

Listening, researching, innovating, implementing:  
three years of unprecedented success

DCQ Prickly Acacia Eradication Program - 2013-2016



*"Insanity: doing the same thing over and over again and expecting different results."* - **Albert Einstein**

progress to date

## Overview

The Desert Channels Queensland Prickly Acacia Eradication Program aims to eliminate core, seeding producing areas of prickly acacia from the northern Lake Eyre Basin. DCQ's definition of eradication is: *'reduction to a level where any regrowth can be easily and cheaply treated by the landholder prior to seeding, thereby breaking the reproductive cycle'*.

The twin program objectives of increased enterprise productivity and improved biodiversity have delivered measurable outcomes against the former, and inferred outcomes against the latter. These are detailed later in this report.

This 5 year program (1st July 2013 to 30th June 2018) is funded by all or part of multiple programs from three sources: Queensland Government (\$2,784,999 - no funding committed for the final year); Australian Government (\$2,604,978 - multiple programs); Desert Channels Foundation (\$280,878 - up to 2016). Desert Channels Foundation is the public trust of DCQ; its principal donor is DCQ's wholly-owned commercial arm, DC Solutions.

The cornerstone of this program is the innovation that has flowed from the field research and development, new technologies, landholder knowledge, previous research, knowledge of the regulatory framework, and continuous refinement of techniques.

Knowledge gained has been shared with landholders and Government agencies through field days, practical demonstrations, trials, publications and personal communications.

The DCQ Prickly Acacia Eradication Program is delivering hope to landholders through unambiguous results and a simple framework for success. They can see, first hand, that there is now a path to freedom from this insidious pest plant.

## Background

The catalyst for the program was the blunt assessment of landholders at the Sesbania field day on 3rd May 2013, where they said it was a waste of time trying to control prickly acacia (*Vachelia nilotica*) if the seed sources couldn't be eliminated.

At issue was the prohibitive cost of treating the core, seed-producing areas along drainage lines. This meant there was ongoing seed distribution by livestock, with the subsequent reinfestation undoing any adjacent control work. Without breakthroughs in efficiencies and cost-effectiveness, even current (2013) best practice was losing the battle.

Grim experience showed that landholders who believed their 20 year battle to clean their paddocks was a good investment, were struck down by the mass germination following the 2009/10 wet season. That single event highlighted the deficiencies of strategies and techniques to date.

In 20 years, the area infested by prickly acacia in Queensland had tripled; without a dramatic breakthrough, 95% of the Mitchell Grass Downs would be impacted by 2030. Continuing to pursue the same strategy that saw infestations triple in 20 years was not an option.

Most landholders understood the connection between weed infestations and reduced productivity. Figures from Mackey (1996), give pasture production loss from a 20% canopy of prickly acacia as 50%, while a canopy cover of 50% virtually prevents pasture growth.

In the face of the imperative to find more effective and efficient ways of killing prickly trees, budget cuts meant DCQ had to achieve far more with far less.

## Process

DCQ undertook a 'nothing is sacred' review of the status quo, identifying the blocks to eradication, and developing an innovative approach to neutralising them.

The major issues identified were:

- significant seed-producing areas
- ongoing seed dispersal and reinfestation
- limited data
- government regulations
- prohibitive costs
- limited techniques
- mindset of 'control' rather than 'eradication'

Opportunities were identified to:

- leverage off Government agency expertise
- clearly identify hotspots and breakout areas
- harness new and alternative technologies for application
- explore lateral ways of using regulations to enable an activity
- reduce costs by customising control methods
- eradicate core seed-producing areas
- develop peer support collaborations amongst graziers
- prevent reinfestation (stock movement quarantine)

Actions taken were as follows:

