NH Natural Heritage Bureau
Spatial Data Notes

DATA LAYER:	forest floodplain complexes
COVER NAME:	FLOODPLAIN_500COMPLEX
COVER CONTENTS:	forest floodplain complexes (condition within 500m buffer was evaluated)
COVER TYPE:	Poly
SOURCE:	TNC contractor at NH DRED Natural Heritage Bureau (NHB)
SOURCE SCALE:	1:24,000
SOURCE MEDIA:	digital
COORDINATE SYSTEM:	NH Stateplane feet, horizontal datum NAD83
TILE:	State
AUTOMATED BY:	NH Natural Heritage Bureau; condition attributes by NH Fish & Game Dept.
STATUS:	Complete
LAST REVISION:	May 2005; attributes revised April 2006; metadata revised June 2006

General Description of the Data

- To determine how high up the riverbank a floodplain forest could extend, all of the NHB floodplain forest element occurrence polygons from the Biotics database were analyzed (68 polygons). Within each polygon, the elevation range (difference between the minimum and maximum elevation) was calculated from the Nhvtned grid. Seventy-five percent of the calculated elevation ranges were 21 feet or less. The remaining polygons had elevation ranges which jumped discontinuously up to 100 feet or more, but visual analysis of these polygons revealed that these high elevation differences were not the result of changes in elevation perpendicular to the river (in the direction of flooding), but rather were due to changes in elevation as the stream flows downhill. Since the calculation of elevation range was intended to determine how high a floodplain could extend perpendicular to the river, these higher ranges were not considered to be indicative of typical floodplain elevation ranges. Thus, from each river, the portion of the riverbank rising 21 feet higher than the river elevation was selected.

- To calculate this 21-foot elevation difference, all areas of water from the landcover layer (Complex Systems Research Center 2001b) that intersected a river from the US EPA Reach File 3 (US Environmental Protection Agency 1998) were selected. This represented all of the rivers including wide impounded areas and some associated lakes. The latest state plane grid (with elevation in feet) derived from the digital elevation model (Complex Systems Research Center 2001a) was used. The elevation of every pixel within this selected area was calculated, and then every pixel in the state was assigned the elevation of the nearest river pixel. The difference between this nearest river elevation and the pixel's actual elevation was then calculated. Any pixel with a difference in elevation of 21 feet or less was selected.

- The grid was then converted to a polygon shapefile. Because the initial selection of rivers and adjacent water included some lakes as well as the coast, some of the predicted floodplain areas were not associated with a river. Thus, the polygons were clipped to only include river floodplains: either within 0.5km of the river if the polygon did not intersect a level 4 stream (from the hydrography layer), or within 1km of the river if the polygon did intersect a level 4 stream, in which case the polygon also had to be within 0.25km of the stream. These values were based on approximate average distances from NHB floodplain forest element occurrences to rivers and streams. In most cases, the polygons did not extend this far from the river and clipping did not reduce their size; however, large coastal areas and polygons next to lakes were removed in the clipping process. The resulting polygons were re-converted to final floodplains grid.

- The grid was then combined with the New Hampshire Landcover Assessment of 2001 and forested pixels were selected. Because wetlands can be an important part of a floodplain forest system, a second grid of floodplain combined with wetland pixels was created. Both grids were converted to shapefiles, and wetland polygons that intersected forested polygons were added to the forested polygons to create a layer of the entire floodplain forest. The shapefile was then converted back to a grid.

- Two majority filters (eight nearest neighbors) were run on this grid to smooth the polygons and eliminate one-pixel holes. Lastly, groups of fewer than 10 pixels were removed, to eliminate small triangular polygons in the final layer. The grid was then converted to a polygon shapefile and analyzed against a known floodplain forests that were not yet included as element occurrences (New_fpf layer). Ninety-three percent of these mapped floodplain forests overlapped the polygons in the shapefile. These known floodplain forest polygons, as well as the NHB floodplain forest element occurrences (Biotics database), were added to the shapefile.

- All polygons adjacent to (within 1km of) major rivers (reachtype "W" in the US EPA Reach File3 layer) were classed as major river silver maple floodplain systems (Sperduto 2004). Polygons that did not fall into this system classification, and which occurred within the four northern ecoregion subsections (Connecticut Lakes, Mahoosic-Rangeley, Vermont Piedmont, and White Mountains), and which overlapped coniferous or mixed forest (from the NH Landcover Assessment 2001) were classed as montane/near-boreal floodplain systems. Montane/near-boreal floodplain systems often have both a deciduous and coniferous component (Sperduto 2004), so in addition, any non-coniferous floodplain polygons that fell near (within 1km of) the same river segment as the coniferous floodplain polygons were also classed as montane/near-boreal floodplain system. All other polygons were classed as temperate minor river floodplain systems.

