Best practice management of opuntioid cacti - from principles to paddock

6th South Australian Weed Conference - 2nd May, 2018

Australian Government

Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

Government of South Australia
Primary Industries and Regions SA

WILD MATTERS PTY LTD

Managing Opuntioid Cacti in Australia

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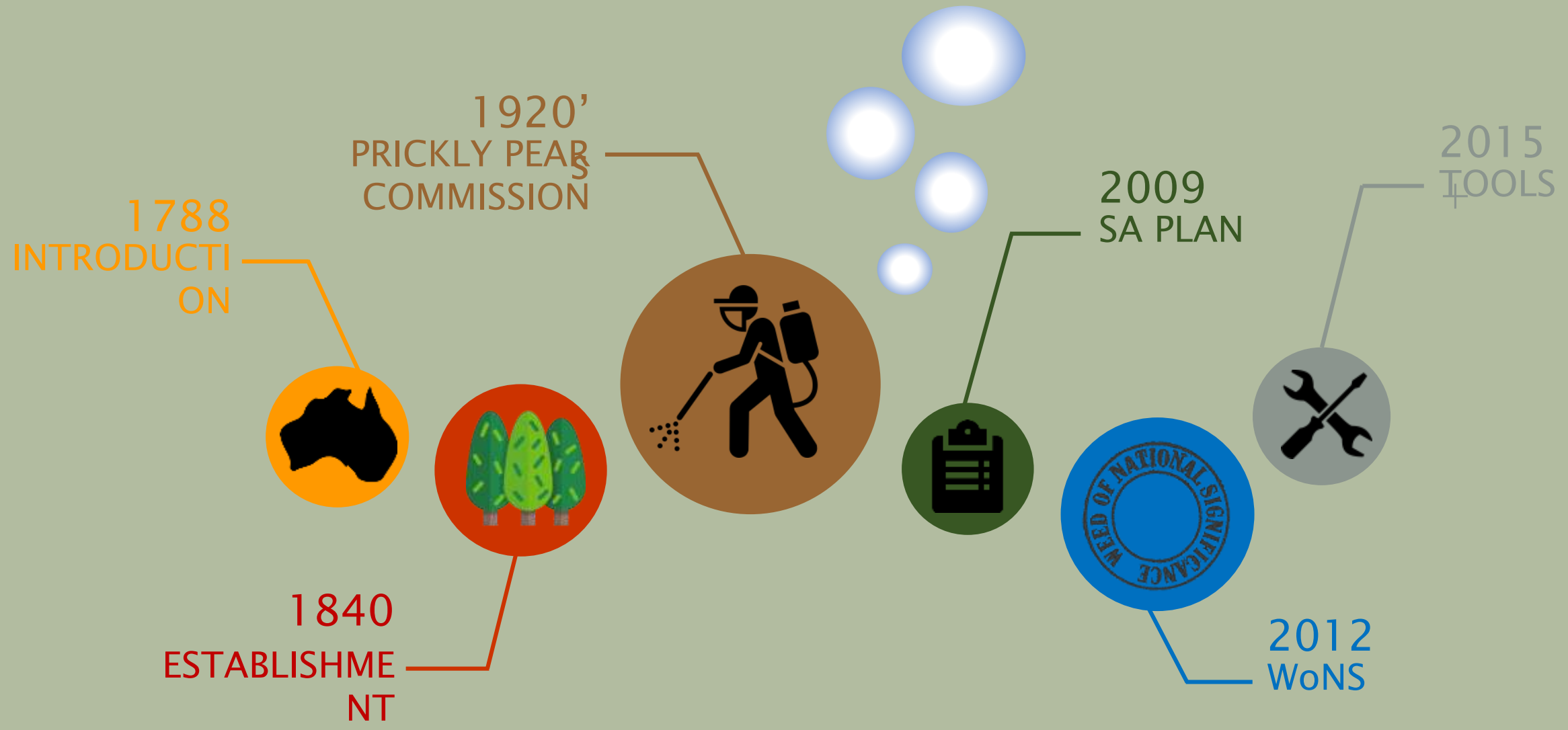
Opuntioid cacti- (an abridged) timeline

