALIS	NEW ENGLAND COTTONTAIL	G4
ABPBX01030	Secondary	VERMIVORA CHRYSOPTERA	GOLDEN-WINGED WARBLER	G4
ABPBX01020	Secondary	VERMIVORA PINUS	BLUE-WINGED WARBLER	G5

Lower New England/Northern Piedmont Ecoregion

Target Species List

Invertebrates (81 Species, 57 Primary Targets, 24 Secondary Targets)

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
IILEYAQ180	Primary	ACRONICTA ALBARUFA	BARRENS DAGGER MOTH	G3G4
IMBIV02030	Primary	ALASMIDONTA HETERODON	DWARF WEDGEMUSSEL	G1G2
IMBIV02100	Primary	ALASMIDONTA VARICOSA	BROOK FLOATER	G3G4
IILEYBY082	Primary	AMPHIPOEA EREPTA RYENSIS	A NOCTUID MOTH	GUT1Q
ICMAL01010	Primary	CAECIDOTEA PRICEI	PRICE'S CAVE ISOPOD	G3G4
IILEPH2020	Primary	CALEPHELIS BOREALIS	NORTHERN METALMARK	G3G4
IILEPE2220	Primary	CALLOPHRYS IRUS	FROSTED ELFIN	G3G4
IILEY8921	Primary	CATOCOLA HERODIAS GERHARDI	HERODIAS UNDERWING	G3T3
IILEY89911	Primary	CATOCALA PRETIOSA PRETIOSA		G4T2T3
IILEYFM010	Primary	CHAETAGLAEA CERATA	A NOCTUID MOTH	G3G4
IICOL02070	Primary	CICINDELA ANCOCISCONENSIS	A TIGER BEETLE	G3G4
IICOL02060	Primary	CICINDELA MARGINIPENNIS	COBBLESTONE TIGER BEETLE	G2G3
IICOL02030	Primary	CICINDELA PURITANA	PURITAN TIGER BEETLE	G1G2
IMGASF9140	Primary	CINCINNATIA WINKLEYI	NEW ENGLAND SILTSNAIL	G2G3
ICMAL0606	Primary	CRANGONYX ABERRANS	MYSTIC AMPHIPOD	G3
ICMAL06010	Primary	CRANGONYX DEAROLFI	PENNSYLVANIA CAVE AMPHIPOD	G2G3
IIODO71090	Primary	ENALLAGMA PICTUM	SCARLET BLUET	G3
IIODO71030	Primary	ENALLAGMA RECURVATUM	PINE BARRENS BLUET	G3
IILEP37171	Primary	ERYNNIS PERSIUS PERSIUS	PERSIUS DUSKY WING	G5T2T3
ICBRA04030	Primary	EULIMNADIA STONINGTONENSIS	A CLAM SHRIMP	G?
IMGASG5100	Primary	FONTIGENS BOTTIMERI	APPALACHIAN SPRINGSNAIL	G3
IIODO08380	Primary	GOMPHUS QUADRICOLOR	RAPIDS CLUBTAIL	G3G4
IIODO08210	Primary	GOMPHUS VENTRICOSUS	SKILLET CLUBTAIL	G3
IILEX0W020	Primary	HEMARIS GRACILIS	GRACEFUL CLEARWING	G3G4
IILEW0M041	Primary	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	G4T2T3
IILEW0M043	Primary	HEMILEUCA MAIA SSP 3	INLAND BARRENS BUCKMOTH	G4T1T2
IILEW0MX20	Primary	HEMILEUCA SP 2	SCHWEITZER'S BUCKMOTH	G1Q
IILEU09X10	Primary	ITAME SP 1	BARRENS ITAME (cf I. INEXTRICATA)	G3
IMBIV21050	Primary	LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	G3G4
IIODO10010	Primary	LANTHUS PARVULUS	NORTHERN PYGMY CLUBTAIL	G4
IMBIV22060	Primary	LASMIGONA SUBVIRIDIS	GREEN FLOATER	G3
IICOL41010	Primary	LORDITHON NIGER	BLACK LORDITHON ROVE BEETLE	G1
IILEPG5021	Primary	LYCAEIDES MELISSA SAMUELIS	KARNER BLUE	G5T2
IILEU3C110	Primary	METARRANTHIS APICIARIA	BARRENS METARRANTHIS MOTH	GU
IILEU3C100	Primary	METARRANTHIS PILOSARIA	COASTAL SWAMP METARRANTHIS	G3G4
IIODO12020	Primary	OPHIOGOMPHUS ANOMALUS	EXTRA-STRIPED SNAKETAIL	G3
IIODO12040	Primary	OPHIOGOMPHUS ASPERSUS	BROOK SNAKETAIL	G3G4
IIODO12090	Primary	OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	G3
IPTUR10010	Primary	POLYCELIS REMOTA	SUNDERLAND SPRING PLANARIAN	G1
IILEYFN010	Primary	PSECTRAGLAEA CARNOSA	PINK SALLOW	G3
IILEP38090	Primary	PYRGUS WYANDOT	SOUTHERN GRIZZLED SKIPPER	G2
IIODO32100	Primary	SOMATOCHLORA GEORGIANA	COPPERY EMERALAD	G3G4
IIODO32130	Primary	SOMATOCHLORA INCURVATA	INCURVATE EMERALD	G4
IILEPJ6040	Primary	SPEYERIA IDALIA	REGAL FRITILLARY	G3
IPTUR04050	Primary	SPHALLOPLANA PRICEI	REFTON CAVE PLANARIAN	G1G3
IZSPN06040	Primary	SPONGILLA ASPINOSA	SMOOTH BRANCHED SPONGE	G2G3
ICMAL05690	Primary	STYGOBROMUS BOREALIS	TACONIC CAVE AMPHIPOD	G3G4
ICMAL05630	Primary	STYGOBROMUS HAYI	HAY'S SPRING AMPHIPOD	G1G2
ICMAL05100	Primary	STYGOBROMUS KENKI	ROCK CREEK GROUNDWATER AMPHIPOD	G1G3
ICMAL05030	Primary	STYGOBROMUS PIZZINII	PIZZINI'S CAVE AMPHIPOD	G2G4
ICMAL05041	Primary	STYGOBROMUS TENUIS TENUIS	PIEDMONT GROUNDWATER AMPHIPOD	G4G5T2
IIODO80010	Primary	STYLURUS AMNICOLA	RIVERINE CLUBTAIL	G3
IIODO80090	Primary	STYLURUS SCUDDERI	ZEBRA CLUBTAIL	G4
IIODO34010	Primary	WILLIAMSONIA FLETCHERI	EBONY BOGHAUNTER	G3G4
IIODO34020	Primary	WILLIAMSONIA LINTNERI	RINGED BOGHAUNTER	G2
IILEY7P260	Primary	ZALE CUREMA	A NOCTUID MOTH	G3G4
IILEY7PX10	Primary	ZALE SP 1	PINE BARRENS ZALE	G3Q

Invertebrates (continued)

Lower New England/Northern Piedmont Ecoregion

Target Species List

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
IIODO14110	Secondary	AESHNA MUTATA	SPATTERDOCK DARNER	G3G4
IILEYJ8060	Secondary	ANARTA LUTEOLA		G4
IILEPA6050	Secondary	ANTHOCHARIS MIDEA	FALCATE ORANGETIP	G5
IILEPE2140	Secondary	CALLOPHRYS HESSELI	HESSEL'S HAIRSTREAK	G3G4
IILEPE2260	Secondary	CALLOPHRYS LANORAIEENSIS	BOG ELFIN	G3G4
IIODO65030	Secondary	CALOPTERYX AMATA	SUPERB JEWELWING	G4
IILEY9S010	Secondary	CERMA CORA	BIRD DROPPING MOTH	G3G4
IILEPJ9140	Secondary	CHLOSYNE NYCTEIS	SILVERY CHECKERSPOT	G5
IICOLO2200	Secondary	CICINDELA PURPUREA	A TIGER BEETLE	G5
IIODO03040	Secondary	CICINDELA TRANQUEBARICA	A TIGER BEETLE	G5
IIODO03040	Secondary	CORDULEGASTER ERRONEA	TIGER SPIKETAIL	G4
IIODO71020	Secondary	ENALLAGMA LATERALE	NEW ENGLAND BLUET	G3
IILEP37140	Secondary	ERYNNIS LUCILIUS	COLUMBINE DUSKYWING	G4
IILEP37100	Secondary	ERYNNIS MARTIALIS	MOTTLED DUSKYWING	G3G4
IIODO08270	Secondary	GOMPHUS DESCRIPTUS	HARPOON CLUBTAIL	G4
IILEY2R050	Secondary	GRAMMIA SPECIOSA	BOG TIGER MOTH	G4G5
IILEU0P020	Secondary	HYPOMECIS BUCHHOLZARIA	BUCHHOLZ'S GRAY	G3G4
IMBIV21160	Secondary	LAMPSILIS RADIATA	EASTERN LAMPMUSSEL	G5
IMBIV24030	Secondary	LEPTODEA OCHRACEA	TIDEWATER MUCKET	G4
IMBIV26010	Secondary	LIGUMIA NASUTA	EASTERN PONDMUSSEL	G4G5
ICBRA05010	Secondary	LIMNADIA LENTICULARIS	AMERICAN CLAM SHRIMP	G4G5
IILEYC0300	Secondary	PAPAIPEMA APPASSIONATA	PITCHER PLANT BORER MOTH	G4
IILEYC0020	Secondary	PAPAIPEMA DUOVATA	GOLDENROD STEM BORDER	G4
IILEYC0X20	Secondary	PAPAIPEMA SP 2	OSTRICH FERN BORER	G2G4

Lower New England/Northern Piedmont Ecoregion

Target Species List

Vascular Plants: (89 Species, 42 Primary Targets, 47 Secondary Targets)

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
PDSCR01010	Primary	AGALINIS ACUTA	SANDPLAIN GERARDIA	G1
PDSCR01130	Primary	AGALINIS AURICULATA	EARLEAF FOXGLOVE	G3
PDBRA061D0	Primary	ARABIS PATENS	SPREADING ROCKCRESS	G3
PDAST0T0T0	Primary	ASTER DEPAUPERATUS	SERPENTINE ASTER	G2
PDFAB0F7P4	Primary	ASTRAGALUS ROBBINSII VAR JESUPII	JESUP'S MILK-VETCH	G5T1
PDAST18070	Primary	BIDENS BIDENTOIDES	MARYLAND BUR-MARIGOLD	G3
PDAST180M0	Primary	BIDENS EATONII	EATON'S BEGGAR-TICKS	G2
PDBRA0K0L0	Primary	CARDAMINE LONGII	LONG'S BITTER-CRESS	G3Q
PMCYP031K0	Primary	CAREX BARRATTII	BARRATT'S SEDGE	G3G4
PMCYP037T0	Primary	CAREX LUPULIFORMIS	FALSE HOP SEDGE	G3G4
PMCYP03AW0	Primary	CAREX POLYMORPHA	VARIABLE SEDGE	G3
PMCYP03C60	Primary	CAREX SCHWEINITZII	SCHWEINITZ'S SEDGE	G3
PMCYP03ES0	Primary	CAREX WIEGANDII	WIEGAND'S SEDGE	G3
PDCAR0605B	Primary	CERASTIUM ARVENSE VAR VILLOSISSIMUM	GOAT HILL CHICKWEED	G5T1Q
PDAST2L0T0	Primary	COREOPSIS ROSEA	ROSE COREOPSIS	G3
PDBOR0B081	Primary	CYNOGLOSSUM VIRGINIANUM VAR BOREALE	NORTHERN WILD COMFREY	G5T4
PMORC0Q020	Primary	CYPRIPEDIUM ARIETINUM	RAM'S-HEAD LADY'S-SLIPPER	G3
PMALI02050	Primary	ECHINODORUS PARVULUS	AMERICAN DWARF BURHEAD	G3Q
PMERI01070	Primary	ERIOCAULON PARKERI	PARKER'S PIPEWORT	G3
PDEUP0Q1T0	Primary	EUPHORBIA PURPUREA	GLADE SPURGE	G3
PDASTDX010	Primary	HASTEOLA SUAVEOLENS	SWEET-SCENTED INDIAN-PLANTAIN	G3G4
PMLIL10010	Primary	HELONIAS BULLATA	SWAMP-PINK	G3
PDCLU03010	Primary	HYPERICUM ADPRESSUM	CREEPING ST. JOHN'S-WORT	G2G3
PPISO01030	Primary	ISOETES EATONII	EATON'S QUILLWORT	G1Q
PMORC1F010	Primary	ISOTRIA MEDEOLOIDES	SMALL WHORLED POGONIA	G2G3
PDAST5X0Q2	Primary	LIATRIS SCARIOSA VAR NOVAE-ANGLIAE	NORTHERN BLAZING-STAR	G3Q
PMORC1R0N0	Primary	MALAXIS BAYARDII	BAYARD'S MALAXIS	G2?
PDHYD0C530	Primary	PHACELIA COVILLEI	BLUE SCORPION-WEED	G2?Q
PMPOA4Z1W0	Primary	POA PALUDIGENA	BOG BLUEGRASS	G3
PDPLM0E0L0	Primary	POLEMONIUM VANBRUNTIAE	JACOB'S LADDER	G3
PMPOT03050	Primary	POTAMOGETON CONFERVOIDES	ALGAE-LIKE PONDWEED	G3G4
PMPOT030F0	Primary	POTAMOGETON HILLII	HILL'S PONDWEED	G3
PMPOT03170	Primary	POTAMOGETON OGDENII	OGDEN'S PONDWEED	G1
PDLAM1N030	Primary	PYCNANTHEMUM CLINOPODIOIDES	BASIL MOUNTAIN-MINT	G2
PDLAM1N0G0	Primary	PYCNANTHEMUM TORREI	TORREY'S MOUNTAIN MINT	G2
PDROS1K540	Primary	RUBUS ORARIUS	BLACKBERRY	G3?Q
PMCYP0Q030	Primary	SCIRPUS ANCISTROCHAETUS	NORTHEASTERN BULRUSH	G3
PMCYP0Q0Y0	Primary	SCIRPUS LONGII	LONG'S BULRUSH	G2
PMCYP0R0K0	Primary	SCLERIA RETICULARIS	RETICULATED NUTRUSH	G3G4
PDMAL100C0	Primary	SIDA HERMAPHRODITA	VIRGINIA MALLOW	G2
PPHYM020V0	Primary	TRICHOMANES INTRICATUM	A FILMY-FERN	G3G4
PDVIT040J0	Primary	VITIS RUPESTRIS	ROCK GRAPE	G3

Lower New England/Northern Piedmont Ecoregion

Target Species List

Vascular Plants (continued)

ELCODE	TARGET	GNAME	GCOMNAME	GRANK
PMORC04010	Secondary	ARETHUSA BULBOSA	SWAMP-PINK	G4
PDBET020H0	Secondary	BETULA PUMILA	SWAMP BIRCH	G5
PDAST1E010	Secondary	BOLTONIA ASTEROIDES	ASTER-LIKE BOLTONIA	G5T?
PDCON040G0	Secondary	CALYSTEGIA SPITHAMAEA	LOW BINDWEED	G4G5
PMCYP032U0	Secondary	CAREX CHORDORRHIZA	CREEPING SEDGE	G5
PMCYP03360	Secondary	CAREX CRAWEI	CRAWE SEDGE	G5
PMCYP03520	Secondary	CAREX GARBERI	ELK SEDGE	G4T3Q
PMCYP03870	Secondary	CAREX MEADII	MEAD'S SEDGE	G5
PMCYP03BK0	Secondary	CAREX RICHARDSONII	RICHARDSON SEDGE	G4
PMCYP03C80	Secondary	CAREX SCIRPOIDEA	BULRUSH SEDGE	G5
PDSCR0D0J0	Secondary	CASTILLEJA COCCINEA	SCARLET INDIAN-PAINTBRUSH	G5
PMLIL0F010	Secondary	CHAMAELIRIUM LUTEUM	DEVIL'S-BIT	G5
PMCYP061L0	Secondary	CYPERUS HOUGHTONII	HOUGHTON'S UMBRELLA-SEDGE	G4?
PMCYP090N0	Secondary	ELEOCHARIS EQUISETOIDES	HORSE-TAIL SPIKERUSH	G4
PMCYP091H1	Secondary	ELEOCHARIS PAUCIFLORA VAR FERNALDII	FEW-FLOWERED RUSH	G5T?
PDRAN0G010	Secondary	ENEMION BITERNATUM	FALSE RUE-ANEMONE	G5
PDGEN07060	Secondary	GENTIANELLA QUINQUEFOLIA	STIFF GENTIAN	G5
PDPRI06010	Secondary	HOTTONIA INFLATA	FEATHERFOIL	G4
PDRAN0F010	Secondary	HYDRASTIS CANADENSIS	GOLDEN-SEAL	G4
PPISO010Q0	Secondary	ISOETES ACADENSIS	ACADIAN QUILLWORT	G3?
PGCUP05070	Secondary	JUNIPERUS HORIZONTALIS	CREEPING JUNIPER	G5
PMORC1M030	Secondary	LIPARIS LILIIFOLIA	LARGE TWAYBLADE	G5
PMCYP0H040	Secondary	LIPOCARPHA MICRANTHA	DWARF BULRUSH	G4
PDONA0B0M0	Secondary	LUDWIGIA POLYCARPA	MANY-FRUIT FALSE-LOOSESTRIFE	G4
PMPOA480B0	Secondary	MUHLENBERGIA CAPILLARIS	LONG-AWN HAIRGRASS	G5
PDBOR0S040	Secondary	ONOSMODIUM VIRGINIANUM	VIRGINIA FALSE-GROMWELL	G4
PDCAR0L020	Secondary	PARONYCHIA ARGYROCOMA	SILVERLING	G4
PDSCR1K0M0	Secondary	PEDICULARIS LANCEOLATA	SWAMP LOUSEWORT	G5
PDPLM0D1J0	Secondary	PHLOX PILOSA	DOWNY PHLOX	G5
PDEUP13040	Secondary	PHYLLANTHUS CAROLINIENSIS	CAROLINA LEAF-FLOWER	G5
PDPLN02090	Secondary	PLANTAGO CORDATA	HEART-LEAVED PLANTAIN	G4
PDPGN0L0X0	Secondary	POLYGONUM DOUGLASII	DOUGLAS KNOTWEED	G5
PMCYP0N070	Secondary	RHYNCHOSPORA CAPILLACEA	HORNED BEAKRUSH	G5
PMCYP0N170	Secondary	RHYNCHOSPORA INUNDATA	DROWNED HORNEDRUSH	G3G4
PDROS1J012	Secondary	ROSA ACICULARIS SSP SAYI	PRICKLY ROSE	G5
PDAST8E010	Secondary	SCLEROLEPIS UNIFLORA	ONE-FLOWER SCLEROLEPIS	G4
PDAST8P1F0	Secondary	SOLIDAGO PTARMICOIDES	PRAIRIE GOLDENROD	G5
PDAST8P2U4	Secondary	SOLIDAGO SIMPLEX VAR RACEMOSA	LAKE ONTARIO GOLDENROD	G5T4?
PMPOA5V0L0	Secondary	SPOROBOLUS NEGLECTUS	SMALL DROPSEED	G5
PMORC2F050	Secondary	TRIPHORA TRIANTHOPHORA	NODDING POGONIA	G4
PDRAN0P020	Secondary	TROLLIUS LAXUS	SPREADING GLOBEFLOWER	G4T3Q
PDLNT020K0	Secondary	UTRICULARIA RESUPINATA	NORTHEASTERN BLADDERWORT	G4
PDVAL030A0	Secondary	VALERIANA PAUCIFLORA	VALERIAN	G4
PDVAL030J0	Secondary	VALERIANA ULIGINOSA	MARSH VALERIAN	G4Q
PDVER0N0W0	Secondary	VERBENA SIMPLEX	NARROW-LEAVED VERVAIN	G5
PDVIO04080	Secondary	VIOLA BRITTONIANA	COAST VIOLET	G4G5
PMLEM04010	Secondary	WOFFIELLA GLADIATA	SWORD BOGMAT	G5

