New Hampshire Fish and Game Department
Spatial Data Notes

DATA LAYER:	Threat/condition attributes for peatlands complexes
COVER NAME:	PEATLANDS_250COMPLEX
COVER CONTENTS:	peatlands complexes, 250m buffer
COVER TYPE:	Poly
SOURCE:	DRED Natural Heritage Bureau (NHB) peatlands habitat
SOURCE SCALE:	1:24,000
SOURCE MEDIA:	digital
COORDINATE SYSTEM:	NH Stateplane feet; horizontal datum NAD83
TILE:	State
AUTOMATED BY:	NH Natural Heritage Bureau
STATUS:	Complete
LAST REVISION:	May 2005; attributes revised April 2006; metadata revised August 2006

General Description of the Data

- Development of this coverage provides condition assessment of marsh-wet meadow-scrub shrub wetland complexes 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.

- Potential peatlands were mapped by system, outlined below. For all systems, any wetlands adjacent to an NWI river or lake, or a major river from the US EPA Reach File 3, were excluded.

- *Black spruce peat swamp:* The two forested systems in this habitat are the black spruce peat swamp and temperate peat swamp. Analysis of all fifteen NHB black spruce peat swamp element occurrences showed that NWI categories nearly always had a primary vegetation class of FO4 mixed with SS or another FO. Water regimes were always E. Thus, all NWI wetlands with these characteristics were selected and grouped into contiguous polygons. The black spruce peat swamp system does not typically have an inlet, nor is it adjacent to lakes or ponds, so any of these grouped polygons that abutted an NWI lake were deleted, as well as those which had more than one intersection with streams (from the hydrography layer, all streams but level 6, which are larger rivers). Multiple stream intersections would indicate both an inlet and an outlet.

- *Temperate peat swamp:* The same analyses were performed for the temperate peat swamp, except that vegetation classes of FO1/FO4, FO1/SS3, and FO1/SS4 were used, based on the vegetation description in Sperduto 2004. Since this system only occurs in central and southern New Hampshire, wetlands in the White Mountains, Vermont Piedmont, Mahoosic-Rangely, and Connecticut Lakes ecoregion subsections were excluded.

- *Kettlehole bog:* Of 24 NHB kettlehole bog element occurrences, 17 had SS3 as one of the vegetation types. Thus, for kettlehole bogs, all wetlands with SS3 in combination with any other vegetation category, and which had hydrologic regimes of B, C, or E (D. Sperduto, pers. comm.) were selected. To be sure that any adjacent, incorrectly classed NWI wetlands were also included, other primarily SS wetlands with B,C, or E hydrologies that were adjacent to the selected SS3 wetlands were added to the set. Wetland groups from the black spruce peat and temperate peat systems were also added if they intersected the potential kettlehole bog wetlands, since kettlehole bogs often have lagg zones with the same communities as these two systems (Sperduto 2004). Adjacent wetlands were grouped, and as with the previous two systems, kettlehole bogs do not have an inlet and are not adjacent to lakes, so groups of wetlands intersecting more than one stream, or adjacent to an NWI lake, were excluded.

- Because kettlehole bogs often have open water and peat mats in the center, wetlands with any combination of vegetation codes UB, AB, and EM (the latter could be an incorrectly classed peat mat), and hydrologic regimes of H or F, were added if they were completely surrounded by suitable kettlehole bog wetlands. In addition, any other small SS, FO, or EM wetlands that were completely surrounded by the potential kettlehole wetlands were added so there would be no holes in the bogs.

- These potential kettlehole bogs were then analyzed based on landscape position and size. Any kettlehole bog groups of more than 20 acres in size were removed (Sperduto 2004). Kettlehole bog groups that were part of a larger wetland complex of more than 20 acres were also excluded. Finally, because NHB kettlehole bog element occurrences were usually isolated from other wetlands with the exception of some that were adjacent to forested wetlands, any potential kettlehole groups that intersected other non-forested wetlands were removed.

- Finally, individual NWI wetlands that had been classed as both kettlehole bogs and either black spruce peat swamp or temperate peat swamp were analyzed visually and assigned to only one of the categories based on whether the forested wetland created an outer ring around the other kettlehole bog wetlands (in which case it was assigned to the kettlehole bog system) or whether it projected out to the side (in which case it was assigned to the appropriate forested system). Note that any forested peatland system wetlands that had been removed from the kettlehole bog system in earlier analyses were *not* removed from their original forested peatland system.