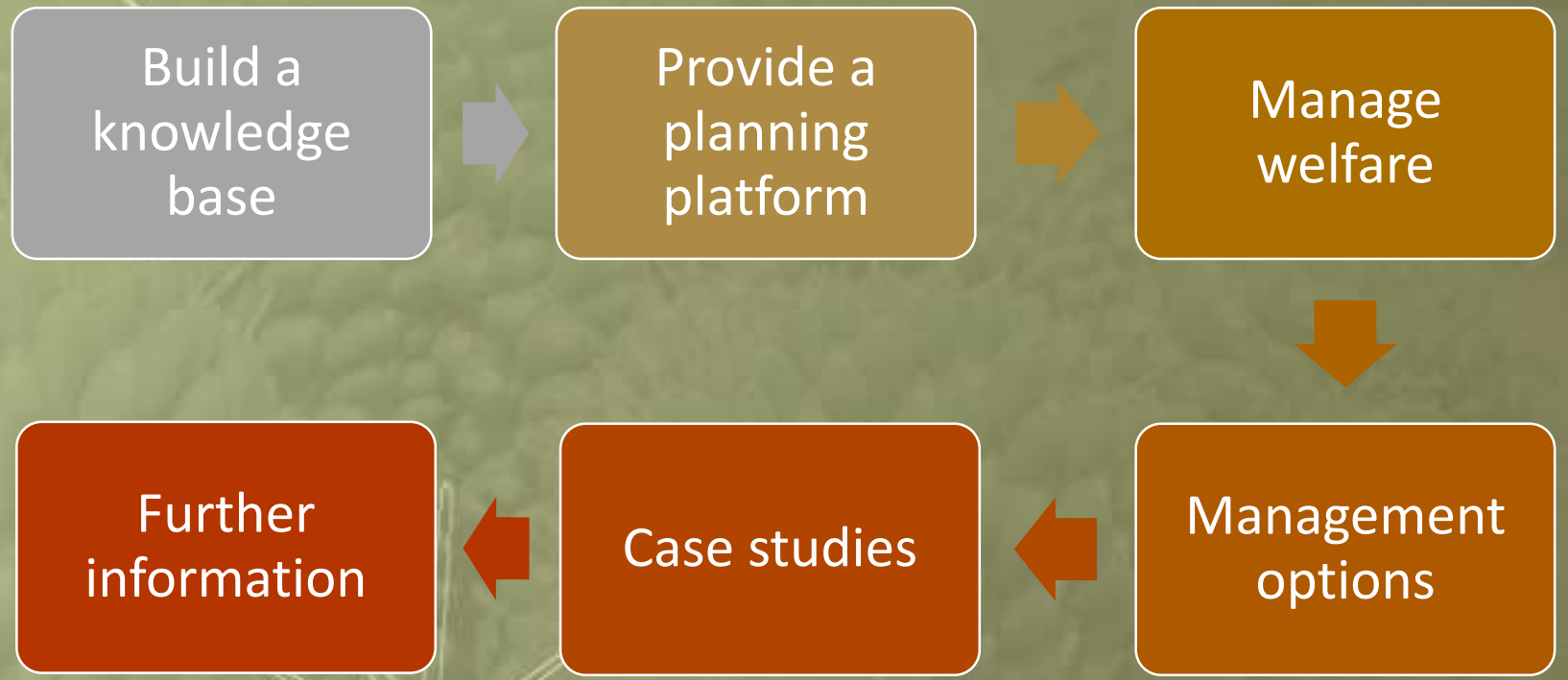


Understanding the problem

- Research
- Field visits
- Meetings & workshops

Brought people and their collective knowledge and experience together

Designing the tools



Chapter 1
Biology and threat

- 1500 – 2000 species
- All but 1 native to the Americas
- No cacti native to Australia

Cactaceae
(family)

Opuntioideae
(sub-family)

Other sub-families
Cactoideae
Pereskioideae
Maihuenioideae

Austrocylindropuntia
10+ species worldwide
2 species in Australia

Cylindropuntia
40+ species worldwide
8 species in Australia

Opuntia
190+ species worldwide
21 species in Australia

Chapter 1
Biology and threat

ID assistance – Genus-level

Cylindropuntia


Shauna Potter

Austrocylindropuntia


Matt Sheehan


Matt Sheehan

Opuntia

Jeremy Wolff, Queensland Herbarium

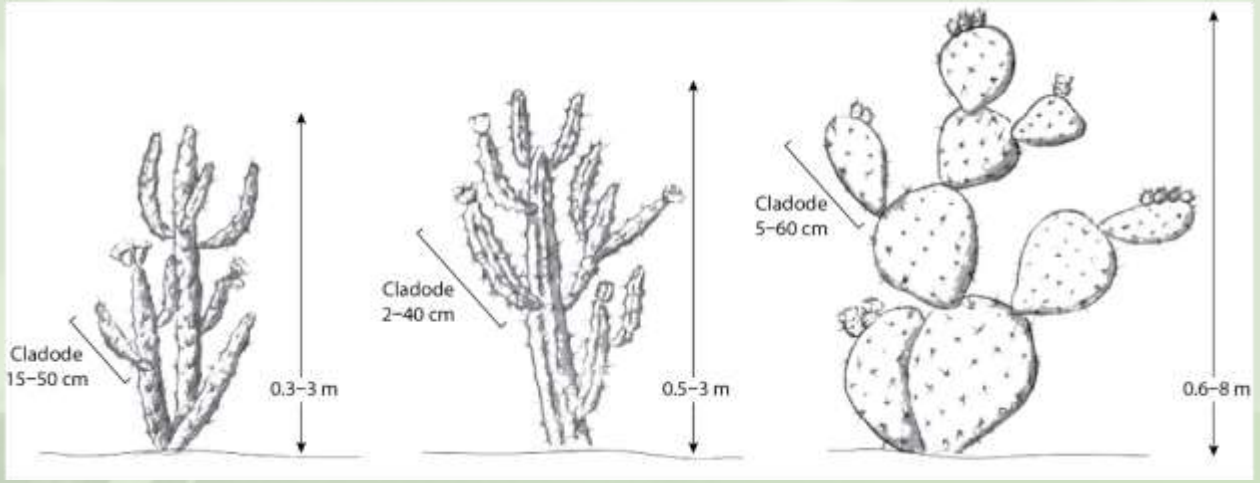
Austrocylindropuntia

Will Smith, Queensland Herbarium

Cylindropuntia

Jeremy Wolff, Queensland Herbarium

Opuntia



Chapter 1
Biology and threat

ID assistance – Species-level

Use the **Quick Identification guide** to compare key characteristics:

