



Options for Goat Management

Andy and Fiona McLeod run Coombah Station, a mixed sheep and cattle property located half way between Wentworth and Broken Hill, New South Wales. They also harvest goats as another source of income.

Goats are a problem on many pastoral properties. Given the increasing numbers, the McLeod's assessed their goat management options. They decided to continue with a sheep and cattle enterprise mix while managing goats. The McLeod's chose to opportunistically harvest goats to reduce their grazing impact and to increase income. This helps manage the Total Grazing Pressure (TGP) on Coombah Station to ensure the long-term viability of the business.



Figure 1: Goats on Coombah Station.



BUSINESS SNAPSHOT

OWNERS

Andy and Fiona McLeod

PROPERTY NAME

Coambah Station

PROPERTY LOCATION

125km south of Broken Hill, NSW

SIZE OF PROPERTY

80,900 hectares

BRIEF ENTERPRISE DESCRIPTION

Sheep enterprise (3,000 Merinos, 1,000 Dorpers), harvesting feral goats and opportunistic cropping.

NUMBER OF PEOPLE WORKING IN THE BUSINESS

3 full time equivalents

AVERAGE ANNUAL RAINFALL

225mm

WHY THIS IS A PASTORAL ZONE INNOVATION

Feral goats are an issue across the pastoral zone. Implementing management options can reduce their impact on Total Grazing Pressure (TGP) and ensures sheep production remains viable.

This business case, 'Options for Goat Management', discusses the different goat management and control methods available for pastoral wool producers. It has been developed as a real example of a formal review and implementation process. This business case aims to provide useful information and tools to help you make a decision for your own business.

Just like the McLeod's, you can use the method shown here to help prepare your own business case and assess this innovation on your own property.

Section 1: Goat Management on Coambah Station

WHY MANAGE GOATS?

Feral goats are estimated to cost Australian farmers more than \$7 million annually (McLeod 2004, cited in MLA n.d.). They cause environmental damage and are found in all mainland states of Australia (MLA n.d.). Goats eat a similar amount to sheep and the hidden costs should not be underestimated. To compare goats with sheep, 1 goat = 0.7 DSE, and 1.3 goats = 1 sheep.

Dave Setchell from Mallee Eco Services provided technical information about goat management options for this business case.

"The most constructive way to look at feral goat management is from a Total Grazing Pressure (TGP) perspective," said Dave Setchell.

Feral goats need to be managed because they:

- Compete with sheep for feed.
- Carry, and potentially spread, diseases to managed goats and sheep.
- Reduce biodiversity by damaging soils and vegetation in the pastoral zone.
- Compete with managed goats for feed.
- Interfere with controlled goat breeding programs.

Each property has a certain carrying capacity (DSE's) and the more goats or unwanted grazers you have on your property the less feed availability there is for domestic grazers. Therefore the property must stock less domestic DSE's.

Total Grazing Pressure (TGP) can be impacted by any grazing animal including goats, kangaroos and domestic stock. Reducing feral goat numbers is a way to manage the TGP. Managing TGP allows pastoral producers to focus on livestock production.

Managing goats requires a 'toolbox' approach, with more than one option available. The options include:

- Mustering and removing goats from the property by:
 - Constructing trap yards
 - Mustering
- Excluding goats from the property by:
 - Constructing exclusion fencing
 - Reducing water points to restrict where goats graze on the property
- Culling goats by:
 - Ground shooting
 - Aerial shooting

The management options that a pastoral producer may select depend on:

- The density of the goat population,
- The economics of the option for their business,
- The level of impact goats have on their property, or
- The effect local legislation has on goat management.

Many pastoral producers, including the McLeod's, aim to manage goat numbers for the following reasons:

1. To manage the TGP. This ensures the available feed and environment are not degraded. It means that there is enough feed for livestock and ensures the land can respond quickly when conditions allow.
2. Goats breed quickly and respond well to good conditions.
3. In some years, livestock income may be limited; harvesting goats provides an alternative income source.



Figure 2: Goats in yards on Coombah Station.

