

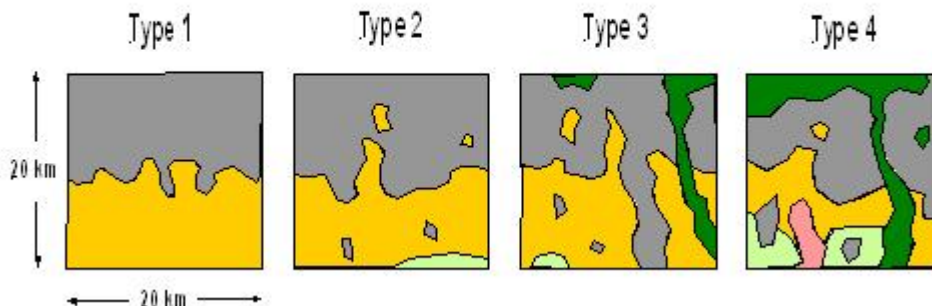
THE LAND BETWEEN AS AN ECOTONE

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“Within the past two decades research has revealed a new dimension to ecotones. They are recognized as being dynamic components of an active landscape, frequently playing significant roles in supporting high levels of biological diversity as well as primary and secondary productivity; modulating flows of water, nutrients, and materials across the landscape; providing important components of wildlife habitat; and acting as sensitive indicators of global change.” (Risser, 1995, 324). Some are even characterized by their own unique ecological functions and biodiversity. That makes it valuable to identify an ecotone as an ecological entity.

When the pattern of an ecotone is highly mixed, it may escape detection as most ecological classification systems seek uniform units. (Risser, 1987). Mixed or mosaic ecotones are a jumble of identifiable pieces, and the mixture distinguishes it from more homogeneous neighbouring landscapes. Researchers have identified both the scale and pattern of mingling ecosystems as important in determining how an ecotone behaves. The mosaic of The Land Between fits the complexity of Types 3 and 4 in the illustration of mosaic patterns below. There is no other ecotone in Ontario with so many varieties of physiography in its mosaic, packed into such a narrow band.

MOSAIC PATTERNS BY VARIATIONS IN COMPLEXITY



Model of types of mosaic complexity of physiography.

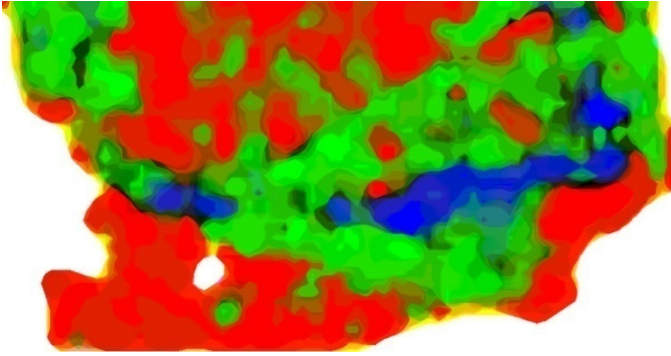
The character of The Land Between, as an ecotone, is shaped by fundamental transitions in:

1. physiography
2. elevation and relief
3. climate and plant hardiness
4. habitat interspersion including density of shorelines and waterbodies

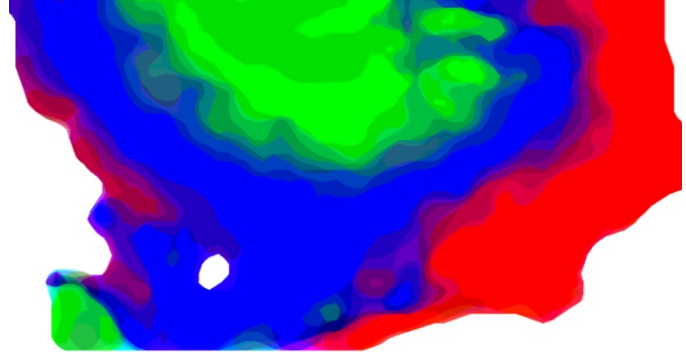
Working together, these features make The Land Between a distinguishable transition zone - an identifiable entity.