Lower New England/Northern Piedmont Ecoregion
Target Species Listed as Federally Endangered or Threatened

GNAME	GCOMNAME	USESA*	USESA DATE*
ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON	LE	67-03-11
ACIPENSER OXYRINCHUS	ATLANTIC STURGEON	(LT-C)	N/A
CLEMMYS MUHLENBERGII	BOG TURTLE	(LT-T(S/A))	N/A
MYOTIS SODALIS	INDIANA OR SOCIAL MYOTIS	LE	67-03-11

GNAME	GCOMNAME	USESA*	USESA DATE*
ALASMIDONTA HETERODON	DWARF WEDGEMUSSEL	LE	90-03-14
CICINDELA PURITANA	PURITAN TIGER BEETLE	LT	90-08-07
LYCAEIDES MELISSA SAMUELIS	KARNER BLUE	LE	92-12-14
STYGOBROMUS HAYI	HAY'S SPRING AMPHIPOD	LE	82-02-05

GNAME	GCOMNAME	USESA*	USESA DATE*
AGALINIS ACUTA	SANDPLAIN GERARDIA	LE	88-09-07
ASTRAGALUS ROBBINSII VAR JESUPII	JESUP'S MILK-VETCH	LE	87-06-05
HELONIAS BULLATA	SWAMP-PINK	LT	88-09-09
ISOTRIA MEDEOLOIDES	SMALL WHORLED POGONIA	LT	94-10-06
SCIRPUS ANCISTROCHAETUS	NORTHEASTERN BULRUSH	LE	91-05-07

*See **Terms Sheet** for a brief explanation of fields and listing codes.

KEY TO TERMS OF FEDERALLY LISTED SPECIES

C	Candidate for listing
E(S/A)	Treat as endangered because of simililarity of appearance
LE	Listed endangered
LT	Listed threatened
LELT	Listed endangered in part of range: threatened in the remaining part
PE	Proposed endangered
PEPT	Proposed endangered in part of range; proposed threatened in the remaining part
(PS)	Status in only a portion of the species range
PT	Proposed threatened
T(S/A)	Treat as threatened because of simililarity of appearance
USESA	Federal status of an element
USESA DATE	Date of notification of the status in the Federal Register
XE	Essential experimental population
XN	Nonessential experimental

Lower New England/Northern Piedmont Ecoregion

Viable Primary Invertebrate Target Species
Distribution and Goals

GNAME	DISTRIBUTION	GOAL	SUBSECTION #221Ae	221Af	221Ag	221Ah	221Ai	221Al	221Am	221Ba	221Bb	221Bc	221Da	221Db	221Dc	M212Bb	M212Bc	M212Bd	M212Cb	M212Cc	221Ak*	232Ac*	M212De*	Grand Total Accepted EOs
ACRONICTA ALBARUFA	L	10 to 20										1												**1**
ALASMIDONTA HETERODON	W	5 to 10		1						1						10		1						**13**
ALASMIDONTA VARICOSA	W	5 to 10					6	3		1							2			2				**14**
AMPHIPOEA EREPTA RYENSIS	R	20	1																					**1**
CAECIDOTEA PRICEI	L	10 to 20							1				2											**3**
CALEPHELIS BOREALIS	L	10 to 20	5							5														**10**
CALLOPHRYS IRUS	L	10 to 20			7		2		1			11		1										**22**
CATOCALA HERODIAS GERHARDI	P	5 to 10																						**0**
CATOCALA PRETIOSA PRETIOSA	L	10 to 20																						**0**
CHAETAGLAEA CERATA	L	10 to 20										1												**1**
CICINDELA ANCOCISCONENSIS	L	10 to 20																		1				**1**
CICINDELA MARGINIPENNIS	L	10 to 20														8								**8**
CICINDELA PURITANA	L	10 to 20		3																				**3**
CINCINNATIA WINKLEYI	W	5 to 10																						**0**
CRANGONYX ABERRANS	L	10 to 20																						**0**
CRANGONYX DEAROLFI	L	10 to 20																						**0**
ENALLAGMA PICTUM	L/P	10																						**0**
ENALLAGMA RECURVATUM	L/P	10			6																			**6**
ERYNNIS PERSIUS PERSIUS	L/P	10			1		2																	**3**
EULIMNADIA STONINGTONENSIS	R	20	1																					**1**
FONTIGENS BOTTIMERI	R	30												3										**3**
GOMPHUS QUADRICOLOR	L	10 to 20								1														**1**
GOMPHUS VENTRICOSUS	W	5 to 10																						**0**
HERMARIS GRACILIS	R	30																						**0**
HEMILEUCA MAIA MAIA	L	10 to 20			2																			**2**
HEMILEUCA MAIA SSP 3	R	30						2				3												**5**
HEMILEUCA SP 2	P	N/A																						**0**
ITAME SP 1	L	10 to 20						1				1												**2**
LAMPSILIS CARIOSA	L/W	10											2									1		**3**
LANTHUS PARVULUS	L	10 to 20																						**0**
LASMIGONA SUBVIRIDIS	W	5 to 10																						**0**
LORDITHON NIGER	R	20			1																			**1**
LYCAEIDES MELISSA SAMUELIS	W	5 to 10										50												**50**
METARRANTHIS APICIARIA	R/L	20 to 30																						**0**
METARRANTHIS PILOSARIA	L	10 to 20			2																			**2**
OPHIOGOMPHUS ANOMALUS	L/W	10					1	6															1	**8**
OPHIOGOMPHUS ASPERSUS	W	5 to 10			2					1	1													**4**
OPHIOGOMPHUS HOWEI	L/W	10						8															1	**9**
POLYCELIS REMOTA	R	20																						**0**
PSECTRAGLAEA CARNOSA	L	10 to 20																						**0**
PYRGUS WYANDOT	L	10 to 20																						**0**
SOMATOCHLORA GEORGIANA	W	5 to 10																						**0**
SOMATOCHLORA INCURVATA	L	10 to 20																						**0**

***Targets in subsections adjacent to LNE/NP ecoregion.**

Lower New England/Northern Piedmont Ecoregion

Viable Primary Invertebrate Target Species
Distribution and Goals

GNAME	DISTRIBUTION	GOAL	SUBSECTION #221Ae	221Af	221Ag	221Ah	221Ai	221Al	221Am	221Ba	221Bb	221Bc	221Da	221Db	221Dc	M212Bb	M212Bc	M212Bd	M212Cb	M212Cc	221Ak*	232Ac*	M212De*	Grand Total Accepted EOs
SPEYERIA IDALIA	L	10 to 20																						**0**
SPHALLOPLANA PRICEI	L	10 to 20											1											**1**
SPONGILLA ASPINOSA	L	10 to 20																						**0**
STYGOBROMUS BOREALIS	R	30																						**0**
STYGOBROMUS HAYI	R	20												2										**2**
STYGOBROMUS KENKI	R	20												2										**2**
STYGOBROMUS PIZZINII	L	10 to 20											3											**3**
STYGOBROMUS TENUIS TENUIS	R	30												1										**1**
STYLURUS AMNICOLA	W	5 to 10																						**0**
STYLURUS SCUDDERI	P	5 to 10																						**0**
WILLIAMSONIA FLETCHERI	W	5 to 10					4	4													1			**9**
WILLIAMSONIA LINTNERI	L/W	10			13	1	5	1													1			**21**
ZALE CUREMA	R	30			2									2										**4**
ZALE SP 1	R	30			1		1	1																**3**
Grand Total			**7**	**4**	**37**	**1**	**21**	**26**	**2**	**9**	**1**	**67**	**8**	**11**	**0**	**18**	**2**	**1**	**0**	**3**	**2**	**1**	**2**	**223**

* = subsection is part of an adjoining ecoregion. EO captured by GIS buffer analysis of EOs close to the LNE-NP boundary.

***Targets in subsections adjacent to LNE/NP ecoregion.**

Appendix 1

Lower New England/Northern Piedmont Ecoregion

Viable Primary Plant Target Species
Distribution and Goals

GNAME	DISTRIBUTION	GOAL	SUBSECTION # 221Ae	221Af	221Ag	221Ah	221Ai	221Al	221Am	221Ba	221Bb	221Bc	221Da	221Db	221Dc	M212Bb	M212Bc	M212Bd	M212Cb	M212Cc	Grand Total Accepted EOs
AGALINIS ACUTA	L	10 to 20			2									1							**3**
AGALINIS AURICULATA	P	5 to 10							1												**1**
ARABIS PATENS	P	5 to 10											1								**1**
ASTER DEPAUPERATUS	L/P	20												14							**14**
ASTRAGALUS ROBBINSII VAR JESUPII	L	10 to 20														3					**3**
BIDENS BIDENTOIDES	P/L	5 to 10								3		13									**16**
BIDENS EATONII	L	10 to20			2																**2**
CARDAMINE LONGII	L	10 to 20	3									2									**5**
CAREX BARRATTII	P	5 to 10		2																	**2**
CAREX LUPULIFORMIS	W	5 to 10	5							1		2		2							**10**
CAREX POLYMORPHA	L	10 to 20			2		1														**3**
CAREX SCHWEINITZII	W	5 to 10	1																7		**8**
CAREX WIEGANDII	W	5 to 10				1															**1**
CERASTIUM ARVENSE VAR VILLOSISSIMUM	W	5 to 10												1							**1**
COREOPSIS ROSEA	W	5 to 10			1																**1**
CYNOGLOSSUM VIRGINIANUM VAR BOREALE	P	5 to 10										1									**1**
CYPRIPEDIUM ARIETINUM	W	5 to 10		1				3			1										**5**
ECHINODORUS PARVULUS	W	5 to 10		1																	**1**
ERIOCAULON PARKERI	W	5 to 10			2																**2**
EUPHORBIA PURPUREA	L	10 to 20												3							**3**
HASTEOLA SUAVEOLENS	W	5 to 10												4							**4**
HELONIAS BULLATA	P	10 to 20	1						1					1							**3**
HYPERICUM ADPRESSUM	W	5 to 10			1																**1**
ISOTRIA EATONII	W	5 to 10																			**0**
ISOTRIA MEDEOLOIDES	W	5 to 10				1	5	11										1			**18**
LIATRIS SCARIOSA VAR NOVAE-ANGLIAE	L	10 to 20	4																		**4**
MALAXIS BAYARDII	L	10 to 20										1									**1**
PHACELIA COVILLEI	W	5 to 10												5							**5**
POA PALUDIGENA	W	5 to 10							1				5								**6**
POLEMONIUM VANBRUNTIAE	P	10 to 20																			**0**
POTAMOTGETON CONFERVOIDES	L	10 to 20																			**0**
POTAMOGETON HILLII	L	10 to 20									1	1				1			9		**12**
POTAMOGETON OGDENII	R	20	1								1					1			1		**4**
PYCNANTHEMUM CLINOPODIOIDES	R	20	1												1						**2**
PYCNANTHEMUM TORREI	W	5 to 10		1										3	1						**5**
RUBUS ORARIUS	W	5 to 10								1											**1**
SCIRPUS ANCISTROCHAETUS	L	10 to 20														5	1			4	**10**
SCIRPUS LONGII	L	10 to 20					1	8													**9**
SCLERIA RETICULARIS	W	5 to 10					1						1	4							**6**
SIDA HERMAPHRODITA	P	10 to 20												3							**3**
TRICHOMANES INTRICATUM	P	5 to 10	1																		**1**
VITIS RUPESTRIS	P	10 to 20												1							**1**
Grand Total			**17**	**5**	**10**	**2**	**8**	**22**	**3**	**5**	**3**	**20**	**7**	**42**	**2**	**10**	**1**	**1**	**17**	**4**	**179**

Lower New England/Northern Piedmont Ecoregion

Viable Primary Vertebrate Target Species
Distribution and Goals

GNAME	DISTRIBUTION	GOAL	SUBSECTION # 221Ae	221Af	221Ag	221Ah	221Ai	221Al	221Am	221Ba	221Bb	221Bc	221Da	221Db	221Dc	M212Bb	M212Bc	M212Bd	M212Cb	M221Cc	Grand Total Accepted EOs
ACIPENSER BREVIROSTRUM	W	5 to 10		2	1					2											**5**
ACIPENSER OXYRINCHUS	W	5 to 10																			**0**
AMMOCRYPTA PELLUCIDA	P	5 to 10										3									**3**
CLEMMYS MUHLENBERGII	W	5 to 10	15						1	9	3		2	26					5		**61**
CROTALUS HORRIDUS	W	5 to 10	11	1						5	1	2							3		**23**
MYOTIS LEIBII	W	5 to 10								2											**2**
MYOTIS SODALIS	P	5								1											**1**
NEOTOMA MAGISTER	W	5 to 10	1																		**1**
Grand Total			**27**	**3**	**1**	**0**	**0**	**0**	**1**	**19**	**4**	**5**	**2**	**26**	**0**	**0**	**0**	**0**	**8**	**0**	**96**

Lower New England/Northern Piedmont Ecoregion

Primary Invertebrate Target Species
Viability and Subsection Distribution
Appendix 1

GNAME / SUBSECTION #	221Ae		221Ae Total	221Af			221Af Total	221Ag			221Ag Total	221Ah			221Ah Total	221Ai			221Ai Total	221Al			221Al Total	221Am			221Am Total	221Ba			221Ba Total	221Bb	221Bb Total	221Bc			221Bc Total
VIABILITY	Y	N		M	Y	N		M	Y	N		M	Y	N		M	Y	N		M	Y	N		M	Y	N		M	Y	N		Y		M	Y	N	
ACRONICTA ALBARUFA																																			1		1
ALASMIDONTA HETERODON					1	5	6							1	1														1		1						
ALASMIDONTA VARICOSA		1	1			1	1			2	2	1			1		6	11	17		3	1	4					1	1		2						
AMPHIPOEA EREPTA RYENSIS	1		1																																		
CAECIDOTEA PRICEI																									1		1										
CALEPHELIS BOREALIS	5		5																									2	5	1	8						
CALLOPHRYS IRUS								2	7		9						2	3	5						1		1								11	3	14
CATOCALA HERODIAS GERHARDI																																					
CATOCALA PRETIOSA PRETIOSA																																					
CHAETAGLAEA CERATA																1			1															1	1		2
CICINDELA ANCOCISCONENSIS																																					
CICINDELA MARGINIPENNIS																																					
CICINDELA PURITANA				1	3	2	6																														
CINCINNATIA WINKLEYI																																					
CRANGONYX ABERRANS																																					
CRANGONYX DEAROLFI																																					
ENALLAGMA PICTUM																																					
ENALLAGMA RECURVATUM								1	6		7																										
ERYNNIS PERSIUS PERSIUS									1		1					1	2	1	4																		
EULIMNADIA STONINGTONENSIS	1		1																																		
FONTIGENS BOTTIMERI																																					
GOMPHUS QUADRICOLOR																													1		1						
GOMPHUS VENTRICOSUS																																					
HEMARIS GRACILIS																3			3																		
HEMILEUCA MAIA MAIA								1	2		3																										
HEMILEUCA MAIA SSP 3																					2		2												3		3
HEMILEUCA SP 2																																					
ITAME SP 1																				1	1		2												1		1
LAMPSILIS CARIOSA				2			2																	1		1	2										
LANTHUS PARVULUS																																					
LASMIGONA SUBVIRIDIS																																					
LORDITHON NIGER									1		1																										
LYCAEIDES MELISSA SAMUELIS																2		1	3															38	50	4	92
METARRANTHIS APICIARIA																1		1	2																		
METARRANTHIS PILOSARIA								1	2		3																										
OPHIOGOMPHUS ANOMALUS																	1		1		6		6														
OPHIOGOMPHUS ASPERSUS									2		2													2			2		1		1	1	1				
OPHIOGOMPHUS HOWEI																					8		8														
POLYCELIS REMOTA				2			2																														
PSECTRAGLAEA CARNOSA																																					
PYRGUS WYANDOT																																					
SOMATOCHLORA GEORGIANA																																					
SOMATOCHLORA INCURVATA																																					
SPEYERIA IDALIA																																					
SPHALLOPLANA PRICEI																																					
STYGOBROMUS BOREALIS																																					
STYGOBROMUS HAYI																																					
STYGOBROMUS KENKI																																					
STYGOBROMUS PIZZINII																																					
STYGOBROMUS TENUIS TENUIS																																					
STYLURUS AMNICOLOR																																					
STYLURUS SCUDDERI								1			1																										
WILLIAMSONIA FLETCHERI																	4		4		4		4														
WILLIAMSONIA LINTNERI								4	13	4	21	1	1		2	5	5		10		1		1														
ZALE CUREMA						1	1	1	2		3					1			1																		
ZALE SP 1									1		1						1		1	1	1		2														
Grand Total	7	1	8	5	4	9	18	11	37	6	54	2	1	1	4	14	21	17	52	2	26	1	29	3	2	1	6	3	9	1	13	1	1	39	67	7	113