1. drew on the collective knowledge of researchers, both inside and outside of Government agencies, to build its knowledge base on prickly acacia biology and habits;
2. worked with the then Department of Science, Information Technology, Innovation and the Arts to perfect time-series satellite mapping to analyse weed infestation changes over time to identify high priority target areas;
3. partnering with PBE Services to trial and prove the use of a 100 kilogram unmanned helicopter (drone) for the application of herbicide to dense and ultra dense infestations, especially in difficult terrain;
4. develop a decision matrix to match optimal treatment method and application rate to infestation density and terrain to ensure most effective results and lowest costs;
5. worked with the Department of Natural Resources and Mines to develop an Area Management Plan (AMP), under the Vegetation Management Act, to allow the removal of immature native vegetation in the course of weed control, but only under

- the guidance of a DCQ-approved five year weed plan, with close supervision by DCQ staff, and the preservation of all mature native trees;
6. successfully applied, in the face of authoritative naysayers, for an Australian Pesticides and Veterinary Medicines Authority permit to apply residual herbicide in ephemeral watercourses;
  7. worked with the Tropical Weeds Research Centre to trial the use of agricultural misters, both tractor and trailer mounted, for prickly acacia control;
  8. getting landholders committed to long-term action through involvement in PACTs (Prickly Acacia Control Teams) whereby groups of landholders make commitments to each other and to DCQ, to undertake collaborative weed control;
  9. develop the DCQ five year weed plan with its unique characteristics and linkages to create incentive and reward;
  10. negotiated a bulk purchasing agreement with Cheminova for the supply of residual herbicide; and
  11. began discussions with landholders, local government and State Government on stock movement quarantine procedures to prevent reinfestation and protect public and private investment.

## Tools

### Drone

The Yamaha Rmax helicopter unmanned aerial vehicle (UAV), or drone as it has become known, delivers residual chemical to an accuracy of one metre, at a specified rate per hectare, and can do so in winds speeds up to seven metres per second.

Its operator, PBE Services holds all relevant chemical handling and aerial application licences, as well as relevant CASA certifications. Their pilot is a qualified trainer and commercial pilot.

Because of the success of this machine in supporting the DCQ prickly acacia eradication program, UAVs are specifically named herbicide application platforms in both the DCQ WoNS AMP and the DCQ APVMA permit.

### AMP

The DCQ Weeds of National Significance (WoNS) Area Management Plan (AMP) was the first AMP to involve clearing for weed control; it trades some short-term, potential impact on native vegetation in exchange for the long term improvement of the natural ecosystem and its biodiversity values - by getting rid of the weed infestation, conditions for the recruitment of native species is greatly enhanced.

Restricted to the five WoNS species, prickly acacia (*Vachellia nilotica*), mesquite (*Prosopis* spp.), parkinsonia (*Parkinsonia aculeata*), and rubber vine (*Cryptostegia grandiflora*), the DCQ WoNS AMP covers the majority of western Queensland.

Historically, the presence of native vegetation restricted the use of efficient control methods, so these types of infestations were notoriously difficult to eradicate using conventional techniques. The difficulty in accessing sites due to weed density and topography only added to the challenge. Now with new control techniques and innovative technologies like the unmanned aerial vehicle, DCQ can treat the most difficult sites using very targeted and efficient methods.

In another first, the DCQ WoNS AMP is tied to the expertise of DCQ through the DCQ 5 year weed plan which identifies control areas, methodologies, monitoring, reporting and ongoing control. Other stipulations are that residual herbicides can only be applied 30 metres or more from the drip line of mature native trees, and can not be applied on slopes that are eroding, or greater than 5% slope.

In summary, this AMP enables the control of difficult infestations of prickly acacia by recognising new techniques and technologies, and taking a pragmatic approach, at a property scale, to the net benefit to native vegetation, while ensuring adequate guidelines, controls and monitoring are in place.

## **APVMA**

The DCQ Australian Pesticides and Veterinary Medicines Authority (APVMA) permit for the application of tebuthiuron for the control of prickly acacia in grazing lands and ephemeral systems to aid arid lands conservation.

This can only be done by contractors, employees or people working under the direction of DCQ, who are experienced in the application of agricultural chemical products and/or hold appropriate licences for aerial application of pesticides.

