NH Natural Heritage Bureau
Spatial Data Notes

DATA LAYER:	forest floodplain complexes
COVER NAME:	FLOODFOR_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 December 2009

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 a 30m dem. 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 elevation data 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.

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 FLOODFOR_500COMPLEX polygon attributes:

ITEM NAME	DESCRIPTION
ID500	Sequential number assigned to complex
ACRES	Area of buffer in acres
HECTARES	Area of buffer in hectares
AREA_M2	Total area (square meters)
PERIM_M	Total perimeter (meters)
NEARDIST	Distance to nearest neighbor (meters)
SHAPEINDEX	Shape index (1=square)
GAP123HA	Area in GAP mgt status 1,2 or 3 (TNC 2005)
GAP123PCT	Percent in GAP mgt status 1,2 or 3 (TNC 2005)
AG_1KMBUF	% of 1km buffer around complex that is agriculture
DEV_1KMBUF	% of 1km buffer around complex that is developed
FOR_1KMBUF	% of 1km buffer around complex that is forest
WAT_1KMBUF	% of 1km buffer around complex that is water
WET_1KMBUF	% of 1km buffer around complex that is wetland
OP_1KMBUFF	% of 1km buffer around complex that is open/cleared
AG_1KMFLD	% of floodplain within 1km that is agriculture
DEV_1KMFLD	% of floodplain within 1km that is developed
FOR_1KMFLD	% of floodplain within 1km that is forest
WAT_1KMFLD	% of floodplain within 1km that is water
WET_1KMFLD	% of floodplain within 1km that is wetland
OP_1KMFLD	% of floodplain within 1km that is open/cleared
ADJACENTAG	whether complex is adjacent to floodplain agriculture
IFESMEAN	Mean Int. Fragmentation Effects Surface score (Zankel, 2005)
DA_MI2	Drainage area of the floodplain complex (square miles)
DAMDA_MI2	Impounded drainage area of the floodplain complex (square miles)
DA_HA	Drainage area of the floodplain complex (hectares)
DAMDA_HA	Impounded drainage area of the floodplain complex (hectares)
ACTIVEDAMS	Count of active dams in the floodplain complex drainage area
NEARDAM	Distance from floodplain complex to nearest dam (meters)
PCTIMPOUND	Percent of floodplain complex drainage area that is impounded
WSGROUP	Watershed Group (single character ID; TNC classification)
WSGNAME	Watershed Group name (TNC classification)
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)
BIO	Raw biological score (high score = high quality)
LAND	Raw landscape score (high score = high quality)

Item definitions for FLOODFOR_500COMPLEX polygon attributes: (continued)

ITEM NAME	DESCRIPTION
HUMAN	Raw human impact score (high score = low impact)
COND	Raw habitat condition score (high score = good condition)
ECOSUB	Ecoregional subsection
CONDITION	WAP Priority based on COND score
PRIORITY	WAP Priority based on COND score with EO add-ins
CONS_AC	Conservation (acres)
CONS_PCT	Conservation (percent)
FORBLOCK	TNC forest block size

NOTES:

BIO Condition score = $(A\_RICH\_BUF_R * .25) + (A\_RICH\_POL_R * .25) + (P\_RICH\_POL_R * .25) + (C\_RICH\_POL_R * .25)$
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 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).

HUMAN 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).

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

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:

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