Online Resource 4

Conserving Red List plant species by managing landscape fragmentation and permeability

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Landscape Ecology

Methodology for Determining the Permeability Threshold (CSI) of 6

To identify areas of high landscape permeability, essential for ecological connectivity and the dispersal of target species, a specific threshold of the Connectivity Suitability Index (CSI) was established. This threshold was derived from a rigorous analysis of empirical data, using CSI values directly extracted from locations where the species of interest had been observed and recorded.

Of the 275 presence points analysed (located within the four plots for which permeability was assessed), CSI values ranged from a minimum of 3.22 to a maximum of 9.00. The mean CSI value was 6.71, and the median was 6.89, indicating a central tendency of the observations towards higher permeability values.

Analysis of the distribution of these values (Fig. 1) revealed a significant concentration of species occurrences in areas with CSI ≥ 6.0. More precisely, approximately 71.27% of presence points were located in sites with CSI values equal to or greater than 6.0. This majority proportion indicates that the threshold of 6.0 represents an ecological inflection point, beyond which permeability conditions become sufficiently favourable to support the presence and dispersal of the species across the landscape.

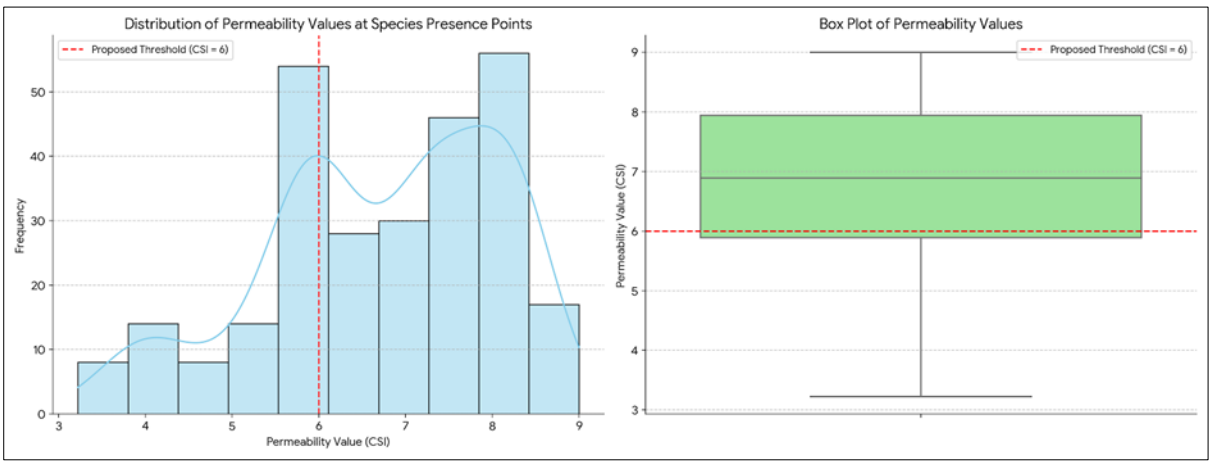

Fig. 1 Distribution and Variation of the Continuum Suitability Index (CSI) Values at Species Presence Points. The histogram (left) illustrates the frequency of recorded CSI values, while the box plot (right) shows the central tendency and dispersion of the data. The red dashed line indicates the proposed permeability threshold (CSI = 6), corresponding to the inflection point identified based on the distribution of presence observations.