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ABARES

Prioritising Targets for Biological Control of Weeds - a Decision Support Tool for Policy Makers

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Introduction

Establishing effective biological control agents in Australia is costly in both resources and time, yet it is often a valuable component of weed control. It has been estimated that biological control of weeds in Australia has provided around $10 billion worth of agricultural protection over the past century (Paterson 2006). To date significant investment has been made in the selection process of biocontrol agents and the identification of priority weeds for biocontrol. However there is no nationally agreed system that facilitates prioritisation of weed targets for biological control. The Department of Agriculture commissioned ABARES to develop:

- a framework that outlines the overall process of prioritising targets for biological control and

- a decision support tool that enables policy makers to determine whether biological control is a suitable option for the proposed target species.

A recent work related to the selection and prioritisation of weeds for biological control targets was published by Paynter et al 2009 (hereafter 'Paynter'). Paynter was used as a basis for discussion about how to assist policy makers in assessing whether biocontrol is an appropriate option for weed control.

The proposal for a decision support tool for policy makers was discussed at a workshop fully recognising that such a system would need to have a science basis that is both transparent and repeatable to be rigorous. The participants were experts in biocontrol or other weed science, state representatives and other relevant stakeholders. The proposal was outlined in a background/discussion paper and provided to participants prior to the workshop. The purpose of the paper was to provide participants with relevant background information and a proposed approach for a decision support tool for policy makers to be debated and progressed at the workshop.

Aim of the workshop and background/discussion paper

The workshop was held in Canberra on 4 April 2013. The objectives of the workshop were to:

- discuss whether the approach based on Paynter is suitable as a decision support tool at the policy level to prioritise targets for biological control

- reach a consensus amongst workshop participants on key principles that need to be considered in the prioritisation process of biological control targets

Suggestions made at the workshop are addressed in this report. Many of the concerns raised at the workshop corresponded with the common 'core' issues recorded in Paynter. These include concerns about lack of data, the tendency of the framework to overlook weeds outside the Weeds of National Significance, concerns that weightings are arbitrary, and a need for the framework to be able to anticipate emergent weeds and potential future problems. Here, those issues that are relevant to policy have been considered with the acknowledgement that remaining 'core' issues need to be addressed elsewhere.

The current decision process

Key issues highlighted by workshop participants

Current approach

Paynter provided the basis for the background/discussion paper as it is the recent comprehensive work capturing the current status in developing a decision support tool and providing a good starting point to develop a suitable framework. A range of alternative approaches to prioritise targets for biological control of weeds were considered during the workshop.

Workshop participants decided to incorporate key elements of the existing framework by Paynter for three main reasons:

1) None of the other approaches currently available were developed with national consultation or consistent endorsement across jurisdictions. This means that they are unlikely able to address the needs of all different jurisdictions.

2) Existing frameworks are often primarily technical and scientific and while Paynter also has a strong scientific focus, it provides the broad knowledge and complexity that is required for the decision making process and could be adapted so that policy thinking is added to the process.

3) The Paynter approach is adaptable to changes in capacity that have occurred in recent years in the policy context of biocontrol. These changes are for example, the termination of the Weeds CRC and changes in funding arrangements. In addition there has been a loss of expertise and resources due to a changed fiscal environment in the public sector.

Complexity and suggested improvements

Workshop participants generally agreed on the principles in the Paynter approach. Most participants were comfortable with the principle of assessing the feasibility of biocontrol and the likelihood of its success, but noted there is a lack of transparency in the Paynter approach inherent in its scoring system.

Scoring system

It was agreed that the scoring system in Paynter appeared somewhat arbitrary and it was difficult to understand why certain weights and scores had been chosen. Ultimately this means that however accessible the scoring is made, it is not transparent. The workshop participants agreed that matrix based systems have more flexibility and room for consensus in expert opinion than a raw numerical score such as that used by Paynter.