Application can be by hand, boom or aerial application, must be prior to crack closure to prevent product runoff on cracking clay soils, cannot be within 30 metres of mature native trees or within 500 metres of a permanent water body, and must be under a DCQ approved weed control plan.

## **DCQ Weed Plan**

The DCQ 5 year weed plan offers landholders a broad year by year program of works outlining who does what, as well as indicating dependencies (e.g. DCQ treats areas of high public benefit in Year 1; landholder treats buffer zone in Year 2; if Year 2 work completed, DCQ treats remaining ultra dense seed sources in Year 3; etc.).

Areas for action are prioritised through the satellite imagery, property mapping and on-ground validation, and an application technique matrix matches technique to density to ensure the most cost-effective use of labour and materials.

## **PACTs**

The DCQ PACTs are groupings of landholders providing peer support and encouragement to each other to tackle the prickly acacia problem on a landscape scale. PACT membership

confers a subsidy for the production of the DCQ five year weed plan and the chemicals to treat buffer zones. It also provides access to Desert Channels Group's bulk chemical buying power.

## Achievements

The program has engaged and energised previously despondent graziers who could see no way forward against prickly acacia under the previously available techniques, technologies and regulatory regime. All expression of interest calls to landholders to be involved in the program have been heavily oversubscribed, with no offer to participate declined.

It protects landscapes, particularly downstream, from the risk of future weed infestation, improves water quality and habitat of associated waterways and wetlands, and supports production values by improving the health of pastures and their carrying capacity.

As outlined above, the program objectives are to increase enterprise productivity and improve biodiversity.

Outcomes against increased productivity are clear. The following table shows the results from the Auteuil monitoring enclosure. While mustering costs were not measurable in the enclosure, the figures quoted are from Mackey (1996), DNRM.

<b>Indicator</b>	<b>Before</b>	<b>After</b>
grass species	2	6
ground cover	5%	40%
grass biomass	100kg/hectare	1500kg/hectare
land condition	D	C
carrying capacity	1 Adult Equivalent:50ha	1 Adult Equivalent:22ha
mustering costs	\$17/head	\$1.50/head

Outcomes against biodiversity are also clear although, necessarily, mostly inferred due to no funding to conduct baseline and follow-up surveys. However, there has been a clear, measurable increase in grass species recolonising treated areas.

The related 800% increase in ground cover provides considerably enhanced food and habitat for small ground-dwelling marsupials, birds and reptiles which, in turn, leads to an increase in native predator numbers. This, coupled with a loss of protective tree cover for feral predators, will be proven to markedly increase biodiversity in treated areas when funding can be obtained for monitoring.

Outcomes have been limited only by funding. In less than 3 years, and in the midst of crippling drought, the DCQ Prickly Acacia Eradication Program has achieved:

- 32 grazier partnerships
- \$330,000 landholder cash contribution
- 50 million Prickly Acacia trees killed
- 8 billion seeds prevented (conservative estimate)
- 1500% increase in grass biomass
- 800% increase in efficiency
- 800% increase in grass coverage
- 300% increase in grass species
- 99.96% kill rate with drone
- 96.7% kill rate with hand application
- 92% reduction in costs
- 317,613 hectares of prickly acacia under management
- 142,630 hectares of native habitat restoration
- 687 kilometres of streamline vegetation protected
- \$1 million spent in local businesses
- local employment

Having redrawn what effective prickly acacia control looks like in Western Queensland, DCQ is still engaging landholders in Weed PACTs, while their field team continues to knock out ultra-dense infestations in riparian areas, enabling the landholders to clear their paddocks in the knowledge that the major seed sources are gone.

Of no less significance in this list of achievements is the mindset change. Historically, people spoke of the need to 'control' prickly acacia, which was likened to having a test cricket match plan of not allowing the opposition to score runs, rather than aiming to bowl them all out.

Language dictates mindset.

Control is not a word DCQ uses any more ... now, the talk is of eradication. It may only be one paddock at a time, one property at a time, one PACT at a time, one catchment at a time, but they are eradicating prickly acacia.