OUTLINE OF THE OPTIONS

Andy and Fiona considered their options for goat management on Coombah Station. These are identified below.

Table 1: The goat management options considered by the McLeod's.

Option	Description	Details
1	Maintain the current situation and do not actively manage goats	Construct exclusion fences.
2	Cull goats	Cull goats by ground or aerial shooting.
3	Build trap yards	Build trap yards around watering points to opportunistically self-muster goats.
4	Mustering	Periodically muster goats to remove them from the property. Mustering can be on the ground, by motor bike or other vehicles, or by aircraft.
5	Construct exclusion fences	Construct exclusion fences around the whole property or specific paddocks to keep goats out.

WHAT IS EXCLUSION FENCING?

Exclusion fencing is a fence specifically designed to exclude unwanted animals from an area. The aim is to prevent unwanted animals passing through, jumping over or going under the exclusion fence. Exclusion fencing is used to exclude kangaroos, feral goats, feral pigs and wild dogs on pastoral properties. It is a useful method to manage total grazing pressure and/or predation, for pastoral livestock enterprises. This ensures the feed available is for the sheep.

Exclusion fencing can be constructed for specific paddocks or property boundaries. There are various designs currently being implemented in the pastoral zone which can include electric wires. Non-electric exclusion fencing usually features mesh fencing materials, or multiple plain and/or barbed wires. Many exclusion fences are also constructed with strong steel strainers and smaller panels compared to traditional sheep or cattle fencing in the pastoral zone.

Exclusion fences help to manage TGP and therefore:

- Increase feed available for livestock enterprises.
- Increase ground cover, resulting in erosion.

This enables stocking rates to be maintained or increased sustainability, and leverages more income.

WHAT ARE THE LIKELY BENEFITS OF EACH OPTION?

Each option could provide potential benefits to the business. Table 2 lists the likely benefits identified for each option at Coombah Station.

Table 2: The benefits of each option.

Option 2: Cull goats	Option 3: Build trap yards	Option 4: Mustering	Option 5: Construct exclusion fences
<ul style="list-style-type: none"> Goats are eliminated. TGP is immediately reduced. 	<ul style="list-style-type: none"> Goats are self-mustered. Reduced labour. TGP is reduced. Opportunistically, the captured goats can be sold to provide additional income. 	<ul style="list-style-type: none"> Effective when large densities are present. TGP is reduced. Opportunistically, the mustered goats can be sold to provide additional income. 	<ul style="list-style-type: none"> Goats are kept off of the fenced land and TGP is reduced.

THE VISION AT COOMBAH STATION

Andy and Fiona have been running Coombah Station for over 30 years, mostly focused on breeding sheep for wool. The McLeod's vision is to:

- Manage total grazing pressure.
- Increase income.
- Manage the goat population.
- Increase enterprise diversification.

CHOSEN OPTION

Goat management can require more than one option to control the population. The options are not often implemented in isolation, rather as a combined strategy. Dave Setchell recommends choosing more than one option to effectively manage the goat population.

This is demonstrated by the McLeod's, who decided to manage TGP via a combined goat management strategy. This involves a mix of Option 3: Build trap yards, Option 4: Mustering and Option 5: Construct exclusion fences.

"In the past 4 years, we've averaged 10,000 goats a year" said Andy.

These options were chosen for the following reasons:

- Allowed the sheep and cattle enterprise to continue.
- Suited the management of the business and was a good strategic fit.
- It was easy to implement and they could responsively manage TGP while benefiting from increased income. Goat harvesting provides a significant part of the business income.
- The level of infrastructure change was minimal as goats and sheep could be run in similar yards. Incremental changes can be made to improve the strategy.
- Keeping the sheep and cattle enterprises, while diversifying into goat harvesting, spread the production risk across the business.

Coombah Station was originally fenced for sheep, but the McLeod's have gradually changed some of the fencing to allow for the effective management of goats. This includes the construction of trap yards, loading ramps and mustering yards across the station. They have also added wings to existing fences to make mustering easier and reduce the overall work force required.

