The Economics of Prickly Acacia control

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Queensland Weed Symposium
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Introduction

• Desert Channels Queensland (DCQ) Prickly Acacia control program
  • Core infestation and outlier program
  • Trialling and pioneering new Prickly Acacia control methods
• Independent evaluation of the economics of different control strategies to:
  • Help guide future activities (research & treatment)
  • Determine where resources are best allocated
  • Quantify the benefit of invoking AMP, APVMA Permit
• Broad overview today, DCQ field trip tomorrow will provide much more detail.

Presentation Overview

• Analysis methodology and assumptions
• Scenarios evaluated
• Key findings
  • Does treatment pay?
  • What is the cost of doing nothing?
  • Evaluating treatment options?
• Summary

Analysis Methodology and Assumptions

• Various treatment methods applied to different scenarios over a fifty year timeframe
• Treatments applied every second year, germination rate is over two years.
• Analysis based on one hectare infestations
• Future cashflows discounted to today’s dollars at an 8% discount rate.
• Assumed infestation is controlled when there are 10 or fewer immature trees per hectare

Analysis Methodology and Assumptions (cont’d)

• Livestock Gross Margin of $150/AE and land can be stocked at 0.10 Ha/AE in A condition
• Maximum infestation levels of 1,000 mature trees and 2,000 immature trees
• Only 20% of germinations survive to maturity in open downs and 50% in riparian areas.
• Labour costs (with equipment) $50/hr
• UAV costs (with equipment) $732/hr

Analysis Methodology and Assumptions (cont’d)

<table>
<thead>
<tr>
<th>Treatment Details</th>
<th>Mature</th>
<th>Immature</th>
<th>Total Treatment</th>
<th>Labour &amp; Equipment (per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weedicide/fertiliser</td>
<td>1.00</td>
<td>0.50</td>
<td>2.00</td>
<td>$50</td>
</tr>
<tr>
<td>Chemical cost/fertiliser/tree</td>
<td>$11.20</td>
<td>$0.12</td>
<td>$11.32</td>
<td>$11.32</td>
</tr>
<tr>
<td>Predator Care</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>VAP/AMP cost</td>
<td>$48.00</td>
<td>$48.00</td>
<td>$96.00</td>
<td>$96.00</td>
</tr>
<tr>
<td>Other treatment costs</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Treatment Cost</td>
<td>$171.20</td>
<td>$171.20</td>
<td>$342.40</td>
<td>$342.40</td>
</tr>
</tbody>
</table>
### Analysis Methodology and Assumptions (cont’d)

#### Scenario One
A medium to high infestation in open downs country (250 mature & 50 immature trees)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Cost/ha (discounted)</th>
<th>Years to control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray by hand (Triclopyr/Picloram)</td>
<td>-1,640</td>
<td>4</td>
</tr>
<tr>
<td>Tebuthiuron (applied by hand)</td>
<td>-1,84</td>
<td>6</td>
</tr>
<tr>
<td>Tebuthiuron (UAV in yr1, then hand)</td>
<td>-366</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Scenario Two
A light infestation in open downs country (0 mature & 20 immature trees)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Cost/ha (discounted)</th>
<th>Years to control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spray by hand (Triclopyr/Picloram)</td>
<td>-15</td>
<td>2</td>
</tr>
<tr>
<td>Tebuthiuron (applied by hand)</td>
<td>-5</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Scenario Three
An extremely high density in a Riparian area with one native tree per ha, Area Management Plan & APVMA permit applied (1000 mature & 100 immature trees)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Cost/ha (discounted)</th>
<th>Years to control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray by hand (Triclopyr/Picloram)</td>
<td>-7,619</td>
<td>42</td>
</tr>
<tr>
<td>Spray 30m radius around native and Tebuthiuron (applied by hand)</td>
<td>-4,449</td>
<td>38</td>
</tr>
<tr>
<td>Spray 30m radius around native and Tebuthiuron (UAV in yr1, then hand)</td>
<td>-4,441</td>
<td>38</td>
</tr>
</tbody>
</table>

#### Scenario Four
An extremely high density in a Riparian area with no native trees, Area Management Plan & APVMA permit applied (1000 mature & 100 immature trees)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Cost/ha (discounted)</th>
<th>Years to control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray by hand (Triclopyr/Picloram)</td>
<td>-7,619</td>
<td>42</td>
</tr>
<tr>
<td>Tebuthiuron (applied by hand)</td>
<td>-720</td>
<td>10</td>
</tr>
<tr>
<td>Tebuthiuron (UAV in yr1, then hand)</td>
<td>-532</td>
<td>10</td>
</tr>
</tbody>
</table>

#### Some Key Findings
- Weed control costs money!
- Production benefits alone are insufficient to recoup treatment costs.
  - Open Downs Country, stocking rate is 0.10 AE/Ha (10 hectares per beast)
  - What is the incremental profit per AE?

<table>
<thead>
<tr>
<th>Regional Average</th>
<th>Top 25%</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Margin/ae</td>
<td>$179</td>
<td>$167</td>
</tr>
<tr>
<td>Operating Profit/ae</td>
<td>$71</td>
<td>$33</td>
</tr>
</tbody>
</table>

- If we go from 0% to 100% stocking rate, top annual benefit is $18/Ha aum.
- Land value increases alone are insufficient to recoup investment.
- This information will help determine appropriate subsidy levels.
Limitations of this Cost Benefit Analysis

- What are the costs?
  - Treatment costs.
  - Cost of not treating... in terms of increasing future treatment costs?
  - Cost of not treating... in terms of future production issues?
- What are the benefits of treating?
  - Production gain (incremental profit from additional livestock run)
  - Land value increase?
  - In terms of wider property and downstream benefits?
  - In terms of wider environmental benefits?
  - In terms of wider economic benefits?

What does it cost not to treat it?

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  - Treatment costs.
  - Cost of not treating... in terms of increasing future treatment costs?
  - Cost of not treating... in terms of future production issues?
- What are the benefits of treating?
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  - Land value increase?
  - In terms of wider property and downstream benefits?
  - In terms of wider environmental benefits?
  - In terms of wider economic benefits?

What about existing infestations

What are the benefits of invoking AMP and APVMA?
When is it beneficial to include UAV in control strategy?

Riparian areas with mature trees

Riparian areas with no mature trees
When is use of UAV cost effective?

Scenario 4: Cost saving of using UAV at various kill rates

Summary

- Act early, ongoing vigilance and preventing establishment is by far the best economic and environmental outcome.
- Underlying assumptions being tested, validated and refined on an ongoing basis.
- Will be used to determine appropriate subsidy levels.
- Findings of analysis will help identify most appropriate treatment methods and where limited resources are best invested.
- More work is required on assessing total community costs, and benefits, of weed control.