Separating the 'importance' rating

A key issue raised at the workshop was the 'importance' rating of a weed. Participants agreed that rating the 'importance' of a weed needs to be transparent, and it was suggested that this rating should be separated from the 'feasibility' and 'likelihood of success' ratings. 'Importance' of a weed varies depending on the context it is considered in (such as national, jurisdiction or local, industry-specific). Because 'importance' is context specific, it was advised that the 'importance' rating be a separate assessment process in the framework

Relationship to Weeds of National Significance (WoNS)

The Paynter approach specifically used WoNS, as the 'importance' rating of a weed depends on whether it is a WoNS or not. As this framework is desired to be used in more than a national context, the use of the WoNS rating was questioned. Additionally, as mentioned above, separating the 'importance' of a weed from other ratings is a priority in this project, and this will naturally reduce the weight behind a WoNS listing. It is also anticipated that this framework will be useful when considering biocontrol of other weed categories, such as sleeper weeds.

Consideration of non-technical obstacles

Current assessments of 'feasibility' often include some measure of whether a biocontrol project may be stopped by a social, political or economic factor such as an economic use for the weed. Paynter includes a 'stop' point if there is a conflict of interest around controlling the weed. It was not agreed that a conflict of interest should immediately halt biocontrol consideration, but it should influence the 'likelihood of success' and therefore manner in which it was undertaken.

Meaning of priority rating for biocontrol

In the Paynter framework, weeds are given a final priority rating of 'high', 'medium' or 'low', in order to rate how highly one would prioritise biocontrol of that weed. Workshop participants discussed the usefulness of this priority rating, highlighting that weeds ranked 'low' and 'medium' may never be given attention, and that relevant experts likely already know which weeds would receive a 'high' rating.

However, the discussion led to a general agreement that while the 'high' priority weeds may already be obvious, the 'medium' and 'low' weeds are the most likely to change their ranking when considered in a specific context (such as a particular industry). Alternatively a weed might receive that rating because of a lack of information, and again, this would be a reason to look further into that case, rather than to ignore it in favour of another. It was also emphasised that there is no definitive point at which we would never consider biocontrol on a weed, and because of this, the 'medium' and 'low' weeds will remain ripe for discussion.

An agreed way forward

Based on the proposed approach in the background/discussion paper and analyses at the workshop, participants agreed on the following key aspects to be included when considering a biocontrol decision support tool:

- Include a matrix decision approach ('feasibility' x 'likelihood of success')

- Draw on the Paynter approach

- Recognise the following assumptions

    - 'importance' of the weed assessment is a separate process to the likely success of a biocontrol agent

    - existing risk assessment processes to determine the importance/suitability of the weed for biocontrol are a solid approach (see HB 294:2006)

   - policy risks will be assessed in the framework

An improved decision process

A clear process framework

The overall decision of the introduction of biological control agents is with the Australian Government and is guided by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the *Quarantine Act 1908* and the *Biological Control Act 1984*.

Following the discussion on key issues and the agreement on a way forward, workshop participants developed a process framework which clearly identifies a range of individual stages that are essential in prioritising weed targets for biological control. Along the prioritisation process, different organisations and experts have key responsibilities in driving and progressing the prioritisation process. Figure 1 outlines stages and organisations responsible in this process.

