



Department of  
Primary Industries

# NSW Weed Biocontrol Taskforce

PROSPECTUS



Partnership model: a shared  
investment commitment  
to sustainably fund weed  
biological control



## ACKNOWLEDGEMENTS

This project was supported by Meat & Livestock Australia with funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.



**Australian Government**  
**Department of Agriculture**  
**and Water Resources**



This prospectus was produced by the Steering Committee of the NSW Weed Biocontrol Taskforce, comprising: NSW DPI, NSW National Parks and Wildlife Services, Horizon Ecological, the NSW Weeds Society, Local Councils: Clarence Valley, MidCoast, Rous County, Hunter Regional Weeds, and Local Land Services: Central Tablelands, North Coast, North West.

New South Wales Weeds Action Program provides ongoing support for research and rearing of biocontrol agents at NSW Department of Primary Industries facilities in Orange, Grafton and Lightning Ridge.

## NEW SOUTH WALES WEEDS ACTION PROGRAM

### Principle authors and project coordination

**Kerinne Harvey**, Research Leader Weed Research Unit, NSW Department of Primary Industries  
**Troy Brown**, Technical Officer (Weeds), NSW Department of Primary Industries

### Creative development

**Design:** Megan Hele Design  
**Editing:** Catriona Nicholls, Hot Tin Roof Communications

August 2020

COVER (From L–R): Water hyacinth weevil (*Neohydronomous affinis*) (A. King, ARC-PPRI); Crawlers of the Hudson pear cochineal (*Dactylopius tomentosus* 'californica var. parkeri' lineage) (A. McConnachie, NSW DPI); cat's claw jewel beetle (*Hylaeogena jureceki*) (A. King, ARC-PPRI); Madeira vine beetle (*Plectonocha correntina*), (NSW DPI)

## Foreword

Dear Investor,

On behalf of the executive it gives me great pleasure to invite you to become a member of the NSW Weed Biocontrol Taskforce.

The Taskforce recently underwent a programme restructure to allow for greater flexibility and value to investors by implementing a shared investment commitment. This innovative model, supported by the former Australian Department of Agriculture and Water Resources (now Australian Department of Agriculture, Water and the Environment), NSW Department of Primary Industries (NSW DPI) and Meat & Livestock Australia (MLA), is designed to facilitate collaboration, drive innovation and provide an efficient biocontrol agent delivery pipeline for members.

At a time where the efficient use of resources for the sustainable management of weeds is vital, the Taskforce provides an exceptional opportunity for leveraging resources and building a culture of collaboration in weed management across NSW and beyond to address the challenges together.

I commend this proposal to you and look forward to welcoming you as an investor.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Royce Holtkamp', with a long horizontal line extending to the right.

**Royce Holtkamp**

CHAIR, NSW WEED BIOCONTROL TASKFORCE

## The challenge

Weeds cause significant impacts to the Australian economy, environment and community. The agricultural economic impact of weeds in Australia is estimated at \$4.5 billion per year<sup>1</sup>. Costs to the environment are thought to be of a similar magnitude. Several widespread weeds are known to affect human and animal health, while others are detrimental to communities – environmentally, socially and economically. Mitigating these impacts for agriculture, the environment and communities is vitally important.

There is an increasing need to apply self-sustaining management technologies when it comes to managing weeds. For example, an increasing incidence and geographical spread of herbicide resistance for many weed species in agricultural systems is driving the need for sustainable non-chemical weed control options. Herbicide resistance is a major impediment to agricultural productivity and sustainability. Moreover, the control and management of weeds using herbicides in environmentally sensitive areas, such as water bodies or where weeds are among threatened species, is particularly challenging.

For more than a century, the applied discipline of biological weed control (biocontrol) has been successfully implemented as an approach to alleviate issues caused by problematic plant species (weeds). Put simply, “biocontrol is the use of the invasive plant’s naturally occurring enemies to help reduce its impact”.<sup>2</sup>

A key advantage of biocontrol over other weed control options (e.g. chemical, mechanical and grazing pressure) is that when natural enemies (agents) are widely established they exist permanently in the ecosystem and are mostly self-perpetuating.