RESULTS OF THE CHANGE

Additional benefits that the McLeod's observed as a result of implementing a planned goat management approach include:

- Increased income on Coombah Station and continuous cash flow throughout the year.
- Reduced TGP across the property.
- No increased husbandry activities because goats do not require tagging, drenching, marking and other time consuming practises such as crutching and shearing as sheep and cattle do.
- Enterprise diversity including sheep and cattle, as harvesting goats has ensured the long term viability of Coombah Station

KEY LEARNINGS

The key learnings Andy and Fiona have observed from implementing this innovation include:

- Invest in the best type of gate and fencing materials as goats tend to damage the infrastructure more than sheep.
- Consider yard design and location for the best layout that will work for your enterprise; the publications in further resources provide options in detail.
- The more you work with goats, the more you learn about handling and management techniques.
- Learn from your neighbours and what practices are working for them.
- Make your management choice specific to your property type and enterprise mix.

One final point that Andy and Fiona make is that they "wouldn't be at Coombah today if it wasn't for the goat market". They learnt to take the problem of feral goats and turn it into an opportunity by making them a significant part of their business.

Figure 3: Mustering goats on Coombah Station.



Section 2: How to use a business case to assess 'Options for goat management'

AIM OF THE BUSINESS CASE

A business case is a practical process to assess investment options; whether it is a new practice or a piece of machinery. This business case aims to assess options for goat management in the pastoral zone.

Section 1 details the McLeod's motivation to start managing goats. The following section will show how a business case can be used to formally assess the costs, risks and other considerations involved when making an important business decision.

WHAT ARE THE COSTS?

When assessing the costs of goat management it is important to understand the economic viability of the options. As discussed earlier, it's important to understand the impact goats have on the TGP of the land. This factor is difficult to assess in a dollar figure.

Table 3 shows the new benefits and costs of each option compared to Option 1: Maintain the current situation. Costs will vary for each property and the table identifies some assumptions to consider when assessing your own figures.

A blank template for you to assess the costs on your property is in Section 3.

Figure 4: Mustering on Coombah Station.



Table 3: Description of the costs for the goat management options.

	Option 2: Culling	Option 3: Trap yards	Option 4: Mustering	Option 5: Exclusion fence
BENEFITS				
New Income				
Increased sheep income	Sheep income will increase due to proactive management of total grazing pressure.			
Goat income		Mustering and trap yard option assumes goats are sold for meat. Assumed price of goats is \$23/head (refer below).		
Total Benefits	\$	\$	\$	\$
COSTS				
New Capital Costs				
Fencing infrastructure		Cost of trap yards, assumed \$6,180 each (refer to table 4 below).		Cost of exclusion fencing, assumed \$2,200/km (refer below).
New Variable Costs				
Employed labour	Assumed \$30/hr			
		Labour for trap yards includes checking the traps, resetting them, and loading captured goats onto trucks for sale.	Labour for mustering includes finding and mustering goats, and then loading them onto trucks for sale.	
Contractor	Calculated* based on hourly rate, or per head. Amount varies depending on labour, ammunition and or use of aircraft. *Sometimes subsidised by governmental programs.		\$2-5/head OR Paid as a percentage of the proceeds from meat sales.	
Repair and maintenance		Assumed ~2-3% of initial capital cost		Assumed ~2-3% of initial capital cost
Freight		Freight includes the cost to get goats from stations to an abattoir or goat depot. The costs are dependent on property location, abattoir location and the individual cost of the company		
Vehicle	Vehicle prices are assumed at 75c/km. Vehicle costs include finding goats for mustering or culling them.			
Total Costs	\$	\$	\$	\$
Gross Margin	\$	\$	\$	\$

Assumptions included in the Table 3 are as follows:

- All options do not include work carried out by contractors.
- The vehicle costs are 75c per kilometre.
 - This is based on the Australian Tax Office's method of calculating vehicle cost. This is for a vehicle with an engine over 2.6L of capacity. This is one of four methods the Australian Tax Office describes.
 - If you know the cost of operating your vehicle, use your own figures for increased accuracy of results.