- Floodplain forest polygons were then grouped into complexes with polygons separated by 500m or less, to create the Floodplain_500complex layer. Adjacent polygons of the same system were dissolved to create the Floodplain_system layer.

- Landscape attributes for the Floodplain_500complex layer were calculated. A 1km buffer was generated around each complex (buffers overlapped, but each complex had a separate buffer). The percentage of the buffer, not including the complex itself, that was within each of the landcover classes was calculated. The same process was repeated but for 1km buffers clipped to only include areas within the floodplain, as an indicator of the surrounding floodplain area in various landcover classes. Some complexes, composed of Natural Heritage element occurrences and other survey polygons, did not fall within the predicted floodplain areas, so the floodplain-clipped buffer analyses could not be done for these polygons. Some complexes were composed of both predicted and Natural Heritage polygons which did not fall within predicted floodplains, so only a portion of the complex fell within the floodplain; for these, only that portion of the clipped buffer that fell within the floodplain was analyzed.

- Using an overlay of the floodplain layer and agricultural areas from the landcover layer, polygons of floodplain agricultural fields greater than one acre in size were selected. Floodplain forest polygons in all three shapefiles which were adjacent to one of these floodplain agricultural fields were attributed as such.

Potential Errors in the Data

Errors in the Nhvtned elevation grid would generate the most error in this model. Using the majority filter reduced some of this error, but likely not all of it. Noise in the elevation values of the pixels would reduce the area of flat slope, thus reducing the pixels selected for floodplains. By using a slope of one foot per pixel or less, some of this noise could be accounted for.

5 June 2006
Spatial Data Notes: FLOODPLAIN_500COMPLEX

Errors in land use classification in the NH Landcover Assessment 2001 layer could result in overprediction or underprediction of floodplain forest habitat, depending on whether non-forest and non-wetland pixels were incorrectly classified as forest or wetland, or vice versa. In addition, land use changes since 2001, mainly the conversion of forest or wetland to other land use classes, would result in an overprediction of floodplain forest habitat in areas where it no longer exists.

The selection of 0.5km from rivers without streams, and 1km from rivers with streams along with 0.25km from streams, as cut-offs for floodplain forest position, may in some cases eliminate actual floodplain forests from the model. More likely, however, is that most floodplain forests do not extend this far, so the model may over predict. This is more likely the case in areas with lower river flows that do not flood as far up the banks as the general 21-foot mark suggests.

Item definitions for FLOODPLAIN_500COMPLEX polygon attributes:

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
ID500	5	I	0	Sequential number assigned to complex
AREA	8	F	3	Area of buffer in sqft (*software assigned*)
PERIMETER	8	F	3	Perimeter of buffer in feet (*software assigned*)
ACRES	12	N	1	Area of buffer in acres
HECTARES	8	N	2	Area of buffer in hectares
AREA_M2	8	N	1	Total area (square meters)
PERIM_M	8	N	1	Total perimeter (meters)
NEARDIST	8	I	0	Distance to nearest neighbor (meters)
NEAR_FGID	4	I	0	ID of nearest neighbor
SHAPEINDEX	5	N	1	Shape index (1=square)
GAP123HA	8	N	2	Area in GAP mgt status 1,2 or 3 (TNC 2005)
GAP123PCT	5	N	1	Percent in GAP mgt status 1,2 or 3 (TNC 2005)
AG_1KMBUF	16	N	3	% of 1km buffer around complex that is agriculture
DEV_1KMBUF	16	N	3	% of 1km buffer around complex that is developed
FOR_1KMBUF	16	N	3	% of 1km buffer around complex that is forest
WAT_1KMBUF	16	N	3	% of 1km buffer around complex that is water
WET_1KMBUF	16	N	3	% of 1km buffer around complex that is wetland
OP_1KMBUFF	16	N	3	% of 1km buffer around complex that is open/cleared
AG_1KMFLD	16	N	3	% of floodplain within 1km that is agriculture
DEV_1KMFLD	16	N	3	% of floodplain within 1km that is developed
FOR_1KMFLD	16	N	3	% of floodplain within 1km that is forest
WAT_1KMFLD	16	N	3	% of floodplain within 1km that is water
WET_1KMFLD	16	N	3	% of floodplain within 1km that is wetland
OP_1KMFLD	16	N	3	% of floodplain within 1km that is open/cleared
ADJACENTAG	16	C	0	whether complex is adjacent to floodplain agriculture
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 of polygon
P_COND_BUF	2	C	0	Average rank of rare plant source features within 1km of polygon

