Which WRA works for Western Australia? A comparison of weed risk assessment systems available in Australia using species of varying growth habit, life form and weediness

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Summary In the last 10 years there has been a proliferation of weed risk assessment (WRA) systems developed in response to a need to make informed judgments on where to spend finite resources on weed control or eradication. Each WRA system varies in the type of input information required, and although there are common elements across all systems, there has not been a study to compare the outputs from each system.

The early results presented here are part of a larger study that compares assessments of a common set of species with five different WRA systems, to determine if the assessment of weed risk to natural ecosystems in Australia is consistent between States. The results will also inform policy makers on the most suitable system for Western Australia (WA). Four of the systems are post-border models, and the fifth is a pre-border model used by Biosecurity Australia to predict weed potential (results not shown). The WA system included in this study is not being applied at the state level, but is being used by some regional and local groups to rank weed species.

Species selected for assessment include those with a range of growth habits, life form (annual or perennial) and estimated weediness.

Ten species were ranked from one to 10 based on the scores for two criteria of a WRA, invasiveness and impacts, and correlation coefficients (Rs) determined. The early assessment results of 10 species show correlations between systems vary for the two criteria. The outcome of invasiveness assessments shows weak non-significant positive correlations between all systems, with the exception of SA and NT, which are significantly positively correlated (Rs = 0.839) (Table 1). This is to be expected, as the NT system is a derivative of the SA system. However, for the assessment of impacts, correlations between all systems are strongly positive and significant, with only the SA and WA systems showing a coefficient of less than 0.8.

It is interesting that for the invasiveness criterion there was a lack of consistency across systems. Information to determine invasiveness is based mostly on the biology of the species, such as germination and establishment requirements, reproduction methods and success, and dispersal through natural and human-mediated means. In contrast, the impacts criterion results were highly consistent across systems, and yet species impacts are often more difficult to determine, because impact information in the literature is frequently deficient. Assumptions and inferred impacts can be necessary for poorly known species.

The third criterion of the post-border WRAs is the potential distribution of a species. These results, analysed in a GIS framework, were not available at the time of writing, but will enable a complete comparison of the outcomes from each WRA system.

Which system best suits WA? Further analysis that includes potential distribution will inform this decision, but it is encouraging that there are strong positive correlations between outputs of the various systems.

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Table 1. Correlation coefficients (Rs) for invasiveness (lower left) and impacts (upper right) criteria of WRA systems from Victoria (Vic), South Australia (SA), Western Australia (WA) and Northern Territory (NT). Results are based on ranked assessments of 10 species.

	Vic	SA	WA	NT
Vic	1	0.855 *	0.894 *	0.874 *
SA	0.552	1	0.646 *	0.866 *
WA	0.387	0.296	1	0.835 *
NT	0.524	0.839*	0.213	1

* indicates significant difference (P <0.05).