

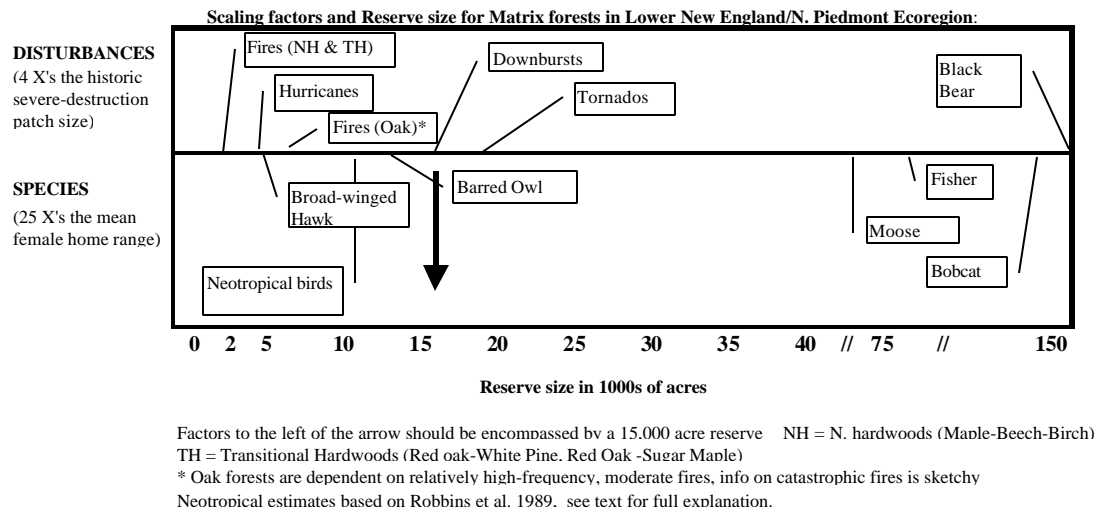
# Results for Matrix-Forming Ecosystems \*

## Modifications to Standard Method

### Size criteria

For area-sensitive and breeding territory analyses of 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: Hairy Woodpecker (*Picoides villosus*), Broad-winged Hawk (*Buteo platypterus*), Eastern Wood-Pee-wee (*Contopus virens*), White-breasted Nuthatch (*Sitta carolinensis*), Veery (*Catharus fuscescens*), Wood Thrush (*Hylocichla mustelina*), 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*), and Yellow-throated Vireo (*Vireo flavifrons*). 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.). The resulting scaling factors and reserve sizes for LNE-NP are shown below:



\* Anderson, M.G. and S.L. Bernstein (editors). 2003. Results for matrix-forming ecosystems. Based on Barbour, H. 2001. Lower New England – Northern Piedmont Ecoregional Conservation Plan; First Iteration. The Nature Conservancy, Conservation Science Support, Northeast & Caribbean Division, Boston, MA.

## Block development

Two sets of ecoblocks were developed for LNE-NP (Maps 10 and 11 - Major and minor road bounded blocks). The first set, “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 set, “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					
	2.5-5K	5-10K	10-5K	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	

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 matrix forest occurrences in the Northeast LNE Plain, LNE Mountains and Highlands, Southern New England Plain (portions), and Hudson River subregions

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

1. Contains  $\geq$  one 10,000 acre local road bounded block
2. Area of block is  $\geq$  5,000 acres with  $\geq$  75% natural land cover **AND**
  - a. Contains  $\geq$  20,000 acres of natural land cover **OR**
  - b. Contains  $\geq$  80% natural land cover **and**  $\geq$  one 2,000 acre local road bounded block **and** managed area  $\geq$  20% or  $\geq$  4,000 acres.

For matrix forest occurrences in the Southern New England Plains (portions), Reading Prong, and Northern Piedmont subregions potential matrix sites are all major road bounded blocks  $>$  5,000 acres with  $>$  55% natural land cover.

Different criteria were used due to the differing patterns of land use and lack of large major road bounded blocks in natural cover in the southern subregions of LNE-NP. The inclusion of potential matrix forest blocks of lesser size and condition, especially blocks whose size was increased by incorporating lands that are functionally separated by major roads, was cause for numerous theoretical discussions on viability and the need to maintain scientific rigor and functional landscapes through the planning process. Valid concerns were raised regarding whether we were ignoring our own scientific evidence for what constitutes a viable matrix forest occurrence. By doing so TNC has accepted into the portfolio occurrences that may not be viable. This issue was never fully resolved but it was generally decided that prudence favored the inclusion of small matrix forest occurrences with diminished condition where no alternative occurrences could be identified. 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 discarding the occurrences entirely.

### **Block selection**

Expert interviews resulted in 128 of the 295 blocks being ranked for further consideration as Yes, Maybe-Yes, or Maybe. 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).

Eleven different Ecological Land Unit groups were defined (See Map14: Matrix Sites by ELU Group) and are listed below in Table 12.

**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

## Summary of Results

At the January, 2000 meeting 95 of the 128 matrix forest occurrences were selected for the portfolio. 25 occurrences were eliminated altogether based on new information regarding their size, condition, or landscape context. 43 of the 95 were chosen as Tier 1 occurrences for the portfolio and 52 were chosen as Tier 2 alternative matrix forest occurrences that will be held in reserve (Map 15). Where a Tier 1 occurrence is no longer deemed to be viable or its conservation feasible, an alternative matrix forest occurrence within the same ELU group may be substituted by the ecoregional planning team.

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

The 43 Tier 1 matrix forest occurrences selected nearly doubles the minimum conservation goal of 22. In part, this was necessary to capture the range of environmental variability present in the region. However, some Tier 1 matrix forest occurrences were selected because TNC already has a presence within the occurrence area, would like to have a presence in the occurrence area, or the occurrence is situated adjacent to another block selected as a Tier 1 preferred occurrence. Though these decisions are more programmatic in nature, it was the will of the matrix forest selection team to accept all of the proposed Tier 1 occurrences.

All 11 matrix-forming forest community types are presumed to be captured in Tier 1 occurrences, though a lack of information on these associations distribution and a lack of inventory to support this analysis make this analysis 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 land use, and disturbances. See Appendix 4, Matrix Forest Associations Captured within Tier 1 Matrix Forest Occurrences for a preliminary analysis.

**Table 13. Tier 1 matrix forest occurrences 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 matrix forest occurrences 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 matrix forest occurrences. 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 second 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.

There are 27 ELU types entirely missing from the portfolio. 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.