LEFT: Paterson’s curse (*Echium plantagineum*) flower with Paterson’s curse weevil (*Mogulones larvatus*), (R. Kwong, Agriculture Victoria)

<sup>1</sup> Sinden J, Jones R, Hester S, Odom D, Kalisch C, James R and Cacho O (2004) The economic impact of weeds in Australia. CRC for Australian Weed Management, Technical Series No. 8, Adelaide

<sup>2</sup> [www.environment.gov.au/biodiversity/invasive/weeds/management/biological-control.html](http://www.environment.gov.au/biodiversity/invasive/weeds/management/biological-control.html)



This innovative approach offered an early indication of its potential during the first part of the 20th Century with the outstanding success achieved against common prickly pear (*Opuntia stricta*) with Cactoblastis moth (*Cactoblastis cactorum*). Since then, Australia has continued to develop and implement biocontrol (using both insects and pathogens) against a plethora of weed targets, both agricultural and environmental.

Limited and sporadic funding during the past decade has resulted in a decline of national weed biocontrol research, development and extension (RD&E) capacity. Maintaining long-term funding can be challenging in the face of competing priorities for RD&E support.

This prospectus aims to obtain a shared financial and in-kind commitment to weed biocontrol across the state of New South Wales. This includes establishing a 'buy-in' from a network of state-wide sources to obtain sustainable funding and a clear perspective and direction for weed management across the state.



RIGHT: Cactoblastis moth (*Cactoblastis cactorum*) larvae feeding within a prickly pear (*Opuntia stricta*) cladode, (R. Burr, Tamworth Regional Council)



## Biocontrol as a solution

History has shown biocontrol to be one of the most cost-effective, self-sustaining weed management technologies on offer. Biocontrol is continually under scientific refinement to not only maximise return on investment, but also maximise safety and impact.

The collective national return on Australia's biocontrol program investment by 2005 was on average 23:1, in direct economic returns to agriculture and health, not including environmental benefits<sup>3</sup>, which is un-paralleled for any other widespread weed management approach. When employed under a rigorous set of operating principles, the technology is sustainable and requires little further investment after agents are established. Biocontrol remains a national RD&E priority under the Australian Weeds Strategy and within the endorsed national strategic plans for each of the Weeds of National Significance (WONS).

Biocontrol is an economical, effective and environmentally sound method, but is a long-term technique with an extensive discovery-to-delivery pipeline. Biocontrol does not eradicate a weed, but can reduce, or suppress it to a level where it can be controlled with other methods.

The development cost of weed biocontrol agents is much lower than that for the development of a new herbicide. Moreover, biocontrol agents, in comparison to herbicides, do not require regular re-application and are an important component of a sustainable and environmentally friendly management solution to be incorporated into integrated weed management (IWM) plans.



Salvinia (*Salvinia molesta*) site before biocontrol, (NSW DPI)



Salvinia weevil (*Cyrtobagous salviniae*), (USDA ARS)



Salvinia molesta site after biocontrol, (NSW DPI)

<sup>3</sup> Page and Lacey (2006) Economic impact assessment of Australian weed biological control. Economic impact assessment of Australian weed biological control. Prepared by the AEC group for the CRC for Australian Weed Management, Technical Series No. 10, Adelaide.



07

## NSW Weed Biocontrol Taskforce partnership: the way forward

The Taskforce comprise of a voluntary collaboration of members from a number of like-minded agencies responsible for managing weeds. The role of the Taskforce includes: obtaining and facilitating commitment and investment, mass-rearing and establishment of agents, monitoring, training, prioritising agents for action in NSW, and communication of research progress. Bi-annual meetings involve updates, training, field visits and demonstrations.

ABOVE: Community members celebrating the successful biocontrol of Hudson pear (*Cylindropuntia pallida*), (A. McConnachie, NSW DPI)

A key deliverable under the NSW Invasive Species Plan is to “Maintain and expand the NSW weed biocontrol taskforce”. To achieve this, a shared investment model is being implemented in NSW.

The Taskforce originally provided a coordinated approach to promote biocontrol, secure resources to mass rear agents, and provide establishment and monitoring in the field, but was limited geographically and financially. To build capacity across the state the Taskforce is now funding and promoting biocontrol research alongside rearing, release and monitoring programs (implementation activities) through a shared investment commitment.