Figure 1: Process framework in prioritising targets for biological control of weeds
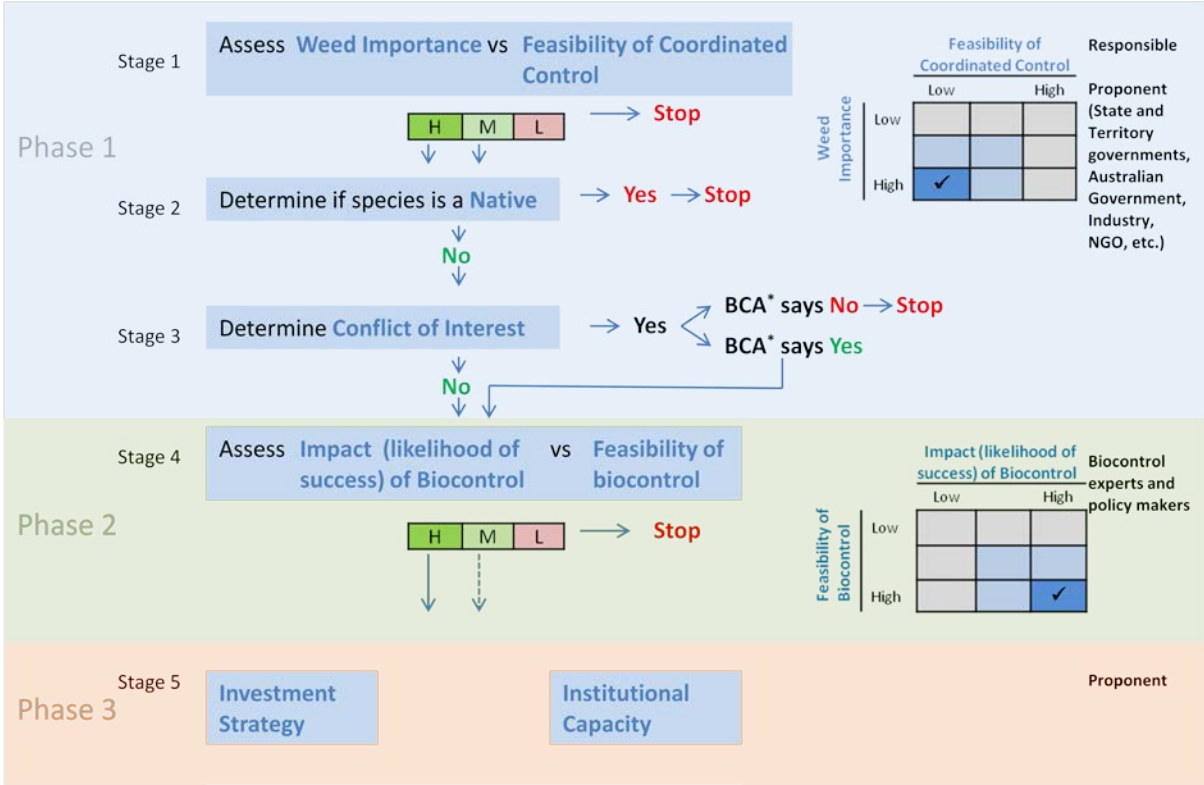
*The Biological Control Act 1984 (BCA) manages cases where there is a conflict of interest.

A phased approach

In the background/discussion paper a phased approach was suggested as it provides clarity to the decision making process regarding key responsibilities. Workshop participants supported the phased approach but suggested reversing the proposed phase order in the background/discussion paper. The updated order in the process prioritising targets for biological control is outlined in Figure 1:

- Phase 1 includes stages 1-3 and is carried out by the proponent (ie. State/Territory Governments, Australian Government, industry or non government organisations, etc.) who has an interest in a species to be assessed as a target for biological control. The focus of this

phase is on the importance of the weed species proposed as target for biological control. Phase 1 will assess the 'Weed Importance' versus 'Feasibility of coordinated Control' using existing weed risk assessment systems.

- Phase 2, stage 4 (potentially also stage 3) involves policy makers and biocontrol experts. During this phase, the focus of the assessment is on the 'Impact (likelihood of success) of Biological Control' and the 'Feasibility of Biocontrol' (e.g. effort to obtain and host range test biological control agents). The term 'success' is a context specific measure and it is important to agree and define 'success' at the beginning of the assessment.

- During phase 3 which includes stage 5 the action/responsibility returns to the initial proponent to develop and implement an investment strategy for the biocontrol project and ensure the required capacity is available to undertake the project.

Figure 1 outlines the process framework only and the course of action or specific methods within each of the stages were beyond the scope of this workshop with the exception of phase 2, the assessment of the 'Impact (likelihood of success) of Biological Control' versus the 'Feasibility of Biocontrol '.

