Supplementary Material

Appendix 1 - The probability of connectivity (PC).

The probability of connectivity (PC) quantifies functional connectivity based on the probability that two points randomly placed within landscape fall into habitat areas that are reachable from each other (interconnected) given a set of n habitat patches and the links (direct connections) among them (Saura et al. 2011):

$$PC = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} a_i a_j \, p_{ij}^*}{A_L^2}$$

where: "a_i" and "a_j" are the areas of habitat patches "i" and "j", "A_L" corresponds to the total landscape area and "p_{ij}" is the probability of direct dispersal between patches "i" and "j". "p^*_{ij}" is the maximum product probability of all the possible paths between patches "i" and "j". When two parches are completely isolated from each other, then $p^*_{ij}= 0$. When i=j the $p^*_{ij}=1$; this relates to the habitat availability concept that applies to PC, in which a patch itself is considered as a space where connectivity exists.

To overcome PC limitations, Saura et al. (2011) propose an alternative index that is directly derived from PC, the equivalent connected probability of connectivity: EC(PC). EC(PC) is defined as the size of a single habitat patch (maximally connected) that would provide the same value of the probability of connectivity than the actual habitat pattern in the landscape. It is calculated as the square root of the numerator of the PC index as follows:

$$EC(PC) = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n} a_i a_j \, p_{ij}^*}$$

EC(PC) takes into account the connected area existing within the habitat patches, the estimated dispersal flux between different habitat patches in the landscape, and the contribution of patches and links as connecting elements. The EC(PC) value will not be smaller than the area of the largest patch in the landscape, avoiding the very low values that may be attained with PC (saura et al. 2011). The value of EC(PC) will coincide with the habitat area existing in the landscape when all the habitat is confined in a single habitat patch.