More about Goats

Goats are sold for a weight over the hook between 12.1–16kg. The median weight is 14kg.

The average price for goats during 2013 ranged from 158c to 171c/kg (MLA 2013). The average of these prices is 164.5c/kg.

An assumed average, based on these figures, is 14kg x 164.5c/kg = **\$23.03/head**

Please refer to your local abattoir and the MLA website for up to date prices and information.

More about Mustering

A periodic muster reduces the numbers and can be a good economic choice if 50-70% of the goats are removed. Mustering can be conducted by the producer. However, contract mustering is popular. The contractor is often paid a share in the goat sales by the landholder.

Mustering does not capture all goats. They can be in the protection of scrub and hard to locate due to difficult terrain. Mustering goats is one option that works well when combined with other options, such as culling or trap yards, to ensure maximum reduction.

Cost of trap yards

Cost of the trap yard materials and construction start from \$2000 per trap yard. For the purposes of this assessment, we have used advice from Dave Setchell that materials are approximately \$3000 per trap yard, and labour to construct approximately equals material investment. This figure varies with the design and size of the trap yard.

Table 4: Cost of trap yards.

Construction of trap yards		
Capital	Materials	\$3,000
	Labour	\$3,000
Annual	Repair and maintenance (assumed 3% of capital costs)	\$180
	TOTAL:	\$6,180

Anecdotally from pastoral producers the cost of a trap yard is known to pay for itself in its first use. Thompson et al. (1999, cited in Connolly et al. 2005) stated the cost of a trap yard can be paid for in the first year by the sale of trapped goats, based on 200 goats. This timeline reduces with the number of goats trapped and sold.

Cost of exclusion fencing

The cost of exclusion fencing depends on the design of the fence, the type of animal you are targeting to keep in or out, and the length of fencing constructed. The following are two examples of exclusion fencing in the pastoral area. They are different designs and these prices can vary.

Example 1

A recent article in Western Australia's Department of Agriculture publication 'Rangeland Memo', quotes an electric exclusion fence costing approximately \$2,200 per km, excluding the energizer (DAF 2012). If the fence is electrified, it is suggested an energizer would be adequate for about 18 km of fencing.

This cost is based on a new fence design aimed at excluding wild dogs, goats and kangaroos in the Murchison region of WA. Features of the fence are as follows:

- 6 high tensile plain wire fence with insulated hot wires second and fourth from the bottom.
- Fence is 1.1 m high.
- Pickets are spaced 20–22 m apart with poly droppers midway.

Example 2

The exclusion fence described in the Bestprac innovation profile, Managing Total Grazing Pressure with Exclusion Fencing, cost the NSW producer approximately \$2,250 per km.

This fence was designed to exclude goats and deter kangaroos. Features of the fence design are as follows:

- 7 line hinge joint pre-fabricated fencing and a top line of barbed wire at 10 metre panels, this cost approximately \$1790 per km (excluding strainers).
- An additional belly and top plain wire run over the hinge joint fencing, this added approximately \$252 per km.
- A bottom barbed wire, this also added approximately \$184 per km plus \$24 per km for clips.

WHAT ARE THE LIKELY RISKS?

When considering implementing a new practice into your business, it is valuable to consider the potential risks of doing so. For this business case, a number of risks and strategies for managing these risks have been identified. The impact of the risks can be mitigated if management approaches are implemented to protect the business.

Table 5: The risks associated with goat management.

What is the risk?	How can this risk be managed?
Goats infect domestic livestock with harmful diseases (biosecurity)	<ul style="list-style-type: none"> Goats can carry diseases that may harm the sheep on the property, or be transferred to humans. This can be managed by limiting interaction between sheep and goats where possible. People can limit the risk by thoroughly washing their hands and contacted skin after handling goats. Further control methods may include using separate yards for sheep and goats.
Injury from goats	<ul style="list-style-type: none"> Using appropriate stock handling techniques, understanding goats and being aware of your surroundings while around goats will help to reduce this risk.
Fluctuating prices with market supply and demand	<ul style="list-style-type: none"> This can be managed by securing contracts and building industry relationships.
Unsafe gun operation	<ul style="list-style-type: none"> Ensure correct gun management and use procedures are followed.
Adverse effects to animals (animal health and welfare)	<ul style="list-style-type: none"> Ensure shade, water and feed are available in trap yards. Ensure trap yards are checked regularly when set. Ensure culling of animals is approved and is conducted in line with state legislation. Construct fencing to ensure goats with horns do not become trapped or caught.

