

ACERA Project 0903

1. **Project Title:** Reducing the Chance of Costly Biological Invasions: A Risk-Efficient Portfolio Approach

2. **Theme:** Biosecurity and framework development

3. **Rationale:**

Modern portfolio theory in finance, and economist's generalizations of it, are designed to allow an individual or organization to divide assets in a way that reduced the risk. Recently, portfolio theory has been applied to the problem of surveillance resource allocation in animal populations (Prattley et al. 2007)¹. The authors noted that surveillance resources need to be varied between each subset of the population because the level of risk of disease incursion and subsequent establishment varies both spatially and temporally. Therefore, more resources should be directed to the areas at greatest risk and fewer resources to regions where disease is less likely to occur. We propose extending the application of portfolio theory to the allocation of resources to reduce the biosecurity risk associated with plant pests.

The proposed project will provide a tool that adds to biosecurity framework development in the area of surveillance. Specifically, the outcome of the proposed project will provide decision makers with a tool that can simplify the process of resource allocation by quantifying the alternative measures using measures such as expected outcome and the uncertainty around the outcome. The proposed project also addresses ACERA's objective of engaging a range of skills and scientist as it has involved people working in agricultural economics, entomology, epidemiology and veterinary public health. Project leaders will also run a workshop for stakeholders and as such address ACERA's objective of ensuring that results are communicated to people in government and the wider community engaged in risk analysis and surveillance of plant pests.

4. **Outputs**

The project has two deliverables: (i) a final report containing the literature review and cases studies and (ii) a workshop for end user. The workshop will provide an opportunity for researchers to present the draft report to end-users, elicit feed back and discuss further application of portfolio analysis and economic decision theory.

The principal scientific outputs will be reports that will form the basis of refereed journal articles. The decision support tool will be available in the public domain. In addition, we will make presentations at scientific conferences and workshops.

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

¹ D.J. Prattley et al. (2007). "Application of portfolio theory to risk-based allocation of surveillance resources in animal populations." *Preventive Veterinary Medicine* 81 (2007) 56–69

6. Project leader(s)

Title	First name	Surname	Location	Organisation	% Time per year ^a
Prof	L. Joe	Moffitt	USA	University of Massachusetts	10
Dr	Naomi	Cogger	New Zealand	Massey University	30

^a Percentage of individuals year that will be spent contributing to this project

7. Resources

A. Funds

Financial years of requested funding	06/07	07/08	08/09
Project Total			\$45,000

B. Funds obtained from other sources for this project

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

Financial years of requested funding	07/08	08/09
Total		\$5,000

8. End Users

The techniques developed in this project will be of use to decision makers, in particular those working for government agencies.