- Habit
- Cladodes (stem segments or pads)
- Spines
- Flowers
- Fruit

Quick guide to opuntioid cacti continued/…

Species:	*Cylindropuntia imbricata* devil's rope	*Cylindropuntia kleiniae* Klein's cholla	*Cylindropuntia leptocaulis* pencil cactus
Habit	Branched shrub or small tree 1–3 m tall. Can develop a short trunk.  Bob Chinnock	Straggly shrub 0.5–2.5 m tall. Large plants form a trunk.  Shauna Potter Bob Chinnock	Spreading shrub 0.4–1.8 m tall.  Bob Chinnock
Cladode (pad/stem segment)	Dull grey-green. 15–40 cm long, 3.5–5 cm diameter. Large, widely-spaced tubercles give a woven, rope-like appearance.  Shauna Potter	Light grey-green. 6–26 cm long, 0.6–1.2 cm diameter.  Bob Chinnock	Green-grey to green. Very slender, 2–8 cm long, 0.3–0.5 cm diameter.  Shauna Potter
Spines	2–12 spines per areole, 0.8–3 cm long. Trunks often covered in spines. Spines and sheath off-white to cream.  Shauna Potter	1–4 spines per areole, 2–4.5 cm long. White to brown. Tan sheath firmly attached.  Matt Sheehan	0–4 spines per areole, 0.5–1.5 cm long. Cream to pale yellow.  Bob Chinnock
Flower	Dark pink, magenta, 3–7.5 cm diameter.  Bob Chinnock	Pink-red.  Shauna Potter	Pale to greenish-yellow.  Bob Chinnock
Fruit	Fleshy, egg-shaped, up to 4 cm long. Greenish-yellow when ripe. Can form chains of fruit.  Bob Chinnock	Egg-shaped to cylindrical. Ripens to orange. Can form chains of fruit.  Bob Chinnock	Fleshy, egg-shaped. Yellow to red when ripe. Spineless.  Shauna Potter
Reproduction	Vegetative. Seed (viable).	Vegetative. Seed (viability unknown).	Vegetative. Seed (viability unknown).
Notes (see Figure 4.1)	Shrub and trunk form. Firmly attached cladodes.	Shrub and trunk form. Easily detached cladodes.	Shrub form. Easily detached cladodes.

Chapter 1
Biology and threat

Common or high-impact species

- Origin
- Distribution
- Habitat suitability
- Features to note
- Management considerations

Cylindropuntia imbricata
Devil's rope

Origin and distribution

Cylindropuntia imbricata is native to south-central USA and northern Mexico, with an exotic range extending to eastern and southern Europe, northern and southern Africa and southern South America. It is thought to have been introduced to Australia in the 1930s, and is commonly found in SA, NSW and Qld. It has scattered distribution in WA, NT and Victoria (Vic) and is absent from the Australian Capital Territory (ACT) and Tas. Cylindropuntia imbricata still has a strong association with areas of introduction, such as abandoned homesteads.

Current distribution of Cylindropuntia imbricata (L)

Habitat suitability for Cylindropuntia imbricata (Classens et al., 2012, www.weedfutures.net)

Cylindropuntia imbricata often grows near abandoned homesteads

Habitat in Australia

This species is mostly found in semi-arid environments and is suited to a diverse range of soil types and situations. It is found along roadsides and in disturbed sites, riparian areas, pastures, open woodlands, rangelands and grasslands. It commonly forms dense, impenetrable thickets that reduce carrying capacity and excludes native grasses and shrubs. Habitat suitability modelling indicates that it poses a potential threat to just over half of the continent, from the Tropic of Capricorn south excluding alpine areas.

Features to note

Cylindropuntia imbricata is an upright, spreading shrub or tree with a short trunk. Cladodes can be long and feature numerous lumps (tubercles), giving them a rope-like appearance. Readily spread along watercourses, C. imbricata also produces numerous seeds from its fruit, which grows individually or as chains.

Management considerations

Reliance on foliar spraying as the sole control method should be avoided as re-treatment is often required. An integrated management approach using biological control, foliar spraying and, in the right situation, mechanical removal, is the most effective control program. Removing 'mother plants' at homesteads is a good way of reducing the seed load.

Cylindropuntia imbricata

Chapter 1
Biology and threat

Other topics covered

- Impacts of opuntioid cacti
  - environmental, agricultural and economic
- How cacti reproduce and spread and the management implications of this
- List of Scientific and common names of opuntioid cacti

