Patterns of genetic diversity in two key understorey species, *Allocasuarina humilis* and *Kennedia coccinea*, used for forest rehabilitation in Western Australia: implications for seed sourcing

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The Forest Management Plan 2004–2013 for Western Australia requires that 'local' seed collection zones be used for species rehabilitation. Although it has been generally agreed that local provenance should be used in rehabilitation it may be less appropriate for widespread species in a time of rapid climate change, particularly where a narrow definition of local provenance is used. The rationale for a local provenance approach is based on the significance of local adaptation and extent of its underlying genetic variation. A reasonable surrogate for adaptive variation can be obtained through analysis of genetic variation as population genetic divergence provides strong evidence that adaptive divergence can occur. Analysis of genetic structure was carried out in two key understorey species used in forest rehabilitation, the wind pollinated *Allocasuarina humilis* and insect pollinated *Kennedia coccinea*. Despite the large geographic range for both species population differentiation was relatively low with 10% (*A. humilis*) and 14% (*K. coccinea*) of the variation partitioned between populations. While there was little genetic structure evident across the range of *A. humilis* some structure was evident in the forest populations of *K. coccinea* with the southern forest, far north eastern forest and Porongurups differentiated from central forest populations. Combined with previous studies we suggest that seed collection zones for more common widespread species can be broader than currently prescribed. One relatively conservative approach now being considered is the sourcing of seed for rehabilitation from within the same landscape management unit (areas of similar underlying geology, landforms, soils and climate).

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