Joint Research Centre

European Forest Fragmentation

An insight into pattern and connectivity

Abstract

Fragmentation is about the loss of forest area and connectivity due to causing factors like transport development, shift in land uses, logging operations, etc... Forest connectivity is based on forest availability and distance between patches; it refers to the degree to which the landscape facilitates or impedes species movement.

Over time, the landscape spatial configuration (pattern) changes, leading to connectivity loss or gain. This has an impact on biodiversity (e.g. birds, mammals, plants), wildlife migration, seeds dispersal and has other ecological effects like pest propagation.

Forest Spatial Pattern refers to the spatial arrangement of forest across the landscape.

Forest Fragmentation is a change in pattern with a loss of forest area and of connectivity (isolation).

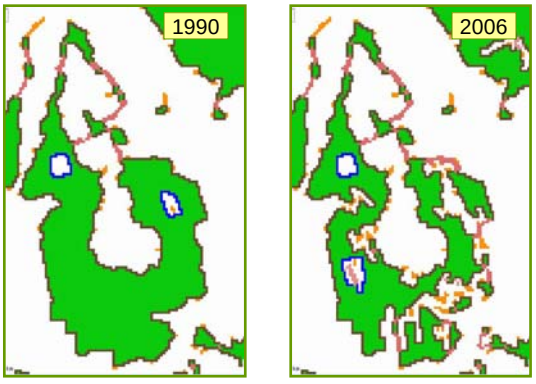
Forest Connectivity refers to the degree to which the landscape facilitates or impedes species movement across forest habitat.

Forest pattern processes and connectivity are captured locally for years 1990, 2000 and 2006 at medium observation scale (1:100,000, 25 ha minimum mapping unit from the European-wide CORINE Land Cover data) and at finer scales (like with the 1 ha minimum mapping unit of the European-wide JRC forest type map).

Tool for pattern mapping

Pattern is mapped according to mathematical morphology with the JRC GUIDOS freeware http://forest.jrc.ec.europa.eu/download/software/guidos

- Non Forest
- Core Forest
- Edge Forest
- Forest Edge of perforation
- Branch Forest
- Forest connector
- Islet Forest



Example of change in pattern

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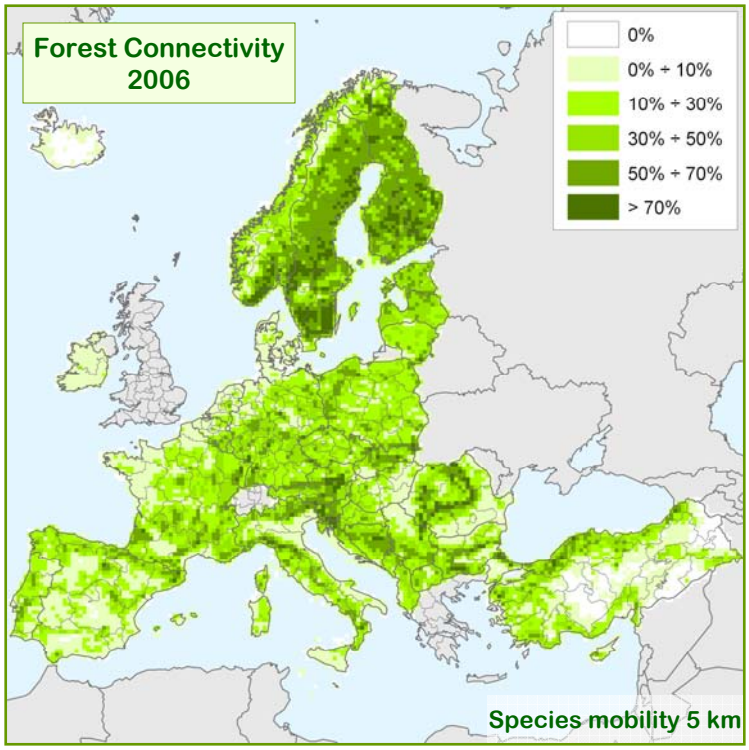


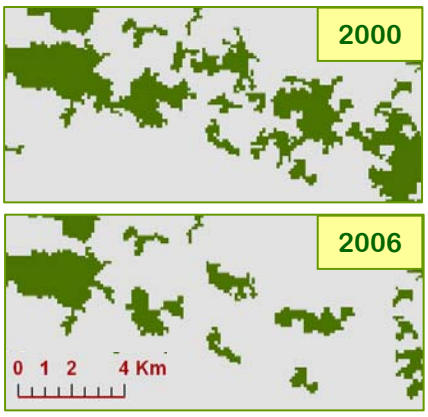
Connectivity assessment

The connectivity of the forest landscape were calculated locally, *i.e.* per landscape unit of 25 km per 25 km, for forest species with specific dispersal capabilities. Forest includes broad-leaved, coniferous and mixed forest.

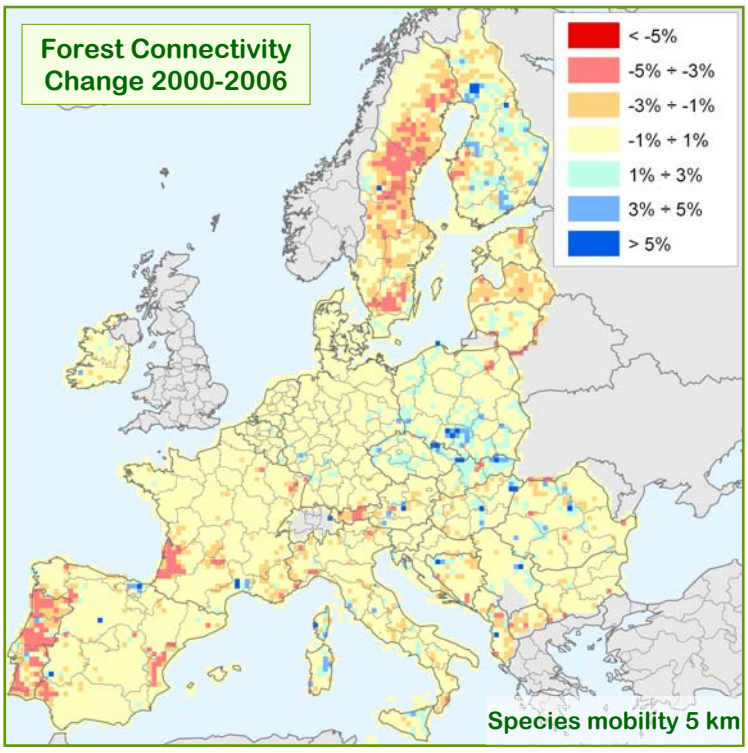
The European-wide map (left side) shows the state of forest connectivity in 2006 for species dispersing at 5 km. The map at bottom enables to identify areas with loss and gain of connectivity between the years 2000 and 2006. Provinces are overlaid to ease geo-location (NUTS: Nomenclature of Territorial Units for Statistics, level 2).

Tool for connectivity assessment

The *Conefor Sensinode* freeware (http://www.conefor.org) calculates an index that accounts for the intra and inter-patch connectivity (distance) of the forest patches in a landscape unit.



Example of connectivity loss



References

Estreguil C. and Mouton C., 2009. Measuring and reporting on forest landscape pattern, fragmentation and connectivity in Europe. *Office for Official Publications of the European Communities*, EUR23841EN.

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