Landscape Connectivity – Least-cost paths

You will compare least-cost paths between two protected areas in a sub-region of the GTA: The Rouge National Urban Park and Claireville Conservation Area.

**Question 1**

Given that different species have different dispersal abilities, you will assess how much natural areas surrounded the two protected areas by tallying the amount of land cover types within buffer areas. The land cover types are reclassified into four broad categories (forest, farm, rural, and urban) and four buffer (radius: 1km, 5km, 10km, and 15km).

* Compare how the amount of grid cells of the four land cover types varies:
  + A) between the Rouge National Urban Park and Claireville Conservation Area.
  + B) as the buffer zone’s radius increases.

**Question 2**

The different least-cost paths are based on five different values of connectivity (minimum, mean, median, binned-median, and maximum). The connectivity values are those computed by Bowman & Cordes (2015) using Circuitscape theory at a grain (gird cell) resolution of 100×100m. Here, the connectivity values were resampled at a resolution of 1×1km.

* A) Provide a general comment on how least-cost paths (in terms of “cost” and actual length of the path in meters) vary according to the five connectivity values used.
* B) Given the least-cost paths’ location in the GTA, what would you recommend as conservation and/or restoration management to maintain animal movement between the Rouge National Urban Park and Claireville Conservation Area?

Study extent: Lat 44.5° - 53.5°; Lon -85.0°; Projection NAD83 or 1335016 - 1416016, 1906212 - 11956212

Grain resolution: 1×1 km

Protected Areas:

Rouge National Urban Park - <https://trca.ca/parks/rouge-park/>

https://www.pc.gc.ca/en/pn-np/on/rouge

Claireville Conservation Area - <https://trca.ca/parks/claireville-conservation-area/>

https://en.wikipedia.org/wiki/Claireville\_Conservation\_Area

Connectivity map: Jeff Bowman and Chad Cordes. 2015. Landscape connectivity in the Great Lakes Basin. figshare <http://dx.doi.org/10.6084/m9.figshare.1471658>.

* Spatial resolution (100×100 m)
* Land Cover Permeability Classes:
  + High resistance (value = 1000) - land cover assumed to be unnatural and impermeable to movement
  + Medium resistance (value = 100) - land cover assumed to be unnatural, but permeable to movement
  + Low resistance (value = 10) - land cover assumed to provide natural cover and would represent relatively high permeability to movement.

Probability of connectivity based on Circuitscape theory