Preliminary analysis involving the overlaying of these various parameters, was conducted by U of T, with the following results:

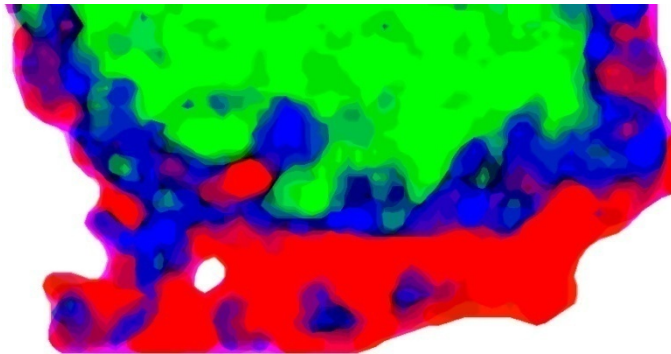
a)



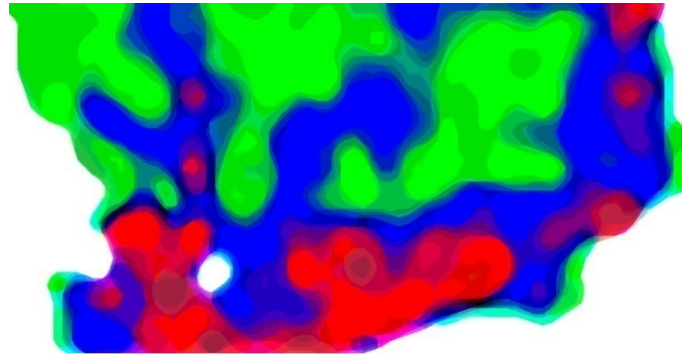
b)



c)



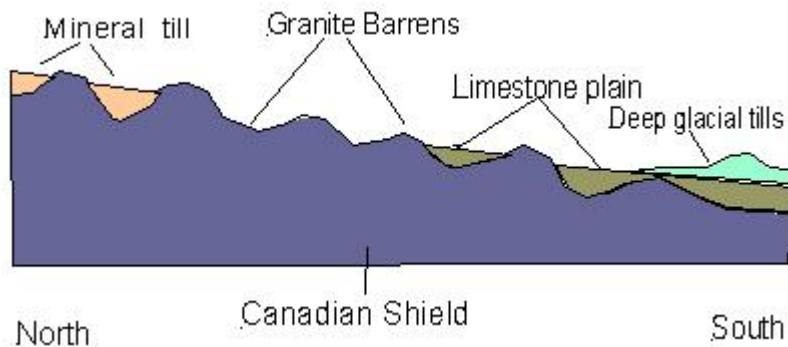
d)



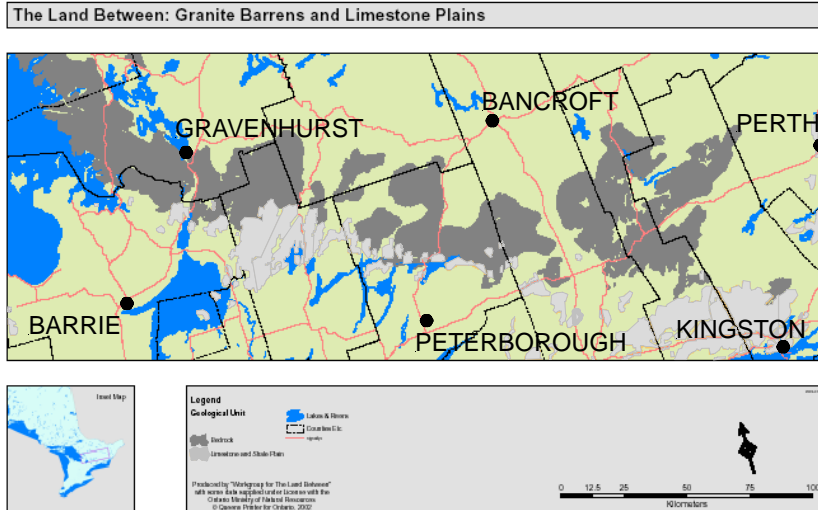
Allan Brand and Marie-Josée Fortin, Department of Ecology & Evolutionary Biology, University of Toronto, November 2007
Fuzzy boundary classes (blue indicates boundary location) for a) Wetlands and Water bodies, b) Elevation, c) Forest cover, and d) Road Density