This model has enabled the setting of priorities and pooling of support and funding, linking local, state and national collaborators, including local government, Local Land Services (LLS), NSW Department of Primary Industries (NSW DPI), Department of Planning, Industry & Environment (DPIE) including NSW National Parks and Wildlife Service – NSW NPWS) to national experts and funding agencies.

The commitment is proving highly successful and is laying the groundwork for further co-investment in a coordinated, collaborative effort. An example of such commitment is the consolidated NSW support for the two most recent rounds for the Rural Research and Development for Profit (RR&D4P) program led by AgriFutures Australia (formally Rural Industries Research and Development Corporation – RIRDC). This work has led to extensive cross jurisdictional and international partnerships to progress work on agents across eight weeds impacting NSW including: African boxthorn, African lovegrass, fleabane, giant rat's tail grass, Hudson pear, ox-eye daisy, mother-of millions and silverleaf nightshade.

This shared investment commitment incorporates the successes and challenges learned from other established biocontrol funding models implemented in Queensland (levy based) and New Zealand (regional council contributions). We now need to expand to lead the way forward in sustainable weed biocontrol efforts.

The NSW Weed Biocontrol Taskforce priorities are guided by established prioritisation frameworks for environmental and agricultural weeds.<sup>4,5</sup>

This shared investment commitment incorporates the successes and challenges learned from other established biocontrol funding models



<sup>4</sup> Morin L, Heard T, Scott J, Sheppard A, Dhileepan K, Osunkoya O, and van Klinken R. 2013. Prioritisation of weed species relevant to Australian livestock industries for biological control. Meat and Livestock Australia Limited, North Sydney.

<sup>5</sup> Morin L, McConnachie A, and Turner P. 2016. Prioritisation of weed biological control targets for NSW. A Report for the Environmental Trust.


## Taskforce investment

NSW DPI, a part of the Department of Regional New South Wales is the lead agency and legal entity responsible for the overarching governance of the Taskforce. The Taskforce has a robust financial management structure, to ensure effective allocation and use of financial resources. NSW DPI is the legal entity appointed for managing finance on behalf of the Taskforce. The Taskforce Steering Committee provides overarching financial direction for Taskforce activities. All investment and financial management must be agreed upon by Steering Committee members every year and approved by NSW DPI. To ensure transparency and overall objectives of the Taskforce are being met, a governance technical working group will annually review and regulate financial management decisions.

The allocation of funds to support new and existing biocontrol projects is an ongoing activity for the working group and the Taskforce.

Taskforce funds can be used to leverage other investment. Details regarding the investment structure and governance are detailed within the Taskforce Terms of Reference (ToR).

The Taskforce is overseen by a Steering Committee, which consists of representatives from: NSW DPI, local councils, Agriculture Victoria, NSW NPWS and LLS.



ABOVE: Ox-eye daisy (*Leucanthemum vulgare*) invading threatened species habitat in Kosciuszko National Park, (P. Turner, NPWS)


### External advisors and corresponding members to the Taskforce include:

- CSIRO Australia
- Queensland Department of Agriculture and Fisheries (QDAF)
- Department of Planning, Industry & Environment (DPIE) including NSW NPWS
- Meat & Livestock Australia (MLA)
- Agriculture Victoria
- AgriFutures Australia.

### Taskforce member resources include:

- NSW DPI's insect biocontrol quarantine facility — Orange Agricultural Institute (OAI)
- NSW DPI rearing facilities — OAI, Grafton Primary Industries Institute (GPII) and the Don Mackenzie Weed Biocontrol Facility at Lightning Ridge NSW
- Access to Australia's leading weed biocontrol practitioners.





INSET ABOVE: Crawlers of the Hudson pear cochineal (*Dactylopius tomentosus* 'californica var. parkeri' lineage) on the spines of Hudson pear (*Cylindropuntia pallida*) (A. McConnachie, NSW DPI)

MAIN IMAGE: Boxing glove cactus (*C. fulgida* var. *mamillata*) covered in cochineal (*D. tomentosus*, 'cholla' lineage) (A. McConnachie, NSW DPI)



## Why invest in the Taskforce?

Joining the Taskforce and participating in the shared investment commitment provides investors with:

- **an integrated and sustainable management strategy** — With the number of herbicide-resistant weed species on the rise, you will be aligning your organisation with the attributes of this environmentally friendly and self-sustaining technology. Including biocontrol in an IWM program, reduces overall herbicide use, helping alleviate future impacts of herbicide resistance.
- **improved economic return in weed management** — Biocontrol is the most cost-effective solution for landscape-scale management of many weeds, with historical benefits outweighing costs on average.
- **increased access to biocontrol agents and training** — You will have access to agents and up-to-date technical information and training.
- **access to knowledge** — The Taskforce offers a wealth of knowledge to help communicate and take action on widespread weeds.
- **assurance you are partnering with Australia's most respected research practitioners in weed biological control** — Establish your organisation as a key partner involved in innovative weed management practices.
- **a greater chance of success** — By leveraging future investment and strengthening community engagement, greater on-the-ground impact can be achieved.
- **certificate of contribution** — Investors will receive formal recognition of membership.
- **improved collaboration, sharing of knowledge and information** — As a Taskforce partner you can communicate face-to-face with other partners, and build and maintain networks within the community.
- **a boost in patronage** — The community will see benefits of the partnership, and will be encouraged to provide support.
- **improved standing and profile within the community** — Your organisation will benefit from public recognition for taking a proactive approach to weed management.
- **intellectual contribution to programs and priorities\*** — Members of the Taskforce are actively involved in the decision-making process regarding planning and prioritisation of programs.
- **opportunities for collaboration** — Taskforce partners have the potential to collaborate in research trials and hold workshops within regions of interest.

ABOVE: First releases of the water lettuce weevil (*Neohydronomus affinis*) on water lettuce (*Pistia stratiotes*) in Maitland, (NSW DPI)

\* Dependent upon the level of investment as detailed within membership of the Terms of Reference and / or at discretion of the Steering Committee





## Timeframe for investment

Organisations expressing interest in investing in the Taskforce should consider this as a long-term proposition. While the Taskforce encourages an annual financial commitment, it also recognises this option is not always possible, thus in-kind commitments are recognised. Fee-for-service will be negotiable and allocated to an applicable investor category. The NSW Weed Biocontrol Taskforce acknowledges that any Expression of Interest (Eoi) is non-binding.

ABOVE: Leaf cactus bug (*Catorhintha schaffneri*). (P. Muskett, Rhodes University)



ABOVE: Tree pear (*Opuntia vulgaris*) under attack by the cochineal (*Dactylopius ceylonicus*), (Horizon Ecological)



ABOVE RIGHT: Cat's claw creeper (*D. unguis-cati*) invasion in northern NSW, (R. Holtkamp, NSW DPI)



RIGHT: Water hyacinth (*Eichhornia crassipes*) mat in Gingham Wetland, NSW, (R. Holtkamp, NSW DPI)





## How to become an investor in the Taskforce

Details regarding various membership level options can be found within the organisational structure of the Taskforce and partner packages (Table 1).

The Taskforce's direction and project portfolio will be guided by members and designed cooperatively with investors and stakeholders.

Potential investors are encouraged to engage as soon as possible with the NSW Weed Biocontrol Taskforce. Together we will aim to develop cost-effective biocontrol solutions to invasive weeds.






























ABOVE: Field day with investors and members of the public releasing biocontrol agents on cat's claw creeper, (NSW DPI)

LEFT: The Don Makenzie weed biocontrol rearing facility in Lightning Ridge, fully stocked with the Hudson pear cochineal (*Dactylopius ceylonicus*), (Castlereagh Macquarie County Council)



Table 1. Organisational structure of the taskforce and partner packages

NSW WEED BIOLOGICAL CONTROL TASKFORCE				
The Taskforce consists of three tiers*:				
<div>STEERING COMMITTEE</div> <div>+</div> <div>Working groups</div> <div>+</div> <div>Corresponding members</div>				
Benefits	Bronze	Silver	Gold	Platinum
	\$500	>\$1,000	>\$5,000	>\$50,000
Biocontrol agent access				
Regular reports including information on biocontrol status in NSW				
Access to training, information exchange and networking opportunities				
Empowered with knowledge to help communicate and take action against widespread weeds				
Certificate of contribution				
Access to expertise for direct discussions twice per year				
Potential to collaborate with research trials and/or a workshops within regions of interest				
Strategic contribution to programs				
Public recognition of contribution to biocontrol				

Note: Fee for service will be negotiable and allocated to an applicable investor category.

