

# Managing mesquite



Section 2



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## Mesquite

Most infestations of mesquite in Australia have originated from dispersal of seeds by humans; however, floodwaters, run-off and animals have also played a major role in its spread.

Weed control can be expensive, and prevention is by far the cheapest option. Reducing the risk of spread by good management practices and strategies may dramatically reduce control costs in the future.

Mesquite seeds can be spread unknowingly during day-to-day activities. This can be minimised by understanding that they can be spread by:

- stock/grazing animals
  - cattle\*
  - sheep
  - goats (domestic)
  - horses\*
- feral animals
  - pigs\*
  - goats
- native animals
  - emus\*
  - kangaroos and wallabies
  - birds (e.g. parrots)
- water
  - watercourses
  - flood plains

\*These animals are major vectors of mesquite in areas where they occur.

## Management strategies

The aim of management strategies is to prevent or reduce the spread of mesquite—an important part of any control program. They are based on the plant's seed dispersal mechanisms (see p.12)

The success of any management strategy depends on:

- correctly identifying mesquite, particularly at the seedling stage
- monitoring susceptible areas such as roadsides, watering points and stockyards
- identifying the most likely means of spread into, and within, the property, and minimising these risks
- treating mesquite plants before they set seed.

Strategies for managing stock, infrastructure, machinery and vehicles, feral and native animals, and water should all be considered when developing the control program.

## Stock

Stock purchased at sales may have viable seeds in their gut. To prevent mesquite from entering the property in this way, quarantine stock in holding facilities before putting them out into 'clean' pasture. If they have viable seeds, plants will come up in the yards and will be much easier and cheaper to control.

Mesquite seed can take up to eight days to pass through the gut of pigs (see 'Mesquite seed spread by feral pigs', (p.76). No information is currently available for the time it takes mesquite seed to pass through the gut of cattle or sheep, but it is recommended that stock that have been in mesquite-infested areas should be quarantined for at least eight days prior to moving them into 'clean' areas.



▲ Seedlings in horse manure.

Remove stock from infestations while pods are available and do not allow them to graze on mature pods. Alternatively, maintain stock in an area of dense mesquite only, and do not let them out. However, the latter option will thicken growth in already infested paddocks.

▼ Travelling stock can move seed large distances.





▲ Mesquite, once planted as a shade tree in stockyards, should be removed.

## Infrastructure

- Strategically fence off infestations or major seed source areas from susceptible country. In combination with managing stock movement, fencing is the cheapest form of containing mesquite, as it will prevent stock from moving from infested areas to non-infested ones.
- Replace mesquite with other shade-producing trees or artificial shade structures. Although removing mesquite that is providing shade for stock may be a difficult decision for some landholders, it should not be a deterrent in any decision made to control the plant. Speak to local authorities for further information on which trees would be the most appropriate to plant for shade in different areas.
- Cap bores and remove bore drains as they provide an ideal environment in which mesquite and other weeds can establish.

## Machinery and vehicles

As mesquite seed can be spread by machinery and vehicles:

- wash down vehicles and machinery after they have been in infested areas
- work from clean areas to infested ones to prevent seed spread
- consider where trucks transporting stock have come from—check that manure in the trucks does not contain seed that could fall out into the paddock.



▲ Public washdown facility.

## Feral animals

Feral animals may play a role in increasing both the size and density of mesquite infestations; however, controlling the movement of these animals can be difficult. Monitoring clean areas for seedlings and controlling them before they reach maturity and produce pods is important if feral animals are identified as agents of spread. This is particularly important if mesquite is growing on neighbouring properties. If feral animal control is the best option, conventional control methods to reduce numbers include trapping, shooting and baiting.

The reduction of feral animal numbers is best when an integrated approach is taken. No method used alone will be the most effective.

- ▼ Feral pig manure containing mesquite seed.



- ▲ Seed in emu manure.