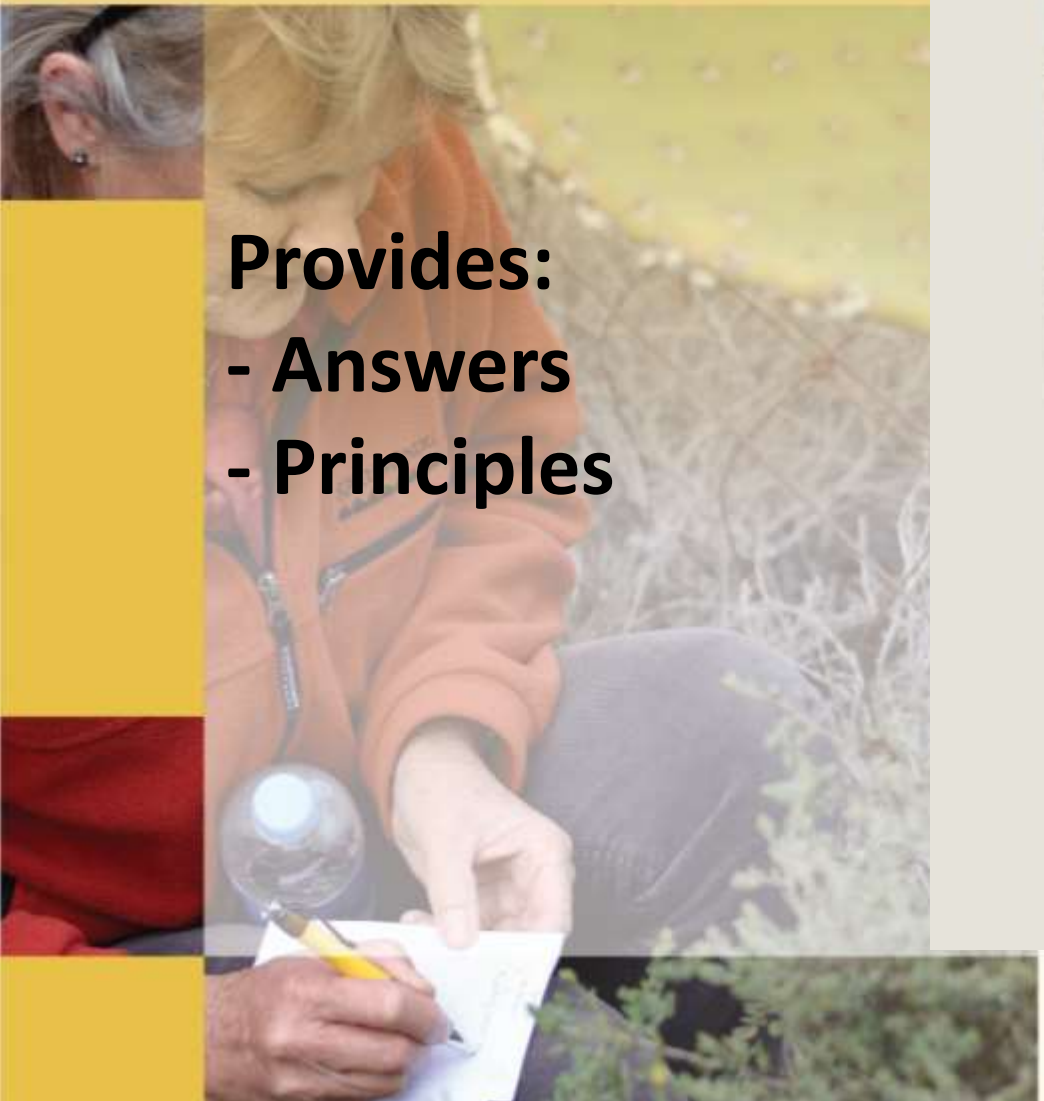
Table 1.2 Scientific and common names of opuntioid cacti that have naturalised in Australia

Scientific name	Common names
Austrocylindropuntia cylindrica	Cane cactus
Austrocylindropuntia subulata	Eve's needle cactus
Corynopuntia sp.*	–
Cylindropuntia fulgida var. *mamillata*	**Coral cactus**, boxing glove cactus
Cylindropuntia imbricata	**Devil's rope**, rope pear
Cylindropuntia kleiniae	Klein's cholla
Cylindropuntia leptocaulis	Pencil cactus
Cylindropuntia pallida (syn. *C. rosea*)	White-spined Hudson pear
Cylindropuntia prolifera	Jumping cholla
Cylindropuntia spinosior	Snake cactus
Cylindropuntia tunicata	Brown-spined Hudson pear
Opuntia aurantiaca	Tiger pear
*Opuntia dejecta**	–
Opuntia elata (syn. *O. paraguayensis*)	Riverina pear
Opuntia elatior	Red-flower prickly pear
Opuntia engelmannii	Engelmann's prickly pear
*Opuntia ficus-indica**	Indian fig
Opuntia humifusa	–
Opuntia leucotricha	–
Opuntia microdasys	**Bunny ears**, golden bristle cactus, teddy bear cactus
Opuntia sp. aff. *microdasys*	–
Opuntia monacantha (syn. *O. vulgaris*)	Drooping tree pear
Opuntia aff. *polyacantha*	–
Opuntia puberula	–
Opuntia robusta	Wheel cactus
Opuntia schickendantzii	Chicken dance cactus
Opuntia streptacantha	**Westwood pear**, Cardona pear, Gracemere pear
Opuntia stricta var. *stricta* and var. *dillenii*	Common prickly pear
Opuntia sulphurea	–
Opuntia tomentosa	**Velvet tree pear**, velvety tree pear