GNAME / SUBSECTION #	221Da			221Da Total	221Db			221Db Total	212Dc Total	M212Bb		M212Bb Total	M212Bc		M212Bc Total	M212Bd			M212Bd Total	M212Cb	M212Cb Total	M212Cc			M212Cc Total	221Ad*	221Ad Total*	221Ak*	221Ak Total*	232Ac*		232Ac Total*	M212De*	M212De Total*	Grand Total of All EOs
VIABILITY	M	Y	N		M	Y	N			Y	N		Y	N		M	Y	N		M		M	Y	N		M		Y		Y	N		Y		
ACRONICTA ALBARUFA																																			1
ALASMIDONTA HETERODON										10	2	12					1	1	2																22
ALASMIDONTA VARICOSA	1		10	11	1		2	3			1	1	2	1	3	1		2	3			1	2	4	7										56
AMPHIPOEA EREPTA RYENSIS																																			1
CAECIDOTEA PRICEI	2	2	5	9																															10
CALEPHELIS BOREALIS																																			13
CALLOPHRYS IRUS	1			1		1	1	2																		1	1								33
CATOCALA HERODIAS GERHARDI																																			0
CATOCALA PRETIOSA PRETIOSA																																			0
CHAETAGLAEA CERATA														1	1																				4
CICINDELA ANCOCISCONENSIS																							1		1										1
CICINDELA MARGINIPENNIS										8	1	9																							9
CICINDELA PURITANA																																			6
CINCINNATIA WINKLEYI																																			0
CRANGONYX ABERRANS																																			0
CRANGONYX DEAROLFI	1			1																															1
ENALLAGMA PICTUM																																			0
ENALLAGMA RECURVATUM																																			7
ERYNNIS PERSIUS PERSIUS																																			5
EULIMNADIA STONINGTONENSIS																																			1
FONTIGENS BOTTIMERI						3		3																											3
GOMPHUS QUADRICOLOR																																			1
GOMPHUS VENTRICOSUS																																			0
HEMARIS GRACILIS																																			3
HEMILEUCA MAIA MAIA																																			3
HEMILEUCA MAIA SSP 3																																			5
HEMILEUCA SP 2																																			0
ITAME SP 1																																			3
LAMPSILIS CARIOSA	13	2	3	18																										1	1	2			24
LANTHUS PARVULUS																																			0
LASMIGONA SUBVIRIDIS			2	2			1	1																											3
LORDITHON NIGER																																			1
LYCAEIDES MELISSA SAMUELIS																																			95
METARRANTHIS APICIARIA																																			2
METARRANTHIS PILOSARIA																																			3
OPHIOGOMPHUS ANOMALUS																																	1	1	8
OPHIOGOMPHUS ASPERSUS																																			6
OPHIOGOMPHUS HOWEI																																	1	1	9
POLYCELIS REMOTA																																			2
PSECTRAGLAEA CARNOSA																																			0
PYRGUS WYANDOT																																			0
SOMATOCHLORA GEORGIANA																																			0
SOMATOCHLORA INCURVATA																																			0
SPEYERIA IDALIA	1			1			4	4																											5
SPHALLOPLANA PRICEI		1		1																															1
STYGOBROMUS BOREALIS																																			0
STYGOBROMUS HAYI						2		2																											2
STYGOBROMUS KENKI						2		2																											2
STYGOBROMUS PIZZINII	3	3		6	2		1	3																											9
STYGOBROMUS TENUIS TENUIS					1	1		2												2	2														4
STYLURUS AMNICOLOR																																			0
STYLURUS SCUDDERI																																			1
WILLIAMSONIA FLETCHERI																												1	1						9
WILLIAMSONIA LINTNERI																												1	1						35
ZALE CUREMA						2		2																											7
ZALE SP 1																																			4
Grand Total	22	8	20	50	4	11	9	24		18	4	22	2	2	4	1	1	3	5	2	2	1	3	4	8	1	1	2	2	1	1	2	2	2	420

CONFIDENTIAL DRAFT

***Targets in subsections adjacent to LNE-NP ecoregion.**

Lower New England/Northern Piedmont Ecoregion

Primary Plant Target Species

Viability and Subsection Distribution

SUBSECTION #	221Ae			221Ae Total	221Af			221Af Total	221Ag		221Ag Total	221Ah	221Ah Total	221Ai			221Ai Total	221Al			221Al Total	221Am		221Am Total	221Ba			221Ba Total	221Bb	221Bb Total	221Bc		221Bc Total	221Da		221Da Total	221Db			221Db Total	221Dc			221Dc Total	M212Bb		M212Bb Total	M212Bc		M212Bc Total	M212Bd		M212Bd Total	M212Cb			M212Cb Total	M212Cc		M212Cc Total	Grand Total of All EOs
GNAME VIABILITY	M	Y	N		M	Y	N		Y	N		Y		M	Y	N		M	Y	N		Y	N		M	Y	N		Y		Y	N		M	Y		M	Y	N		M	Y	N		M	Y		Y	N		Y	N		M	Y	N		Y	N		
AGALINIS ACUTA									2		2																											1		1																					3
AGALINIS AURICULATA																						1		1										1		1																									2
ARABIS PATENS																																			1	1																									1
ASTER DEPAUPERATUS																																					1	14	7	22																					22
ASTRAGALUS ROBBINSII VAR JESUPII																																														3	3														3
BIDENS BIDENTOIDES																										3	3	6			13	8	21																												27
BIDENS EATONII									2		2																																																		2
CARDAMINE LONGII		3	1	4																											2	1	3																												7
CAREX BARRATTII						2		2																																																					2
CAREX LUPULIFORMIS		5	2	7																					1	1	1	3			2	1	3					2		2																					15
CAREX POLYMORPHA			1	1					2	1	3				1		1						2	2																																					7
CAREX SCHWEINITZII		1	1	2																																																		3	7	4	14				16
CAREX WIEGANDII												1	1																																																1
CERASTIUM ARVENSE VAR VILLOSISSIMUM																																						1		1																					1
COREOPSIS ROSEA									1	4	5																																																		5
CYNOGLOSSUM VIRGINIANUM VAR BOREALE																															1		1																												1
CYPRIPEDIUM ARIETINUM						1		1											3	1	4								1	1																															6
ECHINODORUS PARVULUS						1		1																																																					1
ERIOCAULON PARKERI									2		2																																																		2
EUPHORBIA PURPUREA																																					1	3		4																					4
HASTEOLA SUAVEOLENS																																						4	4	8																					8
HELONIAS BULLATA		1		1																		1		1														1		1																					3
HYPERICUM ADPRESSUM									1		1																																																		1
ISOTRIA EATONII																																																													0
ISOTRIA MEDEOLOIDES	1		1	2	1		1	2		2	2	1	1		5	12	17	2	11	35	48																														1	1	2								74
LIATRIS SCARIOSA VAR NOVAE-AN(		4	1	5						2	2			2		3	5																																												12
MALAXIS BAYARDII																															1		1																												1
PHACELIA COVILLEI																																						5	2	7																					7
POA PALUDIGENA																						1	1	2								1	1		5	5			1	1																					9
POLEMONIUM VANBRUNTIAE																																					1		1	2																					2
POTAMOGETON CONFERVOIDES							1	1										2			2																																			1	1				4
POTAMOGETON HILLII			2	2																									1	1	1		1													1	1								9	6	15				20
POTAMOGETON OGDENII		1		1																									1	1																1	1							1	1		2				5
PYCNANTHEMUM CLINOPODIOIDES		1	1	2			1	1								1	1																									1	1	2																	6
PYCNANTHEMUM TORREI			2	2		1		1																														3	2	5	1	1	1	3																	11
RUBUS ORARIUS																										1		1																																	1
SCIRPUS ANCISTROCHAETUS							1	1																																					2	5	7	1	1	2								4	1	5	15
SCIRPUS LONGII															1	1	2		8	1	9																																								11
SCLERIA RETICULARIS										1	1				1		1																		1	1		4		4																					7
SIDA HERMAPHRODITA																																					3	3	1	7																					7
TRICHOMANES INTRICATUM		1		1																																																							1	1	2
VITIS RUPESTRIS																																						1	1	2																					2
Grand Total	**1**	**17**	**12**	**30**	**1**	**5**	**4**	**10**	**10**	**10**	**20**	**2**	**2**	**2**	**8**	**17**	**27**	**4**	**22**	**37**	**63**	**3**	**3**	**6**	**1**	**5**	**4**	**10**	**3**	**3**	**20**	**11**	**31**	**1**	**7**	**8**	**6**	**42**	**19**	**67**	**1**	**2**	**2**	**5**	**2**	**10**	**12**	**1**	**1**	**2**	**1**	**1**	**2**	**4**	**17**	**11**	**32**	**4**	**2**	**6**	**336**

Appendix 1.

Lower New England/Northern Piedmont Ecoregion

Primary Vertebrate Target Species
Viability and Subsection Distribution
DRAFT 9\20\00 CONFIDENTIAL

SUBSECTION #	221Ae			221Ae Total	221Af			221Af Total	221Ag		221Ag Total	221 Ah Total	221Ai		221Ai Total	221Al Total	221Am			221Am Total	221Ba			221Ba Total	221Bb		221Bb Total
GNAME VIABILITY	**M**	**Y**	**N**		**M**	**Y**	**N**		**Y**	**N**			**M**	**N**			**M**	**Y**	**N**		**M**	**Y**	**N**		**Y**	**N**	
ACIPENSER BREVIROSTRUM			1	1		2		2	1		1											2	1	3			
ACIPENSER OXYRINCHUS			1	1			2	2																			
AMMOCRYPTA PELLUCIDA																											
CLEMMYS MUHLENBERGII	10	15	30	55													7	1	22	30	4	9	19	32	3		3
CROTALUS HORRIDUS	8	11	19	38	1	1		2					2	1	3							5	2	7	1	2	3
MYOTIS LEIBII			2	2																		2	1	3			
MYOTIS SODALIS	4			4						2	2											1		1			
NEOTOMA MAGISTER		1	1	2																			2	2			
Grand Total	22	27	54	103	1	3	2	6	1	2	3	0	2	1	3	0	7	1	22	30	4	19	25	48	4	2	6

SUBSECTION #	221Bc			221Bc Total	221Da			221Da Total	221Db			221Db Total	221Dc	221Dc Total	M212Bb	M212Bb Total	M212Bc Total	221Bd	221Bd Total	M212Cb		M212Cb Total	M212Cc	M212Cc Total	M221Da*	M221Da Total*	Grand Total of All EOs
GNAME VIABILITY	**M**	**Y**	**N**		**M**	**Y**	**N**		**M**	**Y**	**N**		**N**		**N**			**N**		**Y**	**N**		**N**		**N**		
ACIPENSER BREVIROSTRUM			2	2	2			2			1	1															12
ACIPENSER OXYRINCHUS											1	1															4
AMMOCRYPTA PELLUCIDA		3		3																							3
CLEMMYS MUHLENBERGII					4	2	16	22	1	26	78	105	2	2						5	1	6	1	1			256
CROTALUS HORRIDUS		2	1	3									2	2	1	1		1	1	3	1	4					64
MYOTIS LEIBII	1		1	2																	4	4					11
MYOTIS SODALIS	1			1																	1	1					9
NEOTOMA MAGISTER																		1	1						1	1	6
Grand Total	2	5	4	11	6	2	16	24	1	26	80	107	4	4	1	1	0	2	2	8	7	15	1	1	1	1	365

***Targets in subsections adjacent to the LNE/NP ecoregion**.

Lower New England\Northern Piedmont
Primary Invertebrate Species
Progress towards Goals

GNAME	GCOMNAME	DISTRIBUTION	GOAL	# of Eos	# ACCEPTED by Expert Team	# ACCEPTED into the Portfolio	GOAL MET
ACRONICTA ALBARUFA	BARRENS DAGGER MOTH	L	10 to 20	1	1	1	No
ALASMIDONTA HETERODON	DWARF WEDGEMUSSEL	W	5 to 10	22	13	13	**Yes**
ALASMIDONTA VARICOSA	BROOK FLOATER	W	5 to 10	56	14	12	**Yes**
AMPHIPOEA EREPTA RYENSIS	A NOCTUID MOTH	R	20	1	1	0	No
CAECIDOTEA PRICEI	PRICE'S CAVE ISOPOD	L	10 to 20	10	3	1	No
CALEPHELIS BOREALIS	NORTHERN METALMARK	L	10 to 20	13	10	10	**Yes**
CALLOPHRYS IRUS	FROSTED ELFIN	L	10 to 20	33	22	22	**Yes**
CATOCALA HERODIAS GERHARDI	HERODIAS UNDERWING	P	5 to 10	0	0	0	No
CATOCALA PRETIOSA PRETIOSA		L	10 to 20	0	0	0	No
CHAETAGLAEA CERATA	A NOCTUID MOTH	L	10 to 20	4	1	1	No
CICINDELA ANCOCISCONENSIS	A TIGER BEETLE	L	10 to 20	1	1	1	No
CICINDELA MARGINIPENNIS	COBBLESTONE TIGER BEETLE	L	10 to 20	9	8	8	No
CICINDELA PURITANA	PURITAN TIGER BEETLE	L	10 to 20	6	3	3	No
CINCINNATIA WINKLEYI	NEW ENGLAND SILTSNAIL	W	5 to 10	0	0	0	No
CRANGONYX ABERRANS	MYSTIC RIVER AMPHIPOD	L	10 to 20	0	0	0	No
CRANGONYX DEAROLFI	PENNSYLVANIA CAVE AMPHIPOD	L	10 to 20	1	0	0	No
ENALLAGMA PICTUM	SCARLET BLUE	L/P	10	0	0	0	No
ENALLAGMA RECURVATUM	PINE BARRENS BLUET	L/P	10	7	6	6	No
ERYNNIS PERSIUS PERSIUS	PERSIUS DUSKY WING	L/P	10	5	3	3	No
EULIMNADIA STONINGTONENSIS	A CLAM SHRIMP	R	20	1	1	1	No
FONTIGENS BOTTIMERI	APPALACHIAN SPRINGSNAIL	R	30	3	3	3	No
GOMPHUS QUADRICOLOR	RAPIDS CLUBTAIL	L	10 to 20	1	1	0	No
GOMPHUS VENTRICOSUS	SKILLET CLUBTAIL	W	5 to 10	0	0	0	No
HEMARIS GRACILIS	GRACEFUL CLEARWING	R	30	3	0	0	No
HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	L	10 to 20	3	2	2	No
HEMILEUCA MAIA SSP 3	INLAND BARRENS BUCKMOTH	R	30	5	5	5	No
HEMILEUCA SP2	SCHWEITZER'S BUCKMOTH	P	N/A	0	0	0	No
ITAME SP 1	BARRENS ITAME (cf I. INEXTRICATA)	L	10 to 20	3	2	2	No
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL	L/W	10	24	3	3	No
LANTHUS PARVULUS	NORTHERN PYGMY CLUBTAIL	L	10 to 20	0	0	0	No
LASMIGONA SUBVIRIDIS	GREEN FLOATER	W	5 to 10	3	0	0	No
LORDITHON NIGER	BLACK LORDITHON ROVE BEETLE	R	20	1	1	1	No
LYCAEIDES MELISSA SAMUELIS	KARNER BLUE	W	5 to 10	95	50	50	**Yes**
METARRANTHIS APICIARIA	BARRENS METARRANTHIS MOTH	R/L	20 to 30	2	0	0	No
METARRANTHIS PILOSARIA	COASTAL SWAMP METARRANTHIS	L	10 to 20	3	2	2	No
OPHIOGOMPHUS ANOMALUS	EXTRA-STRIPED SNAKETAIL	L/W	10	8	8	8	No
OPHIOGOMPHUS ASPERSUS	BROOK SNAKETAIL	W	5 to 10	6	4	3	No
OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL	L/W	10	9	9	9	No
POLYCELIS REMOTA	SUNDERLAND SPRING PLANARIAN	R	20	2	0	0	No
PSECTRAGLAEA CARNOSA	PINK SALLOW	L	10 to 20	0	0	0	No
PYRGUS WYANDOT	SOUTHERN GRIZZLED SKIPPER	L	10 to 20	0	0	0	No
SOMATOCHLORAR GEORGIANA	COPPERY EMERALD	W	5 to 10	0	0	0	No
SOMATOCHLORA INCURVATA	INCURVATE EMERALD	L	10 to 20	0	0	0	No
SPEYERIA IDALIA	REGAL FRITILLARY	L	10 to 20	5	0	0	No
SPHALLOPLANA PRICEI	REFTON CAVE PLANARIAN	L	10 to 20	1	1	0	No
SPONGILLA ASPINOSA	SMOOTH BRANCHED SPONGE	L	10 to 20	0	0	0	No
STYGOBROMUS BOREALIS	TACONIC CAVE AMPHIPOD	R	30	0	0	0	No
STYGOBROMUS HAYI	HAY'S SPRING AMPHIPOD	R	20	2	2	2	No
STYGOBROMUS KENKI	ROCK CREEK GROUNDWATER AMPHIPOD	R	20	2	2	2	No
STYGOBROMUS PIZZINII	PIZZINI'S CAVE AMPHIPOD	L	10 to 20	9	3	1	No
STYGOBROMUS TENUIS TENUIS	PIEDMONT GROUNDWATER AMPHIPOD	R	30	4	1	1	No
STYLURUS AMNICOLA	RIVERINE CLUBTAIL	W	5 to 10	0	0	0	No
STYLURUS SCUDDERI	ZEBRA CLUBTAIL	P	5 to 10	1	0	0	No
WILLIAMSONIA FLETCHERI	EBONY BOGHAUNTER	W	5 to 10	9	9	9	**Yes**
WILLIAMSONIA LINTNERI	RINGED BOGHAUNTER	L/W	10	35	21	21	**Yes**
ZALE CUREMA	A NOCTUID MOTH	R	30	7	4	4	No
ZALE SP 1	PINE BARRENS ZALE	R	30	4	3	3	No
Grand Total				**420**	**223**	**213**	**7 Yes**
							50 No

