

LCD Tech Team Meeting

7/13/21

Attendees: Kathy, Mary, Adam, Aubin, Jason Taylor, Trevor Reid, Peggy

Ecological Connectivity in the CCE

- Rationale
 - Will be modeling functional connectivity for CMP selected species - because there is just a handful of species, it is recommended that coarser scale approach used to complement
 - Ecological integrity includes both biotic and abiotic
- Approach
 - Using index of ecological integrity (Kevin McGarigal) - Brad Compton has been super helpful in sharing code!
 - It's a vetted process and worked well for north east LCC - may want to adapt for this landscape
 - Will be presenting the connectedness metric
- Connectedness metric
 - Measure of physical continuity of ecological features
 - Crown is divided into raster; connectedness is measured for each pixel on the landscape
 - Describes how ecological flows from cell to cell are impeded or facilitated by surrounding landscape
- Ecological Features
 - Human development,
 - Hard development (building and paved roads); road capacity - proxy for road traffic - used CMP roads layer
 - Climate
 - Mean annual temp and mean annual precip
 - Want to keep variables as uncorrelated as possible, but we can think about what variables may be most appropriate
 - solar energy
 - Theobald - predicts solar radiation
 - chemical and physical substrate
 - Soil variables - % clay, pH, and soil depth
 - physical disturbance
 - Slope - fire, avalanches, landslides
 - Fire layer was patchy - seemed to bias areas to areas of fire
 - Maybe need a more continuous layer
 - Moisture
 - Wetness index based on DEM - amount of moisture at any point on the landscape
 - Hydrology
 - Stream temp, flow gradient, flow volume
 - Vegetation

- Vegetative structure - regrouped
 - Questions about the ecological features:
 - Is the data all CMP wide/wall to wall?
 - that is correct; data is pulled from CMP, more global sources, etc.
- Resistance estimation
 - Calculating resistance for each pixel on the landscape
 - If I have max similarity to the pixel next to me, I'm gonna have a distance of 0; if maximally dissimilar, I'll have a distance of 1
 - Weighted by "importance" of each ecological feature - weights are all relative

	Hard development	Road capacity	Temperature	Precipitation	Heat load	Clay	pH	Soil depth	Slope	Wetness	Stream temp	Flow gradient	Flow volume	Veg structure
Resistance weight	2	40	1	1	1	0.5	0.5	0.5	1	4	1	1	4	1
Distance weight	1000	0	1	1	1	0.5	0.5	0.5	1	8	1	2	5	4

- Resistant Kernel
 - "Pay out bank account" when you cross pixels - when you run out of money, that's when you stop
 - Radius of 2km
 - Might be relevant for smaller organisms with lower movement abilities
 - Not only are we interested in flow from each focal pixel, we are also interested in ecological similarity
- Results
 - Definite line at the border - related to land use land cover layer
 - Glacier area - topographically complex
- Rescaled surface
 - Puts every ecosystem type on the same terms - a quantile rank rescale
 - Highlights areas of landcover types
 - Ninepipes example
 - When you scale, you see importance of wetlands
 - Bison Range
 - Low connected value for roads and also streams, but When you scale it, streams come out as being important
 - Note: analysis is 30m pixel size - to upload online, had to make broader
- Next Steps:
 - Address sharp line at the border
 - Should we use vegetative structure or not?
 - Issues with paved road classes - data cleaning
 - Large differences in high montane areas - is this problematic for this landscape?
 - Do we want to add another human modification index layer
 - Add highway 93 wildlife crossings
 - Future forecasting

Questions:

- Using annual average precipitation.
 - where are places that don't get too cold in springtime? - those areas promote more precip in rain form than snow form - for montane species, that becomes critical (ie. native salmonids); mix and match climate data input
- Internally, there may not be high connectivity in Glacier - imagining a small critter getting around in intense, rocky mountain slopes
 - Could do a large intact block analysis
 - We are not necessarily thinking about how species are moving within that protected block (Glacier), but rather thinking about the connection between that block and another block
- Data source for land use/land cover - used CEC landcover layer
 - Commission on Environmental Cooperation
 - If we want to model the current landscape and model future forecasted landscape, maybe we don't even want to include vegetation in current analysis
 - Have you checked out the Impact Observatory?
 - Kathy poked around - it's very coarse, and bad at picking out linear developed features
- Why is such an artificial boundary appearing on an ecological map?
- using the CMP boundary, not the Crown LCD boundary
- Peggy and Kathy will schedule a meeting with Danielle to catch her up on this

Phase 1 tech report

- Incorporated Peggy's comments
- Hoping to finalize and put on the website soon!