

Analysis of structural connectivity between HCV forests

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Script

forest_new_v3.py

Description

This model creates input data to Omniscape for simulating structural connectivity between HCV forests in a given study area and post-processes the output from Omniscape into 10 m connectivity maps with value 0-10, indicating the degree of structural connectivity (the higher the stronger).

Main mapset

connectivity_forest_new

Necessary preparations

1. Update NMD using the script [update_NMD.py](#) (see separate documentation)
2. Generate raster data on protected, restricted and continuity forest using the script [HCV_kskog.py](#) in mapset *HCV_kskog*
3. Generate raster data on density of protected, restricted and continuity forest within a 250 m radius, using [skogliga_vardetrakter.py](#) (requires additional scripts, see documentation), in mapset *density_analysis*

Necessary input data

To be placed in mapset **connectivity_forest_new**

1. **nmd_gen_sv_updated@update_NMD**
 - NMD updated with recent fellings and transmission lines, generated using [update_NMD.py](#), located in mapset *update_NMD*
2. **input_study_area_raw_[region]**
 - vector data representing the study area. There can be multiple study areas. They should have the same name except for [region]
3. **out_input_HCV_kskog_forest_final@HCV_kskog**
 - Raster data on protected, restricted and continuity forest. Generated by [HCV_forest_areas.py](#), located in mapset *HCV_kskog*
4. **result_density_forest_HCV_kskog_NB_250m_v2@density_analysis**
 - raster data (10 m) on density of protected, restricted and continuity forest within a 250 m radius. Generated by [skogliga_vardetrakter.py](#), located in mapset *density_analysis*

Input parameters in GUI

- **Region**
 - Name of the study area. Should match "region" in the input data **input_study_area_raw_[region]**
- **Buffer**
 - Size of the buffer (m) added to the study area to avoid edge effects.
- **Suffix**
 - Optional suffix to the output file name
- **Wetland forest**
 - Resistance value for forests on wetlands that is not identified as protected, restricted or continuity forest. Defaults to 15. Should not be 12 or lower as this is the maximum resistance value generated for protected, restricted, and/or continuity forest.
- **Other natural vegetation**
 - Resistance value for "other natural vegetation". Defaults to 20.
- **Other forest**
 - Resistance value for "other forest", i.e., forests that are not recently harvested and that does not qualify as protected, restricted or continuity forest or wetland forest. In general this means production forest. Defaults to 50
- **Non-natural vegetation**
 - Vegetation that has been substantially modified, i.e., recently harvested forests, agriculture, and vegetation under transmission lines. Defaults to 150.
- **No vegetation**
 - Non-vegetated land. Defaults to 300.

Output data

- out_[region]_calc_resistance_[suffix]
 - where [region] and [suffix] is specified in model GUI.
 - Resistance layer (raster, 10 m) for the specified , saved as grass raster and exported to geotiff and ascii (input to Omniscape).
- out_[region]_calc_resistance_20m_[suffix]
 - Same as above but with 20m resolution

Post-processing

After running the Omniscape simulations using the output data described above, the script can post-process the (normalized) cumulated current maps and generate 10 m connectivity maps with values 0-10. This is the final result of the model.

Usage

Running this script requires a working installation of GRASS GIS with input data with specific names placed in mapsets with specific names, as detailed above. You also need to update some paths in the script to match your own file structure. The script can be run from outside GRASS GIS, e.g., from within an IDE of choice.

1. Specify the input parameters (important: save buffer and suffix before saving region)
2. Press "Prepare datasets" (this is only necessary once for each region, buffer, and suffix)
3. Press "Compute resistance layer"
4. Use the output data to run Omniscape
5. Press "Run post-processing" and browse to the output data from Omniscape

Updating the analysis

For updates in NMD: rerun [update_NMD.py](#) (see separate documentation) and then run the model.

For updates on protected, restricted and continuity forest: rerun [HCV_kskog.py](#) (see separate documentation) and [density_analysis.py](#) (see separate documentation) and then run the model (the name of input data 3 and 4 may change – update the script if necessary).

For updates on density analysis methods: update and rerun [density_analysis.py](#) and then run the model (the name of input data 4 may change – update the script if necessary)