Lower New England\Northern Piedmont

Primary Vertebrate Species

Progress towards Goals

GNAME	GCOMNAME	DISTRIBUTION	GOAL	# of Eos	# ACCEPTED by Expert Team	# ACCEPTED into the Portfolio	GOAL MET
ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON	W	5 to 10	12	5	3	No
ACIPENSER OXYRINCHUS	ATLANTIC STURGEON	W	5 to 10	4	0	0	No
AMMOCRYPTA PELLUCIDA	EASTERN SAND DARTER	P	5 to 10	3	3	2	No
CLEMMYS MUHLENBERGII	BOG TURTLE	W	5 to 10	256	61	47	**Yes**
CROTALUS HORRIDUS	TIMBER RATTLESNAKE	W	5 to 10	64	23	21	**Yes**
MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS	W	5 to 10	11	2	1	No
MYOTIS SODALIS	INDIANA OR SOCIAL MYOTIS	P	5	9	1	1	No
NEOTOMA MAGISTER	ALLEGHENY WOODRAT	W	5 to 10	6	1	1	No
Grand Total				**365**	**96**	**76**	**2 Yes**
							6 No

Lower New England\Northern Piedmont Ecoregion

Primary Vascular Plant Species

Progress towards Goals

GNAME	GCOMNAME	DISTRIBUTION	GOAL	# of Eos	# ACCEPTED by Expert Team	# ACCEPTED into the Portfolio	GOAL MET
AGALINIS ACUTA	SANDPLAIN GERARDIA	L	10 to 20	3	3	3	No
AGALINIS AURICULATA	EARLEAF FOXGLOVE	P	5 to 10	2	1	0	No
ARABIS PATENS	SPREADING ROCKCRESS	P	5 to 10	1	1	1	No
ASTER DEPAUPERATUS	SERPENTINE ASTER	L/P	20	22	14	13	No
ASTRAGALUS ROBBINSII VAR JESUPII	JESUP'S MILK-VETCH	L	10 to 20	3	3	3	No
BIDENS BIDENTOIDES	MARYLAND BUR-MARIGOLD	P/L	5 to 10	27	16	7	**Yes**
BIDENS EATONII	EATON'S BEGGAR-TICKS	L	10 to20	2	2	2	No
CARDAMINE LONGII	LONG'S BITTER-CRESS	L	10 to 20	7	5	2	No
CAREX BARRATTII	BARRATT'S SEDGE	P	5 to 10	2	2	2	No
CAREX LUPULIFORMIS	FALSE HOP SEDGE	W	5 to 10	15	10	7	**Yes**
CAREX POLYMORPHA	VARIABLE SEDGE	L	10 to 20	7	3	3	No
CAREX SCHWEINITZII	SCHWEINITZ'S SEDGE	W	5 to 10	16	8	6	**Yes**
CAREX WIEGANDII	WIEGAND'S SEDGE	W	5 to 10	1	1	1	No
CERASTIUM ARVENSE VAR VILLOSISSIMUM	GOAT HILL CHICKWEED	W	5 to 10	1	1	1	No
COREOPSIS ROSEA	ROSE COREOPSIS	W	5 to 10	5	1	1	No
CYNOGLOSSUM VIRGINIANUM VAR BOREALE	NORTHERN WILD COMFREY	P	5 to 10	1	1	1	No
CYPRIPEDIUM ARIETINUM	RAM'S-HEAD LADY'S-SLIPPER	W	5 to 10	6	5	5	**Yes**
ECHINODORUS PARVULUS	AMERICAN DWARF BURHEAD	W	5 to 10	1	1	1	No
ERIOCAULON PARKERI	PARKER'S PIPEWORT	W	5 to 10	2	2	2	No
EUPHORBIA PURPUREA	GLADE SPURGE	L	10 to 20	4	3	3	No
HASTEOLA SUAVEOLENS	SWEET-SCENTED INDIAN-PLANTAIN	W	5 to 10	8	4	3	No
HELONIAS BULLATA	SWAMP-PINK	P	10 to 20	3	3	3	No
HYPERICUM ADPRESSUM	CREEPING ST. JOHN'S-WORT	W	5 to 10	1	1	1	No
ISOTRIA EATONII	EATON'S QUILLWORT	W	5 to 10	0	0	0	No
ISOTRIA MEDEOLOIDES	SMALL WHORLED POGONIA	W	5 to 10	74	18	15	**Yes**
LIATRIS SCARIOSA VAR NOVAE-ANGLIAE	NORTHERN BLAZING-STAR	L	10 to 20	12	4	4	No
MALAXIS BAYARDII	BAYARD'S MALAXIS	L	10 to 20	1	1	1	No
PHACELIA COVILLEI	BLUE SCORPION-WEED	W	5 to 10	7	5	5	**Yes**
POA PALUDIGENA	BOG BLUEGRASS	W	5 to 10	9	6	6	**Yes**
POLEMONIUM VANBRUNTIAE	JACOB'S LADDER	P	10 to 20	2	0	0	No
POTAMOGETON CONFERVOIDES	ALGAE-LIKE PONDWEED	L	10 to 20	4	0	0	No
POTAMOGETON HILLII	HILL'S PONDWEED	L	10 to 20	20	12	12	**Yes**
POTAMOGETON OGDENII	OGDEN'S PONDWEED	R	20	5	4	4	No
PYCNANTHEMUM CLINOPODIOIDES	BASIL MOUNTAIN-MINT	R	20	6	2	2	No
PYCNANTHEMUM TORREI	TORREY'S MOUNTAIN MINT	W	5 to 10	11	5	4	No
RUBUS ORARIUS	BLACKBERRY	W	5 to 10	1	1	1	No
SCIRPUS ANCISTROCHAETUS	NORTHEASTERN BULRUSH	L	10 to 20	15	10	10	**Yes**
SCIRPUS LONGII	LONG'S BULRUSH	L	10 to 20	11	9	9	No
SCLERIA RETICULARIS	RETICULATED NUTRUSH	W	5 to 10	7	6	6	**Yes**
SIDA HERMAPHRODITA	VIRGINIA MALLOW	P	10 to 20	7	3	2	No
TRICHOMANES INTRICATUM	A FILMY-FERN	P	5 to 10	2	1	1	No
VITIS RUPESTRIS	ROCK GRAPE	P	10 to 20	2	1	1	No
Grand Total				**336**	**179**	**154**	**10 Yes**
							32 No

Lower New England\Northern Piedmont
Secondary targets with EOs in portfolio and 10-year Action Sites

Scientific Name	No. of EOs in Portfolio Sites	No. of EOs in Portfolio 10 Year Action Sites
CORDULEGASTER ERRONEA	0	0
CYPERUS HOUGHTONII	0	0
DENDROICA CAERULESCENS	0	0
ELEOCHARIS PAUCIFLORA VAR FERNALDII	0	0
ENEMION BITERNATUM	0	0
HOTTONIA INFLATA	0	0
PHLOX PILOSA	0	0
PHYLLANTHUS CAROLINIENSIS	0	0
PROTONOTARIA CITREA	0	0
ROSA ACICULARIS SSP SAYI	0	0
UTRICULARIA RESUPINATA	0	0
VERMIVORA CHRYSOPTERA	0	0
VIOLA BRITTONIANA	0	0
AESHNA MUTATA	1	1
BOLTONIA ASTEROIDES	1	0
CALLOPHRYS LANORAIEENSIS	1	1
CAREX CHORDORRHIZA	1	0
CAREX GARBERI	1	1
ERYNNIS LUCILIUS	1	0
GRAMMIA SPECIOSA	1	0
HELMITHEROS VERMIVORUS	1	0
LAMPSILIS RADIATA	1	1
LIGUMIA NASUTA	1	1
LUDWIGIA POLYCARPA	1	0
MUHLENBERGIA CAPILLARIS	1	0
PAPAIPEMA SP 2	1	1
PLANTAGO CORDATA	1	0
SCLEROLEPIS UNIFLORA	1	0
SPOROBOLUS NEGLECTUS	1	0
VALERIANA ULIGINOSA	1	0
VERBENA SIMPLEX	1	0
ANARTA LUTEOLA	2	2
CERMA CORA	2	1
CHLOSYNE NYCTEIS	2	2
PARONYCHIA ARGYROCOMA	2	2
RHYNCHOSPORA INUNDATA	2	1
VERMIVORA PINUS	2	0
CALLOPHRYS HESSELI	3	2
CALYSTEGIA SPITHAMAEA	3	2
CAREX CRAWEI	3	1
CAREX RICHARDSONII	3	2
ELEOCHARIS EQUISETOIDES	3	2
LIPOCARPHA MICRANTHA	3	3
ONOSMODIUM VIRGINIANUM	3	2
CAREX MEADII	4	3
LEPTODEA OCHRACEA	4	1
LIPARIS LILIIFOLIA	4	2
PAPAIPEMA APPASSIONATA	4	2
SOLIDAGO SIMPLEX VAR RACEMOSA	4	3
VALERIANA PAUCIFLORA	4	4
CAREX SCIRPOIDEA	5	3
JUNIPERUS HORIZONTALIS	5	2
PEDICULARIS LANCEOLATA	5	3
RHYNCHOSPORA CAPILLACEA	5	4
TRIPHORA TRIANTHOPHORA	5	3
DENDROICA CERULEA	6	3
ARETHUSA BULBOSA	7	4
GENTIANELLA QUINQUEFOLIA	7	6
POLYGONUM DOUGLASII	7	4
CASTILLEJA COCCINEA	9	6
HYDRASTIS CANADENSIS	10	1
SOLIDAGO PTARMICOIDES	10	4
BETULA PUMILA	11	6
CHAMAELIRIUM LUTEUM	11	5
ENALLAGMA LATERALE	11	7
EMYDOIDEA BLANDINGII	20	11
CLEMMYS INSCULPTA	22	11

Lower New England\Northern Piedmont

Secondary Targets without Occurrences

LNE Secondary Vertebrate Targets with No EOs

ABPBJ18120	0	Secondary	CATHARUS BICKNELLI	BICKNELL'S THRUSH
ABPBX03190	0	Secondary	DENDROICA DISCOLOR	PRAIRIE WARBLER
ABPJ19010	0	Secondary	HYLCOCICHLA MUSTLENIA	WOOD THRUSH
ABPBX10030	0	Secondary	SEIURUS MOTACILLA	LOUISIANA WATERTHRUSH
AMAEB01050	0	Secondary	SYLVILAGUS TRANSITIONALIS	NEW ENGLAND COTTONTAIL

LNE Secondary Invertebrate Targets with No EOs

IILEPA6050	0	Secondary	ANTHOCHARIS MIDEA	FALCATE ORANGETIP
IIODO65030	0	Secondary	CALOPTERYX AMATA	SUPERB JEWELWING
IICOLO2200	0	Secondary	CICINDELA PURPUREA	A TIGER BEETLE
IIODO03040	0	Secondary	CICINDELA TRANQUEBARICA	A TIGER BEETLE
IILEP37100	0	Secondary	ERYNNIS MARTIALIS	MOTTLED DUSKYWING
IIODO08270	0	Secondary	GOMPHUS DESCRIPTUS	HARPOON CLUBTAIL
IILEU0P020	0	Secondary	HYPOMECIS BUCHHOLZARIA	BUCHHOLZ'S GRAY
ICBRA05010	0	Secondary	LIMNADIA LENTICULARIS	AMERICAN CLAM SHRIMP
IILEYC0020	0	Secondary	PAPAIPEMA DUOVATA	GOLDENROD STEM BORDER

LNE Secondary Vascular Plant Targets with No EOs

PPISO010Q0	0	Secondary	ISOETES ACADENSIS	ACADIAN QUILLWORT
PDRAN0P020	0	Secondary	TROLLIUS LAXUS	SPREADING GLOBEFLOWER
PMLEM04010	0	Secondary	WOFFIELLA GLADIATA	SWORD BOGMAT

Appendix 2.
Lower New England\Northern Piedmont
Priority Bird Species of LNE-NP: Secondary Targets

Species	AI-09	PT-09	**PIF09**	AI-17	PT-17	**PIF17**	AI-27	PT-27	**PIF 27**	**GLOBAL**	Habitat	Comments
Bicknell's Thrush				2	3	**23**	4	3	**24**	**21**	Northern forest, mountain top	important to north, watchlist
Wood Thrush	4	5	**24**	4	2	**21**	5	5	**24**	**20**	Hardwood forest	watchlist
Blue-winged Warbler	5	5	**26**	3	2	**20**	2	3	**20**	**19**	Shrub	
Golden-winged Warbler	2	4	**26**	3	2	**25**	2	3	**25**	**25**	Shrub	watchlist
Black-throated Blue Warbler	2	3	**22**	2	3	**21**	3	2	**21**	**20**	Northern hardwood	high scores in all, important to north, watchlist
Prairie Warbler	3	5	**23**	2	2	**19**	2	3	**20**	**20**	Shrub	watchlist
Cerulean Warbler	2	3	**24**	2	3	**25**				**25**	Swamp/hardwood	high scores, inc in region, watchlist
Prothonotary Warbler	2	3	**21**	2	3	**21**				**21**	Swamp/hardwood	high enough scores, low AI, watchlist
Worm-eating Warbler	3	3	**24**	4	3	**25**				**21**	Hardwood	watchlist
Louisiana Waterthrush	4	3	**23**	4	1	**20**	3	2	**20**	**19**	Hardwood	
Kentucky Warbler	2	3	**21**	2	3	**21**				**19**	Hardwood/shrub	high enough scores low AI, watchlist

Comments:

Bicknell's Thrush and Black-throated Blue Warbler will be priorities in the northern portion of the ecoregion.
Prothonotary Warbler and Kentucky Warbler will be priorities to the south.
Dickcissel, Henslow's Sparrow, and Bobolink, although not appearing on this list because of low population sizes, should be considered a management priority when they occur at priority sites.
DC/MD nominated loggerhead shrike. The loggerhead shrike has a global PIF score is 17. The cutoff criteria for this bird list as 19.

Lower New England\Northern Piedmont

Viable Community Occurrences Grouped by Subregion

Subregion	***So NE Plains***			**Totals**		***NE LNE Plains***		**Totals**		***Hudson River***			**Totals**		***No. Piedmont***				**Total**		***Mountain and Highlands***					**Total**	**GOAL**	**SELECTED**
	221Ae	221Af	221Ag			221Ai	221Al			221Ba	221Bb	221Bc			221Da	221Db	221Dc				M212Bb	M212Bc	M212Bd	M212Cb	M212Cc			
bogs and acidic fens																												
acidic dwarf shrub bog	2		6	**8**		5	4	**9**			2		**2**								1		1	4		**6**		
acidic dwarf shrub bog: northern							3	**3**															1			**1**		
Black spruce -tamarack bog																								1		**1**		
fen: acidic	8		4	**12**		2	7	**9**																3	2	**5**		
PP bog																												
																											50	56
Calcareous fen																												
fen: calcareous	11			**11**						4	2		**6**											2		**2**		
fen:neutral	2		1	**3**																				1		**1**		
																											213	23
Cliff/outcrop																												
cliff:acidic:low-mid elev.	1			**6**						1			**1**											1		**1**		
cliff:calc:high elev.																						2		1		**3**		
cliff:calc:low-mid elev.	1			**6**						1	2	7	**10**								1			1		**2**		
cliff:neutral:low-mid elev.																						1				**1**		
riverside outcrop & bluff							1	**1**								1			**1**		1	2				**3**		
traprock outcrop															1		1		**2**									
outcrop: calc: verylow to mid elev							1	**1**			1	2	**3**											3		**3**		
outcrop:acidic:low-mid							2	**2**																3	1	**4**		
outcrop:shale, low to mid elev															1				**1**									
open talus			1	**1**								1	**1**															
talus:neutral:north																												
talus:neutral:south																						2				**2**		
talus:acidic	4		1	**5**																	2			1		**3**		
talus:acidic/subacidic	1	1	1	**3**																								
																											25	66
Deciduous or mixed woodland																												
PP-heath outwash woodlands							1	**1**																				
PP-SO outwash woodlands			2	**2**			7	**7**				1	**1**															
PP-SO rocky summit	4			**4**						2		1	**3**								1			2		**3**		
																											28	21
Floodplain forest and woodland																												
Floodplain forest		4		**4**		3	2	**5**													2	1	3		1	**7**		
																											124	16
Marsh and wet meadow																												
marsh	1	1		**2**		3	1	**4**				2	**2**															
																											24	8
Other																												
cave										1			**1**															
																												1
Palustrine forest and woodland																												
hemlock hardwood swamp	2			**2**																								
Hemlock swamp											1		**1**												1	**1**		
Red maple-NWC swamp																								1		**1**		
red maple-tamarack calc peat swamp											2	1	**3**															
Black gum-redmaple swamp						2		**2**													1					**1**		
Black spruce swamp																												
NWC conifer swamp											1		**1**															
seepage forest																						2				**2**		
seepage swamp: acidic	1			**1**		1	2	**3**																				
seepage swamp: calc/neutral	7			**7**						2			**2**								2			2		**4**		
shrub swamp		1		**1**			1	**1**				2																
Spruce swamp																								3	1	**4**		
swamp: acidic			3	**3**		5	1	**6**																				
swamp: alluvial		1	1	**2**								1											1			**1**		
swamp:acidic																												
																											308	47
Pond and lake																												
pond											1		**1**									2				**2**		
pond: alkaline	1			**1**								1	**1**															
pond: vernal												2	**2**															
Lake/lakeshore							1	**1**																				
pondshore: calcareous																												
pondshore:acidic						4	5	**9**														1				**1**		
																											40	18
Ridgetop/rocky summit																												
summit: acid, high elev																						2				**2**		
summit: acid, low to mid			1	**1**		3	3	**6**		1											3	1		3		**7**		
summit: calc, high elev																						1				**1**		

summit: subacidic: verylow to low	3	4	1	**8**																								
summit:calc:low-mid elev	2			**2**																								
																											74	28
River and Stream																												
stream: high gradient																												
riverscour bank																												
rivershore grassland																						1			1	**2**		
rivershore: coarse sed						2	9	**11**																				
rivershore: cobble																									3	**3**		
riverside seep																					2					**2**		
seep:neutral																						2				**2**		
																											74	20
Sandplains																												
inland dune							1	**1**																				
sand barren																												
marine beach/shore	1			**1**			2	**2**																				
																											122	4
Serpentine barrens																												
serpentine barren																3			**3**									
																											43	3
Terrestrial conifer forest																												
forest: hemlock																1			**1**									
forest: conifer																												
forest: spruce-fir																						1				**1**		
red pine woodland											2		**2**								1	3		1	1	**6**		
talus:calcareous?										1	1	6																
																											27	10
Terrestrial deciduous forest																												
forest: chestnut oak										1			**1**															
forest: northern hardwood																						1				**1**		
forest: oak	1			**1**		3	4	**7**			5		**5**								3	1		1		**5**		
forest: oak-hickory	1			**1**							3	3	**6**											1		**1**		
forest: oak-hickory: calc	3			**1**		5		**5**		2			**2**															
forest: oak-maple							4	**4**			1		**1**									2	1			**3**		
woodland: calcareous										1		1																
forest: lake plain						1		**1**				1	**1**								1					**1**		
forest: cove	2			**2**		2	1	**3**								2			**3**		4	11		1		**16**		
																											105	71
Terrestrial mixed forest																												
forest: oak-pine																												
forest: pine-hardwood																								1		**1**		
forest: spruce-hardwood																								1		**1**		
																											48	2
Tidal																												
marsh:tidal, brackish	3		1	**4**						1			**1**															
marsh:tidal, fresh	1	1	1	**3**						3		8	**11**															
mudflat:tidal	3		1	**4**						3		8	**11**															
shore: intertidal										2		4	**6**															
swamp: tidal, fresh										2		4																
																											33	40
	70	13	28			44	64			28	24	56			2	7	1				25	40	8	38	11			