Item definitions for FLOODPLAIN_500COMPLEX polygon attributes (continued):

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
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
C_RICH_BUF	3	I	0	Richness of rare and exemplary natural communities within 1km of polygon
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
IFESMEAN	2	I	0	Mean Int. Fragmentation Effects Surface score (Zankel, 2005)
DA_MI2	16	N	3	Drainage area of the floodplain complex (square miles)
DAMDA_MI2	16	N	3	Impounded drainage area of the floodplain complex (square miles)
DA_HA	16	N	3	Drainage area of the floodplain complex (hectares)
DAMDA_HA	16	N	3	Impounded drainage area of the floodplain complex (hectares)
ACTIVEDAMS	3	I	0	Count of active dams in the floodplain complex drainage area
NEARDAM	8	I	0	Distance from floodplain complex to nearest dam (meters)
PCTIMPOUND	5	N	1	Percent of floodplain complex drainage area that is impounded
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 rank (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)

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 = ($HECTARES_R$*.5) + (WET_1KMBUF_R*.5)
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) + ($PCTIMPOUNDED_R$*.33) + ($NEARDAM_R$*.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 FLOODCMPLXBUF polygon attributes (500m buffer):

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
ID500	5	I	0	Identification number assigned to floodplain complex
LANDHA	8	N	2	Land area in the buffer (ha)
LANDSQKM	8	N	3	Land area in the buffer (sqkm)
PRIMEWET	1	C	0	Y or N, designated prime wetland area
NONBBIRD	1	C	0	Y or N, in non-breeding bird area (*draft data, incomplete*)
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
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
DOTROADS	8	N	2	Kilometers of all roads
DENSROADS	5	N	2	Density of all roads (km/km2)
DOTMAJORKM	8	N	1	Kilometers of NHDOT maintained state & local roads
DENSMAJOR	5	N	2	Density of NHDOT roads (km/km2)
DISTROUTE	8	I	0	Distance to nearest route (meters)
DOTMINORKM	8	N	1	Km of gravel or unmaintained roads plus private roads
DENSMINOR	5	N	2	Density of minor roads (km/km2)
DISTROAD	8	I	0	Distance to nearest road (meters)
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 (%)
CONSHA	8	N	2	Area in conservation/public land-all types (ha)
CONS_PCT	5	N	1	Percent in conservation/public land-all types (%)
BUILDHA	8	N	2	Buildable area (hectares)
CNSTRNDHA	8	N	2	Buildable with constraints (ha)
BUILDPCT	5	N	1	Percent of area that is buildable (incl. constrained)
NREL4	1	C	0	Natl' Renewable Energy Laboratory wind power class 4
NREL2	1	C	0	Natl' Renewable Energy Laboratory wind power class 2
NREL4HA	8	N	2	Natl' Renewable Energy Laboratory wind power class 4
NREL4PCT	5	N	1	hectares and percent (commercial turbine potential)
NREL2HA	8	N	2	Natl' Renewable Energy Laboratory wind power class 2
NREL2PCT	5	N	1	hectares and percent (small turbine potential)
NREL4DIST	8	I	0	Distance (m) to nearest NREL class 4 polygon 4+ acres
TOWERCNT	3	I	0	Number of communication towers in the buffer
TOWERHT	3	I	0	Maximum height of communication towers (feet)
TOWERDIST	8	I	0	Distance to nearest communication tower (meters)

Item definitions for FLOODCMPLXBUF polygon attributes (500m buffer): continued

ITEM NAME	WDTH	TYPE	N.DEC	DESCRIPTION
TRANSKM	8	N	1	Total length of power transmission lines
TRANSDENS	5	N	2	Density of power transmission lines (km/km2)
DISTTRANS	8	I	0	Distance to nearest power transmission line or pipeline (m)
RAILKM	8	N	1	Total length of active and abandoned railroad (km)
RAILDENS	5	N	2	Density of railroad (km/km2)
DISTRAIL	8	I	0	Distance to nearest railroad (meters)
ELU30VAR	3	I	0	Variety of Ecological Land Units (ELU30 = elevation, substrate, landform)
IFESMEAN	2	I	0	Mean Int. Fragmentation Effects Surface score (Zankel, 2005)
ECOSUB	40	C	0	Ecoregional subection

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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