Physiography

Looking at the physiography of The Land Between, we find three transitions in a narrow space, created by four areas of surficial geology. The centre has two strips of different bare rocks: Precambrian granite and sedimentary Ordovician limestone (Brownell and Riley, 2000)). Bare rock means an average of less than 15 cm soil cover (Lee et al., 1998). The different chemical characteristics of the rock types create differences in water and soil. Water tends to be acidic in the granite barrens and the Shield (except where the rock is marble). The marble, the limestone plains and the southern glacial tills are alkaline. Both kinds of water are mixed in rivers flowing through The Land Between.



cross-section of surficial geology



Granite barrens (dark gray) and limestone plains (light gray).
Ministry of Natural Resources, GIS data for surficial physiography.

Elevation and Relief

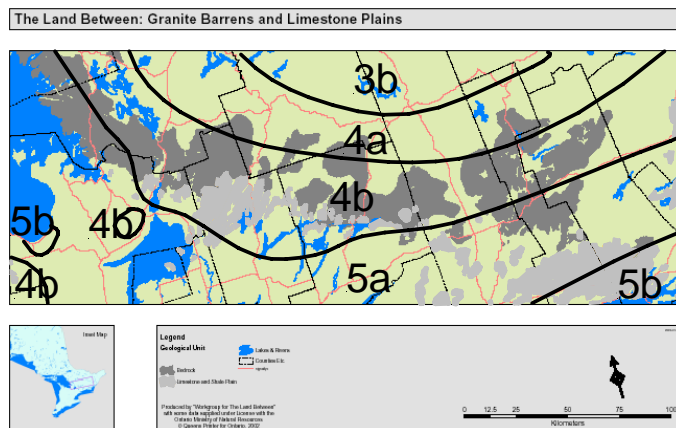
A broad change in elevation coincides with the geological transition from the St. Lawrence Lowlands towards the Algonquin Dome/The Canadian Shield. This general shift spans across The Land Between. The Land Between is also more rugged than the St. Lawrence Lowlands and less so than the Canadian Shield. Too the pattern of relief across the Land Between is irregular.



Elevation and Relief across Southern Ontario.
Ministry of Natural Resources

Climate and Plant hardiness

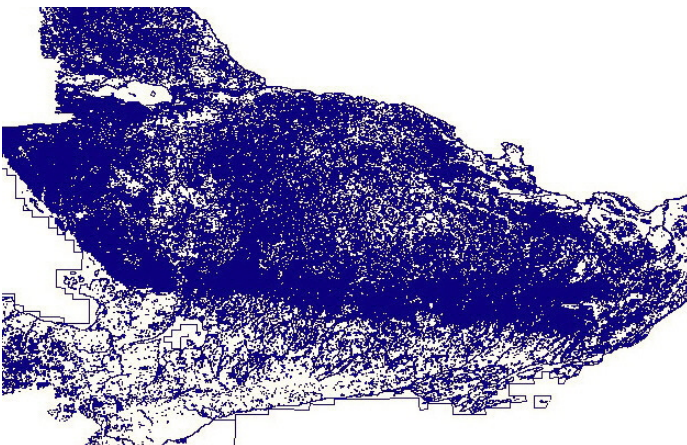
Plant hardiness is a reflection of changes in temperature and precipitation. Zone 4b in southern Ontario covers most of the core transition zone of The Land Between. Zones 4a, just south of the Shield and a small portion of 5a correspond to secondary areas of transition.



Plant hardiness zones in relation to granite barrens and limestone plains.
Agriculture and Agrifood Canada.