Community associations for LNE arranged by group type, subregion, and subsection, with distribution and goals

							No. Piedmont			Reading Prong	Hudson River			So. NE Plains			NE. LNE Plains			Mountain and Highlands				
LNP Major Group	LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc	221Am	221Ba	221Bc	221Bb	221Ae	221Af	221Ag	221Ah	221Ai	221Al	M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Bogs & Acidic Fens		SP	L	13	CEGL006008	Leatherleaf - (Dwarf Huckleberry)- Water Willow / Virginia Chain-fern Dwarf-shrubland	0	0			2	1	2	2	2	2	2	2	2	2	2	2	2	2
Bogs & Acidic Fens		SP	L/W	13	CEGL006394																			
Bogs & Acidic Fens		SP	W	6	CEGL006190	Highbush Blueberry / Peatmoss species Shrubland																		
Bogs & Acidic Fens		SP	W	6	CEGL006302	Leatherleaf / Slender Sedge - Bladderwort species Shrub Herbaceous Vegetation							1							2				
Bogs & Acidic Fens		SP	W	6	CEGL006164	(Smooth Alder, Speckled Alder) / Cinnamon Fern - Peatmoss species Shrubland																		
Bogs & Acidic Fens		SP?	W	6	CEGL006225	Sheep laurel - leatherleaf - (black spruce) / lichen Dwarf-shrubland	0	0	0	0	1	1	2	1	0	1	1	1	2	2	1	0	1	1
Calcareous Fen		SP	L	13	CEGL006356	Shrubby cinquefoil / Limestone beaksedge - Savanna nutrush Shrub Herbaceous Vegetation																		
Calcareous Fen		SP	L/R	25	CEGL006103	Bayberry - Shrubby cinquefoil / Sterile sedge - Yellow sedge Shrub Herbaceous Vegetation	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Calcareous Fen		SP	L?	13	CEGL006160	Sweet gale / Woolly-fruit sedge - Ontario lobelia - Alpine cottongrass Shrub Herbaceous Vegetation																		
Calcareous Fen		SP	R	25	CEGL006101	TUFTED HAIRGRASS - SKUNK CABBAGE HERBACEOUS VEGETATION			0	1	1			1										
Calcareous Fen		SP	R	25	CEGL006357	Eastern red cedar / Shrubby cinquefoil / Yellow sedge - Rigid sedge Shrub Herbaceous Vegetation																		
Calcareous Fen		SP	R?	25	CEGL006326	SHRUBBY CINQUEFOIL / STERILE SEDGE - PORCUPINE SEDGE - YELLOW SEDGE SHRUB HERBACEOUS VEGETATION	0	0	0	0														
Calcareous Fen		SP	R?	25	CEGL006359	Silky dogwood - Hoary willow / Shrubby cinquefoil / Tussock sedge Shrubland					2			2										
Calcareous Fen		SP	R?	25	CEGL006123	DOGWOOD / SEDGES SHRUB HERBACEOUS VEGETATION							1	2						1				
Calcareous Fen		SP	R?	25	CEGL006360	Swamp birch - Poison sumac - Shrubby cinquefoil Shrubland					2	1	2	2						1				
Calcareous Fen		SP	W	6	CEGL006142	Sticky Bog-asphodel - Elk Sedge Herbaceous Vegetation																		
Calcareous Fen		SP	W	6	CEGL006068	Sweet Gale - Shrubby Cinquefoil / Woolly-fruit Sedge - Sawgrass Shrub Herbaceous Vegetation					2		1	2						1				
Cliff/Outcrop		SP	R/L	25	CEGL006104	SERPENTINE MAIDENHAIR FERN - SPLEENWORT - FIELD CHICKWEED SPARSE VEGETATION																		
Deciduous or Mixed Woodland		LP/SP	L/W	9	CEGL006166	Pitch Pine - (Scarlet Oak, Black Oak) / Little Bluestem Woodland								2	2	2	1	2	1	2	1	1	1	1
Deciduous or Mixed Woodland		SP	W	6	CEGL005058	AMERICAN BASSWOOD - WHITE ASH - (SUGAR MAPLE) / GERANIUM SP. WOODLAND																		
Deciduous or Mixed Woodland		SP/LP	L	13	CEGL006320	Red Oak / Eastern Rockcap Fern Woodland	0	0	0		2	0	0	2	2	2	1	2	2	2	1	1	2	2
Floodplain Forest & Woodland		SP	?	0:00	CEGL006001	Silver Maple - American Elm / Sensitive Fern Forest																		
Floodplain Forest & Woodland		SP	?©	0:00	CEGL006042	Silver Maple - American Elm / Eastern Ninebark Forest																		
Floodplain Forest & Woodland		SP	L/R©	25	CEGL006386	Swamp White Oak - Red Maple / Musclewood Forest																		
Floodplain Forest & Woodland		SP	L/W	13	CEGL006114	Sugar Maple / Eastern Waterleaf - Jumpseed Forest																		
Floodplain Forest & Woodland		SP	P	3	CEGL006405	American Basswood - Sugar Maple - Black Maple / Wood Nettle Forest																		

Lower New England\Northern Piedmont

Community Associations arranged by group type, subregion, and subsection with distribution and goals

LNP Major Group	LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc		221Am		221Ba	221Bc	221Bb		221Ae	221Af	221Ag		221Ah	221Ai	221Al		M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Floodplain Forest & Woodland		SP	R?©	25	CEGL006185	Pin Oak - Red Maple / Gray's Sedge - Canada Avens Forest																							
Floodplain Forest & Woodland		SP	W	6	CEGL006176	Silver Maple / False-nettle Forest																							
Floodplain Forest & Woodland		SP/LP	W	6	CEGL006147	Silver Maple - Cottonwood / Ostrich Fern Forest																							
Floodplain Forest & Woodland		SP/LP	W?	6	CEGL006036	Sycamore - Green Ash Forest																							
Floodplain Forest & Woodland		SP?	L	13	CEGL006184	River Birch - Sycamore / Yellow Jewelweed Forest																							
Marsh & Wet Meadow		SP	W	6	CEGL006275	(Softstem Bulrush, Hardstem Bulrush) Eastern Herbaceous Vegetation																							
Marsh & Wet Meadow		SP	W	6	CEGL005174	Canada Reedgrass Eastern Herbaceous Vegetation							1	1	2		1	2	2		2	2	2		2		2	2	2
Marsh & Wet Meadow		SP/LP	W	6	CEGL006153	(Narrowleaf Cattail, Common Cattail) - (Bulrush species) Eastern Herbaceous Vegetation							1	1	2		1								2				
Marsh &Wet Meadow		SP	W	6	CEGL004121	Tussock Sedge Seasonally Flooded Herbaceous Vegetation	2	1					1	1	2		2	1	2		1	1			2	1		1	
Other		SP	W	6	CEGL006193	Golden-saxifrage Herbaceous Vegetation																							
Palustrine Forest & Woodland		LP	L	9	CEGL006189	Atlantic White Cedar / Winterberry Forest	0	0	0		0																		
Palustrine Forest & Woodland		LP	L	9	CEGL006396	Red Maple - (Atlantic White Cedar) / Great Rhododendron Forest	0	0	0		0														0	0	0	0	0
Palustrine Forest & Woodland		LP	L	9	CEGL006207	Atlantic White Cedar - Red Maple Lower New England, Northern Piedmont Forest																							
Palustrine Forest & Woodland		LP	L?	9	CEGL006156	Red Maple - Black Gum / Swamp Azalea - Sweet Pepperbush Forest		2	2		2			0	1		2	2	2		1	2	1		2	1	0	1	0
Palustrine Forest & Woodland		LP	P	3	CEGL006188	Atlantic White Cedar / Inkberry Forest	0	0	0		0		0						1			1			0	0	0	0	0
Palustrine Forest & Woodland		LP	W	5	CEGL006226	Eastern Hemlock - Yellow Birch / Winterberry / Peatmoss spp. Forest																							
Palustrine Forest & Woodland		LP?	L/W	9	CEGL006406	Red Maple - Green Ash, White Ash / Spicebush / Skunk Cabbage Forest		2	2		0		2				2		2										
Palustrine Forest & Woodland		SP	?©	0:00	CEGL006380	Eastern Hemlock - Red Maple - Yellow Birch / Cinnamon Fern Forest																							
Palustrine Forest & Woodland		SP	L	13	CEGL006395	Red maple \ speckled alder - winterberry / royal fern Woodland	0	0	0		0																		
Palustrine Forest & Woodland		SP	L	13	CEGL006364	Atlantic White Cedar - Acer rubrum / Highbush Blueberry / Marsh St. Johnswort Forest																							
Palustrine Forest & Woodland		SP	L	13	CEGL006363	Atlantic White Cedar - Red Spruce / Black Huckleberry / Creeping Snowberry Forest																							
Palustrine Forest & Woodland		SP	L	13	CEGL006321	Atlantic White Cedar / Leatherleaf Woodland											1	1	2		1	2							
Palustrine Forest & Woodland		SP	L	13	CEGL006312	Red Spruce - Balsam Fir / Creeping Teaberry / Peatmoss spp. Forest															2	2	1						
Palustrine Forest & Woodland		SP	L	13	CEGL006311	Red Spruce - Balsam Fir / Magellan Peatmoss Forest																							
Palustrine Forest & Woodland		SP	L/W	5	CEGL006118	Red Maple - Tamarack / Alderleaf Buckthorn Woodland																							
Palustrine Forest & Woodland		SP	L?	13	CEGL006220	Black Ash - Red Maple / Mountain Holly - Highbush Blueberry Forest									2		1	2			1	2	2		2	2	0	2	2
Palustrine Forest & Woodland		SP	L?	13	CEGL006240	Pin Oak - Red Maple / Cinnamon Fern Forest																							

LNP Major Group	LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc	221Am	221Ba	221Bc	221Bb	221Ae	221Af	221Ag	221Ah	221Ai	221Al	M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Palustrine Forest & Woodland		SP	L©	13	CEGL006194	Pitch Pine / Leatherleaf / Peatmoss species Forest	0	0	0	0	0		0	1	1	1	1	1	1	0	0	1	1	1
Palustrine Forest & Woodland		SP	P	3	CEGL006279	Eastern Hemlock / Great Rhododendron / Peatmoss spp. Forest	0	0	1	0	2	0	0	2										
Palustrine Forest & Woodland		SP	P	3	CEGL006110	Sweetgum - Red Maple - Willow Oak / Swamp Fetterbush Forest																		
Palustrine Forest & Woodland		SP	P	3	CEGL006238	Red Maple - Blackgum - Sweetbay Forest																		
Palustrine Forest & Woodland		SP	W	6	CEGL006168	Black Spruce - Larch / Sheep laurel / Sphagnum Forest	0	0	0	0				2		2								
Palustrine Forest & Woodland		SP	W	6	CEGL006241	Swamp White Oak / Highbush Blueberry / Stalkgrain Sedge Forest																		
Palustrine Forest & Woodland		SP	W	6	CEGL006014	Red Maple - Black Gum - Yellow Birch / Sphagnum Forest					0			2	1	1	2	1	1	1	1	2	1	1
Palustrine Forest & Woodland		SP	W?	6	CEGL006007	Northern White Cedar / Stairstep Moss Forest																		
Palustrine Forest & Woodland		SP/LP	L	13	CEGL006355	Atlantic White Cedar / Great Laurel Forest	0	0	1	0				2										
Palustrine Forest & Woodland		SP/LP	L	13	CEGL006078	Atlantic White Cedar - Red Maple - Sweet Bay Forest																		
Palustrine Forest & Woodland		SP/LP	L/W	13	CEGL006198	Red Spruce - Red Maple / Mountain Holly Forest	0	0	0	0				2	0	1	1	2	2	2	2	0	2	2
Palustrine Forest & Woodland		SP/LP	W	6	CEGL006009	Black Ash - Red Maple - (Tamarack) / American Alder-buckthorn Forest					2	1	1	2	2		1	1	1	1	1		1	1
Palustrine Forest & Woodland		SP/LP	W	6	CEGL006119	Red Maple / Tussock Sedge - Sensitive Fern Woodland																		
Palustrine Forest & Woodland		SP/LP	W	6	CEGL002482	WHITE PINE - (RED MAPLE) / ROYAL FERN SPP. FOREST																		
Palustrine Forest & Woodland		SP?	L/P	0:00	CEGL007441	Black Ash - Red Maple Saturated Forest																		
Palustrine Forest & Woodland		SP?	L/P	0:00	CEGL006199	Northern White Cedar - Red Maple / Red-Osier Dogwood Forest																		
**more than one group (Shrub Swamp, Bog & Acidic Fen)		SP	W	6	CEGL003908	Buttonbush Semipermanently Flooded Shrubland					2	1	2	2	2	2	2	2	2	2		2	2	2
Pond & Lake		SP	L	13	CEGL006243	Canary Reedgrass - Matting Rosette Grass Herbaceous Vegetation	0	0	0	0														
Pond & Lake		SP	L/P	0:00	CEGL006300	Virginia Meadowbeauty - Crotalaria Herbaceous Vegetation	0	0	0	0	0									0	0	0		
Pond & Lake		SP	L/P	0:00	CEGL006086	White Waterlily - Robbins Spikerush Herbaceous Vegetation																		
Pond & Lake		SP	L/P	0:00	CEGL006035	Swamp-candles - Threeway Sedge Herbaceous Vegetation																		
Pond & Lake		SP	P	6	CEGL006261	(Blunt Spikerush, Yellow Spikerush) - Seven-angle Pipewort Herbaceous Vegetation																		
Pond & Lake		SP	W	6	CEGL004291	Pickerelweed - Green Arrow-arum Semipermanently Flooded Herbaceous Vegetation					1	1	1	1						1				
Ridgetop/ Rocky Summit		LP	W	5	CEGL006116	Pitch pine / Black chokeberry woodland					2	2	2	2	2	2	1	2	1	2	0	2	2	0
Ridgetop/ Rocky Summit		SP	?©	0:00	CEGL006180	Eastern Red-cedar - Hop Hornbeam / Bristleleaf Sedge Woodland																		
Ridgetop/ Rocky Summit		SP	L	13	CEGL006047	Eastern Red-cedar - Hop Hornbeam / Sideoats Grama Wooded Herbaceous Vegetation																		
Ridgetop/ Rocky Summit		SP	L©	13	CEGL006002	Eastern Redcedar - White Ash / Northern Oatgrass / Canada Bluegrass Woodland			0		0	0	0	2	2	0	0							

Lower New England\Northern Piedmont

Community Associations arranged by group type, subregion, and subsection with distribution and goals