## Native animals

Native animals probably play only a small role in spreading mesquite. If native animals such as emus and kangaroos have been identified as contributing to the spread, then:

- monitor clean areas for seedlings, and control them as soon as they emerge. This is of particular importance in areas where neighbouring properties have mesquite infestations.
- identify areas on the property where native animals are likely to feed on mesquite pods and control these areas as a priority.

## Water

Though the dispersal of seed by water is difficult to control, the likelihood of this becoming a problem can be minimised by:

- controlling infestations that occur in upper catchment situations
- monitoring susceptible areas regularly for seedling growth, particularly after periods of high rainfall.



▲ Water can transport pods and seeds throughout a catchment.

## Developing a weed control plan

Any control program should be planned to ensure that the best possible results are achieved with minimal cost and effort.

Even though the control or eradication of mesquite is the focus of this manual, the same principles can be used for other weeds on the property, and ideally should be included in the same plan. A successful plan cannot be developed in isolation and must be integrated into the overall property management plan (March 2000).

Although 'controlling' mesquite is referred to throughout this manual, steps should always be taken to eradicate infestations wherever this is possible.

It is recommended that a weed control plan have at least a five-year to ten-year timeframe and be reviewed annually.

The control or eradication plan should include the following steps.

## Step 1. Identify and prioritise problem areas

The easiest way to identify these areas is by using a map of the property.

- On the map, outline all natural features, improvements and property boundaries. Then identify areas where mesquite is located, including a description of the species, the size of the infestation and the density.
- Prioritise the areas for control or eradication, at the property level and at a paddock-by-paddock level.
- Consider what legal or ethical responsibilities you may have (e.g. threat of mesquite to neighbouring properties).
- The property map can be an aerial map, a satellite image or a hand-drawn map. Remember that the better and more current the map, the greater will be the accuracy when determining control costs and tracking the long-term effectiveness of control efforts.
- Separate transparent overlays are useful when developing the map. One suggestion is to use one overlay outlining property improvements, one for vegetation types and natural features and another devoted solely to weed infestations. The use of different overlays can make each section of

the map easier to interpret and will also be helpful in determining management options, such as optimal placement of fences and removal of bore drains.

- To help prevent infestations from spreading further, control efforts should initially be focused on high seed source areas or isolated outbreaks. A good rule of thumb is to start with the easiest section to control, and then gradually work towards the thicker patches

## Step 2. Determine the control options

- Identify the resources that are already available or affordable, such as spray equipment, machinery and labour. This will indicate the most economic and beneficial control options.
- Decide on the most effective and relevant management options to reduce spread into other areas.
- Determine the control methods required to address all phases of the control program—initial, follow-up and ongoing monitoring.
- Identify the most appropriate management strategies to control the mesquite species present on the property, noting that different types of mesquite will respond differently to the same control methods. Therefore, work out

which options (or combinations of options) are appropriate for each situation (see pp.38–41).

Implementing the correct management strategies from the start may reduce future control costs. High cost control options are not necessarily the best for all situations. If in doubt, contact a local weeds officer to assist with any decisions.

### Step 3. Develop a financial plan

- Estimate the cost of the management strategies and control options for each priority.
- Compare the costs of control with other operations occurring on the property to make sure that the chosen methods are economically viable.
- Integrate control costs into short-term and long-term budgets.
- Check to see if there are any financial incentives available to assist with control programs.
- Consider all costs when developing a financial plan, including the hourly running costs of machinery and labour. If necessary, seek advice from local government or departmental weeds officers before committing a large amount of funds.

### Step 4. Schedule activities

- Consider the effectiveness of control methods at different times throughout the year and balance this with the time available for control.
- Timetable any weed control activities for the year.

Mesquite control should become an annual part of property management. When developing a plan, take into consideration that monitoring and follow-up control will also be necessary after initial treatment, and ensure that any treated areas are followed up within a year.



## Step 5. Monitor progress

Monitoring is an integral part of any control program. It will visually show what has happened after treatment and will identify areas of regrowth where follow-up is required.

