

## APPENDIX E

### HABITAT STUDIES – SUPPLEMENTARY INFORMATION

#### Detailed Methods

In the 2010 Annual Report, Dillon consulted literature, other researchers, the wetland evaluation records, and used direct observation to produce a preliminary “Blanding’s Turtle Habitat Suitability Index” or HSI<sub>BT</sub> (Dillon Consulting Limited, 2010b). The intention of the index was to provide a numerical indicator of whether the evaluated habitat was a site where Blanding’s turtles might be found, and thus would indicate appropriate places to focus our sampling effort, or in the future, to look elsewhere in the City for Blanding’s turtles. This HSI<sub>BT</sub> was restricted to high probability habitats within the study area leaving much of the study area unclassified. The HSI<sub>BT</sub> was updated for the 2011 Annual Report to more habitats, but still did not classify all surfaces of the entire study area. (Dillon Consulting Limited, 2011b).

The 2010 HSI<sub>BT</sub> indicates that forested areas are considered relatively poor habitat for Blanding’s turtles. Although forested habitats are overall important for travel corridors between suitable habitat for feeding, mating, overwintering, and nesting, Blanding’s turtles do not spend the majority of their time in forested habitats. However, nesting may occur in or near certain forested areas as determined by the 2011 and 2012 field work, yet it is still unknown what makes certain areas stand out from others in terms of suitable nesting locations. Another alteration with the previous HSI<sub>BT</sub> was the vernal pools were considered mildly suitable, however, one vernal pool is actually a groundwater fed swamp and the suitability was upgraded to a higher level of suitability.

A different approach was taken in 2012 to further refine the HSI<sub>BT</sub> developed in 2010. To mitigate any real or perceived bias in the 2010 HSI<sub>BT</sub> and ensure transparency in the results, this new approach uses a Geographic Information System (GIS) to model Habitat Quality. The updated Blanding’s turtle habitat quality index (HSI<sub>BT</sub>) used a vegetation classification, Topographical Wetness Index (TWI), slope, and distance to water to subjectively classify Blanding’s habitat. The Vegetation Classification was determined using Ecological Land Classification (ELC) within the Terry Fox Drive area from 2009 (Dillon, 2010c) and vegetation classes of the South March Highlands Conservation Forests Management Plan (Brunton, 2008). Vegetation classification in areas where there was no information was determined using aerial photos and on-site visits. The ELC categories were generalized to suit the rest of the vegetation classes. The TWI was calculated within the GIS from a Digital Elevation Model (DEM). A 10 m resolution DEM was created using a Triangular Irregular Network (TIN) from 1 m contours (data provided by the MNR) around the study site. The required inputs for the TWI formula were derived from the DEM. This included flow accumulation and slope. The TWI was calculated using the TWI formula ( $TWI = \ln(1 + \alpha / \tan(1 + \beta))$  where ‘ $\alpha$ ’ is the flow accumulation and ‘ $\beta$ ’ is the local slope (in radians). Slope was determined from changes in elevation taken from the DEM. Lastly, distance to streams was

determined for the study area calculated as the Euclidian Distance from the watercourse within the property.

To create the new HQI<sub>BT</sub>, each factor (vegetation classification, TWI, and distance to streams) was given a habitat quality value using the experience obtained from the 2010 HSI<sub>BT</sub> and through literature review. For instance, vegetation and distance to streams was based on best knowledge of Blanding's turtle preferences (**Table E1**). TWI was scaled from 0-100 in which greater wetness had greater suitability (**Table E1**).

**Table E1. Subjective quality for variables used in the Blanding's turtle habitat quality index.**

Factor	Variable	Quality
<b>Vegetation characterization</b>	Deciduous Forest	35
	Deciduous Swamp	90
	Developed	10
	Meadow	15
	Mixed Forest	25
	Mixed Swamp	90
	Open Water	60
	Organic Meadow Marsh	90
	Organic Thicket Swamp	95
	Rock Barren	10
	Shrub Thicket	20
	Roadway	5
	Wildlife Crossings	90
<b>Distance to water</b>	0 - 10 m	100
	10 - 50 m	80
	50 - 100 m	40
	100 - 500 m	10
	500 - 600 m	5
<b>Topographical Wetness Index</b>	0 - 1	3

	1 - 2	11
	2-3	18
	3-4	25
	4-5	33
	5-6	40
	6-7	48
	7-8	55
	8-9	63
	9-10	70
	10-11	77
	11-12	85
	12-13	92
	12-13	99
<b>Slope</b>	0-1.5	100
	1.5-3.5	90
	3.5-6	75
	6-10	50
	>10	25

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Next, each factor is given a certain weighting and then all factors are combined to create an HSI for the area. The four factors were weighted so the vegetation classification was of equal weight to the two moisture indices and the slope index. (i.e., TWI weight = 16.7, distance to streams weight = 16.7, slope = 16.7, and vegetation weight = 50)