LNP Major Group	LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc	221Am	221Ba	221Bc	221Bb	221Ae	221Af	221Ag	221Ah	221Ai	221Al	M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Ridgetop/ Rocky Summit		SP	P	3	CEGL006093	Northern White Cedar / Prairie Goldenrod Woodland	0	0	0	0	0				0	0	0							
Ridgetop/ Rocky Summit		SP	P	3	CEGL006053	Red Spruce / Northern Lowbush Blueberry - Mountain-cinquefoil Woodland																		
Ridgetop/ Rocky Summit		SP	P/0	3	CEGL004996	(Table Mountain Pine, Pitch Pine) / Bear Oak / Black Huckleberry Woodland																		
Ridgetop/ Rocky Summit		SP	P?	3	CEGL006298	ALPINE BLUEBERRY DWARF-SHRUBLAND	0	0	0	0					0	0	0					0		
Ridgetop/ Rocky Summit		SP	W	6	CEGL005094	LOW SWEET BLUEBERRY DWARF-SHRUBLAND	0	0	0	0				1	0	0	1	1	2	2	2	0	2	2
Ridgetop/ Rocky Summit		SP	W	6	CEGL005101	WHITE PINE - RED OAK / POVERTY GRASS ACID BEDROCK HERBACEOUS VEGETATION																		
Ridgetop/ Rocky Summit		SP/LP	W	6	CEGL006134	Red Oak - Rock Chestnut Oak / Blueberry species / Wavy Hairgrass Woodland					2	2	2	2	2	0	1	2	0	2	0	1	2	0
River & Stream		SP	P/W	3	CEGL006283	Big Bluestem - Panicgrass - Tall Blue Wild Indigo Herbaceous Vegetation																		
River & Stream		SP	R	25	CEGL004284	MOSS PHLOX - STICKY GOLDENROD - BALSAM RAGWORT HERBACEOUS VEGETATION	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River & Stream		SP	R	25	CEGL006284	Big Bluestem - Bellflower - Sticky Goldenrod Herbaceous Vegetation																		
River & Stream		SP	W	6	CEGL004286	Common Water-willow Herbaceous Vegetation	2	2		1			0		0	0	0	0	0	0	0	0	0	0
River & Stream		SP	W	6	CEGL004331	Riverweed Herbaceous Vegetation	1	2	1	2				2	2	2	1	2	1			2	1	1
River & Stream		SP	W	6	CEGL006196	American Eelgrass - Clasping-leaf Pondweed Herbaceous Vegetation					2	2	0	2	2	2	1	1	1	1		1	1	1
River & Stream		SP	W	6	CEGL003901	Black Willow Temporarily Flooded Shrubland								2	2	1								
Sandplains		LP	L	9	CEGL006025	Pitch Pine / Scrub Oak / Roundhead Bushclover Woodland						2			2									
Sandplains		SP	L	13	CEGL005046	PITCH PINE / BLUEBERRY SPP. - HUCKLEBERRY WOODLAND	0	0	0	0	0		0	0	2	2	2	1	1	0	0	2	1	
Sandplains		SP	R	25	CEGL006276	Grey Birch / Little Buestem / Stiff Aster Sparse Vegetation	0	0	0	0	0	0	0					1	1	0	0		1	
Sandplains		SP	R	25	CEGL006232	BEACH HEATHER - SILVERLING DWARF-SHRUBLAND	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0
Sandplains		SP	R	25	CEGL006004	White Pine - Grey Birch / Sweetfern / Little Bluestem Woodland	0	0	0	0	0	0	0	0			0	1	1	0	0	1	1	0
Sandplains		SP	R©	25	CEGL006391	Pitch pine - beach heather - golden aster Sparse Vegetation	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0
Sandplains		SP?	L	13	CEGL006203	Pitch Pine / Scrub Oak / Ricegrass Woodland	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	1	
**2 groups(Sandplain & Ridgetop)		SP	W	6	CEGL003883	Bear Oak Shrubland					1	2	1	2	2	0	0	2	2	2	2	0	0	0
Serpentine Barren		LP?	R	18	CEGL006159	Pitch Pine / Little Bluestem - Papillose Nutrush Wooded Herbaceous Vegetation																		
Serpentine Barren		SP	R(s)	25	CEGL006266	Virginia Pine / Blackjack Oak Forest (successional)	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terrestrial Conifer Forest		LP	L	9	CEGL006128	Red Spruce - Balsam Fir - American Mountain-Ash Forest	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	1	1
Terrestrial Conifer Forest		LP	P	3	CEGL006259	Eastern White Pine - Red Pine - Pitch Pine Forest	0	0	0	0														
Terrestrial Conifer Forest		LP?	P	3	CEGL006273	Red Spruce - Balsam Fir - Paper Birch Forest														2		0		
Terrestrial Conifer Forest		M	L	*	CEGL006328	White Pine - Hemlock Lower New England, Northern Piedmont Forest	0	0	0	0	0	1	2	2	2	0	1	2	2	2	2	2	2	2
Terrestrial Conifer Forest		SP	P	3	CEGL007119	Virginia Pine - (Pitch Pine, Shortleaf Pine) - (Rock Chestnut Oak) / Hillside Blueberry Forest			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terrestrial Conifer Forest		SP	P	3	CEGL006253	Eastern White Pine - Red Pine / Canada Bunchberry Forest								2	1									
Terrestrial Conifer Forest		SP	P	3	CEGL006324	Eastern White Pine - Eastern Hemlock - Red Spruce Forest																		

Lower New England\Northern Piedmont

Community Associations arranged by group type, subregion, and subsection with distribution and goals

LNP Major Group / LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc		221Am		221Ba	221Bc	221Bb		221Ae	221Af	221Ag		221Ah	221Ai	221Al		M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Terrestrial Deciduous Forest	?	P	3	CEGL006237	Sugar Maple - White Ash - American Basswood - Cucumber-tree / Common Black-cohosh Forest			0				0	0	0		0	0	0		0	0	0		0		0	0	0
Terrestrial Deciduous Forest	LP	L	9	CEGL006088	Eastern Hemlock - American Beech Forest																							
Terrestrial Deciduous Forest	LP	L	9	CEGL006236	(Pignut Hickory, Shagbark Hickory) - White Ash - Oak species Central Appalachian Forest											1	2				2	0		2	2	2	2	0
Terrestrial Deciduous Forest	LP	P	3	CEGL006374	Black Oak - Scarlet Oak - Chestnut Oak / Mountain Laurel Forest	0	0											2		2	2							
Terrestrial Deciduous Forest	LP	W	5	CEGL002464	PAPER BIRCH / SUGAR MAPLE - MIXED HARDWOODS FOREST	0	0	0		0		0				0	0	0			2	2		2		2	1	2
Terrestrial Deciduous Forest	LP	W	5	CEGL005008	Sugar Maple - Ash species - American Basswood / Sweet Cicely - Blue Cohosh Forest	0	0	0		0		2	2	2		2	2	1		1	1	1		2	2	2	1	1
Terrestrial Deciduous Forest	LP/M	L	9	CEGL006301	Pignut Hickory, Shagbark Hickory - Hop-hornbeam / Pennsylvania Sedge Forest		1	2		1		2	2	2		2	2	2		2	2			2	2	2	2	
Terrestrial Deciduous Forest	M	L	*	CEGL006375	Scarlet Oak - Black Oak / Sassafras / hillside Blueberry Forest											0	2	2			1	0		0	0	0	0	0
Terrestrial Deciduous Forest	M	L?	*	CEGL006336	White Oak, Red Oak, Black Oak / Flowering Dogwood / Maple-leaved Viburnum Forest	2	2	2		2		2	2	2		2	2	2		2	2	0		2	2	0	2	0
Terrestrial Deciduous Forest	M	L?	*	CEGL006173	Red Oak - Sugar Maple - American Beech / Mapleleaf Arrow-wood Forest	0	0					0	2	2		2	2	2		2	2	0		2	2	2	2	0
Terrestrial Deciduous Forest	M	W	*	CEGL006252	Sugar Maple - Yellow Birch - Beech / Hobblebush Forest	0	0	0		0		2	2	2		2	2	2		2	2	2		2	2	2	2	2
Terrestrial Deciduous Forest	M	W	*	CEGL006125	Northern Red Oak - Sugar Maple - Tuliptree Forest	1	2	2		2		2	0	1		2	0	0		0	0	0		0	0	0	0	0
Terrestrial Deciduous Forest	M	W	*	CEGL006282	(Rock Chestnut Oak, Black Oak) / Black Huckleberry Forest	1	2	2		2		2	2	2		2	2	2		2				2	2	1		
Terrestrial Deciduous Forest	SP	?©	0:00	CEGL006000	Red Oak - Yellow Birch / Cinnamon Fern Forest																							
Terrestrial Deciduous Forest	SP	W	6	CEGL006201	Sugar Maple - Tuliptree - White Ash / Bladdernut Forest	1	1			1																		
Terrestrial Deciduous Forest	SP	W	6	CEGL005010	SUGAR MAPLE - CHINQUAPIN OAK FOREST																							
Terrestrial Deciduous Forest	SP?	L?	13	CEGL006020	Sugar Maple - White Ash - Butternut / Bladdernut Forest			1				1				2	2	2		1	1	1		1	1	1	1	1
Terrestrial Deciduous Forest	SP?	W©	6	CEGL006017	Sugar Maple - Chinquapin Oak / Redbud Forest																							
Terrestrial Mixed Forest	LP	L	9	CEGL006129	Eastern Hemlock - Yellow Birch - Red Spruce / Canada Bunchberry Forest	0	0	0		0		0	0	1			0	0		1	1	1		2	2	1	1	2
Terrestrial Mixed Forest	LP	L	9	CEGL006267	Red Spruce - Yellow Birch / Woodfern Forest																			2				
Terrestrial Mixed Forest	LP/M	W	5	CEGL006109	Eastern Hemlock - Yellow Birch Lower New England, Northern Piedmont Forest	2	2	1		2		2	1	2		2	2	2		2				2	2	2	2	2
Terrestrial Mixed Forest	M	W	*	CEGL006293	White Pine - Red Oak, Black Oak - American Beech Forest	0	0	0		0				1		2	1	2		2	2	2		2	2	2	2	2
Terrestrial Mixed Forest	M	W?	*	CEGL006290	Pitch Pine - (Black Oak, Rock Chestnut Oak) Lower New England, Northern Piedmont Forest	0	1	0		1						1	2	2		1	2	2				0	0	0
Terrestrial Mixed Forest	SP	P	3	CEGL006206	EASTERN HEMLOCK - YELLOW BIRCH - BLACK CHERRY / GREAT RHODODENDRON FOREST			1		1		1				1	0	0		0	0	0		0	0	0	0	0
Terrestrial Mixed Forest	SP	P/0©	3	CEGL006383	Pitch Pine - (Shortleaf Pine) / (Blackjack Oak, Scrub Oak) / Hillside Blueberry Woodland																							
Terrestrial Mixed Forest	SP/LP	L	13	CEGL006381	Pitch Pine - Scarlet Oak / Bayberry Forest											1	1	1						2				

Lower New England\Northern Piedmont

Community Associations arranged by group type, subregion, and subsection with distribution and goals

LNP Major Group	LNP Sub-Group	LNP Scale	LNP Distr	GOAL	ElCode	GnameTrans	221Db	221Da	221Dc		221Am		221Ba	221Bc	221Bb		221Ae	221Af	221Ag		221Ah	221Ai	221Al		M212Cb	M212Cc	M212Bb	M212Bd	M212Bc
Tidal		SP	P	3	CEGL006337	(SPECKLED ALDER, SMOOTH ALDER) - SILKY DOGWOOD SHRUBLAND											1	2											
Tidal		SP	P/0	3	CEGL006150	Switchgrass Tidal Herbaceous Vegetation																							
Tidal		SP	P/W	3	CEGL006325	Mixed Forbs (High Marsh) Tidal Herbaceous Vegetation																							
Tidal		SP	P/W	3	CEGL004472	Broadleaf Pondlily Tidal Herbaceous Vegetation							2	2	0		1								0				
Tidal		SP	P?	3	CEGL006165	Red Maple - Green Ash / Smartweed species Woodland																							
Tidal		SP	W	6	CEGL004202	Wild Rice Tidal Herbaceous Vegetation							2	2	0		1								0				
Tidal		SP	W	6	CEGL006352	Estuary Pipewort - Dotted Smartweed Herbaceous Vegetation																							
Tidal		SP	W	6	CEGL006080	Water-hemp Tidal Herbaceous Vegetation											1		2			2							

Patch type: M= matrix; LP=large patch; SP=small patch; **Rangewide distribution**: R= Restricted; L= Limited; W= Widespread; P= Peripheral. **Subsection distribution:** 2= known to occur; 1= probably occurs; 0= does not occur. Blank field = No Information.

Appendix 4. **Lower New England\Northern Piedmont**

Matrix Forest Associations within Tier 1 Preferred Sites; preliminary analysis

General Forest Type	**Matrix Forest Associations**	**No.of potential matrix sites characteristic of these types**	**No. of Tier 1 Preferred Sites chosen for the Portfolio**
Central Hardwoods		19	12
	Scarlet Oak - Black Oak - Sassafras Forest		
	Mixed Oak - Flowering Dogwood Forest		
	Chestnut Oak - Mixed Oak Forest		
	Hemlock - Northern Hardwoods Forest		
	Red Oak - Sugar Maple - Tulip Tree Forest		
	Sugar Maple - Yellow Birch - Beech Forest		
	Pitch Pine - Oak Forest		
	White Pine - Hemlock Forest		
	Black Oak - White Oak Forest		
Transitional Hardwoods		38	15
	Red Oak - Sugar Maple Forest		
	Red Oak - White Pine Forest		
	Chestnut Oak - Black Oak Forest		
	Hemlock - Northern Hardwoods Forest		
	Sugar Maple - Yellow Birch - Beech Forest		
	Pitch Pine - Oak Forest		
	Hickory - Ostraya - Sedge Forest		
	White Pine - Hemlock Forest		
	Mixed Oak - Flowering Dogwood Forest		
	Scarlet Oak - Black Oak - Sassafras Forest		
Northern Hardwoods		32	13
	Red Oak - Sugar Maple - Tulip Tree Forest		
	White Pine - Northern Hardwood Forest		
	Hemlock - Northern Hardwoods Forest		
	Sugar Maple - Yellow Birch - Beech Forest		
	Chestnut Oak - Black Oak - huckleberry Forest		
	Pitch Pine - Oak Forest		
	Hickory - Ostraya - Sedge Forest		
	White Pine - Hemlock Forest		
	Mixed Oak - Flowering Dogwood Forest		
	Scarlet Oak - Black Oak - Sassafras Forest		
"Outliers"		4	2
	Blocks largely consisting of water		

Appendix 5

Lower New England\Northern Piedmont
Ecological Land Unit Gap Analysis Summary

ELUs Present in LNE = 371
ELUS Represented in Tier 1 Matrix Sites = 335
ELUS Represented in 10yr Action Matrix Sites = 294
ELUS Represented in the Portfolio = 344
ELUS Represented in the 10Yr Action Portfolio = 311

% ELUS Represented in Tier 1 Matrix Sites = 90.30
% ELUS Represented in 10yr Action Matrix Sites = 79.25
% ELUS Represented in the Portfolio = 92.72
% ELUS Represented in the 10Yr Action Portfolio = 83.83

Ecological Land Unit Detailed Summary: Percent and Acreage of ELU Groups within Portfolio Sites

Summarized ELU Groups	% of LNE	Acres in LNE	% of Tier 1 that is in this ELU Group	Acres of this ELU Group that is in Tier 1	% of Matrix 10yr Action that is in this ELU Group	Acres of ELU Group that is in Matrix 10 yr Action	% of Portfolio that is in this ELU Group	Acres of this ELU Group that is in the Portfolio	% of Portfolio 10yr action that is in this ELU Group	Acres of this ELU Group that is in the Portfolio 10yr Action
Cliff, Upperslope, Summit	**2.56**	**596783**	**6.33**	**134506**	**6.53**	**82039**	**5.95**	**160026**	**6.00**	**87399**
Sideslope or Coves - on Acidic Granitic/Mafic	5.14	1195390	13.26	281932	10.74	134858	11.88	319360	9.71	141489
Sideslope or Coves - on Acidic Sed/Metased	5.56	1294011	11.67	248068	12.29	154351	10.46	281245	11.26	164201
Sideslope or Coves - on Acidic Shale	0.57	133063	0.42	8996	0.41	5185	0.49	13284	0.40	5783
Sideslope or Coves - on Calcareous/mod Calcareous	1.72	400897	2.54	54044	3.42	42943	2.74	73623	3.46	50398
Sideslope or Coves - on Coarse Sedimentary	0.00	461	0.00		0.00		0.00	75	0.00	
Sideslope or Coves - on Ultramafic	0.02	4095	0.02	377	0.00		0.03	754	0.02	356
Sideslopes or Coves Total:	**13.01**	**3027918**	**27.91**	**593417**	**26.87**	**337337**	**25.61**	**688340**	**24.85**	**362226**
Gently Sloping Flat - on Acidic Granitic/Mafic	9.59	2231315	10.82	230074	9.73	122159	10.03	269673	9.10	132643
Gently Sloping Flat - on Acidic Sed/Metased	11.17	2599203	10.18	216377	11.73	147242	9.35	251259	10.81	157557
Gently Sloping Flat - on Acidic Shale	1.81	420562	0.93	19863	0.51	6382	0.97	26118	0.65	9507
Gently Sloping Flat - on Acidic Shale on Ultramafic	0.07	16088	0.02	504	0.01	109	0.18	4842	0.17	2406
Gently Sloping Flat - on Calcareous/Mod Calcareous	3.13	727463	2.31	49114	2.82	35436	2.86	76997	3.25	47360
Gently Sloping Flat - on Coarse Sedimentary	0.08	19760	0.00	29	0.00		0.03	760	0.04	531
Gently Sloping Flats Total:	**25.84**	**6014391**	**24.26**	**515961**	**24.79**	311328	**23.42**	**629649**	**24.01**	**350004**
Dry Flat - Deep Coarse Grained Sediment	7.02	1634526	2.42	51509	2.67	33525	4.54	121975	4.86	70900
Dry Flat - Deep Fine Grained Sediment	2.03	473103	0.21	4417	0.24	3057	0.70	18726	0.57	8374
Dry Flat - Till or Patchy Quarternary on Acidic Granitic	8.58	1995982	7.52	159844	6.84	85929	7.26	195158	6.69	97495
Dry Flat - Till or Patchy Quarternary on Acidic Sedimentary	11.52	2680769	6.15	130755	7.78	97732	5.69	153071	7.11	103612
Dry Flat - Till or Patchy Quarternary on Acidic Shale	3.20	745797	0.87	18568	0.58	7341	0.84	22702	0.61	8903
Dry Flat - Till or Patchy Quarternary on Calcareous	3.64	846230	1.35	28667	1.43	17922	1.87	50131	1.80	26222
Dry Flat - Till or Patchy Quarternary on on Ultramafic	0.09	20121	0.01	188	0.00	21	0.17	4555	0.16	2313
Dry Flats Total:	**36.08**	**8396529**	**18.53**	**393948**	**19.55**	**245526**	**21.07**	**566318**	**21.80**	**317819**
Wet Flat / Slope Bottom	**13.17**	**3064370**	**12.52**	**266144**	**12.30**	**154416**	**13.50**	**362791**	**13.39**	**195236**
Stream/River/Lake/Ocean	**9.33**	**2171792**	**10.46**	**222438**	**9.95**	**124995**	**10.45**	**280819**	**9.96**	**145155**

Lower New England\Northern Piedmont
Ecological Land Unit Gap Analysis Summary

Ecological Land Unit Detailed Summary: Percent and Acreage of ELU Groups in Natural Land Cover within the Portfolio