Figure 5: Goats in a trailer.



Figure 6: Trucking goats on Coombah Station.



WHAT ELSE IS THERE TO CONSIDER?

When making a decision, the cost of implementation isn't the only thing to consider. To undertake a robust comparison, other areas are identified. Other areas to consider include implications to Workplace Health and Safety (WHS), labour, time requirements, and how easy the innovation will be to implement. Table 6 below shows a range of factors for consideration when choosing to manage goats.

Table 6: Other implications to consider when assessing goat management options.

What else is there to consider?	Option 2: Culling	Option 3: Building trap yards	Option 4: Mustering	Option 5: Constructing exclusion fencing
Workplace Health and Safety (WHS)	Safety focus is essential when using guns.	Handling feral goats with large horns can be dangerous.	Handling feral goats with large horns can be dangerous.	
Labour	Labour is required to track and cull goats.	Initial labour is required to build trap yards. Labour is required to set and check the traps which may be combined with weekly water runs. Labour is required to load captured goats onto trucks for sale.	Initial labour is required to construct a goat holding yard. Labour is required to muster goats and load them on trucks for sale.	Initial labour is required to construct the exclusion fence.
Ease of implementation	Approval may be required from state government bodies. Culling may be performed by state government employee or contractors	Use of trap yards needs to comply with state government or pastoral board legislation. You need to have a good understanding of goat marketing.	Use of goat holding yards needs to comply with state government or pastoral board legislation. You need to have a good understanding of goat marketing. Can be implemented by a contractor.	May require a fencing contractor.
Time taken to implement	Can be implemented immediately	Requires some initial time to construct trap yards.	Requires some initial time to construct holding yards.	Requires initial time to re-fence the property.

Below are some other key steps to consider when implementing goat management options in your own business:

- Know your property, understand the carrying capacity and the current impact of goats.
- Undertake workshops in goat management.
- Research what works, and what doesn't work.
- Check the legislation in your area.
- Take a landscape approach to manage goat population beyond your property.
- Work with your neighbours where possible.
- Understand the goat market.
- Start small and learn as you go.
- Manage the capital investment and invest only the income from goats back into the goat capital investment.

FURTHER INFORMATION

For more information, please visit the following websites:

- Bestprac Innovation Case Study on Goat Control <http://www.bestprac.info/pages/posts/control-strategy-gets-the-goat-542.php?searchresult=1&string=goats>
- Bestprac Innovation Profile, Managing Total Grazing Pressure with Exclusion Fencing
- Bestprac Innovation Profile, Use of trap yards at watering points
- Meat and Livestock Australia, for the latest goat meat prices <http://www.mla.com.au/Prices-and-markets/Trends-and-analysis/Goatmeat>
- Australian Tax Office, for vehicle operating costs: <http://www.ato.gov.au/Business/Deductions-for-business/Motor-vehicle-expenses/Calculating-your-deduction/>

Further references for goat management:

- Brennan, G., and Kopke, S. (2012) Guard dog experiences of Queensland Pastrolists Jim and Rod Allpass from Barcaldine, Rangeland Memo, August 2012 edition. Pg. 11, WA Department of Agriculture and Food 2012 http://www.agric.wa.gov.au/PC_94329.html
- Connelly, P. Horrocks, D., Pahl, L., and Warman, K. (2005) Cost-effective and multipurpose self-mustering enclosures for stock, Queensland Government Department of Primary Industries and Fisheries (2005) http://futurebeef.com.au/wp-content/uploads/self-mustering_enclosures_for_stock.pdf
- Khairo, S. and Hacker, R. (2011) Economica Analysis of Feral Goat Control within the Western NSW Rangeland. Western Catchment Management Authority.
- McLeod, R. (2004) Counting the Cost: Impact of Invasive Animals in Australia 2004. Cooperative Research Centre for Pest Animal Control. Canberra <http://www.gamecouncil.nsw.gov.au/docs/mcleod.pdf>
- Meat and Livestock Australia (2013), Australian Goat – 2013 in Review, MLA <http://www.mla.com.au/Prices-and-markets/Trends-and-analysis/Goatmeat>
- Sharp, T. and Saunders, G. (2004) Standard Operating Procedure: Trapping of Feral Goats, NSW Department of Primary Industries <http://www.environment.gov.au/system/files/resources/dd56dc25-6e77-4700-825b-83fbd12b5371/files/46217-operating-procedure-1.pdf>
- Underwood, C. (2002) Total Grazing Management Field Guide: Self-mustering systems for cattle, sheep and goats, WA Department of Agriculture <http://www.environment.gov.au/system/files/resources/dd56dc25-6e77-4700-825b-83fbd12b5371/files/46217-operating-procedure-1.pdf>

Section 3: How can you make the change?

Section 3 provides all of the tools necessary to work through a business case process to assess a change. You can assess the option of trading stock on your own property by completing the templates below.

WHAT ARE THE OPTIONS?

Identify three feasible options for you to move forward. One option can be to stay as you are and make no change. You can therefore compare your current situation with other options.

Option	Description
1	Maintain the current situation
2	
3	

WHAT ARE THE LIKELY BENEFITS OF EACH OPTION?

Benefits can be measurable, such as income and wool yield; or non-measurable, such as safety and achievement of business goals. Assess the benefits you assess for you and your property in the table below for each of the options.

Option 1:	Option 2:	Option 3:

WHAT ARE THE LIKELY COSTS?

Using the information provided in section 2, use the blank template to work through the process to assess the opportunity for your business. This partial budget only considers costs or income that will change as a result of the new practice

	Option 2: Culling	Option 3: Trap yards	Option 4: Mustering	Option 5: Exclusion fence
BENEFITS				
New Income				
Increased sheep income	\$	\$	\$	\$
Goat income		\$	\$	
Total Benefits	\$	\$	\$	\$
COSTS				
New Capital Costs				
Fencing infrastructure		\$	\$	\$
New Variable Costs				
Employed Labour	\$	\$	\$	\$
Contractors			\$	
Repairs and maintenance		\$		\$
Freight		\$	\$	
Vehicle	\$	\$	\$	\$
Total Costs	\$	\$	\$	\$
Gross Margin Benefits - Costs =	\$	\$	\$	\$

WHAT ARE THE LIKELY RISKS?

When considering implementing a new practice into your enterprise or business, it is valuable to consider the potential risks. The impact of the risks can be mitigated if management approaches are identified and implemented to protect the business.

Identify the risks of your chosen option/s (you may need to adapt the table if assessing more than one option). Consider management strategies to control these risks.

1. What can you do to reduce the risk?
2. How can the risk be mitigated?

What is the risk?	How can this risk be managed?

WHAT ELSE IS THERE TO CONSIDER?

When making a decision, the cost of implementation isn't the only thing to consider. To undertake a robust comparison, other areas are identified. Other areas to consider include implications to Workplace Health and Safety (WHS), labour, time requirements, and how easy the innovation will be to implement.

1. Identify different aspects for your property.
2. Assess the impact on your property against the options. Identify how each option can be implemented, the impact on your business and property, and how you can address each aspect.

What to consider?	Option 1:	Option 2:	Option 3:

CONTRIBUTORS

Bestprac would like to acknowledge the contribution of David Setchell from Mallee Eco Services, and Andy, Fiona and Felicity McLeod, Coombah Station.

David Setchell is the coordinator of the Riverland Biosphere feral goat and rabbit control program for the Department of Environment, Water and Natural Resources, South Australia.

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January 2014

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