The Nature Conservancy and New Hampshire Fish & Game Department
Spatial Data Notes

DATA LAYER:	Hemlock-hardwood-pine habitats of New Hampshire
COVER NAME:	hemhwdpine
COVER CONTENTS:	hemlock-hardwood-pine habitat polygons
COVER TYPE:	Poly
SOURCE:	The Nature Conservancy, New Hampshire Department of Fish and Game, NH Audubon, and New Hampshire Natural Heritage model criteria
SOURCE SCALE:	1:24,000 and 30-meter raster
SOURCE MEDIA:	digital
COORDINATE SYSTEM:	NH State Plane feet, horizontal datum NAD83
TILE:	State
AUTOMATED BY:	The Nature Conservancy, New Hampshire Chapter
STATUS:	Complete
LAST REVISION:	October 2008; attributes revised December 2009

General Description of the Data

- Development of this coverage provides general Hemlock-hardwood-pine habitat locations within the state of New Hampshire. Analysis was completed for incorporation into the New Hampshire Wildlife Action Plan. Funding for the Plan was provided by State Wildlife Grants administered by the US Fish & Wildlife Service.

- Relevant forested 2001 NH Land Cover Assessment grid values were combined with elevation ranges from sea level to 2000' based on criteria developed by experts from The Nature Conservancy, NH Fish and Game, NH Audubon, and the NH Natural Heritage Bureau.

- Ecological Land Units, created by The Nature Conservancy's Conservation Science Support, were also added to capture additional areas likely to have geo-physical conditions favorable to hemlock-hardwood-pine, or remove areas likely to have geo-physical conditions unfavorable to hemlock-hardwood-pine. North-facing sideslopes and north-facing coves were removed from some land cover/elevation classes, and some land cover/elevation classes were restricted to only north-facing sideslopes and north-facing coves. South-facing sideslopes and south-facing coves were removed from some land cover/elevation classes, and some land cover/elevation classes were restricted to only south-facing sideslopes and south-facing coves.

- To further refine the model, soil types associated with hemlock-hardwood-pine were selected from county soil data, where available. The soils were selected, then clipped to only include forested areas, and added to the existing model information. The same was done for Appalachian oak-pine, and then Appalachian oak-pine was used to erase areas from hemlock-hardwood-pine where there was overlap, so that Appalachian oak-pine takes precedence over hemlock-hardwood-pine. This process is expected to somewhat over-predict locations of Appalachian oak-pine, but better captures broad patterns of Appalachian oak-pine.

- Model results were reviewed by experts from The Nature Conservancy, the NH Fish and Game Department, and NH Heritage Bureau, who agreed that the broad patterns depicted by the model align with reasonable expectations. No ground truthing was conducted. This version of the model is considered a first iteration, and further refinements may be developed in the future.

- The complete model criteria grid is available with the data layer. To obtain additional information, please contact The Nature Conservancy.

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Item definitions for HEMHWDPINE polygon attributes:

ITEM NAME	DESCRIPTION
FGID	unique sequential polygon ID number
ACRES	Area (acres)
HECTARES	Area (hectares)
DENSROADS	Road density in the area/unit (km/km2)
IFESMEAN	Mean IFES score (Integrated Fragmentation Effects Surface. TNC; Zankel, 2005)
POP00SQMI	Population density in 2000 (persons per square mile)
HU00SQMI	Housing units density in 2000 (houses per square mile)
PROXINDEX	Proximity index (1km distance)
WETPCT	Percent wetland
ELU30VAR	Variety of ecological land units (ELU30 = elevation, substrate, landform)
HG_TOT	Average total deposition of mercury (wet [precipitation + cloud water interception] + dry [GEM + RGM + aerosol]) by land cover (Miller et al, 2005)
CA_INDEX	Average deposition index, rate of cation depletion per ha/per year (Miller et al, 2005)
MILLERPCT	percent matching Miller forest types (listed below)
GAPVERTMAX	Vertebrate species richness maximum (VT/NH GAP Analysis)
A_RICH_BUF	Species richness of rare animals within their dispersal distances (2009)
A_RICH_POL	Species richness of rare animals within polygon (2009)
P_RICH_POL	Species richness of rare plants in polygon (2009)
C_RICH_POL	Richness of rare and exemplary natural communities in polygon (2009)
ECOSUB	Ecoregional subsection
CONS_AC	Conservation (acres)
CONS_PCT	Conservation (percent)
FORBLOCK	TNC forest block size

NOTES:

Condition of all matrix forest habitats was evaluated using a single, seamless matrix forest condition raster. This raster was used to select areas, or neighborhoods, of each forest type that are at least 100 acres in size, meeting original thresholds (below). If the contiguous area of top-ranked matrix forest habitat was less than 100 acres it was designated Tier 3 supporting landscape.