Summarized ELU Classes	% of ELU in LNE that is in Natural Cover	Acres of ELU in Natural Cover in LNE	% of ELU in Natural Cover in LNE that is in Tier 1	Acres of ELU in Natural Cover in LNE that is in Tier 1	% of Elu in Natural Cover in LNE that is in Matrix 10yr Action	Acres of ELU in Natural Cover in LNE that is in Matrix 10 yr Action	% of Elu in Natural Cover in LNE that is in the Portfolio	Acres of ELU in Natural Cover in LNE that is in the Portfolio	% of Elu in Natural Cover in LNE that is in the Portfolio 10yr Action	Acres of ELU in Natural Cover in LNE that is in the Portfolio 10yr Action
Cliff, Upperslope, Summit	**94.12**	**561700**	**23.44**	**131683**	**14.29**	**80288**	**27.82**	**156274**	**15.20**	**85382**
Sideslope or Coves - on Acidic Granitic/Mafic	93.11	1113063	24.72	275192	11.78	131119	27.92	310750	12.33	137241
Sideslope or Coves - on Acidic Sed/Metased	89.90	1163264	20.47	238077	12.73	148097	23.06	268193	13.47	156669
Sideslope or Coves - on Acidic Shale	87.40	116292	7.18	8348	4.21	4894	10.62	12353	4.65	5404
Sideslope or Coves - on Calcareous/mod Calcareous	86.13	345290	14.40	49720	11.36	39232	19.20	66302	13.10	45237
Sideslope or Coves - on Coarse Sedimentary	71.83	331	2.45	8	0.00		15.69	52	0.00	
Sideslope or Coves - on Ultramafic	91.35	3741	9.99	374	4.69	175	19.37	724	9.21	344
Sideslopes and Coves Total:	**90.56**	**2741982**	**20.85**	**571719**	**11.80**	**323517**	**24.01**	**658374**	**12.58**	**344895**
Gently Sloping Flat - on Acidic Granitic/Mafic	77.48	1728752	12.36	213755	6.51	112554	14.23	246027	7.01	121142
Gently Sloping Flat - on Acidic Sed/Metased	63.58	1652564	11.77	194550	8.14	134465	13.19	217974	8.50	140490
Gently Sloping Flat - on Acidic Shale	57.51	241870	5.99	14478	1.49	3598	7.77	18799	2.28	5511
Gently Sloping Flat - on Acidic Shale on Ultramafic	62.11	9991	3.82	382	1.01	101	36.34	3630	18.29	1827
Gently Sloping Flat - on Calcareous/Mod Calcareous	62.86	457308	8.82	40327	6.39	29200	12.94	59190	8.02	36675
Gently Sloping Flat - on Coarse Sedimentary	42.69	8435	0.17	15	0.00		5.66	478	4.81	406
Gently Sloping Flats Total	**68.15**	**4098921**	**11.31**	**463507**	**6.83**	279917	**13.32**	**546098**	**7.47**	**306052**
Dry Flat - Deep Coarse Grained Sediment	50.04	817898	5.23	42758	3.45	28233	10.84	88656	6.63	54257
Dry Flat - Deep Fine Grained Sediment	38.55	182382	1.15	2094	0.76	1389	5.04	9199	2.20	4004
Dry Flat - Till or Patchy Quarternary on Acidic Granitic	69.04	1377949	10.65	146768	5.72	78751	12.72	175272	6.43	88642
Dry Flat - Till or Patchy Quarternary on Acidic Sedimentary	46.87	1256584	8.97	112773	6.78	85143	9.96	125125	6.98	87726
Dry Flat - Till or Patchy Quarternary on Acidic Shale	37.34	278517	3.99	11107	0.93	2586	5.03	14015	1.23	3423
Dry Flat - Till or Patchy Quarternary on Calcareous	43.30	366408	5.99	21932	3.77	13820	9.82	35996	5.22	19116
Dry Flat - Till or Patchy Quarternary on on Ultramafic	44.51	8957	1.52	136	0.22	19	29.92	2680	13.76	1233
Dry Flat Total:	**51.08**	**4288696**	**7.87**	**337569**	**4.90**	**209941**	**10.51**	**450944**	**6.03**	**258399**
Wet Flat / Slope Bottom	**67.75**	**2076141**	**11.40**	**236758**	**6.55**	**136049**	**15.09**	**313279**	**8.08**	**167757**
Stream/River/Lake/Ocean	**81.65**	**1773260**	**11.84**	**209969**	**6.61**	**117201**	**14.79**	**262187**	**7.61**	**134883**

*** Please remember that these values are estimates based on 90m ELU cells and 30m land cover cell intersections.**

Although the data can show general patternsn, some categories such as streams/rivers/lakes/ocean acreage in natural coverage may be hard to interpret due to the resolution difference in the input datasets. For example, in the ELUs all water features are represented as 90m cells (even if the width of the stream was less than 90m across). Therefore, the area of water is overestimated and when 30m landcover is intersected with these 90m cells, some of the agriculture or developed 30m cells intersect water ELUS causing us to report water in non-natural cover. Although this combination of non-natural cover water should not exist, it does show us that there is development very near the water features

Lower New England\Northern Piedmont
Matrix Sites by their Ecological Land Unit Group

ELUGROUP	NAME	TIER	PORTFOLIO	ACRES	STATE	MUIDS
1	French Creek East/Pine Swamp	1	Y-10-Yr. Action Site	43648.28	PA	221Da
1	Swartswood Block	1	Y-Partner Lead	71199.72	NJ	221Ba
1	Furnace Hills	2	Alternate Site	34020.51	PA	221Da
2a	Wood River Barrens/Pachaug	1	Y-10-Yr. Action Site	45719.30	RI/CT	221Ag
2a	Saugatuck Forest	1	Y-10-Yr. Action Site	15331.91	CT	221Ae
2a	Pawtauckaway	1	Y-TNC Lead	28659.11	NH	221Ai
2a	Arcadia Pond - South Pachaug, CT	2	Alternate Site	21440.93	CT	221Ag
2a	North Pachaug (Mt. Misery)	2	Alternate Site	20407.40	CT	221Ag
2a	Arcadia Ponds	2	Alternate Site	22095.55	CT/RI	221Ag
2b	Pleasant Mountain	1	Y-10-Yr. Action Site	53020.88	ME	221Al
2b	Meshomasic State Forest	1	Y-10-Yr. Action Site	40123.82	CT	221Ag / 221Af
2b	Kezar River	2	Alternate Site	35645.19	ME	221Al
3a	Sourland Mountains	1	Y-10-Yr. Action Site	29956.43	NJ	221Da
3a	Lower Patapsco River	2	Alternate Site	19953.56	MD	221Db
3b	Shaupeneak	1	Y-Partner Lead	25933.80	NY	221Ba
3b	Pretty Boy/Hereford	1	Y-Partner Lead	26147.62	MD	221Db
4a	Big Kitty/Whately	1	Y-10-Yr. Action Site	41621.99	MA	221Ae / 221Af
4a	Tekoa	1	Y-10-Yr. Action Site	25243.34	MA	221Ae / 221Af
4a	Bomoseen	1	Y-10-Yr. Action Site	22829.83	VT	221Bb
4a	Macedonia Brook	1	Y-10-Yr. Action Site	37003.33	CT/NY	221Ae
4a	New Marlborough	2	Alternate Site	109495.90	MA/CT	M212Cc
4a	Barkhamstead/Granville (N/S)	2	Alternate Site	117598.64	CT/MA	221Ae
4a	Westhampton	2	Alternate Site	31899.28	MA	221Ae
4a	Putney Mountain	2	Alternate Site	30800.63	VT	M212Cc
4a	Mid-Dutchess	2	Alternate Site	28730.09	NY	221Ae
4b	Surrey Mountain	1	Y-10-Yr. Action Site	32472.55	NH	M212Bc
4b	Canaan Mountain	1	Y-10-Yr. Action Site	41936.56	CT	221Ae
4b	Pine River	1	Y-10-Yr. Action Site	68540.96	NH/ME	221Al
4b	Warwick	1	Y-Partner Lead	77198.45	MA/NH	M212Bd
4b	Wendell	2	Alternate Site	45080.76	MA	221Ah
4b	Burnt Meadow Brook	2	Alternate Site	46345.63	ME/NH	221Al
4b	White Hollow	2	Alternate Site	14627.35	CT	221Ae
4b	Cornish	2	Alternate Site	47370.70	NH	M212Bb
4b	Merry Meeting Lakes	2	Alternate Site	49737.68	NH	221Al
4b	Minks	2	Alternate Site	26796.73	NH	M212Bd / 221Ai
4b	Francestown	2	Alternate Site	38034.63	NH	M212Bd
4b	Mohawk	2	Alternate Site	15601.64	CT	221Ae
5	Harriman	1	Y-Partner Lead	47585.10	NY	221Ae
5	Waywayanda	1	Y-Partner Lead	36306.14	NJ/NY	221Ae
5	Ringwood	1	Y-Partner Lead	18982.55	NY/NJ	221Ae
5	Sparta Mountain	2	Alternate Site	31482.61	NJ	221Ae
5	Hudson Highland	2	Alternate Site	51401.87	NY	221Ae
5	West Point/Black Rock	2	Alternate Site	16383.44	NY	221Ae
6a	Pisgah	1	Y-10-Yr. Action Site	38330.84	NH	M212Bd
6a	Yale-Myers Forest	1	Y-10-Yr. Action Site	33315.36	CT/MA	221Ag / 221Ah
6a	Royalston	1	Y-Partner Lead	64324.07	MA/NH	M212Bd
6a	Silver Lake	1	Y-TNC Lead	22675.60	NH	221Al
6a	Gunstock	2	Alternate Site	40480.94	NH	221Al
6a	Bear Brook	2	Alternate Site	51926.86	NH	221Ai
6a	Scott Mountain	2	Alternate Site	16733.23	NH	M212Bd
6a	Rhododendron	2	Alternate Site	18067.71	NH	M212Bd

Lower New England\Northern Piedmont
Matrix Sites by their Ecological Land Unit Group

6a	Blue Hills	2	Alternate Site	43940.31	NH	221Al
6b	Otis	1	Y-10-Yr. Action Site	20875.16	MA	M212Cc
6b	Super Sanctuary/Nubanuset Willard	1	Y-10-Yr. Action Site	54932.18	NH	M212Bc
6b	Lake George/S. Bay	1	Y-10-Yr. Action Site	154881.61	NY	221Bc
6b	Franklin Falls	1	Y-Partner Lead	25414.95	NH	M212Bc
6b	Plymouth	2	Alternate Site	33589.32	NH	M212Bc
6b	Ragged Mountain	2	Alternate Site	41219.18	NH	M212Bc
6b	Unity	2	Alternate Site	93495.67	NH	M212Bc
6b	Lyneborough	2	Alternate Site	54568.71	NH	M212Bd
6b	Wapack	2	Alternate Site	37324.83	NH	M212Bd
7a	Middlefield - Peru	1	Y-10-Yr. Action Site	107420.82	MA	M212Cc
7a	Andora	1	Y-10-Yr. Action Site	70256.12	NH	M212Bc
7a	Mt. Cardigan	1	Y-Partner Lead	99795.56	NH	M212Bc
7a	Glebe Mountain	1	Y-TNC Lead	23811.47	VT	M212Cc
7a	Mohawk Trail South	2	Alternate Site	76498.97	MA	M212Cc
7a	Beartown	2	Alternate Site	49805.38	MA	M212Cc
7a	Gile State Forest	2	Alternate Site	94084.65	NH	M212Bc
7a	Stiles Brook	2	Alternate Site	37557.41	VT	M212Cc
7b	Ossipee Mountains	1	Y-Partner Lead	58851.91	NH	221Al
7b	Kearsarge	2	Alternate Site	45509.42	NH	M212Bd / 221Ai
8	October Mountain	1	Y-10-Yr. Action Site	49386.57	MA	M212Cc
8	Mascoma	1	Y-Partner Lead	121358.25	NH	M212Bc
8	Moosilauke	2	Alternate Site	53293.26	NH	M212Bc
8	Chalet WMA	2	Alternate Site	21679.14	MA	M212Cc
8	Windsor	2	Alternate Site	30242.10	MA	M212Cc
8	Schateaguey	2	Alternate Site	63138.12	VT	M212Cc
8	Arthur Davis	2	Alternate Site	33916.89	VT	M212Cc
8	Smokeshire	2	Alternate Site	28474.45	VT	M212Cc
8	Dovertown Forest	2	Alternate Site	47799.13	VT	M212Cc
8	Monadnock	2	Alternate Site	18220.42	NH	M212Bc
8	Pillsbury	2	Alternate Site	78014.78	NH	M212Bd / M212Bc
9	Mt. Washington - Mt. Riga	1	Y-10-Yr. Action Site	47490.89	MA/CT/NY	M212Cb
9	Equinox	1	Y-10-Yr. Action Site	71682.89	VT/NY	M212Cb
9	Northern Taconic/Berlin Mountain	1	Y-10-Yr. Action Site	34842.69	NY/MA	M212Cb
9	Blueberry Hill	1	Y-TNC Lead	20679.10	VT	M212Cb
9	Bird Mountain	2	Alternate Site	23504.41	VT	M212Cb
9	Mt. Greylock	2	Alternate Site	33581.58	MA	M212Cb
9	Dorset Peak	2	Alternate Site	50374.65	VT	M212Cb
9	Grass Mountain	2	Alternate Site	43248.28	VT/NY	M212Cb
10	Rensselaer Plateau Central	1	Y-10-Yr. Action Site	75020.92	NY	M212Cb
10	Rensselaer Plateau North	2	Alternate Site	29573.84	NY	M212Cb
10	Rensselaer Plateau South	2	Alternate Site	27108.51	NY	M212Cb
Outliers	Lock Raven	1	Y-Partner Lead	13652.19	MD	221Db
Outliers	Quabbin	1	Y-Partner Lead	88021.45	MA	221Ah

Appendix 6.
Lower New England\Northern Piedmont
<u>The Seven Major LNE-NP Ecological Drainage Units</u>

Group1 : Potomac/Susquehanna basins: Distinguished by zoogeographic differences with other areas (Maxwell et al. 1995, Hocutt and Wiley, 1986).

<u>Major Systems</u>:
1) Lower Susquehanna from Harrisburg to Chesapeake Bay – a big river with complex upstream influences from glaciated mountains.
2) Monaccy Creek and Upper Susquehanna tribs – small to moderate systems flowing over sandstone with low/moderate base flow
3) Rock Creek, Patapsco/Gunpowder/Patuxent Rivers, and lower Susquehanna tributaries –small to moderate, flashy systems flowing over complex geology comprised mostly of gneiss and ultramafics.

Group 2 : Merrimac/Saco Basins: Distinguished because of zoogeographic differences with other areas (Maxwell et al. 1995, Hocutt and Wiley, 1986).

<u>Major Systems</u>:
1) Merrimac/Saco/Androscoggin – big rivers originating in mountains (steep gradients flowing over granite/quartzite/schist bedrock and thin till), flowing to more moderate gradients similar to below
2) Ipswich/Charles/Nashua/Salmon – generally low gradient systems flowing over thin till. Spring peak flows and fall low flows.

Group 3 : Poultney River and Otter Creek Headwaters: Should be included in Northern Appalachian Ecoregional Plan. Distinguished because of zoogeographic differences with other areas (Maxwell et al. 1995, Hocutt and Wiley, 1986).

<u>Major Systems</u>:
1) Small area of headwaters to the Poultney, Mettawee, and Otter Creek - thin till over shales and meta-sedimentary bedrock. Small and moderate streams that are low-to-moderate gradient, with some lakes and wetlands.

Group 4 : Hudson drainage – through 221B(a,b,d): Distinguished because of physiographic, climatic, and geologic differences.

<u>Major systems</u>:
1) Hudson and Mohawk - Large rivers in valleys of loamy till over shale and limestone.
Tributary systems in same setting.
2) Batten Kill, Hoosic River – originating in low Taconic Mountains, sandy till over meta-sedimentary / limestone and flowing into Hudson Valley. Tributaries originating in low Catskill Mountains on loamy till/outwash over shale/sandstone and flowing into Hudson Valley

Group 5 : Delaware / NJ Drainage – through 221D: Distinguished because of physiographic, climatic, geologic differences.

<u>Major Systems</u>:
1) Delaware – large river flowing over sandstone; complex upstream influences from glaciated mountains
2) Skuykill/Lehigh Rivers – small to medium rivers originating in low mountains, ridge and valley with carbonate sandstones, then flowing over sandstone, and finally a complex geology comprised mostly of gneiss and ultramafics (serpentine) before flowing into the Delaware.
3) Brandywine, Chester, etc – small rivers flowing first through sandstone and then through a complex geology comprised mostly of gneiss and ultramafics (serpentine) before flowing into the Delaware.
4) Raritan – medium river originating on granitic gneiss then flowing over sandstone before flowing into ocean
5) Passaic – 221Dc – medium river flowing through loamy till over shale into ocean

Appendix 6.
Lower New England\Northern Piedmont
<u>The Seven Major LNE-NP Ecological Drainage Units</u>

Group 6 : Lower Connecticut Drainages: Distinguished because of physiographic, climatic, geologic differences.

Major Systems:
1) Connecticut – large river flowing through broad glacial valley (with many deposits)over sedimentary/volcanic bedrock
2) Croton, Naugatuck, Quinnipiac, Thames, and other coastal streams) – low gradient, small and medium rivers flowing through hills over sandy to coarse till over granite-schist-gneiss and into ocean
3) Housatonic, Farmington, Westfield – medium rivers originating in low mountains (till and outwash over meta-sedimentary bedrock) with moderate gradients and flowing into lower gradient hills over sandy to coarse till over granite-schist-gneiss and into ocean

Group 7 : Upper Connecticut drainages (M212): Distinguished because of physiographic climatic, geologic differences.

Major Systems:
1) Connecticut – large river flowing through glaciated high hills of lake silts and kame gravel over meta-sedimentary bedrock
2) Deerfield, Gree, West, While, Cold, Ashuelot, Millers – Tributaries to large rivers flowing through low mountains of sandy loam till over various bedrock.