- *Coastal conifer peat swamp:* All NWI wetlands with a vegetation class dominated by FO4 and a hydrologic regime of B,C, or E were selected (Sperduto 2004, D. Sperduto pers. comm.). Because this system does not have an emergent or open water component, only combinations including FO and SS were included. It is extremely likely that all of the inland coastal conifer peat swamp systems have been discovered, so for this map of predicted wetlands, only those within the two coastal subsections (Gulf of Maine Costal Plain and Gulf of Maine Coastal Lowland) were included. Any wetland that overlapped a previously predicted black spruce peat swamp wetland was classed as potentially being either of these two systems.

- *Northern white cedar minerotrophic swamp:* All NWI wetlands with a vegetation class dominated by FO4 and a hydrologic regime of B,C, or E were selected (Sperduto 2004, D. Sperduto pers. comm.). Wetlands for this system were restricted to the two northernmost ecoregion subsections (Mahoosic-Rangeley and Connecticut Lakes).

- *Medium level fen and other peatlands:* For remaining peatlands, all other wetlands with any vegetation class including SS2, SS3, or SS4 with hydrologic regime of B, C, or E were selected. Added to this set were wetlands with a dominant vegetation class of any SS category, as well as EM, EM1, and any EM/SS combination, with B,C, or E hydrology, and which intersected the initial set. This last selection was based on the numerous NWI wetlands of "non-peat" classes that occurred along the margins of many peatland EO's, some of which may be misclassified in the NWI and which in reality are peatlands.

- From this selection, wetland groups with more than one stream intersection (indicating an inlet as well as an outlet) were designated as medium-level fen systems, since this is the only peatland system that can have a definable inlet (Sperduto 2004). Other peatlands located over 2500 feet in elevation were classed as "Alpine/subalpine bog system or montane sloping fen system" (USGS 2001). All others were classed as "System Unknown."

- *Addition of known peatlands:* Any predicted peatland that significantly overlapped an element occurrence peatland was replaced by the element occurrence, because of increased mapping accuracy of the element occurrence boundaries. The same procedure was conducted with peatlands from NHB surveys that have not yet been added to Biotics (Peatbound). For NHB EO and non-EO peatlands that overlapped predicted peatlands only slightly, the overlap was clipped out of the predicted peatlands, and all three layers (predicted peatland, element occurrence peatlands, and non-EO peatlands) were merged together.

- Wetlands were merged into complexes to create a second new layer, Peatlands_250complex, with the criterion that a complex consisted of wetlands separated by no more than 250m. Wetlands initially within the same complex but with a major route (from the Routes layer) between them were assigned to different complexes. In a few cases, a wetland slightly overlapped a route, due to differences in spatial accuracy between the layers. In these cases, the wetland was not split, but was assigned to the complex in which most of the wetland fell.

- Buffers of 250m radius were generated around each peatland complex, excluding the peatland complex itself. Within this buffer, the percent area of each landcover classification from the New Hampshire Land Cover layer was calculated. In addition, the total area of fee ownership and easement conservation land within each buffer was calculated, using the Conservation Lands layer (Complex Systems Research Center)

Potential Errors in the Data

The National Wetlands Inventory maps can underpredict peatlands and peatland vegetation (D. Sperduto, pers. comm.). An attempt was made to account for this error by including other non-peatland NWI types adjacent to peatland types, but this may not offset all the error, and it may also introduce new errors of overprediction.

Any spatial errors in the NWI, hydrography, and EPA Reach File 3 layers could result in erroneous analyses of adjacency to streams, rivers and lakes, which could result in the elimination of some wetlands that should actually be considered peatlands, or the inclusion of wetlands that should not be considered peatlands.

Classification of wetlands into specific systems could contain error based on the general nature of NWI categories and the lack of more detailed information to aid in the classification.

