New Hampshire Fish & Game Department
Spatial Data Notes

DATA LAYER:	Rocky-ridge/Talus slope habitats of New Hampshire
COVER NAME:	ridge_talus
COVER CONTENTS:	rocky-ridge and talus slope habitat polygons
COVER TYPE:	Poly
SOURCE:	TNC ecological land units; NH County Soils Surveys; USGS 30m DEM
SOURCE SCALE:	1:24,000 and 30-meter raster
SOURCE MEDIA:	digital
COORDINATE SYSTEM:	NH Stateplane feet; horizontal datum NAD83
TILE:	State
AUTOMATED BY:	NH Fish & Game Department
STATUS:	Complete
LAST REVISION:	December 2008; attributes revised December 2009

General Description of the Data

- Development of this coverage provides general rocky-ridge and talus slope 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.

- Talus slopes range from open, lichen covered talus “barrens” to closed-canopy forested talus communities (Sperduto and Nichols 2004). Rocky ridges generally occur on outcrops and shallow-to-bedrock ridge and summit settings (Sperduto and Nichols 2004).

- To attempt to map potential locations for these habitats/communities, existing NHB exemplary rocky ridge and talus community polygons were overlayed atop landforms delineated within The Nature Conservancy’s Ecological Landunit (ELU) datalayer (TNC 2003) to determine if a correlation existed. Rocky ridges were found to occur on s-facing slide slopes, n-facing sideslopes, slope crests, steep slopes, and low hills. Talus slopes were found to occur on steep slopes, cliffs, s-facing side slopes, s-facing coves, and n-facing coves. The landforms associated with rocky ridges were then combined with concave and neutral surfaces generated from 30-m digital elevation model data to attempt to predict other occurrences of this community type, while talus slope landforms were combined with convex and neutral surfaces identified from a 30-m DEM. In addition to there being tremendous overlap between the areas predicted for both, a significant amount of the state was predicted as being one or the other community type. As such other data was investigated to create a better habitat/community model.

- Data within the NH county soil surveys was found to be the best current alternative for mapping potential locations of rocky ridges and talus slopes. Rocky ridges are typically found in areas that are shallow to bedrock. Shallow to bedrock areas were isolated from the soils layers using the data fields, “bedrock_shallow,” defined as the distance from the soil surface to the shallowest depth to bedrock for any of the major components, and “bedrock_deep” defined as the distance from the soil surface to the deepest depth to bedrock for any of the major components using the parameters outlined in Table 1.

Table 1. Parameters used to identify shallow to bedrock areas using county soil survey data provided by GRANIT at Complex Systems Research Center, UNH (2003).

County	Bedrock Shallow Depth (cm)	Bedrock Deep Depth (cm)	# Polygons
Belknap	--	--	--
Carroll	0	0, 20	132
Cheshire	0	0	15
Coos	0	0, 20, 26	39
Grafton	0	20, 26	60
Hillsborough East[b]	NA	NA	NA
Hillsborough West	0	0[a]	37
Merrimack	--	--	--
Rockingham	0	40	75
Strafford	0	0[a]	4
Sullivan	0	0[a]	10
Total			**372**

Soils data Belknap/Merrimack counties provisional, was not recommended for use.
[a] Next lowest available depth was 40 cm which would have resulted in an unreasonable increase in the number of polygons identified (e.g., hundreds of polygons being selected rather than < 100 polygons).

[b] Hillsborough East was left out of this analysis because lowest "Bedrock Deep Depth" available was 40 cm, which would have resulted in an unreasonable number of polygons being identified.

Shallow to bedrock areas identified using these parameters tended to be classified as rock outcrops many with steep or very steep slopes. It is reasonable to assume that many such areas could actually be talus slopes. As such, the two communities were lumped for this analysis.

- The polygons identified by the soils analysis were combined with known NHB exemplary rocky ridge and talus slope exemplary natural communities. The NHB rocky ridge communities that were included were:

  Appalachian oak - pine rocky ridge
  Chestnut oak forest/woodland
  Dry Appalachian oak - hickory forest
  Jack pine rocky ridge woodland
  Montane acidic cliff
  Montane heath woodland
  Red oak - ironwood - Pennsylvania sedge woodland
  Red oak - pine rocky ridge
  Red pine rocky ridge
  Red spruce - heath - cinquefoil rocky ridge

  The NHB talus slope communities that were included were:

  Montane lichen talus barren
  Red oak - black birch wooded talus
  Red oak - hickory wooded talus
  Spruce - birch - mountain maple wooded talus
  Subalpine cold-air talus barren

Polygons were then delineated as being either “NHB Ridge” for known locations of rocky ridge communities, “NHB Talus” for known locations of talus barren communities, or “Potential” for areas that could potentially be either.