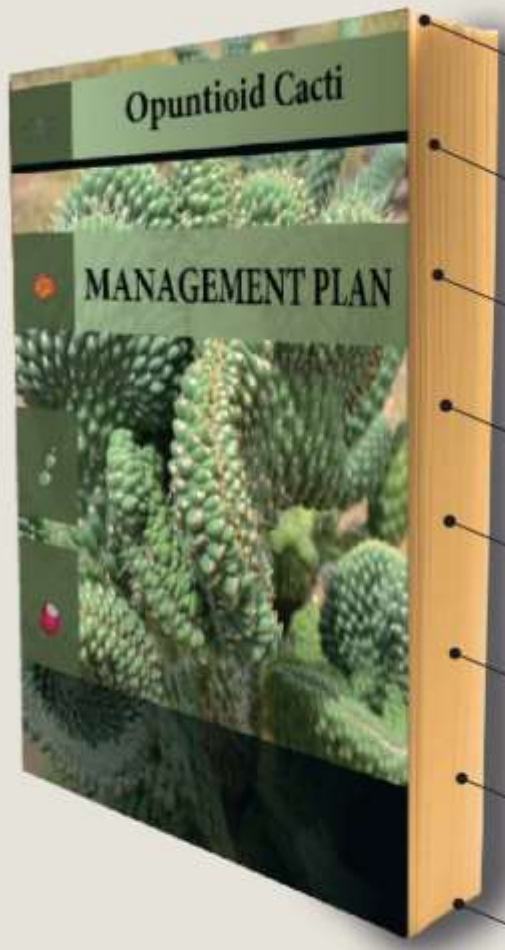
* Not a WoNS listed species

Bold denotes the most widely accepted common name where more than one name is used in Australia

Chapter 2
Planning

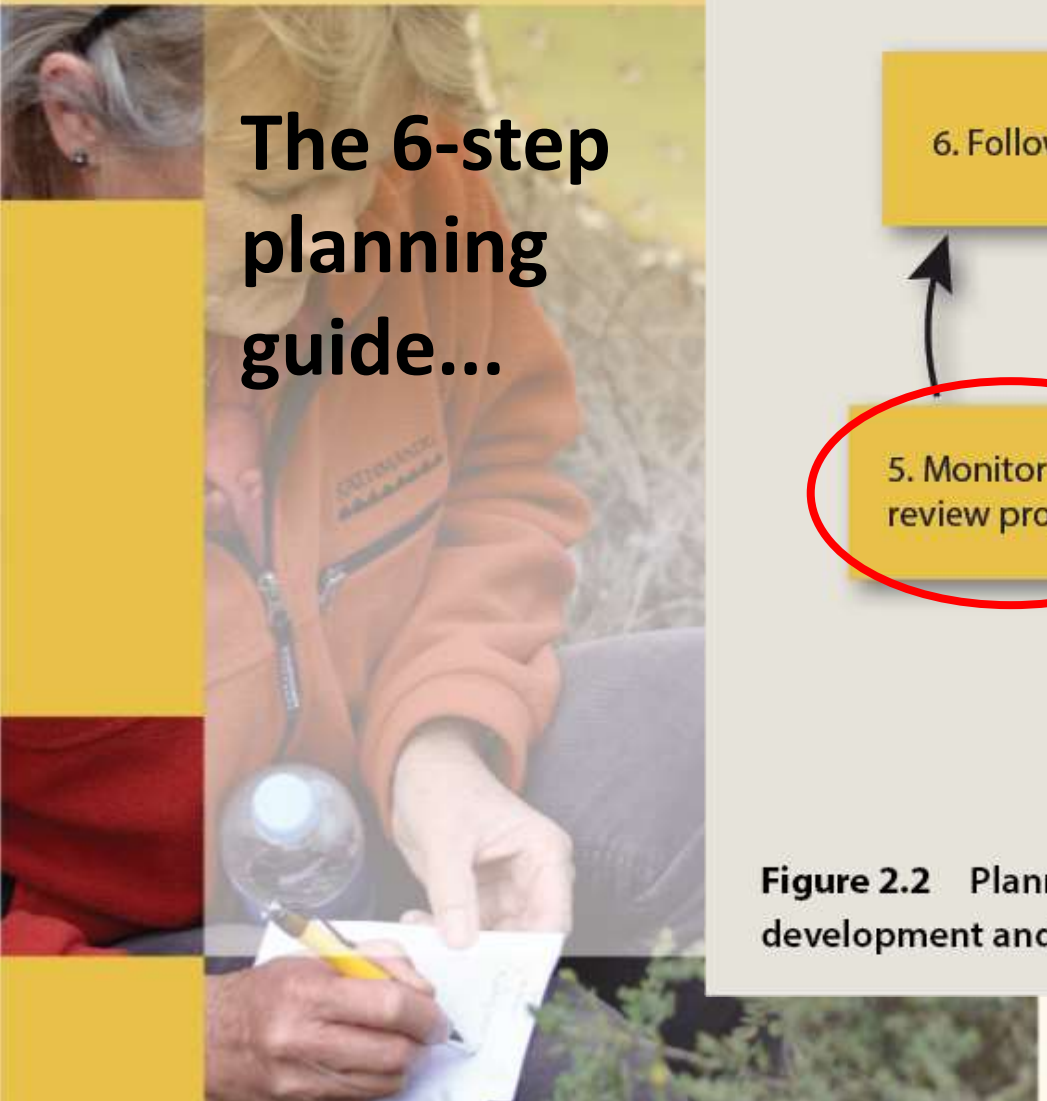


Provides:
- Answers
- Principles



- What species do I have?
- What happens if I do nothing?
- How do I control it?
- How much will it cost?
- Where do I start?
- What is at risk?
- Who else is affected?
- Where can I get help?