- Use the map of the property as a starting-point record of the problem before any control work has commenced.
- On the map, show any new and previously treated areas.
- Set up photo points at different points of control (see p.31).
- Document control costs and resource requirements.
- Incorporate monitoring activities into the yearly timetable.

Information on setting up monitoring sites is given in more detail on (pp.30–32).



▲ Helicopter surveillance can be useful on large properties.

## Step 6. Follow up what was started

Follow-up control is crucial. No control method for mesquite gives a 100 % kill rate and some level of seedling regrowth is almost guaranteed.

- Identify areas from the monitoring sites where follow-up is needed as a result of regrowth or from seedling germination.

Further information is given on p.34.

## Conclusion

Any control plan is useless without implementation. If, because of the size of the problem or the lack of experience, it is difficult to start the planning process, it is advisable to gain professional advice and/or to start on a smaller scale.

The development of a weed control plan and commitment to its implementation are essential for the long-term effectiveness of control efforts. While the plan should be structured, it should be flexible enough to allow for changes brought about by uncontrollable external influences such as drought and fluctuating commodity prices. It is also critical to review the plan annually to assess the effectiveness and efficiency of the control options and strategies implemented.

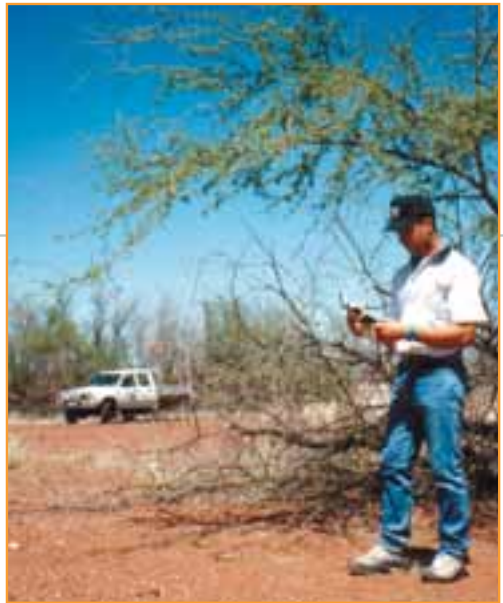
## Monitoring mesquite control

The control of mesquite is a long-term commitment. Control programs need to be well planned and include monitoring and follow-up systems, which are just as important as the control plan itself.

Regular monitoring will show the changes that have resulted from control work over time, and is more efficient than relying on memory alone. It will show how effective initial treatments have been and will assist in identifying what more is required to ensure that regrowth is minimised and seedlings controlled before they reach reproductive maturity.

Monitoring not only assists landowners in making decisions about future control work, it also shows the differences in pasture condition and hence their carrying capacity. Results from monitoring will assist in the annual review of the control plan. They will identify areas that have responded well to treatment and others that have not.

For the development and implementation of a monitoring program to be successful, two types of data are necessary:



▲ Recording mesquite locations using a GPS.

- **Starting point data** provides information on the vegetation as it *currently* stands and is the basis for comparison in future years. This information should be used in conjunction with the weed control plan. Starting-point data can be obtained from photo points and vegetation sites.
- **Progressive data** is a cumulative record of the information collected from different monitoring sites over a number of years. It will show if control strategies are working, if any regrowth has occurred and if there has been any change in pasture production and composition.

As major changes in vegetation occur gradually, monitoring will give an early indication of them. Timely adjustments to management practices can then be made, making success more likely.

The monitoring system can be as simple or as complex as desired. The recommended minimum requirement for monitoring is for photographs to be taken annually, at the same time of the year, from each of a number of established photo points.

## Photo points

The benefit of having photographs as records is that they will show changes in the landscape over time, indicating if an infestation is increasing or decreasing, and if native vegetation has returned after control. Photographic records will assist landholders in determining what measures are required to control regrowth and prevent seedling re-establishment.