- Even though soils data currently is the best available data to map potential rocky ridge and talus slope communities, using soils data alone accurately predicted only 4 of 20 (20%) NHB talus communities and 29 of 92 (32%) NHB rocky ridge communities. As such, there are likely substantially more rocky ridge and talus slope communities in the state than what this model currently predicts. Since much of the soils data is based on interpretation of aerial photos and topographic maps, errors of omission or commission are possible. The extant of these errors is currently unknown. Field verification will need to take place to better ascertain levels of error.

Item definitions for RIDGE_TALUS polygon attributes

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
FGID	5	I	0	(*unique, sequential ID number*)
STATUS	15	C	0	KNOWN or POTENTIAL
UNIT_NAME	50	C	0	Name of conservation planning unit
ACRES	8	N	1	area (acres)
HECTARES	8	N	2	area (hectares)
TOTALAC	8	N	1	total area of contiguous ridge/talus/cliff (acres)
TOTALHA	8	N	2	total area of contiguous ridge/talus/cliff (hectares)
DISTROAD	8	I	0	Distance to nearest road (meters)
HIKEDENS	5	N	2	Density of hiking trails in the unit (km/km2)
DISTHIKE	8	I	0	Distance to nearest hiking trail (meters)
DISTRAIL	8	I	0	Distance to nearest railroad (meters)
ELU30VAR	3	I	0	Variety of Ecological Land Units (ELU30 = elevation, substrate, landform)
AREA_M2	8	N	1	Total size of area/unit (square meters)
PERIM_M	8	N	1	Total perimeter of area/unit (meters)
SHAPEINDEX	5	N	1	Shape index (value of 1 is nearly square)
PROXINDEX	5	N	1	Proximity index
NEARDIST	8	I	0	Distance to nearest neighboring area/unit (meters)
NEARFGID	4	I	0	ID of nearest neighbor
IFESMEAN	2	I	0	Integrated Fragmentation Effects Surface score (Zankel, 2005)
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)
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 natural communities in polygon (2009)
BIO	8	N	2	Raw biological score (high score = high quality)
LAND	8	N	2	Raw landscape score (high score = high quality)
HUMAN	8	N	2	Raw human impact score (high score = low impact)
COND	8	N	3	Raw habitat condition score (high score = good condition)
ECOSUB	40	C	0	Ecoregional subsection
CONDITION	40	C	0	WAP Priority based on COND score
PRIORITY	40	C	0	WAP Priority based on COND score and EO add-ins
CONS_AC	10	N	2	Conservation (acres)
CONS_PCT	5	F	1	Conservation (percent)

8 March 2010
Spatial Data Notes: RIDGE_TALUS

NOTES:

BIO Condition = ($A\_RICH\_BUF_R$*.25) + ($A\_RICH\_POL_R$*.25) + ($P\_RICH\_POL_R$*.25) + ($C\_RICH\_POL_R$*.25)
where all biological variables are positive indicators of biological quality and subscript denotes percentile rank, thus "good" sites score high (maximum percentile rank=100) and "poor" sites score low (minimum percentile rank=0).

LAND Condition = ($HECTARES_R$*.25) + ($TOTALHA_R$*.25) + ($PROXINDEX_R$*.25) + ($ELU30VAR_R$*.25)
where all landscape variables are positive indicators of landscape integrity and subscript R denotes percentile rank, thus "good" sites score high (maximum percentile rank=100) and "poor" sites score low (minimum percentile rank=0); and TOTALHA is total contiguous area of adjacent ridge/talus/cliff habitat combined.

HUMAN Condition = ($IFESMEAN_R$*.2) + ($DISTHIKE_R$*.2) + ($DISTROAD_R$*.2) + ($HGTOT_R$*.2) + (CA_INDEX_R*.2) where deleterious human impact variables have been transformed so that all variables are positive indicators of ecological integrity and subscript R denotes percentile rank, thus "good" sites score high (maximum percentile rank=100) and "poor" sites score low (minimum percentile rank=0).

COND The condition index = (BIO+LAND+HUMAN)/3 as defined above

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).

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.

DATA SOURCES:

New Hampshire Natural Heritage Bureau. January 2005. *Exemplary Natural Community Data*. Scale varies, vector data. Available with permission from the NH Natural Heritage Bureau.

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

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

The Nature Conservancy, Conservation Science Support. 2003. *Ecological Land Units*. 30m raster data. Available from TNC, Eastern Resource Office, Boston, MA.

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.

Vogelmann, J.E., S.M. Howard, L. Yang, C.R. Larson, B.K. Wylie, and N. Van Driel. 2001. Completion of the 1990s National Land Cover Data Set for the conterminous United States from Landsat Thematic Mapper data and ancillary data sources. Photogrammetric Engineering and Remote Sensing 67:650-662.

Wind power raster data provided by Massachusetts Technology Collaborative (data finalized 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.