Chapter 2
Planning



The 6-step planning guide...

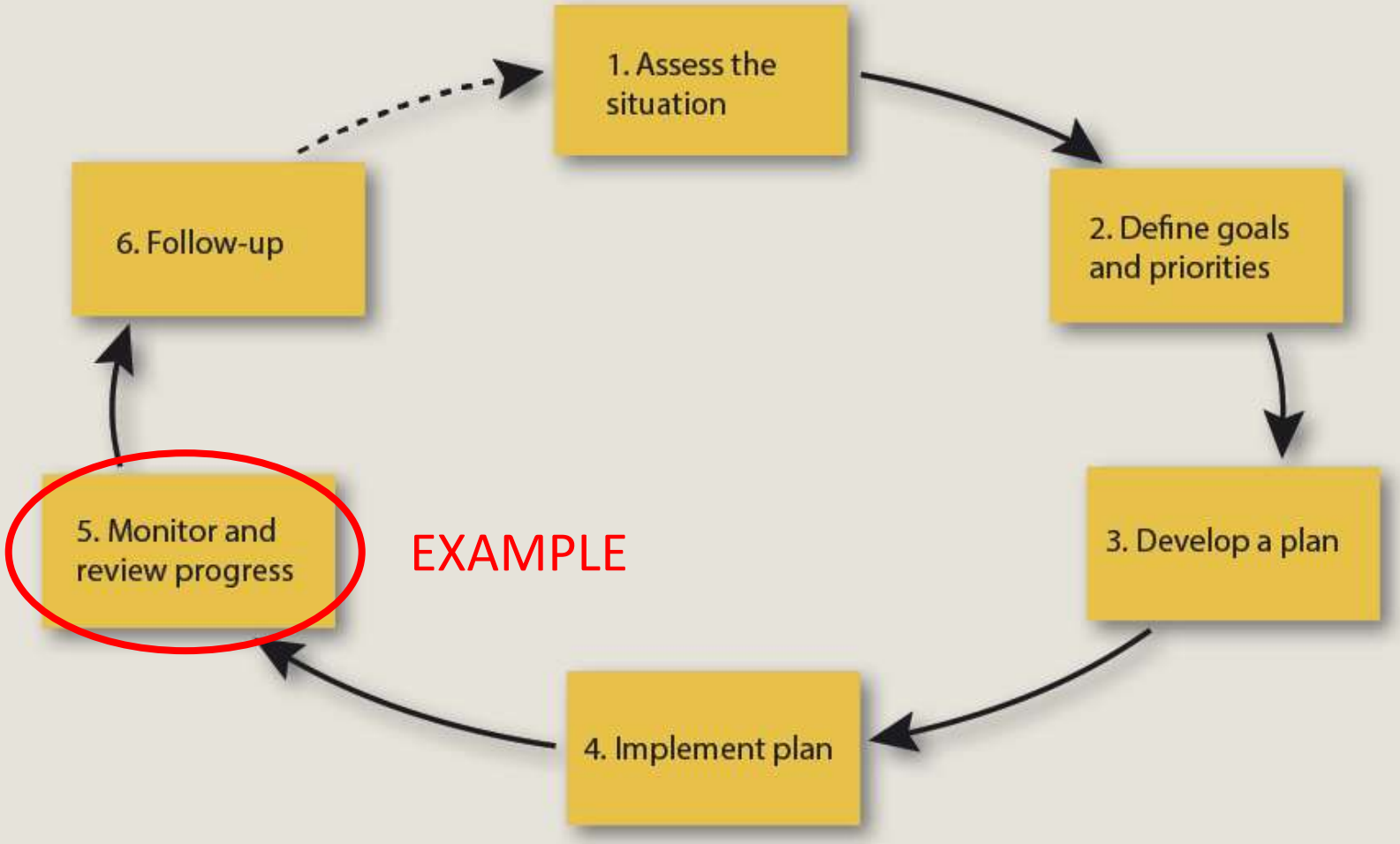


Figure 2.2 Planning cycle flowchart: Six steps to effective cacti management through the development and implementation of a weed management plan

Chapter 2
Planning

Example:

5. Monitor and review progress

- Why you should monitor
- Review questions
- Approaches to monitoring
  - Photo monitoring points

Establishing photo monitoring points

When set up correctly, photo monitoring can be one of the cheapest and most reliable records of change over time. It is quick, inexpensive, requires little technical skill and causes little to no disturbance of the site.

To establish photo monitoring points:

- Mark out the location where the photo will be taken with a star picket. If possible, record the location with a GPS.
- Where possible, align the photo in a north-south direction to avoid excessive sun or shadow. If not possible, record a compass bearing of the direction the camera is pointing. Try to have the sun behind you when taking photos.
- Take photos in the morning or afternoon, or on a slightly overcast day to avoid excess glare or downward shadows.
- Where possible, include distinct objects in the photo to provide a basis for comparison (e.g. a significant tree or piece of infrastructure).
- Use the same camera and settings each time.
- Take photos as frequently as needed to show changes.
- Try to take photos at the same time of year for annual comparisons.