\* For further details on organisation structure, including membership roles and responsibilities see the Terms of Reference for the Taskforce

# NSW Weed Biocontrol Taskforce

## MEMBERSHIP EXPRESSION OF INTEREST

(Scan or photocopy page to complete for submission)

Weeds cause significant impacts to the economy, environment and community. There is an increasing need to apply self-sustaining management technologies, such as biocontrol, when implementing successful integrated weed management (IWM) strategies. Boom-and-bust funding is a common scenario for the sciences, but these long-term problems do not meet the short-term funding cycles. We need a shared financial and in-kind commitment to weed management across the state. Thank you for your interest in joining us in this cooperative approach to developing tomorrow's biocontrol solutions for invasive weed management.

The undersigned (Chief Executive or authorised officer) warrants that their organisation provides an in-principle commitment to:

- participate in the NSW Weed Biocontrol Taskforce and its collaborative biocontrol programs, administered by NSW DPI
- become a party to, and to contribute cash and in-kind resources, as indicated as a NSW Weed Biocontrol Taskforce Member or in a Partner Declaration.

The undersigned and NSW Weed Biocontrol Taskforce acknowledge that this Expression of Interest is non-binding.

Name of authorised officer: \_\_\_\_\_

Position: \_\_\_\_\_

Organisation: \_\_\_\_\_

ABN: \_\_\_\_\_

Signature: \_\_\_\_\_

NSW Weed Biocontrol Taskforce investor type (ex. GST):

Bronze: \$ \_\_\_\_\_ Silver: \$ \_\_\_\_\_ Gold: \$ \_\_\_\_\_

Platinum: \$ \_\_\_\_\_ In-kind contributions: \_\_\_\_\_

Is your organisation registered for GST? Yes No

What is your organisations biocontrol priorities (e.g. RD&E, implementation)?

\_\_\_\_\_

What contributions can your organisation make to biocontrol (e.g. monitoring, implementation)?

\_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

### RETURN TO:

**NSW Weed Biocontrol Taskforce**

NSW Department of Primary Industries, Weed Research Unit, PMB 2, Grafton NSW 2460

**E:** [weed.biocontrol@dpi.nsw.gov.au](mailto:weed.biocontrol@dpi.nsw.gov.au)

## MEMBERSHIP TERMS

By becoming a Member and paying any amount to the Taskforce, you are agreeing to the following terms.

- Membership fees are paid in advance and direct to NSW DPI.
- NSW DPI is responsible for the management and use of funds for the Taskforce.
- The Taskforce retains the sole discretion to utilise the funds held by the NSW DPI.
- Members acknowledge that the Steering Committee of the Taskforce is solely responsible for the decision making of the Taskforce. Decision making is by consensus only by members of the Steering Committee. If there is no consensus NSW DPI led by the Chair has the authority to work with Taskforce Steering Committee members to seek a resolution.
- Membership is activated when we receive from you a completed application form and payment. A receipt will be issued upon receipt of payment for a full twelve (12) month membership.
- Membership is for one (1) financial year from 1 July to 30 June or part thereof once receipt of your membership form. All membership fees must be paid annually in advance.
- One month prior to the expiration of the 12 month membership, you will be provided an option to review your membership prospectus for the upcoming 12 months where you will be given the option to renew your membership.
- There is no refund of any membership payment should you wish to no longer be a member of the Taskforce.
- Your Membership is not transferable.
- You must notify us of changes to your contact details in writing (hard copy by letter or fax) otherwise we may not be able to make you aware of upcoming meetings or provide you with opportunities to remain a member after the expiration of the first 12 months.
- We reserve the right to change, from time to time, the services available to members.
- The Taskforce has prepared a detailed Terms of Reference where the Taskforces governance is set out in detail. Please review the Terms of Reference prior to signing the Membership Agreement.



# nswweedbiocontrol TASKFORCE



## FURTHER INFORMATION:

### **NSW Weed Biocontrol Taskforce**

NSW Department of Primary Industries  
Weed Research Unit  
PMB 2, Grafton NSW 2460

**T:** 02 6640 1600

**E:** [weed.biocontrol@dpi.nsw.gov.au](mailto:weed.biocontrol@dpi.nsw.gov.au)