To record what the vegetation looks like, and the density of mesquite on a property at a given time:

- Establish photo points for each different land type and infestation area, at least 100 m from fence lines, tracks and waterways.
- At each photo point, put in a 1.8 m star picket with a painted top (for safety and ease of location in the future).
- Identify each point with a GPS reading (if possible), and a name (e.g. long paddock 01). This information can be recorded on a metal tag attached to the post.

- Standing at the star picket with a standard 35 mm camera, focus the camera towards the horizon and take the picture.
- Record the date.
- Record the direction (compass bearing) from which the photo has been taken, so that in the future, photos taken from the same point can be taken from the same angle.
- Note what photo on the film has been taken at each point.

## Vegetation transects

Collecting specific vegetation information within a given area will give an accurate representation of what is currently growing in the paddock and its condition.

Record all vegetation, including grasses, herbage, woody weeds and native trees. The purpose of this is to see, over time, how control work has decreased weed density, and to show the effect that this is having on pasture regeneration.

A vegetation monitoring site can be marked out as shown in figure 3. A record of all the vegetation within each quadrat (50 cm x 50 cm square) should be taken. An example of a recording sheet is given in table 2.

Record each site separately. Note factors that may influence the results such as:

- treatment of mesquite already conducted
- grazing pressure at different times of the year
- climatic conditions (e.g. extremely wet/dry year).

Vegetation information should be collected at least once a year at the same time.

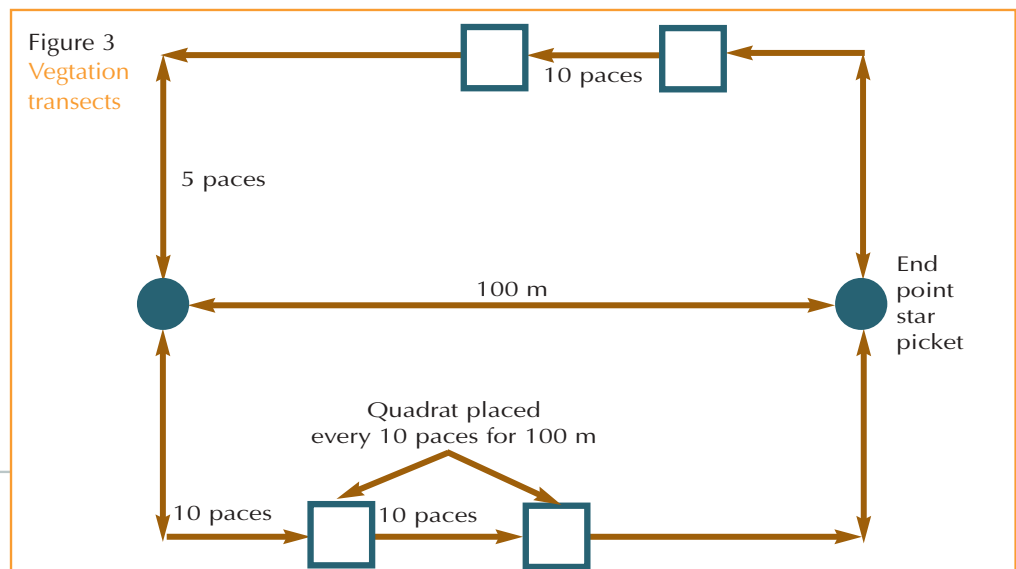
Results obtained can be used in determining follow-up control, and how it could best be achieved for a particular area of infestation. They will also show any improvements in pasture composition that control measures may have brought about.

To estimate mesquite density, select an area that is representative of the infestation and mark out three

different areas of 10 m x 10 m (10 m<sup>2</sup>). Count the number of mesquite plants greater than 1.5 m in height within each of the three areas. (As plants less than 1.5 m are seedlings or juvenile plants, some of which will die naturally, counting only mature plants over 1.5 m will give a more accurate figure for density level). Using the following example, calculate the approximate density per hectare (ha). This will indicate if there has been a change in the density over time and will assist in working out control costs.