The decision support tool for phase 2 (biocontrol experts and policy makers)

The workshop participants agreed to use a matrix based system to combine the 'Feasibility of Biocontrol' and 'Impact (likelihood of success) of Biocontrol' scores. 'Feasibility of Biocontrol ' scores (the effort to obtain and host range test biological control agent') are generated by addressing the questions under module 2 in Paynter. 'Impact (likelihood of success) of Biocontrol' (predicting the impact of biocontrol) scores are generated by addressing the questions under module 3 in Paynter. 'Feasibility of Biocontrol' and 'Impact (likelihood of success) of Biocontrol' scores have been categorised into three levels ('low', 'medium' and 'high') which enables weed species to be placed in a prioritisation matrix (Figure 2).

Figure 2: Prioritisation matrix for biological control targets

		Impact (likelihood of success) of Biocontrol		
		Low (<50)	Medium (50-70)	High (>70)
Feasibility of Biocontrol	Low (<25)	Low	Low	Low
	Medium (25-35)	Low	Medium	Medium
	High (>35)	Low	Medium	High

Care (based on transparency and repeatability of the assessment) will still need to be taken in assigning the score for each axis of the matrix as any scoring system is inherently arbitrary. For now assigning scores follows the principles described in Paynter but further discussion is likely to be needed to establish the thresholds for each level of 'Impact (likelihood of success) of Biocontrol' effort' and 'Feasibility of Biocontrol'.

Conclusions

Workshop participants agreed on the value of a harmonised system that facilitates prioritisation of weed targets for biological control.

Participants reached a consensus on key principles to be considered when developing a biocontrol decision support tool.

Considering the key principles the workshop proposed a logical process framework for prioritising weed targets for biological control. This framework includes a clear role for policy to make decisions within the process.

In line with the workshop discussion a decision support tool for policy was proposed based on the criteria and questions in Paynter.

The strength of the process and the decision support tool lies in its relative simplicity using existing risk assessment systems and building on past work, albeit the continued need for expert opinion and consensus in the process.

In using the proposed framework, it would be assumed that issues beyond the control of the decision makers (such as the political climate or funding availability) could also affect the outcome of the decision process. These issues are outside the scope of this workshop but remain relevant to decision making on biocontrol of weeds.

Workshop participants agreed there is a need to support the Australian Weeds Committee (AWC) and National Biosecurity Committee (NBC) in maintaining a case for and consensus building processes around biocontrol of weeds, where clear future directions for the discipline are still required.

To allow further development of the prioritisation process for biological control targets we recommend the production of a more detailed report/publication including further information on methodology etc. to inform stakeholders and to allow the system to be tested and improved.

References

HB 294:2006 (2006) National Post-Border Weed Risk Management Protocol (Standards Australia/Standards New Zealand/Cooperative Research Centre Australian Weed Management)

Paterson J (2006) Biocontrol provides $10 billion in protection. Farming Ahead, www.Kondinin.com.au

Paynter Q, Hill R, Bellgard S and Dawson M (2009) Improving targeting of weed biological control projects in Australia. A report prepared for Land & Water Australia, by Landcare Research NZ, Auckland. The full report is available from www.lwa.gov.au/weeds

Appendix

Workshop attendance list

Cameron Allan	Meat & Livestock Australia
Jeanine Baker	Australian Government, Department of Agriculture
Bertie Hennecke	Australian Bureau of Agricultural and Resource Economics and Sciences
Royce Holtkamp	Department of Primary Industries (NSW)
Michael Noble	Department of Primary Industries, Parks, Water and Environment (TAS)
Louise Morin	CSIRO
Olusegun Osunkoya	Department of Agriculture Fisheries and Forestry (QLD)
Andy Sheppard	CSIRO
Lucinda Staley	Grains Research and Development Corporation
John Virtue	Department of Primary Industries and Resources (SA)
Saan Ecker (Facilitator)	Australian Bureau of Agricultural and Resource Economics and Sciences