Item Defintions for PEATLANDS_250COMPLEX polygon attributes:

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
ID250	5	I	0	Sequential number assigned to buffer polygons
ACRES	16	N	3	Total area of the peatland complex (acres)
AREA_HA	16	N	3	Total area of the peatland complex (hectares)
NO_SYSTEMS	8	I	0	Number of NHB systems in the complex
NO_POLYS	8	I	0	Number of non-contiguous polygons in the complex
KM_MULTIPY	16	N	3	Distance to nearest other complex with more than 1 polygon
KM_ROUTE	16	N	3	Distance to nearest major transportation route (km)
AVG_KM_RTE	16	N	3	Mean minimum distance (km) to major trans. route
KM_MARSH	16	N	3	Distance to nearest marsh complex (km)
A_RICH_BUF	3	I	0	Species richness of rare animals within their dispersal distances from the polygon
A_SF_BUF	3	I	0	Number of source features of rare animals within their dispersal distances from the polygon
A_SHAN_BUF	3	N	3	Shannon diversity index of rare animal source features within their dispersal distances from the polygon
A_RICH_POL	3	I	0	Species richness of rare animals within polygon
A_SF_POLY	3	I	0	Number of source features of rare animals within polygon
A_SHAN_POL	3	N	3	Shannon diversity index of rare animal source features in poly
P_RICH_BUF	3	I	0	Species richness of rare plants within 1km of polygon
P_SF_BUF	3	I	0	Number of source features of rare plants within 1km of polygon
P_SHAN_BUF	3	N	3	Shannon diversity index of rare plant source features within 1km
P_COND_BUF	2	C	0	Average rank of rare plant source features within 1km of polygon
P_DISP_BUF	3	N	3	Dispersal of rare plant source features within 1km of polygon
P_RICH_POL	3	I	0	Species richness of rare plants in polygon
P_SF_POLY	3	I	0	Number of source features of rare plants in polygon
P_SHAN_POL	3	N	3	Shannon diversity index of rare plant source features in polygon

Item Defintions for PEATLANDS_250COMPLEX polygon attributes: (continued)

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
C_RICH_BUF	3	I	0	Richness of rare and exemplary natural communities within 1km
C_SF_BUF	3	I	0	Number of source features of rare and exemplary natural communities within 1km of polygon
C_COND_BUF	2	C	0	Average rank of rare and exemplary natural community source features within 1km of polygon
C_AREA_BUF	3	N	3	Percent of area within 1km of polygon that is rare or exemplary natural community
C_AREA_POL	6	N	3	Percent of polygon that is rare or exemplary natural community
C_RICH_POL	3	I	0	Richness of rare and exemplary natural communities in polygon
C_SF_POLY	3	I	0	Number of source features of rare and exemplary natural communities in polygon
DEV_250M	16	N	3	Percent of 250m buffer of complex that is developed
AG_250M	16	N	3	Percent of 250m buffer of complex that is agriculture
FOR_250M	16	N	3	Percent of 250m buffer of complex that is forest
WAT_250M	16	N	3	Percent of 250m buffer of complex that is water
WET_250M	16	N	3	Percent of 250m buffer of complex that is wetland
OP_250M	16	N	3	Percent of 250m buffer of complex that is open/cleared
NATURAL_	16	N	3	Percent of 250m buffer of complex that is forest, water or wetland
CONS_BUFF	16	N	2	Percent of land within 250m buffer of complex that is conserved
FEE_OWN_HA	16	N	3	Area of 250m buffer that is conservation fee ownership
EASE_HA	16	N	3	Area of 250m buffer that is conservation easement/other
GAP123HA	12	N	2	Area in conservation GAP management status 1,2 or 3 (TNC 2005)
GAP123PCT	5	N	1	Percent in conservation GAP management status 1, 2 or 3
IFESMEAN	2	I	0	Mean Integrated Fragmentation Effects score (Zankel 2005)
ECOREGION	40	C	0	Ecoregional subsection
WSGROUP	1	C	0	Watershed Group (single character ID; TNC classification)
WSGNAME	30	C	0	Watershed Group name (TNC classification)
HAB	8	C	0	Habitat name (abbrv)
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)
DEV	8	N	3	Raw development risk (high score = high risk)
RISK	8	N	3	Raw risk score (high score = high risk)
WSGBIO	3	I	0	Watershed Group biological rank (high rank = high quality)
WSGLAND	3	I	0	Watershed Group landscape rank (high rank = high quality)
WSGHUMN	3	I	0	Watershed Group human impact rank (high rank = low impact)
WSGCOND	3	I	0	Watershed Group habitat condition (high rank = good condition)
WSGDEV	3	I	0	Watershed Group development risk (high rank = high risk)
WSGRISK	3	I	0	Subsection risk rank (high rank = high risk)
NHBIO	3	I	0	Statewide biological rank (high rank = high quality)
NHLAND	3	I	0	Statewide landscape rank (high rank = high quality)
NHHUMN	3	I	0	Statewide human impact rank (high rank = low impact)
NHCOND	3	I	0	Statewide habitat condition rank (high rank = good condition)
NHDEV	3	I	0	Statewide development risk rank (high rank = high risk)
NHRISK	3	I	0	Statewide risk rank (high rank = high risk)
PRIORITY	50	C	0	Priority (based on statewide and regional condition rank)
S1	1	C	0	Contains an EO of an S1 rank wildlife species
S2	1	C	0	Contains an EO of an S2 rank wildlife species
LEVEL1	1	C	0	Contains an EO of a WAP Level 1 wildlife species
LEVEL2	1	C	0	Contains an EO of a WAP Level 2 wildlife species
LEVEL3	1	C	0	Contains an EO of a WAP Level 3 wildlife species
LEVEL4	1	C	0	Contains an EO of a WAP Level 4 wildlife species