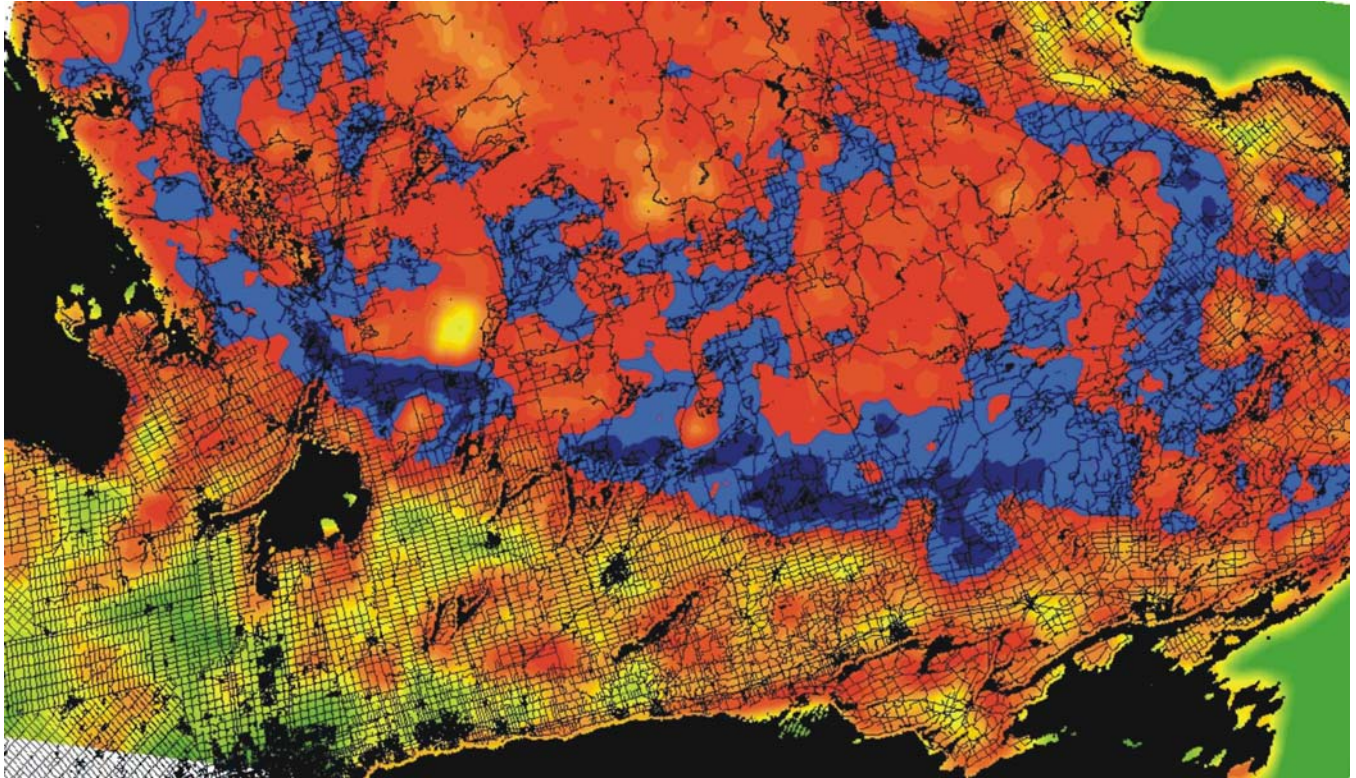
Habitat Interspersion and Aquatic Pockets

The Land Between is a water source for many rivers flowing into Lake Ontario and Georgian Bay. In fact parts of The Land Between boast the highest density of shoreline in Ontario.



Waterlines of Ontario
Ministry of Natural Resources.

Paul Zorn of Parks Canada, using remote imagery and Geographic Information Systems, highlighted areas of greatest vegetation community interspersion using the well known Simpson's Index: The darkest blue corresponds to areas of greatest density-change in vegetation communities at a 25kmx24km grid.



Paul Zorn Analysis. Parks Canada