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

DATA LAYER:	Northern hardwood-conifer habitats of New Hampshire
COVER NAME:	norhwdconifer
COVER CONTENTS:	Northern hardwood-conifer 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 Northern hardwood-conifer 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 500' – 1,400' based on criteria developed by experts from The Nature Conservancy, New Hampshire Fish and Game, NH Audubon, and the NH Natural Heritage Bureau. Appropriate elevation ranges were determined for each of New Hampshire's nine ecoregional subsections in which northern hardwood-conifer is expected to occur. Refer to the complete model criteria table for a detailed list of land cover grid values and elevation ranges, stratified by ecoregional subsection.

- Ecological Land Units, created by The Nature Conservancy's Conservation Science Support, were also incorporated to capture additional areas likely to have geo-physical conditions favorable to northern hardwood-conifer, or remove areas likely to have geo-physical conditions unfavorable to northern hardwood-conifer. South-facing side slopes and south-facing coves were removed from some land cover/elevation groups, and some land cover/elevation groups were restricted to only north-facing side slopes and north-facing coves.

- The NHFG Department had previously completed a model to map high-elevation spruce fir in New Hampshire, based on a Vermont Institute of Natural Science (VINS: Lambert et al. in press) elevation threshold, which depicts the lower elevation limit of Bicknell's Thrush habitat, Hale's (in press) Bicknell's Thrush probability surface, and NH Natural Heritage Bureau (NHB) exemplary high-elevation spruce-fir natural communities. There were some areas which fell between the lowest elevation of this high-elevation spruce fir model, and the upper elevation of the northern hardwood conifer model. Areas in this gap that met the other requirements for northern hardwood conifer were assigned to the northern hardwood conifer matrix type.

- The lowland spruce-fir model layer was used to erase some areas of overlap from the northern hardwood conifer layer, so that the lowland spruce fir model was considered to take precedence over northern hardwood-conifer model. The criteria for the lowland spruce-fir model were based on more information than the northern hardwood conifer model, and without the lowland spruce-fir precedence lowland spruce-fir appeared to be under predicted overall.

- 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.

Item definitions for NORHWDCONIFER polygon attributes:

ITEM NAME				DESCRIPTION
FGID				unique sequential polygon ID number
ACRES	8	N	1	Area (acres)
HECTARES	8	N	2	Area (hectares)
DENSROADS	5	N	2	Road density in the area/unit (km/km2)
IFESMEAN	2	I	0	Mean IFES score (Integrated Fragmentation Effects Surface The Nature Conservancy; Zankel, 2005)
POP00SQMI	8	I	0	Population density in 2000 (persons per square mile)
HU00SQMI	8	I	0	Housing units density in 2000 (houses per square mile)
PROXINDEX	8	N	2	Proximity index (1km distance)
WETPCT	5	N	2	Percent wetland
ELU30VAR	3	I	0	Variety of ecological land units (ELU30 = elevation, substrate, landform)
HG_TOT	16	N	6	average total deposition of mercury (wet [precipitation + cloud water interception] + dry [GEM + RGM + aerosol]) by land cover type within the polygon (Miller et al, 2005)
CA_INDEX	16	N	6	avg deposition index, rate of cation depletion per ha/per year (Miller et al, 2005)
MILLERPCT	5	F	1	percent matching Miller forest types (defined below)
GAPVERTMAX	3	I	0	Vertebrate species maximum (VT/NH GAP Analysis)
A_RICH_BUF	3	I	0	Species richness of rare animals within their dispersal distances from the polygon (2009)
A_RICH_POL	3	I	0	Species richness of rare animals within polygon (2009)
P_RICH_POL	3	I	0	Species richness of rare plants in polygon (2009)
C_RICH_POL	3	I	0	Richness of exemplary natural communities in polygon (2009)
ECOSUB	40	C	0	Ecoregional subsection
CONS_AC	10	N	1	Conservation (acres)
CONS_PCT	5	F	1	Conservation (percent)
FORBLOCK	8	N	1	TNC forest block size (acres)

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).

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

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

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)

Wind power raster data provided by Massachusetts Technology Collaborative. (June 2003).
    Developed by TrueWind Solutions, LLC under contract to AWS Scientific, Inc as part of a project
    jointly funded by the Connecticut Clean Energy Fund, Mass. Technology Collaborative, and
    Northeast Utilities System.

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.