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NOTES

BIO1 Condition score = ($A\_RICH\_BUFF_R$*.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).

LAND1 Condition score = ($HECTARES_R$*1.00)
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).

HUMAN2 Condition score = ($IFESMEAN_R$*.34) + ($\%NATURAL_R$*.33) + ($DIST\_HUM_R$*.33)
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).

COND2 The condition index = (BIO1+LAND1+HUMAN1)/3 as defined above

Item Definitions for PEATLANDS_BUF polygon attributes (250m buffer of the complexes):

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
ACRES	12	N	1	Area of buffer in acres
SQKM	12	N	3	Area of buffer in square kilometers
HECTARES	8	N	1	Area of buffer in hectares
PRIMEWET	1	C	0	Y or N, designated prime wetland area
NONBBIRD	1	C	0	Y or N, in non-breeding bird area
WETPERMITS	5	I	0	# Wetlands Bureau permits (non-forestry)[1]
FORPERMITS	5	I	0	# Wetlands Bureau forestry permits
KNOWNCS	5	I	0	Number of known contamination sites
POTENTCS	5	I	0	Number of potential contamination sites
EXOTICS	1	C	0	Downstream of exotic aquatic plant infestation
DRAWDOWN	1	C	0	Within 100m of a water body subject to fall draw down[2]
WATERUSER	1	C	0	Within 4000 ft of large water withdrawal
DOTMAJORKM	8	N	1	Kilometers of NHDOT maintained state & local roads
DOTMINORKM	8	N	1	Kilometers of private or gravel roads
DENSMAJOR	5	N	2	Density of NHDOT roads (km/km2)
DENSMINOR	5	N	2	Density of private or gravel roads (km/km2)
NREL4HA	8	N	2	Natl' Renewable Energy Laboratory wind power class 4
NREL4PCT	5	N	1	hectares, percent (commercial turbine potential)
NREL2HA	8	N	2	Natl' Renewable Energy Laboratory wind power class 2
NREL2PCT	5	N	1	hectares, percent (small turbine potential)
DISTNREL4	8	N	0	Distance (m) to nearest NREL class 4 polygon 4+ acres
DISTTOWER	8	I	0	Distance to nearest communication tower (meters)
DISTROAD	8	I	0	Distance to nearest road (meters)
DISTRAIL	8	I	0	Distance to nearest railroad
CONSFO	8	N	2	Area in conservation fee ownership (hectares)
CONSFO_PCT	5	N	1	Percent land area in conservation fee ownership (%)
CONSCE	8	N	2	Area in conservation easement/other (hectares)
CONSCE_PCT	5	N	1	Percent land area in conservation easement/other (%)
ELU30VAR	3	I	0	Variety of ecological land units (ELU30 = elevation, substrate, landform)

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NOTES:
[1] Count of Wetlands permits represents five year total: 2000, 2001, 2002, 2003, 2004
"Dock notifications" were excluded from the permit count
[2] 2004 List of water bodies subject to drawdown (NHDES)

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: wilddiv@wildlife.state.nh.us

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