Tier 1 Top-ranked in NH = Top 15% in NH (by area, for each forest habitat type)
Tier 2 Top-ranked in biological region = Top 15% in subsection (by area, for each forest type)
Tier 3 Supporting landscapes = Top 30% in subsection (by area, for each forest type)

PLEASE REFER TO THE DOCUMENT "MATRIX_FOREST_datanotes.pdf" for explanation.

The list above represents the complete set of attributes developed for the WAP habitat data layer. Only select attributes are distributed in the public release version WAP data layers. For more information, please contact the NH Fish and Game Department, Wildlife Division, 11 Hazen Dr, Concord NH 03301 Phone: (603) 271-2461 E-mail: wildlife@wildlife.nh.gov

The fields: A_RICH_BUF, A_RICH_POL, P_RICH_POL and C_RICH_POL, provide species richness counts (number of different species potentially present in the habitat polygon) from the NH Natural Heritage Bureau as of December 2008. Care must be taken in interpreting these counts as most areas of NH have never been surveyed for biodiversity elements. See *Important Background Information for Interpreting Species Richness Counts based on NH Natural Heritage Bureau Data* for details.

Digital data describing atmospheric deposition of mercury were provided by Ecosystems Research Group, Ltd. using the methods described in Miller et al. (2005). Digital data describing the risk of calcium and other base cation depletion and limitation in forested ecosystems provided by Ecosystems Research Group, Ltd. using methods described in Miller (2005).

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Forest Type:	Description
B-NHW	beech, northern hardwoods
SM-NHW	sugar maple, northern hardwoods
NHW	northern hardwoods
CHW	central hardwoods
WP	white pine
WP-HEM-RS	white pine, hemlock, red spruce
BF-RS-WP-HEM	balsam fir, red spruce, white pine, hemlock
CHW-WP-HEM	central hardwoods, white pine, hemlock
NHW-WP-HEM	northern hardwoods, white pine, hemlock
NHW-BF-RS-HEM-WP	northern hardwoods, balsam fir, red spruce, hemlock, white pine
NHW-BF-RS	northern hardwoods, balsam fir, red spruce
BF-RS-B	balsam fir, red spruce, beech
BF-RS	balsam fir, red spruce

DATA SOURCES:

Complex Systems Research Center. 2001. *New Hampshire land cover assessment – 2001*. 30m raster data. Available from GRANIT, University of New Hampshire.

Sperduto, D.D. and W.F. Nichols. 2004. Natural communities of New Hampshire. The NH Natural Heritage Bureau and The Nature Conservancy. 229pp.

Miller, E.K. VanArsdale, A., Keeler, G.J., Chalmers, A., Poissant, L., Kamman, N., and Brulotte, R. 2005. Estimation and Mapping of Wet and Dry Mercury Deposition across Northeastern North America. Ecotoxicology 14: 53-70.

Miller, E.K. 2005. Assessment of Forest Sensitivity to Nitrogen and Sulfur Deposition in New Hampshire and Vermont. Project report dated 12/15/2005. New Hampshire Department of Environmental Services, 29 Hazen Dr, Concord NH 03302. 18 pp.

Natural Resources Conservation Service. Date varies, in progress with last revision in 2002. Automated by and available from GRANIT, University of New Hampshire.

NH Natural Heritage Bureau BIOTICS database January 21, 2009 (species/community richness)

The Nature Conservancy, Conservation Science Support. 2008. *Ecological Land Units*. 30m raster data. Available from TNC, Eastern Resource Office, Boston, MA.

The Nature Conservancy (J. Tollefson). 2005. GAP Status Assessment of NH Conservation Lands. Unpublished report to the NH Fish and Game Department.

The Nature Conservancy. 2006. NH Forest Block Model.

United States Geological Survey. Date varies, complete by 2003. *National Elevation Dataset*. 30m raster data. Projected by Complex Systems Research Center in January 2005, available from GRANIT, University of New Hampshire.

Vermont/New Hampshire GAP Analysis Project – Draft Vertebrate Distributions. 2001. Vermont Cooperative Fish & Wildlife Research Unit, School of Natural Resources, University of Vermont.

V-LATE 1.1 Vector-based Landscape Analysis Tools (Extension for ArcGIS 9). Dirk Tiede, Stefan Lang, Hermann Klug, Tobias Langanke. The development of V-LATE has been financed by the EU project. SPIN (Spatial Indicators for European Nature Conservation, Contract No. EVG2-2000-0512, 2001-2004)

Zankel, M. 2005. Integrated Fragmentation Surface for the State of New Hampshire. The Nature Conservancy, Concord NH. Unpublished report to NH Fish and Game Department.