Opuntia robusta (wheel cactus) control photo monitoring point at Pigeon Hill in Victoria
(i) Site in 2010 prior to management; (ii) The same site in 2014
Note the use of a tree on the left hand side as a distinct reference point

Chapter 3
Safety and welfare

If cacti management is getting the better of you:

STOP. REASSESS. REACH OUT. ACCESS SUPPORT.

Beyond Blue: www.beyondblue.org.au
1300 224 636

Lifeline Australia: www.lifeline.org.au
13 11 14

Aussie Farmer's Foundation:
www.aussiefarmersfoundation.org.au

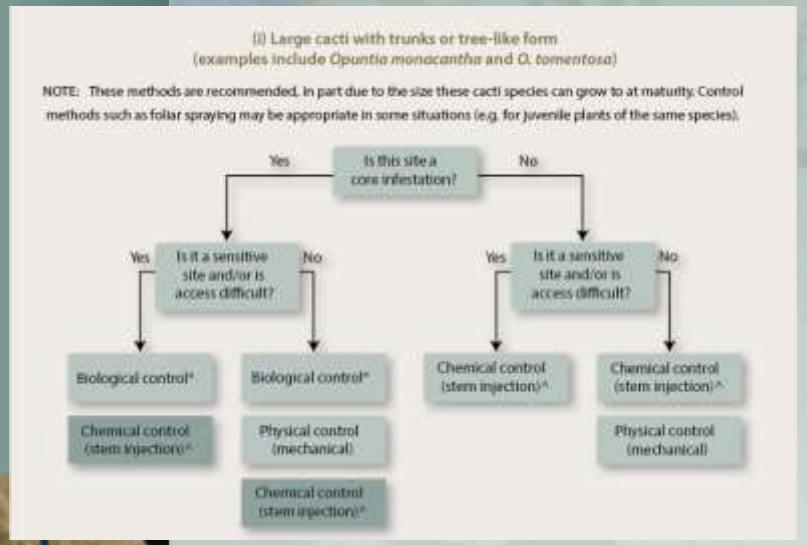
Covered in this chapter:

- Risk to human health
  - Physical
  - Psychological
- Risk to wildlife and stock
- Safe management of cacti
- Safe use of equipment when managing cacti
- First Aid specific to cacti

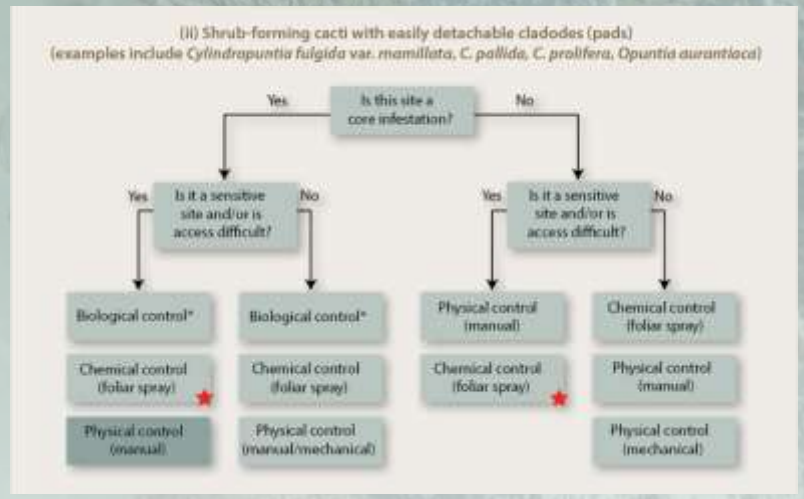
Pages 63-74

Chapter 4
Managing cacti

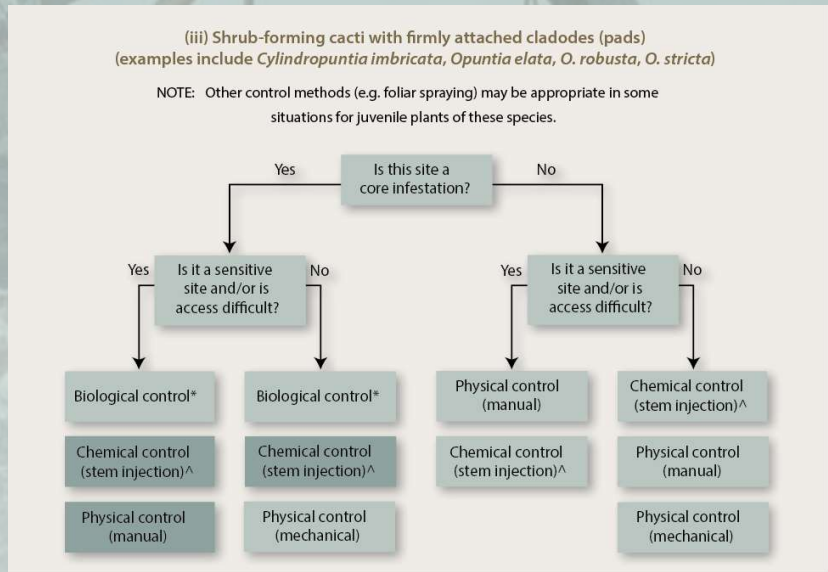
Decision support tools for the selection of appropriate control options



Large cacti with trunks or tree-like form



Shrub-forming cacti with easily detachable cladodes (pads)



Shrub-forming cacti with firmly attached cladodes (pads)

Chapter 4
Managing cacti

Control options:

1. Physical control
   I. Manual
   II. Mechanical
   III. Disposal
2. Chemical control
3. Fire management
4. Biological control

- Techniques
- Situations and species where this method is effective
- Equipment

Manual removal (hand pulling)

Mechanical removal (machinery)

Chapter 4
Managing cacti

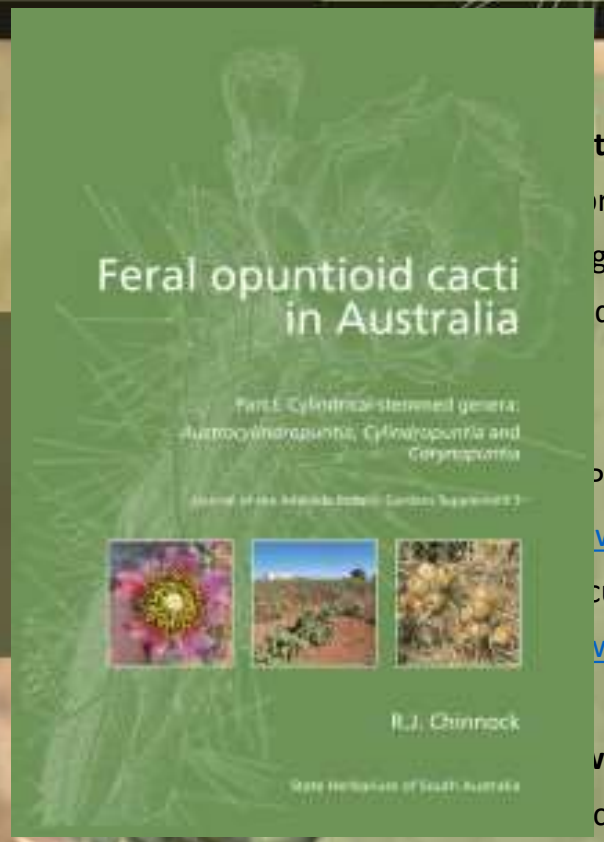
Other important topics covered in this chapter:

- Integrated weed management
- Weed hygiene
- Follow-up

Refining the tools

- Based on current knowledge
- Provides a guide
- Still a need to keep trialing, asking questions & documenting efforts
- SA has been a pioneer- keep up the great work!

Additional resources



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ww.agric.wa.gov.au/invasive-spe practice-control-manual

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ww.pir.sa.gov.au/__data/assets/p ntioid_Cacti_Manual_WE

workshops

ct Wild Matters

R.J. Chinnock, **Feral opuntioid cacti in Australia Part I. Cylindrical-stemmed genera:*Austrocylindropuntia*, *Cylindropuntia* and *Corynopuntia***

H. Rutherford, S. Potter and M.R. Sheehan, **Field Identification Guide: *Austrocylindropuntia*, *Cylindropuntia* and *Opuntia* 2nd Edition**

Potter, S. and Sheehan, M.R. **Opuntioid Cacti Management Guide for *Austrocylindropuntia*, *Cylindropuntia* and *Opuntia*.**

Thankyou

Questions?

Chapter 2
Planning

Checklist

- Summarises each task in each of the six steps
- Allows a quick-glance guide to how to plan and what to do

Step	Further information
1. Assess the situation	
☒ **Identify and research the target species**	Chapter 1 'Biology' and Chapter 4 'Managing cacti'
☒ **Determine the extent (distribution and density)** by mapping infestations and estimating density (Establish a baseline)	Chapter 6 'Further information' *A Field Manual for Surveying and Mapping Nationally Significant Weeds*
☒ **Identify any risks to safety and welfare**	Chapter 3 'Safety and welfare'
☒ **Identify and record assets**	
☒ **Determine land use and/or management history**	
Remember to identify the scale of your plan (e.g. property scale or landscape scale)	
2. Define goals and priorities	
☒ **Set goals** (Prevention, eradication, containment or asset protection)	
☒ **Prioritise sites** New, small or outlying infestations; Areas with high risk of spread; High value assets	
☒ **Find out what else is being done?** Other plans, strategies	Contact your local weed management authority Chapter 6 'Further information'
☒ **Know your management obligations** Are there any legal obligations in your state and territory and what is involved?	Chapter 6 'Further information'
☒ **What are your resources?**	Chapter 4 'Managing cacti'
3. Develop a plan	
☒ **Who** is or will be involved? **Why** are you doing it? **What** are you doing? What are the actions? **When** are you doing it and for how long? **Where** will you do it?	*Introductory Weed Management Manual*
4. Implement your plan	
☒ **Implement your plan**	Chapter 4 'Managing cacti'
☒ **Develop and implement hygiene protocols** to prevent spread	Chapter 4 'Managing cacti'
5. Monitor and review progress	
☒ **Establish a monitoring and evaluation program**	
☒ **Is your management adhering to your priorities and goals?**	
6. Follow-up	
☒ **Have you allowed for adequate follow-up?**	Chapter 4 'Managing cacti'

Refining the tools?

Traffic light p.9

Guide is based on knowledge current at the time of development- may have evolved already!

Provide a guide- needs to be supplemented by local knowledge (e.g. yourself, someone who has face a similar situation or an expereicned local NRM officer)

Keep talking, trialing, documenting efforts, pushing towards workable and effective solutions

SA has proven to be a pioneer in this space, keep up the good work