### Example

No. of trees area 1:	9
No. of trees area 2:	7
No. of trees area 3:	2
Total:	18
Average per 10 m <sup>2</sup> :	18/3
	= 6
Trees per ha:	6 x 100
	= 600



**Table 2: Example recording sheet**

Site name:		Date:	
Quadrat	Major plants present	% ground cover	Comments
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
General comments (control, climate, etc.)			

For further information on monitoring, refer to section 5.

## Follow-up control

Follow-up control with mesquite is critical and any good program will include follow-up measures. Rarely will any control method be 100% effective—partly because of the limitations of the initial control methods, and partly because new seedlings will almost certainly emerge from the long-lived seed bank.

Poor kill rates and the consequent need to re-treat trees can be due to:

- use of inappropriate control method for the species of mesquite
- use of incorrect herbicide
- incorrect mixing rates
- unfavourable weather conditions
- poor equipment
- incorrect application of herbicide
- missed trees
- time of the year.

Seed banks can be large and long-lived. If not controlled at an early stage, plants can quickly grow to maturity and seed, setting the control program back to the beginning. However, as the rapid recruitment of new seedlings can deplete the seed bank, seedling emergence can be a good thing, provided there is follow-up control.

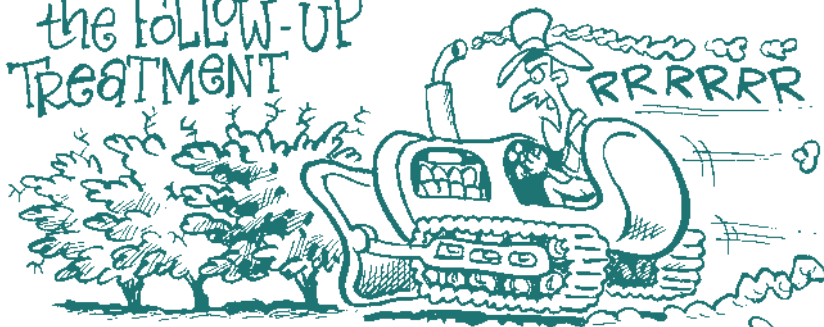
Seedling emergence after initial control will occur in most situations; however, it can be accelerated by the following:

- *Initial control method.* Some control options can actually encourage seedling emergence e.g. mechanical disturbance of soil. In these instances, it is important to monitor for new growth regularly and, if possible, to re-sow at the time of treatment with suitable pasture species to provide competition for the emerging mesquite seedlings.



▲ Incorrect application of herbicide treatment can result in regrowth.

the FOLLOW-UP  
TREATMENT



SCREECH  
RRRRRRRRRR



RRRRRRRRRR SCREECH



SREEE  
RRR I THINK  
YOU'RE STARTING  
TO ENJOY  
THIS!



- *Rainfall.* High rainfall following initial treatment will provide optimal conditions for the germination of mesquite seeds and will usually result in a high level of seedling regrowth. Low rainfall will generally have the opposite effect and fewer seedlings will germinate. Most seeds will typically germinate within three years; however, it is important to continue monitoring, as seedlings may still emerge after more than 10 years.
- *Soil moisture.* Areas that naturally have more soil moisture for longer periods throughout the year, such as along riverbanks, bore drains, dams and creeks, can also show high levels of seedling germination after initial treatment.

- *Soil seed load.* In areas where thick infestations have been treated, large numbers of mature trees will have been dropping seeds in the soil for a number of years. In these situations, there will be a high level of seed in the soil ready to germinate once the older trees have been killed.

Follow-up control can take many years and must be complemented by ongoing monitoring and preventative action. It is important to plan, budget for and implement follow-up control, or the future problem of mesquite will be just as bad, if not worse, than the initial one.



◀ Mass seedling germination following mechanical control.