

ACERA Project 0906

1. **Project Title:** Determining necessary survey effort for detecting invasive weeds in native vegetation communities
2. **Theme:** Biosecurity framework and development; Surveillance and monitoring; Communication and decision making
3. **Rationale:**

Early detection of invasive weeds is vital if their management is to be successful and cost effective. In this project, we will use a recently developed model based on failure time analysis to determine the amount of time necessary to detect invasive weed species in native ecological communities. We will relate the probability of detecting the species at a single site to the time spent searching at that site, allowing users to determine the survey effort necessary to achieve a pre-specified level of certainty that they will detect the species if it is present, or conversely, to estimate the confidence in their observations based on the amount of time allocated for surveys. Using empirical data collected in temperate grasslands, we will develop models to determine the survey time necessary to detect invasive species if they are present at a site.

By holding workshops with practitioners and decision makers within AQIS and NAQS, we will work with government departments and regulatory authorities to develop a framework for incorporating species' detectability into the design of survey protocols for detecting rare incursions of weeds in northern Australia.

The methods that will be developed are not limited to the communities used as case studies in this research, but may be applied to other species and vegetation types. Clear links exist between this and current ACERA projects relating to surveillance and search strategies. There is potential for collaboration with Cacho and Possingham/McCarthy to develop decision support tools for incorporating detectability information into surveillance programs.

4. **Outputs**

This project will produce a number of decision support tools for invasive weed surveillance and monitoring. The first phase of the research will produce species-specific models for individual weeds of concern, such as Serrated Tussock, *Nassella neesiana*, and Chilean Needle-grass, *N. trichotoma*, based on data collected in southern Australia. In addition, we will develop a general model of weed detectability, based on plant traits, for weeds in lowland temperate grasslands. These models will enable end-users to determine the level of survey effort required to detect weed species in grasslands.

The second phase of the project will develop a methodology for incorporating ideas of detectability into the survey strategies employed to detect invasive species in northern Australia. This process will use feedback and information from AQIS and NAQS (the end users), collected during workshops.

Both phases of the research are relevant to a range of local, state and federal government departments, including AQIS, and the methods used will be applicable to a wide range of species and communities. Models will be constructed in WinBUGS, a freely available statistical program and the outcomes will be documented in a major report. At least two journal papers – one from each research phase - will be submitted to a relevant journal.

5. **Time frame:** Commencing: September 2008; finishing: May 2009

6. **Project leader(s)**

Title	First name	Surname	Location	Organisation	% Time per year
Dr	Sarah	Bekessy	School of Global Studies, Social Science & Planning	RMIT University	5
Dr	Brendan	Wintle	School of Botany, Applied Environmental Decision Analysis	University of Melbourne	5
	Georgia	Garrard	School of Global Studies, Social Science & Planning	RMIT University	100

7. **Resources**

A. Funds

Financial years of requested funding	06/07	07/08	08/09
Project Total \$			\$57,539

B. Funds obtained from other sources for this project

(Participant, Industry or Third Party support (cash or in-kind))

Total			\$23,263
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8. **End Users**

AQIS and NAQS