To identify and map aquatic macrohabitats a conceptual model was first developed an aquatics team led by Greg Podnisinski. The team identified key variables for aquatic diversity in the ecoregion and spatial approximation of these variables were then derived from available GIS layers (e.g. 90 m digital elevation models, RF3 and DLG hydrologic features, State geologic maps). For streams the key variables consisted of stream size, acidity, stability, gradient, and downstream connectivity. Each of these components was subdivided into a small number (1 to 5) of classes and when these classes were intersected to produce 400 (4 x 2 x 2 x 5 x 5) possible stream types such as “small, calcareous, stable, low gradient stream connected to another small stream” . For lakes, the key variables consisted of size, acidity class, naturalness, shoreline type, connectivity class, and network placement class. When these classes were intersected it produced 720 (4 x 2 x 2 x 3 x 3 x 5) possible lake types such as “ large, acidic, natural, round lake with outlets connected to a medium size stream”. The macrohabitats were then mapped and used to described the aquatic features found within a given watershed.

Appendix 6.

Lower New England \ Northern Piedmont

Final LNE-NP Aquatic Macrohabitat Classification

Streams

Stream macrohabitats will be defined based upon the concatenation of values for the following five variables:

Size

- 1 - headwater (link 1-5)
- 2 - creek (link 6-30)
- 3 - small river (link 31-450)
- 4 - large river (link >450)

Hydrologic regime

- 1 – unstable (elaborate rules based on watershed geology and stream size)
- 2 – stable (elaborate rules based on watershed geology and stream size)

Chemistry

- 1 – calcareous/neutral (elaborate rules based on watershed geology and stream size)
- 2 – acidic (elaborate rules based on watershed geology and stream size)

Downstream connectivity

- 1 – headwater/creek (link 1 – 30)
- 2 – small river (link 31 – 450)
- 3 – large river (link 451 and greater)
- 4 – lake/wetland
- 5 – coastal

Gradient

- 1 – <0.005
- 2 – 0.005 - <0.02
- 3 – 0.02 – < 0.04
- 4 – 0.04 – 0.1
- 5 - >0.01

Let's go with this for now and see how it plays out – we may group 1 and 2 together and 4 and 5 together.

Lakes

Lake macrohabitats will be defined based upon the concatenation of values for the following five variables:

Natural (vs. impoundment)

- 1 – natural
- 2 – impoundment

General water chemistry (inferred from local geology)

- 1 – calcareous/neutral

2 – acidic

Size

1 – 1 - 10 ha
2 – 11 – 100 ha
3 – 101 – 1000 ha
4 - >1000 ha

Shoreline complexity

Four classes, (round , elongate, complex, very complex), based upon Shoreline Complexity Index, will be used. Class intervals will be the same as used in Great Lakes Pilot Project.

$$\text{Shoreline Complexity } Index = \frac{Perimeter}{2\sqrt{\Pi * Area}}$$

1 – round = .97-1.02
2 – elongate = 1.03 – 2.03
3 – complex = 2.04 – 4.00
4 – very complex = >4.00

Network position

Hydrologic regime inferred from GIS flow accumulation model (low, moderate and high) and connectivity (unconnected, outlet only, inlets and outlets). Ranges for flow accumulation categories will be assigned after flow accumulation analysis has been completed and the statistical distribution of data examined. Nine combinations are possible as follows:

	Flow Accumulation	Connectivity
1.	a. Low	Unconnected
	b. Low	Outlet Only
	c. Low	Inlet and Outlet
2.	a. Moderate	Unconnected
	b. Moderate	Outlet Only
	c. Moderate	Inlet and Outlet
3.	a. High	Unconnected
	b. High	Outlet Only
	c. High	Inlet and Outlet

Elevation

This variable may be useful... we can do this pretty easily, so let's just get an absolute number and use later if necessary.

APPENDIX 7--PLANNING TEAMS

The planning process involved the Eastern Resource Office, thirteen Nature Conservancy Chapter offices, and thirteen Natural Heritage offices. The group established a Core Team to direct the overall progress of the plan and a number of Expert Teams to address particular taxonomic and ecological dimensions of the project.

Core Team
Henry Barbour, Director of Conservation Science, MA Chapter (Lead)
Mark Anderson, Director of Eastern Conservation Science\Regional Ecologist, ERO (Co-leader)
Wayne Klockner, State Director, MA Chapter: (Sponsor)
Joshua Royte, Conservation Planner, ME Chapter
Don Cameron, Botanist, Maine Natural Areas Program
Doug Bechtel, Assistant Director of Science and Stewardship, NH Chapter
Dan Sperduto, Ecologist, New Hampshire Natural Heritage Inventory
Ana Ruesink, Site Conservation Planner, VT Chapter
Eric Sorenson, Ecologist, Vermont Nongame and Natural Heritage Program
Frank Lowenstein, Geoffrey Hughes Berkshire Taconic Landscape Program Director, MAFO
Judy Preston, Director of Science and Stewardship, CT Chapter
Nancy Murray, Director, Connecticut Natural Diversity Database
Laura Flynn, formerly Director of Science and Stewardship, Lower Hudson Chapter
Maria Trabka, formerly Director of Science and Stewardship, Eastern New York Chapter
Tony Wilkinson, Director of Conservation Programs, Combined NY Chapters – replaced Laura and Maria
Andy Finton, Associate Ecologist, New York Natural Heritage Program
Anne Heasley, Assistant State Director for Conservation Programs, NJ Chapter
Tom Breden, Coordinator, New Jersey Natural Heritage Program
Mark Zankel, Director of Science and Stewardship, DE Chapter
Gregory Eckert, Director of Science and Stewardship, PA Chapter
Greg Podniesinski, Ecologist, PA Natural Diversity Inventory East
Stephanie Flack, Conservation Planner, MD Chapter
Olin Allen, formerly District of Columbia Natural Heritage Program
Judy Dunscomb, Director of Science and Stewardship, VA Chapter

Terrestrial Communities Expert Team
Julie Lundgren, Ecologist, ERO: (Team Leader)
Mark Anderson, Director of Conservation\Regional Ecologist, ERO: (Co-leader)
Sue Gawler, Maine Natural Areas Program
Dan Sperduto and Bill Nichols, New Hampshire Natural Heritage Inventory
Eric Sorenson,Vermont Nongame & Natural Heritage Program
Pat Swain and Jennifer Kearsley, Massachusetts Natural Heritage & Endangered Species Program
Sally Shaw ,The Nature Conservancy , Massachusetts Chapter
Ken Metzler, Connecticut Natural Diversity Database
Andy Finton, Ecologist, New York Natural Heritage Program
Tom Breden, Yvette Alger, Kathleen Strakosch Walz, New Jersey Natural Heritage Program
Tony Davis and Greg Podniesinski, Pennsylvania Natural Diversity Inventory – East

Jean Fike, Pennsylvania Natural Diversity Inventory – Central
Ashton Berdine, Maryland Natural Heritage Program
Rick Enser, Rhode Island Natural Heritage
Liz Thompson, TNC Vermont Chapter
Carol Reschke, formerly NY Heritage
Bob Zaremba, former Director of NY Conservation Science, now Conservation Ecologist, ERO

Plant Expert Team
Joshua Royte, Conservation Planner, ME: (Team Leader)
William Brumback, Director, New England Plant Conservation Program,
New England Wildflower Society
Chris Frye, State Botanist, Maryland Dept. of Natural Resources Wildlife and Heritage Division
Ann Rhoads, Ph. D., Director, Pennsylvania Flora Project, Morris Arboretum, University of PA
Gregory E. Eckert, PhD., formerly Director, Science and Stewardship, PA Chapter

Vertebrate and Invertebrate Expert Team
Bill Toomey, Stewardship Ecologist, CT: (Team Leader)
Larry Master, Chief Zoologist, HO - ERO
Geoff Hammerson, Zoologist, HO-ERO/Wesleyan University
Frank Lowenstein, TNC Berkshire/Taconic Landscape Project Manager, MA
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Dale Schweitzer, TNC Invertebrate Zoologist, NJ
Jane O'Donnell, Natural Heritage Zoologist, CT DEP
Dave Wagner, Professor of Entomology, University of Connecticut
Andrew Milliken, Senior Biologist, US Fish and Wildlife Service
Alison Whitlock, Biologist, US Fish and Wildlife Service
Tom Savoy, Fisheries Biologist, Connecticut DEP Fisheries
Olin Allen, District of Columbia Natural Heritage Program
Scott Smith, Zoologist, Maryland Department of Natural Resources
Jim McCann, Zoologist, Maryland Department of Natural Resources
Dan Feller, Zoologist, Maryland Department of Natural Resources
Beth Swartz, Maine Dept. of Inland Fisheries and Wildlife
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Paul Novak, Associate Zoologist, NY Natural Heritage Program, NY
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Ana Ruesink, Director of Science, VT TNC
Eric Sorenson, Community Ecologist, VT Natural Heritage Program, VT

Bird Expert Team
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Lise Hanners, Den Preserve Assistant, CT Chapter
Dave Mehlman, Director of Conservation Programs, TNC Wings of the Americas

Doug Bechtel, Assistant Director of Science and Stewardship, NH Chapter

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Arlene Olivero, GIS Analyst, ERO
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David Strayer
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GIS and Data Management
Arlene Olivero, GIS Analyst, ERO
Shyama Khanna, Ecoregional Information Manager, ERO
Meredith Hammon, Administrative Coordinator, ERO

Additional expert advice and assistance provided by:
Greg Low, Vice President for U.S. Conservation, HO
John Cook, Northeast Regional Director, ERO
Steve Buttrich, former Director of Eastern Conservation Science
Bob Zaremba, former Director of NY Conservation Science, now Conservation Ecologist, ERO
Diane Vosick, former Conservation Science, HO
Meg Connerton, Office Manager, MA Chapter

Lower New England GIS Data Sources

Transportation: Macon USA TIGER Transportation 1994 1:100K.
Minor Road Bounded Blocks are based on primary highways, primary roads, secondary roads, local roads, railroads, utility lines, and major streams and shorelines from Macon USA TIGER 1994 1:100K.
Major Road Bounded Blocks are based on primary highways, primary roads, and secondary roads from Macon USA TIGER 1994 1:100K with major road class updates from Geographic Data Technology (GDT) 1997.
Transportation Feature Types
1. Primary highway with limited access: Interstate highways and some toll highways. Distinguished by the presence of interchanges, access ramps, and opposing traffic lanes separated by a median strip.
2. Primary road without limited access: Nationally and regionally important highways that do not have limited access. Mostly US highways but may include some state and county highways that connect larger cities May be divided or undivided and have multilane or single lane characteristics.
3. Secondary and connecting road: Mostly state highways that connect smaller towns. Must be concrete or asphalt and are usually undivided with single-lane characteristics.
4. Local, neighborhood, and rural road: Used for local traffic and usually have a single lane or traffic in each direction. Includes paved and unpaved roads.
5. Waterbodies: Lakes and wide rivers.
6. Railroads
7. Major Utility Lines: Pipelines or Powerlines
8. Airport runways, permanent fences, ski lifts
9. Vehicle and non-Vehicle Trails

Potential Matrix Sites:
For states in Lower New England (ME, NH, VT, NY, MA, CT, RI):
Potential matrix sites are major road bounded blocks which met one of the following criteria
1. Contain >= one 10,000 acre local road bounded block,
2. Area of block is >= 5,000 acres with >= 75% natural land cover **AND**
   a. Contains >= 20,000 acres of natural land cover OR
   b. Contains (>= 80% natural land cover) and (>= one 2,000 acre local road bounded block) and (managed area >= 20% or >= 4,000 acres)

For states in the Piedmont (NJ, PA, MD, VA, DE, DC):
Potential matrix sites are all major road bounded blocks > 5,000 acres with > 55% natural land cover.

Managed Areas: Includes all managed lands with a conservation purpose, along with other large state or federally managed lands greater than 500 acres. Sources include:
PA - PA DEP 1:24K. State, county, federal, & private 1999.
MD - MD DNR 1:24K. State, county, federal, & private 1999.
DE DNREC Protected Lands 1:24K 1999.
NJ DEP Natural and Historic Resources 1:24K 1999.
VA - VA DCR 1:24K; VA Heritage 1:24K; VA DIGF 1:24K 1999.
NY and Northern Forest Conservation Lands Coverage by TNC/Sweet Water Trust 9/98, scales vary
MassGIS Open Space 1998, 1:24k.
CT Managed Area coverage from Federal, State, Municipal, and Private coverages from CT DEP, various scales
RI Protected Land RIGIS open space coverages 1999, various scales.
UCSB MAD 1:250K. Major federal & state lands; and USFWS National Wildlife Refuges, various scales.

Land cover: EPA/USGS/Hughes MRLC 30 meter classified Landsat TM imagery. Omage dates 1991-1993. Draft for New England.

Ecoregion boundaries and Subsections: TNC Eastern Conservation Science, based on USFS (Keys et al.) subsections and Natural Heritage Program data 1:1M.

Bibiliography

Element Occurrences: All primary and secondary LNE target species and all communities that occur within the LNE Ecoregion. Provided by State Heritage programs.

Waterbodies: USGS National Hydrography Dataset 2000.

Streams (single line): EPA Reach File 3 (RF3) 1:100K.

Dams: U.S. Army Corps of Engineers 1998 National Inventory of Dams from EPA Basins dataset 1999.

Cultural and Natural Features: USGS Geographic Names Information System (GNIS) database 1998.

Political boundaries: ESRI ArcData 1:100K 1998.

Elevation: From USGS 1:250k Digital Elevation Model (90m).

Landforms: Landforms were modeled using land position, slope, and relative moisture from UGS 1:250k DEM. Wetlands from the 1991-1993 EPA MRLC 30m classified Landsat TM imagery Draft for New England dataset were also integrated into the wet flat landform feature. Lakes and wide river polygons and streams are from the National Hydrography Dataset 1:100k. Surficial sediments were integrated into the dry flats and gently sloping flat landform classes. Created by TNC Eastern Conservation Science, 1999.

Surficial Geology: from USGS DDS-38 Digital Representation of a Map Showing the Thickness and Character of Quaternary Sediments in the Glaciated United States East of the Rocky Mountains. 1:1M 1998.

Bedrock Geology: Formations classified into simplified 8 categories by TNC Eastern Conservation Science.
Maine: Digital map based on Osberg,P.H., Hussey,A.M.,II, and Boone,G.M., 1985, Bedrock Geologic Map of Maine, 1985, scale 1:500:000.
Maryland: 1968 Geologic Map of Maryland (blueline). 1:250,000 scale. Maryland Geological Survey; compiled and edited by Cleaves, E.T., J. Edwards, Jr., and Glaser, J.D.; supervised by K.N. Weaver.
Massachusetts and Connecticut: MA data compiled by USGS-WRD Connecticut River NAWQA (1:125,000) and USGS - New England Coastal NAWQA (1:250,000).The USGS is the originator of dataset. Based on Zen, E-an, Goldsmith, Richard, Ratcliff, N.L., Robinson, Peter, and Stanley, R.S., [compilers], 1983, Bedrock geologic map of Massachusetts: U.S. Geological Survey, 3 map sheets, scale 1:250,000.
New Hampshire: Digital map based on Lyons,J.B., Bothner,W.A., Moench,R.H., and Thompson,J.B.,Jr., 1997, Bedrock Geologic Map of New Hampshire, scale 1:250,000.
New Jersey: Digital version originated from 3 USGS and NJ Geological Survey 1:100,000 scale sheets; Northern, Central and Southern NJ.
New York: NY State Geological Survey, 1:250,000.
Pennsylvania: Geologic Map of Pennsylvania, 1980, 1:250,000 scale. (Berg et al.) PASDA distributed.
Rhode Island: RI data compiled and USGS - WRD - New England Coastal NAWQA (1:250,000). Hermes, O.D., Gromet, L.P., and Murrey, D.P. (compilers), 1994, Bedrock geologic map of Rhode Island: Kingston, R.I., University of Rhode Island, Rhode Island Map Series No. 1, scale 1:100,000.
Vermont: Digital map based on Doll,C.G., Cady,W.M., Thompson,J.B.,Jr., and Billings,M.P., 1961, Centennial geologic map of *Vermont:* Vermont Geological Survey, scale 1:250,000. Geologic classes grouped by VTGS 1998.
Virginia: Berquist, C.R., Jr., and Uschner, N. E., 1999, Spatial data of the digital geologic map of Virginia: VA Div. of Mineral Res. Digital Pub. 14B. Based on 1993, Geologic map of Virginia: Virginia Division of Mineral Resources, scale 1:500,000.
USGS-WRD: NEW ENGLAND COASTAL NAWQA LITHOLOGY: The USGS is the originator of dataset. The original sources of data were the individual Bedrock maps produced for each state: New Hampshire, Massachusetts, Maine, and Rhode Island. The references for the state bedrock maps are as follows: Lyons, J.B., Bothner, W.A., Moench, R.H., and Thompson, J.B., Jr., eds., 1997, Bedrock geologic map of New Hampshire: U.S. Geological Survey, 2 map sheets, scale 1:250,000 Zen, E-an, Goldsmith, Richard, Ratcliff, N.L., Robinson, Peter, and Stanley, R.S., [compilers], 1983, Bedrock geologic map of Massachusetts: U.S. Geological Survey, 3 map sheets, scale 1:250,000 Osberg, P.H., Hussey, A.M., and Boone, G.M., eds., 1985, Bedrock geologic map of Maine: Maine Geological Survey, Department of Conservation, 1 sheet, scale 1:500,000 Hermes, O.D., Gromet, L.P., and Murrey,

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D.P. (compilers), 1994, Bedrock geologic map of Rhode Island: Kingston, R.I., University of Rhode Island, Rhode Island Map Series No. 1, scale 1:100,000.
USGS-WRD: CONNECTICUT RIVER NAWQA LITHOLOGY: The USGS is the originator of dataset. The original sources of data were the individual Bedrock maps produced for each state. Scale 1:125,000 1997.

<u>Ecological Land Units:</u> Combination of elevation, landform, bedrock geology, and surficial geology grids. See lneelu.doc for more information regarding the development and use of this dataset. Created by TNC Eastern Conservation Scinec, 1999.